

HORSELESS VEHICLES

AUTOMOBILES

MOTOR CYCLES

OPERATED BY

**STEAM, HYDRO-CARBON, ELECTRIC AND
PNEUMATIC MOTORS**

A PRACTICAL TREATISE FOR AUTOMOBILISTS, MANUFACTURERS, CAPITALISTS, INVESTORS AND EVERYONE
INTERESTED IN THE DEVELOPMENT, USE AND
CARE OF THE AUTOMOBILE

INCLUDING A SPECIAL CHAPTER ON HOW TO BUILD AN ELECTRIC CAB,
WITH DETAIL DRAWINGS

BY

GARDNER D. HISCOX, M.E.

AUTHOR OF

"GAS, GASOLINE AND OIL ENGINES"

AND

"MECHANICAL MOVEMENTS, POWERS, DEVICES AND APPLIANCES"

WITH 316 ILLUSTRATIONS



NEW YORK

NORMAN W. HENLEY & CO.

132 NASSAU STREET

1900

CHAPTER XVI.

COMPRESSED AIR POWER FOR VEHICLES.

The use of compressed air for railway propulsion has now been on trial for nearly a quarter of a century, with but small advances in its adaptability beyond the limited terminals of local road lines, and for factory and mining traction.

The bar to its early success seems to have been wholly due to the initial low pressure in the storage tanks, which was limited to from 300 to 600 pounds per square inch, until the beginning of the last decade, when high pressure air service, for motive power, began to receive attention. The first trials of compressed air at from 2,000 to 3,000 pounds pressure per square inch was in railway work, and has reached a successful issue.

The first trials of high pressures for road carriages did not give satisfactory results in England, but its application as a motive power for heavy vehicles has made a fair progress, and is now in successful operation in France. A delivery wagon is reported to be in operation in Paris, having a storage capacity of 18 cubic feet of compressed air at a pressure of 4,200 pounds per square inch.

The air is delivered from the high pressure steel bottles by a differential valve, and reheated in a steel coil by a gasoline burner to an amount to double its volume under a varying working pressure of from 25 to 50 pounds per square inch, as needed. The cost of reheating the air for this vehi-

cle is about one pound of gasoline per hour, when running at ordinary speed.

In the United States, the American Air Power Company, the International Air Power Company, and the New York Auto Truck Company are pushing the interest of compressed air for vehicle propulsion with a line of practical experiments to demonstrate the feasibility of compressed air vehicles for street haulage and for ordinary truckage. These companies are operating under the Hardie and Hoadley-Knight patents.

A runabout wagon has been constructed by Mr. C. D. P. Gibson for the Air Vehicle Company, with an air engine weighing but 36 pounds, and with compressed air storage capacity of six cubic feet at 2,500 pounds pressure per square inch, the vehicle, storage and motive power weighing 670 pounds. The working pressure is reduced to 150 pounds through a differential valve, and the air reheated. Thus, a single storage charge should give out one horse power for five hours, and cover a distance of from 20 to 30 miles in such a vehicle. Thus the possibilities of compressed air for individual use lie in the ability to obtain a charge at some high pressure air station, or to operate a small oil engine power and high pressure compressor with, perhaps, a high pressure reserve tank for contingencies.

For trucks or traction wagons operating on short circuits, the problem of the practicable service of compressed air for vehicle power is most encouraging. For shop and yard work requiring short circuits with facilities for recharging at several points from pipe-line air hydrants, the problem has been practically solved; and we illustrate in Fig. 267 a shop truck built by and operated in the works of the American Wheelock Engine Company, Worcester, Mass. The upper hand wheel is on the steering spindle; the lower hand wheel

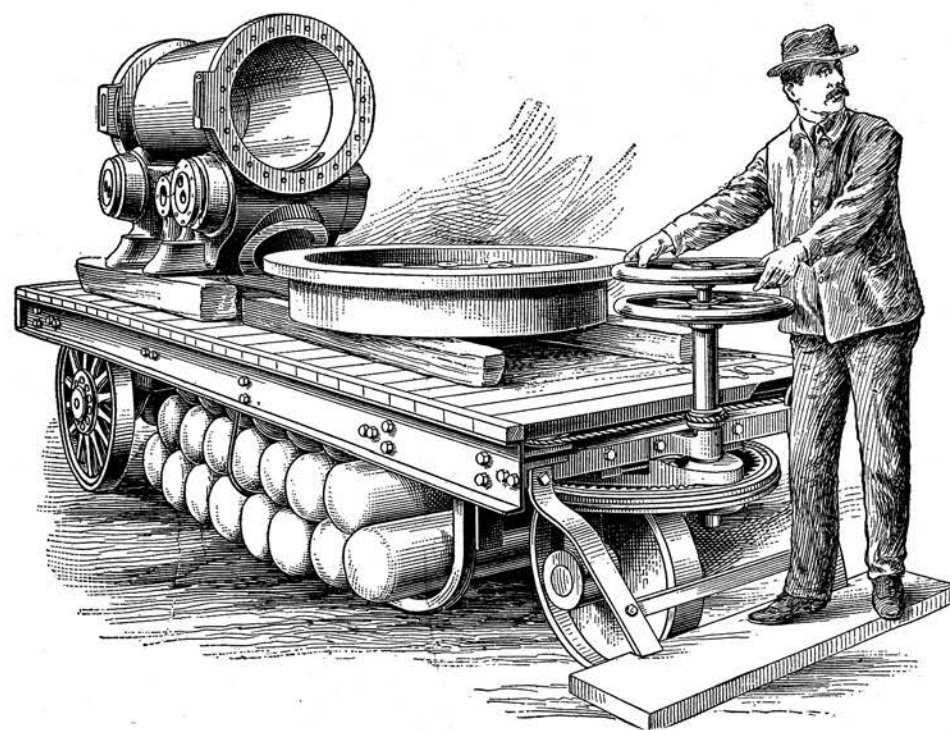


FIG. 267.—COMPRESSED AIR SHOP TRUCK.



FIG. 268.—A COMPRESSED AIR STREET TRUCK.

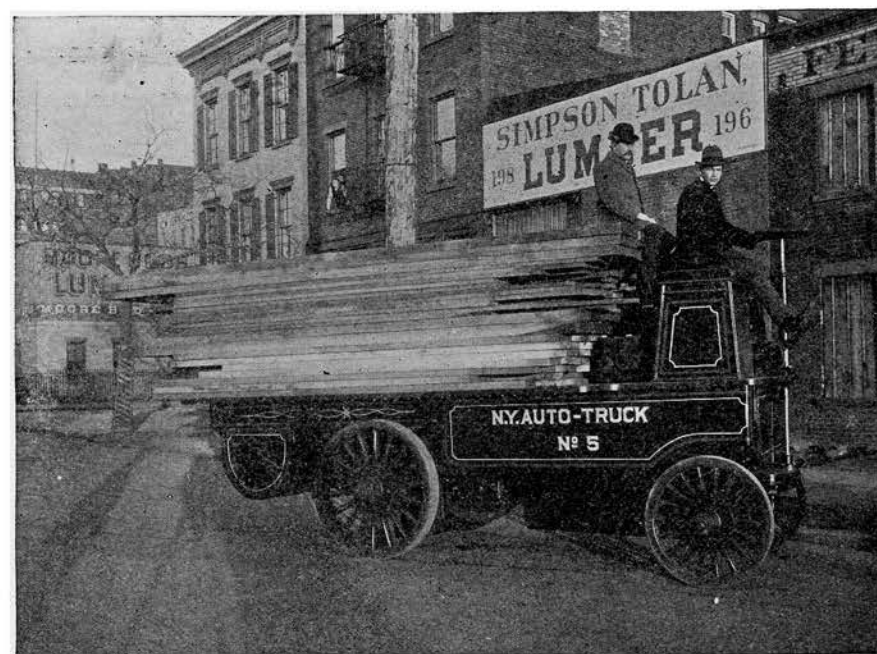


FIG. 269.—A COMPRESSED AIR STREET TRUCK UNDER A LOAD OF LUMBER.

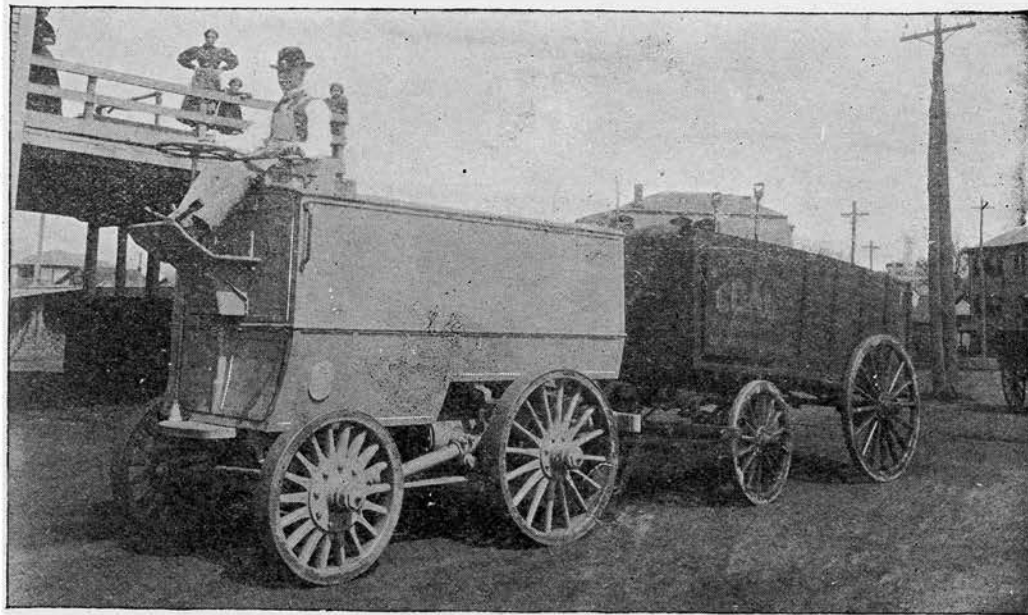


FIG. 270.—A COMPRESSED AIR TRACTION TRUCK WITH A TRAILING COAL WAGON

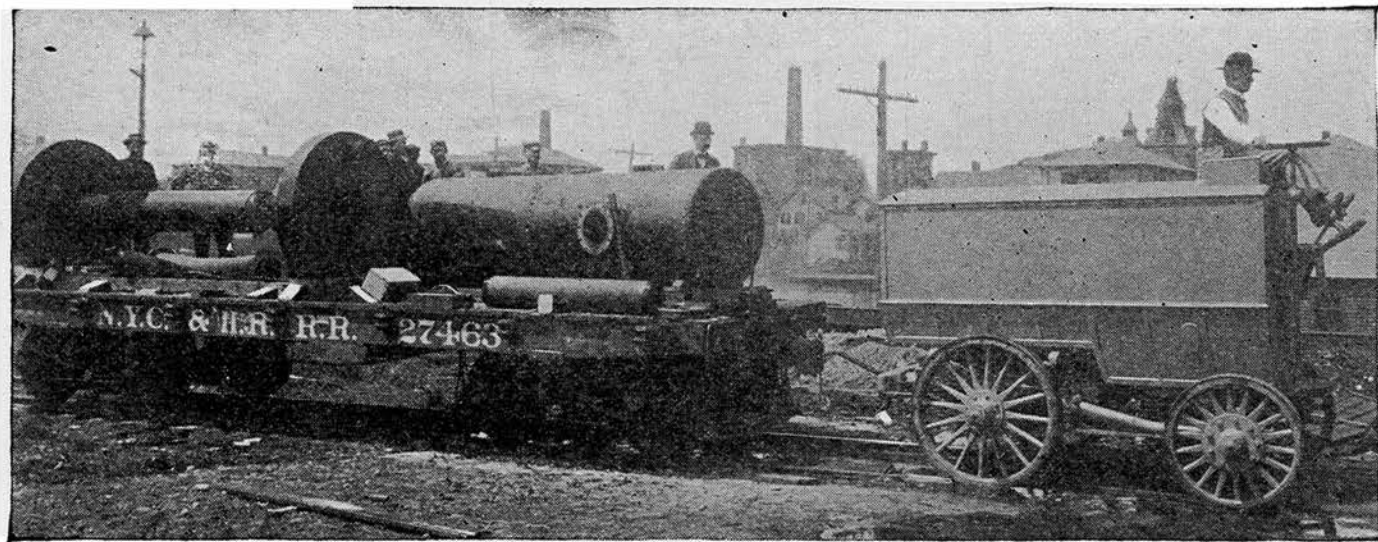


FIG. 271.—A COMPRESSED AIR TRACTION TRUCK MOVING A LOADED PLATFORM CAR.

is for operating the motive power by a lanyard connection to the link valve gear. The throttle is governed by a lever which is opened by the operator pressing his knee against it and is closed by a spring. The motor drives both rear wheels through a differential gear, and, when working under ordinary conditions, uses about 75 cubic feet of free air per mile.

It will move a load of ten tons, and occupies a space of 4 feet wide by 15 feet long.

Fig. 268 illustrates a truck for general haulage used at the

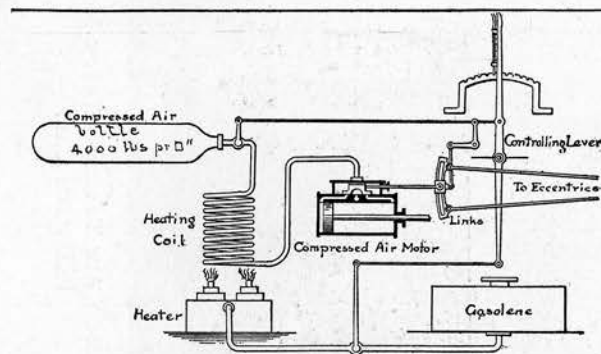


FIG. 272.—THE REHEATING OF COMPRESSED AIR WHEN COOLED BY EXPANSION FROM HIGH PRESSURE STORAGE.

Worcester works for shipping machinery and hauling supplies. In this truck the air is reheated by passing through a hot water tank charged to a high pressure.

In Fig. 269 is illustrated the same kind of truck loaded with lumber and in use in New York City, and in Fig. 270 a compressed air traction wagon hauling a coal wagon.

In Fig. 271 is illustrated the same traction wagon hauling a flat car loaded with machinery from the works, acting the part of a switching engine.

Fig. 272 is an ideal diagram of the operating parts of a

compressed air motor gear with the reheating device. Compressed air trucks and traction wagons are also used at the works of the International Power Company, Providence, R. I.

AN AUTOMATIC ELECTRIC AIR PUMP.

A most desirable adjunct of the automobile carriage house

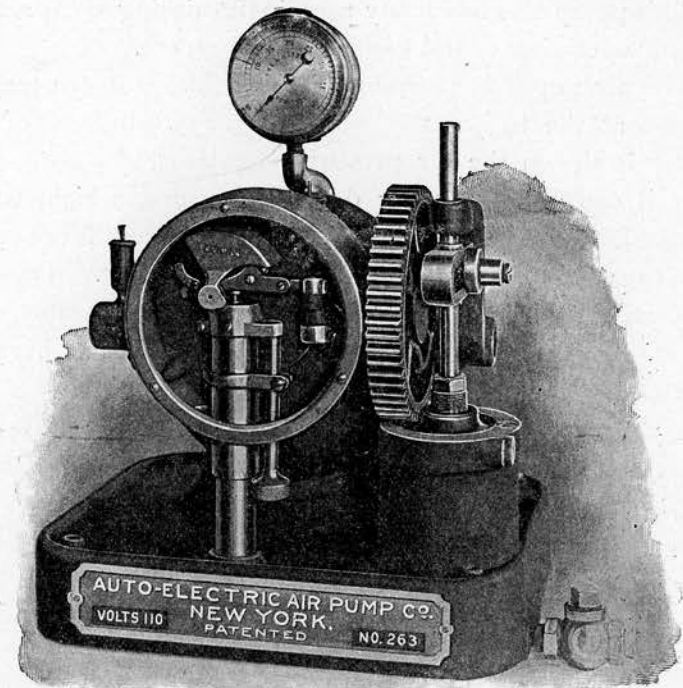


FIG. 273.—THE AUTOMOBILE AIR PUMP.

has been brought out by the Auto-Electric Air Pump Co., of Rochester, N. Y., and No. 39 Cortlandt Street, New York City. The electric motor and air pump are set upon a base 8 x 10 inches, and stands 10 inches high. Its pumping power is derived from an electric motor of six horse power geared to an air pump of a capacity of $2\frac{1}{4}$ cubic feet of free air per minute, at 100 revolutions of the crank per minute, at any

desired pressure for automobile or bicycle tires. The motor operates from a 110-volt continuous or alternating current, and will also operate from a nearly full charged automobile battery, thus putting the pneumatic tires in full tension before starting, and by this means save much tiresome work for the operator.

This pump also has many uses in furnishing compressed air for operating dental tools, air brushes, etc.

The air pump is provided with an air pressure gauge, shown at the top of the motor, Fig. 273. In front of the motor is shown the air pressure regulator, so constructed that it can be set to any desired pressure, which, when reached, a small delicately arranged piston and lever operates to switch off the current and stop the motor.

It is certainly a very compact and neat apparatus, and should occupy a place in every automobile stable where an electric current can be obtained.

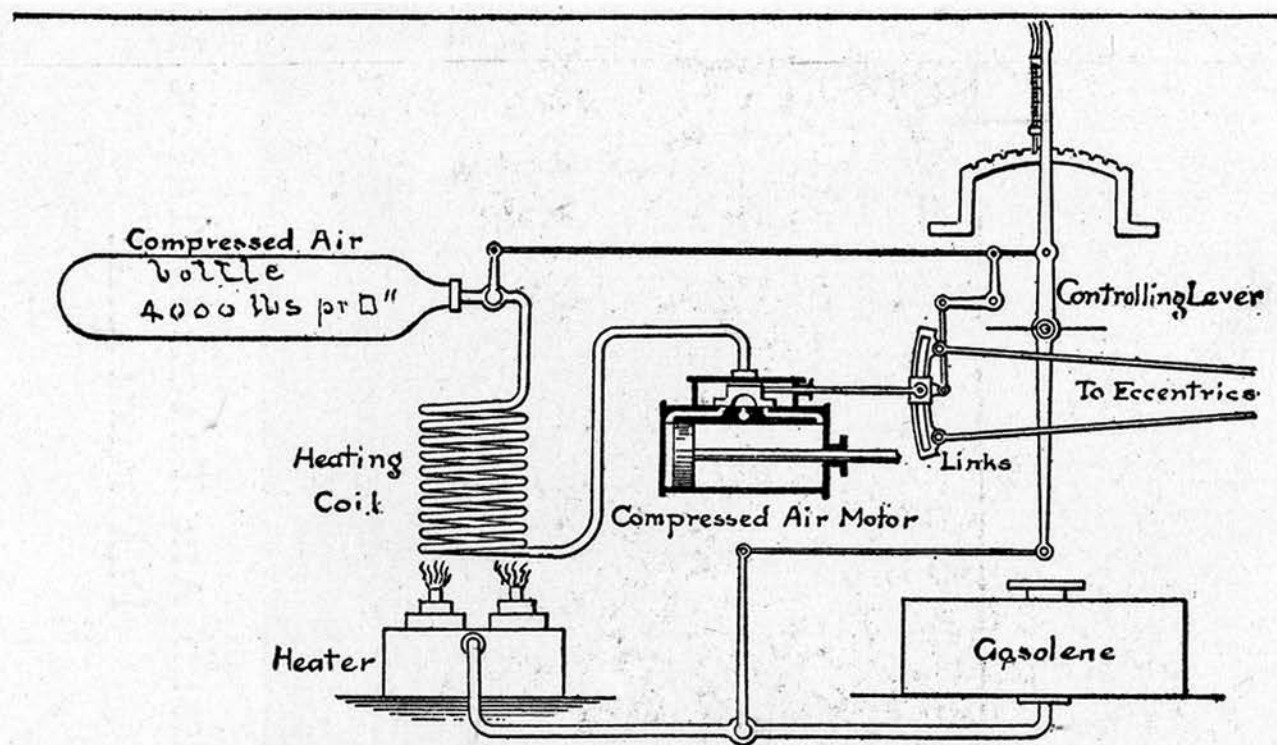


FIG. 272.—THE REHEATING OF COMPRESSED AIR WHEN COOLED BY EXPANSION FROM HIGH PRESSURE STORAGE.