

F. BARNHART.
WOOD SPLITTING MACHINE.
APPLICATION FILED OCT. 28, 1907.

1,020,072.

Patented Mar. 12, 1912.

3 SHEETS—SHEET 1.

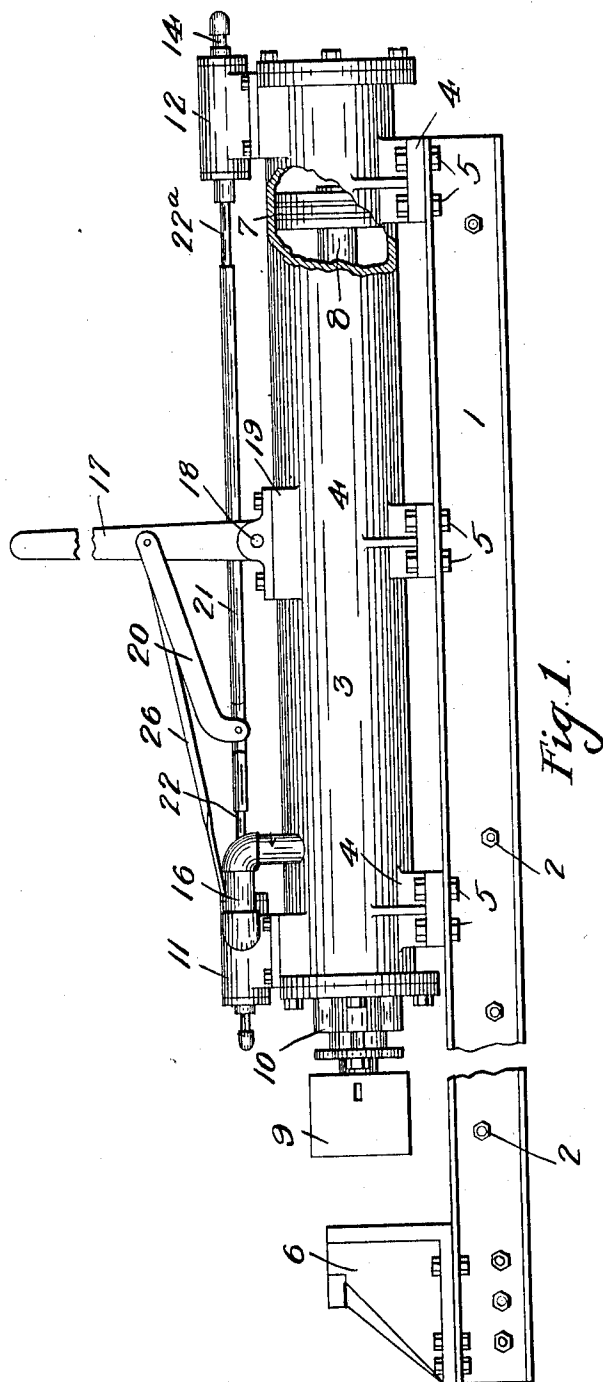


Fig. 1.

WITNESSES
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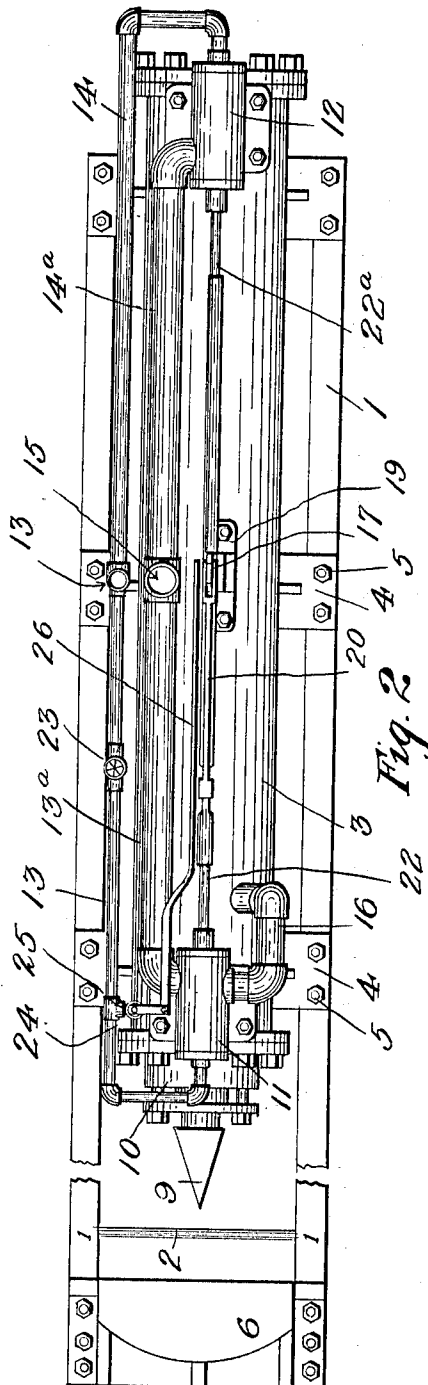
INVENTOR
Frank Barnhart

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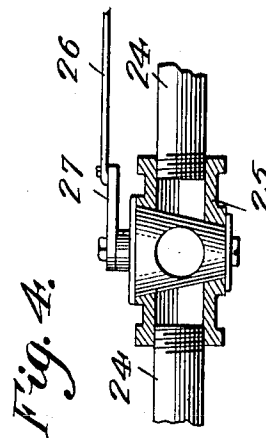
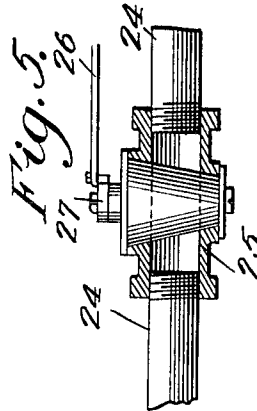
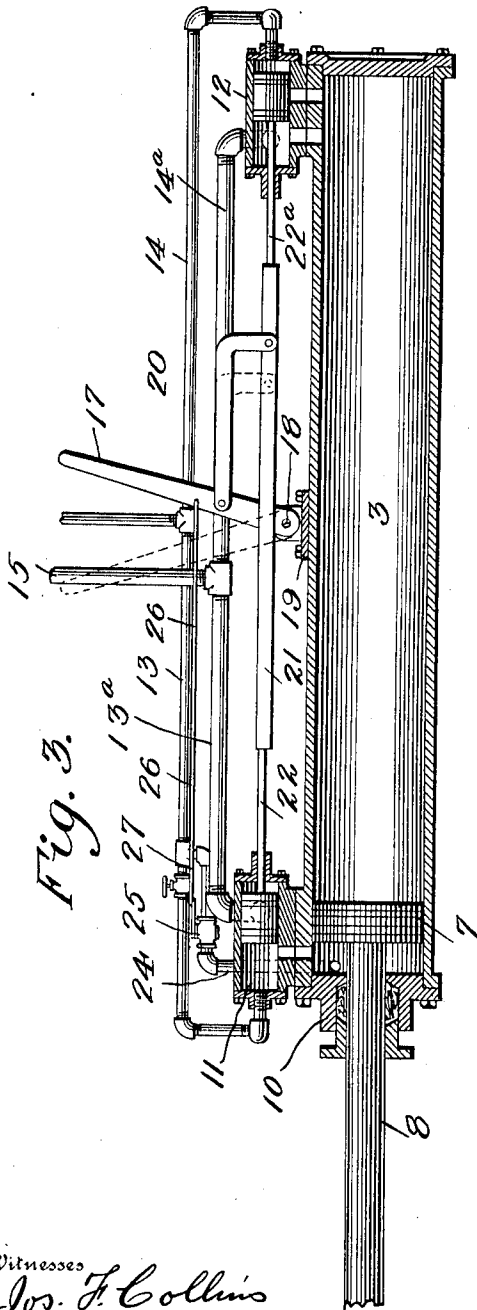
WITNESSES
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3 SHEETS—SHEET 3.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK BARNHART, OF SPOKANE, WASHINGTON.

WOOD-SPLITTING MACHINE.

1,020,072.

Specification of Letters Patent. Patented Mar. 12, 1912.

Application filed October 28, 1907. Serial No. 399,480.

To all whom it may concern:

Be it known that I, FRANK BARNHART, a citizen of the United States, residing in the city and county of Spokane, State of Washington, have invented new and useful Improvements in Wood-Splitting Machines, of which the following is a specification, reference being had to the drawings hereto attached.

This invention relates to that class of steam or pressure operated machines designed especially for splitting short lengths or blocks of wood for fuel, and the main object of the invention is to provide a machine of this character that will be simple in construction and be effectively operated under a simple and readily actuated manual control.

Further, the invention has for its object the lessening of the resistance to the splitting wedge by making suitable provision whereby the wedge will follow the natural or easiest splitting line of the block being split and thus prevent binding of the wedge or the necessity of the wedge being driven straight through the block.

Furthermore, the invention has the special object of accomplishing a swift and forceful driving of the wedge to the end of the splitting stroke with the minimum of steam or other pressure fluid, and to cause the cushioning of the operating piston at or near the end of its stroke in a manner that will not retard or interfere with the driving or splitting force of the piston stroke.

To these ends the invention consists in the novel construction and arrangement of parts, all as hereinafter described, and specifically set forth in the appended claims.

In the accompanying drawings, Figure 1, is a view in side elevation of a machine constructed in accordance with the invention. Fig. 2, is a top plan view thereof. Fig. 3 is a longitudinal vertical section view of the pressure cylinder and its valves, Fig. 4 is a section taken through the valve for admitting steam to cushion the piston, and showing the said valve closed, and Fig. 5 is a similar view showing the said valve open.

Referring to the drawing, 1 designates the bed of the machine, which, as shown, is composed of two channel beams arranged and spaced in parallel relation and so held by cross-bolts 2. Upon this bed frame and adjacent one end thereof is supported in

horizontal position the pressure cylinder 3 which is cast with side lugs 4 to rest on the bed beams and to be secured thereto as by the bolts 5. At the other end of the bed frame is supported a chopping head block 6 suitably bolted to each bed beam, against which the block to be split is placed. The pressure cylinder is provided with the usual piston 7 and the piston rod 8, and upon the projecting end of the latter is rigidly keyed the splitting wedge 9. By reason of mounting the piston and rod so as to be capable of rotation, the wedge 9 being free of other support, is adapted to have axial movement during the stroke of the piston, thereby admitting of slight rotary movement of the wedge when entering a block of wood, the movement being controlled by the natural tendency of the block to split with the grain, which is often tortuous and about knots. The usual form of stuffing box 10 is employed upon the cylinder head. Steam or other pressure agent is admitted to the cylinder at each end through suitable ports which are respectively controlled by piston or plunger valve within the valve cylinders 11 and 12, into which the steam or other pressure agent is admitted from the main feed pipe 13 through the branch pipes 14. Each valve cylinder is provided with an exhaust pipe 13^a and 14^a, respectively, which meet in the exhaust pipe 15, and the exhaust from the pressure cylinder into the valve cylinders is controlled by the plungers or pistons of the latter, alternately with the admission of the pressure agent thereto in the well-known manner.

In order to provide for the exhaust on the forward or splitting stroke of the piston that will relieve any cushioning that would appreciably retard this stroke, the pressure cylinder is provided with an exhaust pipe 16 which opens into the pressure cylinder at a point in advance of the limit of the splitting stroke, which point determines the unobstructed part of the stroke, while beyond it compression takes place to cushion the stroke, which cushioning is augmented by the action of the pressure agent in a manner to be referred to.

The control of the piston valve is effected by the movement backward and forward of the hand-operated lever 17 pivoted at 18 to a bracket 19 bolted upon the pressure cylinder, the said controlling lever having a link arm 20 which connects it with a rod 21 that

joins together the piston rods 22 and 22^a of the valve cylinders, thus the forward movement of the lever 17 will operate the valve slides or pistons so as to open the exhaust 16 and close the valve cylinder 11 against the admission of the pressure agent to the pressure cylinder, while opening the pressure admission port of the valve cylinder 12, so that the pressure agent will be admitted behind the piston 7 and cause the splitting stroke. A reversal movement of the lever brings about the return of the piston, the pressure cylinder taking the pressure agent through valve cylinder 11 and exhausting through valve cylinder 12.

Within the pressure supply pipe 14 leading to the valve cylinder 11, there is provided a gate valve 23 for the regulation of the pressure required to make the return stroke of the piston, and leading from this supply pipe and into the pressure cylinder there is a by-pass pipe 24 controlled by a plug valve 25, which is operated by the lever 17 through the link rod 26 and the lever arm 27 rigidly mounted on the valve plug, the valve adjustment being such that the by-pass will be opened to admit pressure to the cylinder in front of the advancing piston when the exhaust port is reached, thereby supplying the compression which takes place with this additional resisting agency, thus quickly stopping the splitting stroke and allowing for greater speed thereof, while assisting materially to bring about the return stroke promptly.

What I claim is:—

1. In a wood splitting engine, a pressure cylinder having a piston and a wedge-operating piston rod, valves for alternately controlling the admission of the pressure agent

at each end of the cylinder and the exhaust port for each piston stroke, the exhaust for the splitting stroke being located intermediate the limits of said stroke, and a secondary valve for admitting pressure to one end of the cylinder, and means connecting said secondary valve operatively with the main valves whereby to open the secondary valve after the splitting stroke has started and before its completion and admit the pressure agent in opposition to the splitting stroke, and close said secondary valve before the opening of the valve for the return stroke, substantially as described.

2. In a wood splitting engine, a pressure cylinder having a piston and a wedge-operating piston rod, valves for alternately controlling the admission of the pressure agent at each end of the cylinder and the exhaust for each piston stroke, the exhaust for the splitting stroke being located intermediate the limits of said stroke, a lever for operating said valves, having a different position of movement in which to open and close each valve, and a secondary valve for admitting pressure to one end of the cylinder, adapted to be opened after the splitting stroke has started and before its completion whereby to admit the pressure agent in opposition to the splitting stroke, and to close with the closing of the valve for the splitting stroke and before the opening of the valve for the return stroke, substantially as described.

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

FRANK BARNHART.

Witnesses:

HUBERT I. CALL,
O. B. SETTERS.