

No. 683,165.

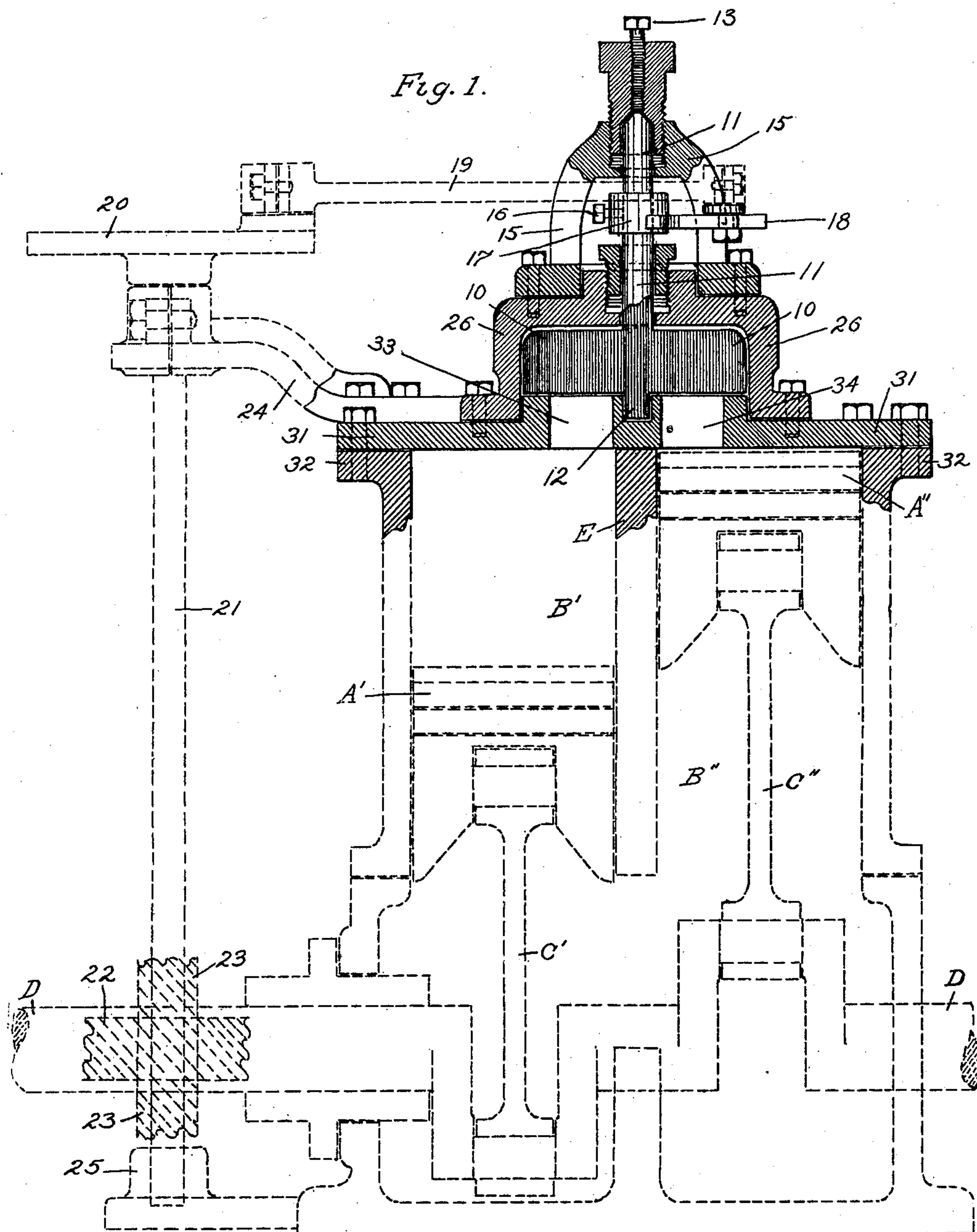
Patented Sept. 24, 1901.

C. M. WILCOX.
VALVE FOR STEAM ENGINES.

(Application filed Jan. 17, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses;
Samuel G. Duwall.
R. G. Randle.

Inventor;
CHARLES M. WILCOX,
by his attorney,
Robert W. Randle.

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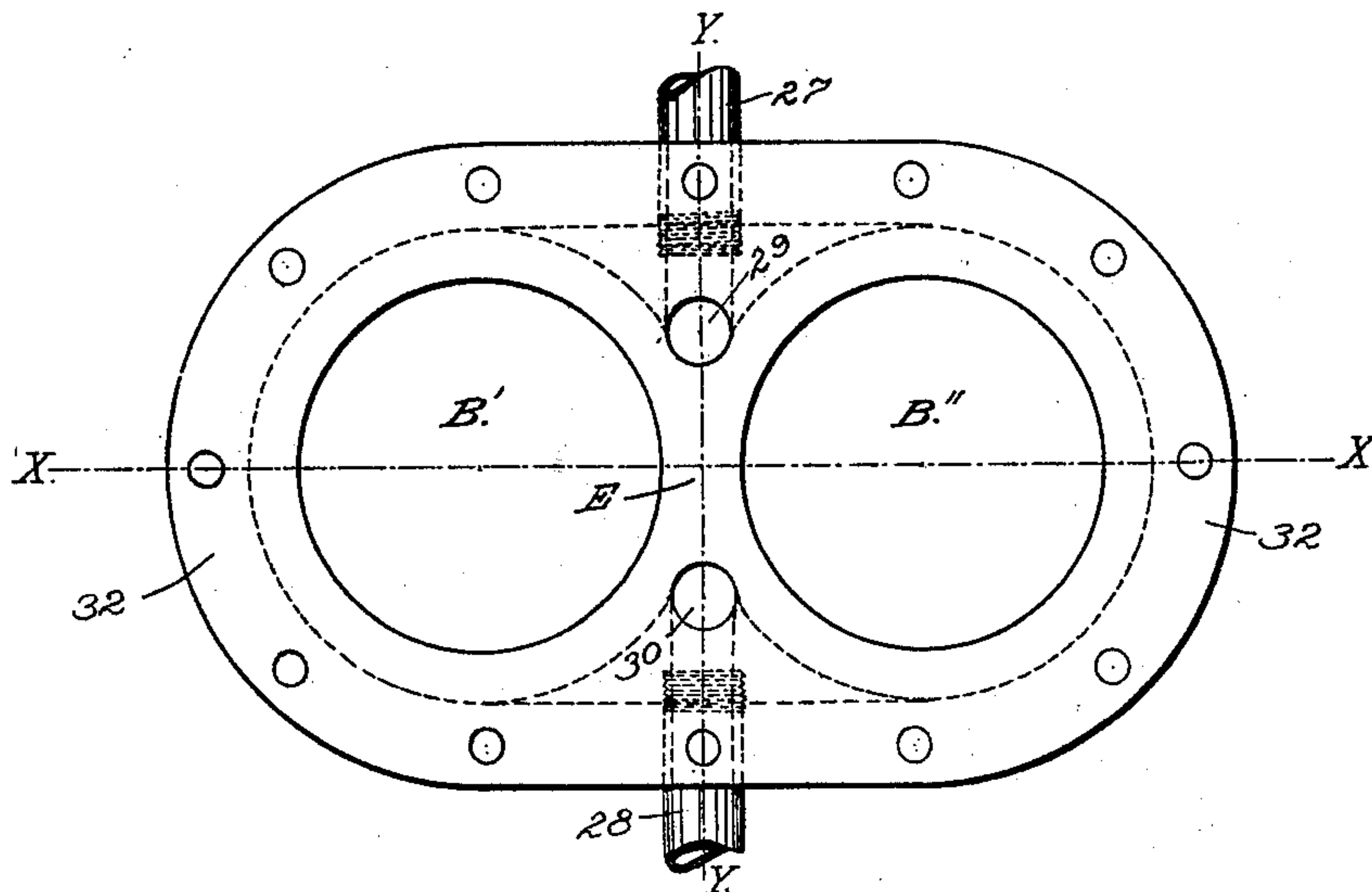


Fig. 2.

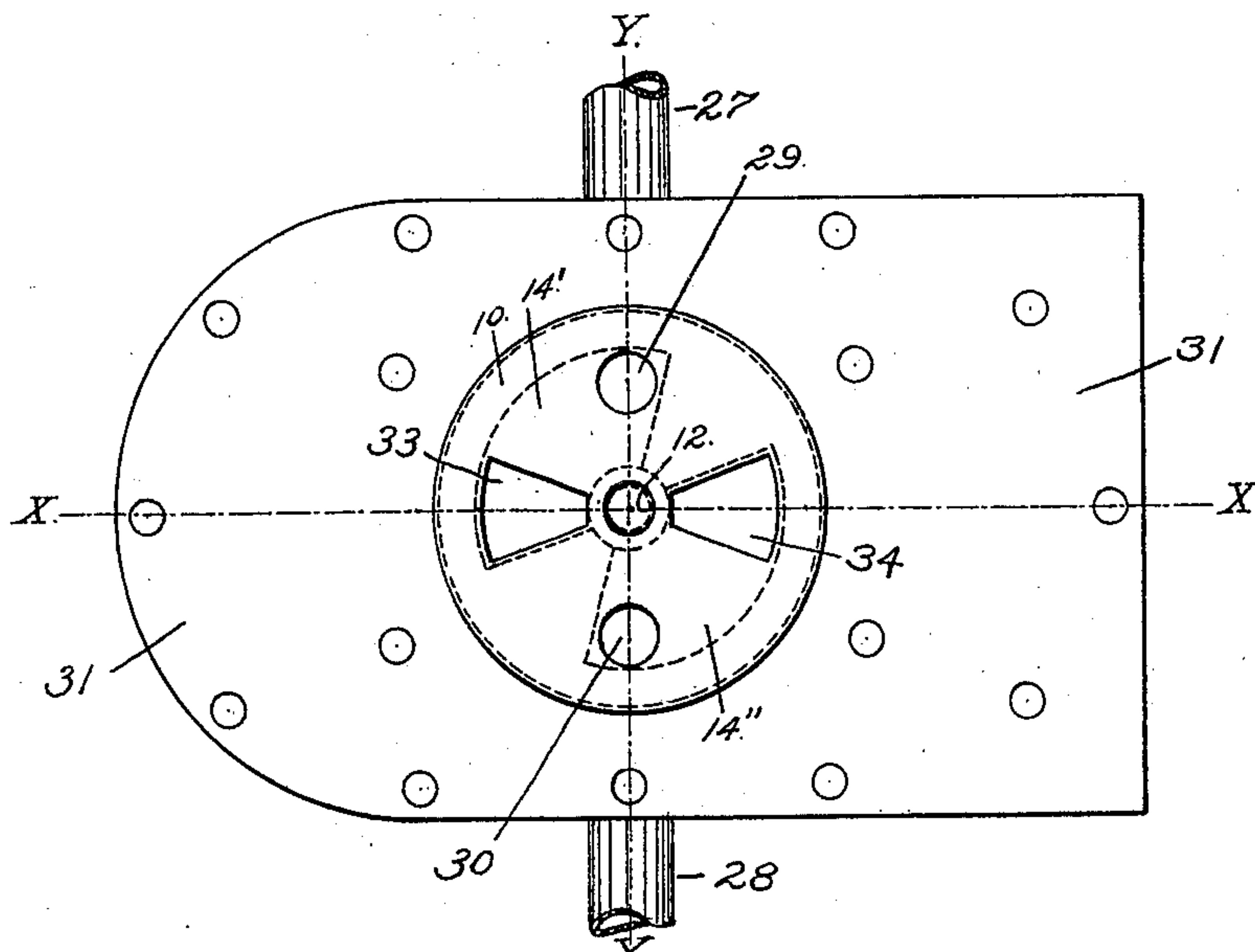


Fig. 3.

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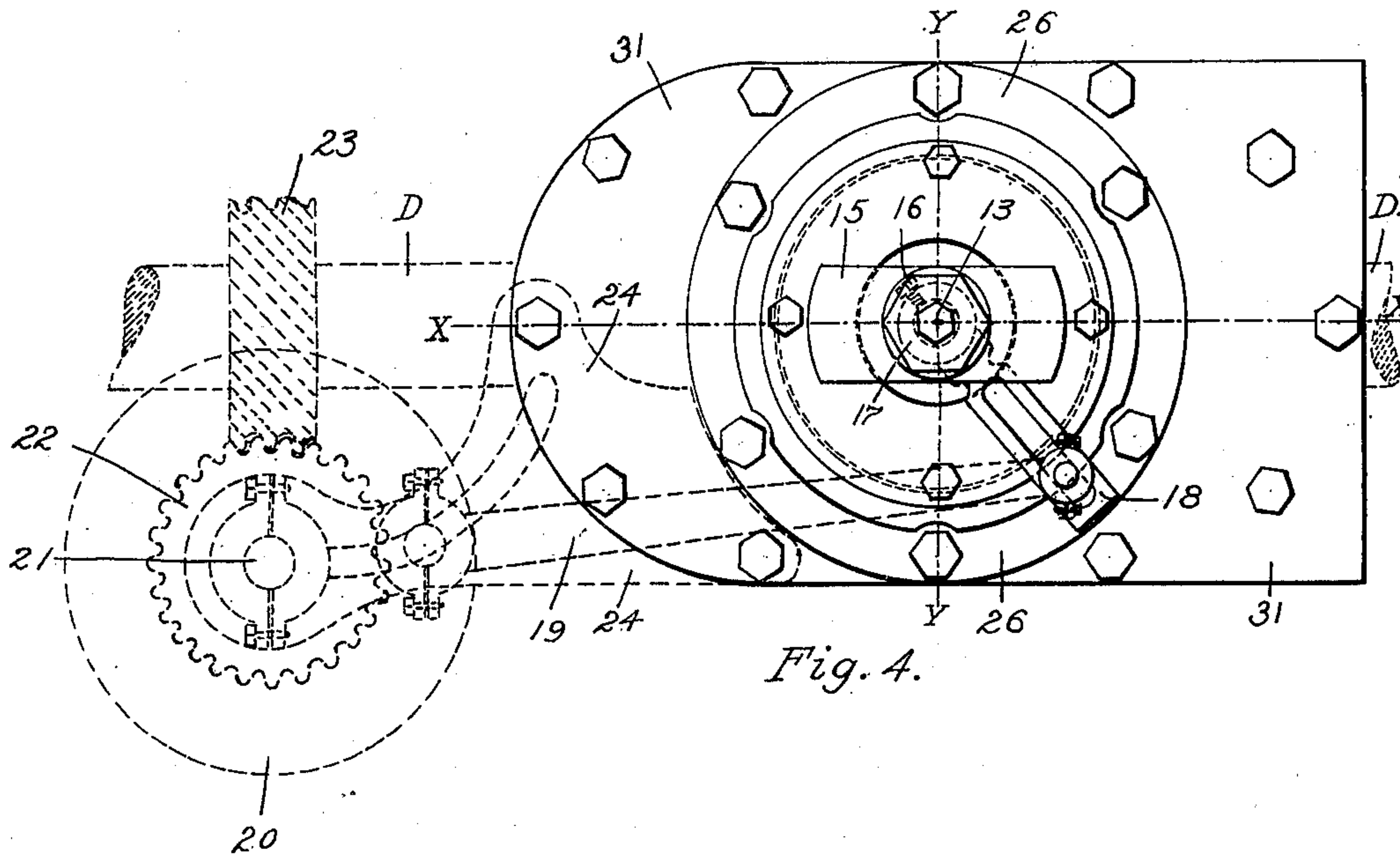


Fig. 4.

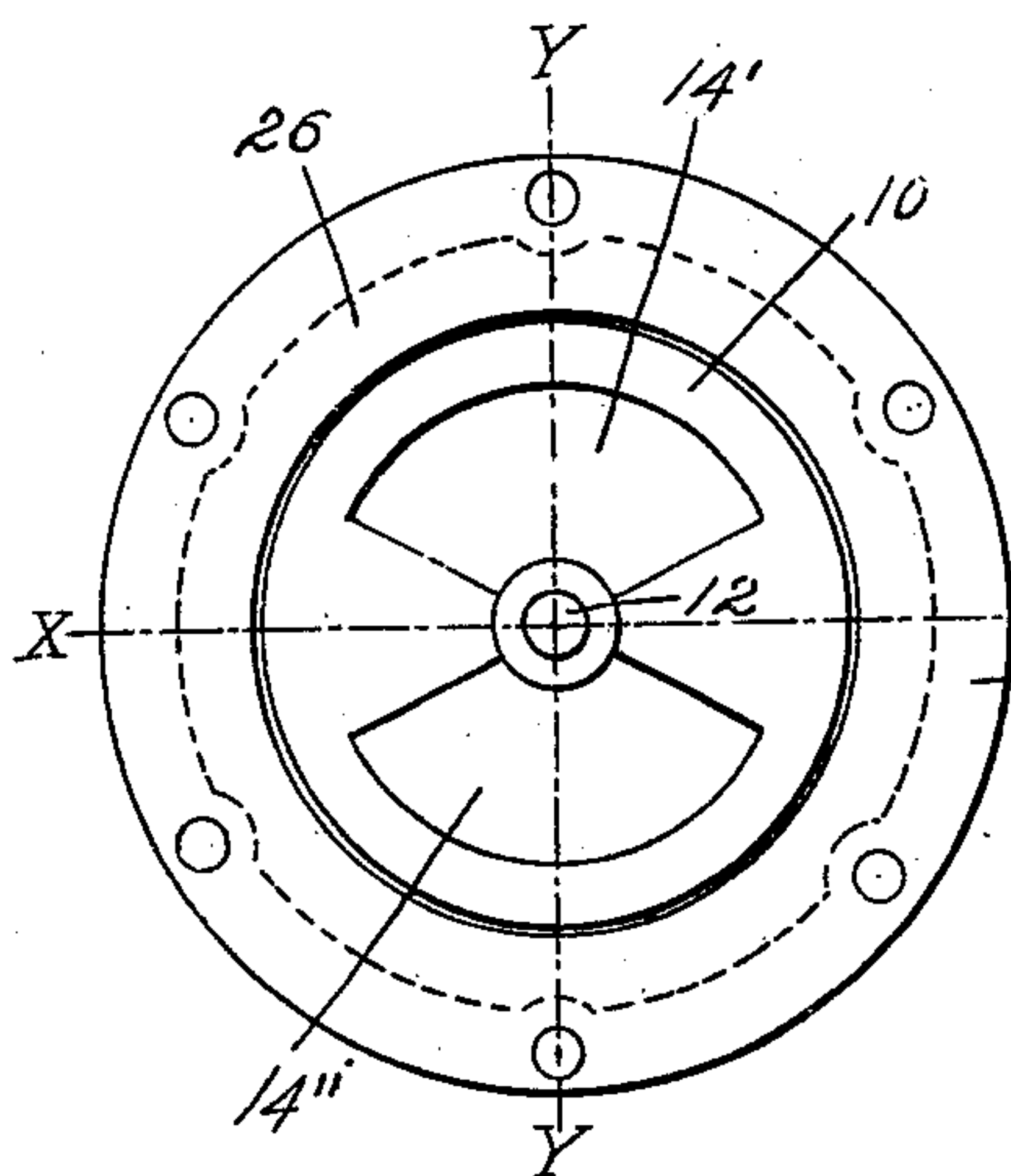


Fig. 5.

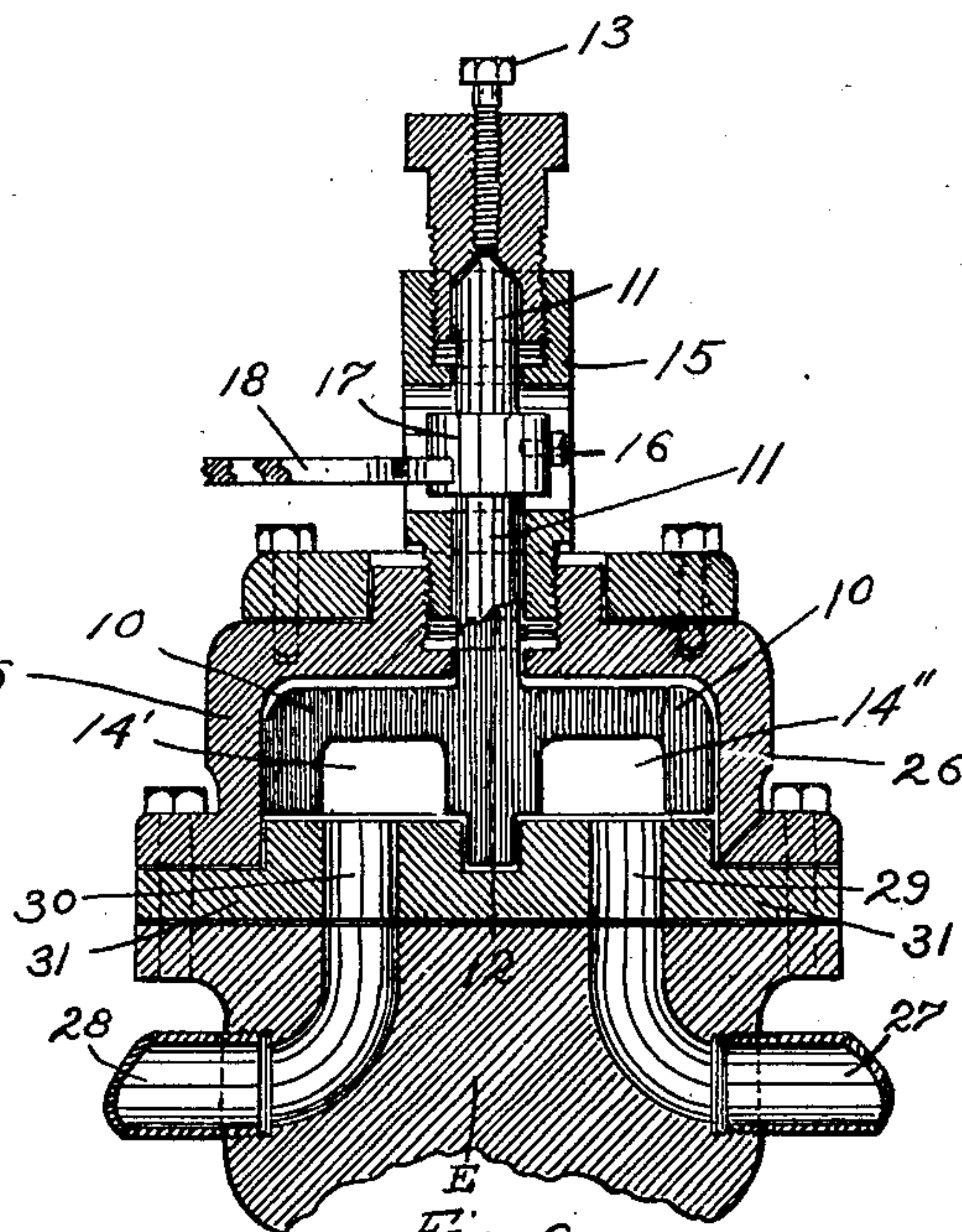


Fig. 6.

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UNITED STATES PATENT OFFICE.

CHARLES M. WILCOX, OF NEW PARIS, OHIO, ASSIGNOR OF ONE-HALF TO
CHARLES W. BLOOM, OF SAME PLACE.

VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 683,165, dated September 24, 1901.

Application filed January 17, 1901. Serial No. 43,610. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. WILCOX, a citizen of the United States, residing at New Paris, in the county of Preble and State of Ohio, have invented new and useful Improvements in Valves for Steam-Engines, of which the following is a specification.

My invention relates to improvements in steam-engines, and more particularly to the controlling-valve and the parts contiguous thereto, in which the valve is caused to operate on pivots with a circular oscillating motion to admit and release the steam from the cylinder or cylinders of an engine.

The object of my present invention, broadly speaking, is the provision of an improved steam-engine simple in its construction, easy of operation, compact in its parts, and in which the friction and consequent wear on the vital parts of the engine are reduced to a minimum.

A more specific object is to provide a controlling-valve for steam-engines of novel construction in which the steam-pressure will always be from below and on the under face of the controlling-valve and in which the pressure or bearing of the valve, usually on the valve-seat, is transferred to a single point located directly above the controlling-valve.

Another object is to provide an improved steam-engine of the class stated which involves simplicity of construction and operation and in which the greatest possible efficiency or working power is secured with a minimum of steam.

Another object is to provide a steam-engine with a perfectly-balanced controlling-valve, thereby dispensing with much of the friction and consequent loss of power of an ordinary slide-valve; and still another object consists in a novel and useful valve for controlling the admission and exhaust of steam into and from the ports of the cylinder or cylinders and for enabling the direction in which the pitman is turning the operating-shaft to be reversed at will.

Other minor and subordinate features of my invention will appear from the following description.

I attain these and other objects by the mechanism and arrangement of parts illustrated

in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal sectional view of my invention, taken on the line X X of Figs. 2, 3, 4, and 5. Fig. 2 is a plan view of the end of the engine-cylinder, showing the steam entrance and exhaust pipes and ports. Fig. 3 is a plan view of the cylinder-head, showing the valve-seat, the cylinder-ports, the steam entrance and exhaust ports and pipes, and the action of the controlling-valve with reference to the ports. Fig. 4 is a top plan or vertical view of my engine. Fig. 5 is a bottom plan view of the controlling-valve and the chest in which it operates. Fig. 6 is a cross-sectional view of the essential parts of my engine, taken on the line Y Y of Figs. 2, 3, 4, and 5.

Similar letters and figures of reference refer to similar parts throughout the several views.

A' and A'' represent the piston-heads of an engine.

B' and B'' represent the cylinders or, more properly, the operating-space of the piston-heads.

C' and C'' represent the pitmen of an engine.

D represents a crank-shaft.

E represents the division-wall between the cylinders.

10 represents my controlling-valve.

11 represents my valve-stem extending up from 10 and terminating in a pivot to operate against the screw 13.

12 represents the valve journal or pivot below the valve.

13 represents a screw for adjusting the valve to the valve-seat.

14' and 14'' represent the steam-spaces in the valve.

15 represents the arms of a yoke rising above the valve-case 26 for the purpose of providing a seat for the valve-stem 11.

18 represents a slotted arm extending out from a collar 17, said collar and arm being adjustably secured to the valve-stem 11 by a set-screw 16.

19 represents a connecting-arm journaled at one end to the arm 18 by a pivot mounted adjustably in the slot referred to in the arm

18, the other end of 19 being journaled to a revolving disk 20, said disk being permanently mounted on the end of the shaft 21. The shaft 21 is journaled, near the top thereof, to the arm 24, and at the bottom it is pivoted in the part 25.

22 and 23 represent a worm-gear or endless screws meshing with each other at right angles, 22 being secured to the shaft 21, and 23 being secured on the crank-shaft D.

26 represents the valve-case in which the valve 10 operates.

27 and 28 represent steam-pipes connecting with the openings 29 and 30, respectively, and leading through each side of the valve-seat.

31 represents the plate which forms the cylinder-heads.

32 represents the top or ends of the cylinders.

33 represents the trapezoid port leading into the cylinder B', and 34 represents the trapezoid opening leading into the cylinder B''.

I have shown my controlling-valve and the adjacent parts in connection with one type of steam-engine for the purpose of showing how my invention can be operated; but I do not wish to limit my invention to this type of engine, for it is evident that my valve and its adjacent parts are applicable to various kinds of engines.

The parts I have shown in dotted lines in Figs. 1 and 4 I consider unimportant, in that other types or similar arrangements may be used in place thereof.

In Fig. 2 I show a plan of the ends of the cylinders 32 of an engine with steam pipes and ports thereto for the use of my invention. I now secure the plate 31 on top of the part 32. When this is done, the ends of the cylinders will appear as in Fig. 3. I now place the valve 10 on the valve-seat, so that the steam-spaces 14' and 14'' will occupy the position as shown by the dotted lines in Fig. 3, the pivot 12 extending down into its socket in the face of the valve-seat and the valve-stem 11 projecting upward, as shown in Figs. 1 and 6. I now place the valve-case 26 in its place over the valve 10 and secure it to the plate 31. I now secure the part 15 around the shaft 11 to the top of the valve-case, at the same time entering the valve-stem 11 through the collar 17. I now insert the screw 13 to contact with the pivot of the valve-stem 11, by means of which the valve 10 can be adjusted to contact with the valve-seat. By means of the arm 18 the valve 10 can be rocked laterally in the valve-case 26 for the purpose of admitting and releasing the steam to and from the cylinders B' and B'' or to opposite ends of a single-cylinder engine.

The operation of the valve-gear is accomplished by any well-known method; but I have shown an arrangement which I consider the best adapted to the type of engine herein shown, which consists of a worm or screw gear 22 and 23, connecting the crank-shaft D at right angles to the shaft 21, the shaft 21

having a crank-disk 20 on its upper end for the purpose of operating the connecting-arm 19. It can be seen that when the crank-shaft D is revolved it will cause the connecting-arm 19 to move the arm 18 with a lateral sweeping motion, and thus transmit to the controlling-valve 10 a circular oscillating motion to control the entrance and exhaust of the steam to and from the steam-spaces 14' and 14'' and from them into the cylinders of the engine.

My invention consists, essentially, of a body of circular form of sufficient thickness to allow the steam-spaces 14' and 14'' to be hollowed out on the face thereof, with an axle 12 projecting down from the face and a stem 11 projecting upward from the top.

It can be seen that if the valve in the position shown in Fig. 5 be placed on the valve-seat, Fig. 3, the port 29 will be opposite the center of the steam-space 14' and the port 30 will be opposite the center of the steam-space 14'', in which position the solid parts of the face of the valve 10 will cover the ports 33 and 34, (considering for the present that 27 is the entrance for the live steam and that 28 is the exhaust.) Should the valve 10 be turned to the left on the pivot 12 to the position shown by the dotted lines, Fig. 3, it is apparent that a channel is established for the steam to enter through the pipe 27 and the port 29 into the steam-space 14' and then through the port 33 into the cylinder B' and cause the piston-head A' to be depressed. In like manner a channel is at the same time established for the exit of the steam from the cylinder B'' by passing up through the port 34 into the steam-space 14'', through the port 33, and exhaust through the pipe 28. In the position of the valve 10 above described if the valve 10 be given approximately a quarter-turn to the right the steam-space 14' will assume the same relation with 29 and 34 as it formerly did with 29 and 33 and the steam-space 14'' will assume the same relation with 30 and 33 as it formerly did with 33 and 34. In the position of the valve just stated it is apparent that the live steam entering through the pipe 27 and the port 29 into the steam-space 14' will enter through the port 34 into the cylinder B'' and that the steam contained in the cylinder B' will exhaust through the port 33 into the steam-space 14'' and out through the port 30 and pipe 28.

It is apparent that if properly adjusted the revolution of the crank-shaft D will cause the valve 10 to shift at the proper time to admit and exhaust the steam to and from the cylinders B' and B'' alternately.

With the construction and arrangement of the valve shown and described it can be seen that if I desire to reverse the engine and cause the shaft D to revolve in the opposite direction I have only to admit the live steam through the pipe 28 and exhaust the steam through the pipe 27.

My improvements are perfectly adapted to

accomplish the results for which they are intended; but it is evident that changes in and modifications of the construction herein shown and described may be made and that analogous parts may be used to accomplish the same results without departing from the spirit of my invention or sacrificing any of its advantages.

Having shown and described the best construction of my engine known to me at this time, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A steam-engine valve, of circular form, having steam-spaces in the face thereof, an upwardly-projecting stem and pivot and a downwardly-projecting pivot, all substantially as shown and described and for the purposes set forth.

2. In a steam-engine, the combination with a valve-seat having supply and exhaust ports or passages, of a valve-chest, an oscillating valve having steam-chambers in its face adapted to coact with the ports aforesaid and located in the valve-chest and provided with a stem which is journaled in the valve-chest, and an adjusting-screw on the valve-chest which is stepped against the end of the valve-stem, whereby the valve is prevented from bearing against the valve-chest.

3. In a steam-engine, the combination with a valve-seat having supply and exhaust ports or passages, of a valve-chest, an oscillating

valve having steam-chambers in its face adapted to coact with the ports aforesaid and located in the valve-chest, an adjusting-screw on the valve-chest which is stepped against the end of the valve-stem, and a pivot or journal projecting from the valve and journaled or stepped in the valve-seat, whereby the valve is centered and prevented from lateral or longitudinal displacement by steam-pressure.

4. In a steam-engine, the combination with admission and exhaust ports or passages therein, of a valve-chest secured thereto, a yoke rising above the valve-chest, an oscillating valve in the chest having chambers to coact with the ports aforesaid, a stem secured to said valve which is journaled in the valve-chest, an adjusting-screw on the yoke which is stepped against the end of the stem, a slotted arm having a collar adjustably connected to the valve-stem between the yoke and the valve-chest, and an operating-arm having an adjustable connection with the slot in the aforesaid arm and connected to the operative parts of the engine for oscillating the valve.

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

CHARLES M. WILCOX.

Witnesses:

R. W. RANDLE,

R. E. RANDLE.