

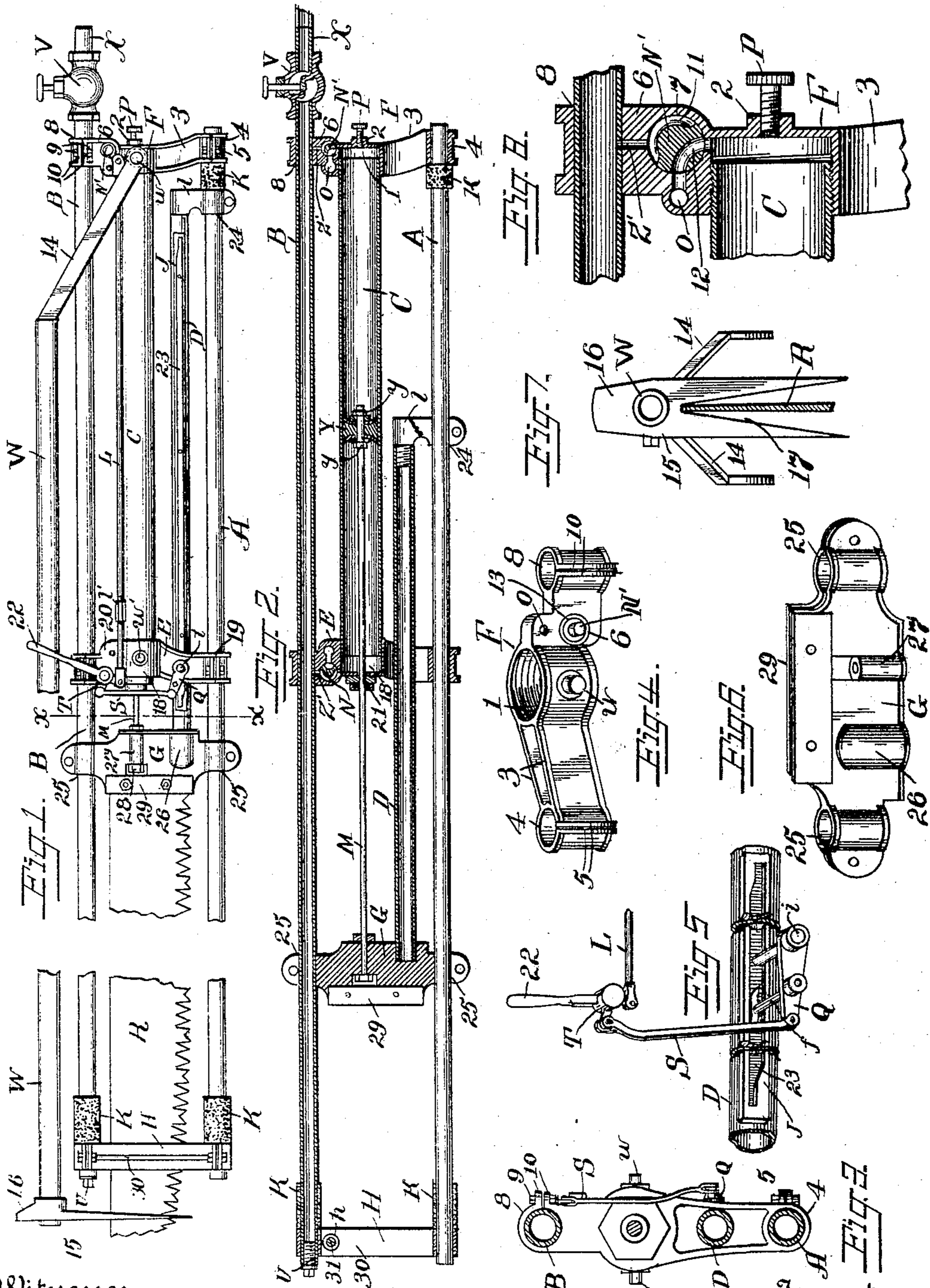
No. 774,625.

PATENTED NOV. 8, 1904.

H. WHITE.
PORTABLE ENGINE.

APPLICATION FILED MAY 13, 1903.

NO MODEL.



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PORTABLE ENGINE.

SPECIFICATION forming part of Letters Patent No. 774,625, dated November 8, 1904.

Application filed May 13, 1903. Serial No. 157,004. (No model.)

To all whom it may concern:

Be it known that I, HENRY WHITE, a citizen of the United States of America, and a resident of Marion, in the county of Marion and State of Ohio, have invented certain new and useful Improvements in Portable Engines, of which the following is a specification.

My invention relates to an improvement in portable motors, the object being to provide a reciprocating device for operating any suitable mechanism, which may be easily conveyed from place to place as needed, and which combines strength with great power and yet is inexpensive, neat, simple, and durable.

I have shown and will describe my motor in connection with a saw for cutting logs, timber, and the like; but I do not wish to be understood as limiting the use of my invention to sawing, since it may be utilized wherever a reciprocatory movement is desired.

I have shown my invention in the present instance as operating a crosscut-saw, the latter being suitably secured to a cross-head slidingly supported upon suitable guides and connected with the piston of the cylinder, and the device may be employed for cutting down timber, cutting logs, or for any kind of cross-cutting which would be accomplished by means of a crosscut-saw.

The weight of the entire device is such that it may be transported from place to place in the woods or elsewhere without difficulty or inconvenience and may be set up or taken down with no trouble whatsoever.

To this end my invention consists in certain novel features of construction and combinations of parts, such as will be more fully described hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of my invention combined with a crosscut-saw. Fig. 2 is a longitudinal cross-sectional view. Fig. 3 is a view in transverse cross-section, taken on the line *xx* of Fig. 1. Fig. 4 is a detail view of the rear cylinder-head detached. Fig. 5 is a perspective detail view of the valve-operating mechanism carried by the front cylinder-head. Fig. 6 is a detail perspective view of the cross-head. Fig. 7 is a view in end elevation of

the dog-bar and dog, and Fig. 8 is an enlarged detail view in cross-section of the valve *N'* and its connected parts.

The framework of the motor is constructed, preferably, of tubing, of which *A* and *B* indicate the guide-rods, one of which, *B*, is utilized as the supply-tube for the cylinder. Mounted upon and rigidly connecting the tubes *A* and *B* are the front and rear cylinder-heads *E* and *F* and the bracket *H*. The rear cylinder-head *F* is formed as shown in Fig. 4, the cylinder-head proper, 1, being internally threaded, as shown, to receive the threaded end of the cylinder *C*, the head being further provided with a flanged port 2, normally closed by means of the screw *P*. Extending from cylinder-head are webs 3 3, to which may be integrally secured a resilient split sleeve 4, provided with apertured lugs 5 5, the sleeve adapted to embrace the guide-tube *A* and be frictionally secured thereon by means of a bolt passing through the apertures in the lugs, compressing the sleeve around the tube.

Projecting in the opposite direction from the webs or braces 3 3 is a valve-casing 6, having a valve-chamber 7 formed therein adapted to receive the rotating valve *N'* and also provided with an exhaust-port *O*, leading to the atmosphere, the valve-chamber provided with an inlet-port *Z'* communicating with the interior of the supply-tube *B*, the exhaust-port *O* communicating with the valve-chamber 7. A split sleeve 8 is formed integrally with the valve-casing and is adapted to embrace the supply-tube *B* and be secured thereupon by means of a bolt 9 passing through the apertured lugs 10 10 of the sleeve, the inlet-port *Z'* communicating with the bore of the sleeve 8 and registering with an opening provided in the supply-tube *B*.

The valve *N'* is provided with valve-ports 11 and 12, adapted to connect the cylinder with the inlet-port *Z'* or with the exhaust-port *O* alternately. The stem of the valve passes out through a suitably-packed gland 13 and is provided with a pitman *t*, to which is suitably secured a connecting-rod *L*, extending and secured to the valve *N* in the front cylinder-head, hereinafter referred to.

The connecting-rod may preferably be made in sections connected by means of a turn-buckle *Z'*, whereby the rotary movement of the valves is regulated.

5 The rear cylinder-head is provided with trunnions *w w*, adapted to pivotally receive the apertured arms 14 14 of the dog-bar *W*, the free end of which is provided with a dog 15, having a head 16 and a slot 17, the latter
10 adapted to straddle the saw-blade *R* to guide the same and retain it in perfect alinement. It will thus be observed that the dog-bar extends from the rear cylinder-head to a point beyond the frame in front of the bracket *H*.
15 The front cylinder-head *E* is substantially similar to the rear cylinder-head, it consisting of a front cylinder-head proper, 18, adapted to receive the forward end of cylinder *C*, the head proper, 18, provided with webs or
20 braces carrying a split sleeve 19 at their ends adapted to embrace and be firmly secured upon the guide-tube *A* and provided also with a valve-casing having a valve-chamber 20 formed therein and exhaust and inlet ports
25 communicating therewith, the valve-casing further provided with a split sleeve secured upon the supply-tube *B* in such a manner that the inlet-port *Z'* shall register or communicate with an aperture formed in said supply-
30 tube. A valve *N* is received in the valve-chamber and is provided with valve-ports which alternately cause the communication of the inlet and exhaust ports with the cylinder *C*. The valve is provided with a stem to the
35 outer end of which is secured a bell-crank lever *T*, one arm of which has secured thereto the slotted end of the connecting-rod *L*, as above set forth. The front cylinder-head is also provided with trunnions *W' W'* for the re-
40 ception of the resilient arms 14 14 of the dog-bar *W* when it is desired that the latter project farther beyond the framework of the motor.

The front cylinder-head is provided with a
45 stuffing-box 21, through which extends the piston-rod *M*, its inner end being threaded and provided with nuts *y y*, between which is held the piston *Y*.

The bell-crank lever *T* is provided with a
50 handle 22, whereby the valves *N* and *N'* may be manually operated, if desired; but I have also shown means for automatically and simultaneously operating these valves, which mechanism is as follows: To the remaining arm of the
55 bell-crank lever is secured a link *S*, having slotted ends, the opposite end of which link is fastened to a crank *Q*, pivotally secured at *i* to the web of the front cylinder-head. A pin *f'* is adjustably secured to the crank intermediate its ends, and to the free end of this pin
60 is fastened an ogee cam-traveler *j*, received in a groove 23, formed in a runway *J*, the groove being oppositely tapered or beveled at each end—that is to say, the taper at one end causes
65 the follower to ride up and at the opposite end

forces the traveler down. This runway may be concaved to fit upon and be secured to a guide-rod *D*, passing between the webs or braces of the front cylinder-head, the rod *D* being threaded at its rear end for attachment
70 to the threaded stud *l*, which stud is provided with a split sleeve 24, slidably secured upon the guide-tube *A*.

The cross-head *G* will next be described, it comprising a casting provided with split
75 sleeves 25 25, slidably secured upon the guide-tube *A* and supply-tube *B*, respectively, and having a socket 26 for the reception of the forward end of the guide-rod *D*, which is secured therein. The rear face of the cross-
80 head is also provided with a socket 27, in which is received the forward end of the piston-rod, which projects therethrough and is held therein by means of a nut 28 on its outer end. The front face of the cross-head is provided
85 with apertured wings 29 29, between which is held one end of the saw-blade *R*, which latter is provided with apertures registering with those formed in the wings and adapted to receive bolts or other fastening means.
90

The supply and guide tubes at their forward ends are provided with a bracket *H*, comprising a pair of split sleeves firmly secured to the respective tubes and connected by means of
95 braces 30 30, between which the saw-blade reciprocates. A journal-pin 31 extends between the braces 30 30 and carries a friction-wheel *h* thereupon, against which the back of the saw-blade *R* bears, whereby it is supported and the friction reduced.
100

Located at either end of the guide-tube *A* are the cushion-sleeves *K K*, against one of which the split sleeve 24 of the guide-rod impinges, and the remaining cushion, together
105 with a similar cushion on the forward end of the supply-tube *B*, is designed to receive the impact of the cross-head in its outward movement.

The supply-tube at its forward end may be closed by means of a plug *U*. At its rear end
110 is located a globe-valve *V*, to which is connected a pipe *X*, leading from any suitable source of supply.

The operation, briefly, is as follows: The machine is conveyed to the place where it is
115 to be employed and set up, the slotted end of the dog 15 being driven into the timber or log to be sawed and the framework suitably supported, as upon saw-horses, for instance. The steam, compressed air, gas, fluid, or other
120 motive power is then admitted through the valve *V* from the source and enters the cylinder-chamber *C* through whichever valve *N* or *N'* is open, one being open and the other closed. The motive power entering the cyl-
125 inder forces the piston backward, let us say, the products of combustion or air back of the piston being forced out through the exhaust *O*. The rearward movement of the piston draws with it the cross-head *G* and the guide-
130

rod D, carrying the runway J. As the piston approaches its rearward limit of movement the tapered portion at the end of the groove 23 forces the cam-traveler *j* downward, partially rotating the pin *f* and crank Q, forcing the link S downward and rocking the bell-crank T, which partially rotates the valve N to close the communication between the supply-tube B and cylinder C and opens communication between the cylinder and the exhaust-port O. Simultaneously therewith the valve N', by means of the connecting-rod L, has been partially rotated to close the communication between the exhaust-port O of the rear cylinder-head and the cylinder C and has opened the communication between the cylinder C and the supply-tube B, whereupon the motive power enters the cylinder behind the piston, driving it forward, together with the cross-head and saw. The guide-rod D, passing between the webs or braces of the front cylinder-head, is adapted to retain the cross-head in perfect alinement during its reciprocations, and the cushions K K serve to reduce jars and vibrations incident to the operation of the machine.

It is obvious that changes might be made in the form and arrangement of the several parts described without departing from the spirit and scope of my invention, and hence I do not wish to limit myself to the exact construction herein set forth; but,

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A reciprocating mechanism comprising guide members, a cylinder, cylinder-heads connecting the guide members and cylinder, a cross-head movably supported on the guide members, a piston in the cylinder, a piston-rod connecting the piston and cross-head, a stud slidably secured to one of the guide members, a guide-rod extending between the stud and cross-head, a runway carried by the guide-rod, a traveler operating in the runway, valve-gear mechanism and means connecting the traveler and valve mechanism for operating the latter.

2. A reciprocating mechanism comprising guide members, a cylinder, cylinder-heads, connecting the cylinder and guide members, a bracket extending between the guide members, a cross-head slidably mounted on the guide-members, means for reciprocating the cross-head, valves located in each cylinder-head, a connecting-rod extending between the valves, a movable runway, means traveling in the runway and a link connecting one of the valves with the means traveling in the runway to transmit motion to the valves simultaneously.

3. A portable steam-engine comprising a pair of guide-tubes, one of which is utilized as a reservoir, a cylinder disposed intermediate the guide-tubes, cylinder-heads on the cylin-

der, webs connecting the cylinder-head extending between and sliding upon the guide-tubes, means for operating the cross-head, a communication extending from the reservoir-tube to the cylinder and means operated by the valve for controlling the communication.

4. A portable engine comprising guide and supply tubes, cylinder-heads extending between and connecting the tubes, a cylinder supported in the cylinder-heads and between the tubes, the head provided with passages connecting the supply-tube and each end of the cylinder, valves located in the passages, a cross-head slidably received upon the guide and supply tubes, means for operating the cross-head, a connecting-rod extending between and secured to the valve, a runway secured to and movable with the cross-head, a traveler received in the runway and means connecting the traveler and valves to alternately and successively open and close the latter.

5. A portable engine comprising a guide-tube and a supply-tube, cylinder-heads connecting the tubes, a cylinder received in the cylinder-heads and lying parallel with and intermediate the guide and supply tubes, the cylinder-heads provided with passages connecting the supply-tube with either end of the cylinder, a cross-head slidably received on the supply and guide tubes, means for actuating the cross-head, a runway member, one end of which is slidably received on the guide-tube, the runway member connected with the cross-head and reciprocating therewith, a traveler received in the runway and oscillated thereby, and valves controlling the passages from the supply-tube to the cylinder, the valves connected with the traveler and operating to alternately close one end of the cylinder to the entrance of motive power and open the opposite end of the cylinder, the cylinder-heads provided with exhaust-openings with which the valves register when the passages from the supply-tube to the cylinder are closed.

6. A reciprocating means comprising a movable member, guide-tubes supporting the member, one of the guide-tubes constituting a supply or reservoir, cylinder-heads connecting the guide-tubes, the cylinder-heads comprising a cylinder-seat, webbing, a split sleeve connected therewith, a valve-casing and a second split sleeve connected therewith, valves and inlet and outlet ports located in the valve-casing and communicating with the cylinder-seats, the supply-tube adapted to be in communication with the valve-casing, a cylinder, the ends of which are received in the cylinder-seats, means for operating the movable member, and means for reversing the valves automatically and simultaneously.

7. A reciprocating means comprising guide-tubes and cylinder-heads connecting the tubes, each cylinder-head consisting of a cylinder-

seat, a split sleeve, braces connecting the sleeve and seat, a second split sleeve, a valve-casing connecting the second sleeve and seat, the valve-casing containing a valve-chamber communicating with the cylinder-seat and having an outlet-port connected with the chamber and an inlet-port extending from the second split sleeve to the chamber, one of the guide-tubes provided with apertures communicating with the inlet-ports, valves in the valve-chambers, a movable member, a cylinder the ends of which are received in the cylinder-seats, means for actuating the movable member, and means operated by the movable member for automatically and simultaneously reversing the valves.

8. A portable engine provided with guide and supply tubes, a cross-head slidingly mounted thereon, braces connecting the guide and supply tubes, means for actuating the cross-head and cushioning-sleeves carried by the tubes and seated against the braces, the cross-head impinging against the sleeves.

9. A reciprocating mechanism comprising a framework, a movable member, a cylinder, means for operating the movable member, a guide-rod, a stud to which the guide-rod is

connected at one end, a split sleeve carried by the stud and slidingly mounted on the framework, the opposite end of the guide-rod secured to the movable member, a runway member supported by the guide-rod, a traveler operated by the runway member, valve mechanism connected with the cylinder, and means connecting the traveler and valve mechanism for simultaneously and automatically operating the valves.

10. A reciprocating mechanism for cutters comprising a plurality of guide-tubes, one of which constitutes a supply-tube, means for connecting a suitable motive-power source therewith, a cylinder-valve mechanism adapted to connect the supply-tube with either end of the cylinder, a movable member, means for operating the movable member and means connected with the movable member for simultaneously and automatically reversing the valve mechanism.

Signed at Marion, Ohio, this 9th day of May, 1903.

HENRY WHITE.

Witnesses:

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