Nov. 3, 1959 A. HUET 2,910,897

APPARATUS FOR THE FORMATION OF NECKS ON HEADERS

Filed Feb. 27, 1957

FIG. 1

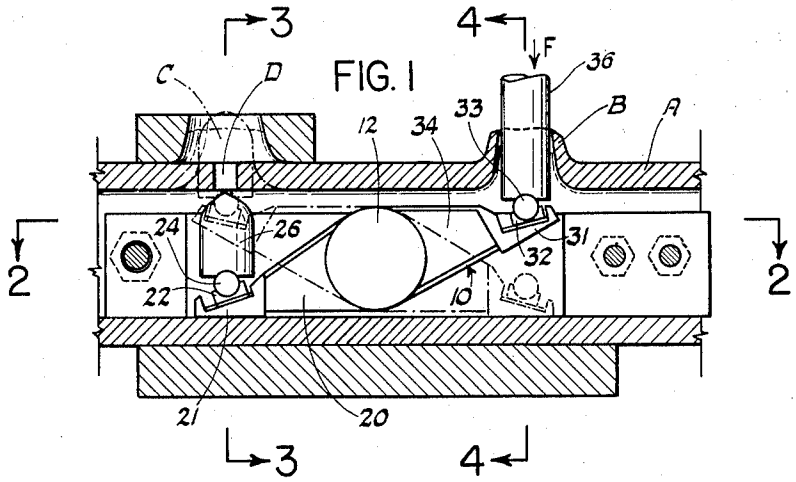


FIG. 2

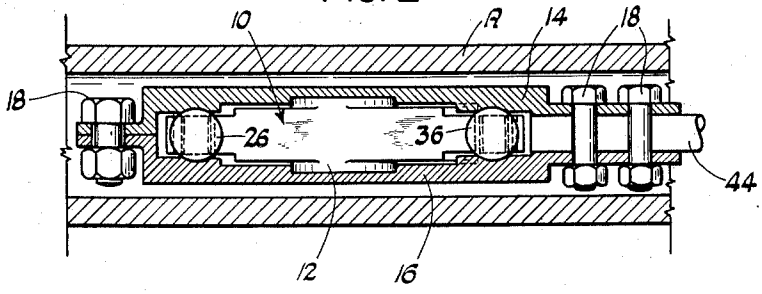


FIG. 3

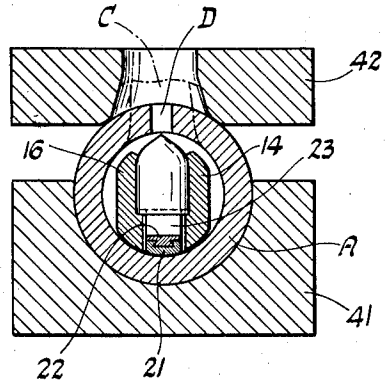
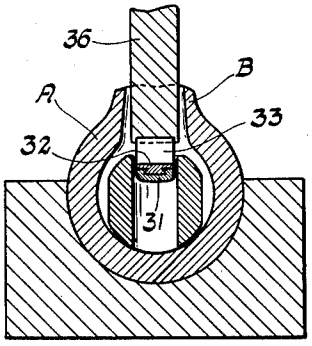


FIG. 4



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APPARATUS FOR THE FORMATION OF NECKS ON HEADERS

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2 Claims. (Cl. 78—1)

The present invention relates to improvements in apparatus for forming necks or nipples on tubular metallic members, such as fluid distributing headers, in which the necks provide for tube connections to the header.

Apparatus of this type generally provides for making a neck in one single operation by the utilization of a punch placed inside the header and moved by a piston of a hydraulic jack in such manner that the punch, piercing the preheated wall of the header, forms the neck by extrusion of metal in combination with a die applied against the outer wall surface of the header opposite the punch. In the case of headers of small diameter and relatively thick walls it is not possible to place such a punch and its jack inside the header because the space left for the stroke of the piston of the jack is not sufficient to move the punch far enough to execute the movement necessary for the complete formation of the nozzle, this movement becoming longer as the header wall thickens.

For the purpose of remedying this difficulty applicant has devised an arrangement constituting the object of this invention, which essentially consists of a lever to be introduced into the header and pivotally carrying at one end a wall piercing punch while the other end of the lever serves as the point of applicant of an actuating rod which is introduced through the wall of the header by way of a neck already formed and transmits the punch operating pressure from the outside. The necks formed on a header are generally alined in one or several rows and are separated in each row by intervals of equal length so that the last formed neck in a row can be used for the passage of the actuating rod for executing the following neck by means of the lever.

The following description in reference to the attached drawings, given as example, will help to better understand the method in which the invention can be carried out.

Figure 1 is a longitudinal section of the neck forming apparatus mounted in the workpiece or header.

Figure 2 is a cross section on line 2—2 of Figure 1.

Figure 3 shows a cross section on line 3—3 of Figure 1.

Figure 4 shows a cross section on line 4—4 of Figure 1.

The lever **10** has a central point of support or hub **12** pivoting between two side plates **14**, **16**, assembled by bolts **18** and bearing on the bottom of the interior of header A (Figs. 3 and 4) in the wall of which the necks are to be established. The end of the left arm **20** of lever **10** carries on a dovetailed slide bar **21** a bearing **22** in which a cylinder **24** is supported on which rests the base of punch **26** which is formed with a recess fitting cylinder **24**.

The same kind of fittings consisting of bar **31**, bearing **32** and cylinder **33** are mounted at the right end of the other arm **34** of lever **10** and serve as point of application for a rod **36** which, as can be seen in Figure 1, can exert a force F either by continuous pressure or by shock. Rod **36** passes through an already formed neck B in the wall of header tube A.

The header tube A can rest in a semi-cylindrical support **40**, joined or not to a die **42** which is applied oppositely on header A at the point where the following neck C is to be established.

The functioning of the apparatus is as follows:

The lever **10** and its fitments, including punch **26**, is introduced into the interior of the header A in the region of header A where it is intended to establish neck C where a small opening D has been made. The lever **10** is introduced into the inside of the header A by means of guide and fixing rod **44**, bolted to side plates **16** and **18**. The header A having been heated in the region where neck C is to be formed, pressure F is then exerted on rod **36** which makes the lever **10** swing around the axis of hub **12**. With this movement punch **26** penetrates the wall of the header A and, in combination with outside die **42**, forms neck C as shown in mixed lines on Figures 1 and 3.

The first neck to be pierced into the wall of the header is, of course, effected by a pressure F, exerted on rod **34** with the latter entirely outside the header. After this rod **36** then passes successively into the necks already formed. If the space beween the successive necks B, C, etc., should vary, levers of different length are used, or still better, arms **20**, **34** may be made extensible.

What I claim is:

1. Apparatus for forming a series of tubular necks in longitudinally spaced relation along one generatrix of a cylindrical header comprising; a pair of spaced plates supported within and disposed parallel to the longitudinal axis of the header; a lever of the first class pivoted between said plates with the distal end of one arm thereof located in transverse alinement with the opening of a tubular neck previously formed through and projecting from the header wall on said generatrix; a wall piercing punch articulated to the other arm of the lever opposite said generatrix and adapted to be displaced perpendicularly to said axis of the header to form a second tubular neck; and a rod displaceable parallelly to said punch through said first mentioned neck formed on the header for engaging said one arm of said lever and operating the latter to actuate said punch, said rod and lever serving as a gauge to index and space said punch with respect to a previously formed tubular neck.

2. Apparatus for forming tubular necks on a header as defined in claim 1 wherein said rod detachably engages said lever arm for removal from said first mentioned neck to enable movement of said lever and punch longitudinally of said header.

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