

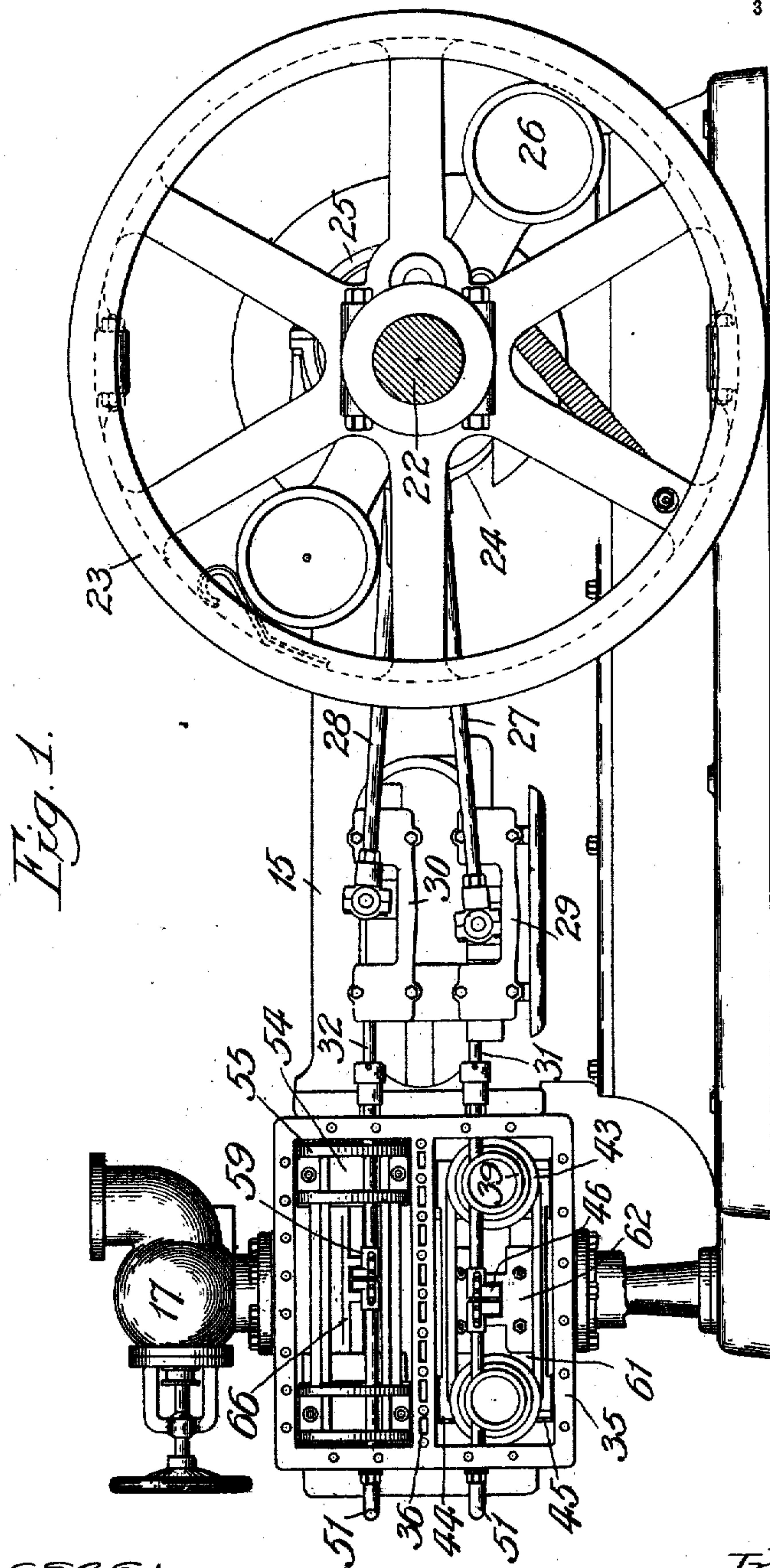
STEAM ENGINE.

APPLICATION FILED MAR. 9, 1908.

912,991.

Patented Feb. 23, 1909.

3 SHEETS--SHEET 1.



Witnesses:

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Fig. 2.

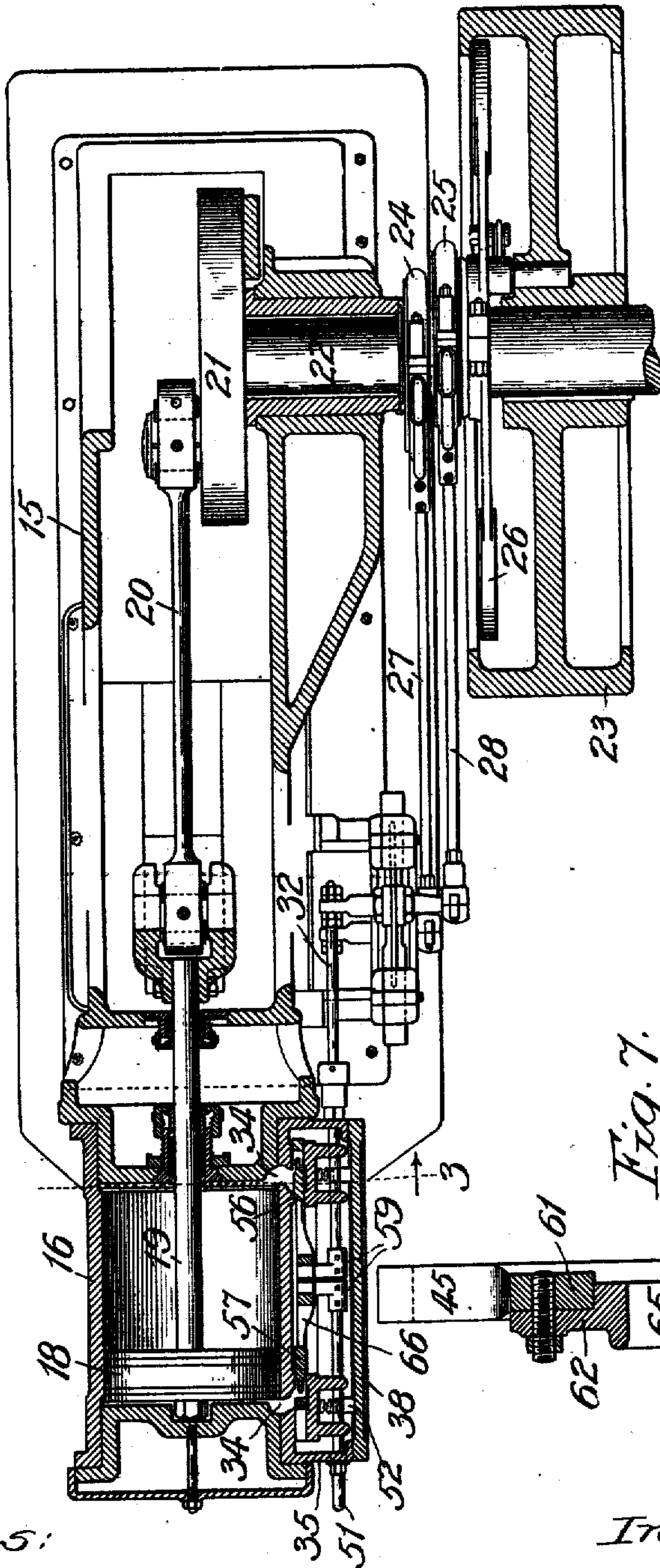
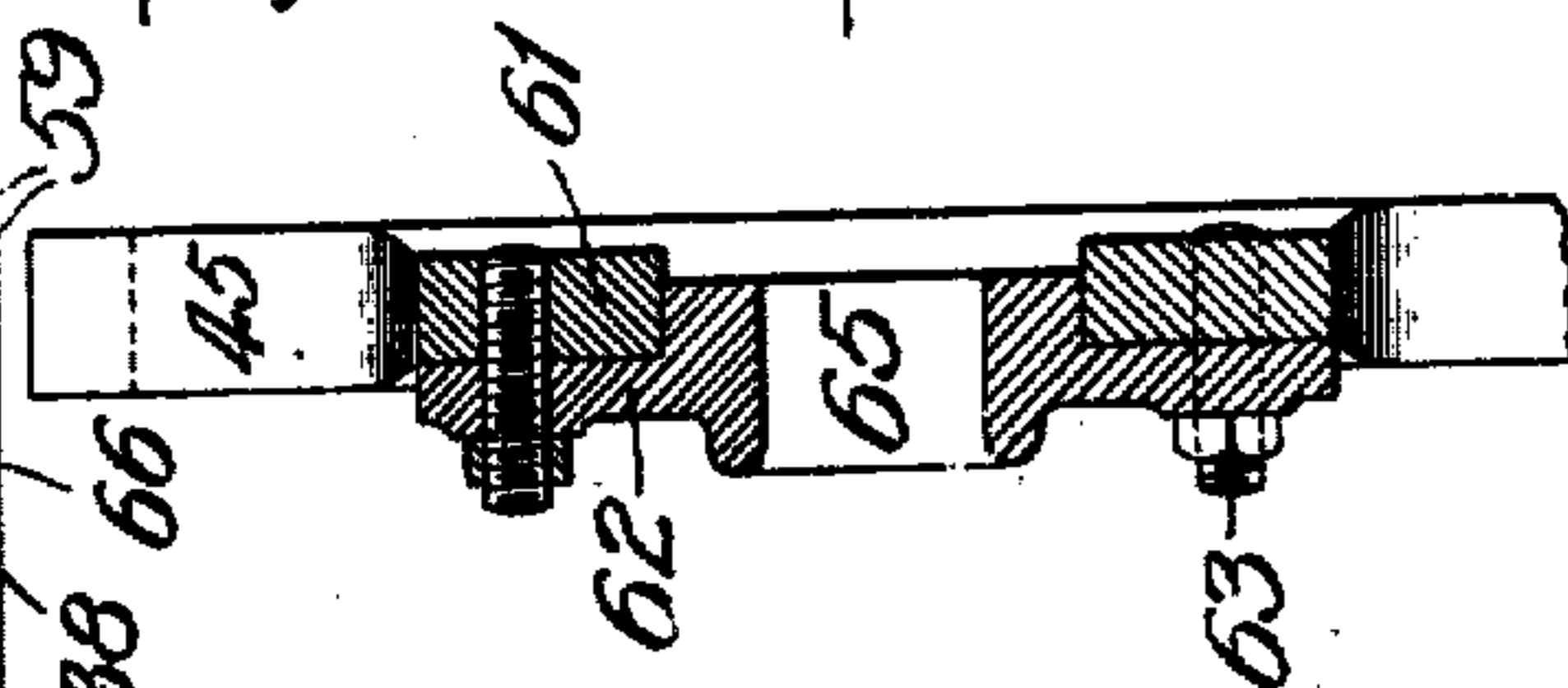


Fig. 7.



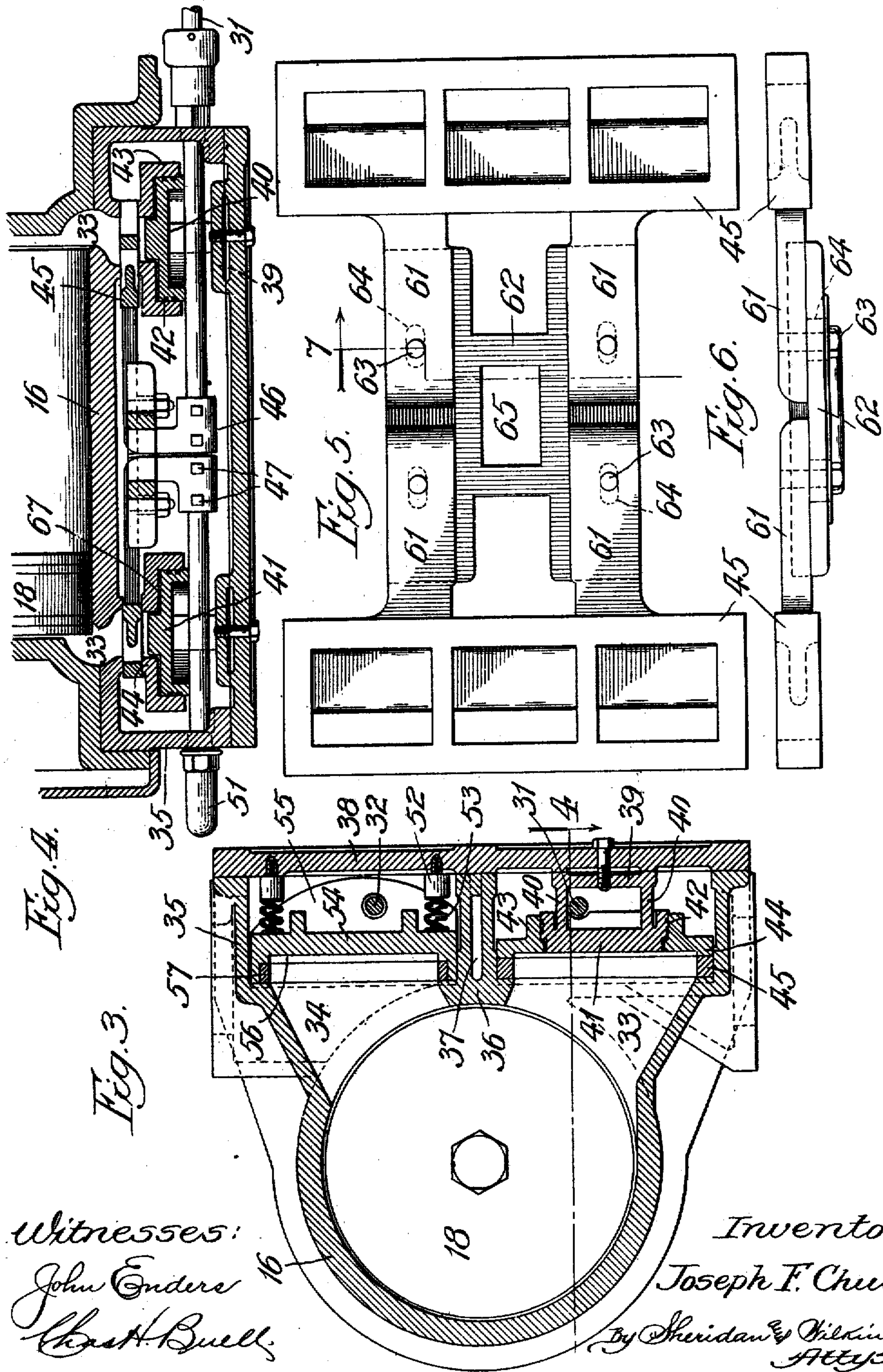
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UNITED STATES PATENT OFFICE.

JOSEPH F. CHUSE, OF MATTOON, ILLINOIS.

STEAM-ENGINE.

No. 912,991.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed March 9, 1908. Serial No. 420,014.

To all whom it may concern:

Be it known that I, JOSEPH F. CHUSE, citizen of the United States, residing at Mattoon, in the county of Coles and State of Illinois, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification.

The object of my invention is to provide a new and improved high speed reciprocating engine.

A further object of my invention is to provide such an engine having a side crank with separate live steam and exhaust valve gears and respective steam chests on that side of the engine on which the crank shaft extends.

Still another object is to provide a balanced exhaust valve for a steam engine.

These objects and various others will be made apparent in the following specification and claims, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of my improved engine, the cover plate for the valve chests being removed; Fig. 2 is a horizontal section passing through the upper, or live steam chest; Fig. 3 is an enlarged transverse section taken on the line 3 of Fig. 2. Fig. 4 is an enlarged horizontal section taken through the exhaust steam chest, the plane thereof being below that of the section shown in Fig. 2. Fig. 5 is an enlarged elevation of the exhaust valve. Fig. 6 is a top plan view of the exhaust valve, and; Fig. 7 is a section taken on the line 7 of Fig. 5.

The engine has a horizontal frame 15, with a cylinder 16 at the end thereof. The throttle valve 17 is in the live steam pipe leading to the upper part of the steam chest. The usual piston, piston rod, and connecting rod are designated, respectively, as 18, 19 and 20. The crank disk 21 is mounted on the crank shaft 22, which also carries the fly-wheel 23. This crank shaft 22 carries two eccentrics 24 and 25, the former being fixed on the shaft, while the latter is adjustably mounted thereon, its position being controlled in a well known manner by means of the fly-wheel governor 26. The fixed eccentric 24 connects by an eccentric rod 27 to the exhaust valve stem 31 through a cross-head which is adapted to reciprocate in the guide 29. The shiftable eccentric 25 connects through an eccentric rod 28, to the live steam valve rod 32 through a cross-head

which is adapted to reciprocate in the guide 30.

The cylinder 16 has exhaust ports 33 leading from its lower side to the exhaust steam chest, and steam ports 34 above these, leading to the live steam chest. The outside walls of these steam chests are indicated by the reference numeral 35, and the common or partition wall by the reference numeral 36. The latter is made with an intermediate chamber 37, the purpose of this being to check the flow of heat from the live steam on one side through to the exhaust steam on the opposite side. A common cover plate 38 is provided for both the live and exhaust steam chests.

Within the exhaust steam chest a member 39 is bolted to the cover plate 38, and from it two arms 40 project horizontally toward the exhaust port 33. At their ends they carry a fixed piston 41, having packing rings 42 about its periphery. About this piston 41 is a sleeve 43, which, on the side toward the exhaust port 33, is extended in the form of a pressure or balance plate 44 which acts as a seat for the valve 45. This pressure plate has the shape of a rectangular frame with its greatest dimension extending in a vertical direction. It is opposed to the edge of the exhaust port 33, and between the two lies the exhaust valve 45, which is of a similar rectangular frame shape.

The valve stem 31 extends clear through the exhaust steam chamber and its end projects into the housing 51. Within the steam chest it carries a pair of brackets 46, which are adjustably fixed thereon by the set screws 47 and project across toward the engine cylinder. The two exhaust valves 45 are separate and they have arms 61 which are united by a frame 62, to which they are attached by stud bolts 63. Slots 64 in the frame 62 permit adjustment of the valves 45 relatively to said frame. The aforementioned brackets 46 project into the rectangular opening 65 in the frame 62 and thus transmit motion from the valve rod 31 to the valves 45.

Within the live steam chamber, spring seats 52 project toward the live steam port 34 from the cover plate 38. Extending from these seats are the springs 53, which press against plate 54. The latter are strengthened by transverse arching ribs 55, and each one has a vertical slot 56 in the face toward

the live steam port 34. The boundaries of this slot 56 correspond in position to the edge of the port 34, and between the two is the valve member 57. At an intermediate point in the steam chest the valve rod 32 carries brackets 59, which project toward the cylinder and into the frame 66 which unites the live steam valves 57.

The operation of my improved steam engine will be obvious to those skilled in the art. It will be observed that I have provided a side crank engine having separate valves and valve gear for live and exhaust steam, all arranged on the side of the engine on which the crank shaft extends. The live steam on being admitted to the upper steam chest will pass thence to the engine cylinder only when the valve 57 is drawn either forward or back, that is when the opening therethrough (see Fig. 2) does not register with the steam port 34 and the opposed channel 56. It will be observed that this valve member 57 is subjected to a balanced pressure. The plate 54 is held against the port 34 by the live steam pressure thereon. In case of excessive compression of the steam within the cylinder, the springs 53 may yield and thus prevent injury to the cylinder. The steam in the cylinder always has access through the exhaust port 33 to the space 67 between the piston 41 and the pressure plate 44. The intermediate space 67 is so designed that this pressure on the pressure plate 44 will hold the valve 45 up against the cylinder port and insure a nearly balanced pressure upon it. The valve members 45 may each be adjusted relatively to the frame 62, and further adjustment may be had between the valve rod 32 and the exhaust valves 45 by means of the set screws 47 which engage the brackets 46. Not only is there a balanced pressure on the exhaust valves 45, but all wear is taken up automatically so that the pressure plate 44 always holds the valve 45 closely between itself and the port 33.

I desire to call attention to the fact that the water will drain by gravity from the cylinder 16 into the exhaust steam chamber, and I also call attention to the hollow heat insulating partition wall between the two steam chests.

The construction here disclosed will be

recognized by those skilled in the art, as intended for high speeds. My invention is especially adapted for use in high speed engines having a piston velocity of about 600 or 700 feet per minute.

I claim:

1. In a reciprocating steam engine, an exhaust steam chest, exhaust ports leading thereto from the cylinder, skeleton frames projecting toward the said ports from the opposite inside wall of the steam chest, each said frame carrying a piston at its end, a movable sleeve on each piston, a pressure plate attached to said sleeve, said plate being in registry with the said exhaust port, a slide valve interposed between the port and pressure plate, and a reciprocatory valve stem attached to said slide valve and extending through the said skeleton frames.

2. In a reciprocating steam engine, an exhaust steam chest, exhaust ports leading thereto from the cylinder, pistons projecting toward the said ports from the inside wall of the steam chest, a movable sleeve on each piston, a pressure plate attached to said sleeve, said plate being in registry with the said exhaust port, a slide valve interposed between each port and its opposed pressure plate, extension arms from each slide valve toward the other slide valve, a frame adjustably bolted to said extension arms, a reciprocatory valve stem, and brackets on said valve stem projecting laterally therefrom and engaging said frame.

3. In a reciprocating steam engine, an exhaust steam chest, exhaust ports leading thereto from the cylinder, pistons projecting toward said ports from the inside wall of the steam chest, an independent movable sleeve on each piston, an independent pressure plate attached to each sleeve, each said plate being in registry with a corresponding exhaust port, a slide valve interposed between each port and its pressure plate, a reciprocatory valve rod, and connections from said rod to said slide valves.

In testimony whereof, I have subscribed my name.

JOSEPH F. CHUSE.

Witnesses:

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