

Description

The present invention relates to an apparatus for removing fastener members, such as a snap button, on the occasion that the latter is attached to a garment fabric in improper position and/or posture.

As shown in Figure 4 of the accompanying drawings, known apparatus for the concerned purposes generally comprise a stationary die 2 having a vertical hole 3, and a vertically reciprocable punch 1 having at its lower end a cutting blade vertically aligned with the hole 3. In use, clinched male and female fastener members 4, 5 of a snap fastener 6 which is attached to a garment fabric C in improper position and/or posture, are placed on the stationary die 2 in register with the hole 3, whereupon the punch 1 is lowered into the hole 3 of the die 2 to punch or pierce the male and female members 4, 5 along cutting lines (indicated in broken lines) L. A common problem with this prior apparatus is that when the punch 1 returns to its upper position after punching, a scrap piece or pieces 7 stick to the punch 1 and must be removed therefrom by hand, which is laborious and time-consuming.

The present invention seeks to provide an apparatus for removing fastener members, such as of a snap fastener, from a garment fabric by means of a punch in which apparatus a scrap piece or pieces of the fastener stuck to the punch can be removed therefrom automatically with maximum ease.

According to the present invention, there is provided an apparatus for removing fastener members from a garment fabric, comprising: a stationary die for supporting on its top end surface the fastener members and having a vertical hole opening to said top end surface; a punch holder disposed above said die and vertically movable toward and away from said die; a punch mounted on a lower end of said punch holder and movable, in response to the vertical movements of said punch holder, into and out of said hole of said die for punching the fastener members supported on said die; and a scrap-piece removal member carried on said punch holder around said punch and movable downwardly relative to said punch, in response to upward movement of said punch holder, for removing a scrap piece which is stuck to said punch as a result of the above-mentioned punching.

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 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 vertical cross-sectional view of a fastener removing apparatus embodying the present invention;

Figures 2 and 3 are cross-sectional views similar to Figure 1, illustrating the mode of operation of the apparatus; and

Figure 4 is a cross-sectional view of a primary part of a prior art apparatus, illustrating a prior problem.

Figure 1 shows an apparatus for removing clinched male and female fastener members 4, 5, such as of a snap fastener or button 6, attached to a garment fabric C.

The apparatus generally comprises a stationary die 2, and a punch unit 10 disposed above the die 2 and vertically movable toward and away from the die 2.

The die 2 is fixedly mounted on a base 2a fixedly secured to a frame (not shown) and has a vertical hole 3 of circular cross section opening to a top end surface of the die 2.

The punch unit 10 includes a punch holder 13 fixedly secured to a ram 12 vertically movably supported by a support 11 fixedly secured to the non-illustrated frame. A punch 14 is mounted on a lower end of the punch holder 13 and has at its lower or free end a circular cutting blade in registry with the hole 3 of the die 2. In response to the reciprocating movement of the ram 12, the punch holder 13 is vertically movable toward and away from the die 2 to bring the punch 14 into and out of the hole 3 of the die 2.

The apparatus also includes a scrap-piece removal member 15 axially slidably mounted on the punch holder 13 and normally urged downwardly toward the die 2 by a compression spring 21 extending around the punch holder 13. The scrap-piece removal member 15 includes a cylindrical wall 16 having at its lower end an inwardly directed annular flange 19 defining a central aperture 20 through which the punch 14 is projectable. The cylindrical wall 16 has a vertical slot 17 extending parallel to the axis of the cylindrical wall 16. A stop pin 18 is fixedly mounted on the punch holder 13 and is slidably received in the slot 17. The stop pin 18 and the slot 17 jointly restrict the downward movement of the scrap-piece removal member 15; the stop pin 18 is normally disposed at an upper end of the slot 17 under the resilience of the spring 21 as shown in Figures 1 and 2, during which time the punch 14 is completely retracted in the scrap-piece removal member 15.

During the returning of the punch 14 from the projected position (indicated in dash-and-two-dot lines in Figure 1) to a retracted position (indicated in solid lines in Figure 1), the annular flange 19 is engageable with a scrap piece 7 (which is stuck to the punch 14 as a result of punching or piercing the fastener members 4, 5 by the punch 14 as described below) on the punch 14 so as to remove the scrap piece 7 therefrom.

In the illustrated example, while the stop pin 18 is at the upper end of the slot 17, the lower end surface of the punch 14 is substantially flush with the lower surface of the annular flange 19. Preferably, however, the lower end surface of the

punch 14 is slightly restricted from the lower surface of the annular flange 19.

In operation, the clinched male and female fastener members 4, 5 attached to a garment fabric C in improper position and/or posture, are placed on the top surface of the die 2, whereupon the punch 14 and the scrap-piece removal member 15 are lowered initially as a unit from the position of Figure 1 to the position of Figure 2 as the punch holder 13 is lowered by the ram 12. In Figure 2, the lower surface of the annular flange 19 is disposed against the garment fabric C, while the lower end surface of the punch 14 is disposed against the fastener member 4, 5 to be removed.

With continued lowering of the punch holder 13 by the ram 12, only the punch 14 is further lowered from the position of Figure 2 to the position of Figure 3 in which the punch 14 projects into the hole 3 of the die 2, thus punching or piercing the fastener members 4, 5. A scrap piece 7 is stuck to the punch 14 as a result of this punching.

Upon completion of the punching, as the punch holder 13 is raised by the ram 12, the punch 14 and the scrap-piece removal member 15 return from the position of Figure 3 to the position (shown in solid lines) of Figure 1, with the scrap piece 7 stuck to the punch 14. During that time the scrap-piece removal member 15 is moved downwardly relative to the punch holder 13 and hence the punch 14 under the resilience of the spring 21, that is, the punch 14 is moved from the projected position (dash-and-two-dot lines in Figure 1) to the retracted position (solid lines in Figure 1). When the punch 14 is retracted into the central aperture 20 of the scrap-piece removal member 15, the scrap piece 7 stuck to the punch 14 is blocked by the annular flange 19 from entering the central aperture 20 and is hence removed from the punch 14.

According to the present invention, since the scrap piece 7 stuck to the punch 14 is blocked by the annular flange 19 of the scrap-piece removal member 15 around the punch 14 as the latter returns to its raised position, the scrap piece 7 can be removed from the punch 14 smoothly without any assistance of the operator's hand.

Claims

1. An apparatus for removing fastener members (4), (5) from a garment fabric (C), comprising; a stationary die (2) for supporting on its top end surface the fastener members (4), (5) and having a vertical hole (3) opening to said top end surface; a punch holder (13) disposed above said die (2) and vertically movable toward and away from said die (2); a punch (14) mounted on a lower end of said punch holder (13) and movable, in response to the vertical movements of said punch holder (13), into and out of said hole (3) of said die (2) for punching the fastener members (4), (5) supported on said die (2); and a scrap-piece removal member (15) carried on said punch holder (13) around said punch (14) and movable

downwardly relative to said punch (14), in response to upward movement of said punch holder 13, for removing a scrap piece (7) which is stuck to said punch (14) as a result of the above-mentioned punching.

2. An apparatus according to claim 1, said scrap-piece removal member (15) including a cylindrical wall (16) having at its lower end an inwardly directed annular flange (19) defining a central aperture (20) through which said punch is projectable from and retractable in said scrap-piece removal member (15), said scrap-piece removal member (15) being normally urged by a spring (21) to move relative to said punch holder (13) and hence said punch (14), said cylindrical wall (16) having a vertical slot (17) slidably receiving a stop pin (18) mounted on said punch holder (13) for restricting the downward movement of said scrap-piece removal member (15) relative to said punch holder (13) and hence said punch (14).

3. An apparatus according to claim 2, a lower end surface of said punch (14) being substantially flush with a lower surface of said annular flange (19) when said stop pin (18) is disposed at an upper end of said vertical slot (17) of said cylindrical wall (16).

4. An apparatus according to claim 3, a lower end surface of said punch (14) being slightly retracted from a lower surface of said annular flange (19) when said stop pin (18) is disposed at an upper end of said vertical slot (17) of said cylindrical wall (16).

Patentansprüche

1. Vorrichtung zur Beseitigung von Verschlußteilen (4), (5) von einem Kleiderstoff (C), umfassend: ein ortsfestes Gesenk (2), auf dessen oberer Endfläche die Verschlußteile (4), (5) abstützbar sind und das eine in diese obere Endfläche mündende vertikale Bohrung (3) aufweist; einen Stempelhalter (13), der über dem Gesenk (2) angeordnet und in vertikaler Richtung zu dem Gesenk (2) hin und von diesem weg bewegbar ist; einen Stempel (14), der an einem unteren Ende des Stempelhalters (13) angeordnet und entsprechend den vertikalen Bewegungen des Stempelhalters (13) in die Bohrung (3) des Gesenks (2) hinein und aus dieser heraus bewegbar ist, um die auf dem Gesenk (2) abgestützten Verschlußteile (4), (5) auszustanzten; und einen Abfallteil-Abstreifer (15), der den Stempel (14) umgebend an dem Stempelhalter (13) angeordnet und bei der Aufwärtsbewegung des Stempelhalters (13) gegenüber dem Stempel (14) nach unten bewegbar ist, um ein Abfallteil (7) abzustreifen, das infolge des erwähnten Ausstanzens an dem Stempel (14) haftet.

2. Vorrichtung nach Anspruch 1, wobei der Abfallteil-Abstreifer (15) eine zylindrische Wand (16) umfaßt, die an ihrem unteren Ende einen nach innen gekehrten Ringflansch (19) hat, der eine zentrale Öffnung (20) begrenzt, durch die der Stempel aus dem Abfallteil-Abstreifer (15) ausfahrbar bzw. in diesen einziehbar ist, wobei der



punch 14 is slightly restricted from the lower surface of the annular flange 19.

In operation, the clinched male and female fastener members 4, 5 attached to a garment fabric C in improper position and/or posture, are placed on the top surface of the die 2, whereupon the punch 14 and the scrap-piece removal member 15 are lowered initially as a unit from the position of Figure 1 to the position of Figure 2 as the punch holder 13 is lowered by the ram 12. In Figure 2, the lower surface of the annular flange 19 is disposed against the garment fabric C, while the lower end surface of the punch 14 is disposed against the fastener member 4, 5 to be removed.

With continued lowering of the punch holder 13 by the ram 12, only the punch 14 is further lowered from the position of Figure 2 to the position of Figure 3 in which the punch 14 projects into the hole 3 of the die 2, thus punching or piercing the fastener members 4, 5. A scrap piece 7 is stuck to the punch 14 as a result of this punching.

Upon completion of the punching, as the punch holder 13 is raised by the ram 12, the punch 14 and the scrap-piece removal member 15 return from the position of Figure 3 to the position (shown in solid lines) of Figure 1, with the scrap piece 7 stuck to the punch 14. During that time the scrap-piece removal member 15 is moved downwardly relative to the punch holder 13 and hence the punch 14 under the resilience of the spring 21, that is, the punch 14 is moved from the projected position (dash-and-two-dot lines in Figure 1) to the retracted position (solid lines in Figure 1). When the punch 14 is retracted into the central aperture 20 of the scrap-piece removal member 15, the scrap piece 7 stuck to the punch 14 is blocked by the annular flange 19 from entering the central aperture 20 and is hence removed from the punch 14.

According to the present invention, since the scrap piece 7 stuck to the punch 14 is blocked by the annular flange 19 of the scrap-piece removal member 15 around the punch 14 as the latter returns to its raised position, the scrap piece 7 can be removed from the punch 14 smoothly without any assistance of the operator's hand.

Claims

1. An apparatus for removing fastener members (4), (5) from a garment fabric (C), comprising; a stationary die (2) for supporting on its top end surface the fastener members (4), (5) and having a vertical hole (3) opening to said top end surface; a punch holder (13) disposed above said die (2) and vertically movable toward and away from said die (2); a punch (14) mounted on a lower end of said punch holder (13) and movable, in response to the vertical movements of said punch holder (13), into and out of said hole (3) of said die (2) for punching the fastener members (4), (5) supported on said die (2); and a scrap-piece removal member (15) carried on said punch holder (13) around said punch (14) and movable

downwardly relative to said punch (14), in response to upward movement of said punch holder 13, for removing a scrap piece (7) which is stuck to said punch (14) as a result of the above-mentioned punching.

2. An apparatus according to claim 1, said scrap-piece removal member (15) including a cylindrical wall (16) having at its lower end an inwardly directed annular flange (19) defining a central aperture (20) through which said punch is projectable from and retractable in said scrap-piece removal member (15), said scrap-piece removal member (15) being normally urged by a spring (21) to move relative to said punch holder (13) and hence said punch (14), said cylindrical wall (16) having a vertical slot (17) slidably receiving a stop pin (18) mounted on said punch holder (13) for restricting the downward movement of said scrap-piece removal member (15) relative to said punch holder (13) and hence said punch (14).

3. An apparatus according to claim 2, a lower end surface of said punch (14) being substantially flush with a lower surface of said annular flange (19) when said stop pin (18) is disposed at an upper end of said vertical slot (17) of said cylindrical wall (16).

4. An apparatus according to claim 3, a lower end surface of said punch (14) being slightly retracted from a lower surface of said annular flange (19) when said stop pin (18) is disposed at an upper end of said vertical slot (17) of said cylindrical wall (16).

Patentansprüche

1. Vorrichtung zur Beseitigung von Verschluss-
teilen (4), (5) von einem Kleiderstoff (C), umfas-
send: ein ortsfestes Gesenk (2), auf dessen oberer
Endfläche die Verschlusssteile (4), (5) abstützbar
sind und das eine in diese obere Endfläche mün-
dende vertikale Bohrung (3) aufweist; einen
Stempelhalter (13), der über dem Gesenk (2)
angeordnet und in vertikaler Richtung zu dem
Gesenk (2) hin und von diesem weg bewegbar ist;
einen Stempel (14), der an einem unteren Ende
des Stempelhalters (13) angeordnet und entspre-
chend den vertikalen Bewegungen des Stempel-
halters (13) in die Bohrung (3) des Gesenks (2)
hinein und aus dieser heraus bewegbar ist, um
die auf dem Gesenk (2) abgestützten Verschluss-
teile (4), (5) auszustanzten; und einen Abfallteil-
Abstreifer (15), der den Stempel (14) umgebend
an dem Stempelhalter (13) angeordnet und bei
der Aufwärtsbewegung des Stempelhalters (13)
gegenüber dem Stempel (14) nach unten beweg-
bar ist, um ein Abfallteil (7) abzustreifen, das
infolge des erwähnten Ausstanzens an dem
Stempel (14) haftet.

2. Vorrichtung nach Anspruch 1, wobei der
Abfallteil-Abstreifer (15) eine zylindrische Wand
(16) umfaßt, die an ihrem unteren Ende einen
nach innen gekehrten Ringflansch (19) hat, der
eine zentrale Öffnung (20) begrenzt, durch die der
Stempel aus dem Abfallteil-Abstreifer (15) aus-
fahrbar bzw. in diesen einziehbar ist, wobei der



Abfallteil-Abstreifer (15) normalerweise von einer Feder (21) zu einer Bewegung relativ zu dem Stempelhalter (13) und damit zu dem Stempel (14) vorgespannt ist, wobei die zylindrische Wand (16) einen vertikalen Schlitz (17) aufweist, der einen an dem Stempelhalter (13) angeordneten Anschlagstift (18) verschiebbar aufnimmt, um die Abwärtsbewegung des Abfallteil-Abstreifers (15) relativ zum Stempelhalter (13) und damit zum Stempel (14) zu begrenzen.

3. Vorrichtung nach Anspruch 2, wobei eine untere Endfläche des Stempels (14) mit einer Unterseite des Ringflansches (19) im wesentlichen fluchtet, wenn der Anschlagstift (18) an einem oberen Ende des vertikalen Schlitzes (17) der zylindrischen Wand (16) angeordnet ist.

4. Vorrichtung nach Anspruch 3, wobei eine untere Endfläche des Stempels (14) von einer Unterseite des Ringflansches (19) geringfügig zurückgesetzt ist, wenn der Anschlagstift (18) an einem oberen Ende des vertikalen Schlitzes (17) der zylindrischen Wand (16) angeordnet ist.

Revendications

1. Dispositif d'enlèvement d'éléments de fermeture (4), (5) d'un vêtement (C), comprenant; une matrice fixe (2) pour supporter sur sa surface terminale supérieure les éléments de fermeture (4), (5) et ayant un trou vertical (3) s'ouvrant sur ladite surface terminale supérieure; un porte-poinçon (13) placé au-dessus de ladite matrice (2) et mobile verticalement vers ladite matrice (2) et en sens opposé à celle-ci; un poinçon (14) monté sur une extrémité inférieure dudit porte-poinçon (13) et mobile, en réponse aux mouvements verticaux dudit porte-poinçon (13), dans et hors dudit trou (3) de ladite matrice (2) pour poinçonner les éléments de fermeture (4), (5) supportés sur ladite matrice (2); et un élément d'enlèvement

(15) de pièce manquée porté sur ledit porte-poinçon (13) autour dudit poinçon (14) mobile vers le bas par rapport audit poinçon (14), en réponse au mouvement ascendant dudit porte-poinçon (13), pour enlever une pièce manquée (7) qui est accrochée audit poinçon (14) à la suite du poinçonnage mentionné ci-dessus.

2. Dispositif selon la revendication 1, ledit élément d'enlèvement (15) de pièce manquée comprenant une paroi cylindrique (16) ayant à son extrémité inférieure un rebord annulaire (19) dirigé vers l'intérieur qui définit une ouverture centrale (20) par laquelle ledit poinçon peut avancer et se retirer dans ledit élément d'enlèvement (15) de pièce manquée, ledit élément d'enlèvement (15) de pièce manquée étant normalement poussé par un ressort (21) pour se déplacer par rapport audit porte-poinçon (13) et donc audit poinçon (14), ladite paroi cylindrique (16) ayant une fente verticale (17) recevant de façon coulissante une tige de butée (18) montée sur ledit porte-poinçon (13) pour limiter le mouvement descendant dudit élément d'enlèvement (15) de pièce manquée par rapport audit porte-poinçon (13) et donc audit poinçon (14).

3. Dispositif selon la revendication 2, une surface terminale inférieure dudit poinçon (14) étant sensiblement alignée avec une surface inférieure dudit rebord annulaire (19) lorsque ladite tige de butée (18) est placée à une extrémité supérieure de ladite fente verticale (17) de ladite paroi cylindrique (16).

4. Dispositif selon la revendication 3, une surface terminale inférieure dudit poinçon (14) étant légèrement en retrait par rapport à une surface inférieure dudit rebord annulaire (19) lorsque ladite tige de butée (18) est placée à une extrémité supérieure de ladite fente verticale (17) ladite paroi cylindrique (16).