No. 751,261. PATENTED FEB. 2, 1904.

A. W. CLARKE.

MOTOR OPERATED HAND TOOL.

APPLICATION FILED FEB. 27, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

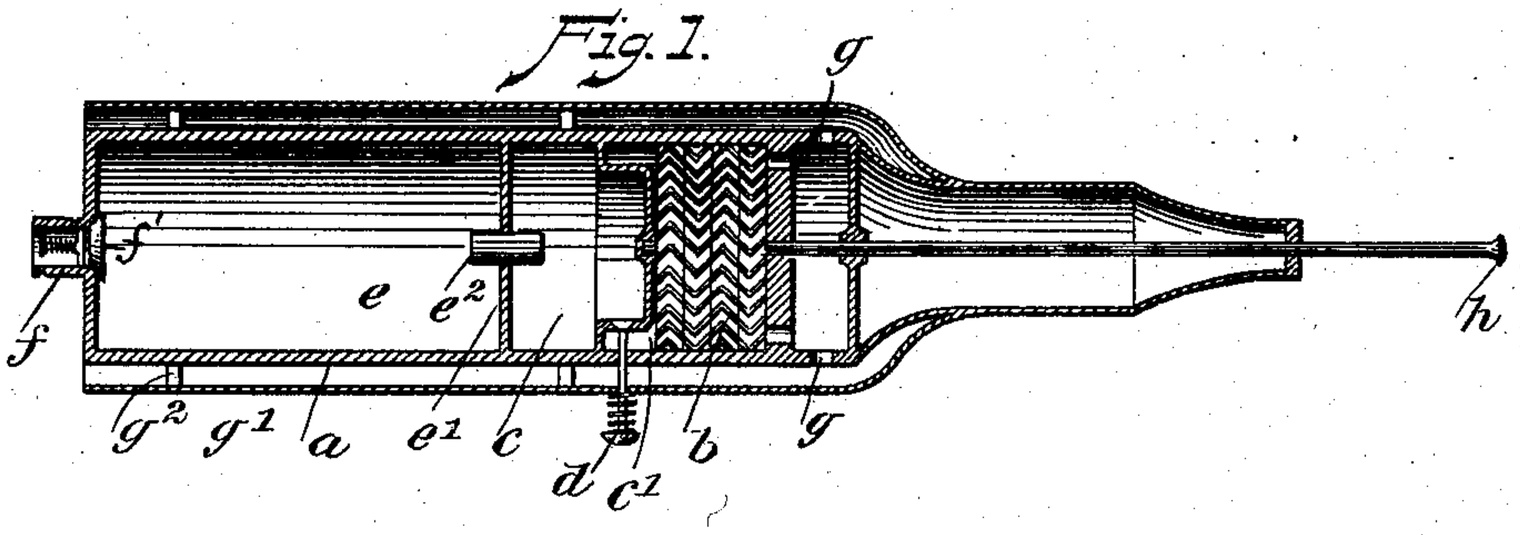
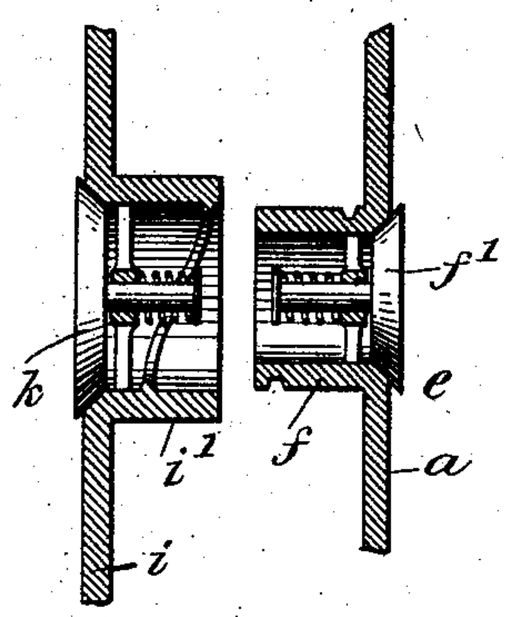


Fig. 2.



WITNESSES:

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Fig. 3.

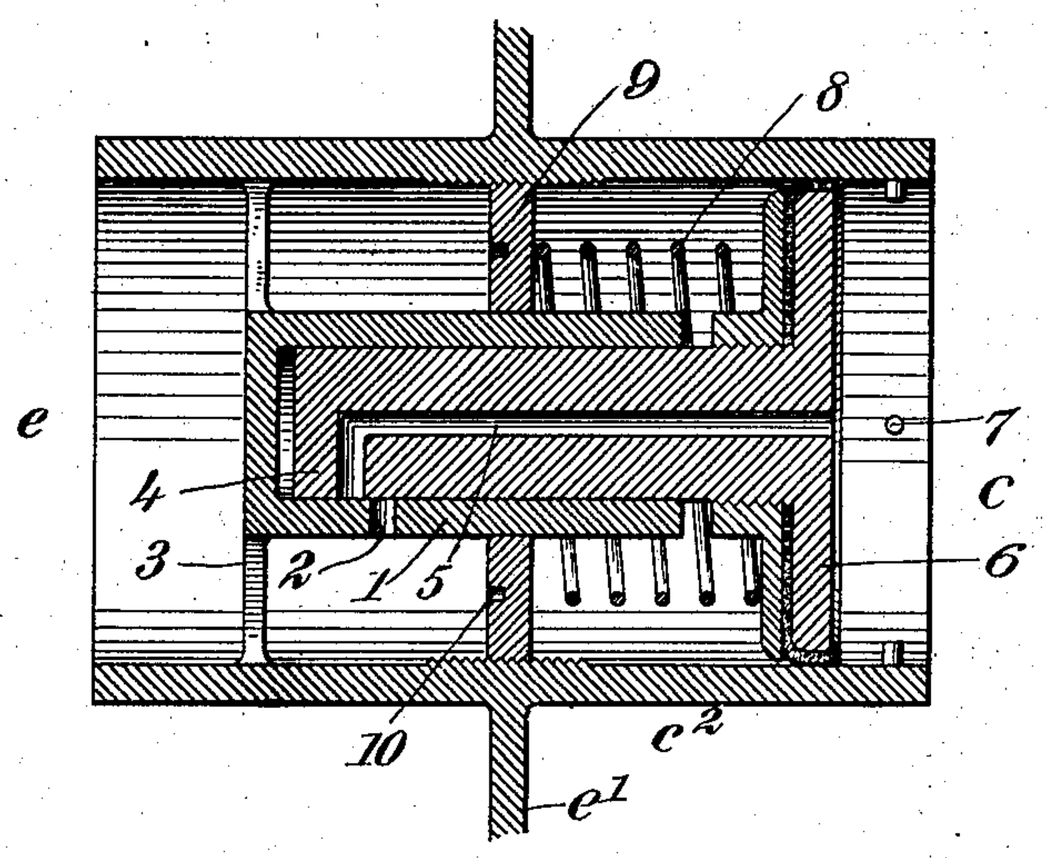
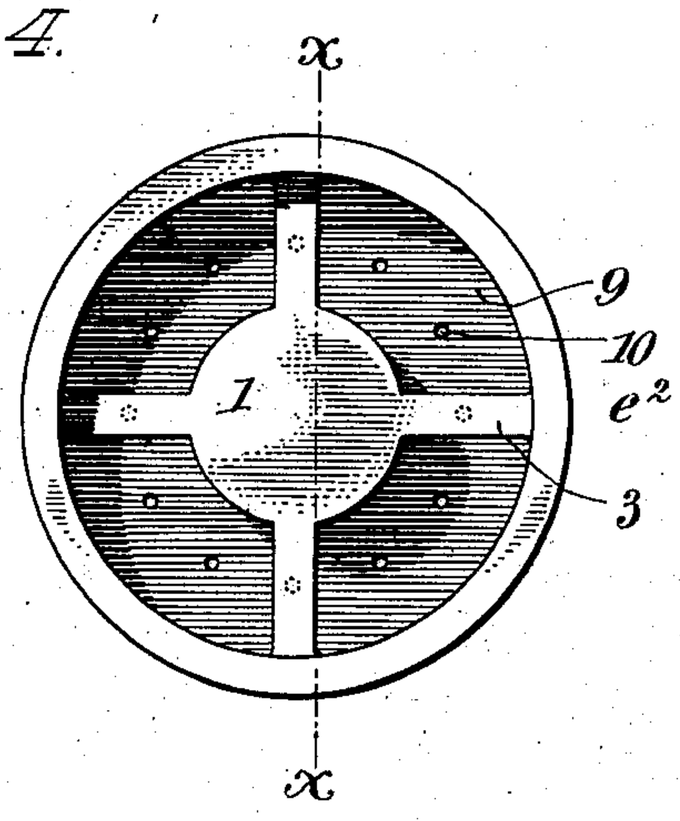


Fig. 4.



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No. 751,261. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

ALFRED W. CLARKE, OF NEW YORK, N. Y.

MOTOR-OPERATED HAND-TOOL.

SPECIFICATION forming part of Letters Patent No. 751,261, dated February 2, 1904.

Application filed February 27, 1903. Serial No. 145,321. (No model.)

To all whom it may concern:

Be it known that I, ALFRED W. CLARKE, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Motor-Operated Hand-Tool, of which the following is a full, clear, and exact description.

This invention relates to a hand-tool provided with a motor for operating it; and the principal feature of the invention lies in the provision of a motive-fluid reservoir forming part of the tool, so that when said reservoir is charged the motor may be driven by the fluid in the reservoir for a certain length of time, depending upon the reservoir capacity, without any connection with a reservoir separate from the tool.

The invention is particularly useful in dental work, and by its means I am able to provide a motor-driven dental tool with no connection whatever with a dental engine or compressed-air reservoir. The advantage of this will be obvious.

This specification is an exact description of one example of my invention, while the claims define the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal section taken through the tool. Fig. 2 is a detail of the charging-valves. Fig. 3 is a section on the line *x x* of Fig. 4, showing the reducing-valve; and Fig. 4 is an end elevation of said valve.

The tool comprises a main shell *a*, which is preferably cylindrical in form and tapered toward its outer or tool end, as shown. In this shell is located a turbine or other motor *b*, placed in the forward end of the shell or barrel and communicating with a chamber *c* by means of passages *c'*.

d indicates a hand-operated valve which controls said communication and the stem of which projects outward beyond the shell or barrel *a* for a purpose which will be fully explained hereinafter. The chamber *c* is divided from a pressure-storage chamber *e* by means of a wall *e'*, and in this wall is placed a reducing-valve e^2, which controls communication between the chambers *e* and *c*, this valve allowing the fluid to pass from the storage-chamber *e* into the chamber *c*, but reducing the pressure of the fluid in such passage, as will be fully explained hereinafter.

The pressure-reducing valve may be of any suitable structure. An example is given in Figs. 3 and 4, which may be described as follows: 1 indicates a sleeve having a port 2 therein and held securely in the casing e^2 by means of a spider 3. 4 indicates a plug sliding in the sleeve 1 and having a passage 5 therein adapted at certain times to register with the port 2, the passage 5 leading to the chamber *c* and the port 2 being in communication with the chamber *e*. 6 indicates a piston attached to the plug 4 and sliding in the shell e^2, which in this sense is a cylinder, and 7 indicates stops for limiting the movement of the piston 6 toward the chamber *c*. 8 indicates an expansive spring pressing against the piston 6, and 9 indicates a ring which is screwed into the casing e^2 and by which the pressure of the spring 8 may be regulated. Said ring 9 is provided with a number of spanner-holes 10 therein, and by introducing a suitably-constructed spanner through the orifice for the valve *f* and causing said spanner to straddle the arms of the spider 3 the ring 9 may be adjusted at will. The spring 8 should be adjusted so as to be overcome by the pressure which it is desired to retain within the chamber *c*—say, for example, twenty pounds. When, therefore, this pressure drops below twenty pounds, the spring 8 asserts itself, the piston 6 and plug 4 move rightward, and the ports 2 and 5 are placed in registry. A passage is then opened from the chamber *e* to the chamber *c*, and the pressure from the former flows into the latter until twenty pounds is again established, and thereupon the spring 8 is compressed and the ports 2 and 5 are placed on lap.

At the rear end of the shell *a* is located a nipple *f*, this nipple serving to facilitate connection with a motive-fluid reservoir, (indicated at *i* in Fig. 2,) and *f'* indicates a valve the stem of which is projected into the nipple *f*. This valve *f'* controls an opening into

the storage-chamber *e*. The reservoir for the motive fluid is provided with a nipple *i'* corresponding to the nipple *f*, these nipples being arranged to fit one within the other and being correspondingly threaded, whereby they may be engaged in an essentially hermetic manner. The pressure-reservoir has a valve *k* similar to the valve *f'*, and when the stems of these valves strike each other both valves will be opened. This will enable the storage-chamber *e* to be charged from the reservoir, and when the nipples are disconnected both the valve *f'* and the corresponding valve *k* of the pressure-reservoir will be automatically seated.

g indicates the exhaust-ports of the motor *b*, and these ports lead into an auxiliary shell *g'*, which is placed over the shell or barrel *a*, being closed at its front end and extending rearward to the rear end of the tool, the rear end of the shell being open to permit the escape of the exhaust.

g^2 indicates any suitable means (brackets, for example) for holding the shell rigidly in position with respect to the other parts. The dental tool *h* is in connection with the motor, as illustrated in Fig. 1.

In the practical operation of the device, particularly in the dental art, I purpose employing carbonic-acid gas at a pressure of about seven hundred pounds in a temperature of 60° to 70° Fahrenheit. This should be kept in the motive-fluid reservoir *i*, referred to hereinbefore. In operation, therefore, the nipple *f* is engaged with the nipple *i'* of the reservoir, and the valve *f'* and the corresponding valve *k* of the reservoir will thereupon be opened, thus charging the storage-chamber *e* with carbonic-acid gas at a pressure of seven hundred pounds. This pressure will pass through the reducing-valve e^2, and it is my purpose to adjust this valve so that the pressure in the chamber *c* will be about twenty pounds. When the tool is charged, it should be disconnected from the reservoir, and then by manually operating the valve *d* the pressure from the chamber *c* will be admitted to the turbine passages and the turbine operated to drive the tool *h*. This operation may be readily controlled by the valve *d*, as will be apparent. When the pressure drops in the chamber *c*, the valve e^2 acts automatically to admit additional pressure up to the predetermined limit. When the fluid is exhausted from the storage-chamber *e*, the tool may be readily recharged by the operation above described.

Various changes in the form, proportions, and minor details of my invention may be resorted to without departing from the spirit and scope thereof. Hence I consider myself entitled to all such variations as may lie within the intent of my claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A motor-driven hand-tool, comprising a motor, walls forming a storage-chamber for the motive fluid, said parts being in direct association with each other, and means for controlling the passage of the motive fluid to the motor.

2. A motor-driven hand-tool, comprising a shell or barrel having two chambers therein, a reducing-valve controlling communication between the chambers, a motor, and means for controlling the passage of the fluid from the low-pressure chamber to the motor.

3. A motor-driven hand-tool, comprising a shell or barrel having a pressure-storage chamber therein, a motor mounted in the shell or barrel, means for controlling the passage of the motive fluid to the motor, and an exhaust-shell inclosing the main shell or barrel and discharging at the rear end of the tool.

4. A motor-driven hand-tool, comprising walls forming a pressure-storage reservoir, a motor, means for controlling the application of the motive fluid to the motor, and a valve controlling the inlet of the motive fluid, said valve having a part projecting beyond the walls of the tool, for the purpose specified.

5. A motor-driven hand-tool, comprising a shell or barrel having a pressure-storage chamber therein, a motor in the shell or barrel, and a valve controlling the passage of the motive fluid to the motor, said valve having a stem projected through the shell to the exterior thereof, to permit the manual operation of the valve.

6. A motor-driven hand-tool, comprising a barrel having a pressure-storage chamber therein, a motor juxtaposed to said chamber and located at the front portion of the hand-tool, means for controlling the passage of the fluid to the motor, and means communicating with the motor-exhaust and constituting a passage leading rearward to discharge the exhaust at the rear end of the hand-tool.

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

ALFRED W. CLARKE.

Witnesses:
JNO. M. RITTER,
ISAAC B. OWENS.