

A FOUR-CYLINDER AIR-COOLED RUNABOUT.

The latest application of the four-cylinder air-cooled motor to a light runabout is typified in the Waltham-Orient machine illustrated herewith. In this 1,300-pound car the motor is placed longitudinally under the bonnet with a fan in front to blow on it. A three-speed sliding-gear transmission is placed back of the motor and connected to the usual universally-jointed propeller shaft with a bevel-gear drive at the rear axle. The transmission is so arranged that no gears are in mesh when the car is running on the high speed. This arrangement is shown in the photograph reproduced herewith. For the intermediate and low speeds the sliding member, 4, 5, is moved to the left by shifting fork, *S*, until 5 meshes with 6 or 4 with 3. As rod *S'* (upon which *S* is mounted) is moved, it carries with it slide *G*. A roller on the end of lever, *E*, is set in a notch in this slide. The other end of *E* fits in a shifting collar, 9, of gear, 2, and *E* is mounted on a pivot at its center. As *S* and *G* move to the left, *E* moves a certain distance with them, or until the roller slips out of the notch and rides upon the edge of *G*. The other end of *E* is moved to the right and gear 2 is slid into mesh with gear 1 and held there until the high speed is again engaged. This speed is obtained by locking the left-hand end of the lower shaft to the short right-hand end carrying gear 1, by means of the jaw clutch, *M F*. The drive on the low and intermediate speeds is through 1-2-3-4 and 1-2-6-5 respectively, while the reverse is had through 1-2-7-8-4. Pinion 8 is the intermediate pinion in mesh with 7 and running on a stud attached to the gear case. This transmission has the advantage that all gears on the lay shaft are idle when the car is on the high speed.

Another cut shows the carbureter with side broken away. The chamber on the left contains the float, which rises as the gasoline enters through the pipe in the bottom, and lowers the needle valve by means of the levers above it, until the gasoline reaches the desired level. The valve is then closed, and it

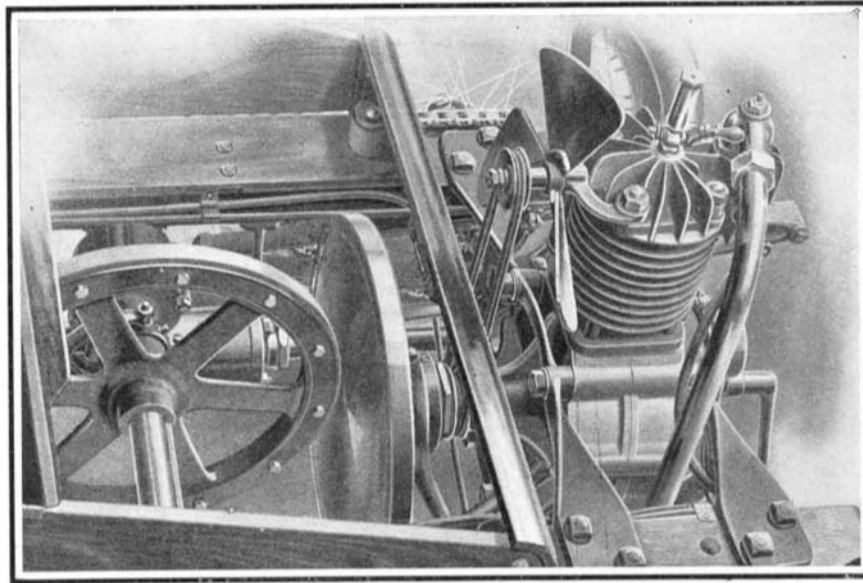
opens slightly to let in the fuel in proportion as it is used. The gasoline is maintained in the spraying nozzle at the level shown. The air, aspirated through the lower horizontal pipe, passes up through the hood

within its periphery. It is integral with the spider, *T*, and is held to its seat by the coiled spring shown. When the suction of the motor increases and more air is required, this valve is raised and an additional supply of air beyond what normally passes through the holes, is drawn in. The tension on the spring may be adjusted by the milled nut, *x*, on the top of the carbureter. The engine of this runabout has a 3¼-inch bore and 4¼-inch stroke. It is rated at 16 horse-power. A belt-driven fan running on ball bearings is used to keep it cool. A governor is fitted also. The crankshaft is supported in five long plain bearings. The 72-pound flywheel carries a leather-lined internal cone clutch which is accessible and may be readily removed. The engine is oiled by an automatic sight-feed oiler. Jump spark ignition with separate coils, and storage batteries is used. The commutator has a special wipe contact and is conveniently placed. The car has an 82-inch wheel base, standard tread, and 30 x 3½-inch tires. It will travel 40 miles an hour on a fuel consumption of one gallon per 15 miles.

The other car shown is the very light, low-powered runabout, which has been developed from the buckboard originally built by this company. As with the buckboard, the motor is placed at the rear end

of the car, being mounted on the frame of the body directly over the rear axle. The motor shaft is placed lengthwise of the car. On its forward end is a large friction disk. A countershaft placed in front of the disk carries a friction pulley at right angles to the

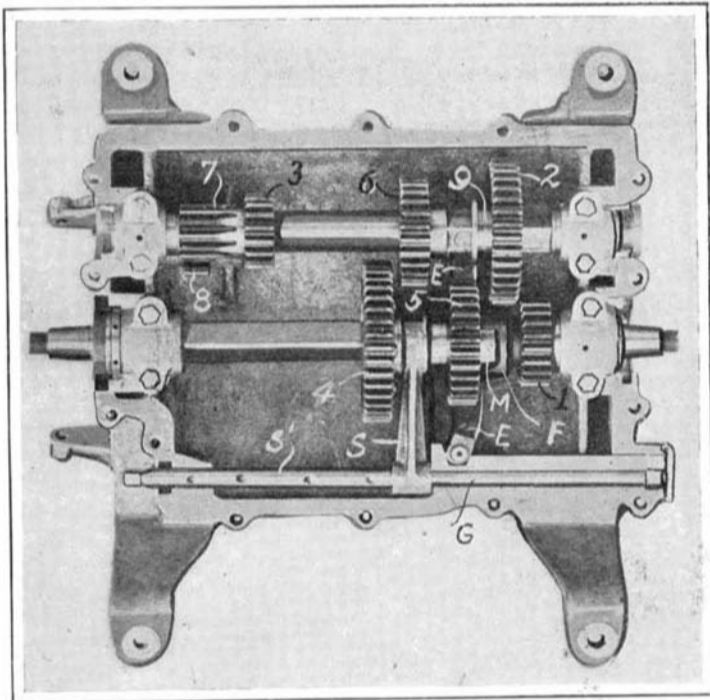
latter. By sliding the pulley across the face of the disk any number of different speeds can be obtained. The reverse is obtained by sliding the pulley over to the opposite side of the disk, and any speed from the slowest to the highest can also be had in this direction. The friction disk arrangement is shown in the cut above. The countershaft drives the rear wheels by chains, as shown in the cut below. A fan is placed in front of the motor. The valves, commutators, and spark plug are readily got at from behind.



THE FRICTION DISK DRIVE EMPLOYED ON THE BUCKBOARD RUNABOUT.

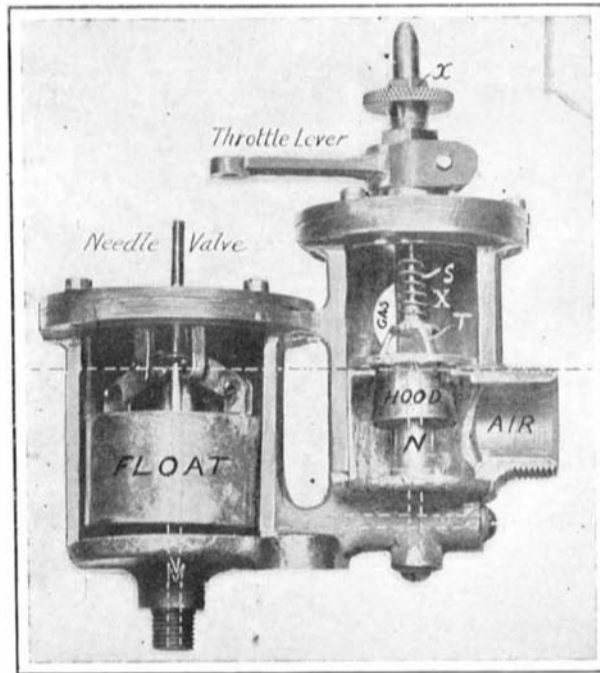
This form of drive has also been used successfully on heavy commercial vehicles and touring cars.

around the spraying nozzle and out through the hole at the back, which is shown in the cut half closed by the throttle. The throttle lever is seen on top. The horizontal disk above the hood and spraying nozzle has a hole in the center and a ring of smaller holes just



TYPICAL 3-SPEED SLIDING-GEAR TRANSMISSION SHOWING DIRECT DRIVE ON HIGH SPEED.

E, Lever for shifting gear 2. *F, M*, Jaw clutch for direct through drive. *S*, Shifting fork for sliding gears 4 and 5. *S'*, Rod with notches, to which *S* is attached. *G*, Notched slide adapted to move with rod *S*.

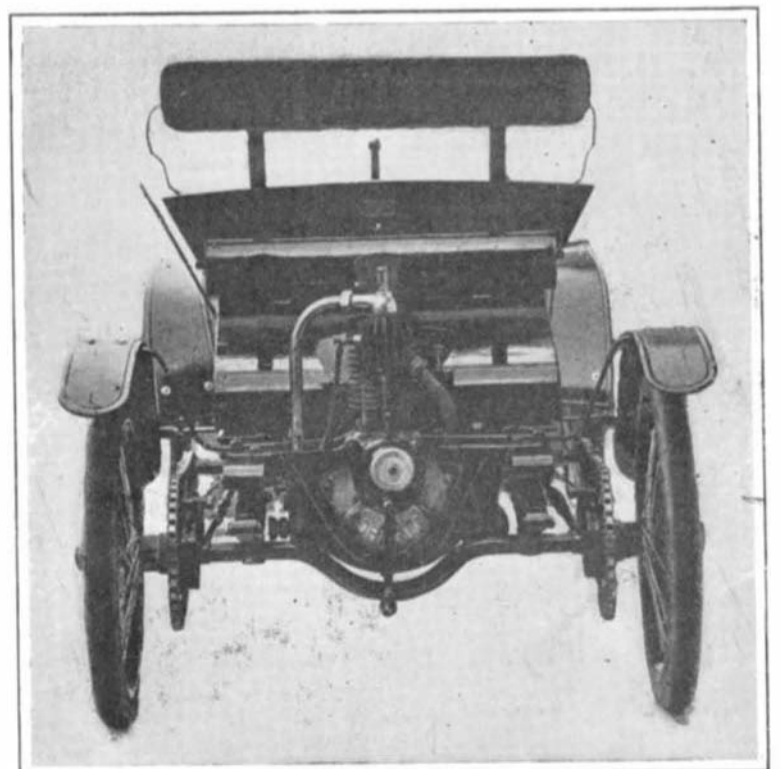


A TYPICAL FLOAT-FEED AUTOMATIC CARBURETER.

N, Spraying nozzle. *T*, Auxiliary air valve. *S*, Adjustable spring of air valve. *x*, Thumb screw for adjusting tension of *S*. *X*, Throttle valve.



A 1,300-POUND RUNABOUT FITTED WITH A 16-HORSE-POWER, 4-CYLINDER, AIR-COOLED MOTOR.



REAR VIEW OF LIGHT BUCKBOARD, SHOWING DOUBLE CHAIN DRIVE FROM COUNTERSHAFT.