

Description

The present invention relates to an apparatus for assembling a pair of fastener elements of a garment fastener with a garment fabric disposed therebetween, comprising : a frame ; a die mounted on a lower portion of said frame for supporting thereon one of the fastener elements ; a reciprocable ram mounted on an upper portion of said frame and carrying a punch in confronting relation to said die for supporting thereon the other fastener element ; drive means for moving said ram and hence said punch vertically toward and away from said die to join the two fasteners together, with the garment fabric sandwiched between the fastener elements ; and a safety device including a vertical elongate rod having a feeler disposed adjacent to the path of movement of said punch, said rod being vertically movable between an uppermost position in which said feeler is disposed upwardly remotely from said die, and a lowermost position in which said feeler is disposed adjacent to said die, first means urging said rod downwardly towards said lowermost position, sensor means for detecting the arrival of said rod at said lowermost position, and a second actuator operatively connected with said sensor means and said drive means for activating said drive means only when the arrival of said rod at said lowermost position is detected by said sensor means.

An apparatus of this type is disclosed in EP-A2-14 2806. In this conventional apparatus the vertical elongate rod is movably supported by the upper portion of the frame and said first means for urging said rod downwardly comprise an air cylinder. The piston rod of said air cylinder is drivingly coupled with said piston rod by a lever pivotally mounted on the frame. It is to be assumed that this air cylinder also serves for returning the elongate rod in its uppermost position after completion of a working cycle. This conventional safety device seems to be somewhat complex in construction with respect to the means for reciprocating the elongate rod between its uppermost and lowermost positions.

It is an object of the present invention to provide a fastener-assembling apparatus having a safety device for securing safety of the operator, the safety device being simple in construction and reliable in operation.

This object is realized by the basic concept of the invention set forth in the characterizing portion of the main claim.

Further developments of the invention are set forth in the depending claims.

The invention will now be described in more detail with reference to an exemplifying, non-limiting embodiment thereof illustrated in the accompanying drawings, in which

Figure 1 is a side elevational, partially cross-sectional

view of a fastener assembling apparatus embodying the present invention ;

Figure 2 is an enlarged cross-sectional view taken along line II - II of Figure 1 ;

Figure 3 is an enlarged fragmentary cross-sectional view taken along line III - III of Figure 2 ; and Figure 4 is a right side elevational view of Figure 3, showing an upper part of the apparatus.

As shown in Figure 1, a fastener assembling apparatus embodying the present invention includes a generally C-shaped frame 5 having a pair of upper and lower horizontal portions 6, 7 and an intermediate vertical portion 8 interconnecting the upper and lower frame portions 6, 7 with a punch-working space 9 defined therebetween. The upper frame portion 6 supports thereon an electric motor 10 and has, throughout the length thereof, a horizontal bore 11 in which a main shaft 12 is rotatably supported via a pair of roller bearings 13, 13. A primary pulley 14 is secured to a drive shaft 15 of the motor 10 for corotation therewith and is drivingly connected by an endless belt 16 to a secondary pulley 17 which is rotatably mounted on an end portion of the main shaft 12 by means of a pair of roller bearings 18, 18. The secondary pulley 17 has a diameter much larger than the diameter of the primary pulley 14 for multiplying a torque generated by the motor 10. A single revolution clutch 19 is mounted on the main shaft 12 adjacent to the secondary pulley 17 for intermittently connecting the secondary pulley 17 and the main shaft 12. The single revolution clutch 19 is connected in driven relation to a first solenoid 20 and is driven by the latter to engage the pulley 17 with the main shaft 12 when the solenoid 20 is energized.

The upper frame portion 6 includes a vertical recess 21 extending centrally in a front wall 6a of the upper frame portion 6. A pair of L-shaped elongate ram guides 22, 22 (Figure 2) is secured to the front wall 6a, one on each side of the recess 21 so as to define therebetween a guide groove 23 (Figure 2). As shown in Figure 3, the guide groove 23 and the vertical recess 21 communicate with each other to jointly constitute a guide channel 24. A ram 25 is slidably disposed in the guide channel 24 and includes, as shown in Figure 1, a connecting pin 26 projecting horizontally from a vertical rear wall of the ram 25. The connecting pin 26 is pivotally connected to one end of a link 27, the other end of which is pivotally connected to the main shaft 12 by an eccentric pin 28 projecting from one end of the main shaft 12. With this construction, the ram 25 completes one cycle of vertical reciprocation in response to a single revolution of the main shaft 12. The ram 25 carries on its lower end a punch 29 for supporting thereon a fastener element E₁.

The ram 25 includes, in its side wall 25a, a vertical guide groove 30 extending throughout the length of the ram 25 for slidably receiving therein an elongate rod 31, the rod 31 constituting a part of a safety device. The rod 31 includes a ring-like feeler 32 con-

nected to a lower end of the rod 31 by a connecting plate 33. The ring-like feeler 32 extends loosely around the punch 29 when the ram 25 is held in its uppermost waiting position.

A pair of upper and lower guide blocks 34, 35 is secured to the side wall 25a adjacent to the guide groove 30, the guide blocks 34, 35 at least partially overhanging the guide groove 30 to hold the rod 31 in the vertical guide groove 30 against lateral displacement. The rod 31 is vertically movable between an uppermost position in which the feeler 32 is disposed around the punch 29, as indicated by solid lines in Figure 2, and a lowermost position in which the feeler 32 is disposed downwardly remotely from the punch 29, as indicated by phantom lines in the same figure. The rod 31 is normally urged toward its lowermost position by a tension spring 36 acting between the elongate rod 31 and the upper frame portion 6. A stopper lever 37 is pivotably connected by a pivot pin 38 to an upper end of the elongate rod 31. The stopper lever 37 is angularly movable between a locking position in which a downwardly facing locking nose 37a of the stopper lever 37 is held in interlocking engagement with an upwardly facing retaining surface 39a of an abutment 39 secured to an upper end wall 25b of the ram 25, and a releasing position in which the locking nose 37a is disengaged from the retaining surface 39a. The stopper lever 37 is normally urged toward the locking position by means of a torsion spring 40 (Figures 2 and 4). A second solenoid 41 is mounted on the upper wall of the upper frame portion 6 and is connected to a horizontal actuation bar 42 slidably supported by a support block 43 secured to the upper wall of the upper frame portion 6. The actuating bar 42 has an flanged free end 42a engageable with a lateral projection 37b extending horizontally from a lower end of the stopper lever 37. When the second solenoid 41 is energized to pull the actuation bar 42 against the force of a compression coil spring 44, the flanged free end 42a of the actuation bar 42 is brought into engagement with the lateral projection 37b of the stopper lever 37 and then turns the stopper lever 37 clockwise in Figure 1 against the force of the spring 40, thereby bringing the locking nose 37a out of engagement with the retaining surface 39a. When the second solenoid 41 is de-energized, the actuation bar 42 is returned to its extended position of Figure 1 wherein the flanged free end 42a is held out of engagement with the lateral projection 37b.

A cam plate 45 is secured to an intermediate portion of the elongate rod 31 for engagement with a leaf-roller actuator 46 of a limit switch 47 secured to one of the ram guides 22, as shown in Figures 2 and 3. The cam plate 45 and the limit switch 47 is positioned such that while the elongate rod 31 is disposed in its lowermost position, the cam plate 45 engages the leaf-roller actuator 46 of the limit switch 47, thereby activating the limit switch 47. The limit switch 47 is

electrically connected with the first solenoid 20 for energizing the latter upon activation of the limit switch 47.

Operation of the fastener assembling apparatus thus constructed is described below.

The electric motor 10 is driven to rotate the pulleys 14, 17. In this instance, the single revolution clutch 19 is de-energized so that the rotary motion of the pulley 17 is not transmitted to the main shaft 12.

Then, as shown in Figure 2, a fastener element E_1 , such as a retainer of a button, is held on the punch 29 and a mating fastener element E_2 , such as a button body, is held on a die 48 mounted on the lower frame portion 7. A garment fabric F is placed on the die 48 so that a desired portion of the garment fabric F is located above the fastener element E_2 held on the die 48.

Thereafter, a foot switch or other suitable switching means (not shown) is actuated by the operator to energize the second solenoid 41 whereupon the actuating bar 42 is pulled toward the solenoid 41 against the force of the spring 44. This movement of the actuator bar 42 causes the flanged free end 42a of the actuator bar 42 to engage with the lateral projection 37b and then to turn the stopper lever 37 clockwise in Figure 1 against the force of the spring 40, thereby releasing the locking nose 37a from the retaining surface 39a of the abutment 39. With the stopper lever 37 thus released, the elongate rod 31 is descended by the force of the tension spring 36 until the rod 31 and hence the ring-like feeler 32 arrived at its lowermost position indicated by the phantom lines in Figure 2. Upon arrival of the rod 31 and the feeler 32 at their lowermost positions, the cam plate 45 engages the leaf-roller actuator 46 of the limit switch 47 to activate the limit switch 47. The limit switch 47 in turn energizes the first solenoid 20, thereby activating the single revolution clutch 19 to connect the pulley 17 and the main shaft 12 for thereby turning the main shaft 12 through an angle of 360 degrees. This rotary motion of the main shaft 12 is converted by the pins 26, 28 and the link 27 into one cycle of vertical reciprocation of the ram 25 so that the two fastener elements E_1 , E_2 are clinched together by and between the punch 29 and the die 48, with the garment fabric F sandwiched between the fastener elements E_1 , E_2 .

Upon completion of the clinching operation, the ram 25 moves upwardly. The upward movement of the ram 25 causes the retaining surface 39a of the abutment 39 to hook the locking nose 37a of the stopper lever 37. Thereafter, as the upward movement of the ram 25 advances, the elongate rod 31 is lifted by the ram 25 to its uppermost position against the force of the tension spring 36.

If the operator's finger, for example, is inserted into the gap between the punch 29 and the die 48, the elongate rod 31 cannot arrive at its lower position even though the foot switch is stepped. This is

because the ring-shaped feeler 32 is brought into engagement with the operator's finger before the arrival of the rod 31 at its lowermost position, thereby rocking further downward movement of the rod 31. With the rod 31 thus blocked, activation of the limit switch 47 by the cam plate 45 cannot take place, thus maintaining the first solenoid 20 in de-energized condition. In this condition, the rotating pulley 17 and the main shaft 12 still remain disengaged and therefore lowering of the ram 25 and hence the punch 29 does not take place, thus avoiding any accident that the operator's finger inadvertently inserted could be hit by the punch 29.

Claims

1. An apparatus for assembling a pair of fastener elements (E_1 , E_2) of a garment fastener with a garment fabric (F) disposed therebetween, comprising : a frame (5) ; a die (48) mounted on a lower portion (7) of said frame (5) for supporting thereon one of the fastener elements (E_2) ; a reciprocable ram (25) mounted on an upper portion (6) of said frame (5) and carrying a punch (29) in confronting relation to said die (48) for supporting thereon the other fastener element (E_1) ; drive means (10) for moving said ram (25) and hence said punch (29) vertically toward and away from said die (48) to join the two fasteners (E_1 , E_2) together, with the garment fabric (F) sandwiched between the fastener elements (E_1 , E_2) ; and a safety device including a vertical elongate rod (31) having a feeler (32) disposed adjacent to the path of movement of said punch (29), said rod (31) being vertically movable between an uppermost position in which said feeler (32) is disposed upwardly remotely from said die (48), and a lowermost position in which said feeler (32) is disposed adjacent to said die (48), first means (36) urging said rod (31) downwardly toward said lowermost position, sensor means (46, 47) for detecting the arrival of said rod (31) at said lowermost position, and a second actuator (20) operatively connected with said sensor means (46, 47) and said drive means (10) for activating said drive means (10) only when the arrival of said rod (31) at said lowermost position is detected by said sensor means (46, 47), **CHARACTERIZED IN THAT** said rod (31) is movably supported by said ram (25), said first means (36) for urging said rod (31) downwardly comprise a spring, and that said safety device further includes an abutment (39) disposed on said ram (25), a stopper lever (37) pivotably connected to said rod (31) and angularly movable between a locking position in which said stopper lever (37) is held in interlocking engagement with said abutment (39), and a releasing position in which said stopper lever (37) is disengaged from said abutment (39), second spring means (40) for urging said stopper lever (37) toward said locking position, a first actuator (41,

42) for moving said stopper lever (37) toward said releasing position against the force of said second spring means (40).

2. An apparatus according to claim 1, said feeler having a ring-like shape extending circumferentially around said punch (29) while said rod (31) is disposed in said uppermost position.

3. An apparatus according to claim 1 or 2, said ram (25) including a vertical guide groove (30) in which said rod (31) is slidably received, and at least one guide block (34, 35) at least partially overhanging said guide groove (30) for holding said rod (31) in said guide groove (30) against displacement therefrom.

4. An apparatus according to one of the claims 1 to 3, said first spring means comprising a tension spring (36) acting between said rod (31) and said upper frame portion (6).

5. An apparatus according to one of the claims 1 to 4, said stopper lever (37) having a downwardly facing locking nose (37a), said abutment (39) having an upwardly facing retaining surface (39a) engageable with said locking nose (37a).

6. An apparatus according to one of the claims 1 to 5, said first actuator (41, 42) comprising a solenoid (41) mounted on said upper frame portion (6), and an actuating bar (42) connected in driven relation to said solenoid (41) and engageable with said stopper lever (37) when said solenoid (41) is energized.

7. An apparatus according to claim 6, said stopper lever (37) having a lateral projection (37b), said actuating bar (42) having a flanged free end (42) engageable with said lateral projection (37b).

8. An apparatus according to claim 1, said sensor means (46, 47) comprising a limit switch (47) and an actuator (46), said rod (31) including a cam plate (45) engageable with said actuator (46) of said limit switch (47) to activate said limit switch (47) while said rod (31) is disposed in said lowermost position.

Ansprüche

1. Vorrichtung zum Verbinden von zwei Verschlus-
Elementen (E_1 , E_2) eines Kleiderverschlusses mit einem dazwischen angeordneten Kleiderstoff (F), umfassend : einen Rahmen (5) ; ein an einem unteren Bereich (7) des Rahmens (5) gelagertes Gesenk (48) zum Abstützen eines der Verschlus-Elemente (E_2) ; einen hin- und herbewegbaren Stößel (25), der an einem oberen Bereich (6) des Rahmens (5) gelagert ist und einen dem Gesenk (48) gegenüberliegenden Stempel (29) trägt zum Abstützen des anderen Verschlus-Elementes (E_1) ; eine Antriebseinrichtung (10) zum vertikalen Bewegen des Stößels (25) und damit des Stempels (29) zu dem Gesenk (48) hin und von diesem weg, um die beiden Verschlus-Elemente (E_1 , E_2) zu vereinigen, wobei der Kleiderstoff (F) zwischen den Verschlus-Elementen (E_1 , E_2) angeordnet ist ; und



because the ring-shaped feeler 32 is brought into engagement with the operator's finger before the arrival of the rod 31 at its lowermost position, thereby rocking further downward movement of the rod 31. With the rod 31 thus blocked, activation of the limit switch 47 by the cam plate 45 cannot take place, thus maintaining the first solenoid 20 in de-energized condition. In this condition, the rotating pulley 17 and the main shaft 12 still remain disengaged and therefore lowering of the ram 25 and hence the punch 29 does not take place, thus avoiding any accident that the operator's finger inadvertently inserted could be hit by the punch 29.

Claims

1. An apparatus for assembling a pair of fastener elements (E_1 , E_2) of a garment fastener with a garment fabric (F) disposed therebetween, comprising : a frame (5) ; a die (48) mounted on a lower portion (7) of said frame (5) for supporting thereon one of the fastener elements (E_2) ; a reciprocable ram (25) mounted on an upper portion (6) of said frame (5) and carrying a punch (29) in confronting relation to said die (48) for supporting thereon the other fastener element (E_1) ; drive means (10) for moving said ram (25) and hence said punch (29) vertically toward and away from said die (48) to join the two fasteners (E_1 , E_2) together, with the garment fabric (F) sandwiched between the fastener elements (E_1 , E_2) ; and a safety device including a vertical elongate rod (31) having a feeler (32) disposed adjacent to the path of movement of said punch (29), said rod (31) being vertically movable between an uppermost position in which said feeler (32) is disposed upwardly remotely from said die (48), and a lowermost position in which said feeler (32) is disposed adjacent to said die (48), first means (36) urging said rod (31) downwardly toward said lowermost position, sensor means (46, 47) for detecting the arrival of said rod (31) at said lowermost position, and a second actuator (20) operatively connected with said sensor means (46, 47) and said drive means (10) for activating said drive means (10) only when the arrival of said rod (31) at said lowermost position is detected by said sensor means (46, 47), CHARACTERIZED IN THAT said rod (31) is movably supported by said ram (25), said first means (36) for urging said rod (31) downwardly comprise a spring, and that said safety device further includes an abutment (39) disposed on said ram (25), a stopper lever (37) pivotably connected to said rod (31) and angularly movable between a locking position in which said stopper lever (37) is held in interlocking engagement with said abutment (39), and a releasing position in which said stopper lever (37) is disengaged from said abutment (39), second spring means (40) for urging said stopper lever (37) toward said locking position, a first actuator (41,

42) for moving said stopper lever (37) toward said releasing position against the force of said second spring means (40).

2. An apparatus according to claim 1, said feeler having a ring-like shape extending circumferentially around said punch (29) while said rod (31) is disposed in said uppermost position.

3. An apparatus according to claim 1 or 2, said ram (25) including a vertical guide groove (30) in which said rod (31) is slidably received, and at least one guide block (34, 35) at least partially overhanging said guide groove (30) for holding said rod (31) in said guide groove (30) against displacement therefrom.

4. An apparatus according to one of the claims 1 to 3, said first spring means comprising a tension spring (36) acting between said rod (31) and said upper frame portion (6).

5. An apparatus according to one of the claims 1 to 4, said stopper lever (37) having a downwardly facing locking nose (37a), said abutment (39) having an upwardly facing retaining surface (39a) engageable with said locking nose (37a).

6. An apparatus according to one of the claims 1 to 5, said first actuator (41, 42) comprising a solenoid (41) mounted on said upper frame portion (6), and an actuating bar (42) connected in driven relation to said solenoid (41) and engageable with said stopper lever (37) when said solenoid (41) is energized.

7. An apparatus according to claim 6, said stopper lever (37) having a lateral projection (37b), said actuating bar (42) having a flanged free end (42) engageable with said lateral projection (37b).

8. An apparatus according to claim 1, said sensor means (46, 47) comprising a limit switch (47) and an actuator (46), said rod (31) including a cam plate (45) engageable with said actuator (46) of said limit switch (47) to activate said limit switch (47) while said rod (31) is disposed in said lowermost position.

Ansprüche

1. Vorrichtung zum Verbinden von zwei Verschlus-
selementen (E_1 , E_2) eines Kleiderverschlusses mit ei-
nem dazwischen angeordneten Kleiderstoff (F),
umfassend : einen Rahmen (5) ; ein an einem unteren
Bereich (7) des Rahmens (5) gelagertes Gesenk (48)
zum Abstützen eines der Verschlusselemente (E_2) ;
einen hin- und herbewegbaren Stößel (25), der an ei-
nem oberen Bereich (6) des Rahmens (5) gelagert ist
und einen dem Gesenk (48) gegenüberliegenden
Stempel (29) trägt zum Abstützen des anderen Ver-
schlusselementes (E_1) ; eine Antriebseinrichtung (10)
zum vertikalen Bewegen des Stößels (25) und damit
des Stempels (29) zu dem Gesenk (48) hin und von
diesem weg, um die beiden Verschlusselemente (E_1 ,
 E_2) zu vereinigen, wobei der Kleiderstoff (F) zwischen
den Verschlusselementen (E_1 , E_2) angeordnet ist ; und



eine Sicherheitseinrichtung mit einer vertikalen länglichen Stange (31), die einen neben der Bewegungsbahn des Stempels (29) angeordneten Fühler (32) aufweist, wobei diese Stange (31) zwischen einer obersten Stellung, in der dieser Fühler (32) im Abstand oberhalb des Gesenks (48) angeordnet ist, und einer untersten Stellung, in der dieser Fühler (32) neben dem Gesenk (48) angeordnet ist, vertikal bewegbar ist, mit ersten Mitteln (36), die diese Stange (31) nach unten in die unterste Stellung belasten, mit Sensormitteln (46, 47), um die Ankunft dieser Stange (31) in der untersten Stellung zu ermitteln, und mit einer zweiten Betätigungseinrichtung (20), die mit den Sensormitteln (46, 47) und der Antriebseinrichtung (10) gekuppelt ist, um die Antriebseinrichtung (10) nur dann einzuschalten, wenn die Ankunft der Stange (31) in der untersten Stellung von den Sensormitteln (46, 47) ermittelt wird, dadurch gekennzeichnet, daß die Stange (31) durch den Stößel (25) beweglich abgestützt ist, daß die besagten ersten Mittel (36), um die Stange (31) nach unten vorzuspannen, aus einer Feder bestehen und daß die Sicherheitseinrichtung ferner einen an dem Stößel (25) angeordneten Anschlag (39), einen Haltehebel (37), der mit der Stange (31) schwenkbar verbunden und zwischen einer Sperrstellung, in der dieser Haltehebel (37) mit dem Anschlag (39) in Verriegelungseingriff gehalten ist, und einer Freigabestellung verschwenkbar ist, in der dieser Haltehebel (37) vom dem Anschlag (39) getrennt ist, zweite Federmittel (40) zum Vorspannen des Haltehebels (37) in die Sperrstellung und eine Betätigungseinrichtung (41, 42) umfaßt, um den Haltehebel (37) gegen die Kraft der zweiten Federmittel (40) in die Freigabestellung zu bewegen.

2. Vorrichtung nach Anspruch 1, wobei der besagte Fühler die Form eines Rings hat, der sich um den Stempel (29) herum erstreckt, während sich die Stange (31) in der obersten Stellung befindet.

3. Vorrichtung nach Anspruch 1 oder 2, wobei der Stößel (25) eine vertikale Führungsnut (30) aufweist, in der die Stange (31) verschiebbar geführt ist, und mindestens einen Führungsblock (34, 35) aufweist, der diese Führungsnut (30) zumindest teilweise überdeckt, um die Stange (31) in dieser Führungsnut (30) zu halten.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, wobei die ersten Federmittel aus einer Zugfeder (36) bestehen, die an der Stange (31) und an dem oberen Rahmenbereich (6) angreift.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei der Haltehebel (37) eine nach unten gekehrte Sperrnase (37a) hat und wobei der Anschlag (39) eine nach oben gekehrte Haltefläche (39a) hat, die mit der Sperrnase (37a) in Eingriff bringbar ist.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, wobei die erste Betätigungseinrichtung (41, 42) aus einem an dem oberen Rahmenbereich (6) angeordneten Solenoid (41) und aus einer Betätigungs-

stange (42) besteht, die mit dem Solenoid (41) gekuppelt und mit dem Haltehebel (37) in Eingriff bringbar ist, wenn das Solenoid (41) erregt wird.

7. Vorrichtung nach Anspruch 6, wobei der Haltehebel einen seitlichen Vorsprung (37b) hat und wobei die Betätigungsstange (42) ein mit einem Flansch (42) versehenes freies Ende hat, der mit dem seitlichen Vorsprung (37b) in Eingriff bringbar ist.

8. Vorrichtung nach Anspruch 1, wobei die Sensormittel (46, 47) einen Grenzlagenschalter (47) und einen Betätiger (46) umfassen, wobei die Stange (31) eine Steuerkurve (48a) aufweist, die mit dem Betätiger (46) des Grenzlagenschalters (47) in Eingriff bringbar ist, um diesen Grenzlagenschalter (47) zu betätigen, während die Stange (31) in der untersten Stellung angeordnet ist.

Revendications

1. Appareil destiné à assembler une paire d'éléments (E_1 , E_2) d'attache faisant partie d'une attache de vêtement, avec un tissu (F) de vêtement disposé entre eux, comprenant : un bâti (5) ; une matrice (48) montée sur la partie inférieure (7) dudit bâti (5), destinée à supporter un des éléments (E_2) d'attache ; un coulisseau (25) susceptible d'effectuer un mouvement de va-et-vient, monté sur la partie supérieure (6) dudit bâti (5), et portant un poinçon (29) disposé en face de ladite matrice (48) destiné à supporter l'autre élément (E_1) d'attache ; des moyens d'entraînement (10) destinés à déplacer ledit coulisseau (25) et, de ce fait, ledit poinçon (29) verticalement en direction de ladite matrice (48) et en l'en éloignant, afin d'assembler les deux attaches (E_1 , E_2) le tissu (F) de vêtement étant pris en sandwich entre les éléments d'attache (E_1 , E_2) ; et un dispositif de sécurité comprenant une tige oblongue verticale (31) comportant un palpeur (32) disposé à proximité du trajet de déplacement dudit poinçon (29), ladite tige (31) étant mobile verticalement entre une position haute extrême dans laquelle ledit palpeur (32) est disposé vers le haut, à l'écart de ladite matrice (48), et une position basse extrême, dans laquelle ledit palpeur (32) est disposé à proximité de ladite matrice (48), un premier moyen (36) poussant ladite tige (31) vers le bas en direction de sa position basse extrême, des moyens de capteurs (46, 47) destinés à détecter l'arrivée de ladite tige (31) à sa position basse extrême, et un second élément d'actionnement (20) connecté fonctionnellement auxdits moyens de capteurs (46, 47), et ledit moyen d'entraînement (10) destiné à activer ledit moyen d'entraînement (10) seulement lorsque l'arrivée de ladite tige (31) à sa position basse est détectée par ledit moyen de capteur (46, 47), caractérisé en ce que ladite tige (31) est supportée de façon mobile par ledit coulisseau (25), que ledit premier moyen (36) destiné à pousser ladite tige (31) vers le bas



comprend un ressort, et en ce que ledit dispositif de sécurité comporte en outre une butée (39) disposée sur ledit coulisseau (25), un levier d'arrêt (37) relié de façon pivotante à ladite tige (31) et mobile angulairement entre une position de verrouillage, dans laquelle ledit levier d'arrêt (37) est maintenu en engagement de verrouillage réciproque avec ladite butée (39) et une position libre dans laquelle ledit levier d'arrêt (37) est désengagé de ladite butée (39), un second moyen de ressort (40) destiné à pousser ledit levier d'arrêt (37) en direction de ladite position de verrouillage, un premier élément d'actionnement (41, 42) destiné à déplacer ledit levier d'arrêt (37) en direction de ladite position libre, à l'encontre de la force dudit second moyen de ressort (40).

2. Appareil selon la revendication 1, ledit palpeur ayant une forme annulaire s'étendant circonférentiellement autour dudit poinçon (29) tandis que ladite tige (31) est placée dans sa position haute extrême.

3. Appareil selon la revendication 1 ou 2, ledit coulisseau (25) comprenant une gorge (30) de guidage vertical dans laquelle ladite tige (31) est logée de façon glissante, et au moins un bloc de guidage (34, 35) surplombant au moins partiellement ladite gorge de guidage (30) en vue de maintenir ladite tige (31) dans ladite gorge (30) de guidage à l'encontre de son déplacement hors de celle-ci.

4. Appareil selon l'une des revendications 1 à 3, ledit premier moyen de ressort comprenant un ressort de tension (36) qui agit entre ladite tige (31) et ladite partie de cadre supérieure (6).

5. Appareil selon l'une des revendications 1 à 4, ledit levier de blocage (37) comportant une dent (37a) de verrouillage dirigée vers le bas, ladite butée (39) comportant une surface (39a) de retenue dirigée vers le haut, susceptible de se mettre en prise avec ladite dent (37a) de verrouillage.

6. Appareil selon l'une des revendications 1 à 5, ledit premier élément d'actionnement (41, 42) comprenant un solénoïde (41) monté sur ladite partie supérieure (6) de bâti, et une barre (42) d'actionnement reliée audit solénoïde (41) de façon à être entraînée par celui-ci, et susceptible de se mettre en prise avec ledit levier d'arrêt (37) lorsque ledit solénoïde (41) est alimenté en énergie.

7. Appareil selon la revendication 6, ledit levier d'arrêt (37) comportant une saillie latérale (37b), ladite barre d'actionnement (42) présentant une extrémité libre (42) comportant une collerette, susceptible de se mettre en prise avec ladite saillie latérale (37b).

8. Appareil selon la revendication 1, ledit moyeu de capteur (46, 47) comprenant un contact (47) de fin de course et un élément d'actionnement (46), ladite tige comportant une plaque de came (45) susceptible de se mettre en prise avec ledit élément d'actionnement (46) dudit contact (47) de fin de course afin d'activer ledit contact (47) de fin de course lorsque

ladite tige (31) se trouve dans sa position basse extrême.

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