

No. 885,670.

PATENTED APR. 21, 1908.

A. P. DWIGGINS.
STEAM ENGINE.

APPLICATION FILED MAY 22, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

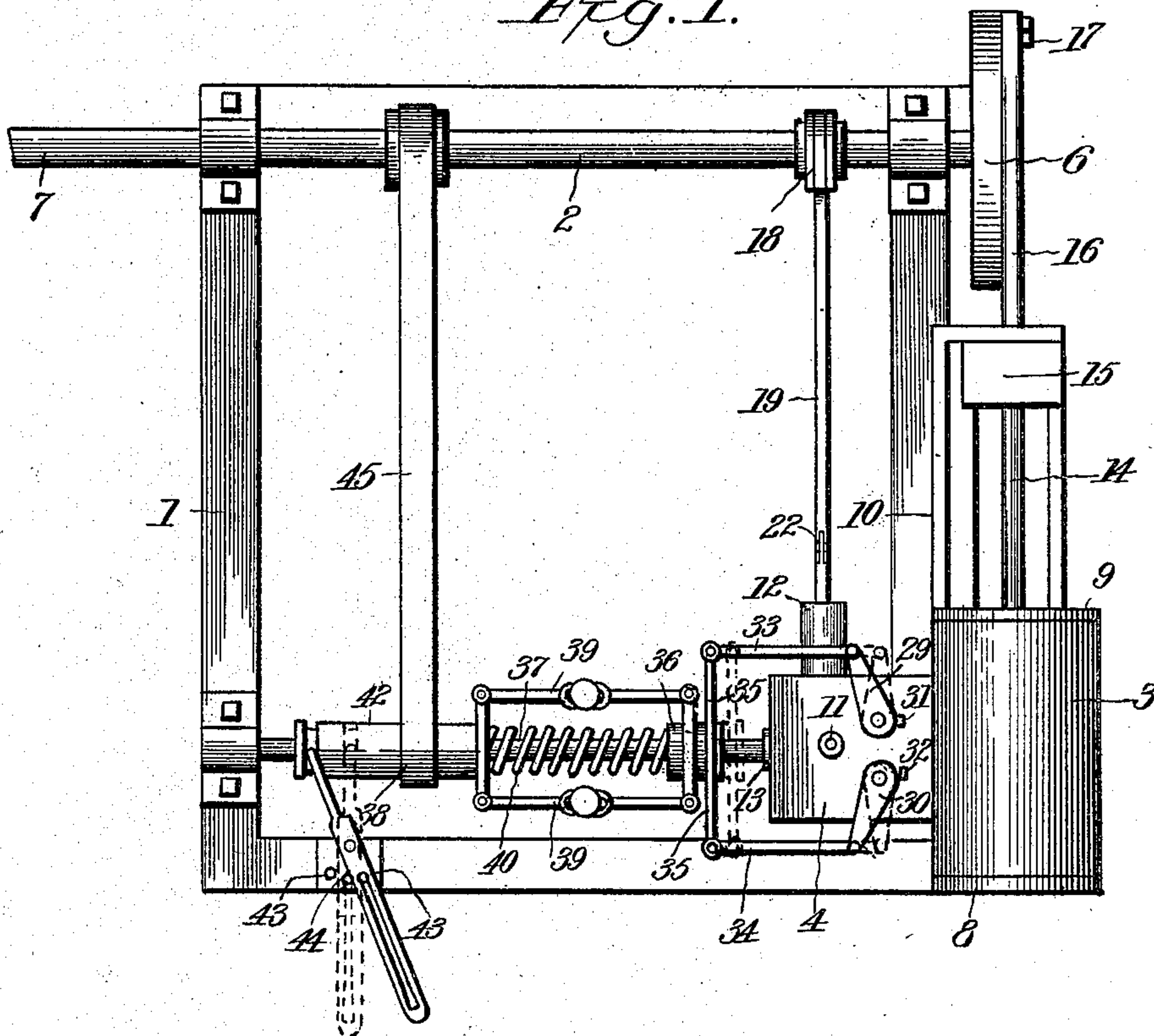
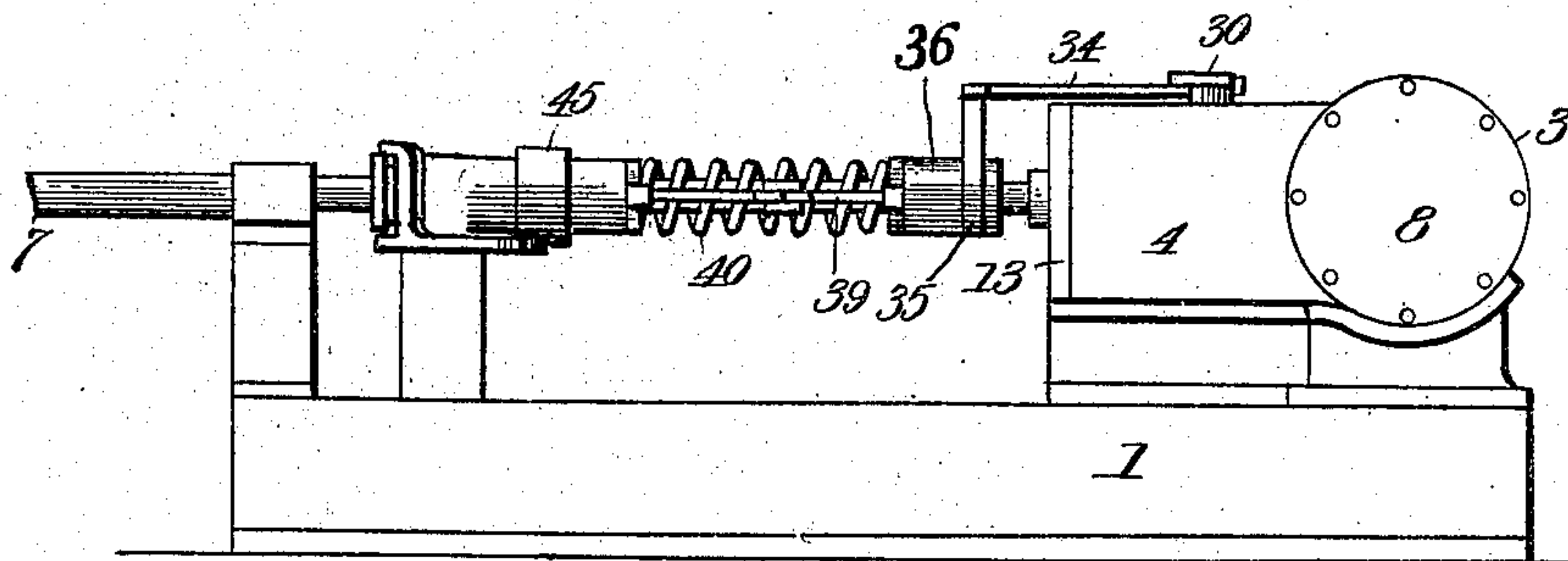


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

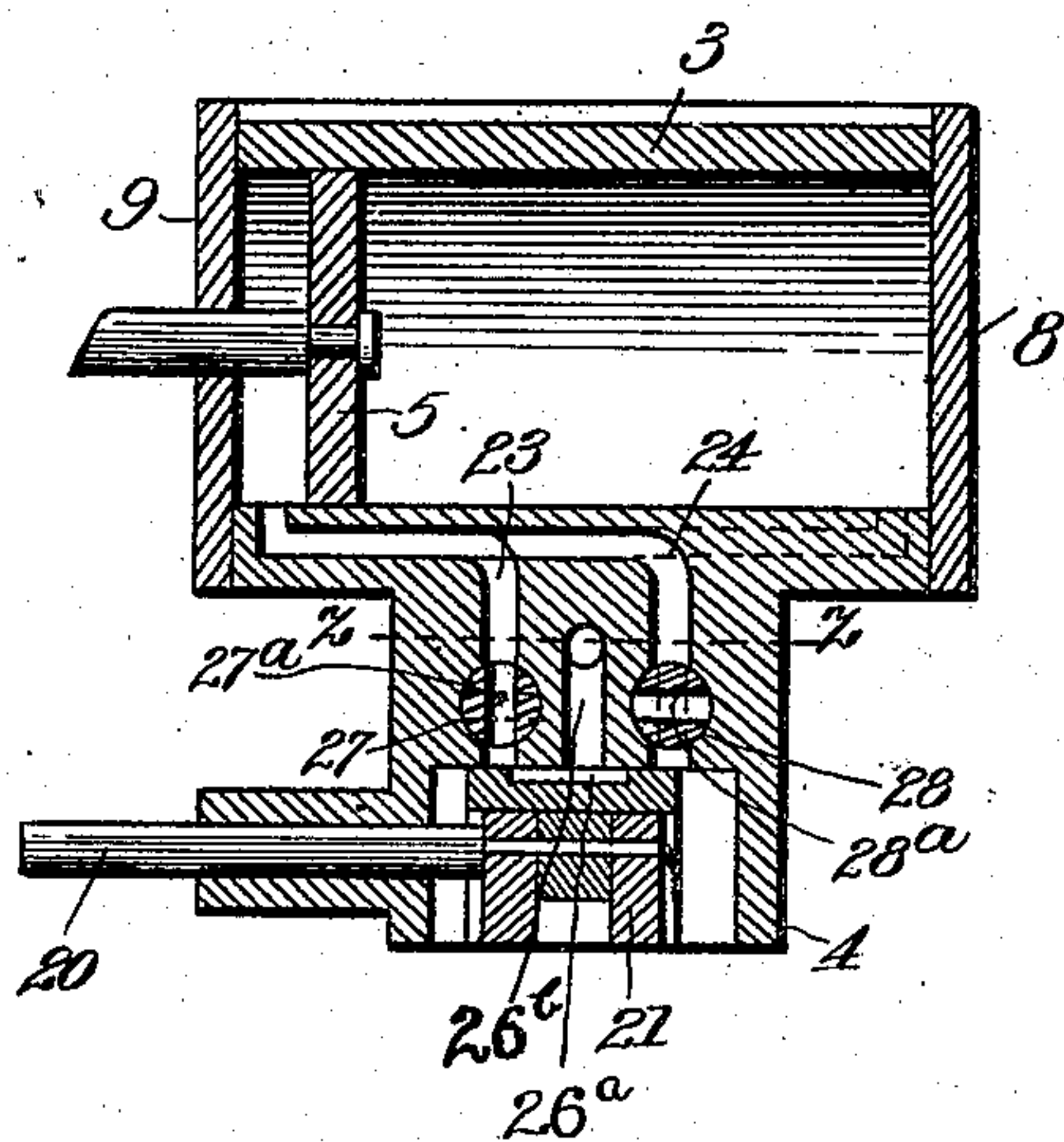


Fig. 4.

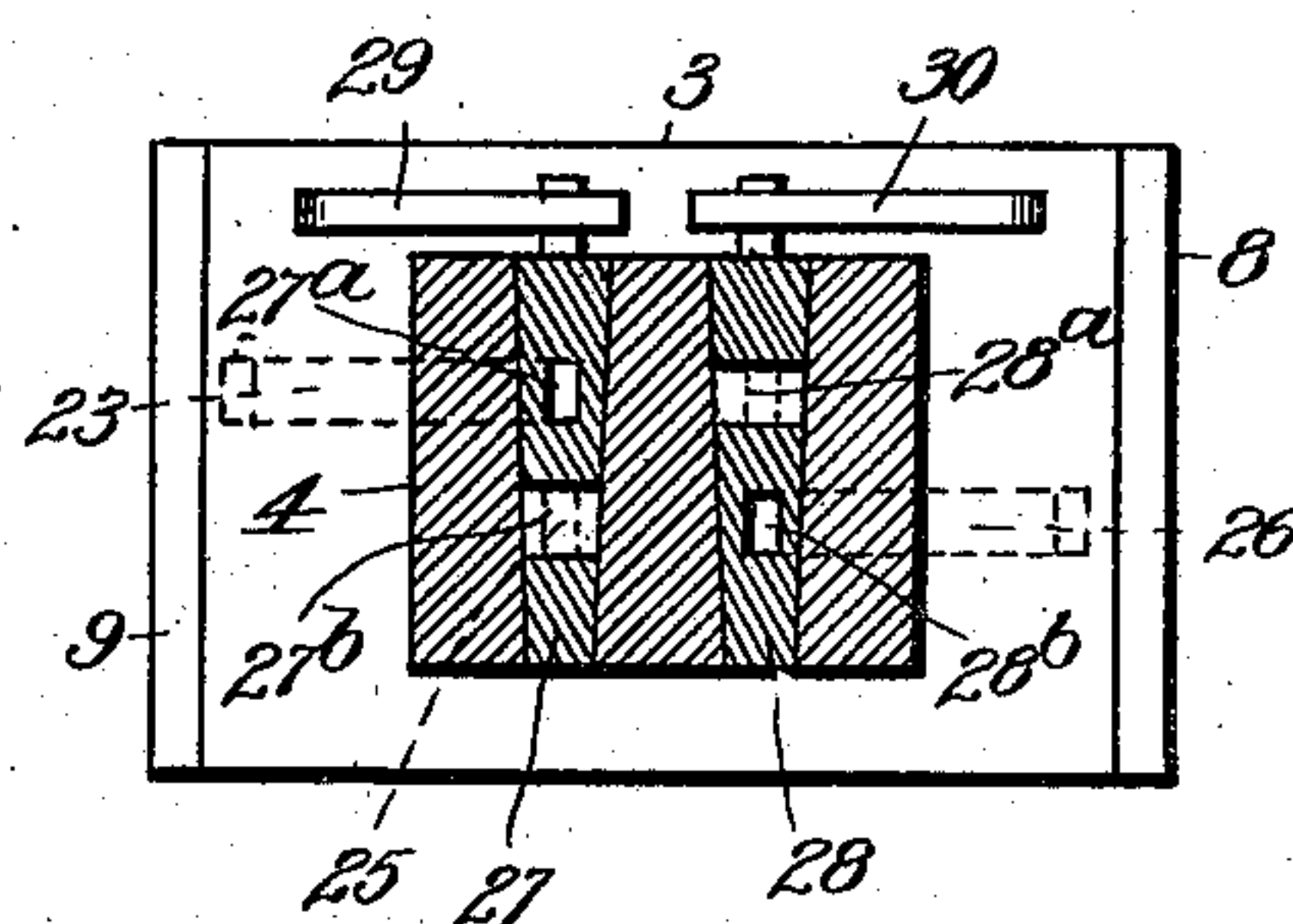


Fig. 6.

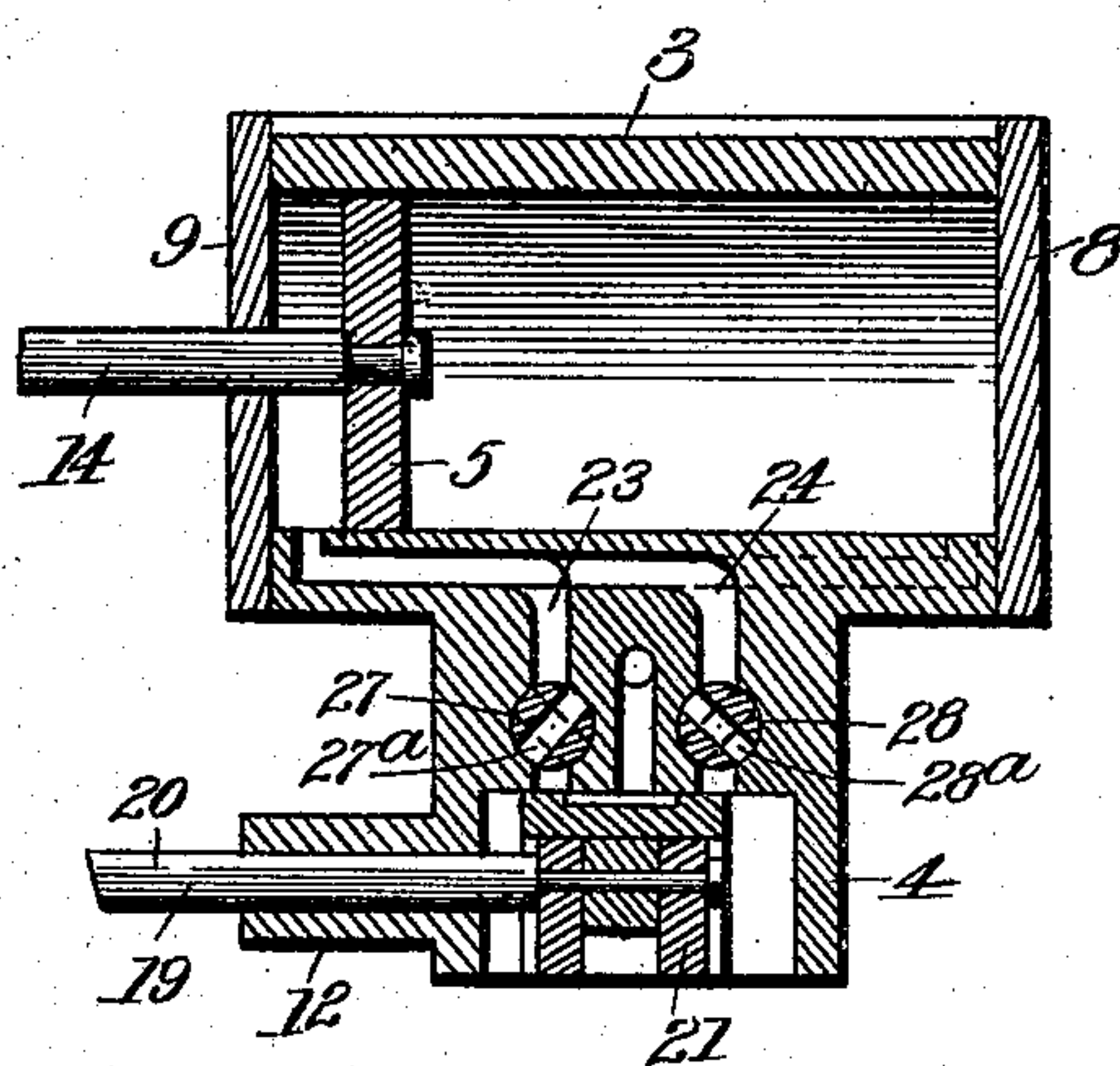
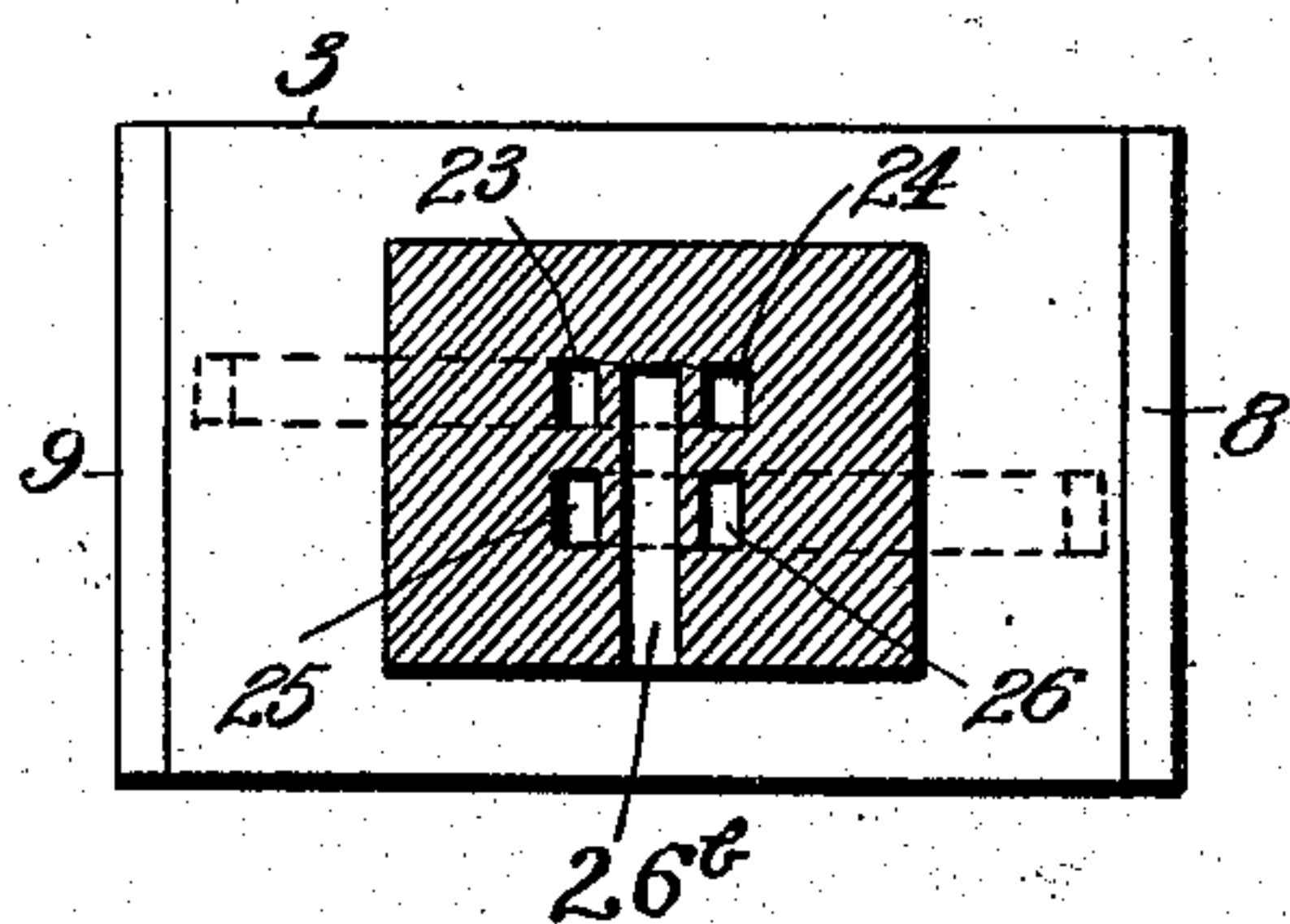


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALVA P. DWIGGINS, OF WAYNETOWN, INDIANA, ASSIGNOR TO JOHN E. BARRICKLOW, OF WAYNETOWN, INDIANA.

STEAM-ENGINE.

No. 885,670.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed May 22, 1907. Serial No. 375,109.

To all whom it may concern:

Be it known that I, ALVA P. DWIGGINS, citizen of the United States, residing at Waynetown, in the county of Montgomery and State of Indiana, have invented certain new and useful Improvements in Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to steam engines and especially to mechanism for governing and reversing such engines.

It has for its object to provide a simple arrangement of devices for instantly reversing the engine independently of the cut off valve, and further to provide a governor connected up to operate the reversing valves.

The invention consists in the features of construction and combinations of parts hereinafter described and specified in the claims.

In the accompanying drawings illustrating the preferred embodiment of my invention:

Figure 1 is a plan view of a steam engine constructed and equipped in accordance with my invention, the position of the governor and reversing mechanism when the reversing valves are closed being shown in dotted lines. Fig. 2 is an elevation looking at the end of the cylinder. Fig. 3 is an enlarged horizontal sectional view of the cylinder and steam chest taken through the upper ports of the reversing valve, the positions of the lower ports being shown in dotted lines. Fig. 4 is a vertical sectional view taken through the reversing valves or plugs. Fig. 5 is a sectional view on the line $z-z$ of Fig. 3, and Fig. 6 is a view similar to Fig. 3 but showing the valve plugs in position to entirely cut off steam from the cylinder.

Referring more particularly to the drawings, 1 represents the main supporting frame which may be of any suitable form.

The driving mechanism of my invention may be of any approved pattern but for the purpose of illustration, I have shown a well known construction which consists of the drive shaft 2, cylinder, 3, steam chest 4 and piston 5. The revoluble drive shaft 2 is mounted in suitable bearings on the main frame and is provided with a drive wheel 6 rigidly secured upon one end in line with the cylinder 3 and a free end 7 upon which any

desired mechanism may be secured to utilize its power.

By preference, the body of the cylinder and steam chest are of integral construction and are rigidly secured upon the main frame 1. The cylinder 3 has removable heads 8 and 9, and a bracket 10 secured to the head 9 and the main frame 1. The steam chest 4 is provided with a steam inlet 11, a projection 12 and a removable head 13. The piston 5 which reciprocates within the cylinder connects with the drive wheel 6 by means of the piston rod 14, cross head 15, and the connecting rod 16 at the pin 17. Said piston rod, which is rigidly secured into the centers of said cross head and piston reciprocates in a suitable opening in the cylinder head and the bracket 10 serves as a guide for said reciprocating cross head.

The eccentric and cut off mechanism may also be of any desired type but for an illustrative purpose, I have shown a form in common use which comprises an eccentric wheel 18, a connecting rod 19, a reciprocating rod 20 and a cut off valve 21 which reciprocates within the steam chest. Said connecting rod is mounted freely on the eccentric wheel at its end and is pinned at 22 to the reciprocating rod 20 which has its inner end securely mounted in the distributing valve 21.

Four passages 23, 24, 25 and 26 lead from the steam chest into the cylinder. The passages 23 and 24 meet as shown in Fig. 3 and lead to one end of the cylinder while the other passages 25 and 26 meet in the same manner and lead to the other end of the cylinder as shown in dotted lines in said figure. The passages 23 and 25 are arranged in vertical alinement with each other as are also the passages 24 and 26. Valve plugs 27 and 28, for reversing the engine, are mounted to turn in the steam chest and are preferably tapered slightly to prevent leakage from wear. The valve plug 27 has ports 27^a and 27^b arranged at right angles to each other and in the horizontal planes with the passages 23 and 25 respectively. The other valve plug 28 is provided with similarly arranged ports 28^a and 28^b in the horizontal planes with the passages 24 and 26 respectively. As shown in Fig. 3, the valve plug 27 is in position so that the upper port 27^a therein is in line with the passage 23 while the plug 28 is so positioned that its lower port 28^b is in line with the passage

26. The ports 27^b and 28^a will then be in position to close the passages 25 and 24 respectively. When the plugs are in this position, it will be seen that steam will be fed alternately through the passages 23 and 26, as the cut off valve reciprocates and that said passages will also alternately act as exhausts to the pocket 26^a in said distributing valve and the outlet passage 26^b. It will also be understood that if said plugs were turned so as to open the passages 25 and 24 and close the passages 23 and 26, the direction of the engine would be reversed because the steam would be switched from one end of the cylinder to the other, that is, from the passage 23 to the passage 24 or from the passage 26 to the passage 25.

On the upper projecting ends of the valve plugs are adjustably secured lever arms 29 and 30 by means of set screws 31 and 32. Connecting rods 33 and 34 are pivoted to the outer ends of said lever arms and to projections of a collar 35 on a sleeve 36 slidably mounted on a rigid shaft or rod 37. A pulley 38 is also mounted on said rod 37 and is connected to the sleeve 36 by the hinged governor arms 39. Said governor arms are normally held extended by a coiled spring 40 interposed between said pulley and sleeve. The controlling lever 41 connects with a collar 42 on the pulley and is pivoted on the main frame in which are formed three sockets 43 adapted to be engaged by a locking pin 44 on said lever. If the lever is adjusted so that its locking pin engages the middle one of the sockets 43, the valve plugs will be in position shown in Fig. 6, and steam will be entirely cut off from the cylinder. When the lever is in the position shown, with the locking pin engaging the right hand end socket, steam will be fed to the cylinder as before explained. Should the lever be moved from the position illustrated to the position where its locking pin would engage the other end socket, the valve plugs would be turned to reverse the direction of the engine. The pulley and governor are driven by a belt 45 from the shaft 2.

I claim:

1. The combination, with a steam engine, the distributing valve thereof and means for operating said valve, of a reversing valve having independent operating means, and a governor connected to said reversing valve operating means.

2. The combination, with a steam engine

having its steam chest provided with two passages arranged in the plane of the longitudinal axis of the cylinder and leading to one end thereof and two passages similarly arranged and leading to the other end thereof, of two valve plugs each arranged in a seat cutting two of said passages, each plug having two ports at right angles to each other, one of the ports in each plug arranged in the plane of one of the passages leading to one end of the cylinder and the other port in the plane of one of the passages leading to the other end of said cylinder, a distributing valve arranged to reciprocate over the outer opening of said passages in said steam chest, and means to turn said plugs to reverse the engine.

3. The combination, with a steam engine, of valve plugs arranged in the steam chest, arms secured to said plugs and extending in opposite directions, a governor adapted to slide with relation to said steam chest, a hand lever connected to said governor and connections between said arms and the governor for controlling and reversing the engine.

4. The combination, with a steam engine, of valve plugs arranged in the steam chest, arms secured to said plugs, a rod arranged substantially at right angles to said arms, a governor mounted to slide on said rod, means of connection between said arms and governor and means to move said governor to reverse or stop the engine.

5. The combination, with a steam engine having its steam chest provided with two passages leading to one end of the cylinder and two passages leading to the other end thereof, of two valve plugs, each having two ports at right angles to each other, one of the ports in each plug arranged in the plane of one of the passages leading to one end of the cylinder and the other port in the plane of one of the passages leading to the other end of said cylinder, arms secured to said plugs, a rod arranged substantially at right angles to said arms, a governor mounted to slide on said rod, means of connection between said arms and governor, and means to move said governor to reverse or stop the engine.

In testimony whereof, I affix my signature, in presence of two witnesses.

ALVA P. DWIGGINS.

Witnesses:

H. E. ZUCK,
C. C. ELLIS.