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BUTTON MANUFACTURE

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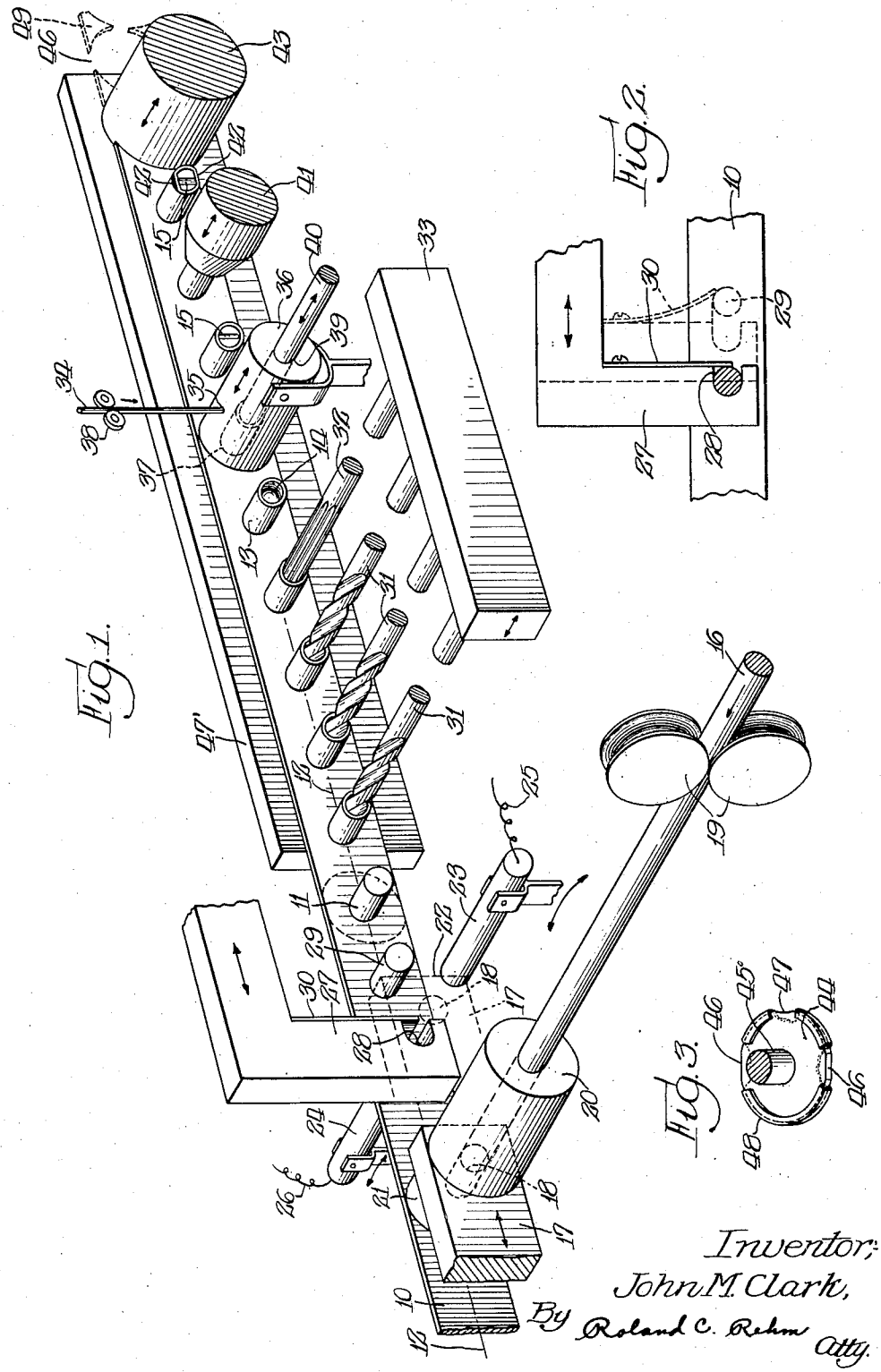


Fig. 1.

Fig. 2.

Fig. 3.

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BUTTON MANUFACTURE

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3 Claims. (Cl. 79—2)

This invention relates to buttons and, among other objects, aims to improve and reduce the cost of manufacture of solid steel buttons.

The nature of the invention may be readily understood by one illustrative embodiment thereof disclosed in the accompanying drawing.

In said drawing:

Fig. 1 is a perspective view, diagrammatic in character, illustrating the sequence of operations in the manufacture of the button and the mechanism for performing such operations;

Fig. 2 is an elevation of the device for periodically advancing the work; and

Fig. 3 is a perspective view of the button.

Buttons of the character herein illustrated are largely employed on workmen's clothing, children's play-suits, etc., to which they are attached, generally with automatic machinery, by pronged fasteners which are upset and anchored in a cavity in the shank of the button. While the present button (see Fig. 3) is not integral in the sense that its head and shank are made from one piece, it is in essence a solid steel button and possesses all the advantages of that type of button; and by its present method of fabrication, manufacturing economies, among other advantages, are secured.

According to the present method, the head and shank of the button are formed from separate elements rigidly connected together, as by welding, to form a button which is essentially a solid metal button. As here shown, the metal for forming the button heads is provided in the form of a soft steel strip 10 having the width and thickness of the button head. Generally the thickness of the strip is from two to three hundredths of an inch and its width is preferably slightly less than the intended width of the button head. To minimize waste, the width of the strip is therefore determined by the intended diameter of the button head. To provide the button shanks, short blanks 11 of rod or wire are secured, in the present instance, by welding at spaced points along the central axis 12 of the strip, the spacing being slightly less than the button head diameter.

The opposite ends 13 of the blanks are formed with die cups or cavities 14 which serve to bend or upset the attaching fastener prong. The manner in which the die cavity is finished depends upon whether the button is to be attached by a single or double pronged fastener. If attached by a single prong fastener, the opening into the cavity is restricted so that after the prong is upset by the curved bottom of the cavity, it cannot be withdrawn therefrom. If, as in the case of the illustrative button, it is to be attached by a double pronged fastener, the cavity is provided with a transverse bar 15 about which the fastener prongs curl.

The blanks 11 are in the present instance formed by severing short sections from a soft steel rod or wire 16 whose diameter is that of the shank of the button, in this instance about one-quarter inch. The wire is advantageously fed toward strip 10 in a transverse direction to a shear which severs short sections of blanks periodically therefrom. The shear is here shown in the form of a reciprocating blade 17 having a hole 18 therethrough of sufficient size to admit the end of the rod 16 which is advanced toward the shear blade by conventional feeding rolls 19. The terminal portion of the wire is held by quill 20 through which the wire passes and which, in conjunction with the shear blade 17 which passes over the face of the quill, cooperates to sever the blank from the rod. As here shown, the blade 17, whose width is equivalent to the length of the blank reciprocates between the face of the quill 20 and a fixed stop 21 against which the end of the wire is advanced before the shearing operation.

The mechanism for reciprocating the shear is conventional and has been omitted to facilitate illustration. It is designed to advance the blade from the position shown in full lines in Fig. 1 (in which the hole 18 is in alignment with the bore through quill 20) to the dotted line position 22 in which the hole 18 is in alignment with the welding position. By forming the shear blade 17 with a hole into which the rod is inserted, the blade serves as a means for carrying the severed blank from shearing position to welding position. In the latter position the blank is engaged by an electrode 23 which reciprocates in a direction transverse to strip 10 and serves to advance the blank into engagement with the strip, the opposite face of which is engaged by the other electrode 24.

Any appropriate mechanism may be employed in reciprocating and synchronizing the reciprocation of the electrodes with the other operations. The current supply which is conducted to the electrodes by cables 25 and 26 is preferably controlled by apparatus which measures the amount of energy delivered so as to secure a weld in which there is a minimum of discoloration and upsetting of the metal at the weld. Controlling apparatus of this sort can be purchased on the open market and details thereof have been omit-

ted as unnecessary to the illustration of the invention.

In the present instance, the blank, after being pushed from the shear blade by electrode **23**, enters a holding device **27** having a recess **28** which is in registry with the opening **18** in the shear blade. When the blank is entirely discharged from the shear blade, the latter may, if desired, be withdrawn simply by momentarily withdrawing the electrode **23**. Thereafter the latter may be advanced into engagement with the blank and pressed against the strip with only sufficient pressure to effect a proper weld without objectionally upsetting the blank or strip at the weld.

After the weld has been completed, both electrodes are withdrawn to permit strip **10** to be advanced by a distance slightly less (in this case two hundredths of an inch) than the diameter of the button head. In the present instance the aforesaid periodic advance may be effected by holder **27** which is made to reciprocate periodically by a distance slightly less than the diameter of the button head (i. e. equivalent to the spacing between blanks) and to engage successively the projecting welded blanks, thus carrying each welded blank in succession to the position **29** and advancing the adjacent portion of the strip to welding position. Holder **27** is provided with a flexible strip or spring **30** partially covering the opening **28** which serves to hold the blank in position, but which, on the return stroke of the holder will flex (as shown in dotted lines in Fig. 2) to clear the blank.

The die cavities **14** are, in the present instance, formed in the blank by drilling. In this case, a gang of three drills **31** are used, each drill being set slightly in advance of the other so that each drills approximately one-third of the depth of the cavity. This serves to minimize wear and prolong the period during which the apparatus may be used before sharpening and adjustment of the drills becomes necessary. A finishing reamer **32** serves to true up the cavity after drilling. The reamer and preferably the last drill are provided with semispherical contours at their ends to give the cavity a smooth, curved surface. Drills and reamer are here shown carried in a reciprocating head **33** by which they are rotated and periodically advanced toward and withdrawn from the work. Such periodic reciprocation occurs incoherent with the operations of holder **27**.

Following completion of the die cavity **14**, the latter is provided with a bar **15**. In the present instance the bar is formed by severing short blanks from a hard wire **34** fed toward and transversely of the extremity of the shank. The wire is here shown entering an opening **35** in a reciprocable quill **36** adapted to advance over a button shank in the position **37**. The wire is advanced by conventional feed rolls **38** across the bore **39** of the quill in which reciprocates shearing pin **40**. The latter serves in conjunction with the quill to sever a short blank of wire and to carry the latter into the die cavity where it is momentarily wedged against the curved die surfaces.

At a later stage in the operation, the shank thus provided with a bar, is engaged by a reciprocating crimping tool **41** which engages the end of the shank and upsets or bends down portions **42** of the rim of the die cavity opposite the ends of the wire bar **15** to fasten the latter firmly in place.

In the next operation the strip is engaged by a reciprocating punch **43** which shears or punches the button head **44** from the blank concentrically with its shank **45**. The diameter of the punch is in this case about two hundredths of an inch greater than the width of the strip, thus providing a button head with opposite small flat spots **46**. Since the shank spacing is also less (two one hundredths of an inch) than the button head or punch diameter, the finished head will have a small crescent **47** cut in its edge. The flat spots **46** and crescent **47** (which are shown exaggerated in size in Fig. 3) give the button edge a slightly non-circular or irregular outline which serves to prevent the decorative or finishing sheet metal shell **48** which is afterwards crimped over the head, from rotating thereon in the event the crimping is not absolutely tight. The waste **49** remaining after the punching operation is by this means also minimized. It is collected and sold as scrap.

As here shown, the strip passes over and bears against a base plate **47'** which serves to support the strip and blanks for the foregoing operations.

After the completed buttons are severed from the strip, they are preferably cleaned and plated with a rust-proof plating, such as cadmium, and the heads are thereupon covered with the aforesaid thin metal shell **48**.

While the above process involves the production of some waste in both strip and rod drillings, this is offset by low tool, operating, and handling cost. Until the buttons are completed, except for plating and decoration, they require no handling.

Obviously the invention is not limited to the details of the illustrative construction herein shown since these may be variously modified. Moreover, it is not indispensable that all features of this invention be used conjointly since various features may be used to advantage in different combinations and sub-combinations.

Having described my invention, I claim:

1. The steps in the manufacture of buttons which comprise advancing a metal strip of the thickness and diameter of the button head, severing short blanks from a rod of the diameter of the button shank and bringing said blanks into endwise engagement with said strip at spaced points on said strip, applying welding current to weld one end of each of said blanks endwise to said strip, forming die cavities in the other ends of said blanks, feeding a wire toward the ends of said blanks, severing short sections from said wire and placing a section across each end cavity.

2. In the manufacturing of buttons, the method which comprises advancing a metal strip of the thickness and diameter of the button head, severing short blanks from a rod of the diameter of the button shank and bringing said blanks into endwise engagement with said strip at uniformly spaced points thereon, applying welding current to weld said blanks endwise to said strip, engaging successive projecting welded blanks to advance said strip periodically through a distance equivalent to the spacing between said blanks, forming die cavities in the opposite ends of each of said blanks as the latter are successively advanced, and punching said strip concentrically with said blanks to cut the button heads therefrom.

3. The steps in the manufacture of buttons which comprises periodically advancing a soft steel strip of the thickness and width of the button head, a distance slightly exceeding the

diameter of the button head, advancing a rod of the diameter of the button shank toward one side of said strip and in a direction transverse to said strip, severing sections of said rod of the length of the button shank to form blanks, bringing the ends of the severed blanks into abutting engagement with the said side of said strip, welding the blanks to said strip, forming die cavities in the opposite end of each of said rod sections, and then punching said strip concentrically of each of said blanks in a substantially circular outline whose diameter is slightly greater than the width of said strip to form a button head whose edge has short straight sections formed by portions of the original edges of said strip.

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