United States Patent

Lewis

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[54] CUTTING AND ASSEMBLING APPARATUS FOR MAKING BUTTONS

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[52] **U.S. Cl.** **79/5,** 83/444, 83/569

[51] **Int. Cl.** **A44b 1/06**

[58] **Field of Search** 79/4, 5; 83/566, 568, 569, 83/570, 685, 420, 437, 440, 444, 450

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[57] **ABSTRACT**

Portions of a pin-on button are cut and assembled as a result of a plurality of operations in a machine having a vertical press. Cutter and work deforming tools are displaced by a single press ram to cut blanks and deform the blanks onto a button top placed in one of two die assemblies positioned in alignment below the work deforming tool on the lower end of the ram.

12 Claims, 9 Drawing Figures

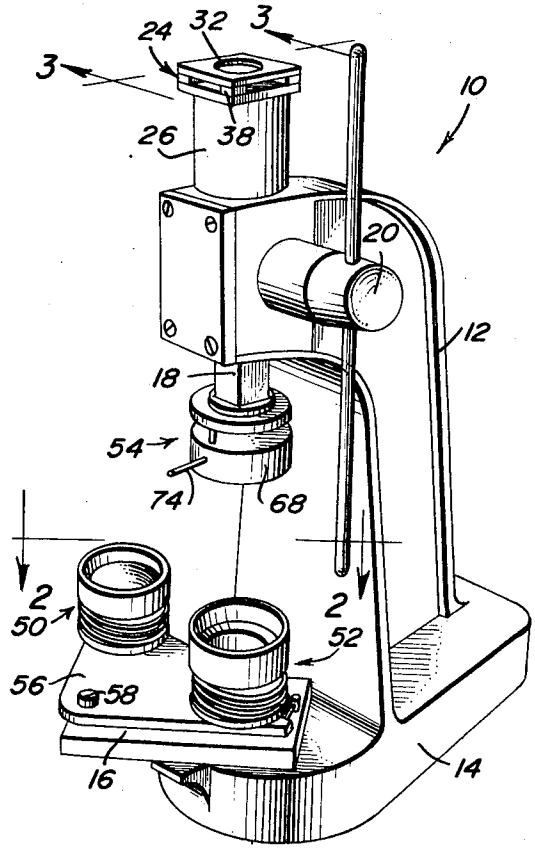


Fig. 1

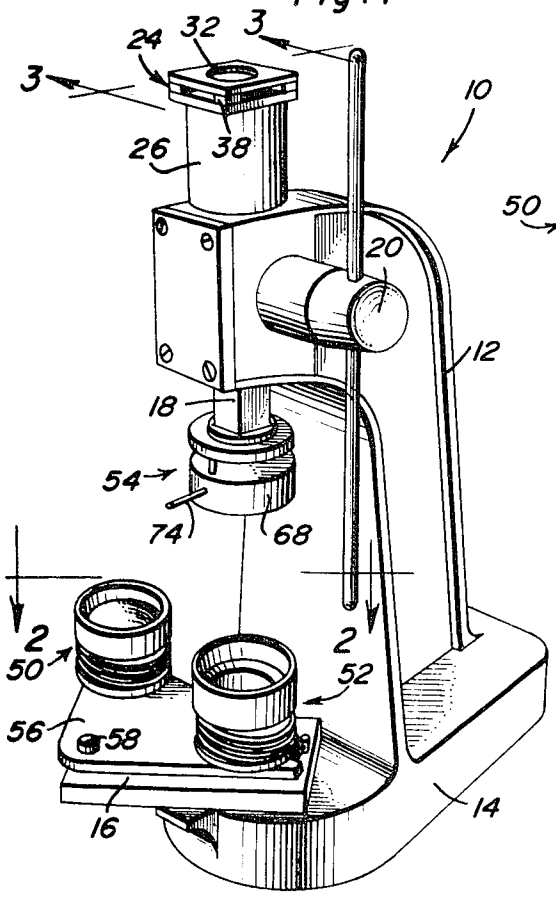


Fig. 2

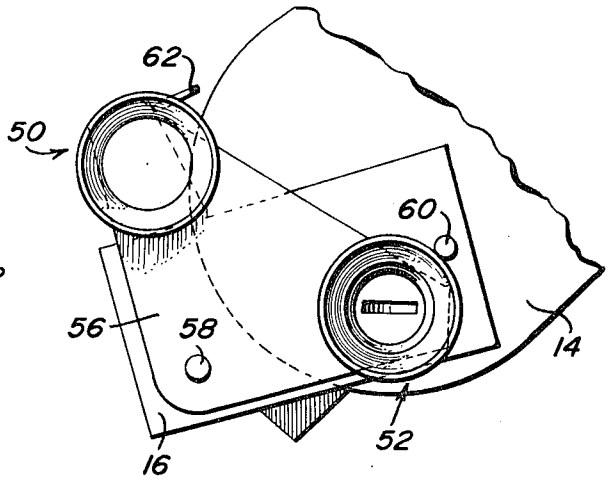


Fig. 3

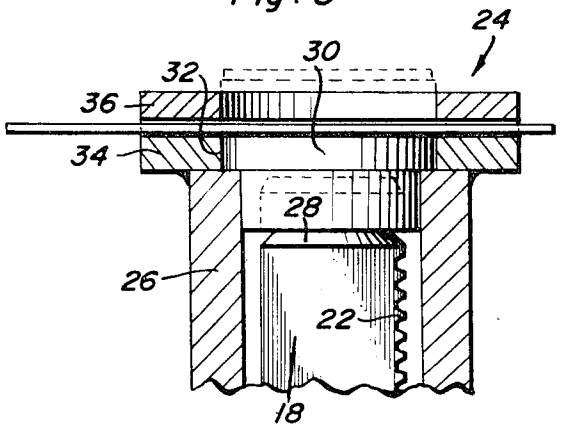
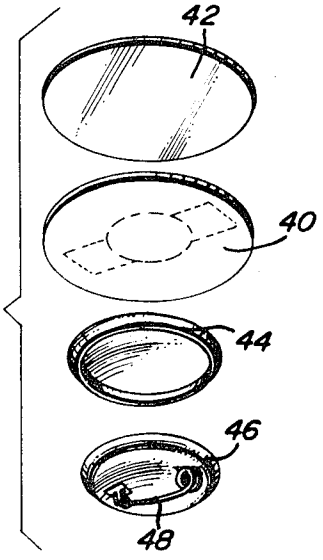


Fig. 4



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Fig. 5

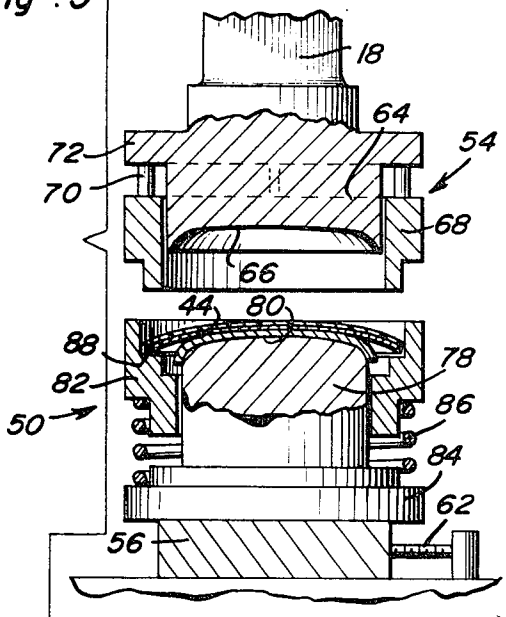


Fig. 6

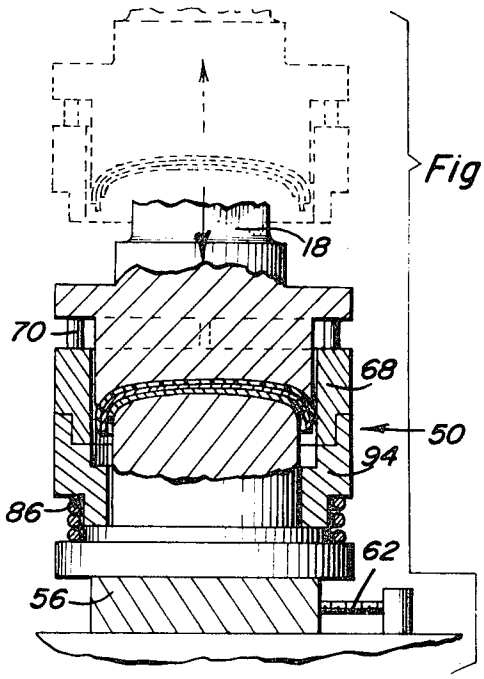


Fig. 7

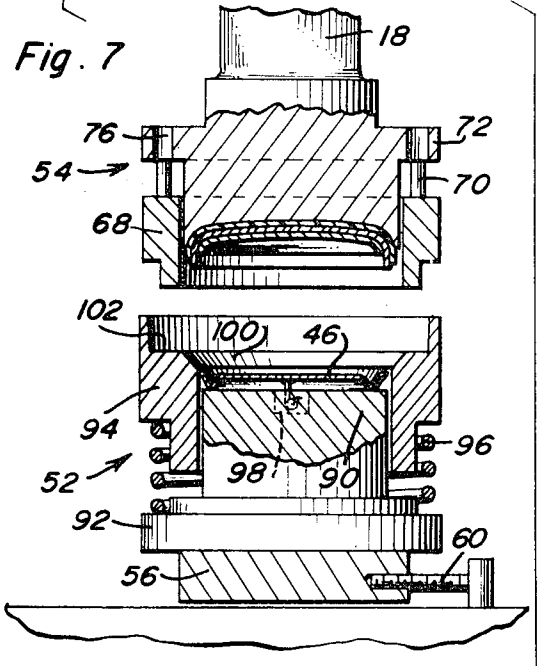


Fig. 8

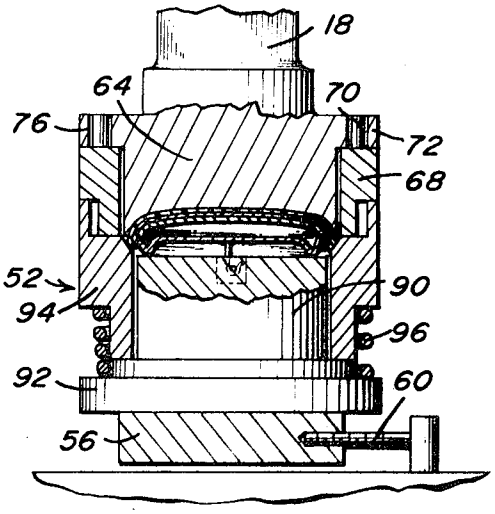
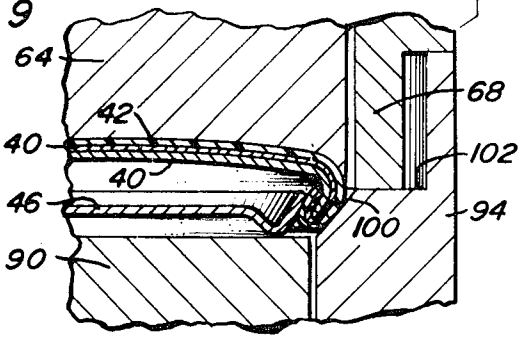


Fig. 9



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CUTTING AND ASSEMBLING APPARATUS FOR MAKING BUTTONS

This invention relates to apparatus for cutting blanks and assembling said blanks onto a button top.

Machines which involve a vertical press successively operative to assemble portions of a button are well known. However, such button making machines have a limited role in the button manufacturing process. Separate machines are required for example to cut the parts which are assembled onto the button top. Also, button making machines heretofore utilized were rather complex, requiring frequent repair and maintenance and susceptible to wear. It is therefore an important object of the present invention to provide a button making machine capable of performing both cutting and assembling operations in connection with the button manufacturing process in an efficient manner.

In accordance with the present invention, a single ram is displaceable from an inactive position both in an upward and a downward direction in order to perform a plurality of operations. The ram is displaced upwardly through a guide tube on top of which a cutter is seated within the opening of a blank receiving plate assembly to displace the cutter through a stroke substantially shorter than that of the ram. Thus, the machine operator may cut a circular blank such as a picture within a die plate opening. The cut blank may then be assembled on top of a button together with a transparent plastic covering. The blanks are assembled onto the top of the button in two operations performed by downward movement of the ram. A pair of die assemblies are pivotally displaceable into alignment with the ram and cooperate therewith to perform assembling operations. A work deforming assembly is accordingly mounted on the lower end of the ram and includes an angularly adjustable sleeve which in one angular position is prevented from being axially displaced relative to a work engaging member.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a perspective view showing the button making machine of the present invention.

FIG. 2 is a partial top plan view of a portion of the machine as viewed from section line 2—2 in FIG. 1.

FIG. 3 is a partial sectional view taken substantially through a plane indicated by section line 3—3 in FIG. 1.

FIG. 4 is a perspective view showing the disassembled parts of the pin-on button product.

FIGS. 5 through 8 are sectional views showing the different operational phases of the button making machine.

FIG. 9 is a sectional view showing an enlarged portion of FIG. 8.

Referring now to the drawings in detail, and initially to FIG. 1, the button making machine generally denoted by reference numeral 10 includes a press frame 12 which extends upwardly from a supporting base 14 on which a base plate 16 is fixedly mounted underlying a ram 18 of noncircular cross-section. The ram is slidably mounted for vertical movement along an axis intersecting the base plate 16 and is displaced from an inactive position both downwardly and upwardly by means of a conventional actuating mechanism mounted by the frame vertically spaced above the base 14 as shown in FIG. 1, from which the operating handle 20 extends. The ram 18 is accordingly provided with rack teeth 22 as shown in FIG. 3.

As shown in FIGS. 1 and 3, the frame mounts a fixed work holding assembly generally referred to by reference numeral 24 above the actuating mechanism into which the ram 18 is displaced during its upstroke movement. The work holding assembly 24 includes a tubular guide 26 through which the ram is upwardly displaced for engagement at its upper end 28 with a cutter tool 30. The cutter tool is normally seated on the top of the tubular guide 26 within a circular opening 32 formed in a die assembly comprising a pair of plates 34 and 36 which are

fixedly spaced from each other by spacers 38. The bottom plate 34 is secured as by welding to the top of the tubular guide 26. Thus, slots are formed between the spacers 38 and between the plates 34 and 36 within which sheet material are adapted to be received and from which circular blanks are cut upon upward displacement of the cutter 30 through a relatively short stroke within the opening 32. In accordance with the present invention, the blanks may be in the form of photos or any other decorative material 40 as shown in FIG. 4 adapted to be assembled as part of a pin-on button. Also, a transparent plastic cover 42 may be cut in the same way. When the ram is lowered the cutter 30 drops under gravitational bias to its inactive position as shown by solid line in FIG. 3 enclosed within plate 34.

The blanks 40 and 42 as shown in FIG. 4, are assembled onto the button top 44 and the bottom portion 46 carrying the pin 48, by operations performed during the downward movement of the ram 18. Toward this end, the button top 44 is placed in a die assembly 50 and the blanks 40 and 42 placed thereover. The button bottom portion 46 on the other hand is placed in the other die assembly 52. The die assemblies 50 and 52 form part of a movable work holding means with which a work deforming assembly 54 is engageable, the work deforming assembly being mounted on the lower end of the ram 18 for this purpose. The die assemblies 50 and 52 are mounted on a carrier plate 56 which is pivotally mounted by means of a pivot pin 58 on the base plate 16 so that the die assemblies 50 and 52 may be respectively aligned below the work deforming assembly 54.

The carrier plate 56 may be manually displaced to one operative position when it abuts an adjustable stop 60 thereby aligning the die assembly 52 with the work deforming assembly 54 as shown in FIG. 2. The carrier plate 56 may be displaced to its other operative position defined by abutment between the frame 12 and the stop 62 projecting from the carrier plate thereby aligning the die assembly 50 with the work deforming assembly 54. The work deforming assembly 54 as more clearly seen in FIG. 5 includes a work engaging member 64 connected to the lower end of the ram 18 and provided with a lower concave surface 66. A sleeve 68 encloses the surface 66 of the member 64 and is prevented in one angular position thereof from being axially displaced relative to the member 64 by means of pins 70 abutting the flange portion 72 of the work engaging member. The sleeve 68 may, however, be angularly displaced by means of pin 74 as shown in FIG. 1 so as to line up the spacer pins 70 with holes 76 in the flange 72 as shown in FIG. 7. Thus, in this latter position of the sleeve 68, it may be axially displaced from the position shown in FIG. 7 to the position shown in FIG. 8 for purposes to be explained hereafter.

As more clearly seen in FIG. 5, the die assembly 50 includes a die member or anvil 78 having a surface 80 on which the button top 44 is adapted to be seated. The sleeve 82 encircles the die member and is yieldably held in axially spaced relation to the base 84 of the die member by means of a coil spring 86. The sleeve has a stepped diameter recess 88 within which the cutout picture 40 and transparent cover 42 are placed on top of the button top as shown in FIG. 5.

The die assembly 52 is similar to the die assembly 50 and as more clearly seen in FIG. 7 includes a die member 90 having a base 92 secured to the carrier plate 56 and a sleeve 94 urged to an upper position spaced from the base by means of the coil spring 96. The upper surface of the die member 90 is formed with a slot 98 as shown by dotted line adapted to receive the pin 48 that projects from the button bottom 46 when seated on the top surface of the die member 90 as shown in FIG. 7. The sleeve 94 is provided with a beveled recess 100 and a shoulder 102 adapted to be engaged by the sleeve 68 of the work deforming assembly 54.

As hereinbefore indicated, the button top and the two cutout portions 40 and 42 are placed in the die assembly 50 which is then positioned under the work deforming assembly 54 as shown in FIG. 5. The ram 18 is then displaced

downwardly by means of the actuating mechanism bringing the surface **66** of its work engaging member **64** into engagement with the blanks **40** and **42** folding them over the peripheral edges of the button top **44** as shown in FIG. **6**. Downward displacement of the member **64** is limited by the sleeve **68** which is prevented from being axially displaced relative to the work engaging member by means of the spacer pins **70**. Also, at the lower end of its downstroke as shown in FIG. **6**, the sleeve **68** of the work deforming assembly **54** displaces the sleeve **82** of the die assembly **50** to its lower position against the bias of the spring **86**. When the work deforming assembly **54** is then retracted upwardly as shown by dotted line in FIG. **6**, it withdraws the blanks **42** and **40** and the button top **44** with it. The die assembly **52** may then be angularly positioned below the work deforming assembly **54** as shown in FIG. **7**. The work deforming assembly **54** is then angularly adjusted to a position wherein the spacer pins **70** are aligned with the holes **76** in the flange **72** as shown in FIG. **7**. Downward movement of the ram **18** will then transfer blanks **40** and **42** and button top **44** to the bottom **46** as member **64** deforms the blanks and button top over the button bottom as more clearly shown in FIG. **9**. The sleeve **94** associated with the die assembly **52** in this position will be displaced downwardly against the bias of the spring **96**. The button is thereby completely and tightly assembled. Upon upward withdrawal of the work deforming assembly **54**, the completed button will be removed from the top of the die member **90** by the upwardly biased sleeve **94** engaging the assembled button along the recess surface **100**.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

I claim:

1. Apparatus for making buttons or the like comprising a frame, a base fixedly mounted on the frame, a ram slidably mounted by the frame for vertical movement along an axis intersecting the base, actuating means operatively connected to the ram for imparting movement thereto downwardly and upwardly from an inactive position, fixed work holding means mounted by the frame above the ram, movable work holding means mounted on the base below the ram, and work engaging tool means displaceable within the fixed and movable work holding means by the ram in response to said upward and downward movement.

2. The combination of claim **1** wherein said tool means includes a cutter engageable by the ram during upward movement and work deforming means connected to the ram at a lower end thereof.

3. The combination of claim **2** wherein said fixed work holding means includes a tubular guide fixed to the frame in concentric relation to said axis through which the ram is slidably received, and a pair of fixedly spaced plates mounted on the tubular guide having an opening within which the tool means is seated in axial alignment with said axis.

4. The combination of claim **1** wherein said fixed work holding means includes a tubular guide fixed to the frame in concentric relation to said axis through which the ram is slidably received, and a pair of fixedly spaced plates mounted on the tubular guide having an opening within which the tool means is seated in axial alignment with said axis.

5. Apparatus for making buttons or the like comprising a frame, a base fixedly mounted on the frame, a ram slidably mounted by the frame for vertical movement along an axis intersecting the base, actuating means operatively connected to the ram for imparting movement thereto downwardly and upwardly from an inactive position through a predetermined stroke, fixed work holding means mounted by the frame above the ram, and cutter means movably mounted within the work holding means for upward displacement by the ram through a cutting stroke substantially shorter than said predetermined stroke.

6. The combination of claim **5** wherein said fixed work holding means includes a tubular guide fixed to the frame in concentric relation to said axis through which the ram is slidably received, and a pair of fixedly spaced plates mounted on the tubular guide having an opening within which the cutter means is seated in axial alignment with said axis.

7. In a button making machine, a frame having a base portion, an actuating mechanism mounted by the frame vertically spaced above the base portion, a work holder fixedly mounted by the frame and projecting upwardly thereabove, ram means drivingly engaged by the actuating mechanism for vertical displacement within the work holder, the work holder having a top opening through which sheet material is exposed, and cutter means movably mounted within the work holder for upward displacement by the ram means through said top opening to cut and eject a blank from the sheet material.

8. The combination of claim **7** including work holding means movably mounted on the base portion of the frame below the ram means and work engaging tool means mounted on the ram means for displacement into said work holding means to deform the blank cut from the sheet material by the cutter means.

9. The combination of claim **8** wherein said work holder comprises a guide member into which the ram means is retracted, and a die assembly fixed to the frame within which the top opening is formed, said die assembly having a slot through which the sheet material is inserted intersecting the top opening.

10. The combination of claim **9** wherein said guide member encloses the ram means within a bore diametrically smaller than the top opening to form a seating shoulder supporting the cutter means in a retracted position within the die assembly.

11. The combination of claim **7** wherein said work holder comprises a guide member into which the ram means is retracted, and a die assembly fixed to the frame within which the top opening is formed, said die assembly having a slot through which the sheet material is inserted intersecting the top opening.

12. The combination of claim **11** wherein said guide member encloses the ram means within a bore diametrically smaller than the top opening to form a seating shoulder supporting the cutter means in a retracted position within the die assembly.

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