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(71) Applicant: **Temar S.r.l.**
40018 S. Pietro in Casale (Bologna) (IT)

(72) Inventor: **Tinarelli, Danilo**
40066 Pieve Di Cento, Prov. of Bologna (IT)

(74) Representative:
Modiano, Guido, Dr.-Ing. et al
Modiano & Associati SpA
Via Meravigli, 16
20123 Milano (IT)

(54) Cartridge for pneumatic stapling hammer, particularly for firing u-shaped fixing elements

(57) A cartridge for pneumatic stapling hammer, particularly for firing U-shaped fixing elements (2), characterized in that it comprises: a profiled element (8), which shaped like an inverted letter U and is fixed below the handle (3) of the stapling hammer (1) and to the rear of the head (6) for firing the fixing elements (2) so as to be open downward; a pusher (22) which can slide on the profiled element (8); a traction spring (23) which is accommodated inside the profiled element (8) and in which one end is rigidly coupled to the profiled element (8) and the other end is rigidly coupled to the pusher (22) through a longitudinal slot of the profiled element (8), the spring (23) being guided by a pulley (31) which is rotatably supported inside the profiled element (8) proximate to the head (6) so as to actuate the pusher (22) towards the head; and a cover (14), which can slide on the profiled element (8) between a position for covering the profiled element (8), in which the cover (14) forms, together with the profiled element (8), a guiding channel (15) for the fixing elements (2), which is connected to the firing channel in the head (6) through an opening of the latter, and a position in which the cover (15) uncovers the profiled element (8) to allow loading of the fixing elements (2).

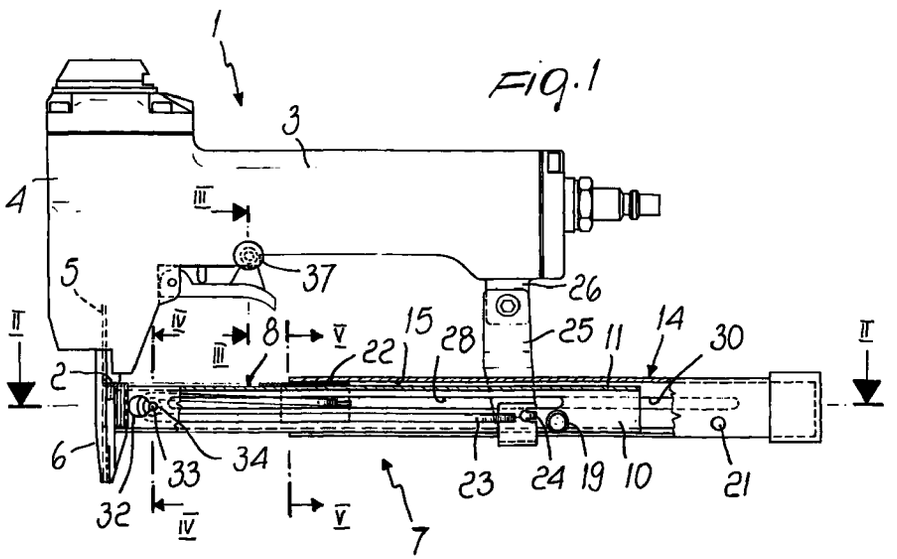

Fig.1

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Description

The present invention relates to a cartridge for pneumatic stapling hammer, particularly for firing U-shaped fixing elements.

Currently cartridges for pneumatic stapling hammers comprise a guide which is adapted to be fixed to the rear of the firing head of the pneumatic hammer and forms a channel inside which a series of fixing elements, joined together in a set, is meant to be accommodated and guided. The fixing elements, particularly U-shaped ones, are inserted from below in the guiding channel of the cartridge and are prevented from escaping by a cover which can slide axially.

It has been observed that inserting the fixing elements from below is inconvenient because the user is forced to turn the pneumatic hammer upside down and thus to direct the firing head upward, producing a dangerous condition if the head still contains fixing elements which might be fired towards the user or nearby people if the pneumatic hammer is operated accidentally.

The aim of the present invention is to provide a cartridge in which the fixing elements are inserted from above, i.e., without turning the pneumatic hammer upside down, so as to substantially avoid highly dangerous conditions.

This aim is achieved with a cartridge for pneumatic stapling hammer, particularly for firing U-shaped fixing elements, characterized in that it comprises: a profiled element, which is shaped like an inverted U and is fixed below the handle of the pneumatic hammer and to the rear of the head for firing the fixing elements; a pusher which can slide on said profiled element; spring means for pushing the fixing elements along said profiled element; and a cover, which can slide on said profiled element between a position for covering said profiled element, in which said cover forms, together with said profiled element, a guiding channel for said fixing elements, which is connected to the firing channel in the head through an opening of the latter, and a position in which said cover uncovers said profiled element to allow loading of the fixing elements.

Within the scope of this aim, an object of the present invention is to provide a device which allows the activation of the pneumatic hammer only by intentional action of the user, characterized in that it comprises a pin which is slidingly accommodated in a seat of the pneumatic hammer which is close to the location of the trigger and can be actuated, in contrast with return means, between a trigger blocking position and a trigger operation enabling position.

Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred embodiment, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a partially sectional lateral elevation view of the stapling hammer with the cartridge in the open position;

Figure 2 is a sectional view of the cartridge, taken along the plane II-II of Figure 1;

Figure 3 is a sectional view, taken along the plane III-III of Figure 1;

Figure 4 is a sectional view, taken along the plane IV-IV of Figure 1;

Figure 5 is a sectional view, taken along the plane V-V of Figure 1;

Figure 6 is a partially sectional plan view of a variation of the invention; and

Figure 7 is a sectional view, taken along the plane VII-VII of Figure 6.

With reference to the accompanying figures, the reference numeral 1 designates a stapling hammer for firing U-shaped fixing elements which are hereinafter termed staples 2 for the sake of convenience in description.

The stapling hammer 1 comprises a body 3 which forms the handle of the hammer and is frontally provided with an enlarged end 4 which accommodates the striking mass, comprising the striking blade 5.

The striking blade 5 slides in the staple firing channel formed in the head 6 fixed below the enlarged end 4.

The reference numeral 7 generally designates the cartridge of the staples 2, which is composed of a profiled element 8 whose cross-section is shaped like a letter U which is upside down with respect to the handle 3 and is complementary to the shape of the staples 2 to be expelled. The profiled element 8 runs below the handle 3 and is fixed with one end to the rear face of the head 6. The profiled element 8 has two side walls 9 and 10, an upper wall 11 and two lips 12, 13 which are obtained by folding outward the longitudinal edges of the side walls 9 and 10.

The lips 12, 13 act as a guide for a cover 14 which is shaped like an inverted letter U and is slightly larger than the profiled element 8. The cover 14 can slide on the lips 12, 13 between a forward position, whereat it abuts against the rear face of the head 6, and a retracted position, in which it leaves the profiled element 8 uncovered. In the forward position, a staple guiding channel 15 remains between the profiled element 8 and the cover 14; said channel is connected to the firing channel of the head 6 through a U-shaped opening 16. In the retracted position of the cover 14, it is possible to insert a pack of U-shaped staples 2 so that they straddle the profiled element 8. The forward and retracted positions of the cover 14 are determined by a ball 17 which is loaded by a spring 18. The ball 17 and the spring 18 are accommodated in a transverse bushing 19 of the profiled element 8.

When the cover 14 is in the forward position, the ball 17 engages a hole 20 which is formed proximate to the front end of the cover. Likewise, the retracted posi-

tion is determined by the engagement of the ball 17 in a hole 21 formed proximate to the rear end of the cover.

In order to allow the advancement of the staples 2 along the channel 15, a pusher 22 is provided which can slide on the profiled element 8 and has a front cross-section which is equal to the cross-section of the staples and complementary to the cross-section of the channel 15.

The pusher 22 is actuated towards the head 6 by means of a traction spring 23 which is accommodated in the cavity of the profiled element 8. One end of the spring 23 is rigidly coupled to a tooth 24 formed in the portion of an arm 25 running inside the profiled element 8. The arm 25 is folded around the cover 14 and is fixed, by means of one end, to a lug 26 protruding from the overlying handle 3.

The opposite end of the spring 23 is coupled to a tooth 27 of the pusher 22 which protrudes inside the profiled element 8 through a slot 28 formed longitudinally in the wall 10 of said profiled element. The pusher 22 is also provided with an outer pin 29 which slides in a longitudinal slot 30 of the cover, which is formed on the face that is adjacent to the wall 10 and opposite the slot 28.

The spring 23 is guided by means of a pulley which is constituted by a roller 31 which is rotatably supported in the walls 9, 10 of the profiled element 8. Conveniently, in order to allow the application of the roller 31 inside the profiled element 8, two mutually opposite holes 32 are formed in the walls 9 and 10 and have a larger diameter than the roller 28; on the side that is furthest from the head 6, said holes have respective semicircular notches 33 which are suitable to receive two axial pivots 34 of the roller.

When the staples 2 are used up and the user has to load a new pack of staples, he acts on the cover 14, pulling it back until the ball 17 engages the hole 20, so as to retain the cover 14 in the position in which the profiled element 8 is left uncovered.

The backward movement of the cover 14 also moves the pusher 22 backward by means of the abutment of the pivot 29 against the end of the slot 30 of the cover and the spring 23 is also loaded.

It is thus possible to load the new pack of staples, which is applied so that the staples 2 straddle the profiled element 8, keeping the stapling hammer upright.

Finally, the cover 14 is closed by sliding it until the ball 17 engages the hole 21. During the sliding of the cover, the spring 23 keeps the pusher 22 rested on the staples 2, which are accordingly pushed into the firing channel of the head 6 through the opening 16. For every staple that is fired by the striking blade 5, another staple enters the firing channel as soon as the striking blade 5 has reached the upper stroke limit.

It is evident that the described cartridge allows more convenient and safer loading than conventional ones. To load the new staples, the stapling hammer in fact remains upright, i.e., with the firing channel directed downward, so that accidental firing of a staple which may have remained in the firing channel of the head is not directed towards the user, differently from what occurs in conventional cartridges, in which staple loading, by being performed from below, entails turning upside down the stapling hammer, whose firing channel is directed towards the user.

The above-described invention is susceptible of numerous modifications and variations, all of which are within the scope of the same inventive concept.

One of these embodiments is shown in Figures 6 and 7, in which elements or parts identical to those of the example of Figures 1 to 5 are designated by the same reference numerals increased by 100.

In particular, the reference numeral 108 designates the profiled element whereon the fixing elements 2 are straddled and the reference numeral 114 designates the cover, which is meant to slide on the profiled element 108.

The profiled element 108 has a cross-section which is shaped like an inverted T and is constituted in practice by a rib 46 which is rigidly perpendicular to a strip 47. The strip 47 is fixed to an arm which is coupled to the handle of the stapling hammer, like the arm 25 of the above-described example, and its opposite edges can slide in mutually opposite slots 48, 49 of the cover 114.

The pusher 122 can slide on the rib 46, and a lug 50 protrudes laterally from the pusher. The pusher 122 is actuated towards the head 6 of the stapling hammer by a spring 123 which is accommodated in a chamber 51 formed between the rib 46 and a side wall 52 of the cover 114.

One end of the spring 123 is rigidly coupled to a lobe 53 of the pusher 122 protruding into the chamber 51. The other end is coupled to a pin protruding from the inner face of the wall 52 of the cover. The spring 123 is wound around a pulley 131 which is rotatably supported on a pivot 134 protruding into the chamber 51 proximate to the head 6.

The wall 54 of the cover 114 which lies opposite the wall 52 that supports the pin 134 has a thicker region in which a pin 55 is inserted; said pin 55 acts as articulation for an L-shaped lever 56 and is capable of assuming two positions. In one of these positions, an arm 57 of the lever 56 protrudes through an opening 58 of the wall 54 of the cover in order to interfere with the lug 50 of the pusher 122, while the other arm 59 arranges itself parallel to the wall of the cover so as to enter an outer seat 60 thereof, so that it does not protrude laterally. Ultimately, the lever 56 is used to allow to assemble and disassemble the pusher 122 inside the cover 114. In particular, when the lever is rotated so that the arm 59 is engaged in the seat 60, the other arm 57 acts as abutment for the lobe 53 and blocks the advancement of the pusher 122, allowing to retract the pusher together with the cover and to retain it while the fixing elements are being arranged so as to straddle the rib 46. In order to ensure greater safety against accidental actuation of

the stapling hammer, it is possible to operate the trigger only after operating an additional button.

For this purpose, below the handle, proximate to the enlarged end 4, a cylindrical transverse seat 35 is provided (see Figure 3), in which a stem 36 is guided coaxially; said stem forms a button 37 at one end and an enlarged region 38 at the opposite end. The stem 36 has a smaller diameter than the seat 35, so that an annular chamber 39 remains which accommodates a spring 40. The spring 40 acts between a collar 41 of the stem 36 and a shoulder 42 of the seat 35, so as to keep the enlarged region 38 in abutment against the handle 3 and the button 37 spaced from the handle 3.

In this position, the collar 41 faces a slot 43 in which a rib 44 of the trigger 45 for actuating the stapling hammer can enter.

From the above description it is evident that when the stem is in the position shown in Figure 3 the actuation of the trigger is prevented by the abutment of the rib 44 against the collar 41. On the other hand, when the button 37 is pressed in contrast with the action of the spring 40 and the collar 41 has cleared the slot 43, the rib 44 can engage the slot 43 and allow the trigger 45 to complete its stroke for activating the stapling hammer.

Conveniently, the button 37 is located in a position in which it can be conveniently pressed by the thumb while the trigger is operated with the index finger.

In the practical embodiment of the invention, the shapes and the dimensions may vary according to the staples to be fired.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A cartridge for pneumatic stapling hammer, particularly for firing U-shaped fixing elements (2), characterized in that it comprises: a profiled element (8), which is fixed below the handle (3) of the pneumatic hammer (1) and to the rear of the head (6) for firing the fixing elements (2); a pusher (22) which can slide on said profiled element; spring means (23) for pushing the fixing elements (2) along said profiled element (8); and a cover (14), which can slide on said profiled element (8) between a position for covering said profiled element, in which said cover (14) forms, together with said profiled element (8), a guiding channel (15) for said fixing elements (2), which is connected to the firing channel in the head (6) through an opening of the latter, and a position where said cover (14) uncovers said profiled element (8) to allow loading of the fixing elements (2).

2. A cartridge according to claim 1, characterized in that it comprises a profiled element (8) which is shaped like an inverted letter U and is fixed below the handle (3) of the stapling hammer (1) and to the rear of the head (6) for firing the fixing elements (2) so as to be open downward, a pusher (22) which can slide on said profiled element (8), a traction spring (23) which is accommodated inside said profiled element (8) and has one end rigidly coupled to said profiled element (8) and the other end rigidly coupled to said pusher (22) through a longitudinal slot (28) of said profiled element (8), said spring (23) being guided by a pulley (31) which is rotatably supported inside said profiled element proximate to said head (6) so as to actuate said pusher (22) towards said head (6), a cover 14 being also provided which can slide on said profiled element (8) between a position for covering said profiled element, in which said cover (14) forms, together with said profiled element, a guiding channel (15) for said fixing elements (2), which is connected to the firing channel in the head (6) through an opening of said head, and a position in which said cover (14) uncovers said profiled element (8) to allow loading of the fixing elements (2).

3. A cartridge according to claim 2, characterized in that said profiled element (8) comprises two side walls (9, 10), an upper wall (11), and two lips (12, 13) which are obtained by folding out the longitudinal edges of said walls (9, 10), said lips (12, 13) acting as a guide for a cover (14) which has a U-shaped cross-section and is slightly larger than the profiled element (8), so as to form a guiding channel (15) for said fixing elements (2) which is connected to the staple firing channel, said cover (14) being able to slide between a forward position, whereat it abuts against said head (6), and a retracted position, in which it leaves said profiled element (8) uncovered, said cover (14) being retained in said forward and retracted position by means of a ball (17) which is loaded by a spring (18), said ball (17) and said spring (18) being accommodated in a transverse bush (19) of said profiled element (8) so that when the cover (14) abuts against said head (6), said ball (17) engages a hole (21) of the cover (14) proximate to its rear end, while when the cover (14) is in retracted position, said ball (17) engages a hole (20) of the cover (14) proximate to its front end.

4. A cartridge according to claim 2 or 3, characterized in that said pusher (22) is actuated towards said head (6) by a traction spring (23) which is accommodated in the cavity of said U-shaped profiled element (8) and in which one end is rigidly coupled to a tooth (24) which is formed in a shaped arm (25) which is fixed to the body of the stapling hammer

(1) and the opposite end is coupled to a tooth (27) of the pusher (22) protruding into said cavity of said profiled element (8) through a slot (28) formed longitudinally in a wall (10) of said profiled element, said pusher (22) being also provided with a pin (29) protruding externally and slides in a longitudinal slot (30) of the cover (14), and also characterized in that said spring (23) is guided by way of a pulley which is constituted by a roller (31) which is rotatably supported in the parallel walls (9, 10) of said profiled element (8), two mutually opposite holes (32) being formed in said parallel walls (9, 10) in order to allow to place the roller (31) in the cavity of said profiled element (8), said holes having a larger diameter than the roller (31) and having, on the side that is furthest from said head (6), respective semicircular notches (34) which are suitable to receive two axial pivots (33) of the roller (31).

5. A cartridge according to claim 1, characterized in that said profiled element (108) has a T-shaped cross-section, with a rib (46) which is rigidly perpendicular to a strip (47) which is fixed to an arm which is attached to the stapling hammer body and whose opposite edges can slide in mutually opposite slots (48, 49) of said cover (114), said pusher (122) being able to slide on said rib (46), a lug (50) protruding laterally from said pusher, said pusher (122) being actuated towards the head (6) of the stapling hammer (1) by a spring (123) which is accommodated in a chamber (51) formed between said rib (46) and a side wall (52) of the cover (114), one end of said spring (123) being rigidly coupled to a lobe (53) of the pusher (122) protruding into said chamber (51), the other end being coupled to a pin which protrudes from the inner face of the wall (52) of the cover (114), said spring (123) being wound around a pulley (131) which is rotatably supported on a pivot (134) which protrudes into said chamber (51) proximate to said head (6).

6. A cartridge according to claim 5, characterized in that the wall (54) of said cover (114) which lies opposite the wall (51) that supports the pivot (134) for supporting the pulley (131) has an expansion in which a pin (55) is inserted which acts as articulation for an L-shaped lever (56) which is capable of assuming two positions, one arm (57) of the lever (56) protruding, in one of said positions, through an opening (58) of the wall (52) of the cover (114) in order to interfere with said pusher (122), while the other arm (59) arranges itself parallel to the wall (52) of the cover (114) in order to enter an external seat (60) thereof.

7. A cartridge according to one of the preceding claims, characterized in that in the body of the stapling hammer (1), at the actuation trigger (45), a cylindrical transverse seat (35) is provided in which a stem (36) is guided coaxially, said stem forming, at one end, a button (37) and, at the opposite end, an enlarged portion (38), said stem (36) having a smaller diameter than the seat (35) so as to form an annular chamber (39) which accommodates a spring (40) acting between a collar (41) of said stem (36) and a shoulder (42) of said seat (35), said stem (36) being movable between a position for blocking the trigger (45) and a position for enabling it; in said blocking position, said enlarged portion (38) being in abutment against the body (3) of the stapling hammer (1) and said button (37) being spaced from said body (3), so that said collar (41) faces a slot (43) to prevent the engagement of a rib (44) of said trigger (45) in said slot; in said enabling position, said button 37 abutting against said body (3) so that said collar (41) is shifted with respect to said slot (43) in order to allow the engagement of said rib (44) in said annular chamber (39) through said slot (43).

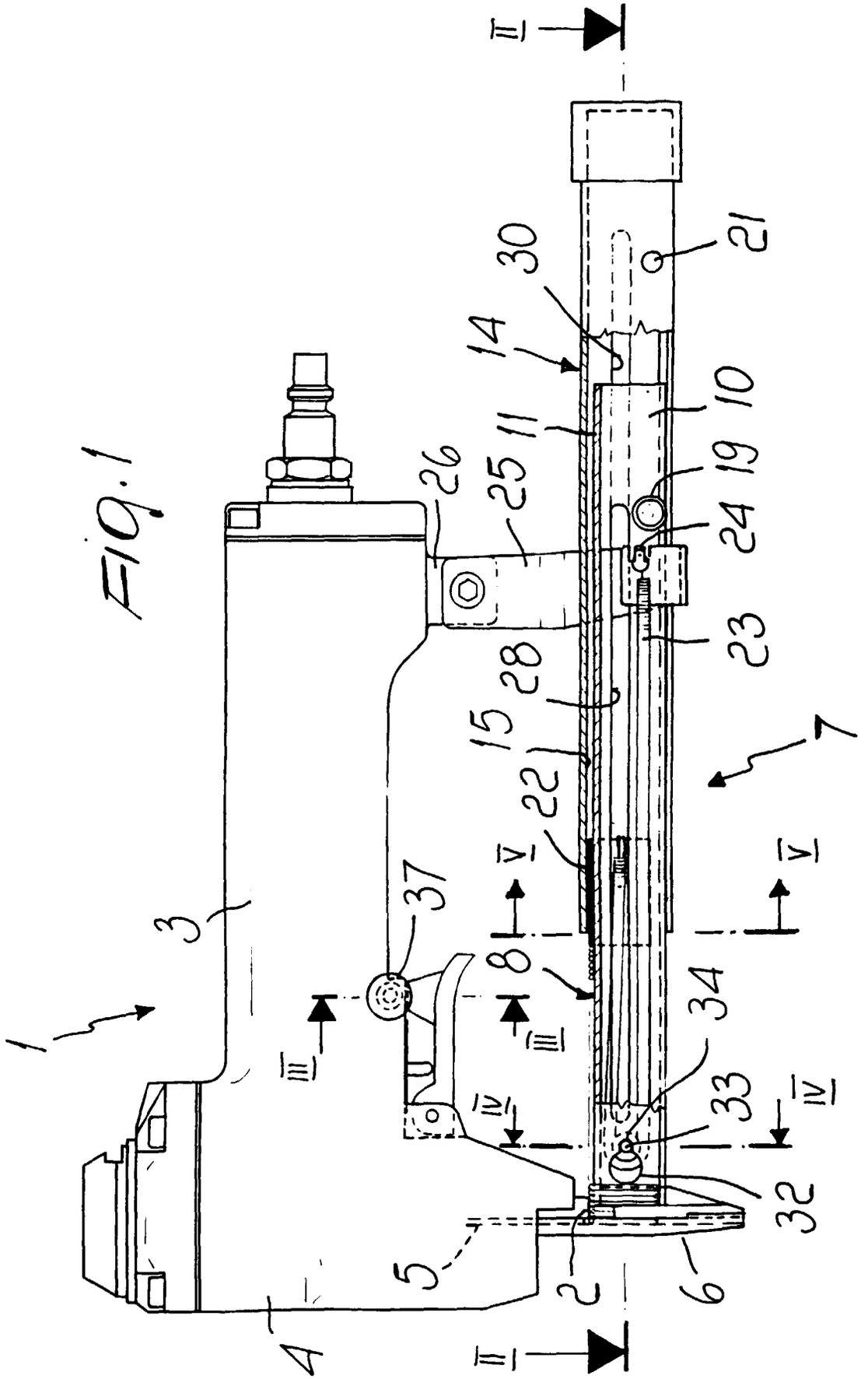
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Fig. 1

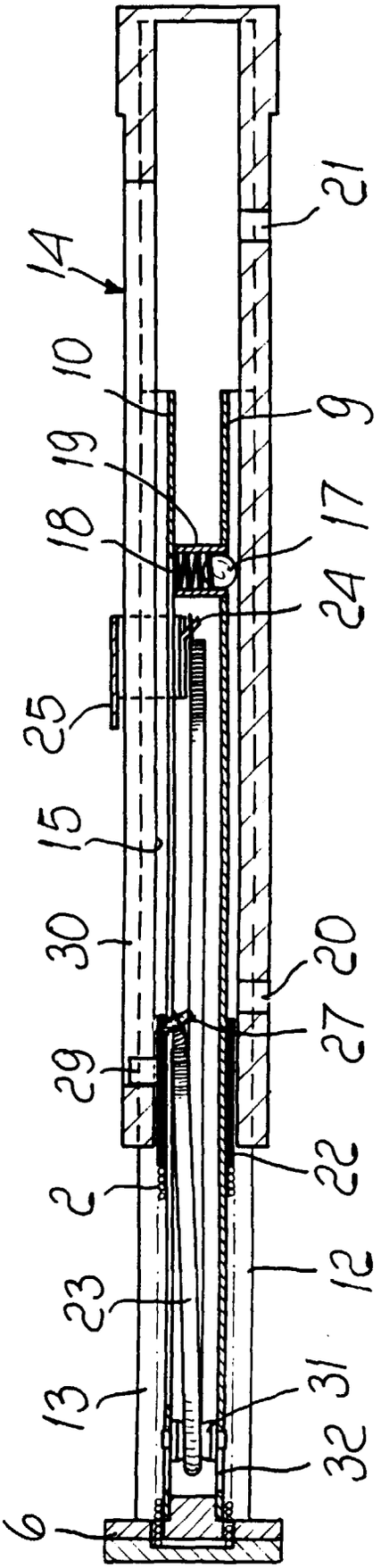
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Fig. 2

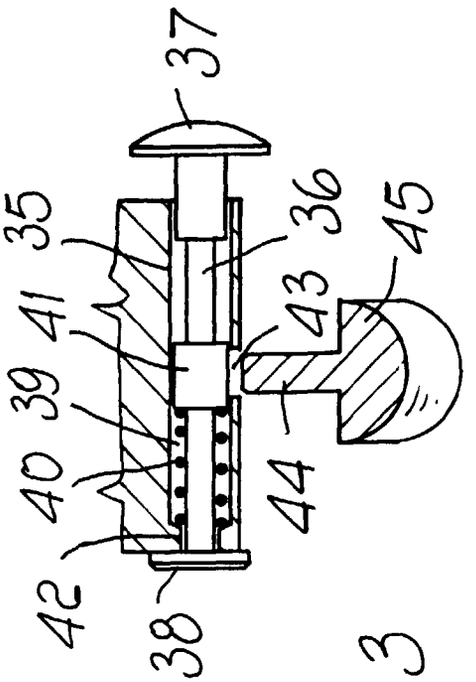
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Fig. 3

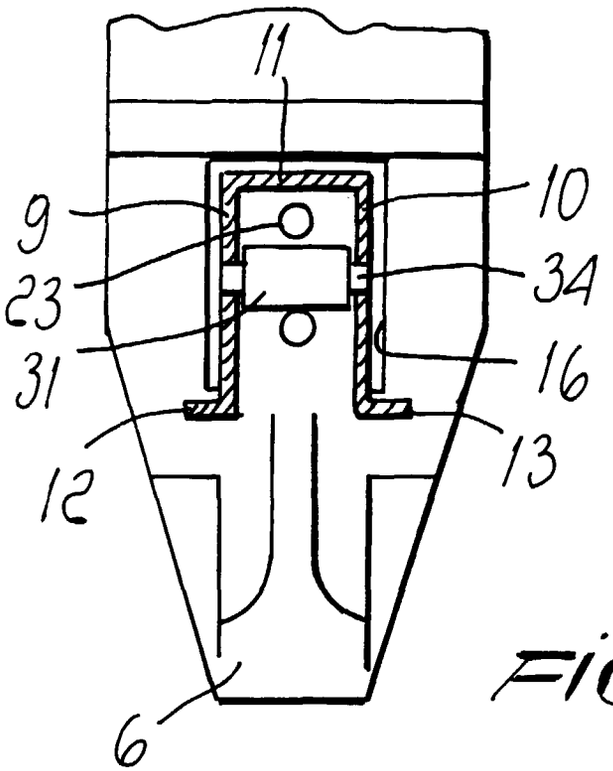

Fig. 4

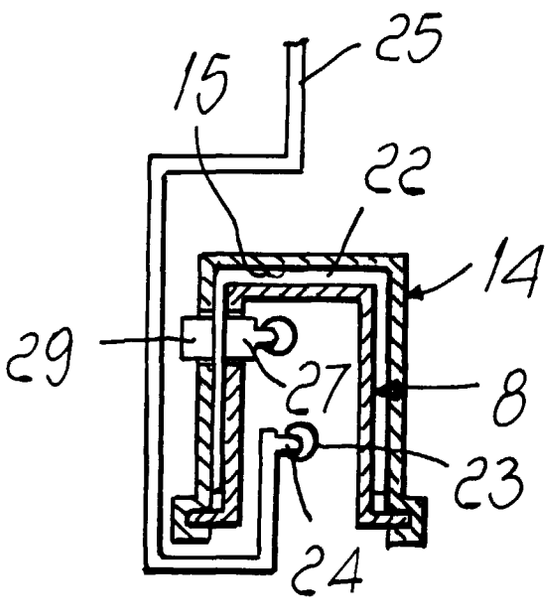

Fig. 5

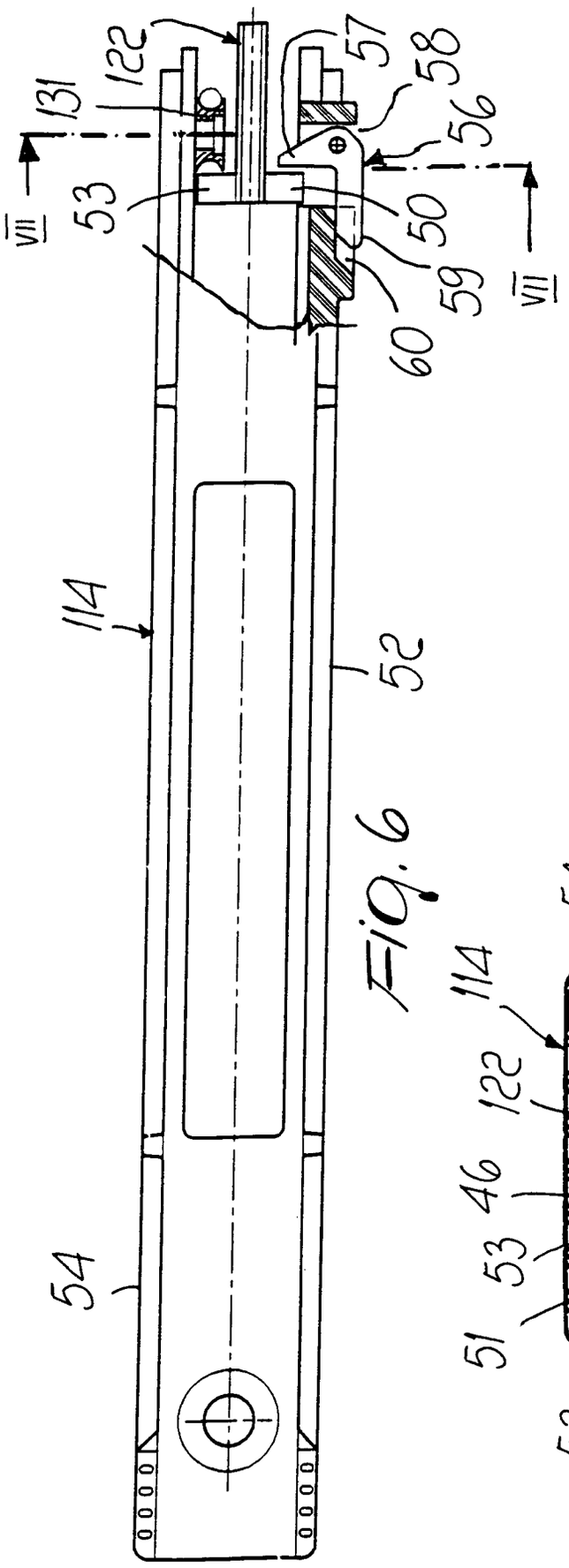
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Fig. 6

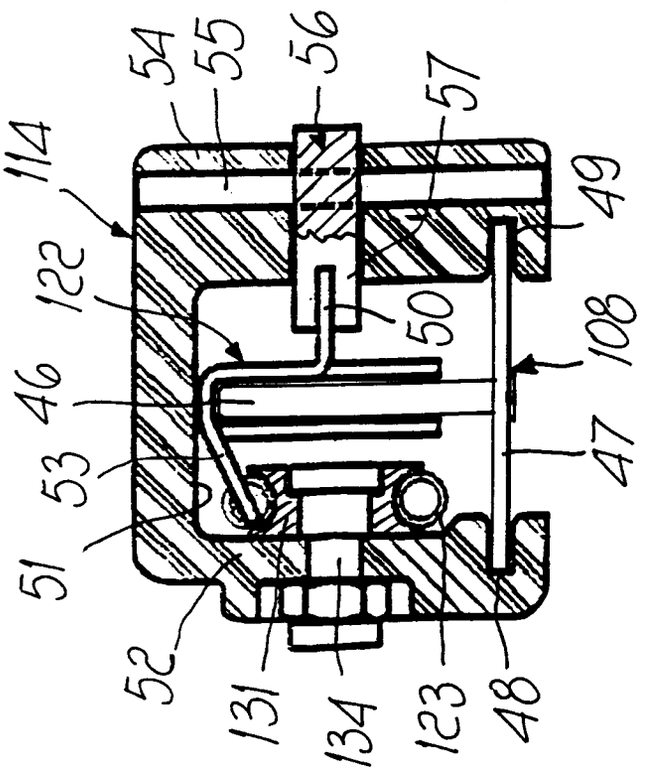
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Fig. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 10 7836

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US 4 211 351 A (MONACELLI UMBERTO) 8 July 1980 * the whole document *	1	B25C5/16
Y	FR 1 475 563 A (RABELOW) 14 June 1967 * page 3, paragraph 1; figure 3 *	1	
A	US 3 049 715 A (ALLEN) 21 August 1962	1	
A	GB 2 154 926 A (MONACELLI UMBERTO) 18 September 1985 * the whole document *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B25C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 August 1998	Gerard, O

CATEGORY OF CITED DOCUMENTS

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