

Description

The present invention relates to an apparatus for assembling a pair of fastener elements comprising: a frame; a die holder supported on a lower portion of said frame and supporting thereon a die on which one of the fastener elements is supported; a reciprocable ram mounted on an upper portion of said frame in confronting relation to said die and supporting thereon a punch on which the other fastener element is supported, said ram being vertically movable toward and away from said die to clinch the fastener elements together by and between said punch and said die; and means for adjustably setting a clinching force to be applied to the fastener elements as they are clinched by said punch and said die.

Such an apparatus is suitable for assembling fastener elements varying in thickness and for attaching fastener elements to garments varying in thickness, because the clinching force to be applied to the fastener elements is adjustable.

In a prior apparatus of this type disclosed in EP—A2—131 180 the drive mechanism operatively connected to the ram to reciprocate the same includes a toggle joint having a pair of levers pivoted together at one end, the free end of one of said levers being connected to said ram. The means for adjustably setting a clinching force to be applied to the fastener elements includes a compression spring disposed between the frame and the free end of the other lever of said toggle joint. This compression spring is elastically deformable for absorbing shock forces caused by pressing the pair of fastener elements between said punch and said die. In this conventional apparatus the die holder is immovably supported by the lower portion of the frame.

The object of the present invention is to provide an apparatus of the type mentioned above including a vertically movable die holder and a lower frame portion for supporting same which is compact in construction as a whole and can readily be installed on a flat working table.

This object is realized by the basic concept of the invention set forth in the characterizing portion of claim 1.

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 a cross-sectional view taken along line II—II of Figure 1; and

Figure 3 is a cross-sectional view taken along line III—III of Figure 1.

As shown in Figure 1, a fastener assembling apparatus embodying the present invention includes a generally C-shaped frame 4 having a pair of upper and lower horizontal portions 5, 6

and an intermediate vertical portion 7 interconnecting the upper and lower frame portions 5, 6 with a punch-working space 8 defined therebetween. The upper frame portion 5 supports thereon an electric motor 9 and has, throughout the length thereof, a horizontal bore 10 in which a main shaft 11 is rotatably supported via a pair of roller bearings 12, 12. A primary pulley 13 is secured to a drive shaft 14 of the motor 9 for corotation therewith and is drivingly connected by an endless belt 15 to a secondary pulley 16 which is rotatably mounted on an end portion of the main shaft 11 by means of a pair of roller bearings 17, 17. The secondary pulley 16 had a diameter much larger than the diameter of the primary pulley 13 for multiplying a torque generated by the motor 9. A single revolution clutch 18 is mounted on the main shaft 11 adjacent to the secondary pulley 16 for intermittently connecting the secondary pulley 16 and the main shaft 11.

The fastener assembling apparatus further includes a reciprocable ram 19 vertically movably supported on a front end of the upper frame portion 5, the ram 19 being connected in driven relation to the main shaft 11 via a crank mechanism 20.

The ram 19, as shown in Figures 1 and 2, includes a vertical bore 21 extending longitudinally therethrough and is connected at its lower end with an annular holder 22. A sleeve 23 is slidably fitted in the holder 22 and has an upper flange 23a received in an annular recess 24 defined in an inner peripheral wall of the holder 22. The recess 24 has a depth larger than the thickness of the flange 23a by a distance S so that the sleeve 23 is vertically movable by the distance. More specifically, the sleeve 23 is vertically movable between a lower position where the flange 23a is rest on a step 24a between the annular recess 24 and an inner peripheral wall of the holder 22, and an upper position where the flange 23a is held in abutment with a lower end face 19a of the ram 19.

The sleeve 23 includes an internally threaded lower portion 25 to which an externally threaded punch holder 26 is threaded. The punch holder 26 is locked in position to the sleeve 23 by a lock nut 27. A punch 28 is fitted in a central axial hole 29 in the punch holder 26 and detachably connected to the punch holder 26 by a lock screw 30.

A flanged tubular spring retainer or seat 31 is fitted with an upper portion of the sleeve 23 and receives therein a lower end portion of an elongate adjustment rod 32 which is rotatably and slidably received in the vertical bore 21 in the ram 19. A multiplicity of conical disk springs 33 are disposed in the bore 21 and held between the spring retainer 31 and an upper spring seat 34 secured to an intermediate portion of the adjustment rod 32. The adjustment rod 32 has an externally threaded upper portion 32a threaded to an internally threaded upper portion 21a of the vertical bore 21. With this construction, by turning the adjustment rod 32 in either direction, the distance between the spring seats 24, 31 is

changed, thereby adjusting a combined force of the springs 33 acting on the sleeve 23 via the spring seat 31.

The lower frame portion 6 includes, as shown in Figure 1, a horizontal bore 35 extending longitudinally therethrough, and a generally C-shaped front cover 36 secured to a front end of the lower frame portion 6 to close a front end of the horizontal bore 35. The cover 36 thus secured defines jointly with the frame portion 6 a vertical groove 37 communicating at its lower end with the horizontal bore 35. A slider block 38 is slidably received in the horizontal bore 35 and has a downwardly sloping upper surface 38a facing forwardly toward the cover 36. A die holder 39 is slidably received in the vertical groove 37 and has an upwardly sloping flat lower surface 39a resting flatwise on the sloping flat upper surface 38a of the slider block 38. The die holder 39 detachably supports thereon a die 40 and is urged downwardly by a pair of tension coil springs 41, 41 (Figure 2). As best shown in Figure 3, a tabular end bush 42 is fitted in a rear end of the horizontal bore 35 and secured to the lower frame portion 6 by a plurality of screws (only one shown). The slider block 38 includes a stepped blind hole 43 opening toward the end bush 42 for slidably receiving therein a front end portion of an elongate adjustment rod 44. The adjustment rod 44 includes an externally threaded rear end portion 44a threaded to an internally threaded portion 42a of the end bush 42. A multiplicity of conical disk springs 45 are disposed around the adjustment rod 44 and held between a pair of spring seats 46, 47. The spring seat 46 rests on an annular step 43a of the stepped blind hole 43 and the spring seat 47 rests on an annular shoulder 44b of the adjustment rod 44. With this construction, the slider block 38 is urged forwardly by the springs 45, a combined force of which is adjustable by turning the adjustment rod 44 in either direction to vary the distance between the spring seats 46, 47.

The lower horizontal frame portion 6 includes a flat bottom surface 6a (Figure 1) and a pair of mounting side flanges 48, 48 having a pair of through-holes 49, 49, respectively, through which bolts (not shown) extend for mounting the fastener assembling apparatus on a table, also not shown.

The fastener assembling apparatus thus constructed operates as follows.

The electric motor 9 is driven to rotate the pulleys 13, 16. In this instance, the single revolution clutch 18 is de-energized so that rotary motion of the pulley 16 is not transmitted to the main shaft 11.

Then a retainer R and a button body B are held on the punch 28 and the die 40, respectively, and a garment fabric F is placed on the die 40 so that a portion of the garment fabric F is located above the button body B held on the die 40.

Thereafter, the single revolution clutch 18 is energized to connect the pulley 16 and the main shaft 11 whereupon the main shaft 11 is turned through an angle of 360 degrees. This rotary

motion is converted by the crank mechanism 20 into a vertical reciprocation of the ram 19. Since the sleeve 23 is urged by the springs 33 downwardly against the holder 22, the downward movement of the ram 19 causes the punch 28 to descend, in unison with the ram 19, toward the die 40 for joining the retainer R and the button body B in clinched condition with the garment fabric F sandwiched therebetween. Such simultaneous descending movement of the punch 28 and the ram 19 continues until the springs 33 yield to a clinching force applied to the retainer R and the button B as they are clinched by the punch 28 and the die 40, whereupon the springs 33 are gradually compressed as the sleeve 23 moves upwardly relative to the ram 19. The clinching force progressively increases as the displacement of the springs 33 is increased in direct proportion to the upward displacement of the sleeve 23.

When the sleeve 23 is moved upwardly by the distance S (Figure 2), the flange 23a of the sleeve 23 is brought into abutment on the lower end of the ram 19 whereupon the ram 19 and the sleeve 23 move downwardly in unison with each other, without the influence of the force of the springs 33.

During the clinching operation, the die 40 receives the clinching force acting thereon in a vertically downward direction. The vertically downwardly directed clinching force is transmitted from the die holder 39 to the slider block 38 via the sloping flat surfaces 39a, 38 where the direction of the clinching force is changed from the vertically downward direction to a downwardly oblique direction which is normal to the sloping surfaces 39a, 38a. The downwardly obliquely directed clinching force has a horizontal component force F_2 (not shown) acting on the slider block 38 for retracting the same against the force of the springs 45. The horizontal component force is obtained by the following equation.

$$F_2 = \tan \theta \times F_1$$

wherein θ is an angle of inclination of each sloping surface 38a, 39a, and F_1 is a vertically downwardly directed clinching force acting on the die holder 39. As appears from the foregoing equation, the horizontal component force F_2 is always smaller than the clinching force F_1 .

When the clinching force F_1 is increased to such an extent that its horizontal component F_2 overcomes the combined force of the springs 45, the die 40 and the die holder 39 move downwardly to thereby force the slider block 38 rearwardly against the force of the springs 45. The clinching force gradually increases with the magnitude of rearward displacement of the slider block 38.

With the apparatus thus constructed, the clinching force can be adjusted stepwise by means of the sets of springs 33, 45. More specifically, if the punch 28 and the die 40 were mounted directly on the ram 19 and the lower frame portion 6, respec-

tively, without the agency of the springs 33, 34, the clinching force would be determined by and become equal to the maximum downward thrust of the ram 19 and would be always constant and not adjustable. On the contrary, according to the invention, the clinching force is adjustable within a certain wide range below the maximum downward thrust of the ram 19 so that various pairs of fastener elements R, B of different shapes and thickness can properly be set on a garment Fabric F without causing any damage on either fastener element R, B or on the garment fabric F. Adjustment of the clinching force can readily be effected by turning at least one of the adjustment rods 32, 44 to change the distance between the spring seats 31, 34 or 46, 47. Alternatively, such force-adjustment can be done by replacing the springs 33, 45 with those having different spring forces, or changing the angle of inclination of the sloping surfaces 38a, 39a.

Another advantage is in that the die holder 39 is supported on the sloping upper surface 38a of the spring-loaded slider block 38 which is mounted horizontally in the lower horizontal frame portion 6. With this construction, it is possible to minimize the thickness of the lower frame portion 6 to such an extent that only the die holder is vertically movable in such lower frame portion 6, the lower frame portion 6 having such a flat bottom surface 6a. The apparatus having such lower frame portion is compact in construction as a whole and can readily be installed on a flat working table, not shown. Furthermore, since the slider 38 is reactive to a horizontal component of the clinching force, the springs 45 do not require a great resiliency and hence they can readily be assembled with or replaced from the lower frame portion 6.

Claims

1. An apparatus for assembling a pair of fastener elements (B, R) comprising: a frame (4); a die holder (39) supported on a lower portion (6) of said frame (4) and supporting thereon a die (40) on which one of the fastener elements (B) is supported; a reciprocable ram (19) mounted on an upper portion (5) of said frame (4) in confronting relation to said die (40) and supporting thereon a punch (28) on which the other fastener element (R) is supported, said ram (19) being vertically movable toward and away from said die (40) to clinch the fastener elements (B, R) together by and between said punch (28) and said die (40); and means for adjustably setting a clinching force to be applied to the fastener elements (B, R) as they are clinched by said punch (28) and said die (40), characterized in that said die holder (39) is movably mounted on said lower portion (6) of said frame (4); and that said clinching-force setting means includes a downwardly sloping lower surface (39a) of said die holder (39), a slider block (38) disposed in said lower portion (6) of said frame (4) and slidably movable in a horizontal direction, said slider block (38) having a down-

wardly sloping upper surface (38a) engageable with said sloping lower surface (39a) of said die holder (39), first spring means (4) for urging said slider block (38) toward said die holder (39) to hold said sloping upper surface (38a) and said lower surface (39a) in abutting engagement with each other, and first means (44) for adjusting the force of said first spring means (45).

2. An apparatus according to claim 1, said frame (4) having a generally C-shaped configuration and including a lower horizontal frame portion (6), said lower frame portion (6) having a vertical groove (37) in which said die holder (39) is slidably mounted, and a horizontal bore (35) communicating at its one end with said vertical groove (37) and holding therein said slider block (38), said first adjusting means including an adjustment rod (44) disposed in said horizontal bore (35) and axially movable toward and away from said slider block (38), said first spring means (45) being disposed between said slider block (38) and said adjustment rod (44).

3. An apparatus according to claim 2, further including an end bush (42) secured to said frame (4) to close the other end of said horizontal bore (35), said slider block (38) including a blind hole (43) opening toward said end bush (42), said adjustment rod (44) having one end portion (44a) threaded to said end bush (42) and the other end portion slidably received in said blind hole (43) in said slider block (38).

4. An apparatus according to claim 2 or 3 said first spring means comprising a multiplicity of conical disk springs (45) disposed around said adjustment rod (44).

5. An apparatus according to one of the claims 1 to 4 said clinching-force setting means further including a punch holder (26) mounted on said ram (19) for holding said punch (28) and vertically movable relative to said ram (19) by a limited distance (S), second spring means (33) disposed in said ram (19) for urging said punch holder (26) to a lower end of said limited distance, and second means (32) for adjusting the force of said second spring means (33).

6. An apparatus according to claim 5, said ram (19) including a vertical bore (21), said second adjustment means comprising an adjustment rod (32) disposed in said vertical bore (21) and movable toward and away from said punch holder (26), said second spring means (33) acting between said punch holder (26) and said adjustment rod (32).

7. An apparatus according to claim 6, said adjustment rod (32) having an end portion (32a) threaded to said ram (19).

8. An apparatus according to claim 6 or 7, said second spring means comprising a multiplicity of conical disk springs (33) disposed around said adjustment rod (32).

Patentansprüche

1. Vorrichtung zum Vereinigen von zwei Verschluss-Elementen (B, R) umfassend einen Rahmen



tively, without the agency of the springs 33, 34, the clinching force would be determined by and become equal to the maximum downward thrust of the ram 19 and would be always constant and not adjustable. On the contrary, according to the invention, the clinching force is adjustable within a certain wide range below the maximum downward thrust of the ram 19 so that various pairs of fastener elements R, B of different shapes and thickness can properly be set on a garment Fabric F without causing any damage on either fastener element R, B or on the garment fabric F. Adjustment of the clinching force can readily be effected by turning at least one of the adjustment rods 32, 44 to change the distance between the spring seats 31, 34 or 46, 47. Alternatively, such force-adjustment can be done by replacing the springs 33, 45 with those having different spring forces, or changing the angle of inclination of the sloping surfaces 38a, 39a.

Another advantage is in that the die holder 39 is supported on the sloping upper surface 38a of the spring-loaded slider block 38 which is mounted horizontally in the lower horizontal frame portion 6. With this construction, it is possible to minimize the thickness of the lower frame portion 6 to such an extent that only the die holder is vertically movable in such lower frame portion 6, the lower frame portion 6 having such a flat bottom surface 6a. The apparatus having such lower frame portion is compact in construction as a whole and can readily be installed on a flat working table, not shown. Furthermore, since the slider 38 is reactive to a horizontal component of the clinching force, the springs 45 do not require a great resiliency and hence they can readily be assembled with or replaced from the lower frame portion 6.

Claims

1. An apparatus for assembling a pair of fastener elements (B, R) comprising: a frame (4); a die holder (39) supported on a lower portion (6) of said frame (4) and supporting thereon a die (40) on which one of the fastener elements (B) is supported; a reciprocable ram (19) mounted on an upper portion (5) of said frame (4) in confronting relation to said die (40) and supporting thereon a punch (28) on which the other fastener element (R) is supported, said ram (19) being vertically movable toward and away from said die (40) to clinch the fastener elements (B, R) together by and between said punch (28) and said die (40); and means for adjustably setting a clinching force to be applied to the fastener elements (B, R) as they are clinched by said punch (28) and said die (40), characterized in that said die holder (39) is movably mounted on said lower portion (6) of said frame (4); and that said clinching-force setting means includes a downwardly sloping lower surface (39a) of said die holder (39), a slider block (38) disposed in said lower portion (6) of said frame (4) and slidably movable in a horizontal direction, said slider block (38) having a down-

wardly sloping upper surface (38a) engageable with said sloping lower surface (39a) of said die holder (39), first spring means (4) for urging said slider block (38) toward said die holder (39) to hold said sloping upper surface (38a) and said lower surface (39a) in abutting engagement with each other, and first means (44) for adjusting the force of said first spring means (45).

2. An apparatus according to claim 1, said frame (4) having a generally C-shaped configuration and including a lower horizontal frame portion (6), said lower frame portion (6) having a vertical groove (37) in which said die holder (39) is slidably mounted, and a horizontal bore (35) communicating at its one end with said vertical groove (37) and holding therein said slider block (38), said first adjusting means including an adjustment rod (44) disposed in said horizontal bore (35) and axially movable toward and away from said slider block (38), said first spring means (45) being disposed between said slider block (38) and said adjustment rod (44).

3. An apparatus according to claim 2, further including an end bush (42) secured to said frame (4) to close the other end of said horizontal bore (35), said slider block (38) including a blind hole (43) opening toward said end bush (42), said adjustment rod (44) having one end portion (44a) threaded to said end bush (42) and the other end portion slidably received in said blind hole (43) in said slider block (38).

4. An apparatus according to claim 2 or 3 said first spring means comprising a multiplicity of conical disk springs (45) disposed around said adjustment rod (44).

5. An apparatus according to one of the claims 1 to 4 said clinching-force setting means further including a punch holder (26) mounted on said ram (19) for holding said punch (28) and vertically movable relative to said ram (19) by a limited distance (S), second spring means (33) disposed in said ram (19) for urging said punch holder (26) to a lower end of said limited distance, and second means (32) for adjusting the force of said second spring means (33).

6. An apparatus according to claim 5, said ram (19) including a vertical bore (21), said second adjustment means comprising an adjustment rod (32) disposed in said vertical bore (21) and movable toward and away from said punch holder (26), said second spring means (33) acting between said punch holder (26) and said adjustment rod (32).

7. An apparatus according to claim 6, said adjustment rod (32) having an end portion (32a) threaded to said ram (19).

8. An apparatus according to claim 6 or 7, said second spring means comprising a multiplicity of conical disk springs (33) disposed around said adjustment rod (32).

Patentansprüche

1. Vorrichtung zum Vereinigen von zwei Verschluss-elementen (B, R) umfassend einen Rahmen

(4), einen Gesenkhalter (39), der auf einem unteren Bereich (6) dieses Rahmens (4) abgestützt ist und darauf ein Gesenk (40) abstützt, auf dem eines der Verschlüsselemente (B) abgestützt ist, einen hin- und herbewegbaren Stößel (19), der auf einem oberen Bereich (5) des Rahmens (4) in gegenüberliegender Beziehung zu dem Gesenk (40) gelagert ist und darauf einen Stempel (28) abstützt, auf dem das andere Verschlüsselement (R) abgestützt ist, wobei dieser Stößel (19) zu dem Gesenk (40) hin und von diesem weg vertikal beweglich ist, um die Verschlüsselemente (B, R) zwischen dem Stempel (28) und dem Gesenk (40) miteinander zu verklemmen, und Mittel zum Einstellen der auf die Verschlüsselemente (B, R) ausgeübten Klemmkraft, wenn diese durch den Stempel (28) und das Gesenk (40) eingeklemmt werden, dadurch gekennzeichnet, daß der Gesenkhalter (39) auf dem unteren Bereich (6) des Rahmens (4) beweglich gelagert ist und daß die Mittel zum Einstellen der Klemmkraft eine nach unten abfallende Unterseite (39a) des Gesenkhalters (39), einen Gleitblock (38), der in dem unteren Bereich (6) des Rahmens (4) angeordnet und in horizontaler Richtung verschiebbar ist, wobei dieser Gleitblock (38) eine nach unten abfallende Oberseite (38a) hat, die mit der abfallenden Unterseite (39a) des Gesenkhalters (39) in Eingriff bringbar ist, erste Federmittel (45), die den Gleitblock (38) zu dem Gesenkhalter (39) hin belasten, um die abfallende Oberseite (38a) und die Unterseite (39a) miteinander in Eingriff zu halten, und erste Mittel (44) umfassen, um die Kraft der ersten Federmittel (45) einzustellen.

2. Vorrichtung nach Anspruch 1, wobei der Rahmen (4) im allgemeinen C-förmig ist und einen unteren horizontalen Rahmenbereich (6) hat, wobei dieser untere Rahmenbereich (6) eine vertikale Nut (37) aufweist, in der der Gesenkhalter (39) verschiebbar gelagert ist, und eine horizontale Bohrung (35) aufweist, deren eines Ende mit dieser vertikalen Nut (37) in Verbindung steht und die den Gleitblock (38) enthält, wobei die ersten Einstellmittel eine Einstellstange (44) umfassen, die in dieser horizontalen Bohrung (35) angeordnet und in axialer Richtung zu dem Gleitblock (38) hin und von diesem weg bewegbar ist, wobei die ersten Federmittel (45) zwischen dem Gleitblock (38) und der Einstellstange (44) angeordnet sind.

3. Vorrichtung nach Anspruch 2, ferner umfassend eine Endbuchse (42), die an dem Rahmen (4) befestigt ist, um das andere Ende der horizontalen Bohrung (35) zu verschließen, wobei der Gleitblock (38) eine in die Endbuchse (42) mündende Blindbohrung (43) aufweist, wobei die Einstellstange (44) einen Endbereich (44a) hat, der mit der Endbuchse (42) verschraubt ist, und deren anderer Endbereich in die Blindbohrung (43) des Gleitblocks (38) verschiebbar eingreift.

4. Vorrichtung nach Anspruch 2 oder 3, wobei die ersten Federmittel aus einer Vielzahl konischer Tellerfedern (45) bestehen, die die Einstellstange (44) umgeben.

5. Vorrichtung nach einem der Ansprüche 1 bis

4, wobei die Mittel zur Einstellung der Klemmkraft ferner einen Stempelhalter (26) umfassen, der auf dem Stößel (19) angeordnet ist, um den Stempel (28) zu halten, und der gegenüber dem Stößel (19) um eine begrenzte Entfernung (S) vertikal beweglich ist, zweite Federmittel (33) umfassen, die auf dem Stößel (19) angeordnet sind, um den Stempelhalter (26) zum unteren Ende dieser begrenzten Entfernung hin zu belasten, und zweite Mittel (32) umfassen, um die Kraft der zweiten Federmittel (33) einzustellen.

6. Vorrichtung nach Anspruch 5, wobei der Stößel (19) eine vertikale Bohrung (21) aufweist, wobei die zweiten Einstellmittel aus einer Einstellstange (32) bestehen, die in dieser vertikalen Bohrung (21) angeordnet und zu dem Stempelhalter (26) hin und von diesem weg bewegbar ist, wobei sich die zweiten Federmittel (33) an dem Stempelhalter (26) und an der Einstellstange (32) abstützen.

7. Vorrichtung nach Anspruch 6, wobei die Einstellstange (32) einen mit dem Stößel (19) verschraubten Endbereich (32a) hat.

8. Vorrichtung nach Anspruch 6 oder 7, wobei die zweiten Federmittel aus einer Vielzahl konischer Tellerfedern (33) bestehen, die die Einstellstange (32) umgeben.

Revendications

1. Appareil pour assembler une paire d'éléments d'attache (B, R) comprenant: un bâti (4); un porte-matrice (39) supporté sur la partie inférieure (6) du bâti (4) et supportant une matrice (40) sur laquelle un (B) des éléments d'attache (B) est supporté; un piston-plongeur (19) pouvant effectuer un mouvement de va-et-vient et monté sur une partie supérieure (5) du bâti (4) en face de la matrice (40) et supportant un poinçon (28) sur lequel l'autre élément d'attache (R) est supporté, le piston-plongeur (19) pouvant se déplacer verticalement de manière à se rapprocher et à s'éloigner de la matrice (40) pour accoupler l'un à l'autre les éléments d'attache (B, R) à l'aide du poinçon (28) et de la matrice (40) et entre ce poinçon et cette matrice; et un moyen pour déterminer de façon réglable la force d'accouplement devant être appliquée aux éléments d'attache (B, R) lors de leur accouplement par le poinçon (28) et la matrice (40), caractérisé en ce que le porte-matrice (39) est monté de façon mobile sur la partie inférieure (6) du bâti (4); et en ce que le moyen de détermination de force d'accouplement comprend une surface inférieure (39a) qui s'incline vers le bas et que comporte le porte-matrice (39), un bloc coulissant (38) disposé dans la partie inférieure (6) du bâti (4) et pouvant coulisser dans une direction horizontale, ce bloc coulissant (38) comportant une surface supérieure (38a) qui s'incline vers le bas et qui peut venir en contact avec la surface inférieure inclinée (39a) du porte-matrice (39), un premier moyen élastique (45) pour pousser le bloc coulissant (38) vers le porte-matrice (39) afin de maintenir la surface supérieure inclinée (38a) et la surface



inférieure (39a) en contact de butée l'une avec l'autre, et un premier moyen (44) pour régler la force du premier moyen élastique (45).

2. Appareil selon la revendication 1, le bâti (4) ayant une configuration générale en C et comprenant une partie horizontale inférieure (6), ladite partie inférieure (6) de bâti comportant une rainure verticale (37) dans laquelle le porte-matrice (30) est montée de façon coulissante, et un trou horizontal (35) communiquant, à une première de ses extrémités, avec la rainure verticale (37) et contenant le bloc coulissant (38), ledit premier moyen de réglage comprenant une tige de réglage (44) disposée dans le trou horizontal (35) et pouvant être déplacée axialement de manière à se rapprocher et à s'éloigner du bloc coulissant (38), le premier moyen élastique (45) étant disposé entre le bloc coulissant (38) et la tige de réglage (44).

3. Appareil selon la revendication 2, comprenant en outre une douille (42) d'extrémité fixée au bâti (4) pour fermer l'autre extrémité du trou horizontal (35) le bloc coulissant (38) comprenant un trou borgne (43) débouchant en direction de la douille (42) d'extrémité, la tige de réglage (44) ayant une (44a) de ses parties terminales vissée dans la douille (42) d'extrémité et son autre partie terminale logée de façon coulissante dans le trou borgne (43) du bloc coulissant (38).

4. Appareil selon la revendication 2 ou 3, le

premier moyen élastique comprenant une multiplicité de rondelles élastiques coniques (45) disposées autour de la tige de réglage (44).

5. Appareil selon l'une des revendications 1 à 4, ledit moyen de détermination de force d'accouplement comprenant en outre un porte-poinçon (28) et qui peut se déplacer verticalement par rapport au piston-plongeur (19) sur une distance limitée (S), un second moyen élastique (33) disposé dans le piston-plongeur (19) pour pousser le porte-poinçon (26) jusqu'à l'extrémité inférieure de ladite distance limitée, et un second moyen (32) pour régler la force du second moyen élastique (33).

6. Appareil selon la revendication 5, le piston-plongeur (19) comprenant un trou vertical (21), le second moyen de réglage comprenant une tige de réglage (32) disposée dans le trou vertical (21) et pouvant se déplacer de manière à se rapprocher et à s'éloigner du porte-poinçon (26), le second moyen élastique (33) agissant entre le porte-poinçon (26) et la tige de réglage (32).

7. Appareil selon la revendication 6, la tige de réglage (32) ayant une partie terminale (32a) vissée dans le piston-plongeur (19).

8. Appareil selon la revendication 6 ou 7, le second moyen élastique comprenant une multiplicité de rondelles élastiques coniques (33) disposées autour de la tige de réglage (32).

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