

Description

The present invention relates to a button feeder for feeding buttons such as snap buttons, hook buttons, ornamental buttons, or the like to a button applicator for attaching such buttons to garment fabric pieces.

Japanese Laid-Open Patent Publication No. 56-85407 published July 11, 1981 discloses an automatic button applicator having a lower die unit with a die and an upper die unit with a punch. The button applicator is equipped with a button feeder for feeding buttons one by one from a first hopper to the lower die unit. Button attachments are also fed one by one by another feeder from a second hopper to the upper die unit. With a garment fabric piece disposed between the upper and lower die units, the punch is moved toward the die to forcibly join the button and the button attachment together by staking on the garment fabric piece.

If an ornamental button with characters and/or figures on its face is to be attached to a fabric piece, the button must be oriented in a specified direction at all times when it is fed to a button applicator. A known button feeder is designed to supply such a button to a lower die unit while the button is being directed as desired.

For example, as shown by U. S. Patent No. 3,987,950 issued October 26, 1976 to Schmidt et al, a guide member having a wedge-shaped groove and another guide member having a vertical wall are disposed in confronting relation on a base block, thus defining a button feed path receptive of the circular head of a button. When the button is fed along the button feed path by means of a pusher, the button is rotated about its own axis in one direction because the circular button head undergoes greater frictional resistance imposed by the wedge-shaped groove than by the vertical wall. The button has forks on its back which engage confronting edges of the guide members to orient the button while it is being fed along the button feed path.

When the button travels along the button feed path, the button tends to be subjected to more and more frictional resistance to its movement since the circular head thereof is progressively forced into the wedge-shaped groove due to rotation of the button about its own axis.

The present invention seeks to provide a button feeder capable of feeding buttons smoothly to a button applicator without increasing frictional resistance to movement of the buttons.

According to the present invention, there is provided a button feeder for feeding a button to a button applicator, the button having a circular head and a joint stud projecting centrally from the circular head, said button feeder comprising: a feed

guide including a base, a first side guide part fixedly mounted on an upper surface of said base along one side thereof and having first and second vertical walls, and a second side guide part disposed on the upper surface of said base along the other side thereof, said second side guide part including a first member pivotally mounted on said base and having a groove of a generally wedge-shaped cross section confronting said first vertical wall of said first side guide part, and a second member fixedly mounted on said base and having a third vertical guide wall confronting said second vertical guide wall of said first side guide part, said first, second and third vertical walls, said wedge-shaped groove and the upper surface of said base jointly defining a button guide channel of a generally inverted T-shaped cross section, said first member being pivotable toward and away from said first vertical guide wall of said first side guide part; means for normally urging said first member to pivot toward said first vertical guide wall of said first side guide part; and a pusher unit connected to said feed guide for pushing the button into and through said button guide channel.

Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

Figure 1 is a perspective view of a button feeder embodying the present invention;

Figure 2 is a transverse cross-sectional view of a feed guide of the button feeder of Figure 1;

Figure 3 is a schematic side elevational view of a button applicator with which the button feeder is used; and

Figure 4 is an exploded perspective view showing a button and a button attachment to be joined together with a fabric piece sandwiched therebetween.

Figure 3 shows a button applicator including a button attaching assembly 5. The button attaching assembly 5 comprises an upper die unit 2 having a punch 1 vertically movable by a vertical actuator mechanism (not shown), and a lower die unit 4 having a die 3 disposed below the upper die unit 2 in vertical alignment therewith. A first hopper 6 containing a number of button attachments A has an outlet joined by a first chute 7 to a button-attachment feeder 8 connected to the upper die unit 2. A number of buttons B are contained in a second hopper 9 having an outlet joined by a second chute 10 to a button feeder 11 connected to the lower die unit 4. The first and second hoppers 6, 9 are arranged to successively deliver the

button attachments A and the buttons B, each one by one, to the first and second chutes 7, 10, respectively.

As shown in Figure 4, each of the buttons B has a circular head 12 bearing characters, figures, or the like on its face and a joint stud 13 projecting from the back thereof. The circular head 12 has a recess 14 formed in a peripheral edge of the back thereof. The joint stud 13 has a central hole 15 therein. Each of the button attachments A has a pin 16 projecting from a circular base 16a. The button B can be attached to a garment fabric piece C by inserting the pin 16 of the button attachment A into the central hole 15 of the joint stud 13 of the button B, and by pressing the button attachment A against the button B. This can be effected by supplying one button attachment A into the upper die unit 2 beneath the punch 1, one button B into the lower die unit 4, then placing the garment fabric piece C between the upper and lower die units 2, 4, and finally moving the upper die unit 2 toward the lower die unit 4 until the inserted pin 16 is deformed in the hole 15.

As shown in Figure 1, the button feeder 11 generally comprises a feed guide 20 disposed adjacent to the lower die unit 4, and a pusher unit 21 connected to the feed guide 20. The feed guide 20 includes a first side guide part 26 having a first vertical guide wall 25 and disposed on an upper surface of a base 22 along one side thereof. The feed guide 20 also includes a second side guide part 24 having a groove 23 of a generally wedge-shaped cross section and disposed on the upper surface of the base 22 along the opposite side thereof. The first and second side guide parts 26, 24 are disposed in confronting relation to each other over the upper surface of the base 22 so as to define therebetween a button guide channel 27 of a generally inverted T-shaped cross section for the passage of the button B.

The pusher unit 21 includes a pusher body 29 having an upwardly opening guide channel 28, and an elongate pusher 30 longitudinally slidably disposed in the guide channel 28. The pusher 30 has a slot 30a formed in its rear portion and terminating at a sloping edge 30b, from which a thin lower plate 30c extends toward the feed guide 20. A finger 31 is pivotally mounted by a pin 32 on the pusher 30 for vertical pivotal movement about the pin 32. The finger has a rear portion disposed in the slot 30a, and a front portion lying on the thin lower plate 30c. The finger 31 has on its front end a downwardly directed projection 34 disposed forwardly of a front edge 30e of the thin lower plate 30c. The finger 31 is normally urged to turn counterclockwise in Figure 1 about the pin 32 under the resilience of a compression spring 33 disposed in the slot 30a and acting on the rear end of the

finger 31, so that the projection 34 is biased downwardly. The pusher 30 is operatively connected at its rear end to an actuator (not shown) such as a cylinder or a reciprocating link mechanism. The pusher body 29 has in one side wall thereof a side recess 29a at which the second chute 10 is connected to the pusher body 29 to allow the button B to be fed from the second chute 10 through the side recess 29a into the guide channel 28.

The base 22 of the feed guide 30 is generally in the form of a rectangular parallelepiped, having an upright attachment flange 22a on one side thereof. The base 22 also has a vertical opening 44 (Figure 2) formed adjacent to the upright attachment flange 22a.

As shown in Figures 1 and 2, the first side guide part 26 is generally in the form of a rectangular plate having in and along its inner edge a recess 50 so as to define the first vertical guide wall 25 and a downwardly facing horizontal wall 51. The first side guide part 26 is fixedly mounted on the base 22 by means of a pair of screws 52, 52. The first side guide part 26 also has a second vertical guide wall 53.

The second side guide part 24 includes a first member 40 having in and along its inner edge the groove 23, and a second member 42 having along its inner edge a third vertical guide wall 41. The first member 40 has a downwardly directed arm 43 secured to a pivot pin 45 extending through the base 22 across the vertical opening 44. Thus the first member 40 is pivotally supported on the base 22, and is normally urged to pivot counterclockwise in Figure 2 toward the first vertical guide wall 25 under the resilience of a compression spring 46 acting between the upright attachment flange 22a and the first member 40.

The second member 42 is generally in the form of a rectangular plate fixedly secured at its outer edge portion to the top of the upright attachment flange 22a of the base 22 and having along its inner edge a downwardly directed flange 48 defining the third vertical guide wall 41. This flange 48 serves to restrict the counterclockwise pivotal movement of the first member 40.

Thus the first vertical guide wall 25, the horizontal wall 51 and the second vertical guide wall 53 of the first guide part 26, the groove 23 of the first member 40 of the second guide part 24, the third vertical guide wall 41 of the second member 42 of the second guide part 24, and the upper surface of the base 22 jointly define the button guide channel 27 of a generally inverted T-shaped cross section.

In operation, the button B passes down the second chute 10 into the guide channel 28 via the side recess 29a, with the joint stud 22 directed upwardly, as shown in Figure 1. Then, the pusher 30 is moved forwardly to cause its front edge 30e

to push the button B on the peripheral edge of the circular head 12 thereof into the guide channel 27 of the feed guide 20. At that time, the downwardly directed projection 34 of the finger 31 engages the back of the circular head 12 as the finger 31 is slightly turned clockwise about the pin 32 against the bias of the spring 33.

When the button B is pushed into the guide channel 27 of the feed guide 20, the circular head 12 is brought into contact with the inside walls of the wedge-shaped groove 23 of the first member 40 of the second guide part 24 and with the first vertical wall 25 of the first side guide part 26, at diametrically opposite peripheral portions of the circular head 12, as shown in Figure 2. Since the frictional resistance imposed by the inside walls of the wedge-shaped groove 23 than by the vertical wall 25 of the first side guide part 26, the button B is rotated about its own axis in one direction (counterclockwise in Figure 1). Thus the button B rolls on and along the first member 40 until the downwardly directed projection 34 of the finger 31 is received in the recess 14 in the back of the circular head 12. When the projection 34 engages in the recess 14, the button B is prevented from rolling or rotation, and is thereby oriented in a predetermined direction. With continued pushing by the pusher 30, the button B is delivered out of the feed guide 20 into the lower die unit 4. As a result, the button B has been placed on the die 3 in a predetermined orientation.

While the button B is being fed along the guide channel 27 of the feed guide 20, the circular head 12, as it rolls or rotates, tends to be progressively forced into the wedge-shaped groove 23. At that time, partly because the first member 40 is pushed by the circular head 12 to turn clockwise in Figure 1 about the pivot pin 45 against the bias of the spring 46, and partly because the joint stud 13 engages the third vertical wall 41 of the flange 48 of the second member 42 which is non-movable, the circular head 12 is prevented from further entering the wedge-shaped groove 23 of the first member 40 and hence is kept from an increased degree of frictional resistance applied by the wedge-shaped groove 23. Therefore, the button B can be fed smoothly along the guide channel 27 of the feed guide 20 without being caught in the wedge-shaped groove 23.

Claims

1. A button feeder for feeding a button (B) to a button applicator, the button (B) having a circular head (12) and a joint stud (13) projecting centrally from the circular head (12), said button feeder comprising: a feed guide (20) in-

cluding a base (22), a first side guide part (26) fixedly mounted on an upper surface of said base (22) along one side thereof and having first and second vertical walls (25), (53), and a second side guide part (24) disposed on the upper surface of said base (22) along the other side thereof, said second side guide part (24) including a first member (40) movably mounted on said base (22) and having a groove (23) of a generally wedge-shaped cross section confronting said first vertical wall (25) of said first side guide part (26), and a second member (42) fixedly mounted on said base (22) and having a third vertical guide wall (41) confronting said second vertical guide wall (53) of said first side guide part (26), said first, second and third vertical walls (25), (53), (41), said wedge-shaped groove (23) and the upper surface of said base (22) jointly defining a button guide channel (27) of a generally inverted T-shaped cross-section, said first member (40) being movable toward and away from said first vertical guide wall (25) of said first side guide part (26); means (46) for normally urging said first member (40) to move toward said first vertical guide wall (25) of said first side guide part (26); and a pusher unit (21) connected to said feed guide (20) for pushing the button (B) into and through said button guide channel (27), characterized in that said base (22) has a vertical opening (44), that said first member (40) has a downwardly directed arm (43) secured to a pivot pin (45) extending through said base (22) across said vertical opening (44) and that said second member (42) having along its inner edge a downwardly directed flange (48) engageable with said first member (40) for restricting the pivotal movement of said first member (40) under the resilience of said urging means (46), the last-named flange (48) defining said third vertical guide wall (41) engageable with the joint stud (13) of the button (B).

2. A button feeder according to Claim 1 said urging means being a spring (46) acting between said upright attachment flange (22a) and said first member (40).

Patentansprüche

1. Zuführeinrichtung zum Zuführen eines Knopfes (B) zu einer Knopfansetzmaschine, wobei der Knopf (B) einen kreisrunden Kopf (12) und einen Verbindungsschaft (13) aufweist, der mittig von dem kreisrunden Kopf (12) absteht, wobei die Zuführeinrichtung umfaßt: eine Zuführführung (20) mit einer Basis (22), einem



to push the button B on the peripheral edge of the circular head 12 thereof into the guide channel 27 of the feed guide 20. At that time, the downwardly directed projection 34 of the finger 31 engages the back of the circular head 12 as the finger 31 is slightly turned clockwise about the pin 32 against the bias of the spring 33.

When the button B is pushed into the guide channel 27 of the feed guide 20, the circular head 12 is brought into contact with the inside walls of the wedge-shaped groove 23 of the first member 40 of the second guide part 24 and with the first vertical wall 25 of the first side guide part 26, at diametrically opposite peripheral portions of the circular head 12, as shown in Figure 2. Since the circular head 12 undergoes a greater amount of frictional resistance imposed by the inside walls of the wedge-shaped groove 23 than by the vertical wall 25 of the first side guide part 26, the button B is rotated about its own axis in one direction (counterclockwise in Figure 1). Thus the button B rolls on and along the first member 40 until the downwardly directed projection 34 of the finger 31 is received in the recess 14 in the back of the circular head 12. When the projection 34 engages in the recess 14, the button B is prevented from rolling or rotation, and is thereby oriented in a predetermined direction. With continued pushing by the pusher 30, the button B is delivered out of the feed guide 20 into the lower die unit 4. As a result, the button B has been placed on the die 3 in a predetermined orientation.

While the button B is being fed along the guide channel 27 of the feed guide 20, the circular head 12, as it rolls or rotates, tends to be progressively forced into the wedge-shaped groove 23. At that time, partly because the first member 40 is pushed by the circular head 12 to turn clockwise in Figure 1 about the pivot pin 45 against the bias of the spring 46, and partly because the joint stud 13 engages the third vertical wall 41 of the flange 48 of the second member 42 which is non-movable, the circular head 12 is prevented from further entering the wedge-shaped groove 23 of the first member 40 and hence is kept from an increased degree of frictional resistance applied by the wedge-shaped groove 23. Therefore, the button B can be fed smoothly along the guide channel 27 of the feed guide 20 without being caught in the wedge-shaped groove 23.

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ersten seitlichen Führungsteil (26), das an einer Oberseite der Basis (22) entlang einer Seite derselben befestigt ist und erste und zweite vertikale Wände (25,53) aufweist, und mit einem zweiten seitlichen Führungsteil (24), das auf der Oberseite der Basis (22) längs der anderen Seite derselben angeordnet ist, wobei das zweite seitliche Führungsteil (24) ein erstes Teil (40), das auf der Basis (22) beweglich gelagert ist und eine Nut (23) mit im wesentlichen keilförmigem Querschnitt hat, die der ersten vertikalen Wand (25) des ersten seitlichen Führungsteils (26) zugekehrt ist, und ein zweites Teil (42) aufweist, das auf der Basis (22) ortsfest angeordnet ist und eine dritte vertikale Führungswand (41) hat, die der zweiten vertikalen Führungswand (53) des ersten seitlichen Führungsteils (26) zugekehrt ist, wobei die erste, zweite und dritte vertikale Wand (25,53,41), die keilförmige Nut (23) und die Oberseite der Basis (22) gemeinsam einen Knopf-Führungskanal (27) begrenzen, dessen Querschnitt im allgemeinen die Form eines umgedrehten "T" hat, wobei das erste Teil (40) zu der ersten vertikalen Führungswand (25) des ersten seitlichen Führungsteils (26) hin und von dieser weg bewegbar ist; Andrückmittel (46), um das erste Teil (40) normalerweise zu der ersten vertikalen Führungswand (25) des ersten seitlichen Führungsteils (26) hin zu bewegen; und eine Schiebereinheit (21), die mit der Zuführung (20) verbunden ist, um den Knopf (B) in den Knopf-Führungskanal (27) hinein und durch diesen hindurchzuschieben, dadurch gekennzeichnet, daß die Basis (22) eine vertikale Öffnung (44) hat, daß das erste Teil (40) einen nach unten gerichteten Arm (43) hat, der an einem sich quer zu der vertikalen Öffnung (44) durch die Basis (22) erstreckenden Gelenkzapfen (45) befestigt ist, und daß das zweite Teil (42) entlang seinem Innenrand einen nach unten gerichteten Flansch (48) hat, der mit dem ersten Teil (40) in Eingriff bringbar ist, um die Verschwenkung des ersten Teils (40) unter der Elastizität der besagten Andrückmittel (46) zu begrenzen, wobei der letztgenannte Flansch (48) die besagte dritte vertikale Führungswand (41) bildet, die mit dem Verbindungsschaft (13) des Knopfes (B) in Eingriff bringbar ist

2. Zuführeinrichtung nach Anspruch 1, wobei die Andrückmittel von einer Feder (46) gebildet sind, die sich zwischen dem besagten aufrechten Befestigungsflansch (22a) und dem ersten Teil (40) abstützt.

Revendications

1. Dispositif d'alimentation en boutons pour avancer un bouton (B) jusqu'à un dispositif d'application de boutons, le bouton (B) comportant une tête circulaire (12) et une tige d'assemblage (13) faisant saillie centralement de la tête circulaire (12), le dispositif d'alimentation en boutons précité comprenant: un guide d'avancement (20) comprenant une base (22), une première partie de guidage latérale (26) montée de façon fixe sur la surface supérieure de la base (22) le long d'un des côtés de celle-ci et comportant des première et seconde parois verticales (25), (53), et une seconde partie de guidage latérale (24) disposée sur la surface supérieure de la base (22) le long de l'autre côté de celle-ci, ladite seconde partie de guidage latérale (24) comprenant un premier élément (40) monté de façon mobile sur la base (22) et comportant une rainure (23) ayant une section transversale cunéiforme d'une façon générale et située en regard de la première paroi verticale (25) de la première partie de guidage (26) et un second élément (42) monté de façon fixe sur la base (22) et comportant une troisième paroi de guidage verticale (41) située en regard de la seconde paroi de guidage verticale (53) de la première partie de guidage latérale (26), lesdites première, seconde et troisième parois verticales (25), (53), (41), ladite rainure cunéiforme (23) et la surface supérieure de la base (22) délimitant ensemble un canal (27) de guidage de boutons de section transversale en forme de T inversé d'une façon générale, le premier élément (40) pouvait être rapproché et éloigné de la première paroi de guidage verticale (25) de la première partie de guidage latérale (26); un moyen (46) pour pousser normalement le premier élément (40) de manière à rapprocher la première paroi de guidage verticale (25) de la première partie de guidage latérale (26); et un dispositif de poussée (26) relié au guide d'avance (20) pour pousser le bouton (B) d'une extrémité à l'autre du canal (27) de guidage de boutons, caractérisé par le fait que la base (22) comporte une ouverture verticale (44), que le premier élément (40) comporte un bras (43) dirigé vers le bas et fixé à un axe d'articulation (45) s'étendant à travers la base (22) en travers de l'ouverture verticale (44) et que le second élément (42) comportant le long de son bord intérieur un rebord (48) dirigé vers le bas et pouvant venir en contact avec le premier élément (40) pour limiter le pivotement du premier élément (40) sous l'effet de l'élasticité du moyen de poussée (46), le rebord (48) mentionné en dernier délimitant la troisième paroi de guidage



verticale (41) pouvant venir porter contre la tige d'assemblage (13) du bouton (B).

2. Dispositif d'alimentation en boutons selon la revendication 1, le moyen de poussée étant un ressort (46) agissant entre le rebord vertical (22a) de fixation et le premier élément (40).

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