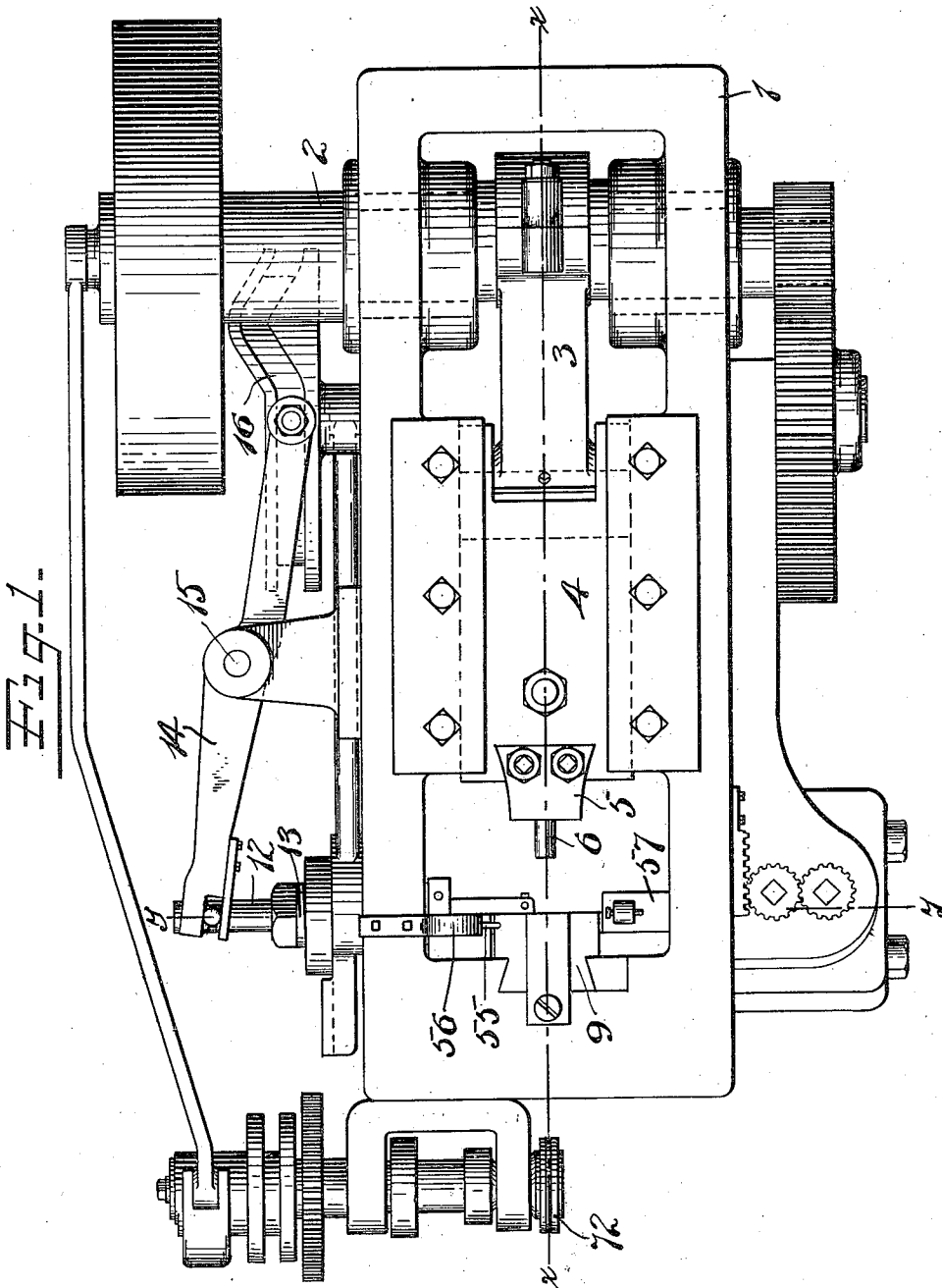


C. GLOVER & H. K. JONES.
 HEADING AND SLOTTING MACHINE.
 APPLICATION FILED DEC. 20, 1910.

990,544.

Patented Apr. 25, 1911.

5 SHEETS—SHEET 1.



Witnesses:
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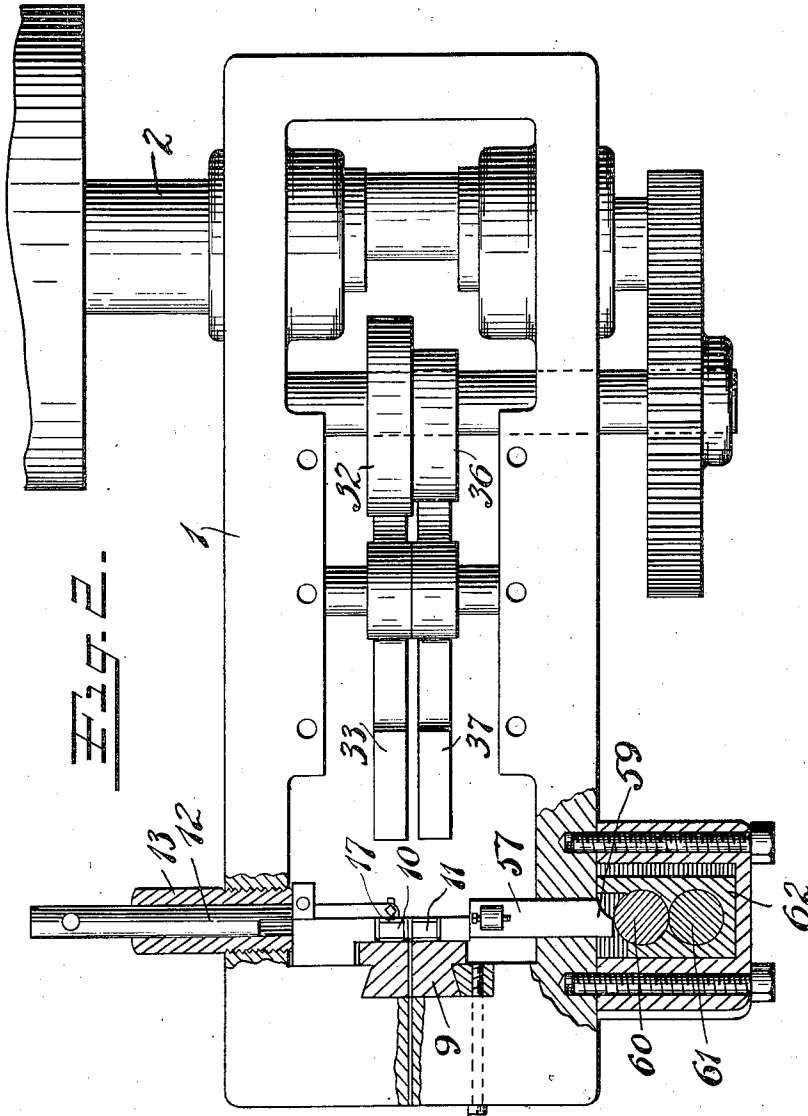
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5 SHEETS—SHEET 2.



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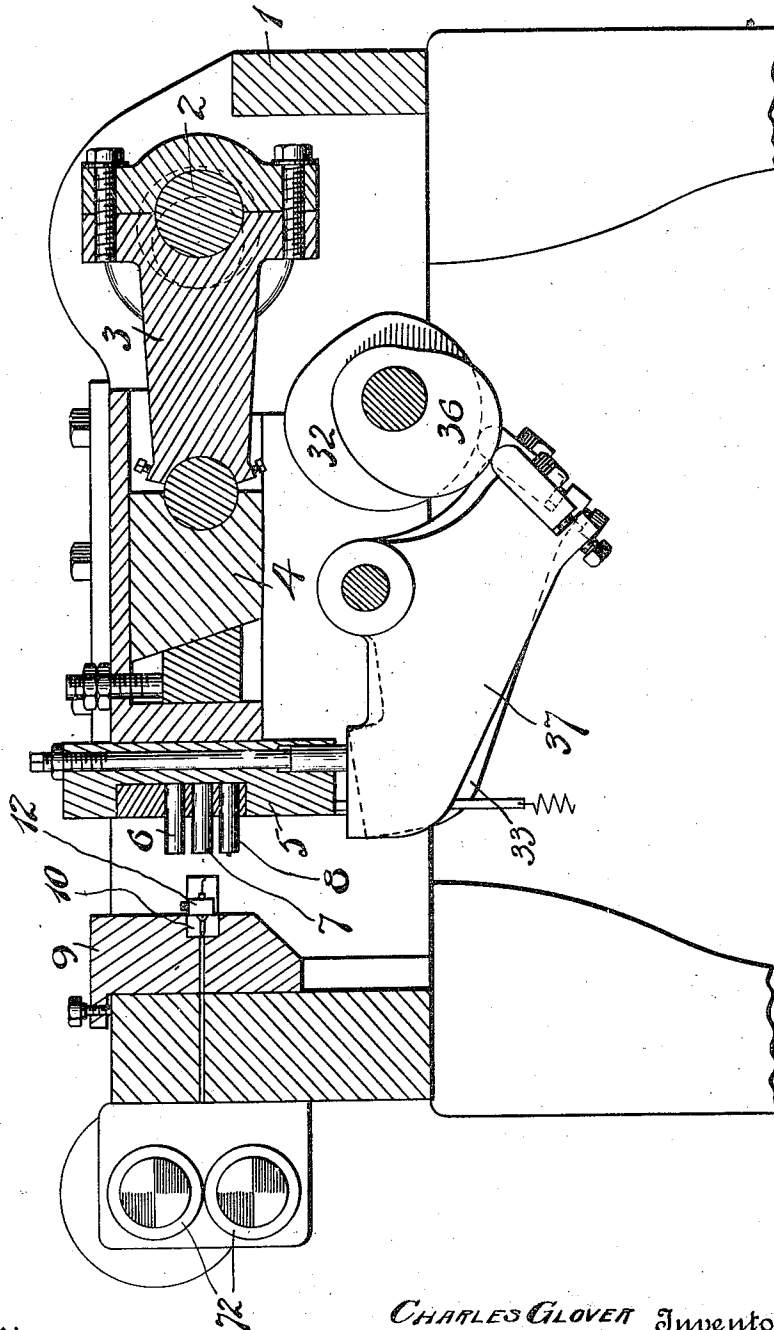
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5 SHEETS—SHEET 3.

Fig. 3.



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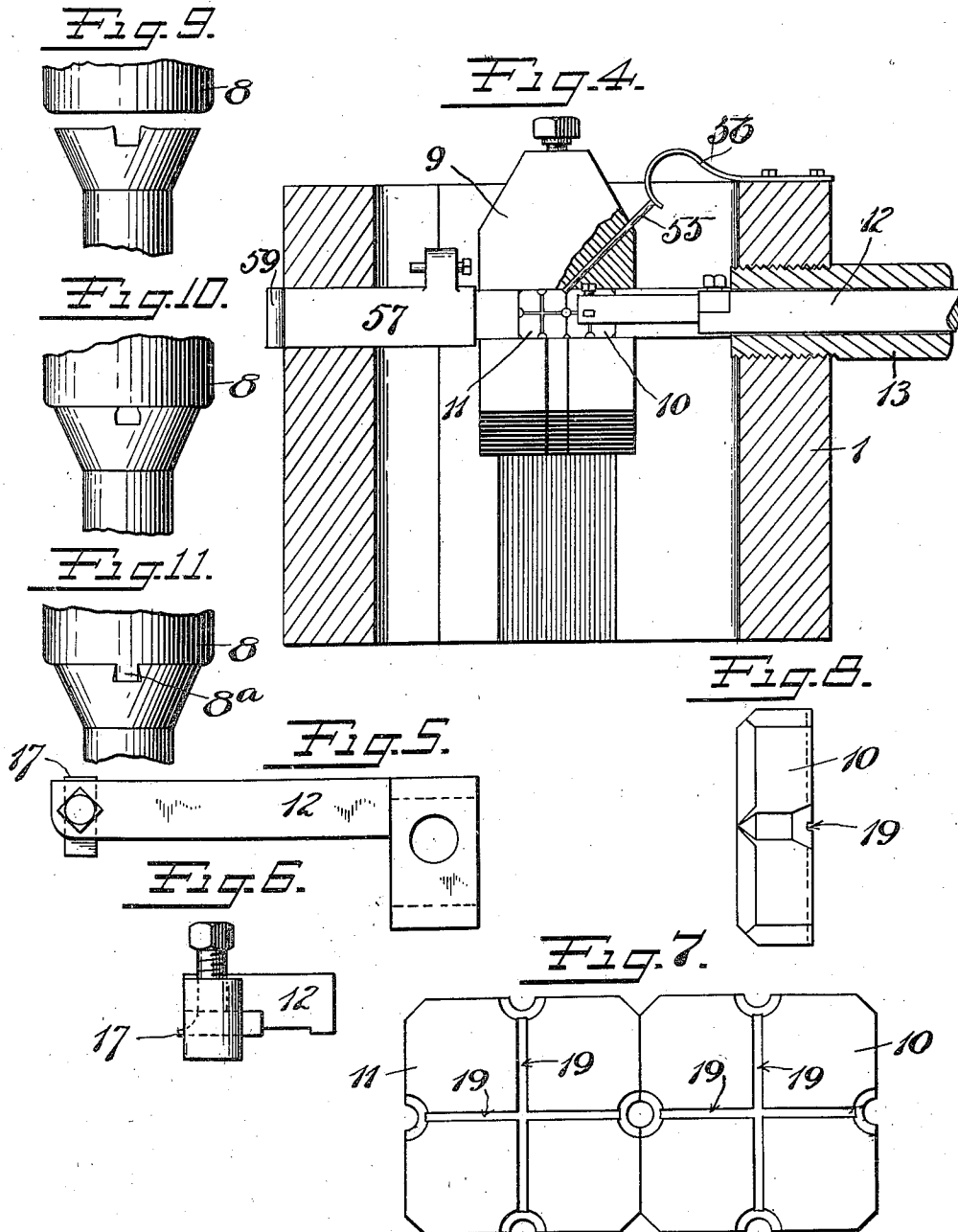
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5 SHEETS—SHEET 4.



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990,544.

5 SHEETS—SHEET 5.

Feb 12

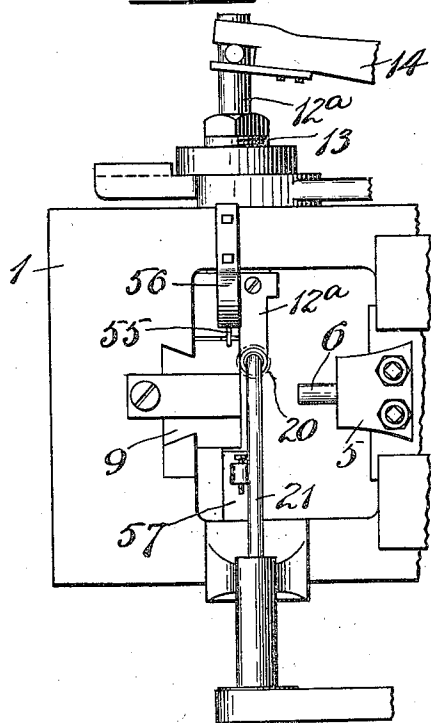
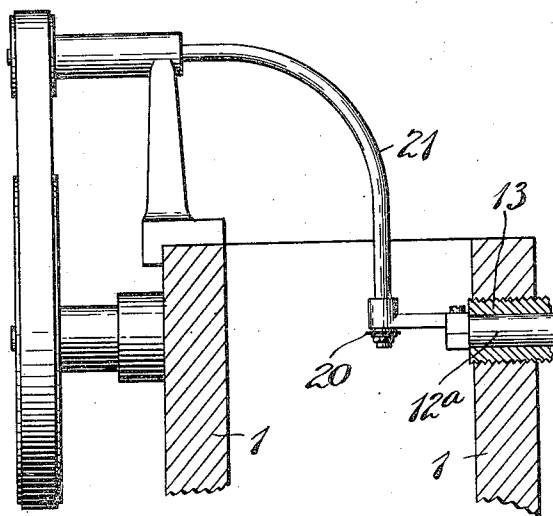


Fig. 13.



Fi 14

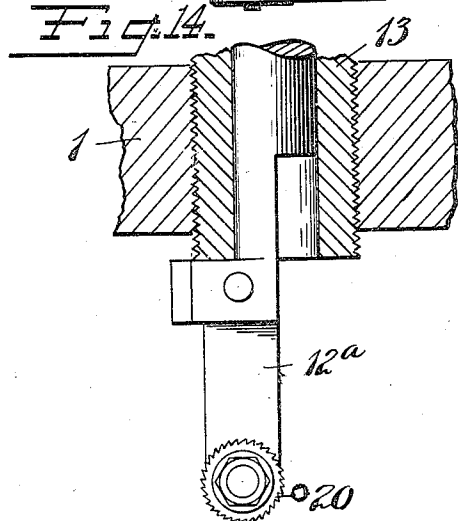


Fig. 15.

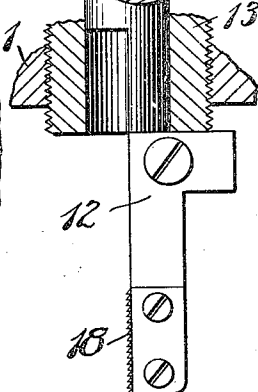
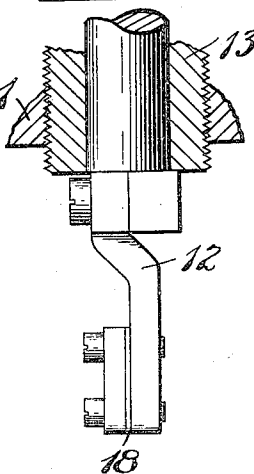


Fig. 16



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UNITED STATES PATENT OFFICE.

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CONNECTICUT.

HEADING AND SLOTTING MACHINE.

990,544.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed December 20, 1910. Serial No. 598,422.

To all whom it may concern:

Be it known that we, CHARLES GLOVER and HORACE K. JONES, citizens of the United States, residing at New Britain and Hartford, county of Hartford, State of Connecticut, respectively, have invented certain new and useful Improvements in Heading and Slotting Machines, of which the following is a full, clear, and exact description.

Our invention relates to an improved combined heading and slot cutting machine, the same being particularly valuable in the manufacture of screws and the like.

The object of the invention is to provide a machine to form and slot screw heads in an effective and expeditious manner.

In the accompanying drawings, Figure 1 is a plan view of the improved machine. Fig. 2 is a similar view partly in section, certain parts being removed. Fig. 3 is a vertical section on the line $x-x$ Fig. 1. Fig. 4 is a relatively enlarged sectional view of certain parts, on the plane of the line $y-y$, Fig. 1. Figs. 5 to 16 inclusive are detail views.

In general the machine, as to its main parts and the method of operating the same, is similar to the machine shown and described in the U. S. Letters Patent to H. K. Jones, numbered 574,609, dated January 5th, 1897, to which reference is made for a further detailed description than contained herein, as to such parts as are in common to the two machines.

Preparatory to describing the machine, we will briefly point out what our present aim is, and in a general way, the means by which our improved results are attained.

The object of the present machine is to rapidly and uniformly form, slot and finish a head, for example, a screw head, in such a manner that the product possesses superior advantages. The machine in general, in its preferred form, is of the type commonly termed a "three-blow header" and the slotting appliance is so timed as to perform its function prior to the finishing blow. It is of the utmost importance, to secure uniform and effective results, that the slots in the heads be formed diametrically across each screw head. As will later be seen, our construction is such that the slot always occurs strictly on the diameter of the screw head, and the side walls and edges of the slot may also be specially

formed so as to most effectively receive a screw driver, this improved formation of the slots being an incident to the manipulation of the metal.

The frame 1 of the machine may be of any suitable sufficiently powerful construction.

2 is a driving shaft mounted in the frame and rotated from any suitable source of power.

3 represents a pitman mounted eccentrically on the driving shaft 2 and connected with a longitudinally reciprocating ram 4. At the forward end of the ram is carried a transversely movable head-block, or punch-holder, 5, upon the face of which is mounted the punches 6, 7 and 8, the faces of these punches being appropriately shaped so as to form, together with dies, by successive blows imparted to the end of a piece of wire, the desired shape of a head, the final punch giving what we have termed the "finishing blow." Suitable means may be provided to cause the punch-holder 5 to shift between each stroke in such a manner as to bring into proper position each of the punches successively.

9 represents the die-holder, or head, through which there is a passage for the wire, or blank, upon which the head is to be formed. Suitable means, for example, such as is shown in the former patent referred to, may be provided for intermittently feeding the wire blank into position to receive the heading and finishing blows. The die-holder is constructed to hold suitable die members 10-11, which are so arranged that when brought together the wire is properly gripped and centered, said dies having countersunk portions into which the upset metal is forced during the heading process. As soon as one head is finished, the blank upon which said head is formed is kicked out, or discharged, and another blank instantly takes its place ready to receive the successive blows.

Thus far described, and in a general way, the various elements of the machine may be of any well-known construction, for example, of the construction described in the above referred to patent.

The present invention comprehends the provision of slot-forming mechanism whereby accurate and uniformly located slots may be formed in each head between the succes-

sive blows of the punches, and particularly in an interval just preceding the final blow, whereby a properly finished head is produced, thereby saving further labor and expense. In the present instance, we have shown two preferred forms of slotting devices, both having a reciprocal movement traversing diametrically the face of the screw head, one of said devices being of a plain single, or multiple, toothed router, the other being in the form of a circular saw, the carrier for which has a reciprocal movement across the face of the screw head. We will first describe a cutter of the router type.

12 represents a reciprocating cutter carrier, which, in this instance, reciprocates transversely of the machine and is so timed with the machine that its reciprocal movement occurs between the successive reciprocations of the heading punches. As shown in Figs. 1, 2, 3 and 4, this reciprocating member 12 is mounted in a suitable guideway 13 on the frame 1.

14 is a lever pivoted at 15, suitably connected at one end of the cutter-carrier 12, and at the other end with a cam 16, the latter being driven by the shaft 2 and so formed as to give a powerful, quick and timely movement to the cutter-carrier above described. The cutter carrier carries a cutter which is so located, and travels in such a path, as to traverse the face of the screw head at its greatest diameter and cut, or rout out, the desired slot therein. In Figs. 5 and 6 we have shown a single toothed router 17, whereas in Figs. 15 and 16 we have shown a multiple toothed router, or saw, 18 either of which may be employed as judgment requires in each particular case.

19 represents a transverse clearance space, or guide-groove extending transversely through the face of the die elements 10—11, through which clearance space these slot cutters may travel.

In Figs. 12 to 14 we have shown a cutter-carrier 12^a which is suitably constructed to carry a rotary cutter 20 of the circular saw type which is caused to move across the face of the screw head in the same manner as the cutters previously described, said saw being rotated in any suitable manner, as by a flexible shaft 21 which may be employed with and driven by any suitable means, for example, the driving shaft 2.

The operation of the machine is substantially as follows: The wire blank is fed in and gripped between the die members 10—11. The heading punches 6—7 upset the end of the wire blank by successive blows imparting to it its proper shape. Next, the slot is formed across the diameter of the face of the head, and finally, the third punch 8 strikes the now slotted head a blow, giving to it its finished appearance. If, during the slotting operation a bur is formed at each

edge of the slot which stands slightly above the surface of the face of the screw head, this bur will be driven down by the finishing blow imparted by the punch 8, as indicated respectively in Figs. 9 and 10. If desired, the face of the finishing punch 8 may have a diametrical rib or projection 8^a, as shown in Fig. 11. In some cases, particularly with heavy screws, it may be desirable to provide this rib 8^a, inasmuch as it serves as an abutment to receive that part of the metal forced inwardly, or toward, the middle of the slot on the finished operation, thus providing a sharp and well finished edge at each side of said slot. As will be seen, any metal raised, or burred up by the action of the slotter, tends, when driven down, to slightly contract and sharpen the edges of the screw slot, and in some instances, indeed, to the extent of forming a slot, which, in cross section may be of the well-known dovetailed type. Where heretofore it has required two obliquely arranged saws, or some special means for forming slots of this type, in the present instance such a slot may be formed as an incident to the regular operation of the machine. It will be seen that a number of advantages flow from performing the slotting operation in the interval between the operation of one of the forming punches and the finishing punch, the machine being so designed and constructed that this slotting operation may occur so rapidly as to not interrupt the uniform timing of the successive blows of the punches. In the same manner a new and unheaded blank may likewise be inserted between the finishing blow of the punch 8 and the starting blow of the punch 6.

The usual adjustment, or, indeed, any suitable adjustment may be employed in the machine for the various operative parts, but no description of any particular form of adjustment is required in the present case since no claim thereto will be made herein. So likewise any suitable means may be provided, for example, such as shown in the former patent referred to, for opening the die members 10—11 when one blank is headed, slotted and finished ready for discharge, appropriate means being employed to bring said die members together again when a new blank has been introduced.

In a machine of the preferred construction referred to herein, the interval of time between each series of three strokes effected by the three punches is the same, and so likewise is the interval of time between the blow of the finishing punch and the first of the next series of blows. In other words, the punch carrier partakes of a uniformly intermittent reciprocating movement, while the transverse movements of the same required in presenting the proper punch in

line with the blank held by the die also occupy the same or uniform intervals of time, it being found that said intervals of time are sufficient to permit, during one interval, the slotting of the head, and during another interval, the discharge of the finished blank and the introduction of an unfinished blank ready for heading.

The means for shifting the punch carrier 5 may correspond to that shown in the former patent above referred to, and may comprise the cams 32—36 operating respectively upon the levers 33—37. When both levers 33—37 are in their lowermost position, the carrier 5 is in its lowermost position, presenting the punch 6 in line with the blank upon which the head is to be formed. When the lever 37 is operated by the cam 36, it swings to a sufficient degree to raise the carrier 5 to the position shown in Fig. 3, presenting the punch 7 in line with the blank which then has a partially formed head thereon. When the lever 33 is engaged by the cam 32, it lifts the carrier 5 another step, presenting the finishing punch 8 to the blank. Following this, both cams retire and the carrier 5 settles to its original position. Obviously the cams 32—36 are driven by the shaft 2 and in proper time to cause the shifting of the punches successively to the appropriate position. So likewise the means for opening and closing the blank holding dies may correspond to that shown in said former patent, the means for opening said dies comprising a sliding rod 55 pressed by spring 56, the means for closing said dies comprising the rollers 60—61 mounted in a sliding block 62. The movement to and fro of the sliding block 62 causes the rollers 60 to operate against the cam-shaped ends 59 of a slide 57, the latter being suitably connected with the movable element of the die to force it closed at the proper moment. In this case likewise the slide block 62 should have its movement timed with the machine so that it will close the dies at the proper moment for gripping a newly inserted blank. The means for feeding the blanks may be similar to that set forth in said former patent, 72 conventionally representing the feed roller element of said feeding mechanism, which latter is appropriately connected with the driving shaft so that the proper feeding of the blanks will occur in synchronism with the correlated parts of the machine.

Broadly speaking, our invention comprehends the use of a transversely movable slot forming device regardless of the actual number of punches employed, which number may be varied as desired, it being understood that more than one punch is preferred in most instances.

While we have described our invention as applied to a header of the so-called open

die type in which the die is composed of two members, one of which at least is movable, it may be applied to a header of the solid die type, one example of which is found in H. K. Jones's former Patent No. 70 590,576, dated September 28th, 1897.

What we claim is:

1. In a heading and slotting machine, a die, a heading punch and a finishing punch, a shiftable carrier for said punches, means for shifting and reciprocating said carrier and punches, a slot cutter and means for moving said slot cutter to and fro transversely across the center of said die in the interval preceding the operation of the finishing punch.

2. In a heading machine, a die for holding a blank, three punches, a shiftable carrier therefor to permit said punches to be presented successively in line with a blank held by said die, means for moving said punch carrier to cause said three punches to act successively on the end of said blank, a slot cutter arranged to be reciprocated to and fro transversely across the center of said die, and means to cause said reciprocal movement of said cutter to occur in the interval between the operation of the second and third punches on said blank.

3. In a heading machine, a blank holder, a plurality of heading devices arranged to successively act upon the end of a blank carried by said blank holder with means for forming a slot in the end of the blank in an interval subsequent to the action of one of said devices, and prior to the action thereon of the final device.

4. In a heading machine, a blank-holder, a plurality of heading devices arranged to successively act upon the end of a blank carried by said blank-holder, with means for broaching transversely a slot across the end of the blank in an interval prior to the action thereon of the final heading device, and means to move said devices successively in front of said blank and also to and fro at uniform intervals of time.

5. In a heading machine, means arranged to grip a blank, a plurality of reciprocating heading devices arranged to successively upset the end of a blank carried by the die, means to form a slot in the headed end of the blank subsequent to the action of the first heading device and prior to the action of the last device.

6. In a heading machine, means for feeding and gripping a blank including a die, means for heading the end of the blank including a plurality of punches, means for operating the punches to cause said blank to be struck successively by the same, said means including a reciprocating head and a relatively transversely movable punch carrier, means for slotting the end of the blank while the same is being held, said means in-

cluding a cutter and a movable carrier therefor, means for operating the blank gripping device in the interval prior to the forward movement of the first of the punches, and
 5 means for operating said cutter carrier in the interval just preceding the forward movement of the last of said punches.

7. In a heading machine, means for feeding and gripping a blank including a die,
 10 means for heading the end of the blank including a plurality of punches, means for operating the punches to cause said blank to be struck successively by the same, said
 15 means including a reciprocating head and a relatively transversely movable punch carrier, means for slotting the end of the blank while the same is being held, said means including a cutter and a reciprocating carrier therefor, means for operating the blank
 20 gripping device in the interval prior to the forward movement of the first of the punches, and means for operating said cutter carrier in the interval just preceding the forward movement of the last of said
 25 punches, the interval of time between the action of said punches being substantially uniform.

8. In a heading machine, a die for hold-

ing a blank, a heading punch and a finishing punch, a shiftable carrier for said punches, 30
 means for reciprocating said carrier and said punches to impart blows to a blank in said die, a slot cutter and means for reciprocating the same across the center of the die to form
 35 a slot in the end of a blank carried thereby in the interval between the successive operations of said punches, said cutter comprising a rotatable toothed element with means for rotating the same.

9. A heading and slotting machine having 40
 a feeding device, a heading die and a heading punch, with mechanism for feeding the stock to the heading die, mechanism for forming a head upon the stock by a blow
 45 from the punch while the stock is in the heading die, a slot cutter and mechanism for moving said slot cutter across the head, after the blow from the punch, while the headed blank is held in the die, and thereby cutting a slot in the head.

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