June 28, 1938. M. L. ENGLER 2,122,368

PUNCH

Filed Nov. 21, 1936

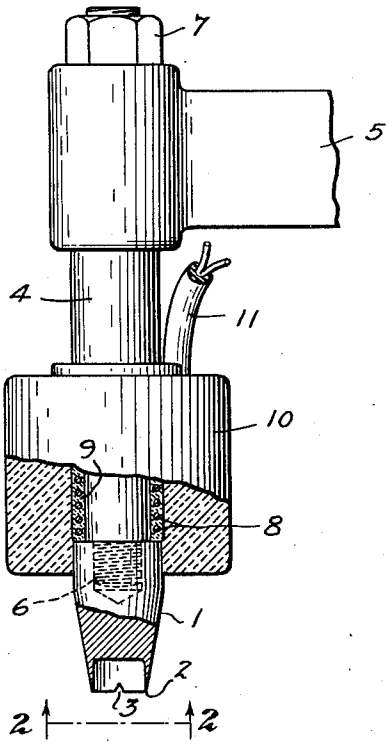


Fig. 1

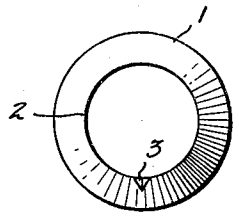


Fig. 2

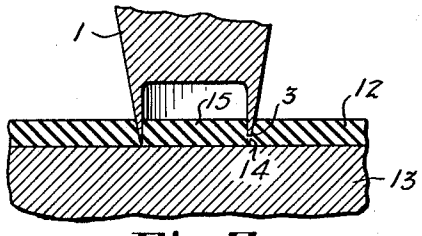


Fig. 3

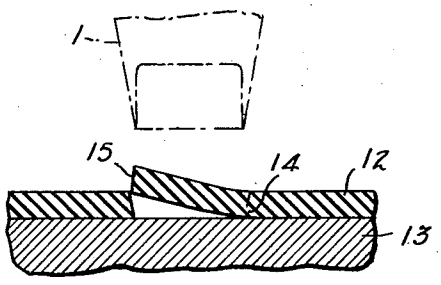


Fig. 4

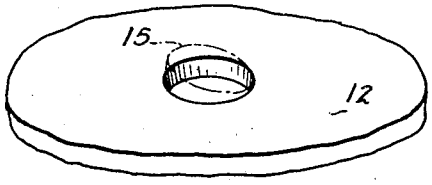


Fig. 5

INVENTOR
Max L. Engler
BY
Evans & McCoy
ATTORNEYS

Patented June 28, 1938 2,122,368

UNITED STATES PATENT OFFICE

2,122,368

PUNCH

Max L. Engler, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio, a corporation of Ohio

Application November 21, 1936, Serial No. 112,061

2 Claims. (Cl. 164—124)

This invention relates to punch devices and more particularly to punches for forming holes in semi-plastic sheet material such as unvulcanized rubber and the like.

An object of the present invention is to provide a punch that is particularly adapted for conventional practices in the manufacture of rubber inner tubes.

Another object is to provide a punch that leaves the punched-out slug free of the punch cutting blade and somewhat elevated above the material punched in order that the slug may be readily grasped and torn loose by the punch operator.

With the above and other object in view, which will be apparent to those familiar with the art to which this invention pertains, an embodiment of the present invention is disclosed in the accompanying drawing, wherein

Figure 1 is an elevational view, shown partly in section with parts broken away, of a punch assembly that embodies the present invention;

Fig. 2 is an end view of the punch blade looking in the direction of the arrows 2—2 of Fig. 1;

Fig. 3 is an enlarged elevational view in section of the punch blade in an operating position in the process of punching openings for valve stems in an uncured rubber tube wall;

Fig. 4 is an elevational section of a portion of the flat stock subsequent to the withdrawal of the punch blade shown in dot and dash lines; and

Fig. 5 is a perspective of a portion of the punched flat stock with the slug shown in dot and dash lines.

In the accompanying drawing the punch 1 comprises a punch body having a hollow centered, frusto-conical cutting edge 2, that is interrupted by a notch 3. The punch 1 is mounted on a suitable carrying means, such as the thrust member 4 and the supporting arm 5 by the externally threaded screw 6 that forms a part of the thrust member 4 that is secured to the supporting arm 5 in conventional manner, as by the nut 7.

The punch 1 may be heated, if desired, as when punching valve stem holes through the side wall of uncured inner tube rubber and the like, by an electrical resistance wire 8, that is wound about the portion of the thrust member 4 that is adjacent the punch 1. The resistance wire 8 is embedded in suitable insulating material 9 as well known to those skilled in the art.

Thermal loss is minimized by enclosing the body of the device in a heat insulating body 10. Electrical energy is supplied to the resistance wire 8 by the lead-in cord 11.

In operation, the cutting edge 2 of the punch 1, is caused to pass down substantially through the uncured side wall rubber 12 of the inner tube while supported on the bench 13. The notch 3 in the cutting edge 2, leaves a connecting ribbon 14 of the stock that anchors the cut-out slug 15 to the material of the tube wall. The major portion of the slug 15 is drawn up out of, and inclined to the plane of the tube wall 12 when the punch is lifted, as shown in Fig. 4. The slug 15 in its elevated and inclined position is easily and quickly grasped by a worker and the ribbon 14 broken to complete the operation. This avoids the use of complicated means for clearing the punch cavity and is very convenient and useful in operation.

It is to be understood that the particular embodiment of the invention that is shown and described herein is for the purposes of illustration and explanation and that various modifications in the punch and in the contour of the punch cutting blade and notch, and in the carrying and supporting means, and in the punch heating means, may be made without departing from the invention as defined in the appended claims.

What I claim is:

1. A punch for forming holes in unvulcanized rubber compound in sheet form, comprising a punch body having a tip terminating in a cutting edge formed by the intersection of an external cone-shaped face and an internal cylindrical bore, a notch of a fraction of the depth of the material to be cut formed in said cutting edge, and means for heating said cutting edge, whereby the outer face of said cone-shaped tip pulls free of said sheet material and said inside bore draws a cut slug substantially out of its hole but leaves the slug connected at a single localized point of small cross sectional area.

2. The method of punching holes in sheet material of uncured rubber compound which consists in severing a slug of rubber from the sheet entirely around one surface portion and around the other surface portion except over a very small area from which the slug may readily be torn loose and lifting the slug partially from the material by engagement of the slug with the punching device.

MAX L. ENGLER.