

No. 885,543.

PATENTED APR. 21, 1908.

J. H. STICK.
STEAM ENGINE.

APPLICATION FILED SEPT. 26, 1907.

4 SHEETS—SHEET 1.

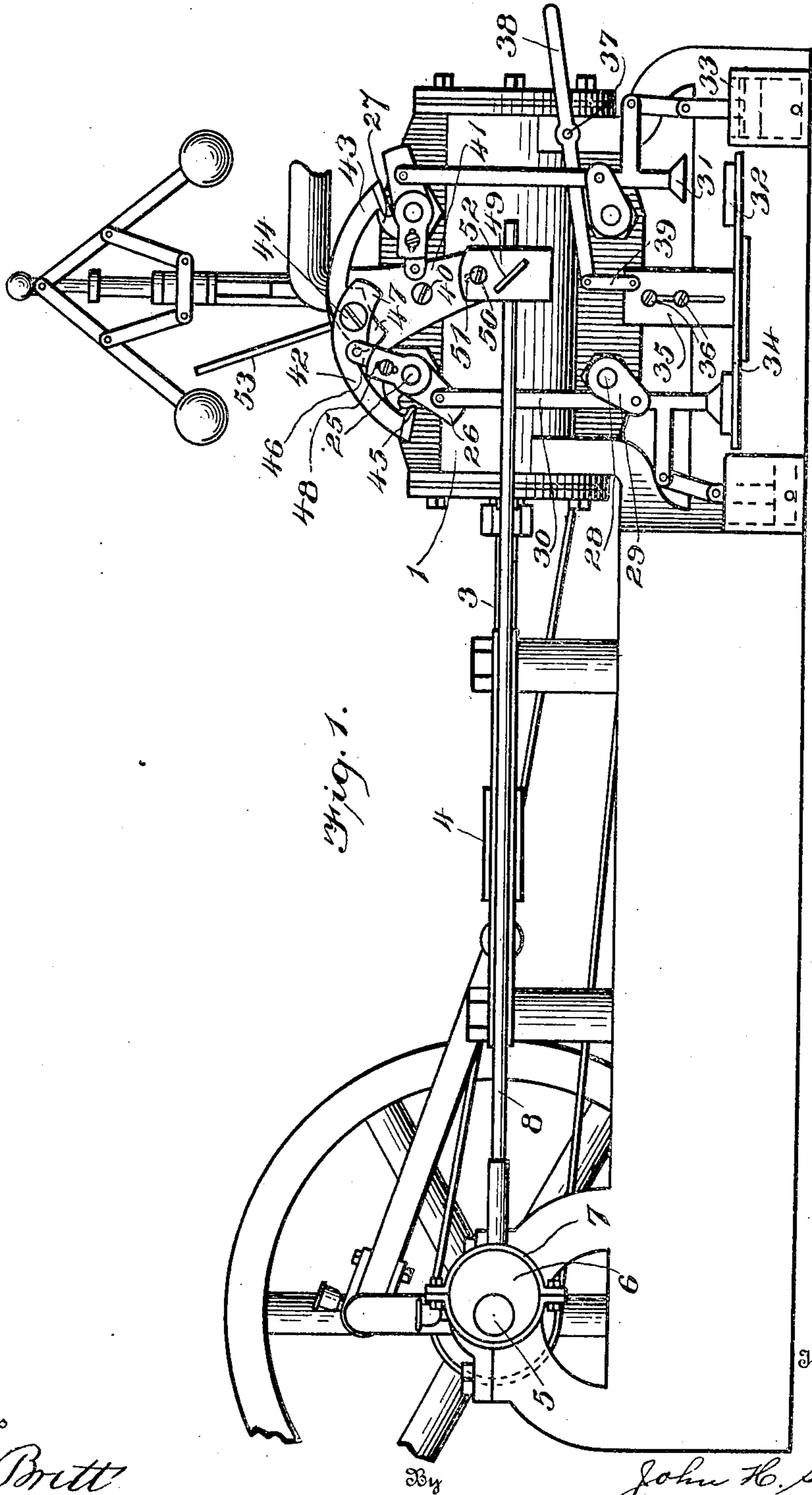


Fig. 1.

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Witnesses

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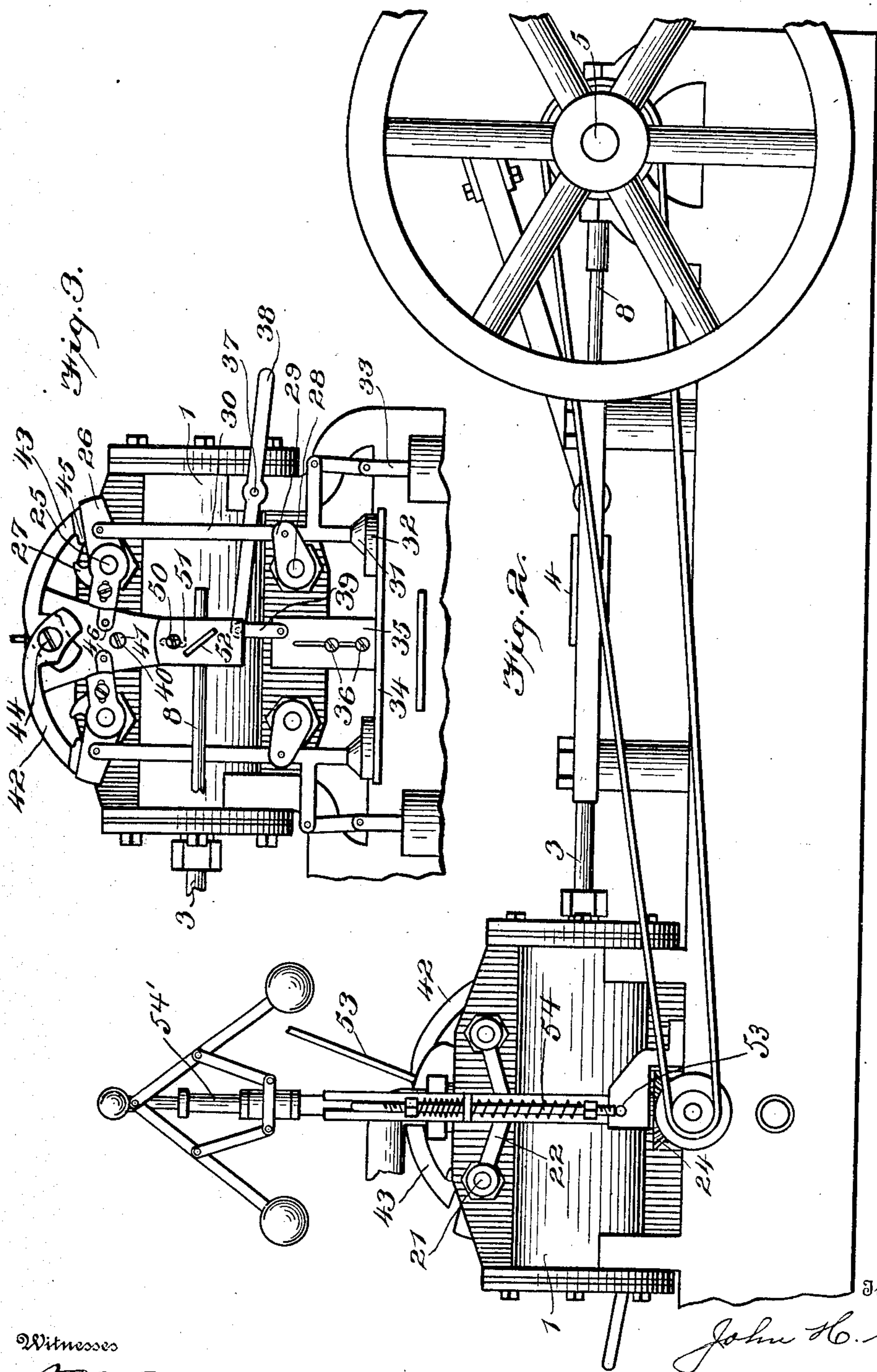
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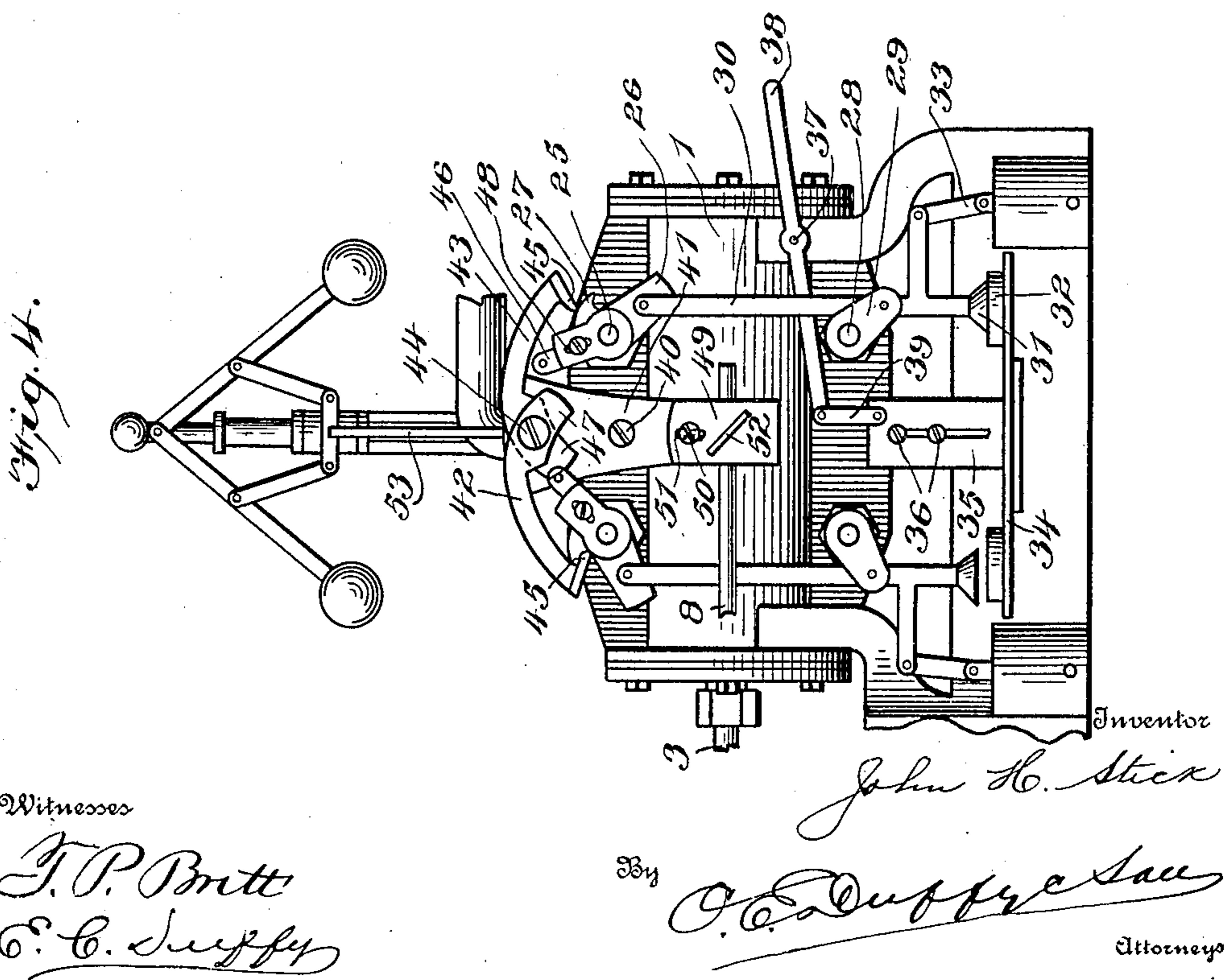
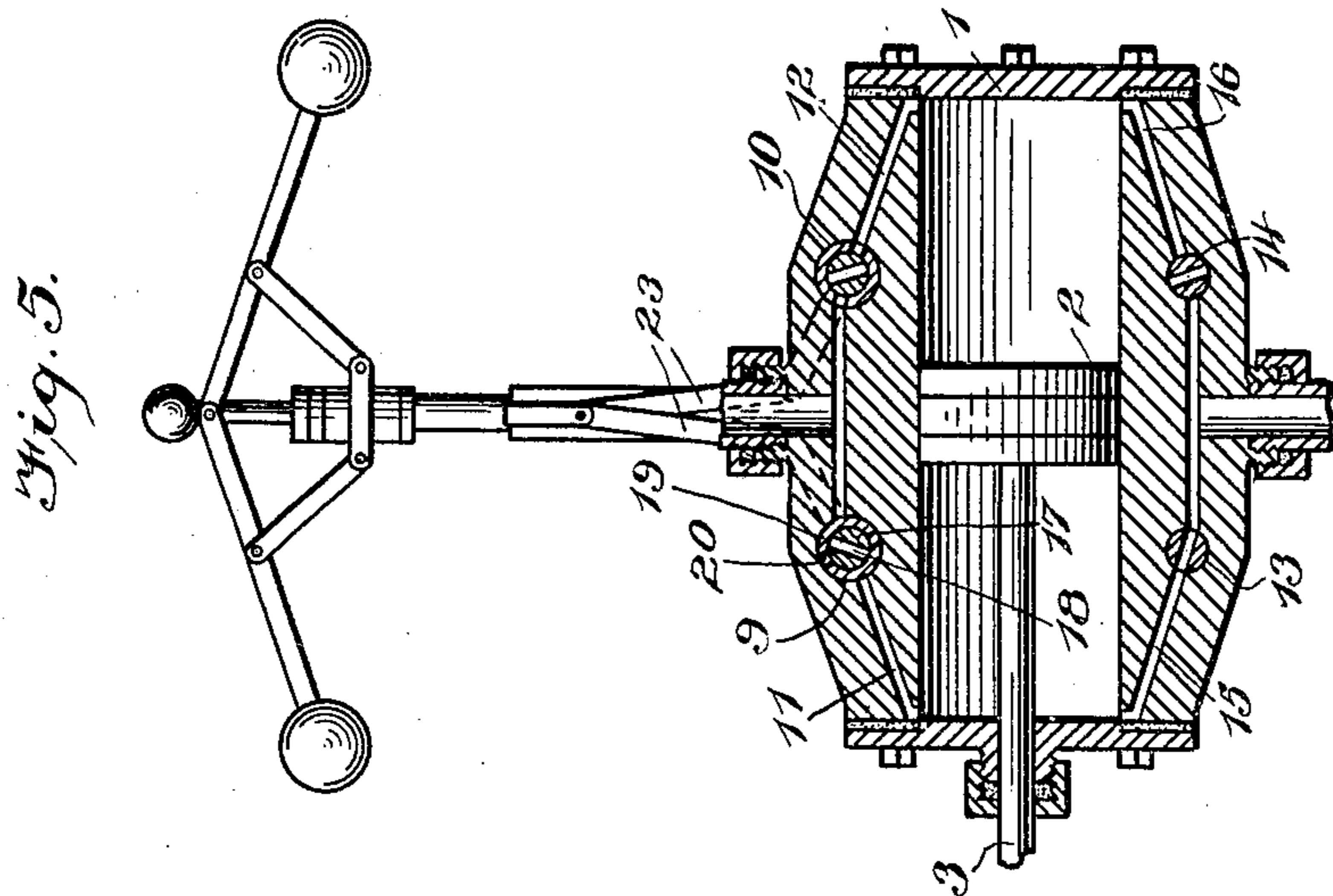
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4 SHEETS--SHEET 3.



Witnesses

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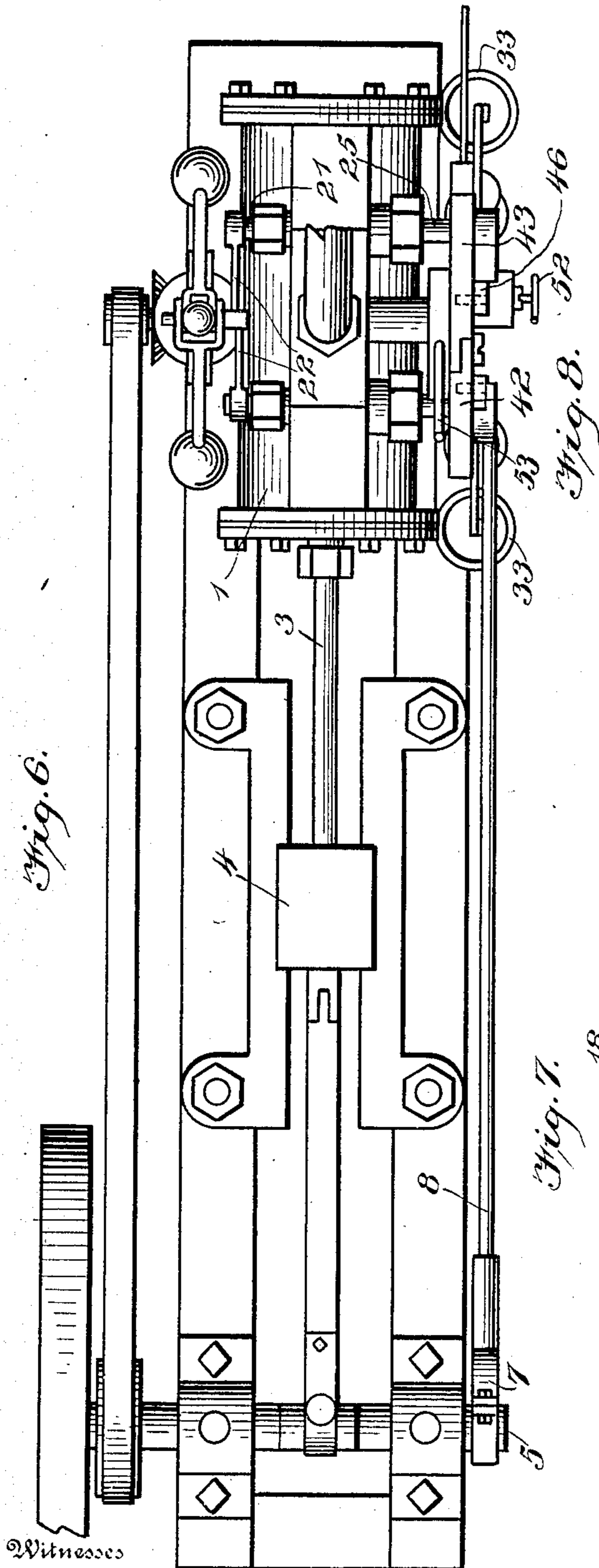
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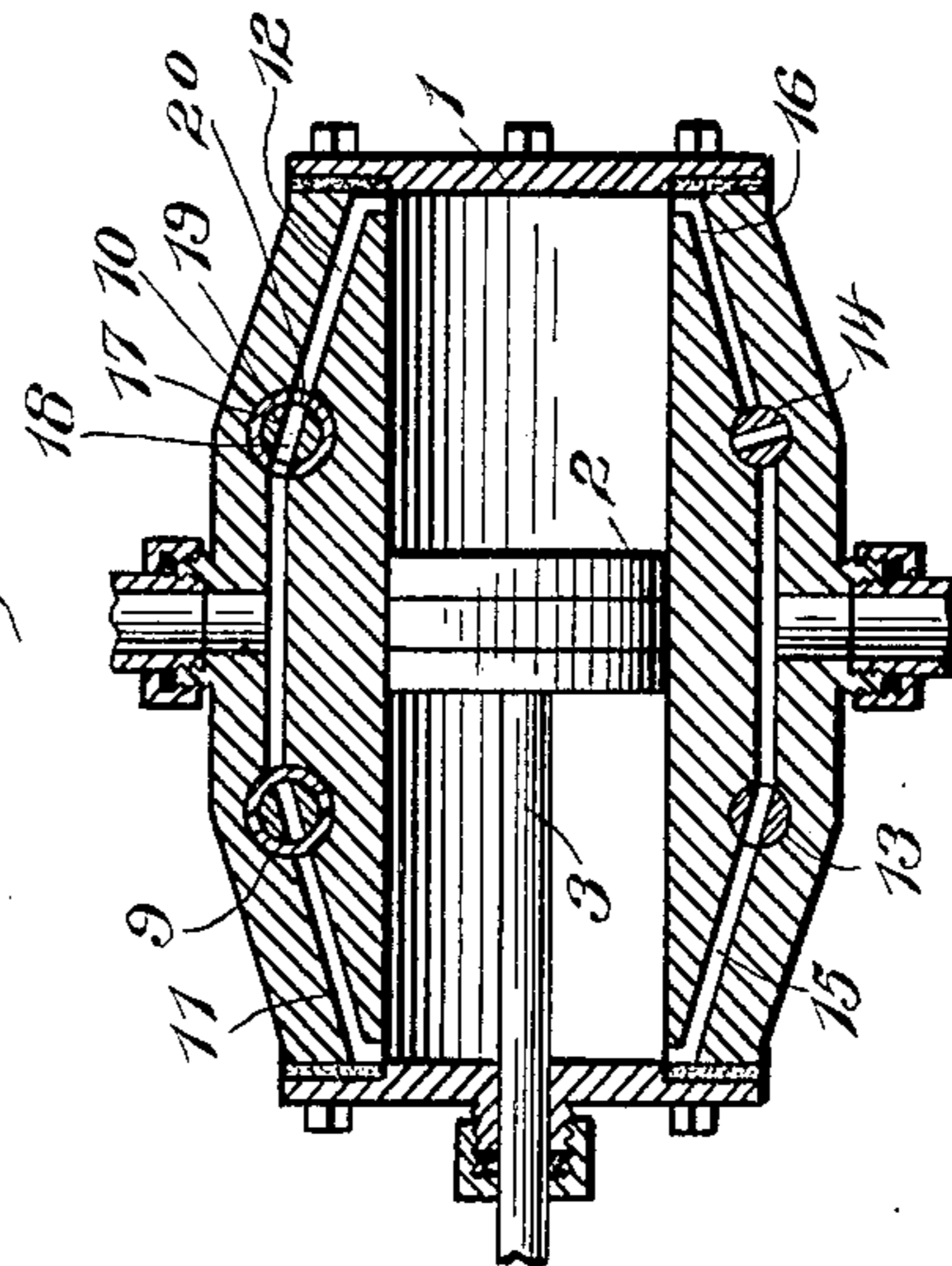
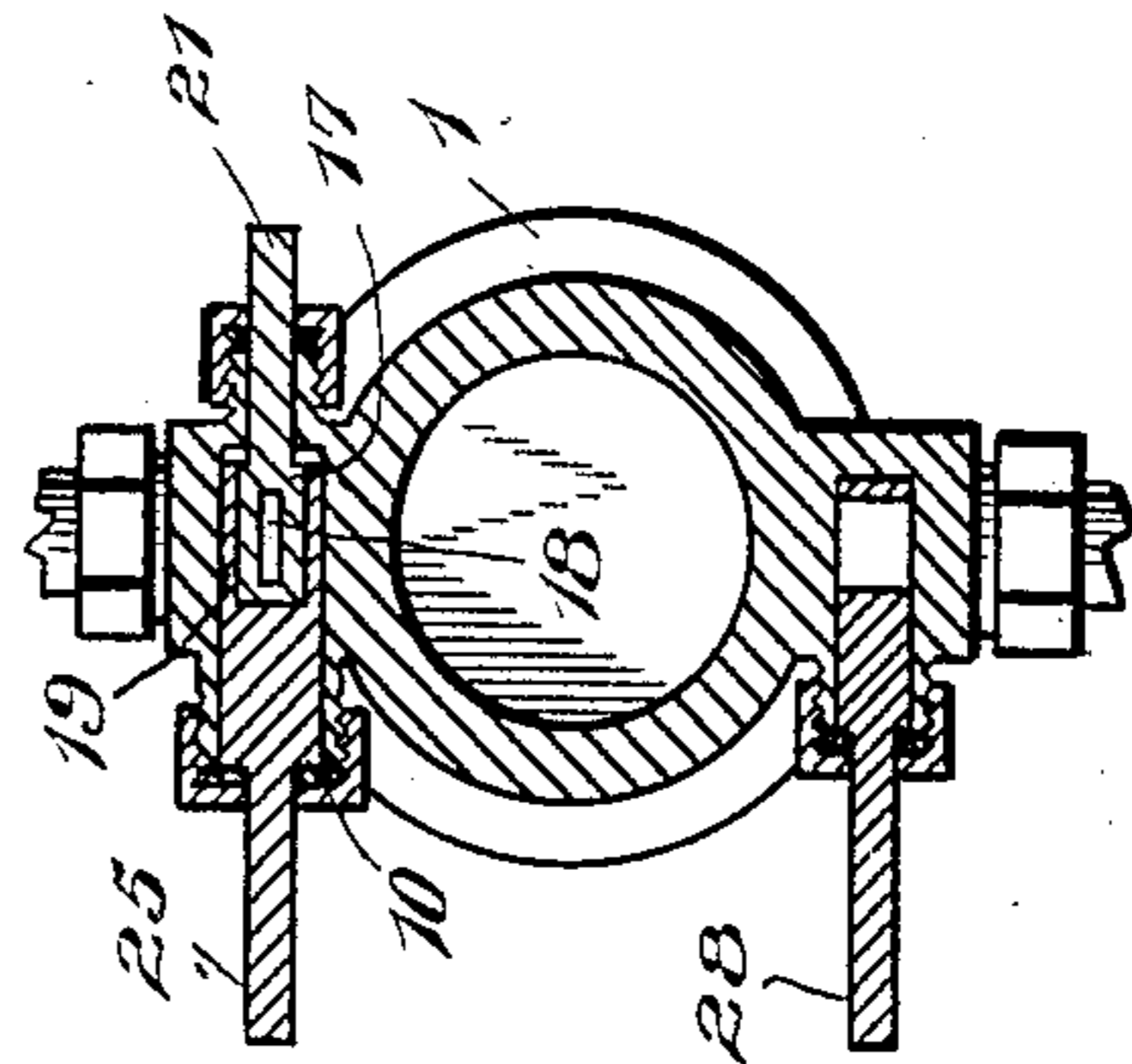
APPLICATION FILED SEPT. 26, 1907.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JOHN HENRY STICK, OF LITTLESTOWN, PENNSYLVANIA.

STEAM-ENGINE.

No. 885,543.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed September 26, 1907. Serial No. 394,701.

To all whom it may concern:

Be it known that I, JOHN HENRY STICK, a citizen of the United States, residing at Littlestown, in the county of Adams and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to steam engines, but more particularly to the valve connection thereof and has for its object to provide a steam engine which is particularly economical using the minimum amount of steam for the maximum amount of power.

A further object of my invention is to provide a steam engine which is particularly easy to control, the ports being arranged, and the valves therefor connected in the novel manner which will be hereinafter fully described.

With these objects in view my invention consists in the novel arrangement of the valve in the intake and exhaust ports, and my invention consists in the novel connections between said valves and in the novel construction and arrangement of parts for operating the same.

Referring to the accompanying drawings: Figure 1 is a side elevation showing a steam engine constructed in accordance with my invention. Fig. 2 is a side elevation showing the opposite side of the engine. Fig. 3 is a side elevation of the steam cylinder showing the valve mechanism in the position of opening both intake and closing both exhaust ports. Fig. 4 is a side elevation of the steam cylinder showing the mechanism in the act of opening one intake and closing one exhaust port. Fig. 5 is a vertical longitudinal sectional view through the steam cylinder showing the arrangement of the valves. Fig. 6 is a top plan of the engine. Fig. 7 is a vertical longitudinal sectional view through the steam chest showing the arrangement of valves in different positions from that illustrated in Fig. 5, and Fig. 8 is a vertical transverse sectional view through the steam cylinder.

Like numerals of reference indicate the same parts throughout the several figures in which:—

1 indicates the steam cylinder, 2 the piston, 3 the piston rod, 4 the cross heads and 5 the crank shaft, an eccentric 6 being carried on the shaft 5 about which is secured an eccentric strap 7 to which the eccentric rod 8 is connected, as illustrated in Fig. 1. Passing transversely through the casing of the steam cylinder are two inlet valves 9 and 10, said valves lying across the path of the intake ports 11 and 12, while the exhaust valves 13 and 14 are arranged transversely of the exhaust ports 15 and 16.

The intake valves 9 and 10 comprise a shaft 17 in which a port 18 is formed, as shown in Figs. 7 and 8, and the shell 19 into which said shaft 17 extends, a port 20 being formed in said shell 19 with which port the port 18 is adapted to register, as shown in Fig. 7. Each of the valves 17 is provided with a stem 21 to which stems cranks 22 (Fig. 2) is connected, said cranks being also connected to links 23 (Fig. 5) carried on the governor, said governor being driven by bevel gears 24 belted to the fly wheel of the engine or by any other suitable means.

Referring again to the valves 8 and 9 and particularly to Fig. 8, it will be seen that each of the valves 19 is provided with a stem 25 to which an arm 26 is connected, each of said arms 26 being provided with a hook 27, as shown in Figs. 1, 3 and 4.

Referring again to Fig. 8, it will be seen that each of the exhaust valves 13 and 14 are provided with a stem 28, each of said stems carrying an arm 29, as shown in Figs. 1, 3 and 4. Connecting the arm 26 on the valve stem 25 with the arm 29 on the exhaust valve stem 28 is a bar 30, and formed on each of said bars 30, as shown in Figs. 1, 3 and 4 are bases 31 arranged to engage a resilient surface 32 such as rubber or the like for the purpose of cushioning the same; and also connected to each of said bars 30 is a dash-pot mechanism 33 also for the purpose of cushioning the bars 30.

34 indicates a shelf upon which the cushioning material 32 is carried, and connected to said shelf is a slotted plate 35 secured to the engine preferably by means of bolts or screws 36 in such manner that the plate 35 and shelf 34 is capable of a vertical movement.

Fulcrumed at 37 is a lever 38 connected to said slotted plate 35 by means of a link 39. By means of this lever the shelf 34 and bars 30 can be instantly raised vertically, as shown in Fig. 3, and as the arms 26 and 29 which control the inlet and exhaust valves are connected to the bars 30 both inlet valves are simultaneously opened and both exhaust valves are simultaneously closed when the lever 38 is operated, as shown in Fig. 3.

Pivoted at 40 intermediate the inlet valves is a face plate 41, said face plate carrying two curved levers 42 and 43 pivoted at 44, said levers 42 and 43 being provided with hooks 45 for engagement with the hook 27 on each of the inlet valve arms 26, as shown in Fig. 4. It will be seen from this figure that an adjustable arm 46 is provided on each of the inlet valve arms 26, said arms being arranged for engagement with the short arm 47 on each of the curved levers 42 and 43, a pin and slot connection 48 providing for adjustment of said arms 46.

49 indicates a block pivoted to the face plate 41 by means of a pin 50 entering a slot 51, shown in dotted lines in Fig. 3, said block being carried on the eccentric rod 8 and being connected thereto by means of a pin 52. By means of the pin and slot connection 50 and 51 the throw of the face plate 41 can be adjusted for timing the operation of the valves and by means of the pin 52 connecting the block 49 to the eccentric rod 8, said block 49 and face plate 41 can be disconnected from the eccentric rod 8 so that said face plate 41 and the entire valve mechanism controlled thereby can be operated by hand, an operating lever 53 entering the face plate 41 being provided for manual operation, as shown in Fig. 1.

Having thus described the several parts of my invention its operation is as follows: The valve mechanism being operated by the eccentric rod, as shown in Fig. 1, and the eccentric rod being in position shown in Fig. 1, the face plate 41 is rocked, the curved lever 43 engaging the hook 27 on the valve arm 26 rocking said arm and opening the inlet valve 10. The exhaust valve arm 29 being connected to the rod 30, said arm is raised simultaneously with the arm 26 closing the exhaust valve 14. As the piston completes its outer stroke the eccentric rod 8 starts to draw the face plate 41 into the position shown in Fig. 4. An adjustable arm 46 on the inlet valve arm 26 engaging the short arm 47 on the curved lever 43 raises the hooked end 45 out of engagement with the hook 27 on the arm 26, allowing said arm 26 to drop into the position, shown in Fig. 4, thereby closing the inlet valve 10 and opening the exhaust valve 14. As the eccentric 8 draws the face plate 41 into the opposite position, as shown in Fig. 1, the inlet valve 9 and exhaust valve 13 are operated in the manner as just

described. By means of the hand lever 53 the valves can be operated manually after disconnecting the block 49 from the eccentric rod 8.

In order to bring the engine to a sudden stop should emergency require, the lever 38 is forced into the position, shown in Fig. 3, which raises both inlet valve arms 26 and both exhaust valve arms 29 instantly opening both inlet valves and closing both exhaust valves thereby equalizing the pressure of the piston.

The governor being arranged and connected as described and controlling the ports 18 within the shell 19 of the inlet valves 9 and 10, said ports are thrown across the ports 20 in the shell 19 of the inlet valves closing said inlet valves, as shown in Fig. 5.

As shown in Fig. 2, a pin 53 located under the rod 54 which is connected to the governor shaft 54' normally holds the governor in the position shown. After the engine is started at the usual speed the pin 53 is withdrawn; should, then any breakage occur in the governor belt the governor would immediately drop down, thus closing both intake ports and stopping the engine. When, however, it is desired to stop the engine in the usual way the pin 53 should be again inserted allowing the engineer to stop the engine by means of the lever 38.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent of the United States, is—

1. In a steam engine, the combination with a steam cylinder and eccentric rod, of the inlet and exhaust ports, inlet and exhaust valves for opening and closing said ports, means for connecting each inlet valve with an exhaust valve, means actuated by said eccentric rod for successively operating each pair of inlet and exhaust valves, and means for simultaneously opening both inlet valves and for simultaneously closing both exhaust valves.

2. In a steam engine, the combination with a steam cylinder and eccentric rod, of the inlet and exhaust ports, inlet and exhaust valves for opening and closing said ports, means for actuating each inlet valve with an exhaust valve, means actuated by said eccentric rod for successively operating each pair of inlet and exhaust valves, means for opening both inlet valves and for simultaneously closing both exhaust valves, and a cushioning means for cushioning the valve operating mechanism, substantially as described.

3. In a steam engine, the combination with a steam cylinder and eccentric rod, of the inlet and exhaust ports, inlet and exhaust valves for opening and closing said ports, means for connecting each inlet valve with an exhaust valve, a pivoted member connected to said eccentric rod, two levers carried

on said pivoted member, an arm connected
to each inlet valve, each of said arms being
arranged to be engaged by said levers on said
pivoted member, means on each of said arms
5 for engaging each of said levers to move each
of said levers out of engagement with each of
said arms, substantially as described.

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

JOHN HENRY STICK.

Witnesses:

B. M. ALLEMAN,
EDW. M. CROUSE.