Aug. 5, 1924. 1,503,551

B. G. NICE

BAND PUNCHING MACHINE

Filed Jan. 23, 1923 2 Sheets-Sheet 1

FIG. 1.

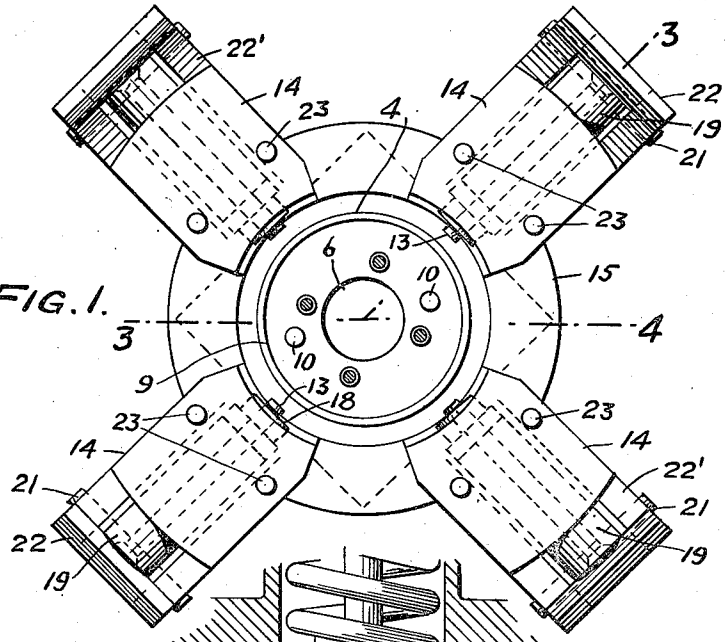
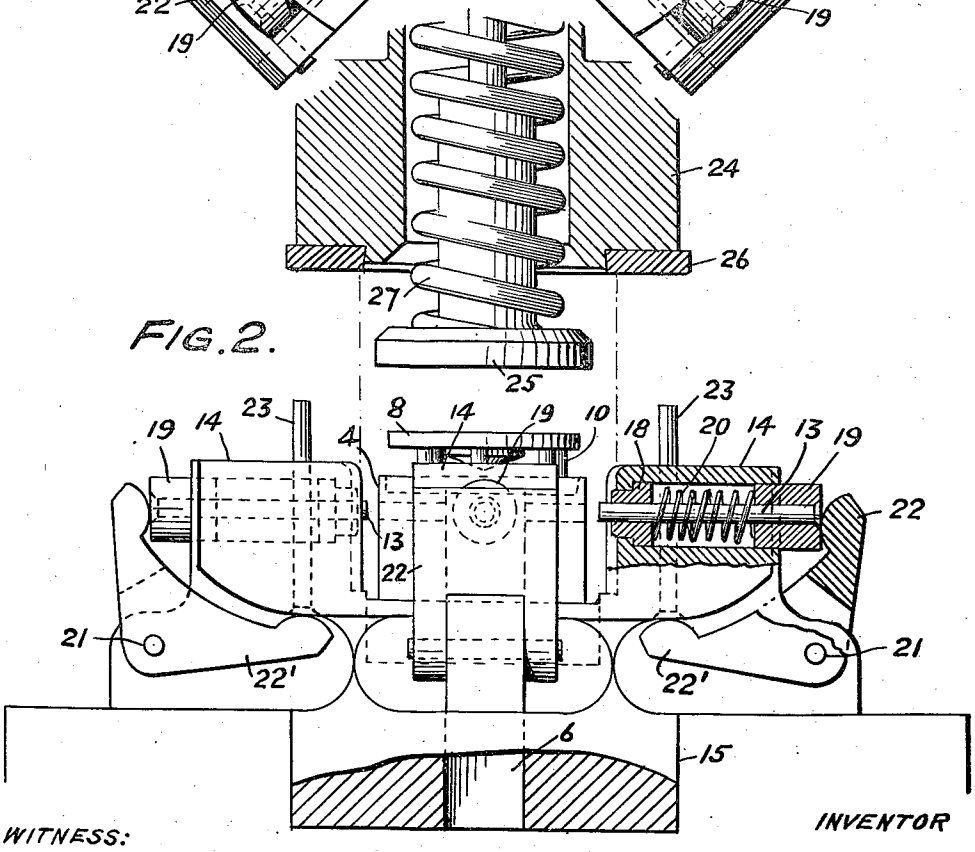


FIG. 2.



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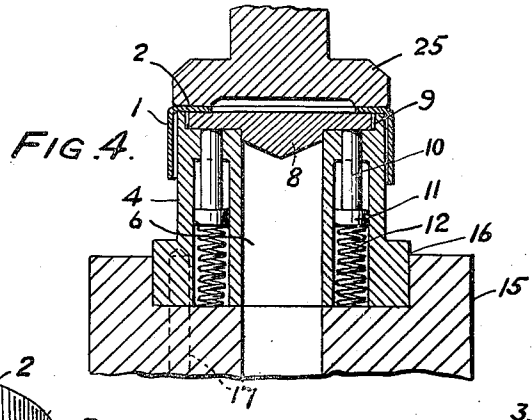


FIG. 4.

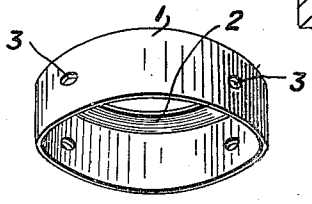


FIG. 5.

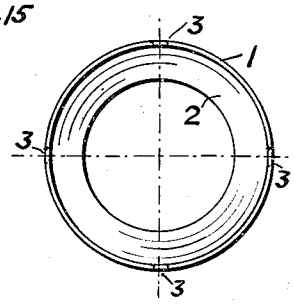


FIG. 6.

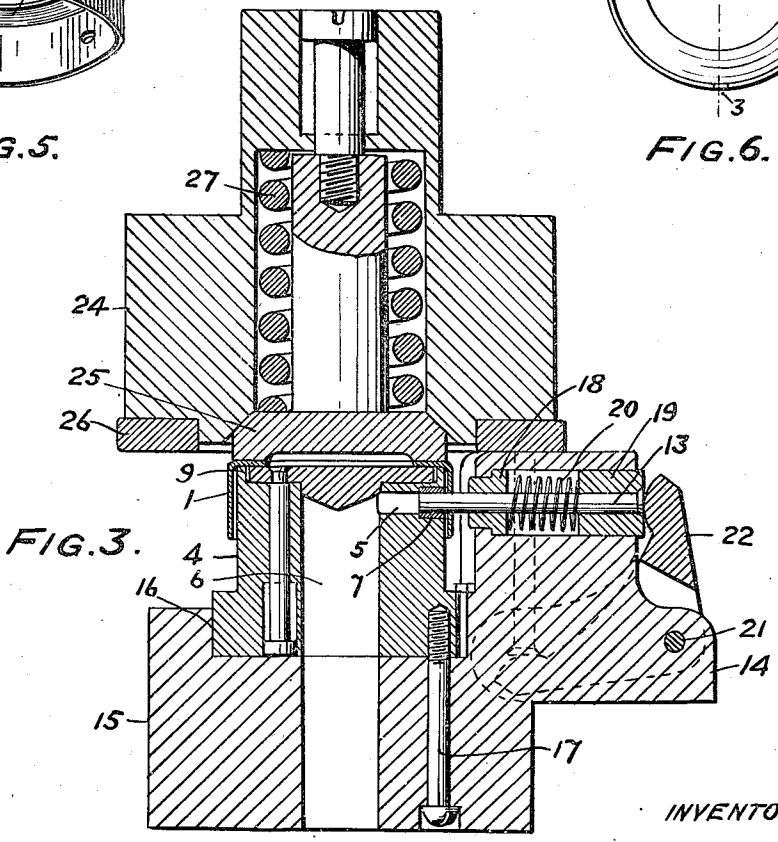


FIG. 3.

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UNITED STATES PATENT OFFICE.

BUDD G. NICE, OF OGONTZ, PENNSYLVANIA.

BAND-PUNCHING MACHINE.

Application filed January 23, 1923. Serial No. 614,360.

To all whom it may concern:

Be it known that I, BUDD G. NICE, a citizen of the United States, residing at Ogontz, in the county of Montgomery and State of Pennsylvania, have invented a new and useful Improvement in Band-Punching Machines, of which the following is a specification.

Bands having at one end an inturned flange are used around the race elements by crimping or inturning the other end in order to hold the parts of the bearing together, and these bands are provided with holes, usually four in number, spaced 90° apart for purposes too well understood by those skilled in the art to require description.

The principal object of the present invention is to facilitate, simplify and reduce the cost of the operation of piercing holes in the bands, to insure accurate spacing of the holes in the band, and to avoid waste by reason of defective spacing or improper piercing. To these and other ends hereinafter set forth the invention comprises the improvements to be presently described and finally claimed.

In the following description reference will be made to the accompanying drawings forming part hereof and illustrating a band punching machine embodying features of the invention and in which—

Figure 1 is a top or plan view with parts of the superstructure omitted.

Fig. 2 is a side view with parts broken away and with the superstructure in section.

Fig. 3 is a sectional view taken on the line 3—3 of Figure 1.

Fig. 4 is a sectional view taken on the line 4 of Figure 1, and

Figs. 5 and 6 are respectively a perspective view and a plan view of a band pierced with four holes disposed 90° apart at a single operation of a band punching machine of the invention.

Referring to Figs. 5 and 6, the band 1 is inwardly flanged as at 2, and the operation of the machine of the invention is such that the band is pierced, for example, with four holes 3, accurately spaced 90 circular degrees apart, although of course the number of holes is not of the essence of the invention. 4, Fig. 4, is a tubular plug having radially arranged dies 5 provided through its curved wall. The dies 5 and the hollow portion 6 of the plug permit of the escape of the slug or waste pierced or punched from the band. 7 indicates the hardened portion of the dies. 8 is a knock-out which, like the plug 4, is of circular outline and it is mounted at the top of the plug in such a way that it can be retracted into a cavity 9 at the top of the plug, Fig. 4, and can be projected out of the cavity 9 and above the top of the plug, Fig. 2. As shown the knock-out 8 is guided by pins 10 having heads 11 and working in openings of two diameters formed in the plug 4, so that they are normally afforded a limited range of projection by the springs 12 arranged in the part of the opening of larger diameter, the part of the opening of smaller diameter co-operating with the heads 11 as a stop. 13 are radially arranged punches aligned with the dies 5 and retractable to permit of the application of the flange 2 of the head 1 to the top of the knock-out in order to bring the band between the ends of the punches and the entrance of the dies. The punches are shown as mounted in punch holders 14 mounted on the same base 15 to which the plug is secured as by mounting the plug in a cavity 16 and securing it to place by screws 17. In the punch holder there is a cap 18 through which the punch works and the punch is provided with a head 19, and there is between the cap and the head a spring 20 which serves to retract the punch and position the mechanism by which it is actuated. The punch holders 14 have pivotally connected with them, as at 21, radially rocking arranged levers of generally claw form. The arm 22 is arranged for co-operation with a punch, or more accurately, with the head 19 thereof, and the double arm 22′ extends inward toward the plug. 23 are endwise movable pins or tappet elements arranged through the punch holders and they co-operate with the arms 22 of the rocking levers and project upwardly. 24 is a reciprocating head provided with a spring pressed pad 25 adapted to contact with the flange 2 of the band, Fig. 3, and hold the band on the plug prior to contact of the head 24, or more accurately, the part 26 of it with the upper ends of the pins 23. In this connection it may be said that the springs 12 yield under less pressure than the spring 27 of the pad 25.

The mode of operation may be described as follows:

When the reciprocating head is in its upper position and the parts are in the positions shown in Fig. 2, a band 1 is placed around the plug 4 with its flange 2 overlying the knock-out 8. The head descends and the pad 25 contacts with the flange 2 which is held between the pad and knock-out. However, the spring 27 overpowers the springs 12 so that the band is positioned as indicated in Fig. 4 ready to be pierced in the proper place by the punches 13. The continued downward movement of the head causes the part 26 thereof to contact with the pins 23, pushing them downward with the result that the ends 22′ of the levers are turned downward about the pivot 21, and the ends 22 of the levers are turned inward pushing the punches 12, as a group, inward toward the axis of the plug. The punches in co-operation with the parts 7 of the dies pierce the band forming in the present instance, four equally spaced holes at a single operation. The slugs pierced or cut from the band are carried by the punches and delivered through the hollow central portion of the plug. When the head rises the punches 12 are retracted by the springs 20 which also acting through the levers project the pins 23, and the springs 12, being no longer opposed by the spring 27, project the knock-out 8 into the position shown in Fig. 2, thus lifting the band from the plug into position for ejection from the machine.

In line with the economy effected by piercing four holes at once, use may be made of the face of the part 25 as a means for stamping names, patent dates, or other legends on the flange of the band during the piercing operation and when the part 25 contacts with the flange 2 of the band.

It will be obvious to those skilled in the art to which the invention relates that modifications may be made in details of construction and arrangement and in matters of mere form without departing from the spirit of the invention which is not limited as to those matters or otherwise than as the prior art and the appended claims may require.

I claim:

1. A band punching machine comprising in combination a tubular plug having radially arranged dies provided through its curved wall, a knock-out normally spring projecting from the top of the plug, radially arranged punches aligned with the dies and retractable to permit of the application of the flange of a band to the knock-out, radially arranged rocking levers having one of their arms disposed for co-operation with the punches and the other of their arms extended inwards, endwise movable pins co-operating with the last named ends of the levers and projecting inwards, springs for positioning the pins and punches, and a reciprocating head provided with a spring pressed pad adapted to contact with the flange of a band prior to contact with the head of the pins.

2. A band punching machine comprising in combination a base, a tubular plug arranged on the base and provided through its curved wall with die-openings, punch holders mounted on the base and arranged radially around the plug, spring retracted punches mounted in the holders for co-operation with the die-openings to punch and knock-out through the hollow portion of the plug, pins projecting upward from the punch holders, actuating means interposed between the pins and punches, and a reciprocating head adapted to contact with the pins.

3. A band punching machine comprising in combination a base, a tubular plug arranged on the base and provided through its curved wall with die-openings, punch holders mounted on the base and arranged radially around the plug, spring retracted punches mounted in the holders for co-operation with the die-openings to punch and knock-out through the hollow portion of the plug, pins projecting upward from the punch holders, actuating means interposed between the pins and punches, a reciprocating head adapted to contact with the pins, and spring provisions between the plug and head for holding a band on the plug whilst the punches pierce it.

4. In a band punching machine the combination of a tubular plug having provided through its curved wall die-openings that communicate with the hollow interior for the passage of slugs pierced from a band, a reciprocating head having means adapted to hold a band on the plug by contact with the flange of the band, normally retracted punch mechanism adapted to co-operate with the dies and radially arranged around and spaced from the plug to accommodate a band at the top of the latter, and actuating means adapted to project the punches and including tappet elements actuated by the head.

BUDD G. NICE.