Dec. 29, 1959 N. O. BRODERSON 2,918,885

BUTTON FEEDING ATTACHMENT FOR SEWING MACHINES

Filed Feb. 24, 1958 4 Sheets-Sheet 1

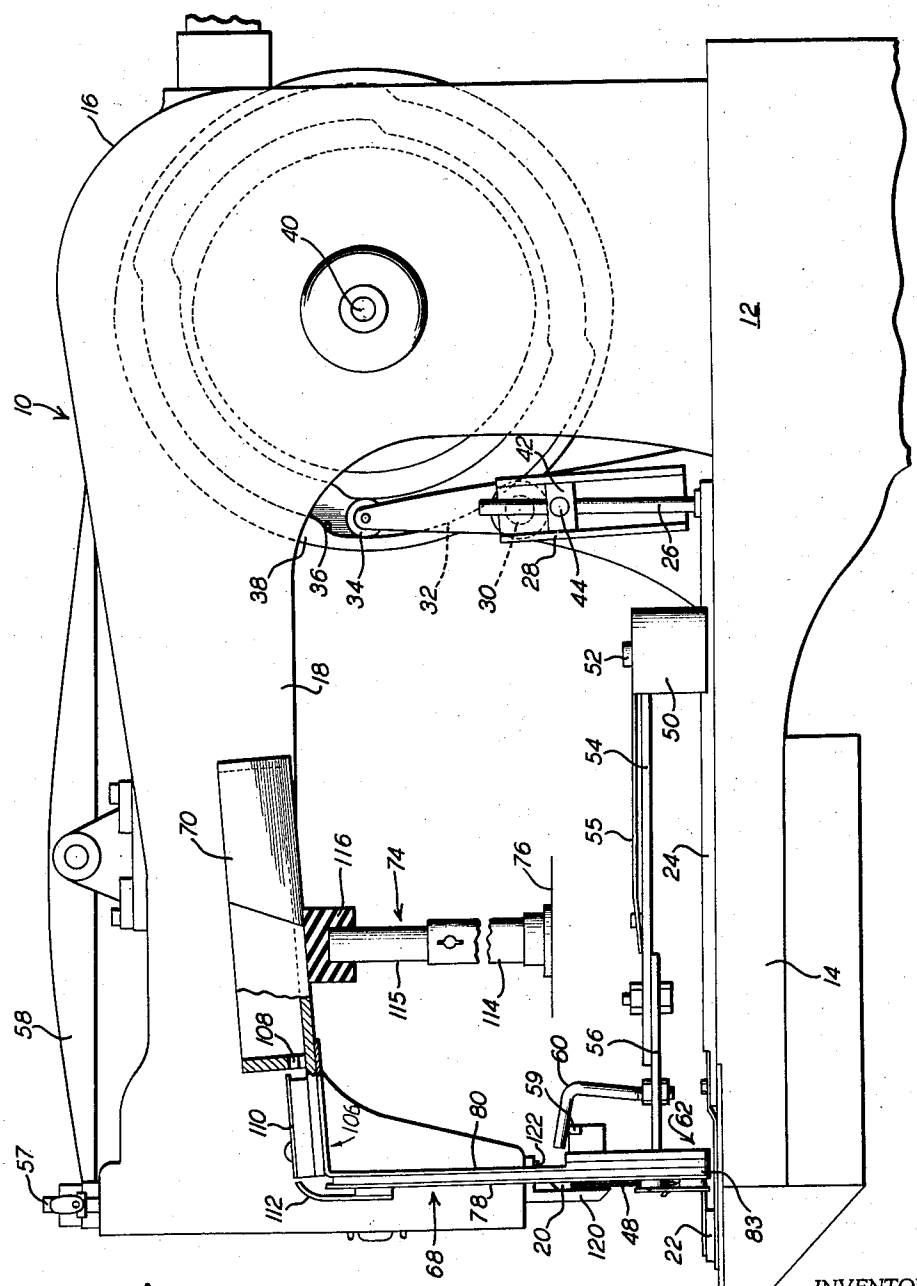


Fig. 1.

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Filed Feb. 24, 1958 4 Sheets-Sheet 2

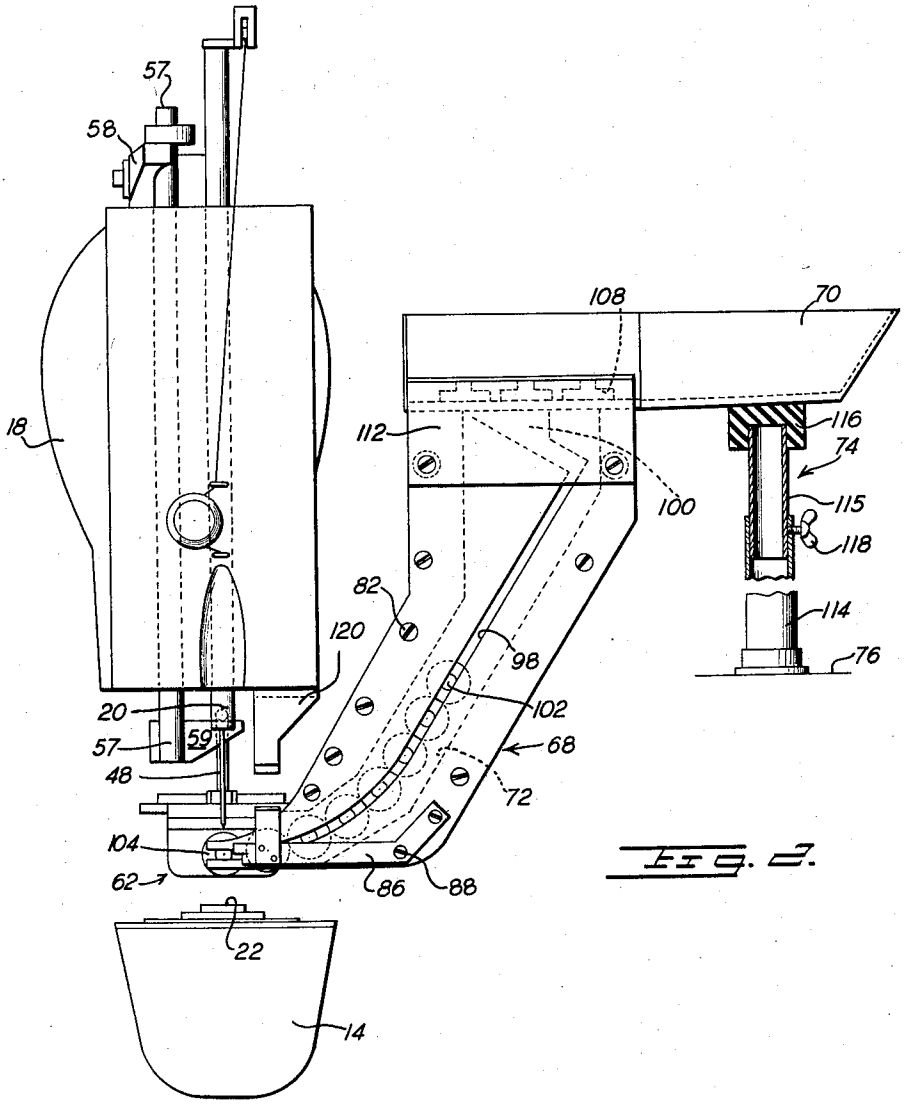


Fig. 7.

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BUTTON FEEDING ATTACHMENT FOR SEWING MACHINES

Filed Feb. 24, 1958 4 Sheets-Sheet 3

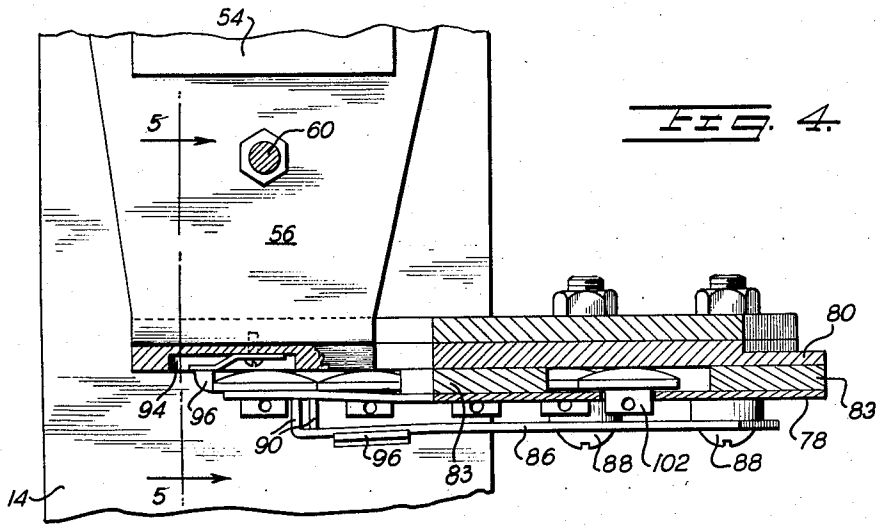


Fig. 4.

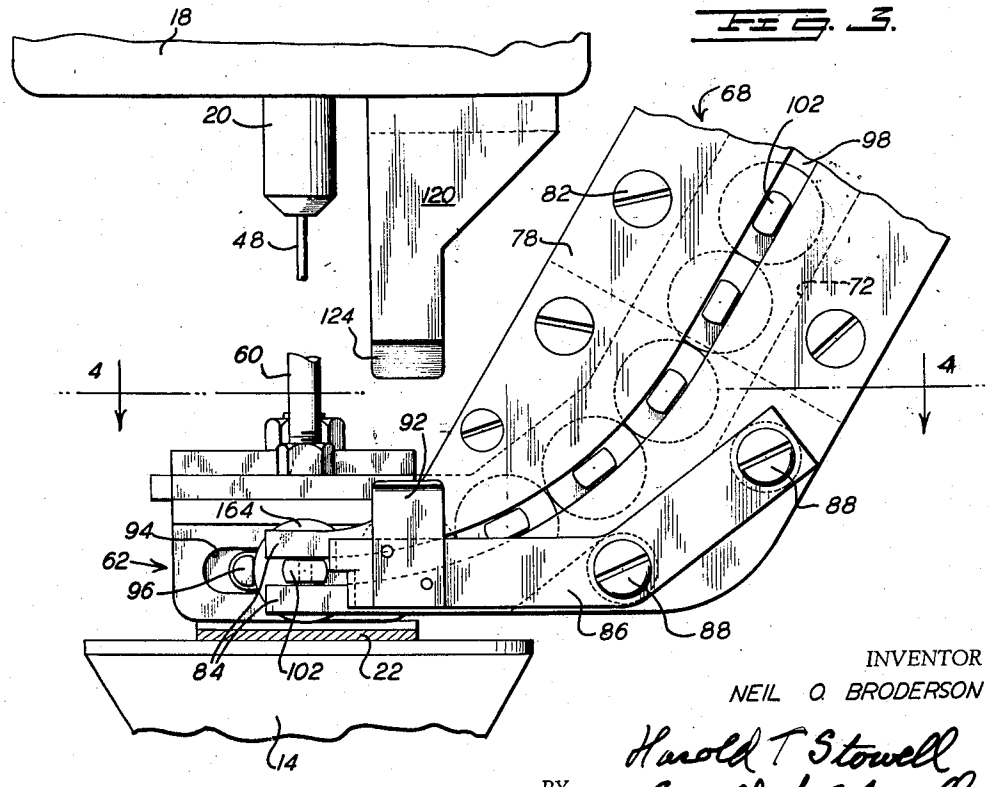


Fig. 3.

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BUTTON FEEDING ATTACHMENT FOR SEWING MACHINES

Filed Feb. 24, 1958 4 Sheets-Sheet 4

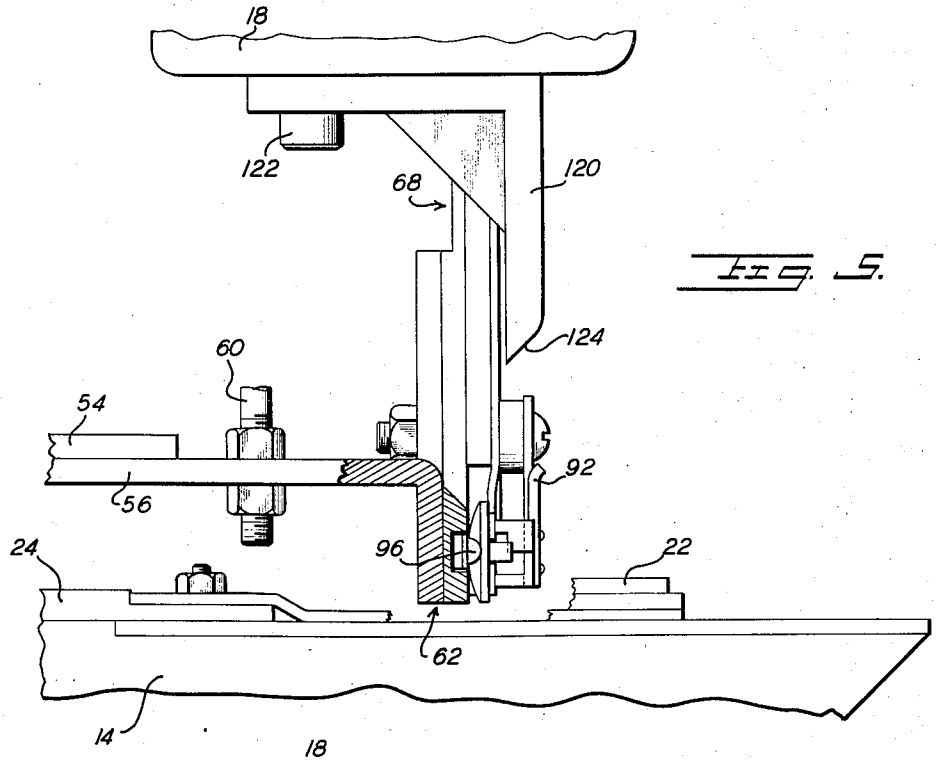


Fig. 5.

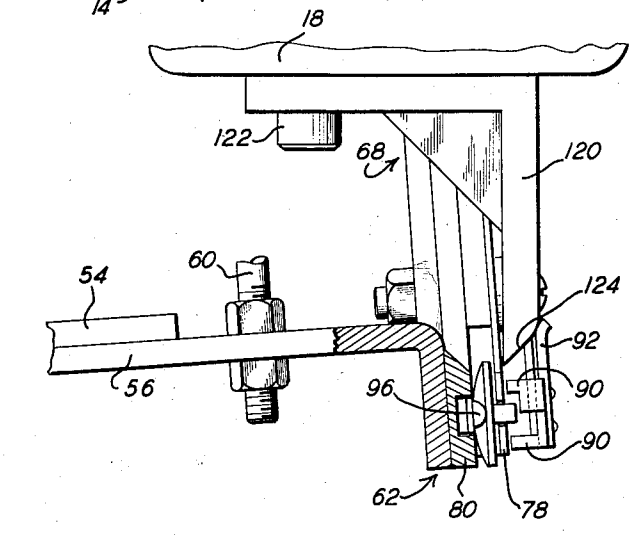
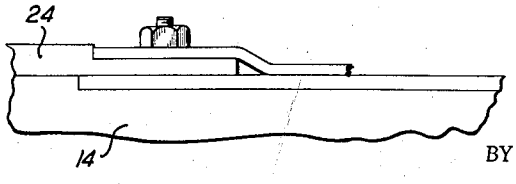


Fig. 6.



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United States Patent Office 2,918,885 Patented Dec. 29, 1959

2,918,885

BUTTON FEEDING ATTACHMENT FOR SEWING MACHINES

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Application February 24, 1958, Serial No. 717,208

2 Claims. (Cl. 112—113)

The present invention relates to sewing machine attachments and more particularly and specifically to an automatic button feeding apparatus for attachment to and cooperative use with a shank button type sewing machine.

It is an object of the present invention to produce a new and useful apparatus which takes the form of a button feeding attachment for a sewing machine wherein shank-type buttons are automatically, serially fed and held in sewing position relative to the needle of the sewing machine.

Another object of the invention is the production of a button feeding apparatus wherein the buttons are permitted to freely feed from an associated hopper by gravity in a first position and when in a second position the apparatus is caused to snugly engage the button to be sewn.

A further object of the invention is to produce an attachment for a sewing machine for feeding buttons to a sewing position and there holding them in place during the operation, which apparatus is of extremely simple and inexpensive design and construction providing an initial low cost sewing machine attachment which may be inexpensively maintained.

Still a further object of the present invention is to produce a button feeding attachment for use with a sewing machine which is substantially universally adaptable for attachment to and operation with any of the standard makes of sewing machines presently available.

These and other objects may be effectively achieved by a button feeding apparatus for attachment to a button type sewing machine including a hopper, a button guiding chute having one end in communication with the hopper and the other end terminating in a spring biased button engaging arrangement and cam means for urging the spring biased arrangement out of engagement with the buttons in the chute when the apparatus is in a non-sewing position whereby the buttons are free to slide to the bottom portion of the chute.

Other objects and advantages of the invention will become manifest to those skilled in the art from reading the following detailed description in conjunction with the drawing in which—

Figure 1 is a side elevation of the button feeding apparatus attached to a sewing machine with a portion of the button hopper broken away,

Figure 2 is a vertical elevation taken in the direction of the needle of the machine with button feeder in a raised position,

Figure 3 is a fragmentary elevational view similar to Figure 2 with the button feeder in its lowermost position,

Figure 4 is a sectional view of the button feeder attachment taken along line 4—4 of Figure 3,

Figure 5 is a sectional view of the invention taken along line 5—5 of Figure 4 showing the attachment in its lowermost sewing position similar to the position shown in Figure 3, and

Figure 6 is a view similar to Figure 5 but shows the button feeding attachment in a raised position.

Referring to the accompanying drawings, there is shown a sewing machine, generally designated at 10, which includes a supporting base 12 from which is projected horizontally a work supporting arm 14 which carries at one end thereof a standard 16 which, in turn, supports the usual drive shaft housing 18 horizontally above the work support arm 14. A needle bar 20 is carried within the extended end of the drive shaft housing 18 and projects downwardly therefrom. The needle bar 20 is mounted for reciprocating movement relative to the work support 22 carried on the extended end of the work support arm 14 by means of the usual cam drive mechanism from the cam shaft of the machine.

Supported lengthwise of the upper face of the work support arm 14 is a slide bar 24 which carries the work support means 22 on the upper face thereof on its outwardly extended end and which is connected at its innermost end toward the standard 16 to the lower end of an arm 26. The arm 26 is substantially vertically disposed within a semi-tubular housing 28, the upper end of which is secured to a shaft 30. The other end of shaft 30 is connected to one end of an arm 32, the second extended end of which carries a cam roller 34 mounted within a cam track 36 in a wheel 38 rotatably mounted on an axle 40 within the standard 16 of the machine. The power source of the sewing machine, not shown, is employed to drive the axle 40.

The arm 26 carries a block 42 which is adjustably secured longitudinally of the arm 26 by means of a thumb screw 44. The block 42 is frictionally secured vertically within the semi-tubular housing 28 to permit its adjustment vertically therein and vertically relative to said arm 26. The adjustment of the block 42 within the semi-tubular housing varies the effective length of the stroke of the lowermost end of the arm 26 induced by the oscillation of the wheel carrying end of the arm 32 due to alternately arranged offset portions 46 in the track 36 in which the cam wheel 38 rolls. This alternate reciprocal movement of the lower end of the arm 26 causes reciprocation of the slide bar 24 lengthwise of the top face of the work support arm 14, thereby producing reciprocal movement of the work support member 22 secured thereon relative to the sewing needle 48 positioned substantially vertically thereabove in the needle bar 20.

In addition to the foregoing apparatus which effects reciprocal movement of the work holding means 22 relative to the vertical alignment of the sewing needle 48, the sewing machine is also provided with a block member 50 secured by bolt means 52 to the slide bar 24 at a point thereon remote to the work holding means and adjacent the standard member of the machine. The block 50 in turn supports an elongate arm 54 which extends in horizontal spaced relationship above the slide bar 24 in the direction of the work holding means 22 and which carries on the distal end thereof an arm 56. Associated with the arm 54 is a flat spring member 55 anchored at one end to the top of the block 50 while the other end urges the extended end of the arm 54 downwardly toward the work supporting arm 14. The arm 56 connects the button feeding attachment of the present invention to the sewing machine as will be described in detail hereinafter and, additionally, is connected to work holding lift rod 57 of the sewing machine. The lift rod 57 extends vertically through the head portion of the machine and is connected to a rocker arm 58 mounted along the upper shaft housing of the machine. The end of the rocker arm 58 opposite to that which is connected to the left rod 57 is connected to the power means of the sewing machine or to a foot pedal whereby the sewing machine operator may impart vertically reciprocating movement to the lift rod 57.

The lower end of the lift rod 57 is attached to a

bracket 59 which engages the under surface of an inverted L-shaped pin 60 which is suitably fastened to the arm 56 such that when the rocker arm 58 effects vertical movement of the lift rod 57, the arms 54 and 56 are simultaneously rocked upwardly or downwardly about the block 50.

By the foregoing construction the reciprocal movement of the slide bar 24, as hereinabove described, will cause simultaneous reciprocal movement of the block 50 therewith which, in turn, imparts like reciprocal movement of the arm 54 supported from the block 50 causing oscillation or reciprocation of the work supporting means 22. At the same time, the foot portion of the L-shaped rod 60 will slide relative to the bracket 59 carried by the lift rod 57, maintaining constant vertical contact between these elements at all times.

The button feeding attachment constituting the present invention in combination with a sewing machine of the type described above consists generally of a vertically inclined chute 68 having attachment at its lower end to the bracket 56 to the presser foot member 62.

The chute 68 supports from its upper and outermost end a tray type button hopper 70. The chute 68 is provided with a button channel 72 therein which extends from the lowermost end adjacent the presser foot 62 to communicate with the hopper 70 through a button orienting and positioning gate 108. Where desired, a vibration dampening and support member 74 may be disposed beneath the projected end of the hopper 70 and has its other end supported on a work surface or support surface as at 76.

In more particular detail, the chute 68 consists of a pair of plates 78 and 80 which are secured by nut and bolt members 82 carrying spacer elements 83 intermediate the plates in parallel spaced relationship. The lowermost end of the plate 78 is provided with substantially horizontally projecting resilient fingers 84 which extends beyond the spacer elements 83.

There is provided at the lower portion of the chute 68, a clamping spring 86 which is suitably secured thereto by a pair of threaded fasteners 88. The free end of the clamping spring 86 is formed to have inwardly turned lips 90 which normally are caused to bear against the resilient fingers 84 of the plate 78, causing the fingers 84 to bear against the lowermost buttons. The upper lip 90 fits snugly in back of the shank 102 of the button to be sewed to militate against any retrograde movement of the button.

A bracket or guide 92 is riveted or otherwise secured to the side of the clamping spring 86. It will be noted that the upstanding portion of the bracket 92 is curved slightly outwardly as is particularly manifest in Figures 5 and 6.

From an examination of Figures 3, 4, 5 and 6, it will be noted that the lower end of the plate 80 is provided with a recessed portion 94 within which is disposed a small spring stop 96. The spring stop 96 acts to militate against the downward and outward passage of buttons which are caused to slide within the passageway formed between the plates 78 and 80.

The plate 78 is provided with a continuous slot 98 opening through the projected end of the plate, where it defines the spaced apart resilient fingers 84 and extending substantially centrally thereof outwardly and upwardly to communicate with an enlarged slotted area 100 shown in Figure 2 immediately adjacent the upper end of the plate and opening therethrough. The slot 98 is of such configuration as to frictionally engage the projected shank portions 102 of the buttons 104 which are slidably introduced into the channel defined by the plates 78, 80 and the spacer elements 83.

The shanks of the buttons are provided with flat sides as shown, for example, in Figures 2 and 3 of the drawings so that the shanks of the buttons will always be delivered down the slot 98 in proper alignment relative to the needle.

The upper outermost end of the plate 80, as illustrated clearly in Figure 1, is turned outwardly and rearwardly of the machine at substantially right angles to form a substantially horizontal platform 106.

The button hopper 70 has a bottom slightly inclined in the position of the chute 68 and is provided with a button orienting and positioning gate 108. The gate 108 is merely an upstanding wall in which is formed a plurality of openings as shown in dotted lines in Figure 2. The openings are of a configuration slightly larger than and conforming to the size and shape of the buttons 104 being fed into the sewing machine. These openings permit to passage of only those buttons having their shank portion disposed upwardly, thereby providing that all the buttons passing into the chute 68 have their shank portion extending outwardly through the slot 98.

The portion of the bottom of the hopper 70 which extends over the platform 106 is provided with a cover plate 110 which prevents buttons from being displaced or rearranged in their passage from the gate 108 to the button feeding chute 68. Likewise, a vertical cover plate 112 secured to the upper end of plate 78 and having the upper end thereof turned inwardly forms a continuation of the cover plate 110 immediately adjacent the angular bend between the plate 80 and the platform 106.

The vibration dampening support member 74 consists of a pair of telescoping tubes 114 and 116 with the upper inner tube 115 slidably mounted in the lower tube which has a flanged bottom support 76 for attachment to a supporting surface. The upper tube 114 is provided with a resilient cylindrical member 116 which is engaged beneath the bottom of the hopper 70. The vertical disposition of the support member 74 is adjusted by a thumb screw 118 for the purpose of controlling the amount of vibration of the hopper 70 from the sewing machine movement to provide the proper agitation and movement of the buttons in the hopper into and through the orienting and positioning gate 108.

Disposed on the bottom surface of the sewing machine housing 16, there is provided a release bracket 120 which is suitably secured thereto by fastening means 122. It will be noted that the bottom surface of the release bracket 120 is formed to have knife-edge 124.

Operation

In operation of the button feeding attachment in combination with or in attachment to a sewing machine of the type described, shank type buttons are placed in the outer region of the hopper or button tray 70 whereupon the vibration of the feeding attachment by reason of its rigid connection to the reciprocating elements of the sewing machine will cause the buttons to move through the positioning and orienting gate 108 which will permit the buttons, in proper position only, to enter the button feeding channel between the spaced plates 78 and 80 with the shank portions thereof projecting outwardly through and being guided by the slot 98. By such button movement, the buttons will be caused to stack in the slot with the first button entering the slot retained between the plate 80 and the fingers 84 of the plate 78 and held from movement out of the slot by the spring stop 96. The shank of the bottom-most button is disposed above the work support 22 and below the sewing needle 48 with the eye of the shank being vertically disposed in that position.

With the presser foot and feeding device in its depressed sewing position (Figures 1, 3, 4, and 5) the button shank is held directly on the work holder 22 to contact with a fabric previously inserted beneath the needle and the presser foot member with the eye of the shank directly above the usual cutout needle passage in the work support member 22. Cycled operation of the sewing machine will then cause reciprocation of the

needle downwardly through the shank eye of the button, the work support, the fabric and into the bobbin chamber of the machine. With a subsequent endwise or lengthwise reciprocation of the work support upon raising of the needle to permit alternate vertical passage of the needle externally of the shank thereby causing a looping of the thread through the fabric and the eye of the shank to secure the button to the fabric.

Following the timed interval of the sewing operation for a shank button, the lift arm **57** will be elevated by rocker arm **58** to raise the presser foot **62** and the button feeding device as illustrated in Figures 2 and 6 whereupon the cam surface **124** of the release bracket **120** will contact the guide **92** and cam the latter and its associated clamping spring **86** away from the clamping fingers **84** of the plate **78**. The pressure heretofore exerted on the buttons **104** by the clamping fingers **84** is relieved and the buttons may now feed down the chute from the hopper **70** by means of gravity and vibration imparted by the action of the sewing machine. It will be appreciated that because the spring fingers no longer grip the bottom buttons they merely provide a continuation of the chute permitting the buttons to slide freely down the chute **68** until coming into contact with the spring stop **96**.

When the feeder attachment is lowered into sewing position, the release bracket **120** no longer holds the clamping spring **86** away from the clamping fingers **84** and the clamping spring **86** again exerts a pressure against the fingers **84** causing them to hold the bottom-most button tightly in sewing position. Also, the upper turned-in end or lip **90** of the clamping spring **86** has dropped in back of the shank of the button to be sewed thereby militating against any shift in position or misalignment of the hole in the shank of the button with respect to the needle **48** of the sewing machine.

At the end of the sewing cycle the button feeder assembly raises causing the clamping spring **86** to release its pressure on the fingers **84** by means of the release bracket camming the release guide **92** and its associated clamping spring **86** away from the plate **78**. The button which has been sewed on the garment is then pulled free from the fingers **84** and a new button slides into position for clamping and sewing by gravity and pressure of the column of buttons in the chute **68**.

It will be appreciated that this invention has produced a new and useful button feeding attachment for a sewing machine which employs no cams or other pushing devices to place the buttons in sewing position. The action is accomplished entirely by gravity and vibration.

I claim:

1. In a sewing machine attachment, a button feeder for buttons having a head portion and a shank portion comprising a button container, a movable presser foot positioned below said container, a chute having an upper end communicating with said container and extending downwardly to a lower end integral with said presser foot, said chute including a side wall with a slot formed therein for guiding the button shanks and a channel for guiding the button heads, a resilient arm mounted on said side wall for engaging the bottommost button in said chute, an upwardly projecting guide member integral with said resilient arm, and stationary cam means adapted to be fixedly mounted on the sewing machine to cooperate with said guide member for camming said guide member and said arm away from the buttons in said chute upon raising said presser foot thereby allowing the buttons to move downwardly by the force of gravity.

2. In a sewing machine attachment, a button feeder for buttons having a head portion and a shank portion comprising a button container, a movable presser foot positioned below said container, a chute having an upper end communicating with said container and extending downwardly to a lower end integral with said presser foot, said chute including a side wall with a slot formed therein for guiding the button shanks and a channel for guiding the button heads, a button stop member disposed in said chute adjacent said presser foot, a resilient arm mounted on said side wall for engaging the bottommost button in said chute, an upwardly projecting guide member integral with said resilient arm, and stationary cam means adapted to be fixedly mounted on the sewing machine to cooperate with said guide member for camming said guide member and said arm away from the buttons in said chute upon raising said presser foot thereby allowing the buttons to move downwardly by the force of gravity.

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