Jan. 18, 1955 W. J. WOODWORTH 2,699,584

FLINT TUBE MOLD AND METHOD OF MAKING THE SAME

Filed Feb. 28, 1950

Fig. 1.

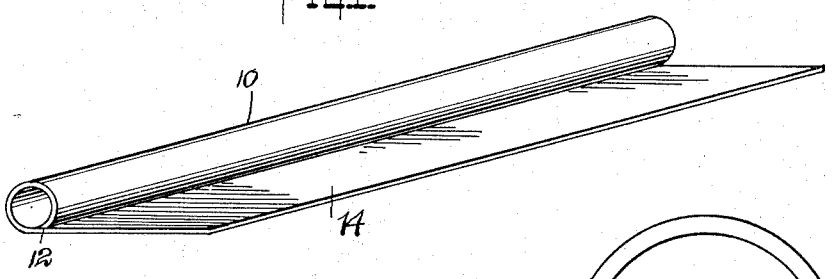


Fig. 4.

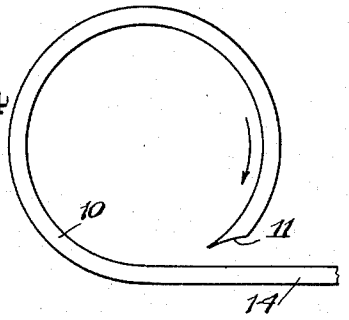


Fig. 2.

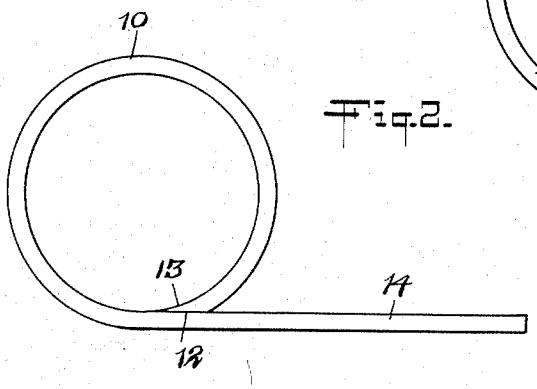


Fig. 3.

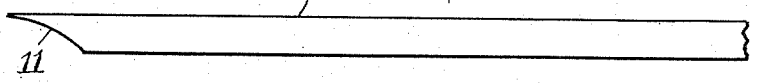


Fig. 5.

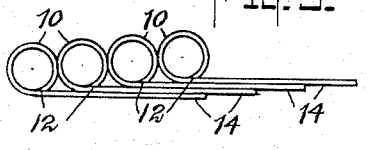
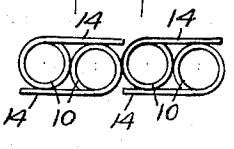


Fig. 6.



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FLINT TUBE MOLD AND METHOD OF MAKING THE SAME

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1 Claim. (Cl. 22—136)

This invention relates to a novel and improved mold and a method of making the same and has especial, although not exclusive, reference to the production of flints for lighters.

An object of the invention is the production of perfectly smooth surfaced articles, either circular, or of other cross sectional shape, by the use of the novel and improved mold which will permit the production of such articles in large quantities by mass production methods.

A further object is the production of a mold which is easy and economical to manufacture and assemble and from which the molded articles can be removed with ease and dispatch.

Further and more specific objects, features, and advantages will more clearly appear from a consideration of the detailed specification hereinafter set forth especially when taken in connection with the accompanying drawings which illustrate a present preferred form which the invention may assume and which form part of the specification.

In brief and general terms, the invention concerns the preparation of a mold from an exceedingly thin sheet of material, such as metal, of suitable predetermined length, width, and thickness. One side edge of this blank is then bent over with any suitable smooth cross section of curve to form a mold and the thus bent free edge is pressed firmly into engagement with the body of the blank to form a tight joint. The blank is thus bent around a suitable mandrel member by any suitable means which mandrel and means as their particular form constitute no part of this invention, since several different types of mandrels and pressure applying means may be employed.

Before being bent around the mandrel to form a mold shape, the free edge of the blank is formed in a curve on the side thereof, which, as it is bent, meets the main body of the blank to form a tight seam and thus permits the formation of smooth surfaced flints, and with no leakage of the flint liquid through such a seam when it is being poured into the mold form. This curvature may be produced by ordinary grinding, hollow grinding, shaving, machining, etc.

This curvature of the free edge forms a feather edge which is somewhat flexible and this form of construction permits the inner face of the blank when bent around to form a smooth uniform curve with the feather edge on the inside of the blank, thus bent, disposed in a smooth continuation of the inside curve of the mold thus formed. The length of the blank is determined to be such that there will be formed a laterally extending apron beyond the mold thus formed so that this apron may be held in the hand or placed in a suitable device such as a vise, so that this mold of very thin metal may be easily and quickly stripped off the flint therewithin.

The completed device then comprises a thin metal mold of desired curved cross-section, with a tight smooth inner seam or joint and an integral lateral apron. The edge of the blank opposite the free edge of the apron is curved on one side, preferably the lower side, to form a feather edge as and for the reasons above noted, and to be later shown and described in detail.

The present preferred form which the invention may assume is illustrated in the drawings, of which:

Fig. 1 is a perspective view of a complete mold formed and constructed in accordance with my method of manufacture;

Fig. 2 is an end elevation of the mold;

Fig. 3 is a partial side elevation of the blank from which the mold is formed showing the curvature of the end edge;

Fig. 4 shows a partial end elevation of the blank in the process of being formed into the final position as a completed mold device;

Fig. 5 shows a series of molds nested for multiple pouring; and

Fig. 6 shows nested molds with a shorter apron to permit another manner of nesting than that shown in Fig. 5.

Referring now merely to the preferred form of the invention shown in the drawings, it will be seen that the blank **10** from which the mold is formed is a relatively long and very thin sheet of material such as metal, and of a width determined by the size of the mold to be formed which depends upon the desired thickness of the to-be-produced flints.

Referring to the partial blank shown in Figure 3, which shows the left hand portion thereof, it is to be noted that the left edge thereof is treated on its under side as at **11**, to produce a feather edge which is somewhat flexible. The hollow grinding is produced on one side and in the view shown, is on the lower side because the free or left end of the blank is to be bent or curved upwardly and around as shown in Figure 4.

This bending of the blank is preferably performed around a mandrel of any well known type (not shown), and the free feather edge is pressed into engagement with the main body of the blank as shown at **12** in Figure 2. By reason of the thinness and flexibility and curvature of this edge, this curvature is transferred to the inside of the edge to form a smooth even continuation of the curve of the remainder of the inside face of the blank as noted at **13**. At this time the hollow ground underside **11** will be pressed against the apron portion **14** so as to be flush therewith. This is possible by virtue of the flexibility of the edge **11**, and the curvature of the underside is thus eliminated. The pressure means for forcing the free edge into this engagement may be any suitable well known device (not shown), and a tight leak-proof seam is thus formed on the inside of the blank to form a very smooth surface so that the flints molded therein are absolutely smooth with none of the customary ribs or unevennesses which have later to be ground off.

The width of the blank is of such an amount, in view of the size of the article to be formed, that, after the mold is formed as thus described, there is left an apron **14** extending laterally from the formed mold portion. This apron provides an ample surface to be gripped in the hands of the operator or to be placed in a tool such as a vise, to enable the mold to be quickly and easily stripped off the article after it has been poured into the mold and allowed to cool off.

Furthermore, this apron **14** may act as a sort of alinement means as shown in Figure 5, to closely position a series of thus formed mold devices in adjacency with each other in a nested manner so that a large number of molds may thus be securely and closely positioned for multiple pouring.

In the form of apron shown in Figure 6, it is clear that the apron is the same as before except that it is shorter, being in width only equal to the diameter of the mold, thereby permitting the particular form of nesting shown in this Figure 6.

Thus it is seen that there has been provided a simple, economical blank which by a novel method, may be formed into a mold to form articles such as flints for lighters, which flints have a smooth even exterior surface, and which can be easily and quickly removed from the mold after they are formed and cooled. The mold is one which can be economically produced and is of such material that it can be easily stripped off the formed product and thrown away. The mold is of a form which permits this easy stripping and also enables a large number of such molds to be compactly related in nested fashion for the purpose of pouring into a large number of molds in one pouring operation.

While the invention has been described in detail and with respect to the preferred form shown in the drawings, it is not to be limited to such details and forms since many changes and modifications may be made in the in-

vention without departing from the spirit and scope of the invention in its broadest aspects. Hence, it is intended to cover any and all forms and modifications of the invention which may come within the language or scope of the appended claim.

What I claim as my invention is:

A mold for use in the manufacture of pyrophoric lighter flints, comprising a thin strip of sheet metal having a substantially flat part and having connected thereto another part which is bent to form a seamed tube, said bent part having a longitudinal edge portion tapered to a sharp edge by a sloping concave cut across said edge portion, the sloping, concave cut surface of said edge portion being outermost and meeting and engaging said flat part of the strip and said edge portion being flexed by said engagement from an original shape wherein the cut surface thereof was concave, to a shape wherein the cut surface is substantially flat and a concavity exists on the opposite surface of the edge portion, located on the inner side of the tube, said opposite surface of the edge portion constituting a smooth continuation of the inner curved surface of the tube and said tube having a substantially true inner cylindrical surface, the sharp edge of said tapered edge portion being held under continual force by the said flexure against the said flat part of the strip.

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