

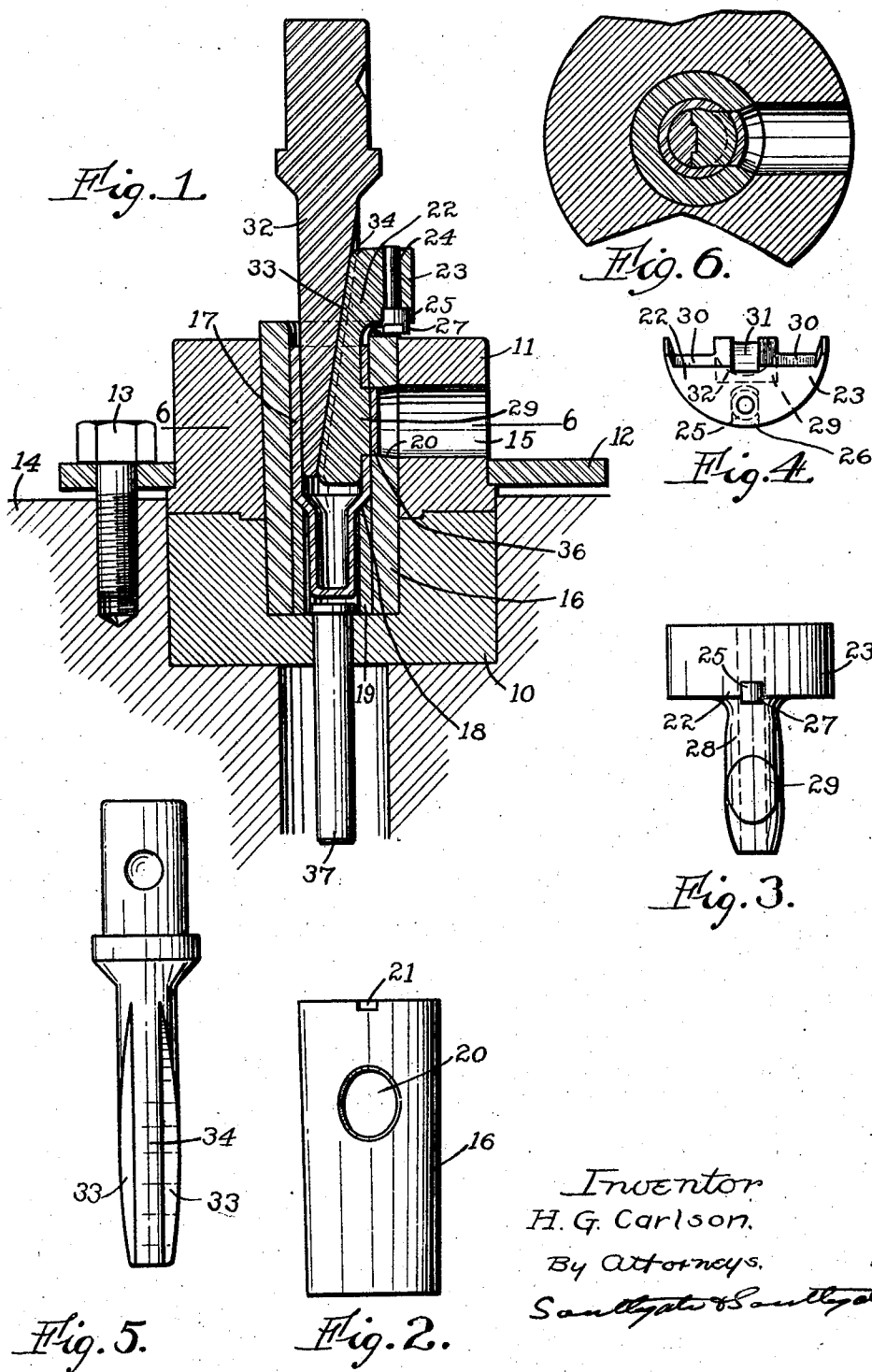
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DEVICE FOR PUNCHING SIDE HOLES IN TUBULAR ARTICLES

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DEVICE FOR PUNCHING SIDE HOLES IN TUBULAR ARTICLES.

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To all whom it may concern:

Be it known that I, HJALMAR G. CARLSON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Device for Punching Side Holes in Tubular Articles, of which the following is a specification.

This invention broadly relates to the punching of side holes in tubular articles, and is especially adapted for the punching of elliptical holes in the sides of sheet-metal ferrules. It is, however, capable of performing corresponding operations on articles manufactured from solid stock.

The principal object of the invention is to provide an apparatus which will punch a side hole in manufactured tubular articles and always reproduce the hole to a definite size and shape and in the same relative spot on each succeeding article; and also to provide for carrying out the waste blank and ejecting it from the die and the article.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a diametrical sectional view of a set of die blocks and tools constructed in accordance with this invention;

Fig. 2 is a side view of the ferrule holder constituting a part of the apparatus shown in Fig. 1;

Fig. 3 is a similar view of the side punch;

Fig. 4 is a plan of the same;

Fig. 5 is a side view of the wedge or plunger for operating the side punch; and

Fig. 6 is a sectional view on the line 6—6 of Fig. 1.

I have shown the invention as employed in connection with a pair of die blocks 10 and 11 adapted to be located in fixed position by means of a plate 12 and a series of bolts 13 in the bed 14 of a press. The upper die block 11 has a lateral passage 15, the purpose of which will appear. It is preferably located with its lower side wall in line with or just above the top of the plate 12 and is shown as horizontal.

The two die blocks 10 and 11 are provided with registering perforations or passages in their centers in which is located the ferrule or article holder 16. This is a tubular die member having a cylindrical or slightly tapered outer surface and having a central passage therethrough which is of

the shape of the ferrule or other article 17 which is to be perforated. In the present instance the article 17 has a substantially cylindrical wall at the top open at one end and connected with a smaller cylindrical part at the bottom providing a conical shoulder 18, resting on a ring 19 set inside the holder 16. The ferrule holder 16 is provided with a lateral perforation 20 registering with the die block passage 15 and slightly smaller at its inner edge than at its outer edge. It can be made elliptical as shown or of any other desired shape. If desired it may be made as wide as the full internal diameter of the article 17. It will be observed that the top of the holder 16 is provided with a radial guide passage 21.

An essential feature of this invention is the side punch 22 which has an enlarged semi-cylindrical top 23 having a flat lower surface adapted to rest on the top of the holder 16. It also has a vertical passageway 24 down through it for a stud which has on its lower end a head 25 located in a slot 26 in the bottom of the enlarged portion 23 and having below it a slight enlargement 27 which rests in and fits the radial guide 21. As the top 23 rests on the flat top of the holder and the guide slot 21 guides the same by the projection 27 in a radial direction, it will be seen that its movement sideways is positively restricted in this way.

The side punch has a shank 28 extending down from it and provided with a projecting punch 29 thereon, located in the same vertical axial plane with the stud. This punch is of whatever shape is required to punch the desired hole in the side of the ferrule, and also of the same size and shape as the smallest part of the die passage 20. It is located just far enough below the bottom of the enlargement 23 to bring it exactly opposite and into registration with the opening 20 in the holder 16 when the side punch has been inserted in its lowest position against the inside wall of the ferrule. The die 29 is shaped on its outer surface to correspond with the external shape of the article 17 at that point.

The opposite side of the side punch consists of a pair of inclined surfaces 30 and a guide slot 31.

For the purpose of forcing this side punch radially outward so as to cause the die 29

thereon to force its way through the side of the ferrule and punch out a disk therefrom, I use a wedge-shaped plunger 32. This is provided on one side with two slanting surfaces 33 adapted to slide along the slanting surfaces 30, and with a longitudinal projection 34 adapted to be guided in the slot 31. On its other side it rests against the wall of the article 17.

In the use of the device the article 17 is placed in position, resting on the ring 19 and located within the holder 16. The side punch 22 is inserted in the ferrule so that its punch 29 rests against the inner surface thereof. The projection 27 is brought into the guide 21 so as to properly locate the punch sideways and the top 23 rests on the top of the holder 16. Now the plunger 32 is brought down so as to engage the back of the side punch 22, and it applies pressure to force punch 22 outwardly into the final position shown in Fig. 1. This cuts out a piece 36 from the side of the article and leaves it in the passage 15. These pieces are forced along by punching them from successive articles, and finally come out of said passage onto the plate 12. When the plunger has been withdrawn, the ejector plunger 37 is forced upwardly to discharge the article and side punch from the die holder 16.

In this way a very simple means is provided for making a side opening in any kind of a tubular article without involving complicated mechanism. The parts are so guided and shaped that the holes will be punched uniformly and the work can be done rapidly.

Although I have illustrated and described only one form of the invention, I am aware of the fact that many changes can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore I do not wish to be limited to all the details of construction herein shown and described, but what I do claim is—

1. In a device for punching side holes in tubular sheet-metal articles, the combination with a tubular holder for the article, of an internal side punch having a projection thereon for perforating the side wall of the article, means located externally of the holder for guiding the punch to move in a radial direction, and a plunger in position to be inserted between the side punch and the opposite wall of the article and having the contacting surfaces of the side punch and plunger fitting each other so that when the plunger is forced in it will force the side

punch laterally to punch out a hole, the opposite surfaces of the side punch fitting accurately within the hollow article.

2. In a device of the character described, the combination with a tubular holder for a hollow metal article, of an internal side punch having a projection thereon for perforating the side wall of the article, external means on the holder for guiding the punch to move in a radial direction, the rear wall of the side punch being located at an inclination, and a plunger in position to be inserted between the side punch and the opposite wall of the article and having a slanting guiding surface fitting on the slanting surface of the side punch, means whereby when it is forced in it will force the side punch laterally.

3. In a device for punching side holes in tubular metal articles, the combination with means for holding the article rigid, of a side punch located within the article and having means on the side adapted to be forced through the wall of the article, guiding means on the outside of the holder and punch for restricting the motion of the punch to a radial direction, means for moving the punch in the direction of its guides to force it through the wall of the article and provide an opening therein, and a set of die blocks in which said holder is mounted, one die block having a perforation there-through for receiving the waste punched out of the side of the article.

4. As an article of manufacture, a side punch for the purpose described, having a wall shaped to fit accurately one interior wall of the article to be operated upon, said wall having a projection extending therefrom adapted to be forced into the side wall of the article and means extending in a direction parallel to said projection for preventing the punch from moving longitudinally.

5. As an article of manufacture, a side punch for the purpose described, having a semi-cylindrical wall fitting the interior of the article to be operated upon, said wall having a projection therefrom adapted to be forced through the side wall of the article and having above it an enlarged head having a horizontal lower surface which is adapted to rest on a flat surface, and a radial guide for restricting its movement to a radial one.

In testimony whereof I have hereunto affixed my signature.

HJALMAR G. CARLSON.