Feb. 23, 1926. 1,573,810

C. C. CUNNINGHAM

APPARATUS FOR MAKING SHOE SHANKS

Filed Jan. 19, 1924 2 Sheets-Sheet 1

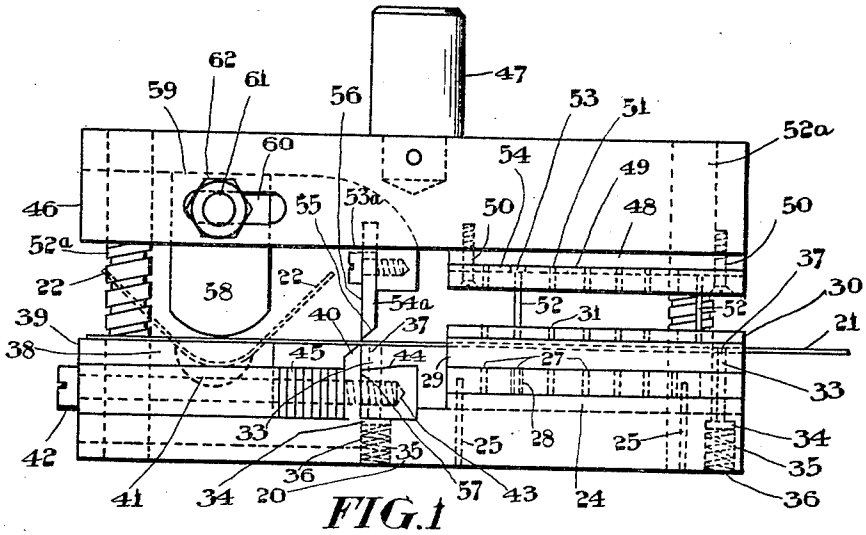



FIG. 1

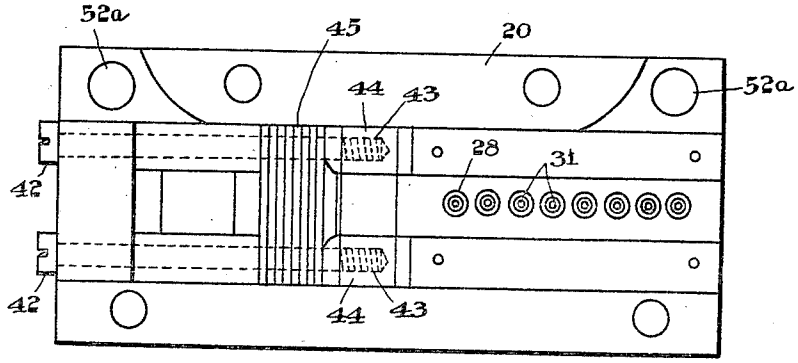



FIG. 2

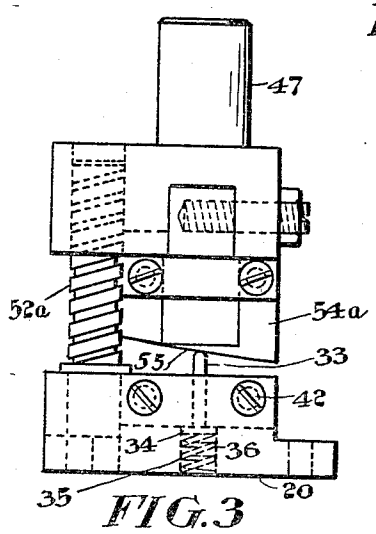



FIG. 3

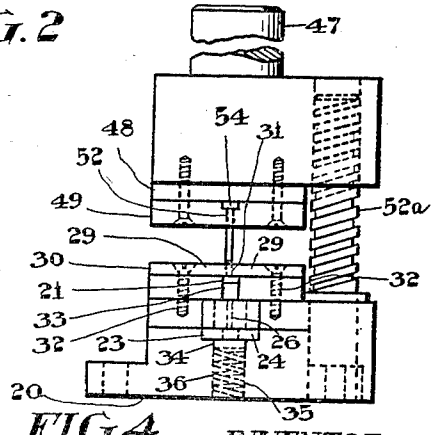



FIG. 4

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APPARATUS FOR MAKING SHOE SHANKS

Filed Jan. 19, 1924 2 Sheets-Sheet 2

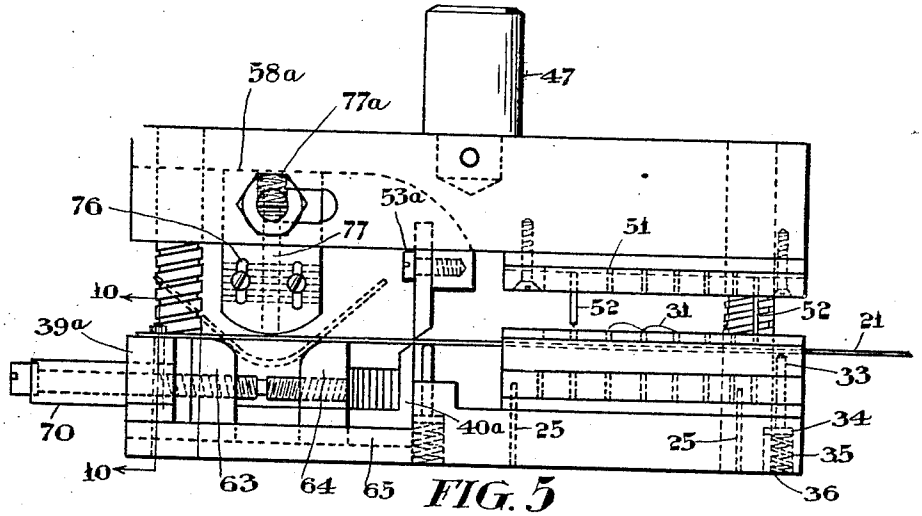



FIG. 5

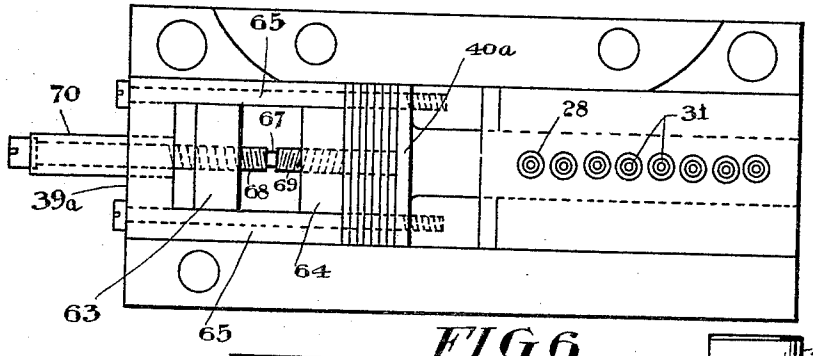



FIG. 6

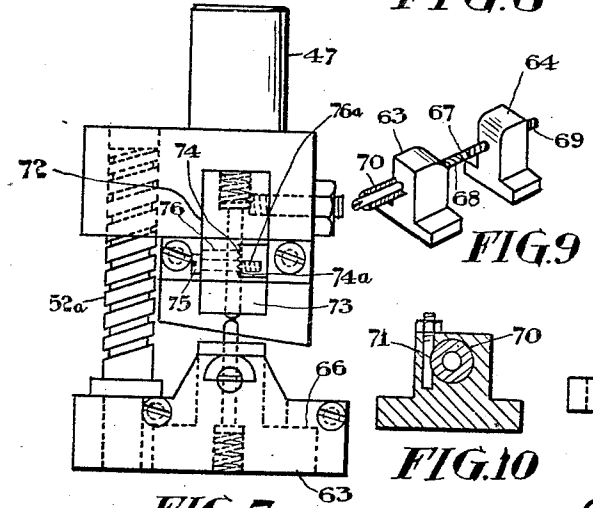



FIG. 7




FIG. 10

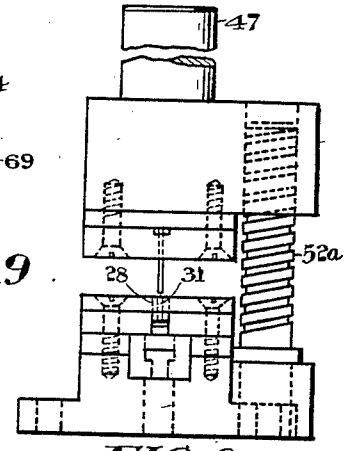



FIG. 8

FIG. 9

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR MAKING SHOE SHANKS.

Application filed January 19, 1924. Serial No. 637,271.

*To all whom it may concern:*

Be it known that I, CHRISTOPHER C. CUNNINGHAM, a subject of the King of Great Britain, of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Apparatus for Making Shoe Shanks, and do hereby declare that the following is a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in the apparatus for forming steel shoe shanks, which are fitted to a shoe for supporting the instep or arch of the foot, and the object of the invention is to provide a simple, inexpensive and efficient apparatus for forming said shoe shank which will greatly reduce the cost of manufacture and increase the production thereof.

Another object is to provide an apparatus for forming shoe shanks which will produce shanks of uniform curvature and even temper.

A further object is to provide an apparatus which will be adjustable to suit the varying lengths and curvatures of shoe shanks.

A still further object is to provide an apparatus in which the shanks will be punched or pierced, cut off and bent to the desired curvature with each stroke of the apparatus.

In my invention I provide a die and punch made in two portions, one portion of each being used for shearing and piercing holes in the material, while the other portion of each is used for bending the material to the desired curvature. The die is provided with a plurality of holes through which piercers adjustably mounted in the punch are adapted to pass, so that the pitch of the holes to be punched in the shank may be varied to accommodate the various lengths of the shoe shanks. The other portion of the die is made adjustable to vary the curvatures of the steel shanks which may vary according to the height of the heels, which may be, as is well known in the trade, Louis, Cuban, military or low heels. Spring ribbon steel is used in the manufacture of the shanks, said steel, being of even temper and subjected to the same pressures during manufacturing process, ensures results in which the shanks are of uniform shape and size.

In the drawings:

Figure 1 is a side elevation of the die and punch.

Fig. 2 is a plan view of the die for forming the shank.

Fig. 3 is an end view of the punch and die showing the bending portion of the die.

Fig. 4 is an end view of the punch and die showing the piercing and shearing portion.

Fig. 5 is a side elevation of one modification of the punch and die shown in Fig. 1.

Fig. 6 is a plan view of the die shown in Fig. 5.

Figs. 7 and 8 are end views of the modified form of the punch and die shown in Fig. 5.

Fig. 9 is a perspective view of the adjustable mechanism for controlling the bending of the shanks.

Fig. 10 is a sectional elevation of the die taken on the line 10—10 Fig. 5.

Referring more particularly to the drawings, and particularly to Figs. 1, 2, 3 and 4—20 designates the base of the die, a portion of which is used for cutting and piercing the ribbon spring steel 21 and the other portion is used for bending the steel into the form shown in dotted lines in Fig. 1 and designated 22. Mounted in the recess 23 of the cutting portion of the die is the hard steel plate 24 which is held in position by the dowels 25 which pass through the said plate and the die. Also mounted in the recess 23 is the piercer guide bar 26 which is held in position by the dowel pins 25. The piercer guide bar is provided with a plurality of holes 27 which are each provided with a hard steel bushing 28. Also mounted on the die are the guides 29 for the ribbon steel and above the guide is mounted the

stripper plate 30 which is also provided with a plurality of apertures 31 to allow the piercers hereinafter described to pass through. The guides are spaced from one another and may be made adjustable to allow for the varying widths of the spring steel used and both the guides and the stripper plate are held in position by the countersunk screws 32. Supporting plungers 33 are provided for the ribbon steel at each end of the cutting portion, said plungers being slidably mounted in the hard steel plates, the piercer guide and the base portion, said plungers being provided with enlarged heads 34 which fit into recesses 35 formed in the underside of the die. Springs 36 are fitted in the recess and, acting against the head, hold the plungers in position so that the ribbon steel passes over the points 37 of the plungers. The guides extend approximately from one end to within a short distance of the centre of the die. At the other end of the die the bending block 38 is mounted between the projections 39 and 40, the centre of the bending block being provided with a curved recess 41 into which the spring steel is pressed by the curving punch hereinafter described. To position the bending block screws 42 are provided passing through the projection 39, the bending block, and screwed in threaded apertures 43 formed in the projection 40. The screws also hold in position a stop 44 which butts against the projection 39, and is spaced from the upper edge of the projection 39 which is bevelled to form a cutting edge for the ribbon steel. The stop 44 is placed between the piercing section and the bending section of the die. To provide adjustment, plates 45 are placed between the projections 39 or 40 and the bending block 38. The punch comprises a base 46 having an extending shank 47 which may be used for attaching said punch to the vertical moving plunger of a Bliss or the like press, not shown. On the lower side of the punch and situated above the piercing portion of the die is a hard steel plate 48 and a pierced holding plate 49 secured to the base of the punch by means of the countersunk screws 50. The plate 49 is provided with a plurality of apertures 51 through which the piercers 52 are placed, said piercers being provided with a head 53 fitting in a slot 54 cut in the plate 49. The centre of the apertures 51 are adapted to coincide with the centre of the holes 27 in the hard steel bushings 28 when the die and punch are brought together, guides $52^a$ being provided in the die, said guides being adapted to pass through holes in the punch to position the punch and the die in the above relationship. Positioned above the projection 40 of the die and secured to the punch by the screws $53^a$ is the knife blade $54^a$ the edge 55 of which is bevelled to form a cutting edge. The side 56 of the blade is so positioned that when the punch and die are brought together, said side will be approximately against the sides 57 of the projection. The bending portion of the punch is provided with a curved block 58 slidably mounted in a groove 59 cut in the base. The block is adjustably held in the slot 60 formed in the base and through which the stud 61 attached to the block may be moved, said stud being locked in any desired position by means of the nut 62. The foregoing description refers to the simplest form of my invention, but this may be modified as shown in Figs. 5 to 10 inclusive which shows a bending portion which is provided with a finer means of adjustment. The remaining portions being similar to those shown in Figs. 1 to 4 inclusive and each part is provided with the same designating numerals.

In the modification between the projecting portions $39^a$ and $40^a$ are mounted the curved T shaped blocks 63 and 64 which are held between the guides 65 connecting the projections and in the slot 66 formed in the underside of the die. The blocks are mounted on a spindle 67 having right and left hand threaded portions 68 and 69 which engage with correspondingly threaded apertures in the blocks so that on turning the screw the blocks approach towards one another or travel away from one another according to the rotation of the spindle. The spindle is held in position by means of a sleeve 70 passing through the projection $39^a$ and is locked in any desired position by means of the grooved key 71 engaging with the sleeve. Temporary adjustments are made by means of the sleeves and finer adjustments made by means of the spindle. The bending portion $58^a$ of the punch is made adjustable in the vertical direction by splitting it into two portions 72 and 73 and being provided with horizontal teeth 74 and $74^a$ which engage with one another. The parts are held together by means of the screws 75, one part of which rides in the slots 76 and the other part engages with the threaded apertures $76^a$. A plunger 77 may be slidably mounted in the bending block 72 and 73 and a spring $77^a$ placed between the base portion and the head of the plunger to hold it in position. This plunger is provided for holding the spring steel in position until the spring steel is bent to the required curvature. The operation of the device is as follows: Spring steel is passed through the piercing die between the guides, and the piercers are adjusted in the punch to the required pitch. In the first part of the operation the shank is sheared and punched only, the spring plunger bringing the spring steel against the shedder plate or stripping plate to allow the piercers to be drawn clear of the

steel. After the first operation one shank is sheared and pierced while the other is bent to any required angle by means of the bending blocks which may be adjusted to suit any desired curvature. When altering the die, plates 45 may be taken from one side of the bending block to the other and may be held in position by means of the screws. Readjustment may be also made in the punch to alter the varying position of the centre of the bending block. In the device shown in Figs. 5 to 10 inclusive the length of the bending block may be varied, said bending block being made in two portions, each portion being provided with engaging teeth and the binding screws are fitted in slots formed in one of the portions to allow for adjustment in the vertical direction. Horizontal adjustment may be made by loosening the nut from the stud attached to the punch and mounted in the slot formed in the base. The bending portion of the die in this modified form is provided with independent bending blocks mounted on a right and left hand threaded spindle and provision is made for approximate adjustment by moving the sleeve in the die and locking same by means of the key, after which the finer adjustments may be made by rotating the threaded spindle. As will be seen, this punch and die mechanism can be adjusted to suit the varying lengths of shoe shanks and by slight modifications may be made to cover the manufacture of all classes of shanks interchangeable and non-interchangeable. The device may be fitted to any class of press (not shown). The shanks being made of spring steel of uniform temper and being subjected to the same pressure and operations, are of uniform curvature and length after the operation and when the shanks are fitted to the shoes the arches will be alike and hold the shoes in the desired shape.

Having thus described my invention, what I claim is:—

1. An apparatus of the character described comprising upper and lower die members, bending, shearing and punching elements adjustably carried by each die member and cooperating with the complementary elements of the other die member, means for rigidly securing the elements of each set to the die member when said elements are in the desired position of adjustment, the arrangement being such that the bending, shearing and punching operations are accomplished simultaneously by movement of one of said die members in the direction of the other die member.

2. An apparatus as recited in claim 1 wherein the punching means of the upper die member is adjustable, vertically and horizontally while the complementary punching means of the lower die member is adjustable in the horizontal direction to regulate the curving of the shank.

3. An apparatus for forming spring steel shoe shanks comprising a punch having piercers mounted in the punch, means for positioning the piercers in one end of the punch, a shearing knife secured to the punch, a bending block mounted in the punch and attached thereto means for adjusting the bending block in combination with a die having means for guiding the shank, means for guiding the piercers, spring controlled means for supporting the shank before shearing and punching, a stripper plate for disengaging the shank from the piercers, means for supporting the shank during the process of shearing, and a curved supporting block adjustably mounted in the die.

4. An apparatus for forming shoe shanks from spring steel comprising, a punch having piercers mounted therein, means for holding the piercers in any desired position, a bending block mounted in the punch, means for adjusting the block in the horizontal direction, and a knife mounted between the piercers and the bending block and secured to the punch in combination with a die having, at one end guides for the piercers, guides for the spring steel, spring controlled plunger supports for the spring steel before shearing same, and at the other end blocks for holding the steel during the process of bending, and midway between the holding blocks and the guides for the shank means secured to the die for supporting the steel during the process of shearing.

5. A shoe shank forming apparatus according to claim 4 having means for adjusting the bending block in the punch, in the vertical direction.

6. In an apparatus for forming shoe shanks, a punch comprising a base portion having piercers mounted therein, means for holding the piercers to the punch and positioning the piercers in any desired position, a two-piece bending block mounted in the punch, means for adjusting the bending block in the horizontal direction, a serrated joint between the portions or pieces of the bending block, and means for adjusting part of the bending block in the vertical direction and a shearing knife secured to the punch and positioned between the piercers and the bending blocks in combination with a die having a base, guides for shoe shank steel and the piercers secured to the base, said guides being positioned at one end of the base, two projecting portions at the other end and made integral with the base, a two-piece shank-supporting block mounted between the projections and slidably mounted in the base, a sleeve, a spindle mounted in the sleeve and secured to the blocks so that on rotation of said spindle the blocks will

move towards or away from one another, means for positioning said sleeve in one of the projecting portions, and spring-controlled positioning means for the spring steel.

7. A device according to claim 6, having spring controlled positioning and releasing means for the spring steel before bending, said means being positioned in the two-piece bending block.

In witness whereof, I have hereunto set my hand.

CHRISTOPHER C. CUNNINGHAM