

No. 864,662.

PATENTED AUG. 27, 1907.

S. LUNDQUIST, DEC'D.
A. LUNDQUIST, ADMINISTRATRIX.
ENGINE FOR OPERATING PUMPS.
APPLICATION FILED MAR. 4, 1907.

3 SHEETS—SHEET 1.

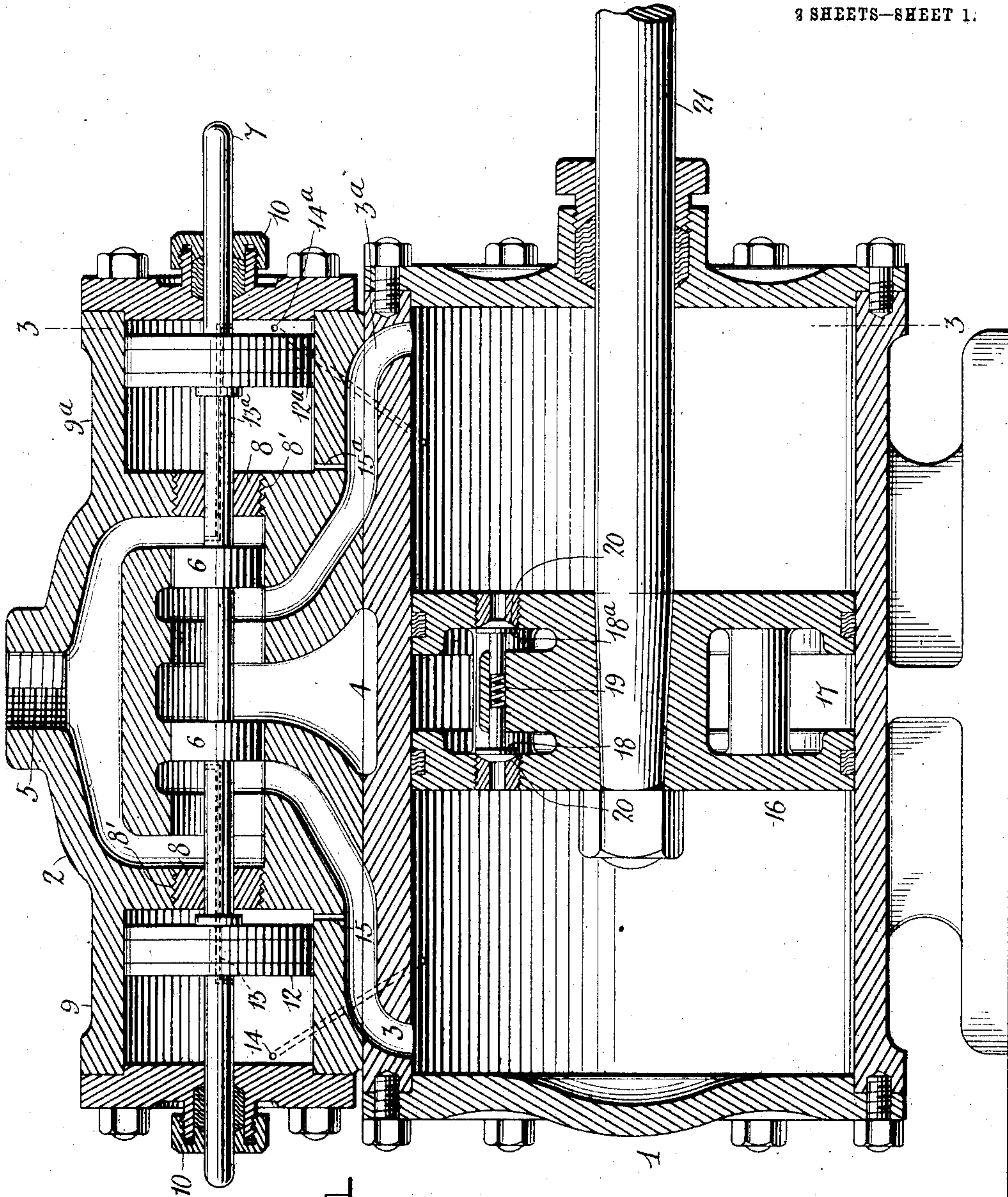


FIG. 1

Witnesses
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C. H. Giesbauer

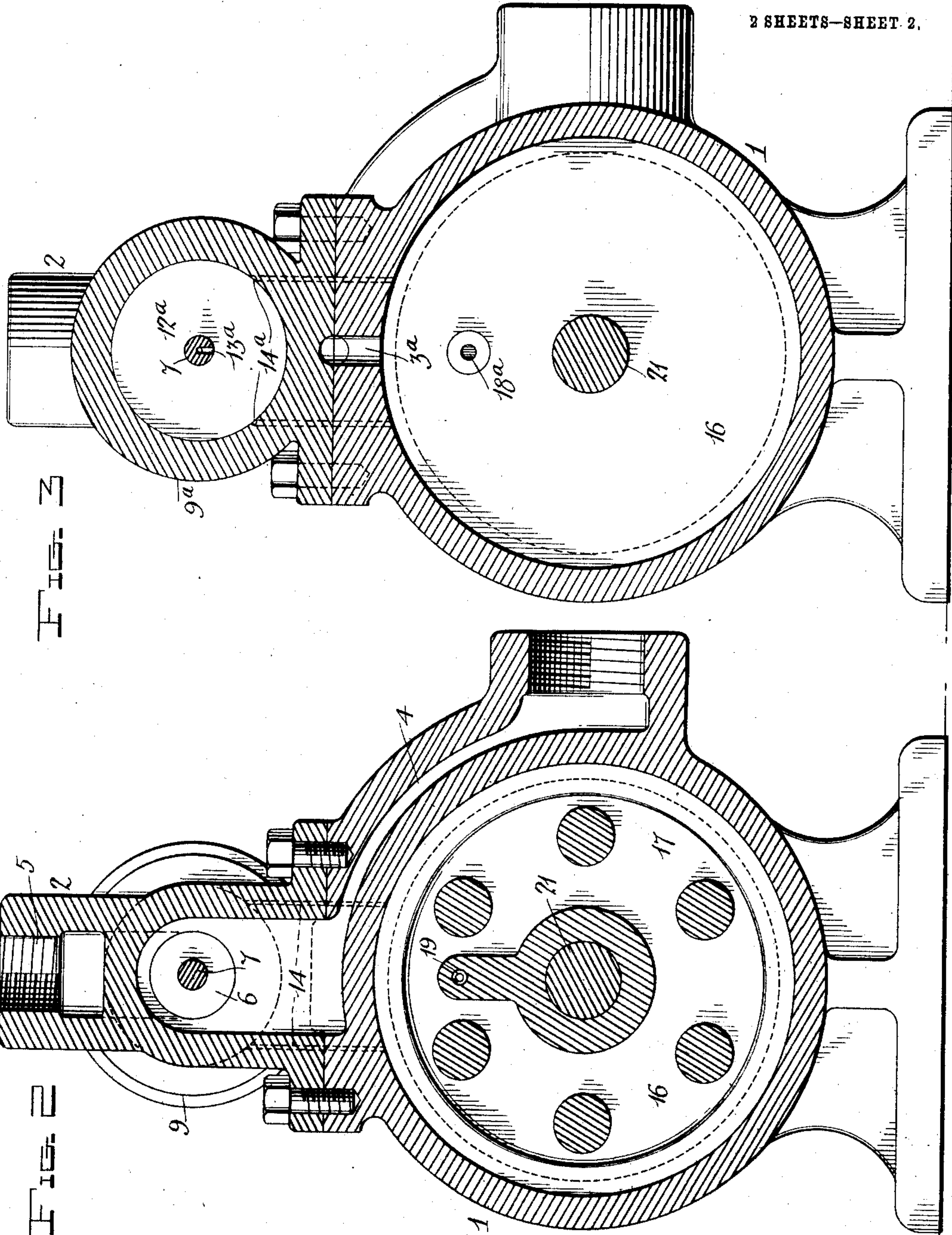
Inventor
Samuel Lundquist, deceased,
Augusta Lundquist, Administratrix
by *A. B. Wilson & Co*
Attorneys

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

AUGUSTA LUNDQUIST, OF DUBOIS, PENNSYLVANIA, ADMINISTRATRIX OF SAMUEL LUNDQUIST, DECEASED, ASSIGNOR TO JOHN LUNDQUIST AND FRANK LUNDQUIST, OF DUBOIS, PENNSYLVANIA.

ENGINE FOR OPERATING PUMPS.

No. 864,662.

Specification of Letters Patent.

Patented Aug. 27, 1907.

Application filed March 4, 1907. Serial No. 360,496.

To all whom it may concern:

Be it known that SAMUEL LUNDQUIST, late a citizen of the United States, and a resident of Dubois borough, in the county of Clearfield and State of Pennsylvania, deceased, did in his lifetime invent certain new and useful Improvements in Engines for Operating Pumps, of which the following is a specification.

This invention relates to improvements in engines for operating pumps.

10 The object of the invention is to provide an engine having a valve adapted to be automatically operated by steam or compressed air from the cylinder, means being provided whereby the valve will be perfectly balanced at all times.

15 With the above and other objects in view, which will appear as the nature of the invention is better understood, the invention consists in certain novel features of construction, combination and arrangement of parts, as will be hereinafter more fully described.

20 In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view of an engine constructed in accordance with the invention; Fig. 2 is a central vertical cross-sectional view thereof; and Fig. 3 is a vertical cross-sectional view on the line 3—3 of Fig. 1.

25 Referring more particularly to the drawings, 1 denotes the engine cylinder having arranged thereon a steam chest 2, said chest being connected to the opposite ends of the cylinder by steam ports or passages 3 and 3^a and provided with an exhaust port or passage 4. The steam chest is also provided with a steam inlet port 5.

30 Slidably mounted in the steam chest 2 is a valve 6 which is adapted to be reciprocated by steam from the engine cylinder to open and close the passages 3 and 3^a which communicate with the opposite ends of said cylinder. The valve 6 is provided with a stem 7 which is slidably mounted in and projects through bushings 8 which are screwed into threaded openings 8' in the opposite ends of the steam chest. The openings 8' in the ends of the steam chest which are closed by the bushing 8 are provided to permit arrangement of the valve 7 within the chest.

45 Formed on the opposite ends of the steam chest 2 are auxiliary cylinders 9 and 9^a through which the opposite ends of the valve stem 7 pass, said ends working through stuffing boxes 10 arranged in the outer heads of the cylinders 9 and 9^a, as shown. The ends of the stem 7 project beyond the ends of the cylinders and serve as handles by means of which the valve may be manually started. On the stem 7 within the cylinders 9 and 9^a are mounted pistons 12 and 12^a, said pistons being adapted to work in the cylinders 9 and 9^a to operate the valve stem 7 in a manner to be hereinafter described. In the opposite ends of the valve stem 7 are formed steam passages 13 and 13^a, the inner ends of which open

into the steam chest 2 adjacent to the outer ends of the valve 6, as shown, while the opposite ends of the passages 13 and 13^a open into the cylinders 9 and 9^a between the pistons 12 and 12^a and the outer heads of the cylinders. The cylinders 9 and 9^a are also connected at their outer ends with the ends of the cylinder 1 by means of ports or passages 14 and 14^a whereby steam is conducted from said engine cylinder to the outer ends of the auxiliary cylinders 9 and 9^a to act on the pistons 12 and 12^a therein and thereby automatically reciprocate the valve 6, as will be hereinafter more fully described.

The cylinders 9 and 9^a are provided at their inner ends with ports 15 and 15^a by means of which said inner ends of the cylinders are connected to the steam passages 3 and 3^a of the steam chest, whereby steam is admitted to and exhausted from said ends of the cylinders at the proper times to aid in operating the pistons therein. Slidably mounted in the engine cylinder 1 is a piston 16, which is provided with an annular chamber 17 adapted to receive steam from the cylinder through check valves 18 and 18^a arranged in the opposite sides of the piston as shown, said check valves being normally held in closed position by means of a coiled spring 19 which forces the valves outwardly into engagement with seats 20 arranged in the piston as shown. The piston 16 is provided with the usual piston rod 21, the opposite end of which may be connected to a pump or other device not shown.

In the operation of the engine assuming the valve 6 to be in the position shown, steam will be admitted from the steam chest through the port 3 into the end of the cylinder 1 and will move the piston 16 to its extreme forward position. At the same time steam will pass through the ducts 14 and 15 to both sides of the piston head 12 and thereby balance the same. The live steam entering the cylinder 1 will also pass through the check valve 18 in the adjacent side of the piston and fill the chamber 17 therein. As soon as the piston has moved to the forward end of the cylinder, the chamber 17 therein will be brought into communication with the port or passage 14^a at this end of the cylinder whereby the steam in the chamber 17 of the piston will pass through said port into the outer end of the cylinder 9^a at this end of the engine and it will act upon the piston 12^a therein, and, owing to the balanced condition of the piston 12, it will force the same and the valve 6 to a backward position, thereby shutting off live steam from the port or passage 3 at the rear end of the engine cylinder and opening the port or passage 3^a at the opposite end thereof which will admit live steam from the steam chest to the forward end of the cylinder and reverse the movement of the piston 16, as will be understood. The move-

ment of the valve 6 in cutting off the passage 3 at the forward end of the engine cylinder will simultaneously connect said passage with the exhaust port 4.

When the piston head 16 begins its reverse movement it closes the port or passage 14^a for a brief period of time and while said passage is thus closed, the valve in the steam chest will tend to spring back, owing to live steam entering the cylinders 9^a through the port 15^a, and in order to counterbalance this tendency, passages 13 and 13^a are provided in the valve stem to connect the outer end of the cylinders 9 and 9^a with the steam chest, thus keeping the steam in the outer ends of the cylinders up to the full pressure. As soon as the piston head 16 has passed beyond the opening of the port or passage 14^a, live steam again enters through said passage into the end of the auxiliary cylinder 9^a and acts upon the piston 12^a to hold the valve in position until the end of the stroke, the valve being then automatically reversed by the action of the steam on piston 12 in cylinder 9, said steam entering this cylinder from the chamber 17 in the engine piston 16 which at this time has been brought into communication with the port 14 connecting with the outer end of the cylinder 9, the chamber 17 in the piston having been recharged with live steam from the forward end of the cylinder during the backstroke of the piston, so that when the chamber 17 in the piston reaches the port 14, this steam passes through the latter and forces the piston 12 and the valve 6 forwardly and again opens the passage 3, when the operation of the piston, as hereinbefore described, is repeated.

The valve is held in position and properly balanced when opening the passage 3 by means of the pressure

of the steam which enters the cylinder 9 through the passage 13 in the valve stem 7.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention, as defined by the appended claims.

Having described the invention, what is desired to be claimed as new and secured by Letters-Patent, is:—

In an engine of the class described, a cylinder, a steam chest arranged thereon and connected therewith by inlet and exhaust ports, auxiliary cylinders arranged on said steam chest, said cylinders being connected by inlet passages with said chest and engine cylinder, a valve slidably mounted in said steam chest, a stem connected to said valve and projecting in opposite directions through the ends of said chest and cylinders, said stem having passages formed therein to connect said cylinders with said steam chest, pistons on said stem to work in said cylinders, a chambered piston slidably mounted in said engine cylinder to coact with the passages connecting said engine cylinder with said auxiliary cylinders whereby steam is admitted to the latter, and check valves in said chambered piston to admit steam thereto from the engine cylinder, substantially as described.

In testimony whereof, I have hereunto set my hand in presence of two subscribing witnesses.

AUGUSTA LUNDQUIST,
Administratrix of the estate of Samuel Lundquist, deceased.

Witnesses:

O. LINDGREN,
FRANK LUNDQUIST.