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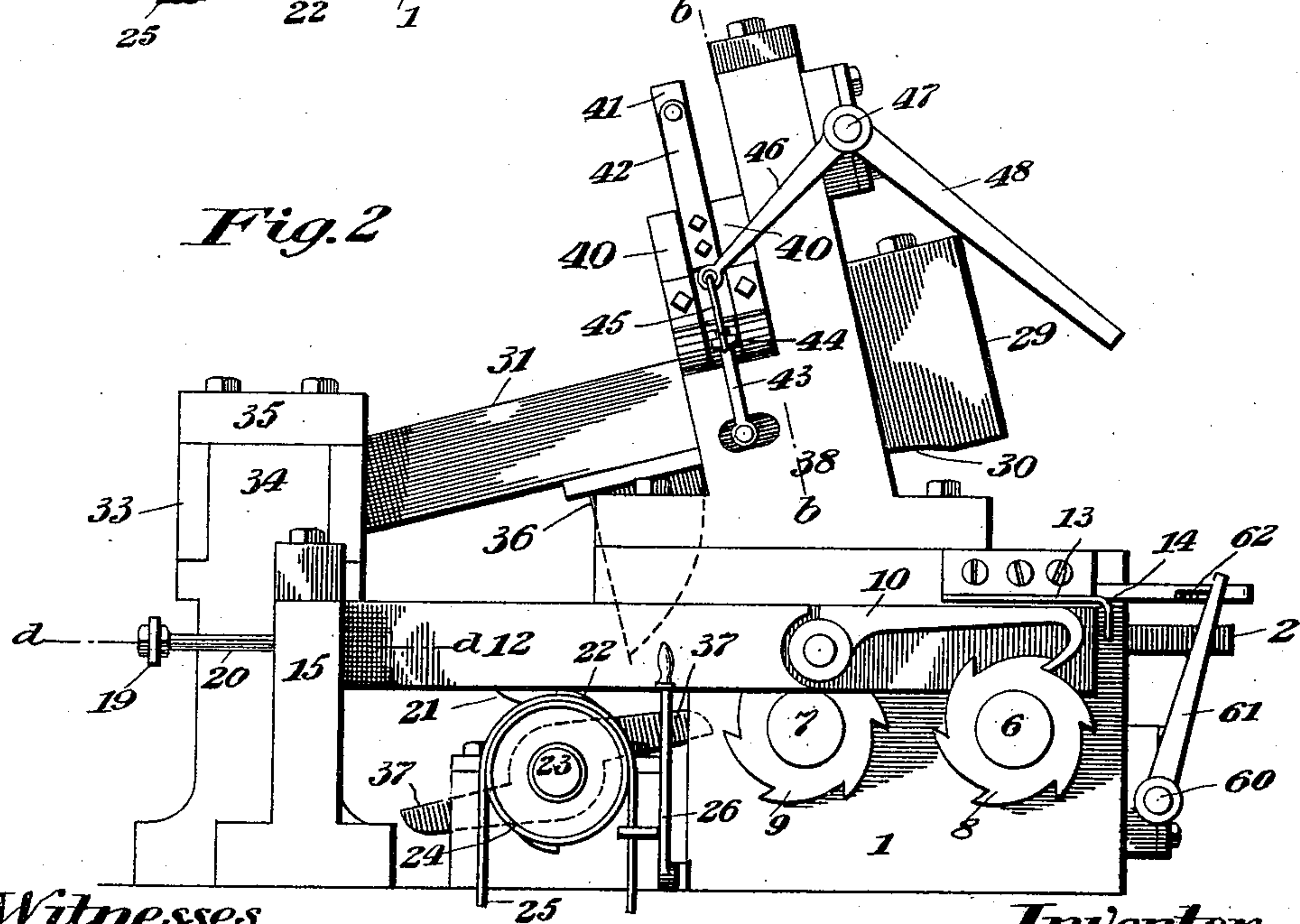
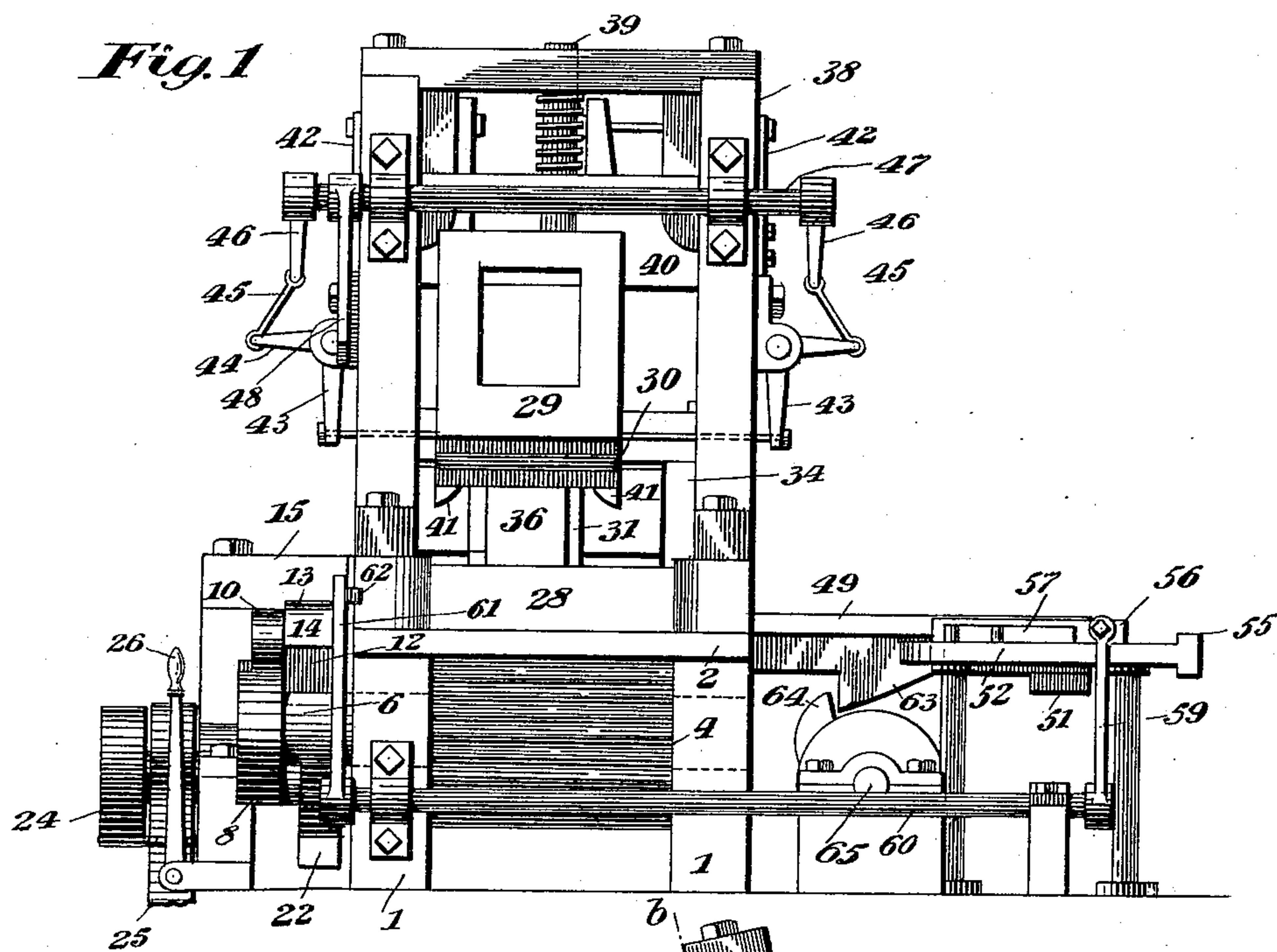
Patented Nov. 22, 1898.

E. D. PHILLIPS.
MACHINE FOR MAKING BILLETS.

(Application filed May 21, 1898.)

(No Model.)

3 Sheets—Sheet I.



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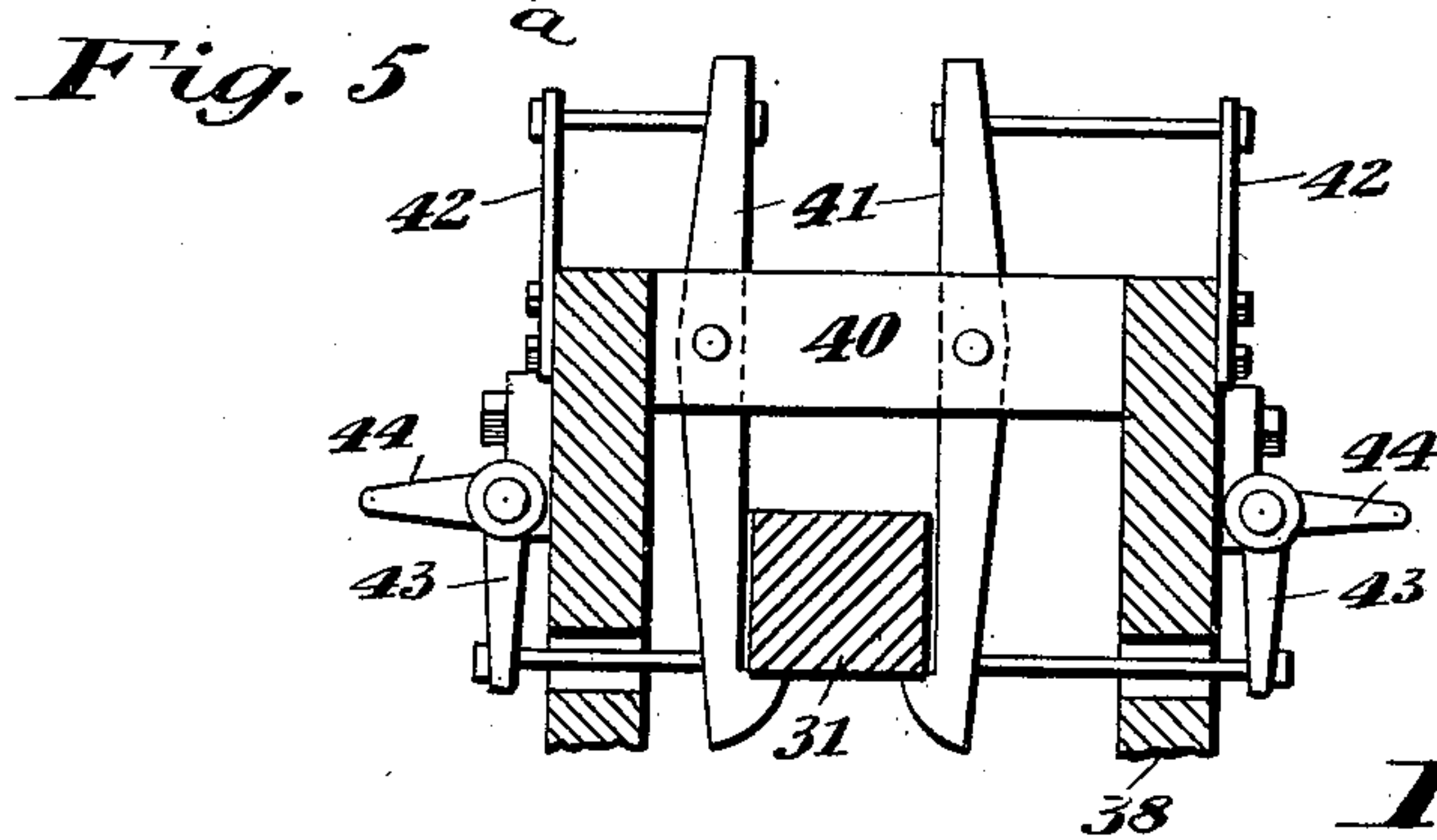
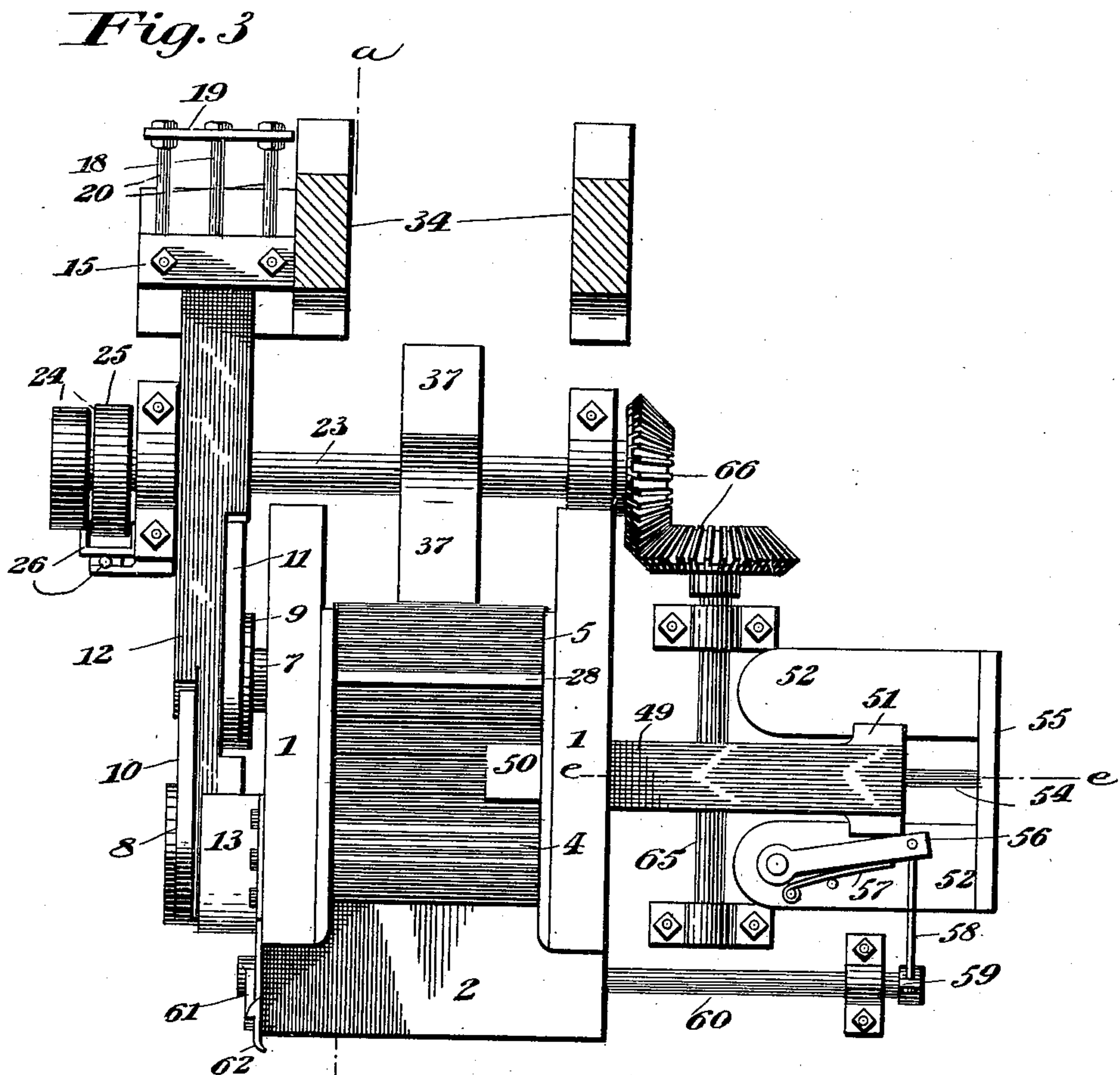
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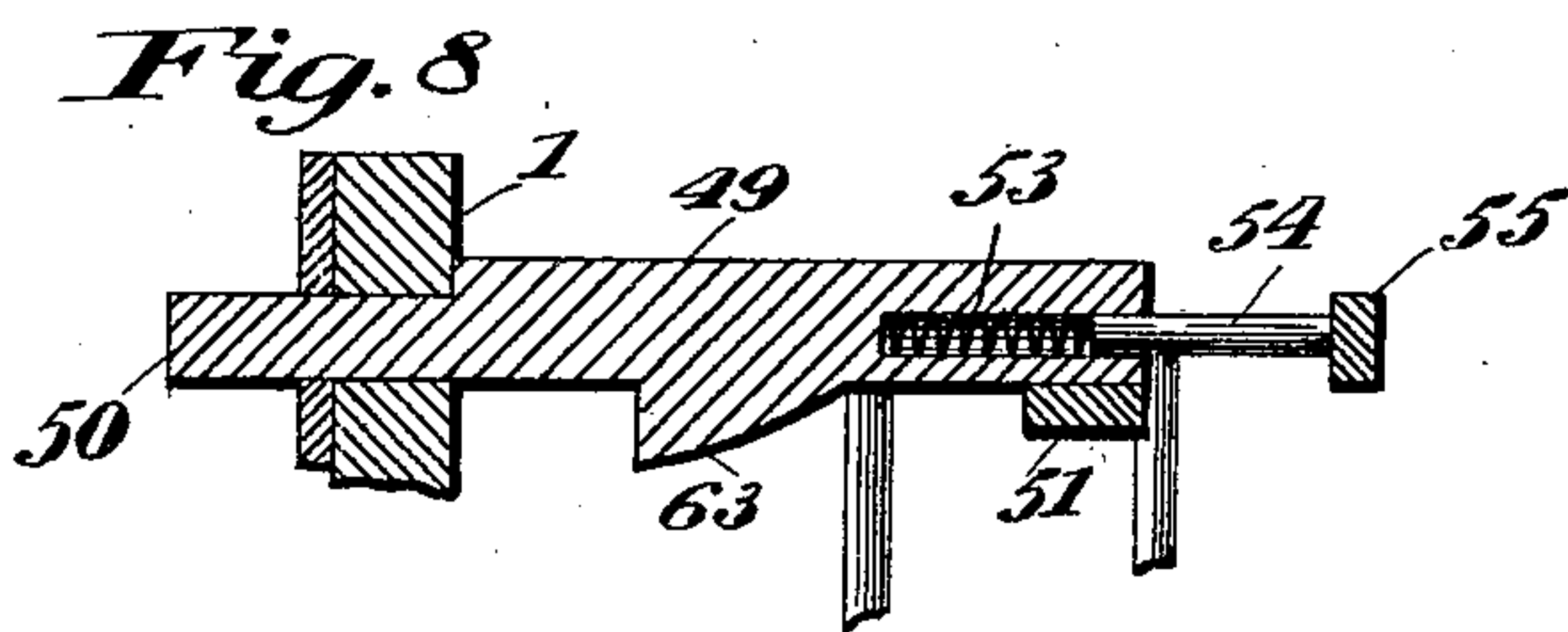
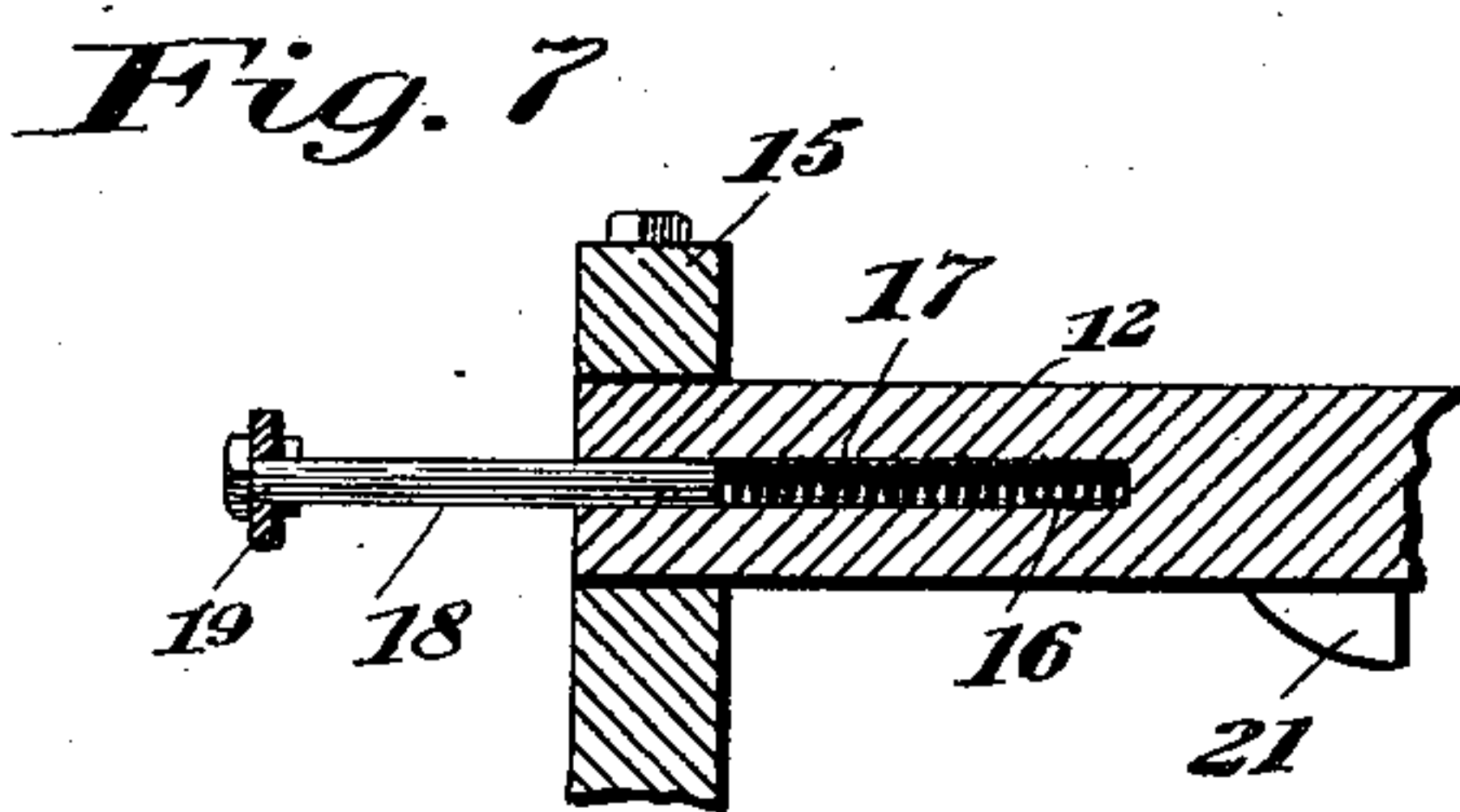
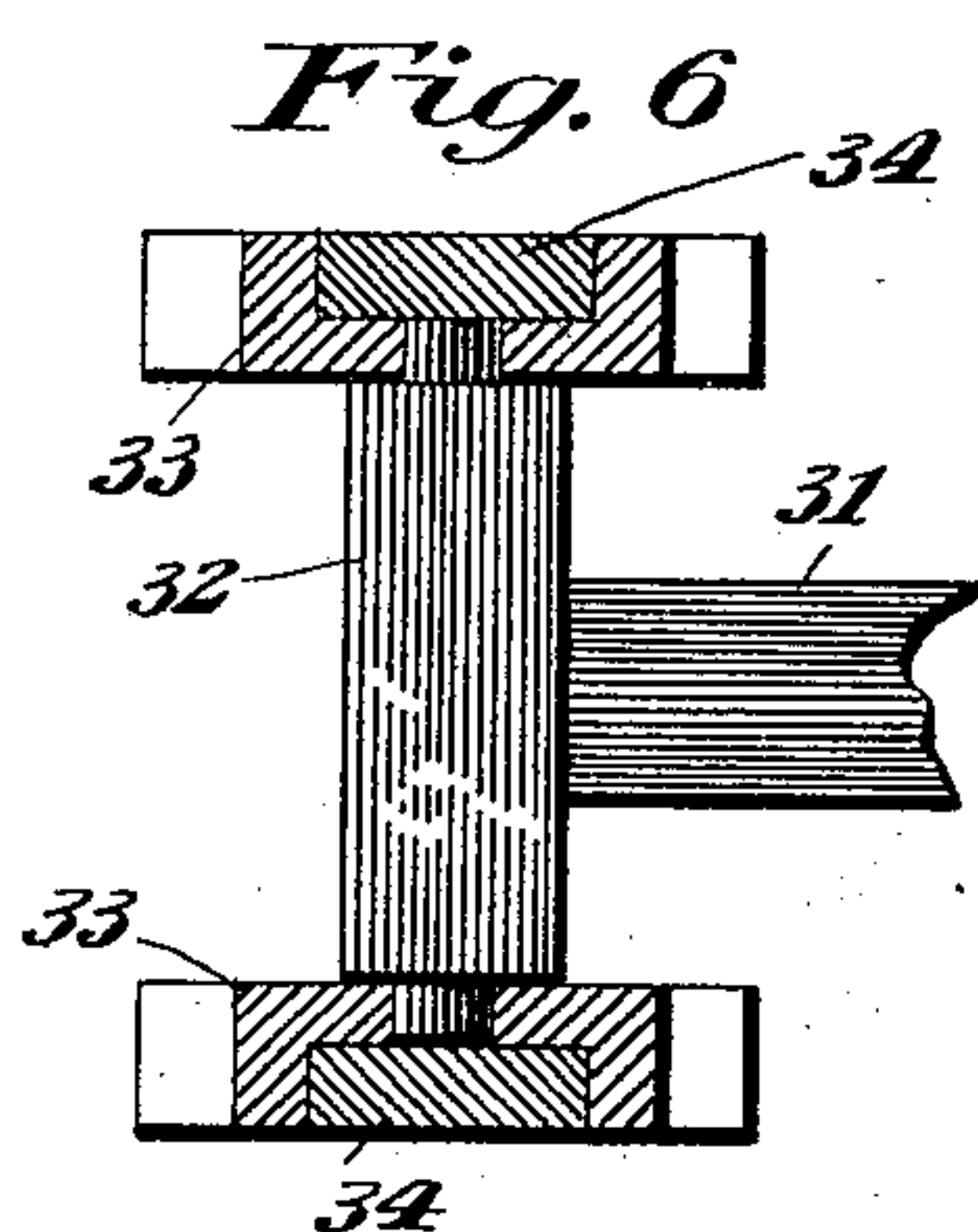
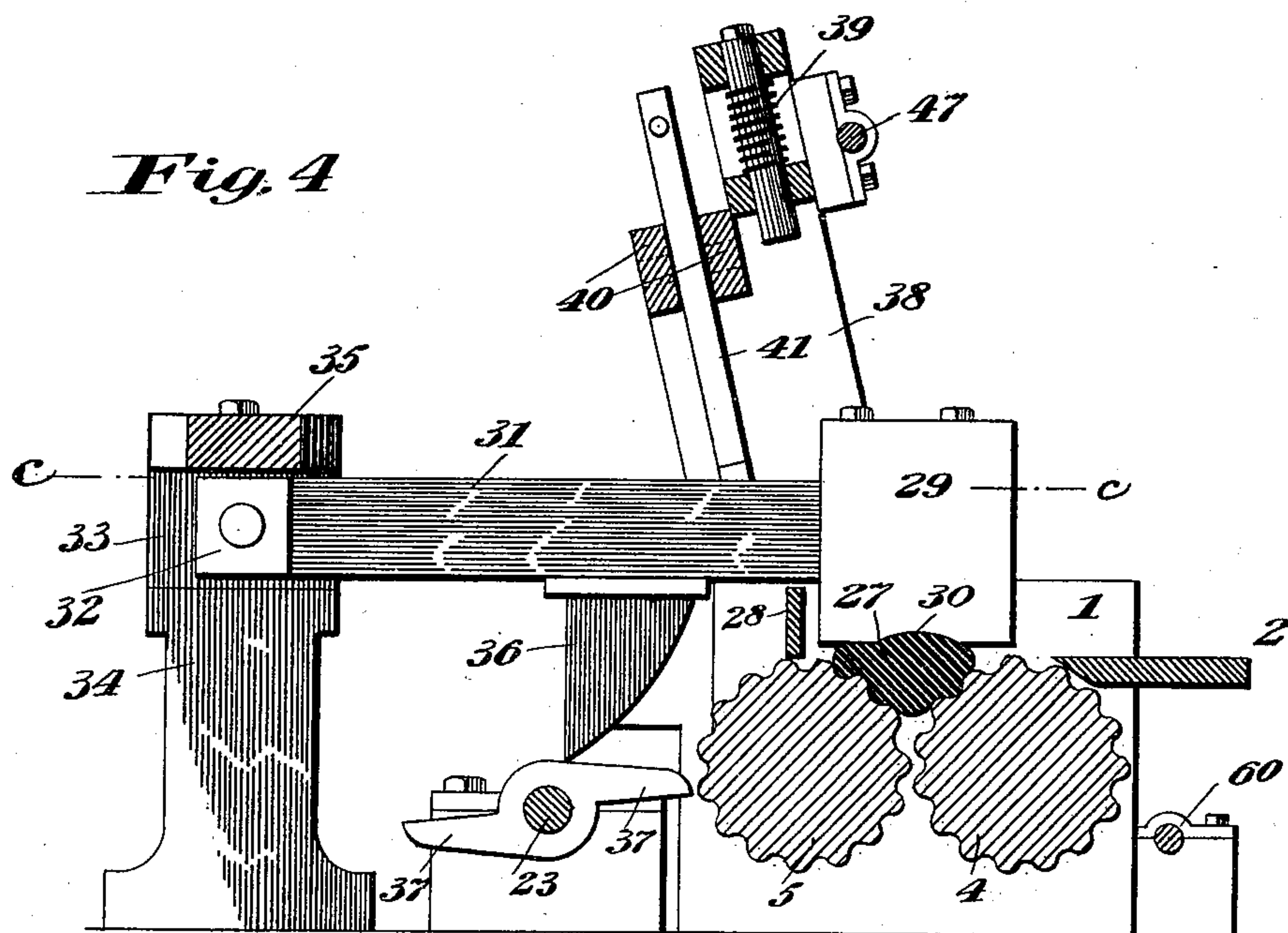
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

ENOCH DAVID PHILLIPS, OF TOLEDO, OHIO.

MACHINE FOR MAKING BILLETS.

SPECIFICATION forming part of Letters Patent No. 614,622, dated November 22, 1898.

Application filed May 21, 1898. Serial No. 681,289. (No model.)

To all whom it may concern:

Be it known that I, ENOCH DAVID PHILLIPS, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Machines for Making Billets; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in apparatus or machines for rolling or forming billets or bars of metal, and has for its object to provide a machine of this character of a simple and inexpensive nature adapted to receive the bloom from which the billet is to be formed and to work or form the same into a billet suitable for passing between the rolls for rolling into bars or rods.

The invention contemplates certain novel features of the construction, combination, and arrangement of the several parts of the improved apparatus or machine whereby certain important advantages are attained and the device is made simpler, cheaper, and otherwise better adapted for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In order that my improvements may be the better understood, I have shown in the accompanying drawings an apparatus or machine constructed according to my invention, in which drawings—

Figure 1 is a front elevation of the machine or apparatus, and Fig. 2 is a side elevation of the same. Fig. 3 is a sectional plan view of the machine, the hammer and its supporting parts being removed to illustrate the means for supporting the bloom beneath said hammer. Fig. 4 is a vertical section taken through the machine in the plane indicated by the line *a a* in Fig. 3. Fig. 5 is a partial sectional view taken in the plane indicated by the line *b b* in Fig. 2. Fig. 6 is a sectional detail view taken in the plane indicated by the line *c c* in Fig. 4. Fig. 7 is a sectional detail view taken in the plane indicated by the line *d d*

in Fig. 2. Fig. 8 is a sectional detail view taken in the plane indicated by the line *e e* in Fig. 3.

In the views, 1 1 indicate two standards spaced apart and serving to support a table 2 at the front of the machine or apparatus over which the bloom from which the billet is to be formed is placed in the apparatus. Between the standards 1 and back of the table 2 are arranged rolls or drums 4 and 5, journaled in the standards and having grooved or corrugated peripheries. The rolls or drums 4 and 5 are mounted on shafts 6 and 7, which are arranged to project at one end beyond the standard and are provided at their extremities with ratchet-disks 8 and 9, arranged in planes at different distances from the adjacent standard.

The teeth of the ratchet-disk 8 are adapted to be engaged by a pawl or dog 10, pivoted in a recess at one side of a slide 12, adapted for endwise movement, being supported at one end on the shaft 6 of the roll or drum 4, in contact with which it is held by a plate 13, secured to the standard 1 and having one end bent down, as shown at 14, to form a stop to limit the endwise movement of the slide in one direction. The slide 12 is guided at its opposite end in a bearing or support 15 and is provided with an axial socket 16 to receive a spring 17, in which socket projects a pin 18, held by a yoke 19, carried by arms 20, projecting from the rear side of the bearing or support on opposite sides of the pin 18. The pin 18 has engagement with the spring 17 in socket 16, so that when said slide 12 is moved rearward the spring is compressed and on the release of the slide acts to return the same to its forward position. (Shown in Figs. 2, 3, and 7.) The slide 12 is provided on its side adjacent to the standard 1 with another recess, in which is pivoted a dog or pawl 11, adapted to engage the teeth of the ratchet-wheel 9 on the shaft 7 of drum 5, so that when the slide is moved rearwardly the pawls or dogs 10 and 11 by engagement with the teeth of the ratchet-wheels will act to impart a partial rotative movement to the drums 4 and 5, as will be readily understood, and when the slide is retracted by the spring 17 said pawls or dogs will ride freely over the teeth of the ratchet-wheels.

On the underside of the slide 12 is fixed a lug or projection 21, adapted to be engaged by cams 22 on a driving-shaft 23, journaled behind the standards 1 and parallel with the axis of each of the shafts 6 and 7, said shaft 23 having at one end tight and loose pulleys 24, over which passes a belt 25, adapted to be moved by a shifting-lever 26, so as to enable the shaft to be conveniently thrown into or out of movement.

In the operation of the machine or apparatus the bloom from which the billet is to be formed is placed in the bite of the rolls or drums 4 and 5, which serve to support the same, the corrugated surfaces of said supporting drums or rolls serving to impart an intermittent rolling movement to said bloom while the billet is being formed, and in order to prevent the bloom (indicated at 27 in Fig. 4) from being carried out of the bite of the drums or rolls by the movement of the same I provide a transverse plate 28, extending across the space between the standards over the drum or roll 5 and serving as a check-wall at the back of the apparatus or machine.

29 indicates a hammer arranged over the bite of the drums or rolls 4 and 5 and adapted to act on the bloom, being provided with a rounded or concave recess 30 in its under side adapted to impart a rounded form to the billet formed by the machine. The hammer is held on a beam 31, having at its end a cross-head 32, (see Figs. 4 and 6,) pivoted in blocks 33, let into recesses at the upper ends of standards 34 and held in place by a cap-plate 35, extending across the top of the standards. The hammer is arranged to act by gravity, being raised by means of cams 37 on the shaft 23, which cams engage a lug 36 on the under side of the beam 31.

The free end of the beam 31 plays vertically in a guide 38, extending above the standards 1 and having at its upper part a cushion device 39 to relieve the shock of the hammer 29 when the same is raised, said device comprising a pin playing in an opening in the top of the guide 38 and having at its lower part a cross-head playing in guides at the sides of the guide 38, a spring being coiled on the pin above the cross-head.

Across the upper part of the guide 38 extend spaced bars 40, between which are pivoted dogs or detents 41, arranged to engage the beam 31 at their lower ends, as clearly shown in Fig. 5, the upper ends of said detents being connected to springs 42, while the lower end of each detent is connected to one arm 43 of an elbow-lever mounted on the outside of the guide 38 and having its other arm 44 coupled by a link 45 to an arm 46 on a shaft 47, extending transversely across the front of the guide and adapted to be rocked by the operator by means of a handle or arm 48 at one end of the said shaft 47.

To prevent the formation of crop ends on the billets, I employ an end hammer 50, carried on a slide 49 and playing through an

opening formed in one of the standards 1, opposite the bite of the rolls 4 and 5, in position to strike upon the end of the billet held under the hammer 29, so as to form a square end on said billet. The slide 49 is larger in cross-section than the hammer at its end, so that a shoulder is formed at the end of the slide, as clearly shown in Fig. 8, which shoulder forms a stop to limit the movement of the hammer 50 in striking the bloom, so that said hammer is always held in proper position to be engaged by its operating devices, as will be explained. The slide 49 has at its outer end a cross-head 51, playing in guides 52, and in said slide is formed a socket wherein is held a spring 53, engaged by the end of a pin 54, held on the central part of a bar 55, which ties together the guides 52. The slide 49 has on its under side a lug 63, adapted to be engaged by a cam 64 on a shaft 65, journaled beneath the slide and driven by bevel-gearing 66 from the shaft 23. The stop formed by the shoulder at the end of the slide 49 insures that the lug 63 will be held in proper position to be engaged by said cam.

To enable the end hammer 50 to be thrown out of operation when desired, I employ a dog 56, pivoted on one of the guides 52 and pressed by a spring 57 into position to engage the cross-head 51 when the slide 49 is moved outward, so as to compress the spring 53. The dog is connected by a link 58 with an arm 59 on one end of a shaft 60, which extends along the front of the machine or apparatus and has at its other end another arm 61, adapted to be engaged with a catch 62 in such a way as to hold the dog drawn forward out of position to engage the cross-head.

In operation the bloom from which the billet is to be formed is first passed, by preference, through squeezing-rolls, so as to facilitate its working in the improved machine or apparatus herein described, although this preliminary rolling is not absolutely essential. The bloom is then placed in the bite of the supporting rolls or drums 4 and 5, and said rolls or drums being set in motion by the manipulation of the lever 26 a rolling movement will be imparted to the mass of plastic metal owing to the corrugated surfaces of the drums or rolls, the plate 28 serving to prevent the bloom from being displaced from the bite of the rolls. As the metal cools the hammer 29 is brought into operation to work the mass into a rounded form or billet, this being effected by the concave recess in the hammer in connection with the rolling movement imparted by drums or rolls 4 and 5. When raised, the hammer 29 is held out of operation by the automatic engagement of the detents 41 with the beam 31 until the shaft 47 is rocked by means of its handle 48 to release said detents from engagement with the beam, as above described. The end hammer is also brought into use as the billet nears completion, this hammer being held out of operation by means of the dog 56, which engages the

cross-head 51, and being released by throwing these parts out of engagement by rocking the shaft 60, so as to engage the arm 61 thereof with the catch 62. When the end 5 hammer is released, the tension of its spring 53 will force it inward, so as to strike on the end of the billet and form a square end thereon, the opposite end of the billet abutting against the opposite flat standard 1. The cam 10 64 acts to retract the hammer and again place the spring 53 under tension, after which by the slipping of the cam out of engagement with the lug 63 the hammer is released and the spring is permitted to act. It will be 15 seen that by the employment of an elastic medium, such as the spring 53 for actuating the hammer 50, the instroke of the hammer is permitted to accommodate itself to billets of different lengths.

From the above description it will be seen that the machine or apparatus constructed according to my invention is of an extremely simple and inexpensive nature, and is especially well adapted for use since it permits of 25 considerable economy in the manufacture of the billets or bars, and it will also be obvious from the above description that the apparatus is capable of some modification without material departure from the principles and spirit of the invention, and for this reason I do not wish to be understood as limiting myself to the precise form and arrangement of the several parts herein set forth.

Having thus described my invention, what 35 I claim, and desire to secure by Letters Patent, is—

1. In an apparatus for forming billets, the combination of a support for the bloom from which the billet is to be formed, a hammer 40 arranged over the support and adapted to strike the bloom held thereon, a driving-shaft, means to operate said hammer from said driving-shaft, means for moving the bloom beneath said hammer, another hammer arranged 45 to strike the end of the billet held on said support beneath the first-named hammer, and gearing for operating said last-named hammer from said driving-shaft, substantially as set forth.

2. In an apparatus for forming billets, the combination of a support for the bloom from which the billet is to be formed, a hammer 50 arranged over the support and adapted to strike the bloom held thereon, means for moving the bloom beneath said hammer, an end hammer arranged to strike the end of the billet held on said support beneath the first-named hammer, a spring to actuate said end hammer, and mechanism for placing said spring 55 under tension, substantially as set forth.

3. In an apparatus for forming billets, the combination of a support for the bloom from which the billet is to be formed, a hammer 60 arranged over the support and adapted to strike the bloom held thereon, means for operating said hammer, means for moving the bloom

beneath the hammer, an end hammer arranged to strike the end of the billet held on said support beneath the first-named hammer, a spring to actuate said end hammer, and 70 mechanism, actuated from the operating means of the first-named hammer, for placing said spring under tension, substantially as set forth.

4. In an apparatus for forming billets, the combination of a support for the bloom from 75 which the billet is to be formed, a hammer arranged over the support and adapted to strike the bloom held thereon, means for moving the bloom beneath said hammer, an end hammer arranged to strike the end of the billet held on said support beneath the first-named hammer, a spring to actuate said end 80 hammer, a shaft mounted to turn, and a cam on said shaft having engagement with said end hammer to move the same and place said spring under tension, substantially as set forth.

5. In an apparatus for forming billets, the combination of a support for the bloom, a 90 hammer arranged to strike the bloom, means to move the bloom beneath the hammer, an end hammer having a lug and arranged to strike the end of the billet held on said support beneath the first-named hammer, a spring 95 to actuate the end hammer, a shaft mounted to turn, and a cam on said shaft arranged to engage the lug on the end hammer in the rotation of the shaft and adapted to slip out of engagement with said lug to release said end 100 hammer, substantially as set forth.

6. In an apparatus for forming billets, the combination of a support for the bloom from which the billet is to be formed, a hammer 105 arranged over the support and adapted to strike the bloom held thereon, means for moving the bloom beneath said hammer, an end hammer arranged to strike the end of the billet held on said support, means to automatically actuate said end hammer when the same 110 is moved to the end of its outstroke, and means adapted for automatic engagement with said end hammer to hold the same out of operation when the end hammer is moved to the end of its outstroke substantially as set forth. 115

7. In an apparatus for forming billets, the combination of a support for the bloom from which the billet is to be formed, a hammer 120 arranged over the support and adapted to strike the bloom held thereon, means for moving the bloom beneath the hammer, another hammer arranged to strike the end of the billet held on the support beneath the first-named hammer, and a spring for actuating 125 said end hammer when moved to the end of its outstroke, and a dog to hold said last-mentioned hammer out of operation when moved to the end of its outstroke, substantially as set forth.

8. In an apparatus for forming billets, the combination of a support for the bloom, a 130 hammer adapted to strike the bloom, means

for moving the bloom beneath said hammer,
another hammer arranged to strike the end of
the billet held on said support beneath said
first-named hammer, a spring for actuating
5 said end hammer when moved to the end of
its outstroke, a dog to hold said last-named
hammer out of operation when moved to the
end of its outstroke, and means to hold said

dog out of operation, substantially as set
forth. 10

In testimony whereof I affix my signature
in presence of two witnesses.

ENOCH DAVID PHILLIPS.

Witnesses:

R. G. CRAWFORD,

A. REIHING.