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Electro Steel—A New Metallurgical Product.

Steel Manufactured in the Electric Furnace is More Nearly Free from Injurious Impurities, Such as Sulphur and Phosphorus, than the Ordinary Product.

By Joseph Schaeffers.

Five years ago the first steel produced in the electric furnace was placed on the market by the Electro Steel Works, Richard Lindenberg, Ltd., Remscheid-Hasten, Germany, which at that time shut down its crucible furnaces and began the operation of Héroult electric furnaces. Today some twenty-five different concerns, four of them American, are using the same process, and the United States Steel Corporation has just acquired the American patents on the furnaces and processes used in the Lindenberg works. The steel produced by this process is purer than that produced by the crucible process, and since it finds its widest application in the manufacture of automobiles a few words on the subject will prove of interest to readers of this paper.

Experiments with a view to manufacturing steel by electricity date back more than half a century. It has been tried to heat crucibles externally by electricity, but without practical success. Induction furnaces have been built with long, narrow grooves containing the molten metal, the latter serving as a conductor for the induced current. As a result of the resistance offered by these conductors, due to their small sectional area, a high temperature was produced, but metallurgical difficulties arose in connection with the distribution of the molten charge in long and narrow channels.

The greatest num-

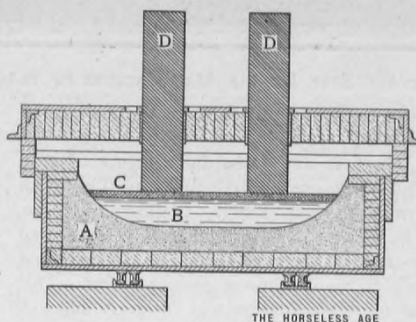


FIG. 1—THE ELECTRIC FURNACE.

A—Basic Hearth; B—Molten Charge; C—Slag Film;
D—Electrodes.

ber of experiments were made with a view to utilizing the electric arc as the source of

heat for making steel; carbon had to be used, however, to produce the arc, and carbonization of the charge was the inevitable result.

A French engineer, Paul Héroult, invented and took out patents on an arc furnace some ten years ago, in which he covered the charge with a heavy layer of slag of a suitable composition to assimilate whatever carbon became free under the electric arc. Simultaneously the slag, being located between the arc and the metal bath, was subjected to a higher heat than the metal, and in consequence a quicker and more thorough reaction of the slag upon the impurities of the steel and the almost complete reduction of sulphur and phosphorus was the result.

The Richard Lindenberg, Ltd., Steel Works at Remscheid-Hasten, Germany, were the first to adopt this style of electric furnace, and by persistent experimentation succeeded in developing from the original idea a practical and successful furnace, known today under the name of the Héroult - Lindenberg electric furnace.

When first announced this novel furnace was held up to ridicule, and characterized as a complicated toy of slight or no commercial possibility, but today there are forty of these furnaces, with capacities of from one-half ton to 15 tons, working day and night in

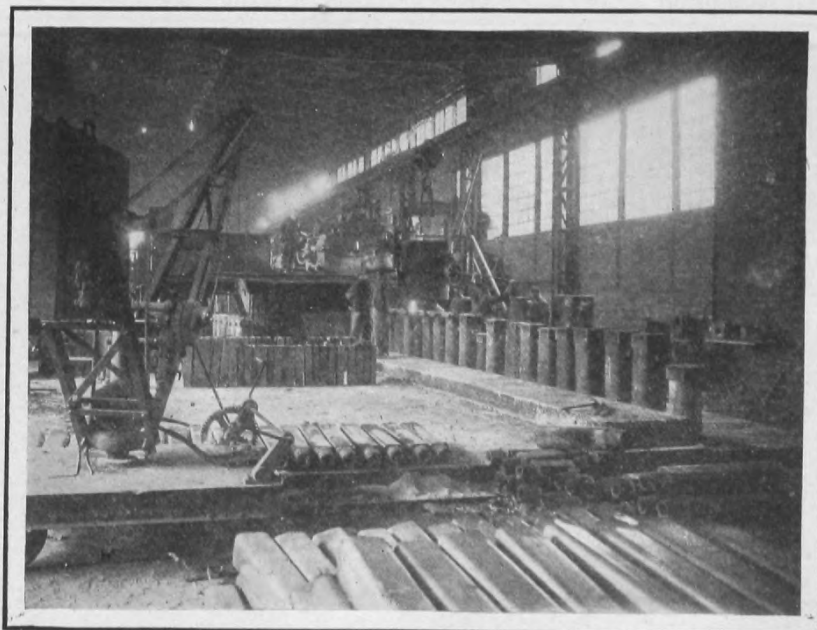


FIG. 2—CASTING ELECTRO STEEL INGOTS.

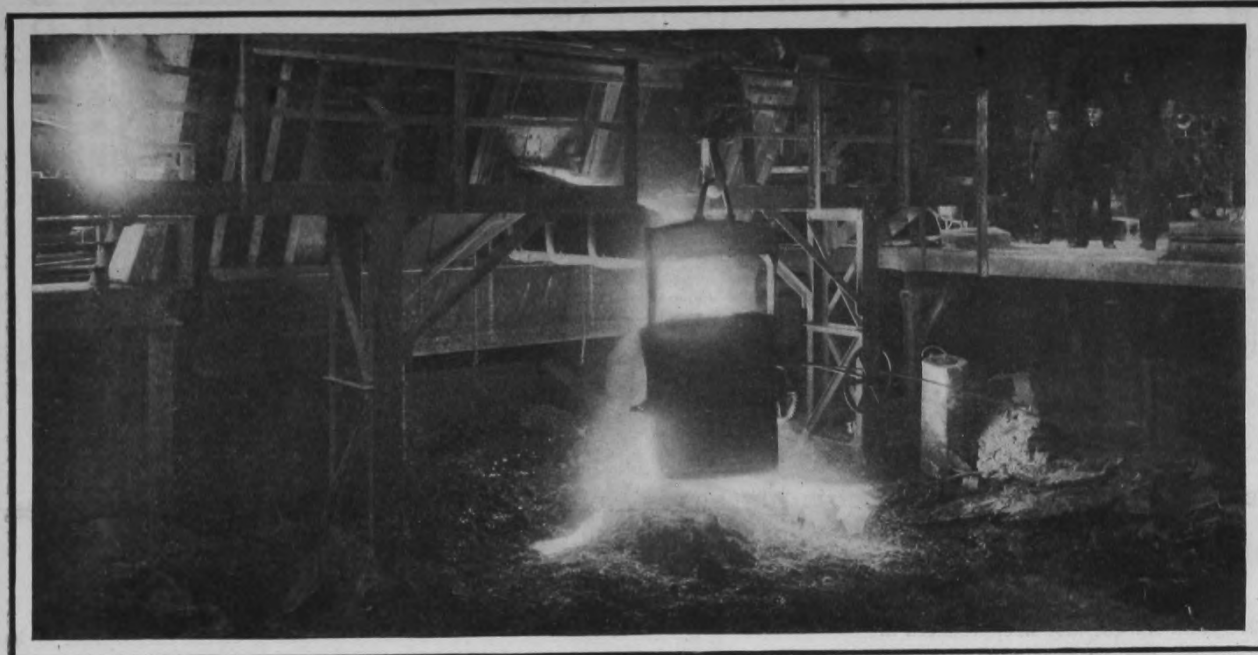


FIG. 3—PRELIMINARY STEP IN THE MANUFACTURE OF ELECTRO STEEL.

twenty-five different steel mills. In general appearance the Héroult-Lindenberg does not differ much from the tilting type of open hearth furnace, but it is easily recognized by the electrodes extending through the roof. Fig. 1 is a cross section of the standard type, showing the cast iron housing, brick lined; the basic lining of the hearth, the molten charge, the film of slag and two electrodes extending through the brick lined roof. The electrodes, made of Acheson graphite, are 8 inches square and 48 inches long; they wear away about three-quarters of an inch per heat, or at the rate of 5 pounds per ton of steel. These electrodes are automatically

kept about $1\frac{3}{4}$ inches from the surface of the slag.

The first step is the manufacture of steel in a tilting open hearth furnace. This is an ordinary basic hearth Wellman furnace. The charge is "overoxidized" before being poured, in order to reduce phosphorus and sulphur to the lowest possible point. This strong overoxidation was formerly impossible, because no means were at hand for neutralizing its effects. Only the invention of the electric process made possible this high preliminary purification of the molten metal, assuring thereby the highest purity of the steel.

In Fig. 2 is shown the casting of electro

steel ingots. Fig. 3 shows the tilting open hearth furnace being emptied, the charge being transferred to the electric furnace, as shown in Fig. 4, by means of a 5 ton ladle. In Fig. 5 two electric furnaces can be seen, the one to the left in operation and the open hearth furnace being visible in the background. Fig. 6 shows the emptying of the furnace to the left and the removing of the slag in the one to the right.

A 5 ton hammer serves to work down the 1 ton ingots into which the steel is cast to sizes suitable for the rolls. The billets from the steam hammer are reheated and passed through the breaking down rolls, then sawed hot to proper lengths and rolled



FIG. 4—CHARGING ELECTRIC FURNACE.

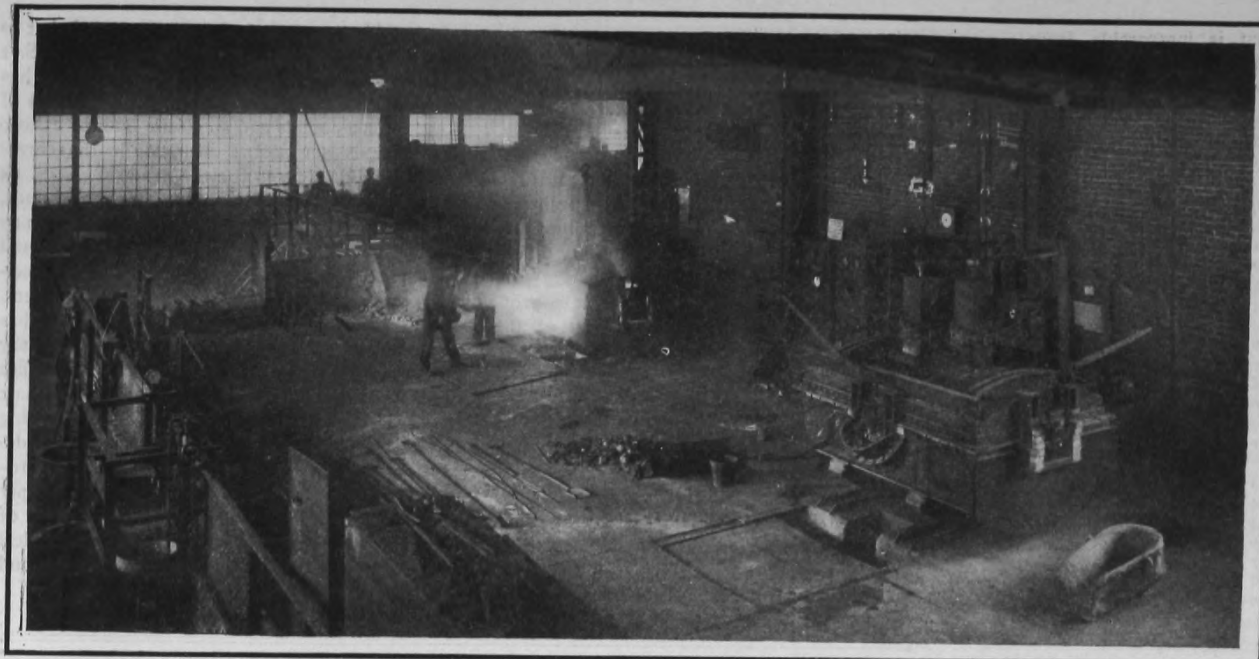


FIG. 5—ELECTRIC FURNACE AT WORK.

down to bars in the caliper rolls. For certain grades and sizes the bars are worked down as usual under triphammers.

For equal toughness electro steel can carry a considerably higher carbon content than crucible or open hearth steel, thus possessing higher resistance to wear and tear. This latter quality is marked in electric steel, particularly on account of its greater density and of the complete absence of blowholes, cracks and surface flaws; providing, of course, that the process has been carried through correctly. Furthermore, electro steel is less susceptible to the influence of copper and arsenic, in consequence of the absence of sulphur, and excels crucible steel

by reason of its complete deoxidation. Finally, electro steel is softer, better forgeable than crucible steel, and able to withstand a higher heat; it can be produced cheaper, being independent of the quality of the raw materials, and less costly in its manufacture. Electro steel is purer than crucible steel, and permits every alloy and chemical composition so far considered impossible, as, for instance, 4 to 5 per cent. silicon steel, or 2 per cent. aluminum steel, so that, on the whole, an entirely new field has been opened to the steel industry by the electric melting process.

In regard to the chemical purity of electro steel, it should be pointed out that even

the electrical process allows of the reduction of only those ingredients which can be oxidized, while arsenic and copper cannot be removed. However, since the electric process permits a practically complete reduction of sulphur and phosphorus, the harmful influence of arsenic and copper is removed, these ingredients being dangerous only in their combination with sulphur. Of course, this purification of the metal is accompanied by a strong superoxidation, which was not possible as long as there were no means to neutralize its effects. The electric process enables the more thorough purification of the bath, thereby insuring the highest chemical purity of the steel, and,



FIG. 6—EMPTYING FURNACE AND REMOVING SLAG.

what is inseparable from purity, greater "endurance."

As an illustration of the chemical purity the following record of 1,000 consecutive charges from the Lindenberg electric furnace is given:

Sulphur not over	No. of charges
.001 per cent.	88
.002 " "	5
.003 " "	14
.004 " "	29
.005 " "	50
.006 " "	82
.007 " "	100
.008 " "	168
.009 " "	99
.010 " "	108
.011 " "	67
.012 " "	64
.013 " "	35
.014 " "	29
.015 " "	20
.016 " "	11
.017 " "	14
.018 " "	6
.019 " "	1

.020 " "	2
.021 " "	2
.022 " "	2
.023 " "	2
.025 " "	1
.026 " "	1
Charges	1,000

Motor car manufacturers can use electro steel to advantage. Alloy steels, and particularly so steel containing nickel, or chromium, or both, offer many difficulties in the tooling and heat treating processes, which difficulties are the more pronounced the less the chemical purity of the steel. Open hearth steel containing several per cent. of nickel, some chromium, and possessing a very considerable tensile strength, may be had for 5 cents per pound or less. However, the elastic limit falls below the tensile strength by 30 per cent. or more, and the elastic limit indicates the value of the steel for motor cars, while the difficulty of machining is dependent upon the tensile strength.

Electro nickel chrome steel costs consid-

erably more than 5 cents a pound, but is cheaper in the end. The grade C. N. S. 1 Lindenberg electro nickel chrome steel has in the annealed state a tensile strength of 258,000 pounds and an elastic limit of 252,000 pounds per square inch, while the corresponding figures for the grade C. N. S. 2h annealed are 185,000 and 180,000 pounds, with 40 per cent. contraction, but these may be raised by heat treatment to 285,000 and 280,000 pounds per square inch, the incidental reduction of area being 30 per cent.

It will thus be seen that electro steel has more strength and endurance than ordinary steel, so that a smaller quantity will suffice for a given purpose, which will compensate for the difference in price. The resulting smaller dimensions of parts, moreover, decreases the expense of machining, thus lowering the share of overhead charges per work unit; and finally reduces the weight of the finished car, making it more economical in respect to fuel and tire consumption and general wear and tear.

Calculation of an Automobile Rear System.

First Instalment Covering the Calculation of the Axle Shafts, Driving and Differential Gears and of the Bearings.

By Karl Feilcke.

The object of this article is to show how the dimensions of an automobile rear system are determined. Owing to the many different types of rear systems in existence it is not convenient to do this in a general manner, and we will restrict ourselves, therefore, to demonstrate the principles involved in a practical example, leaving it to the reader to apply the same sort of reasoning with the necessary modifications in other cases.

The problem that will be solved here is the calculation of the fundamental dimensions of an automobile rear system, as shown in Fig. 1, for a car having the following specifications relating to the proposition:

Weight of loaded car	4,000 lbs.
Weight supported by the rear axle	2,400 lbs.
Diameter of wheels	36 inches
Reduction between motor and wheels on first speed	10:1

Data of motor—	
Bore	5 1/4 inches
Stroke	5 1/4 inches
Number of cylinders	4
Energy delivered at 1,100 rev. per min.	50 H.P.
Moment of inertia of flywheel	1.8 lbs. - feet ² .

The rear system shown is of the full floating type, with both running and emergency brakes mounted on the axle sleeves. The characteristic feature of this type is that the moving parts (propeller shaft, gears and floating shafts) have the sole function of transmitting the motor power to the wheels, and are subjected, therefore,

only to stresses caused by the motor torque, whereas the stationary parts (torsion tube, differential housing and axle sleeves) take

up all stresses caused by the weight of the car and the action of the brakes.

It is convenient to subdivide the article into two parts, viz., the calculation of the moving and the calculation of the stationary parts.

CALCULATION OF MOVING PARTS.

The moving parts of the rear system have to transmit the torque of the motor to the wheels of the car. This torque is variable, and brought about in two distinctly different ways, viz., (1) by the transmission of the motor energy to the wheels of the running car, and (2) by the transmission of energy stored up in the flywheel to the wheels of the starting car.

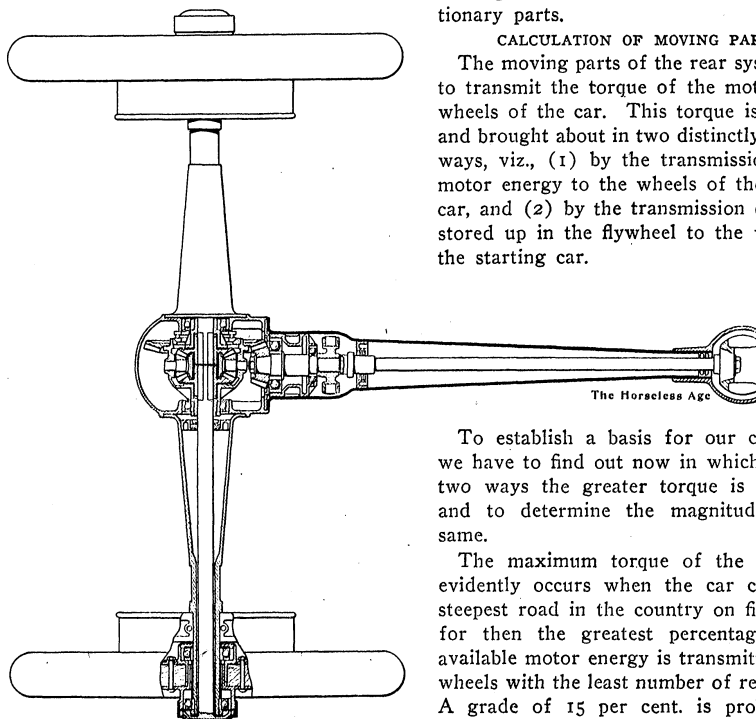


FIG. 1.

To establish a basis for our calculation we have to find out now in which of these two ways the greater torque is produced, and to determine the magnitude of the same.

The maximum torque of the first kind evidently occurs when the car climbs the steepest road in the country on first speed, for then the greatest percentage of the available motor energy is transmitted to the wheels with the least number of revolutions. A grade of 15 per cent. is probably the steepest ever encountered by the great majority of cars, as our present roads are

built to accommodate horse drawn vehicles, and seldom have a grade of more than 12 per cent. To climb such a hill a tractive force equal to the component of the weight parallel to the grade, or of at least

$$4000 \times \sin 8^\circ 30' = 592 \text{ pounds}$$

must be exerted on the road. Including air and road resistance a force of about 650 pounds is required to propel the car up the hill. To produce such a tractive force the motor has to deliver

$$\frac{650 \times 3 \times 3.1416 \times 1100}{33000 \times 10 \times 0.68} = 30 \text{ H. P.}$$

at 1,100 r. p. m., when the efficiency of the energy transmission between motor and wheels is 68 per cent. on first speed. According to our specifications the engine delivers even 50 horse power at 1,100 r. p. m., so the car could easily negotiate the hill, provided the traction coefficient is at least

$$\frac{650}{2400} = 0.271.$$

As this is the case under ordinary circumstances, our example is a practical one, and the maximum torque ever produced by the transmission of the motor energy to the wheels of the running car is consequently

$$M_1 = 650 \times 18 = 11,700 \text{ inch-pounds.}$$

On account of the assumptions which have to be made in its calculation, the greatest torque of the second kind, i. e., the torque caused by the transmission of the flywheel energy to the wheels of the starting car, cannot be accurately determined. The object of the following calculation is, therefore, mainly to ascertain whether it exceeds $M_1 = 11,700$ inch-pounds in magnitude or not. We do this by analyzing a number of ideal starts, taking place under the assumptions that (1) the engagement of the clutch, and consequently the acceleration of the car, is uniform; (2) the work of accelerating the car is done by the flywheel energy only.

In these ideal starts a steady torque of $M = \text{tractive force} \times \text{radius of wheel} = F \times r$ prevails in the floating shafts during the time of engagement.

By computing now the time t in which the clutch had to engage to dissipate the energy stored up in the flywheel at n_1 r. p. m., so that this torque equals $M_1 = 11,700$ inch pounds, and by comparing t with the time actually required to start a car of 4,000 pounds with a 50 horse power engine, we can determine whether M_1 is ever attained or not. For, if an actual start can take place in the same time as an ideal start, M_1 must be at least attained, no matter how the start is performed. Should the engagement of the clutch be non-uniform, the torque will be even greater part of the time, for in the actual as well as the ideal start the same work must be done in the same time. When the second assumption is not realized, i. e., when in addition to the flywheel energy some motor energy is to be dissipated in t seconds, M_1 will be at any rate exceeded. This shows that the above assumptions, while necessary for the calculation,

do not influence the result, and are, therefore, permissible.

The next step is to derive an equation from which the time t can be calculated.

The speed of the car after clutch engagement, i. e., after t sec., is

$$v = \text{acceleration} \times t = \frac{\text{tractive force} \times t}{\text{mass of car}}$$

$$v = \frac{650 \times 32.2 \times t}{4,000} = 5.23 t \text{ feet/sec.} \dots (1)$$

The distance covered

$$s = \frac{v \times t}{2} = \frac{5.23}{2} \times t \times t = 2.615 \times t^2$$

feet. (2)

The number of revolutions of the motor has dropped to

$$n_2 = \frac{5.23 \times t \times 60 \times 10}{3.1416 \cdot 3} = 333 \times t \text{ r. p. m.} \dots (3)$$

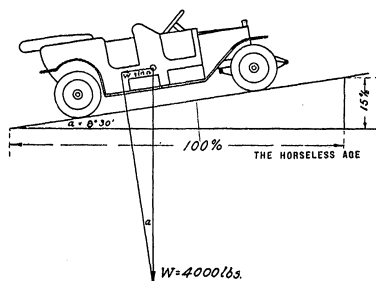


FIG. 2.

The kinetic energy of the flywheel was before engagement

$$E_1 = \frac{I \cdot \omega_1^2}{2}$$

where I = moment of inertia of flywheel
 ω_1 = angular velocity of flywheel;
 in figures

$$E_1 = \frac{1.8}{2} \left(\frac{3.1416 \cdot n_1}{30} \right)^2 = 0.01 \times n_1^2 \text{ ft.-lbs.} \dots (4)$$

and is after engagement

$$E_2 = \frac{1.8}{2} \left(\frac{3.1416 \times 333 \times t}{30} \right)^2$$

$$E_2 = 1.115 \times t^2 \text{ ft.-pounds.} \dots (5)$$

From the equation dissipated flywheel energy = kinetic energy of accelerated car, or

$$0.01 \times n_1^2 = 1.115 \times t^2 = \frac{W \times v^2}{2 \times g}$$

$$= \frac{4000 \times (5.23 \times t)^2}{2 \times 32.2}$$

We derive

$$t = 0.001885 \times n_1$$

In the following table the numerical values for t as given by this equation, and the other data as represented by equations (1) to (5), are computed for four different starts. For these starts n_1 is, respectively, 750, 1,000, 1,250, 1,500 r. p. m.

n_1 r.p.m.	750	1,000	1,250	1,500
t secs.	1.414	1.885	2.355	2.83
v feet per sec.	7.4	9.87	12.32	14.8
s feet.	5.23	9.29	14.55	20.9
n_2 r.p.m.	471	628	784	942
E_1 ft. = lbs.	5.625	10,000	15,620	22,500
E_2 ft. = lbs.	2,230	3,960	6,200	8,930

By a series of experiments on a car similar in size and power to the one we have to deal with, it would be possible now to

determine the difference between an actual and an ideal start, and then to draw conclusions in regard to the stresses prevailing in the moving parts. But having no experimental data on hand, we must be satisfied to find out in an offhand way whether the combined torque in the floating shafts exceeds $M_1 = 11,700$ inch pounds in magnitude or not. This may be done in the following manner:

The mean velocity for the four ideal starts is

$$v_m = \frac{s}{t} = \frac{v}{2}$$

or in figures, respectively, 3.7, 4.935, 6.16, 7.4 feet per second.

According to Hütte the velocity of a slowly walking man is 4.6 feet per second; of a fast walking one 5.7 feet per second. That means a pedestrian could have walked alongside the starting car in the first two starts for 5.22 and 9.29 feet, respectively, without being overtaken. As starts like this are a daily occurrence, we have shown that the torque caused by the transmission of the flywheel energy to the wheels of the starting car exceeds $M_1 = 11,700$ inch pounds.

To what extent this is the case cannot be accurately determined. The greatest torque which might be created is evidently the one required to spin the wheels. With a maximum traction coefficient of 0.6 it would be

$$M_{\text{max}} = 0.6 \times 2400 \times 18 = 25900 \text{ inch pounds.}$$

But it is a question if this will ever be attained. A table corresponding to the one above would read

n_1 r.p.m.	750	1,000	1,250	1,500
t sec.	0.64	0.854	1.068	1.28
s feet.	2.37	4.18	6.6	9.48

That means the car had to travel 9.48 feet in 1.28 seconds, or to attain a speed of 11.58 ft. = 14.7 feet per second = 10 miles per hour in that time, which constitutes a rather quick start for such a heavy car as we have taken for the object of our calculation. Yet at times it may be approached and the stresses incidental to such starts should be taken into consideration by a careful designer.

All forces attacking the moving parts, whether of the first or second kind, can increase from a minimum to a maximum in a very short time. According to conservative engineering practice these parts should therefore be figured with a safety factor of 6 (see Hütte). At least those forces that act for any length of time should be taken care of in this manner. For the other forces that only act occasionally and under favorable circumstances may never act at all, a smaller margin of safety is allowable.

If in our particular case we take $M_1 = 11,700$ inch pounds as a basis, and figure with a safety factor of 6, we still have a factor of safety of

$$\frac{25900}{6 \times 11700} = 1.845$$

in the most unfavorable case possible. This is sufficient and even better than 3—5, which was suggested for such cases by F.

E. Watts (See HORSELESS AGE, Jan. 5, 1910).

Having established a basis for our calculation, we can now proceed to calculate the dimensions of the different parts.

CALCULATION OF FLOATING SHAFT.

The greatest torque in either one of the floating shafts is $M_1/2$, no matter whether the differential is in action or not. If for instance one wheel is completely locked, the other one will revolve twice as fast, on account of the differential action, and the torque will be the same as if the car runs straight ahead, i. e., $M_1/2$. The stress is therefore

$$s = \frac{16 \times M_1}{3,1416 \times d^3 \times 2}$$

Considering how the dimensions of the floating shafts influence those of the axle sleeves and the bearings in the wheel hubs, we select a high grade material, Krupp special steel C. 46.0, in order to keep the size down. The properties of this material are

Elastic limit..... 64,000 pounds per square inch.
Tensile strength ... 89,000 pounds per square inch.
Elongation 15 per cent.

After transposing the terms of the equation and substituting the numerical values we have

$$d^3 = \frac{16 \times 11700 \times 6}{3,1416 \times 64000 \times 2} = 2.79$$

$$d = 1.41$$

chosen $d = 1\frac{1}{8}$ "

CALCULATION OF PROPELLER SHAFT.

The propeller shaft revolves three times as fast as the floating shaft and transmits therefore, only $\frac{M_1}{3}$. Selecting the same material as before we have

$$d^3 = \frac{16 \times 11700 \times 6}{3,1416 \times 64000 \times 3} = 1.86$$

$$d = 1.24$$

chosen $d = 1\frac{1}{4}$ "

CALCULATION OF THE GEARS.

Besides strength, other considerations such as wear and quietness of running enter into the dimensioning of the gears, and make it impossible to calculate them in the same sense as the floating shafts, for instance. As a rule the size is evolved by experience and all we can do here is to show that for the dimensions selected in our particular case, the necessary factors of safety are maintained as far as the strength is concerned. The specifications of our gears are:

	Teeth.	Dia.	Pitch.	Face.
Pinion	15	4	1-16 inch.	
Gear	45	4	1-16 inch.	
Diff. gear, driving 16	6		1½ inch.	
Diff. gear, driven 32	6		1½ inch.	

We calculate the stresses from the well known formulæ of Lewis, first for the big gears. These formulæ read:

$$P = s \times p \times f \times y \cdot \left(\frac{600}{600 + v} \right)$$

where

P = safe load on tooth in pounds,
 s = stress in pounds per square inch,

p = mean circular pitch in inches,
 f = face of gear in inches,
 y = a coefficient,
 v = mean velocity of gear in ft. p. m.

in figures:

$$P = \frac{M}{r} = \frac{11,700}{4.875} = 2,400 \text{ pounds,}$$

$$p = 0.683 \text{ inches,}$$

$$f = 1.5625 \text{ inches,}$$

$$y = 0.111$$

$$v = 383 \text{ ft. p. m.}$$

Therefore,

$$2,400 = s \times 0.683 \times 1.5625 \times 0.111 \times \left(\frac{600}{600 + 383} \right)$$

and $s = 33,200$ pounds per square inch.

In conjunction with these formulæ the same factors of safety as for the shafts cannot be employed, but rather those recommended by Lewis. He considers (see *American Machinist Gear Book*) a factor of safety of

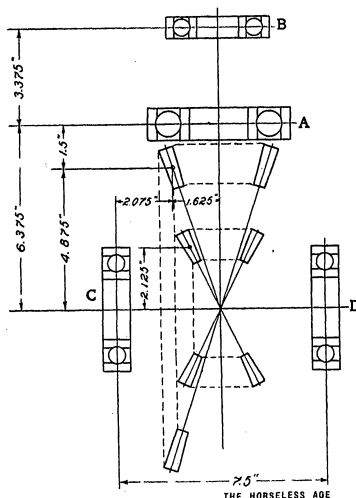


FIG. 3.

1.5 to 2 as sufficient, and his formulæ give satisfactory results with these values only. If we chose for the gears Krupp chrome nickel steel E. F. 58 o., having the following properties:

	Annealed.	Hardened.
	Lbs. per Sq. In.	Lbs. per Sq. In.
Elastic limit	64,000	100,000
Tensile strength	83,000	130,000
	Per cent.	Per cent.
Elongation	20	9

we have a factor of safety of

$$\frac{100000}{33200} = 3.02$$

when the torque equals 11,700 inch pounds, and of

$$\frac{100000}{5320} = 1.88$$

in case of the greatest possible torque of 25,900 inch pounds, which is still more than required.

For the differential gears the factors of the Lewis formulæ are as follows:

$$P = \frac{2400 \times 4.875}{2.125 \times 8} = 686 \text{ pounds,}$$

regardless of the action of the differential. (See calculation of the floating shaft.)

$p = 0.425$ inches.
 $f = 1.125$ inches.
 $y = 0.103$.
 $v = 169.6$ feet per minute.
From the equation

$$688 = s \times 0.425 \times 1.125 \times 0.103 \times \left(\frac{600}{600 + 169.6} \right)$$

we find

$$s = 17,900 \text{ pounds per square inch.}$$

and if the energy is only transmitted by two of the four differential gears

$$s = 2 \times 17,900 = 35,800 \text{ pounds per square inch.}$$

That means that in the most unfavorable case, the differential gears still have about the same factor of safety as the big gears.

CALCULATION OF THE BEARINGS.

The load of $P = 2,400$ pounds is to be taken up by the bearings A, B, C and D (Fig. 3). The loads on the different bearings and the sizes selected are

$$A - L = \frac{2400 \times 4.875}{3.375} = 3470 \text{ pounds}$$

H B No. 410

$$B - L = \frac{2400 \times 1.5}{3.375} = 1065 \text{ pounds}$$

H B No. 210

$$C - L = \frac{2400 \times 5.375}{7.5} = 1720 \text{ pounds}$$

H B No. 310

$$D - L = \frac{2400 \times 7.5}{2.075} = 868 \text{ pounds}$$

H B No. 310 (for the sake of symmetry).

These loads are taken care of with a factor of safety of about 10 (see HB catalogue). In case of the greatest possible tooth load of

$$\frac{25900}{4.875} = 5,320 \text{ pounds}$$

this factor would be reduced to

$$\frac{10 \times 2400}{5320} = 4.5$$

which is still sufficient.

In a full floating type axle the bearings in the wheel hubs are determined by the dimensions of the axle sleeves on which they are mounted, and are usually bigger than required. In our case we have to take HB No. 311 inside and HB No. 310 outside, which sizes are amply strong to do the work.

(To be continued),

Hipple Heads Philadelphia Association.

Geo. W. Hipple, of the Chalmers-Hipple Motor Company, was elected president of the Automobile Trade Association of Philadelphia, at the annual meeting of the organization held December 6. Other officers chosen were W. P. Herbert, of the General Motor Company, vice-president, and Frank W. Eveland, of A. G. Spalding & Brothers, treasurer. The organization now numbers thirty-nine dealers in automobiles in the Quaker City and twenty-one individuals or firms in the accessory and supply trade, while there are ninety contributing members made up of salesmen and employees of the trade. The treasurer's report showed that the association is in fine condition financially.



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 Western Union Code.

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Referring to our recent article explaining in an elementary manner the operation of a high tension magneto, a subscriber writes that he would like to see a similar article on the differential gear. We are uncertain as to the wisdom of giving space to such an article, for the reason that at least 90 per cent. of our readers are perfectly familiar with this mechanism, and from their standpoint the space would be wasted. But every reader deserves some consideration, and if we were sure that 10 per cent., or even 5 per cent., of all those who constantly peruse these pages do not understand the operation of the differential gear, and would like to see a simple, illustrated description, we would print it. We would therefore suggest that those who would like to see the article printed inform us to that effect.

Our Show Numbers.

No doubt some of our readers will be interested in the arrangements we are making for covering the coming New York shows. There will be practically four separate shows in this city within a period of three weeks, which calls for a series of special issues. In connection with each of these shows we will print a forecast or catalogue of everything exhibited in the issue appearing just previous to the opening of the show, and an engineering review, describing and commenting upon the more important novelties and new tendencies, in the issue appearing toward the end of the show.

Thus in the issue of December 28 will appear specifications and illustrations of the cars exhibited at the Importers' Automobile Salon and the Grand Central Palace Show, together with general articles dealing with the history and organization of these shows. In the January 4 issue there will appear specifications of all the cars to be exhibited at the gasoline pleasure car show in Madison Square Garden the following week, together with illustrations of leading models as well as brief descriptions of all the accessories to be shown, with illustrations wherever necessary. The issue will further contain an article on the history and organization of this, the "licensed" show, and various other features that will prove of great interest to the man attending the show with a view to selecting a car to purchase.

The issue of January 11 will contain a technical review of the first week's Madison Square Garden Show, which will be written by a staff of contributors from personal observation, and will reflect the latest tendencies in the different lines. The same issue will contain the catalogue of exhibits at the second week's Madison Square Garden Show; that is, of commercial vehicles, electric vehicles and motorcycles. In the issue of January 18 the exhibits at this show will be discussed in a general way.

No Examination of Owners Needed.

It is said to be the intention of the National Highways Association to secure the passage of a law by the next Legislature in New York State requiring automobile owners who run their own cars to take out chauffeurs' licenses. While it is a very fine idea for the Highways Association to keep acting, it is possible to overdo things, and the proposed step is one which will be of no benefit to the public at large. It will be

a detriment to the automobile business, as it will be an additional drain upon motorists' pockets, and it will benefit no one, except, perhaps, the political bosses, who have to provide berths for their followers.

The supposition that owners, being "amateurs" for the most part, do not know how to properly guide a car is erroneous. In fact, in ninety-nine cases out of a hundred owners drive more carefully and at slower speed than the average professional chauffeur. They are handling their own property, and have every reason to take better care of it than an employee handling another's property. And when one comes right down to the point, what good will licensing owners do anyway? Will that make them any more careful than at present? Not a bit!

When the Callan law was drafted, one of its good features was the licensing of professional drivers. Many accidents and violations of the law were recorded in cases where hired drivers would slip away and never be found again, escaping punishment due, merely because they were not licensed and could give fictitious addresses. This sort of thing was eliminated by the Callan law.

Now, when it comes to talking of licensing owners, it must be borne in mind that practically all a license amounts to is a record of the licensee, so that the authorities can locate him in case of violation of the law or in damage suits. Well, all owners in New York State are registered at Albany, and the registration of their car corresponds to the professional driver's license.

What is to be gained by forcing the owner to take out a driver's license as well? Merely adding to the receipts of the State Automobile Department? The "examination" of thousands of chauffeurs during the past few months has been a grand farce. In New York city it has been "good thing" for the secretary of a company which does business under the guise of a "club"; also a few henchmen of some Bowery politicians and others. The so called "examination" in most cases consisted in the applicant merely paying money to sit down at a desk to answer a couple of dozen questions on paper, with no practical test of ability to handle a motor car of high or low power.

The average automobile owner possesses sufficient intelligence to correctly answer a few questions as to whether or not he would apply his brakes if about to strike a street car or run over a man, or if he would keep to the right ordinarily and pass vehicles ahead of him on the left;

whether he would try to start on "high" when stalled in crowded traffic, drive on sidewalks where nurses and children were congregated, or drive on the reverse gear without looking back, etc.

Even if a practical test were to be imposed on owners, 999 out of every thousand would pass, for owners are prudent enough not to drive in crowded streets until they know how to change gears and work the clutch and steering gear, all of which they master on some deserted highway and not in the Broadway theatre district. No matter what the examination, the owners would contrive to pass.

The Callan law made every owner of a car, large or small, dig down into his trousers pocket, and if now an additional tax were to be imposed on owners for the privilege of making their own State licensed cars run, it would create the idea among many prospective buyers of cars that, after all, automobiles are too expensive—that there are too many fees and incidentals to pay. At the same time the public would be safeguarded no better than at present, and there is really little fault to find with the present system of registration.

The National Highways Association might better devote a little energy toward securing for motorists better roads on which less accidents are liable to occur.

Motor Lubrication Proportional to Load.

There seems to be a growing feeling among designers that the amount of lubricant supplied to a vehicle motor should correspond somewhat to the rate at which it is doing work at any instant. With increased speed between frictional surfaces a larger amount of lubricant should be supplied them, and it is also true that with the increased pressure consequent upon higher torque development an increase of oil supply is called for.

In a way, the separate oil lead system to cylinder walls and bearings from a force feed lubricator meets these conditions in that the lubricant supply is directly increased with motor speed. There is no increase, however with increased torque. The simple splash method from a constant crank case level also, to a certain extent, increases the oil supply to piston walls, piston pins and connecting rod tips with increasing speed, for the number of splashes of lubricant is in direct proportion to the motor speed, assuming that the oil level remains uniform, and the splashing

is also more energetic; but, as ordinarily devised, it makes no provision for the additional lubricant required when torque development is higher. In fact, under such a condition, coupled as it most frequently is with rather low speed, the lubricant supply may at times prove inadequate.

In the self-contained pump circulated oiling system, with splash lubrication for all parts save the main bearings, and a constant crank case level, the shaft bearings receive a flood of oil which is pretty likely to prove sufficient to meet all conditions. The other parts of the motor may not fare so well, however, especially when the motor is driven at its full load for long periods of time, as their lubricant supply is usually by constant level splash entirely. Oiling systems have, it seems, been quite commonly devised to meet the requirements of varying speed, but it is only very recently that the idea of increasing the oil supply with increasing torque has been taken up. Motor torque increases with the opening of the throttle, and the natural method of increasing the oil supply with torque increase is to interconnect the lubricant supply with the throttle. It is interesting to note that the engine lubrication supply of a popular American runabout has been, for several seasons, regulated by throttle position.

In several recent European and American motor designs, provision has been made for increasing the splash distribution at the will of the operator or automatically. This is accomplished by raising the oil level in the splash pools relatively to the connecting rod tips, so that more oil is thrown per splash. The standpipes which return the overflow to the sump may be made capable of being raised, so that the level runs higher and the splashes dip more deeply when an additional supply of oil is required. In certain designs the splash supply is contained in a hinged trough located under each connecting rod, which trough is capable of being raised or lowered so that the splasher dips more or less deeply thereto. The raising and lowering of the standpipes and of the troughs may be either manual—dependent upon the judgment of the operator—or automatic, raised as the throttle is opened and lowered as it is closed. The provision of more abundant splash as the throttle is opened is intended to take care of cylinder and connecting rod lubrication under exceptional conditions under which a motor may be driven for long periods with nearly

open throttle, somewhat reduced speed and with the oil supply thinned by heat, which conditions are most severe. If no special provision like the above is made use of, it is necessary to carry the splash level rather high at all times in order to secure free enough oiling under protracted conditions of heavy load. Too much oil is then likely to be splashed when the motor is run at low speed and output, as it is likely to be most of the time, particularly in city service, and a smoky exhaust is likely to be the result. With a manually or automatically varied splash level it is claimed that it is possible to prevent smoking and, at the same time, to secure adequate lubrication even under protracted full load conditions.

Coming Events.

December 24 to 30—Los Angeles, Cal., Automobile Show, Fiesta Park, Licensed Motor Car Dealers' Association.

December 25 to 26—Los Angeles, Cal., Race Meet, Motordrome.

December 31 to January 7—New York City Automobile Show, Grand Central Palace, American Motor Car Manufacturers' Exhibit Association.

January 2 to 7—New York City, Importers Automobile Show, Hotel Astor.

January 7 to 14—New York City, N. Y., Eleventh Annual Automobile Show at Madison Square Garden, Association of Licensed Automobile Manufacturers.

January 11 and 12—New York City, Meeting of Society of Automobile Engineers.

January 13—New York City, Annual Banquet of Motor and Accessory Manufacturers, Waldorf-Astoria.

January 14 to 28—Philadelphia, Pa., Automobile Show, Third Regiment Armory, Philadelphia Licensed Dealers' Association.

January 15 to 21—Milwaukee, Wis., Second Annual Automobile Show, Auditorium, Milwaukee Automobile Dealers' Association.

January 16 to 21—New York City, Commercial Motor Vehicle Show at Madison Square Garden, A. L. A. M.

January 16 to 21—Detroit, Mich., Automobile Show, Wayne Gardens, Automobile Dealers' Association.

January 18—New York City, Annual Banquet Automobile Trade Credit Association.

January 20 to 25—Omaha, Neb., Sixth Annual Automobile Show, Automobile Show Association.

January 28 to February 4—Chicago, Ill., Tenth Annual Show at Coliseum and First Regiment Armory (pleasure vehicles and accessories only), National Association of Automobile Manufacturers.

February 5—Buffalo, N. Y., Automobile Show, Broadway Arsenal.

February 6 to 11—Chicago, Ill., Tenth Annual Automobile Show, Coliseum and First Regiment Armory (pleasure and commercial cars, motorcycles and accessories), National Association of Automobile Manufacturers.

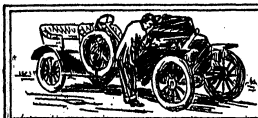
February 13 to 18—Kansas City, Mo., Automobile Show, Convention Hall, Kansas City Motor Car Trade Association.

February 14 to 19—Dayton, Ohio, Second Annual Automobile Show, Memorial Building.

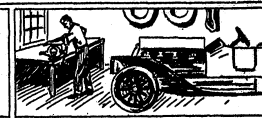
February 18 to 25—Binghamton, N. Y., Automobile Show, Binghamton Chamber of Commerce and Binghamton A. C. Automobile Show.

February 18 to 25—Minneapolis, Minn., Automobile Show, National Guard Armory, Automobile Show Association.

February 18 to 25—Newark, N. J., Automobile Show, New Jersey Automobile Exhibition Co.



Maintenance and Repairs.



Two Simple Helps for the Automobilst.

BY DONALD HAMPSON.

Scarcely a motor car owner but has had at some time occasion to remove a rear wheel; often that wheel bears mute testimony to a first class job of fitting or the bulldog grip of King Rust, and a wheel puller has to be used. Many of these are too light to perform the service required of them, being constructed with a half inch screw, which, before the wheel can be started, twists off.

A simple form of wheel puller is shown in Fig. 1, and consists of a body, or cap A, of cast iron or steel threaded to fit closely the wheel hub, and tapped in the rear wall for a three-quarter inch set screw. In operation it is equally simple—the regular wheel cap is removed, A substituted and the set screw tightened. Its advantages are a pull as near the "stuck" parts as it is possible to get, no springing or marring of the wheel and spokes, a screw having a head big enough to stand some twisting, and strong enough throughout to withstand any strain apt to be put upon it.

"But," I hear someone say, "such a puller will fit only one size of wheel." True enough, but the great majority of motor car owners have but one car in a year, or five years, so that the possibility of a change in sizes is hardly to be considered. Owners blessed with more than one car at a time and garages could undoubtedly keep regular sized pullers of this form on hand. Its low

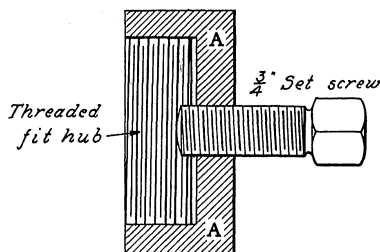


FIG. 1.—WHEEL PULLER.

cost to make (much less than the ordinary puller), its compact shape and moderate weight (handy for long tours), together with the points named above, make it worthy of consideration and fair trial.

The capacity of air for gasoline vapor is not constant at all temperatures at all altitudes. For this reason it sometimes becomes necessary to adjust the valve regulating the admission of air into the carburetor. As an aid to this operation certain visible parts concerned in this adjustment may be graduated. Such a graduation on a type of carburetor having the familiar slotted quadrant is shown in Fig. 2. These marks may be made with a small chisel or a fine three

square file; they should be not over one-sixteenth of an inch apart and should lead close up to the edge nearest the index mark on the arm.

As shown, one end is marked "summer" and the other "winter"—some drivers claiming better starting qualities in cold weather

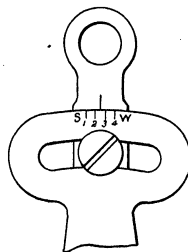


FIG. 2.—GRADUATED AIR VALVE.

with a slight adjustment. For a marked difference in altitude the arm might be shifted one notch for every 1,000 feet change or whenever, with the particular carburetor and the quality of gasoline used for from previous experience, a shift seemed advisable. In returning to normal conditions, or when in case the setting is "lost" from a working loose of parts, it is only necessary to return to the original graduation mark, thereby doing away with any experimenting to find the original setting and that uncertain feeling that perhaps "she wasn't tuned up just as she used to be." The correct setting having been once obtained, it should be carefully recorded for any future use. In nearly every case the factory adjustment will be found to be the best.

Care of Pneumatics in Winter.

Now that many motorists are laying up their cars for the winter, information as to the proper care of tires during this period is timely. The following advice is offered by the Firestone Tire and Rubber Company, with the comment that time and trouble will be amply repaid by extra tire service next year:

Jack up the car off all tires and allow enough air to escape to release the internal pressure on the fabric, but not enough to totally collapse the inner tube. The tires in this condition should be kept from heat and wrapped to exclude the light. If the tires are in perfect condition this will suffice; otherwise observe the following directions:

Take off the tires, clean the outside carefully, removing all dirt, oil, grease and foreign material. Do not allow water to get inside the casing. If any of the cuts penetrate to the fabric have the tire inspected by a competent repairman and repaired or retreaded, as deemed advisable. Wrap each casing and tube in paper or

cloth to keep away light and air and store the tires in a cool, dark place. Clean all rust off the inside of rims and polish with graphite or stove polish to prevent further rust.

London Traffic Records.

An annual census has been taken for the past five years by an English commercial vehicle publication, *Motor Traction*, of the traffic in certain much traveled streets in London, a business day in September being selected each year. An effort is made to determine the number of horse drawn vehicles and motor vehicles passing during the nine busiest hours of the day. The results, given in the following table, show the constant gain of motor vehicles at the expense of the horse:

Year.	Motors.	Horse.	Total.
1906	632	5,310	5,942
1907	1,268	4,809	6,077
1908	1,496	5,118	6,614
1909	2,098	4,388	6,486
1910	2,662	3,716	6,378

Schimpf Elected President of Long Island Automobile Club.

A few minutes prior to the annual banquet of the Long Island Automobile Club on the evening of December 7 that organization held its election of officers and William Schimpf was elected president. Dr. H. R. Price was chosen vice president, C. H. Galt treasurer and Charles Hermann secretary.

The banquet was a great affair and one of the features was the presentation of a new trophy to the club by President-elect Schimpf. This was in the shape of a handsome silver cup, to be competed for by amateur drivers annually. It is a perpetual trophy and will remain the property of the club. Mounted on its pedestal it stands 30 inches high and is 20 inches in diameter, the body being of bronze with an ornamental design etched in silver. Three artistic figures symbolizing victory form the handles.

American Industries, the organ of the National Association of Manufacturers, has made an inquiry among the members of that association as to the state of business, the causes affecting it and the outlook for the future. The replies from motor vehicle manufacturers showed:

Improvement in sales since December, 1909: None, —, slight, 10 per cent.; fair, 30 per cent.; marked, 60 per cent.

Improvement in collections since December, 1909: None, 15 per cent.; slight, 20 per cent.; fair, 55 per cent.; marked, 10 per cent.

Present condition of industry: Poor, 18 per cent.; fair, 22 per cent.; good, 50 per cent.; excellent, 10 per cent.

Prospects of industry in 1911: Poor, 10 per cent.; fair, 30 per cent.; good, 50 per cent.; excellent, 10 per cent.

A Dictionary of Automobile Terms. By Albert L. Clough.

Breech Block Joint—A special form of threaded joint, sometimes applied to parts that require to be screwed into or onto each other quickly. Four segmental portions of both the male and female thread are cut away so that the pieces may be slid into their final engaged positions, one upon the other, by matching the cut away portion with the uncut portion of the other and then rotating one relatively to the other through one-eighth turn, which brings all the threads in engagement and locks the parts securely together.

Brush Contact—A conducting part used to complete the electrical circuit between a stationary and a moving element of an electrical device. Brushes are used to convey the current between the windings of the rotating armatures of magnetos, dynamos and electric motors, and the stationary portions of such machines, and for making connection between the rotating and non-rotating portions of timers and distributors. Brushes are usually made of wear-resisting metal or of copper-plated carbon.

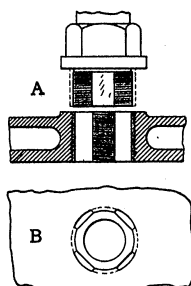
Brush Holder—A device adapted to hold one end of a brush securely but somewhat flexibly in contact with a moving element of an electric circuit, and supplied with a binding post or other means by which a relatively fixed portion of the external circuit is connected to it and thus to the brush. In ignition practice it is usually a fixed brass tube, in which a cylindrical carbon or metal gauze brush is closely fitted, but capable of sliding therein, under the influence of a spiral spring, so that wear between the end of the brush and the rotating part may automatically be taken up and a reliable contact be secured.

Brush Spring—A spring employed to press a brush holder into positive contact with the moving element with which it is to maintain electrical connection.

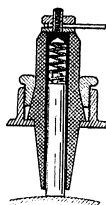
Buckling—The bending or deformation of a plate of a storage cell, generally caused by the discharge of current through it at an excessive rate or by its over-discharge. Under these conditions the active material in the interstices of the grid swells and shrinks excessively, and this causes the buckling of the grid.

Build Up (v.)—To attain a magnetic condition under the influence of an electric current. A small but appreciable period of time elapses between the commencement of flow of an electric current through the winding of an electromagnet and the attainment of full magnetism by its core. In the case of spark coils, for instance, current must be allowed to flow through the primary winding for an adequate length of time before each ignition is called for, or otherwise a full discharge will not take place in the sparking circuit and only a weak spark occur, because of the failure of the magnetism fully to build up in the time of contact allowed.

Burner—The device which produces the gas fire for heating the boiler of a steam car. It consists of a means for vaporizing the pressure fed liquid fuel, of mixing the fuel vapor with air and of distributing the flame produced over the exposed area of the boiler.



BREECH BLOCK.
A, Sectional view in position about to be locked; B, Bottom view in locked position.

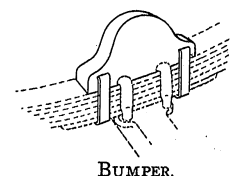


BRUSH HOLDER.

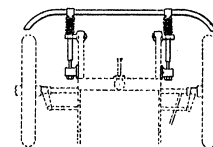
Bumper—An elastic member, placed between two members which may strike one another when in action, in order to cushion the shock resulting when this occurs. A metal spring or a properly shaped piece of rubber, leather or similar material is generally used, it being fastened to one of the parts so as to be interposed between the two.

Syn.: Buffer.

Bumper, Collision—A strong horizontal bar, carried crosswise of and at a little distance from the front or rear end of a car, which is guided so as to be capable of a limited movement along the car's axis of length, and which is kept pressed away from the car by heavy springs. In event of collision between the car and another vehicle or fixed object, the energy of the collision is partly absorbed in compressing the springs and the liability of breakage of car parts is reduced.



BUMPER.



BUMPER, COLLISION.

Burner Jet—The jet of a steam vehicle burner, through which the liquid fuel is sprayed, under pressure, in a finely divided condition, previous to its mingling with air to form a perfectly combustible mixture.

Burner Plate—A perforated metal plate, placed under the boiler of a steam car, through which the combustible mixture rises and burns in a multiplicity of flames.

Burner Casing—A metal housing surrounding the burner of a steam vehicle and the space between it and the boiler, confining the heat to its proper channels and protecting the flame against air currents.

Burner Valve—A valve usually of the needle type, inserted in the fuel feed pipe and used to regulate the flow of liquid fuel to the burner jet of a steam vehicle. Such a valve may be manually operated or under the control of an automatic fire regulator (q. v.).

Burn Out (v.)—To destroy the conductivity of or to break down the insulation of a conductive portion of an electrical device by an accidental electrical discharge, or by the accidental application of excessive electrical heat. As applied to coils used in ignition, a burnout usually results from a puncturing of the insulation and a consequent short circuit to or from the passage of an excessive current, which either melts off the conductors, or melts or chars the insulation, resulting in a breakdown and short circuit.

To loosen the tube ends from the sheets of a steam boiler by the application of a fire to it when it is insufficiently supplied with water.

Bushing, Bearing—A lining, fixed in a bearing support and in which a rod or shaft slides or rotates. It is usually made of anti-friction metal and is generally capable of renewal or adjustment after wear has taken place, so that looseness between the rod or shaft and its support may be corrected.

Syn.: Bush.

Bushing, Insulating—A lining or thimble of insulating material threaded over an electrical conductor and fixed in a support through which the conductor is to pass, so that leakage of current from the conductor to its support may be prevented.

Bushing, Bronze—A bearing bushing made of bronze, which metal, if of proper quality, possesses a high degree of wear

resisting and anti-friction qualities, when used to carry steel shafts.

Bushing, Babbitt—A bushing made of babbitt metal, which may either be cast on the shaft in the bearing support, and scraped to fit the shaft, or which may be cast separately and applied to the bearing support and shaft, or cast in a bronze liner which is applied to the bearing support.

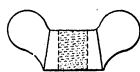
Bushing, Composite—A bushing, the bearing surface of which is composed of alternate segments of a soft and of a harder anti-friction metal, usually babbitt and bronze.

Bushing, Compressed—A bushing the metal of which has been rendered dense and wear resisting by compression, usually by hammering of its surface.

Bushing, Die Cast—A babbitt bushing, the metal of which has been rendered dense, hard and smooth by casting it under pressure in a die or mold. A very fine finish is thus attained and the bushings thus produced are interchangeable.

Bushing, Split—A bushing which, instead of being a complete hollow cylinder, is longitudinally split into halves. This construction allows of ready removal of the shaft and of some adjustment for wear of the bushing by filing away the abutting edges of the bushing halves, or by the removal of shims (q. v.) which have been placed between the edges so as to keep them slightly separated.

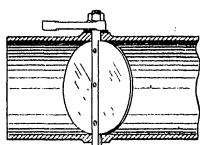
Butterfly Nut—A form of thumb-nut intended to be turned without a wrench, having two wing-like projections formed integrally with the threaded centre, convenient to be grasped by the fingers.



BUTTERFLY NUT.

Syn.: Wing nut.

Butterfly Valve—A form of valve applied to a pipe, consisting of a circular damper capable of nearly or quite filling the pipe bore and a spindle secured to a diameter of the damper, which passes diametrically through the walls of the pipe and bears therein. A common form for throttle valves and carburetor air valves.



BUTTERFLY VALVE.

By-Pass—An alternative path for a fluid which is being circulated in a system, used as a means of regulating

and directing the flow, e. g., in a pumping system supplying water to a boiler, there is inserted in the pump delivery pipe, between the pump and the boiler, a pipe which leads back to the suction side of the pump. This pipe can be entirely closed, in which case all the water pumped flows to the boiler, or it can be partly or fully opened. If the by-pass is partly closed, a portion of the water will go to the boiler and the remainder will pass back to the pump through it. Used on steam cars and in pressure lubricating, and fuel supply systems, in which a pump is operated continuously.

By-Pass Valve—A valve inserted in a by-pass to regulate the degree of obstruction to flow there existing and thus to regulate the rate of supply of fluid from a constantly operated pump to some point in the system.

Calcium Carbide—A compound (CaC_2) produced by the reaction of carbon and quicklime in the electric furnace. It is the source of acetylene gas (C_2H_2), when water is applied to it, according to the reaction $\text{CaC}_2 + \text{H}_2\text{O} = \text{C}_2\text{H}_2 + \text{CaO}$ (quicklime). The quicklime is hydrated into whitewash by the excess of water.

Calcium Chloride—A salt (CaCl_2) a neutral aqueous solution of which is sometimes used as an anti-freeze mixture, if the solution used contains sufficient of the salt to make its specific gravity 1.22 it will freeze at about -15 degrees Fahr. Its boiling point is higher than that of water and, when its volume is reduced by evaporation, pure water only need be added.

Cam—A mechanism employed to transform rotary into reciprocating motion. As applied to automobile valve mechanisms,

the cam consists of an irregular cylinder eccentrically fastened upon a shaft which rotates it. The cam is so shaped that the distance from the shaft axis to the cylindrical cam surface along different radii varies in a predetermined manner. Pressed upon the cam surface by means of a spring or gravity, is a movable, guided part (the cam follower), which as the cam rotates is reciprocated. The full stroke of the follower is equal to the difference in length of the longest and shortest radii of the cam and the rate and direction of the reciprocation at any point in the rotation is proportional to the rate and direction of change of the cam radii at that particular angular position.

Cam, Exhaust Valve—A cam, fixed to a shaft rotating at one-half engine speed, which acts to open and close an exhaust valve of a four cycle engine cylinder.

Cam, Ignition—A cam which acts to operate ignition mechanism. A cam which actuates the make-and-break device of a contact spark igniter. Such a cam is rotated at one-half engine speed in the case of a four cycle motor and at full engine speed in that of a two cycle motor. Used in timers to operate the primary circuit controlling contacts and in magnetos to operate the make and break mechanism included in the primary circuit of the armature.

Cam, Inlet Valve—A cam which acts to open and close an inlet valve. In a four cycle motor it is fixed to a shaft rotating at one-half engine speed.

Cam, Spiral—A cam the elements of the working surface of which instead of being straight lines are helices. It may be imagined to be formed by uniformly twisting an ordinary cam around its axis, through a small angle. All cross sections of such a cam are identical, but each one is somewhat displaced angularly with respect to its neighbor. The follower is adjustable so as to be actuated at will by any cross section of the cam and thus the reciprocating motion produced can be made to vary in its time relation to the rotary motion. Used to advance and retard ignition.

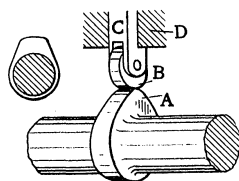
Cam Follower—The mechanical element which is held in contact with the working surface of a cam, obtaining a reciprocating movement from the cam's rotary movement and transmitting the same to other mechanical parts. A valve cam follower is usually a rod sliding in a guide at right angles to the cam shaft, one end of which is pressed against the cam surface by a spring. The working end of the follower is usually provided with a roller, or is mushroom or V shaped.

Cam Profile—The section of a cam taken in a plane at right angles to the cam shaft and passing through the point of contact of the follower.

Cam Shaft—The shaft upon which a cam is fixed and by which it is rotated. The cam may be pinned, keyed or screwed upon the shaft in the direction opposite to its rotation, or it may be formed integrally with the shaft. If the cam shaft is supported in ball bearings it is known as a ball bearing cam shaft.

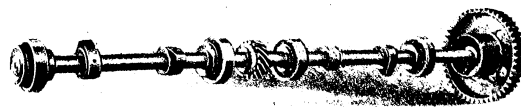
Cam Shaft, Enclosed—A cam shaft which is housed to protect it from dust and to insure its continuous lubrication. In practice, inlet and exhaust cam shafts are located within the enclosed engine crank case or in a compartment of the same upon their respective sides of the motor.

(Begun in Vol. 26, No. 14.—To be continued.)



CAM AND CAM FOLLOWER.

A, Cam; B, Cam Follower; C, Push Rod; D, Push Rod Guide.



CAM SHAFT AND CAM SHAFT GEAR.

practice, inlet and exhaust cam shafts are located within the enclosed engine crank case or in a compartment of the same upon their respective sides of the motor.

(Begun in Vol. 26, No. 14.—To be continued.)



New Vehicles and Parts.



The Alpena Flyer.

The "Alpena Flyer" is made in four models, viz., standard five passenger touring car, standard four passenger touring car, five passenger fore door touring car and roadster. The four and five passenger standard touring car models are exactly alike, excepting in the width of the rear seat.

The car has 112 inch wheel base, 34 inch wheels, semi-elliptic springs in front and platform suspension in the rear. It is claimed to be the easiest riding popular priced car made, and has 200 inches of spring suspension. The hood is long and attractive, and both the standard touring car models are equipped with a shroud. The car complete with 16 gallons of gasoline and filled radiator weighs only 2,250 pounds.

The makers lay special emphasis on the simplicity of construction of this car. One pedal operates both clutch and brake. The accelerator and cut-out are so placed that both can be operated at the same time, the toe being on the accelerator and the heel on the cut-out. The transmission is of the selective type, three speeds forward and reverse.

The motor, clutch and transmission are in one unit and are all enclosed, including the flywheel, which is located between the motor and transmission. The drive is a straight line. The motor works perfectly on high speed down to 2 or 3 miles an hour, it is claimed, and negotiates grades with greatest ease.

The oiling system is unique. The motor carries about 2 gallons of oil in the base, and the oil is forced from the base by a gear pump to a channel through the engine base, and it is strained each time as it passes through the motor, this screen being

easily removed. From there it is delivered by gravity to a pocket under the crank shaft bearings, and a stream of oil flows on the connecting rods as they revolve, this oil lubricating these bearings and throwing the excess oil into the cylinders and upon the cams and cam shaft bearings. All bearings are positively oiled, and all dirty outside oiling devices are eliminated. No stuffing gland is used on the oil pump, which leaves no chance for an oil leak at that point.

The car has four cylinders, cast in pairs. Each cylinder is 4x4½. The motor is high speed (2,700 revolutions), and delivers 33.6 horse power on actual brake test, it is claimed.

The unit power plant of the "Alpena Flyer" is designed to meet the demand for a simple, powerful and reliable motor which cannot be thrown out of alignment by rough use or bad roads. The motor is also designed with a view to making a perfectly oiltight machine, with everything enclosed, yet leaving all parts readily accessible. The three supports of this unit are in the form of trunnions, one trunnion at the front resting on the front cross member of the car, and two trunnions at the rear resting on the bearings secured to side members. This is an important feature, as it eliminates all chances of the motor being twisted or strained out of shape, due to weave of the frame.

The clutch is a multiple disc, and operates in oil. The drive to the rear axle is by shaft, with universal and sliding joint. In the standard touring and foredoor cars a gear ratio of 3¼ to 1 is provided, and in the roadster a ratio of 3½ to 1. The frame side members are of channel cross section and without offset. Thirty-four inch artillery type wheels are fitted, with quick detachable rims. The front axle is an I sec-

tion forging, and the rear axles a full floating, full ball bearing construction. The tire equipment is 3½ inch all around. Front springs are semi-elliptic and rear springs three-quarter elliptic. The car has a 112 inch wheel base, and the standard tread.

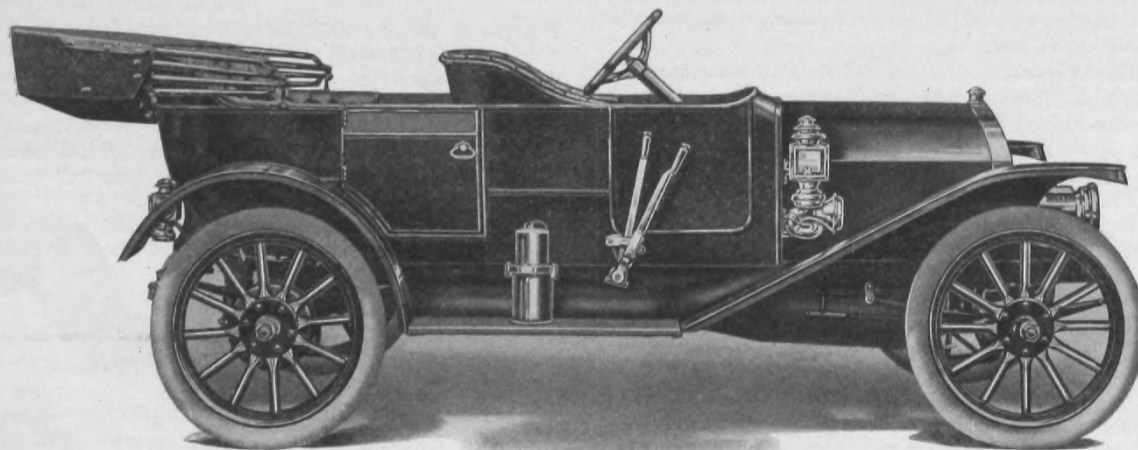
Internal and external brakes act directly on the rear wheels. The steering gear, which has a 17 inch hand wheel and an aluminum spider, is of the worm and wheel type, and of German make. The control members include spark and throttle levers above the hand wheel, a foot accelerator, one pedal for operating both the clutch and the service brake, a hand lever for the emergency brake, and a speed changing hand lever, operating in an H plate.

The oil capacity is 2 gallons. The equipment includes two gas headlights, generator, two side oil lamps, tail lamp, full set of tools, horn, jack, repair kit, and magneto. The prices are \$1,450 f. o. b. Alpena for the standard touring car and roadster, and \$1,500 for the fore door touring car.

Michelin Anti-Skids.

The Michelin Tire Company, Milltown, N. J., after exhaustive tests, have found it is not necessary to fit anti-skid tires to all four wheels, two only being required, one in front on the driver's side and one in the rear on the opposite side. As anti-skids are somewhat more expensive than plain tread tires, the use of two anti-skids instead of four results in an appreciable saving to the owner.

The Michelin anti-skid differs from most others in that the steel studded chrome leather band is vulcanized directly into the tread of the tire instead of being applied to the surface. As the rubber side walls of the tire are not confined by a leather band, these anti-skids are claimed to be



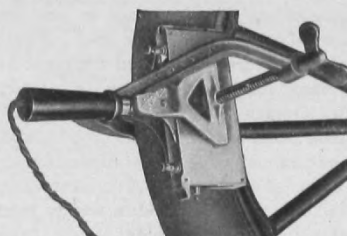
"ALPENA FLYER."

unusually easy riding. To the owner who may be in need of only one new tire, the Michelin Company suggests that he fit a Michelin anti-skid on one of his rear wheels for the purpose of a trial, and if this proves satisfactory a second non-skid could be fitted to one of the front wheels. The two rubber tread tires dismantled when fitting non-skids can be kept for spares.

Improvement in Shaler Vulcanizers.

The C. A. Shaler Company, Waupun, Wis., manufacturer of the Shaler vulcanizers, has made numerous improvements in its line for 1911. On types B & D, electric vulcanizers, which are for vulcanizing tread cuts in casings and for doing all sorts of inner tube work, the vulcanizing surface has been enlarged so that it is now possible to vulcanize two tubes at a time. The wooden shelf formerly furnished on which inner tubes were vulcanized, has been supplanted by a metal shelf with an asbestos pad, which is not only of great durability, but which prevents radiation of the heat and quickens the time of vulcanization.

Another improvement is the self-adjusting

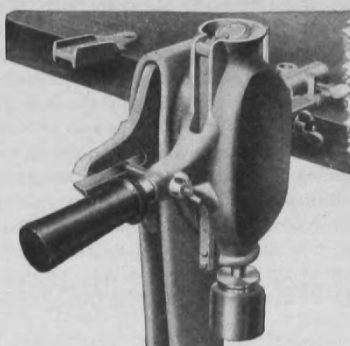


TYPE D REPAIRING CASE.

swiveled clamping device which takes the place of the bolts formerly used for obtaining pressure when vulcanizing a tube and the chain and bolts used when vulcanizing a casing. By means of this the vulcanizer can be applied to the tire in less than five seconds, and uniform pressure on all parts of the repair is assured. Perhaps the greatest improvement in types

B and D, however, is the concave, kidney-shaped plate for vulcanizing casings, the kidney-shape enabling the operator to get right down to the rim and repair rim cuts. This is a decided innovation in portable vulcanizers. Type B is also supplied with a double concave face which gives an extra large surface for vulcanizing casings.

The Shaler Company is also marketing a tread vulcanizing attachment to be used



STITCH-IN-TIME REPAIRING TUBE.

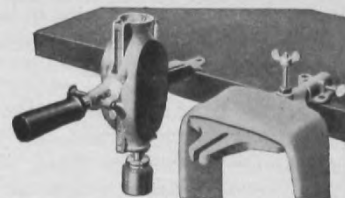
with type C electric vulcanizer so that sectional repairs of any size can be made, the heat being applied to the inside and the outside of the tire at the same time. This tread vulcanizer completely involves the tire from bead to bead.

The latest addition to the Shaler line is the improved Shaler Stitch-In-Time vulcanizer. This is manufactured under the basic patents formerly owned by the Stitch-In-Time Vulcanizer Company, with a number of improvements which Mr. Shaler has been working on for several years. The vulcanizing surface has been greatly increased and an improved lamp in which alcohol is used as a fuel, replacing the old lamp. The Shaler patent handle has been incorporated into the machine so that the vulcanizer may be heated while the tire is being repaired, saving considerable time and may also be moved from one repair to another without waiting for it to cool down. The most important feature, however, is the automatic thermostat temperature control

which keeps the vulcanizer at exactly the vulcanizing heat without any watching or regulating by the operator.

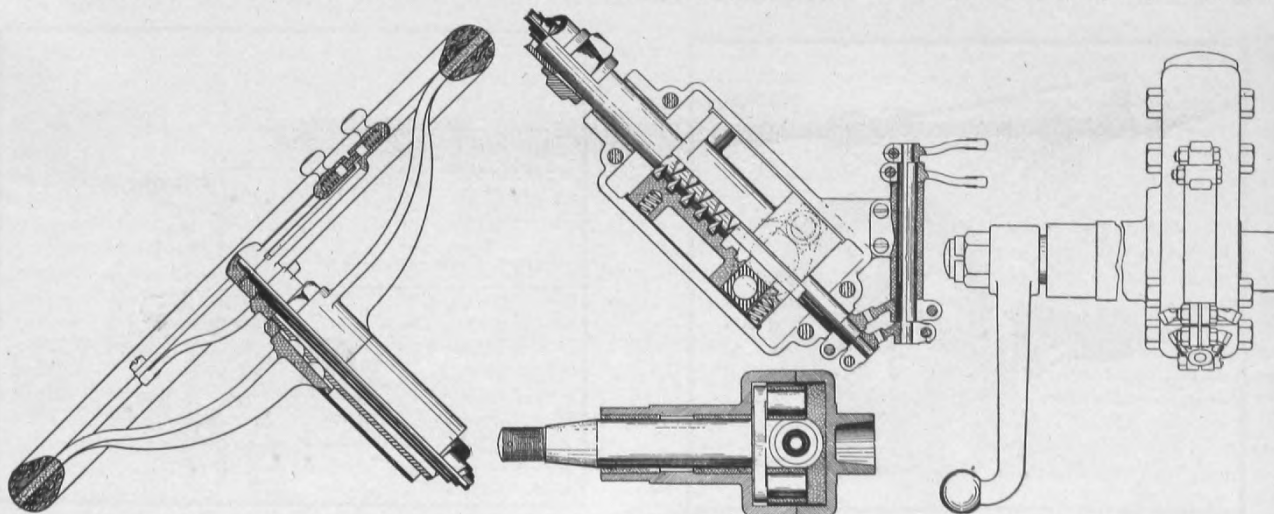
The Lavigne Double Leverage Steering Gear.

A new principle in steering gear design has been introduced by the Lavigne Manufacturing Company, of Detroit, Mich. The company's steering gear is substantially of the screw and nut type, but the screw is provided with double threads, right and left handed respectively, at the same portion of its length, while the nut is split in halves lengthwise, one-half being cut with the right handed and the other with the left handed thread. Each of the halves is provided with a slot in which is fitted a steel trunnion block, these trunnion blocks fitting over studs extending laterally from the ends of a double armed lever formed integral with the steering gear shaft. Owing to the fact that one-half of the nut is threaded right handedly and the other left handedly, when the steering post is turned, one-half of the nut will move up and the other down, thus exerting a push at one end of the double armed lever on the steering shaft and a pull on the other end. This

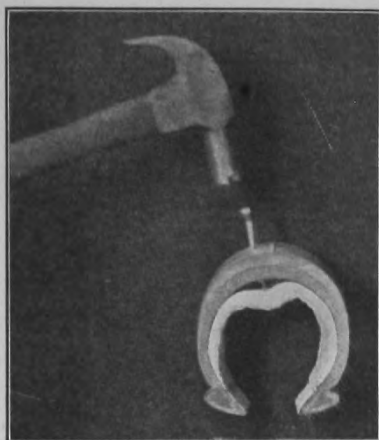


HEATING STITCH-IN-TIME, WHILE TUBE IS BEING REPAIRED.

construction eliminates the need of a ball thrust bearing and of an adjusting nut for same. The wearing contact of the screw threaded shaft is $6\frac{1}{4}$ inches long at all times. The wear of the nut is taken up automatically by two gibb shoes provided with springs. One of the advantages claimed for the construction is that locking of the gear is absolutely impossible, owing



LAVIGNE STEERING GEAR.



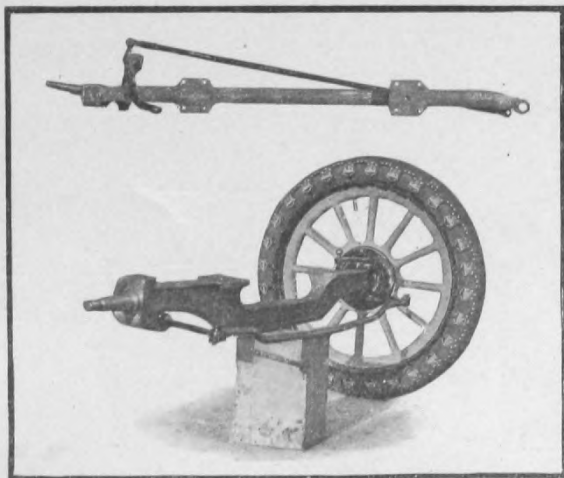
TIMETEST INNER TUBE PROTECTOR.

to the fact that there is a pull on the gear shaft lever for either direction of motion.

The steering gear case is cast from malleable iron, the half nuts are made from bronze; the trunnion blocks are of steel, hardened and ground, and the rocker shaft is a drop forging, also hardened and ground. The case is very narrow and can be inserted between the sub-frame and the main frame. This steering device is made in five models for cars of different sizes.

"Timetest" Inner Tube Protector

The Goodfellow Tire Company, East Grand boulevard, Detroit, Mich., which manufactures and markets a light and resilient tire filling product known as Time-test, and a special inner tube for same; also markets an inner tube protector made of gutta percha felt. This protector is applied to the inside of the tread portion of the tube, and its edges are covered with a glue which readily adheres to the inside of the tire so as to keep it in place. The material of the protector is very tough, and offers great resistance to the penetration of sharp implements. These protectors are made to fit any size of tire.



TWO VIEWS OF AXLE.

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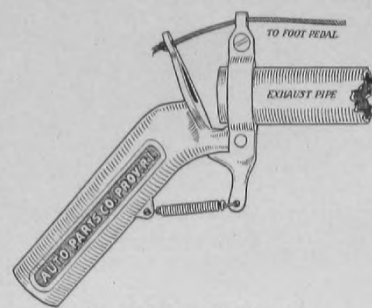
B. L. Caster Front Axle.

A steering axle, with the knuckle pivot in the plane of the wheel, is marketed by the Queen Manufacturing Company, of Webster City, Ia., with a Chicago office at Michigan avenue and Fourteenth street. In the accompanying line drawings the axle is shown to be of pressed steel construction, of channel section set on edge, with a solid axle end riveted to it. The outer end of the latter part is hub shaped, and is bored out vertically for the reception of the pivot bolt. The steering knuckle is forked, the prongs of the fork spanning the hub at the end of the axle proper. The two prongs are provided with extension lugs into which the steering arms are bolted. The hub is made bell shaped at its inner end, so as to provide room for the pivot joint. In the drawing it is shown mounted on two ball bearings of the cup and cone type, though any type of anti-friction bearing may, of course, be used.

The chief advantage of this construction is that road shocks strike the steering pivot directly, and are absorbed by it; they cannot be transmitted to the steering mechanism and the hands of the driver. Furthermore, it will be seen that the centre line of the pivot is seven-eighths inch ahead of the centre of the wheel, which produces a trailer or coaster effect, the steering wheels always tending to keep in the straight ahead direction. This adds to the safety of the car, as in case the steering tie rod breaks the wheel, which becomes free, thereby tends to retain its normal direction, thus avoiding disaster. Another feature is that if the steering pivot should break, it will interlock with the axle end and not let the axle drop.

Apco Exhaust Whistle.

The new signaling device herewith illustrated has been placed on the market by the Auto Parts Company, 308 Post Office square, Providence, R. I. It can be put on the car in twenty minutes, and it is claimed to make more noise than any other signal



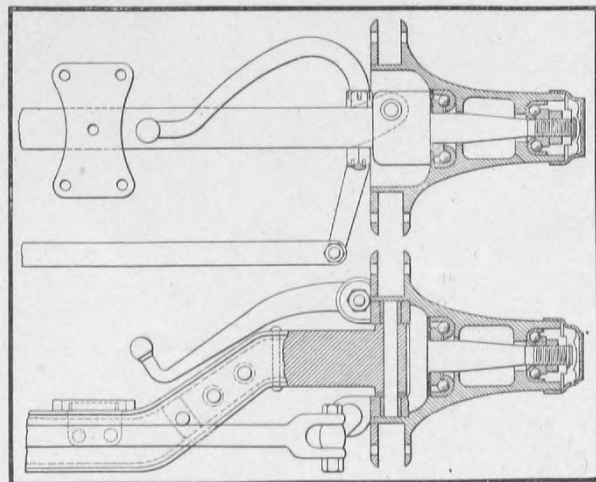
APCO EXHAUST WHISTLE.

on the market. As will be seen from the cut, it is not necessary to cut the exhaust pipe, and there is no chance of the signal becoming clogged with oil or carbon in the exhaust. The illustration shows the method of attaching the device to the exhaust pipe.

Canadian Goodyear Plant.

The Goodyear Tire & Rubber Company of Canada, Limited, is now running and working on deliveries to Canadian automobile manufacturers, from whom the Goodyear Company claims to have taken contracts aggregating about 60 per cent of the total requirements for 1911. The company also recently acquired the plant of the Durham Rubber Company, of Bowmanville, Ontario, who manufactured an extensive line of mechanical goods and enjoyed an enviable reputation throughout Canada. This gives the Goodyear Company a full line of rubber goods, and to meet requirements of the trade direct branches have been opened at 85 Queen street East, Toronto; 72 St. Antoine street, Montreal; 150 Princess street, Winnipeg, and 1213 Granville street, Vancouver.

F. A. Seiberling, president of the Goodyear Tire & Rubber Company, of Akron, Ohio, is president of the Canadian concern. L. C. Van Bever, who is vice president, gives most of his attention to the tire business, and C. H. Carlisle is secretary-treasurer.



SECTIONAL SKETCHES OF CASTER FRONT AXLE.

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Comments and Queries.



The Gas Knock.

Editor HORSELESS AGE:

The "gas knock" which Mr. Clough refers to is simply a pre-ignition, I feel quite sure. My pet engines for the last dozen years or more have been designed to run **hotter than the average**, and so I have had considerable opportunity to experience the knock to which he refers. With a sufficiently high fire test oil there is no reason why an engine should not run hot, and there is a decided gain in economy by so running it. Then the lessened need for a cooling system is of much advantage in a vehicle where every pound is objectionable, as is the case in an automobile. For these reasons I have accepted the occasional pre-ignition as the least evil, and studied it a great deal.

It is not dependent on the spark position, except indirectly. So long as it continues the spark can be shut off. But it is very uncertain. I have many times heard it pound for a few times, and stop as quickly as it began. Also pound a few strokes, miss a few and pound a few again. It requires an easily ignited mixture and good compression usually. Closing the throttle of a four cycle engine, and opening as quickly as possible will cause it to miss, and it may not again begin even though the full throttle and hard pull continue. An early spark helps it to start, doubtless because the bit of carbon or other heated thing which causes it, is heated sooner and **hotter** if the firing is early. If it chances to start under conditions permitting the engine to speed up, it acts just as advancing the spark. It is pretty well known by automobile drivers generally, and the term "gas knock" is a well known one, but this term explains nothing. Changing the mixture but slightly (I always weaken it when I can spare the power) will lessen the ease of ignition and stop the knock, simply because the ignition object is no longer efficient enough to do the work. Most users know that a slightly overfat mixture fires more easily than the most economic. Also that it gives maximum power if it is slightly over fat. So these conditions are the ones which contribute to the gas knock, and the presence of the knock is often good evidence that the best power conditions are present. Heat is necessary to get it, of course, but it often exists with no evidence or of opportunity for overheating. For seven years the road to dinner led up a hill two blocks long, beginning at the factory door. The gas knock was often found on this hill with engines that simply had not time to get hot enough to be considered overhot. This means that the particle of carbon which does the work can be heated easily

and quickly in some instances. It is reasonable to suppose that the mixture, which has the most of its particles in proper proportion for chemical combination is most easily ignited, but it is well known that such a mixture seldom has enough free air to insure perfect combustion of all its fuel. The most power and easiest ignition is, therefore, a matter of burning all the air with as little excess fuel as possible. But the highest economy is found by burning all the fuel to "acid" with as little excess air as possible.

CHAS. E. DURYEA.

Irreversible Steering Gears.

Editor HORSELESS AGE:

Kindly let me know through your "Comments and Queries" column the difference between a reversible and an irreversible steering gear; also the advantages and dis-

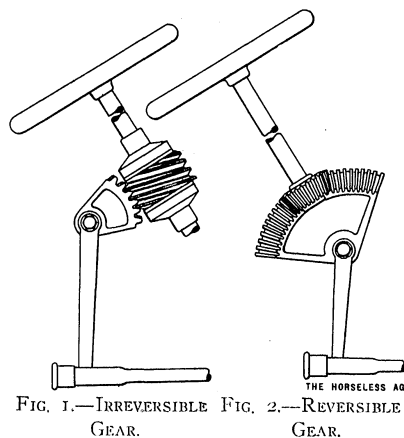


FIG. 1.—IRREVERSIBLE GEAR. FIG. 2.—REVERSIBLE GEAR.

advantages of both systems. By supplying diagrams you will greatly oblige,

SUBSCRIBER.

[An irreversible steering gear is one through which motion can only be transmitted in one direction, from the steering hand wheel to the road wheel, but not in the opposite direction. That is, if one road wheel strikes an obstruction, it will not wrench the hand wheel out of the driver's hand; in fact, neither the hand wheel nor the road wheel will be moved thereby, the shock being taken up in the irreversible or back lock mechanism, which ordinarily consists of a worm and worm sector. This is illustrated in Fig. 1. To the bottom end of the steering post is secured a worm gear, which meshes with a part of a worm wheel secured to a shaft. The latter carries a lever arm from which a link or steering rod connects to the arm of one of the steering knuckles. You will readily understand that when the steering post is turned by means of the hand wheel at its top, this

motion is transmitted to the steering knuckle (the swiveled portion of the front axle on which the front wheel runs). But if a twisting motion is applied to the steering knuckle as when the wheel strikes an obstruction in the road, there will be no transmission of motion to the hand wheel, for the reason that it is impossible to transmit motion from a worm wheel to an ordinary worm.

It is, of course, possible to provide the worm with multiple threads, making them very steep, and to make the worm wheel teeth to correspond, in which case this gear will not be irreversible. But the ordinary type of reversible steering gear has a bevel pinion and bevel gear sector in place of the worm and worm wheel sector, as shown in Fig. 2. Through such a gear motion can be transmitted both ways.

The advantage of the irreversible gear is that the driver's hand does not feel the road shocks, and no effort is required on the part of the driver to keep the steering gear in the straight ahead position, where it must be nearly all the time. The disadvantage of this gear (which is obviated with the reversible gear) is that the members of the steering mechanism are subjected to very considerable stresses by the impact of the wheel with road obstructions. The worm gear locks the mechanism rigidly, and the parts between it and the wheel receive more or less of a blow every time the wheel strikes a stone, etc. With a reversible mechanism these shocks are reduced in intensity because the wheel can swerve to avoid the worst of the obstacle, and what remains is taken up by the yielding arm of the operator.—Ed.]

Compound Gasoline Motors.

Editor HORSELESS AGE:

I find after an extended search that of all the builders of automobile motors no one has ever attempted to make a compound engine like the compound steam engine. I think that if some builder of motors would devote a little thought to this subject the large amount of energy that is puffed out into the open air and muffled down in order to make the motor as noiseless as possible could be turned into useful work. This, to my idea, would make the exhaust come out of the motor as the steam from a compound steam engine. Some compound condensing engines have no exhaust at all, but constantly use over the water making new steam. This, of course, is not possible with the gas engine, but the exhaust from a two cylinder engine can be used in a third cylinder set to receive the exhaust from each cylinder. The four cylinder motor would then become a six, and a six would become

a nine cylinder. Some time back I saw an article in a magazine calling for some one to get up a silencer for automobile motors that would not detract from the power. This magazine claims that a 30 horse power motor, if allowed to exhaust into the open air, would develop a brake horse power of between 5 and 7 more than when exhausting through a muffler. In other words, a 30 horse power motor would be brought back to 25, or even 22 or 23. This would not change the plan of the motor in the least, as the exhaust from No. 1 and No. 3 could be thrown into No. 2 the same is at is now thrown into the exhaust pipe, and after doing duty in No. 2 allowed to pass in the usual way into an exhaust pipe through to the back end of the car.

An engineer goes out to test the horse power of a stream of water, and you will find him with a meter in the middle of the stream testing the velocity of the water. When he returns he can tell approximately the horse power that could be developed by the stream, and I think that if some mechanic would place a meter on the exhaust of an automobile he would find the power lost would almost equal one-half the power of the motor if exhausted against a piston attached to the same crank shaft.

G. K. WATSON.

[You evidently did not carry your search far enough, or you would have found that about 1898 a French engineer, Roser-Mazurier, constructed a compound explosive engine at the works of the Compagnie des Moteurs Charon, which when operated on gasoline developed 4.96 horse power with a fuel consumption of 313 grams per brake horse power hour. In this country such engines were built by Graham & Fox, of New York city, about 1903, whose business was later taken over by the Eisenhuth Horseless Vehicle Company, of Middletown, Conn., which manufactured automobiles with compound motors for several years. Such motors undoubtedly possess advantages from the standpoint of fuel economy and noiseless exhaust, but they are heavier than ordinary motors of the same output, and weight efficiency has so far been a more important factor in automobile motors than either fuel efficiency or noiselessness.—Ed.]

Offset Cam Shafts—Valve Arrangement.

Editor HORSELESS AGE:

Regarding use of offset crank shaft, and its discontinuance, at the time of the adoption of the "silent Knight" motor by the English Daimler Company some two years ago, it was published that (I think) Mr. Knight had publicly stated that in his experiments and practice in this country he had never been able to obtain a really silent engine, and that the reason was pronounced by the Daimler engineers, from their experience, to have been that he used the offset crank shaft, and they as a consequence used the common design of cen-

tred shaft in building the Daimler Knight motors. I speak only from memory, and am not sure that this appeared in the columns of HORSELESS AGE, though I think it did.

To touch upon an entirely different subject: In HORSELESS AGE of November 23d in the article by Roy Lindsay on the Ninth Olympia Show, near bottom of first column, page 705, under heading "Single Cam shafts" he writes: "A single cam shaft driving all the valves on one side of the engine, has entirely superseded valves on opposite sides," etc., while on the next page Chester S. Ricker, speaking of The Latest European Creations, in last column under heading "The Application of the Silent Chain," says: "The Humber represents the most usual type of engine, where the valves are on opposite sides of the cylinder." When one authority states T cylinders to be the most usual type, and another pronounces same to be obsolete, which are we to accept? R. W. B.

[We do not believe that the offset cam shaft will make the valves the least bit more noisy than the central cam shaft. That Mr. Knight's American-built engines did not possess the desired silence was undoubtedly due to the fact that they were built in small, poorly equipped shops.

The tendency is undoubtedly toward valves all on one side, both here and abroad, as small, simple and low priced motors are coming more to the front. But while L head motors may exceed T head motors in number, the latter can hardly be called obsolete so long as they are used on most of the high priced cars.—Ed.]

Automatic Prony Brake.

Editor HORSELESS AGE:

Can you tell me of any form of Prony brake with which, for a given tension of the friction band, the load can be made to vary with the shaft speed? The difficulty with the ordinary form in gasoline motor testing is that with a diminution of shaft speed the motor is stalled because of the failure of the resisting torque to decrease proportionately.

It seems as though a scheme which would overcome this difficulty could be devised, but if the problem has already been satisfactorily solved I should be glad to know of it. N. S. SEELEY.

[We know of no form of Prony brake in which the resistance automatically decreases with the speed of rotation. In testing automobile motors other forms of dynamometers are generally used, the resistance of which varies with the speed. The two most commonly used types are the dynamo mounted on ball bearings and provided with a torque arm the same as the Prony brake, and the fan dynamometer. If any reader knows of a type of Prony brake in which the resistance decreases as the motor slows down we shall be glad to hear from him.—Ed.]

Japanese Units of Value and Weight.

Editor HORSELESS AGE:

Referring to the article on the "New Japanese Tariff," in your last issue, the statement that one "yen" is equal to about 72 cents is not right. It is equal to about 50 cents, or a little less. Unit of weight (kin) is different according to the goods. In this case, thinking it's hardware, one kin is equal to about 1 1/3 pounds. R. H.

[The Standard Dictionary gives the value of the yen as 93 cents.—Ed.]

Offsetting Crank Shafts.

Editor HORSELESS AGE:

Referring to your comments on offset crank shafts I beg to call your attention to an article in your issue of October 28, 1908, regarding the refining of the American Silent Knight motor by the English Daimler Company. They, by abolishing the offset crank shaft used by Knight in this motor, caused this motor, which could not exceed 1,300 r. p. m. without racking itself to pieces, to be able to turn 2,000 r. p. m. Also notice remarks regarding Minerva Company's discovery of loss of power in their motors.

OSCAR J. FROCK.

Resistance to Motion of Vehicles.

Editor HORSELESS AGE:

Will you kindly explain in the columns of your paper what force is required to push a car ahead on a level road at speeds of 10, 20, and 50 miles per hour, assuming the car to weigh 5,000 pounds. A. L. B.

[The force required to push the car ahead depends not alone on the weight but also on the area exposed to the wind or to air resistance, especially at high speed. The force required by road resistance alone is about 25 pounds per thousand pounds, which makes 125 pounds for 5,000 pounds. The air resistance is equal to

$$A \cdot 0.0017 \cdot v^2 \text{ pounds,}$$

A being the forwardly projected area of the car in square feet, and v^2 the speed in feet per second. The forwardly projected area of a car of the size you mention may be taken at 12 square feet. The speed in feet per second corresponding to the different mile-per hour rates inquired about are:

$$10 \text{ m. p. h.} = 14.66 \text{ ft. p. s.}$$

$$20 \text{ m. p. h.} = 29.32 \text{ ft. p. s.}$$

$$50 \text{ m. p. h.} = 73.30 \text{ ft. p. s.}$$

The air resistances for three speeds therefore are:

$$0.0017 \times 12 \times 14.66^2 = 4.38 \text{ lbs.}$$

$$0.0017 \times 12 \times 29.32^2 = 17.32 \text{ lbs.}$$

$$0.0017 \times 12 \times 73.30^2 = 109.6 \text{ lbs.}$$

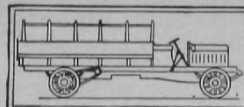
The total resistances (road traction plus air resistances) will therefore be, approximately:

$$\text{at } 10 \text{ m. p. h. } 125 + 5 = 130 \text{ lbs.}$$

$$\text{at } 20 \text{ m. p. h. } 125 + 30 = 155 \text{ lbs.}$$

$$\text{at } 50 \text{ m. p. h. } 125 + 110 = 235 \text{ lbs.}$$

—Ed.]



Commercial



Vehicles.

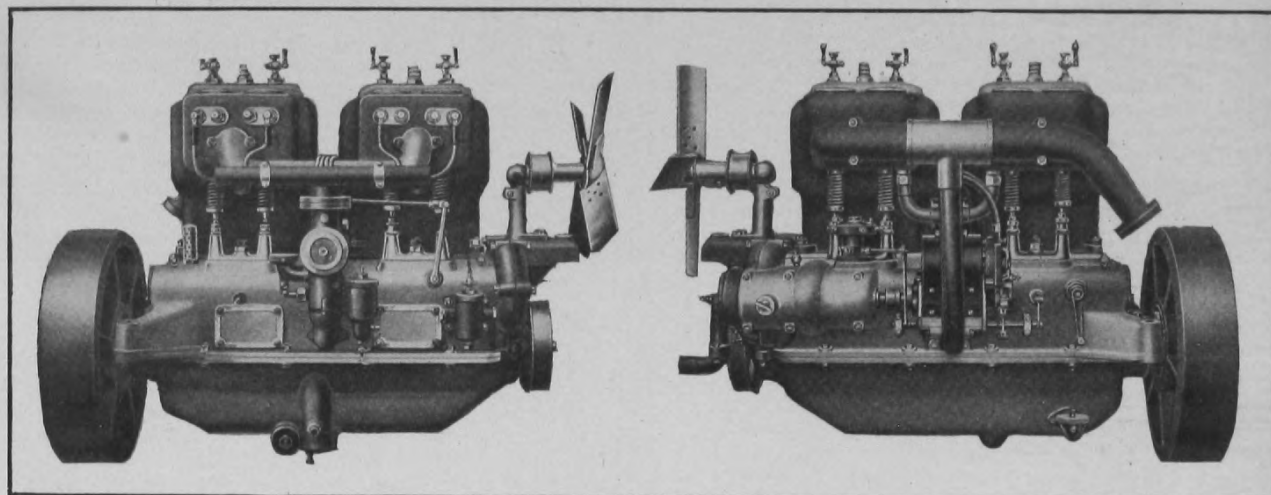


Gaggenau Trucks.

Two sizes of motor trucks, a five ton and six ton, manufactured by the South German Automobile Works of Gaggenau, Germany, a subsidiary of the firm of Benz & Cie., are imported into this country by the Benz Auto Import Company, of 250 West Fifty-

the motor outputs. Both trucks have four cylinder motors, the one on the five ton truck having $4\frac{1}{8}$ inch by 6 inch cylinders and being rated at 30-35 horse power, and that on the six ton truck having cylinders 5 5-16 inch by 6 inch and being rated at 45-50 horse power. The cylinders are cast in pairs and have their inlet and exhaust

of the frame located just back of the radiator. The lower half of the crank chamber serves simply as an oil well, and the motor may be run for a short time with this part removed. This permits of easy inspection of the connecting rod and main bearings, and even of a renewal of the connecting rods. It is also possible to remove the



INTAKE SIDE.

GAGGENAU MOTOR.

EXHAUST SIDE.

fourth street, New York city. The Gaggenau firm was originally organized to manufacture commercial vehicles, and is one of the pioneers in that branch in Germany. Its motor trucks are in service in all parts of the world, and some of the models are subsidized by the Prussian War Office.

Though the difference in the capacity between the two trucks imported is relatively small, there is quite a notable difference in

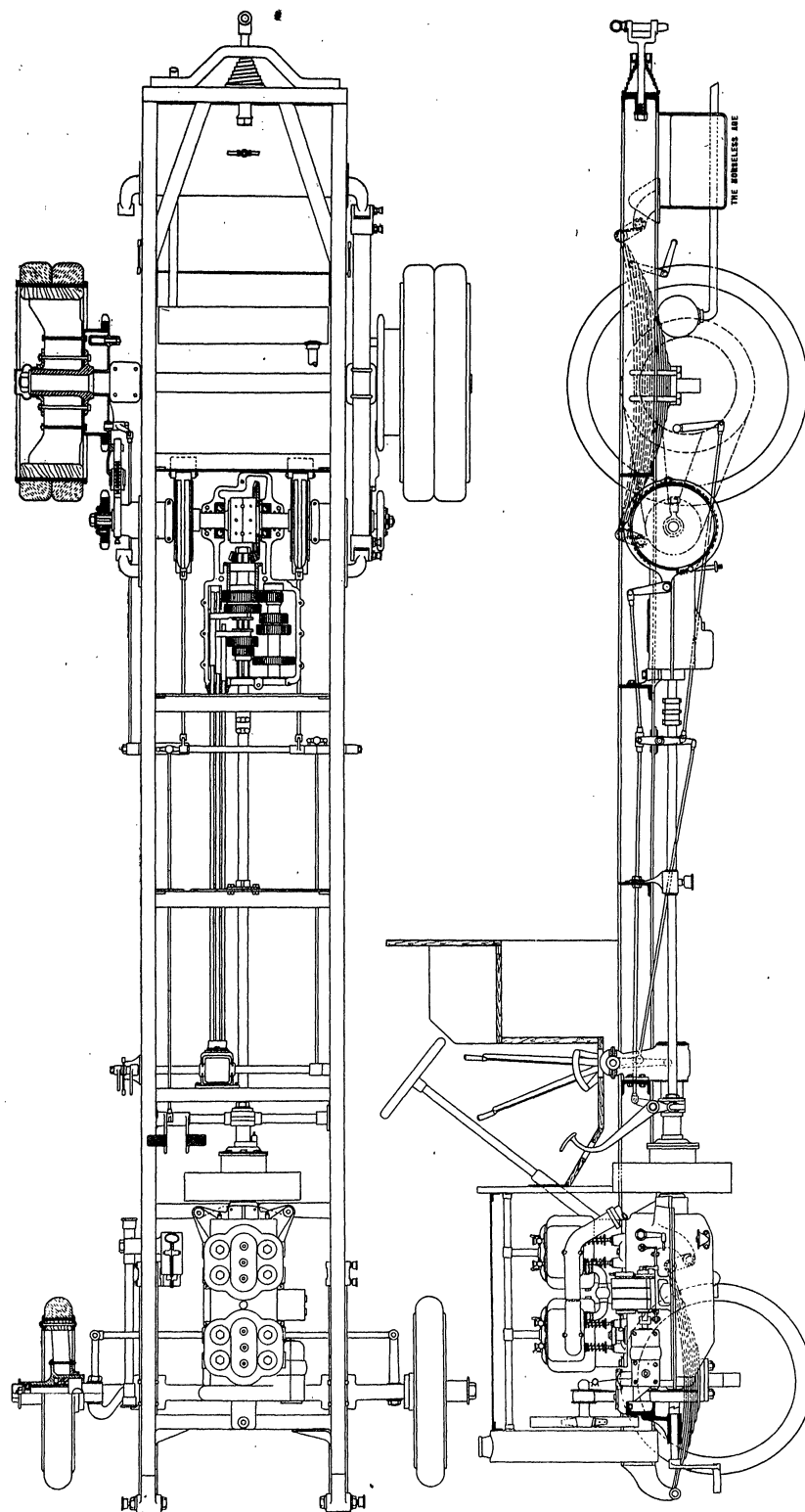
valves on opposite sides. The crank shafts are supported in three bearings entirely contained in the upper halves of the crank cases. The motor has a three point suspension, the upper half of the crank chamber being cast with two short arms resting on a cross member of the frame just back of the motor, and a third supporting arm extends from the crank chamber centrally in front, and also rests on a cross member

crank shaft with the flywheel without taking the motor from the truck.

A four jet carburetor is fitted at the right hand side of the motor and connects by a simple manifold to the siamesed inlet ports. This carburetor is provided with a barrel shaped throttle valve, which, as it is rotated in its housing, brings one after another of the four jets into action. The primary air is taken from a jacket around the exhaust



GAGGENAU SIX TON TRUCK.



PLAN VIEW AND ELEVATION OF GAGGENAU CHASSIS.

pipe on the opposite side of the motor, whence it is drawn through a pipe down to a passage cored in the upper half of the crank chamber. The lower portion of the carburetor is bolted directly to the outlet of this passage on the opposite side. A supplementary spring controlled air valve is fitted, and mechanical control of the supplementary air is also provided. Two independent ignition systems are installed, one comprising a Bosch high tension magneto and the other a storage battery and coil system. The two sets of spark plugs screw into the sides of the inlet valve chambers. The ignition cables are carried through copper tubes, and are thus thoroughly protected against mechanical injury. The spark time is variable with both ignition systems. The battery timer is located immediately in front of the magneto at the top of a vertical shaft driven from the exhaust cam shaft, and its lever and the lever of the magneto interrupter are interconnected by a link and lever system, so that both systems will be advanced or retarded simultaneously.

Lubrication of the motor is effected by a positive circulation system. About two gallons of oil is carried in the motor base, which is circulated by means of a plunger pump inside the base, driven by means of an eccentric and return spring from the inlet cam shaft. The oil delivered by this pump is forced through a sight feed on the dash, and thence through a distributor back to the crank chamber, which it enters through perforated tubes, from which it is thrown over the lower ends of the connecting rods and the pistons. Practically all of the oil tubes are inside the crank chamber, thus insuring a clean design and the utmost accessibility of all motor parts. The oil drawn in by the circulating pump is thoroughly filtered, and all grit and metal dust are removed before it is again applied to the wearing surfaces. In addition to the constant circulation of the oil supply contained in the motor, additional oil is fed to the crank chamber from an oil tank located under the footboard, by means of gas pressure derived from the exhaust. This oil also passes through a sight feed on the dashboard, and the rate of feed can be adjusted at will. There is also a pressure feed grease cup on the dash, with leads to the water pump and clutch collar respectively.

In the heavy motor truck the cooling system constitutes one of the main problems of design. This has been thoroughly worked out in the Gaggenau truck, and we are assured that even in the heaviest work in hot weather the motors of these trucks never show the least sign of overheating. The radiator consists of flat tubes bent zig-zag fashion and arranged vertically so as to produce a sort of honeycomb effect. The centrifugal water pump is driven off the forward end of the exhaust cam shaft and connects by a short length of tubing and rubber hose with the bottom tank of the radiator. The pump discharges into a passage cored in the upper half of the crank

case, which terminates about the middle of the length of the case. From its outlet a Y shaped tubular connection conveys the water to the jackets around the exhaust valves, where the heat is the most intense and the greatest cooling effect is required. The radiator is carried on the main frame by hinged supports, and braced at the top by the water return manifold, which extends in one straight line from the dashboard to the radiator and has lengths of rubber hose incorporated in both its vertical and horizontal sections. A four bladed fan is mounted on the engine base back of the radiator and driven by a flat belt from the crank shaft. To facilitate starting the motor the exhaust cam shaft is provided with relief cams, and is so arranged as to be capable of being shifted to bring these relief cams into action when it is desired to crank the motor.

A governor is mounted on the exhaust cam shaft and is enclosed in a housing, which also encloses the driving gears for the pump, magneto and battery timer. This housing is made in halves, joined in a vertical plane, and the outer half can be quickly removed when access to the governor or other enclosed parts is desired. One of the unusual features of the Gaggenau motor is the manner in which control members are carried straight through the upper half of the crank case, instead of around the engine, and the way in which passages are formed in the crank case casting for conveying the cooling water and combustible charge. The control shaft connecting the governor with the throttle valve leads right through the top half of the crank case between the two forward cylinders, and a rod in the ignition timing linkage leads through the top half of the crank case between the two rear cylinders. The motor, as well as the other parts of the car, bears every evidence of having been thoroughly worked out on paper before being executed in metal.

Fan shaped spokes are a feature of the flywheel. The clutch, which is built together with the flywheel, is of the multiple disc type, composed of ground steel discs. The change speed gear is of the selective type, and gives four forward speeds and one reverse. It is mounted on ball bearings throughout. The high speed is a direct drive. The gear box is located only a short distance in front of the rear axle, and connects to the clutch by means of a long shaft, which is supported in a special bearing on a frame cross member near the middle of its length, whereby all "whipping" is obviated. The bevel gear drive and differential are enclosed in a rearward compartment of the gear box. From the ends of the jack shaft the drive is transmitted to the rear wheels by means of side chains.

The front and rear axles are solid forgings of Krupp nickel steel. The front axle of the 6 ton truck is $2\frac{1}{4}$ inches wide by $3\frac{1}{4}$ inches high, and the rear axle of the same truck measures $3\frac{1}{4} \times 4\frac{1}{4}$ inches. The frame is made from channel section rolled steel, and is reinforced by truss rods underneath. It is supported by semi-elliptic springs, both in front and rear, the rear springs being

located outside the frame, so as to reduce the bending moment on the axle and lower the frame.

The truck is provided with two independent brake systems. The pedal operated service brakes act on drums on the jack shaft on opposite sides of the gear casing; they are of the contracting type, lined with cast iron, and are readily removable. The hand operated emergency brakes are of the internal expanding type, and act on drums secured to the rear wheels. The steering gear is of the screw and nut type. The steering pivots are of special construction, making it possible to bring the pivot centre very close to the centre plane of the wheel, thus reducing to a minimum the reaction of road shocks and making the truck very easy steering. The steering screw is made of steel, and is cut with a peculiar thread, while the nut is made of bearing metal. The rear wheels run on plain bearings, while the front wheels have ball bearings.

The 5 ton truck has a wheel base of 13 feet 6 inches, and the 6 ton truck of 14 feet 10 inches. The tread of both models is 66 inches. The loading space is $6 \times 13\frac{1}{2}$ feet in the smaller truck and 6×14 feet in the larger. The 5 ton chassis weighs 5,400 pounds, and the 6 ton chassis 7,600 pounds. The former, which is fitted with 33×4 inch solid front tires and 36×5 inch dual solid rear tires, is geared to a maximum speed, loaded, of 14 miles per hour; the latter, which has 33×5 inch single solid front tires and $38 \times 5\frac{1}{2}$ inch dual solid rear tires, is capable of a maximum speed of 11 miles per hour. One of the most characteristic features of these trucks is their rugged construction. In addition to the axle, the frames and other important parts are of nickel steel, and both the material and workmanship are of the best throughout.

New York Hackmen Want Cut in Taxi Fares.

Commissioner Francis V. S. Oliver, of the Bureau of Licenses, had submitted to him last Saturday, December 10, a plan for a radical change in the present rate of cab fares. The plan was gotten up by the Independent Hackmen's Association, and provides for a material reduction in the present rates, fixing the fare for the first mile at 30 cents, the rate to be a flat one for horse cabs, while a charge of 10 cents is to be made for each additional third of a mile by taxicabs.

In addition to this the idea provides for the abolition of all private hack stands, which will be replaced by public stands. At each of these a city official acting as an inspector shall be in charge.

In speaking of the plan Thomas Duffy of the Hackmen's committee said:

"Our plan involves the establishment of a call system to be installed in restaurants, cafés, subway stations, department stores, theatres and similar places where there might be sufficient demand. Under this plan any person may call a cab and within five minutes have his call answered.

"We favor a high license, and penalties

requiring its revocation whenever its terms are violated. We believe all the stands should be thrown open to any licensed cab driver who applies, is willing to take out a license and to obey its provisions. This would insure the public against unscrupulous practices and would naturally tend to drive dishonest men from the business and create a reliable cab service."

Duffy and the rest of the delegation told Oliver that the income in cab and hack hire should average about \$1,000,000 a week in New York city. The commissioner promised to take steps in the near future to reorganize both the taxicab and horse drawn vehicle business in the metropolis.

New York to Have Motor Fire Engine.

Following the example set by numerous smaller cities, the metropolis at last is to have an automobile steam pumping fire engine, and if successful it may sound the knell of the dashing and picturesque, but less efficient fire horse. Fire Commissioner Waldo recently gave the matter close study, and with the approval of Chief Croker made a contract with the Nott Fire Engine Company, of Minneapolis, to build a modern engine propelled truck. Two of the fire department's mechanics have been sent to Minneapolis to the shops of the company to pick up some pointers on the new engine, and when the machine is ready for delivery they will have charge of it in New York.

The engine will pump 800 gallons per minute, the pumping to be done by steam, although the car itself will be propelled by a gasoline motor.

Macon's Fire Equipment a Regular Elephant.

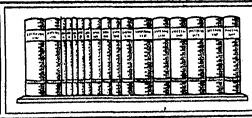
Although the Macon (Ga.) City Council has just purchased \$18,500 worth of automobile fire equipment, the investment is at present an elephant on the city's hands. The reason is that no place can be found by the city council to install the equipment. It was originally intended to equip a new \$12,000 fire station in Vineville in order to secure a reduction of insurance rates, but citizens of that section have protested against a fire house being located in their midst. The city owns lots recently bought on Ward street, Rogers avenue and Georgia avenue but citizens of these localities announced that should a fire house be built an injunction will be applied for to stop the work. It has been suggested that it would be a good plan for the city to try to sell the equipment back to the company which manufactured it.

New Bedford Wants Fire Engine.

The fire department of New Bedford, Mass., has recommended that the city council appropriate \$1,200 for a 30 horse power chassis for the master mechanic of the department. The fire committee recently made a round of the garages in that city, looking at various makes of cars.



Legislative and Legal.



Recent Decisions

STATUTE OF LIMITATIONS.

Where an action was brought for failure to stop an automobile on signal, thereby causing a team to run away and injure plaintiff's wife, although the defendant was charged to have disregarded the signal wilfully and unlawfully, it was held that it was an action for negligence and controlled by Connecticut Public Acts, 1903. Chap. 149, and was barred within one year from date of injury by Statute of Limitations.—*Sharkey vs. Skilton*, Connecticut, 77 Atl., 950.

CONTRIBUTORY NEGLIGENCE OF MOTORIST.

In an action by the owner of an automobile against a trolley car company for damages for collision, the jury rendered a special finding that plaintiff was guilty of contributory negligence, but notwithstanding this, that the defendant with the exercise of ordinary care could have prevented the injury. Judgment for plaintiff was reversed on the ground that the proximate cause of the injury was the reckless and unlawful driving of his automobile by plaintiff through the streets at a dangerous rate of speed when approaching the car-line tracks and barred recovery. It was held that it was plaintiff's duty to have the car under complete control and to look and listen when approaching car tracks, and the collision was brought about by the attempt to rush across the track ahead of the car.—*Lindley vs. Fries Manufacturing & Power Company*, North Carolina, 69 S. E., 274.

WARNING AGAINST SPEED TRAPS.

Constables were on duty observing and timing the speed of motor cars driven along a certain road with a view to the prosecution of the drivers of such cars as should be traveling at an illegal speed. For that purpose they had measured a certain distance along the road. The defendant warned the drivers of cars which were approaching the measured distance of the presence of the constables and the purpose for which they were there. There was evidence that at the time the warning was given the cars were being driven at an illegal speed, and the drivers upon receipt of the warning slackened their speed and proceeded over the measured distance at a lawful speed, whereby the constables, as the defendant intended, were prevented from obtaining such evidence as would be accepted as sufficient in a police court that the drivers of the cars were committing an offense.

Held, that the defendant had wilfully obstructed the constables in the execution of their duty within the meaning of the Pre-

vention of Crimes Amendment Acts.—*Betts vs. Stevens*, L. R., K. B., Vol. 1, 1910

NO ORDER FOR EXAMINATION TO OBTAIN EVIDENCE FOR A COMPLAINT.

In an action for conspiracy to prevent the plaintiffs from purchasing automobile tires and for procuring them to be black-listed it was held that an order for the examination of parties in order to frame a complaint would not be allowed, as no facts were shown rendering it necessary to perpetuate testimony.—*In re Moto Bloc Import Company*, New York, 125 N. Y. Supp., 427.

REFILLING ACETYLENE TANKS.

The *Claude & Hess* patent, No. 664,383, for an acetylene gas tank for use on automobiles, etc., covers not only the steel tank containing acetone, but the internal equipment, consisting of a supersaturated solution of acetylene gas, which is recognized as an essential part of the device. The final conclusion of the Patent Office was that the gaseous solution bore the same relation to the outer shell as the column of mercury bears to the glass stem and bulb of a thermometer. An unlicensed refilling of the tanks after the gas has been exhausted, therefore, constitutes an infringement, and one who knowingly aids and abets such refilling is a contributory infringer. The tank, with normal use, requires recharging after having been used a certain number of hours. The owner of the patent, it is held, may, by a notice attached to the tanks when sold, prohibit their use except when charged by the seller. Anyone who, with knowledge of such limited license, recharges such tanks infringes the patent, since such recharging requires the practice of its invention. And anyone who with such knowledge sells an apparatus used and designed for recharging the tank is chargeable as a contributory infringer.—*Commercial Acetylene Company vs. Autolux Company*, Circuit Court, E. D., Wisconsin, 181 Federal Rep., 387.

FALSE REPRESENTATION IN SALE OF AUTOMOBILES.

The defendant showed the plaintiff an automobile which he represented to be the latest model of 1907. It was in fact a model of 1906, but plaintiff, relying on the representations, purchased it for \$2,815, delivering to the defendant in part payment a second hand automobile at an agreed valuation of \$1,000. There was evidence tending to show that the 1907 model was a decided improvement on that of 1906. The court held the value of the automobile delivered to be \$2,120, that the market value of that agreed to be purchased was \$2,650, and gave judgment for

the difference, \$530. A contention that the car taken in exchange was not of the value of \$1,000 was not sustained. There was evidence that the defendant, an expert motor car man, examined it, saw its condition and manner of construction, and fixed the price at which he was willing to receive it in exchange. It appeared that he took the machine on the faith of his own examination and at a value determined by himself.—*Luckenbach' vs. Smith*, California Court of Appeals, 111 Pac., 266.

AUTOMOBILE DRIVER NOT NEGLIGENT.

An automobile, while proceeding at a speed not exceeding 6 miles an hour, collided with a boy playing on a public street. The trial court, notwithstanding a verdict of the jury to the contrary, held the driver of the automobile not negligent in its management. All the eye-witnesses of the accident testified that the boy ran into the machine; and there was a dent in the fender on the side of the machine where it was claimed he ran into it. The boy alone testified that he was standing still when struck. Under the rule that a decision on conflicting evidence will be affirmed unless it clearly appears to be erroneous, judgment for the defendant was affirmed.—*Rogers vs. Brown*, Wisconsin Supreme Court, 128 N. W., 64.

AUTOMOBILE FACTORY OWNERS LIABLE FOR WORKMEN'S NEGLIGENCE.

A woman whose lot adjoined an automobile factory was, while in her garden, struck by a piece of iron thrown from a window in the factory by some of the workmen. They had daily, for a year or more, thrown pieces of iron into the garden from the windows, notwithstanding protests from the plaintiff and orders from the manager of the factory. It was held that the owner of the factory was liable for the injuries sustained. The facts showed that it was guilty of suffering a nuisance to exist on its premises and it was liable without proof of negligence.—*Hogle vs. H. H. Franklin Manufacturing Company* New York Court of Appeals, 92 N. E., 794.

Rush for Jersey Licenses.

It is reported from the office of one of the New Jersey deputy commissioners in New York city that the rush for 1911 license tags for the Mosquito State has set in with a vim. It is said that a suspicion prevails that at the next Legislature at Trenton the advice of the New Jersey Grangers' Association may be accepted, and that the yearly fees will be raised to double the present schedule if reciprocal arrangements are made with other States, so that tourists from these can motor in New Jersey without paying a license fee to that State.

New State Examiners Appointed.

Frederick H. Elliott, secretary of a touring information company in New York, has been reappointed chief examiner of chauffeurs by Secretary of State Koenig, and will divide his time between Albany and his New York office. Herbert H. Patterson, of Brooklyn, and Charles Wright, of New York, have been appointed to assist Mr. Elliott in the first district, which includes Greater New York, Long Island and Westchester County.

The State has been divided into nine districts, and examiners for these respective districts have been appointed from the State Civil Service list. Exclusive of District No. 1, the list is as follows:

Dutchess, Putnam, Columbia, Greene, Ulster, Orange and Rockland Counties—Henry M. James, Hudson.

Albany, Rensselaer and Schenectady Counties—Bernard Schmidt, Albany.

Sullivan, Delaware, Schoharie, Otsego, Chenango, Broome and Tioga Counties—Clark A. Sanford, Margaretville.

Herkimer, Montgomery, Madison, Oneida and Lewis Counties—Louis I. Lutes, Herkimer.

Washington, Saratoga, Fulton, Warren, Hamilton, Essex, Clinton, Franklin and St. Lawrence Counties—Robert G. Remington, Saratoga.

Cortland, Tompkins, Seneca, Cayuga, Onondaga, Oswego and Jefferson Counties—Charles A. Benjamin, Syracuse.

Chemung, Schuylar, Steuben, Allegany, Wyoming, Erie, Cattaraugus and Chautauqua Counties—George L. Long, Warsaw.

Wayne, Ontario, Yates, Livingston, Monroe, Genesee, Orleans and Niagara Counties—Ruric H. Strickland, Rochester.

City Council Regulating Automobile Signals.

Patients in Columbus, Ohio, hospitals, as well as the public at large, are to be protected against noises incidental to the operation of automobiles and motor cycles by an ordinance now pending in the city council. The council judiciary committee has approved the ordinance and recommends its passage. The ordinance prohibits the use of anything except a signal horn of low tone or a 5 inch bell on electric cars other than those used by the fire department. Hospitals may erect signs of warning 500 feet in every direction, and it will be unlawful for the operator of a motor driven vehicle to make any unnecessary noise with 200 feet of such institution.

After Taxi Grafters in Chicago.

City Sealer Kjellender, of Chicago, has started a crusade against taxicab drivers who indulge in overcharging passengers, and has applied to the chief of police for aid along this line. According to Kjellender, there is considerable grafting going on, and he says that two men recently hired a taxicab on the South Side, and after driving 3 miles they noticed that the flag of

the meter had not been pulled down. When the ride was finished the chauffeur threw up the flag and announced that the fare was \$6.30. As the trip did not cover more than 5 miles, for which the legal fare is \$2.20, the chauffeur was ordered to drive to the police station. He refused, and in a little while was glad to accept \$1 as a compromise.

Attorney General's Decision on Second-Hand Car Licenses.

Last week Attorney General O'Malley, of New York State, rendered a decision which is of considerable interest to dealers throughout the State and others who may purchase or exchange second-hand cars. He holds that a dealer may purchase a second-hand automobile which is properly registered and operate that vehicle under the dealer's or manufacturer's registration number without paying the usual fee of \$1, which is required to transfer the registration number from the vendor to the vendee of a motor vehicle.

The Attorney-General also draws attention to the point that notice of the sale of a duly registered car should be given to the

Imports and Exports for October.

The imports of foreign automobiles into the United States are decreasing month by month, and even the imports of parts, which held up pretty well until recently, now show a heavy decline. During the month of October last there were imported 59 automobiles valued at \$125,919, and parts valued at \$23,400, a total of \$149,328, as compared with 104 automobiles valued at \$290,857, and parts valued at \$84,084, a total of \$374,941, during October, 1909. This shows a decline of practically 60 per cent. Of the 59 cars imported during October last 30 came from France, 13 from Italy, 7 from Germany and 4 from the United Kingdom. During the ten months ending with October, 1910, there were imported 868 automobiles valued at \$1,749,059, and parts valued at \$615,189, a total of \$2,364,248, as compared with 1,352 automobiles valued at \$2,509,271, and parts valued at \$740,455, a total of \$3,249,726, for the corresponding period in 1909. The accompanying table shows the countries of origin of the cars imported and the number and value imported from each:

IMPORTS FOR TEN MONTHS ENDING WITH OCTOBER						
1908.		1909.		1910.		
Imported from—	No.	Value.	No.	Value.	No.	Value.
United Kingdom.....	67	\$141,537	86	\$201,886	66	\$161,262
France	820	1,453,930	781	1,380,907	479	897,950
Germany	20	54,595	84	239,443	103	259,352
Italy	213	435,687	345	565,050	153	280,388
Other countries.....	15	45,651	56	121,985	67	150,107

Secretary of State even though the purchaser is a dealer or manufacturer. The law requires notice of sale of a registered automobile to be given to the Secretary of State and provides that the purchaser may have the right to use the registration of the former owner upon paying a fee of \$1. This fee is not required where the purchaser is a dealer having a general manufacturer's number, provided the machine is one of the kind he is engaged in handling.

Pennsylvania Motor Federation Trying to Abolish Toll Gates.

At the next meeting of the Legislature at Harrisburg, Pa., the Pennsylvania Motor Federation will endeavor to have the toll gate nuisance abolished. Nearly every other State in the Union has done away with this system of taxation which has been termed "polite robbery," largely for the reason that the tolls enrich the stockholders of the toll roads to an extent of which the original settlers and builders never dreamed.

The chief complaint now is that the proprietors of the roads do not furnish motorists with good highways and have ceased in nearly every case to keep the roads in any sort of repair, and the rule seems to be, the poorer the road the higher the toll. The Motor Federation set about its task originally by approaching the candidates for office, and in practically every case the candidate put himself on record as promising that he would vote to abolish the system if elected.

During October, 1910, there were exported 539 automobiles valued at \$647,785, and parts valued at \$123,854, a total of \$771,639, as compared with 338 automobiles valued at \$439,326, and parts valued at \$83,443, a total of \$522,769, for October, 1909. During the ten months ending with October, 1910, there were exported 7,008 cars valued at \$9,521,851, and parts valued at \$1,669,787, a total of \$11,191,638, as compared with 3,764 cars valued at \$5,921,033, and parts valued at \$701,593, a total of \$6,622,626, during the same period in 1909. The distribution of our exports for the first ten months of the last three years, respectively, is shown by the following table:

EXPORTS FOR TEN MONTHS ENDING WITH OCTOBER—			
Exported to—	1908.	1909.	1910.
United Kingdom.....	\$1,605,075	\$1,839,772	\$2,498,171
France	538,865	789,735	679,757
Germany	151,467	157,974	322,998
Italy	221,519	214,430	355,522
Other Europe....	201,711	392,968	641,962
Canada	1,047,024	2,120,600	4,422,383
Mexico	249,036	375,153	571,962
West Indies and Bermuda	137,117	232,137	321,766
South America....	101,677	158,701	334,337
British Oceania..	75,165	192,337	413,441
Other Asia and Oceania	115,097	138,216	451,998
Other countries..	51,750	100,603	177,341

During October last there were exported automobile tires to the value of \$103,788; exports of such tires during the four months since July 1 amounted in value to \$535,071.

Hot Rolling Differential Gear Members.

Harold N. Anderson, engineer of the Speedwell Motor Car Company, Dayton, Ohio, has perfected a new method of manufacturing gears, that is, the hot rolling of the teeth to size or a little over size if desired. Although the first principle is old, it has never until recently been developed to a commercial basis. The advantages of this process are claimed to be as follows:

The whole periphery of the gear is rolled in one or two heats, depending on the size of the blank, which gives an idea of the rapidity with which these gears can be made, and of the saving in cost. A more dense metal is obtained in the teeth, as can readily be seen, as each tooth has an enormous pressure exerted on both faces crowding it together, and producing a tooth 50 to 100 per cent stronger.

A perfect tooth is developed. While this statement may seem open to criticism, it has been demonstrated that the shrinkage on the diameter of this gear can be absolutely gauged, and an allowance made for it, the main point being that the blanks are of uniform heat before being operated on. The accuracy of the finished gears is as close as steel gears which are cut and case hardened, and the product can be used for differentials and transmissions in the cheaper class of cars without being refinished or trued up. This also gives an ideal proposition when it comes to rolling gears over size and grinding the faces of the teeth afterwards.

The tendency to warp in case-hardening is a great deal less in the rolled gear than in a cut gear, as the structure of the metal at the periphery is changed while hot, and there are no internal strains to be righted in the case hardening operation, as is the case with a cut gear when the periphery has been changed when the metal is cold.

The surface left by the rolling process has a hard outer shell, which in a great many classes of work would give a first class wearing surface without being case hardened.

This rolling process may be applied to bevel as well as spur gears, and when a bevel is roughed out on the machine at the present time it is impossible in the ordinary roughing machine to follow the correct contour of the tooth, which leaves considerable more stock for the finishing cut than necessary. This refers to a bevel gear which is roughed by the rolling process and finished in a gear-cutting machine. For the bevel gears used in differentials the accuracy is high enough for the best grade cars. The limit of accuracy on the pitch diameter will not be over .005 on an 8 inch pitch diameter gear, and on the tooth itself .003. The scale which is thrown off by rolling is negligible, being about the same thickness as the scale in case hardening, and does not interfere with the accuracy of the tooth.

The gears will be furnished sand blasted all over, and gears made by this system carefully and ground with emery, the same as the ordinary cut gears are handled for transmission purposes, will be as quiet in transmissions and be more durable as far as strength and wear goes.

Palace Show Has Nearly Seventy Car Exhibitors.

While it was predicted by some of the "knowing" ones that there would be but few exhibitors at the show of the American Motor Car Manufacturers' Exhibit Association in Grand Central Palace, December 31-January 6, it looks now as if these wisecracks are doomed to disappointment, for the list of exhibitors of cars now numbers more than sixty. The fact that an organization has been effected—the National Association of Motor Car Manufacturers—doubtless means that a number of independent makers who did not care to enter while the matter was "up in the air" will now be willing to purchase space, as a good sized show is now assured.

Among the late comers who have applied for locations are the following: Maytag-Mason Motor Company, Waterloo, Ia.; Ideal Motor Company (Sage & Creighton trucks), 701 Grand River avenue, Detroit, Mich.; Velie Motor Vehicle Company, Moline, Ill.; Colt-Stratton Company (Cole "30"), New York, N. Y.; Flanagan Motor Car Company (Monitor trucks), 679 Seventy-third street, Brooklyn, N. Y.; Otto Motor Car Company of New York (Crown truck of Milwaukee), 1964 Broadway, New York; Carter Motor Car Corporation, Washington, D. C., and Beyster-Detroit Motor Car Company, Detroit, Mich.

American Road Makers' Convention.

Widespread interest in good roads has been aroused in Indiana by the American Good Roads Congress, which met in Indianapolis during the week of December 5. Several hundred delegates gathered from all parts of the United States, and all phases of road building were discussed.

On Indiana Day, Friday, it was decided to appoint a special committee to draft and have introduced in the Indiana Legislature a bill providing for the creation of a State highway commission. This committee is composed of representatives of a number of commercial and civic associations, Fred I. Willis and H. O. Smith representing the Indianapolis Automobile Trade Association. Carl G. Fisher and Charles A. Bookwalter represent the Indianapolis Trade Association. A movement has also been started in Indianapolis to build a paved highway from the city limits to the Hamilton County line, a distance of 12 miles. The road would be of brick construction, and the matter of building it has already been taken up with the Marion County commissioners.

Busy Program for A. L. A. M. Show Week.

Thank goodness! There will be only three or four speakers at the annual banquet of the A. L. A. M. this year. That's a-plenty. Thursday, January 12, is the date selected for the occasion, which comes during the first week of the Madison Square Garden show. The same banquet committee that handled the affair of last April will again be in charge, including H. B. Joy, chairman; Benjamin Briscoe, A. L. Pope, R. E. Olds and H. A. Lozier. It is planned at this banquet, to recognize some of the very old timers in the motor car trade, including those pioneers who struggled in the early days to obtain recognition for their machines and for the infant industry.

During the two weeks of the Madison Square Garden show, there will be meetings of almost every organization of any consequence in the motor car industry. In addition to the A. L. A. M. banquet there are several other meetings and events already scheduled, as follows:

- January 10—Meeting of executive committee of the American Automobile Association. The contest, good roads, legislative and touring boards will hold open sessions during the two weeks' period of the show.
- January 11—Meeting of executive committee of the Association of Licensed Automobile Manufacturers at official headquarters, 7 East Forty-second street, New York.
- January 11—Meeting of executive committee of National Association of Automobile Manufacturers.
- January 11-12—Annual meeting of Society of Automobile Engineers at the Automobile Club of America. A dinner will be held during the session.
- January 12—Meeting of board of managers of the Association of Licensed Automobile Manufacturers, at executive offices.
- January 13—Annual meeting of the Motor and Accessory Manufacturers' Association. Annual dinner at Waldorf at night.

Dayton Truck Company Buys Plant.

The Dayton Auto Truck Company has purchased the factory of the C. W. Raymond Company, First and Taylor streets, Dayton, Ohio. The plant has been occupied by the purchasing company for several months, but the actual sale did not take place until last week. R. T. Johnson is president, and J. B. Aldrich general manager of the concern, which will manufacture commercial vehicles in larger quantities during the coming season.

Business Troubles.

Suit asking for a receiver has been filed in the Superior Court at Indianapolis by the Gibson Auto Company against the Auto Sales Company, on an account of \$32.05, insolvency being alleged. The Auto Sales Company was first organized about one year ago, and has since been reorganized. It has the Jackson, Stearns, Fuller and Monitor agencies.

Caley Manager of Hustling Cincinnati Club.

Frederick H. Caley, who has been Registrar of Automobiles of Ohio since the establishment of that department, has been appointed general manager of the Cincinnati Automobile Club and will assume this office January 15. The place was created especially for Caley, who has become well and favorably known in automobile circles, not only in Ohio but in the country at large. The position was offered to him at a meeting at the Gibson House, December 7, he having had the matter under advisement for some time.

Caley is the author of a greater part of the present automobile law of the Buckeye State, and as such has originated one of the best laws in any State in the Union. He is credited with many reforms in the relations between the State and the motorists who use the highways.

One of the new incumbent's duties will be to foster and develop a propaganda for better legislation, good roads and an increase in membership in the club. Reforms in the signboard matter will also be taken up by Caley. In other words, the club expects to grapple with the question of publicity in the same manner as other clubs have done. He will be editor-in-chief of the



Honk-Honk, the organ of the Cincinnati Club and the Ohio State Association.

Ohio Electric to Merge With Milburn.

Negotiations are under way for the merger of the Ohio Electric Car Company and the Milburn Wagon Works Company, both of Toledo, Ohio. The former company was organized about three years ago, with a capital of \$75,000 to manufacture an electric vehicle, and some months ago the capital was increased to \$150,000. The Milburn concern has a capital of \$700,000, and manufactures farm wagons, buggies and motor car bodies. The Ohio car has so far been made in a part of the Milburn shops, and the companies have been closely allied.

E. V. A. to Launch Publicity Boom.

At a meeting of the Electric Vehicle Association of America, held in New York on December 3, it was decided to undertake a publicity campaign along broad national lines, and in order to make it effective, it is thought that it will be necessary to expend a minimum of \$50,000 annually for at least three years. Practically half this amount was subscribed by those present at the meeting.

The plan is to further the development and extend the use of the electric vehicle, both pleasure and commercial, and to utilize the magazines and trade papers of national circulation to this end. A big press work campaign has also been suggested. Accordingly a subcommittee was appointed and it was decided to begin the solicita-



A. L. WESTGARD AND RAY McNAMARA IN PREMIER CAR. 1—THROUGH THE ARIZONA NEEDLES. 2—INDIAN PONY HAVING HIS FIRST INTRODUCTION TO A MOTOR CAR IN NEW MEXICO. 3—ROLLING THROUGH THE CALIFORNIA FOOTHILLS.

tion of subscriptions from central stations on the basis of one-twenty-fifth of one per cent. of the gross income of each company, it being felt that this would give all electric lighting and power companies a definite basis of subscription in proportion to the benefits to be received from such a campaign.

Albany Club Active.

The Albany Automobile Club, of Albany, N. Y., has elected the following officers for 1911: President, Dr. Edward G. Cox; vice president Howard Martin; secretary-treasurer, J. C. Fitzgerald. Co-operating with the Albany authorities the club hopes to secure the strict enforcement of the local ordinance requiring all vehicles to display lights at night. It will also co-operate with the State Highway Commission.

Beecroft Retains Leadership of Motor Club.

President David Beecroft, of the Chicago Motor Club, was re-elected head of that organization on December 6, after the most hotly contested election in the history of that organization. His opponent was Charles P. Root, who was defeated by a margin of fifty-nine votes. Because of the many split tickets it required hours of work to ascertain the full results of the election. With but one exception all of the regular ticket were chosen.

For the first vice presidency, Thomas J. Hay won over L. B. Sanders by a sweeping majority, and Henry Paulman was



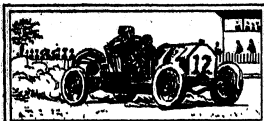
chosen for second vice-president over M. G. Temme. The secretaryship went to N. H. Van Sicklen, Jr. Charles E. Gregory was nominated for treasurer on both the regular and "insurgent" tickets, and, of course, will be the next incumbent of that office. The successful directors include C. C. Sinsabaugh, F. E. Edwards, J. P. Frisbie, W. J. Zucker and John H. Kelly. On the auditing committee L. L. Halle, L. R. C. Campbell and Louis Geyler were chosen.

West Virginia May Reciprocate.

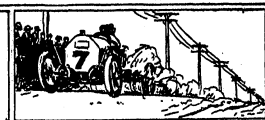
The West Virginia Automobile Association has prepared a bill which is designed to secure reciprocal relations in the matter of automobile licenses between West Virginia and other States. At present this State does not recognize license tags of other States, and while it is against the law for cars to travel there without a West Virginia license, many tourists go through the State without bothering with this little formality, and the law has never been vigorously enforced.

Credit Association Banquet.

Arrangements are being made for the annual banquet of the Automobile Trade Credit Association, to be held the evening of January 18, during the second week of the A. L. A. M. Show.



Sport and Contests.



Portola Contest to Be Known as "Panama-Pacific Race."

In order to help out the general publicity campaign of the Panama Exposition the name of the Portola road race, which is to be held in San Francisco January 2, has been changed to the "Panama-Pacific Road Race." Everything is practically arranged for the event, the necessary road permits having been secured. The course will be 10.91 miles in length, which is about one-half the distance of the 1909 circuit. The principal prize is the St. Francis trophy, which last fall was awarded in a 300 mile race held at Tanforan track.

Two piston displacement class events and a free-for-all are on the card, and the tentative entries include such cars as Fiat, Isotta, Pope-Hartford, Ohio, Franklin and National, the list of drivers including some of the most prominent on the Coast.

Racing Circuit Plan Revived.

As was the case last year when the A. A. A. Contest Board endeavored to form a circuit of racing dates so as to keep down the traveling expenses of manufacturers' racing teams, there will be some difficulty in arranging the 1911 schedule. The Contest Board of the A. A. A. has issued a circular requesting clubs and individual promoters to name the dates desired for race meets, and already has received many requests for bookings in the speed calendar. The official tentative schedule will be issued early in January. One difficulty encountered with the 1910 schedule was that after securing good dates which would not conflict with other events, promoters would suddenly want them changed, knocking the general scheme of things out of kilter.

Ralph Gives a Luncheon.

Partially by way of announcing that he had been released at his own request from his contract with the Fiat Automobile Company, and that he is about to drive a Simplex car on the Los Angeles board track in the January 14-15 twenty-four hour race, but chiefly to show his appreciation for the way the newspaper men have treated him during the past season, Ralph De Palma gave a luncheon to twenty-five of his friends of the press at Hotel Empire, New York city, Thursday, December 8. Everything ran smoothly and the gathering was a decidedly convivial one.

Several of the representatives of the fourth estate made a few remarks complimenting the driver upon his winning, with forty-eight starts in competitive events, thirty first places, seven second places and eight thirds, while out of the total number of starts he was unplaced

but three times. These include all his performances in track races, speedway events, hill climbs and road races, exclusive of exhibitions and time trials. De Palma announced that he will endeavor to break the world's twenty-four hour exhibition record of 1,581 miles made by S. F. Edge on the $\frac{3}{4}$ mile cement motordrome at Brooklands, England, at an average speed of 65.8 miles per hour.

Shuart Gets Speedway Plum.

It is announced by the Indianapolis Motor Speedway management that C. E. Shuart, formerly automobile editor of the Indianapolis *Star*, and more recently in charge of the publicity of the Buick racing team, has been made publicity manager of the Indianapolis Speedway. Shuart has a wide acquaintance in newspaper and automobile circles throughout the country, and is well fitted to carry on the boom for the Decoration Day 500 mile \$25,000 race, as well as the other events of the 1911 season on the Hoosier course.

Winners Awarded Prizes.

At a luncheon given by the New York Automobile Trade Association at the Automobile Club of America, Tuesday, December 14, winners in the recent endurance run under the auspices of that organization received their prizes. William C. Poertner made the presentations, and the successful contenders were made quite happy.

Sporting Flashes.

J. M. Nye, manager of the Atlanta Motordrome, who had his arm broken recently, met with more illness a few days ago, and has been confined to his home for a week trying to improve.

The twenty-four hour race scheduled for the board track at Los Angeles for Christmas Day has been postponed until January 14, owing to the fact that an aviation meet at that city would conflict with the original date.

The South Jersey Motor Club, which recently conducted an automobile meet on the Bridgeton Driving Association's track at Bridgeton, N. J., is negotiating for the purchase of the track to convert it into a motordrome.

An Interstate car is the third entry which has been made for the meet to be held May 27 at the Indianapolis Motor Speedway. The other two entries are a Case, to be driven by Lewis Strang, and a Simplex, with the driver not named.

E. A. Moross was in New York city the early part of the week and started

last Tuesday for Florida with a view to promoting a race meet on the famous beach course on the East Coast.

Herbert Lytle will sail for Europe on the Mauretania December 17, and while abroad plans to visit the principal foreign factories, including the Napier, Isotta, Fiat, Mercedes and Benz plants. He says that he may drive again in races next season.

Directors of the Indianapolis Motor Speedway have changed the date for the 500 Mile International Sweepstakes event from May 27 to Memorial Day, May 30. In the event of inclement weather, the race will be held the Saturday after Memorial Day.

World Touring Hupmobile in Los Angeles.

The world touring Hupmobile party arrived in Los Angeles on December 8, having made its trip from Detroit there in thirty-six days. The party was met by W. M. Nason, the local representative, and party in San Bernardino early in the morning, the escort being augmented in Pasadena by many cars. Efforts were made to have the car held over for the automobile show which opens in Los Angeles next week, but arrangements had already been made to sail Tuesday from San Francisco for Honolulu, so that any such arrangement was impossible. Both car and party came through the strenuous trip from Detroit in good style, but the crew of the sturdy little touring car will welcome the change that the long sea voyage will bring.

Ohio Annual Report.

The report of State Registrar of Automobiles Fred H. Caley for the fiscal year ending November 15 shows that there are about 35,000 automobiles in use in the Buckeye State. Licenses were issued to owners for 32,940 cars, and licenses were issued to manufacturers and dealers and demonstrators for 1,778 cars more, making a total of 34,718 cars. During the year chauffeurs to the number of 5,144 were licensed, and 488 duplicate tags were issued to owners who had lost their number plates. The total revenue of the department for the year was \$178,125; quite a large increase over the previous year.

Lacroix to Remove to Demarest Salesrooms.

Paul Lacroix, vice president of Renault Frères Selling Branch, Broadway and Fifty-seventh street, New York city, announces that the branch will shortly remove from its present location to the showrooms occupied by A. T. Demarest Company on the opposite corner. The latter concern has also been selling Renault cars in the past.

Organize \$2,000,000 Tire Company.

From Santa Ana, Cal., comes the startling announcement that I. O. Wilson, an automobile enthusiast of that city, has invented a new tire, and a company to exploit it has been organized, capitalized at \$2,000,000. The invention is calculated to revolutionize the automobile tire industry, according to the Santa Ana sponsors of the concern, the chief feature of the tire being that it is airless and rubberless. In construction it consists of a series of springs interlaid with oil felt running entirely around the rim and covered with a waterproof leather casing.

California's Governor Approves of Large Appropriation.

Governor Gillett of California heartily approves of the proposition to submit to the voters of California an \$18,000,000 bond issue to be used for building highways in that State. Speaking of the project, the Governor said recently: "I think that today the question of good roads is the greatest before the people of California. There is no other issue so important as the construction of first class highways in this State. Furthermore, new roads ought to be constructed and opened before the Panama-Pacific exposition is held."

Trimming Company Takes Old Hudson Plant.

Beginning January 1 the American Auto Trimming Company will occupy as its main factory the plant recently vacated by the Hudson Motor Car Company, northeast corner of Mack avenue and the Michigan Central Belt Line, Detroit, Mich. The main building was erected originally for the Aerocar Company about five years ago. It is a two story brick structure of mill construction covering an area of 400x54 feet and there are also several smaller buildings on the premises.

Taxi Company Sold.

A deal which is said to have involved approximately \$100,000 was consummated in St. Louis, Mo., the early part of the month, when the Keyes & Marshall Brothers Livery Company took over the business of the St. Louis Taxicab Company. A reorganization of the business took place, John D. Marshall succeeding Charles D. James as president, the other officers elected being Merritt H. Marshall, vice president; Sylvester P. Keyes, secretary.

The Ford Motor Company informs us that the Australian Government has supplied W. L. Owen, resident magistrate of Bunbury, with a Ford car, in order to enable him to deal with the administration of justice in the southwest more expeditiously than was possible while the magistrate was restricted to the train service.

Receiver Named for Smith Automobile Company.

An order appointing F. B. Clark, of Topeka, Kan., receiver for the Smith Automobile Company, makers of the Great Smith car, has been filed with the clerk of the United States District Court at Topeka. Clark's bond, fixed at \$10,000, was approved by the court, and the receiver immediately assumed his new duties. Several plans have been suggested for the reorganization of this concern, one of which is to float \$50,000 worth of stock in Topeka, President Wernicke, of the company, subscribing \$75,000 in addition to this, which will be sufficient to pay off the bank and the merchandise creditors. The remainder of the indebtedness can then be extended. Another plan is to reorganize with \$500,000 capital stock, and active plans are being taken to get local investors interested. Judge Pollock, who appointed the receiver, did not look upon the company as being insolvent, but rather in need of "friendly protection."

Parry Receivership.

The Superior Court has appointed the Union Trust Company receiver for the Parry Automobile Company, of Indianapolis, Ind. The proceedings were not contested, officers of the automobile company admitting they have not sufficient cash to carry on the business. It is stated that, although the company had a capitalization of \$1,000,000, but \$150,000 was actually paid in, and it now finds itself with orders for 3,500 cars with no capital to finance their construction. The receiver will probably ask permission to issue receiver's certificates to obtain money with which to continue the plant's operation. Assets of the company are said to be about \$250,000, much in excess of the liabilities.

Indians Buying Cars.

A few days ago two Indians, Louis and Peter Mousseaux, brothers, of Interior, S. Dak., visited Sioux Falls to purchase a carload of automobiles. The brothers are among the wealthiest of the mixed blood Sioux Indians of that State, Peter owning 1,920 acres of land and his brother almost as much, all situated in Stanley County. They conduct a good sized store and intend to sell automobiles to a number of the well to do Indians and white ranchers living in the vicinity of Interior, while for their own use they will retain a high priced, high powered car.

Bailey Changes Name.

It is announced that the Bailey Motor Truck Company, of Detroit, Mich., has changed its firm name, and in the future will be known as the Federal Motor Truck Company, M. L. Pulcher, who was formerly secretary and purchasing agent for the Oakland Motor Car Company, will remain as general manager of the newly organized concern, which will continue to manufacture the Bailey truck.

Buffalo Trade Association's Annual Meeting.

On December 6 the Buffalo Automobile Trade Association held its annual meeting at the Iroquois Hotel in that city, and after electing directors discussed plans for the coming automobile show. The directors appointed will elect officers of the association at the next meeting. A gold watch was presented to C. F. Monroe, the retiring president, and J. J. Gibson was the recipient of a similar token, while R. A. Brown was presented with a silver cigarette chest. The week beginning February 5 has been decided upon for the annual display in the Broadway Arsenal.

Club Notes.

The Automobile Club of Philadelphia has decided to admit women to membership, but there is doubtless trouble ahead, for the women will not be allowed to vote.

The Automobile Club of America has received judicial permission to raise a mortgage of \$350,000 to cover part of the cost of erection and equipment of the new addition to its clubhouse. It is stated that the new building when completed will cost \$650,000. The site cost \$183,833.

The Leechburg (Pa.) Automobile Club has been organized with a membership of thirty to influence automobile legislation and to advance the good roads movement. The officers elected are: Dr. J. D. Orr, president; S. J. McDowell, vice president; N. K. Clements, secretary, and R. A. Cunningham, treasurer.

The Commercial Club, of Springfield, Ohio, has extended an invitation to the Automobile Club of Springfield to share the club rooms of the former. The board of governors of the automobile club will be called together soon to act on the invitation. If the proposition is accepted the Springfield Automobile Club will have the finest clubrooms of any automobile club in the Buckeye State.

The Wolverine Automobile Club, Detroit, Mich., took possession of its new club rooms in the Griswold Hotel on November 26, celebrating the event with an old fashioned house warming, which was attended by about 350 members. The entertainment provided included twelve vaudeville numbers and music by an orchestra. The club now has 721 members, and new applications are said to be coming in rapidly.

At a meeting of the directors of the Connecticut Automobile Association held at the Elton Hotel, Waterbury, recently, C. H. Gillette, of Hartford, made a report on the efforts of the American Automobile Association to secure the passage of a Federal registration law. The Connecticut Association favors such a measure. The possibility of a new automobile State law being passed by the next Legislature was discussed, and steps were taken to be thoroughly represented at legislative hearings if the question should come up.



Garage and Salesroom.



Garage of the Mar-Del Mobile Company, Baltimore, Md.

The Garage, as the Mar-Del Mobile Company, Packard agents in Baltimore, terms its establishment, is located on the northwest corner of Charles street and Mt. Royal avenue, within two blocks of the Pennsylvania Railroad Union Station on Charles street and within two blocks of the Baltimore & Ohio Railroad Mt. Royal Station on Mt. Royal avenue; within three blocks of the Belvedere Hotel, the finest in the city of Baltimore, and within five blocks of Mt. Vernon Place, the most fashionable residential section of Baltimore, within the heart of the apartment house and residential section of the city.

The company owns the land and the building, which is 150 feet square, three stories and basement, having a floor space of 90,000 square feet. The building is constructed throughout of reinforced concrete, including all steps, ceilings, floors and roof, being faced, however, with concrete and brick. The architecture is fundamentally Spanish, having a balcony 6 feet wide projecting from the second floor and extending 300 feet in length, covering the two main fronts of the building, it having a slag roof with green tile projections.

On the first floor are located the show room, sales department (including a separate room for the sale of supplies) and a dining room facing Charles street, size 40 feet square. The rest of this large floor is used for the storage of customers' auto-

mobiles. On the second floor are located the general offices, ladies' retiring rooms, and the rooms of the Automobile Club of Maryland, as well as rooms for the storage of automobiles.

The third floor has the club rooms and gymnasium of the Women's Athletic Association of Baltimore, room for the storage of supplies of Packard automobile parts, and the repair shop. The third is an exceptionally comfortable floor, with a ceiling 20 feet high, with several large skylights, besides the numerous side windows. The space between posts is 40 feet, and the garage and repair facilities are all of the very best, the building having been erected especially for the purpose after the owners had examined the principal garages from Boston to St. Louis.

Freak Garage Collapses.

The garage of S. A. Gibbs, of Tacoma, popularly known as the "Canyon Garage" on account of being built for the most part in a deep gulch, collapsed the morning of December 7, completely demolishing the four story frame structure, and carrying down with it a score or more of automobiles, which were held in storage. The loss will amount to upward of \$30,000. Luckily there was but one person in the building, the young lady stenographer, who escaped with a few bad bruises. The cause of the wreck was the undermining of the foundations by rains. The garage was described and illustrated in THE HORSELESS AGE Garage Number of May 4, 1910.

Garage Association Working Reforms.

Officials of the Garage Owners' Association of New York, organized some months ago, claim that the organization is now accomplishing many of the objects for which it was formed. Recently it started a crusade against short measure, and was successful in the prosecution of garage owners, who were found guilty of serving small gallons. In a civil action brought by Inspector Mills, of the Department of Weights and measures, against a garage proprietor in East 108th street on a short measure charge, a judgment of \$100 was obtained through evidence furnished by the association.

Now the "deadbeat" is the target of the association's activity, and an effort is being made to have a law enacted making it a misdemeanor for a car owner to surreptitiously remove his automobile from a garage without paying the charges due thereon, which will be a difficult ordinance to put through. At present the lien given to the garage keeper by statute merely permits him to retain the car in his possession until the accrued charges have been paid. If the car leaves the garage the lien is lost, and the "deadbeat" is practically immune to prosecution. New members recently admitted to the association are the following: Continental Auto Company, Riverside Garage, Washington Heights Garage, Park View Garage, Manhattan Garage, Gus Lind Company and Sidney B. Bowman Auto Company.



MAR-DEL AUTOMOBILE COMPANY GARAGE, BALTIMORE, MD.

Garage Notes.

Little Rock, Ark.—The Argenta Auto Company has opened its new shop at 508-10 Main street. The shop is equipped to handle any kind of repair work.

New Haven, Conn.—A garage is being erected at 524 Chapin street for Dr. F. Lane.

New Haven, Conn.—Thomas Nesbit, who until recently conducted a carriage and wagon repair shop exclusively, has added an automobile repair department to his establishment at 254 Park street.

Washington, D. C.—Charles B. Pierce has purchased the property of the old Swiss laundry on E street, between Twenty-first and Twenty-second streets, N. W., which he will convert into a modern garage.

Jackson, Fla.—Jones & McGraw have secured the agency for the Glide car and have opened an office in Room 509 of the Atlantic National Bank building.

Palatka, Fla.—A new firm, under the style of Anderson & Tilgham, has been formed to handle Rambler and Ford cars in the building occupied by the Athletic Association on Front street. Alterations are now being made for the new concern.

Atlanta, Ga.—T. J. James, Jr., of Adrian, has purchased the Dixie Garage at 12-14 East Cain street, and will handle supplies and conduct a general garage business.

Coeur d'Alene, Idaho.—The New Lake City Garage, a structure 50x110 feet, is completed and ready for business.

Stockton, Ill.—Rosensteil & Meyers, of Freeport, have leased premises from G. Speth, in which they will conduct a garage.

Chicago, Ill.—The Henry Motor Company of Illinois has changed its name to the Henry Motor Car Sales Company, and has removed to 1507 Michigan avenue. The Chicago office will be the main distributing point and will be under the direction of J. J. Maloney, who is vice president and treasurer, as well as manager of the company. Other officers of the company are, A. E. Demange, president, and P. H. Demange, secretary.

Mt. Carmel, Ill.—B. H. Kamp has just completed a 40x100 foot garage. He has a vulcanizing plant and carries supplies of all kinds. Mr. Kamp has closed a contract for 100 Ford cars for 1911.

Indianapolis, Ind.—The National Garage Company has established a new garage at 50 Kentucky avenue.

Indianapolis, Ind.—The Holcomb Motor Car Company has moved into its new building in North Meridian street, near St. Clair Park.

Indianapolis, Ind.—The Oakland Motor Car Company has moved from North Delaware street to 315 North Pennsylvania street.

Indianapolis, Ind.—The Premier Motor Sales Company has leased quarters

from the Gibson Auto Company, on North Pennsylvania street.

Indianapolis, Ind.—Samuel Davidson has taken the agencies for the Imperial and Whiting cars and has located at 18 South Capitol avenue.

Hopkinton, Ia.—F. K. Barnes has leased the Morgan livery stable on First street and will put it in shape to do a garage business.

Rockwell, Ia.—The Neitert Garage has been purchased by C. E. Gunsaelus, formerly of South Dakota. He will handle the E-M-F cars.

Waterloo, Ia.—Work has been started on a new garage for the Cedar Valley Automobile Company, corner of Ninth and Sycamore streets.

Great Bend, Kan.—Fred A. Silverling is erecting a garage and repair shop, 40x80 feet.

Larned, Kan.—The Whitmire Randall Auto Company has succeeded Barney Simpson and is doing a general garage and repair business. The company handles the Jackson car.

Topeka, Kan.—C. L. Frith has purchased the North Topeka Motor Car Company, and will conduct a modern garage and repair shop.

Winfield, Kan.—W. B. Huff has succeeded L. S. Haight as part owner of the Winfield Automobile Company.

Winfield, Kan.—The Butler Auto and Garage Company has opened a salesroom and repair shop at 216-18 East Ninth street.

Lexington, Ky.—The Phoenix Garage Company has completed its new building on East Main street. The new garage is 120x227 feet, a show room in front having a floor space of 80x40 feet. In connection with the garage there is a complete vulcanizing plant and repair shop occupying 100x40 feet.

Cumberland, Md.—Gilsan Brothers have opened their new garage on North Centre street.

Brookline, Mass.—J. Walker, of the Commonwealth Garage, Boston, has opened a garage at 112 Corey road. The building is 60x175 feet, and has a capacity for storing eighty-five cars. A plant for charging electric vehicles has been installed.

Boston, Mass.—A new company has been formed in Boston to handle the Amplex car made at Mishawaka, Ind. F. R. Moseley is president, G. H. Phelps treasurer and general manager, and Albert W. Hills secretary and sales manager. The two former officers have been in the automobile business in Boston for some time, while Hills is a new comer in the industry.

Springfield, Mass.—The Springfield Power Association has been granted a permit to build a garage at 184-86 Dwight street.

Westfield, Mass.—The property at the corner of Franklin and Maple streets, known as Rand place, has been purchased for a garage site by Charles C. White, who plans to erect a large garage at the corner

of Maple street, having an entrance on both Franklin and Maple streets.

Worcester, Mass.—The Franklin Garage is being renovated, the equipment of the machine and repair shop is being overhauled and new machinery and devices installed. William H. Sickinger, formerly connected with the Maxwell interests, has been made assistant manager and is in charge of the work.

Detroit, Mich.—The Oakland Sales Company, Ltd., has removed to a new garage at 810-12 Woodward avenue, where the company will have the exclusive agency for Oakland cars in Detroit and vicinity. A repair shop will also be conducted there.

Minneapolis, Minn.—The Paterson Motor Company has taken the salesrooms vacated by the Maxfield Auto Company at 1401 Hennepin avenue. C. P. Davison is in charge.

St. Louis, Mo.—A fire destroyed the garage of Arthur Hess at 3458 Wyoming street last week, together with two automobiles. The cause of the fire is unknown.

Nebraska City, Neb.—John Markel, agent for the Ford car, will shortly build a garage on property south of his present salesrooms.

South Orange, N. J.—The garage of Walter F. Dormitzer at 137 Ralston avenue was destroyed by fire last week. Loss about \$8,000.

Buffalo, N. Y.—The United Motor Buffalo Company has completed its new salesroom at 24-28 Goodrich street. A fully equipped repair shop occupies the second floor, while the third floor and basement are given over to storage of new cars.

New York City, N. Y.—John De Palma, a brother of Ralph De Palma, the race driver, has opened an automobile repair shop at 314-16 West Eightieth street, on the top floor of the Apthorp Garage. He has no connection with the latter concern, however.

New York City, N. Y.—Allan H. Whiting, prominent in the Automobile Club of America and for many years agent for Stoddard-Dayton cars in the metropolis, has taken the New York agency of the Cunningham car, built by J. B. Cunningham Sons Company, of Rochester, N. Y. Associated with Whiting will be Gilbert Burdette and E. C. J. McShane, who at present are connected with the Dayton Motor Car Company's New York branch. The Cunninghams are old carriage builders, having been in this business for seventy-three years. Whiting will shortly open a salesroom on Broadway.

Charlotte, N. C.—George Stephens has secured the Wadsworth property on North Tryon street, formerly used as a livery stable, and will convert it into a garage.

Laurinburg, N. C.—The People's Garage, which has been undergoing alterations and improvements, has resumed business with a fully equipped repair shop and a full supply of accessories and parts.

Lumberton, N. C.—The Lumberton Motor Car and Machine Company has recently completed the erection of a 60x75 foot

one story brick garage. A general repair shop is one of the chief features of the new building.

Maxton, N. C.—The A. J. McKinnon Company, whose garage is on Railroad street, is agent for the Cadillac and Maxwell cars. A. J. McKinnon is president, J. C. Baldwin vice president, R. M. Williams, secretary and treasurer.

Wadesboro, N. C.—Blalock Hardware Company has opened a garage on Wade street, to handle the Maxwell.

Bryan, Ohio.—A. Knepper has purchased the repair shop of Clarence Bishop on North Main street and will continue the automobile and other machine repair work.

Oklahoma City, Okla.—The Motor Sales Company has taken over the business of the White Garage Company at 318-20 West First street, and will remodel the old quarters, besides adding an attractive salesroom. The company handles the Peerless and White cars.

Portland, Ore.—The Portland Detroit Auto Company has let the contract for the construction of a two story brick garage.

Portland, Ore.—W. D. Dulmage and D. M. Smith have opened an agency for Elmore cars at Seventh and Ankeny streets.

Portland, Ore.—Salesrooms have been opened for the Krit and Cole cars at 243 Burnside street under the management of J. L. Snead.

Portland, Ore.—Plans are under way for the erection of a two story garage on the corner of Fourteenth and Couch streets for the Portland-Detroit Auto Company, agent for Warren-Detroit cars.

Portland, Ore.—The East Side Automobile Company has been reorganized, and will continue to handle the Knox, Premier and Moline cars. Dr. G. E. Watts is president and E. Sutor manager of the company.

Portland, Ore.—Geo. W. Miller, northwest manager for the Winton Motor Carriage Company, while here last week closed negotiations whereby the firm known as the Portland Motor Car Company was incorporated as a sub-branch of the northwest main branch, located at Seattle. Plans for a new building for the Portland branch are now under way.

Philadelphia, Pa.—The Hart-Kraft Motor Car Company has opened a branch at 133 South Sixteenth street, under the management of Edward R. Griel.

Philadelphia, Pa.—R. T. Mitchell has purchased the property on the corner of Thirtieth street and Allegheny avenue and will build a 150x225 foot garage thereon.

Philadelphia, Pa.—A garage is being erected for Edward J. Berwind, at his seashore estate, The Elms, Newport, R. I. The building will be of sufficient size to house twenty automobiles and fifteen carriages, and will cost, it is said, \$500,000.

Philadelphia, Pa.—The Regal Sales Company has been formed by Walter C. Herbert, formerly with the General Motor Car Company, and his associates. They

will handle the Regal cars at 339 North Broad street, the company's territory including Philadelphia and vicinity.

Newport, R. I.—The Foss-Hughes Motor Car Company has opened a branch office and garage for all makes of cars on Bellevue avenue, adjoining the Casino. Accessories and supplies of all kinds will be carried. Alterations are now being made to the building, which will be made to harmonize with its surroundings.

Cheraw, S. C.—The Pee Dee Iron Works has recently completed its new garage on Second street. It is a one story 65x100 foot structure. The company handles Regal cars.

Cheraw, S. C.—The Rouse-Pegues Automobile Company will shortly erect a 75x100 foot, two story, brick garage. The company is agent for Chalmers, Hudson, Columbia and Maxwell cars.

Florence, S. C.—D. W. Martin, whose garage and repair shop is located at 26 Dargin street, has taken the agency for the Everitt car.

Georgetown, S. C.—Mercer Brothers have taken the agency for Everitt cars, and will also carry a line of accessories.

Nashville, Tenn.—The Maxwell-Briscoe Sales Company will remove to 227 Third avenue, North, the first of January.

Salt Lake City, Utah.—Alfred O. Whitmore, who has been granted a permit to erect a garage at 430 East South Temple street, notwithstanding a protest filed against it, is continuing with the work of building and the structure is well under way. The protest was signed by fifteen residents of East South Temple street, who hold that a garage at the proposed site would be a detriment to the property in the vicinity.

Seattle, Wash.—The Metropolitan Motor Car Company was recently re-incorporated and S. M. Ament named as its new manager.

Seattle, Wash.—The Winton Motor Carriage Company is fitting up a new salesroom at Terry avenue and Pike street, to accommodate twenty cars.

Spokane, Wash.—The Archer, Coombs & Child Company, dealer in automobile supplies, has changed its name to the Child, Day & Churchill Company, and has also changed its location to 1227 First avenue.

Tacoma, Wash.—Si Slocum, formerly of the Kimball Body Works, Chicago, Ill., has started an automobile repair shop and body works at Thirteenth and E streets.

Wenatchie, Wash.—The Thornhill-Lang Automobile Company is preparing to build a modern garage at Chelan avenue and Second street.

Wheeling, W. Va.—The E. & E. Equipment Company has removed to 58-60 Eighteenth street, where it has larger quarters, embracing offices, showroom, garage and repair shop.

Marinette, Wis.—The Buick Automobile Company will soon commence the construction of a garage and repair shop in this town.

New Incorporations.

The Pacific Auto Tire Filling Company, Portland, Ore.—Capital stock, \$60,000.

Rocky Ford Auto Company, Rocky Ford, Col.—Capital stock, \$20,000. Incorporators: H. M. Ingraham, E. D. Manny and N. D. Ingraham.

Hale-Knox Motor Company, Wayne, Pa.—Capital stock, \$13,000. Incorporators: Philander C. Knox, Jr., and Richard T. Tindle, of Valley Forge.

The Flower City Automobile Company, Rochester, N. Y.—Capital stock, \$25,000. Incorporators: A. M. Flannery, Fay Brown and Jos. S. Flannery.

The Utica Electric Garage Company, Utica, N. Y.—Capital stock, \$6,000. Incorporators: Walter R. Shiller, Joseph A. Harding and Egmont G. Brewer.

McQuay-Norris Manufacturing Company, St. Louis, Mo.—Capital stock, \$100,000. To manufacture automobiles, etc. Incorporators: Edward Murrell and Chas. R. Kalb.

The Crowe Motor Car Company, Detroit, Mich.—Capital stock, \$100,000. Incorporators: Walter A. Crowe, Wm. W. McIntyre, Guy R. Price and W. W. McIntyre.

The Kelly Automobile Company, Youngstown, Ohio.—Capital stock, \$15,000. Incorporators: R. M. Kelly, Jr., Earl F. English, Anna B. Kelly, R. D. Gibson and W. F. Gibson.

The H. H. Franklin Automobile Company, Syracuse, N. Y.—Capital stock, \$400,000. The directors are practically the same as in the H. H. Franklin Manufacturing Company.

The Excelsior Motor & Supply Company, Salt Lake City, Utah.—Capital stock, \$50,000. Incorporators: H. L. Hoyward, W. A. Williams, Fred Barnett, B. L. Kessler, and H. O. Kaar.

The Hewitt Motor Truck Company, Cleveland, Ohio.—Capital stock, \$10,000. Incorporators: W. C. Molin, John H. Price, M. I. Scott, Edwin G. Guthery and K. T. Bambeby.

The Jungclas Automobile Company, Cincinnati, Ohio.—Capital stock, \$10,000. Incorporators: Wm. C. Jungclas, Edward H. Jungclas, R. E. Morrison, Carrie Jungclas and Edna Jungclas.

The Rassel Motor Car Company, Toledo, Ohio.—Capital stock, \$1,250,000. Incorporators: Edward C. Rassel, Richard D. Logan, Wm. E. Brown, Edwin Tait and Nicholas W. Rassel.

Mercer County Automobile Company, Bluefield, W. Va.—Capital stock, \$10,000. Incorporators: Chas. H. Williamson, S. M. Smith, W. A. Bowles, Jr., Henry A. Harman and W. C. Given.

The Columbus Taxicab and Service Company, Columbus, Ohio.—Capital stock, \$25,000. Incorporators: J. G. Orr, Chas. M. Peters, Burch D. Huggins, E. N. Huggins and Daniel H. Sowers. The company will conduct a taxicab and automobile livery service.

Lake Mills Auto & Garage Company, Elmore, Minn.—Capital stock, \$10,000.

The Merchants Motor Delivery Company, Richmond, Va.—Capital stock, \$25,000.

Roy Cushman Company, Waterloo, Ia.—Capital stock, \$10,000. Incorporators: Roy Cushman, A. N. Cushman.

The Dubuque Auto & Garage Company, Des Moines, Ia.—Capital stock, \$75,000. Incorporators: F. G. Becker and others.

Western Motor Company, El Paso, Tex.—Capital stock, \$6,000. Incorporators: P. J. Savage, George W. Kennedy and others.

The Cino Auto Company, Kansas City, Mo.—Capital stock, \$10,000. Incorporators: D. S. Rettig, A. Kirkpatrick and Wm. Lingle.

Ames Motor Car Company, Chicago, Ill. Capital stock, \$25,000. Incorporators: Vincent Bendix, William W. Loomis and Matthew Mills.

Batten-Dayton Motor Company, Chicago, Ill.—Capital stock, \$125,000. Incorporators: Wilbur O. Dayton, Minnie A. Dayton and Edmund S. Carr.

Maryland Garage Company, Los Angeles, Cal.—Capital stock, \$50,000. Incorporators: H. B. Miller, L. B. Miller, L. R. Perhammer, P. Ingram and Elmer I. Moody.

Imperial Motor Car Company, Cincinnati, Ohio.—Capital stock, \$150,000. Incorporators: Frank H. Lamb, J. Straus, B. Charron, J. C. Kunze and F. W. Mowbray.

The California Automobile Company, Los Angeles, Cal.—Capital stock, \$10,000. Incorporators: D. Laughlin, E. W. Freeman and R. A. Richardson.

The Winnebago Auto Company, Forest City, Ia.—Capital stock, \$10,000. Incorporators: Hans S. Sorenson, J. B. Giving, O. O. Martinson and B. J. Folken.

The Curtis-Young Company, Providence, R. I.—Capital stock, \$10,000. Incorporators: Frank L. Young, Geo. W. Curtis, Arthur P. Young and Wm. L. Curtis.

The Vickers Motor Car Company, Coshoc-ton, Ohio.—Capital stock, \$25,000. Incorporators: Eugene McMasters, Carl B. Vickers, Wm. C. Myers, Homer H. Kline and J. G. Kline.

Frank J. McCaw Company, Providence, R. I.—Capital stock, \$25,000. Incorporators: Edward C. Stiness, Frank J. McCaw and Frederick W. O'Connell. To conduct a general automobile and vehicle business.

The Callen Co-operative Company, Cleveland, Ohio.—To deal in automobile accessories, etc. Capital stock, \$50,000. Incorporators: Chas. Callen, Clara L. Callen, E. A. Callen, Geo. A. Callen and C. Cole.

Tire Chain Patents Company, Brooklyn, N. Y.—Capital stock, \$25,000. To manufacture non-skidding chains, etc. Incorporators: F. Cormack, Port Ewen, N. Y.; Elmer E. Holmes, Arthur W. Britton, 37 Wall street, New York city.

Fire directors of Lindenhurst, L. I., have decided to expend \$1,985 for a Watrous gasoline fire engine, which it is claimed will throw a stream a distance of 150 feet through a thousand feet of hose.

Trade Personals.

M. Ray Stehley, for two years manager of C. A. Mezger, Inc., has been appointed general manager of the Auto Wind Deflector Company.

Cecil H. Taylor, formerly of the engineering staff of the Hudson Motor Car Company, has joined the engineering staff of the E-M-F Company.

Otis R. Cook has resigned from the Federal Rubber Company, Milwaukee, Wis., and has in mind hooking up with a large manufacturing concern in the near future.

H. N. Powers, formerly with the Gould Storage Battery Company, of New York, has been made sales manager of the Columbia Nut and Bolt Company, Bridgeport, Conn.

F. L. Sandford, who has been with the Franklin branch in Boston, has joined the staff of the Dodge Motor Vehicle Company, agent for the Pope-Hartford car in that city.

G. M. Berry, assistant general manager of the Thos. B. Jeffery Company, is on an extensive Western trip, visiting the company's branches, and reached Los Angeles, Cal., last week.

O. A. Lawton has been appointed manager of the Boston branch of the H. H. Franklin Manufacturing Company, Syracuse, N. Y., succeeding A. B. Henley, who resigned a few days ago.

Paul Lacroix, vice president and general manager of Renault Frères' selling branch, returned to New York last week from his trip abroad. He is one of the committee in charge of the Importers' Automobile Salon.

Frederick R. Simms, president of the Simms Magneto Company, returned to this country on the Campania, on December 3, and is now actively engaged in the organization of the company's new works at Bloomfield, N. J.

Stefan Kjeldsen, until recently head of the S. P. O. Automobile Company in New York city, has been made general manager of the Importers' Automobile Salon, which will be held January 2-7 at the Hotel Astor. His headquarters are at 1776 Broadway.

Charles Neumaier, of Benz & Co., arrived in New York from the Mannheim, Germany, factory on the Kaiser Wilhelm der Grosse, Wednesday, December 7. Accompanying him were George Diehl, technical director of the Benz concern, and Fritz Wuernall, engineer of the Mannheim plant. The trio came to confer with Jesse Froelich, of the Benz Auto Import Company, in New York.

Harry E. Fields, vice president and general sales manager of the Hartford Rubber Works, Hartford, Conn. has resigned from that company to assume the presidency of the Rambler Automobile Company of New York. This concern is the New York branch of the Thomas B. Jeffery Company, and Field's territory will in-

clude all the cities east of Buffalo and Pittsburg in which the Rambler car is represented.

Edward McCaffrey, formerly with the Gibney Tire Company, has been made Philadelphia manager of the Kelly-Springfield Tire Company, and will have charge of the distribution of that company's product in the Pennsylvania territory.

Belmont S. Walters, who some time ago left the Pullman Motor Car Company, York, Pa., to go with the Parry Automobile Company, has returned to the Pullman concern, and in the future will travel through the Middle West and Southwest.

David J. Post, head of the Veeder Manufacturing Company, Hartford, Conn., is at present in San Francisco meeting a number of his old friends who were formerly in the bicycle trade, and introducing the new model Veeder register, which is attached to the hub cap.

George Crackel, formerly general manager for Seeley, Van Zant & Crackel, of Los Angeles, Cal., has resigned from that firm in order to take up another line of business. Crackel is one of the best known automobile men on the Coast. His plans for the future, however, are not ready for publication.

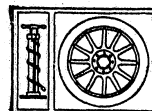
I. H. Atwood, formerly of the Atwood Manufacturing Company, and of late factory manager of the Castle Lamp Company, has resigned. Atwood is one of the best informed men in the automobile lamp industry, having had experience in all its branches for the past twenty years. He is considering several propositions for the future.

John W. Kelly has taken the position of general factory representative of the Swinehart Tire and Rubber Company, and will give his special attention to solid tires for truck and pleasure electrics. Mr. Kelly was formerly with the Edison Storage Battery Company and is considered an expert on tires for electric vehicle work.

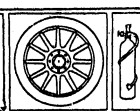
E. E. Schwarzkopf, who recently sold his magazine, *Automobile Topics*, to S. W. Merrihew, has opened an "information bureau" in the Buick Building, Broadway, New York city. He will dispense "automobile information—Commercial and technical," and also continue the publication of the *Club Journal*, the A. C. A.'s official organ.

Business Opportunity.

The agency for a good popular priced car in New York, Philadelphia, Chicago, St. Louis and Kansas City, Mo., is wanted by the Times Square Automobile Company. The company has been long established, is well known, and should be able to market a great many cars. Mr. Mansbach, treasurer of the company, says: "The success we have had in disposing of a number of new cars has convinced us that, in addition to our second hand business, we could handle a line of new cars to very good advantage."



Items of the Industry and Trade.



Firestone Agency in Jacksonville.—Joseph H. Walsh, 12 East Adams street, Jacksonville, Fla., has secured the distributing agency for Firestone tires and demountable rims, and is making a leader of the Firestone non-skid for slippery weather service.

New Morgan & Wright Representation in Cleveland.—The Ohio Rubber Company, Cleveland, Ohio, has been appointed agent for Morgan & Wright tires in that city and all of northern Ohio. The agency is under the management of Peter Meyer and E. E. Anderson.

To Manufacture Specialties in Boston.—A large portion of the Carter Building, 162 Columbus avenue, Boston, Mass., has been leased to the Couch & Seeley Company, who will occupy it for the manufacture of automobile specialties, in the near future. The premises are being equipped with machinery.

Kelly-Racine Buildings Completed.—The large buildings for the Kelly-Racine Company, adjacent to the Mitchell-Lewis Company's plant at Racine, Wis., have been finished, and the work of installing machinery and equipment is now in progress. The concern intends to start operations around the first of the year.

Gabriel Horn Plant Burned.—The plant of the Gabriel Manufacturing Company, 1411 East Fortieth street, Cleveland, Ohio, was totally destroyed by fire on Saturday last. C. H. Foster, general manager of the concern, estimates the loss at \$90,000, while the insurance carried amounted to only \$20,000.

Carhartt Used to Assist Horses.—During the recent baby blizzard in New York city, a new phase of Carhartt service was introduced and demonstrated, when a 50 horse power car of this make was used for the purpose of rescuing all sorts of vehicles, trucks and trolley cars which were stranded in snow drifts and slipping on icy pavements.

Kinsey Removes to New Plant.—The Kinsey Manufacturing Company has removed its factory to the company's new building on Central avenue, Toledo, Ohio. The vacated plant will be converted by the Overland Automobile Company into a body manufacturing plant and machinery for this purpose is now being installed. The Kinsey concern will add a wind shield plant in the near future.

Acme Sales Company Formed.—Organized for the purpose of acting as manufacturers' agents and dealers in automobile supplies, the Acme Sales Company, Detroit, Mich., has secured the Detroit agency for the Michigan Wheel Company products. The latter concern is one of the largest manufacturers of marine hardware and motorboat equipment. The Acme concern has

located at 237 Jefferson avenue, with Wm. E. Lore in charge of sales. Other lines of automobile and motorboat equipment will be carried.

Knox Adopts Connecticut Shock Absorbers.—As a result of comparative tests, the Knox Automobile Company, of Springfield, Mass., has adopted Connecticut shock absorbers as regular equipment on all 1911 cars.

Dayton to Hold Exhibit.—The Dayton Automobile Club has decided to hold its first annual show March 6-11 at Memorial Hall, Dayton, Ohio. The show was originally planned for February, but the dates conflicted with other engagements for the hall.

Chicago Branch For Booth.—The Booth Demountable Rim Company, of Cleveland, Ohio, has opened a branch house in Chicago at 2129 Michigan avenue, under the management of J. W. Benton, president of the Chicago Tire and Supply Company.

Anoka Produces its First Car.—The first motor car made in Anoka, Minn., was run on the streets of that place a few days ago. It is made by the Veerac Motor Company, of Anoka, and it is said that the first two models turned out have been sold to a New York concern.

Commercial Vehicle Show For Pittsburgh.—April 4-8, 1911, are the dates selected for the commercial vehicle show to be held at Pittsburgh, Pa., under the auspices of the Automobile Dealers' Association of Pittsburgh. The regular pleasure vehicle show will be held March 25 to April 1.

Gramm Organizes Canadian Company.—The Canadian Gramm Motor Truck Company has been organized at Walkerville, Ontario, and as the name of the company indicates it will reproduce the American Gramm truck models on the other side of the border. A factory will be equipped in the near future.

New Plant For Wind Shield Company.—The Troy Carriage Sunshade Company, of Troy, Ohio, has erected another factory in which it will manufacture Troy automatic wind shields and speedometers exclusively. The plant is of gray steel pressed brick, and will contain the company's general offices.

To Exhibit Aeroplanes at Palace.—As a sort of side show a number of biplanes and monoplane are promised for the American Motor Car Manufacturers' Exhibit Association show in Grand Central Palace, opening December 31. Capt. T. T. Lovelace is the director of this end of the show and several of the machines brought over to this country and held in bond for the exhibit include the Blériot, Demoiselle, Clermont-Bayard, Antoinette,

also Moisant's Statue of Liberty flight winner. A Curtiss biplane will be among the American machines present.

Vulcan Gear Works Removed.—The Vulcan Gear Works has removed its plant from Detroit to Pontiac, Mich. In the latter city a large brick structure is being occupied in the group of buildings being erected for the Pontiac Foundry Company and Pontiac Motorcycle Company.

Dorian Rim Company Resumes.—The Doran Rim Company, one of the losers by the fire which threatened the Thoroughfare Building last week, has resumed business in temporary quarters in the Stoddard-Dayton Building, 225 West 57th street, where it will remain until the completion of its new building at 1804 Broadway. In the meantime it will maintain temporary exhibition rooms at 1775 Broadway.

Buy Studebaker Patrol Wagons.—The City Board of Control of Columbus, Ohio, at a meeting held recently, approved the action of Safety Director McCune in awarding the contract for two automobile police patrols to the Studebaker Automobile Company of South Bend, Ind. The cars will cost \$3,450 each and will be delivered in sixty days. They will have a maximum speed of 60 miles an hour and will be 40 horse power.

McIntyre to Abandon Two of its Factories.—With the intention of concentrating its business, the W. H. McIntyre Company, Auburn, Ind., which has been using three separate factories in that city for the manufacture of automobiles and delivery wagons, has decided to abandon two of them, and has moved a large amount of machinery and material to its four story building on the west side of the city, from where in future all the company's business will be conducted.

Commercial Club Will Boom Show.—Automobile dealers of St. Paul, Minn., are incorporating an association with the object of holding a local show. The dealers have insured the co-operation of the Commercial Club, which will join them in advertising the show. The plans of the Automobile Dealers' Association were outlined to the Commercial Club at a committee meeting of the latter on November 28 by President J. H. Seagraves, of the Dealers' Association.

Newark Show February 18-25.—Dates have been set for the Newark Automobile Show, but as yet no place has been selected for holding same. The New Jersey Automobile Exhibition Company, which has the support of the New Jersey Trade Association and the Associated Automobile Clubs of New Jersey, will hold its exhibit February 18-25, and is considering the First Regiment Armory as its setting. Former shows were held in the Sussex County Armory.