

No. 756,831.

PATENTED APR. 12, 1904.

P. B. CLARKE.

CUT-OFF OPERATING ENGINE AND VALVE MECHANISM.

APPLICATION FILED JAN. 4, 1901. RENEWED FEB. 9, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

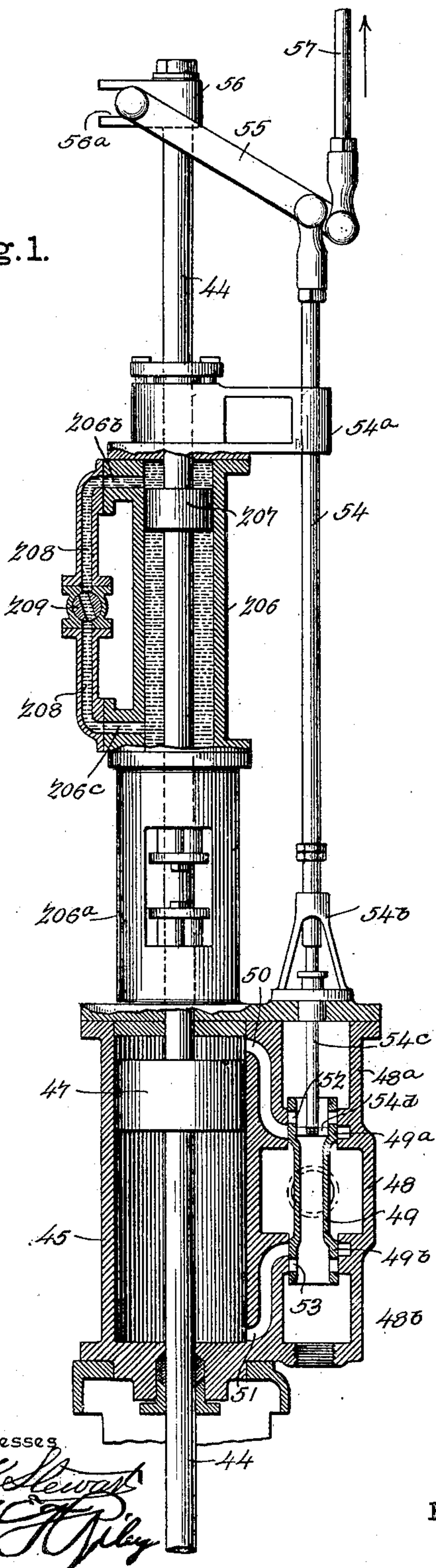
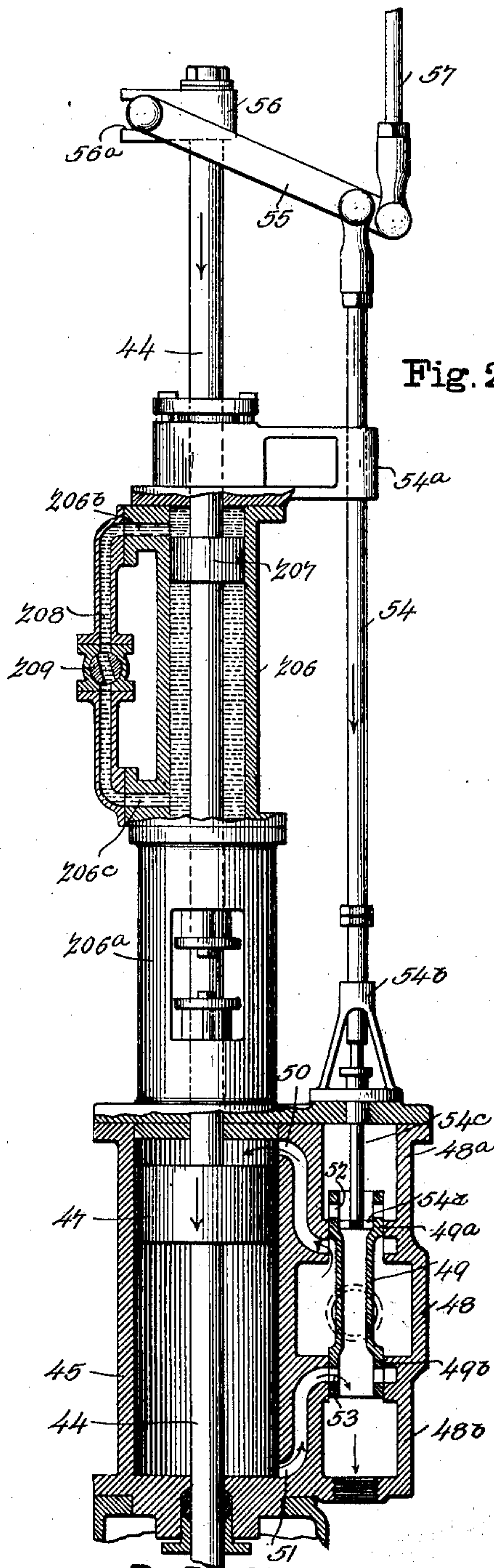


Fig. 2.



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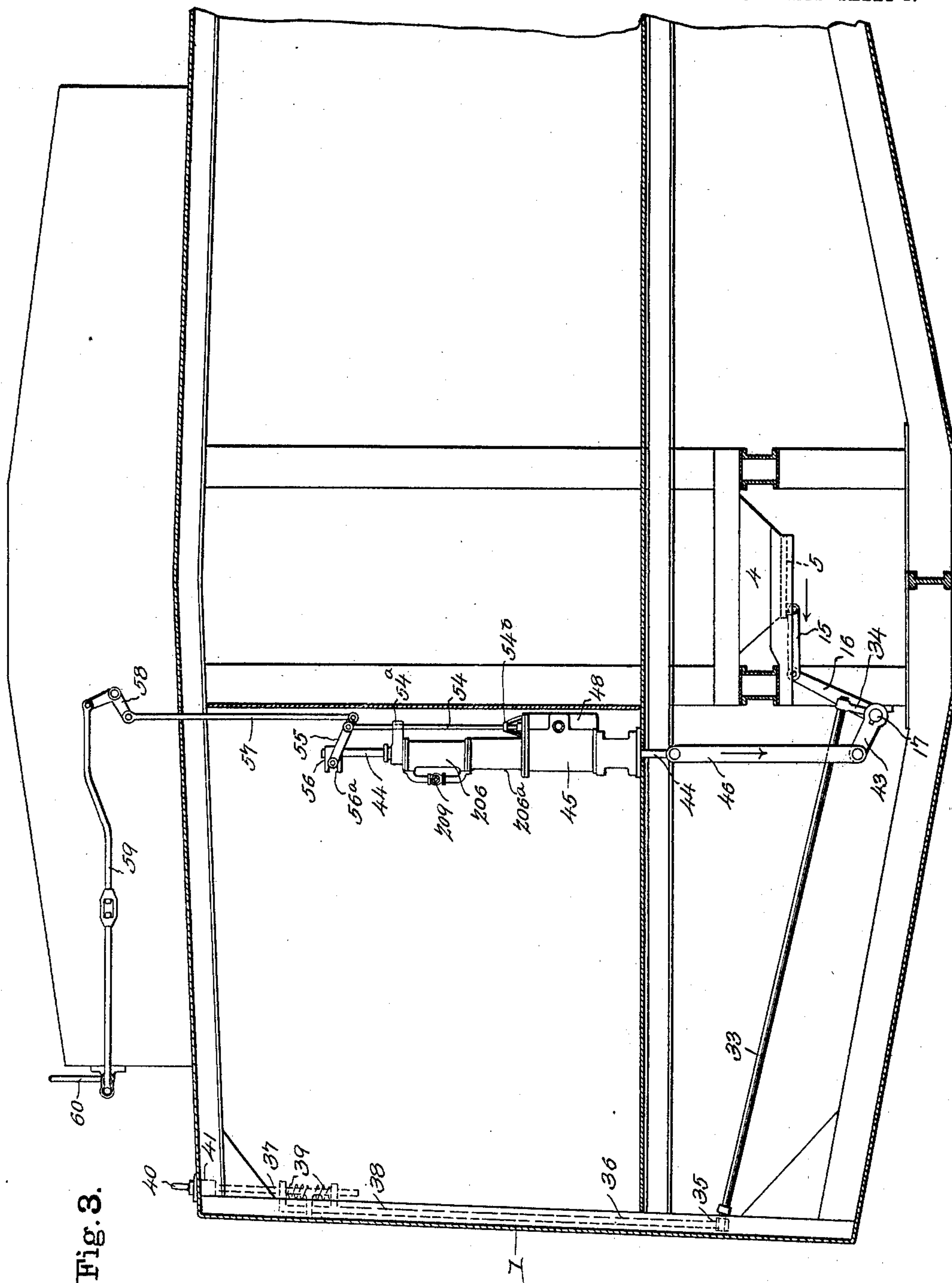


Fig. 3.

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3 SHEETS—SHEET 3.

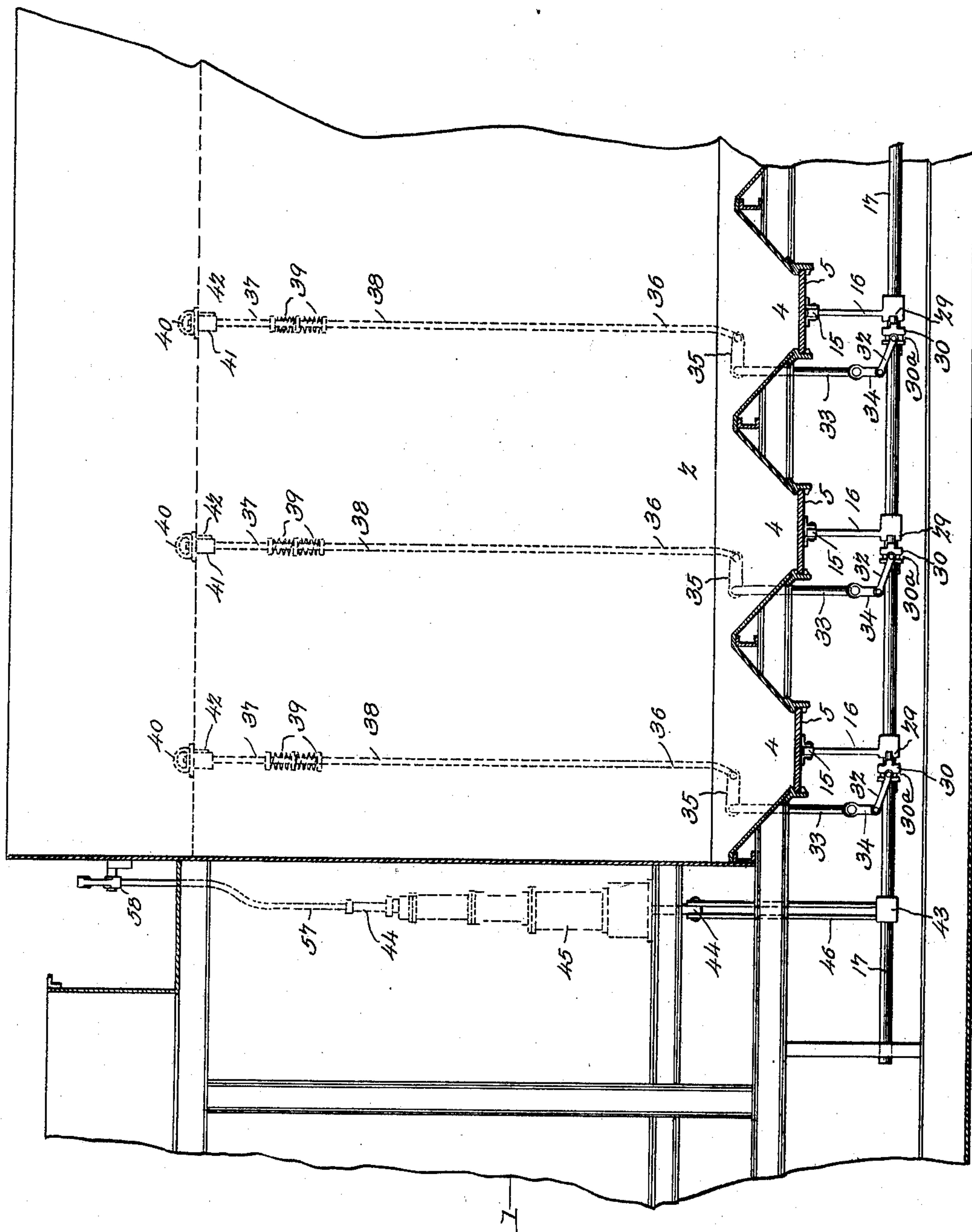


Fig. 4.

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# UNITED STATES PATENT OFFICE.

PEETE B. CLARKE, OF NEW YORK, N. Y.

## CUT-OFF-OPERATING ENGINE AND VALVE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 756,831, dated April 12, 1904.

Application filed January 4, 1901. Renewed February 9, 1904. Serial No. 192,846. (No model.)

*To all whom it may concern:*

Be it known that I, PEETE B. CLARKE, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Cut-Off-Operating Engine and Valve Mechanism, of which the following is a specification.

The invention relates to a cylinder and valve mechanism for operating sliding doors or cut-offs for controlling the discharge of material.

The object of the present invention is to provide a simple, inexpensive, and efficient cylinder and valve mechanism designed for actuating sliding doors or cut-offs for controlling the flow of material from bins or compartments and adapted to be connected with a rock-shaft for oscillating the same and capable after the valve has been set for admitting steam at either end of the cylinder of automatically cutting off the steam at the end of the stroke of the piston whereby after the valve has been once set to operate the cylinder it may be left unattended.

Another object of the invention is to provide a cushioning device for resisting the movement of the piston to enable the cut-offs or sliding doors to be actuated at the desired speed.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claim hereto appended.

In the drawings, Figures 1 and 2 are vertical sectional views of a cut-off-operating cylinder and valve mechanism constructed in accordance with this invention. Fig. 3 is a transverse sectional view of a barge, illustrating the arrangement of the cut-off-operating cylinder and valve mechanism. Fig. 4 is a longitudinal sectional view of a portion of a barge.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 designates a barge designed to be provided with a longitudinal series of bins or compartments 2, and each bin or compartment 2 is provided at its bottom with a series of depending

hoppers 4, having sliding doors or cut-offs 5, adapted to be opened to permit coal or other material to be discharged from the bin or compartment into buckets of an endless conveyer. (Not shown.) The sliding door 5 is provided at one side with a pair of depending ears arranged at opposite sides of the inner end of a link 15 and pivoted to the same, and the said link 15 extends outward to an arm 16, loosely mounted on a longitudinal rock-shaft 17 and adapted to be coupled thereto and uncoupled therefrom, whereby the sliding doors or cut-offs are adapted to be operated independently of one another, so that one or more of them may be opened and closed when the shaft 17 is rocked. Each of the arms 16 of the rock-shaft is provided with a clutch-face 29, adapted to interlock with a corresponding clutch-face of a sliding clutch-section 30, whereby the arm 16 is coupled to the longitudinal rock-shaft. The rock-shaft 17, which is located at one side of the barge, extends longitudinally thereof, and the clutch-sections 30, which are keyed or otherwise secured to the rock-shafts and which rotate with the same, are adapted to slide on the said shaft 17 to interlock with the arm 16 and to release the latter. Each clutch-section 30 is provided with an annular groove 30<sup>a</sup>, which is engaged by suitable lugs or projections of a yoke 32, that is pivoted to an inner arm 34 of a transversely-disposed rock-shaft 33. Each rock-shaft 33 is arranged at an inclination, and its inner arm 34 is located above the longitudinal rock-shaft 17. The transverse rock-shaft 33 is provided at its outer end with an arm 35, which is connected with an operating-rod 36, and the latter extends to the deck and is adapted to permit the couplings or clutches to be controlled from that point. The operating-rod is composed of yieldingly-connected upper and lower sections 37 and 38, having overlapped inner adjacent ends, which are slidingly connected. The slidingly-connected overlapped adjacent ends of the sections of the operating-rod are engaged by coiled springs 39, adapted to permit a limited independent movement of the sections 37 and 38. The upper section 37 is provided with a swiveled handle or grip 40, having a shank 41 arranged in a suitable opening or slot of the



deck and provided with a lug or flange 42, adapted to project beyond the opening when turned transversely thereof, whereby the operating-rod is held in an elevated position.

5 When the operating-rod is drawn upward, the transversely-disposed rock-shaft is partially rotated, and the inner arm thereof is swung in the direction of the adjacent arm 16, and the clutch-section is coupled with the hub of the

10 said arm 16. The clutch-section 30 is provided with suitable lugs or projections to engage corresponding recesses of the clutch-face of the hub of the arm 16, and if the recesses of the hub should be out of alinement with

15 the lugs or projections of the clutch-section the coiled springs 39 will permit the upper section of the operating-rod to be raised sufficiently to lock it, and it will cause the clutch-section 30 to spring into engagement with the

20 clutch-face of the arm 16 when the longitudinal rock-shaft is rotated and the recesses are brought into alinement with the lugs or projections.

The rear end of the longitudinal rock-shaft

25 17 is provided with an arm 43, extending outward and upward, as clearly illustrated in Fig. 3 of the accompanying drawings, when the door is closed and connected with a vertically-movable piston 44 of a vertical steam-

30 cylinder 45 by vertical links 46. When the piston-rod is moved downward, the longitudinal rock-shaft will be oscillated, and the sliding doors or cut-offs, with which the rock-shaft is connected by the said arms 16, will

35 be opened. The vertically-movable piston 44 is provided with a piston-head 47, arranged within the cylinder 45, which is provided at one side with a vertical steam-chest 48, disposed vertically and having a vertically-reciprocating tubular slide-valve 49 within it. The

40 ends of the vertically-disposed cylinder 45 are connected with the ends of the steam-chest by upper and lower ports 50 and 51, and the vertically-movable slide-valve is provided with a reduced central portion located

45 between enlarged ends of the slide-valve and providing an annular recess adapted when the slide is at the limit of its movement in either direction to establish a communication

50 between the steam-chest and one end of the cylinder 45 to admit steam above or below the piston-head. The tubular slide-valve is provided with upper and lower ports or apertures 52 and 53, adapted to register alter-

55 nately with the said ports 50 and 51 to establish a communication between the interior of the cylinder and the interior of the tubular slide-valve to permit the steam to exhaust from the former. The steam-chest is pro-

60 vided with tubular extensions 48<sup>a</sup> and 48<sup>b</sup>, into which the steam exhausts. The tubular slide-valve is provided between its upper and lower ports or apertures and the terminals of the central reduced portion with solid imperforate portions 49<sup>a</sup> and 49<sup>b</sup>, which are adapted,

as illustrated in Fig. 1 of the accompanying drawings, to cover the upper and lower ports 50 and 51 to shut off the steam from both ends of the cylinder 45. The vertically-reciprocating tubular slide-valve is adapted to

70 be moved upward or downward from the position illustrated in Fig. 1 of the drawings, where the imperforate portions 49<sup>a</sup> and 49<sup>b</sup> cover the upper and lower ports 50 and 51. When the piston-head is at the upper end

75 of the cylinder, as shown in Fig. 1, the tubular slide-valve is raised by the means hereinafter described, to the position illustrated in Fig. 2 to admit steam to the upper end of the cylinder 45 and to exhaust from the lower

80 end of the same, and after the piston has completed its downward movement or at the completion of the same the tubular slide-valve will, by the means hereinafter described, be returned to the intermediate position

85 (shown in Fig. 1) to cut off the steam from both ends of the cylinder 45. The piston is connected with the slide-valve and is adapted to return the same to its intermediate position in order that the operator, after actuat-

90 ing the operating mechanism hereinafter described, may leave the steam-cylinder unattended.

The upper end of the tubular slide-valve is connected with a reciprocating vertically-dis-

95 posed rod or stem 54, pivoted to a lever 55 and connected by the latter with the rod of the piston of the cylinder 45 and with the operating mechanism. The upper end of the piston-rod is provided with a horizontal guide

100 56, consisting of a block or head secured to the piston-rod and extending horizontally therefrom and provided with an opening 56<sup>a</sup>, extending inward from the outer end of the block or head and receiving a pin or pivot 55<sup>a</sup>

105 of the lever 55. The pin or pivot 55<sup>a</sup> is arranged at one end of the lever 55, and the valve stem or rod 54 is connected with the latter near the other end thereof, which is pivoted to the lower end of a rod 57, which extends

110 upward to a bell-crank lever 58. The bell-crank lever 58 is connected by a horizontal rod 59 with an operating-lever 60, designed to be mounted on the barge at the deck there-

115 of and adapted to be swung upward and downward to reciprocate the slide-valve to move it from its intermediate position to admit steam above or below the piston-head to rock the longitudinal shaft 17 and slide the doors or cut-offs 5. When the slide-valve is moved in

120 either direction by the said operating mechanism, its position is changed, and steam is admitted to the cylinder 45 to actuate the piston. The reciprocation of the piston oscillates the lever 55, which is connected with the slide-

125 valve and which carries the same to its intermediate position to automatically shut off the steam. The valve stem or rod is mounted in upper and lower guides 54<sup>a</sup> and 54<sup>b</sup>, and its

130 lower end 54<sup>c</sup> extends into the upper end of



the tubular slide-valve and is suitably secured to a spider or frame 54<sup>d</sup> thereof, as clearly illustrated in Figs. 1 and 2 of the accompanying drawings.

5 In order to cushion and control the movement of the piston, the latter is provided with a supplemental piston-head 207 of less diameter than the piston-head 47, and the said piston-head 207 is arranged within a superimposed auxiliary cylinder 206, connected with the cylinder 45 by a cylindrical supporting-shell 206<sup>a</sup>, suitably secured to and interposed between the cylinders 45 and 206. The ends of the auxiliary cylinder are provided with upper and lower ports 206<sup>b</sup> and 206<sup>c</sup>, which are connected by a passage 208, preferably consisting of a tube, and provided at the center with a controlling-valve 209 for constricting the longitudinal passage 208. The auxiliary cylinder is filled with a suitable cushioning liquid, such as oil, and when the piston 44 is reciprocated its movement is resisted by the oil or other liquid within the auxiliary cylinder, which liquid is forced from the cylinder at one end through the longitudinal passage or conduit 208 to the other end of the cylinder. By regulating the controlling-valve 209 the desired cushioning action and the necessary resistance to the reciprocation of the vertically-movable piston may be obtained. Instead of employing a longitudinal pipe or tube to form the longitudinal passage or conduit 208 any other suitable construction may be provided. The steam and auxiliary cylinders are provided with suitable stuffing-boxes, and they may be secured to the cylindrical supporting-shell in any suitable manner.

It will be seen that the cut-off-operating cylinder and valve mechanism are simple and comparatively inexpensive in construction, 40 that they are positive and reliable in operation, and that the movement or reciprocation of the piston is cushioned and retarded to prevent injury to the parts with which the piston is connected, and that the steam is automatically cut off from the cylinder when the piston completes its reciprocation, so that the operating mechanism after being actuated may be left unattended.

What I claim is—

50 In a device of the class described, the combination with a steam-cylinder, of a steam-chest provided with ports in communication with the cylinder, a valve disposed in said steam-chest, a piston in the cylinder, a piston-rod connected to said piston, a valve-stem connected to the valve, a guide-block carried by the piston-rod and provided with a slot extending transversely of the piston-rod, a floating lever having one end adjustably connected to the slotted block and pivotally connected to the valve-stem, and an adjustable valve-operating means connected to said floating lever and forming when adjusted to either position, a fixed fulcrum for said lever to thereby permit the closing of the valve by the movement of the piston and its rod.

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

PEETE B. CLARKE.

Witnesses:

JOHN FRENCH,  
CHARLES ENGEL.