(No Model.)

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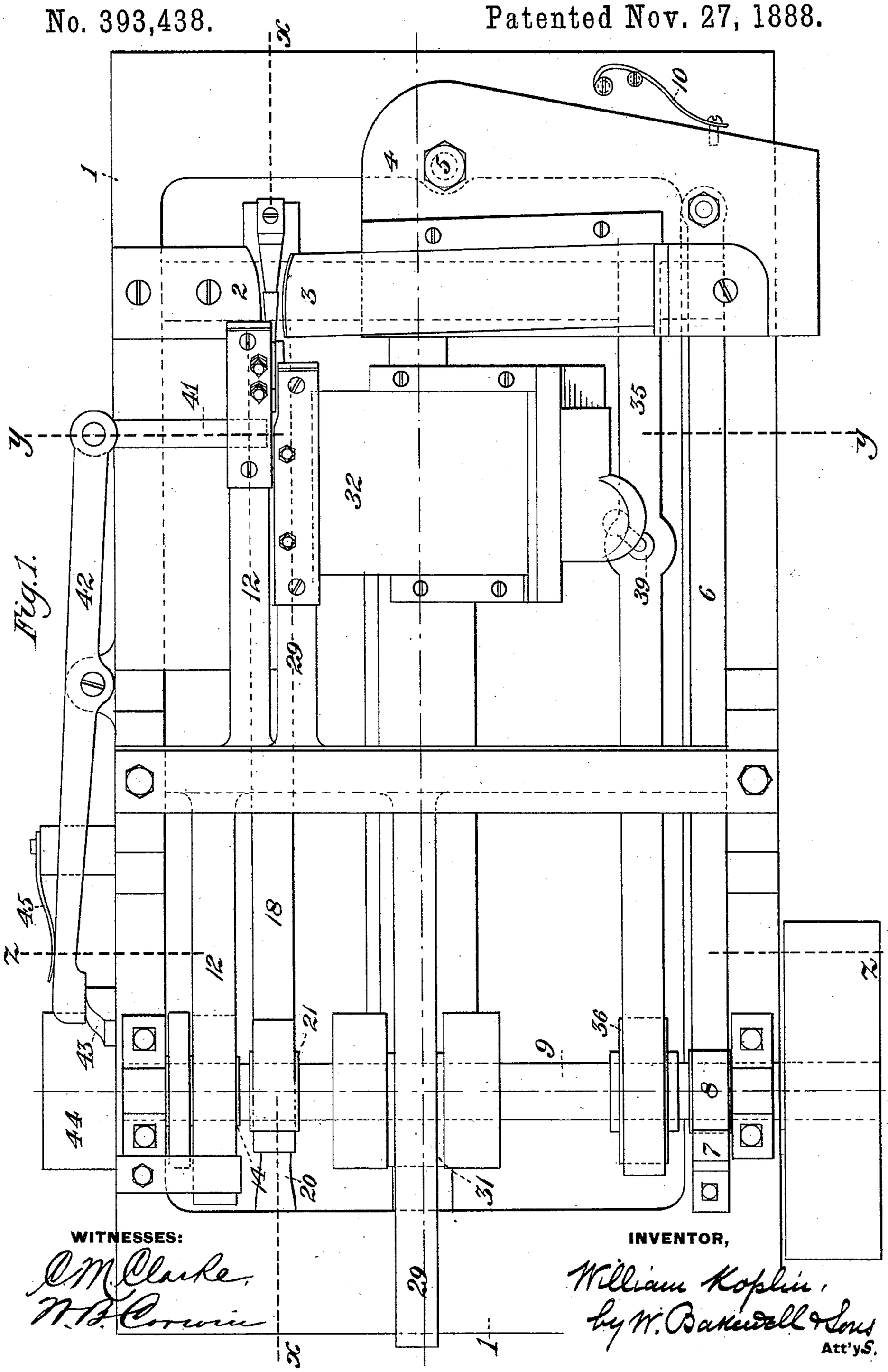
W. KOPLIN.

SPIKE MACHINE.

No. 393,438. Patented Nov. 27, 1888.



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(No Model.) 4 Sheets—Sheet 2.

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SPIKE MACHINE.

No. 393,438. Patented Nov. 27, 1888.

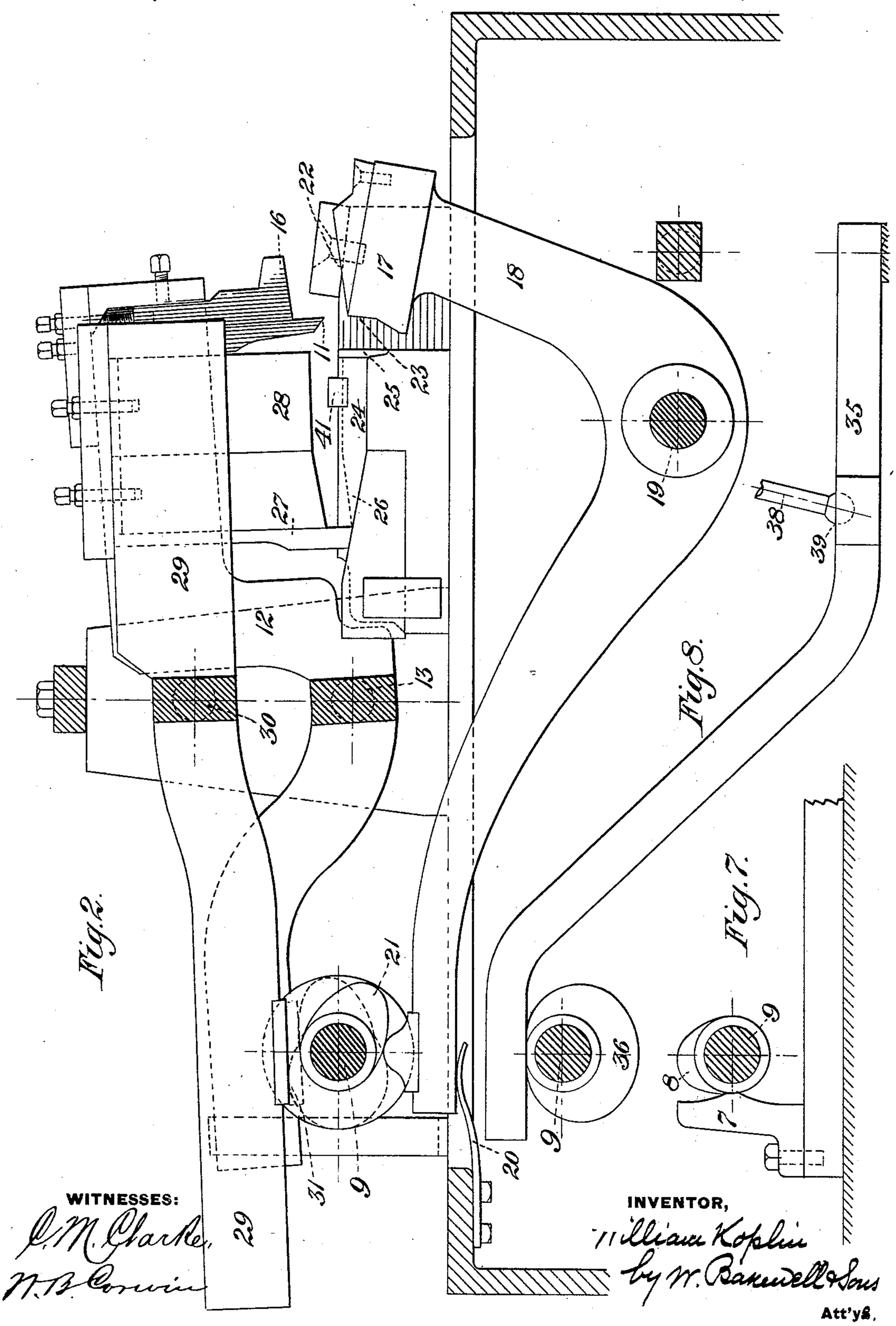

Fig. 2.

Fig. 8.

Fig. 7.

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SPIKE MACHINE.

No. 393,438. Patented Nov. 27, 1888.

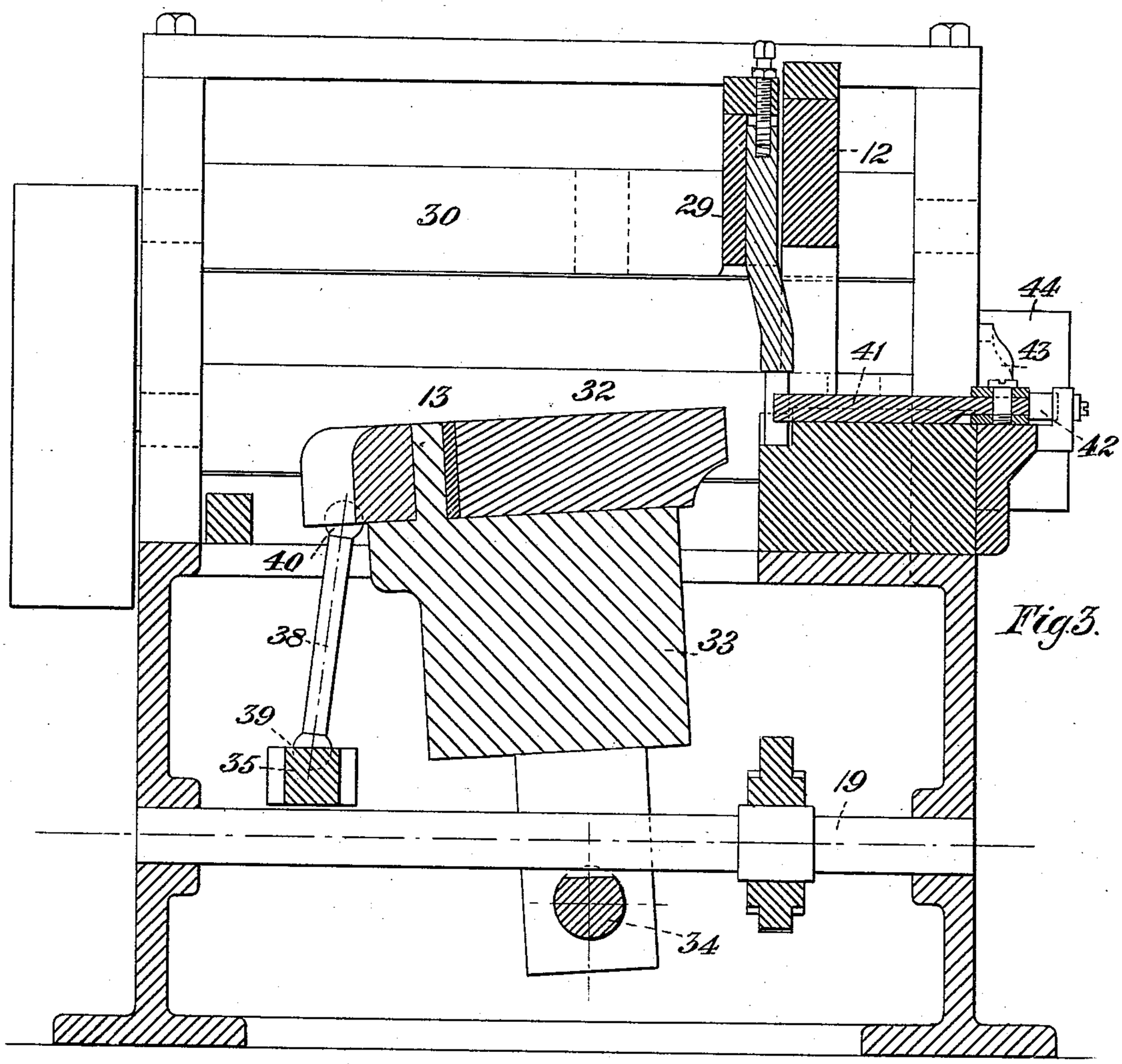

Fig. 3.

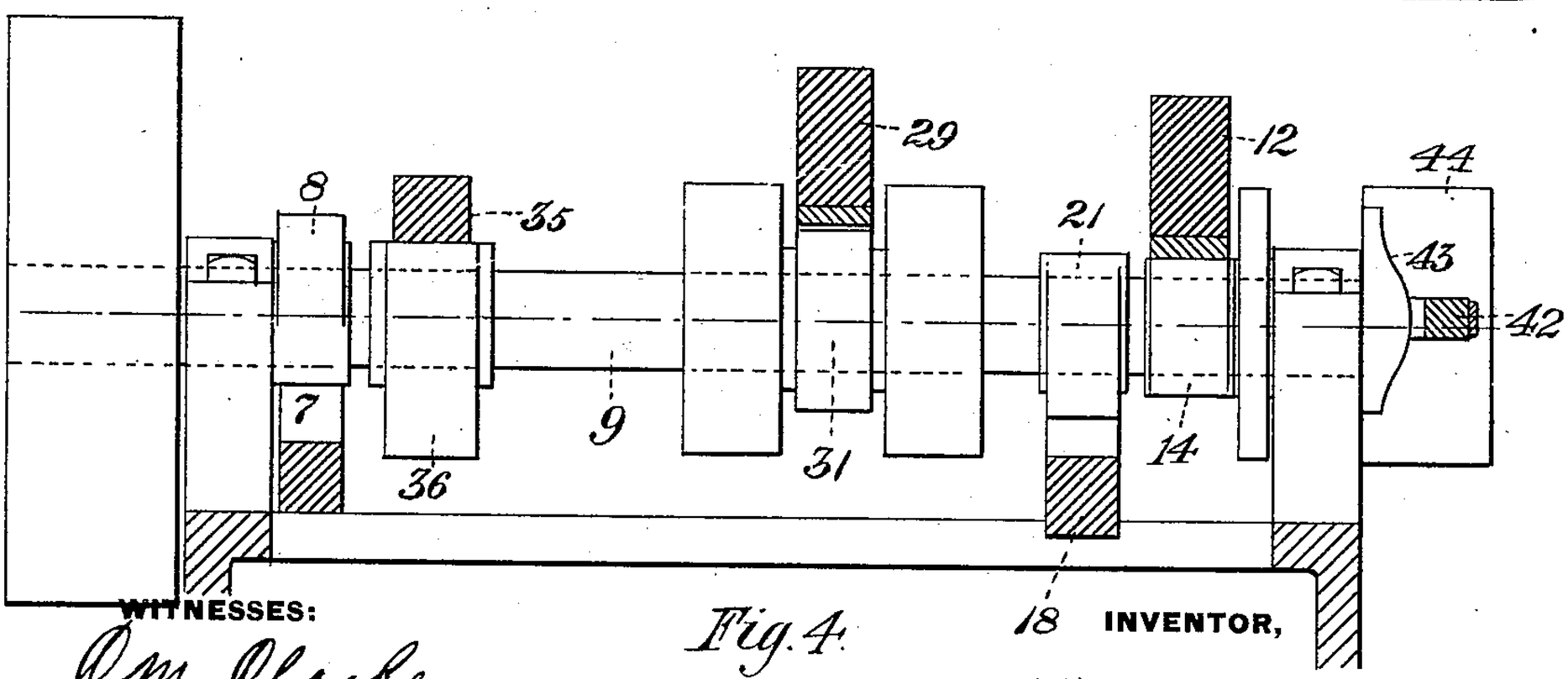

Fig. 4.

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SPIKE MACHINE.

No. 393,438. Patented Nov. 27, 1888.

Fig. 5.

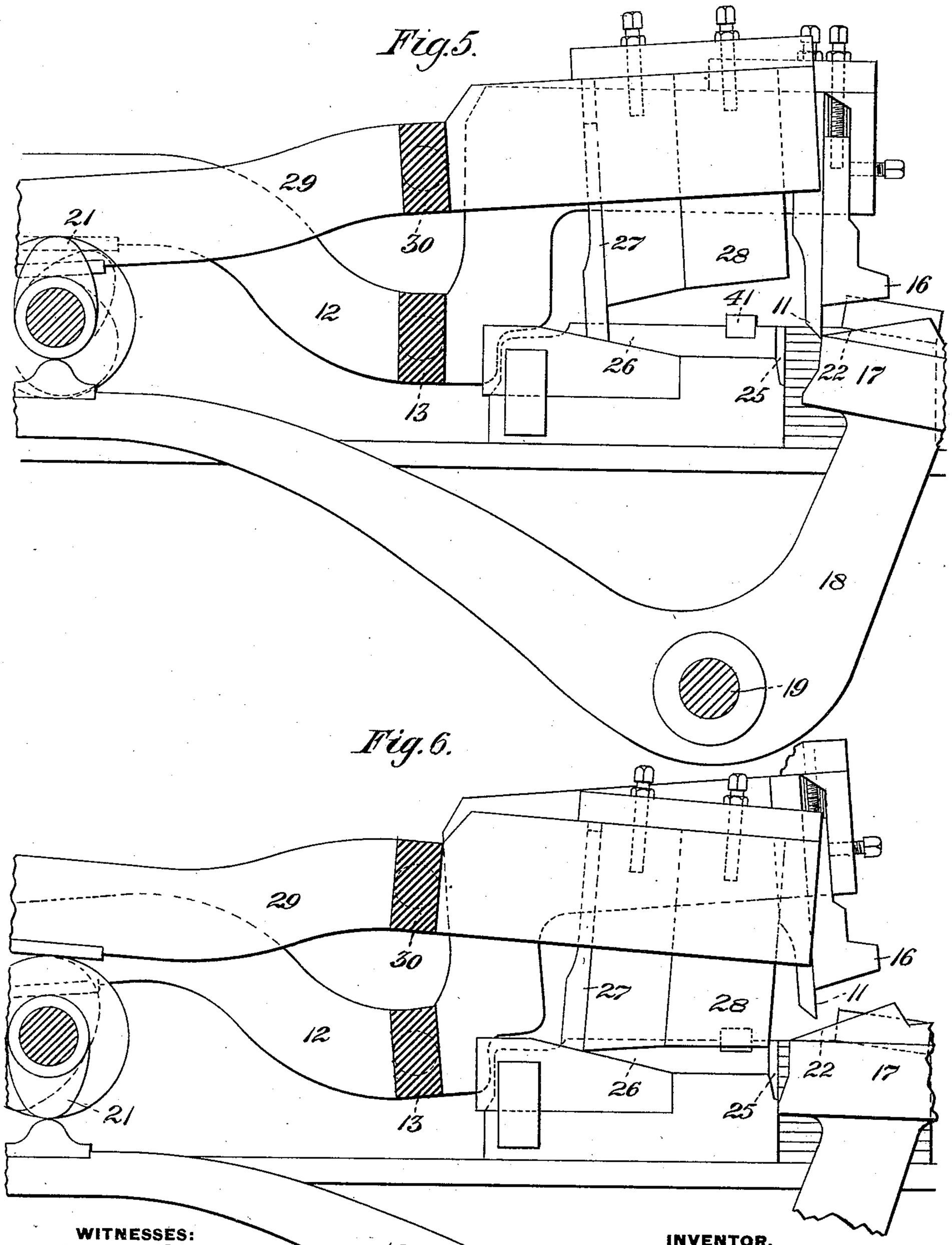

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM KOPLIN, OF NEW CASTLE, PENNSYLVANIA.

SPIKE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 393,438, dated November 27, 1888.

Application filed June 9, 1888. Serial No. 276,587. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KOPLIN, of New Castle, in the county of Lawrence and State of Pennsylvania, have invented a new and useful Improvement in Spike-Machines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of my improved machine. Fig. 2 is a vertical longitudinal section on the line *x x* of Fig. 1. Fig. 3 is a vertical cross section on the line *y y* of Fig. 1. Fig. 4 is a vertical cross-section on the line *z z* of Fig. 1. Fig. 5 is a vertical longitudinal section on the line *x x*, showing the parts in position for cutting. Fig. 6 is a like view showing the parts in position of heading the spike. Fig. 7 is a sectional elevation of the end of the lever and its operating-cam for actuating the reducing-head, and Fig. 8 is a similar view of the lever and its operating-cam for actuating the side die.

Like letters of reference indicate like parts wherever they occur.

Heretofore in the manufacture of spikes having long points it has been necessary to first form the spike having a short point in the ordinary spike-machine, after which the spikes are passed through a second machine for the purpose of elongating the points.

The object of my invention is to manufacture spikes having long points by a single operation, whereby the second or elongating machine is dispensed with; and it consists in the apparatus which first reduces the bar and cuts the blank therefrom and also finishes the reduced portion into an elongated point and at the same time forms the head on the spike.

I will now describe my invention, so as to enable others skilled in the art to manufacture and use the same.

In the drawings, 1 represents the bed-frame of the machine, at one end of which is a fixed or stationary reducing-head, 2. Opposite this head 2 is a movable reducing-head 3, which is secured to the lever 4, which is pivoted to the bed-frame at 5, and is operated laterally by the reciprocating shaft 6, one end of which is pivoted to the lever 4 and the other end is provided with the knee 7, which is operated by the cam 8 on the shaft 9. Secured to the lever 4 is a spring, 10, the other end of which is fastened to the bed-frame 1. Situate above the space between the reducing heads 2 and 3 is a knife, 11, which is secured to one end of the rock lever 12, which is pivoted on the shaft 13, while the outer end of the lever 12 rests on the cam 14 on the shaft 9. On the outer face of the knife 11 is a head or reducing-die, 16. Situate below the die 16 is the header 17, which is fixed to the end of the rock-lever 18, which is pivoted on the shaft 19, and the outer end of which rests on the spring 20 in the path of the cam 21 on the shaft 9. The upper face, 22, of the header forms a reducing-die, the counterpart of the die 16, while the inner face, 23, of the header forms a cutting-die for the knife 11 and the die for forming the head of the spike. Situate in front of the heading face 23 is the spike-matrix or fixed die 24, having a cavity, 25, for the head and an incline, 26, for forming the point, and at the end of the incline is the stop 27. This matrix is open at the top and one of the sides to permit of the operation of the top and side forming-dies. In the rear of the knife 11 is the top forming-die, 28, which is inclined at one end for the purpose of forming the point on the spike. This die is fixed to the end of the rock-lever 29, which is pivoted on the shaft 30, and the outer end of which rests on the cam 31, which is keyed to the shaft 9.

Opposite the open side of the matrix or fixed die 24 is a movable side die, 32, which is fixed on the rocking head 33, which is pivoted on the shaft 34, (see Fig. 3,) and is operated by the rock-lever 35, the outer end of which rests on the cam 36 on the shaft 9. The head 33 is connected with the lever 35 by a rod, 38, the lower end of which is attached to the lever 35 by a ball and socket, 39, while on the upper end of the rod there is a ball, 40, which fits in a socket in the head 33. Extending to the cavity of the matrix 24 is an opening or way in which a reciprocating ejector, 41, is fitted, which ejector is pivoted to one end of the rock-lever 42, the outer end of which lever is held against the face of the cam 43 on the wheel 44 by the spring 45.

The operation is as follows: The bar from

which the spikes are formed is first fed into the machine only as far forward as the path of the knife 11. The head or die 3 then advances and reduces the end of the bar by pressing it against the head or die 2. The cutting knife 11 then descends, while at the same time the header 17 advances, and the end of the bar is further reduced by the dies 16 and 22. When these parts have separated, the reduced end of the bar is fed forward against the stop 27. The die 3 then advances, seizes the bar and reduces, as already described, (for the purpose of forming the point on the second spike.) The knife 11 then descends and the header 17 advances and cuts the first blank from the bar, while the dies 16 and 22 complete the reduction of the end of the bar. At the same time the top die, 28, descends and the side die advances and forms the spike in the matrix 24, the inclined parts of the matrix and forming-die acting on the reduced ends of the blank, so as to form an elongated point. As the knife 11 descends and cuts the blank from the bar it carries a portion of the metal of the blank down in front of the header, whereupon the knife is withdrawn, the die 28, however, remaining down, and the header advances and forms the head in the cavity 25. The dies then separate and the ejector 41 advances and forces the finished spike from the matrix. The reduced end of the bar is then again fed forward and another spike is formed in a like manner.

It should be noticed that before the bar is fed into the matrix the end is first reduced by the tapering side dies, 2 and 3, and top dies, 16 and 22, and as the spike is being formed in the matrix and the blank is cut from the bar the end of the bar is at the same time reduced for the formation of the point of the next blank. Another feature that should be noticed is that as the knife cuts the blank from the bar it carries a portion of the metal of the blank in front of the header, and while the knife is at once withdrawn the spike-forming dies remain closed until the header has finished its stroke and formed the head of the spike.

Owing to prior reduction of the blank the forming-dies are enabled to act on the metal, so as to form an elongated point.

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

1. In a machine for making spikes complete from the bar, and comprising a cutter, pointing and heading dies, and an ejector, the reducing-dies 2 3, substantially as set forth.

2. In a machine for making spikes complete from the bar, the preliminary side reducing-dies, 2 3, having oppositely-inclined faces, combined with the top die, 16, and its mate 22, formed on the top of the header, and means to operate them to reduce the end of the blank before it is fed to the matrix, substantially as described.

3. In a spike-machine, the combination of a matrix and dies having elongated inclines on their faces and dies for reducing the blank prior to its delivery to the forming matrix and dies, substantially as and for the purposes described.

4. In a spike-machine, the combination of the matrix 24, upper die, 28, side dies, 33, and header 17, an ejector, 41, and operating mechanism, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 5th day of June, A. D. 1888.

WILLIAM KOPLIN.

Witnesses:
JOHN S. TAGGART,
W. B. SUTTON.