

No. 661,104.

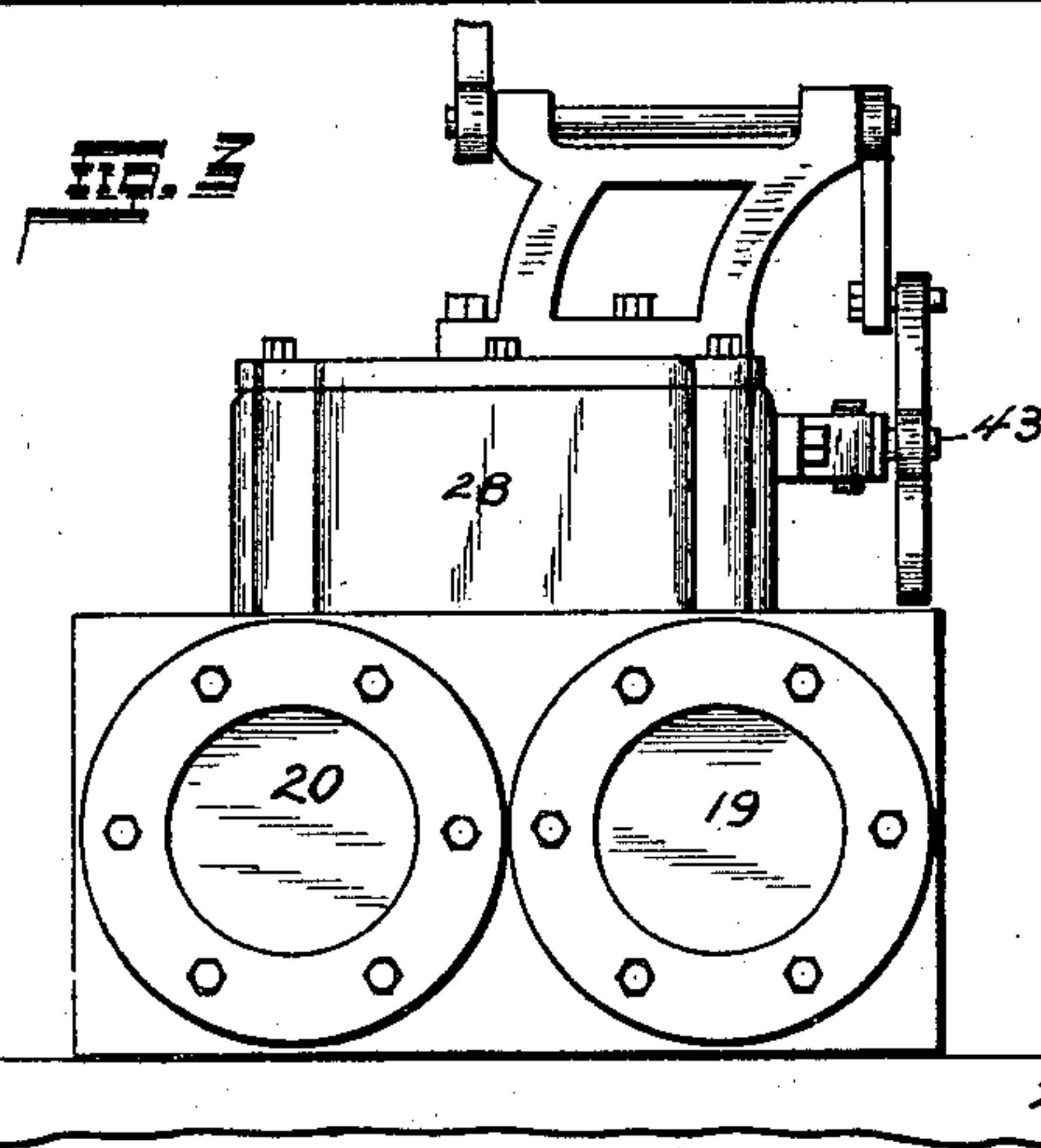
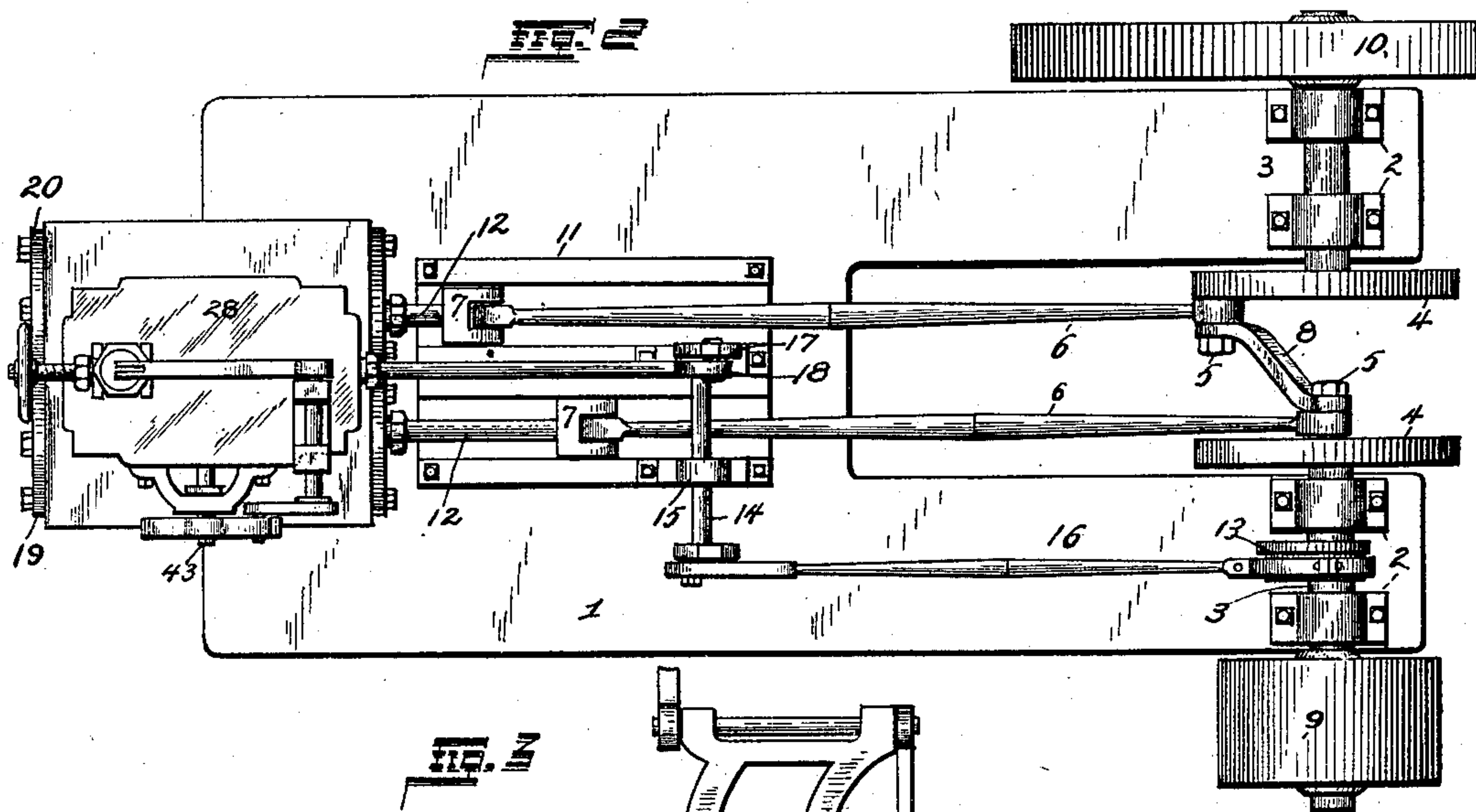
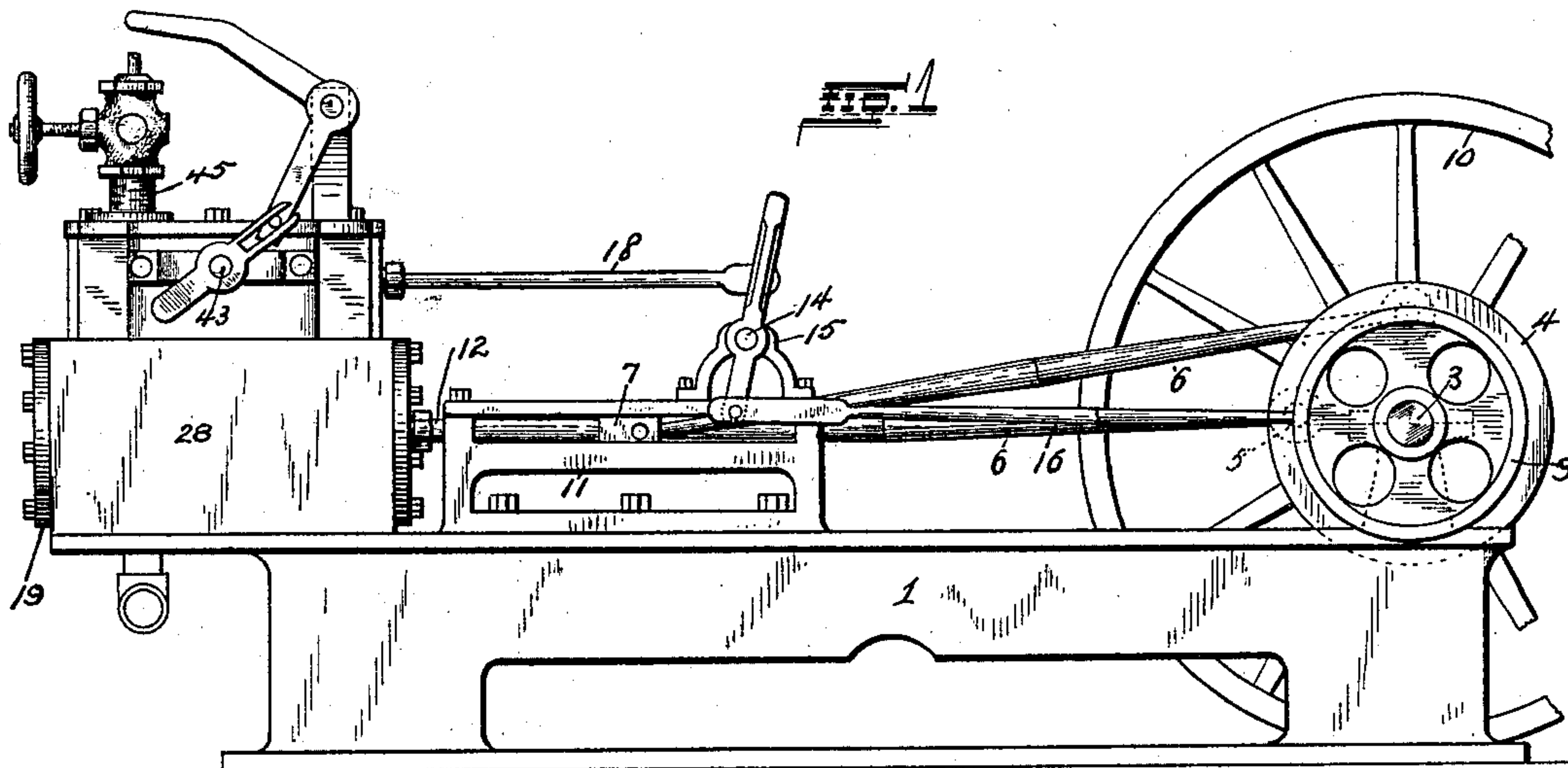
Patented Nov. 6, 1900.

L. E. KOTTMAYER.
ENGINE.

(Application filed Dec. 29, 1899.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses,
Alfred A. Eicher
J. D. Rippey

Inventor,
L. E. Kottmeyer.
By Higdon & Longan, Attys.

No. 661,104.

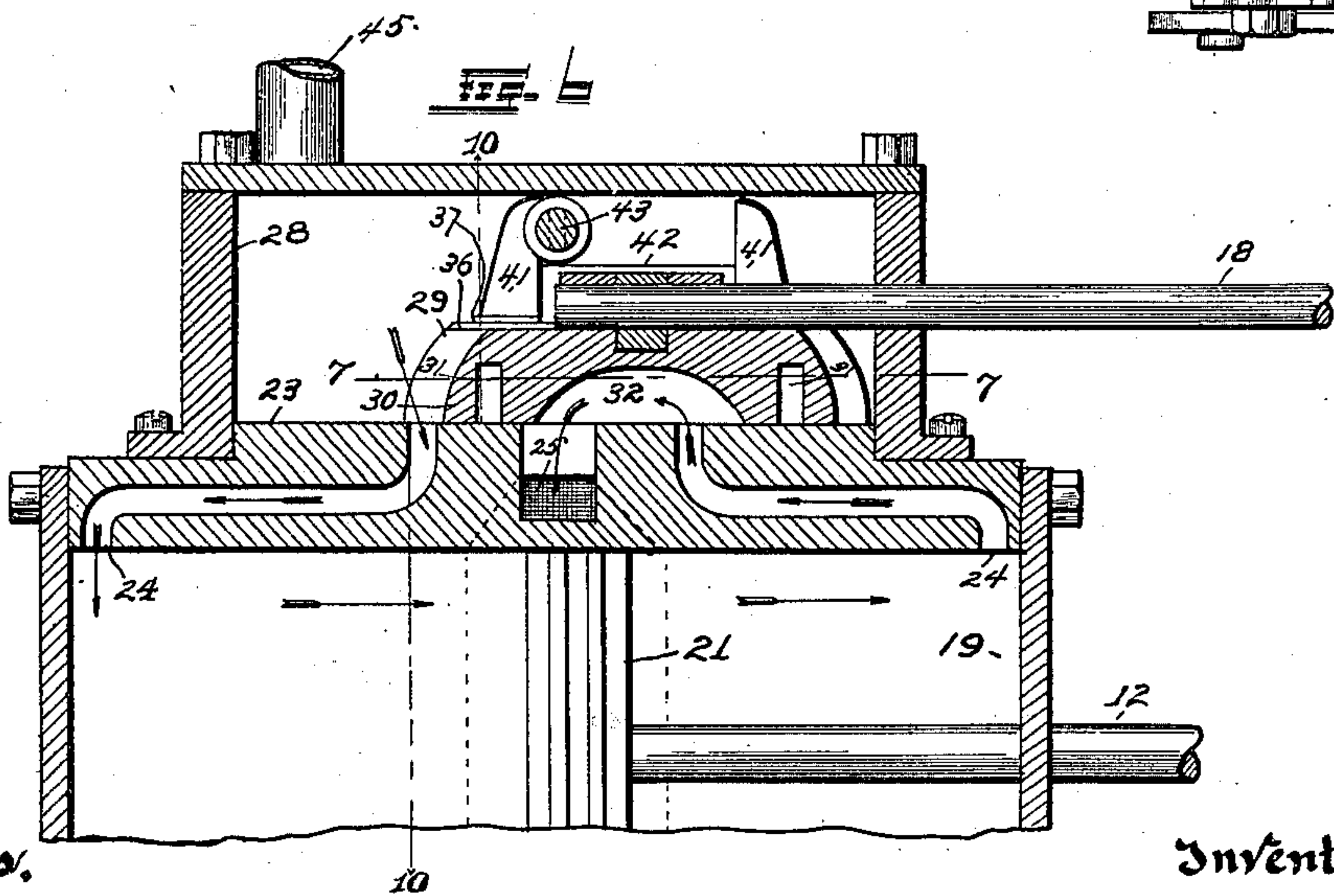
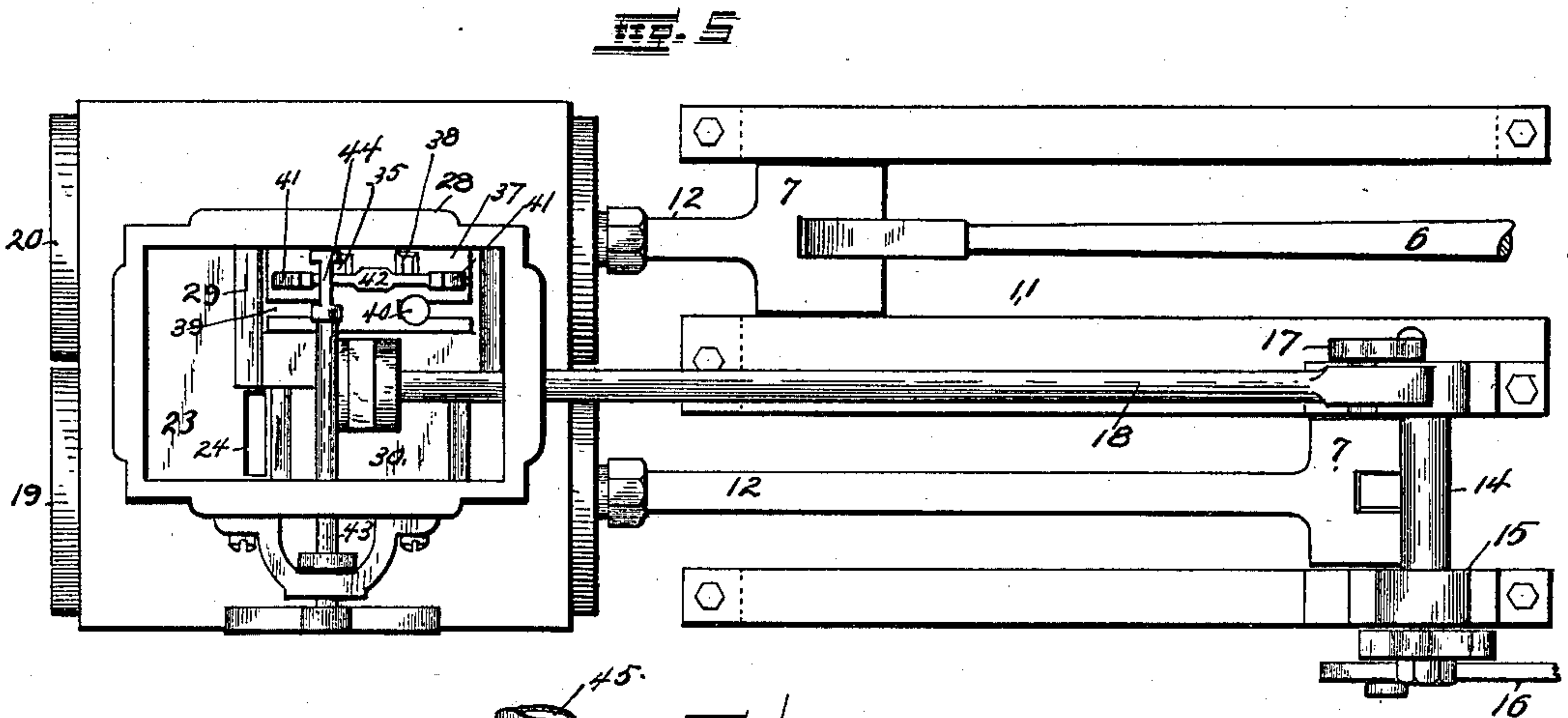
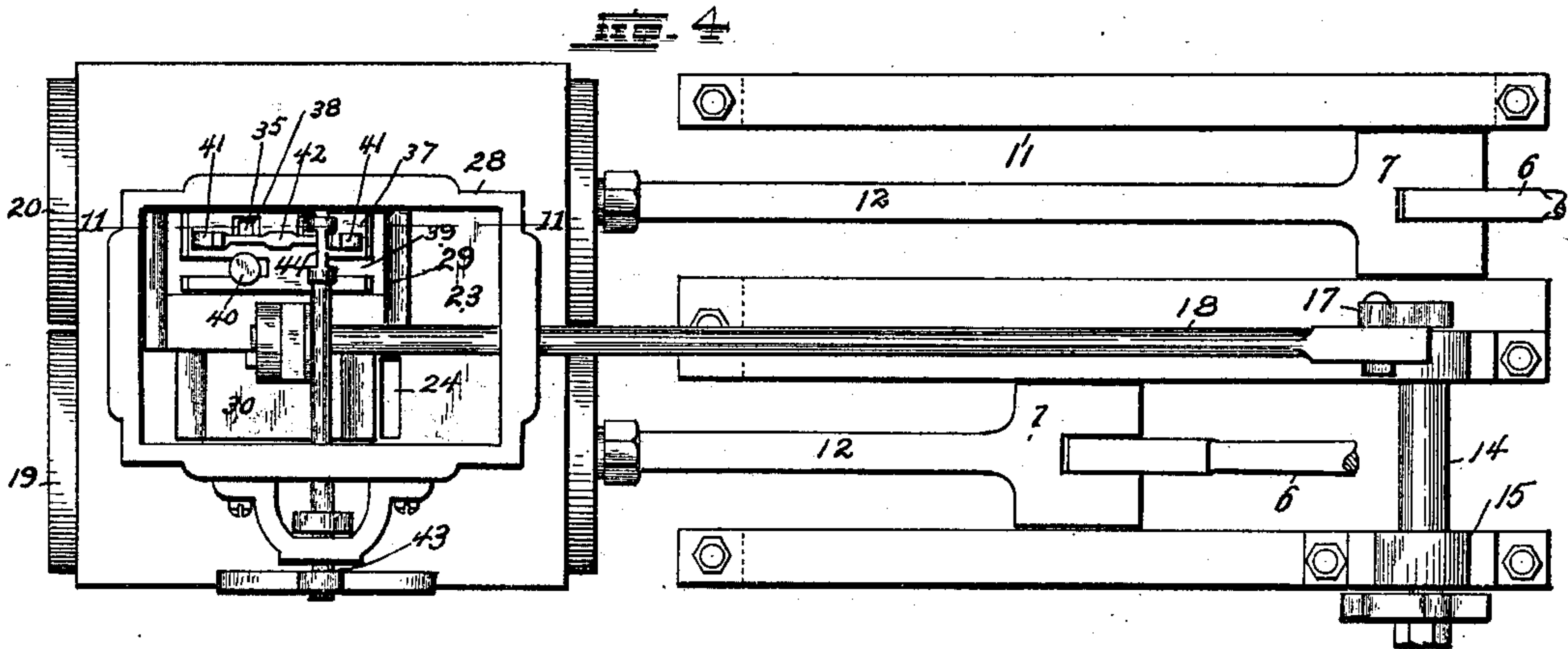
Patented Nov. 6, 1900.

L. E. KOTTMAYER.
ENGINE.

(Application filed Dec. 29, 1899.)

(No Model.)

5 Sheets—Sheet 2.



Witnesses.

Inventor.

Alfred A. Eicher
J. D. Rippey

L. E. Kottmeyer.
By Higdon & Longan, Attys.

No. 661,104.

Patented Nov. 6, 1900.

L. E. KOTTMAYER.

ENGINE.

(Application filed Dec. 29, 1899.)

(No Model.)

5 Sheets—Sheet 3.

FIG. 7

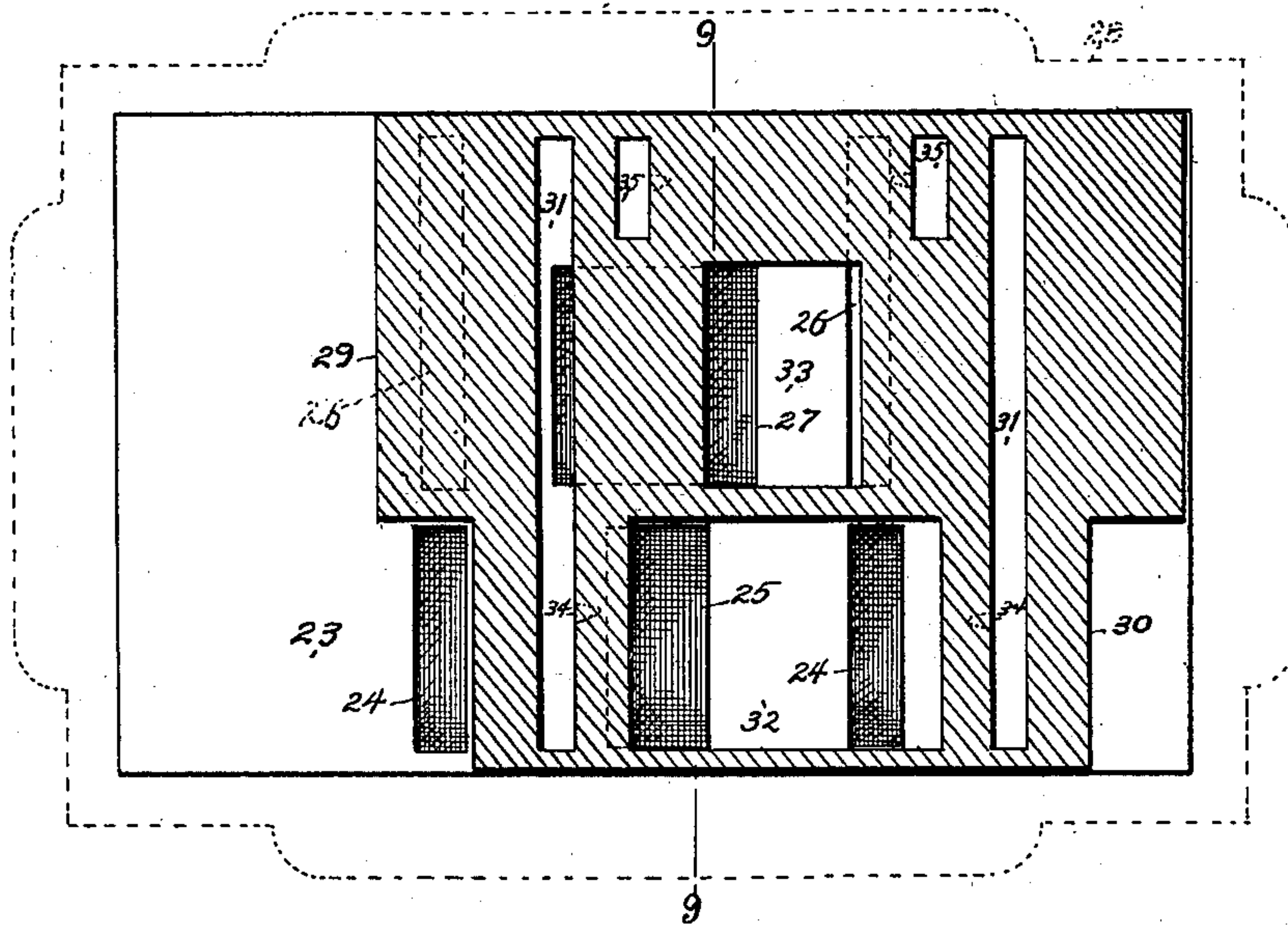
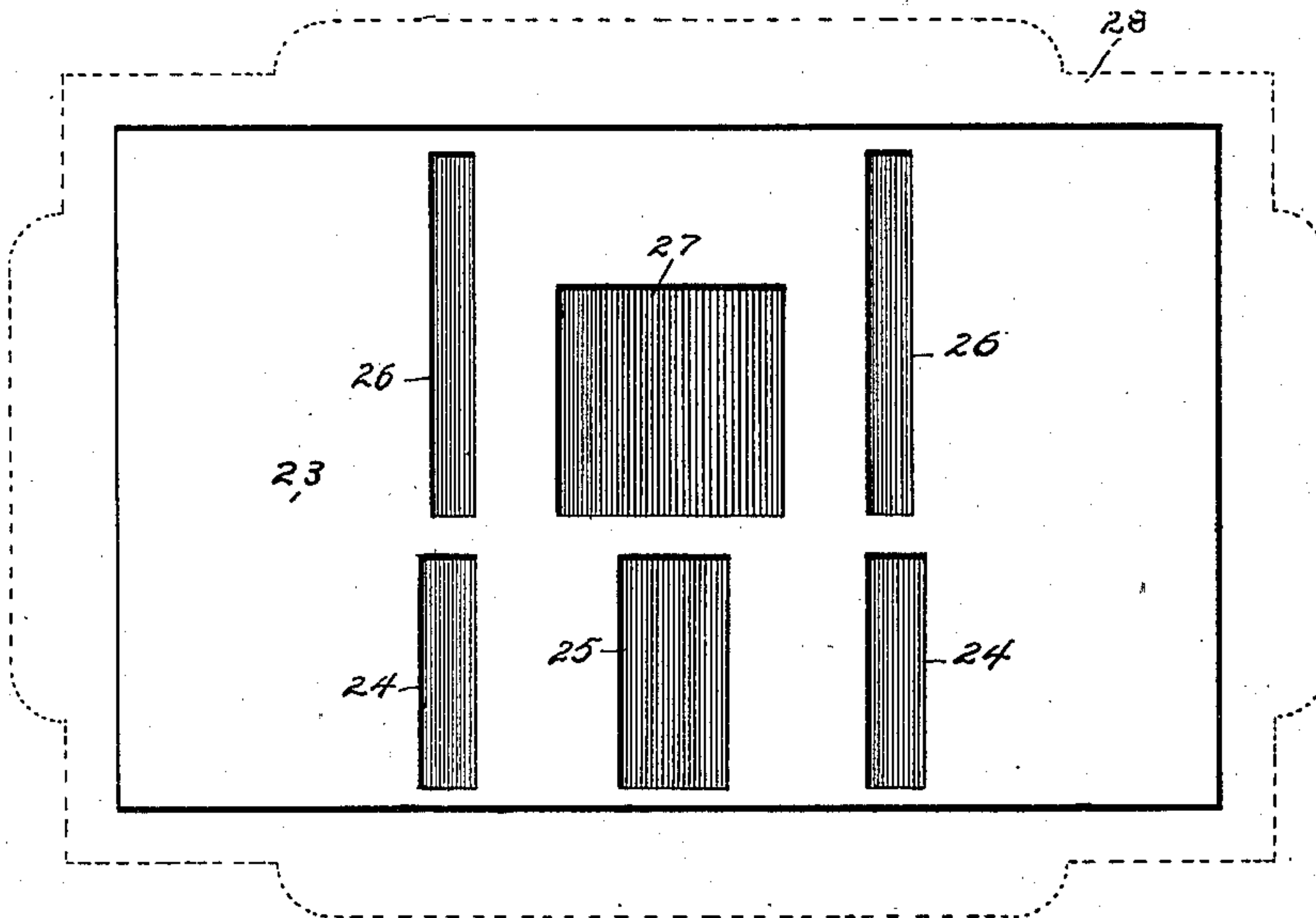


FIG. 8



Witnesses.

Alfred O. Einker
J. D. Rippey

Inventor.

L. E. Kottmeyer.
By Higdon & Longan, Attys.

No. 661,104.

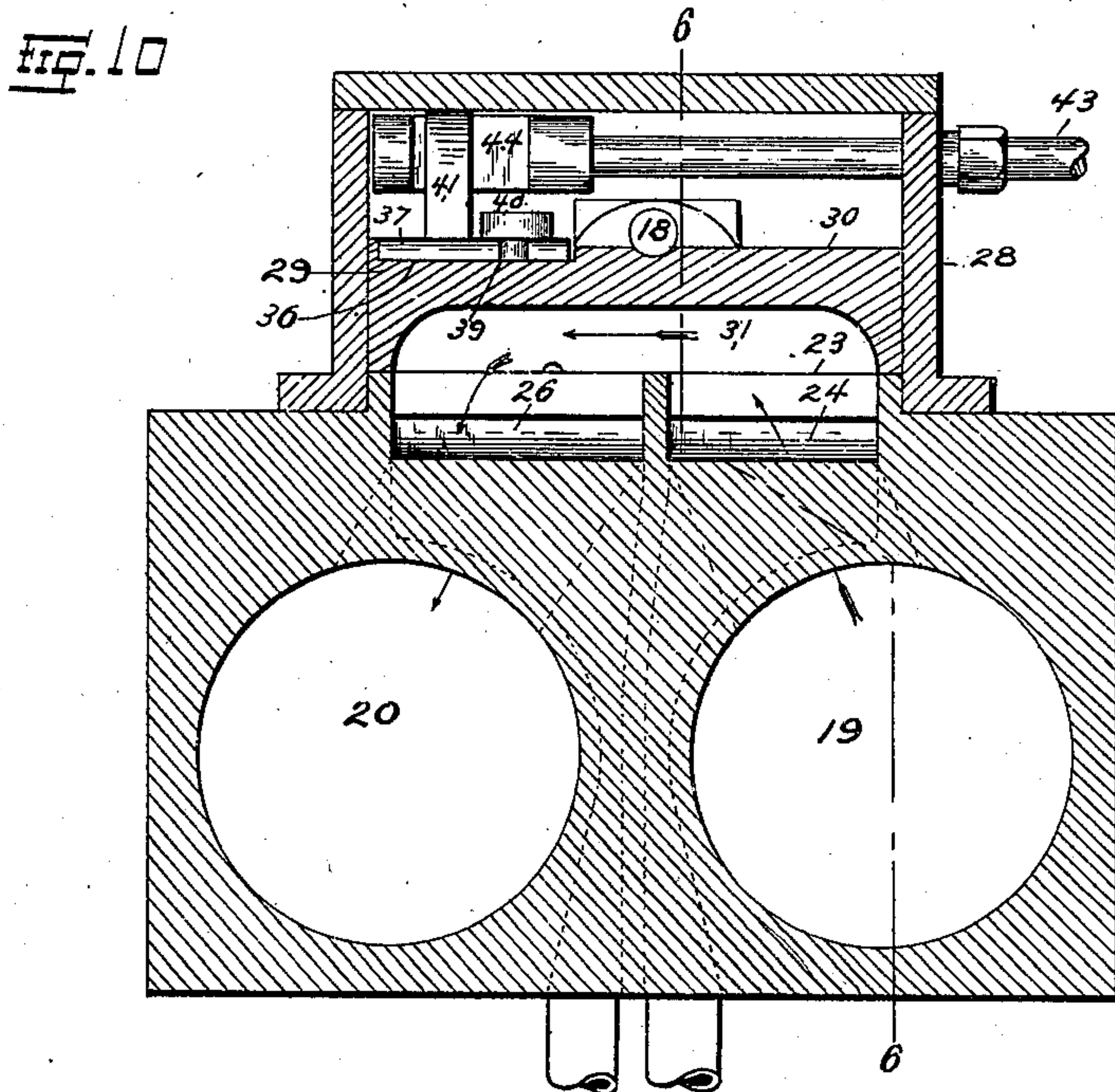
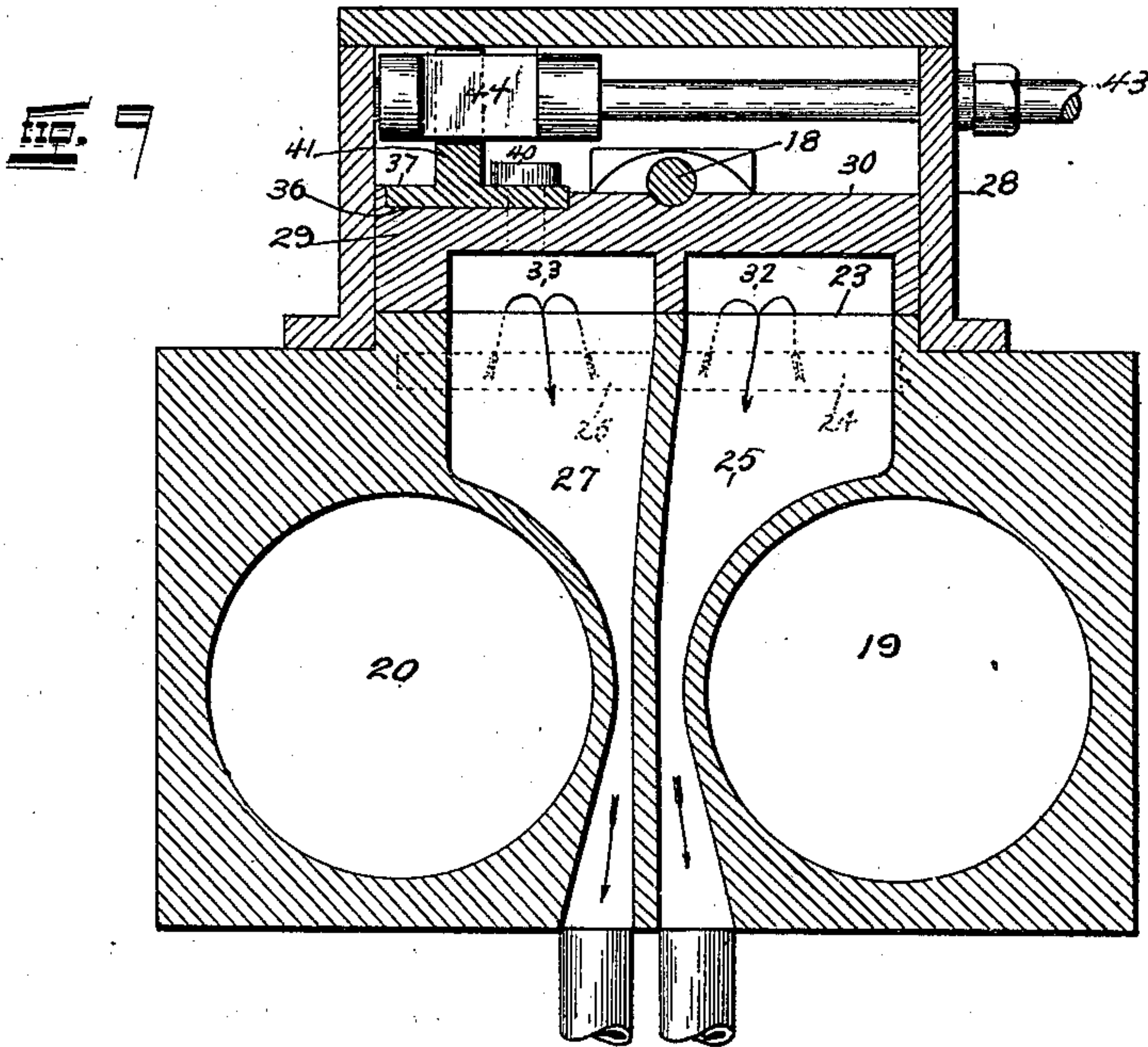
Patented Nov. 6, 1900.

L. E. KOTTMAYER.
ENGINE.

(Application filed Dec. 29, 1899.)

(No Model.)

5 Sheets—Sheet 4.



Witnesses.

Alfred A. Eicher,
J. D. Rippey

Inventor.

L. E. Kottmeyer.

By Higdon & Longan, Attys.

No. 661,104.

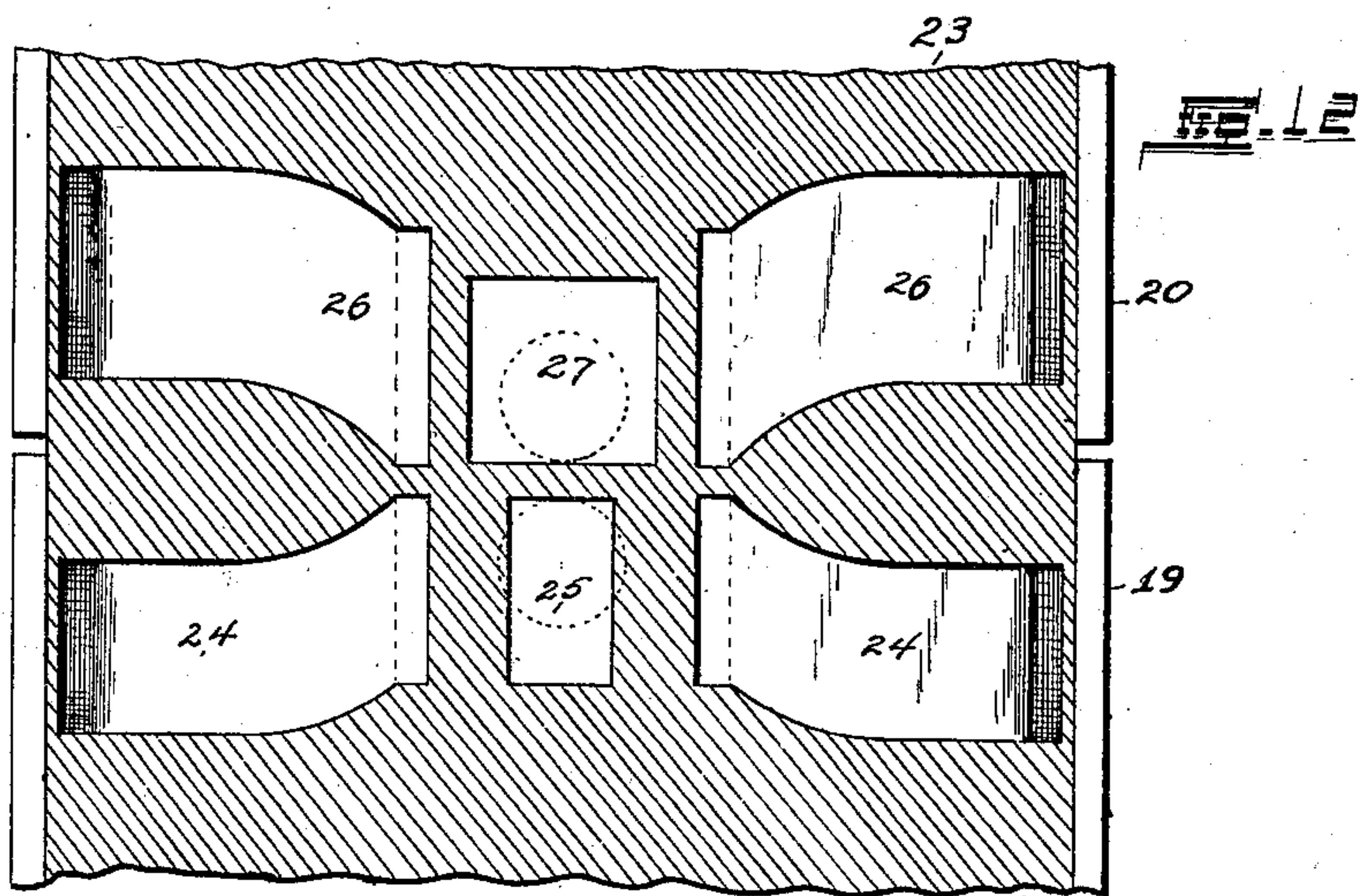
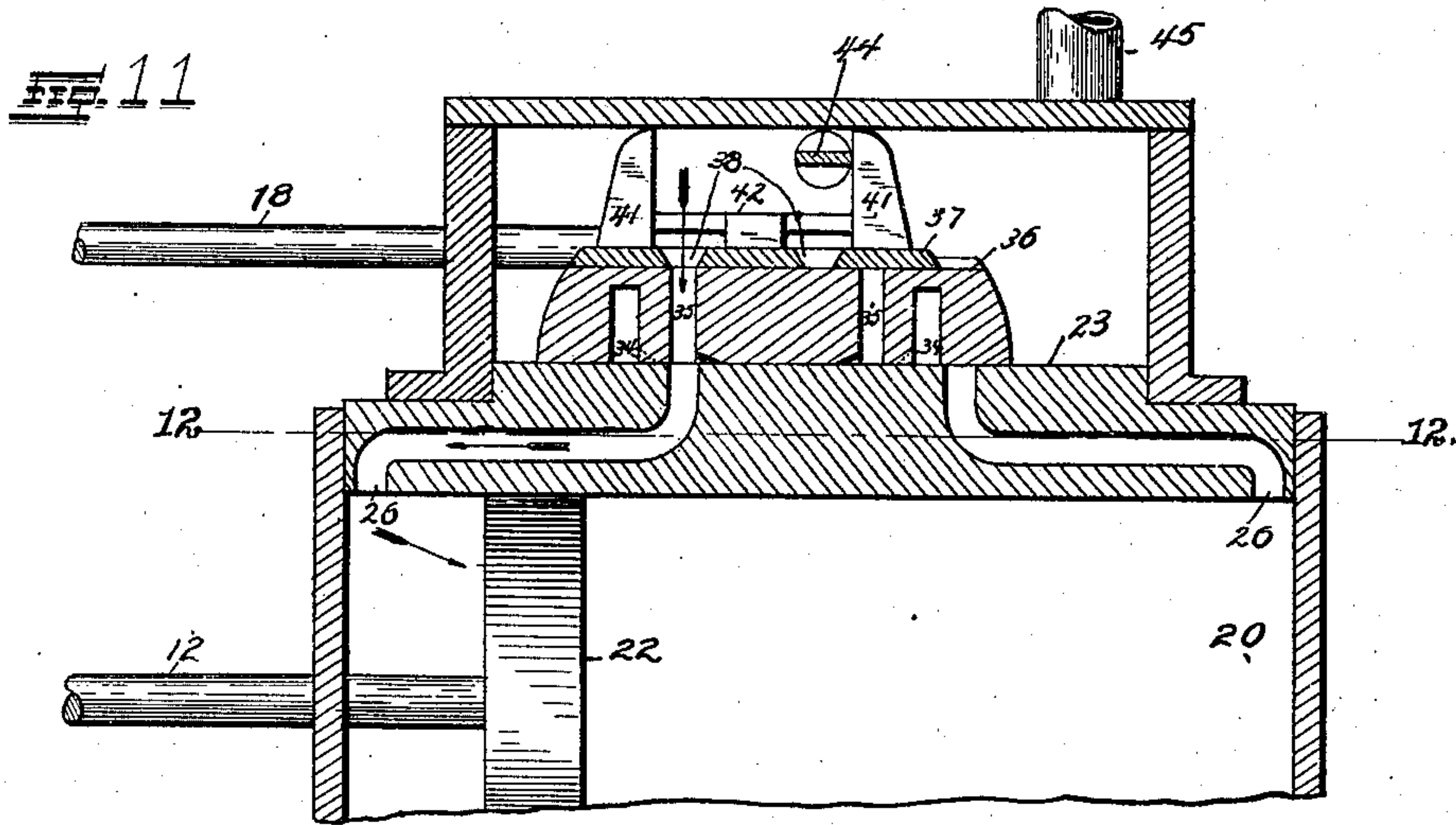
Patented Nov. 6, 1900.

L. E. KOTTMAYER.
ENGINE.

(Application filed Dec. 29, 1899.)

(No Model.)

5 Sheets—Sheet 5.



Witnesses.

Alfred A. Eicher
J. H. Rippey

Inventor.

L. E. Kottmeyer.
By Higdon & Longan, Attys.

UNITED STATES PATENT OFFICE.

LOUIS EDWARD KOTTMAYER, OF RHINELAND, MISSOURI, ASSIGNOR OF
ONE-HALF TO J. J. MERITT AND S. J. BURCH, OF SAME PLACE.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 661,104, dated November 6, 1900.

Application filed December 29, 1899. Serial No. 742,010. (No model.)

To all whom it may concern:

Be it known that I, LOUIS EDWARD KOTTMAYER, of the city of Rhineland, Montgomery county, State of Missouri, have invented
5 certain new and useful Improvements in Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

10 This invention relates to engines; and it consists of the novel construction, combination, and arrangement of parts hereinafter described and claimed.

The object of this invention is to construct
15 an engine in which the steam may be transferred from one cylinder to another after having performed its work in the first-mentioned cylinder, to provide an automatically-operating valve which opens when the engine re-
20 quires a higher pressure and closes when such is not needed, and to arrange the connecting-rods in such manner that both cannot be on a dead-center at the same time.

Figure 1 is a side elevation of my improved
25 engine. Fig. 2 is a top plan view. Fig. 3 is an end view of the piston-cylinders. Fig. 4 is a plan view of a part of the engine with the cover of the steam-chest removed, showing the front entrance-port open. Fig. 5 is a plan
30 view with the rear entrance-port open. Fig. 6 is a longitudinal sectional view taken on the line 6 6 in Fig. 10. Fig. 7 is a sectional view taken on the line 7 7 in Fig. 6. Fig. 8 is a plan view of the valve-seat. Fig. 9 is a sectional view taken on the line 9 9 of Fig. 7. Fig.
35 10 is a cross-sectional view taken on the line 10 10 of Fig. 6. Fig. 11 is a sectional view taken on the line 11 11 of Fig. 4. Fig. 12 is a sectional view taken on the line 12 12 in
40 Fig. 11.

In the construction of this invention I provide a suitable base 1, upon one end of which and journaled in suitable bearings 2 is the
45 driving-shaft 3, of two parts, and rigidly secured upon the inner end of each of said parts is a disk 4. Rigidly secured to the inner side of each of the disks, near the edge thereof, is a wrist-pin 5, and pivoted upon each of the wrist-pins is a connecting-rod 6 of equal length
50 and each of which is secured at the opposite

end to a cross-head 7, which cross-head is made to operate in a suitable framework yet to be described. The wrist-pins 5 are rigidly connected by the metallic brace 8 of a length
less than the diameter of either of the disks 55 in order that the two disks may not both be on dead-center at the same time. Upon the outer end of one of the parts of the driving-shaft 3 is keyed a belt-pulley 9, and rigidly secured upon the outer end of the other of
60 said parts is a fly-wheel 10.

Secured upon and near the center of the frame 1 is the framework 11, in which is arranged to slide the cross-heads 7, one of which is pivotally secured to each of the connect-
65 ing-rods 6. Each of the said cross-heads is rigidly connected to the outer end of a piston-rod 12.

Keyed upon one of the parts of the driving-shaft 3 is an eccentric 13, which is made
70 to operate a crank 14, journaled in bearings 15, carried by the framework 11, by means of the rod 16. Pivoted to the arm 17 of the crank is the valve-rod 18, the function of which is hereinafter described. 75

Carried upon the end of the framework 1 opposite from the driving-shaft 3 are the two piston-cylinders 19 20, in which operate the piston-heads 21 22, each of which is connect-
80 ed to one of the piston-rods 12. By referring to the drawings it may be seen that when one of the piston-heads is at the (either) end of the piston-cylinder the other of the piston-heads is necessarily near the center of the other piston-cylinder, which is best shown
85 by the location of the cross-heads in Fig. 1.

Integral with the upper side of the piston-cylinders is a valve-seat 23. Through the valve-seat 23 and through the top of the cylinder 19 extend the steam-ports 24, one of
90 which enters the cylinder 19 at the outer end and the other at the inner end, and through the valve-seat and downwardly between the cylinders leads an exhaust-port 25 for the cylinder 19.

The cylinder 20 is provided with steam-ports 26, which are adapted to allow the same amount of steam to pass through as are the ports 24; but the ports 26 are at their upper
95 ends longer and narrower than are the ports 100

24. An exhaust-port 27 for the cylinder 20 leads downwardly through the valve-seat 23 and between the cylinders 19 and 20.

A steam-chest 28 is located upon the upper surface of the cylinders 19 20 and fits around the valve-seat 23. Within the steam-chest and operating on the valve-seat 23 is a valve 29, which is connected to the end of the reciprocating valve-rod 18. The ends of the valve are cut away on one side, making the side 30 over the cylinder 19 of shorter length than the other side, which is over the cylinder 20. (See Fig. 7.) By this construction the valve when at either end of the steam-chest leaves one of the steam-ports 24 uncovered, while at no time is the longer portion of the valve removed from over the ports 26.

On the under side of the valve 29, near each end thereof, is a slot 31, which slots at times during the operation of the valve are in vertical alinement with the ports 24 26 and would allow a part of the steam which had been first forced into the cylinder 19 to pass out through the same port through which it had entered and to pass through the slot 31 on that end of the valve over and down through the port 26 on that end of the valve-seat and into the cylinder 20. In the under side of the valve are also two exhaust-cavities 32 33, of which the cavity 32 is in the short side 30 of the valve 29 and the cavity 33 is on the opposite side of said valve. When the slots 31 have in the operation of the valve passed from over the ports 24 26, the exhaust-cavities 32 33 connect the port 24 from which the steam is being forced and the port 26 from which the steam is being forced with the exhaust-ports 25 and 27, respectively, thereby allowing the remaining steam to be forced outwardly through the continuous exhaust-pipe so formed. On the inner edge of each of the slots 31 is a small groove 34, the inner ends of which after the slots have passed from over the ports 24 and 26 communicate with the exhaust-port 27, allowing the steam which had been left in the slots to be drawn out through the exhaust-ports.

Extending vertically through the longer side of the valve 29, between the slots 31, are two ports 35, one of which is in vertical alinement with one of the ports 26 when both the ports 24 are closed by the valve. Seated in a suitable valve-seat 36 on the upper surface of the valve 29 is an auxiliary valve 37, having two ports 38, which are arranged so that when one end of the auxiliary valve is in alinement with the end of the valve 29 one of the ports 38 is in alinement with one of the ports 35, Fig. 11, and when the opposite end of the auxiliary valve is in alinement with the opposite end of the valve 29 the other of the ports 38 is in alinement with the other port 35. This is for the purpose of admitting steam into the cylinder 20 through the ports 38, 35, and 26 when the entrance-ports to the cylinder 19 are closed. The auxiliary valve 37 has a slot 39 extending inwardly from each end,

and screws 40 extend through these slots and into the valve 29, which screws are intended to serve as a guide for the auxiliary valve to retain it in position on the valve 29 and to serve as stops for the auxiliary valve when it has moved into the desired position. Integral with the auxiliary valve 29 are the standards 41, further secured in their upright position by the brace 42. Journaled in suitable bearings in the steam-chest 28 is a rod 43, enlarged and flattened at the end which is over the auxiliary valve. This rod is connected to the governor by any well-known means, so that when the engine is moving slowly the rod 43 is turned so that the flattened part 44 is in a horizontal plane. When the rod assumes this position, as the valve 29 is operated the standards 41 are alternately brought into contact with the said rod, which alternately brings the ports 38 in alinement with the ports 35. Thus it may be seen that when the engine is moving slowly from any cause and more steam is needed the auxiliary valve automatically opens and allows the steam to enter.

45 denotes the steam-pipe leading into the steam-chest.

An engine of my improved construction presents many advantages over all others. The live-steam, after entering the cylinder 19 and performing its work there, partly passes from cylinder 19 into cylinder 20 and exerts its force at the exact time needed to overcome the dead-center of the main crank and at the same time adds from ten to fifteen per cent. more power to the main shaft. The cylinder 20 does not exhaust until after cylinder 19 has taken steam from the boiler. This causes less fuel to be required than when steam is forced at first hand into both cylinders. The auxiliary valve affords a simple and practical means of injecting steam into the other valve when it is needed, and when such steam is not required the auxiliary valve will automatically close and thus shut off the extra supply.

I claim—

1. In an engine, a pair of piston-cylinders, live-steam ports leading into one of the said cylinders, a valve operating on the said cylinders, ports on each end of the said valve for conveying the steam from one end of one cylinder to the same end of the other cylinder, ports through the said valve and leading into the second-mentioned cylinder, an auxiliary valve carried in the first-mentioned valve for closing said ports, and a means for operating the said auxiliary valve, substantially as specified.

2. In an engine, a pair of uniform piston-cylinders live-steam ports leading into one of said cylinders, a valve operating on the said cylinders, ports within the said valve for conveying steam from one to the other of said cylinders, ports leading through the valve for admitting steam to the latter of the said cylinders, an auxiliary valve carried on the

first-mentioned valve, ports leading through the said secondary valve intermediate of the ports in the first-mentioned valve and a means for operating said auxiliary valve as the speed of the engine is decreased whereby the ports in the several valves are made to register with each other, substantially as specified.

3. In an engine, a plurality of piston-cylinders, a steam-chest on the said cylinders, a valve operating upon said cylinders, steam-ports leading through one side of said valve, an auxiliary valve having steam-ports intermediate of the first-mentioned ports operat-

ing on the first-mentioned valve, an operating-rod mounted in the said steam-chest and a means whereby the said rod operates the auxiliary valve to register the ports in the various valves with each other as the speed of the engine decreases, and closes said valve as the speed increases, substantially as specified.

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

LOUIS EDWARD KOTTMAYER.

Witnesses:

JOHN RUETTIGERS,
HENRY RUETTIGERS.