April 7, 1936. J. M. CLARK 2,036,255

BUTTON ATTACHING MACHINE

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Fig. 1

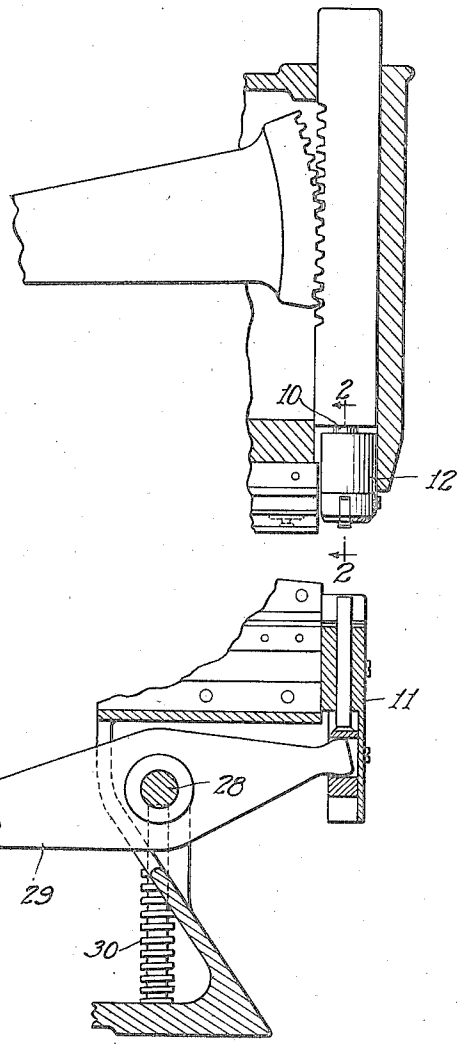


Fig. 2

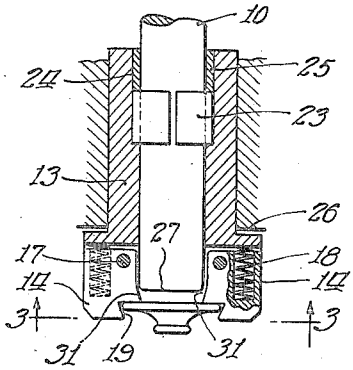
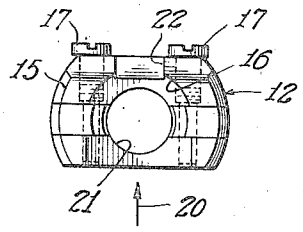


Fig. 3



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BUTTON ATTACHING MACHINE

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5 Claims. (Cl. 218—6)

This invention relates to button attaching machines, and among other objects aims to improve the attachment of the button to the fabric.

The invention may be readily understood by reference to one illustrative construction embodying the invention as shown in the accompanying drawing.

In said drawing:

Fig. 1 is a fragmentary longitudinal sectional elevation of the button attaching dies and their operating mechanism;

Fig. 2 is a vertical section of the button holder taken on the plane 2—2 of Fig. 2; and

Fig. 3 is a bottom plan view, taken from the plane 3—3 of Fig. 2, showing the under face of the button holder.

Buttons of the character here shown for illustration are attached to the garment by means of pronged metal fasteners whose prongs are upset by a curved die surface inside the button through the action of opposite attaching dies which engage the button and fastener respectively. When a double pronged attaching fastener is employed its prongs are generally tightly curled in the shank of the button. When the button is attached by a single prong fastener the prong is upset inside the button by the attaching dies so that it cannot be withdrawn through the restricted opening at the end of the button shank. The length of the fastener prong (either double or single prong) which projects inside the button obviously depends upon the length of the prong and the thickness of cloth which it penetrates at the point of attachment. In the manufacture of overalls and work coats, the thicknesses of cloth to which buttons are attached by a given attaching machine, may vary from a single thickness to as many as eight thicknesses of cloth. The possible location of a seam at the point of attachment of the button is likely to cause the button to tilt (unless firmly held) throwing it out of alinement with the fastener prong, and result in a faulty location of the fastener prong or prongs. The foregoing are some of the problems which must be satisfactorily solved to insure the efficient operation of a high speed attaching machine.

The present apparatus insures the efficient attachment of a button regardless of the variation in thickness of cloth to which it is attached or whether or not the button lies partly on a seam. As here shown the illustrative construction may advantageously be applied to the apparatus of my Patent No. 1,798,970.

In the present instance the button, after being presented to attaching position in alinement with the upper and lower attaching dies 10 and 11 respectively, is held in such position by button holder 12. This button holder may advantageously be substituted for that shown in my aforesaid prior patent. Obviously however its use is not limited to the particular form of apparatus shown in said patent.

The illustrative button holder is here shown in the form of a sleeve 13 slidably fitting about the upper die 10 and carrying its lower and button gripping means in the form of resilient, narrow jaws 14 located between stationary portions of a rim 15 at the lower end of the holder which form a pocket 16 for reception of the button head. The jaws 14 are pivotally mounted on screw pins 17 which pass transversely through the jaws of the holder the jaws being pressed toward the button by compression springs 18 set in recesses in the upper face of the jaws. The button engaging faces 19 of the jaws are preferably undercut slightly to guard against accidental discharge of the button.

The button is introduced by the button feeding mechanism into the holder in the direction of the arrow 20 in Fig. 3. On this side the rim 15 surrounding the pocket 16 is cut away to provide a space slightly wider than the full diameter of the button head to allow the latter to enter the holder. On the opposite side of the pocket 16 the rim 15 while not entirely continuous surrounds the pocket sufficiently to hold the head of the button exactly concentric with the bore 21 of the holder and therefore exactly concentric with the dies 10. The rim is preferably cut away at 22 to allow the insertion of a tool between the button head and holder in order to pry out a button if this be desired for any purpose.

The tension of springs 18 is made sufficient to hold the button sufficiently firmly to prevent its turning or tilting in its position against the flat face of the holder, during the attaching operation. The tendency for the button to rotate may be caused by the bending of double fastener prongs inside the button, and the tendency to tilt may be caused by the shank of the button striking the edge of a seam which forms a base of uneven thickness for the button.

After the button has been pressed in the holder it is moved down into contact with the cloth and there held immovable until the fastener prong or prongs have penetrated the cloth and have been upset inside the button to hold the latter tightly against the cloth. After the completion of the attachment, the button is released from the holder

and the latter then rises into button receiving position.

The reciprocating movement of the button holder is made periodic with the reciprocations of the upper die 10. This operation is advantageously effected in the present instance by frictionally connecting the holder to the die. The frictional connection is here effected by a split spring ring 23 whose inner diameter is slightly less than that of the die 10 which is therefore frictionally gripped by the ring. The spring ring is shown mounted in a recess on the sleeve of the holder which in this case is formed by counterboring the holder 24 to receive the spring. A press fit bushing 25 is forced into the upper position of the counter-bore after the insertion of the spring. The frictional grip on the die is sufficient not only to move the holder but to cause it to press the button very tightly against the cloth. The frictional grip allows relative downward movement of die 10 after a certain compression against the cloth has been exceeded; but during said relative downward movement toward the button, the firm pressure of the button against the cloth is maintained. The holder also slips on the die 10 on the latter's upward stroke when the upper end of the holder sleeve engages a fixed portion 26 of the housing surrounding the die and is thereby stopped. The surface 26 and the length of the holder sleeve are obviously adjusted so that the holder is arrested on the upward movement with the button pocket 16 in button receiving position. After arrest of the upward movement of the holder the die 10 continues its movement. Upon downward movement of the die the holder is carried down and causes the button firmly to engage the cloth before the end 27 of the die reaches the top of the button head.

When the compression of the button against the cloth exceeds frictional grip of the ring 23, the die 10 then moves downward independently of the holder and eventually strikes the button head. Closer approach of the dies 10 and 11 through yielding compression of the cloth is permitted by the resilient mounting of the pivot shaft 28 of the lower die operating lever 29 upon heavy springs 30. The springs are under initial compression and do not yield during the upsetting of the fastener prongs but only at its completion when the full force of the die is delivered to the cloth.

The button is advantageously released, in the present instance, by the action of the die 10, a portion of whose side engages the lower cam faces 31 of the jaws. These faces are separated slightly less than the diameter of the die at the point of engagement with the jaws; and slight additional downward movement of the die thus separates the jaws by the amount necessary to release the button. The relative movement of the die necessary to effect this operation is slight and it occurs at the time of attachment and not before in order to insure that the button will be firmly held with its shank in exact alinement with the fastener until attachment has been practically completed. The above construction thus avoids the ejection of the button from the holder before its attachment to the cloth. In other words the movement of the holder is not arrested above the cloth to effect release of the button but continuous until the button is pressed in tight contact with the cloth, before release of the button. In the former arrangement when the button was discharged just above the cloth, the character of its attachment depends largely upon the evenness of the surface which it engages. If the surface were uneven or the button struck a seam the attachment was likely to be defective or incomplete. With the present arrangement the fastener prong is upset while the button shank is held in exact axial alinement with the fastener prongs and the complete and efficient upsetting of the fastener prongs is effected.

Obviously the invention is not limited to the details of the illustrative construction wherein 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. In a button attaching machine the combination comprising a reciprocating attaching die, a button holder having a bore through which said die is adapted to pass, a button receiving seat on said holder in alinement with said bore and said die, resilient holder jaws for engaging said button to hold it on its seat, and a spring ring in said bore frictionally connecting said holder with said die.

2. In a button attaching machine the combination comprising a reciprocating attaching die, a button holder having a bore through which said die is adapted to pass, a button receiving seat on said holder in alinement with said bore and said die, resilient holder jaws for engaging said button to hold it on its seat, a spring ring in said bore frictionally connecting said holder with said die, and cams extending into said bore to be engaged by the movement of die therein to actuate said jaws to release the button.

3. In a button attaching machine the combination comprising a reciprocating attaching die, a button holder having a bore through which said die is adapted to pass, a button receiving seat on said holder in alinement with said bore and said die, resilient holder jaws for engaging said button to hold it on its seat, means associated with said holder for frictionally engaging said die whereby the holder is carried therewith, said frictional engaging means being sufficient to cause the holder to move with the die and to press the button against the article to which it is to be attached while holding it against tilting, said die having a range of movement sufficient to carry the button into engagement with the article regardless of the thinness of the article, and jaw operating cams projecting into said bore and located so as to be engaged by the die to release the button only when it comes substantially into operative engagement with the button whereby the latter is held by the die against tilting after release from said jaws.

4. In a button attaching machine the combination comprising a reciprocating die, a reciprocating button holder associated therewith, button jaws on said holder for releasably holding a button in attaching position, mechanism for moving the die and holder to attaching position and to press the button tightly against the article to which it is to be attached while it is held by the holder, said holder having a range of movement sufficiently great to press the button tightly against the article regardless of variations in thickness of the article, yielding means for compensating for variations in the thickness of the article, and means located in the path of said die to be actuated by movement of the die relative to the button while the button is substan-

tially at rest in engagement with the article for opening the holder jaws to release the button.

5. In a button attaching machine the combination comprising a die, a reciprocating button holder associated therewith, button jaws for releasably holding a button in attaching position, mechanism for moving the die and holder to attaching position and to press the button tightly against the article to which it is to be attached while it is held by the holder, said holder having a range of movement sufficient to press the button tightly against the article regardless of the latter's thickness, and means operable by movement of said die relative to and independently of the button for causing said holder to release the button as it is held in firm contact with the said article by said die.

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