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PATENTED MAR. 12, 1907.

W. A. FANNON & E. A. PETERSON.

LOG SPLITTING MACHINE.

APPLICATION FILED JULY 14, 1905.

2 SHEETS—SHEET 1.

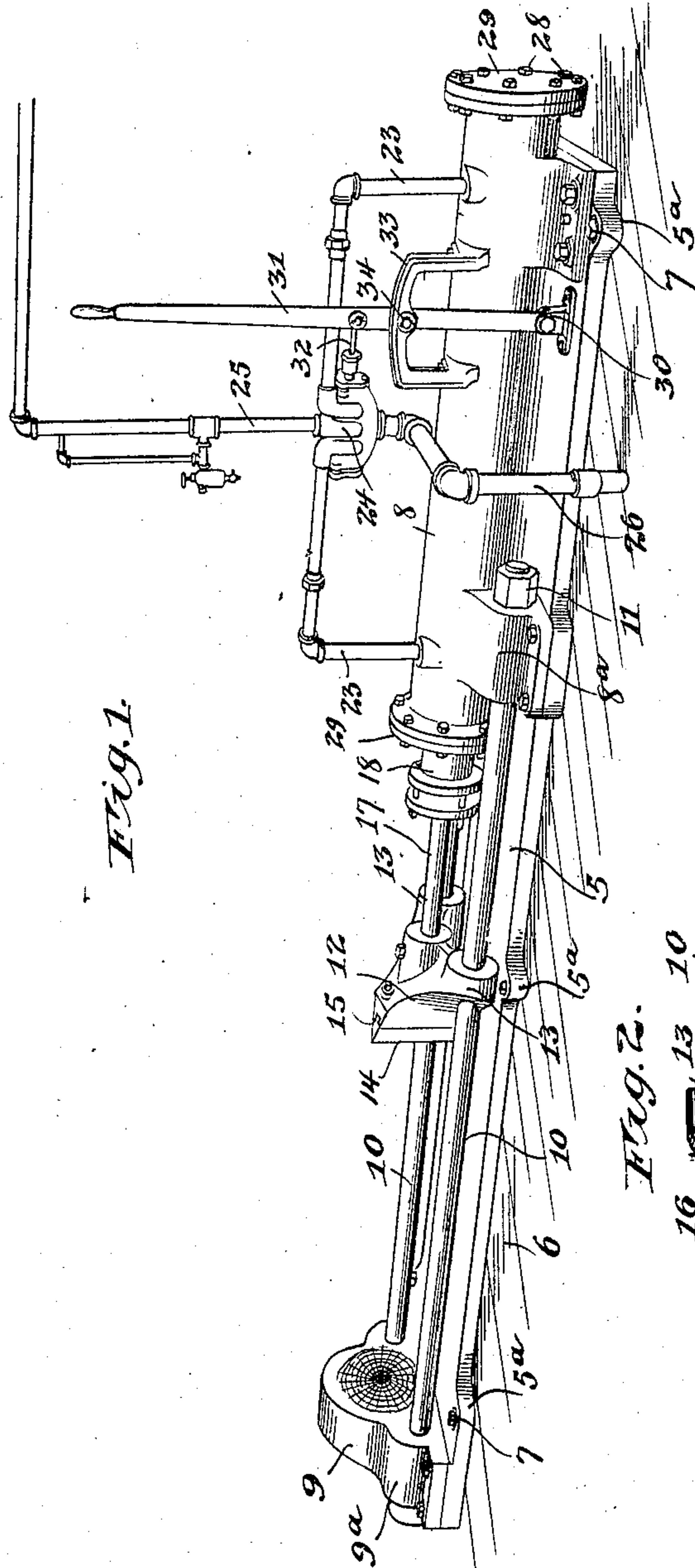
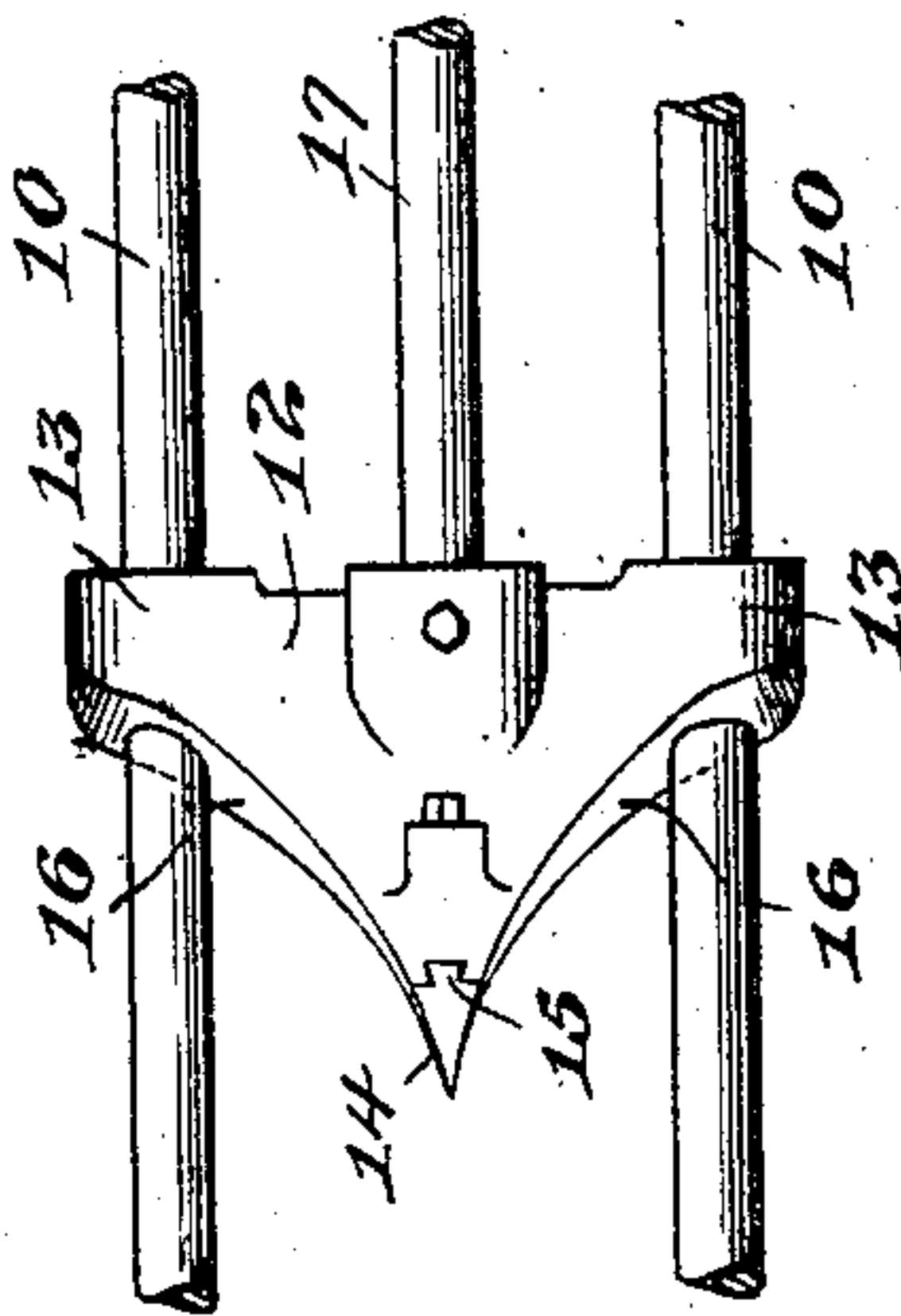


Fig. 1.

Fig. 2.



Witnesses,
J. D. Mann,
S. N. Ford

Inventors,
William A. Fannon
Emil A. Peterson
By Offield, Towler & Smith
Attys.

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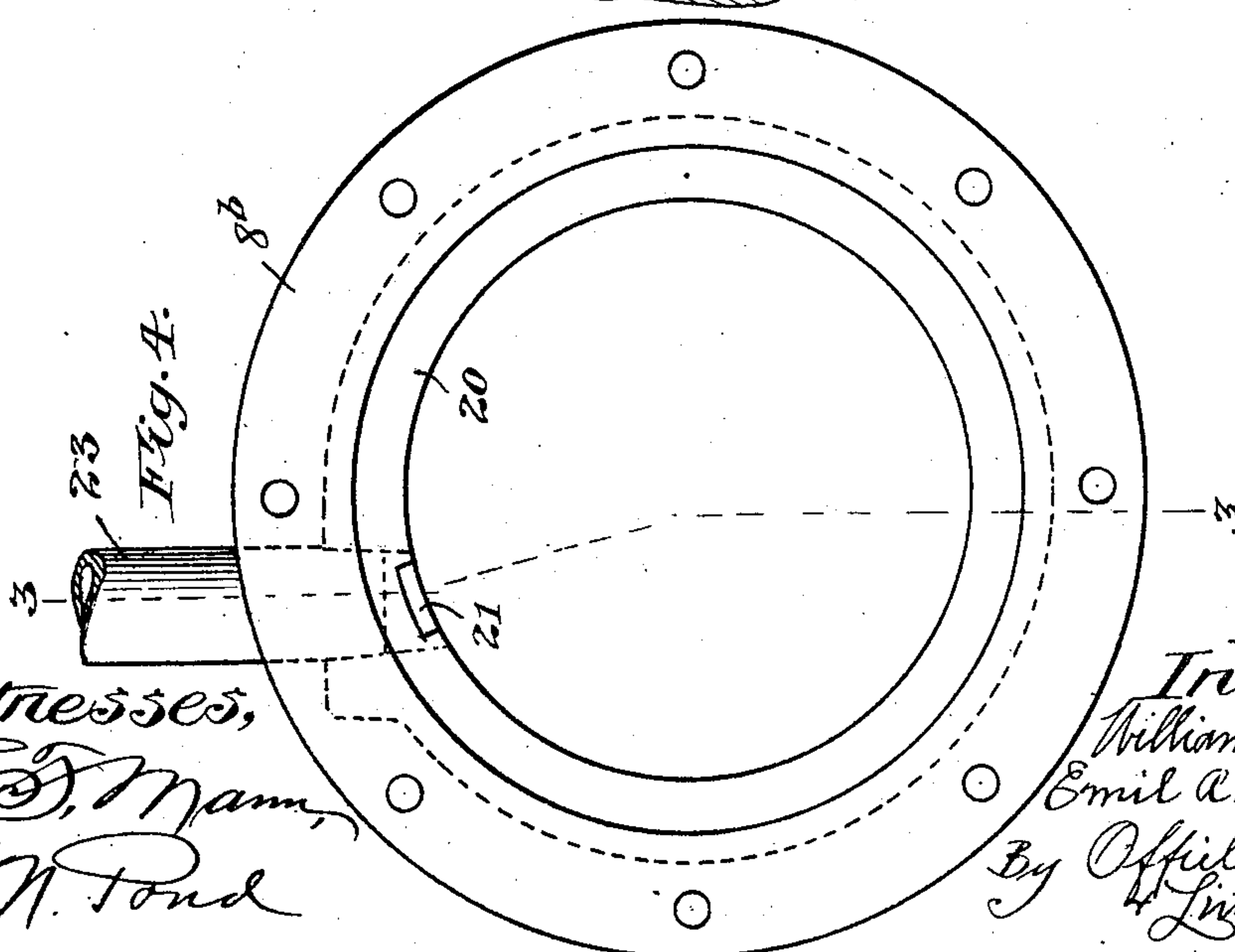
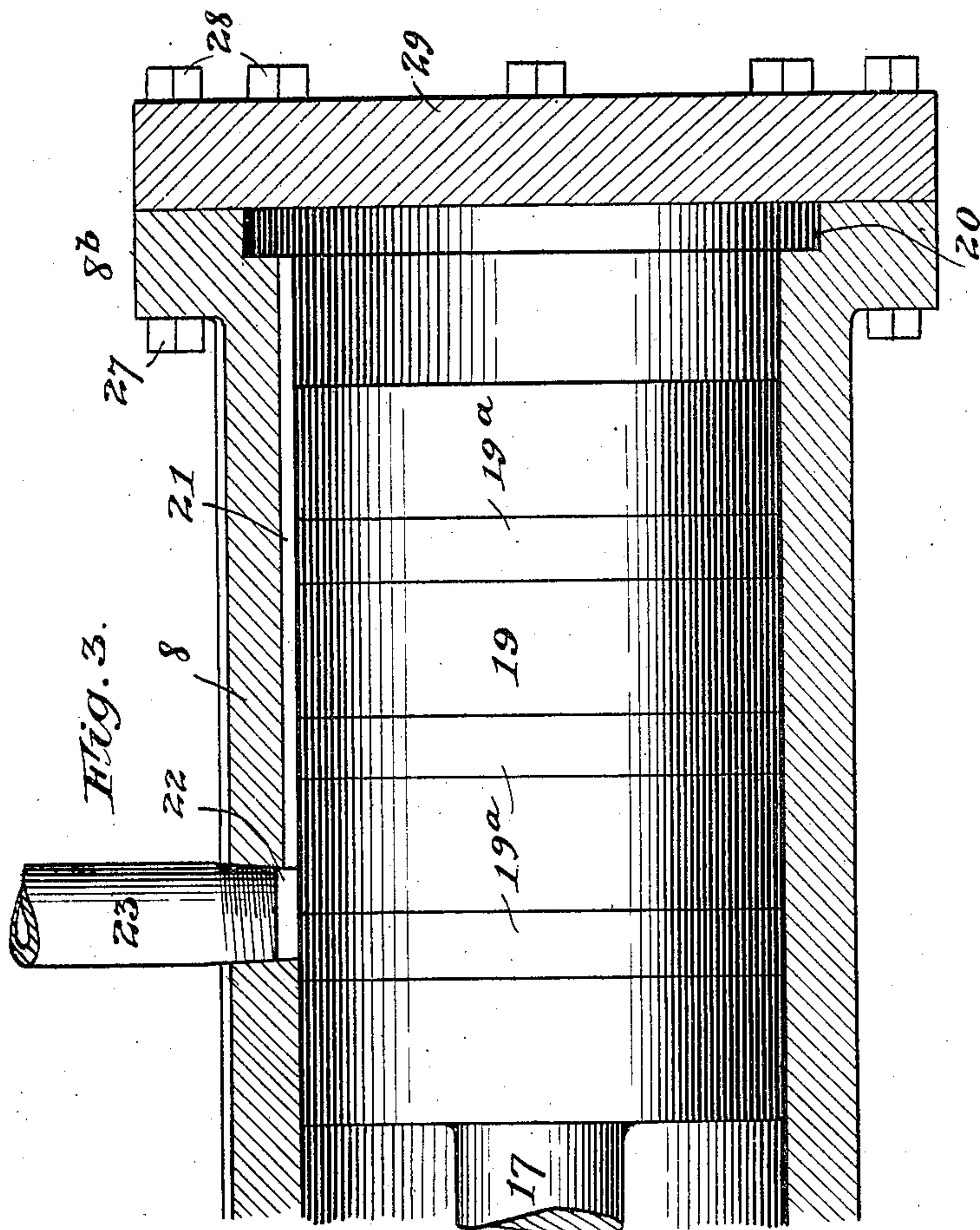
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Witnesses,
J. D. Mann,
S. H. Pond

Inventors
William A. Fannon
Emil A. Peterson,
By Offield Towle
Luthien
Ill.

UNITED STATES PATENT OFFICE.

WILLIAM A. FANNON AND EMIL A. PETERSON, OF APPLETON, WISCONSIN.

LOG-SPLITTING MACHINE.

No. 846,839.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed July 14, 1905. Serial No. 269,676.

To all whom it may concern:

Be it known that we, WILLIAM A. FANNON and EMIL A. PETERSON, both citizens of the United States, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented certain new and useful Improvements in Log-Splitting Machines, of which the following is a specification.

Our invention relates to machines for splitting logs, and consists more particularly of improvements upon a log-splitting machine on which application was filed December 5, 1904, by William A. Fannon, Serial No. 235,651.

The present invention has for its principal object to provide a simple, easily-manipulated, and self-contained log-splitter in which the logs may be operated upon with a minimum of manual handling both before and after the splitting operation.

Another object of the invention is to provide an ax-head of such a formation as tends to facilitate the discharge of the sections of the log after the same has been split.

Log-splitting machines are at present employed principally in pulp-mills for splitting short sections of logs to prepare the same for the pulp-grinders or chipping-machines, and at the present time the log-splitters used for this purpose consist, so far as we are aware, of vertically-reciprocating mechanically-driven ax-heads, which for the most part only partially split the logs, leaving the work to be completed by means of wedges and manual labor. The improved machine of our present invention is disposed horizontally and employs in its best form a cast-iron bed of suitable length on which is mounted a cylinder and a head-block, both of which are bolted to the bed, the cylinder and head-block being provided with ears or lugs through which steel tie-rods are passed, uniting the bed, cylinder, and head-block into practically one piece and rendering the splitter entirely self-contained and avoiding the transmission of shocks and jars to the foundation on which the machine is set. The steel tie-rods constitute supporting-guides for the ax-head, and the cylinder is provided at each end with a valveless internal cushioning means, the cushioning agent being the motive fluid itself, which is preferably compressed air.

A log-splitting machine embodying our present improvements in the form which has

proved successful by severe tests is illustrated in the accompanying drawings, wherein—

Figure 1 is a perspective view of the complete machine. Fig. 2 is a top plan view of the ax-head, more particularly illustrating the warped formation of its curved sides that facilitates the throwing out of the split sections. Fig. 3 is a longitudinal central sectional view through one (either) end of the cylinder, illustrating the automatic cushioning means; and Fig. 4 is an end view of Fig. 3, with the cylinder head or cap removed.

Referring to the drawings, 5 designates as an entirety a flat bed-plate, which extends the entire length of the machine and may conveniently be secured to the floor or other foundation 6, as by screws 7, passing through lateral lugs or ears 5^a. On one end of this bed-plate is rigidly bolted or otherwise secured a cylinder 8, and on the opposite end is similarly secured a head-block 9. The cylinder and head-block are rigidly united longitudinally of the machine by means of steel tie-rods 10, that are passed at their ends through laterally-projecting ears or lugs 8^a and 9^a of the cylinder and head-block, respectively, and are provided with threaded ends and nuts 11, which when drawn up cooperate with the bed-plate in rigidly uniting the head-block and the cylinder in such a way as to balance and neutralize the effect of longitudinal strains exerted between said parts. The tie-rods 10 also serve as supports and guides for the ax-head 12, that is slidably mounted thereon by means of apertured lateral ears 13, through which said rods pass. The ax-head 12 is a solid metal block and is provided at its forward end with a cutting point or knife 14, removably fitted thereto by a vertical dovetailed joint, (indicated at 15.) It will be observed by reference to Fig. 2 that the concave sides of the ax-head are given a warped formation, (indicated at 16,) the warped surfaces being formed by extending the upper curved margin of the lateral surfaces somewhat farther rearward of the head than the lower margins of said surfaces. The peculiar advantage of this formation will be explained later in describing the operation of the machine.

The ax-head 12 is connected by a piston-rod 17, passed through a suitably-packed stuffing-box 18 on the inner end of the cylinder to a piston 19, Fig. 3. This piston is of considerable length, as shown, and has a se-

ries of annular packing-rings, (indicated at 19^a.) At each end of the cylinder the cylinder-bore is countersunk, as shown at 20, while the internal wall of the cylinder is formed with a small longitudinal groove 21, extending inwardly from said countersunk end to a port 22, entered by a pipe 23, leading from a distributing-valve 24, Fig. 1, to which latter are also connected a motor-fluid inlet-pipe 25 and discharge-pipe 26. The port 22 is set inwardly from the end of the cylinder-bore such a distance that it will still be covered by the piston when the latter is at the extreme limit of its travel toward the end of the cylinder. On the end of the cylinder is formed an integral annular flange 8^b, to which is removably secured by threaded bolts 27 and nuts 28 the head or cap 29.

In a vertical lug 30, secured to the bed-plate 5, is mounted an operating-lever 31, to which is connected the stem 32 of an ordinary piston-valve controlling the distribution of the motive agent to and from the cylinder. The lever 31 plays in a segment-guide 33, which latter carries a locking-bolt 34, coöperating with a hole in the lever, whereby the latter is locked in intermediate or idle position when the machine is not in use, in order to prevent possible injury by an accidental throw of the lever.

In operation the log to be split is rolled up to the machine and laid on the tie-rods 10 with one end abutting against the head-block 9. At this time the piston 19 is at the rear end of the cylinder, and by operating the lever 31 in the proper direction the compressed air or other motive agent is admitted, through the pipe 23, to that end of the cylinder. The motive fluid finds its way through the port 22 and groove 21 to the countersunk space in the end of the cylinder behind the piston and starts the latter inwardly with a comparatively slow initial movement until the rear end of the piston has cleared the port 22, whereupon the motive fluid acts with full pressure against the piston, forcing the latter to the opposite end of the cylinder and driving the ax into and through the log. As the splitting takes place the curved concave sides of the ax-head not only tend to throw the split sections of the log to either side, but by reason of their warped surfaces exert at the same time a lifting effect upon said sections, which coöperates in throwing the sections upwardly as well as outwardly, thus insuring the clearing of the machine. Ordinarily the two half-sections are replaced in turn upon the guides and each split in the same manner, thus quartering the original log. As the piston approaches the end of the cylinder either on its operative or return movement as soon as the piston passes the port 22 the escape of the exhaust back through the pipe 23 is constricted, thereby compressing a portion of the exhaust behind the piston and ar-

resting the impetus of the latter without shock or injury to the cylinder-head. It will thus be seen that the cushioning of the piston is obtained entirely without the use of valves or external appliances and solely by a recompression of the previously-expanded motive fluid, thus obviating the expenditure of motive fluid other than that employed in the driving of the piston.

We claim—

1. In a log-splitting machine, the combination with a horizontal bed-plate, of an ax-operating cylinder bolted to one end of said bed-plate, a head-block bolted to the opposite end of said bed-plate, and a pair of tie-rods rigidly uniting the opposite sides of said cylinder and head-block, respectively, above said bed-plate, substantially as described.

2. In a log-splitting machine, the combination with a horizontal bed-plate, of an ax-operating cylinder bolted to one end of said bed-plate and having apertured lateral ears, a head-block bolted to the opposite end of said bed-plate and provided with apertured lateral ears, and a pair of tie-rods passed at their ends through said ears and rigidly uniting said cylinder and head-block above said bed-plate, substantially as described.

3. In a log-splitting machine, the combination with a horizontal bed-plate, of a cylinder rigidly secured to one end of said bed-plate, a head-block rigidly secured to the opposite end of said bed-plate, tie-rods rigidly uniting said cylinder and head-block above said bed-plate, an ax-head slidably supported and guided on said tie-rods, a piston in said cylinder, and a piston-rod connecting said piston and ax-head, substantially as described.

4. In a log-splitting machine, the combination with a horizontal bed-plate, of a cylinder bolted to one end of said bed-plate and having apertured lateral ears, a head-block bolted to the opposite end of said bed-plate and provided with apertured lateral ears, a pair of tie-rods passed at their ends through said ears and rigidly uniting said cylinder and head-block above said bed-plate, an ax-head having apertured lateral ears whereby it is slidably supported and guided on said tie-rods, a piston in said cylinder, and a piston-rod connecting said piston and ax-head, substantially as described.

5. In a log-splitting machine, the combination with a horizontal bed-plate, of an ax-operating cylinder rigidly secured to one end of said bed-plate and provided with means for cushioning the piston at the limits of its stroke, a head-block rigidly secured to the opposite end of said bed-plate, and tie-rods rigidly uniting said cylinder and head-block above said bed-plate, substantially as described.

6. In a log-splitting machine, the combination with a cylinder, a head-block, a pis-

ton and piston-rod, disposed horizontally, of a guide between said cylinder and head-block, and an ax-head connected to said piston-rod and slidably mounted on said guide, 5 said ax-head having oppositely-inclined warped sides adapted to both separate and raise the sections of a log in the splitting operation to facilitate their discharge from the machine, substantially as described.

10 7. In a log-splitting machine, the combination with a cylinder, a head-block, a piston and piston-rod, disposed horizontally, of a pair of parallel guides between said cylinder and head-block, and an ax-head connected 15 to said piston-rod and slidably mounted on said guides, said ax-head having oppositely-inclined concave warped sides adapted to simultaneously separate and raise the sections of a log in the splitting operation to

facilitate their discharge from the machine, 20 substantially as described.

8. In a log-splitting machine, the combination with a cylinder, a head-block, a piston and piston-rod disposed horizontally, of a pair of parallel tension-rods rigidly connect- 25 ing said cylinder and head-block, and an ax-head connected to said piston-rod and slidably mounted at its sides on said rods, said ax-head having a central vertical splitting edge and oppositely-inclined concave warped 30 sides extending rearwardly and outwardly therefrom, substantially as described.

WILLIAM A. FANNON.
EMIL A. PETERSON.

Witnesses:

W. H. BURNS,
E. A. MORSE.