

J. ERICKSON.
ENGINE.

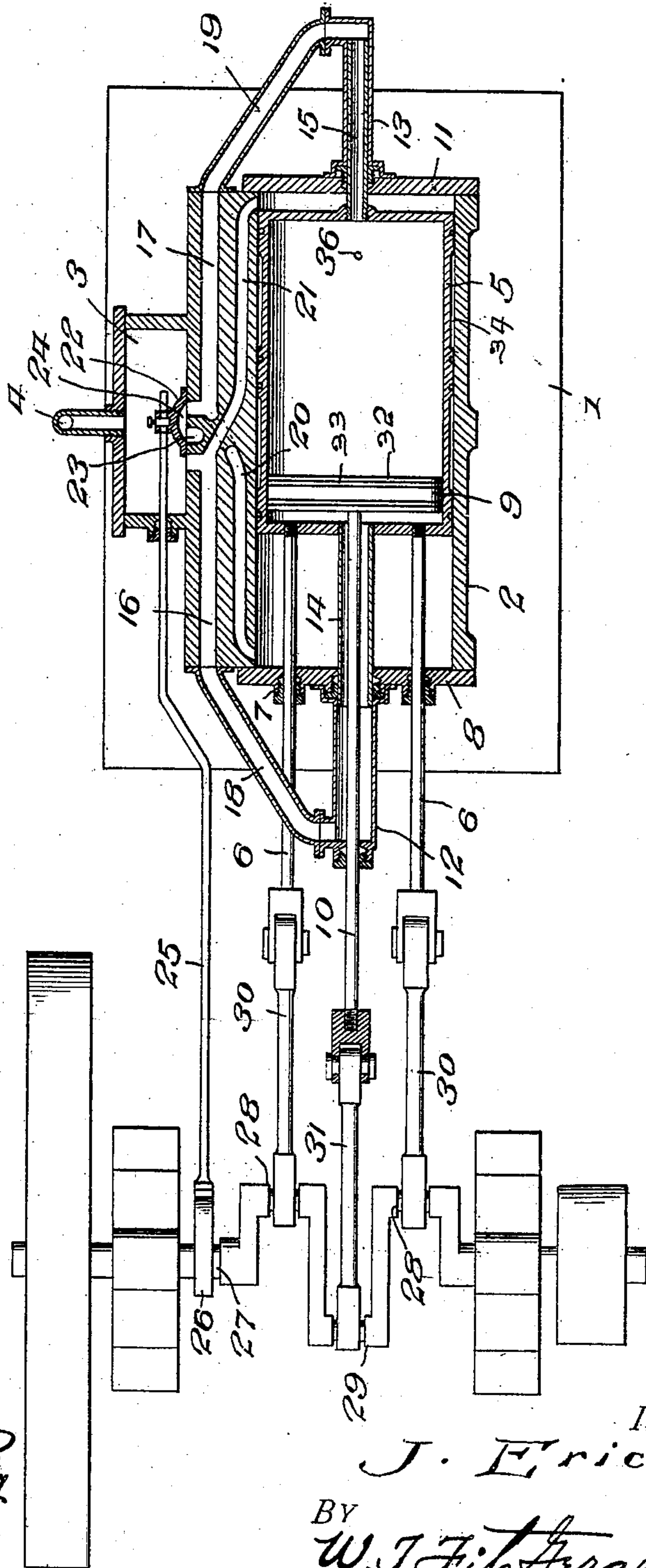
APPLICATION FILED FEB. 25, 1908.

899,297.

Patented Sept. 22, 1908.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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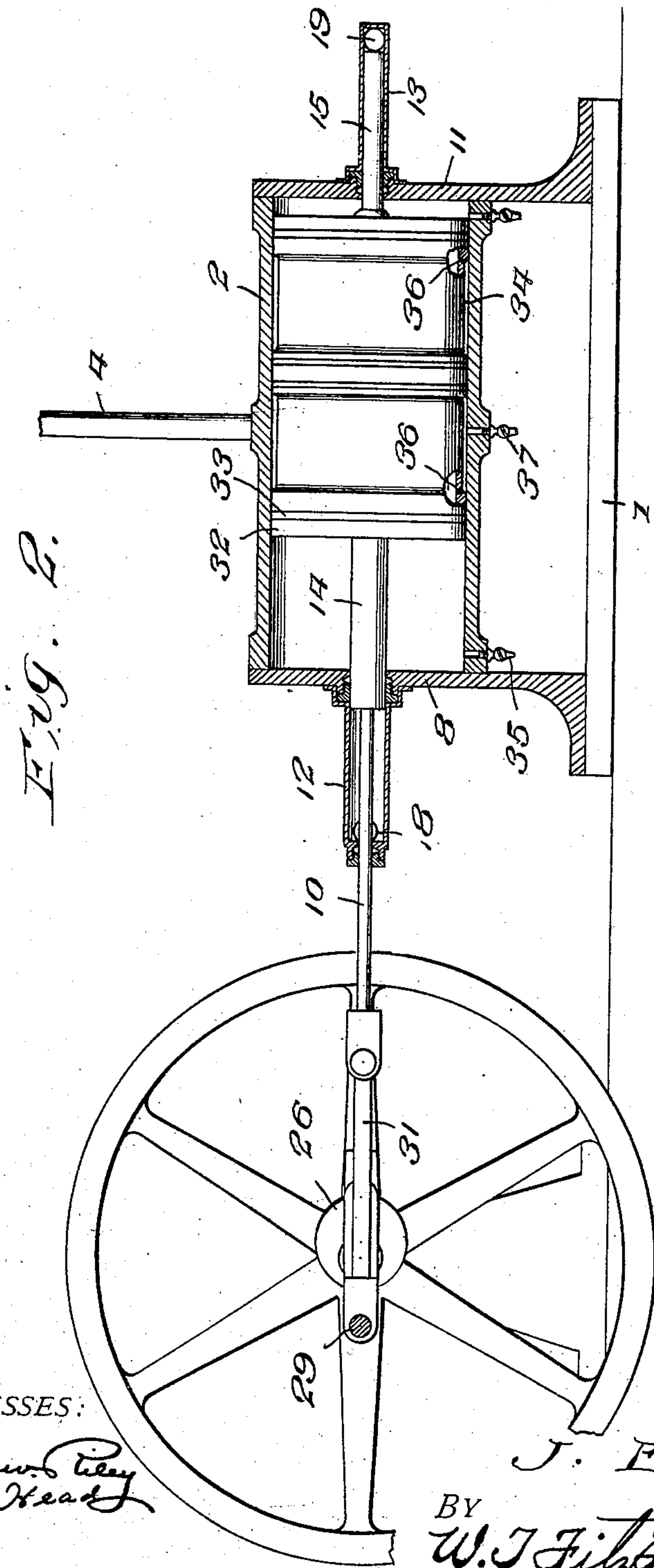
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UNITED STATES PATENT OFFICE.

JOHN ERICKSON, OF FAIRDALE, NORTH DAKOTA.

ENGINE.

No. 899,297.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed February 25, 1908. Serial No. 417,784.

To all whom it may concern:

Be it known that I, JOHN ERICKSON, a citizen of the United States, residing at Fairdale, in the county of Walsh and State of North Dakota, have invented certain new and useful Improvements in Engines; and I do hereby 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.

My invention relates to new and useful improvements in engines and more particularly to that class employing steam as a propelling medium and my object is to provide a compound cylinder or a cylinder within a cylinder.

Other objects and advantages will be hereinafter referred to and more particularly pointed out in the claims.

In the accompanying drawings which are made a part of this application, Figure 1 is a top plan view of an engine showing the cylinder and steam chest in section, and, Fig. 2 is a side elevation of the engine, showing the outer cylinder in section and parts of the inner cylinder broken away.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1 indicates the base of the engine, on which is mounted a cylinder 2, said cylinder having a steam chest 3 located thereon, into which steam is fed through a pipe 4.

Slidably mounted within the cylinder 2 is an auxiliary cylinder 5, to the forward end of which are secured piston rods 6, said rods extending through suitable packing boxes 7 in the head 8 of the cylinder 2, while slidably mounted in the auxiliary cylinder 5 is a piston 9 extending from one face of which is a piston rod 10. Extending outwardly from each of the heads 8 and 11 of the cylinder 2 is a pipe section 12 and 13, respectively, in which are slidably mounted tubular sections 14 and 15, respectively, the tubular section 14 being of sufficient diameter to loosely receive the piston rod 10.

The object in providing the pipe sections 12 and 13 and the tubular sections 14 and 15, is to allow steam to be introduced into opposite ends of the auxiliary cylinder 5, while the auxiliary cylinder is reciprocating in the main cylinder and in conveying the steam from the steam chest to opposite ends of the auxiliary cylinder 5, ports 16 and 17 are placed in the wall of the cylinder 2 and com-

municate at one end with the steam chest, while the opposite ends thereof are placed into communication, respectively, with the outer ends of the pipe sections 12 and 13 by means of tubular couplings 18 and 19. This manner of introducing the steam into the auxiliary cylinder will cause the piston 9 to reciprocate in reverse movement to said auxiliary cylinder while the auxiliary cylinder is reciprocated in the main cylinder by introducing steam into opposite ends of the main cylinder through the medium of ports 20 and 21, one end of the port 20 communicating with the port 17 and one end of the port 21 communicating with the port 16 adjacent their entrance into the steam chest 13 and, in order to alternately direct the steam into said ports, a slide valve 22 is located in the steam chest and so arranged that when one of the ports is opened, the opposite ports will be closed and the exhaust steam from the closed ports is directed into an exhaust port 23 by providing a curved recess 24 in the lower face of the valve, the exhaust port being located between the ports 16 and 17, the recess will form a passage between the closed port and the exhaust port.

The valve 22 is controlled by means of an eccentric rod 25, which extends forwardly and is secured to an eccentric 26 on a driving shaft 27. The piston rods 6 and 10 are also secured to the cranked portions 28 and 29, respectively, of the shaft 27 by means of crank arms 30 and 31, respectively, the cranked portions 28 being oppositely disposed to the cranked portions 29, so that when a pulling movement is being given to one of the cranked portions, a driving motion will be given to the opposite cranked portion.

The auxiliary cylinder is provided around its periphery with collar-like projections 32, said projections having seats therein to receive the usual or any preferred form of packing ring 33, the projections 32 being spaced apart to form channels 34 around the auxiliary cylinder.

When the engine is stopped, the steam remaining in the main and auxiliary cylinders will become condensed and in order to release the water formed by condensation, I provide a pair of cocks 35, which are secured at each end of the main cylinder and depend therefrom and by which means the water is drained from the main cylinder, while the water in the auxiliary cylinder passes through drains 36 into the channels 34 and is

released from the channels through a cock 37 located at the longitudinal center of the main cylinder 2, the drains 36 being at opposite ends of the auxiliary cylinder and the channels 34 so located that one of them will be in communication with the cock 37 whenever the auxiliary cylinder is in its full stroke in either direction.

In operating the engine, steam is introduced through the pipe 4 into the steam chest 3 and, when the engine is set in the position shown in Figs. 1 and 2, the steam will enter the rear end of the cylinder 2 through the port 21 and the forward end of the auxiliary cylinder 5 through the port 16, coupling 18, pipe section 12 and tubular section 14, the steam entering through the port 21, moving the auxiliary cylinder forwardly, while the steam entering through the port 16 drives the piston 9 rearwardly, thereby giving a driving and pulling motion to the shaft 27. At the same time that the auxiliary cylinder and piston are moving as described, the slide valve 22 will move forwardly and close the ports 16 and 21 and open the ports 17 and 20, allowing the steam to pass through said ports and drive the auxiliary cylinder and piston in the opposite direction, the exhaust steam in the main cylinder and auxiliary cylinder returning through the ports 21 and 16 and entering the exhaust

port 23 through the recess 24 in the slide valve.

What I claim is:

In an engine of the class described, the combination with a main cylinder and a steam chest on said cylinder; of an auxiliary cylinder slidably mounted in said main cylinder, a piston in said auxiliary cylinder, a tubular section secured to each end of the auxiliary cylinder, a pipe section extending from the main cylinder in which said tubular sections are adapted to slide, a pair of ports in the wall of the main cylinder, one end of each of which is adapted to communicate with the steam chest, tubular couplings connecting said ports with the pipe sections, whereby steam may be conveyed into opposite ends of the auxiliary cylinder, a port communicating with each end of the main cylinder and at their opposite ends with the first-mentioned ports, respectively, and a slide valve adapted to control the introduction of steam into said ports.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN ERICKSON.

Witnesses:

OLE J. NORDLIE,
C. B. MOFFETT.