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APPARATUS FOR MAKING ALL-PLASTIC MOLDED BUTTONS

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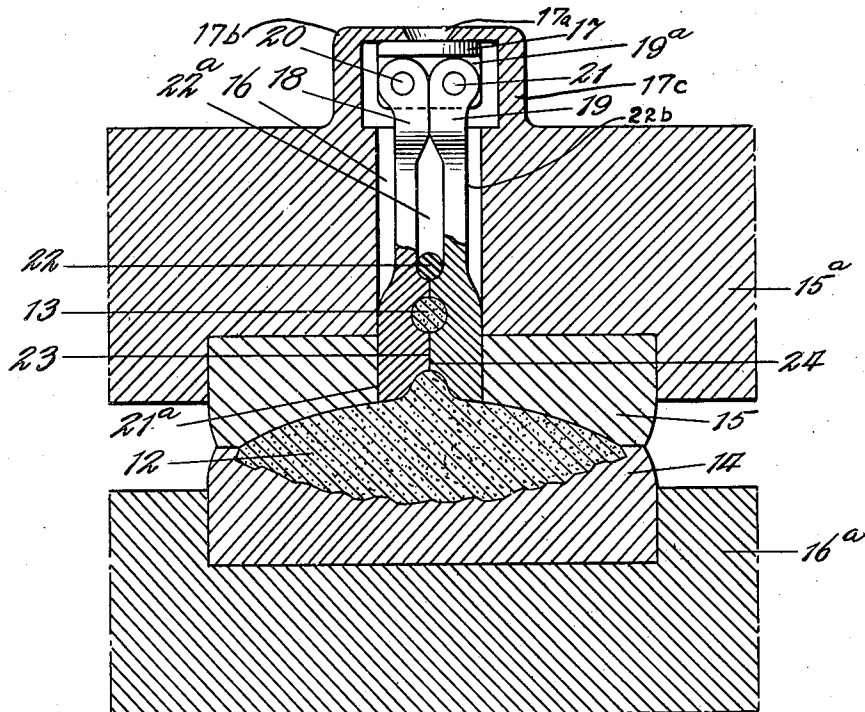


Fig. 2.

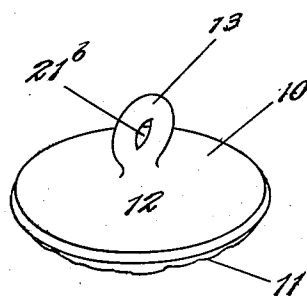
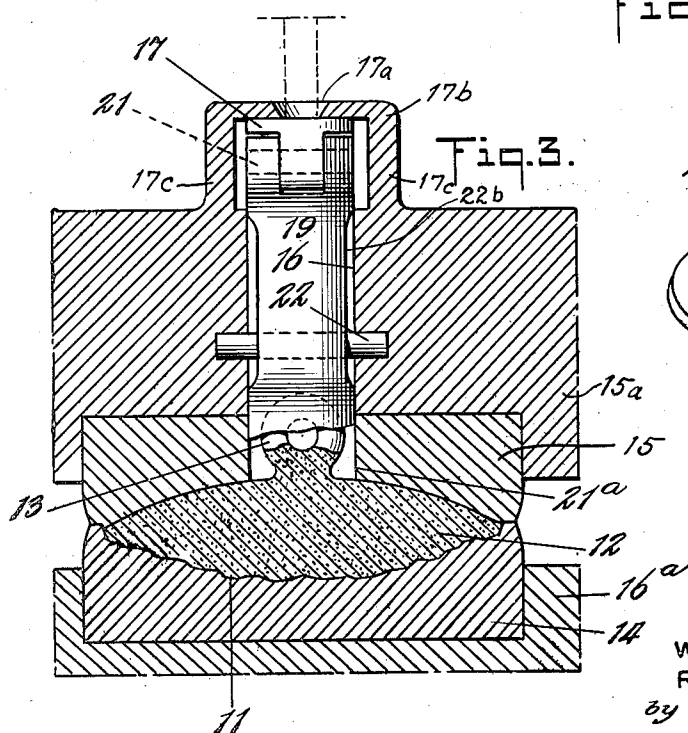


Fig. 1.

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APPARATUS FOR MAKING ALL-PLASTIC
MOLDED BUTTONS

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7 Claims. (Cl. 18—42)

One object of the present invention is to provide an apparatus for manufacturing an all-plastic button comprising a two-section mold, one section of which includes a split knock-out rod having two spreadable jaws hinged to said rod and adapted to form a core for producing the aperture of the button eye.

A further object is to provide an apparatus of the above nature which will be simple in construction, inexpensive to manufacture, easy to manipulate, compact, and very efficient and durable in use. With these and other objects in view, there has been illustrated on the accompanying drawing one form in which the invention may be conveniently embodied in practice.

In the drawing:

Figure 1 represents a perspective inverted view of an all-plastic integral eye button embodying the invention.

Figure 2 is a sectional view of an apparatus for molding the button, as it appears in closed position.

Figure 3 is a similar sectional view of the molding apparatus shown in Figure 2, but taken at right angles from the view shown in Figure 2.

Referring now to the drawing in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 generally indicates an improved all-plastic integral eye button manufactured by a molding apparatus embodying the present invention.

The button 10 is provided with an embossed top surface 11, an intermediate body 12, and a circular integral eye 13 projecting rearwardly from the body at the central part thereof, said eye being ring-shaped, and all of the parts of said button comprising a single unitary piece of molded plastic material.

Molding apparatus

In order to produce the all-plastic integral eye button shown in Figure 1, provision is made of a special molding apparatus illustrated in Figures 2 and 3 of the drawing. As shown, this molding apparatus comprises a cooperating bottom die 14 and a top apertured force 15 which are adapted to be fitted together with their edges in abutment. As clearly shown in Figures 2 and 3 of the drawing the force 15 and the die 14 are embraced by a pair of upper and lower mold sections 15a and 16a preferably operated hydraulically, and capable of exerting extremely high pressure upon said top force and said bottom die for compressing the molded plastic material 12 therebetween under the proper temperature conditions.

It will be understood that any suitable plastic material may be employed for molding the improved all-plastic button of the present invention, and that said material may be either "thermo-setting" or "thermo-plastic" as desired. Preferably, however, the molding material will be of the type known as urea plastic composition.

The upper mold section 15a is provided with a circular bore 16 within which is fitted a split knock-out rod 17 as clearly shown in Figures 2 and 3 of the drawing. The knock-out rod 17 is provided with a pair of separable jaws 18 and 19 which are hinged to the upper body 19a of the knock-out rod 17 by means of a pair of spaced pivot pins 20, 21. The jaws 18 and 19, when in closed position, are adapted to fit snugly within the circular bore 16 of the upper mold section 15a and the bore 21a of the top force 15, and said jaws are provided with abutting lower end sections 23 and 24, the flat surfaces thereof being located within the center of the mold and being adapted to form a core for producing the circular aperture 21b within the eye 13.

Provision is also made of a spreading pin 22 which passes through the bore 16 of the upper mold section 15a and is seated at its opposite ends in the sides of said upper mold section 15a.

It will be understood from the above construction that the plastic molding material will first be placed between the bottom die 14 and the upper force 15. The latter will then be moved downwardly with respect to the former, causing the plastic material to flow upwardly through the aperture formed within the abutting sections 23 and 24 of the jaws 18 and 19 to produce the projecting integral ring-shaped eye 13 of the button 10.

It will also be understood that the abutting sections 23 and 24 of the jaws 18 and 19 will serve as a core for forming the cavity 21b within the center of the button eye 13 and will mold the exterior surface of said eye.

Operation

When it is desired to remove a button 10 from the molding apparatus after the molding process has been completed, the lower die 14 will first be separated from the force 15, thus exposing the embossed surface 11 of the button.

While holding the force 15 and the upper mold section 15a stationary, the knock-out core rod 17 as a unit will next be driven down to remove the eye 13 out of the force 15 with a suitable tool (not shown), which may be inserted through an aperture 17a in the bridge member 17b which

forms an abutment for holding the core rod 17 in operating position during the molding process. The bridge member is rigidly joined by depending arms 17c to the top of the upper mold section 15a.

The inclined top cam sections of the interior central slot 22a will thus be caused to strike the stationary pin 22 and since the force 15 will be then in alignment with the outer recesses 22b of the jaws 18 and 19, said jaws will be permitted to be swung apart laterally by said pin 22. The completed button 10 may thereafter be readily separated from the force 15 and placed in a suitable receptacle.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention and what is claimed as new and for which it is desired to secure Letters Patent is:

1. An apparatus for molding a one-piece all-plastic button having an integral circular eye from plastic material, comprising a bottom die, an upper force fitting upon said die, an upper mold section embracing said force, said force and upper mold section having aligned apertures forming a bore, a split knockout core rod tightly fitted into said bore and free to move therein, said core rod comprising a connecting element and a pair of side jaws hinged at their upper ends to said element, the adjacent portions of said jaws being cut away to form an interior slot, a jaw-spreading pin anchored in said upper mold section at the sides of said bore and adapted to pass loosely through said interior slot, the lower extremities of said jaws having faces shaped to abut each other and forming a core for producing the aperture in the circular eye of the plastic button formed in said apparatus.

2. An apparatus for molding a one-piece all-plastic button having an integral circular eye from plastic material, comprising a bottom die, an upper force fitting upon said die, an upper mold section embracing said force, said force and upper mold section having aligned apertures forming a bore, a split knockout core rod tightly fitted into said bore and free to move therein, said core rod comprising a connecting element and a pair of side jaws hinged at their upper ends on spaced pivots to said element, the adjacent portions of said jaws being cut away to form an interior slot, a jaw-spreading pin anchored in said upper mold section at the sides of said bore and adapted to pass loosely through said interior slot, the lower extremities of said jaws having faces shaped to abut each other and forming a core for producing the aperture in the circular eye of the plastic button formed in said apparatus.

3. The apparatus as defined in claim 1, in which the length of said interior slot in said jaws is greater than the thickness of the central

part of said force, so as to permit said pin to spread said jaws apart to disengage the lower abutting portions of said jaws from the eye of said button, whereby the latter may be readily removed from said apparatus when said knockout rod is driven downwardly with respect to said upper mold section and said force.

4. The apparatus as defined in claim 1, in which the outer surfaces of said jaws are provided with elongated recesses intermediate the ends of said jaws to clear the inner edges of said force so that when said knockout rod is depressed to bring said pin below said force there will be no obstruction to the spreading apart of said jaws by said pin to permit the button eye to be separated from said rod.

5. An apparatus for molding a one-piece all-plastic article having an integral projecting circular apertured eye from moldable plastic material comprising: a pair of cooperating die sections shaped to fit against each other, an outer mold section embracing one of said die sections, said outer mold section and the die section embraced thereby having aligned apertures forming a central bore, a split knockout rod fitted into said bore and movable therein, and including a pair of jaws, said jaws having abutting lower ends tightly fitted into said bore during the molding operation and shaped to form the aperture of the circular eye, the intermediate portion of said jaws having inner and outer recesses, said inner recesses forming a slot, a jaw spreading pin passing through said bore and anchored in said outer mold section, said pin being adapted to pass freely through the slot formed by the inner recesses of said jaws, the outer recesses of said jaws being shaped to clear the inner edges of said embraced die section when said knockout rod is driven downwardly to bring the top of said slot into engagement with said spreading pin, so as to permit removal of said molded article from the mold.

6. The apparatus as set forth in claim 1 in which the upper ends of the cut-away portions of said jaws are inclined to form cams for facilitating the spreading apart of said jaws when said cams strike said pin.

7. An apparatus for molding from plastic material a one-piece all-plastic button having an integral protruding shank, comprising a bottom die, an upper force fitting upon said die, an upper mold section embracing said force, said force and upper mold section having aligned apertures forming a bore, a split knockout core rod snugly fitted into said bore and free to move therein, said core rod comprising an upper connecting pin and a pair of cooperating side jaws hinged at their upper ends to said pin, the adjacent portions of said side jaws being cut away to form an interior slot, and jaw-spreading means extending loosely through said interior slot and anchored in said upper mold section at the sides of said bore, the lower ends of said jaws fitting tightly in said bore during the molding operation and having protuberances extending inwardly toward each other.

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