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H. C. & L. S. WOLF.

STEAM ENGINE.

APPLICATION FILED MAY 15, 1907.

Fig. 1.

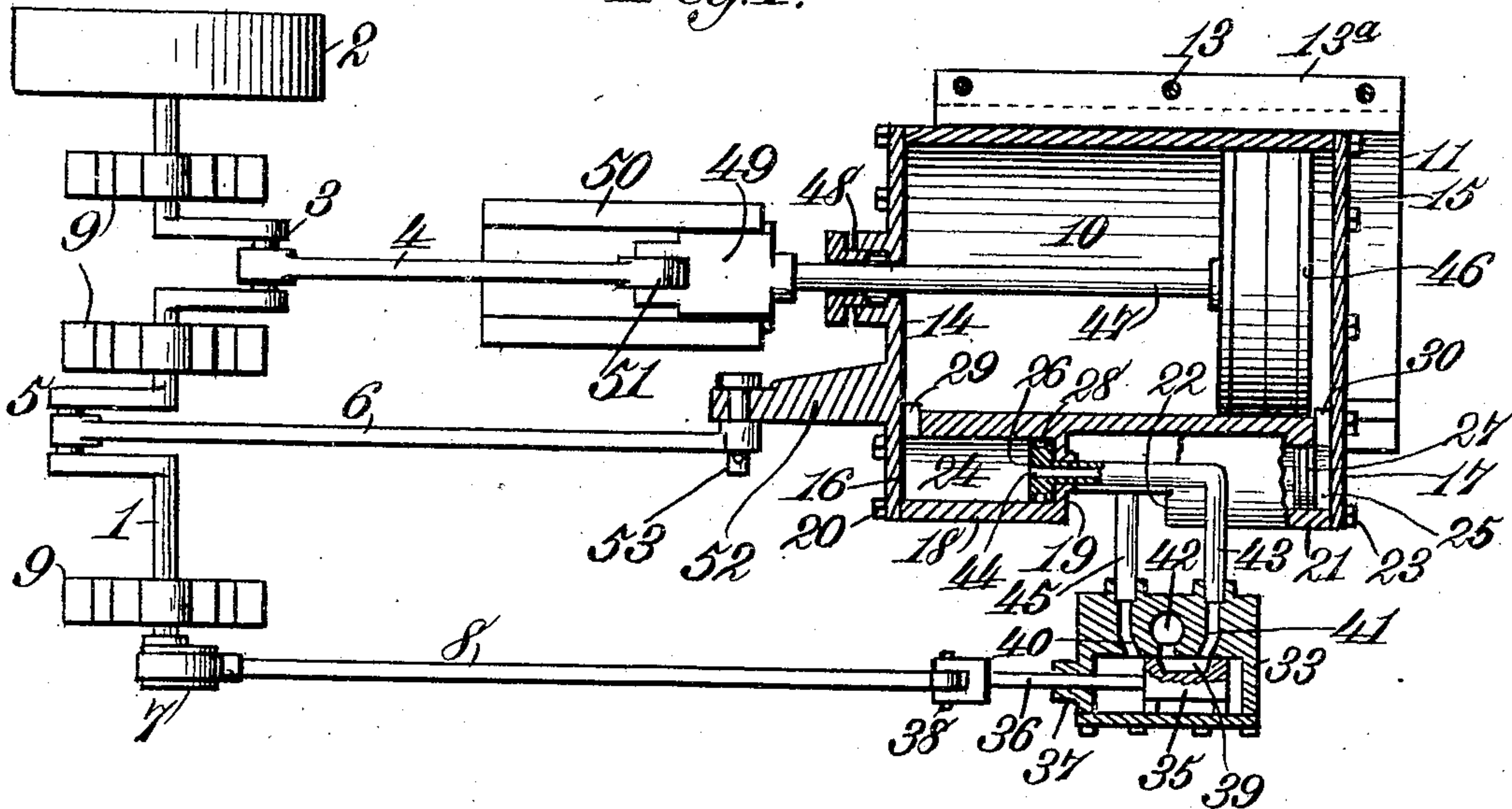


Fig. 2.

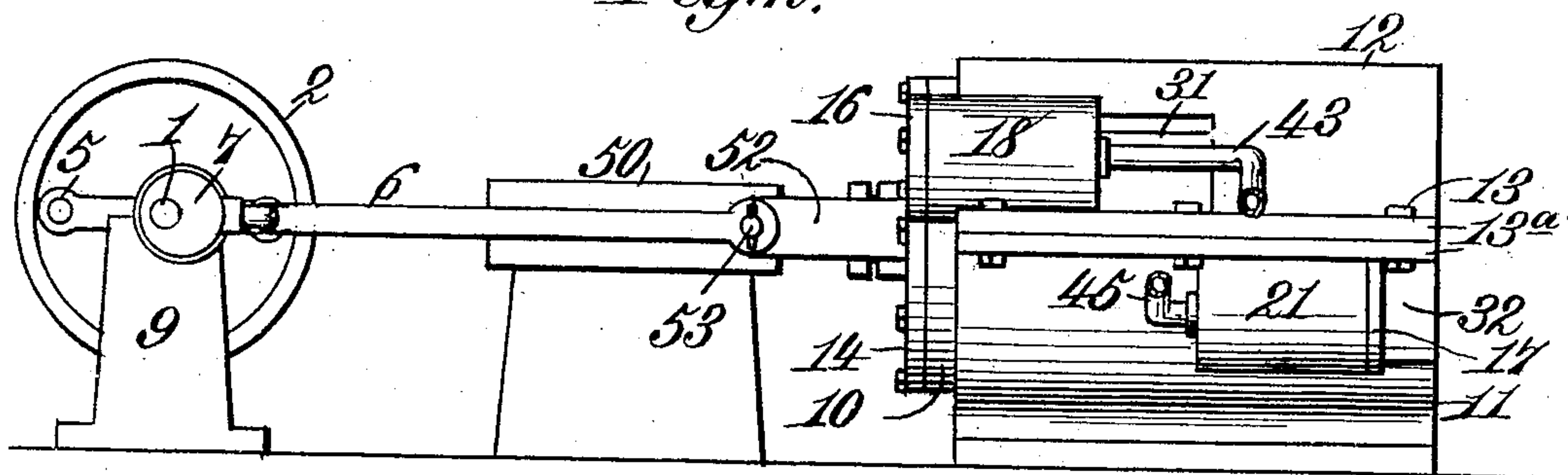
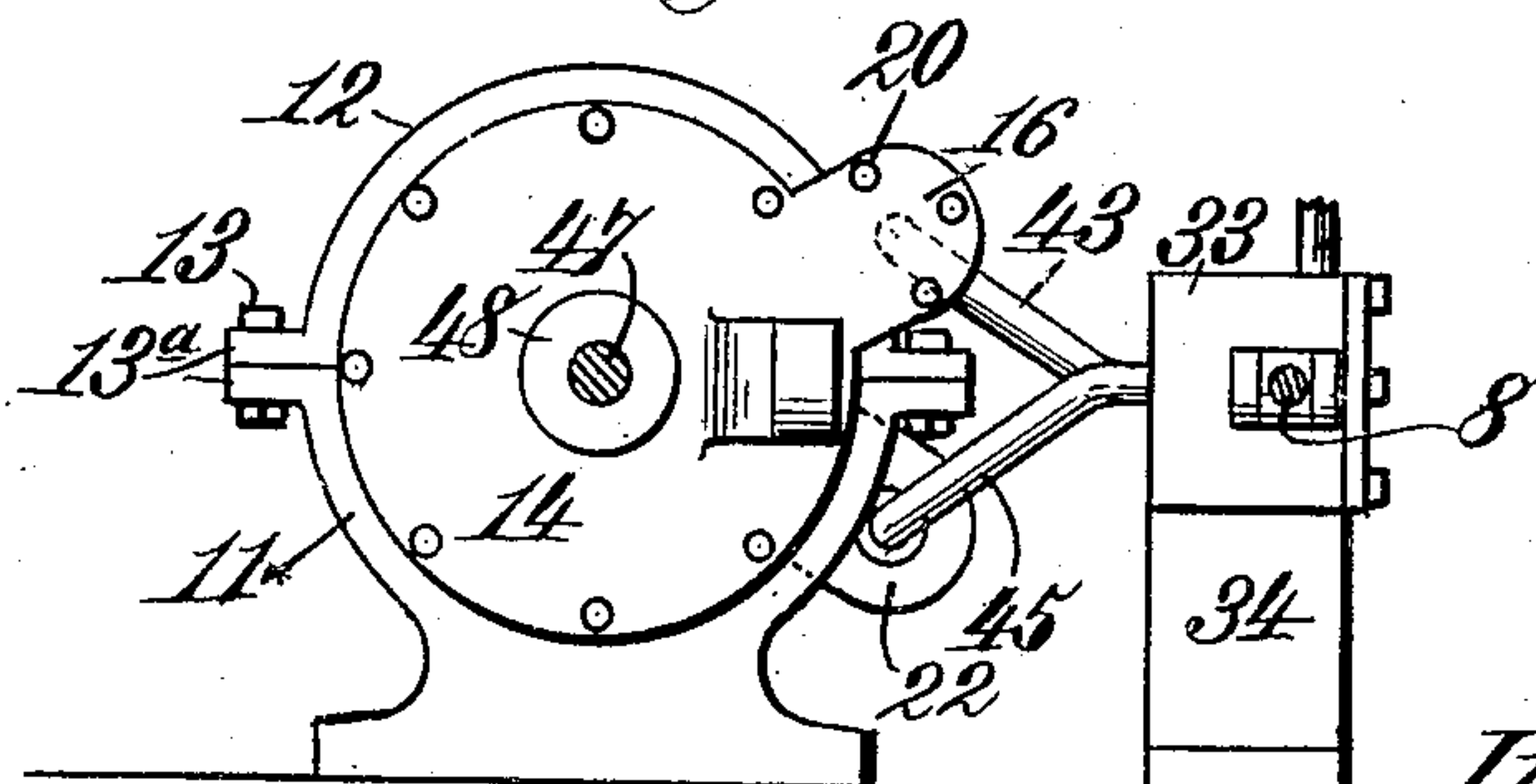


Fig. 3.



Witnesses.
Robert Coult,
J. B. Keeler

Inventors.
Henry C. Wolf
Leo S. Wolf.
By James L. Norris
Att'y.

UNITED STATES PATENT OFFICE.

HENRY C. WOLF AND LEO S. WOLF, OF CATAWISSA, PENNSYLVANIA.

STEAM-ENGINE.

No. 876,758.

Specification of Letters Patent.

Patented Jan. 14, 1908.

Application filed May 15, 1907. Serial No. 373,803.

To all whom it may concern:

Be it known that we, HENRY C. WOLF and LEO S. WOLF, citizens of the United States, residing at Catawissa, in the county of Columbia and State of Pennsylvania, have invented new and useful Improvements in Steam-Engines, of which the following is a specification.

This invention relates to improvements in steam and other fluid-pressure engines, and contemplates the provision, in a manner as hereinafter set forth, of an improved engine in which the piston and the cylinder containing the same are connected to a common crank shaft or other element to be driven and are independently movable under the influence of steam or other fluid pressure, so that the latter will be directly applied to the crank shaft or other element to be driven, thereby utilizing all the pressure of the steam at each stroke.

A further object of the invention is to provide an engine of the character referred to with means in a manner as hereinafter set forth which is arranged exteriorly of the engine cylinder, for forming steam impacting surfaces to facilitate the shifting of the cylinder, and further to overcome any liability of the cylinder binding or wedging in its bearings.

A further object of the invention is to provide an engine of the character referred to with means in a manner as hereinafter set forth for connecting the cylinder to the crank shaft in such a manner as to not retard the shifting movement of the cylinder.

Further objects of the invention are to provide an engine of the character referred to which shall be simple in its construction, strong, durable, efficient in its use, readily set up, utilizing all the pressure of steam at each stroke, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view the invention consists in the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings wherein like characters denote corresponding

parts throughout the several views, and in which—

Figure 1 is a sectional plan of an engine in accordance with this invention; Fig. 2 is a side elevation partly in section; Fig. 3 is an end view.

Referring to the drawings by reference characters, 1 denotes a duplex crank shaft carrying a fly-wheel 2 and connected, as at 3, to the pitman 4, and as 5 to the link 6. To the crank shaft 1 is also connected an eccentric 7 to which is attached a rod 8. The supporting standards for the crank shaft 1 are indicated by the reference character 9.

The engine cylinder is indicated by the reference character 10 and is slidably mounted in a bearing or housing which is formed of a casting consisting of a lower section 11 and an upper section 12. The two sections 11, 12 are secured together by the hold-fast devices 13, suitable flanges 13^a being provided through which said devices extend. The heads of the cylinder are indicated by the reference characters 14 and 15 and each of which is formed with a protuberance, these protuberances being indicated by the reference characters 16, 17.

Projecting from one side of the cylinder 10 near the top thereof at one end is a hollow extension 18 having at one end a head 19 and its other end closed by the protuberance 16, the latter being secured to the extension 18 by the hold-fast devices 20. Projecting from the same side of the cylinder 10 near the bottom and at the other end thereof is a hollow extension 21 having a head 22 and its other end closed by the protuberance 17, the latter being secured to the hollow extension by hold-fast devices 23. Each of the hollow extensions forms a piston chamber. These chambers are indicated by the reference characters 24, 25. In the former is arranged a piston head 26 and in the latter a piston head 27. Each of these pistons carries a packing 28 so that a snug fit will be had between the wall of the extension and piston. The chamber 24 communicates with the cylinder at one end through the medium of a passage 29 and the chamber 25 communicates with the cylinder at its other end through the medium of a passage 30. Provision is made for the passage of the extensions 18 and 21 during the shifting of the cylinder by the cutting away of the sections 11 and 12 of the housing so as to form recesses 31, 32 respectively.

The reference character 33 denotes a steam

chest mounted upon a support 34 and which communicates in a known manner with a steam supply. Within the steam chest 33 is arranged a supply valve 35, the stem of which is indicated by the reference character 36, said stem extending through the packing gland 37 and pivotally connected as at 38 to the rods 8. The valve 35 is formed with a recess 39. The steam chest is formed with a pair of outlets 40, 41 which are alternately closed to the interior of the steam chest through the medium of the valve 39. The steam chest is furthermore provided with an exhaust port to the atmosphere as at 42. The said port 42 is adapted to alternately communicate with the ports 40, 41. Alternate communication is established through the medium of the recess 39.

Communicating with the port 41 is a steam-conducting pipe 43 which is formed in an angular manner and extends through the head 19 and is connected to the piston head 26. The latter is formed with a centrally-arranged opening 44 with which the pipe 43 communicates. The port 40 opens into the steam-conducting pipe 45 which is formed in an angular manner and extends through the head 19 and is connected to the piston 27. The latter is formed in the same manner as the piston 26—that is to say, provided with a centrally-arranged opening with which the pipe 45 communicates.

Within the cylinder 10 is arranged a piston head 46 to which is attached a piston rod 47, the latter extending through the cylinder head 14, and packing gland 48 and is connected to the cross-head 49. The latter is slidable in the ways 50 and pivotally connected, as at 51 to the pitman 4. Projecting from the cylinder head 14 is an angle-shaped arm 52 carrying a pin 53 to which the link 6 is pivotally connected. The piston heads 26, 27 form steam-impacting surfaces which are arranged exteriorly of the cylinder and the function thereof is to assist, in connection with the cylinder heads and crank shaft, the shifting movement of the cylinder 10, or in other words, the pistons 26 and 27 tend to facilitate the movement of the cylinder owing to the fact that the steam exhausted from the cylinder 10 will impact against said piston heads and in connection with the protuberances 16 and 17 materially assist to cause an alternate shifting of the cylinder 10. The protuberances 16 and 17 act as steam-impacting surfaces for the incoming steam from the steam chest. The steam impacting against the protuberances will further assist to alternately shift the cylinder. The moving of the cylinder 10 through the medium of the steam impacting with the protuberances 16 and 17 and piston heads 26 and 27 also tends to prevent binding or wedging of the cylinder within its bearing or housing.

It is thought that the operation will be readily understood from the foregoing description, taken in connection with the accompanying drawings, but it will be stated that steam being supplied to the chest 33, it will alternately enter the chambers 24 and 25, alternately impact against the protuberances 16 and 17 and be alternately supplied by the passages 29 and 30 to the ends of the cylinder 10 and impact alternately against the face of the piston 46. The piston will then be reciprocated which will cause the operation of the crank shaft. Owing to the operation of the crank shaft and the expanding of the steam within the cylinder 10 the latter will also be reciprocated, but its direction of movement will be in an alternate manner with respect to the direction of movement of the piston 46, that is to say the piston moving towards one ends of the cylinder, the latter moving in an opposite direction. These relative movements are continued throughout the operation and such manner of operation will attain increased power, expedited action and the utilization of all the pressure of steam at each stroke, especially in view of the fact that when the steam is exhausted alternately from the cylinder 10 it will alternately impact against the piston heads 26, 27, respectively, and the protuberances 16 and 17 respectively.

What we claim is—

1. In a steam engine, the combination of a reciprocatory steam cylinder, a reciprocatory piston within the cylinder, means to operate the cylinder and the piston in relatively opposite directions, a pair of hollow extensions projecting laterally from one side of the cylinder and forming piston chambers communicating with the ends of the cylinder, pistons mounted in each of said chambers and each of which is formed with a centrally disposed opening, a steam-conducting pipe communicating with the opening in and fixedly connected to each of the pistons, and means for alternately establishing communication between each of said pipes with a steam supply and the atmosphere.

2. In a steam engine, the combination of a reciprocatory steam cylinder, a stationary housing therefor provided at one side with a pair of cut-away portions, one arranged above the other and oppositely disposed, a pair of hollow extensions projecting from one side of the cylinder and each communicating with the cylinder, said extensions oppositely disposed and arranged one above the other and extending through said cut-away portions, a reciprocatory piston in said cylinder, a crank shaft, connections between the crank shaft and said piston, an arm extending from one end of the cylinder, a connection between the crank shaft and said arm, a piston mounted in each of said hollow extensions and having a centrally-disposed opening, a

steam conducting pipe communicating with the opening in and fixedly connected to each of the pistons, and means for alternately establishing communication between each of
5 said pipes with a steam supply and the atmosphere.

3. In a steam engine, the combination of a reciprocatory steam cylinder, a reciprocatory piston in said cylinder, a crank shaft,
10 connections between the crank shaft, cylinder and piston for operating the cylinder and piston in relatively opposite directions, a pair of hollow extensions projecting from one side of the cylinder, communicating there-
15 with and oppositely disposed with respect to each other, a pair of protuberances projecting from the cylinder heads and acting as a closure for the outer ends of the hollow extensions, a piston head arranged in each of
20 the extensions and having an opening, and oppositely disposed steam pipes communicating with the openings in the piston heads and alternately communicating with a steam supply and with the atmosphere for alter-
25 nately establishing communication between the cylinder, steam supply and the atmosphere.

4. In a steam engine, the combination of a reciprocatory steam cylinder, a reciprocatory
30 piston in said cylinder, a crank shaft, con-

nections between the crank shaft, cylinder and piston for operating the cylinder and piston in relatively opposite directions, a pair of hollow extensions projecting from one side of the cylinder, communicating therewith
35 and oppositely disposed with respect to each other, a pair of protuberances projecting from the cylinder heads and acting as a closure for the outer ends of the hollow extensions, a piston head arranged in each of the
40 extensions and having an opening, oppositely disposed steam pipes communicating with the openings in the piston heads and alternately communicating with a steam supply and with the atmosphere for alternately es-
45 tablishing communication between the cylinder, steam supply and the atmosphere, and a housing for said cylinder, said housing provided with cut-away portions to allow of the shifting of the hollow extensions when the
50 cylinder is reciprocated.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

HENRY C. WOLF.
LEO S. WOLF.

Witnesses:

AMOS TEPLE,
FRANK LEVAN.