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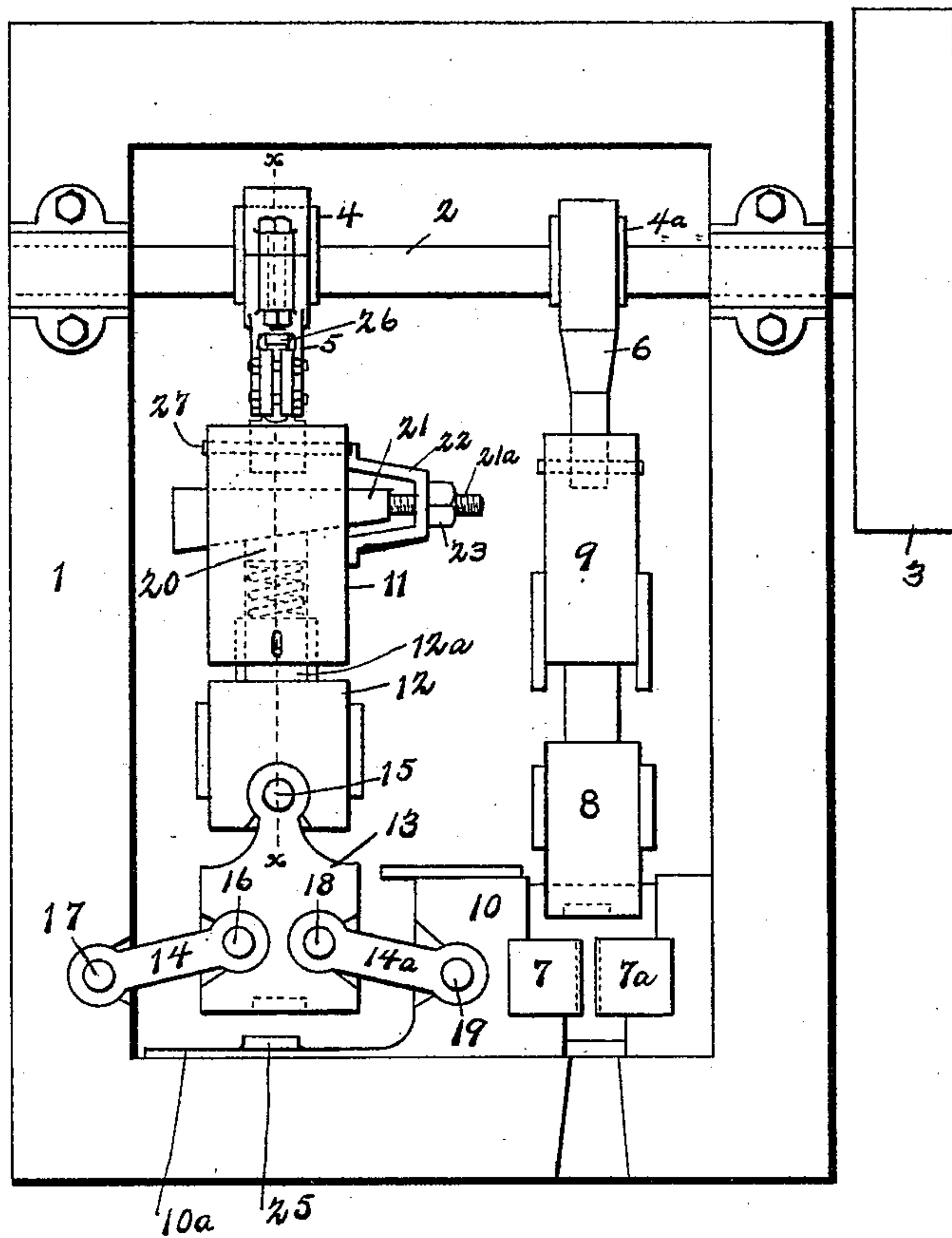
2 Sheets—Sheet 1.

C. W. DURCHSCHLAG.
BOLT HEADING MACHINE.

No. 584,928.

Patented June 22, 1897.

Fig. 1.



WITNESSES:

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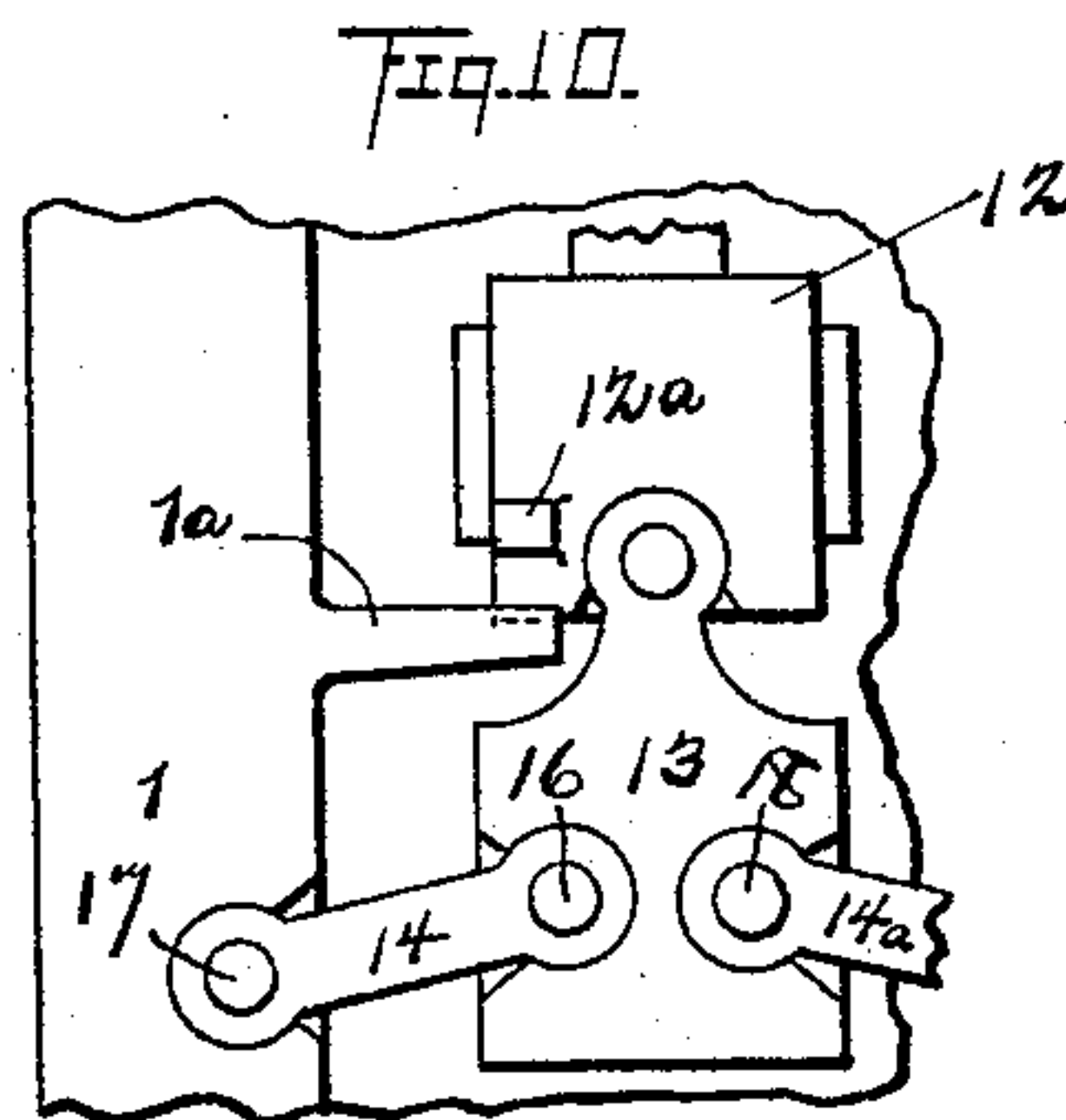
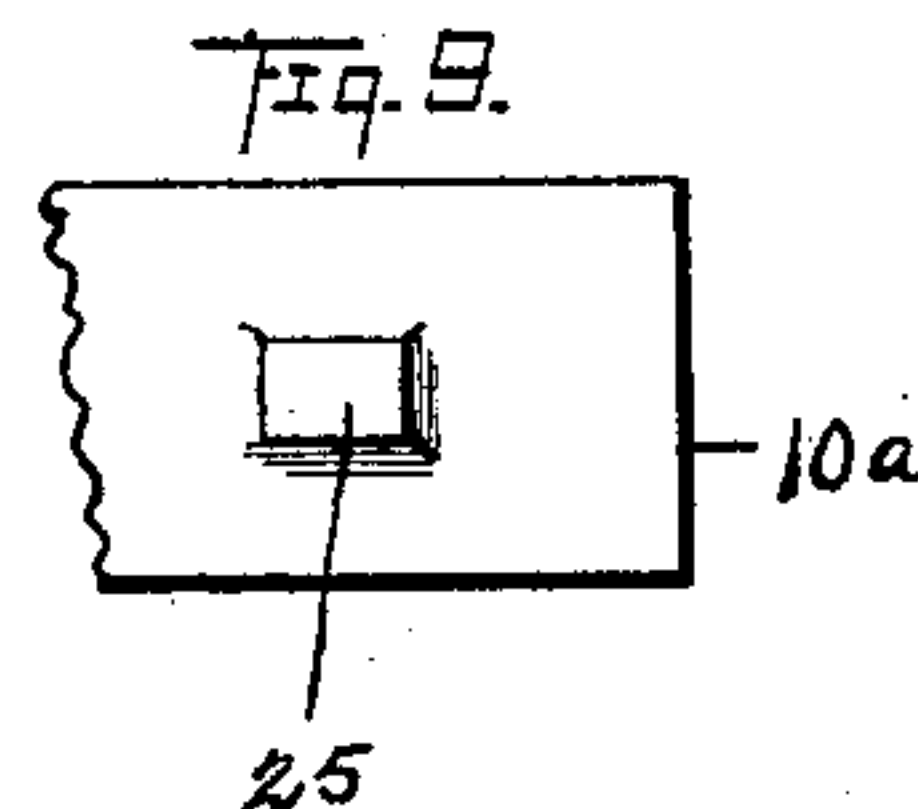
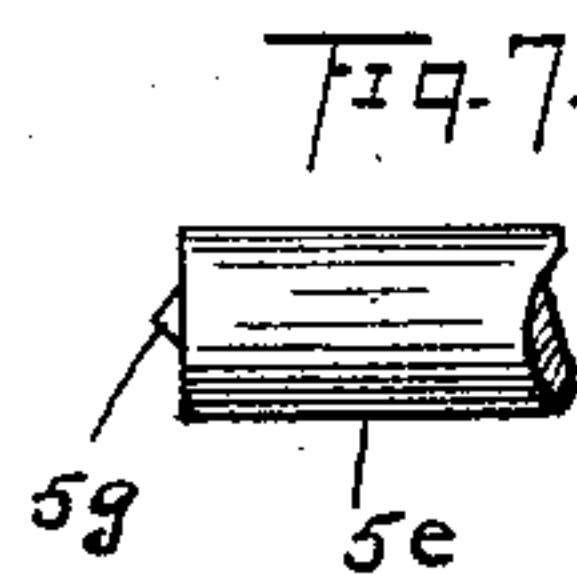
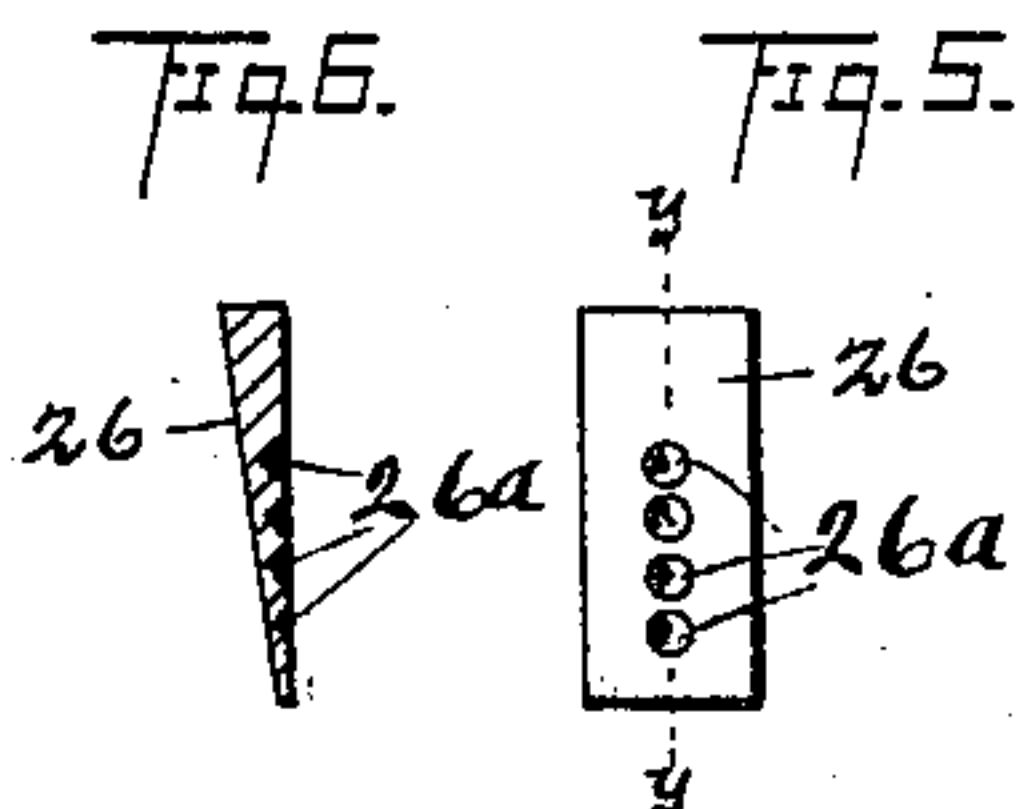
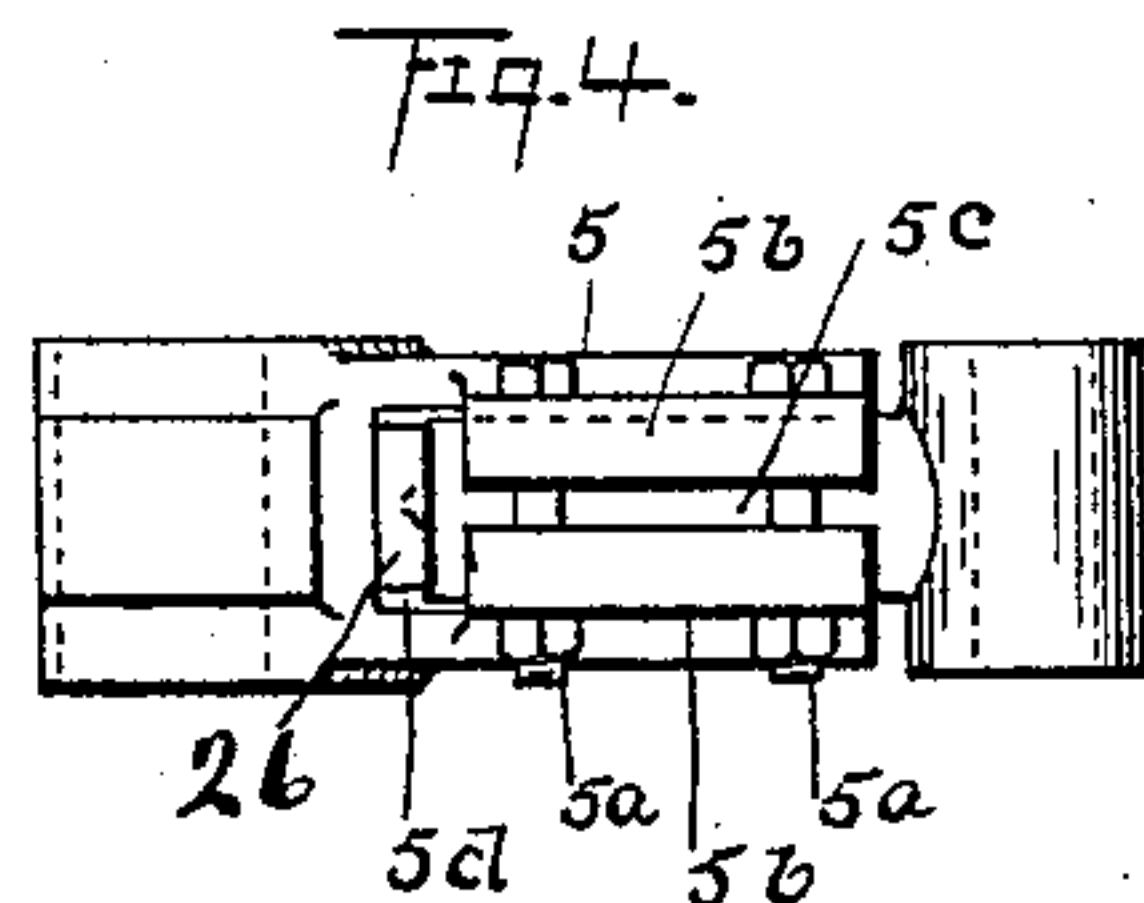
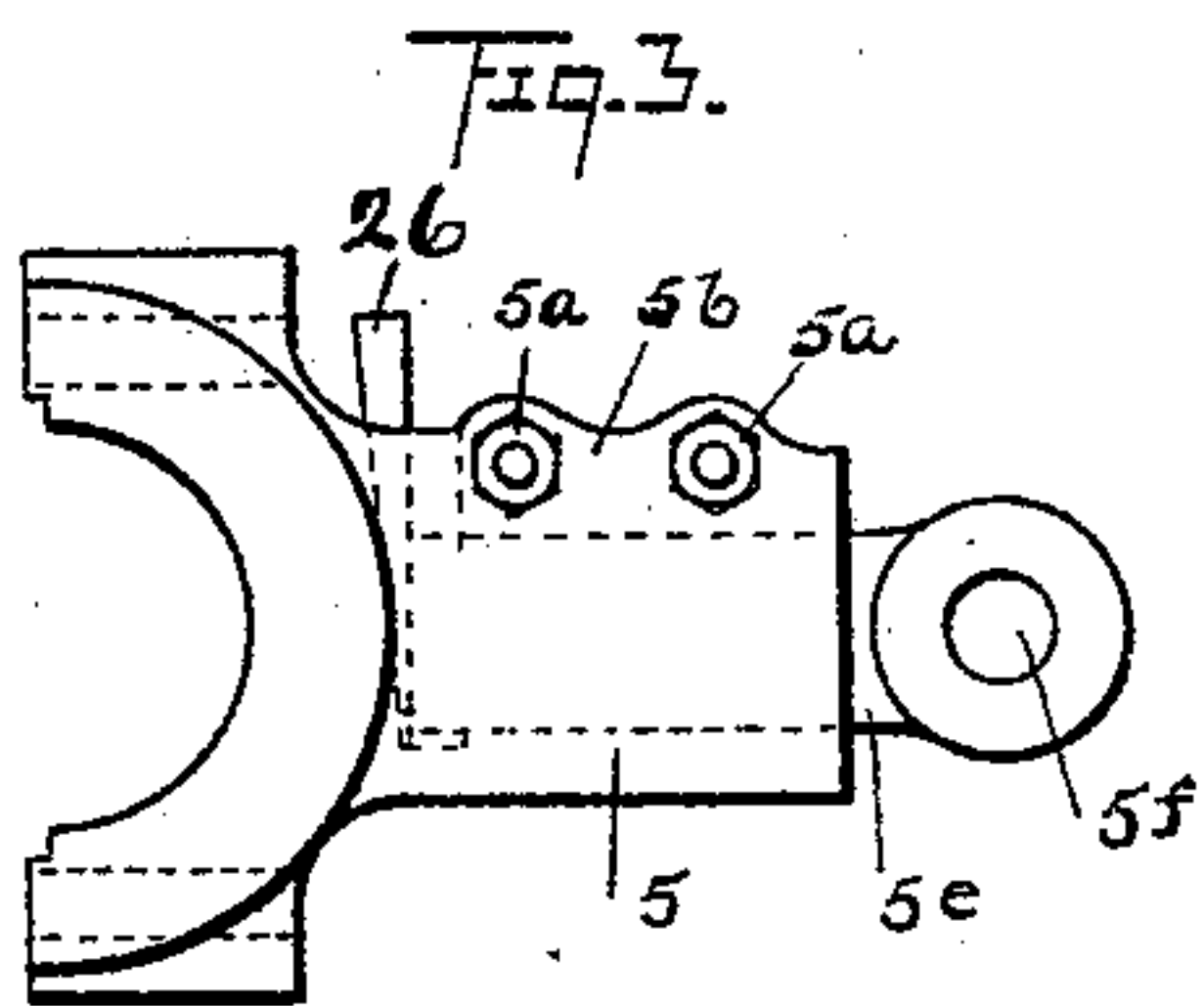
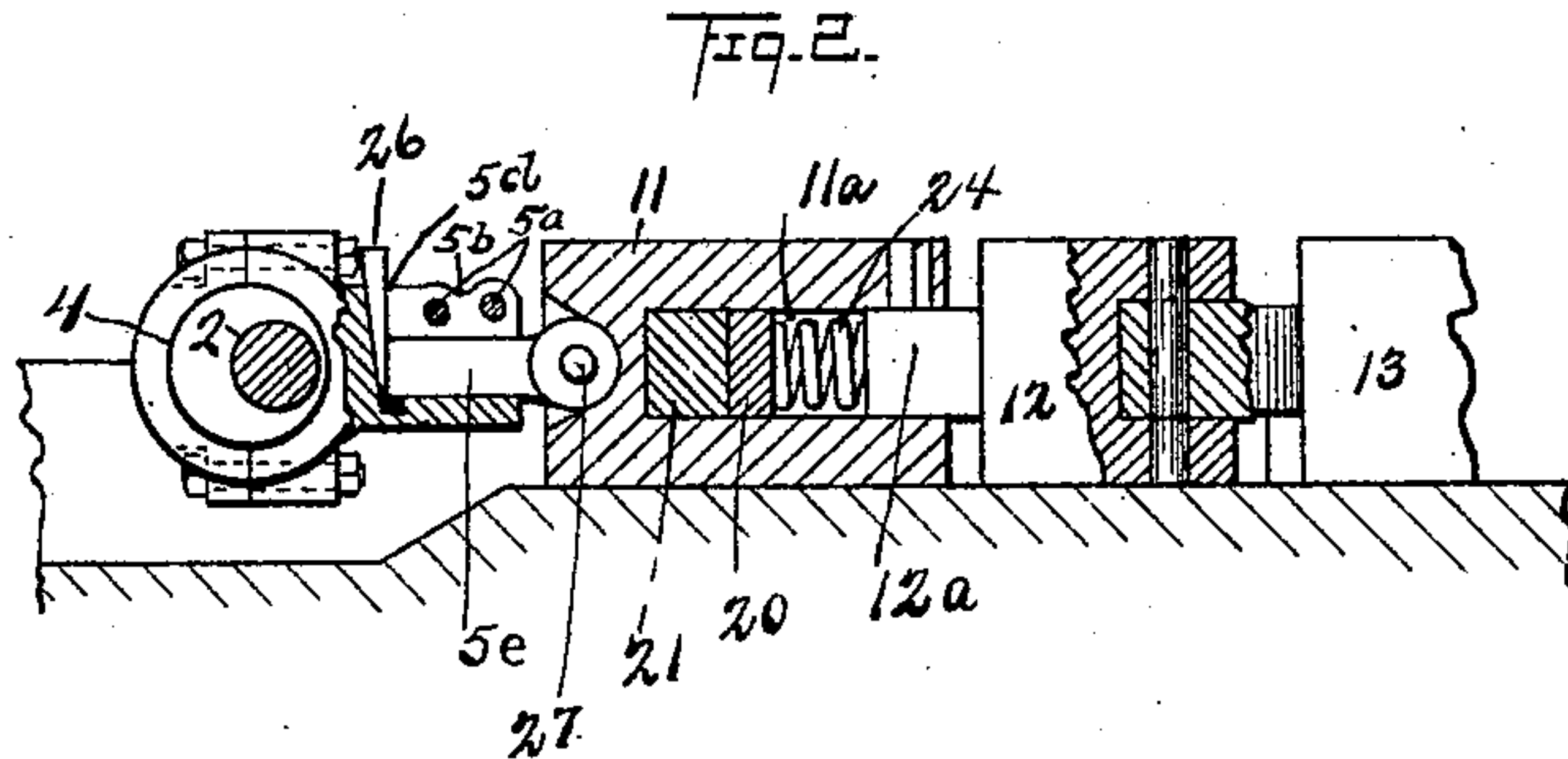
(No Model.)

2 Sheets—Sheet 2.

C. W. DURCHSCHLAG.
BOLT HEADING MACHINE.

No. 584,928.

Patented June 22, 1897.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES W. DURCHSCHLAG, OF CLEVELAND, OHIO, ASSIGNOR TO THE
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BOLT-HEADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 584,928, dated June 22, 1897.

Application filed February 4, 1897. Serial No. 621,949. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. DURCHSCHLAG, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Bolt-Heading Machines, of which the following, with the accompanying drawings, is a full, clear, and exact specification.

My invention relates to improvements in machines used for heading spikes, bolts, and rivets, and for upsetting and forging metal for various purposes. The most practical machines used for these purposes and those in general use employ a toggle mechanism for operating a movable die to and from a stationary die to grip the metal to be operated upon and to release it when the operation shall have been completed. The toggle mechanism in these machines is actuated from a cam or a crank offset from a shaft that rotates continuously with uniform speed. The plunger that strikes the blow to upset the metal comes into contact with it at the instant the metal is gripped between the dies. The dies would close and open almost instantly as the crank or cam rounds the forward throw of its travel if no provision were made to prolong the grip of the dies. This instantaneous closing and opening of the dies is sufficient in making rivets, track-bolts, and the like, but in making the larger bolts, spikes, &c., where considerable metal is upset, the dies should remain closed a longer time, proportioned to the amount of metal to be upset and the character of the work to be done. To this end various means have been devised for holding the dies closed, but they are all more or less defective, because the toggles either have a continuing movement while the dies are closed or are subject to movement under the great strain that is put upon them, which causes a slight wobbling, rocking, or twisted movement of the dies while closed. This results in an unnecessary strain on the dies, the metal is not held evenly, and often a fin is left on the finished product in consequence of the twisting of the dies.

The object of my present invention is an improved, simple, and an effective means for holding the dies closed, and means for keep-

ing the toggles immovable a sufficient time for upsetting metal in the larger classes of work, and that is simply and easily adjustable to the widest range of work, from the smallest sizes of rivets to the largest sizes of forging within the capacity of the machine.

My invention consists, broadly, in locking the toggles in the position they have when the dies are closed and holding them immovable during the time the plunger is in contact against the metal; and it also consists in an improved means for making the locking device adjustable to accommodate the time of holding the dies closed to the character of the work to be done.

My invention further consists in the construction and the combination of parts described herein.

Reference is here made to the claims for a detailed statement of my invention.

On October 15, A. D. 1895, United States Letters Patent No. 547,773 were issued to me for an improvement in heading-machines, the object of which is to prevent the breakage of the dies or any other parts of the machine by any unusual strain caused by getting something between the die-faces that would not let them close together, &c.

The preferred embodiment of my present invention in means to accomplish its object to the best advantage employs parts of the means in which said other invention is embodied, in combination with the other things herein described. In other words, some of the parts of the means employed in the embodiment of the invention covered by said Letters Patent may perform their functions as a safety device and yet enter into the means in which the present invention is embodied, and this is the preferred construction. Other means than that herein described may, however, embody my present invention.

In the drawings, Figure 1 represents in plan view a bolt-heading machine embodying my invention. Fig. 2 is a vertical section on the line *x x* in Fig. 1 and illustrates a part of the details of the preferred arrangement of my invention. Fig. 3 is an enlarged side elevation of the clamping-sleeve and link that form the adjustable pitman, and Fig. 4 is a top plan thereof. Fig. 5 is a face view of the

adjusting-wedge, and Fig. 6 is a vertical section thereof on the line *yy*. Fig. 7 is an enlarged broken section of the link that enters the clamping-sleeve, and Fig. 8 is an end view thereof. Fig. 9 is an elevation of the toggle-stop, and Fig. 10 illustrates a modification of the toggle-stop.

In all the figures of the drawings like reference-characters refer to like parts.

1 represents the frame of the machine.

2 is the crank-shaft, driven by the pulley 3, on which are cranks or eccentrics 4 4^a, which actuate the pitmen 5 and 6, by which the gripping-die and the plunger are operated in the usual or any preferred manner.

7 and 7^a are the gripping-dies, and 8 is the plunger, that is operated through the slide 9 and the pitman 6 from the crank or cam 4^a. The gripping-die 7^a is fixed to a rigid support and is immovable, while the die 7 is fixed to the die-block 10 and has a reciprocating movement therewith to close and open the dies. The die-block slides in guideways in the bed of the machine. The die-block 10 is actuated from the crank or cam 4 through the pitman 5, the center block 11, the toggle-head 12, the toggle-block 13, and the toggles 14 14^a. The toggle-block 13 has an oscillating connection with the toggle-head 12 by means of the pin 15. One of the toggles, 14, is connected with the toggle-block on one side by the pivotal pin 16 and with the bed or a rigid support by the pivotal pin 17, and the other toggle, 14^a, is connected with the toggle-block by the pivotal pin 18 and with the sliding die-block 10 by the pivotal pin 19. The parts so far described may be of the usual or of any preferred construction. They are well known to persons skilled in the art and need no more detailed description.

In the said Letters Patent No. 547,773, issued to me October 15, 1895, provision is made for preventing the breakage of the dies or other parts of the machine. The toggle-head 12 is provided with a shank 12^a, that enters a recess 11^a in the front end of the center block 11 and has slight longitudinal play therein. Against the inner end of the shank 12^a is a spring 24, against which the toggle-head has a bearing, and a follower 20, which has a wedge-face, projects into a transverse opening or recess in the center block. Through this opening, back of the follower, passes a wedge 21. The wedge is made adjustable by means of the screw 21^a, that projects from the end of the wedge through the bracket 22 and the nut 23, whereby the wedge may be drawn or forced through the transverse recess through the center block 11. The wedge 21 and its adjustment provides for adjusting the resistance of the spring 24.

My present invention provides for locking the toggles when the dies are in closed position and in holding the dies closed during the time required by the character of work to be done. This I do by providing a stop that serves as an obstruction to prevent the forward

movement of the toggle-block 13 when the pivotal points 16, 17, 18, and 19 of the toggles 14 and 14^a shall be in a right line, and in the use therewith of a yielding connection between the die-operating crank or cam and the toggle-block. In the preferred construction the stop 25, that forms an obstruction, is located on the inner side of the projection 10^a of the die-block 10. The projection of the die-block provides a large bearing-surface for the die-block. The stop is preferably a lug cast thereon to engage the end of the toggle-block when the toggles are brought up to a straight line. When making rivets and track-bolts, the pitman and other connections between the crank or cam 4 and the toggle-block are of a length that will close the die at the instant the crank or cam reaches its forward throw. The dies in this case close and open almost instantly. When making bolts and spikes of larger sizes, the pitman is lengthened, so that the toggles are brought to a straight line and the dies are closed before the crank or cam reaches its extreme forward throw. This adjustment is made by loosening the bolts 5^a 5^a, that pass through the lugs 5^b 5^b, that project upwardly from the edges of the slot 5^c of the slotted sleeve 5, and then lowering the wedge 26, that enters a recess 5^d. The stud 5^e, which has its back end bear against the wedge 26, is forced forward by depressing the wedge until the proper length of pitman is had, when the bolts 5^a 5^a are again tightened up. The slotted sleeve and the stud therein constitute an adjustable pitman. The pitman is pivotally connected with the center block 11 by a pin 27, that passes through said block and the hole 5^f in the stud. The wedge 26 has a number of depressions or recesses 26^a in one side, in which a small projection 5^g on the end of the stud 5^e enters to prevent the wedge from lifting under pressure. As the pitman is lengthened, so that the toggles are in a straight line, and the dies are closed before the crank or cam 4 reaches its extreme forward throw, and as the stop herein described obstructs the further forward movement of the toggle-block, the toggles will be held immovable, while the crank or cam is permitted to round its extreme forward throw by the yielding connection provided by the compression of the spring 24. In other words, the stop and the forward pressure from the crank-shaft lock and hold the toggles immovable while the dies are closed. The lower the wedge 26 the longer the dies will be held closed, and vice versa.

The stop that obstructs the forward movement of the toggles may be located at any place forward of the spring 24 and perform its function. In Fig. 10 I have shown a modified stop, in which 1^a is a projection from the side of the machine-frame to engage the lug 12^a on the toggle-head 12, or the projection 10^a may be left off the die-block and the lug 25 project from the inner side of the frame, or the frame itself may serve as a stop if the

toggle-block should be so constructed or placed that it would engage the machine-frame when the toggles are in a line.

It will be seen that my invention may take on various modifications in its embodiment, and I do not therefore limit my claims by the detailed description given.

What I claim as my invention, and desire to secure by Letters Patent, is—

10 1. In a bolt-heading machine, the combination, with the toggles and dies, and means to actuate the toggles, of a stop to hold the toggles immovable while the dies are in closed position, substantially as described.

15 2. In a bolt-heading machine, the combination, with the dies, the toggles, and mechanism for operating the toggles, of an obstruction to prevent further forward movement of the toggles when the dies are in closed position, substantially as described.

20 3. In a bolt-heading machine, the combination, with the dies, the toggles and the crank-shaft, of yielding operating mechanism between the crank-shaft and the toggles, and an obstruction to limit the forward movement of the toggles, substantially as described.

25 4. In a bolt-heading machine, the combination, with the dies and the toggles, and yielding means to actuate the toggles, of means for adjusting the length of said actuating means, and a stop to hold the toggles immovable while the dies are in closed position, substantially as described.

30 5. In a bolt-heading machine, the combination, with the dies, the toggles, and mechanism having longitudinal adjustment for actuating the toggles, of a stop to hold the toggles immovable when the dies are in closed position, and a spring forming part of the toggle-actuating mechanism, substantially as described.

35 6. In a bolt-heading machine, the combination of a movable die-block actuated through toggles, a crank or cam shaft from which said toggles are actuated, a yielding connection

between said crank or cam shaft and said toggles, and an obstruction that limits the forward movement of the toggles, substantially as described.

7. In a bolt-heading machine, the combination, with the toggles through which one of the dies is moved and the means for actuating the toggles, of an obstruction to limit the movement of the toggles, and a spring for making the toggle-operating means yielding, substantially as described. 50

8. In a bolt-heading machine, the combination of a center block actuated by a cam or pitman, a toggle-head connected therewith and having a sliding movement relatively thereto, a spring against which the toggle-head has bearing, a toggle-block having oscillating connection with the toggle-head and carrying toggles on its opposite sides, one of which is connected to the die-block and the other to a rigid support, and a stop to hold the toggles against movement when the dies are closed, substantially as described. 60

9. In a bolt-heading machine, the combination of a center block actuated by a pitman that has longitudinal adjustment, a toggle-head connected therewith and having a sliding movement relatively thereto, a spring against which the toggle-head has bearing, a toggle-block having oscillating connection with the toggle-head and carrying toggles on its opposite sides, one of the toggles being connected to the die-block and the other to a rigid support, and an obstruction to hold the toggles against forward movement when the dies are in closed position, substantially as described. 70

In testimony whereof I affix my signature, in the presence of two witnesses, this 1st day of February, 1897. 80

CHARLES W. DURCHSCHLAG.

Witnesses:

ALFONSO H. CARPENTER,
J. A. OSBORNE.