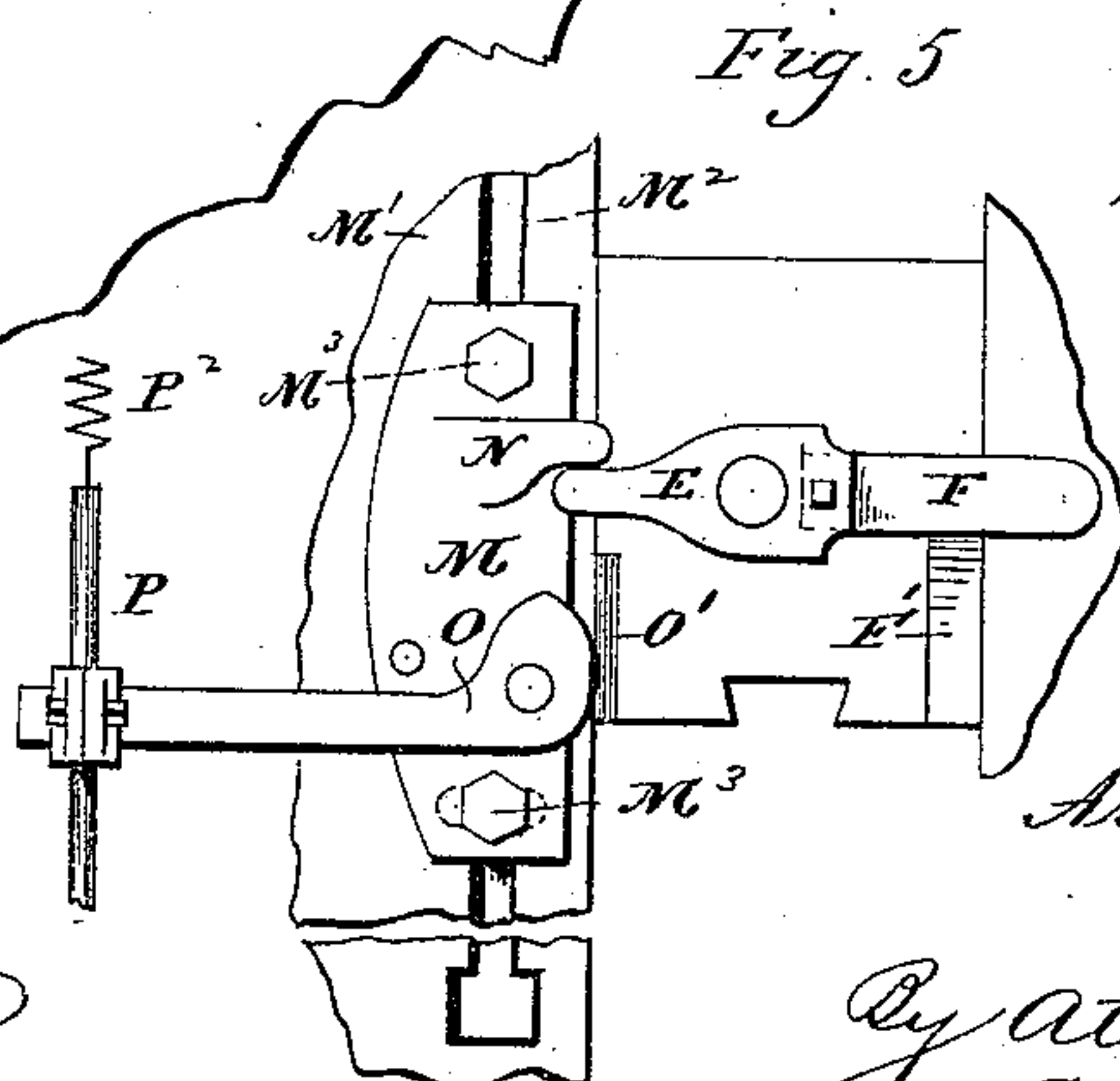
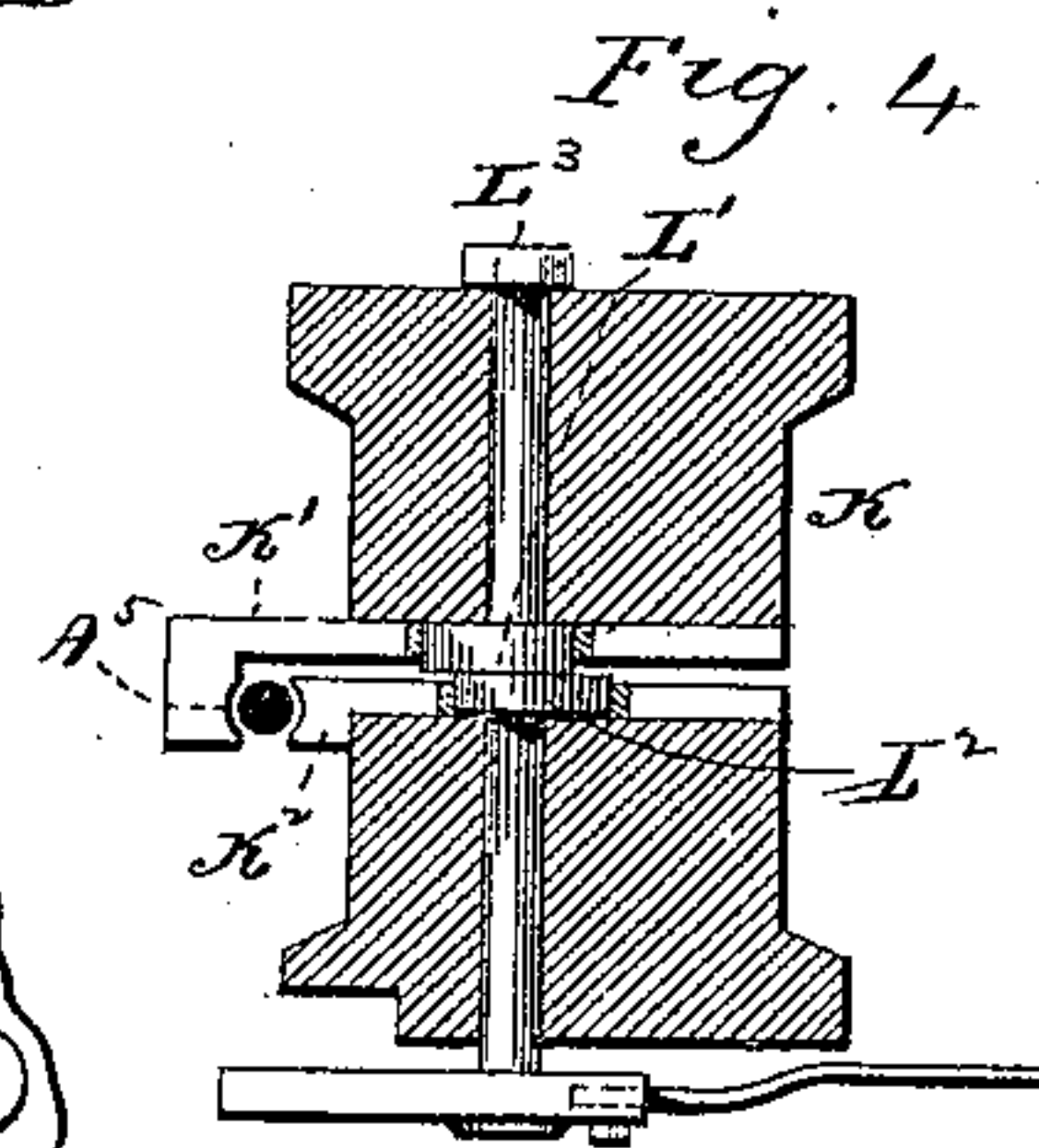
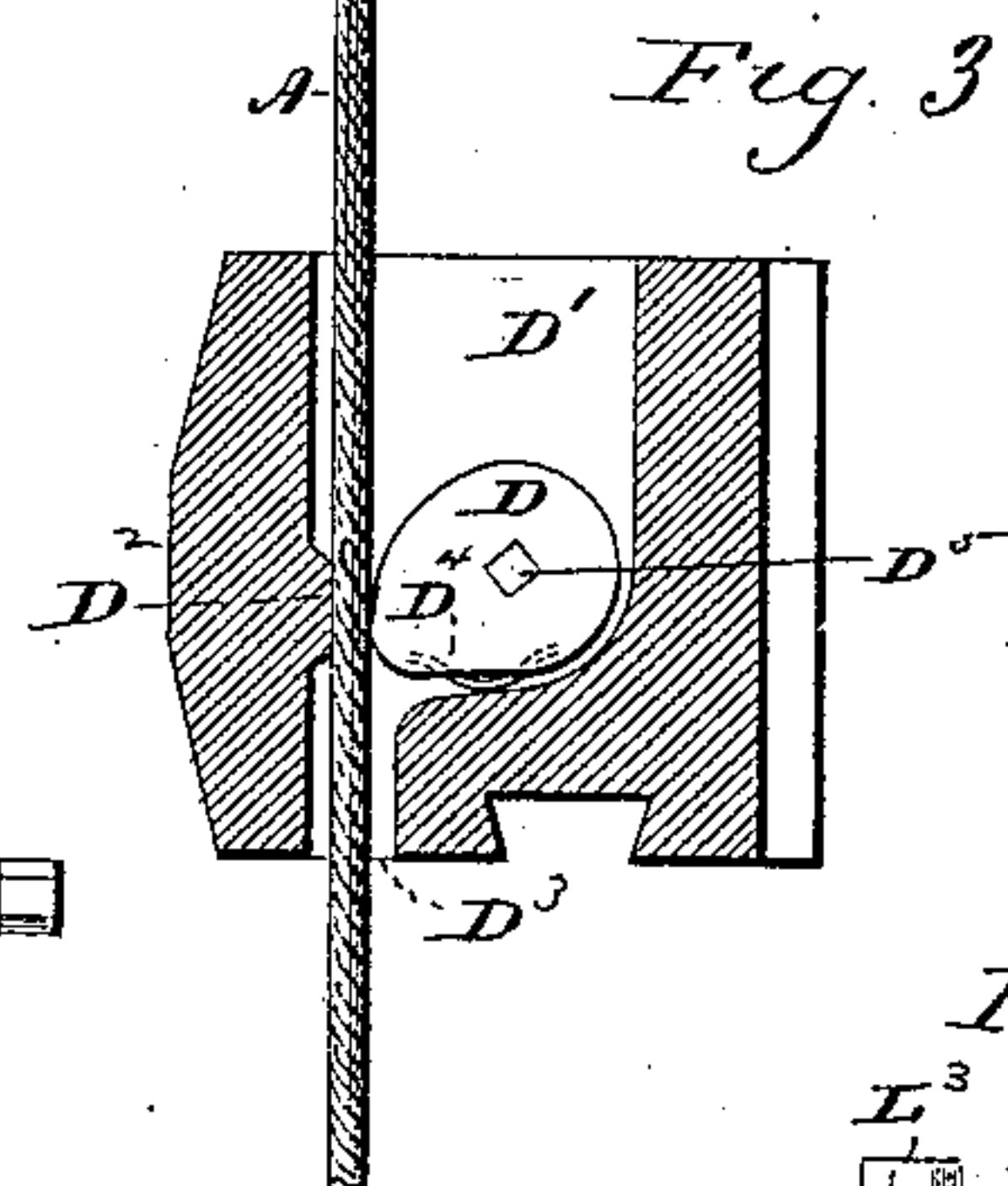
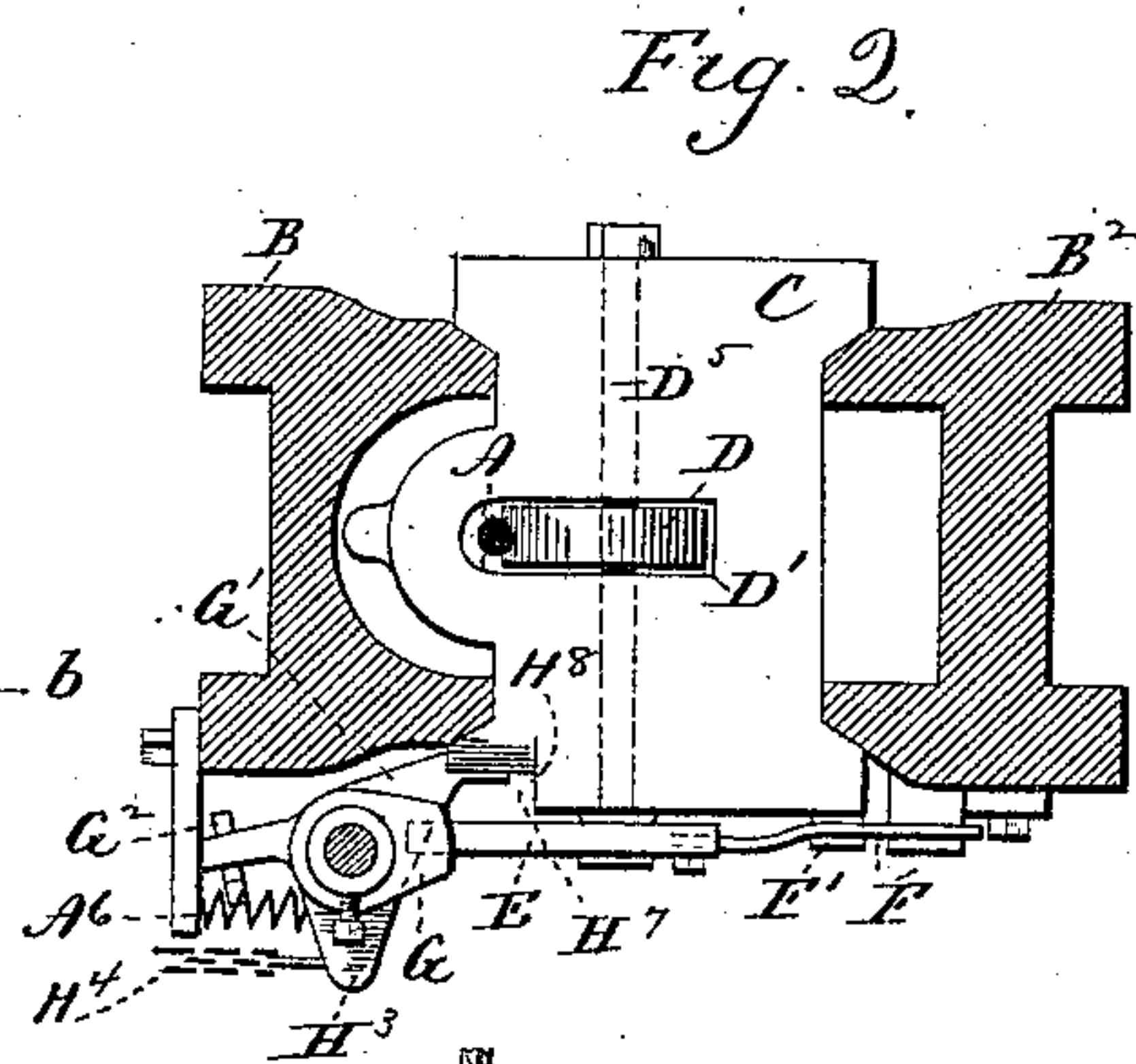
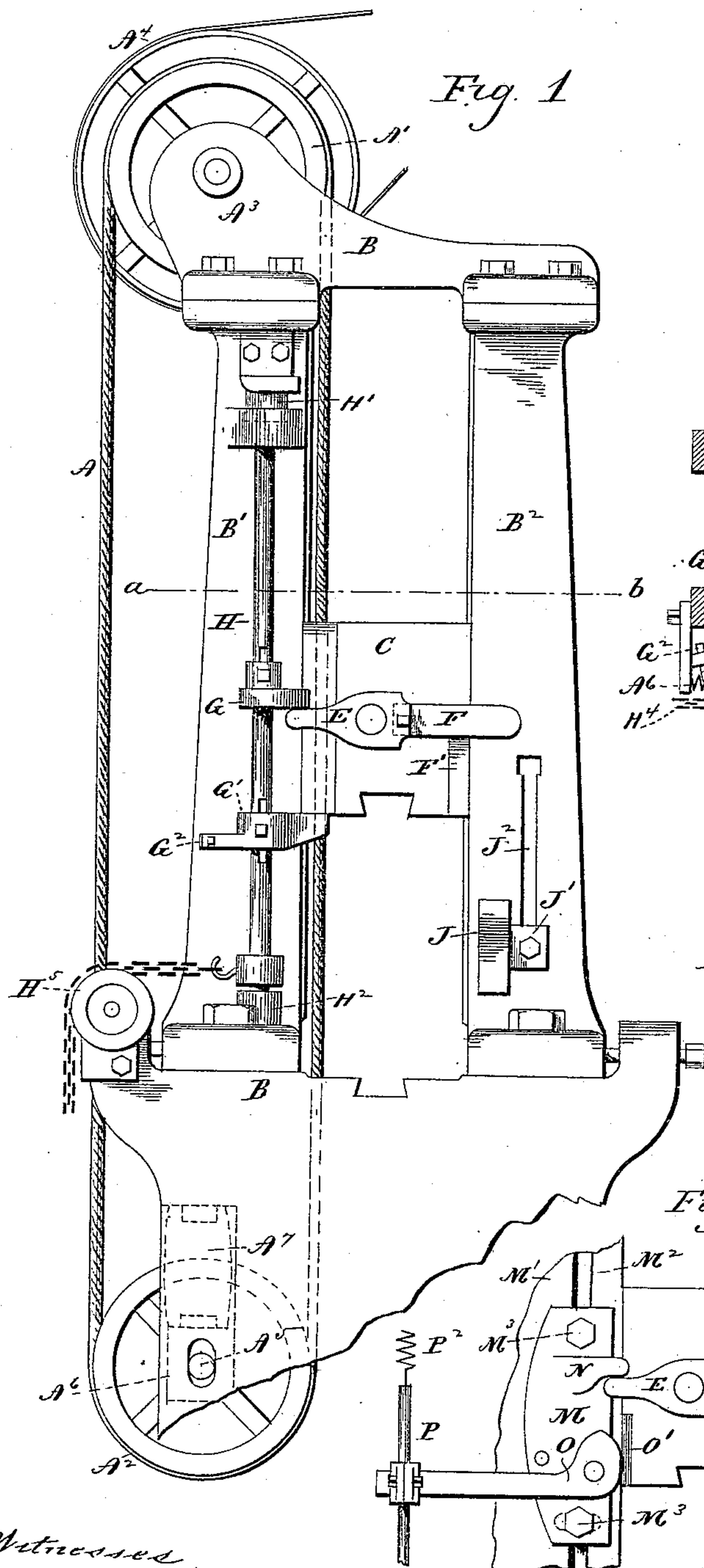


(No Model.)

A. WILZIN.
DROP HAMMER.

No. 447,093.

Patented Feb. 24, 1891.



Witnesses
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ARTHUR WILZIN, OF MIDDLETOWN, CONNECTICUT.

DROP-HAMMER.

SPECIFICATION forming part of Letters Patent No. 447,093, dated February 24, 1891.

Application filed July 26, 1890. Serial No. 360,019. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR WILZIN, of Middletown, in the county of Middlesex and State of Connecticut, have invented new Improvements in Drop-Hammers; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in front elevation of one form which a machine embodying my invention may assume. Fig. 2 is a view of the machine in transverse section on the line *a b* of Fig. 1, with the ram and some minor adjuncts in plan; Fig. 3, a detached view in vertical section of the ram; Fig. 4, a detached view, partly in plan and partly in section, of a ram provided with another form of gripping mechanism; Fig. 5, a view in front elevation of a modified form of the devices employed for tripping the gripping mechanism to release the ram and for supporting the same until it is allowed to fall.

Heretofore free-falling drop-hammers, to which my invention relates, have usually been furnished with a plank carrying the ram at its lower end and passing at its upper end between two revolving friction-rollers automatically engaged with and disengaged from it by means of shifting devices operated by the ram itself in rising and in falling. These machines have been found objectionable, in that the planks are splintered under the continual shocks imposed upon them and must be frequently replaced at a serious expense for material and labor and with a loss of time. The said machines are also objectionable on account of the overhead room required by them for the clearance of the plank when the ram is raised.

The object of my present invention is to overcome the objections above referred to and to produce a strong, compact, durable, and efficient drop-hammer of the free-falling type.

With these ends in view my invention consists in the combination, with the ram of a free-falling drop-hammer, of coupling mechanism carried thereby, and an endless traveling flexible power connection, the ascending side whereof has the ram connected with

and disconnected from it by means of the said mechanism.

My invention further consists in devices for operating the coupling mechanism and in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

Under my invention, in whatever form it may assume, the ram is lifted by means of an endless traveling flexible power connection. As herein shown, this consists of a cable *A*, running over a driving-wheel *A'* and an idler *A''*, respectively located at the top and bottom of the machine-frame *B*, the said driving-wheel being mounted on the same shaft *A'''*, with a belt-pulley *A''''* driven so as to cause the cable to travel in the direction of the arrow *a*. If desired, the cable may be replaced by a belt or band or any equivalent thereof. The shaft *A'''''* of the idler *A''* is mounted in a vertically-movable box *A''''''*, acting against a rubber cushion *A'''''''*, placed above it, the said box and cushion being located in the lower portion or anvil of the machine-frame. The cushion serves to keep the cable under tension and also to prevent the shock of the ram from reacting upon the cable and idler.

The ram *C*, which may be of any approved form and construction and is guided in the ordinary manner between the two upright posts *B'* and *B''* of the machine-frame *B*, is raised by the said cable and thereto temporarily connected with the ascending side thereof by coupling mechanism which is carried by it and which may assume a variety of forms. That in Figs. 1, 2, and 3 of the drawings acts on the principle of frictionally gripping the cable, and consists of a gripping-cam *D*, located in a chamber *D'*, formed in the upper end of the ram and adapted to grip the cable between its nose and a gripping or bearing surface *D''*, projecting toward the same into the said chamber, through which and an aligned passage *D'''*, also formed in the ram, the cable passes. A spring *D''''*, located between the lower edge of the cam and the bottom of the chamber, exerts a constant effort to throw the cam into gripping engagement with the cable. The said cam is mounted upon a horizontal rock-shaft *D'''''*, journaled in the ram and provided at one of its ends which projects beyond the face of the ram with a

horizontal tripping-arm E, rigidly secured to it, and carrying a spring locking-arm F, which co-operates with the upper end of a beveled locking-lug F', which locks the cam in its depressed or retired position, in which it is disengaged from the cable, against the force of the said spring. The said arm E is tripped for disengaging the cam from the cable by means of a vertically-adjustable tripping-finger G, with which the arm engages just before the ram reaches the limit of its upward movement, the said finger being mounted upon a vertical rod H, having its opposite ends set into elastic bearings H' and H², which absorb the shock to which it is subjected by the dropping of the ram upon a vertically-adjustable stop-finger G', also mounted upon the rod H and provided with a set-screw G², engaging with the machine-frame, and set to limit the lateral outward movement of the finger from under the lower edge of the ram, which it supports after the gripping mechanism carried thereby has been caused to let go of the cable under the action of the tripping-finger, the ram being so supported until it is desired to let it fall, when the stop-finger is cleared from under it by rotating the rod, which is done through an arm H³, a chain H⁴, attached thereto and leading over an idler H⁵, and a treadle attached to the chain, but not shown. A spring H⁶ operates to automatically rotate the rod to throw the stop-finger into position to support the ram, the adjacent edge whereof is recessed to form a clearance-space H⁷, in which the inner end of the stop-finger plays clear of the tripping-arm E, carried by the ram. The inner wall of this recess is beveled, as at H⁸, so as to push the inner end of the stop-finger aside when the ram is raised. Just before the ram reaches the limit of its fall the outer end of its spring locking-arm F engages with the beveled face J of a block J', mounted for vertical adjustment in a slot J², formed in the post C' of the machine-frame, the said beveled face springing the arm so as to disengage it from the locking-lug F', and thereby permitting the spring D⁴ to act in forcing the gripping-cam to take hold of the cable. This is done when the ram is at the bottom of its fall. Then when the ram is being lifted the tripping-arm engages with the tripping-finger to release the cable, whereby the said arm is depressed and the locking-arm elevated and caused to ride up over the bevel of the locking-lug, from the edge of which it springs over the top of the same, as shown by Fig. 1 of the drawings, the gripping-cam being then locked in its retired position, in which it clears the cable. It will thus be seen that by using an endless traveling flexible power connection I secure a free-falling drop-hammer of simple and compact form without the drawbacks incident to using a plank.

I would have it understood that I do not limit myself to the construction and arrangement of parts herein shown and described.

I have before mentioned that the cable may be replaced by other forms of flexible power connection. The ram and the coupling mechanism carried by it may also be modified—as, for instance, as shown by Fig. 4 of the drawings, in which the cable is designed to pass outside of the ram K and to be gripped by two independent gripping-arms K' and K², actuated by eccentrics L' and L² on a rock-shaft L³, journaled in the ram, and rotated by means substantially like those herein shown for rotating the shaft D⁵; or the endless flexible power connection may be provided with perforations, into which a finger carried by the ram may be projected and withdrawn for connecting the ram with and disconnecting it from the power connection, or the said connection might have tooth-like projections to be engaged by pawls or fingers carried by the ram. The mechanisms last suggested I mention as forms of coupling devices not acting on the frictional or gripping principle. The tripping and supporting devices may also be changed—as, for instance, as shown by Fig. 5 of the drawings, which shows a block or carrier M, mounted for vertical adjustment upon a post M', corresponding to the post B' of the machine-frame B, the said post M' being provided with a vertical groove M², receiving the inner ends of clamping-bolts M³ M³, carried by the block, which is provided with a tripping-finger N, adapted to engage with the tripping-arm E of the ram, and with a pivotal cam-faced lever O, adapted to engage with a face O', set into the ram and attached at its outer end to a rod P, connected at its lower end with a treadle, which is not shown, and at its upper end with a spring P², which exerts a constant effort to lift the rod and hence throw the cam-face of the lever into engagement with the ram. This tripping and supporting device is not limited in its application to drop-hammers of the construction herein set forth, but is applicable to drop-hammers of any type. Nor is it essential that the pivotal cam-faced lever and the tripping-finger be mounted upon the same carrier. I would therefore have it understood that I hold myself at liberty to make such changes and alterations from the forms herein shown and described as fairly fall within the spirit and scope of my invention.

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

1. In a free-falling drop-hammer, the combination, with the ram thereof, of coupling mechanism carried thereby, an endless traveling flexible power connection the ascending side whereof has the ram connected with and disconnected from it by the said mechanism, and means for actuating the said mechanism thereto, substantially as described.

2. In a free-falling drop-hammer, the combination, with the ram thereof, of a spring-actuated gripping-cam located therein, an endless traveling flexible power connection

the ascending side whereof passes through the ram in range of the said cam, and means for actuating the cam to release its grip upon the flexible connection for holding it in its retired position and for releasing it to permit it to grip the said connection, substantially as described.

3. In a free-falling drop-hammer, the combination, with the ram thereof, of a spring-actuated gripping-cam located therein, a horizontal rock-shaft journaled in the ram and carrying the said cam, an endless traveling flexible power connection the ascending side whereof passes through the ram in range of the said cam, a tripping-arm and a spring locking-arm attached to the said shaft, and means for respectively engaging the said arms to retire the cam and lock it in its retired position and to unlock it, substantially as described.

4. In a drop-hammer, the combination, with the ram thereof, of means for raising the same, and a cam-faced lever arranged to have its cam-face engage with the ram to support

the same in its suspended position, substantially as described.

5. In a drop-hammer, the combination, with the ram thereof, of means for raising the same, a pivotal cam-faced lever adapted to have its cam-face engage with the ram to support the same in its suspended position, and a vertically-adjustable carrier for the said lever, substantially as described.

6. In a free-falling drop-hammer, the combination, with the ram thereof, of coupling mechanism carried by the ram, an endless traveling flexible power connection the ascending side whereof is connected with and disconnected from the said mechanism, and a vertically-adjustable block carrying a tripping-finger and a cam-faced ram-supporting lever, substantially as described.

ARTHUR WILZIN.

Witnesses:

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