

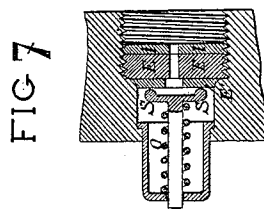
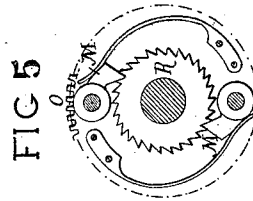
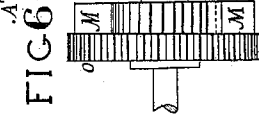
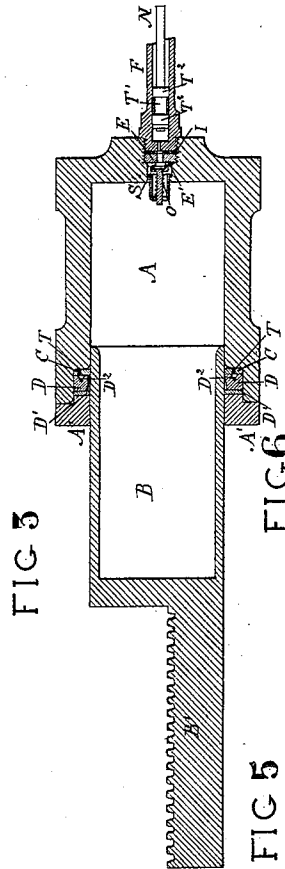
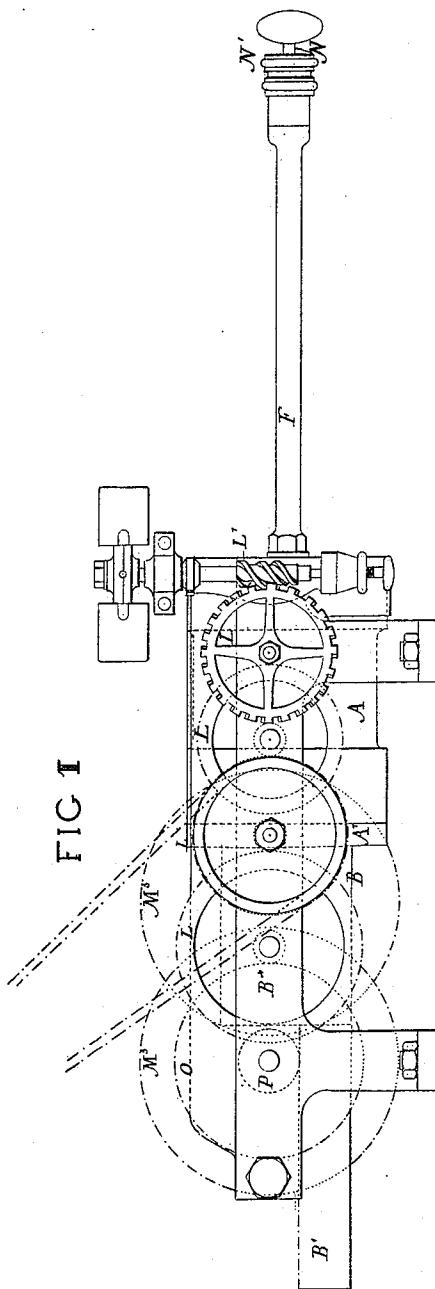
(No Model.)

2 Sheets—Sheet 1.

P. GIFFARD.
COMPRESSED AIR MOTOR.

No. 480,089.

Patented Aug. 2, 1892.



Witnesses

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By his Attorney

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(No Model.)

2 Sheets—Sheet 2.

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FIG 8

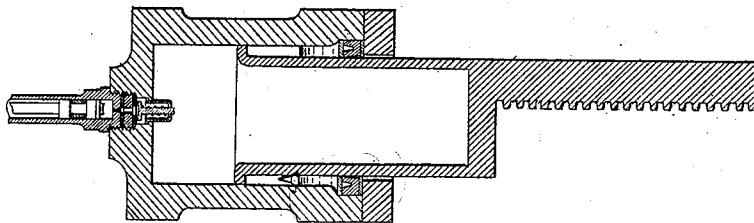


FIG 2

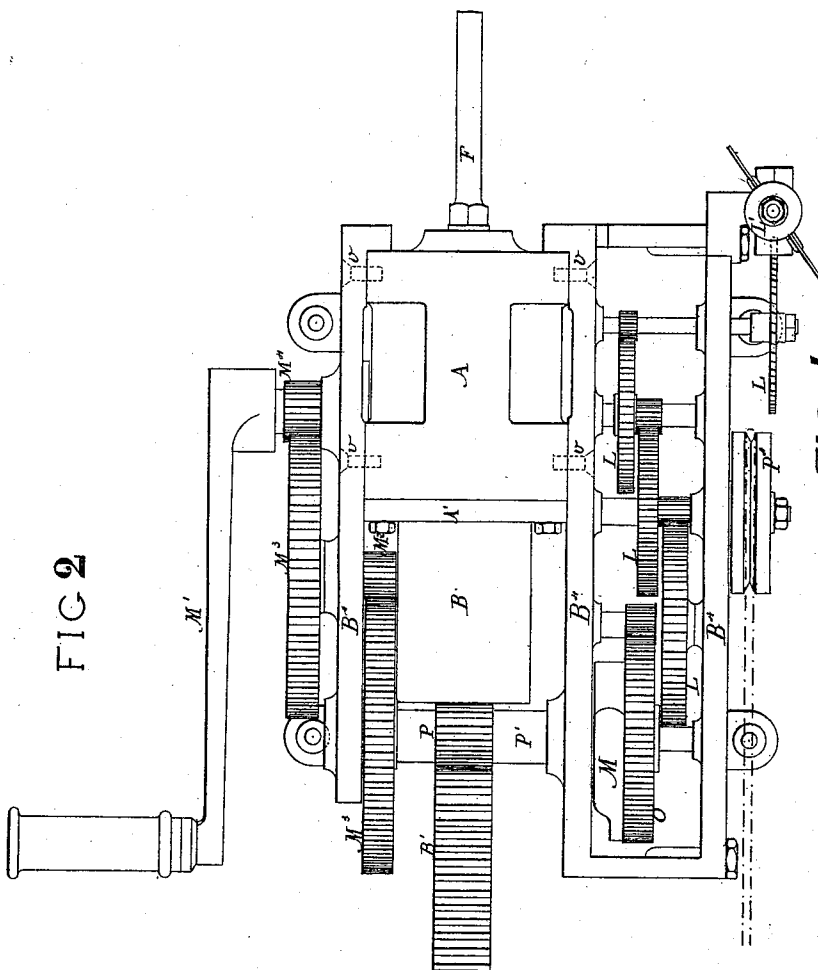
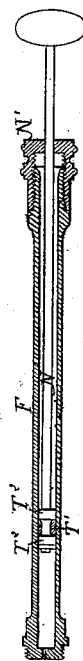


FIG 4



Witnesses

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UNITED STATES PATENT OFFICE.

PAUL GIFFARD, OF PARIS, FRANCE.

COMPRESSED-AIR MOTOR.

SPECIFICATION forming part of Letters Patent No. 480,089, dated August 2, 1892.

Application filed August 25, 1888. Serial No. 233,761. (No model.) Patented in France March 5, 1888, No. 189,141, and in England July 23, 1888, No. 10,645.

To all whom it may concern:

Be it known that I, PAUL GIFFARD, engineer, of Paris, France, have invented certain new and useful Improvements in Compressed-Air Motors, (for which I have obtained Letters Patent in France, dated March 5, 1888, No. 189,141, and in England, dated July 23, 1888, No. 10,645,) of which the following is a specification.

My invention consists of a spring-motor operated by compressed air, the said motor being an apparatus in which mechanical work is stored by means of a handle or analogous device, actuated by manual power for one or more minutes, the work thus stored or accumulated being afterward restored or given out automatically for part of an hour or for one or more hours, so as to serve as a motor for driving tools or apparatus.

By this invention compressed air takes the place of steel springs, such as have hitherto been employed for a like purpose, and this with considerable advantage.

The arrangement and action of the motor will be fully understood by the annexed drawings and the following description.

Figure 1 is a longitudinal elevation of the motor. Fig. 2 is a plan of same. Fig. 3 is a longitudinal section of the cylinder and its piston or plunger. Fig. 4 is a section of the pump. Figs. 5 and 6 represent a toothed wheel with ratchet-wheel and pawls, herein-after referred to. Fig. 7 represents on a larger scale the valve for charging the motor with compressed air. Fig. 8 shows a vertical arrangement of the motor.

The motor is formed of a cylinder A, in which is a hollow piston or plunger B. This plunger moves with slight friction in the cylinder. Absolute hermiticity of the plunger is obtained by a washer D, of semi-hardened caoutchouc embedded in the cylinder-walls and forcibly pressed upon by the cylinder-cover A', which bears upon an interposed washer D' of oiled leather, while there is behind the caoutchouc washer D a brass washer C, which lies in the recess in the cylinder-walls. There are small holes T in this brass washer C to allow the compressed air to enter a groove D² in the caoutchouc washer D, in order to ex-

pand it like a cup-leather between the plunger and the cylinder. The inner periphery or aperture of the caoutchouc washer D is conical, so that there may be minimum friction.

At the end of cylinder A is the apparatus or mechanism for charging it with compressed air. This apparatus or mechanism comprises besides a pump a brass washer E, screwed into an aperture or chamber in the cylinder end. This washer carries a caoutchouc obturator E'. A metallic valve S, acted upon by a helical spring O, bears with its flange against the obturator, which hermetically closes the apparatus. An outer leather washer I serves as a joint to the charging-pump, which I will now describe. This pump is formed of a barrel F, screwed into the cylinder end and having a piston composed of a leather washer T', between guides T² T², and is otherwise of the usual construction, being provided with an ordinary air-pump valve, as will be readily understood by those skilled in the art. The piston-rod passes through the outer end N' of the barrel and is terminated by a handle.

The hollow plunger B, before described, terminates outside its cylinder in a toothed rack B', actuating a pinion P. This pinion is fixed on the shaft P' and transmits its movement to a ratchet-wheel R, which by means of two pawls M M moves the toothed wheel O. This wheel transmits the movement to the train of wheels L L and to the endless screw L'. The entire arrangement of gearing is fixed to two side frames D⁴ D⁴, connected to the cylinder A by the screws v v. The crank-handle M' for setting or moving the plunger transmits its power through the pinions M² and the wheels M³ to the rack B of the plunger.

The driving-pulley P⁴, fixed on the shaft of one of the wheels of the train L, transmits the movement derived from the motor to the various apparatus or tools to be actuated.

The action of the motor is readily understood. The compressed air with which the apparatus is charged exerts its power on the plunger during its whole stroke and the movement is transmitted by the rack to the wheels. When the stroke is completed, the plunger is returned by means of the crank-handle.

The motor can be arranged either horizon-

tally, as in Fig. 1, or vertically, as in Fig. 8, and oil, glycerine, or mercury A² can be employed to form a hydraulic joint between the plunger and the cylinder for very high pressures and to keep the plunger lubricated.

What I claim, and desire to secure by Letters Patent, is—

1. A compressed-air motor consisting of a compressed-air cylinder having one end open, a hollow plunger also having one end open and entering the open end of the cylinder, and multiplying gear driven by the plunger for transmitting power to the apparatus to be driven, substantially as described.

2. A compressed-air motor consisting of a compressed-air cylinder having one end open, a hollow plunger also having one end open and entering the open end of the cylinder, an air-pump connected with the cylinder for storing air therein, and gear driven by the plunger for transmitting power to the apparatus to be driven, substantially as described.

3. For a compressed-air motor, an expandible-air reservoir consisting of the combination of a compressed-air cylinder having one

end open and an air-pump communicating with the other end, with a hollow plunger, also having one end open, entering the open end of the cylinder, and a rack-bar extending from the closed end of the piston for communicating motion to the driving-gear of the motor, substantially as described.

4. A compressed-air motor consisting of a compressed-air cylinder having one end open, a hollow plunger also having one end open and entering the open end of the cylinder, an air-pump connected with the cylinder for storing air therein, multiplying gear driven by the plunger, and other gear connected to the said plunger for returning it to its original position against the action of the compressed air, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PAUL GIFFARD.

Witnesses:

R. J. PRESTON,
ALBERT CAHENO.