[54] DIE-SET COMBINATION FOR MAKING PIN-BACK BADGES
[76] Inventor: Malcolm J. Roebuck, Box 618, LaSalle, Ill. 61301
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Primary Examiner—James L. Jones, Jr.
Attorney, Agent, or Firm—Rummler & Snow

[57] ABSTRACT
A combination of mutually interfitting die and press-block elements adapted for manual use and operation with each other to produce a finished and permanent assembly of the separate components of a pin-back button or badge.

1 Claim, 10 Drawing Figures
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DIE-SET COMBINATION FOR MAKING PIN-BACK BADGES

BACKGROUND OF THE INVENTION

Generally pin-back badges are made by assembling the components of the badge by means of a progressive die press in which several die-forming operations are mechanically performed. This requires a rather bulky and costly apparatus, usually too large or heavy for easy storage or transportation and, in general, not suited for home use or for fun. Thus the primary object of the present invention is to provide a set of block-like elements that can be readily used at home by almost anyone to make pin-back badges as desired without the need for other tools or apparatus except the preformed body, shell and cover components of the complete badge.

SUMMARY OF THE INVENTION

The gist of my invention resides in the provision of a set of forming elements designed for interrelation with each other in a particular sequence for entirely manual operation to perform the several assembly and formation steps of the process for making finished pin-back buttons or badges. A complete set of the said elements comprises a pressure member, a forming ring, a forming die, and a hammer member, each element being of cylindrical form and made of steel or other material of suitable hardness. All of these elements are dimensioned to interfit with each other for making a button or badge of predetermined size; and the badge components to be assembled comprise a flanged shell over which the cover material is applied, suitable cover material in disc form, and a body member to which a pin is attached.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing the several elements comprising the die-set of my invention;
FIG. 2 is an exploded view showing the components of a typical badge to be assembled by means of the elements of FIG. 1;
FIG. 3 is a partly sectioned view of a complete pin-back badge or button;
FIG. 4 is a partly sectioned view showing the assembly of the shell and cover material in the forming die with the forming ring applied;
FIG. 5 is a partly sectioned view showing the elements of FIG. 4 inverted and with the hammer member positioned for the first forming operation by which the cover material is applied to the shell, the said operation being indicated by broken outline;
FIG. 6 is a view like that of FIG. 4 but showing the shell and cover components of the badge as positioned in the forming ring by the first forming operation;
FIG. 7 is a view like that of FIG. 6 but with the pressure member positioned in the forming ring for a second forming operation;
FIG. 8 is a view showing the elements of FIG. 7 with the pressure member forced through the forming ring to perform the second forming operation;
FIG. 9 is a view showing the elements of FIG. 8 in inverted position and the badge body component positioned in the shell for the final forming operation; and
FIG. 10 is a view like FIG. 9 but showing the hammer member applied to the forming die for the final forming operation to produce the finished badge of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the form shown in FIGS. 2 and 3, the pin-back button or badge to be made by the use of my invention comprises a shallow axially flanged metal shell 1, over which paper and plastic cover sheets 2 and 3 are applied to carry the picture or message for the badge, and a body or backing disc 4 which carries a pin 5 by which the badge can be attached to the wearer's clothing. These components of the badge are conventional and readily available preformed devices, and form no part of the present invention.

As shown in FIG. 1, the die-set of my invention comprises a cylindrical pressure member A, a cylindrical forming ring B, a ring-like cylindrical forming die C, and a cylindrical hammer member D. The forming ring B has concentric, axially parallel, inside and outside walls and the internal diameter of this ring, which is the same as the diameter of the badge or button to be made by the die-set, determines the working diameters of all of the other elements of the die-set. The axial length of this ring also sets the axial measurement of the other elements of this set. As indicated in FIG. 6, the length of the forming ring should be about one-half again the width of the shell flange 6 plus the amount of overhang of the cover sheets following the first forming operation.

As shown by FIGS. 1 and 6, the forming die C has an outside diameter somewhat greater than the forming ring B and at one end is provided with a flat radial surface 10, defined by a rim 12, for seating the forming ring A. The inner diameter of the forming die C at this one end is made the same as the inner diameter of the forming ring B, to serve as a continuation thereof and to provide a wall 14 which terminates at an inwardly and downwardly curved shoulder 16 which in turn defines the upper end of a second wall 18 extending to the other end of the forming die C. The length of the wall 14 is preferably only slightly longer than the width of the flange 6 on the shell 1 of the button to be made by the die-set, so that the free end of the said flange may rest on the shoulder 16 to hold the shell near the level of the end surface 10 preparatory to the first forming operation, as shown in FIG. 4. The width of the shoulder 16 is preferably only slightly greater than the thickness of the shell flange 6 plus the combined thicknesses of the cover sheets 2 and 3 and the curvature is that of a quarter-round. This determines the inside diameter of the forming die C at the end 20 having the wall 18, which wall is axially parallel and concentric with the wall 14. The length of the wall 18 is preferably about one-half the total thickness of the forming die C. The width of the end surface 10 is about one-half again as wide as the flange 6 on the button shell 1 so as to receive cover sheets 2 and 3 of a size to provide margins sufficiently wide to extend beyond the end of the flange upon completion of the first forming operation. This determines the thickness of the ring B.

The hammer member D has two functions; first to perform the first forming operation by driving the shell and cover elements into the forming ring B from their initial position overlying the forming ring, as indicated in FIG. 5; and secondly to perform the finishing operation of clinching the flange of the shell over the inturned margins of the cover sheets and the margin of the body or backing disc 4, as indicated in FIG. 10. As
shown in FIGS. 5 and 10, the hammer member works only through the forming die C at the end 20 and is a double ended device having concentric cylindrical end portions 22 and 24 of equal diameter gauged for a sliding fit into the end 20.

The hammer end portion 22 serves as a pressure means for the first forming operation, as shown in FIG. 5, and the end portion 24 functions as a hammer for clinching the flange 6 of the shell over the margin of the body member 4. The two end portions of the hammer D are defined by an annular rib 26 which has flat radial sides and functions as a stop for the first forming operation. Thus the length of the hammer end portion 22 beyond the rib 26 should be equal to the thickness of the forming die C between the surface 10 and end 20 plus at least two-thirds the length of the ring B.

The hammer end portion 24 is made with a length at least equal to the length of the forming die C between the end surfaces 10 and 20, or sufficient to fully clinch the flange 6 of the shell 1 during the final or finishing button-making operation. Also, the end 28 of the portion 24 is centrally recessed as at 30 to provide clearance for the body pin 5 during the clinching operation.

The pressure member A of the die-set of this invention is made with a diameter that will allow a sliding fit into the forming ring B, as shown in FIG. 7. An annular flange 32 is provided at one end of the member A and the opposite end is concavely recessed with a margin 33 that curves sharply inwardly from the periphery of the member A to more or less conform to the rounded forward edge of the finished badge or button. The length of the pressure member beyond the flange 32 is made to pass through the forming ring B and into the forming die C, when these members are combined as in FIGS. 7 and 8, a distance sufficient to drive the combined shell and cover sheets of FIGS. 6 and 7 against the rounded shoulder 16 in the die C far enough to turn the free edges 34-36 of the cover sheets inwardly over the edge of the flange 6 and to turn the edge of the flange 6 slightly beyond the inner edge of the shoulder 16. (See FIG. 8.) At that point, the flange 28 acts as a stop, by engagement with the end of the forming ring B, and prevents turning the shell flange 6 too far inwardly so as to interfere with the reception of the body or backing member 4 for the final button making operation.

As shown, each of the die-set members A and D are provided with a central passage extending from end to end, to provide for air pressure relief during their operation in the course of the badge making process.

The procedure for making a button or badge with the hereindisclosed die-set begins by assembling the shell 1 and cover sheets 2 and 3 in the forming die C, as shown in FIG. 4, the shell 1 resting with its flange 6 edgewise on the shoulder 16 and the cover sheets overlaying the shell and extending over the surface 10. The forming ring B is then set into the forming die over the seat 10 and this assembly is inverted as in FIG. 5 and set on a solid surface, such as a table top or the floor. Then the end portion 22 of the hammer member D is set into the now upper end of the forming die, as shown in FIG. 5, and manually pressed downward until the flange 26 engages the end of the die C. This forces the shell and cover sheets into the forming ring B to the position indicated in FIG. 6.

Then the hammer element is removed and the B and C combination is again inverted to its original position as shown in FIG. 6 and the pressure element A is inserted into the forming ring B, as shown in FIG. 7, and manually pressed downward to force the combined shell and cover sheets from the ring B into the forming die C. Manual pressure is continued until the shell flange 6 and cover sheet margins 34-36 button against the shoulder 16 which provides an automatic stop against further movement by manual force. The result is that the margins 34-36 of the cover sheets are turned inwardly and over the edge of the shell flange 6 by the inwardly curved shoulder 16, as shown in FIG. 8. As shown, the cover sheet margins extend beyond the flange 6 to provide means to secure the cover sheets on the finished button.

The next step is to invert the combined elements A, B and C and insert the body member 4 into the upper element C with its margin overlaying the intumed margins 34-36 of the cover sheets, as shown in FIG. 9, and then insert the end portion 24 of the hammer member D into the open end 20 of the forming die C, as shown by FIG. 10, and press downwardly to push the body member 4 into engagement with the shell 1. This tucks the free end margins 34-36 of the cover sheets between the shell flange 6 and the marginal bead 40 on the body member 4 as the body member becomes bottomed against the shell.

The final step is to clinch the flange 6 against the bead 40 of the body 4 to complete the assembly of the button or badge. Manual pressure on hammer D for this final badge forming operation is not sufficient to complete the clinching operation and to obtain a force great enough the die-set assembly can be inverted and set on the floor with the pressure element A uppermost. Force can then be applied by the operator's foot to drive the pressure element into the forming ring. This forces the shell flange 6 against the curved shoulder 16 of the forming ring C and turns the flange 6 inwardly toward the body bead 40 to clamp both the cover sheet margins and the badge body 4 to the shell 1. Now the die-set elements A, B, C and D can be separated and the finished button or badge removed.

As shown in FIG. 10, the recess 30 in the end portion 24 of the hammer member D will provide space for the pin 5, when a pin is used, and the bead 40 on the body 4 provides for pressing the body below the free edge of the flange 6 so as to tuck the cover sheet margins between the flange 6 and bead 40 to be clamped when the flange is clinched by the pressure element A.

A particular advantage of this invention resides in its simplicity of form and manufacture, all elements being annular pieces capable of being readily made on automatic lathe machinery. Other advantages are to be found in the fact that the several elements comprising the set of tools are, by shape and design, used in a logical sequence and can be operated manually by almost any person without the need for other equipment other than the several parts comprising the badge or button to be made.

Although but one embodiment of this invention is herein shown and described, it will be understood that details of the construction comprising the invention may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:
1. A die-set for use in making permanent badges out of a conventional pin-back, shell and indicia-bearing paper assembly comprising:
   a. a cylindrical forming ring having a flat face normal to the ring axis at each end and an inside diameter substantially equal to the diameter of the badge to be made;
   b. a cylindrical pressure member having an outside diameter gauged for a sliding fit into said forming ring, a radial flange at one end, and a concaved face at its other end, the margin of the concavity being inwardly rounded from the periphery of the said pressure member;
   c. a hollow cylindrical forming die having a flat recessed shoulder at one end defined by a radial rim the inside diameter of which is gauged to slidable receive said forming ring, the inside diameter of the forming die at said one end being equal to that of said forming ring to provide a first wall which terminates inwardly of the die in a concavely curved shoulder to define the inner end of a second wall extending to the other end of the forming die, the diameter of said second wall being substantially the same as the inside diameter of the shell for the badge to be made; and
   d. a cylindrical hammer member having a radial rib intermediate its ends and concentric first and second end portions extending from each side of the said rib and each having an outside diameter gauged for sliding fit into the said other end of the forming die, the length of the first end portion being equal to the length of the first and second walls of the forming die plus about one-half the length of the forming ring, and the length of the second end portion being about the length of said first and second walls of the cylindrical forming die;
   e. the length of said pressure member beyond the flange thereof being made sufficient to pass through the forming ring and into said other end of the forming die a distance greater than the length of the flange on the shell of the badge to be made.

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