

NEW VEHICLES AND PARTS.

The Twelve Horse Power Toledo Gasoline Touring Car.

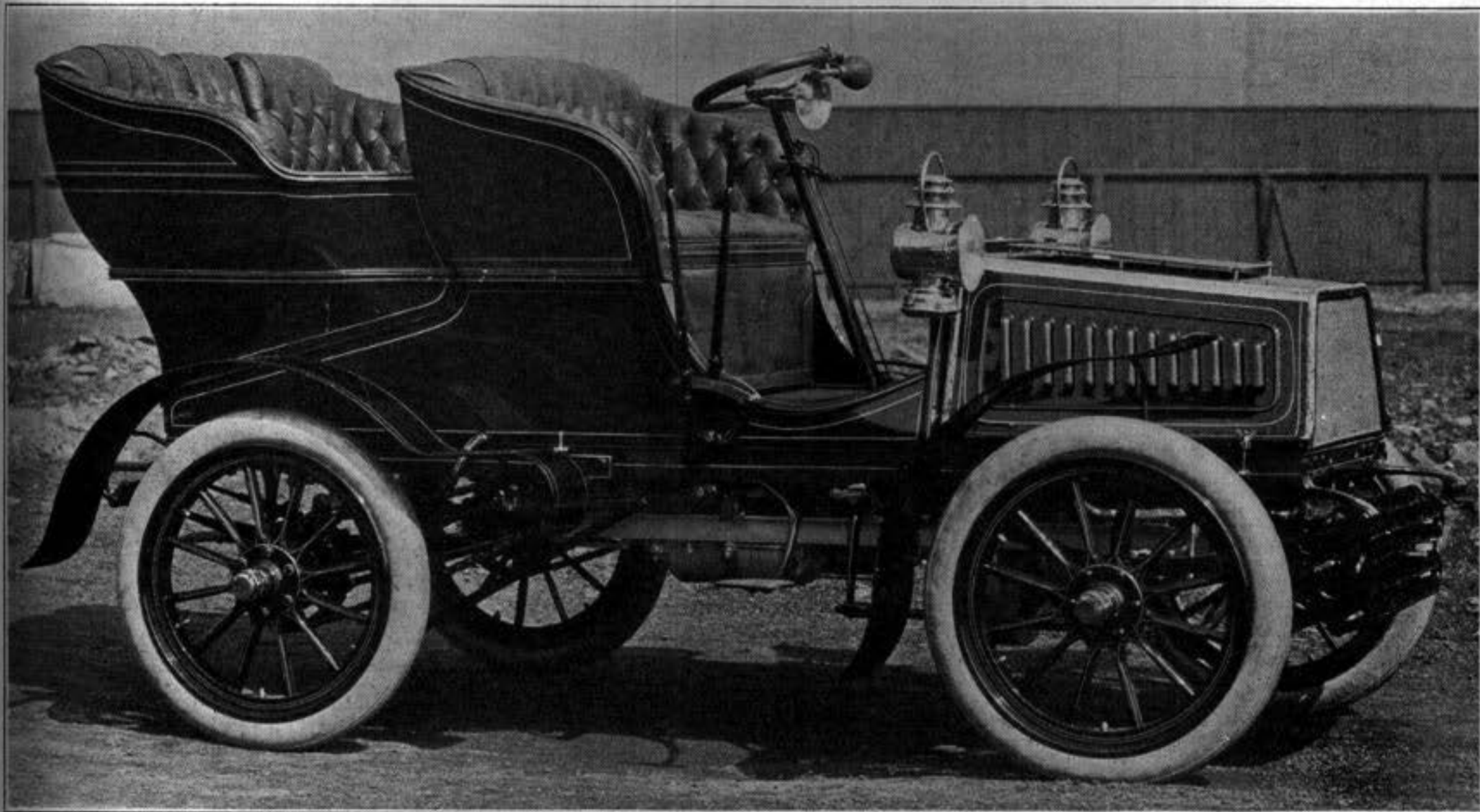
The original three cylinder 18 horse power gasoline touring car of the International Motor Car Company has this season been followed by a two cylinder and a four cylinder car of similar design, and the company now manufactures two, three and four cylinder machines, rated at 12, 18 and 24 horse power respectively. The cylinder dimensions of the three engines are alike, and the different cars are designed on similar lines, although the four cylinder car is provided with a number of fittings and attachments that are not found in the two

in width, and have five leaves; the rear springs are 36 inches in length, 2 inches in width, and also have five leaves. Panhard type of axle ends and steering knuckles are used. The running gear frame is of composite construction, consisting of beams of second growth ash, lined with steel plate 3-16 inch thick. The motor and change gear are supported upon a false frame of angle iron. The main frame is slightly narrowed down in front, as shown by the plan view.

THE ENGINE.

The engine is a two cylinder vertical one of $4\frac{1}{4}$ inches cylinder bore and $5\frac{1}{4}$ inches stroke, and runs at 900 revolutions per minute, normal speed. The two cylinders are cast integral and are bolted down to an aluminum crank case, which is divided

identical with each other. They are located side by side, and the valve spaces communicate with the compression space through the same passage. The openings over the valves are closed by plugs. The valve stem guides are fitted into the valve chamber wall without threading. The cam shaft is driven from the crank shaft by spur gears of bronze located outside the casing at the front end of the engine. The cams are enclosed in a special housing bolted to the crank casing, and operate on the valve push rods through the intermediary of cam rollers at the lower ends of these rods. The spark plugs are fitted centrally into the cylinder head. The upper half of the crank case is fitted with arms, by which the engine is supported on the angle iron false frame. The piston is of unusual length



TWELVE HORSE POWER GASOLINE TOURING CAR.

cylinder one. The photo and drawings herewith refer to the 12 horse power two cylinder car.

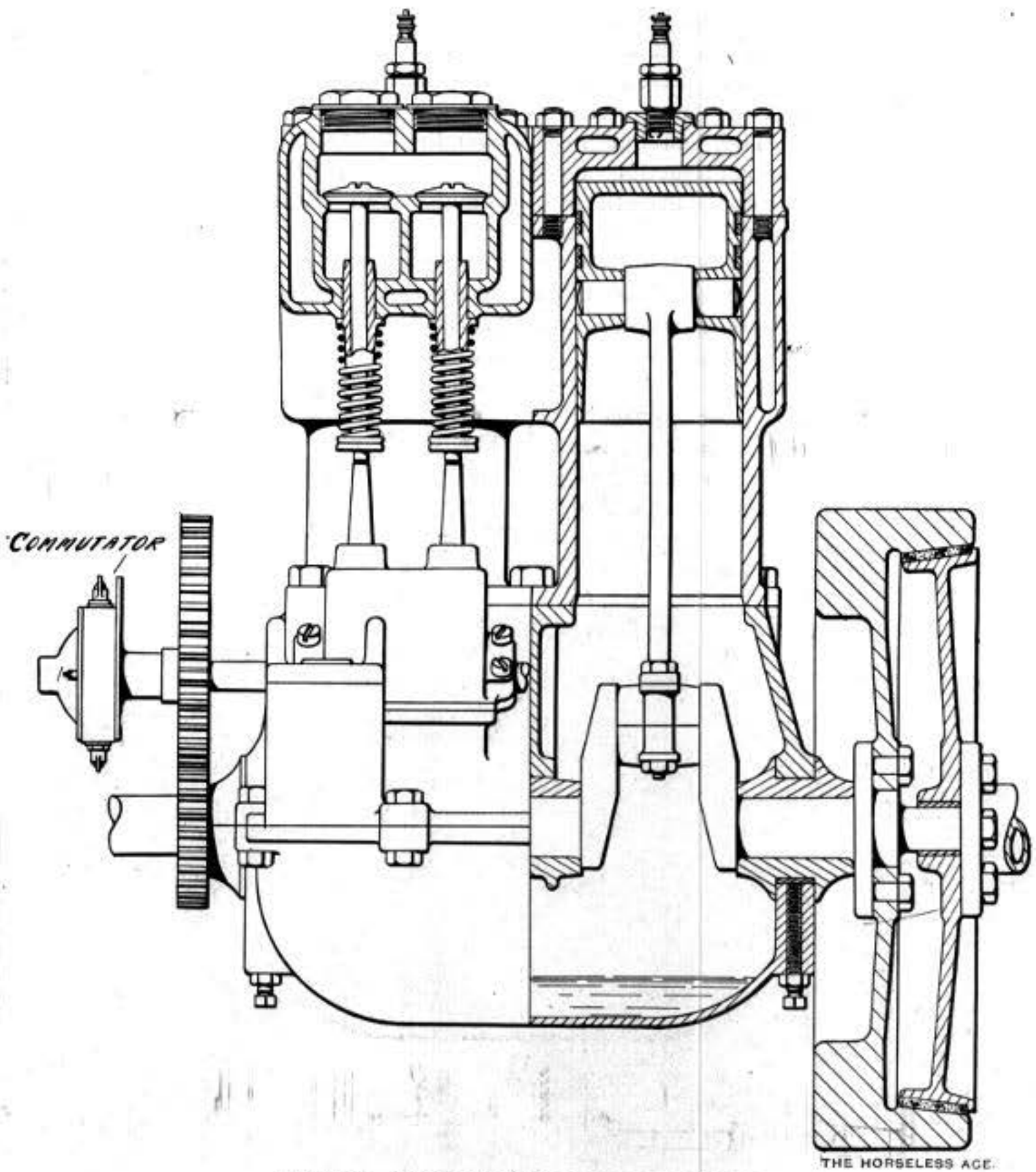
The wheel base of this vehicle is 76 inches and the tread standard. The wheels are of the artillery wood pattern, 30 inches in diameter, provided with twelve spokes each, and fitted with $3\frac{1}{2}$ inch G & J clincher tires in the case of the vehicle from which this data was taken, though it is stated that the make of tires is optional to the purchaser. Both front and rear wheels run on ball bearings. The rear axle is a solid forging of square section, 2x2 inches. The front axle is a round tube 2 inches in outside diameter, and is formed with a drop in the centre. The body frame is supported on semi-elliptic springs in front and in the rear, and the car is said to be exceptionally easy riding. The front springs are 34 inches in length, $1\frac{3}{4}$ inches

in a horizontal plane through the centre of the crank shaft bearing. The crank shaft is of the double throw type, insuring the best possible balance of reciprocating parts for this type of engine, and has three bearings. The central bearing is entirely independent of the lower half of the crank case, and the lower half of the casing can therefore be taken off, while the crank remains in position supported by the central bearing. Attention should be called to the method of adjusting the outside bearings by means of a set screw passing up through the support of the bearing from below. The cylinder heads are separate from the cylinders and are cast integral with the valve boxes. As the sectional views show, the water jacket not only surrounds the cylinders but also the cylinder heads and valve chamber. Exhaust and intake valves are both mechanically operated and are

and is fitted with four packing rings, two of which are placed in the same groove. The connecting rod is a drop forging and provided with a connecting rod end of bronze. The flywheel of the engine is bolted to a flange on the crank shaft outside the bearing, as is customary where it serves at the same time as a friction clutch member. It is $16\frac{1}{2}$ inches in diameter, and is turned with an internal taper surface to receive the leather faced friction cone of the transmission clutch. The two cylinders are lubricated by means of oil cups and the bearings in the crank chamber are lubricated by splash. The weight of the engine, complete with flywheel, is 233 pounds.

IGNITION.

Jump spark ignition is employed, the spark plugs, as already stated, being fitted into the head of the cylinder. The ignition



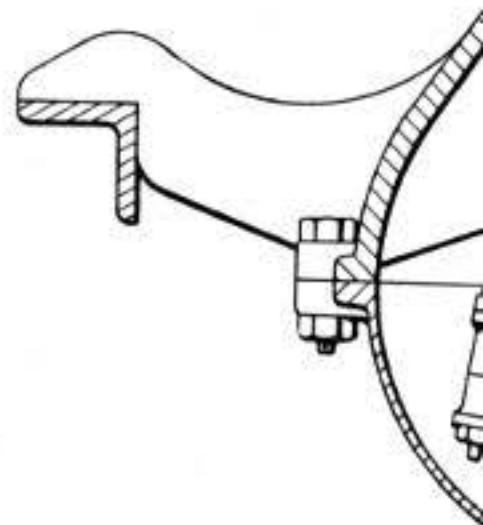
SECTION THROUGH CYLINDERS OF MOTOR.

current is furnished by a dry battery of six cells, disposed in a compartment in the front seat. The commutator is located at the front end of the cam shaft, and is fitted with an aluminum cover, which can be very readily snapped off for examination. Two coils, with magnetic buzzers, are employed, which are placed in a hardwood box attached to the dashboard. The time of spark is varied in the usual manner, by means of a small handle on the steering column, which rocks the commutator around its support.

The carburetor is of the constant level, float feed type, and is located close to the cylinder. The air intake is placed directly below the exhaust pipe, to insure the air drawing in being warmed, and the carburetor has only a single pipe connection to the engine, the spaces below the intake valves of the two cylinders being in communication with each other. An air throttle is placed in the air pipe, this throttle being operated by means of a handle at the front of the car. In starting the engine by hand this handle is drawn out, which practically closes the air throttle and thereby insures a rich mixture getting into the cylinder. The carburetor proper has two adjustments, one to vary the proportion of air and gas, which is operated by a small hand lever on the oppo-

site side of the steering column from the spark lever, and the other to throttle the flow of gas to the engine, which is operated by a pedal under the right foot of the operator. The gasoline is carried in a sheet copper tank in the front seat, which holds 10 gallons.

From the photo of the car it will be seen that the bonnet is unusually long for a two cylinder car. This is due to the fact that the water tank is placed in front of the engine under the bonnet and increases the length of the latter. The water tank holds $5\frac{1}{2}$ gallons, and is pierced by thirty-four tubes of about 2 inches diameter in the direction of the car. A flanged radia-



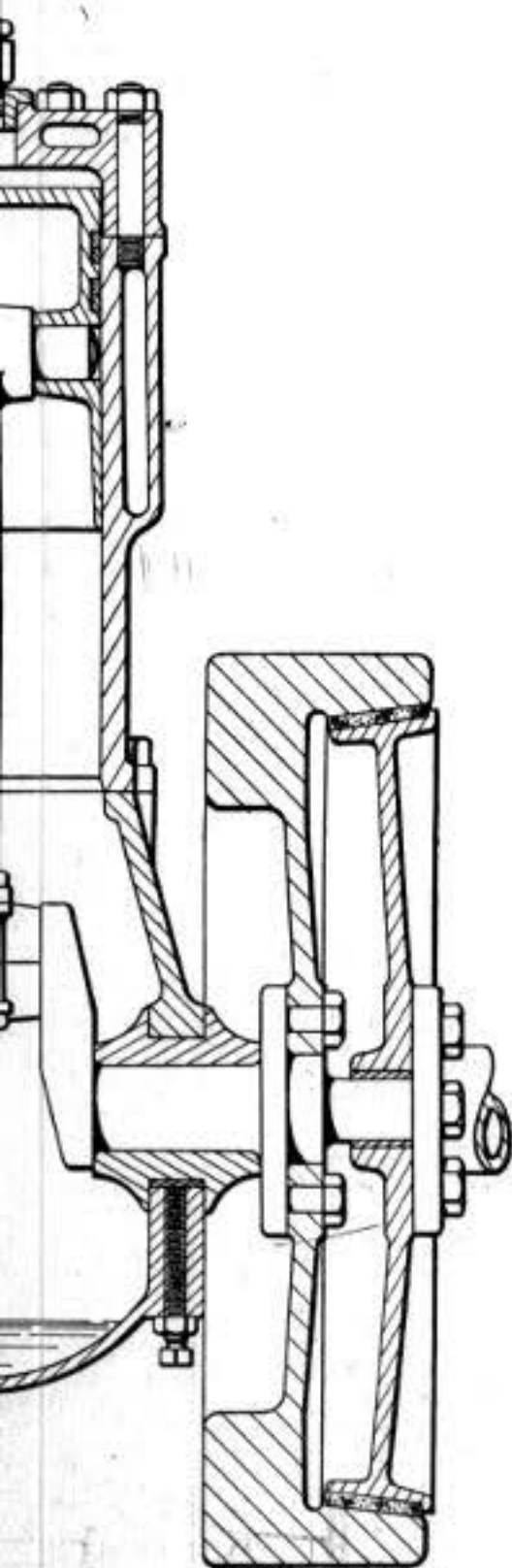
SECTION THROUGH CYLINDERS A

tor of sixteen tubes is placed below the water tank, and the gear pump, which circulates the cooling water, is placed directly behind the tank, so that the water connections are very short. The gear pump is driven by means of a chain from the engine crank shaft, at the same speed as the engine. The bonnet is hinged to the dashboard, and when raised gives access to all parts of the engine and its accessories. A screen of wire gauze in the front of the bonnet hides the water tank from view.

THE TRANSMISSION.

The friction clutch is of the usual conical type and is pressed into engagement by means of a coiled spring concealed in a sleeve upon the clutch shaft. All end thrust is self contained within the clutch. The change gear is of the sliding gear type and gives three forward speeds and one reverse. It is operated by a single lever and is completely enclosed in a dustproof aluminum case. The three speeds forward are 6, 14 and 30 miles per hour respectively. The bevel gears transmitting power from the change gear shaft to the differential gear shaft give a reduction in the ratio of 5 : 6. The differential gear is enclosed within the change gear casing. All the bearings of the change gear casing are lined with bronze. The change gear is supplied with lubricant by means of a grease pump on the dashboard.

As will be observed from the plan of the

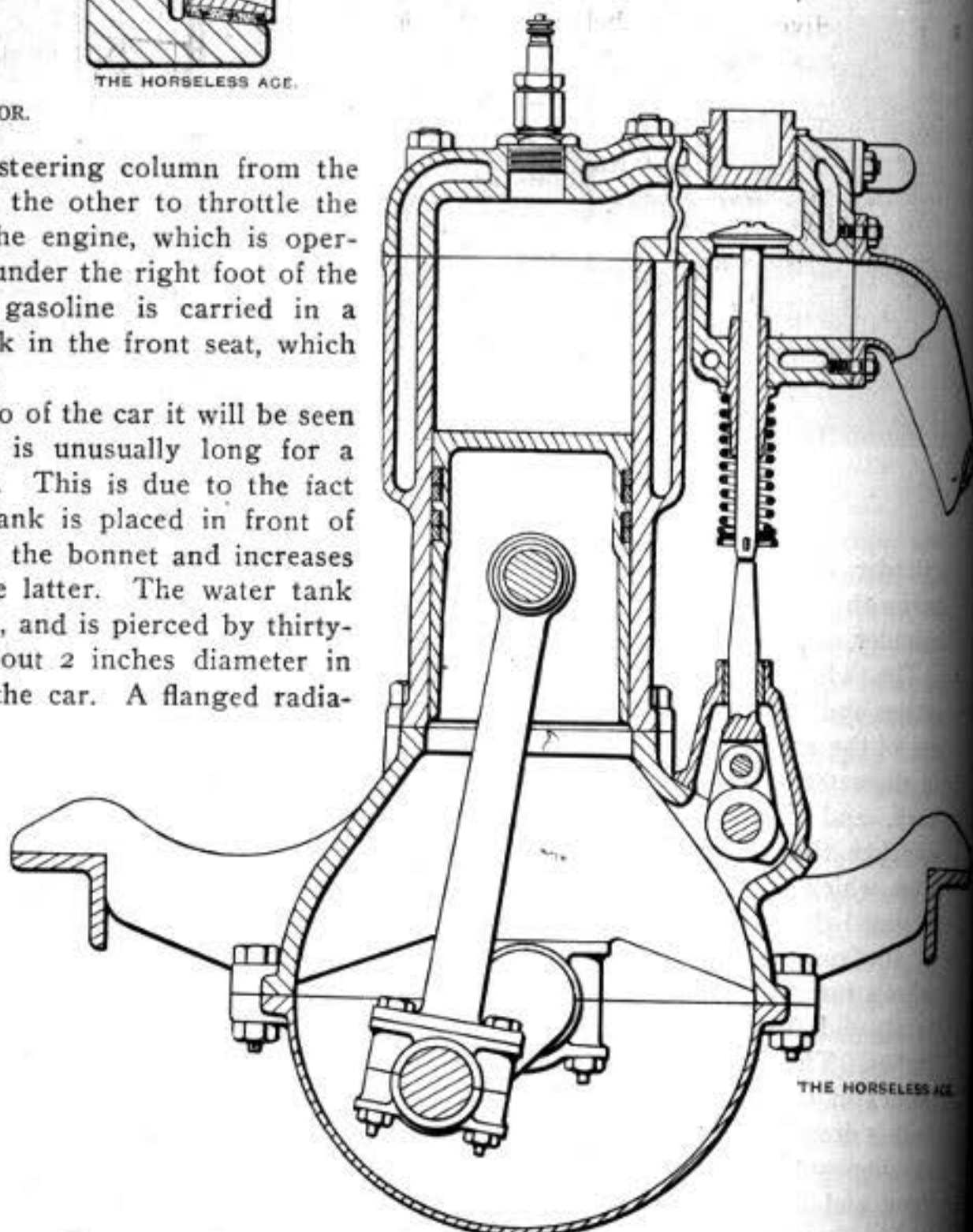


THE HORSELESS AGE.

MOTOR.

of the steering column from the dashboard, and the other to throttle the gas to the engine, which is operated by a pedal under the right foot of the driver. The gasoline is carried in a tank in the front seat, which holds 10 gallons.

In the photo of the car it will be seen that the bonnet is unusually long for a motor car. This is due to the fact that the water tank is placed in front of the engine under the bonnet and increases the length of the latter. The water tank holds 10 gallons, and is pierced by thirty tubes of about 2 inches diameter in the front of the car. A flanged radia-



THE HORSELESS AGE.

SECTION THROUGH CYLINDERS AND VALVE CHAMBER OF MOTOR.

vehicle the countershaft is fitted with a sort of universal joint on both sides of the gear casing, and both ends of the countershaft are supported in very long and substantial bearings, which are lined with babbitt metal. The transmission to the rear wheels is by separate chains, Diamond chains of 1¼ inch pitch and with five-eighths inch rollers being used. The sprockets have twelve and twenty-three teeth respectively, and when the car is driven on the high gear the ratio of reduction from the engine to the drive wheels is 3⅓ : 1. The rear wheels are fitted with drums for band brakes, which are 8½ inches in diameter and have 1¾ inches brake surface. The brakes are of the double acting band type and are operated by a hand lever on the right hand side of the seat through the well known stranded cable equalizing device. The car is also fitted with a sprag. Steering is by means of a 14 inch hand wheel of laminated wood through an irreversible worm and sector mechanism. The joints of the steering mechanism are of the adjustable ball type.

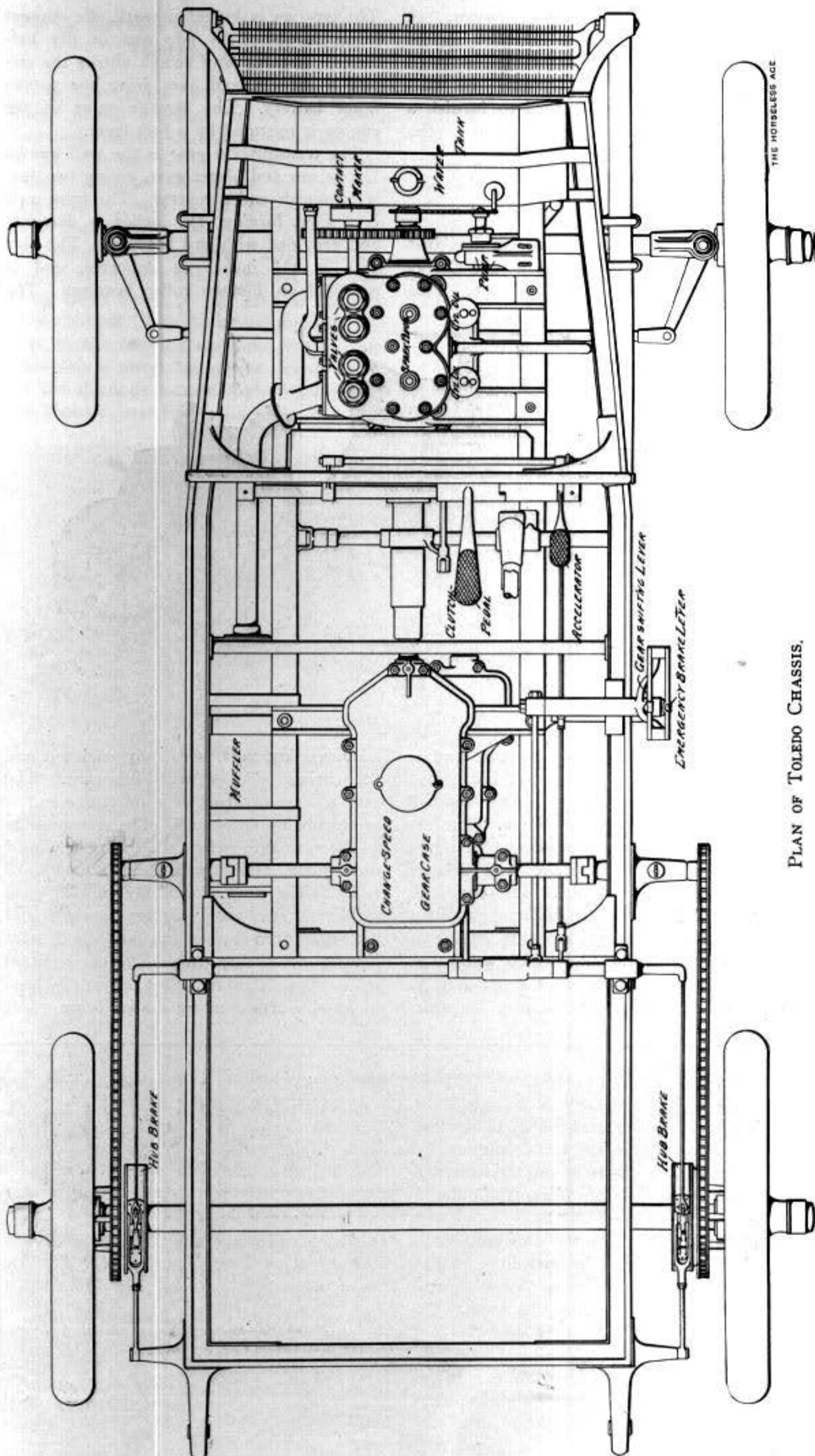
The car has a roomy tonneau, which will seat three if required, and is fitted with large fenders, steps and lamps. The finish is of the usual high grade of the International Motor Car Company. The weight of the car complete is 1,800 pounds.

The Ide-Sprung-Huber Gasoline Delivery Wagon.

At the recent Detroit show was exhibited a motor delivery wagon belonging to a local newspaper which had been changed from electric to gasoline propulsion. The electric motors and battery had been taken out and a four cylinder gasoline motor and change gear been substituted by the Ide-Sprung-Huber Company, of Detroit. Before the change was made the vehicle unloaded weighed 5,700 pounds, and after the change 3,800 pounds. The following description of the new equipment is furnished:

This engine is capable of developing from 15 to 21 horse power, having a bore of 3¾ inches, and a stroke of 4½ inches, and makes from 75 to 1,500 revolutions per minute. The compression is high. The flywheel, which, by the way, only weighs 40 pounds, is used as the friction clutch. The intake and exhaust valves are arranged on opposite sides of the cylinders, and are both mechanically operated. The ignition is by jump spark with current furnished by a battery of ten dry cells. The vibrator with a quadruple cam is mounted on and operated by the intake valve cam shaft, and the secondary current commutator is mounted on the exhaust valve cam shaft. The vibrator and commutator are connected by a link, so that when it is desired to vary the period of ignition they are moved together by a single operation.

When the machine is standing still and the engine is going, all gear wheels are standing still. In starting up, the low speed gear is thrown in first. While running on



PLAN OF TOLEDO CHASSIS.

this speed, all other gears are running in mesh, although performing no work. When the next higher speed is thrown in, the slow speed gears continue to run, but cease to do any work. This is also true of the back-up gears. When running at high speed, the engine is connected by a straight shaft to the driving countershaft, the latter

being connected to the rear wheels by means of chains. While the controlling lever is in the high speed notch all gears are running, but on account of their being bronze and cast steel there is little noise.

An emergency brake is convenient to the right hand of the operator, by which the machine can be brought to a sudden stop, at