C. C. R. HAMMAR.

POWER DRIVEN RECIPROCATING MECHANISM.

APPLICATION FILED APR. 27, 1914.

1,136,796. Patented Apr. 20, 1915.

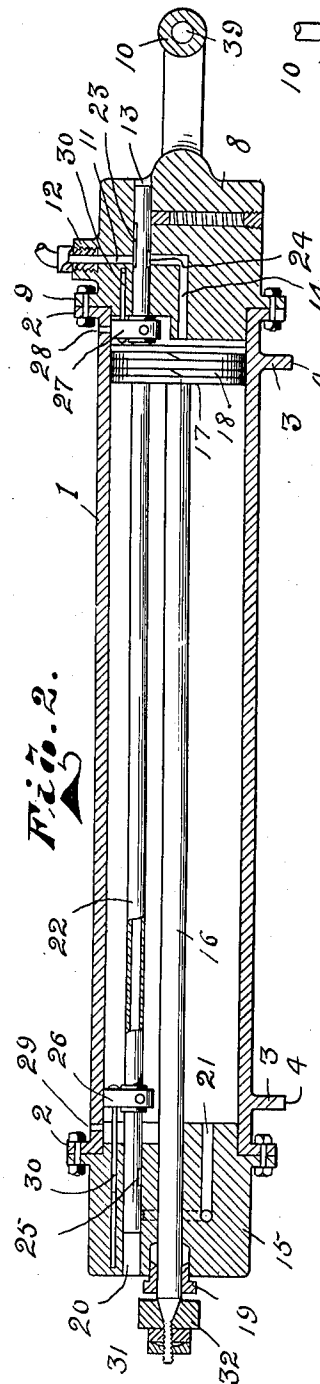


Fig. 2.

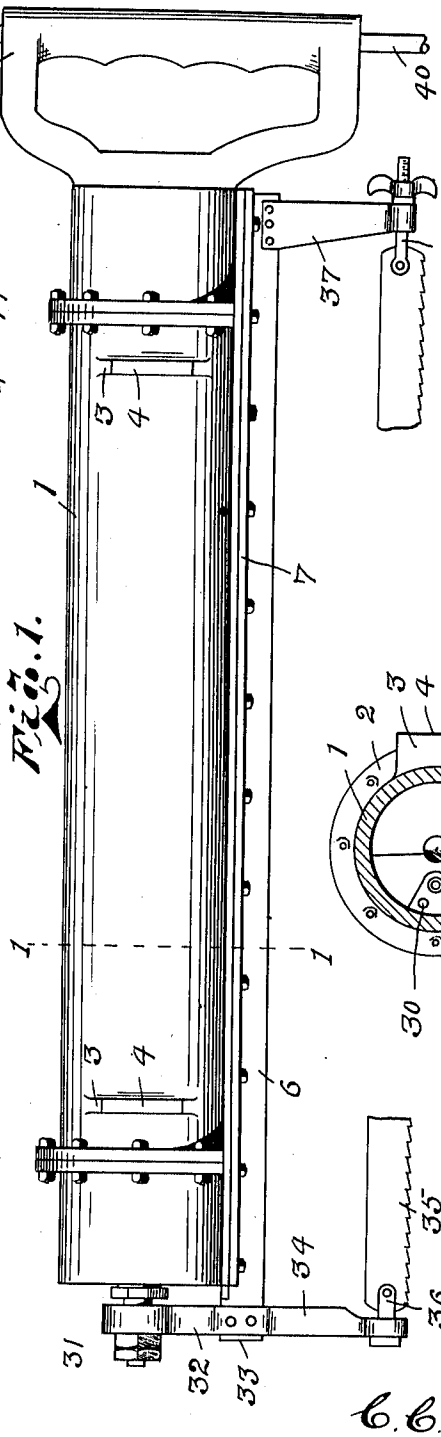


Fig. 1.

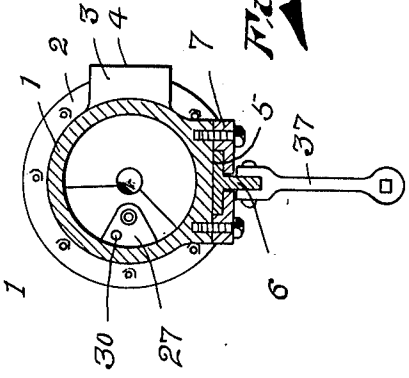


Fig. 3.

WITNESSES:

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POWER-DRIVEN RECIPROCATING MECHANISM.

1,136,796. Specification of Letters Patent. Patented Apr. 20, 1915.

Application filed April 27, 1914. Serial No. 834,803.

To all whom it may concern:

Be it known that I, CHARLES C. R. HAMMAR, a citizen of the United States, residing at New Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Power-Driven Reciprocating Mechanisms, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in power driven reciprocating mechanisms the primary object of which is to devise a power driven reciprocating mechanism adapted to be applied to reciprocating tools.

The present invention is particularly adapted to be applied to hack saws which are used in connection with the cutting of metal. It is to be understood, however, that the invention is not limited to this application for it may be readily applied to files, rasps, sandpaper, etc.

A still further object of the present invention is to provide a simple device of this character which derives its power from expansive gases such as compressed air, steam or the like, and which may be flexibly connected to such source of supply and used as a portable manually controlled reciprocating means.

In the accompanying drawings: Figure 1 is a side elevation of my improved reciprocating mechanism applied to a saw. Fig. 2 is a central longitudinal sectional view partly in plan. Fig. 3 is a transverse sectional view taken on the line 1—1 of Fig. 1.

Referring now to the drawings in which like reference numerals designate similar parts, 1 represents a cylinder of smooth bore suitably adapted for the reception of a gas actuated piston. The cylinder is formed at each end with an annular flange 2, intermediate and upon one side thereof are provided a plurality of projecting members 3 which have a straight outwardly projecting face 4 upon which the cylinder may be made to rest when it is so desired.

A straight flat face 5 is formed upon one side of the cylinder 1 at right angles to the members 3, and is made to form a smooth bearing surface for the T-shaped reciprocable member 6. The member 6 is slidably held against the flat face 5 by means of the side guide-pieces 7 which are securely bolted against the flat face 5, one on each side of the member 6, as is clearly shown in Fig. 3 of the drawings.

At one end of the cylinder, I provide a head member 8 which is preferably formed of a single piece of metal having an annular flange 9 formed thereon which corresponds to the flange 2 on the cylinder 1 and which is designed to be bolted thereto when the head is in place. A portion of the head 8 projects within the cylinder in order to secure a substantial fit therewith. The outer end of the head 8 has formed integral therewith a suitable handle 10 for the manual manipulation of the device. Within the head 8 is a radially extending port or passage way 11 which is surrounded at its external terminus by a boss 12 into which any form of hose connection may be fitted. A hole 13 is bored longitudinally of the head 8 and at one side of the center thereof communicating on one side with the passage 11 and on the opposite side with a similar passage way 14 which leads to the interior of the cylinder 1. The opposite end of the cylinder 1 is provided with a head 15 similar to the head 8 except that there is no handle attached thereto, and through the center thereof passes a piston rod carrying a piston 17 which is preferably formed integral therewith and provided with suitable expansion rings 18 as is usual in such devices. Surrounding the piston rod 16 and adjacent the exterior of the head 15 is formed any suitable stuffing box 19. A hole 20 is bored through the head 15 directly in line with the hole 13 in the head 8. This hole 20, however communicates with but a single passage-way 21 which leads to the inside of the cylinder.

Within the holes 13 and 20, in the heads 8 and 15 respectively, is slidably mounted a hollow rod or valve stem 22 which is closed at both ends. The said valve stem within the head 8 is provided with an elongated port 23 which is adapted to communicate

with the passage-way 11 and a port 24 which is adapted to communicate with a passage-way 14, whereby the expansive gas may pass directly through the passage-way 11 into the passage-way 14 and thence into the cylinder, imparting a pressure against the face of the piston 17. The valve stem 22 passes through the piston 17 and has a reasonably close fit therethrough in order to prevent undue leakage. Upon the opposite end of the valve stem 22 within the head 15 is formed a circumferential port 25 which is positioned longitudinally on the stem 22 in such a manner, that when the stem is in its extreme extended position toward the head, as illustrated in Fig. 2 of the drawings, the port 25 will be closed against the discharge by the walls of the hole 20, but when the stem is extended to its limit in the opposite direction, this port 25 will communicate with the passage 21 and admit the expansive gas therethrough in order to impinge the rod side of the piston 17. When this piston is in this latter position, the port 24 within the head 8 will be closed against the wall of the hole 13 and will not communicate with the passage-way 14. However, the port 23 being elongated as before described, will at all times be in communication with the supply passage 11 and thus feed the expansive gas through either port 24 or 25, thus supplying gas at opposite sides of the piston head as the position thereof demands.

The stem 22 has fixedly mounted thereon two sectorally shaped valves 26 and 27 adjacent each end thereof and which slidably engage the inner surface of the cylinder. These valves are designed to alternately open and close the exhaust ports 28 and 29 which are formed through the wall of the cylinder 1 at opposite ends thereof. Each valve 26 and 27 carries a stem 30 which extends within the head adjacent thereto and reciprocates therein when the valves are moved back and forth. These stems 30 are for the purpose of keeping the valves and stem 22 in a fixed rotational position.

From the foregoing description it will be understood that as gas is admitted through the passage-way 11, the piston being in the position illustrated in the drawing, it will pass directly through the stem 22 diametrically through the passage-way 14 into the cylinder 1 and impinging the piston 17 will force it to the opposite end of the cylinder, exhausting the air on the opposite side of the piston through the port 29. When the piston 17 approaches the limit of its stroke thus imparted, it will engage the valve 26 and carry it with it, causing the stem 22 to travel longitudinally in the same direction, resulting in the closing of the port 24 and the port 29 and simultaneously opening the inlet ports 25 and the exhaust port 28. This action will admit the expansive gas upon the opposite side of the piston 17, driving the piston on its return stroke and exhausting through the port 28 when it will again assume the position originally started with. As long as the expansive gas is thus admitted to the port 11, the reciprocation of the elements thus described will continue.

The externally extending end 31 of the piston rod 16 is provided with a depending arm 32 which is fixed to the extending end 33 of the T-bar 6 having a downwardly extending portion 34 to which is removably attached a saw-blade 35, by means of any suitable connection 36. The opposite end of the T-bar 6 is provided with a depending arm 37 to which is attached the opposite end of the saw-blade 35 by means of any removable and adjustable means such as 38. Thus it will be seen that as the piston-rod 16 is reciprocated through the mechanism above described, the T-bar 6 attached thereto will be reciprocated and that the saw-blade 35 will be furnished with a very substantial and direct power of reciprocation for sawing purposes.

I have illustrated the handle 10 of the machine as being provided with a hole 39 through which any suitable rod 40 may be extended and whereby the mechanism may be suspended above any single cut to be made and allowed to feed downwardly therein by its own gravity. This attachment enables the mechanism to be left to feed itself after it has once been set in the cut.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. A tool reciprocating mechanism comprising a cylinder, a piston and piston rod operatively mounted within the cylinder and having the end of the rod extending through one end of the cylinder and attached to the tool carrying means mounted upon one side of the cylinder, and a plurality of projecting members upon one side of the cylinder at right angles to the tool carrying means upon which the cylinder may rest while at work.

2. A tool reciprocating mechanism comprising a cylinder, a piston and piston rod operatively mounted within the cylinder, inlet and exhaust ports in the ends of the cylinder, a valve rod reciprocally mounted within the cylinder and communicating with the said inlet and exhaust ports, a slide in one side of the cylinder, and a bar connected to the piston rod and adapted to be reciprocated in the said slide.

3. A tool reciprocating mechanism comprising a cylinder, a piston and piston rod operatively mounted therein, inlet and exhaust valves within the ends of the cylinder, a hollow valve rod reciprocally mounted within the cylinder and having ports on

its ends adjacent the cylinder heads communicating with the said inlet and exhaust valves, a slide in one side of the cylinder, and tool engaging means connected to the piston rod and reciprocally movable within the said slide, the parts arranged as and for the purpose described.

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

CHARLES C. R. HAMMAR.

Witnesses:
WESLEY J. THOMAS,
FRANK POOLE.