

lamps is furnishing the amperes necessary to light 100 lamps. The voltage required for one lamp is the same as required for 100 lamps if the lamps are in multiple, as lamps are ordinarily arranged on a 100-volt circuit. If the lights were arc lights in series, then the amperes would be the same for 100 as for one lamp, and the volts would vary from lamp to lamp. One lamp would require about 50 volts, and 100 would require 5,000 volts. It is, however, not usual to put more than 50 lamps in series upon 2,500 volts.

(10292) J. F. M. asks: I would like to know if the small dynamo can be run as a motor on a 110-volt circuit, and what changes in winding would have to make for that purpose. A. The small dynamo of SUPPLEMENT No. 161 cannot be run on a 110-volt circuit. It would burn out directly. We have not the winding data for changing this dynamo to 110 volts. You will find such a machine described in Poole's "Designs of Small Dynamos," which we send for \$2.

(10293) E. L. W. asks: Will you kindly state in your Notes and Queries column what causes the report made by the cracking of a whip? A. The crack of a whip communicates a shock to the air which is transmitted to the ear, and we hear the sharp, sudden sound.

(10294) G. L. S. asks: Will you kindly tell me if I hold a strong horseshoe magnet near a copper wire, say within a half inch, and then pass a powerful current of electricity through the copper wire, will there be any attraction between the wire and the magnet? If I make the magnet stationary, and then hold the wire very close to it, and slack enough for it to readily reach the magnet when the current is sent through it, would they move toward each other, or would there be no change of position at all? If they do attract each other, how strong a magnet, also how strong a current, will be needed to pull this wire say a distance of an inch or a little less? A. If a coil of wire carrying a current of electricity is brought near a powerful magnet, one end of coil will be attracted toward the magnet and the other end will be repelled from it. This is because the coil is itself a magnet and behaves as a magnet does. A straight wire will be very slightly affected by even a powerful magnet. It will be twisted around till its field of force lies with the lines parallel and in the same direction as that of the magnet. It will then move toward the magnet, but not with much force. The energy of a single wire is not great enough to cause it to do so.

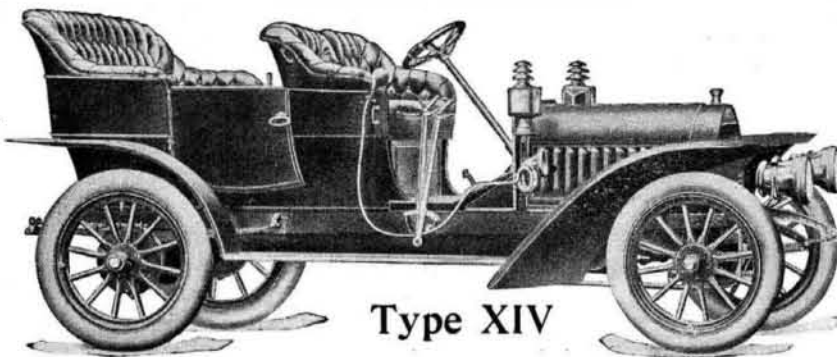
(10295) G. O. V. asks: Will you please let me know what century or year, and where, the Romans first made the day to begin at 12 o'clock and end the next night at 12 o'clock? A minister told me some time ago that he guessed they did it in the fourth century. I want to know sure. A. We think you have been incorrectly advised as to the practice of the Romans in beginning the day at midnight. They did not begin to do this in the fourth century, since they seem always to have begun the day at the middle of the night. Varro, a learned Roman of the time of Cicero, wrote a book which has not come down to us, but which has been quoted by several authors whose works we have. The title of the book was "Concerning Human Affairs." One of the chapters was upon "Days." This chapter is quoted in the "Saturnalia" of Macrobius, Book I., Chap. 3, as also by Gellius in his "Attic Nights": "Men who are born in the 24 hours from midnight to the next midnight are said to have been born upon the same day." By which words it is evident, Macrobius says, "that they divided the observation of the day so that he who was born after sunset and before midnight, that should be his birthday in which that night begins; on the contrary, he who was born in the six later hours of the night should be considered to be born on that day which followed that night." And this, so far as the authorities go, was always the practice of the Romans. The Babylonians reckoned from sunrise to sunrise (Isidorus, "Orig." V. 30), while the Athenians and the Hebrews reckoned from sunset to sunset (Gellius, "Attic Nights," III., 2.) "The same Varro in the same book has written," says Gellius, "the Athenians observe differently, in that they say that all the time intervening from one sunset to the succeeding sunset is one day."

PNEUMATIC STEEL HUB FOR AUTOMOBILE WHEELS.

While the pneumatic tire admirably performs its function of absorbing obstructions and inequalities of a roadbed when these are small, it falls far short in the case of large obstacles and deep ruts and holes. The novel construction illustrated herewith is offered as a remedy for this deficiency. In order to relieve the tire which, as shown by incessant tire troubles, is entirely too delicate a member to be subjected to such rough treatment as it ordinarily receives, an auxiliary cushion is provided at the center of the wheel to take up heavy shocks. This air cushion, which is in the form of a column of air, is placed between the wheel and the axle, so large obstacles can

The Autocar

1907

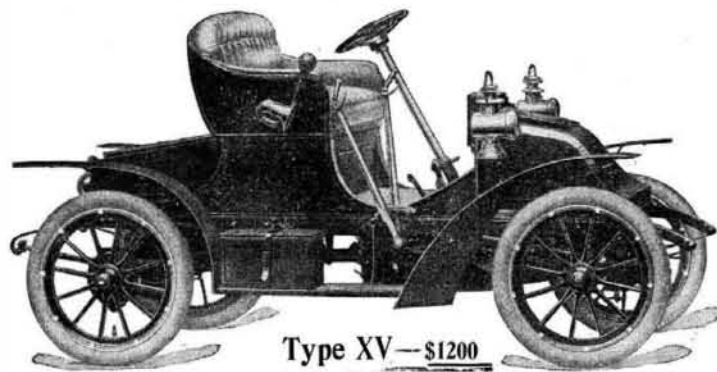


Type XIV

30 horsepower Five Passengers **\$3,000**
112-in. wheel base

More power, more speed, more strength, more room; finer lines and more impressive style than ever; together with the important new feature of three-point unit suspension of power-plant, preserving perfect alignment at all times of all parts from motor to rear axle and wonderfully conserving power in transmission to the driving wheels.

Autocar Limousine and Landaulet for immediate delivery. Autocars are sold with standard warranty of the N. A. A. M.



Type XV—\$1200

12 h. p. Two horizontal-opposed cylinders. Motor under hood. The only two cylinder car with sliding-gear ball-bearing transmission, three speeds forward and reverse. Direct shaft drive. The most highly developed motor car in the world. Standardized.

SPACE 24: MADISON SQUARE GARDEN SHOW

Write for the Autocar Book, illustrating and explaining Autocar construction and describing the unique system of factory tests assuring Autocar Reliability.

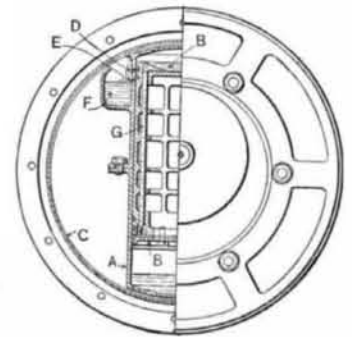
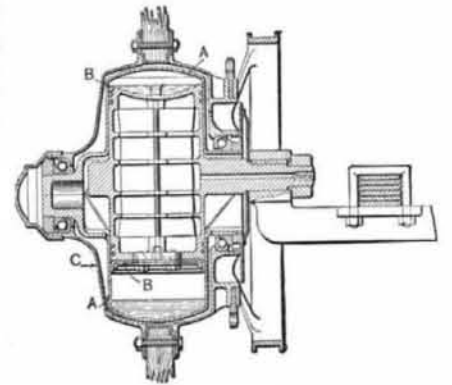
The Autocar Company, Twentieth St., Ardmore, Pa.

Member: Association Licensed Automobile Manufacturers.

Reliability

be overridden without lifting the car body. The new construction has been subjected to a thorough test during the last year on a double-chain stock machine weighing about 3,000 pounds with its full complement of five passengers. The wheels, which are of the usual artillery type, 36 inches in diameter, are fitted with solid tires.

The construction of the wheel may be readily understood by reference to the accompanying sectional views. It will be observed that it consists of three essential parts. A vertically-disposed double cylinder, A, mounted in ball bearings on the wheel, a hollow piston, B, operating within the cylinder and formed integral with the axle, and a hollow hub, C, entirely enveloping the piston and cylinder. The car is provided with a small air compressor driven by the engine, which delivers air under pressure to a reservoir or tank provided with a safety



valve controlled from the dashboard. The air from this tank is delivered through a central bore in the axle to the hollow piston. Between the top of the piston and the upper end of the cylinder, an air cushion is provided, which is utilized to produce a forced circulation of oil to the moving parts.

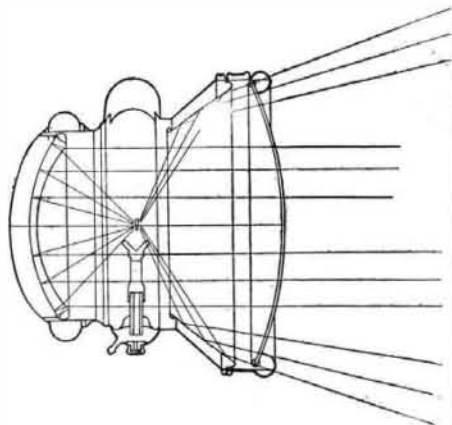
In operation, when an obstruction is encountered by the wheel, the latter is raised, compressing the air between the bottom of the piston and the lower end of the cylinder, while at the top air is drawn through a row of ports, D, in the cylinder, and oil is sucked in through a lower row of ports, E, from the reservoir, F. This oil flows into the concave top of the piston, lubricating the piston rings and guides. On the rebound of the wheel the oil trapped is forced down a tube, G, to the lower end of the piston. It escapes past the piston rings, lubricating the latter, and through ports in the lower end of the cylinder drips into the hollow hub. As the latter is rapidly revolving, the oil is carried upward, as shown in Fig. 2, and dashed against the upper end of the cylinder, whence it falls into the oil reservoir, F. Thus a complete cycle is established. It is claimed the loss of air and wear of the parts is very small. This wheel is particularly adapted for use on such cars as use compressed air.

A NOVEL REFLECTOR.

The accompanying illustration represents in longitudinal section the Gray-Davis acetylene lamp for automobiles. In order to obtain a light which will answer the dual purpose of being visible at a great distance and which will, at the same time, brightly illuminate the road ahead of the car, a novel arrangement of a concave mirror and convex lens has been adopted. It will be seen that the

(Continued on page 43.)

burner is placed at the principal focus of the concave mirror, so that the rays of light after having been reflected will emerge from the lamp in a pencil composed of parallel rays only. The beam of light thus produced brightly illuminates the road, and clearly shows obstacles and depressions. The other beam of light consists of a divergent pencil, and is pro-



A DOUBLE RAY ACETYLENE, WHICH CAN BE SEEN AT A CONSIDERABLE DISTANCE AND WHICH ALSO ILLUMINATES THE ROAD.

duced by first causing the rays from the burner to strike a cylindrical mirror, by which they are reflected through the convex lens at the front of the lamp. As the diagram indicates, the rays are widely scattered, so that they can be seen at a considerable distance.

IMPROVEMENTS IN THE WHITE STEAM TOURING CAR.

The latest model White touring car has been increased in size and power, so that it is now one of the largest and most luxurious automobiles built in America. The increased power of this machine has been obtained both by increasing the size of the engine and generator, and by increasing somewhat the mean steam pressure by means of a thermostatic regulator, which always assures a pressure of 600 pounds. By the addition of a simple feed-water heater, consisting of a short coil of pipe placed between the water tank and generator and surrounded by the exhaust pipe, the efficiency of the power plant has been further increased by about ten per cent. The feed-water heater not only supplies the water to the generator at a higher temperature, but it also increases the efficiency of condensation.

Another radical departure in the new White cars is the location of the gasoline tank in the rear of the car, behind the rear axle. The tank is raised several inches above the axle, so that should the former ever strike obstructions, the tank will be protected. The front axle is of the tubular type, as it is claimed that both theory and practice show that an axle of this type, when properly designed, will best withstand both vertical and horizontal strains. The water tank has been moved to a position under the floor on the left-hand side of the car, where the gasoline tank was formerly located. This tank is provided with a suitable strainer, to stop any oil from passing from the condenser into the tank.

As the new White car is capable of increased speed, and as it is built heavier to withstand the road strains, every part of the frame and running gear has been considerably strengthened. The car is provided with larger and heavier wheels, brakes, and tires, and its every part has been designed upon a new standard of size and strength, which is more than proportionate with the increase in power. A compound steam engine of 3 and 6-inch bore by 4½-inch stroke is used as heretofore. The car is also provided with a disconnecting clutch, so that the engine can be run and warmed while the car is standing. A lower speed can also be thrown in, should the car get stuck in a mudhole, or should there be any occasion for a decided increase in power.

The new touring car can be fitted with

Regular Equipment on the **PIERCE Great Arrow**

Regular Equipment on the **WINTON**

Regular Equipment on the **WHITE**

Regular Equipment on the **THOMAS BUFFALO**

Regular Equipment on the **Cleveland**

The fact that Goodrich Tires have been selected as the regular equipment for 1907 by ten manufacturers of ten leading cars is significant.

It means that Goodrich Quality—which is exclusively a matter of tire construction, material and workmanship—not of words—is an established fact.

The consistent records made by

GOODRICH TIRES

during 1906 and all previous years will be upheld.

The faith in Goodrich tire goodness indicated by Goodrich Records is ever widening—the man with the best car wants the best tires.

If your Tire selection has not been made it is time to get in touch with us at once.

Let us send you fuller information about GOODRICH TIRES

THE B. F. GOODRICH CO., Akron, O.

Regular Equipment on the **PREMIER**

Regular Equipment on the **STANLEY**

Regular Equipment on the **Stoddard Dayton**

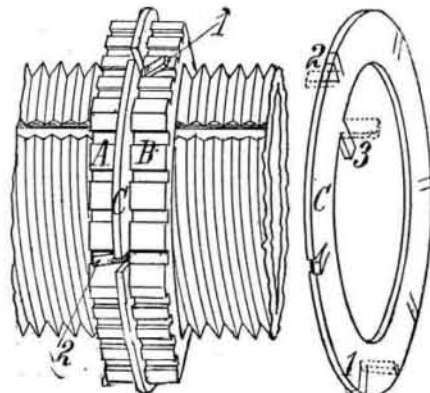
Regular Equipment on the **THOMAS DETROIT**

Regular Equipment on the **MOON**

a Pullman type of body, in which there are two revolving chairs in the tonneau (this type is shown in the illustration on page 33), or it can be fitted with a shorter ordinary touring car body, having extra space on the rear of the frame for carrying baggage. The latter body has ample room for carrying three passengers on the rear seat. It is also considerably lighter than the body which we illustrate.

AN INGENIOUS LOCKING DEVICE.

A locking device that will absolutely preclude the coming loose of nuts is essential for automobile construction. One of the neatest and simplest devices of this kind which we have seen, is found on the Stoddard-Dayton automobile. The arrangement consists of a locking washer, C, having lips such as 1, 2, 3 on its inner and outer surfaces, and which is placed between the usual nut and lock nut that are generally used. The nuts have transverse grooves on their faces for the purpose of receiving the outer lips, such as 1-2, of the washer. After the nut, A, has

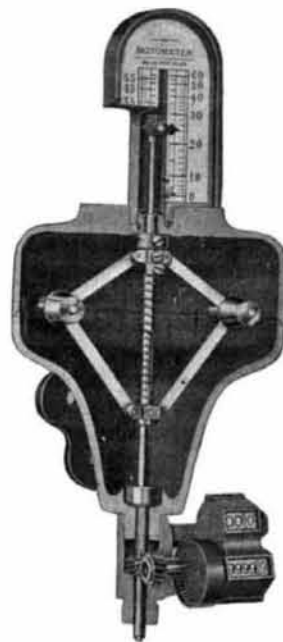


A SIMPLE AND EFFECTIVE LOCKING DEVICE.

been set and jammed tightly, the locking washer is slipped on the shaft with its inner lip, 3, in a groove in the latter, and with an outer lip, such as 2, bent over into one of the notches of A. The lock nut, B, is then set up, and another lip of C, such as 1, is bent over into one of the notches of B. The arrangement, as can be seen, makes it impossible for either nut to turn with respect to the other, or to the shaft.

A SIMPLE TYPE OF AUTOMOBILE SPEEDOMETER.

Among the many kinds of speedometers now on the market, one of the simplest and most positive that we have seen is that made by the R. H. Smith Manufacturing Company, of Springfield, Mass. This motometer, as it is called,



SECTIONAL CUT OF SMITH MOTOMETER.

consists of a vertical spindle driven through a flexible shaft from the wheel of the automobile, and carrying upon it weights similar to those of an ordinary flyball governor, so arranged that the vertical movement secured by the pivoted

(Continued on page 47.)