

[54] FASTENER ATTACHMENT SYSTEMS

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[51] Int. Cl. **B65c 7/00**

[58] Field of Search 227/26, 68, 70, 71, 93, 95, 227/96, 120, 130; 112/104

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Primary Examiner—Granville Y. Custer, Jr.

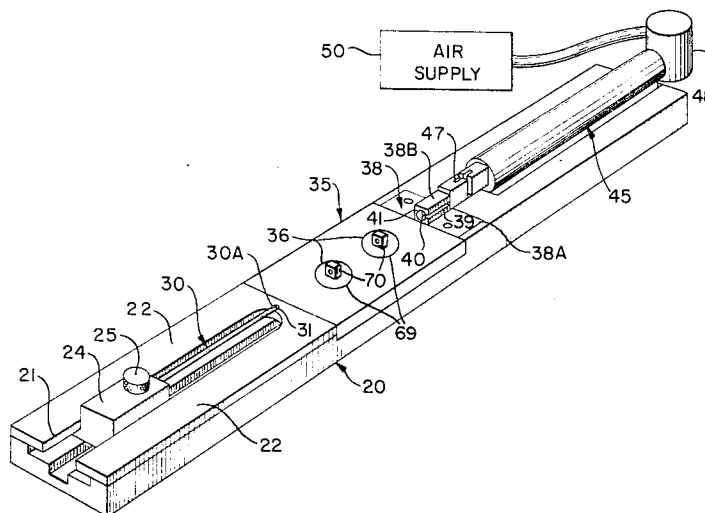
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[57]

ABSTRACT

A machine for inserting an attachment member having a filament and heads on either end through an opening in an article, said machine including a holder for the article, a tube for receiving a head of the attachment member, a device for feeding the attachment member into an end of the tube, said tube adapted to first enter the opening in the article, then proceed to pick up the attachment member from device for feeding an then carry a portion of the attachment member back through the article opening. The device for feeding the attachments includes a fluid powered piston shaped to feed attachment members into the device, said piston carrying a rod to push the attachment members into the tube, needle or the like and the device also including a valve to cause fluid under pressure to move the piston.

23 Claims, 19 Drawing Figures



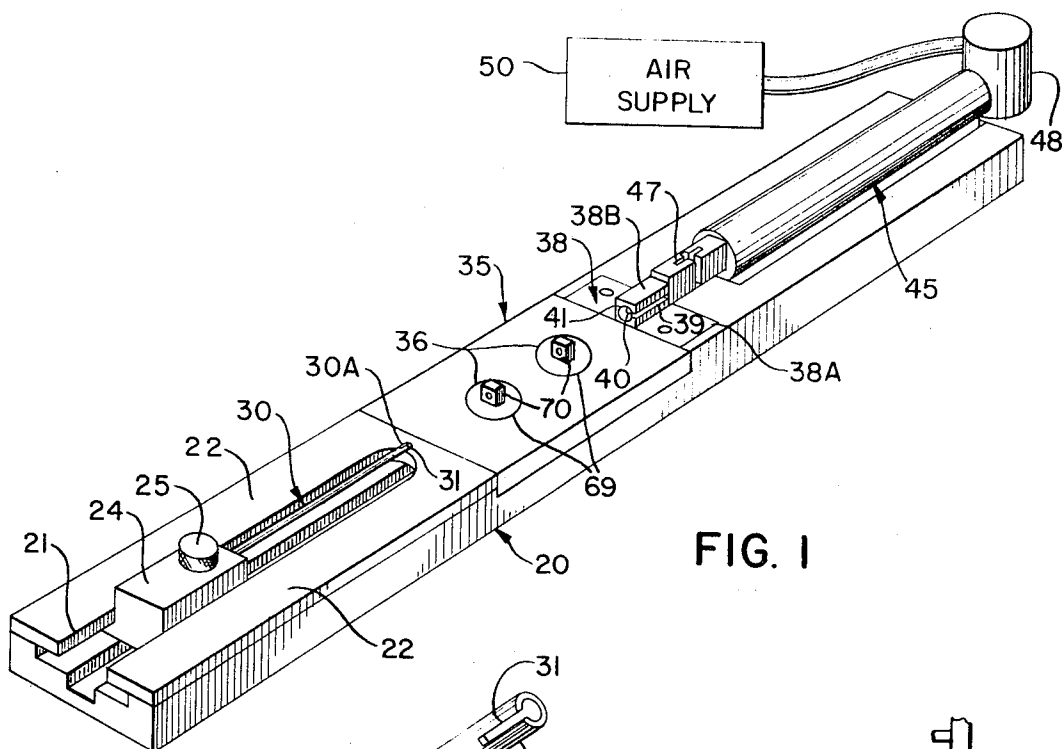


FIG. 1

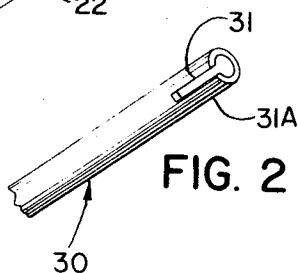


FIG. 2

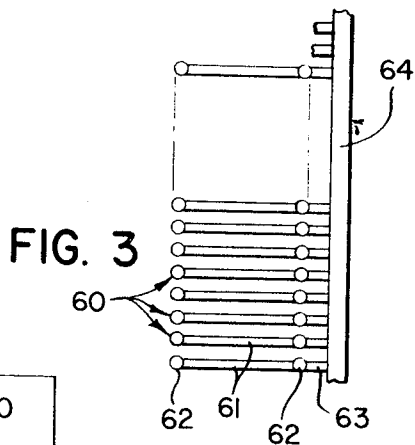


FIG. 3

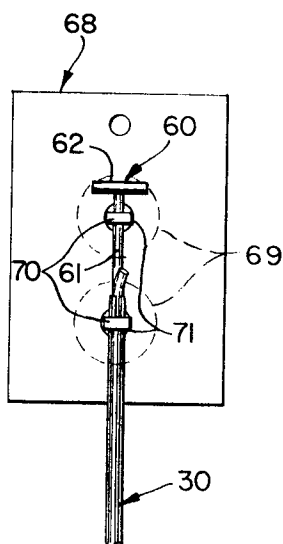


FIG. 4A

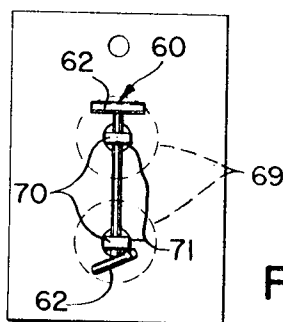
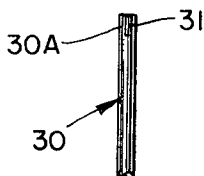


FIG. 4B



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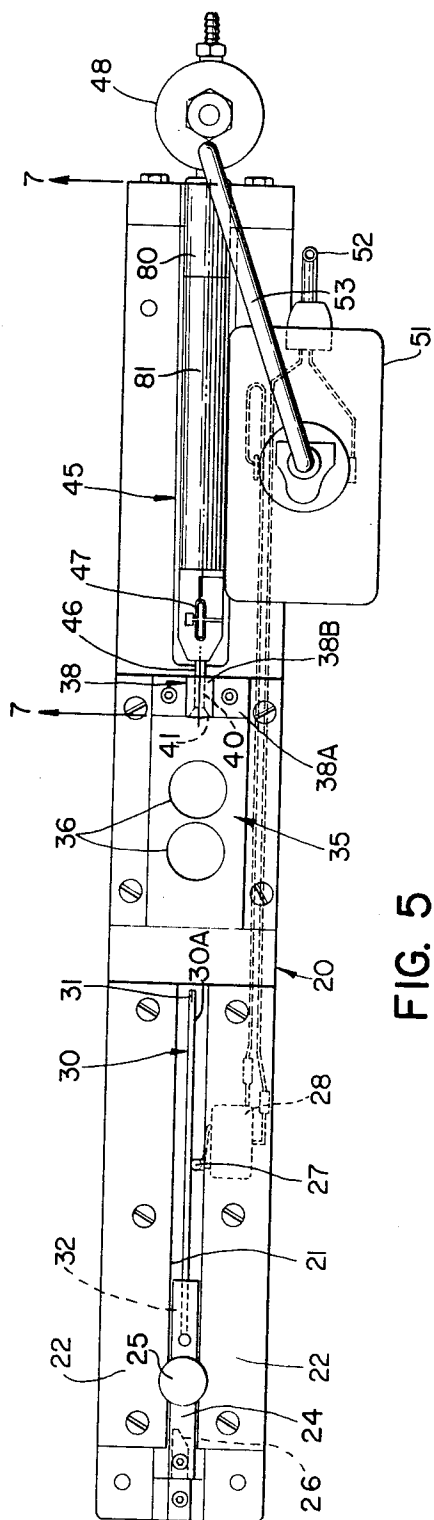


FIG. 5

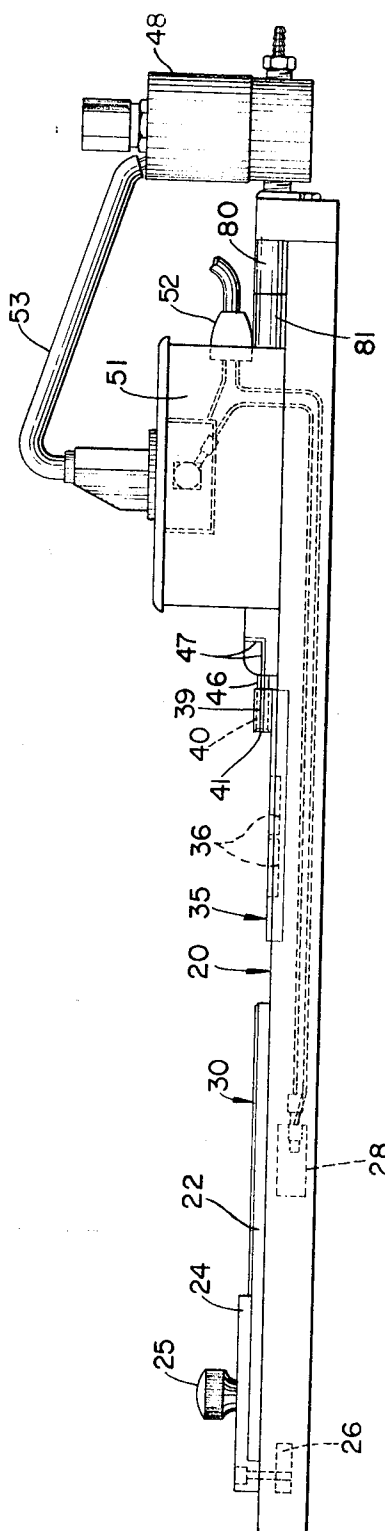


FIG. 6

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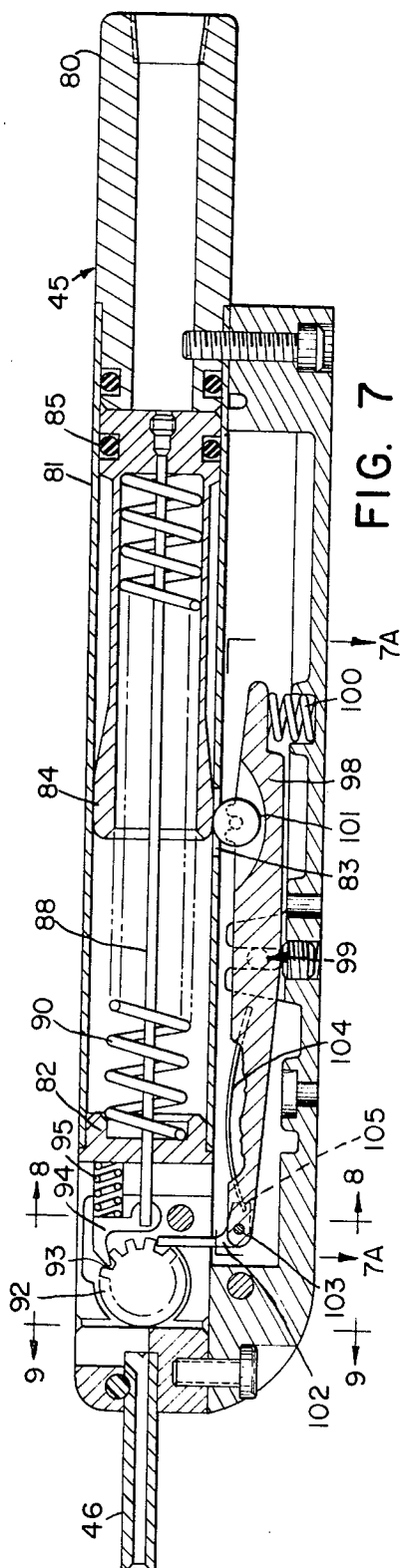


FIG. 7

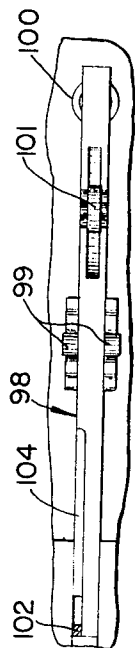


FIG. 7A

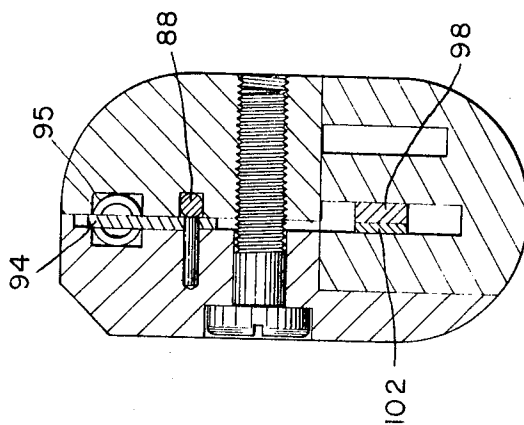


FIG. 8

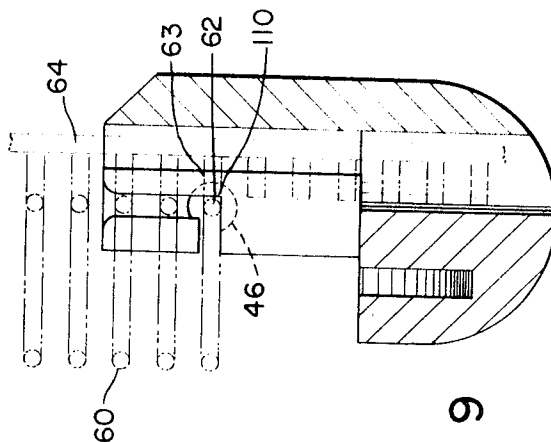
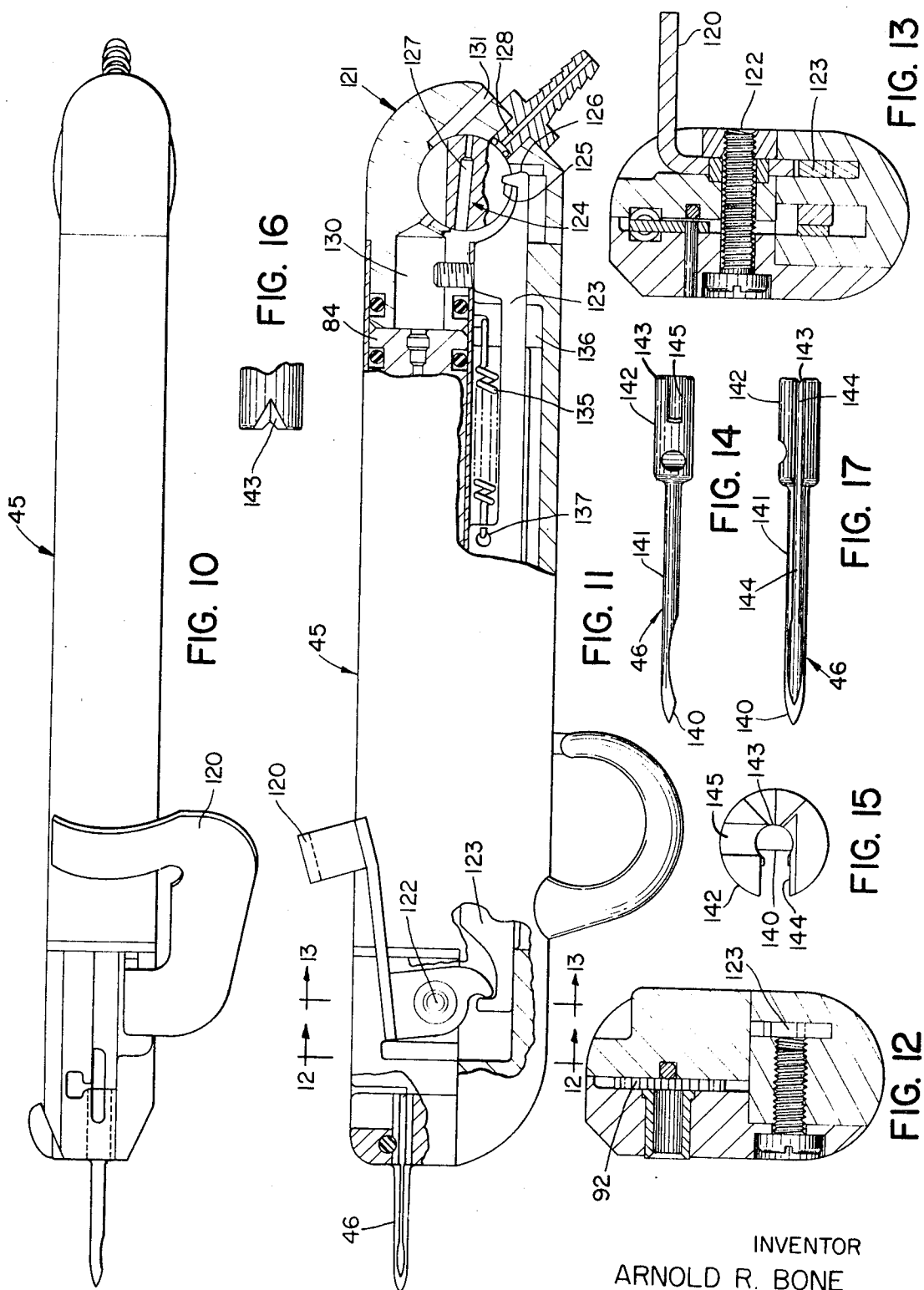


FIG. 9

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FASTENER ATTACHMENT SYSTEMS

BACKGROUND OF THE INVENTION

This invention relates to an apparatus for inserting an attachment member into an article and is more particularly related to a new and improved machine for carding buttons and the like as well as to a new and improved machine for feeding attachment members into a tube, needle or the like.

The applicant of this application has in the past obtained U.S. Pat. Nos. 3,103,666 and 3,470,834, for devices to fasten attachment members to articles and the like. Such devices have been found to be eminently usable in attaching tickets or tags to clothing and to fastening buttons to clothing, etc.

The devices shown and claimed in the aforementioned patents have proven to be highly successful commercially and because of such demand it became necessary to continue development of new devices which could be applied to additional uses and/or new uses.

In order to satisfy such new use requirements, new and improved devices had to be developed to provide for and permit the devices to operate more rapidly than those presently available.

In particular, applicant has developed, as shown in this application, a device for coupling buttons or the like on a display card for the same. In addition, applicant has provided a new and improved fluid powered device which is able to provide attachment members at a rapid rate, so that it can be incorporated in automatic devices for joining two articles together.

Other uses and advantages of the invention will in part be obvious and will in part be apparent from the specification. The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the invention will be indicated in the claims.

SUMMARY OF THE INVENTION

In accordance with this invention a new and improved machine is provided which is adapted to provide fastener attachment members at a high rate of speed and automatically. This has in part been accomplished by developing a fluid operated system, where the fluid is preferably compressed gas but could be other fluids such as oil, etc. normally utilized in hydraulic systems. The above has also in part been accomplished by the development of a new feed mechanism which is adapted to be operated automatically by a device propelled along with the means for pushing attachment members from the machine. In addition, this machine provides a new and improved needle or the like for guiding an attachment from the machine which includes a cutting edge to assist in separating attachment members from a bar or rod carrying a plurality of attachment members. The new and improved machine of this invention is also adapted to be used in conjunction with a slide mounted receiver to couple buttons or the like to a card or the like.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view with some parts removed showing the carding device of this invention which includes a machine for providing fastener attachments and a tube for receiving said attachments;

FIG. 2 is a perspective view showing the construction of the tip of the above mentioned tube;

FIG. 3 is a side view showing the construction of attachment members suitable for use according to this invention;

FIG. 4A is a view showing the method of inserting an attachment through the shanks of buttons;

FIG. 4B is a view showing an attachment in place after being inserted through the button shanks;

FIG. 5 is a top view of the carding device shown in FIG. 1;

FIG. 6 is a side view of the device shown in FIG. 5;

FIG. 7 is a sectional view of the machine for providing fastener attachments taken on line 7—7 of FIG. 5;

FIG. 7A is a sectional view taken along line 7A—7A in FIG. 7;

FIG. 8 is a sectional view taken on line 8—8 of FIG. 7;

FIG. 9 is a sectional view taken on line 9—9 of FIG. 7;

FIG. 10 is a top view of the fastening attachment machine of FIG. 7 and 9 which has been modified to be operated by hand;

FIG. 11 is a partial sectional view of FIG. 10 without showing the parts already shown in the sectional view of FIG. 7;

FIG. 12 is a sectional view taken on line 12—12 of FIG. 11;

FIG. 13 is a sectional view taken on line 13—13 of FIG. 11;

FIG. 14 is a top view of an improved needle or the like shown in the construction of FIGS. 10—13;

FIG. 15 is a rear view of the needle shown in FIG. 14;

FIG. 16 is a side view of the rear cutting edge of the needle;

FIG. 17 is a view of the other side of the needle.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIGS. 1, 2 and 5 and 6 there is shown a button carding device according to this invention, which includes a new and improved machine for providing fastener attachments. At 20 there is shown a base support member in which there is provided a guide slot 21 covered by guide plates 22. Positioned within the guide slot 21 there is provided a slide 24 having a knob 25 for moving the slide within the guide slot 21. Slide 24 carries a cam member 26 which is adapted to engage an electrical switch contactor 27 of an electrical switch 28. The purpose of the electrical switch will be described below in describing the operation of the button carding device. At 30 there is shown a tube or needle receiver which may be hollow throughout or which may only be hollow at the end thereof. The needle receiver is provided with a small slot 31 at its tip. This end of the tube 30 is adapted to receive the head of an attachment member of the type as shown in FIGS. 3, 4A and 4B. The needle receiver is positioned within a bore 32 formed in the slide 24 and moves with the slide back and forth as will be described. At 35 is shown a plate in which there are provided a plurality of recesses or button holders 36 which are adapted to receive the buttons in a manner such that the shanks thereof will extend upwardly (i.e. the buttons will be positionable in a face down position). The button holder arrangement is also adapted to permit a cardboard or other button holder such as a plastic member having holes therein for the button shanks to be placed and positioned on top of the button holder 35. The button holder is adapted to be raised or lowered using conventional means so that the tube 30 can move through the holes in the buttonshanks. At 38 there is shown a mounting plate having a base portion 38A and a center raised portion 38B. The center raised portion 38B has an elongated slot 39 along one side thereof, and a central bore 40 of a smaller diameter and at its mouth it has an enlarged bore 41. The enlarged bore 41 is adapted to permit the tube 30 to pick up an attachment member as will be described.

The attachment members are provided by a fastener attachment machine shown at 45 which has a tube or needle 46 extending therefrom. The tube or needle 46 also has an elongated slot along its side in alignment with the elongated slot 39 in the mounting plate. The construction of the machine 45 will be described more particularly with reference to FIGS. 7—9. In order to provide at this time a general explanation of the operation of the machine 45, it may be observed there is provided at 47 an input slot which is adapted to receive attachment members 60 coupled to a bar or rod 64 which is shown at FIG. 3. There is also provided an electro-magnetic solenoid valve shown at 48 which is coupled to a fluid supply such as a source of compressed air shown at 50. The solenoid valve could be of the ordinary type such as sold by the Skinner Company of New Britain, Conn. The solenoid valve is adapted to open and close, to provide fluid into the chamber of the machine 45 to cause it to eject an attachment member 60 from the front thereof into the needle receiver 30. At 51 there is shown an electrical junction box. Electrical power is brought into the junction box by the power cord shown at 52.

One of the wires of the input power cord is coupled to the aforementioned switch 28 which opens and closes depending upon the position of the cam 26. The wires are then brought together in the junction box 51, passed through a protective shield 53 and connected to the electromagnet of the solenoid valve 48.

Reference should now be had to FIGS. 1-6 for a description of the operation of the button carding device according to this invention. The attachment members are more particularly shown in FIGS. 3, 4A and 4B of the drawings. Each of the attachment members are shown at 60 and generally comprise a thin flexible center filament 61 and two ends shown at 62. The attachment members or bar-lock attachments as referred to in the aforementioned patents are coupled by neck portions 63 to a bar or rod 64. At FIGS. 4A and 4B there is shown a card at 68 which is positioned above a plurality of buttons 69 placed in the nest or holder 35 such that their shanks 70 extend above the card 68 and through holes 71 in the cards 68. In order to insert the attachment member as shown in FIG. 4B, to retain the buttons on the card 68, the slide 24 and tube 30 are moved to the right of FIG. 5 and into the mounting plate 38. The movement of the slide 24 causes switch 28 to close when cam 26 engages switch element 27. The closure of switch 28 causes an attachment member to be inserted from the machine 45 through the tube 46 into the open tip 30A of the member 30 as shown in FIG. 4A. Thereafter the tube 30 is withdrawn to the left of FIG. 5 and in being withdrawn pulls the attachment member through the first button shank and thence through the second button shank whereupon the topmost end of the attachment member engages the topmost button shank side wall and causes the attachment member to be withdrawn from the tube 30. FIG. 4B shows the position of the attachment member retaining the buttons on a card after the tube 30 has been completely withdrawn.

Reference should now be had to FIGS. 5, 6, 7, 7A, 8 and 9 for a more detailed description of the operation of the machine 45. The machine 45 includes a coupling member 80 which is adapted to be connected to the solenoid valve 48 as shown in FIGS. 5 and 6. At 81 there is shown a cylinder which is connected at one end to the connector member 80 and is supported at its other end over a supporting member shown at 82. The cylinder 81 has an elongated slot 83 formed or cut out in the underside thereof. The slot 83 is in the bottom of the cylinder 81 and is wide enough to permit a cam follower or roller to engage a piston as shown. Positioned within the cylinder 81 is a piston 84 which is shaped to provide a coming surface to operate the feed mechanism. At the other end of the piston there is provided sealing means such as an o-ring 85 to insure that fluid or air as the case may be does not escape from one side of the piston 84 to the other end of the piston 84. The piston 84 carries and supports a plunger 88 which is adapted to penetrate through a bore provided in the member 82. The plunger 88 is adapted to force or push an attachment member or bar-lock attachment 60 out of the front end of the device in the same manner as shown in the aforementioned patents by separating the member 60 from the bar 64. Within the cylinder 81 there is also provided a resilient biasing element such as a spring 90 which is positioned between the member 82 and the piston 84. The spring is adapted to return the plunger and the piston carried therewith to its initial starting position when the solenoid valve is deenergized so as to prevent air under pressure from entering cylinder 81. Air is permitted to exhaust on the return stroke from cylinder 81 through appropriate venting means provided in the solenoid valve.

At 92 there is shown an indexing gear having a plurality of teeth 93 which are adapted to engage the necks 63 connecting the attachment members 60 to the rod 64. By rotating the indexing gear in a counter clockwise manner, as shown in the previously mentioned U.S. Pat. No. 3,103,666, the bar attachment members are brought into register with the plunger 88 as well as with the opening of the needle or the tube 46. In this manner the plunger 88 when driven may engage an end

thereof to push it out of the slotted tube 46 as shown in the aforementioned U.S. Pat. No. 3,103,666. To control the indexing wheel there is provided a detent 94 which is resiliently biased between two of the teeth 93 by a spring 95. The detent 94 prevents clockwise motion of the indexing gear 92. In order to index the gear in a counter clockwise direction there is provided a lever shown at 98 which is mounted in the body portion of the machine 45 on a pivot support means 99. The lever 98 is urged in an upward direction by a spring 100 so as to force a roller or cam follower 101 supported on the lever into engagement with the piston 84 through the slot 83 formed in the bottom of the cylinder 81. On the opposite side of the lever 98 is provided a feed pawl 102 which is supported on the lever by a pin 103 and is retained in place and is urged counter clockwise by a flat spring 104 mounted in the lever. The spring 104 is supported in a slot 105 of the feed pawl 102 and in its opposite end in a slot formed in the wall of the lever. In operation the piston 84 moves toward the left of FIG. 7 and the roller 101 follows the shape of the piston. This causes the pawl 102 to move downward from the wheel 92 and then rotate counter clockwise because of the spring 104. On the return stroke of the piston 84 after the ejection of the attachment, the pawl rises as the wider part of the piston 84 engages the roller. This causes the pawl 102 to engage the next lower tooth which then causes the gear 92 to rotate against the neck 63 (attachment member) to position the next attachment member in register with the plunger as well as with the needle or tube opening. The piston 84 is preferably proportioned and of a length such that the end thereof will preferably engage the member 82 prior to the O-ring 85 moving past the hole 83. If this was permitted to occur it would cause leakage of fluid into the area of the device housing the cam follower 101 and its associated supporting members.

In FIG. 9 there is shown a view of the opening through which the attachment member passes prior to being pushed into the needle or tube 46 with the attachment member shown in dot-dash. The plunger engages the attachment member 60 hitting one end 62 thereof and forces the neck over a bar 110 thus causing a severing of the neck portion 63 and a separation of the attachment member from the bar 64.

Reference should now be had to FIGS. 10-13 which show an alternate embodiment of an attachment machine according to this invention. Instead of using an electrically actuated valve mechanism for providing fluid to move the plunger as well as the piston as previously disclosed, there is provided a hand actuatable valve operated by the movement of a lever. Since the parts of the mechanism are the same except for the valve mechanism as shown in FIGS. 7-9, only the valve control will be described in detail. At 120 in FIGS. 10 and 11 there is shown a lever which is depressible upon the top of the machine body 45 to control a ball valve arrangement shown generally at the rear of the device at 121. The lever is attached at a pivot point 122 to the body 45 and engages a slidable rod 123 in a manner such that the rod is adapted to move to the left of FIG. 11 upon the depression of the lever 120. The outer end of the slidable member 123 operated the rotary valve 121. The rotary valve includes a rotary member 124 having a slot formed therein at 125 which mates with a detent 126 of the slidable member 123. The rotary member 124 is constructed such that a passageway 127 therethrough is adapted upon rotation to provide a passage for a fluid from a coupling member 128 into the chamber 130 on one side of the plunger 88 and piston 84. In its other position it is adapted to bleed fluid from the chamber 130 and vent the same through a vent passageway 131. If a gas source is being utilized, the vented gas (air) is permitted to escape directly into the air and if a hydraulic source is being utilized to operate the machine, the hydraulic fluid would be returned into the system by suitable means e.g., reservoir and pump known in the art. In order to return the rotary valve into its original position that is such that the fluid will not be provided from the coupling member to the chamber 130, there is provided a spring at 135 which is coupled to a support member 136 mounted on the base of the

machine 145. The spring is supported at its opposite end to a projecting member 137 having a hole therein, said projecting member being a part of the slidable member 123. Thus if the lever 120 is released, the spring 135 will cause the lever to be raised and also cause the rotary valve to return to its original position.

Reference should again be had to FIGS. 10, 11 in conjunction with FIGS. 14-17 for the disclosure of another embodiment according to the invention. In this embodiment, instead of permitting the needle as shown in FIG. 7 to extend only part of the way into the front end of the machine and not have any part in the separation of the attachment members from the bar holding them, there is provided a new and improved needle construction which at its back end also provides a knife means for causing the severance or cutting of the necks 63 holding the attachment members to the rod. In the views shown in FIGS. 10 and 11 the needle is seen extending into the front end of the machine 45 such that the plunger 88 of the machine will cause the neck 63 connecting the attachment members 60 to the bar 64 to be forced against the knife edge provided at the rear of the needle where the plunger cuts one of the ends 62.

FIGS. 14-17 show more particularly the construction of the improved needle. With this needle construction instead of having to replace certain cutting pieces or parts of the machine, as is currently the case, all one need do is insert a new needle. The needle comprises, as shown, a tip 140, a central portion 141, and a mounting portion shown at 142 having a slot 145 shown particularly in FIGS. 14 and 15. The mounting portion includes a knife edge shown at 143, preferably a V-shaped knife edge as shown. The elongated slot shown at 144 extends the length of the needle. Thus as the plunger of the machine forces the attachment member into the needle 46, the neck portion 63 will engage the V-shaped cutting member or knife edge and be severed. As this knife edge wears down a new needle can easily be inserted by replacing the old needle. The use of this type of needle instead of relying on the other type of devices to cut or separate the attachment from the bar provides considerable advantages with respect to maintenance required to keep the machines operating.

It is to be understood that this disclosure is for the purpose of illustration only and that the invention includes all modifications and equivalents falling within the scope of the appended claims.

I claim:

1. A needle comprising a tip, a central portion and a mounting portion, said mounting portion having a hollow rearward end, a first slot extending the entire length of said needle to the tip thereof and starting at the rearward end of said mounting portion, and a knife edge extending from the rearward end inwardly toward said tip, the knife edge being wider at the rearward end than at the portion thereof closest to said tip.

2. A needle according to claim 1 in which the knife edge is positioned opposite said slot.

3. A needle according to claim 1 in which the knife is V-shaped.

4. A needle according to claim 2 in which the knife edge is positioned opposite said slot.

5. A needle according to claim 1 in which the mounting portion is provided with a second elongated slot which extends from the rearward end thereof inwardly towards said tip along a portion thereof.

6. A needle according to claim 4 in which the mounting is provided with a second elongated slot which extends from the rearward end thereof inwardly towards said tip along a portion thereof.

7. A machine usable to card buttons or the like with a fastener member having at least one head and a filament portion, said machine comprising in combination a tube having a hollow portion provided in at least one end thereof, a slide for supporting the tube at one end thereof such that hollow end is open, guide means adapted to guide the movement of the slide, means for supporting an item having a portion with a

hole therethrough in a manner such that with movement of the slide, the tube can pass into and be pulled out of the hole in the item portion, and means for feeding at least a portion of the fastener member head into said tube hollow portion so that the head can be drawn through the hole in the item.

8. A member according to claim 7 in which actuation means is provided for operating said means for feeding.

9. A machine according to claim 8 in which said actuation means comprises an electrical switch operated by cam means coupled to said slide.

10. A machine according to claim 9 in which the switch is coupled to the guide means.

11. A machine according to claim 8 in which means for feeding includes aligning means positioned adjacent to said means for feeding, said aligning means adapted to receive said hollow tube end prior to said means for feeding inserting a fastener head portion into said hollow tube end.

12. A machine according to claim 11 in which said aligning means includes an elongated slot.

13. A machine according to claim 7 in which said means for feeding comprises a tube provided in said means for feeding, a plunger movable in said tube and having a rod for driving the fastener member into said hollow tube portion, and a valve means for controlling the flow of fluid into said tube to move said plunger which is actuated after the hollow tube portion has been positioned to receive the fastener member.

14. A machine according to claim 7 in which said means for supporting the item comprises at least one receptacle for receiving a button in the shank up position.

15. An apparatus being adapted for utilizing plural assemblies of bar-lock attachments or the like in which the individual attachments are secured by a neck to an assembly rod, said apparatus comprising a plunger at least partially movable in guide means provided in the apparatus, said plunger adapted to push said bar-lock attachments, feeding means for bringing each of an assembly of bar-lock attachments, one at a time, into position to be pushed by said plunger, and first means movable with said plunger to cause operation of said feeding means, said first means comprises a cam means surface to move with said plunger and wherein a cam follower means is provided to engage said cam means surface to operate said feed means, said feed means comprises a gear wheel means having teeth for engaging the necks coupling the bar-lock attachments to the rod in order to bring each bar-lock attachment into position, and wherein said cam follower means includes a pawl for indexing the gear wheel means, said cam follower means also comprising a lever having surface contact means carried thereby for engaging the cam means surface, and in which the surface contact means comprises a roller, and including means provided to resiliently bias said roller against said cam means and said guide means having a portion cut-out therefrom to permit the roller to engage the cam means surface movable within the guide means.

16. In a machine for dispensing bar-lock attachments one at a time from a plurality of bar-lock attachments, and which includes an indexing wheel having means for feeding the bar-lock attachments into the machine, the improvement comprising a lever carrying a feed pawl for indexing the wheel and a cam follower, a piston having a cam surface for engaging said cam follower, and means for resiliently holding said cam follower against said cam surface, said machine including a tube positioned about the piston, said tube having a cut-out for permitting the cam follower on the outside of the tube to engage the piston cam surface movable inside.

17. In a machine according to claim 16 in which the cam follower comprises a roller and the means for resiliently biasing comprises a spring.

18. An apparatus for providing a bar-lock attachment or the like, said apparatus comprising a housing, a needle supported at the front of the housing and having a shaped slot to guide a portion of the bar-lock attachment therethrough, means positioned within the housing for feeding one at a time bar-lock attachments at the rear of said needle, a cylinder formed within

said housing and having a piston slidable movably therein, said piston supporting a plunger positioned to force said bar-lock attachments through said needle, a chamber at the rear of said cylinder, a valve member supported for rotation within said housing and having a passageway for the passage of fluid into and out of said chamber, exhaust and inlet means supported by said housing and positioned to cooperate with said valve passageway depending upon the position of the valve, a guide means formed within the housing and having a rod positioned therein for slidable motion, said rod having means at one end thereof for coupling the rod to said valve in order to rotate said valve, and a lever coupled to said housing and having means extending into said housing for slidably moving said rod.

19. An apparatus according to claim 18 in which a spring is coupled to said rod and to said housing for maintaining said rod in one position within the guide means to prevent the flow of fluid into said chamber.

20. An apparatus according to claim 19 in which the valve includes a slot and in which the rod includes a detent positioned within the valve slot.

21. In an apparatus being adapted for dispensing bar-lock attachments one at a time from a plurality of bar-lock attachments supported by a carrier, said apparatus comprising a housing, a guide means supported by the housing and having a

shaped slot therethrough for the movement of a portion of the bar-lock attachment therethrough, a plunger positioned to the rear of the guide means slot and in the housing for pushing the bar-lock attachments through said needle, and a feed mechanism comprising a wheel having teeth supported by said housing for engaging portions of the carrier to sequentially position said bar-lock attachments in position to be forced through said guide means, the improvement being that said feed mechanism comprises a piston having a cam surface coupled to the plunger and movable therewith, a cam follower positioned to continuously engage said cam surface, means resiliently biasing said cam follower against said cam surface, means including a pawl coupled to said cam follower, said pawl positioned to engage one tooth at a time of said feed wheel, and means for moving said piston back and forth to move said pawl to engage one tooth at a time to feed said bar-lock attachments.

22. In an apparatus according to claim 21 in which said pawl moves away from a tooth of said wheel upon the advance of said piston and then moves towards and engages the next tooth of the wheel on the return of the piston.

23. In an apparatus according to claim 22 in which guide means comprises a needle.

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