

Jan. 29, 1924.

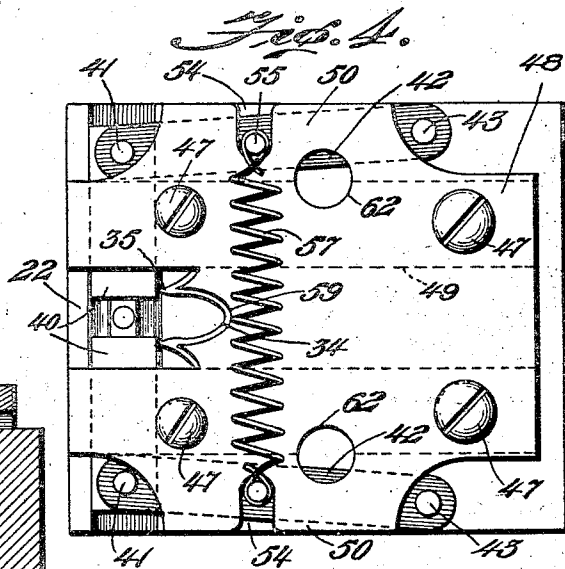
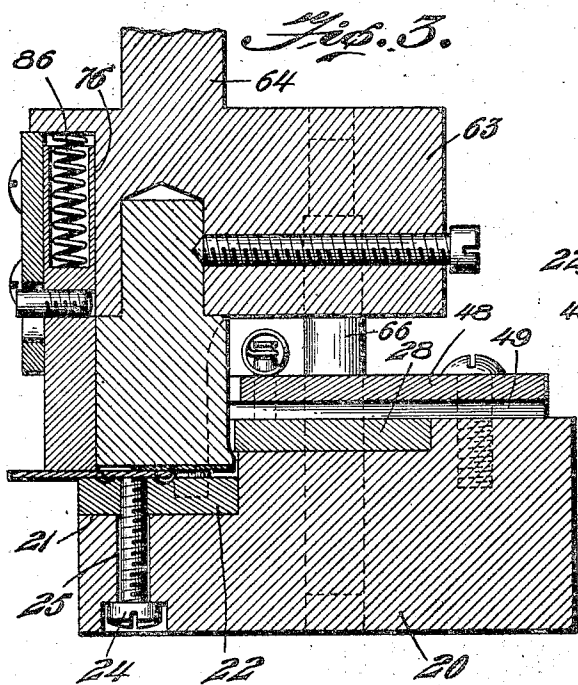
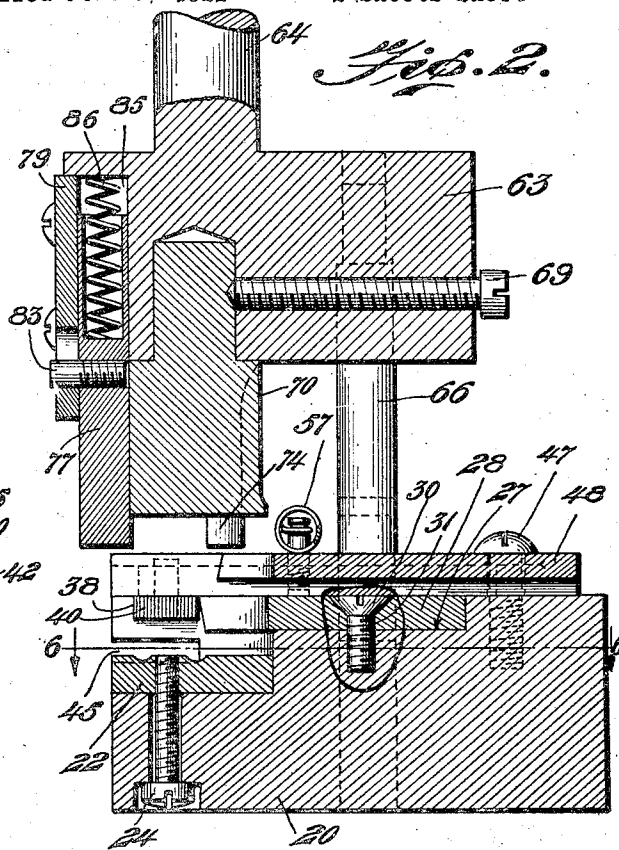
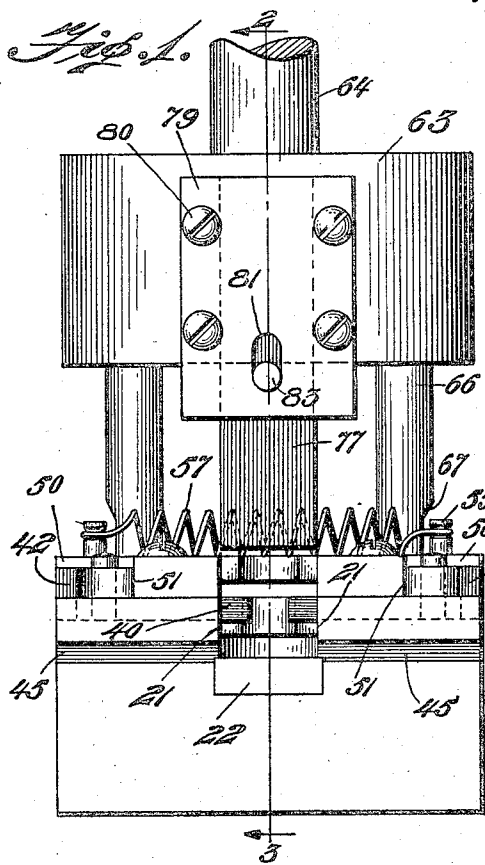
1,481,867

H. R. HOLBROOK

STAPLING MACHINE

Filed Feb. 8, 1922

2 Sheets-Sheet 1



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Attorney

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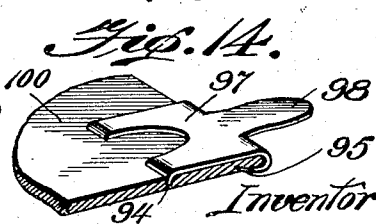
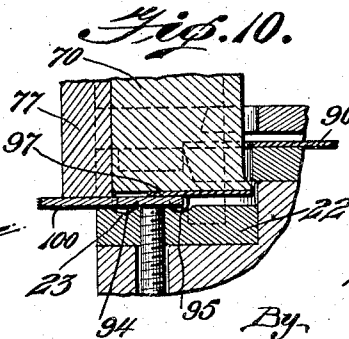
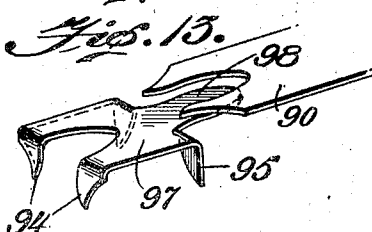
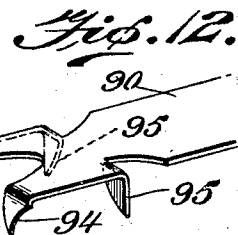
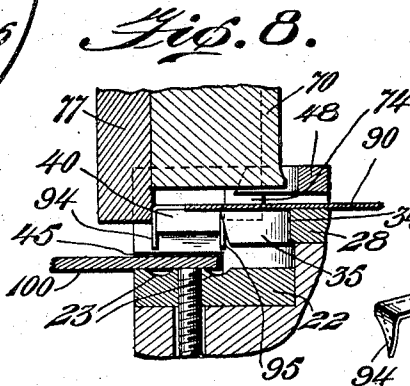
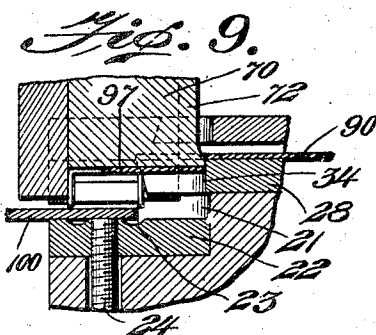
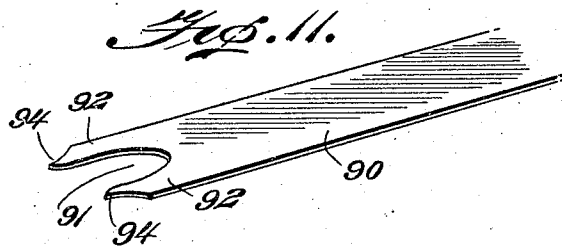
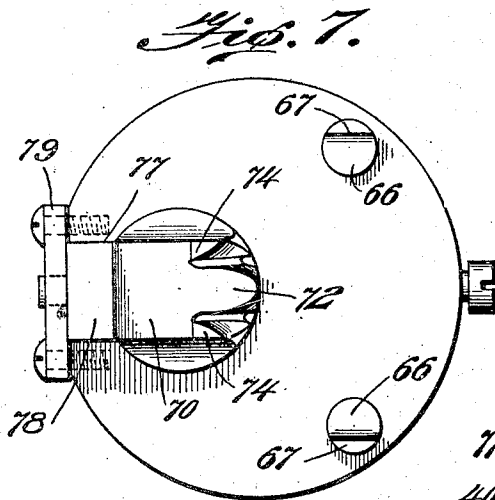
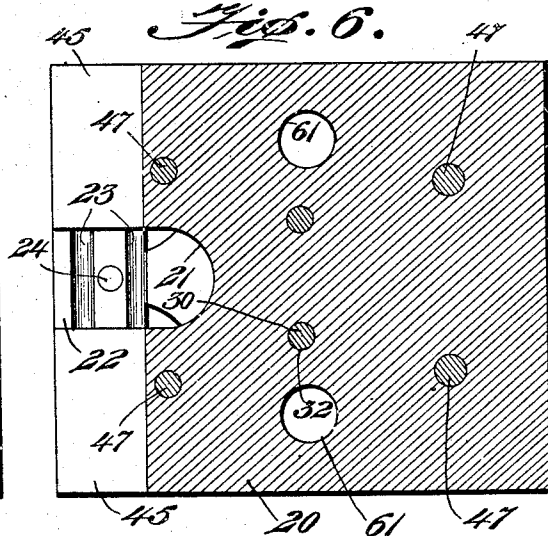
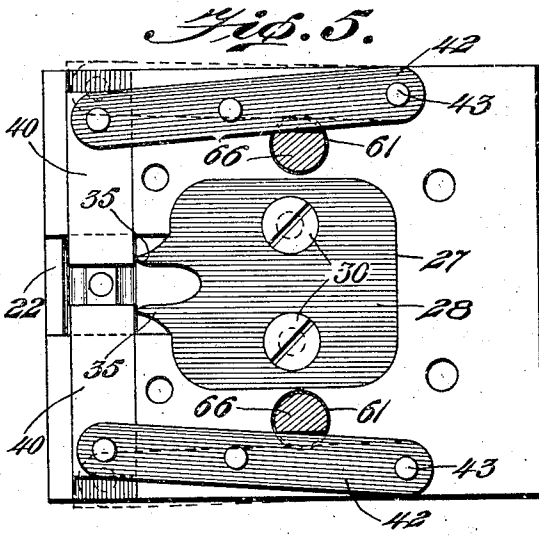
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STAPLING MACHINE

Filed Feb. 8, 1922

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

HARRY R. HOLBROOK, OF ATTLEBORO, MASSACHUSETTS.

STAPLING MACHINE.

Application filed February 8, 1922. Serial No. 534,867.

To all whom it may concern:

Be it known that I, HARRY R. HOLBROOK, a citizen of the United States, residing at Attleboro, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Stapling Machines, of which the following is a specification.

The essential objects of my invention are to provide tools, such as a set of dies for cutting from a thin strip of sheet metal or other material tabs or fasteners with prongs formed thereon, and clinching the same upon a card, box, tube, or other desired article; to perform these combined operations, or any one or more of the operations prior to the clinching operation by a single set of tools and by a single continuous movement; and more specifically to provide a practicable die construction for cutting and bending depending prongs in a strip, severing the portion of the strip carrying the prongs together with a tongue from the strip, and finally, if desired, clinching the prongs upon a selected article; and finally to attain these objects in a compact and inexpensive structure, capable of utilizing the entire material of the stock strip without waste. Other objects and advantages will be apparent to those skilled in the art by an inspection of this specification.

To the above enumerated and suggested ends my invention consists in such parts and in such combinations of parts as fall within the scope of the appended claims.

In the accompanying drawings—

Figure 1 is a front elevation of a set of tools or dies embodying my invention.

Figures 2 and 3, sections of the same on line 2—2 of Figure 1, showing the parts in extreme open and closed positions respectively,

Figure 4, a plan view of the lower die or receiving member,

Figure 5, a similar view of the same with the retaining plate removed,

Figure 6, a section on line 6—6 of Figure 2,

Figure 7, a bottom plan view of the plunger or master die member,

Figures 8, 9, and 10, fragmentary sections on line 2—2 of Figure 1 showing the parts in three different successive positions.

Figure 11, a perspective view of the blank strip in an initial stage, and

Figures 12, 13, and 14, similar views of

the blank at successive intervals of formation and attachment.

Like reference characters indicate like parts throughout the views.

The dies illustrated are adapted to be actuated, and the strip to be fed thereto, by any suitable press; the upper member being attached to the plunger or platen, and the lower member to the frame or bed, and the strip being intermittently advanced by the usual feed rolls.

As illustrated the lower die comprises a bottom member or block 20 having a recess 21 in its forward portion in the lower portion of which is seated a plate or anvil 22 provided in its top face with spaced parallel longitudinally disposed grooves 23. This plate is suitably secured by a screw 24 extending up through an opening 25 in the block and entering the plate. Above the latter the top of the member 20 is recessed as at 27 to receive a die or cutter plate 28 which is flush with the upper face of the member 20 and fastened thereto by screws 30 passing through holes 31 in the plate and entering threaded apertures 32 in the member 22. The forward portion of this plate has an angular extension provided with an oval rearwardly directed recess 34 forming resultant forwardly directed pointed projections 35 above the anvil. Recessed in the top of the block is a longitudinal guideway 38, or two guideways in alignment with each other intercepted by the recess 21. Slidable in the guideways are forming dies 40 pivoted at their outer ends by pins 41 to arms 42 whose opposite ends are pivoted upon the pins 43 fast in the rear side margins of the upper face of the block 20. Extending rearwardly into the front of the block and extending entirely across the same longitudinally is a slot 45 merging at its intermediate portion with the recess 21.

Fastened by screws 47 to the top of the member 20 is a retaining or guide plate 48 provided in its lower face with a centrally disposed guideway 49. The lower portions of the lateral margins of the plate 48 are also grooved or under cut forming lateral flanges 50 above the arms 42, and walls 51 forming stop abutments. The flanges have lateral notches 54 to admit pins 55 on intermediate portions of the arms 42. To the pins are attached the ends of a helical expansion spring 57. The plate 48 has an intermediate portion of its front edge cut away rearwardly

above the anvil plate forming a recess 59 which conforms to the shape of the recess 34 and fingers 35. The latter are in the horizontal plane of the reciprocating clamping members 40 which slidably contact with points 35.

The block 20 is provided with spaced vertical holes 61 in vertical alignment with holes 62 in the plate 48. In retracted position the arms 42 occlude a portion of these holes.

Cooperating with the receiving tool or die hereinabove described, is the reciprocable plunger member or master die comprising a block 63 having in this instance an integral shank 64 adapted for seating in the slide of a power press. Fast in the die block 63 are guide pins 66 of cylindrical form in their upper portions and having their lower portions cut away forming intermediate cam shoulders 67. These pins slide in the holes 62 and 61 of the guide plate and block. The block is provided with an opening 68 in which is retained by a set screw 69 a punch 70 having a flat operating face with a rearwardly directed semioval extension or shoulder portion 72 at each side of which are depending cutters 74 of triangular cross section terminating in triangular operating faces. In front of the stud portion 70 of the die 63 the latter is cut away to form a vertical guideway 76, rectangular in cross section in which is slidably mounted a die 77 having a rectangular operating face 78. A retaining plate 79 for this member is attached to the body 63 by screws 80 and is provided with a vertical slot 81 in which is slidable a pin 83 fast in the die 77. In a vertical recess 85 in the latter is a helical spring 86 with its outer projecting end pressing against die 63, and its lower end bearing against the bending die 77.

The upper tool or plunger die is vertically reciprocated while a stock strip 90 is intermittently advanced. In Figure 11 the stock strip is shown in its initial form having centrally of its forward end a longitudinal semioval recess 91 dividing the end into fingers 92 terminating in points 94. The blank is advanced through the guideway 49 over the cutter plate 28 and forming dies 40 with the points 94 in the path of the bending die 77 which during the initial stage of its descent bends the points downwardly against the forward faces of the forming dies to form prongs, as shown in Figure 8. At the same time the descending cutters 74 cooperate with the outer edges of the projections 35 to cut from opposite sides of the blank 90 points 95 and bend said points downwardly against the rear faces of the forming dies 40, as shown in the last mentioned figure. The blank is now of the form shown in Figure 12.

As the upper tool continues its descent the

cam shoulders 68 engage the inner edges of the vibratory arms 42 and withdraw the members 40 from beneath the blank, while the punch 70 will register with the recessed portion 34 of the cutter plate 28 and sever from the strip the portion 97 thereof which carries the prongs. This blank 97 because of the extended portion 72 of the punch cooperating with the recessed shape of the cutter plate, has a rearwardly directed tongue portion 98, and a second resultant recess 91 in the strip 90 is created. The described cutting operation is shown in Figure 9, and the fastener blank 97 is shown in Figure 13.

If it is desired to clinch the blank 97 into a card, box or other article, 100, the latter is inserted into the slot 45 transversely of the recess 21 and resting on the anvil plate 22. The punch 70 as it continues its descent forces the prongs 94 and 95 through and past the material 100 respectively into the grooves 23 which roll up or clinch the prongs into the under face of the material. The die 77 by virtue of the spring 86 yields to permit the complete descent of the punch, and for the same purpose the cutters 74 enter cavities 102 in the anvil plate. The clinching operation is shown in Figure 10, and the attached fastener is shown in Figure 14. By inserting the material 100 more deeply than shown into the slot the prongs 95 may pass through rather than past the material.

It will be understood that the positions of the upper and lower tools may be reversed or may be arranged in other than vertical alignment; that one or more of the operations may be omitted; and that the principles may be carried out in substantially the same way in the formation and attachment of fasteners of other forms, without departing from the spirit and scope of the invention.

I claim:—

1. In a machine of the character described, a plunger, a punch on the plunger, a depending bending die carried by the plunger, a receiving die, a cutter plate in the receiving die engageable with the punch, and a former plate slidably mounted in the receiving die in the path of the punch.

2. In a machine of the character described, a plunger, a punch in the plunger, a receiving die, a cutter plate rigidly mounted in the receiving die in shearing engagement with the punch, a reciprocable former plate in the horizontal plane of the cutter plate movable into and out of the path of the punch, and means for reciprocating the former plate.

3. In a machine of the character described, a plunger, a punch in the plunger, a bending die carried by the plunger depending below the punch, a receiving die, a cutter plate in the receiving die cooperating with the punch, a reciprocable former plate for-

ward of the cutter plate movable into and out of the path of the punch, and means actuated by the plunger for reciprocating the former plate.

5 4. In a machine of the character described, a plunger, a punch in the plunger, a bending die in the plunger depending below the punch, cam pins in the plunger, a receiving die provided with holes in which the pins
10 slide and having a transverse guideway, a cutter plate in the receiving die engageable by the punch, a former plate slidably mounted in the guideway in front of the cutter plate and movable into and out of the path
15 of the punch, and a yielding arm pivoted at one end to the receiving die and at its other end to the former plate and engageable by one of said pins.

20 5. In a machine of the character described, a plunger, a punch in the plunger having a rearwardly directed extension, a bending die carried by the plunger in front of the punch, depending cutters on the punch at each side
25 of the extension, cam pins in the plunger, a receiving die provided with holes for the pins and with a transverse guideway, a cutter plate on the receiving die provided with a recess adapted to receive the extension
30 and comprising forwardly directed points enclosing the recess and engageable with the cutters, former plates slidable in the guideway in the path of the punch, arms pivotally connected with the receiving die and the former plates and engaging the pins, and a
35 spring connecting the arms.

6. In a machine of the character described, a plunger, a punch in the plunger, a receiving die, an anvil plate in the receiving die
40 in the path of the punch, a cutter plate above the anvil provided with a recess registerable with the punch, a vibratory former plate supported by the receiving die adjacent the cutter plate movable into and out of the path of the punch, and means for vibrating
45 the former plate.

7. In a machine of the character described, a plunger, a punch in the plunger, a receiving die, an anvil plate in the receiving die provided with a groove in the path of the
50 punch, a cutter plate above the anvil provided with a recess registerable with the punch, a vibratory former plate supported by the receiving die adjacent the cutter plate movable into and out of the path of the
55 punch, and means operated by the plunger for vibrating the former plate.

8. In a machine of the character described, a receiving die, a cutter plate in the die adapted to support a strip, slidable former
60 plates adjacent the cutter plate adapted to support prongs on the strip projecting beyond the former plates, said die being provided with a guideway for directing the strip over the cutter plate and former plates,

an anvil plate in the die below the former
65 plates provided with a groove, a reciprocatory plunger, a die yieldingly mounted on the plunger adapted during the descent of the plunger to downwardly bend the projecting prongs against the sides of the
70 former plates, and a punch in the plunger adapted as the plunger descends to engage the cutter plate and sever a fastener blank from the strip, and finally force the prongs through a material resting on the anvil and
75 into the groove to clinch the prongs into the material.

9. In a machine of the character described, a receiving die, a cutter plate in the die adapted to support a strip, movable former
80 plates adjacent the cutter plate adapted to support prongs on the strip projecting beyond the former plates, said die being provided with a guideway for directing the strip over the cutter plate and former plates,
85 an anvil plate in the die below the former plates provided with grooves and with cavities, a reciprocatory plunger, a bending die yieldingly mounted on the plunger adapted during the descent of the plunger to down-
90 wardly bend the projecting prongs against the sides of the former plates, depending cutters supported by the plunger adapted during the descent of the plunger to cut from the strip and downwardly bend prongs
95 against the sides of the former plates and finally enter the cavities, and a punch in the plunger adapted as the plunger descends to engage the cutter plate and sever a fastener blank from the strip and finally force
100 the prongs through a material resting on the anvil and into the grooves to clinch the prongs into the material.

10. In a machine of the character described, a receiving die provided with a vertical
105 recess, and with a horizontal transverse slot in the wall of the die opening into the recess, a grooved anvil plate in the bottom of the recess flush with the slot, a cutter plate fast in the die provided with an oblong recessed portion projecting into the vertical recess above the anvil plate, a transverse guideway in the die extending to opposite sides of the vertical recess, former
110 plates slidably mounted in the guideway and normally projecting into the vertical recess in the plane of the cutter plate, a plunger slidably mounted in the receiving die, arms pivotally mounted in the receiving die attached to the former plates and movably by
120 the pins, a punch on the plunger movable through the vertical recess cooperating with the cutter plate, and the anvil, and a yielding bending die on the plunger cooperating with the former plates.

In testimony whereof I have affixed my signature.

HARRY R. HOLBROOK.