

No. 684,468.

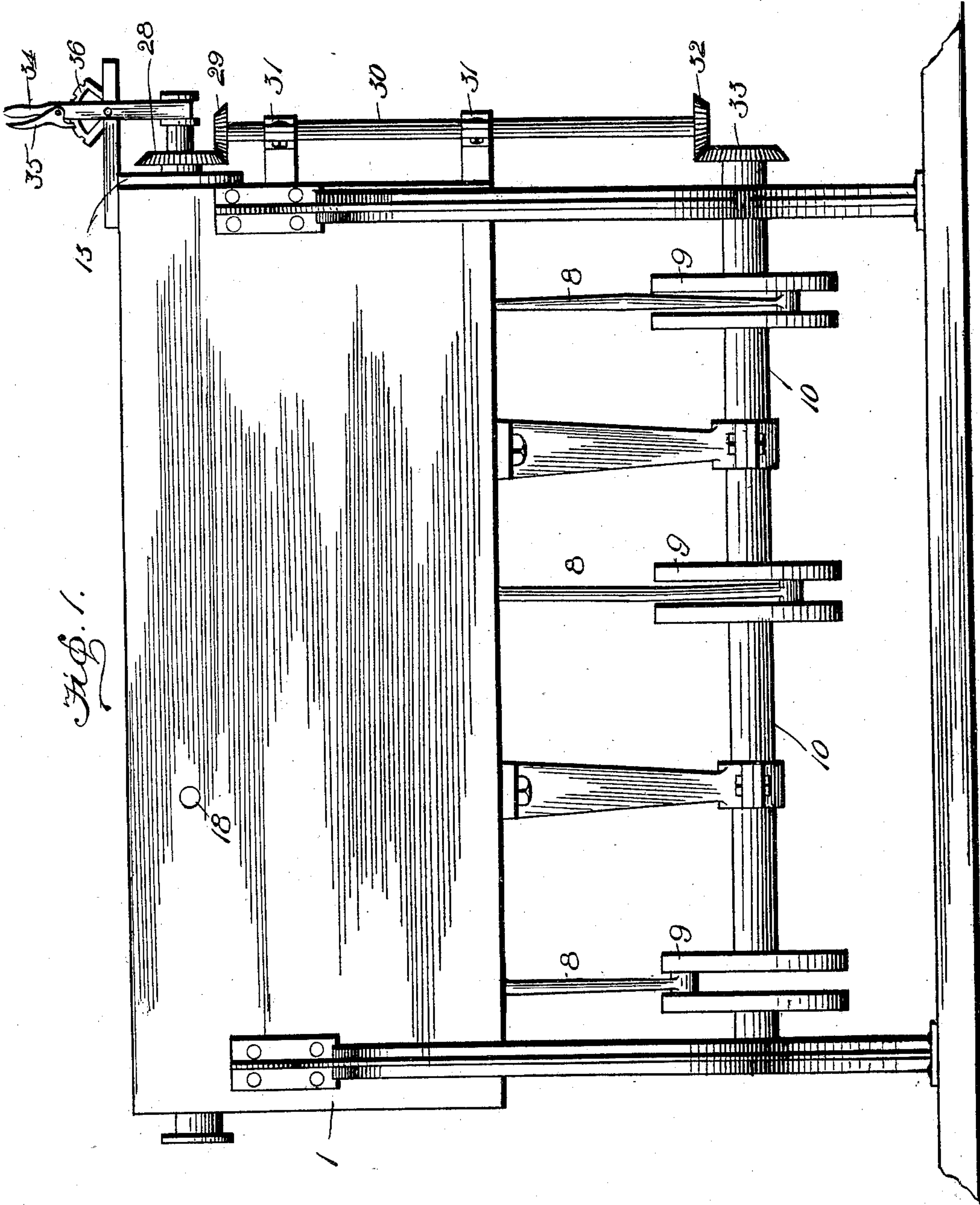
Patented Oct. 15, 1901.

H. SHOEMAKER.
ENGINE.

(Application filed Apr. 8, 1901.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES:

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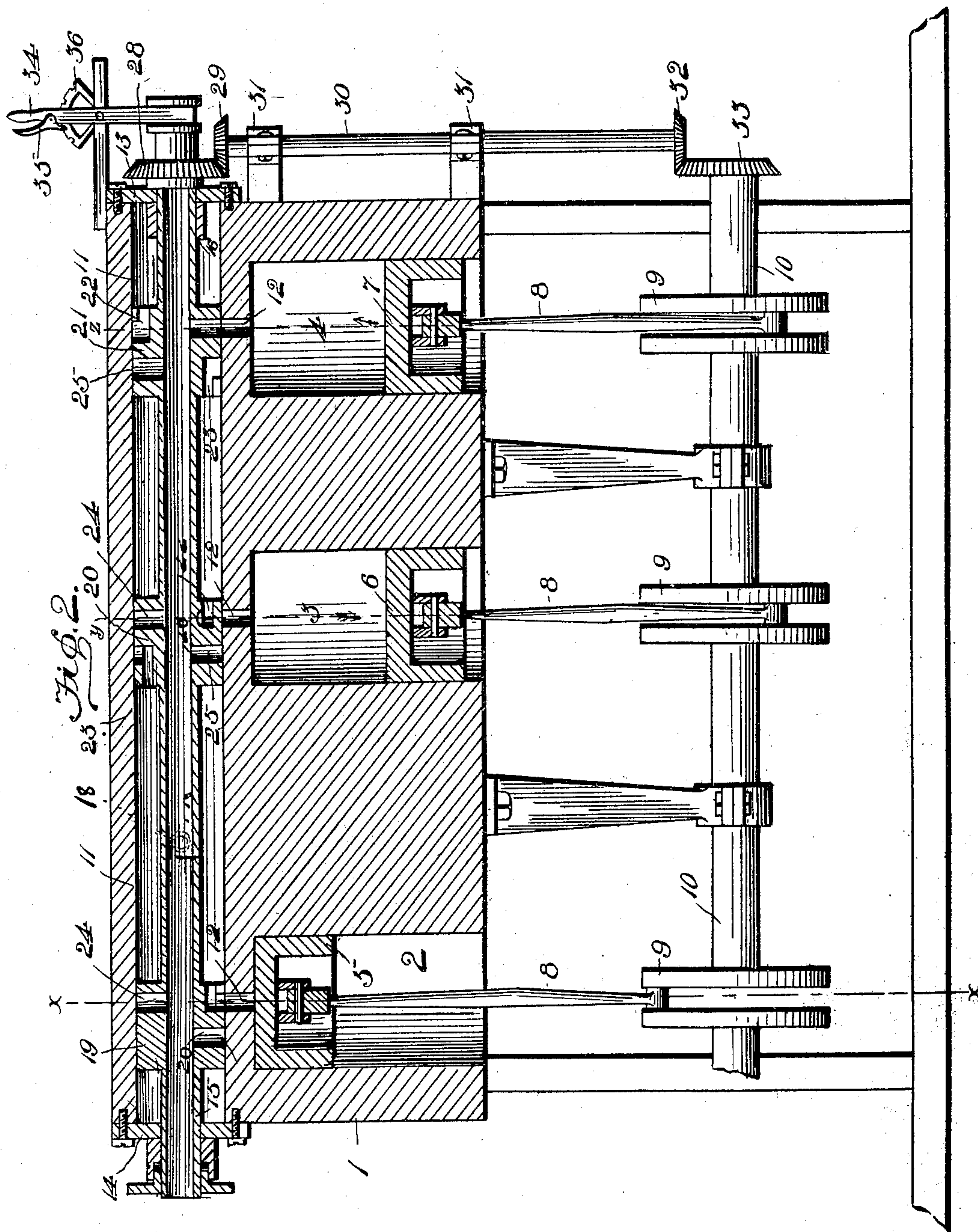
Patented Oct. 15, 1901.

H. SHOEMAKER.
ENGINE.

(Application filed Apr. 3, 1901.)

(No Model.)

4 Sheets—Sheet 2.



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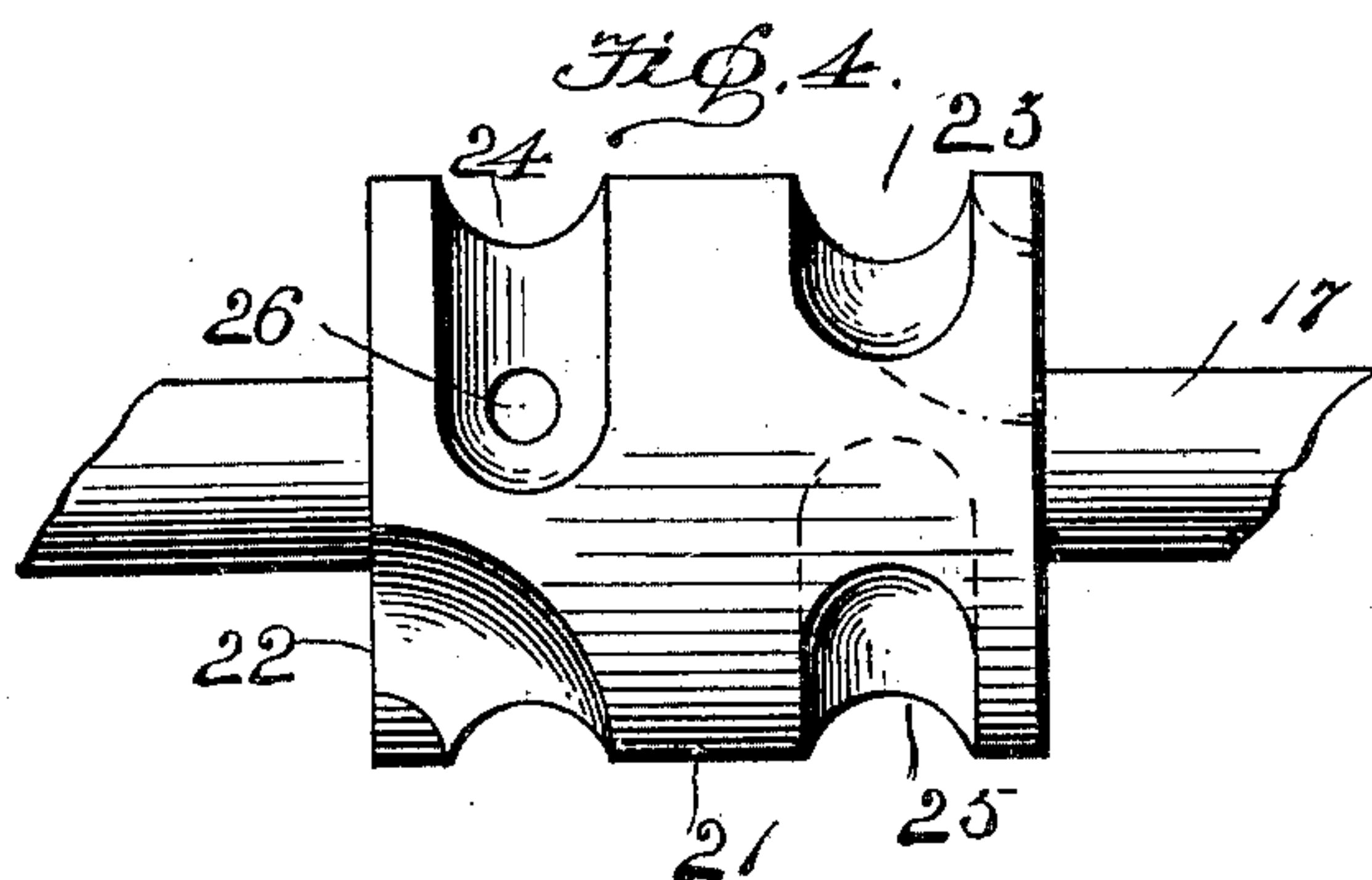
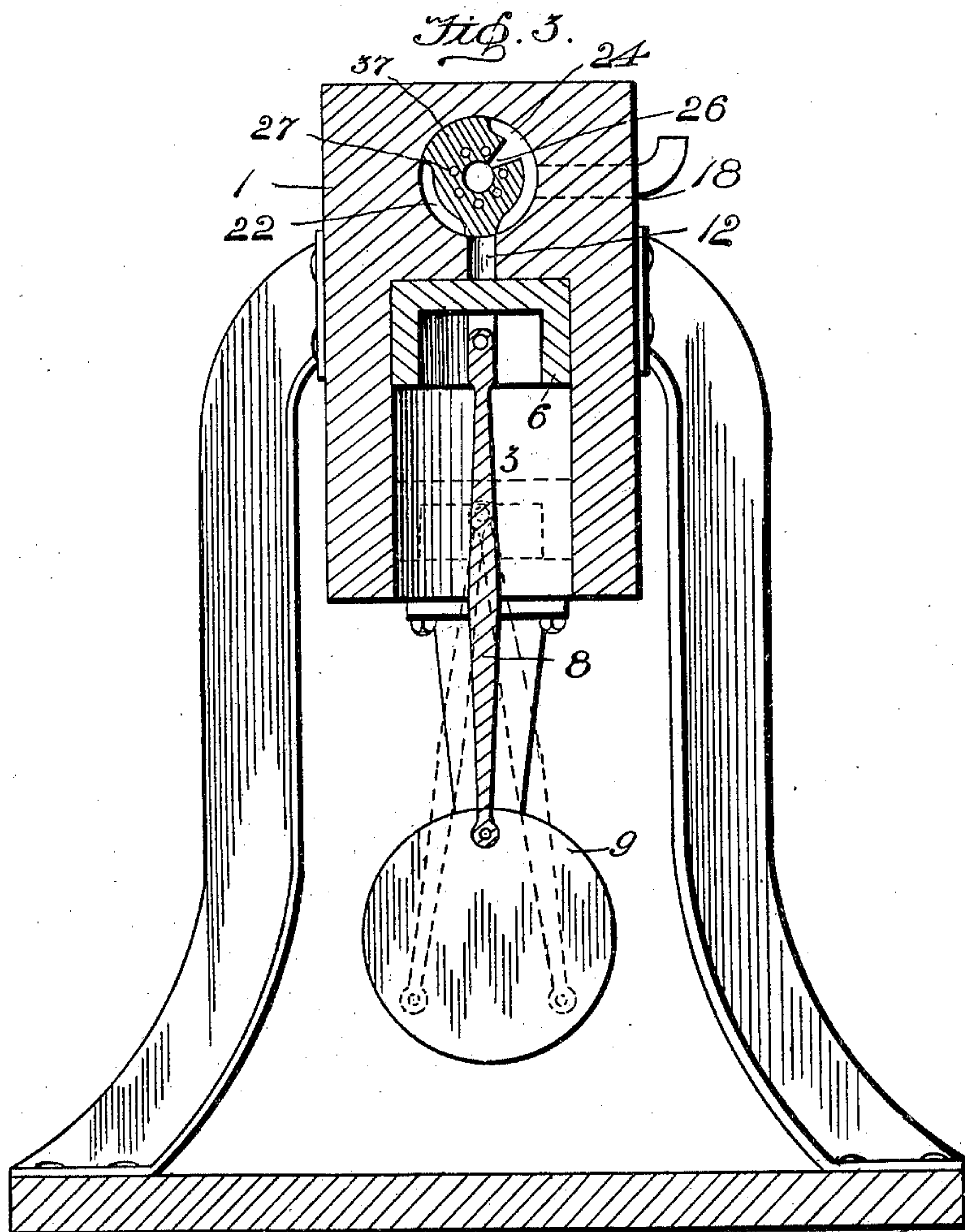
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4 Sheets—Sheet 3.



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4 Sheets—Sheet 4.

Fig. 5.

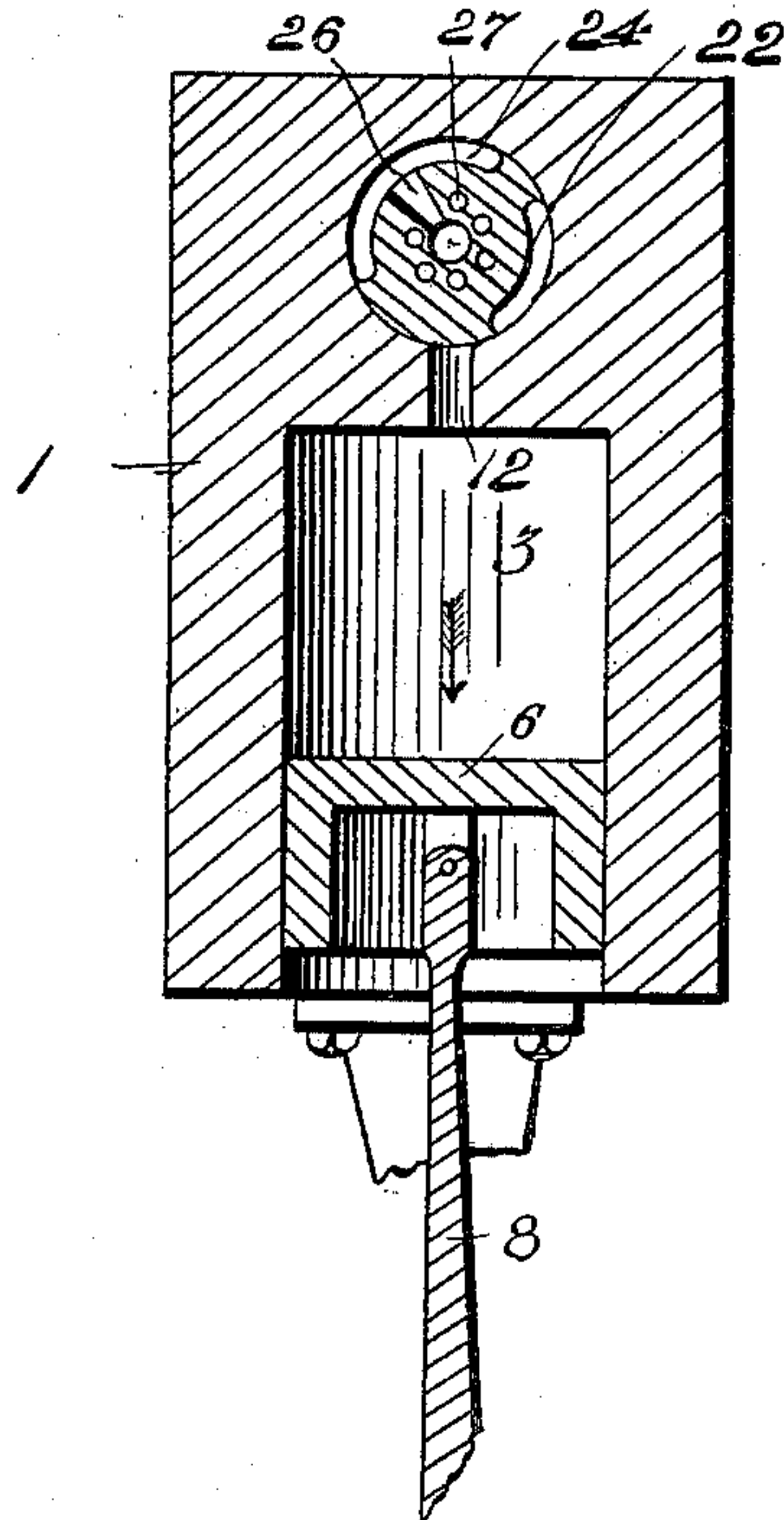
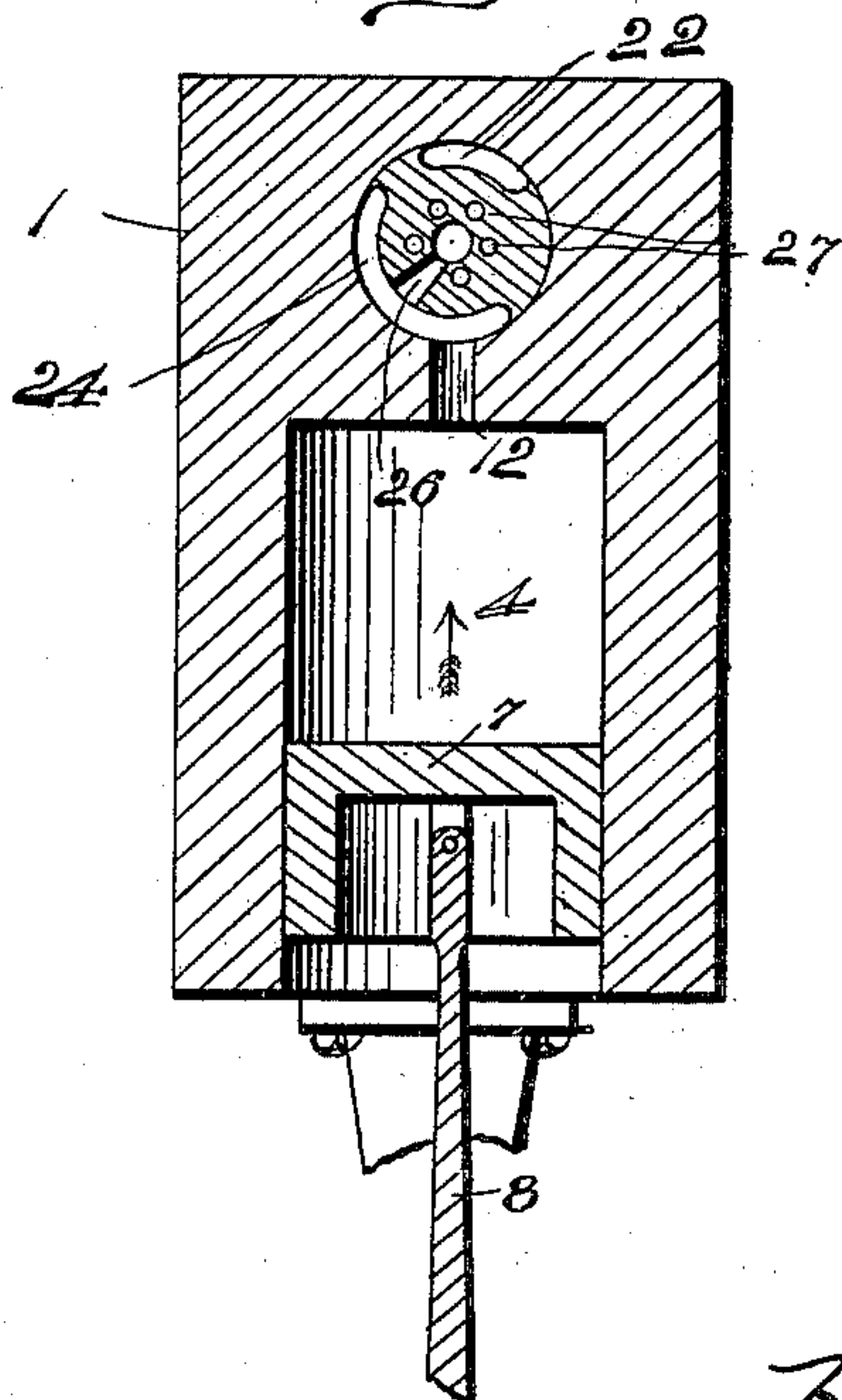


Fig. 6.



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UNITED STATES PATENT OFFICE.

HARRY SHOEMAKER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
MARIE V. GEHRING AND GUSTAVE P. GEHRING, OF SAME PLACE.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 684,468, dated October 15, 1901.

Application filed April 3, 1901. Serial No. 54,156. (No model.)

To all whom it may concern:

Be it known that I, HARRY SHOEMAKER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Engines, of which the following is a specification.

My invention relates to improvements in an engine; and the main object of my invention is the provision of a simple, durable, and inexpensive high-pressure engine, which is very compact and is provided with a simple construction of valve, which is easily and readily operated to start or reverse an engine.

To attain the desired objects, my invention consists of a compound engine embodying novel features of construction and combination of parts, substantially as disclosed herein.

In the drawings, Figure 1 is a side elevation of my invention in its entirety. Fig. 2 is a longitudinal central sectional view thereof. Fig. 3 is a transverse vertical section on line *xx* of Fig. 2, the positions of the pistons and rods of the other cylinders being shown in dotted lines. Fig. 4 is an enlarged detail view of the valve removed from the engine. Fig. 5 is a sectional view of one of the cylinders on line *y* of Fig. 2, and Fig. 6 is a similar view taken on line *z* of Fig. 2.

Referring to the drawings, the numeral 1 designates a single casting or piece of metal having provided therein the three cylinders 2, 3, and 4, in which are mounted the piston-heads 5, 6, and 7, connected, respectively, to the piston-rods 8, which are connected to their respective cranks 9, carried by the shaft 10. Formed in the casting and extending the full length thereof above the cylinders is the longitudinal channel 11, which communicates with the cylinders by means of the channels 12. Secured to the ends of the castings and forming a steam-tight joint therewith are the bearings or plates 13 and 14, provided with the openings 15 and 16, in which is adapted to be journaled the long hollow shaft 17, which is adapted to rotate in said channel. Communicating from the outside with this channel is a steam-inlet 18, which admits steam to the channel and cylinders. Mounted upon and revoluble with the shaft 17 are the

valves 19, 20, and 21, each of which is provided with two inlet-ports 22 and 23 and the two exhaust ports or channels 24 and 25, one inlet and an exhaust port being substantially side by side, said exhaust-ports being in communication with the hollow of the shaft 17 by means of the opening 26. Formed in the body portion of these valves are the series of openings 27, which allow the steam to extend or have a free passage the entire length of the channel and only necessitate the employment of a single inlet-port. The solid portion or ring 27^a between the ports forms a cut-off to close the channels 12. Connected upon the protruding ends of the shaft 17 by means of a groove and slot is a bevel-gear 28, which is adapted to mesh with a similar gear 29, mounted upon a shaft 30, which is journaled in bearings 31 and is provided with a beveled gear 32 upon its other end, said bevel-gear 32 meshing with a similar gear 33, carried upon the shaft 10. In order that the engine may be reversed, the shaft 17 must have a horizontal sliding movement, and in order that this result may be accomplished I employ the lever 34, provided with the detent 35, which is adapted to engage the tooth-segment 36 to hold the lever in the proper position.

From this description, taken in connection with the drawings, the operation of my improved engine is readily understood and its numerous advantages fully appreciated; but, briefly stated, it is as follows: Steam is admitted through the steam-port 18, and as the channels or inlet-ports 22 occupy about one-quarter of the periphery of the circular valves one of the cylinders is pushed downward, another cylinder is exhausting through its proper exhaust-port, which occupies about one-third of the periphery of its valve, and the other cylinder is at about the top of its ascent, and the solid portion 37 of the valve is over its port, thus closing the entrance thereto. Should the engine need reversing, it is simply necessary to pull upon the lever 34, which throws the inlet-ports 23 and the exhaust-ports 25 of the valves into operation, and thus the piston 5, which is at its highest point, as shown in Fig. 2, will descend, causing the piston 6 to ascend and the piston 7 to descend,

thus reversing the movement of the pistons, which are shown by arrows in Fig. 2 as going in the opposite direction.

It is evident that I provide a very compact engine, which is easily started, stopped, or reversed, and whose valves are revolved by the shaft 10 in unison, through a medium of beveled-gear connections, thus producing a thoroughly efficient and practical engine.

This engine is especially designed for purposes where a powerful and yet compact engine is desired—such, for instance, as motor-vehicles, heavy dray-wagons, marine purposes, and for running all kinds of machinery.

I claim—

1. In an engine, the combination of the body portion provided with a series of cylinders and a single channel communicating with the cylinders, pistons mounted in said cylinders, a shaft revolved by said pistons, a hollow shaft fitting in the channel and slidingly and revolubly journaled in bearings at the end thereof, a series of circular valves provided with inlet-ports and outlet-ports, means for sliding said shaft to move the valves and reverse the pistons, and means for revolving the shaft connected with the main shaft of the engine.

2. In an engine, the combination of a solid body provided with a series of cylinders and a long channel therethrough communicating with the cylinders, pistons mounted in said cylinders, a shaft operated by said pistons, and a hollow shaft revolved by said shaft and carrying a series of valves, each valve, consisting of a circular disk provided with inlet-

channels and exhaust-ports, an exhaust-port and an inlet-port being upon substantially the same side of the valve and providing a central ring or cut-off to close communication with the cylinders of an engine when the same is passive.

3. In an engine, the combination of a casting, a series of cylinders formed therein from the under side, a horizontal channel formed in the casting and extending the full length thereof above the cylinders, passages causing communication between the cylinders and channel, bearing-plates mounted in the ends of the channel, a hollow shaft revolubly and slidably journaled in said plates and extending through the channel, a series of disks or valves carried by the hollow shaft and in communication therewith, said disks each being provided with two ports communicating with the shaft and two communicating with the channel, one port of each description being upon the opposite sides of the disk in order that one revolution thereof admits steam to one cylinder and allows it to exhaust through the exit of the casting, a series of pistons mounted in the cylinders, a main shaft connected with the pistons, and a shaft connected with the main shaft and the hollow shaft so that the said shafts revolve in unison.

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

HARRY SHOEMAKER.

Witnesses:

M. WIEGAND,
J. N. FORT, Jr.