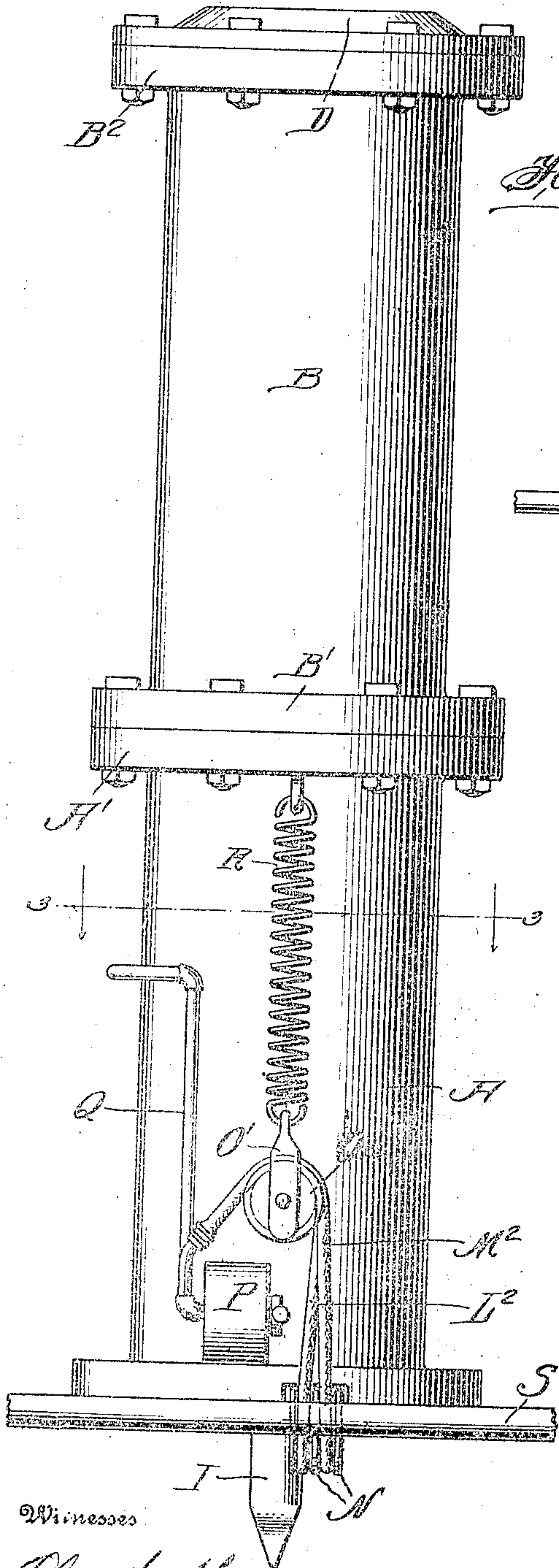


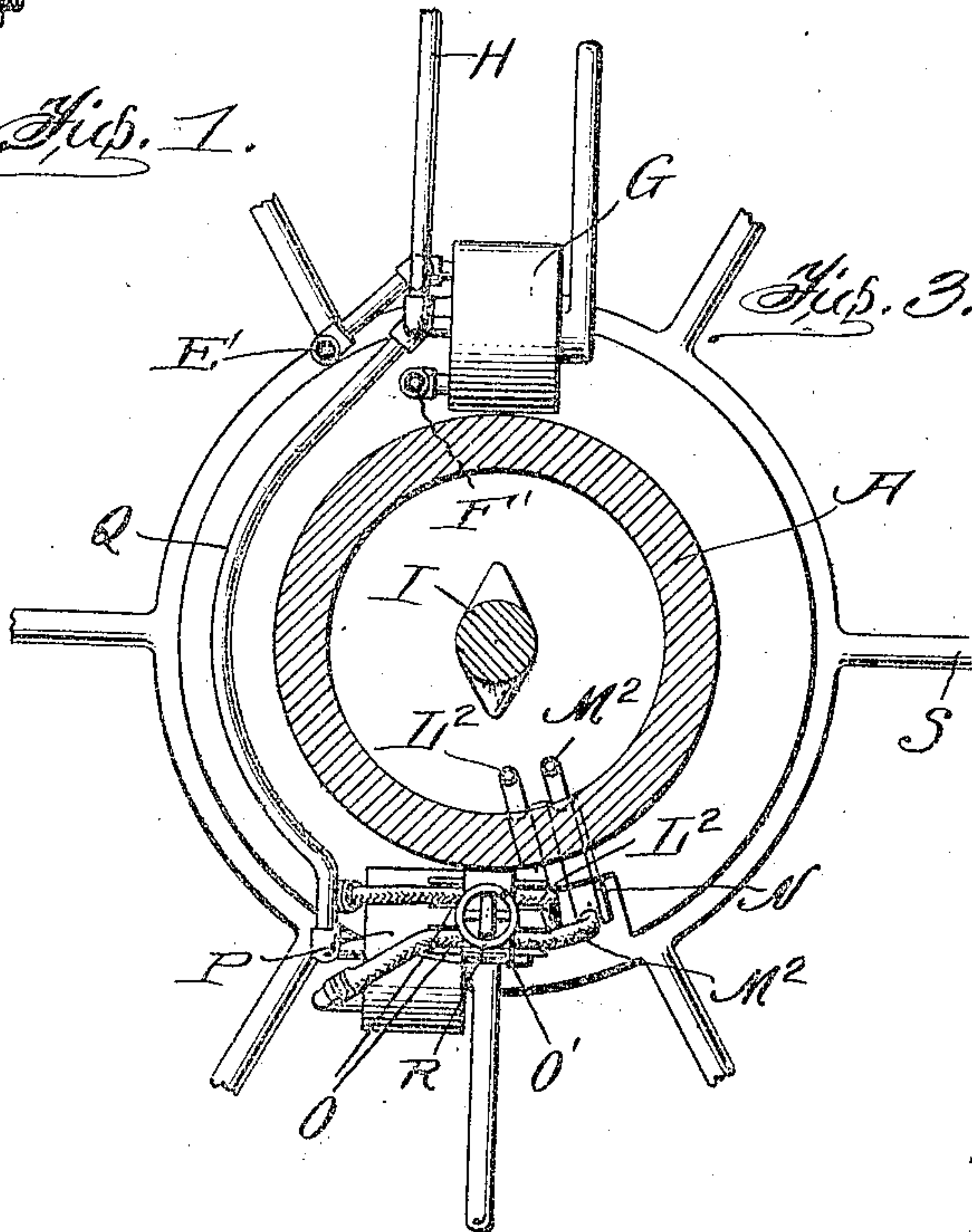
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APPLICATION FILED OCT. 12, 1908.

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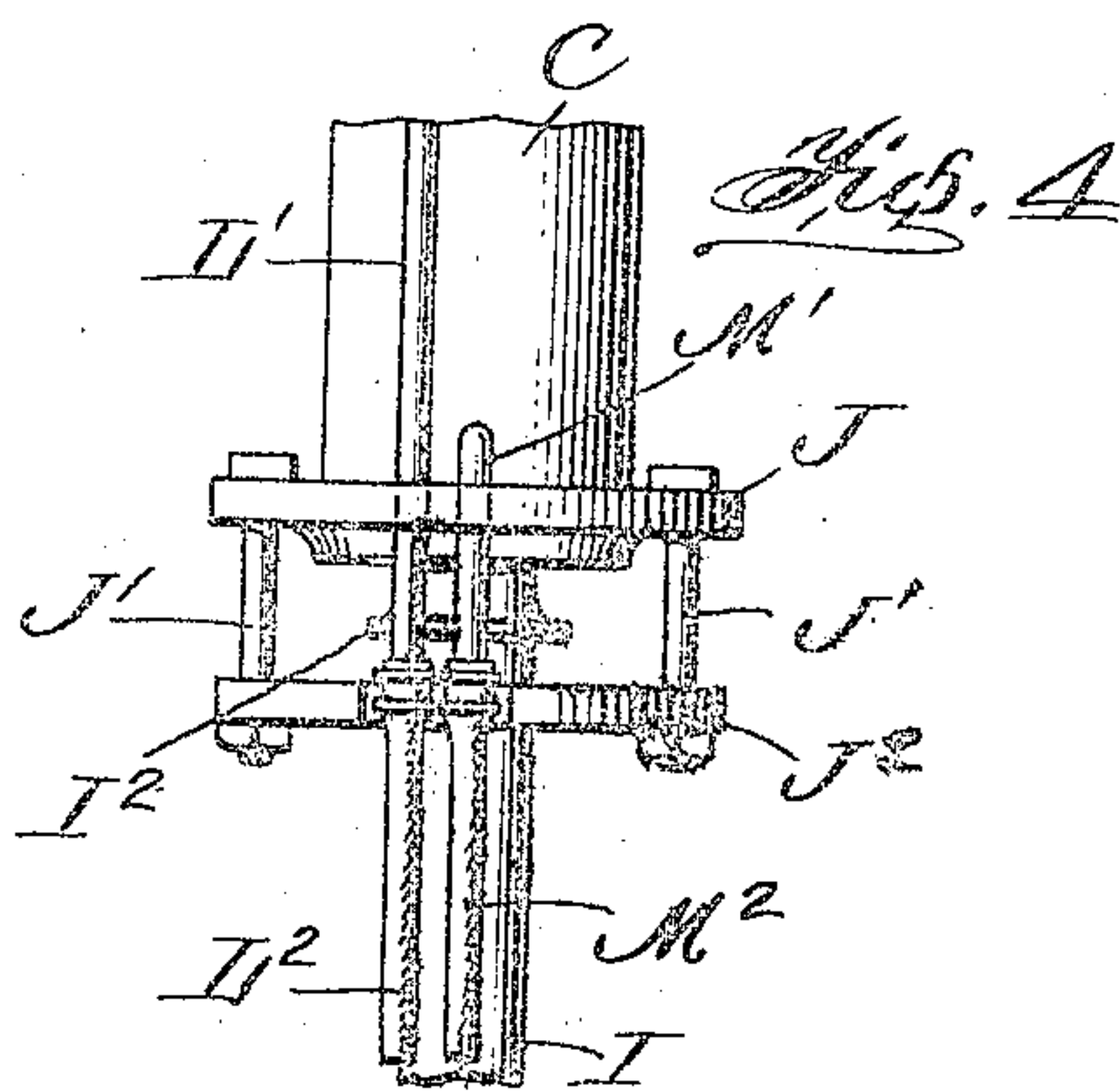
Patented Apr. 6, 1909.  
2 SHEETS—SHEET 1.



*Fig. 1.*



*Fig. 3.*



*Fig. 4.*

Witnesses

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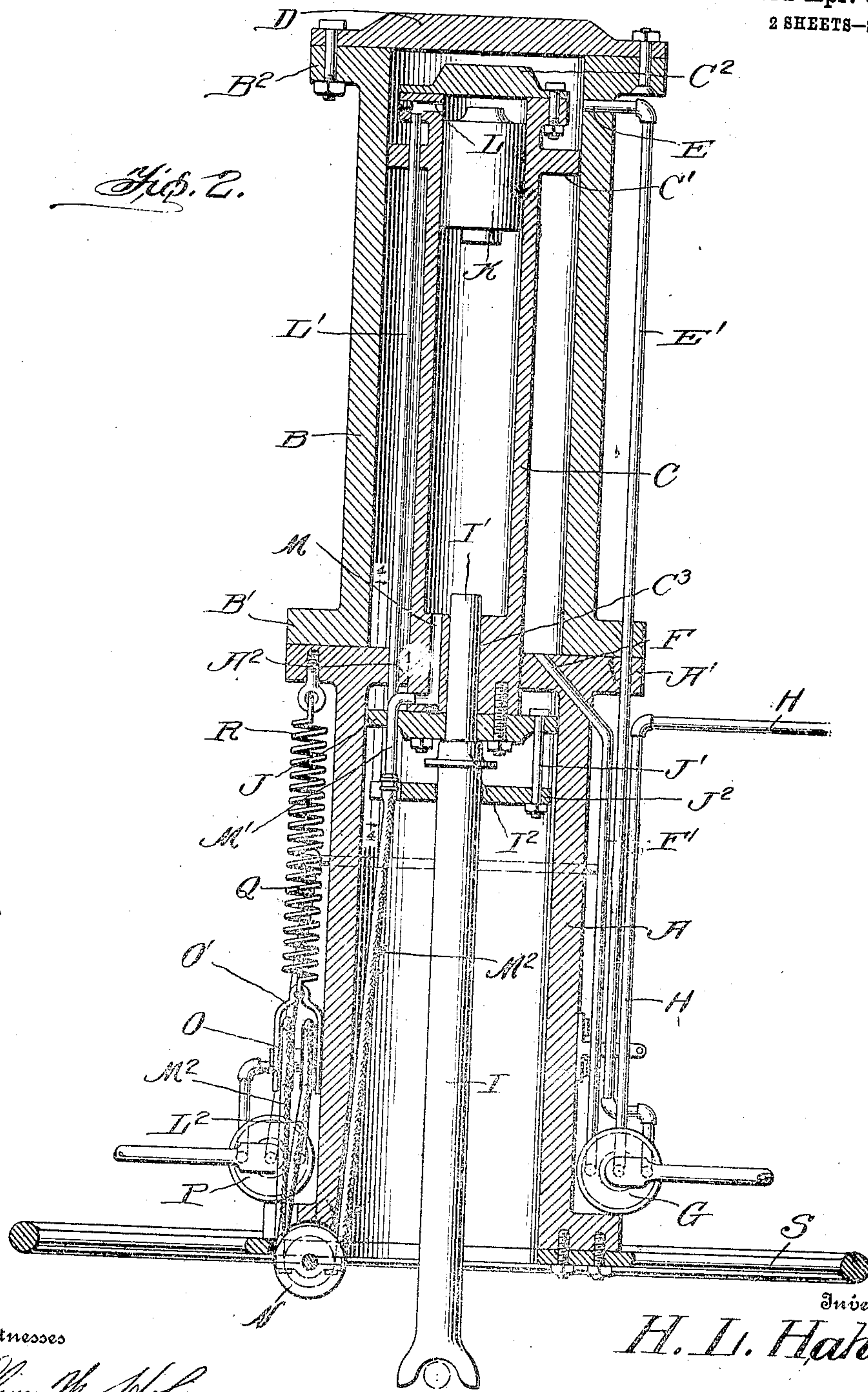
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Witnesses

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# UNITED STATES PATENT OFFICE.

HARRY LOUIS HAHN, OF TRENTON, NEW JERSEY.

## STAY-BOLT-BREAKING MACHINE.

No. 917,052.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed October 12, 1903. Serial No. 457,375.

*To all whom it may concern:*

Be it known that I, HARRY LOUIS HAHN, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented a new and useful Improvement in Stay-Bolt-Breaking Machines, of which the following is a specification.

This invention relates to stay bolt breaking machines especially adapted to be used for breaking the stay bolts used for holding the fire sheet and water sheet of a locomotive boiler together, the object being to provide a machine with a cutter which is so mounted that it can be easily and quickly moved into engagement with the stay bolt to be cut.

A further object of the invention is to provide a machine which is operated by compressed air and one which is carried by a movable trolley whereby it can be quickly moved into position to engage a stay bolt.

Another object of the invention is to provide a stay bolt breaking machine with a fluid operated cylinder carrying a cutting tool and a plunger which is adapted to be forced into engagement with the cutting tool by the compressed fluid so as to strike a blow.

A still further object of the invention is to provide very novel means for holding the flexible supply pipes of the cylinder taut at all times as the cylinder is moved in different positions.

A further object of the invention is to provide novel valves in connection with the supply pipes so that when one of the ports is opened to supply fluid to the cylinder or casing, the other port will be opened to allow the exhaust.

With these various objects in view, my invention consists in the novel features of construction, arrangement and combination of parts hereinafter described, pointed out in the claims and shown in the accompanying drawings, in which:—

Figure 1 is a side elevation of my improved machine. Fig. 2 is a vertical section of the same. Fig. 3 is a section taken on the line 3—3 of Fig. 1, and Fig. 4 is a fragmentary view in elevation of the lower portion of the cylinder C, and parts connected therewith.

In carrying out my invention, I employ a pair of cylinders A and B provided with exterior flanges A', B' which are connected

together by bolts, the cylinder A being provided with an interior flange A<sup>2</sup> through which extends a cylinder C which is provided with an annular rib C' which fits snugly within the cylinder B the upper end of the cylinder C being closed by a cap C<sup>2</sup>. The cylinder B is closed by a cap D which is secured on an outwardly projecting flange B<sup>2</sup> formed on its upper end and communicating with the cylinder B are ports E and F to which are connected pipes E', F' leading from a rotary valve G to which is connected a main supply pipe H. The valve G is provided with ports so arranged that when fluid is forced into the valve through the main pipe H the fluid can be forced into the cylinder B through either of the pipes E or F and when forced into the cylinder through the pipe E the fluid within the cylinder will be forced out of the pipe F, or when the fluid is being forced into the cylinder through the pipe F the fluid within the cylinder will exhaust through the pipe E, this being accomplished by the ordinary form of rotary valve now in use. It will be seen by this arrangement that the position of the cylinder C within the cylinder B can be readily controlled by the operator by operating the valve G so as to raise or lower the cylinder.

The cylinders A and B are adapted to be connected to a suitably movable trolley, not shown, at the points where they are connected which allows the device to be moved readily in order to be placed in position over the boiler as will be hereinafter fully described.

The lower end of the cylinder C is provided with a longitudinal bore C<sup>3</sup> in which is mounted the reduced end I' of a cutting tool I which is provided with an annular shoulder I<sup>2</sup> for limiting the movement of the cutting tool. Secured to the lower end of the cylinder C within the cylinder A is a ring J against which the shoulder bears when the cutting tool is in its farthest upward position and the ring J is provided with bolts J' supporting a ring J<sup>2</sup> which is engaged by the shoulder I<sup>2</sup> of the cutting tool for limiting the downward movement of the tool. Arranged within the cylinder C is a plunger K adapted to engage the upper end of the tool I so as to cut off a stay bolt. The plunger is operated by fluid which enters the cylinder C through the ports L and M to which are connected pipes



L', M' which are supported by the rings J, J<sup>2</sup> and to which are connected flexible hose L<sup>2</sup>, M<sup>2</sup> which pass out through the lower end of the cylinder A around wheels N and over pulleys O, the ends being connected to a rotary valve P similar to the valve G. The valve P is connected to the main supply pipe H by a branch pipe Q and it will be seen that the fluid can be allowed to enter the cylinder C through either of the ports in a similar manner as it enters the cylinder B and when the port M is opened the plunger K will be forced to the top of the cylinder the fluid within the cylinder exhausting through the port L and when fluid is forced into the cylinder through the port L the plunger will be forced downwardly so as to strike a blow against the upper end of the cutting tool I. Connected to the frame O' of the pulleys O is a coil spring R which is connected to an eye bolt secured in the flanges of the cylinders A and B so that as the cylinder C is moved up and down in the cylinder B the flexible hose will be drawn tight at all times whereby all danger of the hose becoming jammed within the cylinder A is prevented.

The lower end of the cylinder A is provided with an exterior flange to which is connected a handle S for guiding the machine and the lower end of the cutting tool I is preferably formed concaved as clearly shown and adapted to be placed over a stay bolt by means of the controlling fluid in the cylinder B which will raise or lower the cylinder C so that by operating the valve G, the cutting tool can be forced up against the stay bolt to be cut and held in that position and then by operating the valve P the plunger K can be operated so as to cause the same to strike the cutting tool.

From the foregoing description, it will be seen that I have provided a stay bolt breaking machine which will operate upon a stay bolt so as to break or cut the same. It will also be seen that I have provided a machine with novel means for raising and lowering the cutting tool so that it can be placed in position against the said stay bolt by simply operating the valve.

What I claim is:—

1. In a machine of the character de-

scribed, the combination with a pair of connected cylinders, disposed end to end and one above the other, and adapted to be supported by a movable trolley, of an inner cylinder mounted in the said first mentioned cylinders, a plunger in the inner cylinder, a cutting tool movably mounted in the lower end of the inner cylinder, ports formed in the respective cylinders adjacent their ends, fluid supply pipes connected to said ports, and valves controlling the supply of said fluid to the respective cylinders to position the inner cylinder and to operate the plunger.

2. In a machine of the kind described, the combination with a pair of connected cylinders disposed end to end, and located one above the other and adapted to be supported by a movable trolley, of a cylinder slidably mounted within the upper cylinder carrying a cutting tool carried by the inner cylinder and extending out through the lower cylinder, a plunger slidably mounted within the inner cylinder, ports communicating with the respective cylinders, pipes connected to said ports, flexible pipes connected to the pipes carried by the inner cylinder and passing over pulleys, a coil spring supporting said pulleys and a valve connected to the ends of said flexible pipes, for the purpose described.

3. A machine of the kind described comprising a pair of connected cylinders disposed end to end, and one above the other, of a cylinder arranged within the said first mentioned cylinders, a cutting tool carried by the inner cylinder extending within the same, a plunger adapted to engage said cutting tool, ports communicating with the outer cylinder, pipes connecting said ports to a rotary valve, ports communicating with the inner cylinder, pipes connected to said ports, flexible pipes connected to said pipes having their ends connected to a rotary valve, said flexible pipes passing over spring actuated pulleys and a main supply pipe connected to said valve, for the purpose described.

HARRY LOUIS HAHN.

Witnesses:

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