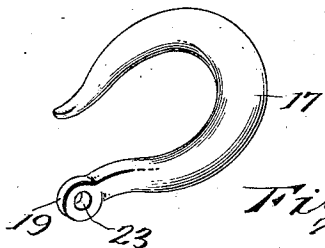


APPLICATION FILED JUNE 29, 1912.

Patented May 6, 1913.

3 SHEETS—SHEET 1.



Witnesses
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MACHINE FOR BENDING AND PUNCHING EYES IN HOOKS.
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1,060,866.

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3 SHEETS-SHEET 2.

Fig. 2.

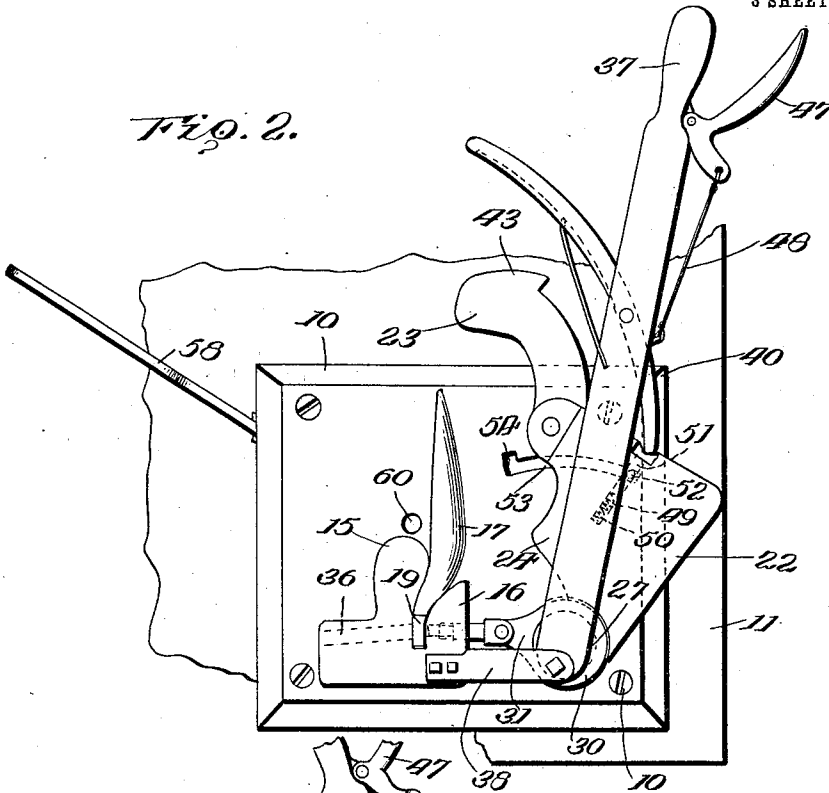
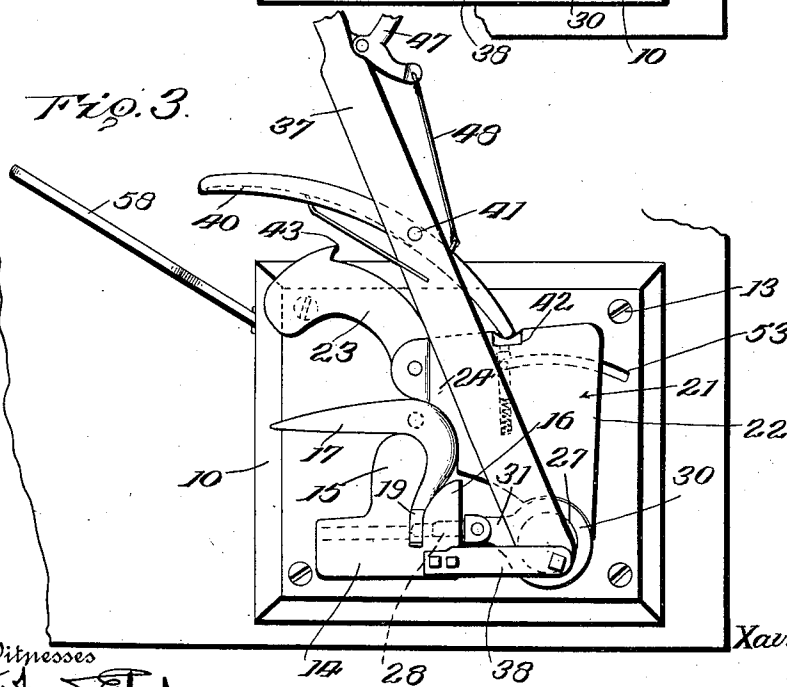


Fig. 3.



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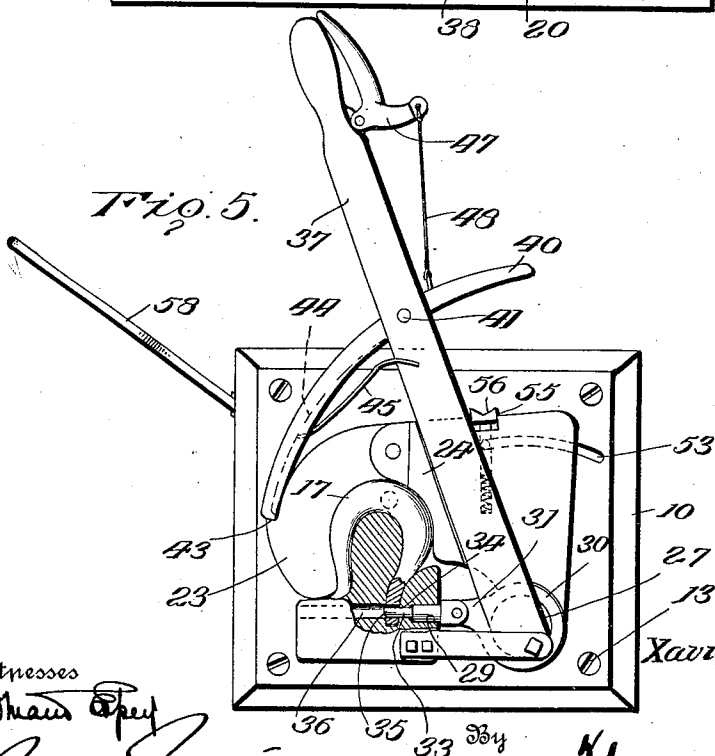
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

XAVIER T. TARDIF, OF ST. AGATHA, MAINE.

MACHINE FOR BENDING AND PUNCHING EYES IN HOOKS.

1,060,866.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed June 29, 1912. Serial No. 706,764.

To all whom it may concern:

Be it known that I, XAVIER T. TARDIF, citizen of the United States, residing at St. Agatha, in the county of Aroostook and State of Maine, have invented certain new and useful Improvements in Machines for Bending and Punching Eyes in Hooks, of which the following is a specification.

My invention relates to new and useful improvements in metal working machines, and the primary object of my invention is to provide a machine adapted to receive a suitable blank and shape the same to form a hook.

A further object of my invention is to provide a machine which simultaneously shapes the hook and punches a hole through the free end of its shank to form a cable or link receiving eye.

A further object of my invention is to provide a machine which forms the eye during the initial movement of the shaping jaw in such a manner that the eye forming punch acts as a lock to hold the hook blank in place during the remaining phases of its shaping.

A further object of my invention is to provide a machine of the character described in which the hook forming blank is bent into shape about a fixed form block by the action of a swingingly mounted shaping jaw including a body member having a pivoted terminal member.

A further object of my invention is to provide a hook forming machine actuated wholly by a single lever having an operating cycle of three separate and distinct phases, the first movement of the lever acting upon a punch to form an eye in the free end of the shank of the hook forming blank and upon the body member of the swinging jaw to partially bend the blank about the form block, the second movement bringing the lever into active engagement with the pivoted terminal member of the swinging jaw and the last movement forcing the pivoted jaw terminal into engagement with the blank to complete the shaping of the hook.

A further object of my invention is to provide means for locking the body member of the jaw against movement during the last two phases of lever movement.

A still further object of my invention is to provide means whereby the punch is actuated by the movement of the body member of the jaw, this construction permitting the

punch to assist in holding the partially formed hook in place during the final steps of its manufacture, the body member of the hook being then locked against movement. And a still further object of my invention is to provide an ejector for forcing the completed hook from the machine.

With these and other objects in view, my invention will be more fully described, illustrated in the accompanying drawings, and then specifically pointed out in the claims which are attached to and form a part of this application.

In the drawings: Figure 1 is a perspective view of the hook forming machine, showing the position of the parts at the beginning of its operation, the blank from which the hook is to be formed being shown in place upon the bed plate of the machine; Fig. 2 is a top plan view of the machine in the position shown in Fig. 1, illustrating the first step in the manufacture of a hook, namely, the positioning of the blank; Fig. 3 is a top plan view of the machine, illustrating the second step, namely, the punching of the eye in the free end of the hook shank and the partial shaping of the hook through the action of the body member of the compound shaping jaw; Fig. 4 is a top plan view, illustrating an intermediate movement of the operating lever, having no effect upon the partially formed hook, but bringing the advance arm of the pawl into active engagement with the pivoted terminal member of the shaping jaw; Fig. 5 is a top plan view of the machine, partially in section, illustrating the third and last step in the forming of the hook; the terminal member of the shaping jaw being swung to bend the bill of the hook into shape; Fig. 6 is a fragmentary sectional view, showing the manner of mounting the ejector; Fig. 7 is a perspective view of the hook forming blank ready to be acted upon by the machine; Fig. 8 is a perspective view of the completed hook as it comes from the machine.

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

The preferred embodiment of my invention includes a bed plate 10 formed of metal, preferably steel, and with a plane surfaced upper face, securely mounted upon a suitable support 11 and in spaced relation there- to by means of spacer blocks 12 and bolts

13, the heads of which are countersunk in the plate to lie flush with its upper face. This bed plate is provided adjacent one corner with a form block which may be
 5 cast integrally with the bed plate or made in a separate piece and secured thereto and this form block which, as a whole is designated by the numeral 14, is shaped at one side to conform to the inner contour of the
 10 type of hook to be manufactured by the machine, as shown at 15. The form block is provided with an extension 16 which extends in spaced relation to the base portion of the part 15 of the block and which is
 15 adapted to co-act with the body of the block, as shown in the drawings, to receive and hold the free end of the shank portion of the hook forming blank.

The hook forming blanks employed with
 20 this machine, and one of which is illustrated in Fig. 7 of the drawings, include a substantially cigar shaped body portion 17 curved slightly at one end, as shown at 18, and having a flattened terminal 19 adapted to
 25 seat between the portions 15 and 16 of the form block, as best illustrated in Fig. 2 of the drawings. These blanks may be rough shaped in any suitable manner to prepare them for the machine, the forming of the
 30 blanks themselves having nothing to do with my present invention.

Mounted for swinging movement about a suitable pivot pin 20 extending from the bed plate, is a shaping jaw designated as a whole
 35 by the numeral 21 and including a substantially triangular shaped body member 22 and a terminal member 23. The inner faces of both the body and terminal members are shaped in such a manner that when the hook
 40 is swung into active position, they conform to the outer contour of the completed hook, as best illustrated in Fig. 5 of the drawings. The body member of the jaw 21 is formed with an offset shoulder 24 which
 45 extends radially from the pivot pin 20 and the free end of the body member is bifurcated to form spaced ears 25 between which is pivotally mounted the extended ear 26 of the terminal member of the jaw. These
 50 ears 25 and 26 are so formed as to limit the outward swinging of the jaw member 23 with respect to the jaw member 22.

The pivoted end of the jaw member 22 is cut-away to provide a cylindrical stud 27
 55 which is formed eccentrically about the pivot pin, providing a cam or eccentric for the actuation of a punch, designated as a whole by the numeral 28. The body portion of this punch is mounted for reciprocation
 60 upon the bed plate in a recessed chamber 29 formed in the block 14 and is operatively connected to the cam or stud 27 by means of an eccentric strap 30 surrounding the stud and having a laterally directed arm 31,
 65 the free end of which is pivotally connected

between spaced ears 32 formed upon the terminal of the punch shank. The punch proper, 33, is movable through a bore 34 formed in the extension 16 of the block 14 and into the reduced inner end 35 of a bore 36 formed through the body portion of the block. It will therefore be seen that during its inward movement, the punch will pass through the flattened terminal 19 of the hook forming blank to form an eye therein.

As a means for actuating the shaping jaw 21 and consequently the punch, I have provided a hand lever 37 which is pivoted by one end upon the pivot pin 20 and which swings over the body member 22 of the jaw in such a manner as to engage against the shoulder 24. In order to stiffen the pivot pin and prevent its bending, I have provided a brace 38, one end of which is mounted upon the outer end of the pin and the other end of which is rigidly secured upon the upper face of the block 14 by bolts or other preferred means 39.

In order to provide means for swinging the jaw 21 to inoperative position and also for swinging the terminal member 23 of the jaw independently of the body member, I have provided a double armed pawl 40 which is pivotally mounted intermediate its length upon the lower face of the lever 37, as shown at 41 and one arm of which is adapted for engagement in a pawl seat 42 formed in the outer edge of the jaw member 22. The other arm of the pawl is likewise adapted for engagement in a pawl seat 43 formed in the outer face of the terminal member 23 of the shaping jaw. The inner face of this latter arm of the pawl is channeled longitudinally, as at 44 to form a guide for the free end of a leaf spring 45, the other end of which is rigidly secured to the lever arm 37, as shown at 46. This spring, as shown, is so disposed as to normally maintain the shorter arm of the pawl in engagement with the pawl seat 42. As a means for swinging this shorter arm of the pawl out of engagement with its seat and for swinging the longer arm of the pawl into engagement with the pawl seat 43, I have provided a hand latch 47 which is pivoted adjacent the free end of the lever 37, as shown, and which is operatively connected with the shorter arm of the pawl by a link 48.

In order to limit the swinging movement of the jaw member 20 and also to provide means for locking said jaw member in active position, I have provided the jaw with a cylindrical socket 49 which extends inwardly from the pawl seat 42 and which is open throughout a portion of its length upon that side of the jaw member which bears upon the bed plate. Seated in the inner end of this socket, is a helical spring 50 and mounted in the socket and bearing by its inner end

against this spring, is a bolt 51 having a laterally directed arm 52 which extends through the open side of the socket and which engages in an arcuate shaped slot 53 formed in the upper face of the bed plate 10 and terminating at that end adjacent the form block in an off set extension 54. The free end of the bolt 51 extends into the pawl seat 42 and terminates in a head 55 notched, as shown at 56 to receive the free end of the shorter arm of the pawl 40.

It will be apparent that when the body member of the jaw is swung to active position and the pawl disengaged from the seat 42 to swing it into engagement with the seat 43, the spring 50 will force the bolt outwardly to force its arm 52 into the extension 54 of the slot and so lock the body member of the jaw against movement. It will also be apparent that when the shorter arm of the pawl is again brought into engagement with its pawl seat and consequently into engagement with the head of the bolt, and when the lever is swung to move the jaw to inoperative position, the initial movement of the lever will act through the pawl to force the bolt out of engagement with the extension of the slot and so permit the movement of the jaw upon further movement of the lever.

As a means for forcing the completed hook out of engagement with the form block, I have provided the bed plate 10 with a bore 57 which is formed through that portion of the bed plate upon which the bite portion of the hook rests when completed. A hand lever 58 is pivotally mounted intermediate its length between spaced ears 59 dependent from the lower face of the bed plate and pivotally mounted upon the inner end of this lever is a pin or ejector 60 which is movable through the bore 57 upon the depression of the free end of the lever and which is normally maintained in lowered position by means of a helical spring 61 surrounding the ejector and bearing between the lever and the lower face of the bed plate. The bed plate is preferably provided with a downwardly directed shoulder 62 arranged to limit the movement of the lever under the action of the spring 61 and consequently to prevent the disengagement of the ejector pin of the bed plate. As shown, the free end of the lever 58 extends beyond the bed plate in position to be readily grasped by the operator.

From the foregoing description, taken in connection with the drawings, the operation of my improved machine will be readily understood.

With the machine in the position shown in Figs. 1 and 2 of the drawings, the hook forming blank 17 is put in place with its flattened terminal 19 positioned between the portions 15 and 16 of the form block and in

alignment with the punch. The lever 37 is then swung in the direction of the arrow to swing the jaw 21 in such a manner as to bring the body member 22 of the jaw into engagement with the hook forming blank 17 and partially bend the same about the portion 15 of the form block, as shown in Fig. 3. During this movement of the jaw the swinging of the cam 27 carried by the jaw member 22 acts upon the punch to force it through the flattened terminal of the blank to form an eye. The hand latch 47 is then operated to swing the shorter arm of the pawl out of engagement with the pawl seat 42 and bolt head 55, thereby releasing the bolt which automatically locks the body member 22 of the jaw against movement. The hand lever 37 is then swung in the direction of the arrow shown in Fig. 3 until the longer arm of the pawl seats in the pawl seat 43 of the terminal member 23 of the jaw, as shown in Fig. 4. During this operation, the body member of the jaw is held in active position by the bolt 51 and the punch is consequently locked in its extended position and so assists in maintaining the hook forming blank in place. The hand lever 37 is then swung in the direction indicated by the arrow in Fig. 4, the pawl being maintained in engagement with the jaw member 23 until the jaw member 23 assumes the position shown in Fig. 5 of the drawings, this independent movement of the terminal member of the jaw completing the formation of the hook. The hand latch is then released to permit the pawl to swing to reverse position and engage in the pawl seat of the body member of the jaw when the hand lever 37 is swung in the reverse position to release the bolt 51 and to swing both the jaw members to the position shown in Fig. 2. The lever 58 is then depressed to move the ejector pin into engagement with the hook and force the same from the machine. The completed hook is shown in Fig. 8, the eye formed by the punch being designated by the numeral 63.

It will of course be understood that the blank may be heated before it is placed in the machine to facilitate the bending and punching, if desired.

By actuating the punch by the movement of the body member of the jaw, the punch is brought into engagement with the blank during the initial movement of the machine and therefore assists throughout the remainder of the hook forming operation in the holding of the blank in place, both the body member of the jaw and the punch being locked against movement during the latter stages of operation by the bolt 51.

It will further be apparent that with a machine operated by a single lever, as described, the body member and terminal member of the shaping jaws are successively

moved into active position and simultaneously moved out of active position. Moreover, the same movement of the lever which releases the bolt serves to move the jaws out of active position.

By forming the jaw in two parts and arranging the operating mechanism to cause the parts to act successively upon the hook forming blank, much less force is required during any one stage of the operation and it is possible to form much heavier hooks with a machine, the parts of which are comparatively light, than would be possible if the completing of the hook were performed in a single operation.

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

1. A hook forming machine, including a form block, a compound jaw, actuating means for said jaw, a punch, and means operable by the movement of the jaw for moving the punch.

2. A hook forming machine, including a form block, a shaping jaw, means for actuating said jaw, a punch, and cam operated means actuated by the jaw for moving said punch.

3. A hook forming machine, including a form block, a shaping jaw, means for actuating the jaw, a cam carried by the jaw, a punch, and an operative connection between the cam and punch.

4. A hook forming machine, including a form block, a shaping jaw, a punch, an operative connection between the jaw and punch, and a lever for actuating said jaw.

5. A hook forming machine, including a form block, a shaping jaw, a lever for actuating said jaw, a punch, and a pivot joint connection between the jaw and punch.

6. A hook forming machine, including a form block, a pivotally mounted jaw, means for swinging the jaw about its pivot, an eccentric cam formed upon the jaw, a punch mounted for reciprocation, and means operable by the cam for actuating the punch.

7. A hook forming machine, including a form block, a jaw mounted for swinging movement, an eccentric cam formed upon the jaw, an eccentric strap for said cam, a punch pivotally connected to said strap, and means for actuating said jaw to swing it and the punch into active position with respect to the form block.

8. A hook forming machine, including a form block, a compound shaping jaw including a swingingly mounted body member and a pivoted terminal member, means for swinging the body member into active position, means for swinging the terminal member into active position, and means for holding the body member against movement during the swinging of the terminal member.

9. A hook forming machine, including a

form block, a compound shaping jaw including a body member and a terminal member pivoted to the body member, means for successively swinging the body and terminal members into active position, and means for holding the body member against movement during the swinging of the terminal member.

10. A hook forming machine, including a form block, a compound shaping jaw including a body member and a terminal member, means for swinging the body member into active position, means for locking the body member in active position, and means for swinging the terminal member into active position.

11. A hook forming machine, including a form block, a compound shaping jaw including a body member mounted for swinging movement and a terminal member pivoted to the free end of the body member, means for successively swinging the body member and the terminal member into active position, an automatic lock for securing the body member in active position, and means for simultaneously swinging both the body member and terminal member to inactive position.

12. A hook forming machine, including a form block, a compound shaping jaw including a body member mounted for swinging movement and a terminal member pivoted to the free end of the body member, means for successively swinging the body member and the terminal member into active position, an automatic lock for securing the body member in active position, and means for simultaneously unlocking the body member and swinging it and the terminal member to inactive position.

13. A hook forming machine, including a form block, a compound shaping jaw including a swingingly mounted body member and a terminal member pivoted to the body member, means for swinging both members of the jaw to active position, a punch, and an operative connection between the punch and body member of the jaw.

14. A hook forming machine, including a form block, a jaw, means for moving the jaw into active position with respect to the form block, and means for locking the jaw in active position.

15. A hook forming machine, including a form block, a movable jaw, means for moving the jaw into active position with respect to the form block, a punch, means operable by the jaw for moving the punch to active position, and means for locking the jaw in active position, said means also locking the punch in active position.

16. A hook forming machine, including a form block, a movable jaw, a punch, and co-acting means for simultaneously moving the jaw and punch in and out of active position.

17. A hook forming machine including a

form block, a movable jaw, a punch, means for simultaneously moving the jaw and punch to active position, means for automatically locking the jaw in active position, said means also locking the punch in active position, and means for simultaneously releasing said lock and moving both the jaw and punch to inactive position.

18. A hook forming machine, including a form block, a compound shaping jaw including a swingingly mounted body member and a terminal member pivotally connected to the body member, a punch, connecting means between the punch and body member of the jaw, and means for moving the jaw in and out of active position.

19. A hook forming machine, including a form block, a compound shaping jaw including a swingingly mounted body member and a terminal member pivotally connected to the body member, a punch, connecting means between the punch and body member of the jaw causing the punch to move with the jaw, means for moving the jaw in and out of active position, and means for locking the jaw in active position.

20. A hook forming machine, including a form block, a compound shaping jaw including a swingingly mounted body member and a terminal member pivotally connected to the body member, a punch, connecting means between the punch and body member of the jaw, means for moving the body member of the jaw to active position, said means also moving the punch to active position, and means for moving the terminal member of the jaw to active position.

21. A hook forming machine, including a form block, a compound shaping jaw including a swingingly mounted body member and a terminal member pivotally connected to the body member, a punch, connecting means between the punch and body member of the jaw, means for moving the body member of the jaw to active position, said means also moving the punch to active position, means for locking the body member of the jaw in active position, said latter means also locking the punch in active position, and means for moving the terminal member of the jaw to active position.

22. A hook forming machine, including a form block, a compound shaping jaw including a movable body member and a terminal member pivoted to the body member, a punch arranged for simultaneous movement with the body member of the jaw, and means for successively moving the body and terminal members of the jaw to active position.

23. A hook forming machine, including a form block, a compound shaping jaw including a movable body member and a terminal member pivoted to the body member, a punch arranged for simultaneous movement with the body member of the jaw, means for

successively moving the body and terminal members of the jaw to active position, and means for locking the body member in active position.

24. A hook forming machine, including a form block, a compound shaping jaw including a movable body member and a terminal member pivoted to the body member, a punch arranged for simultaneous movement with the body member of the jaw, means for successively moving the body and terminal members of the jaw to active position, means for automatically locking the body member in active position, and means for simultaneously releasing the body member and moving it and the terminal member of the jaw to inactive position.

25. A hook forming machine, including a bed plate, a form block carried by the bed plate and arranged to engage one end of a hook forming blank, means for bending the blank about the block to form a hook, and means coacting with and operated by the jaw for punching the block engaged end of the blank to form an eye.

26. A hook forming machine, including a bed plate, a fixed form block carried by the bed plate and arranged to engage one end of a hook forming blank, and means including a swinging jaw and reciprocating punch for simultaneously bending the blank about the block and punching its end to form a hook with a terminal eye.

27. A hook forming machine, including a bed plate, a fixed form block carried by the bed plate and arranged to engage one end of a hook forming blank, a jaw mounted for movement over the bed plate and arranged to bend the blank about the block to form a hook, means for moving said jaw, and a punch movable with the jaw and in a plane with the same.

28. A hook forming machine, including a bed plate, a fixed form block carried by the bed plate, a movable jaw co-acting with the block and provided with an offset shoulder, and a lever mounted for swinging movement and arranged to engage the shoulder to swing the jaw into active position.

29. A hook forming machine, including a bed plate, a fixed form block carried by the bed plate, a movable jaw co-acting with the block and provided with an offset shoulder upon its upper face and with a pawl seat in its outer edge, a lever mounted for swinging movement and arranged to engage the shoulder to move the jaw in one direction, and a spring pressed pawl carried by the lever and engaging in the pawl seat of the hook when the lever is in engagement with the shoulder.

30. A hook forming machine including a bed plate having an arcuate slot provided at one end with a lateral offset formed in its upper face, a fixed form block carried by

the bed plate, a shaping jaw pivoted for swinging movement over the bed plate, a spring pressed bolt carried by the jaw and seating in the slot and arranged to engage in the offset portion thereof when the jaw is in active position, and means for swinging said jaw to active position.

31. A hook forming machine including a bed plate having an arcuate slot provided at one end with a lateral offset formed in its upper face, a fixed form block carried by the bed plate, a shaping jaw pivoted for swinging movement over the bed plate, a spring pressed bolt carried by the jaw and seating in the slot and arranged to engage in the offset portion thereof when the jaw is in active position, means for swinging said jaw to active position, and means for moving the bolt out of the offset end of the slot to release the jaw for movement to inactive position.

32. A hook forming machine, including a bed plate, a form block carried by the bed plate, a compound shaping jaw including a body member pivoted to swing over the bed plate and a terminal member pivoted to the free end of the body member, said members being provided upon their outer edges with oppositely disposed pawl seats, a lever pivoted for swinging movement, and a double armed pawl carried by the lever and adapted for engagement with either of the pawl seats.

33. A hook forming machine, including a bed plate, a form block carried by the bed plate, a compound shaping jaw including a body member pivoted to swing over the bed plate and a terminal member pivoted to the free end of the body member, said members being provided upon their outer edges with oppositely disposed pawl seats, a lever pivoted for swinging movement, and a double armed spring pressed pawl carried by the lever and normally engaging in the pawl seat of the body member of the jaw.

34. A hook forming machine, including a bed plate, a form block carried by the bed plate, a compound shaping jaw including a body member pivoted to swing over the bed plate and a terminal member pivoted to the free end of the body member, said members being provided upon their outer edges with oppositely disposed pawl seats, a lever pivoted for swinging movement, a double armed spring pressed pawl carried by the lever and normally engaging in the pawl seat of the body member of the jaw, and means for swinging the pawl from engagement in the seat of the body member into engagement in the seat of the terminal member.

35. A hook forming machine, including a bed plate having an arcuate slot formed in its upper face provided at one end with a lateral offset, a fixed form block carried

by the bed plate, a compound shaping jaw including a body member pivoted to swing over the bed plate and having an offset shoulder and a terminal member pivoted to the free end of the body member, said jaw members being provided in their outer edges with oppositely disposed pawl seats, a spring pressed bolt carried by the body member of the jaw with an arm engaging in the slot of the bed plate and with one end extending into the pawl seat of the body member in position to be engaged by a pawl, a lever pivoted to swing in spaced relation to the bed plate and to engage against the shoulder of the body member of the jaw, a double armed pawl carried by the lever, a spring normally holding one arm of the pawl in the pawl seat of the body member of the jaw, and means for swinging the pawl to bring its other arm into engagement with the pawl seat of the terminal member of the jaw.

36. A hook forming machine, including a bed plate, a form block carried by the bed plate, a jaw pivoted for movement in and out of position with respect to the form block, a lock for automatically locking the jaw in active position, a lever arranged to swing the jaw in either direction, and means carried by the lever for releasing the lock.

37. A hook forming machine, including a bed plate, a form block, a jaw movable into and out of active position with respect to the block, means for moving said jaw, and means for limiting the movement of the jaw in either direction and means for locking the jaw in one position.

38. A hook forming machine, including a bed plate, a form block, a shaping jaw pivoted to the bed plate, means for swinging the jaw about its pivot, an eccentric cam formed upon the jaw about the pivot, an eccentric strap for said cam, and a punch pivoted to the strap.

39. A hook forming machine, including a bed plate, a form block corresponding in contour to the inner contour of a hook and provided at one side with a blank receiving extension spaced from the body of the block, the body of the block and the extension being provided with transversely aligned bores, a punch mounted for movement through the bore of the extension and into the bore of the block, a movable shaping jaw arranged to cooperate with the block, an operative connection between the jaw and punch, and means for actuating the jaw.

40. A hook forming machine, including a bed plate, a form block carried by the bed plate, a pivot pin extending from the bed plate, a jaw pivoted by one end on said pin and having a cylindrical cam stud formed eccentrically about the pin, an arm pivoted on said stud, a punch pivoted to

the free end of the arm and movable in a socket formed in the form block, a lever mounted for movement upon the pivot pin, and means carried by the lever for engagement with the jaw to move the latter in and out of operative position with respect to the form block.

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

XAVIER T. TARDIF. [L. s.]

Witnesses:

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J. S. DUGAL

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
