

W. EDGE.

STAPLE FORMING AND DRIVING MECHANISM.

(Application filed Aug. 31, 1901.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.

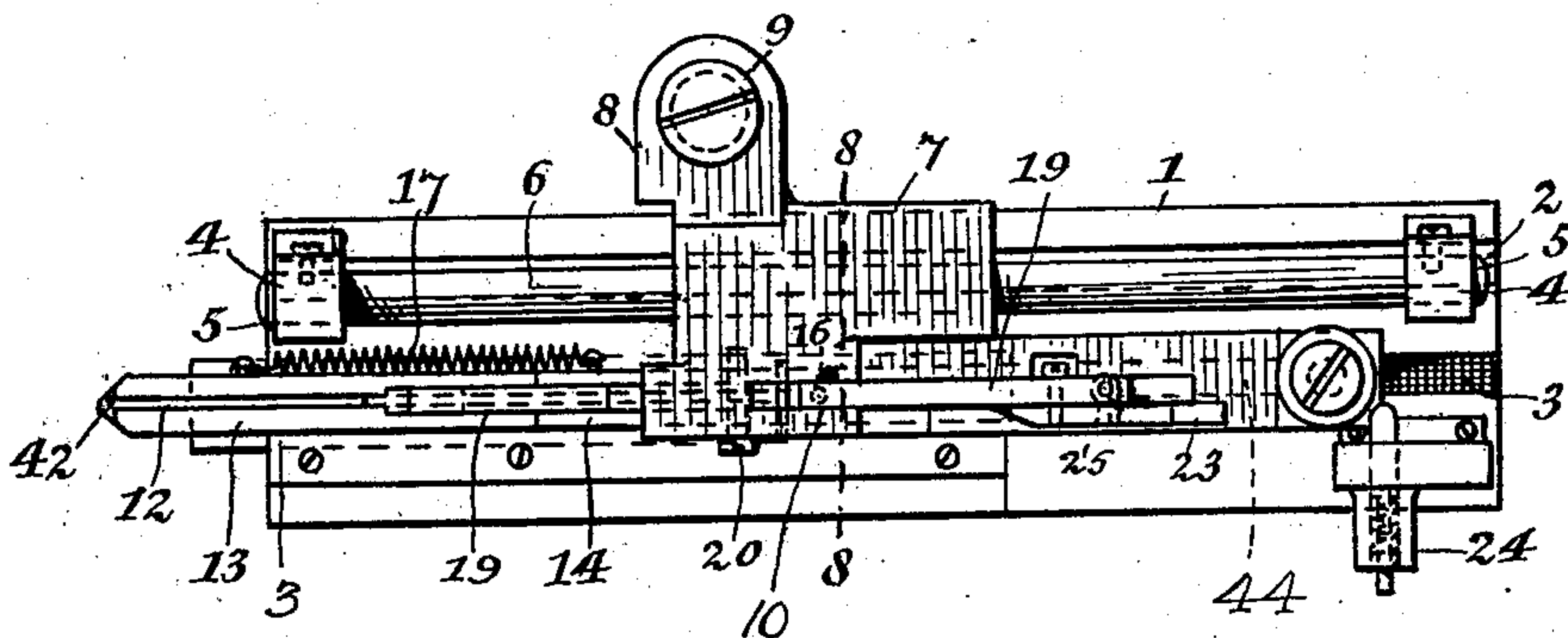


Fig. 2.

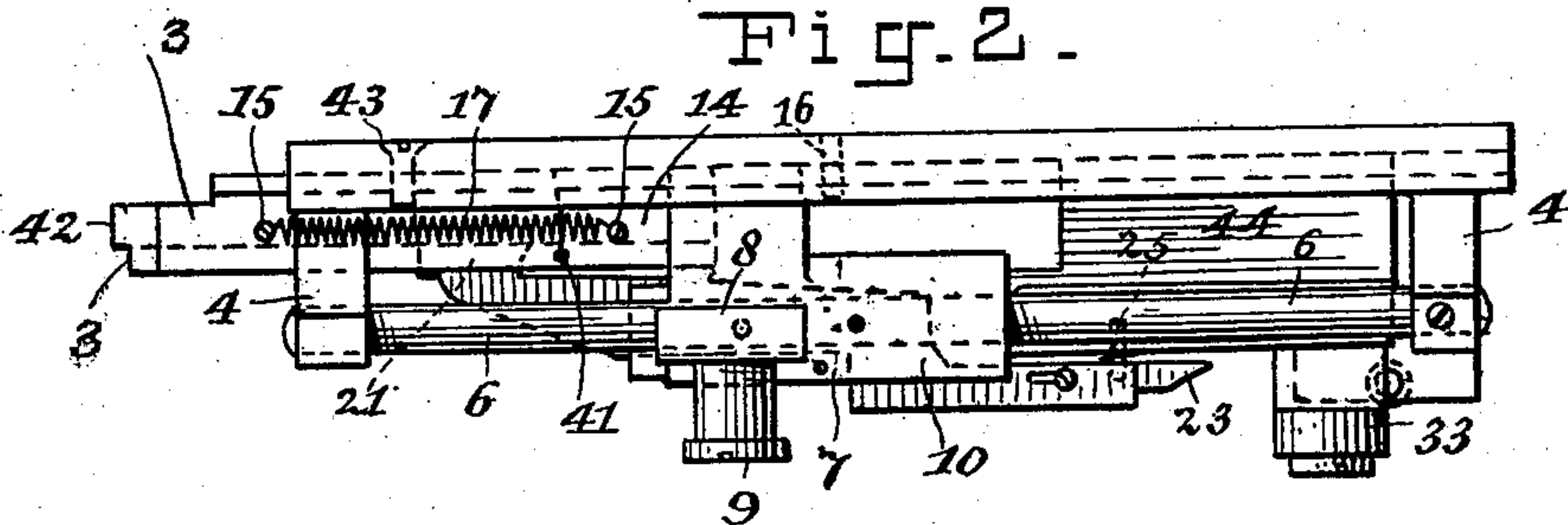


Fig. 3.

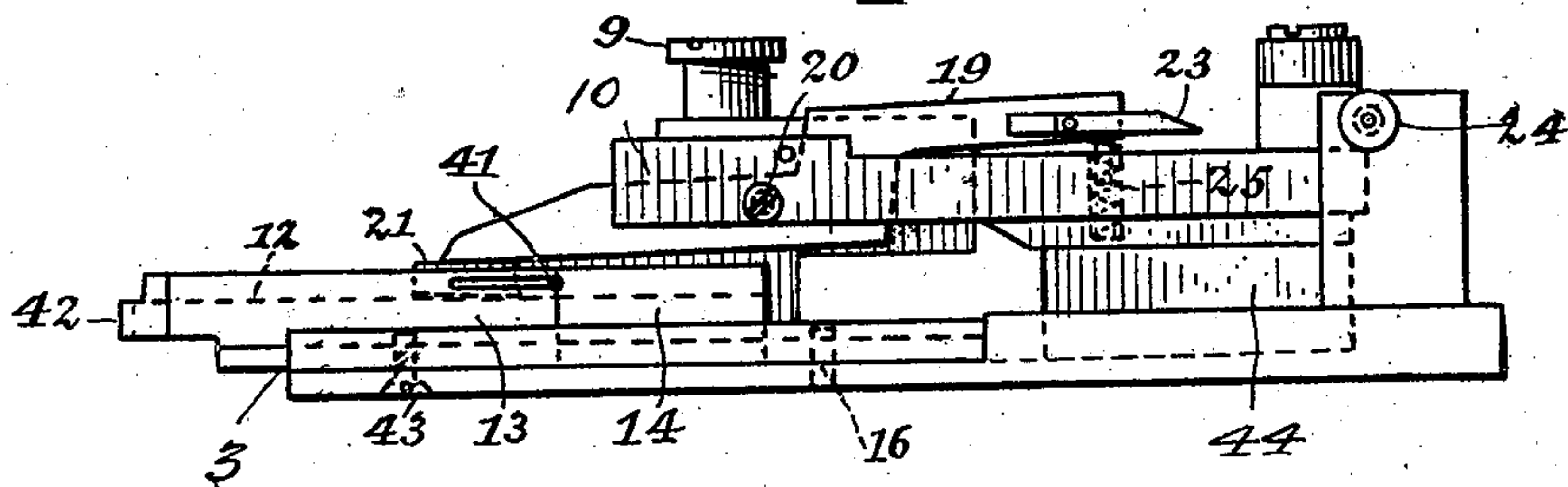


Fig. 4.

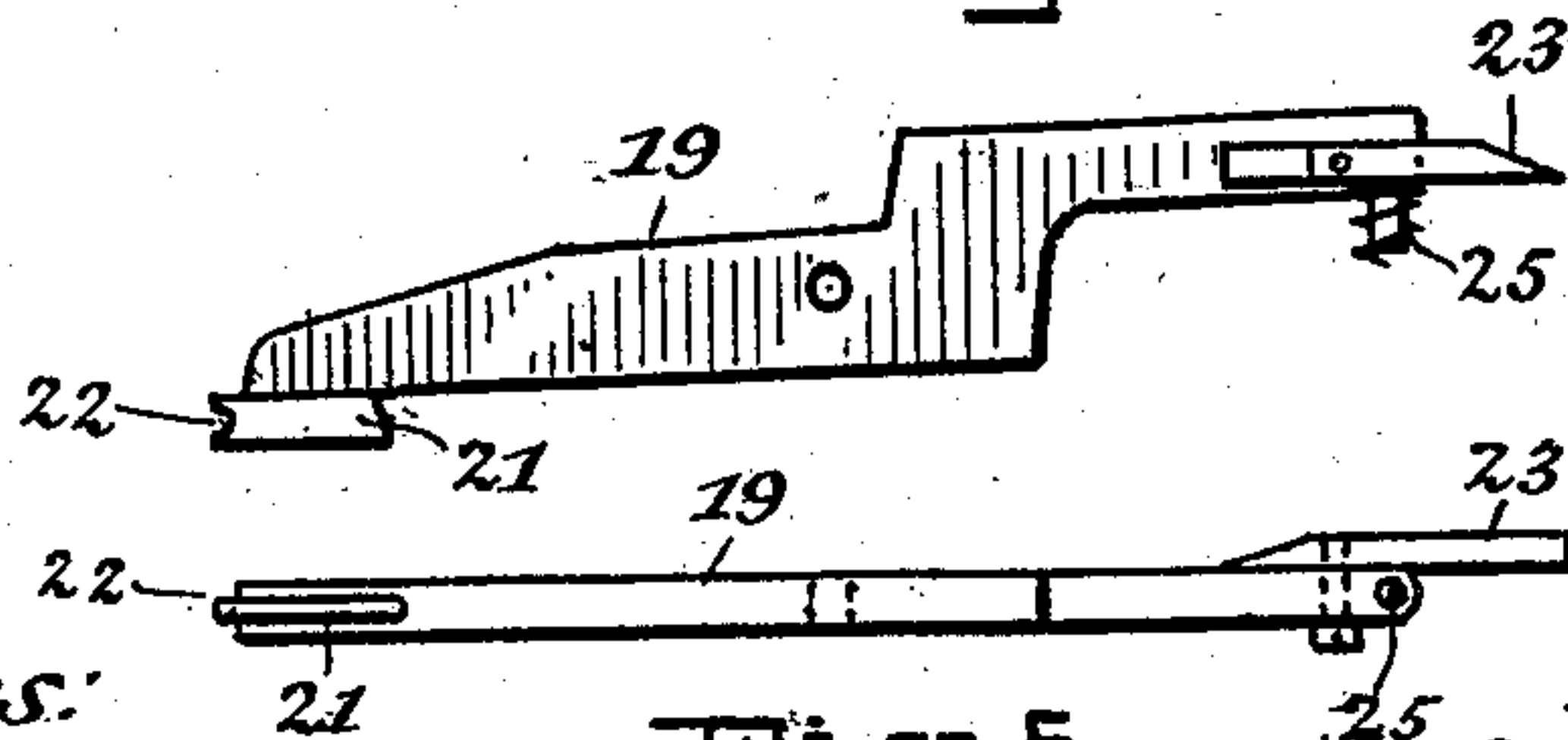


Fig. 5.

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Fig. 6.

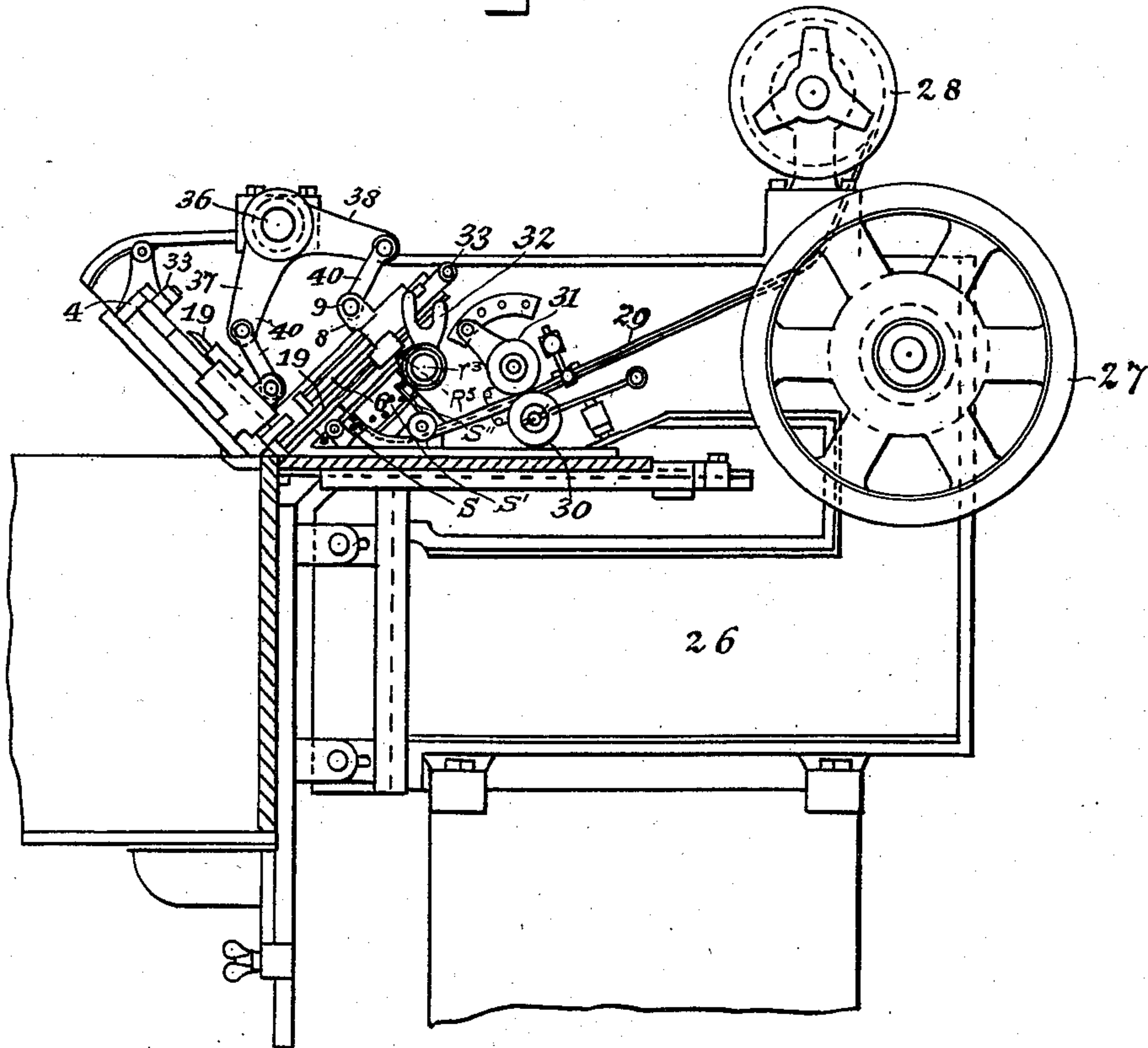
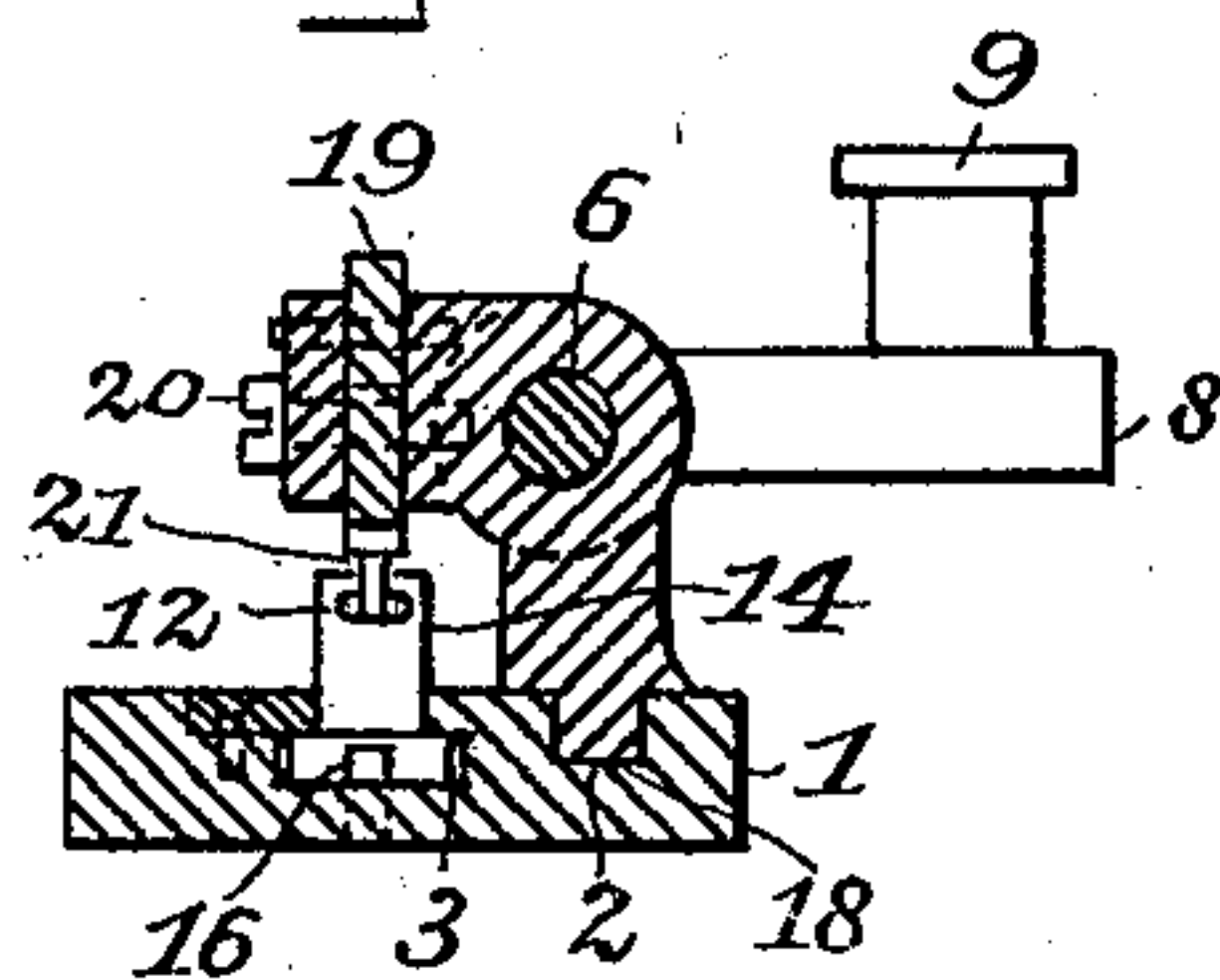


Fig. 8.



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Fig. 6a

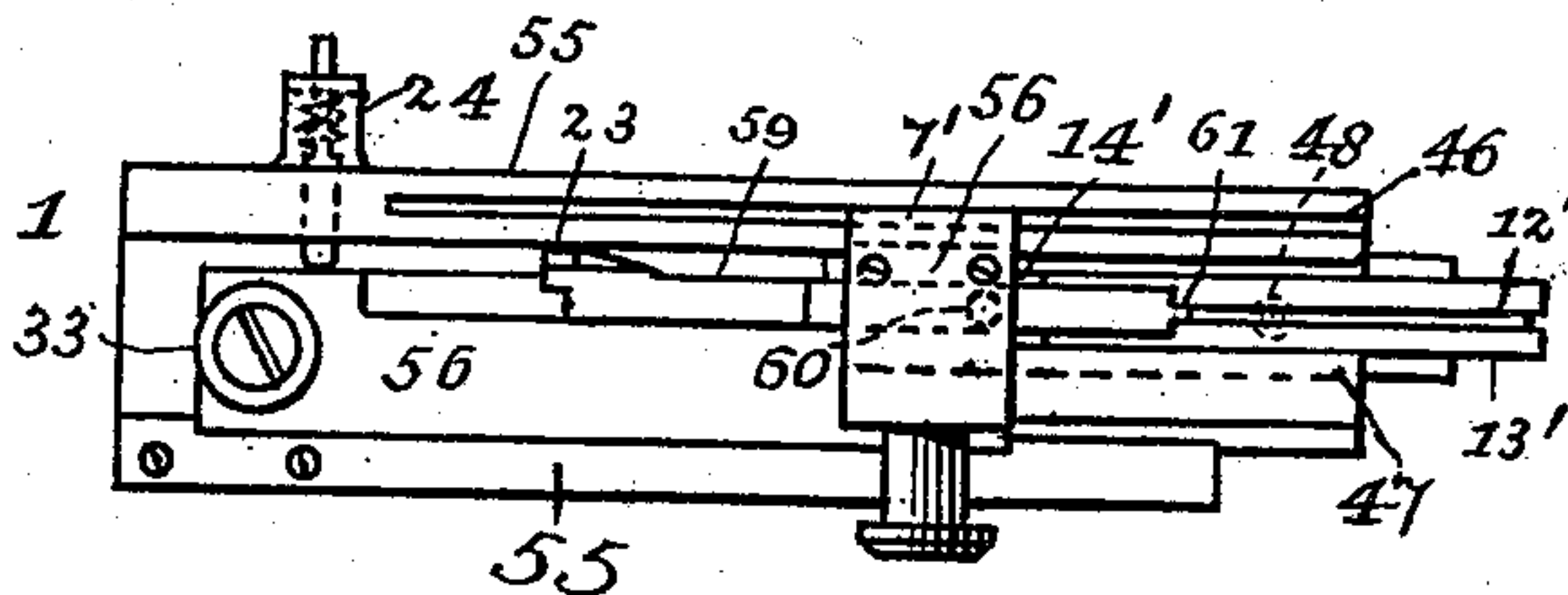
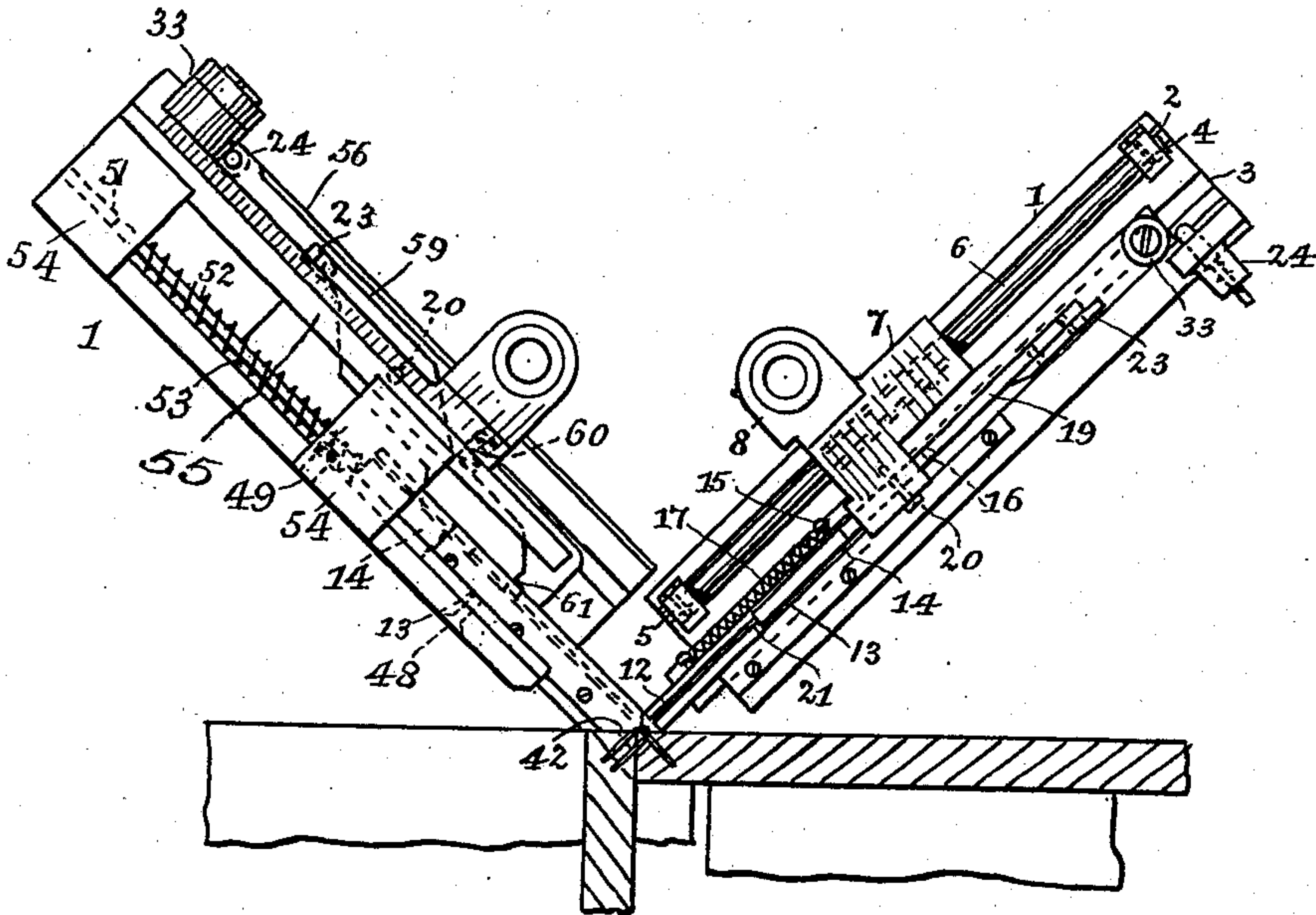


Fig. 6b

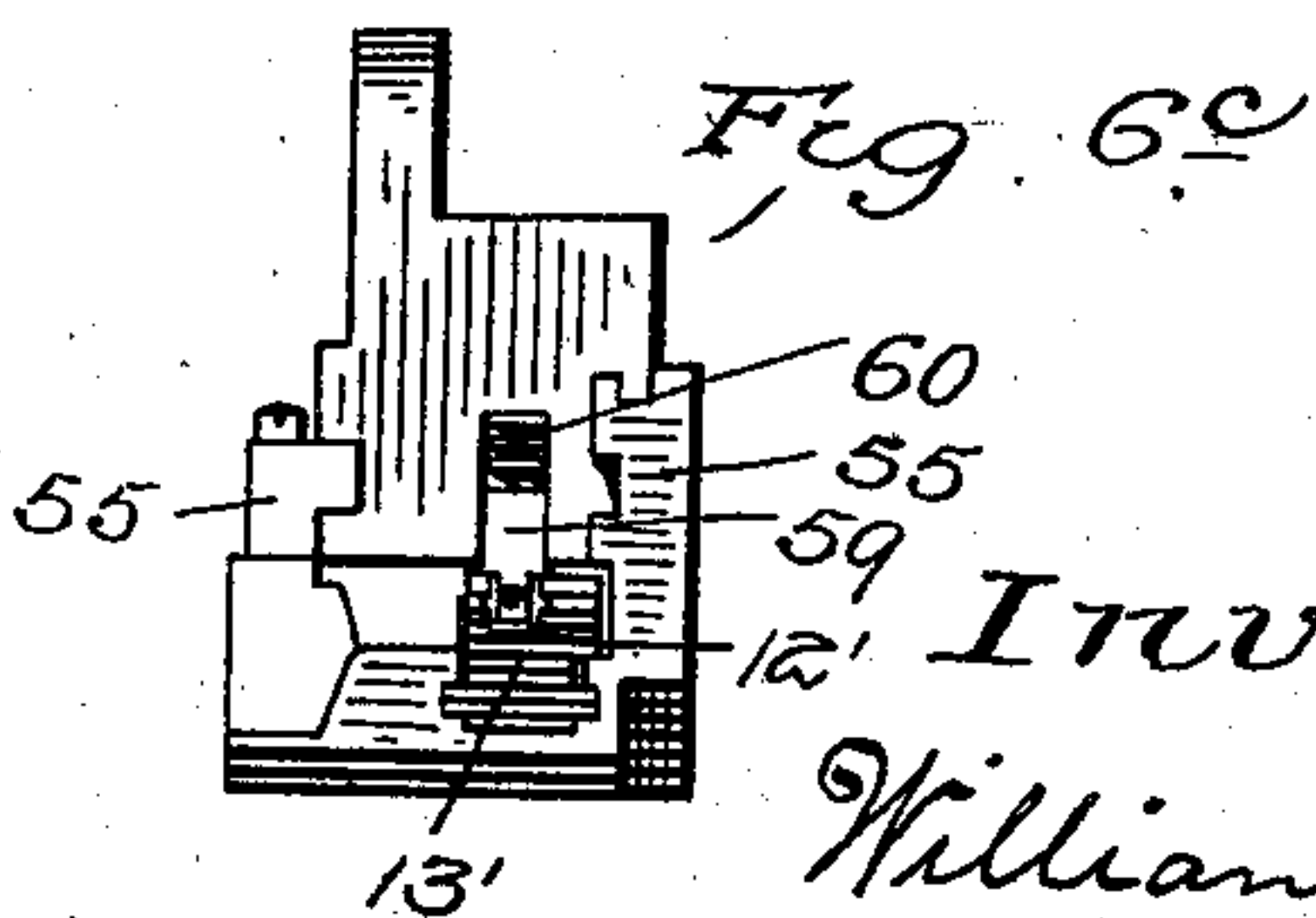


Fig. 6c

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No. 702,091.

Patented June 10, 1902.

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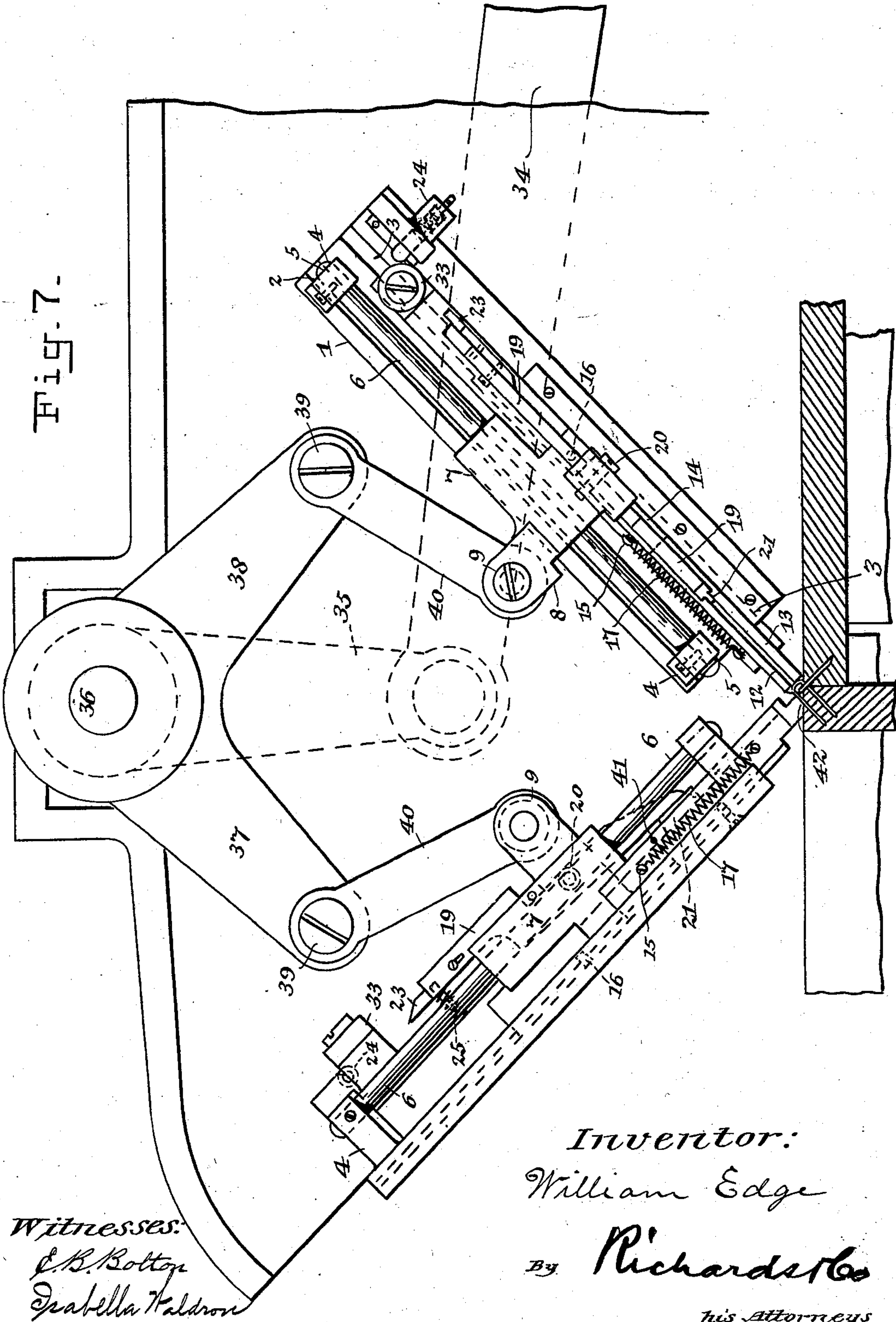
STAPLE FORMING AND DRIVING MECHANISM.

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(No Model.)

4 Sheets—Sheet 4.

Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM EDGE, OF BROOKLYN, NEW YORK, ASSIGNOR TO ALFRED N. BENJAMIN, OF NEW YORK, N. Y.

STAPLE FORMING AND DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 702,091, dated June 10, 1902.

Application filed August 31, 1901. Serial No. 74,003. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EDGE, a citizen of the United States, and a resident of Brooklyn, New York, have invented certain new and useful Improvements in Staple Forming and Driving Mechanism, of which the following is a specification.

My invention relates to staple forming and driving mechanism for use in box-hinging and other machines; and it consists substantially of a base-plate or guide, a former and driver, and other details of structure hereinafter more fully described, and pointed out in the claims.

Referring to the annexed drawings, forming part of my application, and in which similar characters of reference indicate like parts throughout the several views, Figure 1 is a top plan view of the improved forming and driving mechanism. Fig. 2 is a side view thereof, the device being inverted. Fig. 3 is a side elevation taken from the side opposite that shown in Fig. 2. Fig. 4 is a side elevation of the driver and former bar. Fig. 5 is a top plan view of the same. Fig. 6 is a side elevation of a box-hinging machine with a pair of staple forming and driving devices at right angles to each other secured therein. Fig. 6^a is a front plan view showing the formers and drivers at right angles to each other, the driver on the left being a modified form of that shown in Figs. 1, 2, 3, 6, and 7. Fig. 6^b is a top plan view of such modified left-hand former and driver. Fig. 6^c is an end view looking from the right of Fig. 6^b. Fig. 7 is an enlarged view of the forming and driving devices and the operating means therefor shown in Fig. 6, and Fig. 8 is a cross-sectional view taken on the line 8-8 of Fig. 1.

In the drawings, 1 is the base-plate or guide, provided with tracks or ways 2 and 3, Figs. 1 and 8. At each end of the track 2 is an upwardly-extending standard 4, in the eyes 5 of which the guide-rod 6 is rigidly held. Slidably mounted on the guide-rod 6 and surrounding the same is the sleeve 7 of the former-bar-carrying frame. The former-bar-carrying frame consists of the sleeve 7, having an outwardly-projecting lug 8, into which a pin or screw 9 is fastened, and a slotted or grooved casing 10, Figs. 1 and 2, in which the lever 19 operates.

13 designates a guide for the formed staple, and 14 a female former in line therewith, both being held in the T-way 3. The channeled guide 13 is rigidly secured to the base-plate 1 by means of screw 43, while the channeled female former 14 has a limited sliding motion in the T-way 3. The movement of the female former 14 is limited by a pin 16, projecting into the way 3. To each of the parts 13 and 14 one end of a retractile spring 17 is fastened by means of screws 15, which hold the part 14 normally forward against the part 13, but allow the part 14 to yield rearwardly for a purpose hereinafter described. From the sleeve 7, extending downwardly, is a tongue 18, Fig. 8, sliding in the way 2, and in the lower part of the casing 10 is a similar tongue 44, sliding in the way 3, Figs. 2 and 3.

The male staple former and driver proper consists of a lever 19, fulcrumed on a pivot 20 in the casing 10. To the forward end of the lever 19, either brazed thereto or formed integrally therewith, is a tongue 21, notched at 22. The tongue 21 projects downwardly from the front part of the lever 19. Near the rear end of the lever 19 and on the side thereof is a trip 23, operating in combination with a tripping device 24 to raise the forward end of the lever 19 and clear the tongue 21 of a staple when the same has been formed and is lying in the slot 12. The tongue 21 is normally held down in the slot 12 in position to act upon the staple by a spring 25 in the casing 10 acting upon the lever 19, as shown.

In Figs. 6 and 7 of the drawings I have shown part of a box-hinging machine as illustrative of the manner in which my invention may be embodied. It will be noted that a pair of formers and drivers are shown at right angles to each other. One former and driver (the right-hand one, for instance) is of the construction just described. As the staple to be formed and driven by the left-hand former and driver must be turned at an angle of ninety degrees from the other staple in order that the staples may interlock, as shown, the parts of the left-hand former and driver must have a somewhat-different arrangement relative to each other, though the operation of each former and driver will be the same. A convenient form of construction for the left

former and driver is shown in Figs. 6^a and 6^b. On the base-plate are two guideways. One (marked 46) is to guide the block 7', the functions of which are substantially the same as described in connection with the sleeve of right-hand former, and the other, 47, being for receiving and holding the guide and female former 13' 14', similar to the parts 13 14, before described. The guide or part is rigidly secured to the base-plate 1 by a screw 48, while female former or part 14' is movable in the way 47 a certain distance, its movement therein being limited by a pin 49, projecting into the slot. Upon the base-plate 1 is a perforation 51, in which a rod 52, surrounded by a spring 53, slides. The spring 53 acts upon the female former 14' and tends to press the latter into engagement with the guide 13'. Projecting upwardly from the base-plate 1 are standards 54, carrying rods 55, which act as guides for the male former and driver proper in their travel across the base-plate. The former-bar-carrying block 7' has an extension 56, carrying pivotally at 20' a lever 59. At the forward part of the carrying-frame is a spring 60, which tends to normally hold the tongue 61 of the lever 59 in the slot 12. The operation of the left-hand former and driver being similar to that of the right-hand one, a description of such operation is deemed unnecessary.

Referring to Fig. 6, I will give a brief description of the box-hinging machine to indicate clearly the application of my invention thereto. 26 is the frame supporting the mechanism. In the frame is journaled a pulley-wheel 27, to which a constant rotary motion from any convenient source of power is imparted, and from the pulley motion is transmitted to the other parts of the mechanism. 28 is a reel from which the wire 29 for forming the staples is fed to the formers and drivers. 30 and 31 are intermeshing gear-wheels which feed forward the wire 29. 32 is a forked arm to which an intermittent rocking motion is imparted by a pin and roll 33 on the upper end of the casing 10. During the upward movement of the driver and former the forked arm is made to point upwardly, as shown in Fig. 6, and the wire-feed mechanism is held stationary. When the former and driver is moved downwardly, the forked arm is struck by the pin and roller 33 and by means of suitable connection with the gear-wheels 30 and 31 causes the latter to revolve and feed the wire 29.

Referring to Fig. 7, showing on an enlarged scale the pair of drivers and formers, 34 is a link (connected with the power-supply) having an arm 35, mounted on a shaft 36. On the shaft 36 are rocking arms 37 and 38, being pivoted at 39 with links 40, connected to the pins 9 in the lugs 8 of the former-bar-carrying frames. The link 34 has a reciprocating motion, and from it the formers and drivers are alternately operated.

The wire for forming the staple is fed

through a hole 41 laterally across the slot 12 at the point where the parts 13 and 14, forming the slot 12, meet. The proper length of wire for forming a staple is then cut off by any suitable cutting device, the severed portion of the wire being left in the hole 41. This cutting mechanism is substantially the same as that shown in Letters Patent of the United States granted March 26, 1901, No. 670,816, to D. H. Saunders. The fixed cutter-blade is indicated generally at S in Fig. 6 and the movable cutting-knife at S'. This latter is operated in the same manner as that shown in the patent by a cam projection R⁵ on the shaft r³ of the forked arm 32. The knife is retracted by a spring S''. When the wire is in position, the male driver and former is at the forward part 42 of the slot 12. As the male drivers and formers are drawn backward by the arms 37 and 38 the rear end of the tongue 21 strikes the wire 29, presses it against the end of the female former 14, and carries back with it the female former 14 until the latter strikes and is stopped by the pin 16 in the way 3. The female former 14 is made to move back in this way in order that the ends of the piece of wire may be free to bend forward and into the slot 12 in the female former 14 in the form of a staple as the driver is drawn farther backward. When the staple has thus been completely formed in the slot 12, the tongue 21 of the lever 19 is cleared of it by means of the trip 23 coming in contact with the tripping device 24 and slightly lifting the tongue 21 out of the slot 12, and the female former 14 is drawn forward by the spring 17, so that the portion of the slot 12 carried by the female former 14 shall be continuous with the portion of the same slot carried by the guide 13. The male driver and former is drawn backward to the end of its stroke to form the staple in the way just described, and it is then driven forward. In the latter movement the notched part 22 of the tongue 21 engages with the staple in the slot 12, and the staple is pushed forward through the length of the slot and into the box or other device ready to receive it. The other staple, which shall interlock with the first one driven, as described, so as to form a hinge, is driven by the other of the two drivers and formers illustrated on the boxing-machine shown in the drawings, the operation of which is the same as the operation which I have described in detail.

It will be understood that my invention may be used either singly or in gangs in any connection wherein the formation and driving of staples is necessary and that its use is not limited to hinging-machines, nor do I desire to limit myself to the exact means shown for connection to the parts of the machine or operating mechanism in conjunction with which my improved driver and former may be used.

Having now described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In combination the base-plate having a track or way therein containing a female former having a sliding motion, a channel in said female former, in which the staple is formed, a stationary guide containing a corresponding channel, means for holding the female former and guide together while the staple is being driven and a male staple former and driver guided upon said base-plate, substantially as described.

2. In staple forming and driving mechanism, the male staple former and driver comprising a pivoted lever having a notched tongue at one end thereof, said notch being formed in the front end of the said tongue, the rear edge of the said tongue being adapted to engage the wire for forming the staple, substantially as described.

3. In staple forming and driving mechanism, the combination of a base-plate, a female former and guide upon said base-plate, each having a longitudinal channel, a retractile spring normally holding the former and guide together so that the slot is then continuous from one part to the other, a frame carrying a pivoted male former mounted on said base-plate, and means for tripping the male former when it has reached a determined point in its travel in the slot, substantially as described.

4. In combination the base-plate, a guide rigidly secured to the base-plate and having a longitudinal channel, a female former having a limited sliding motion and also having a longitudinal channel, a male staple former and driver guided in said channels, and means for tripping said male former and driver and lifting it clear of the staple which has been formed and is laid in the channel, substantially as described.

5. The combination of the base-plate, a continuous channel, one section of said channel being contained in a guide rigidly held on the plate and the other section being in a female former having a sliding motion therein, a spring for drawing the female former forward, an opening at the meeting-points of the former and guide for admitting the wire, a male staple former and driver moving in said channel, and means for tripping said male former and driver and lifting it clear of the wire when a staple has been formed therefrom, substantially as described.

6. In a staple forming and driving device a frame carrying a pivoted male former, said male former being provided with a notched tongue at its forward end and a trip near its rear end, a base-plate upon which the frame is mounted, carrying a channel in which the tongue travels and a tripping device for lifting said tongue out of the channel when the trip strikes the tripping device, said male former being pivoted intermediate of its length, substantially as described.

7. The combination of the base-plate, a guide-rod mounted thereon, a former-bar-carrying frame comprising a sleeve and a casing carrying a pivoted male former, a channel composed of two sections in which a tongue upon the forward end of the male former travels, a tripping device carried by the base-plate and a trip near the rear end of the male former for striking said tripping device and lifting the tongue clear of the channel when a staple has been formed thereon, substantially as described.

8. The combination of the base-plate, a guide-rod mounted thereon, a former-bar-carrying frame suitably mounted on said rod, said former-bar comprising a male former pivoted in the frame, and means for tripping said male former comprising a trip on the rear end of said male former and a spring-actuated pin mounted in a lug projecting upwardly from the base-plate, against which said trip strikes, substantially as described.

9. In combination, a stationary channeled guide, a movable female former arranged in line therewith and channeled to conform thereto, means for feeding the wire transversely of said channel, a male former and driver moving in said channel in the female former and guide, and means for lifting said male former and driver on its backward stroke to disengage it from the staple and allow it to drop into driving position behind the staple, substantially as described.

10. In combination, a stationary channeled guide for the wire and male former, a female former arranged in line with the guide and channeled to conform thereto, said female former being longitudinally movable in relation to the guide, and a male former and driver combined working within said female former and guide, substantially as described.

11. In combination, a channeled guide for the staple, a male former, a female former in which the male former works, said female former being channeled to provide a continuation of the channel in the guide and being movable away from the channeled guide in the forming operation, and means for returning the female former to normal position against the channeled guide, substantially as described.

12. In combination, a channeled guide for the staple, a male former, a female former in which the male former works, said female former being movable in relation to the channeled guide to separate therefrom in the formation of the staple, and means for returning the female former to normal position, the said male former serving also as a driver, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM EDGE.

Witnesses:

WILLIAM MCMURRAY,
OTTO MUNK.