

No. 615,912.

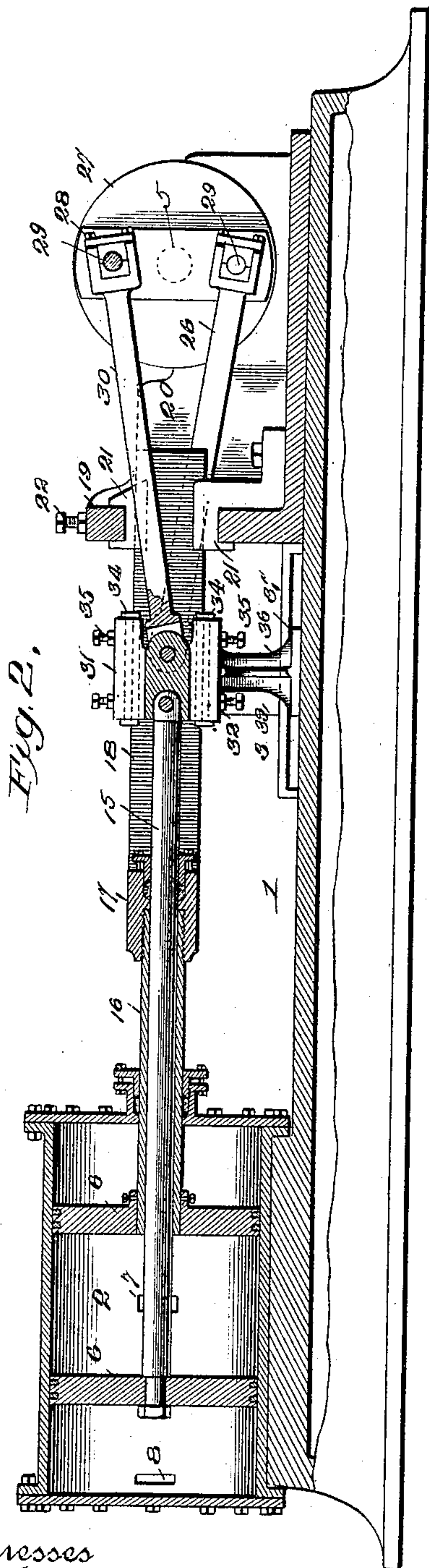
Patented Dec. 13, 1898.

H. R. SACKETT & J. H. HUHN.
STEAM ENGINE.

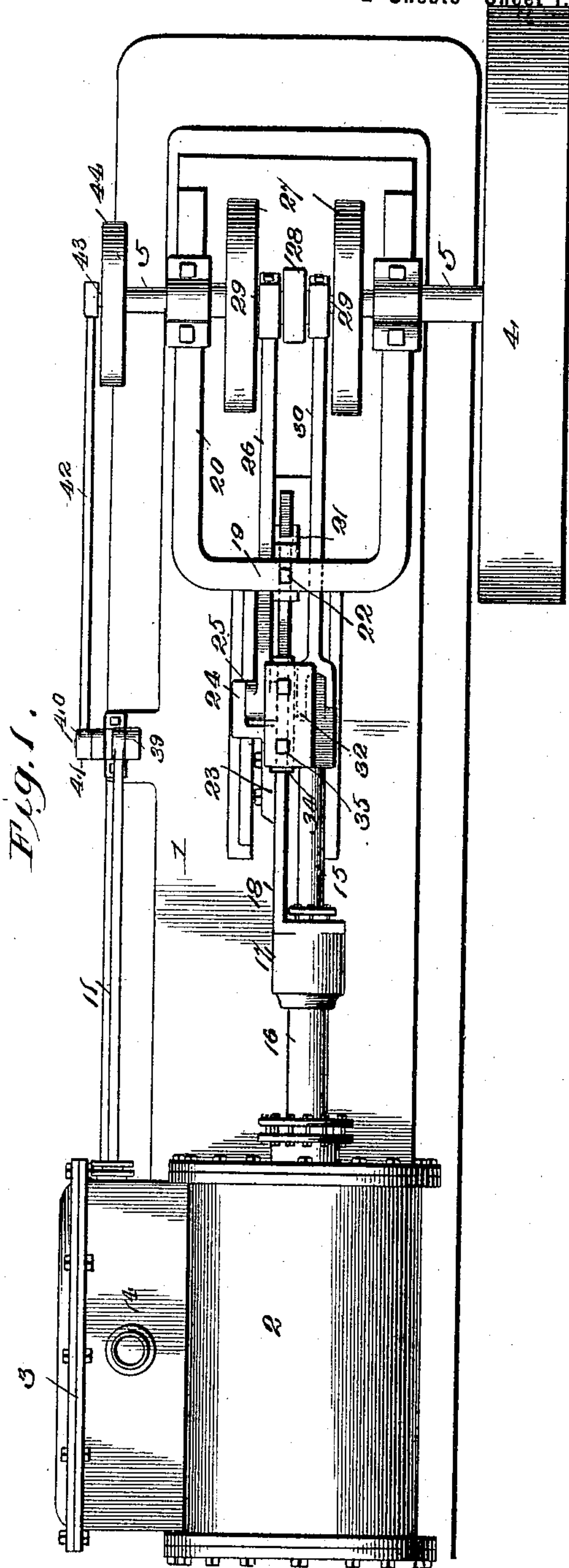
(Application filed Jan. 17, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
Jos. C. Stack.
L. W. Stockbridge



Inventors,
HUGH R. SACKETT,
JOHN H. HUHN,
By V. D. Stockbridge,
Attorney

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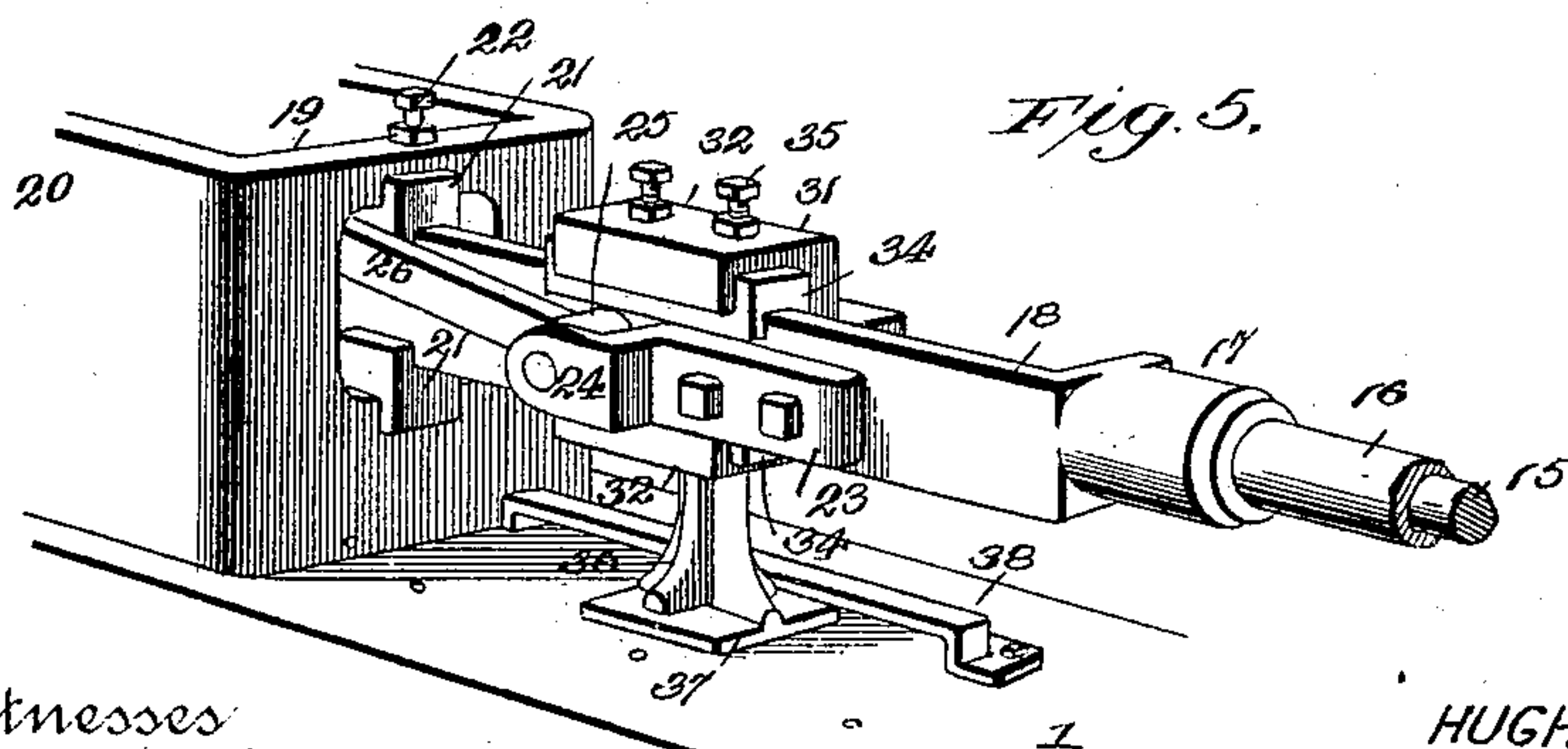
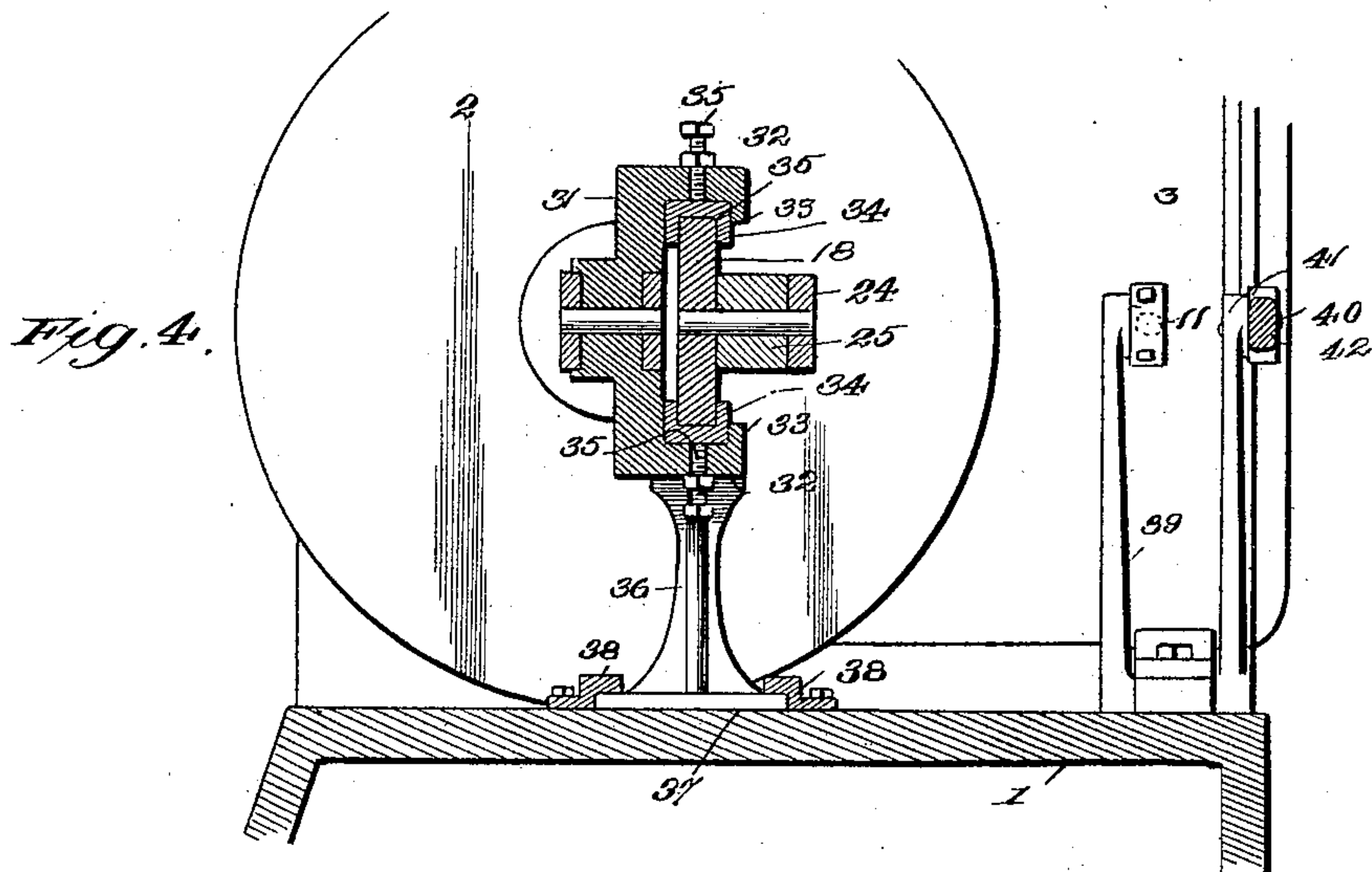
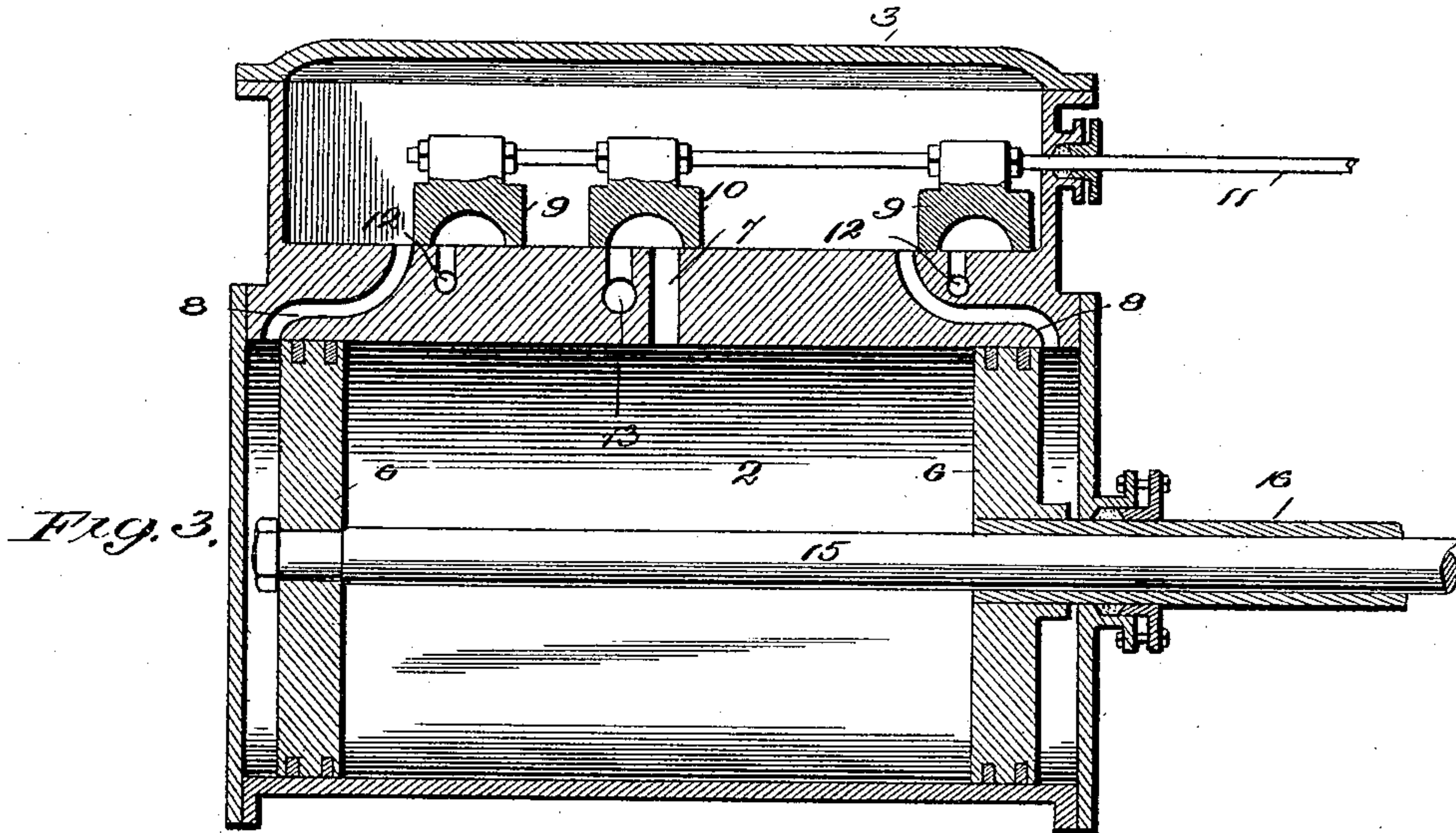
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STEAM ENGINE.

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2 Sheets—Sheet 2.



Witnesses
Jos. C. Stack.
L. W. Stockbridge

Inventors,
HUGH R. SACKETT,
JOHN H. HUHN,
By U. D. Stockbridge,
Attorney

UNITED STATES PATENT OFFICE.

HUGH R. SACKETT, OF SMITHFIELD, AND JOHN H. HUHNS, OF UNIONTOWN,
PENNSYLVANIA.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 615,912, dated December 13, 1898.

Application filed January 17, 1898. Serial No. 666,946. (No model.)

To all whom it may concern:

Be it known that we, HUGH R. SACKETT, of Smithfield, and JOHN H. HUHNS, of Uniontown, Fayette county, Pennsylvania, citizens of the United States, have invented certain new and useful Improvements in Steam-Engines; and we 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.

This invention relates to steam-engines; and the object in view is to provide a high-speed non-vibrating engine which is especially adapted for use upon vehicles, traction-engines, threshing-machines, sawmill-engines, and in all places where an engine cannot be mounted upon a stationary base. By reason of the improved construction all vibration is practically dispensed with and the strain on the boiler and other parts of the machine, as well as wear and tear on the several parts of the engine, are avoided. The improved engine is also well adapted for indoor purposes, as by reason of the absence of vibration it will not injure the structure.

In embodying the present improvements we employ double pistons, which are actuated simultaneously in opposite directions, affording twice the area for the action of the steam and necessitating but half the ordinary throw for each piston-head. The movements of the piston-heads thus counteract and balance each other, in this manner obviating the vibration which is always present in an ordinary single-piston reciprocating engine.

The detailed objects and advantages of the invention will be pointed out in the course of the subjoined description.

The invention consists in an improved steam-engine embodying certain novel features and details of construction and arrangement of parts, as hereinafter fully described, illustrated in the drawings, and incorporated in the claims hereto appended.

In the accompanying drawings, Figure 1 is a plan view of an engine constructed in accordance with the present invention. Fig. 2 is a longitudinal section through the same. Fig. 3 is a longitudinal section through the cylinder and steam-chest, showing the arrangement and operation of the valve mechanism.

Fig. 4 is a cross-section through the machine, showing the manner in which the pistons are mutually supported and guided. Fig. 5 is an enlarged detail perspective view showing the means whereby the pistons are mutually guided and supported.

Similar numerals of reference designate corresponding parts in all the views.

In the drawings, 1 designates the bed-plate of the improved engine; 2, the steam-cylinder; 3, the steam-chest; 4, the fly-wheel, and 5 the main fly-wheel shaft.

Within the cylinder 2 are mounted two piston-heads 6, arranged to move from the ends of the cylinder toward the center, and vice versa, and to be actuated by the steam admitted at one time between the piston-heads and at another time at the opposite ends of the cylinder, each piston-head traveling substantially half the length of the cylinder.

7 designates the central induction-port, and 8 other induction-ports which communicate with the ends of the cylinder, all of said ports communicating with the steam-chest, as clearly illustrated in Fig. 3. Within the steam-chest are mounted three valves, 9 designating two end valves, and 10 an intermediate or central valve, all of said valves being mounted fast upon a common stem 11, passing through one end of the steam-chest. The relative arrangement of said valves and ports is such that when the stem 11 is moved toward the right in Fig. 3 the end induction-ports 8 will be thrown into communication with the steam-chest, thereby allowing the steam to pass to the ends of the cylinder and move the piston-heads toward the center. When the valve-stem 11 is moved to the left in Fig. 3, the ports 8 will be covered and the central induction-port 7 will be uncovered, thereby allowing the steam to pass into the cylinder and actuate the piston-heads in opposite directions toward the ends of the cylinder. In this same movement of the valves the induction-ports 8 are placed in communication with exhaust-ports 12, thus allowing the steam to exhaust from the ends of the cylinder. In a similar manner the central induction-port communicates with a centrally-located exhaust-port 13 when the valves

are in the position shown in Fig. 3. Steam is admitted to the chest 3 through a supply-pipe 14, which is preferably located centrally of said chest.

5 One of the piston-heads 6 is mounted upon a rod 15, and the other piston-head is mounted upon a tubular or hollow rod 16, which surrounds the rod 15, so that both piston-rods are arranged concentrically, one sliding with-
10 in the other. The tubular rod 16 carries at its outer end a collar 17, from which extends a guide-bar 18, arranged out of longitudinal alinement with the piston-rods or at one side of the inner rod 15, as clearly shown in Fig. 1.
15 The guide-bar 18 is of sufficient length to extend through the adjacent wall 19 of the frame 20, in which the main fly-wheel shaft 5 is journaled, and in said wall 19 of the frame are arranged upper and lower brasses 21, the
20 upper one preferably being adjustable by means of a screw or bolt 22, whereby wear may be taken up and the parts properly adjusted.

The guide-bar 18 is provided at one side
25 with a rigidly-attached bracket 23, having an offset ear 24, in which is pivotally received the eye 25 of a connecting-rod 26, which extends to and operates the main fly-wheel shaft 5. This shaft extends through the side
30 walls of the frame 20, and between said walls it comprises oppositely-located disks 27 and an intermediate crank-plate 28, arranged midway between said disks and connected at its opposite ends to said disks by means of crank-
35 pins 29 for receiving the ends of the two connecting-rods.

30 designates the remaining connecting-rod, which at its inner end is bifurcated and pivotally coupled to a reciprocating slide 31,
40 which is mounted to travel longitudinally upon the guide-bar 18 during the reciprocation of the latter. The slide 31 is arranged at one side of the guide-bar 18 and in close proximity thereto and is provided at its top
45 and bottom edges with horizontal flanges 32, which extend over and beneath the guide-bar and which are provided at their extremities with vertical flanges 33 for further embracing said guide-bar. The slide is also provided
50 with upper and lower brasses 34 of wedge shape in longitudinal section and of U shape in cross-section. These brasses are held between the main body of the slide and the flanges or lips 33 and embrace the top and
55 bottom edges of the guide-bar 18, and both of said brasses are made adjustable by means of set-screws 35, whereby the relative positions of the slide and guide-bar may be accurately adjusted.

60 The slide 31 has at its lower end a depending foot-piece 36, the lower end of which is widened to form a horizontal plate 37, which slides at its opposite side edges beneath the overhanging portions of a pair of parallel
65 guide-rails 38, secured rigidly to the bed-plate 1. The foot-piece 36 prevents vertical vibration of the piston-rods, and thereby

greatly steadies the operation of the engine. In the event of wear between the plate 37 and guide-rails 38 such wear may be taken
70 up or compensated for by a proper adjustment of the brasses 34, by means of which the slide 31 may be slightly raised with relation to the guide-bar 18. It will thus be seen that while the guide-bar and slide mutually sup-
75 port and guide each other, together with the piston-rods to which they are attached, wear between said parts may be easily taken up.

The valve-stem 11 at its outer end is connected pivotally with a crank-arm 39 on a
80 rock-shaft 40, mounted in suitable bearings on the bed-plate intermediate the cylinder and main shaft, and this rock-shaft is provided with a second crank-arm 41, from which a connecting-rod 42 extends to and is jour-
85 naled upon a wrist-pin 43, carried by a disk 44, mounted fast on the main axle 5.

It will of course be understood that the valve-gear is so connected with the main shaft that the triple valve will be moved just as the pis-
90 tons reach the inner and outer limits of their throw, thus covering and uncovering the induction and eduction ports for the purpose of admitting steam alternately to opposite
95 sides of the pistons and exhausting the steam from the cylinder at the proper time. By having the pistons arranged to move in opposite directions and reach the ends of their
100 throw simultaneously the impetus of one piston is counteracted by that of the other, and thus all vibration is taken away from the engine, thus adapting it particularly for use as
a mounted engine, such as must necessarily be employed upon motor-driven vehicles, traction-engines, threshing-machines, saw-
105 mill-engines, &c.

The main feature of the invention resides in the particular construction whereby the valve-rods are so coupled as to mutually sup-
110 port and guide each other and whereby also both rods are guided and supported by auxiliary means having a sliding engagement with the bed-plate of the engine.

Another feature of the invention resides in the simple form and arrangement of the triple
115 valve, whereby the induction and eduction ports are covered and uncovered at the proper time.

We are aware that it is not new to employ in connection with a single cylinder two pis-
120 ton-heads arranged to move in opposite directions toward and away from the center of the cylinder and mounted upon piston-rods which slide one within the other, and we therefore do not claim this construction and arrange-
125 ment.

It will be understood that the improved engine hereinabove described is susceptible of various changes in the form, proportion, and minor details of construction, which may ac-
130 cordingly be resorted to without departing from the principle or sacrificing any of the advantages of the invention.

Having thus described the invention, what

is claimed as new, and desired to be secured by Letters Patent, is—

1. In an engine of the class described, a cylinder, two piston-heads arranged to move simultaneously in opposite directions, piston-rods sliding one within the other, a guide-bar rigidly connected to one rod and extending along the side of the other rod and passing through a guide-opening in the machine-frame, and a slide reciprocating upon said guide-bar and connected to the other piston-rod, whereby said rods are adapted to mutually support and guide each other, substantially as described.

2. In an engine of the class described, in combination, a cylinder, oppositely-moving pistons therein, piston-rods connected thereto and sliding one within the other, a guide-bar connected to one piston and extending in parallel relation to the other piston, said guide-bar being flat or rectangular in cross-section, a frame provided with an opening to receive said guide-bar, brasses arranged in said opening and partially embracing said guide-bar, means for adjusting one of said brasses, a slide embracing said guide-bar and coupled to the remaining piston-rod, brasses carried by said slide, and means for adjusting one of said brasses, whereby the piston-rods are mutually guided and supported, substantially as described.

3. In an engine of the class described, a cylinder, oppositely-moved pistons therein, piston-rods connected thereto and sliding one within the other, a bar connected to one piston-rod and extending parallel to the other piston-rod, a slide embracing said guide-bar and coupled to the other piston-rod, a foot-piece rigidly connected to said slide, and oppositely-arranged parallel guide-rails with which said foot-piece coöperates, substantially as described.

4. In an engine of the class described, in combination, a cylinder, oppositely-moving piston-rods therein, piston-rods sliding one within the other, a guide-bar rigidly connected to one piston-rod and extending in parallel relation to the other rod, a slide mounted upon said guide-bar and coupled to the other piston-rod, a depending foot-piece rigidly connected to said slide and provided at its lower end with a plate, and oppositely-located and parallel guide-rails secured to the bed-plate and extending over the plate on the foot-piece, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

HUGH R. SACKETT.
JOHN H. HUHNS.

Witnesses:

CHARLES T. CRAMER,
CHAS. F. GLENN.