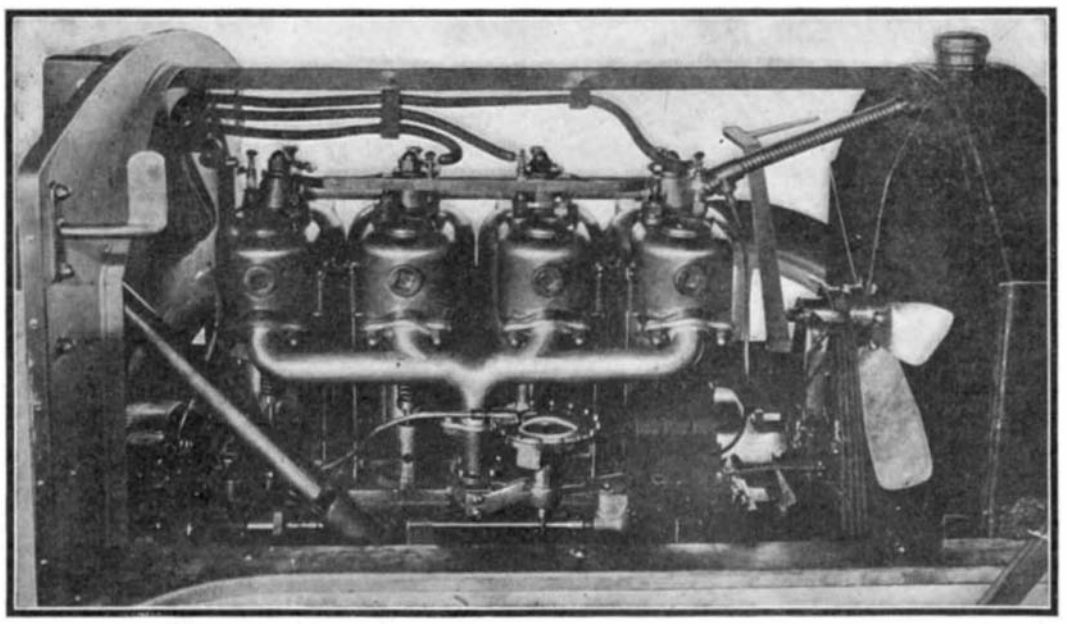
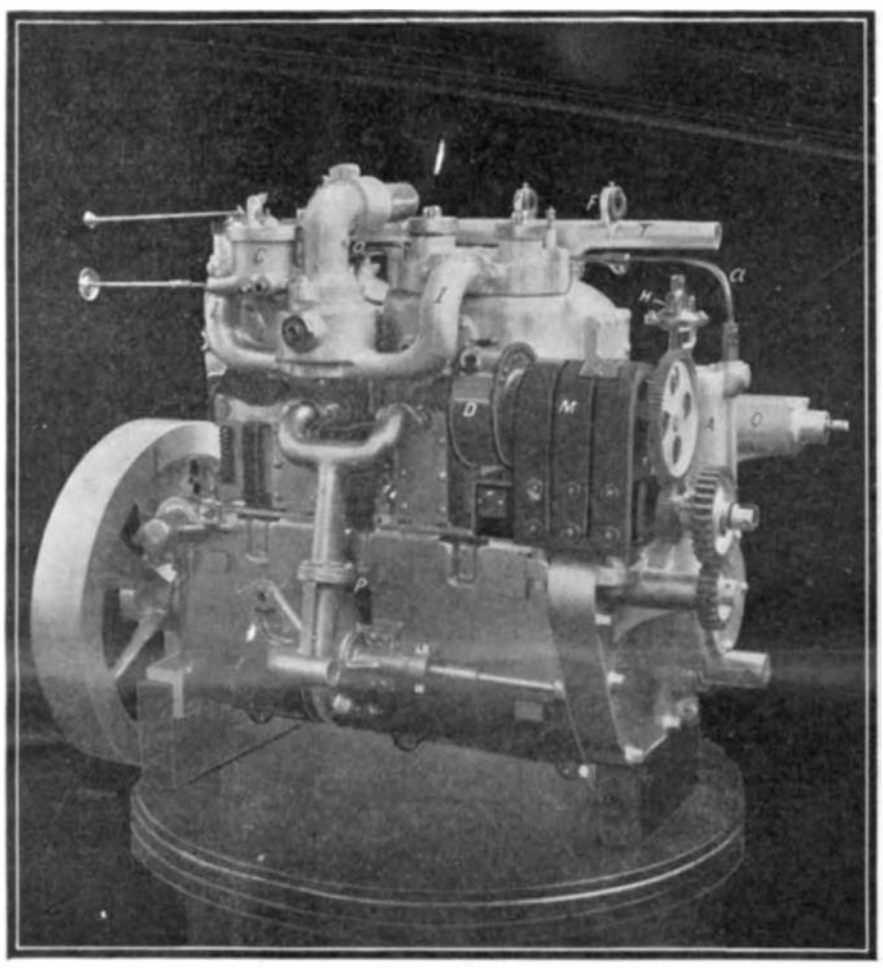
A TYPICAL AMERICAN FOUR-CYLINDER GASOLINE TOURING CAR MOTOR.

The motor shown in the annexed cut was one of the finest exhibited at the Automobile Show recently, where it was seen mounted on a large touring car, the product of the H. H. Buffum Company, of Abington, Mass. It is composed of four individual integrally-cast cylinders fitted with mechanically-operated inlet and exhaust valves, both make-and-break and jump-spark igniters, and a special automatic carbureter with hydraulic governor. The motor flywheel, seen at the left, has gear teeth cut in its periphery for the purpose of driving positively a gear water pump, which forces water at a varying pressure, according to the speed of the engine, against a horizontal diaphragm seen beside the motor in the center of the picture. This diaphragm operates a piston valve on the carbureter below, as well as a small auxiliary air valve, which is opened as the speed increases. The piston valve can be set, by a lever on the steering wheel, to close only to the point that gives the desired speed. The low-tension magneto ignition is supplemented by that of the high-tension type with batteries and coils with vibrators; the motor can be readily started by the latter system by switching on the current, and afterward run by the former system of ignition. The commutator for the primary jump-spark current is placed horizontally at the front end of the motor, the four small wires running to it from

(*Continued on page 84.*)

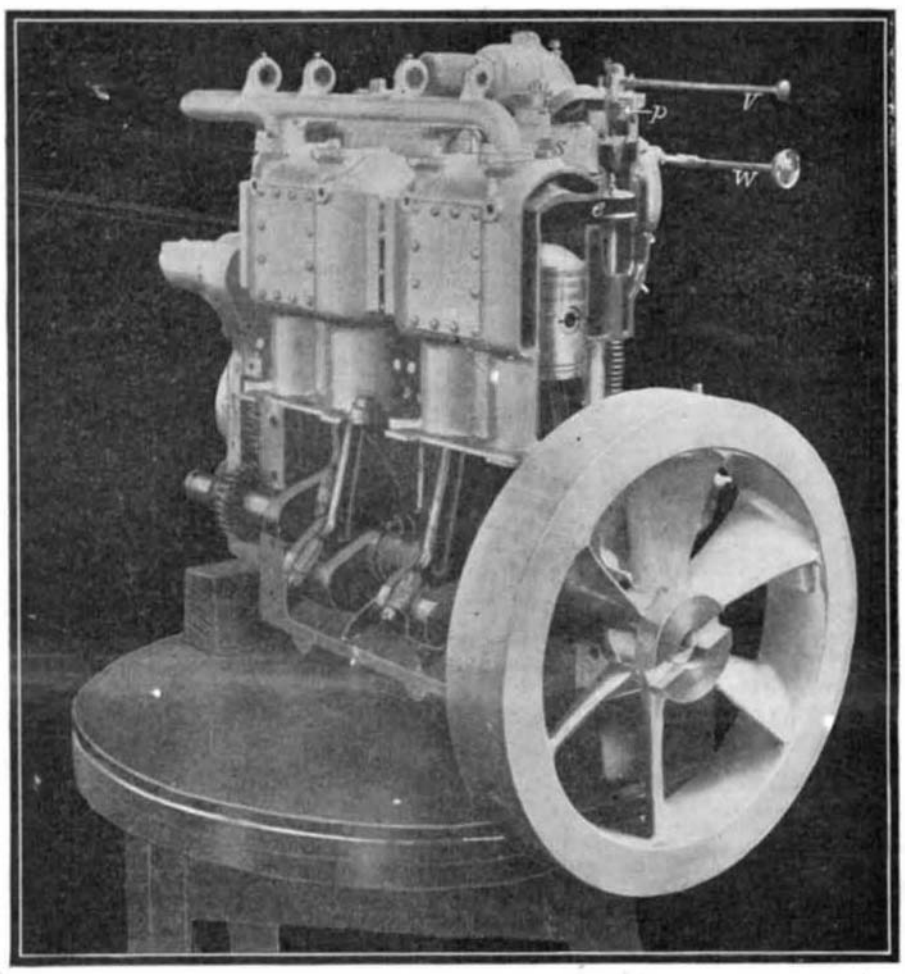


THE BUFFUM 30-HORSE-POWER MOTOR FITTED WITH MAKE-AND-BREAK AND JUMP SPARK IGNITION, MAGNETO, AND HYDRAULIC GOVERNOR.



Winton Motor as Viewed From the Front.

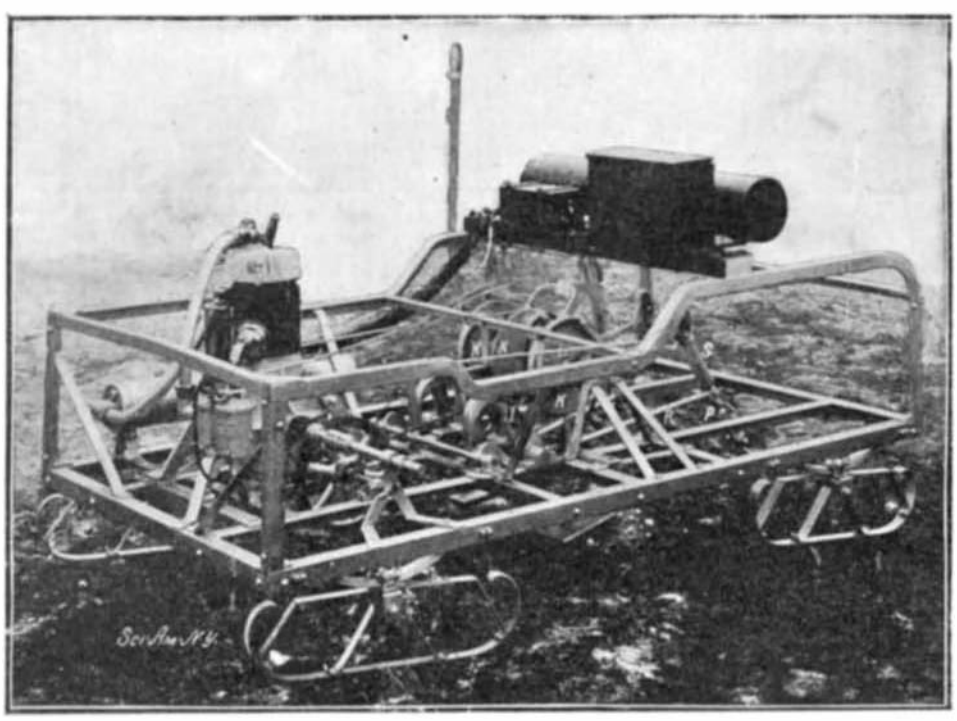
This photograph shows the air-pump, *A*, connected by the pipe, *a*, to the diaphragm, *H*, and the four chambers above the inlet valves containing the air pistons. *O* is the gear-driven oiler; *P* the centrifugal water pump; *C*, the carbureter; and *M* the magneto with its distributor, *D*. The secondary wires run from *D* through *T* and fiber-lined bushings, *F*, to the spark plugs. *I I* are the inlet pipes to the two pairs of cylinders.



Winton Motor as Viewed From the Rear.

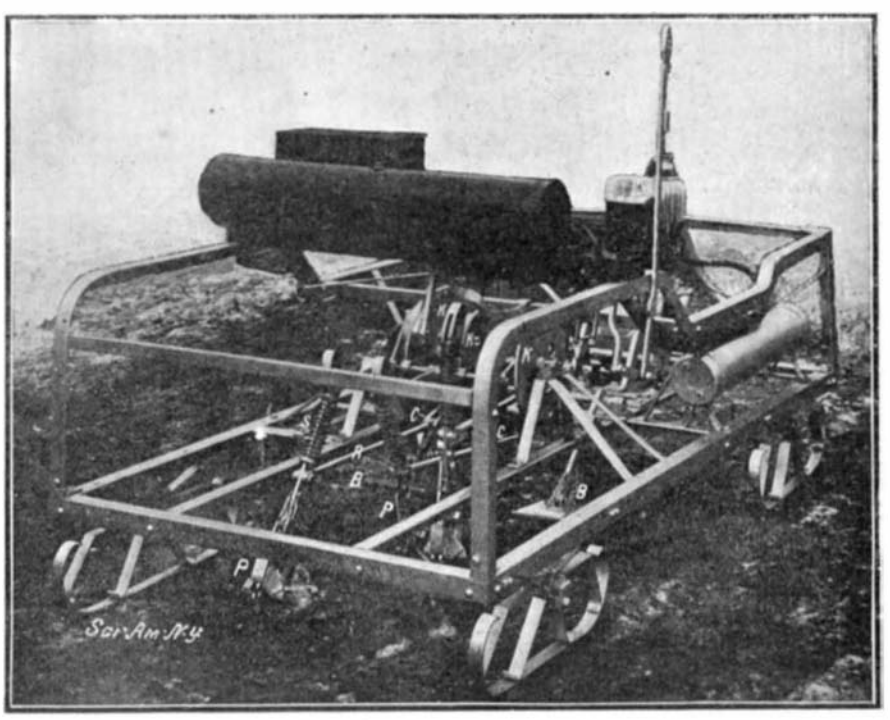
In this picture one side of the crank case has been removed and the end cylinder cross-sectioned, showing the piston with hollow wrist-pin and convex head; the exhaust valve, *e*; inlet valve, *i*, with air piston, *p*, on its stem: spark plug *S*; and primer handle and gasoline shut-off valve, *V* and *W*. Note the fan blades cast in the flywheel to aid in inducing a draught.

THE NEW FOUR-CYLINDER MOTOR USED ON THE WINTON CARS.



Motor Sleigh Viewed From the Front.

A 4-horse-power high-speed motor, mounted in front under a bonnet, furnishes the propelling power. There are two speed reductions from motor to crankshaft that operates pushers, *P*, by means of connecting rods, *R*.



Motor Sleigh Viewed From the Rear.

The sleigh is propelled by three pushers, *P*, operated by cranks, *C*, and connecting rods, *R*. The pushers are raised on the return stroke by specially-shaped cams, *K*.

A NOVEL FORM OF MOTOR SLEIGH.

A TYPICAL AMERICAN FOUR-CYLINDER GASOLINE TOURING CAR MOTOR.

(*Continued from page 57.*)

the coils being visible. This engine has 4½ x 5-inch cylinders, and, at a speed of 900 R. P. M., develops 30 horse-power. Both it and the transmission of the Buffum car are protected by a steel pan beneath. The finish of all the parts of the car is excellent, and the wheels, rear axle, and transmission are all mounted on imported, non-adjustable, ball bearings. The Buffum motor is one of the few American motors having both systems of ignition.

AN AMERICAN MOTOR SLEIGH.

One of the novelties at the recent Automobile Show was a motor sleigh invented by a Boston lawyer, and which has, we are informed, been thoroughly tested and driven at a speed of 15 miles an hour for four hours at a time. As can be seen from the illustrations on page 57, the sleigh body is mounted upon a suitable framework, carrying at the forward end a high-speed, air-cooled, gasoline motor. The first speed reduction is obtained through a large gear meshing with a pinion on the motor. A sprocket on the same shaft as this gear drives a three-throw crankshaft in the middle of the frame by means of a chain running over the large sprocket, *I*, thus reducing the speed still further. The cranks are connected through horizontal connecting rods, *R*, with three pushers, *P*, having at their lower ends spikes and knife blades for cutting into the ice and snow. These pusher rods are hung from slotted arms, which are suitably connected to peculiar-shaped cam disks, *K*, which cause them to rise into the position in which the right-hand pusher is seen in the rear view of the chassis during the return stroke. The pusher rods are provided with springs, which keep them fully extended, yet allow them to be raised in the slots of the arms just mentioned, should they meet with an obstacle in the road. A suitable friction clutch connects the motor to the countershaft when the machine is being driven. The sleigh is provided with two flat grooved plates pivoted on the ends of rods and shown at *BB* in the rear view of the chassis. These plates act as brakes when moved down against the ground. The sleigh is steered by moving the front runners in the same manner as the front wheels are moved on an automobile. The frame of the sleigh is supported on springs on the runners. The principle used for propelling this sleigh is much the same as that used on some of the original locomotives. The inventor claims that it is the correct one, as the pushers pack the snow and obtain a positive hold when traveling in soft snow or on ice. The use of toothed wheels for propelling a motor sleigh, it is claimed, has never been entirely successful. The motor used on the present model is of 4 horse-power. The stroke of the pushers is 16 inches, so that they move the sleigh forward 4 feet for every revolution of the three-throw crankshaft.

Greensand is a closely coherent clayey or sandy deposit, composed largely of the mineral glauconite—a hydrated silicate of iron and potassium. Owing to the presence of the latter element it is often employed as a fertilizer.

For many years Algiers has been one of the principal ports in the Mediterranean as a coaling station. The coaling trade at Algiers has steadily increased from the year 1885 to 1900, during which period it successively rose from 5,000 tons in 1890 to 244,000 tons in 1895, and to 290,000 tons in 1900. During the same time the coal trade at Gibraltar, which had risen to 562,000 tons in 1889, gradually decreased to 272,000 tons in 1895, to rise to 303,000 tons in 1900. Algiers supplied in 1902 for ships' bunkers 297,000 tons, and in 1903 she supplied 339,000 tons, whereas the amount supplied by Gibraltar fell to 167,000 tons, and finally to 123,000 tons.