

No. 766,116.

PATENTED JULY 26, 1904.

H. M. RAWL & D. L. REEHL.
STARTING ATTACHMENT FOR EXPLOSIVE ENGINES.

APPLICATION FILED FEB. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

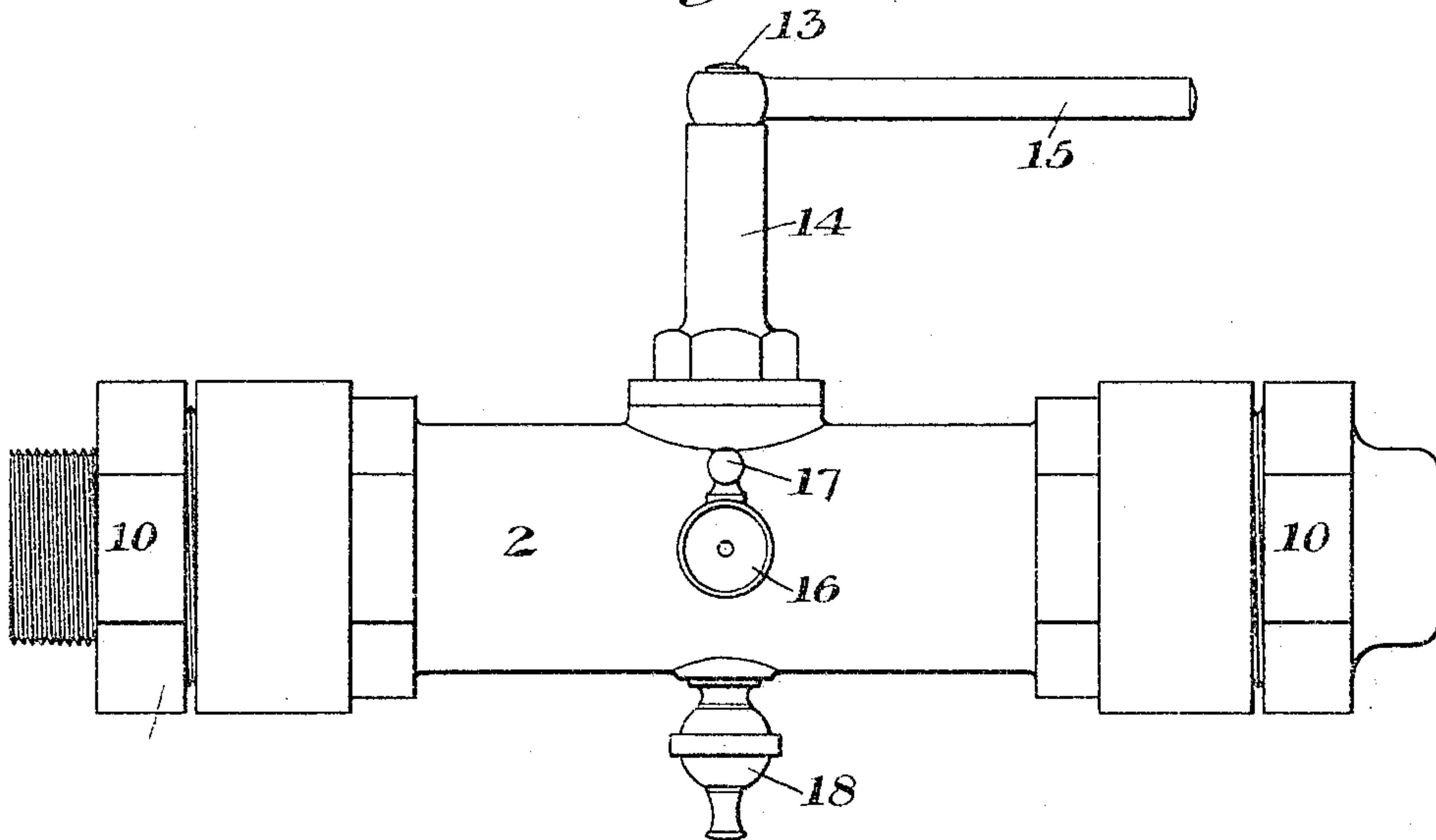
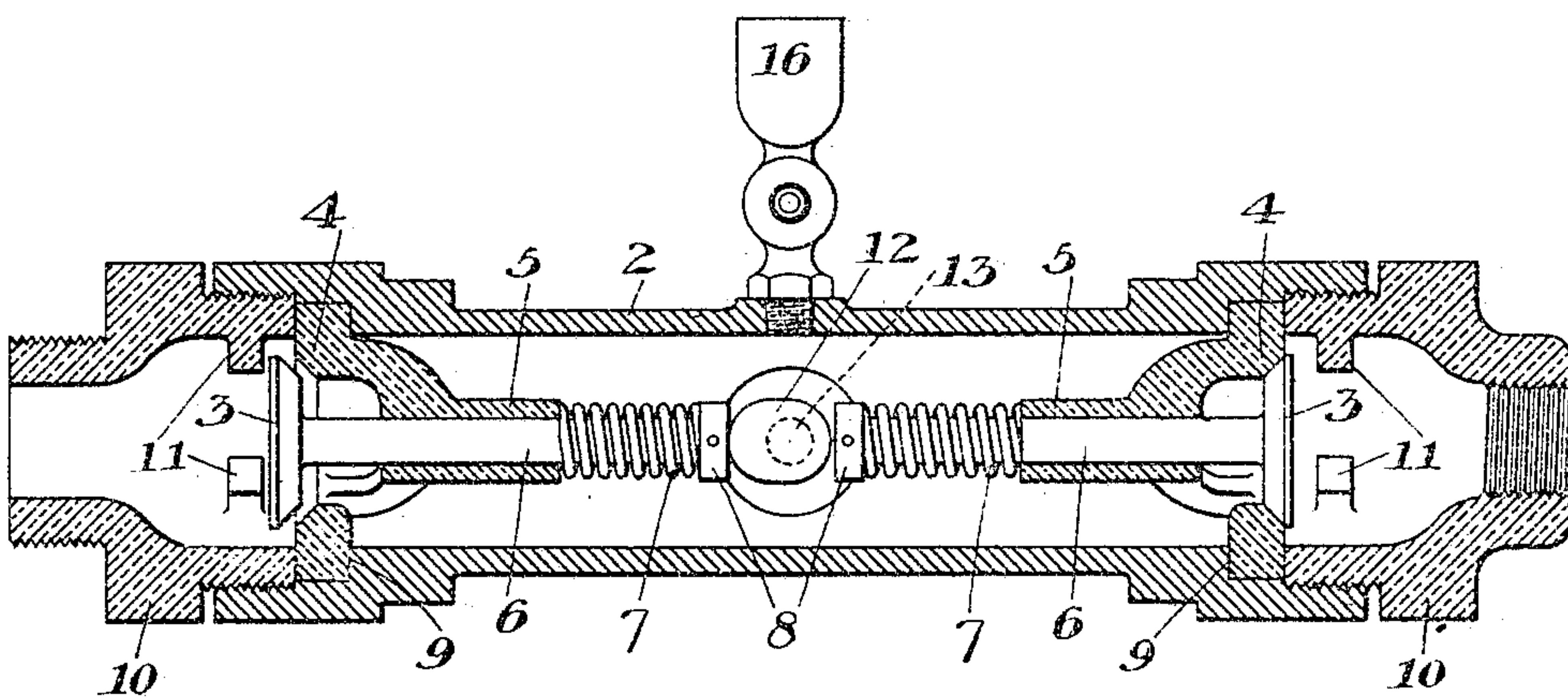


Fig. 2.



WITNESSES

Warren M. Swartz
J. M. Corbin

INVENTORS

Harry M. Rawl
Samuel L. Reehl
by Robert H. Hynes
Their atty

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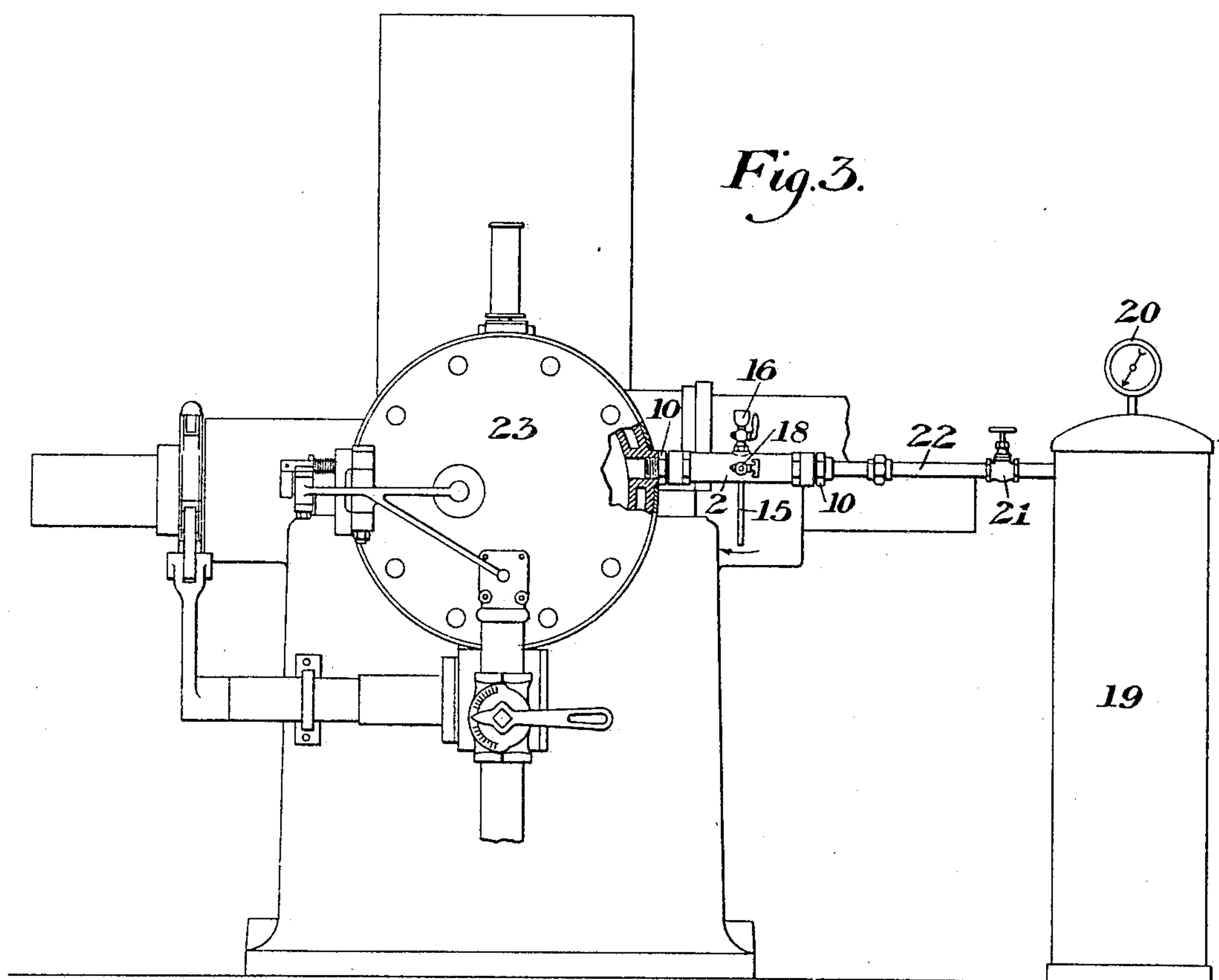
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Warren W. Swartz
G. B. Blumling

INVENTORS

H. M. Rawl, D. L. Reehl
by Baswell & Byrnes
their Attorneys

UNITED STATES PATENT OFFICE.

HARRY M. RAWL, OF NEW BRIGHTON, AND DEMPSEY L. REEHL, OF WEST BRIDGEWATER, PENNSYLVANIA, ASSIGNORS TO PIERCE-CROUCH ENGINE COMPANY, OF NEW BRIGHTON, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

STARTING ATTACHMENT FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 766,116, dated July 26, 1904.

Application filed February 24, 1903. Serial No. 144,612. (No model.)

To all whom it may concern:

Be it known that we, HARRY M. RAWL, of New Brighton, and DEMPSEY L. REEHL, of West Bridgewater, in the county of Beaver and State of Pennsylvania, have invented a new and useful Starting Attachment for Explosive-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of our improved attachment. Fig. 2 is a sectional side elevation of the same, and Fig. 3 is an end elevation of a gas-engine provided with our attachment.

Our invention relates to the starting of gas-engines by the use of compressed air or compressed air and gasoline or any other hydrocarbon combined, and is designed to provide a simple and easily-operated attachment which may be cheaply made, easily repaired, and may be operated by a single lever.

In the drawings, 2 represents a supply tube or conduit, one end of which is connected to the gas-engine cylinder, while the other end is connected to an air-reservoir. This tube 2 is provided at each end with an inwardly-seating valve 3, arranged to close against a removable seat 4, having a central tube extension 5 surrounding the stem 6 of the valve. The valve is thus guided in its movements and is normally held to its seat by a spiral spring 7, surrounding the inner portion of the valve-stem and compressed between an end collar 35 or enlargement 8 of the stem and the inner end of the guide-collar 5.

To provide a simple and cheap arrangement of the parts and to make them easy of access for repairs, we preferably enlarge the tube near each end to provide an annular shoulder 9, against which the ring forming the valve-seat fits and is held by a connection 10, screwed into the end of the tube and preferably provided with stops 11, which limit the opening movement of the valve.

The inner ends of the valve-stems are ar-

ranged to be acted upon by cam 12, secured to the inner end of a shaft 13, extending through and journaled in the bearing 14, which is secured to the tube or casing 2. Shaft 13 is provided with an operating-handle 15. In the top of the tube or conduit is provided a hole in which is screwed a cup 16, provided with a valve-handle 17.

The attachment is preferably provided with a small air-cock 18, leading from the interior portion of the tube or conduit between the valves. The air-tank 19 is preferably provided with a pressure-gage 20 and also with a sealing-valve 21 in the pipe 22, leading to the double-valve attachment. The attachment may be connected to the gas-engine cylinder 23 by screwing the connection 10 into a port leading through its side, as shown in Fig. 3, or in any other convenient manner.

In using the device the handle 15 of the attachment is turned so as to close both of the valves 3. A small quantity of gasoline or other hydrocarbon is poured into the cup 16. The cock 18 is opened to release any pressure in the attachment and then closed and the valve 17 opened to drop the gasoline into the supply-tube before connection is established between the air-tank and the cylinder. The sealing-valve in the pipe leading from the air-tank is then opened. A throw of the starting-valve handle admits a small quantity of air to the cylinder, vaporizing the gasoline in the pipe and forming a combustible mixture which is ignited in the cylinder, thus giving the piston its movement. On its next forward stroke the piston draws in a charge from the regular supply, the handle 15 having been moved to allow the valve to close which leads into the cylinder.

The air-tank will supply air for several startings, and to refill the air-tank it is only necessary to cut off the gas-supply, open the sealing-valve, and raise the starting-valve handle. The power stored in the fly-wheels is sufficient to recharge the air-tank ready for further starting of the engine, or any form of

an air-compressor may be used to charge the air-tank, either operated directly from the engine or by power from any outside source.

The advantages of the invention result from the use of the single handle having connections which actuate both of the valves, one controlling the connection to the air-tank and the other that to the cylinder. A movement in one direction of the handle actuates one valve, and an opposite movement forces open the other valve. A simple, compact, and inexpensive device is thus provided.

Variations may be made in the form and arrangement of the parts without departing from our invention.

We claim—

1. A starting device for explosive-engines, a tube or conduit having an intermediate inlet for combustible material, and valves on opposite sides of the inlet, one valve being arranged to connect to the air-tank and the other to the cylinder, and a single lever arranged to force open either valve when desired; substantially as described.

2. In a starting device for explosive-engines, a tube having inwardly-seating valves on opposite sides of its center, springs arranged to keep the valves closed, said tube having an intermediate inlet for combusti-

ble fuel, and an intermediate shaft independent of the engine having a cam device arranged to force open either valve; substantially as described.

3. In a starting device for gas-engines, a tube having removable valve-seats in opposite ends thereof, screw connections arranged to hold the seats in place, said tube having an intermediate inlet for combustible material, inwardly-seating valves, springs arranged to hold the valves to their seats, and a shaft between the inner ends of the valve-stems having a cam arranged to force open either valve; substantially as described.

4. In a starting device for explosive-engines, a tube or conduit having valved outlets at its end, and an intermediate valved inlet for combustible material, said tube having an intermediate valved air-vent, and means for opening and closing the valve for combustible material; substantially as described.

In testimony whereof we have hereunto set our hands.

HARRY M. RAWL.
DEMPSEY L. REEHL.

Witnesses:

HERBERT S. HAWTHORNE,
WM. W. WILSON.