

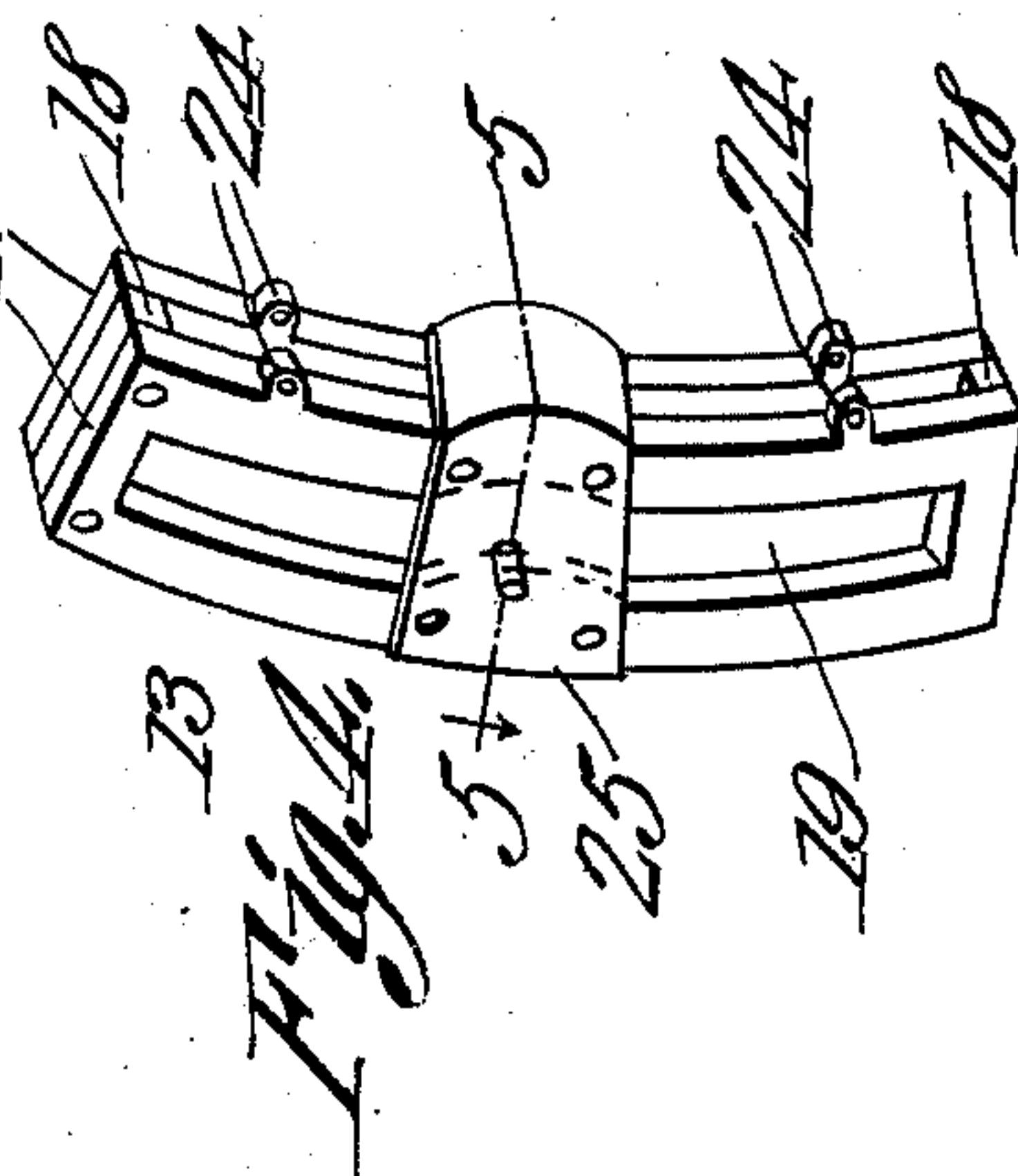
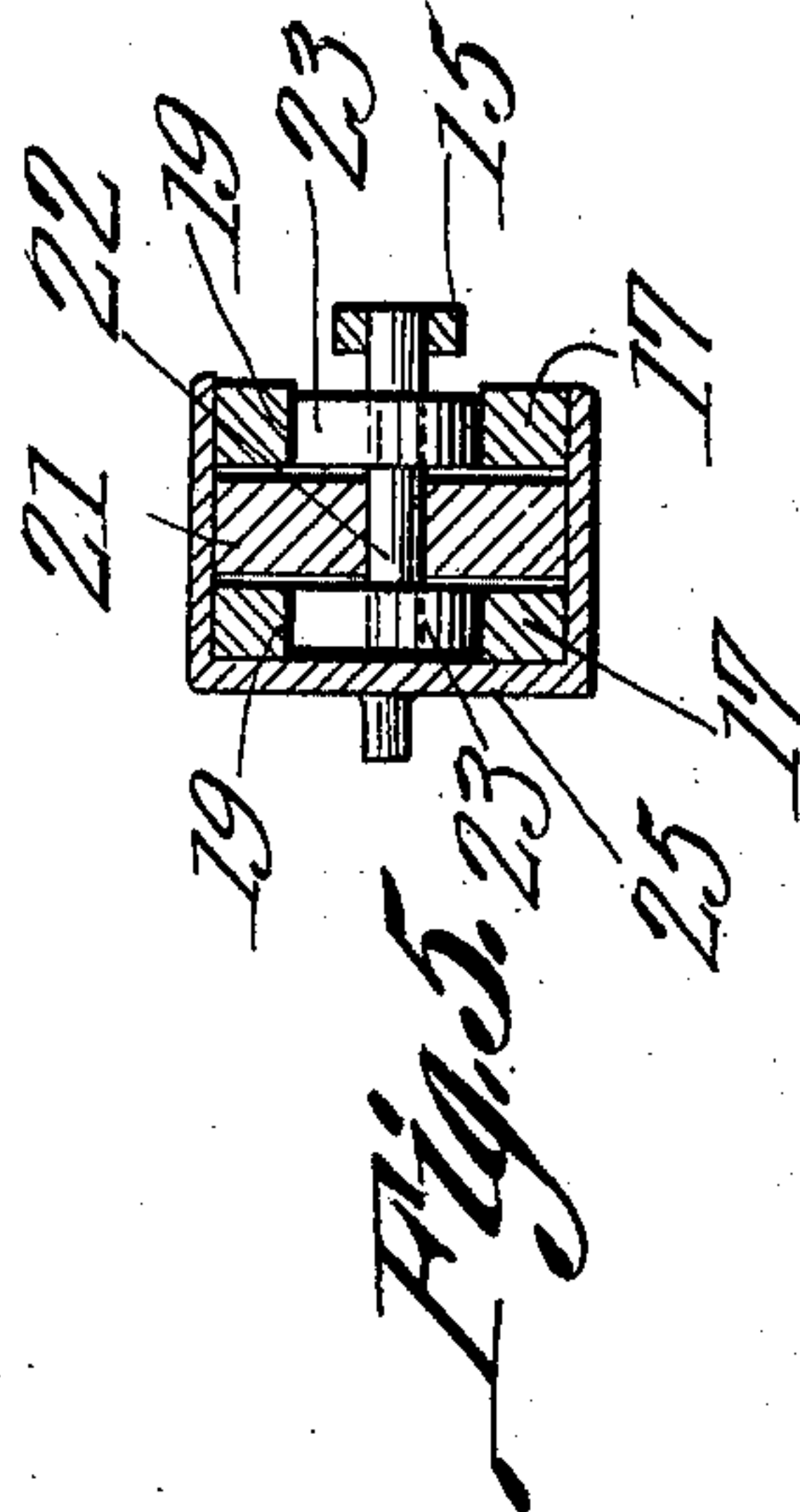
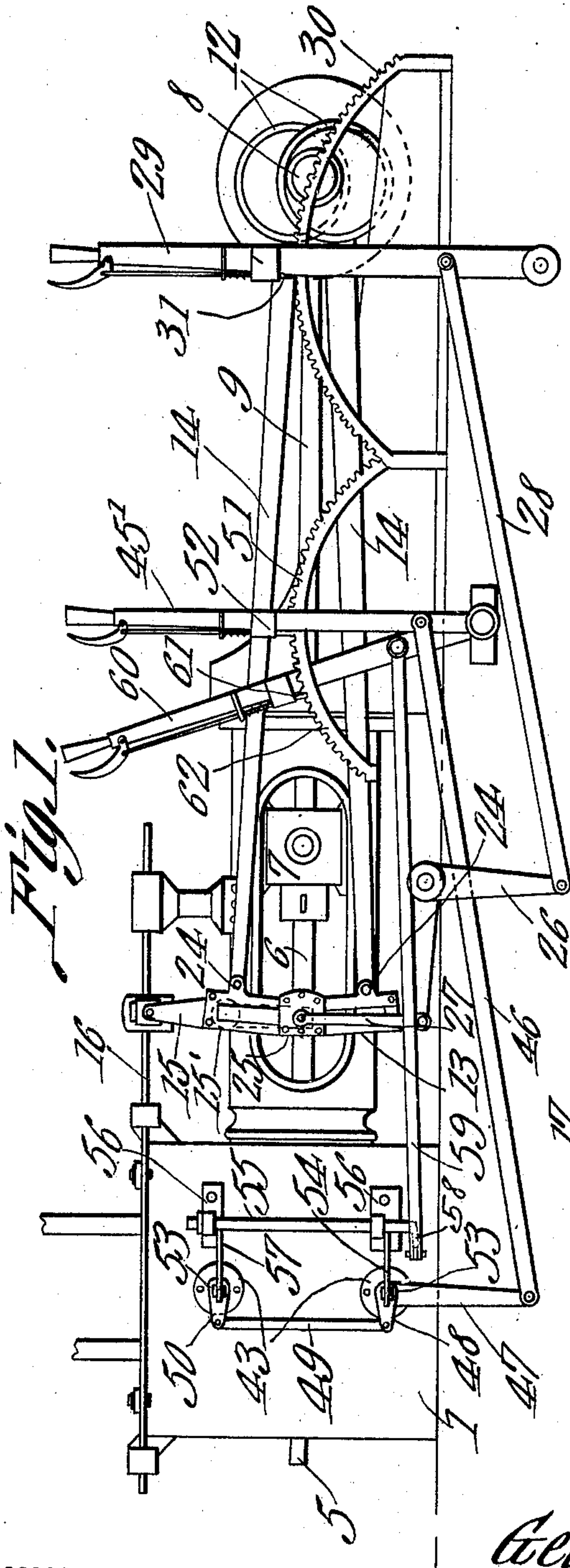
G. W. BAKER.
STEAM ENGINE.

APPLICATION FILED MAY 23, 1910.

987,035.

Patented Mar. 14, 1911.

2 SHEETS—SHEET 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

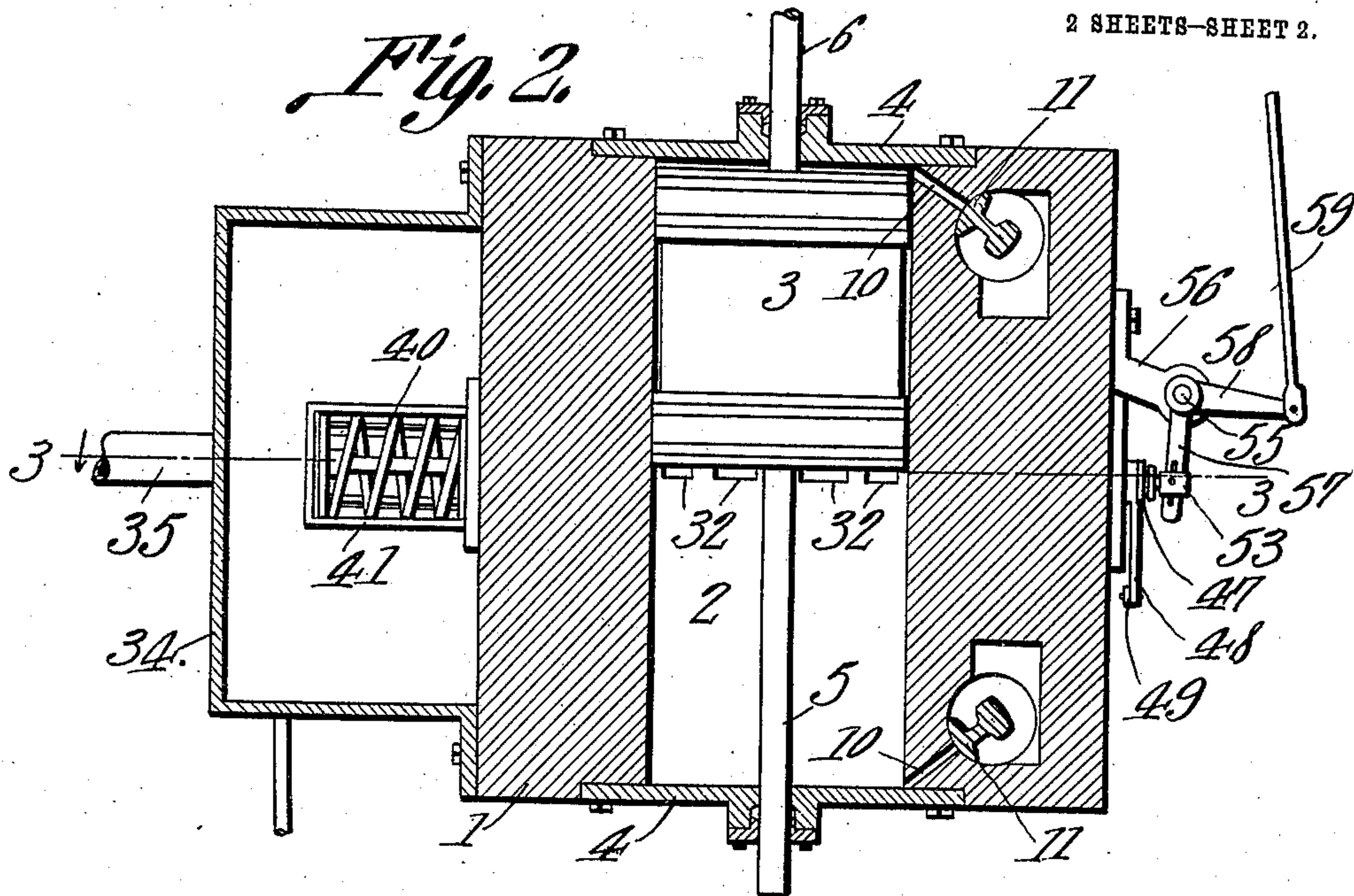
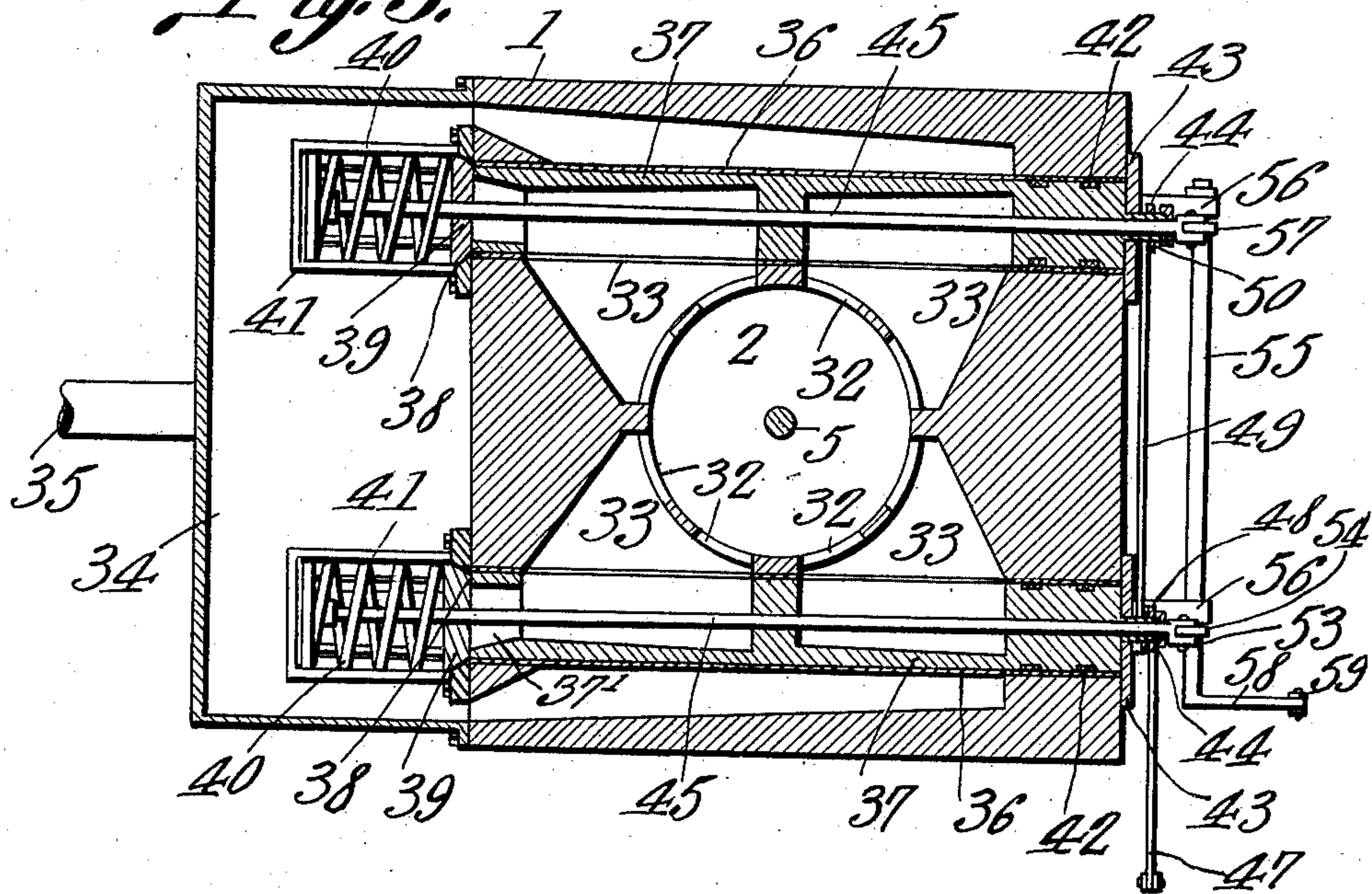


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE W. BAKER, OF DENVER, COLORADO.

STEAM-ENGINE.

987,035.

Specification of Letters Patent. Patented Mar. 14, 1911.

Application filed May 23, 1910. Serial No. 562,901.

To all whom it may concern:

Be it known that I, GEORGE W. BAKER, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented a new and useful Steam-Engine, of which the following is a specification.

This invention has relation to improvements in steam engines of the general type disclosed in my former application No. 524,575, filed December 23, 1909; and it relates more particularly to exhaust valve mechanism and to the supplemental valves thereof, improved means being provided for adjusting the tension of the springs which hold said valves seated.

With these and other objects in view as will appear when the nature of the invention is better understood, the same consists of the novel construction and arrangement of the parts to be hereinafter described and claimed, reference being had to the accompanying drawings forming a part of this specification, in which:

Figure 1 is a side elevation of the engine. Fig. 2 is a horizontal section taken through the cylinder. Fig. 3 is a transverse section on the line 3—3 of Fig. 2. Fig. 4 is a perspective view of the shifting link. Fig. 5 is a transverse section on the line 5—5 of Fig. 4.

In the drawings, 1 denotes the cylinder, in the bore 2 of which a piston 3 reciprocates. The cylinder is closed at its ends by heads 4 provided with suitable stuffing boxes. Through the stuffing box of one cylinder head passes a stem 5 extending from one side of the piston, said stem serving merely as a guide. From the other side of the piston extends a piston rod 6 which passes through the stuffing box on the other cylinder head and is connected to a cross head 7 sliding in guides formed on the engine bed. The crank on the engine shaft 8 is connected to the cross head by a connecting rod 9. The steam inlet ports of the cylinder are indicated at 10, said ports opening into the bore of the cylinder at the respective ends thereof. Valves 11 of the Corliss type control these ports, said valves being operated from eccentrics 12 on the engine shaft through a shifting link 13 connected by rods 14 to the respective eccentrics. In the slot of the link operates a block to which is connected a rocker arm 15 fulcrumed on the engine bed at 15'. One

end of this arm is connected to the link block, and the other end is connected to the valve actuating rod 16.

The link 13 is of skeleton form and comprises two spaced members 17, said members being held in spaced relation by spacing blocks 18 therebetween at the ends. Bolts or other suitable fastening means passing through the members and through the spacing blocks securely fasten the parts together. These members have aligned slots 19 which are arcuate as usual. The link block is indicated at 21. This block is located between the two spaced members 17 and carries an axle 22 on which are journaled rollers 23 which work in the slots 19. The link block overlaps the members 17 sufficiently to hold the rollers in place within the slots. To one end of the axle 22 is connected the rocker arm 15. The link members are also provided with ears 24 to which the eccentric rods 14 are connected. Intermediate its ends, the link carries a stirrup 25 to which the link shifting mechanism is connected. Said mechanism comprises a bell crank lever 26 fulcrumed on the engine bed, and having one of its branches connected by a link 27 to the stirrup 25. The other arm of the bell crank lever is connected by a rod 28 to a hand lever 29 fulcrumed on the engine bed, or at any other suitable and convenient location. A toothed quadrant 30 is provided, and the hand lever has the usual spring latch 31 engageable therewith, whereby the lever is locked, and the shifting link thus held in adjusted position.

Leading from the bore of the cylinder 1, is a circular series of exhaust ports 32 which open into exhaust cavities 33 formed in the cylinder wall at the top and bottom thereof in order to constitute an ample exhaust passage. The exhaust cavities open at one end through one side of the cylinder wall and over said ends is mounted a casing 34 into which the exhaust is discharged, said casing having an outlet 35. The exhaust cavities 33 are formed with cylindrical portions 36 in which operate rotary valves 37 controlling the escape of the exhaust, the valves each being provided with a by-pass 37' to permit the exhaust steam to discharge into the casing 34. Each valve terminates at one of its ends in a circular valve seat 38 which is engaged by a valve 39 held seated by a coiled spring 40 engaging the back of the

valve. This valve opens into the casing 34 to let the exhaust steam thereinto from the valve 37. On the outside of the cylinder wall 1 is mounted a cage 41 which incloses the spring 40, and which serves as a guide for the valve 39. The opposite end of the valve 37 opens through the other side of the cylinder 1, and is made solid at this end so that packing rings 42 may be applied thereto. On the outer end of this portion of the valve fits a plate 43 which is bolted or otherwise secured to the cylinder wall. Through this plate passes a sleeve 44 extending axially from the valve, and through said sleeve passes a rod 45, said rod extending longitudinally through a central opening in the valve 37 and also passing through an opening made in the valve 39, on the outside of which it is connected to the outer end of the spring 40, this rod being provided for the purpose of adjusting the tension of said spring.

The two exhaust valves 37 are adapted to be set simultaneously by means of a hand lever 45' fulcrumed on the engine bed or at any other suitable place, said lever being connected by a rod 46 to a rocker arm 47 connected to the lower valve stem 44. A second rocker arm 48 is carried by this valve stem, and said second mentioned rocker arm is connected by a link 49 to a rocker arm 50 connected to the stem of the upper exhaust valve 37, whereby both valves are operated simultaneously when the lever 45 is swung. A toothed quadrant 51 engageable by a spring latch 52, carried by the hand lever, is provided for locking the latter in adjusted position. The valve stems are provided with suitable stuffing boxes.

To the outer end of the rod 45 is fastened a knuckle 53 to which is connected the outer end of a horizontal rocker arm 54 carried by and extending from a vertical rock shaft 55 mounted in bearings 56 carried by the cylinder wall 1. A second rocker arm 57 is connected to the rod 45 of the other exhaust valve. From the shaft 55 extends a third rocker arm 58 which is connected by a rod 59 to a hand lever 60 fulcrumed on the engine bed or at any other suitable location. This hand lever also carries a spring latch

61 adapted to engage a toothed quadrant 62 for the purpose of locking the lever.

The hereindescribed connections between the hand lever 60 and the rods 45 are provided for the purpose of moving said rods in the direction of their length for the purpose of adjusting the tension of the springs 40. In operation, the lever 60 regulates the lead of the engine when running at a high speed. To reverse, the link 13 is shifted by the hand lever 29, the exhaust valve being moved to closed position by the lever 45'. Through the lever 60 the springs 40 may be adjusted to give more lead, and steam will not be admitted until the piston is at the center, and then steam will be admitted to the cylinder on the end of the stroke, the excess of motive fluid being exhausted through the valves 39, when the pressure thereof exceeds the tension of the springs 40. For instance, if the springs are set to resist a pressure of 40 pounds, the steam in the cylinder may escape when it is in excess of this pressure but when the steam pressure is reduced to or below this pressure it is trapped in the cylinder and compressed in the cylinder upon the return stroke of the piston.

What is claimed is:—

In combination with an engine including a cylinder having a piston mounted for reciprocation therein, said cylinder having an induction port at one end of the piston stroke and an exhaust port at the other end of the piston stroke; a manually operable valve for controlling the exhaust port, and having a bypass and a spring pressed valve mounted upon the exhaust valve and normally closing the bypass thereof, the tension of said spring being opposed to pressure from the cylinder, and a manually operable means for varying the tension of said spring.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE W. BAKER.

Witnesses:

FRANK B. OCHSENREITER,
HERBERT D. LAWSON.