(No Model.) 3 Sheets—Sheet 1.

C. ROSSMAN.

EYE FORMING MACHINE FOR PICKS, &c.

No. 573,109. Patented Dec. 15, 1896.

Fig. 1.

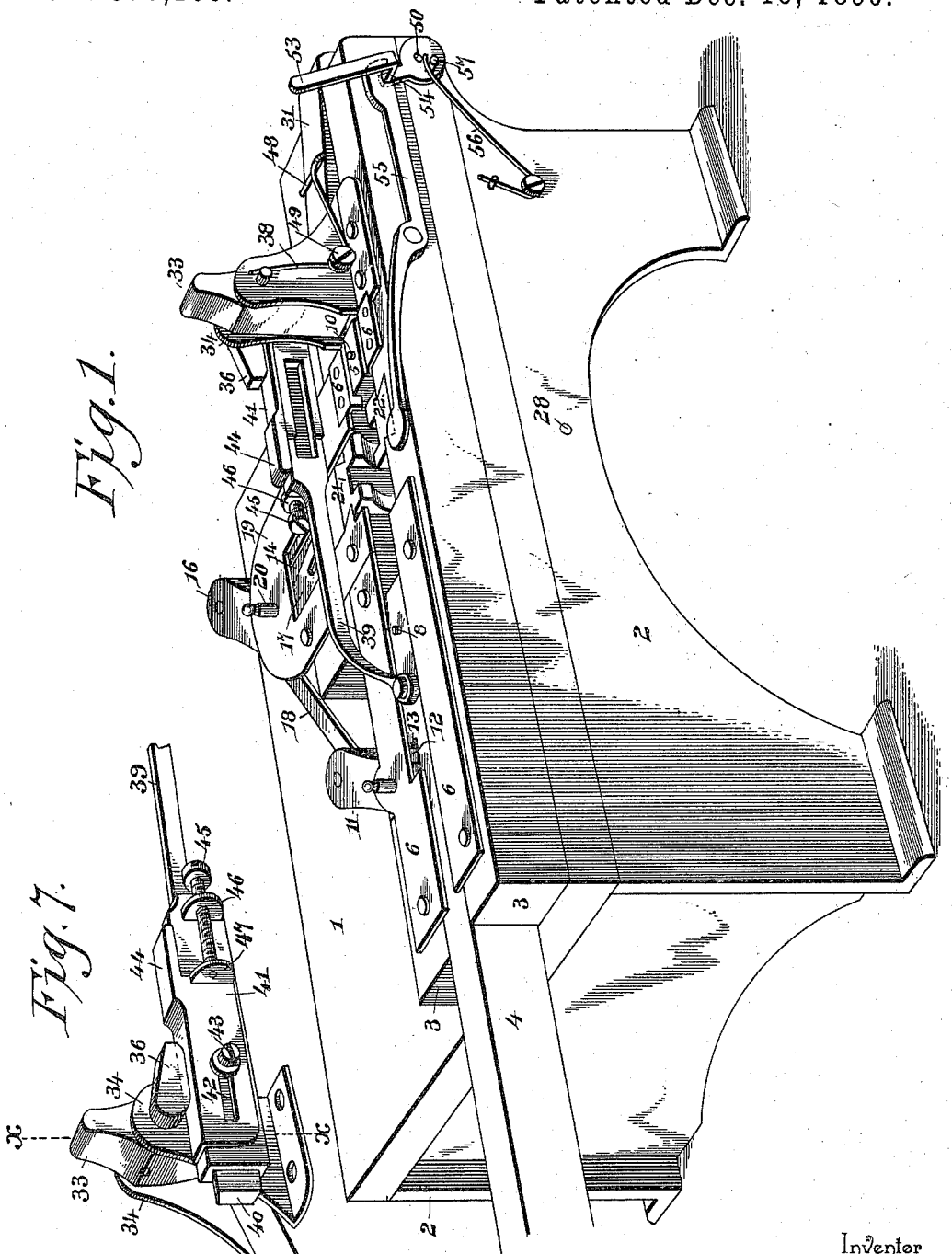
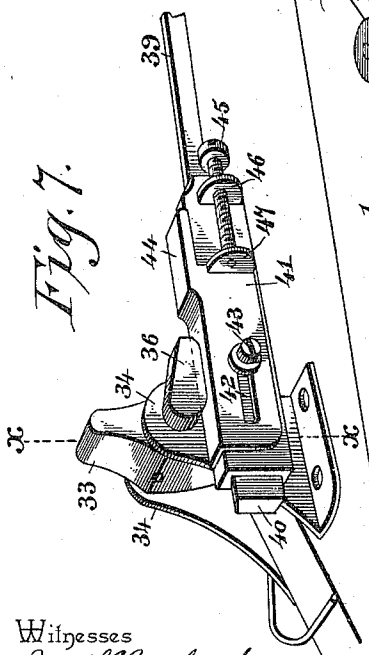


Fig. 7.



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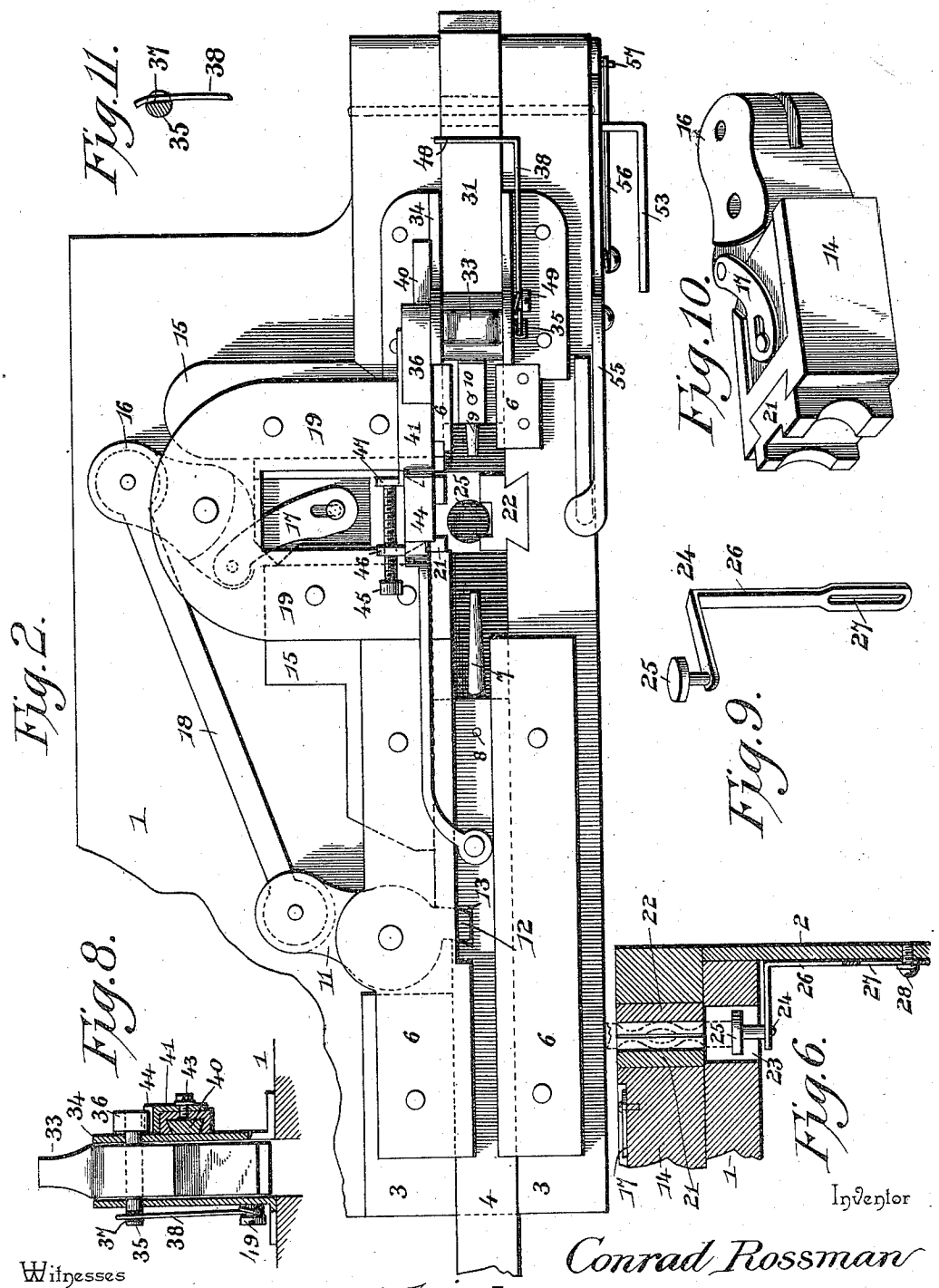

Fig. 1.

Fig. 2.

Fig. 10.

Fig. 9.

Fig. 8.

Fig. 6.

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Fig. 3.

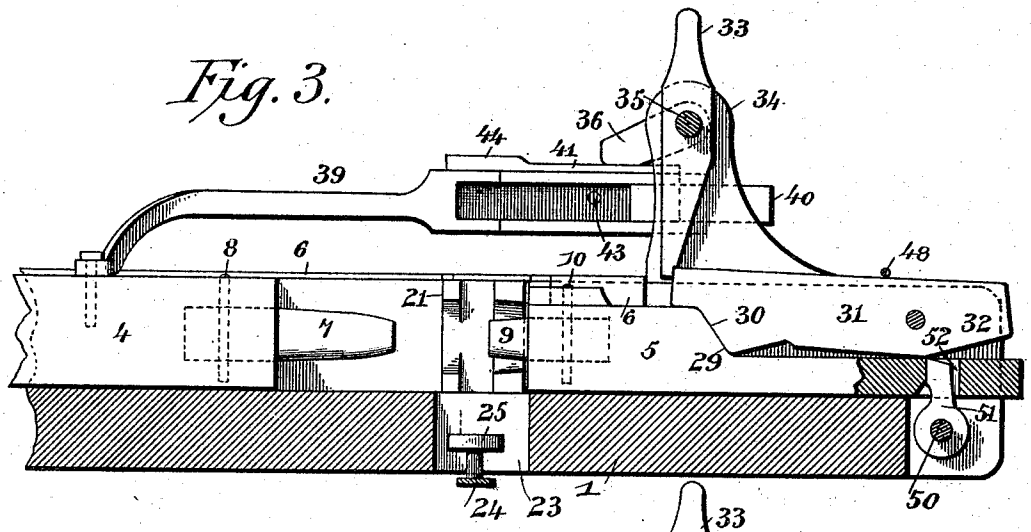


Fig. 4.

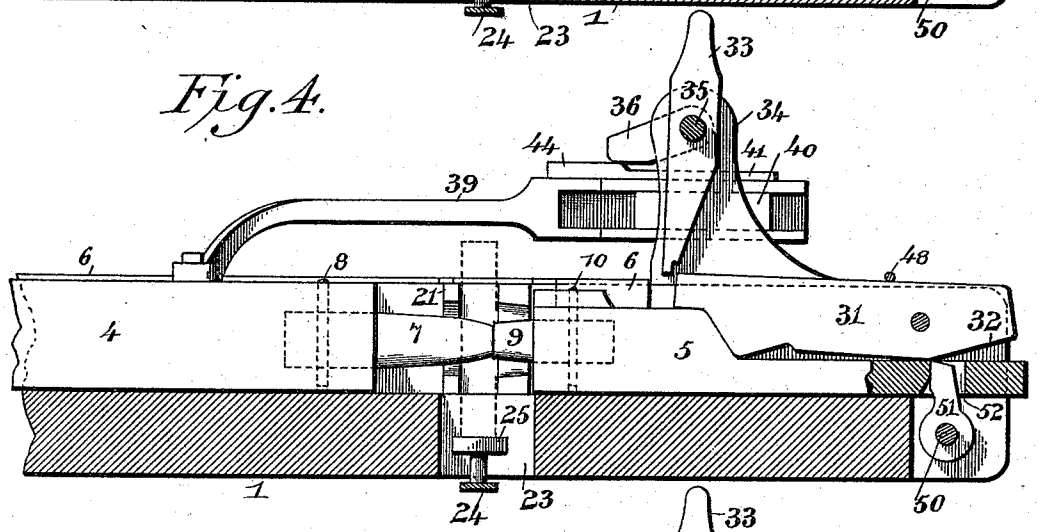
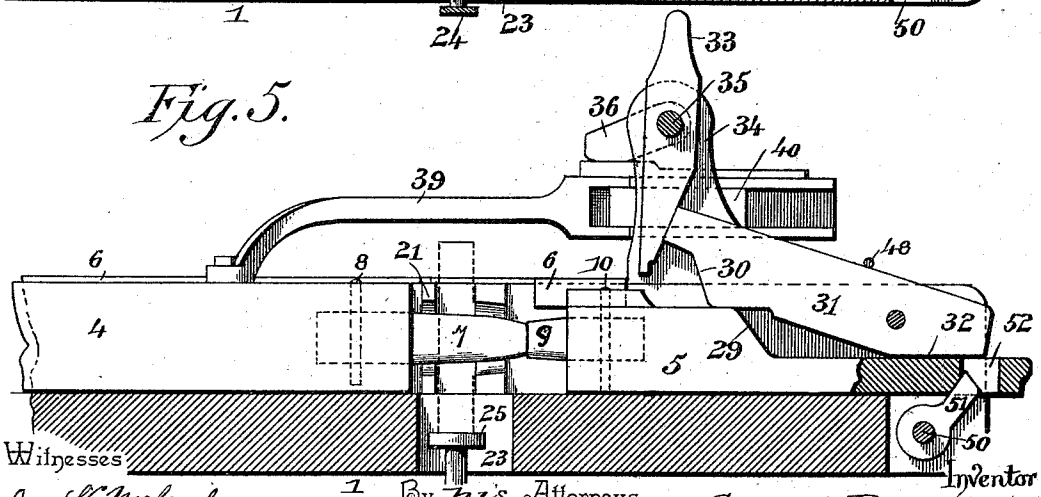


Fig. 5.



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UNITED STATES PATENT OFFICE.

CONRAD ROSSMAN, OF PITTSBURG, PENNSYLVANIA.

EYE-FORMING MACHINE FOR PICKS, &c.

SPECIFICATION forming part of Letters Patent No. 573,109, dated December 15, 1896.

Application filed September 8, 1896. Serial No. 605,172. (No model.)

To all whom it may concern:

Be it known that I, CONRAD ROSSMAN, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Eye-Forming Machine for Picks, Mining and other Tools, of which the following is a specification.

The purpose of this invention is to devise a machine for forming the eyes in picks, mattocks, grubbing-hoes, mining-tools, hammers, hatchets, and all kindred implements and tools provided with eyes to receive handles.

The chief object of the invention is the provision of a machine for the purpose aforesaid which will form the eye in a tool at one operation, thereby admitting of a machine constructed in accordance with this invention accomplishing more work than is possible by any similar machine as generally constructed in the same time.

In its general construction the machine comprises an adjustable support for the tool or implement in which the eye is to be formed, dies for gripping the tool, oppositely-coacting mandrels for forming the eye, means for holding one of the mandrels while the other mandrel is in active operation, a release mechanism for the retarded mandrel automatically actuated from the initial movable mandrel, and a locking mechanism for holding the retarded mandrel out of the way until the tool having the eye formed therein is removed from the machine, said locking mechanism being tripped by the attendant to permit the retarded mandrel to return to a normal position under the action of a resetting-spring.

For a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and the following description.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a machine constructed in accordance with the principles of this invention. Fig. 2 is a top plan view thereof, a portion of the bed and plunger being broken away. Fig. 3 is a detail section showing the normal position of the mandrels and the parts coöperating therewith. Fig. 4 shows the mandrels in contact and the release mechanism for the retarded mandrel actuated. Fig. 5 shows the position of the parts when both mandrels have moved to the limit of their forward movement. Fig. 6 is a detail section showing the tool-support and the gripping-dies. Fig. 7 is a detail view of the mechanism for releasing the retarded mandrel. Fig. 8 is a transverse section about on the line X X of Fig. 7. Fig. 9 is a detail view of the tool-support. Fig. 10 is a detail view of the block carrying the movable die and the cam-lever for operating the block. Fig. 11 is a detail view showing the relation of the spring to the shaft upon which the dog is mounted.

Corresponding and like parts are referred to in the following description and indicated in the several views of the accompanying drawings by the same reference-characters.

The bed 1 is mounted upon a suitable base or stand 2, and is provided at one side with longitudinal bars 3, forming a guideway for the plunger 4 and bar 5, the latter being retained in place by plates 6, secured to the top side of the bars 3 and having their inner edge portions overlapping the movable parts 4 and 5. The plunger 4 is adapted to be connected to any suitable actuating mechanism for imparting sufficient power thereto to force the mandrels through the tool in which an eye is to be formed. The mandrel 7 is let into a socket formed in the inner end of the plunger 4, and is held therein by convenient means, such as a pin 8, and the mandrel 9 is similarly secured to the bar 5 by a pin 10, and these mandrels 7 and 9 aline and coöperate to form the eye in the tool. A lever 11 is pivoted at one side of the guideway to the inner longitudinal bar 3, and is formed with a cog 12 to enter a notch 13 in the adjacent side of the plunger 4, whereby a reciprocating movement imparted to the plunger will cause a corresponding movement of the lever 11 upon its pivotal support.

A block 14 is slidably mounted in a guideway formed between lateral extensions 15 of

the inner longitudinal bar 3, and has connection with a cam-lever 16, located opposite the guideway in which the said block is located, by means of a link 17, the latter having pivotal connection at its outer end with the lever 16 and a sliding connection at its inner end with the said block. A bar 18 connects the outer ends of the levers 11 and 16 and is the means for transmitting motion from the lever 11 to the lever 16. An approximately U-shaped plate 19 is secured to the top side of the lateral extensions 15 and retains the block 14 in place, and the lever 16 has the outer end of its pivot 20 passing therethrough. The inner end of the lever 16 is cam-shaped, so as to engage positively with the outer end of the block 14 and move the latter inward at the same time that the plunger 4 is moved forward, and upon withdrawing the plunger the link connection 17 between the lever 16 and block 14 will draw the latter outward. A die 21 has detachable connection with the inner end of the block 14, and a corresponding die 22 is removably fitted to the outer longitudinal bar 3 directly opposite the block 14, and these dies 21 and 22 grip the tool in which the eye is to be formed, and their gripping-faces are of a shape to correspond to the configuration of the tool, so as to grip the latter firmly and securely. By having the dies detachably connected with their supports they may be interchanged or replaced by others, according to the form of the tool or implement to be operated upon. An opening 23 is formed in the bed directly opposite the dies and is intended to receive the lower end of the tool, which rests upon a vertically-adjustable support 24, the same comprising a rest 25 and a bracket 26, the latter having its lower end slotted, as shown at 27, to receive a binding-screw 28, which is let into the base 2, to secure the support in an adjusted position. Tools and implements vary in size, and in order that they may be held in proper position the support 24 is made vertically adjustable.

The bar 5 is formed with an inclined shoulder 29, against which abuts a corresponding shoulder 30 of a catch-bar 31, pivoted between the longitudinal bars 3, and the end portion of the catch-bar is beveled, as shown at 32, to admit of the inner end moving vertically, as clearly indicated in Fig. 5. When the shoulders 29 and 30 are in engagement, the bar 5 and its mandrel are held stationary or retarded, and the catch-bar is held in locked relation with the bar 5 by means of a dog 33, pivotally supported between brackets 34, rising from and secured at their lower ends to the longitudinal bars 3. The dog 33 is secured to a shaft 35, which obtains bearings in the brackets 34 and to a projecting end of which an arm 36 is secured, the opposite end having a flattened portion 37, against which a spring-arm 38 bears for turning the shaft to throw the dog in position to engage with the inner end of the catch-bar 31 and lock the latter. A bar 39 has connection at one end with the plunger 4, and its opposite end is slidingly mounted upon a rib or extension 40, provided on the outer face of the inner bracket 34, and upon this bar 39 is adjustably mounted a trip 41 for engaging with the arm 36 when the plunger 4 reaches a predetermined point in its forward movement, so as to disengage the dog 33 from the catch-bar 31, as shown in Fig. 4, whereby a continued advancing movement of the plunger will cause the retarded mandrel to move forward therewith, as indicated in Fig. 5, thereby completely forming the eye in the tool. The trip 41 is of L form in cross-section, and its vertical wing has a slot 42, through which operates a machine-screw 43 for retaining the trip in place. The inner end of the horizontal wing is thickened, as shown at 44, to engage with the terminal of the arm 36 and move the latter and effect a disengagement of the dog 33 from the catch-bar 31. A set-screw 45 operates in a threaded ear 46 of the bar 39 and has connection with an ear 47 of the trip, and by turning the set-screw in the proper direction the trip can be adjusted to effect a release of the dog 33 at any stage in the movement of the plunger-bar 4. A spring 48 engages with the catch-bar 31 and serves to return it to a normal position when the retarded mandrel assumes a normal position after being actuated. The springs 38 and 48 form end portions of a wire which is coiled between its ends and mounted upon a screw 49, let into a side of the outer bracket 34.

A shaft 50 is located at one end of the bed and has a spur 51 secured thereto and entering an opening 52 of the bar 5, and a lever 53 is secured to the outer end thereof and is formed with an offset 54 to engage with the hooked end of a lever 55, fulcrumed between its ends to a side of the machine and having its free end extending to a convenient point to be struck by the attendant to effect a release of the lever 53 when removing the tool or implement from the machine after the eye has been formed.

The attendant, having the tool grasped by the tongs for convenience in handling, strikes the inner end of the lever 55, thereby releasing the retarded mandrel and permitting it to move forward to a normal position under the action of a resetting-spring, which in the present instance is applied to the base of the machine, as shown at 56, and engages with a pin 57, projecting from the lever 53. By this disposition of the parts no extra pass or movement is required to operate the lever 55. Hence the output of a machine of the present construction is greater than a machine of like size in a given time as generally constructed. By means of the lever 53 and the spur connection thereof with the bar 5 the retarded mandrel can be moved outward at will, and in order to provide for the disengagement of the dog 33 from the catch-bar 31 the said dog is extended, providing a projec-

tion to be engaged by a finger of the hand when it is required to operate it independently of the trip 41.

The operation of the machine may be briefly stated as follows: The tool or implement in which the eye is to be formed is placed in position upon the support 24, between the dies 21 and 22, and the machine being thrown in gear the plunger 4 moves forward, and by reason of the connections herein set forth the die 21 moves toward the die 22 and firmly grips the tool, and the plunger continuing to advance causes the mandrel 7 to enter the tool and partially form the eye, and the tool being caught between the mandrel 7 and 9 the latter will become partially embedded in the tool and start the eye in the side thereof remote or opposite that from which the mandrel 7 entered. The plunger 4 continuing to advance causes the trip 41 to engage with the arm 36 and disengage the dog 33 from the catch-bar 31, and by reason of the inclined stop-shoulders 29 and 30 the pressure upon the retarded mandrel will cause the latter to move with the plunger 4, the shoulder 30 riding upon the shoulder 29 and liberating the bar 5. When the plunger reaches the limit of its forward movement, the lever 53 will become locked by engagement with the hooked end of the lever 55, and the retarded mandrel will retain its forward or outward position during the return stroke of the plunger. When the plunger 4 nearly reaches the limit of its return stroke, it will actuate the lever 11 and cause an outward movement of the die 21 and effect a release of the tool, which latter is removed from the machine by an attendant, who when in the act of removing the tool will tap the lever 55, so as to release the lever 53 and permit the spring 56 to return the retarded mandrel to a normal position, when the machine is in condition for a repetition of the operation.

Having thus described the invention, what is claimed as new is—

1. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, a catch to interlock with and secure one of the mandrels while the other mandrel is advancing to the work, and a releasing mechanism actuated by the movable mandrel to liberate the catch, whereby in a continued advance of the primary actuated mandrel the two mandrels will move together, substantially as set forth.

2. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, a locking mechanism for securing one of the mandrels while the other mandrel is advancing to the work, and a trip having connection with the movable mandrel and actuated thereby to effect a release of the locking mechanism and the retarded mandrel, substantially as set forth.

3. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, a locking mechanism for one of the mandrels, and an adjustable trip actuated by the movable mandrel to effect a release of the locking mechanism at a predetermined stage of movement of the movable mandrel, substantially as set forth.

4. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, a locking mechanism for one of the mandrels, a bar having connection with the movable mandrel, a trip mounted upon the bar and adapted to effect a release of the locking mechanism, and means for adjusting the trip upon the bar, whereby the release of the locking mechanism can be effected at any stage of movement of the movable mandrel, substantially as set forth.

5. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, one of the mandrels having an inclined shoulder, a catch-bar having a corresponding inclined shoulder to engage with the inclined shoulder of the retarded mandrel, a dog for maintaining the stop-shoulders in engagement, and a trip actuated from the primary movable mandrel to effect a release of the catch-bar, substantially as and for the purpose set forth.

6. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, a catch-bar to engage with and retard one of the mandrels during the advance of the other mandrel to the work, a dog for engaging with and securing the catch-bar, an arm in connection with the dog, and a trip actuated from the other or primary movable mandrel for effecting a release of the catch-bar, substantially as set forth.

7. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, a shaft having a spur in engagement with one of the mandrels, a resetting-spring for the last-mentioned mandrel, and a lever adapted to engage with a projecting portion of the said shaft to hold the mandrel projected against the action of the resetting-spring until the said lever is actuated, substantially as and for the purpose set forth.

8. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, a shaft having a spur engagement with one of the mandrels, a lever secured to the said shaft and having an offset, a resetting-spring, and a lever adapted to interlock with the offset lever to hold the mandrel projected against the action of its resetting-spring, substantially as specified.

9. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, means for retarding the movement of one of the

mandrels while the other mandrel is advancing to the work, a trip actuated by the movable mandrel to effect a release of the retarded mandrel, a shaft having spur engagement with the retarded mandrel, a lever secured to the said shaft and having an offset, a resetting-spring, and a lever adapted to interlock with the offset lever to hold the retarded mandrel projected against the action of the resetting-spring, substantially as set forth.

10. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, dies located opposite the meeting ends of the mandrels, a movable block carrying one of the dies, a lever having a cam portion to engage with the movable block, a sliding link connection between the lever and movable block, and means for transmitting movement to the lever from the primary movable mandrel, substantially as set forth.

11. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, gripping-dies located oppsite the meeting ends of the mandrels, and a vertically-adjustable tool-support arranged below the gripping-dies, substantially as set forth.

12. In a machine for forming the eyes of tools and implements, the combination of oppositely-disposed coöperating mandrels, dies located opposite the meeting ends of the mandrels, a movable block carrying one of the dies, a cam-lever having a sliding link connection with the movable block, a second lever having a cog to enter a recess in the primary movable mandrel, and a link connection between the two levers, substantially as and for the purpose set forth.

13. A machine for forming the eyes of tools and implements, comprising oppositely-disposed coöperating mandrels, dies located opposite the meeting ends of the mandrels, means for positively actuating one of the dies from the movable mandrel, an adjustable tool-support beneath the dies, a catch-bar for engaging with the other mandrel and retarding it during the advance of the aforesaid movable mandrel, a dog for engaging with the catch-bar, an adjustable trip actuated by means of the movable mandrel for releasing the dog, a shaft having spur engagement with the retarded mandrel, a lever having an offset and secured to the said shaft, a resetting-spring, and a lever for interlocking with the offset lever to hold the retarded mandrel projecting against the action of the resetting-spring, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CONRAD ROSSMAN.

Witnesses:
A. A. BATCHELOR,
JOE A. RISING.