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(54) **Manual press for joints**

(57) A manual press for joints includes a main body that supports a first guide means joined to a first jaw that engages a first tubular member and is aligned with a second jaw that engages a second tubular member; the second jaw is slidingly associated with the first guide means and is movable with respect to the first jaw to allow reversible transition from an open condition, in which the jaws are substantially at their maximum mutual distance, to a tightening condition, in which the jaws are substantially at their minimum mutual distance. The press includes a manual feed device which is functionally connected to the second jaw in order to allow the transition from the open condition to the tightening condition.

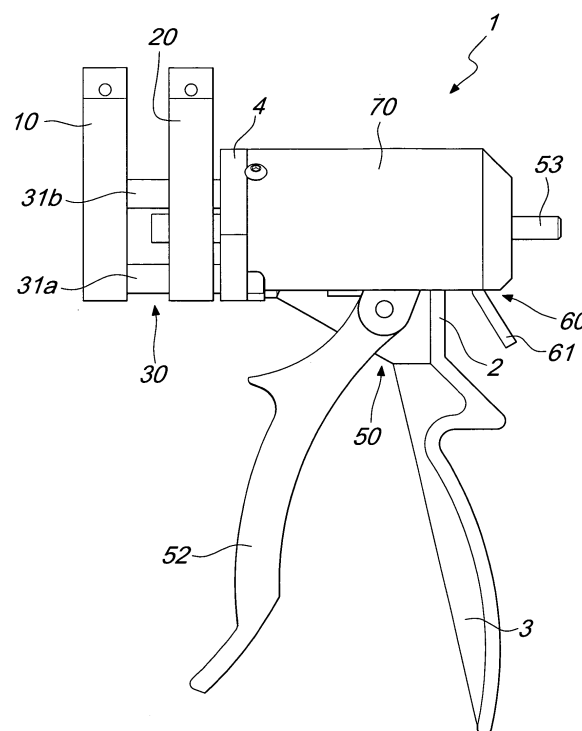


Fig. 1

Description

[0001] The present invention relates to a manual press for joints. The press is adapted to tighten mechanical connectors and to perform butt welds of pipes and/or connectors made of heat-sealable material.

[0002] As is known, in the production of apparatus for conveying hot, cold and refrigerated fluids, new materials and new laying systems that allow to speed up and optimize the operations are used increasingly often.

[0003] In recent years, an ever increasing use is in fact noticeable of multilayer pipes and of pipes made of synthetic materials, which are replacing traditional galvanized steel pipes used previously in water, heating and sanitary systems.

[0004] New pipes are provided with adapted fittings connected by means of compression systems or by heat-sealing.

[0005] More particularly, mechanical compression connectors are generally constituted by a main body provided with a shank to be inserted within the pipe. Once the pipe is inserted, a locking ring that abuts against an annular portion of the main body ensures both mechanical tightness and hydraulic tightness with the aid of an adapted gasket.

[0006] Compression of the ring is generally performed by means of specific presses, which are essentially constituted by a fixed jaw and by a movable jaw, which can slide with respect to the fixed jaw.

[0007] Each jaw is provided with templates adapted to accommodate the main body of the connector at one side and the ring at the other side.

[0008] The simple closing of the two jaws causes the fastening of the joint.

[0009] However, it should be noted that the required tightening force has a substantial intensity. In this regard, the movement of the movable jaw is generally assisted by piston-type actuators which are actuated by electric-hydraulic pumps or by pedal-operated pumps.

[0010] Accordingly, the practicality and versatility of mechanical compression connectors is at least partly thwarted by the inevitable need of specific equipment that requires the use of hydraulic control units, an electric power supply and hydraulic connecting tubes, and therefore turns out to be scarcely practical, heavy and unquestionably expensive.

[0011] In the joining method that utilizes heat sealing, the surfaces to be heat-sealed, previously flattened by means of adapted cutters, are heated until they melt by contact with a thermal member and then, after the spacing of the member, are joined by pressing in order to obtain heat-sealing.

[0012] The surfaces to be heat-sealed are generally joined by means of presses that are substantially equivalent to the ones described above but differ from the preceding ones mainly in that the templates are replaced with adapted pipe locking devices.

[0013] Accordingly, even by resorting to this second

joining system, problems which are substantially similar to the ones already highlighted for the first system are encountered.

[0014] The aim of the present invention is to solve the problems described above by providing a manual press which does not require any type of electrical and/or hydraulic connection for its operation.

[0015] Within the scope of this aim, a particular object of the invention is to provide a manual press that can be used to tighten mechanical connectors.

[0016] Another object of the invention is to provide a manual press that can be used to perform butt welds of pipes and/or connectors made of heat-sealing material.

[0017] Another object of the invention is to provide a manual press that can produce a considerable tightening force by utilizing a relatively modest muscular effort by the operator.

[0018] Another object of the invention is to provide a manual press that is at once lightweight and easy to handle.

[0019] Another object of the invention is to provide a manual press that is particularly advantageous from a strictly economic standpoint.

[0020] This aim, as well as these and other objects that will become better apparent hereinafter, are achieved by a manual press for joints, comprising a main body that supports a first guide means joined to at least one first jaw that engages a first tubular member, said first jaw being aligned with a second jaw that engages a second tubular member, said second jaw being slidably associated with said first guide means and being movable with respect to said first jaw, said manual press passing reversibly from an open condition, in which said jaws are substantially at their maximum mutual distance, to a tightening condition, in which said jaws are substantially at their minimum mutual distance, said manual press being **characterized in that** it comprises a manual feed device which is functionally connected to said second jaw in order to pass it from said open condition to said tightening condition.

[0021] Further characteristics and advantages will become better apparent from the description of preferred but not exclusive embodiments of a manual press according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a side view of a manual press according to the invention in the open condition;

Figure 2 is a side view of a manual press according to the invention in the closed condition;

Figure 3 is an exploded view of a manual press according to the invention;

Figure 4 is a perspective view of a manual press according to the invention during use;

Figure 5 is an exploded view of a manual press according to a further aspect of the invention.

[0022] With reference to Figures 1 to 4, a manual

press, particularly for joints, is generally designated by the reference numeral 1.

[0023] The manual press 1 has a main body 2, which is essentially constituted by a metallic frame and a grippable fixed lever 3 that protrudes from the frame.

[0024] A substantially disk-like abutment plate 4 is associated with the main body 2 and supports a first guide means 30, which is joined to a first jaw 20 to be engaged with a first tubular member.

[0025] The first guide means 30 is preferably constituted by three longitudinal bars 31a, 31b and 31c which are mutually parallel.

[0026] The ends of the longitudinal bars 31a, 31b and 31c are respectively associated with the first jaw 10 and with the abutment plate 4, for example by means of screws or other equivalent fastening systems.

[0027] This construction allows, if necessary, to replace the longitudinal bars 31a, 31b, 31c with other bars having a different length, so as to change the distance between the first jaw 10 and the abutment plate 4.

[0028] A second jaw 20 is slidably mounted on the longitudinal bars 31a, 31b, 31c and will engage a second tubular member.

[0029] The second jaw 20 can move with respect to the first jaw 10, and this allows the manual press 1 to pass from an open condition, in which the two jaws are substantially at their maximum mutual distance, to a tightening condition, in which the two jaws are substantially at their minimum mutual distance.

[0030] Preferably, the second jaw 20 is provided with a second guide means 40, which allows the second jaw to maintain more easily a substantially parallel arrangement with respect to the first jaw 10, during transition from the open condition to the tightening condition.

[0031] The second guide means 14 is preferably constituted by a pair of rods 41a and 41b, which are respectively parallel to each other and are also parallel to the longitudinal bars 31a, 31b, 31c.

[0032] The two rods 41a and 41b are fastened, at one end, to the second jaw 20, by means of screws or other equivalent systems, and can slide freely with respect to the abutment plate 4.

[0033] Two notches 5a and 5b are provided on the main body 2 and are mutually diametrically opposite, with a shape that is respectively complementary to the profile of the transverse cross-section of each rod 41a and 41b, which is accommodated slidably.

[0034] The rods 41a and 41b and the notches 5a and 5b relate to the specific embodiments described; however, in a further constructive variation, not shown in the accompanying figures, they might also be omitted, without compromising at all the correct operation of the manual press 1.

[0035] The first jaw 10 and the second jaw 20 are constituted by two plate-like bodies. Two substantially U-shaped multifunctional seats designated respectively by the reference numerals 11 and 21, are provided on top of the plate-like bodies.

[0036] According to a first embodiment, in which the manual press 1 is designed to connect two tubular members constituted by the body 1000 of a mechanical connector and by the corresponding ring 1001, the multifunctional seats are shaped so as to accommodate a first adapter 12 and a second adapter 22.

[0037] The two adapters 12 and 22 are substantially U-shaped and have a shape that allows to engage them by interlocking respectively with the body 1000 and with the ring 1001 or vice versa.

[0038] The adapters 12 and 22 are associated with the multifunctional seats 11 and 21 detachably and are mutually interchangeable.

[0039] According to the invention, the manual press 1 comprises a manual feed device 50, which is functionally connected to the second jaw 20 in order to allow the transition from the open condition to the tightening condition by using only the strength of one's hands.

[0040] The manual feed device 50 comprises at least one friction pusher 51, which is slidably crossed by a pusher rod 53. The pusher rod 53 is joined at one end to the second jaw 20 and is arranged parallel to the first guide means 30 and to the second guide means 40.

[0041] The friction pusher 51 is actuated by an oscillating lever 52, which is articulated to the main body 2 substantially at the mutually opposite fixed lever 3, which is transverse to the direction of motion of the second jaw 20. The friction pusher 51 interacts with the pusher rod 53 so as to move the second jaw 22 toward the first jaw 10, during transition from the open condition to the tightening condition.

[0042] The movement of the oscillating lever 52 is in fact converted into the linear movement of the friction pusher 51, which by overcoming the thrust of a first elastic means that abuts against the main body 2, not shown in the figures, causes the advancement of the second jaw 20 with respect to the first jaw 10.

[0043] In particular, during the movement of the oscillating lever 52 the friction pusher 51 loses its substantially parallel arrangement with respect to the pusher rod 53 and, due to the minimal play that exists, a mechanical interference arises which causes the advancement of the second jaw 20 with respect to the first jaw 10.

[0044] When the action on the oscillating lever 52 ceases, the first elastic means moves the friction pusher 51 into a position that is substantially parallel to the longitudinal axis of the pusher rod 53, so as to allow their mutual sliding and return the oscillating lever 52 to the inactive position.

[0045] It is important to note that the configuration described above allows to use an oscillating lever 52 that is particularly advantageous, i.e., has a very short resistance arm with respect to the effort arm. Accordingly, the manual press 1 is capable of generating a considerable tightening force starting from a relatively modest muscular effort by the operator.

[0046] Preferably, the manual feed device 50 is provided with a retention mechanism 60, which is activated

automatically after each movement of the second jaw 20 toward the first jaw 10.

[0047] The retention mechanism 60 comprises a trigger 61 which is provided with a hole 62 in which the pusher rod 53 is slidingly accommodated.

[0048] The trigger 61 is pivoted to the main body 2, at one of its ends. The trigger 61 is arranged transversely to the longitudinal axis of the pusher rod 53 and interacts with it in order to reversibly lock the second jaw 20 with respect to the first jaw 10, during transition from the open condition to the tightening condition.

[0049] After each advancement of the second jaw 20 with respect to the first jaw 10, a second elastic means, not shown in the figures, abuts against the main body 2 and turns the trigger 61 with respect to its pivoting axis. By virtue of the minimal play that exists between the hole 62 and the pusher rod 53, the rotation induces mechanical interference between the trigger 61 and the pusher rod 53, preventing their relative sliding.

[0050] The manual feed device 50 and the retention mechanism 60 are preferably covered by a protective enclosure 70, which is detachably associated with the main body 2.

[0051] According to a further embodiment of the invention, shown in Figure 5, the manual press is generally designated by the reference numeral 101.

[0052] The manual press 101 is adapted to perform the butt welding of pipes and/or connectors made of heat-sealable synthetic material, and therefore the tubular members are constituted by the end of a first pipe and by the end of a second pipe.

[0053] A first jaw 110 and a second jaw 120 are provided respectively with a first pipe locking device 112 and with a second pipe locking device 122, of a per se known type.

[0054] Each one of the two pipe locking devices essentially comprises two mutually opposite members, which form, when they are joined, a circular seat that is adapted to lock a portion of pipe.

[0055] While the first member in practice can be identified as the first jaw 110 or the second jaw 120, the second member, designated respectively by the reference numeral 113 and 123, is constituted by a plate-like body, which is substantially U-shaped and is pivoted by one of its ends to the first member.

[0056] A closure device, designated respectively by the reference numerals 116 and 126, is fitted at the free ends of each member.

[0057] A slot is provided on the grip surface of the members and accommodates a corresponding portion of a body for reducing the diameter of the pipe locking seat.

[0058] The slots are designated respectively by the reference numerals 114a, 114b, 124a and 124b, and the portions of the reduction bodies are designated by the reference numerals 115a, 115b, 125a and 125b.

[0059] In the embodiment shown in Figure 5, the parts that corresponds to the parts already described with ref-

erence to the embodiment shown in Figures 1 to 4 have been designated by the same reference numerals.

[0060] The operation and use of the manual press according to the invention are described hereafter.

[0061] Starting from the open condition, in which the two jaws 10 and 20, or 110 and 120, are substantially at their maximum mutual distance, the first tubular member is engaged with the first jaw 10 or 110 while the second tubular member is engaged with the second jaw 20 or 120.

[0062] In detail, when the two tubular members are constituted by the body 1000 of a mechanical connector and by the corresponding ring 1001, the first adapter 12 and the second adapter 22 are associated beforehand with the corresponding multifunctional seats 11 and 21.

[0063] Then the body 1000 and the ring 1001 are engaged by interlocking with the two adapters 12 and 22.

[0064] When the tubular members are constituted by the end of a first pipe and by the end of a second pipe, they are fixed respectively to the first pipe locking device 112 and to the second pipe locking device 122.

[0065] More particularly, fixing is perfected by joining the second member 113 and/or 123 to the first member, i.e., to the first jaw 110, and/or to the second jaw 120, so as to form a circular seat that is adapted to lock a portion of pipe.

[0066] If the diameter of the tubular members to be joined changes, it is sufficient to replace the reduction bodies 115a, 115b, 125a and 125b.

[0067] Locking is then completed by tightening the closure devices 116 and 126.

[0068] Before welding, the ends of the first pipe and of the second pipe to be joined must be prepared by means of cutting operations and subsequently heated with a heater.

[0069] After engaging the tubular members to be joined with the respective jaws, the operator acts on the oscillating lever 52, moving it toward the fixed lever 3.

[0070] The action of the operator on the oscillating lever 52 leads to the linear movement of the friction pusher 51, which by interfering mechanically with the pusher rod 53 moves the second jaw 20 or 120 toward the first jaw 10 or 110 and consequently moves the two tubular members to be joined mutually closer.

[0071] After each advancement of the second jaw 20 or 120, the retention mechanism 60 is activated automatically and locks the second jaw 20 or 120 in the position it has reached, even when the action of the operator on the oscillating lever 52 ceases.

[0072] In detail, the trigger 61 is subjected to the action of the second elastic means and by rotating with respect to its pivoting axis, by virtue of the minimal play that exists between the hole 62 and the pusher rod 53, interferes mechanically with the rod, preventing further sliding.

[0073] Simultaneously, the first elastic means restores the substantially parallel arrangement between the friction pusher 51 and the pusher rod 53 and returns the oscillating lever 52 to the inactive position.

[0074] The advancement of the second jaw 20 or 120 with respect to the first jaw 10 or 110 causes transition from the open condition to the tightening condition, which leads to the joining of the two tubular members.

[0075] In particular, in the first case, the ring 1001 is interlocked on the body 1000 of the mechanical connector, while in the other case the end of the first pipe is heat-sealed to the end of the second pipe.

[0076] When the connection of the two tubular members is completed correctly, they are released with respect to the first jaw 10 or 110 and with respect to the second jaw 20 or 120.

[0077] It is subsequently possible to pass from the tightening condition to the open condition by acting on the free end of the trigger 61 so as to move it into a position that is substantially perpendicular to the longitudinal axis of the pusher rod 53, so as to ensure the sliding of the second jaw 20 or 120 with respect to the first guide means 30.

[0078] By using the manual press according to the invention, the transition from the open condition to the tightening condition occurs by acting on the oscillating lever 52 a very limited number of times.

[0079] Specifically, with a maximum of three movements of the oscillating lever 52 the operator achieves the full approach of the second jaw 20 or 120 to the first jaw 10 or 110.

[0080] By virtue of the particular configuration of the manual feed device 50, the manual press according to the invention is capable of generating a tightening force that is particularly intense, equal to at least 5000 N, with a relatively modest muscular effort by the operator.

[0081] In practice it has been found that the manual press according to the invention fully achieves the intended aim. The manual press does not require, for its operation, any type of electrical and/or hydraulic connection.

[0082] With minimal adaptations, this manual press can be used both for tightening mechanical connectors and for performing butt welds of pipes and/or connectors made of heat-sealable material.

[0083] Also the manual press according to the invention is lightweight, easy to handle and particularly advantageous from a strictly economic point of view.

[0084] This application claims the priority of Italian Patent Application No. MI2009A001403, filed on August 3, 2009, the subject matter of which is incorporated herein by reference.

Claims

1. A manual press for joints, comprising a main body that supports a first guide means joined to at least one first jaw that engages a first tubular member, said first jaw being aligned with a second jaw that engages a second tubular member, said second jaw being slidably associated with said first guide means and being movable with respect to said first jaw, said

manual press passing reversibly from an open condition, in which said jaws are substantially at their maximum mutual distance, to a tightening condition, in which said jaws are substantially at their minimum mutual distance, said manual press being **characterized in that** it comprises a manual feed device which is functionally connected to said second jaw in order to pass it from said open condition to said tightening condition.

2. The manual press according to the preceding claim, **characterized in that** said manual feed device comprises at least one friction pusher, which interacts with at least one pusher rod which is substantially parallel to said first guide means and is coupled to said second jaw, said friction pusher being actuated by an oscillating lever which is articulated to said main body substantially at an opposite fixed lever, said friction pusher interfering mechanically with said pusher rod, overcoming the action of a first elastic means.

3. The manual press according to claim 2, **characterized in that** said manual feed device comprises a retention mechanism that interacts with said pusher rod in order to reversibly lock said second jaw with respect to said first jaw during transition from said open condition to said tightening condition.

4. The manual press according to claim 3, **characterized in that** said retention mechanism comprises at least one trigger which is articulated to said main body and interacts with said pusher rod, said trigger interfering mechanically with said pusher rod under the action of a second elastic means.

5. The manual press according to one or more of the preceding claims, **characterized in that** said first guide means comprises at least two mutually parallel longitudinal bars, the ends of said longitudinal bars being joined respectively to said first jaw and to an abutment plate that is joined to said main body, said second jaw being slidably associated with said longitudinal bars.

6. The manual press according to one or more of the preceding claims, **characterized in that** it comprises a second guide means, which is joined to said second jaw in order to maintain more easily a substantially parallel arrangement with respect to said first jaw during transition from said open condition to said tightening condition.

7. The manual press according to claim 6, **characterized in that** said second means comprises at least two mutually parallel rods associated with said second jaw at one of their ends and slidably associated with said abutment plate.

8. The manual press according to one or more of the preceding claims, **characterized in that** said first jaw and said second jaw comprise respectively a first adapter and a second adapter which are substantially U-shaped, said first adapter being engaged by interlocking with said first tubular member, said second adapter being engaged by interlocking with said second tubular member, said adapters being detachably associated with said jaws and being mutually interchangeable. 5 10
9. The manual press according to one or more of the preceding claims, **characterized in that** said first jaw and said second jaw comprise respectively a first pipe locking device and a second pipe locking device, said first pipe locking device being engaged with said first tubular member, said second pipe locking device being engaged with said second tubular member. 15 20
10. The manual press according to one or more of the preceding claims, **characterized in that** each of said locking devices comprises a pair of mutually opposite members adapted to form, when they are joined, a circular locking seat with a modifiable diameter, said members being pivoted at one end and being provided, at the opposite end, with a closure device. 25 30 35 40 45 50 55

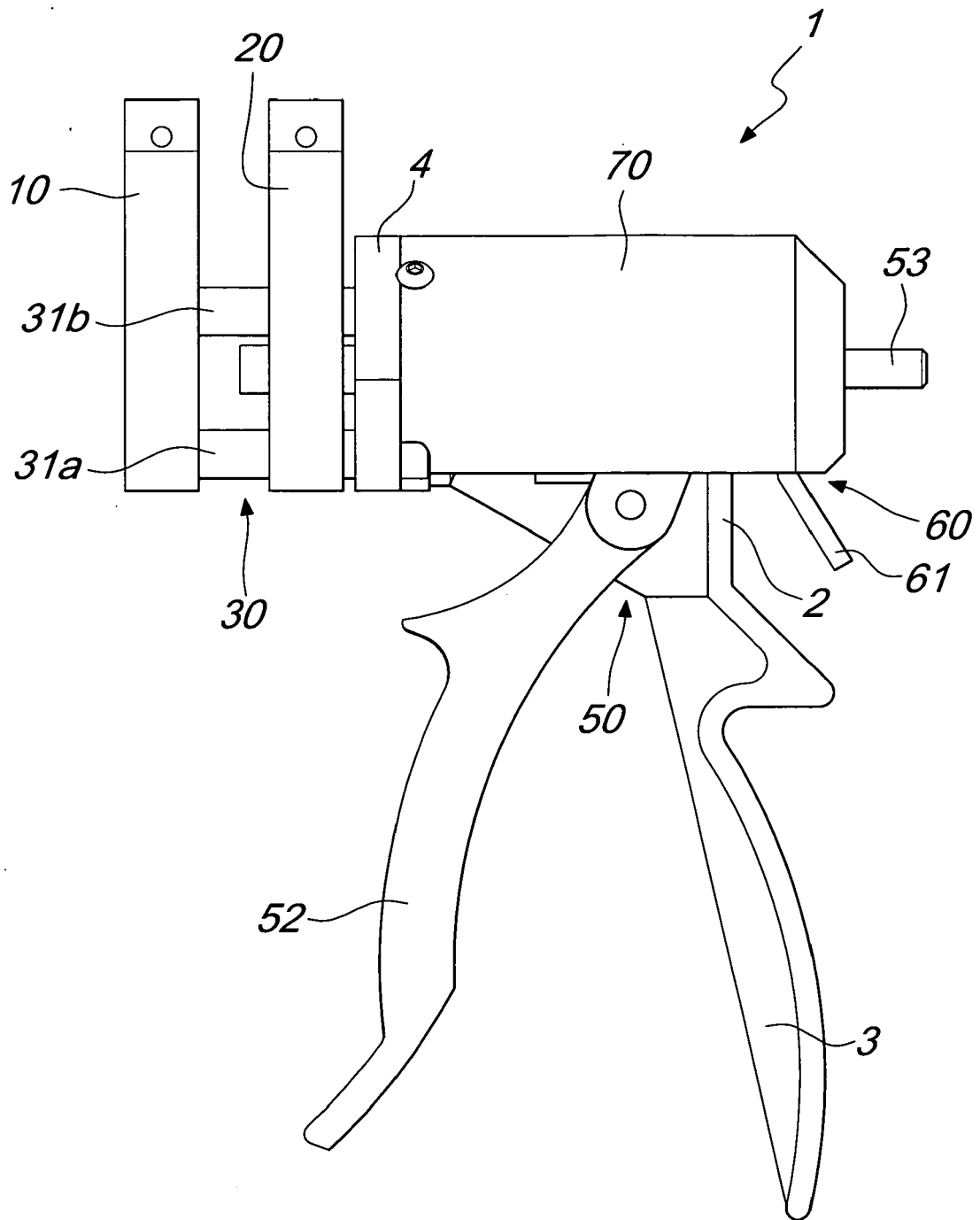


Fig. 1

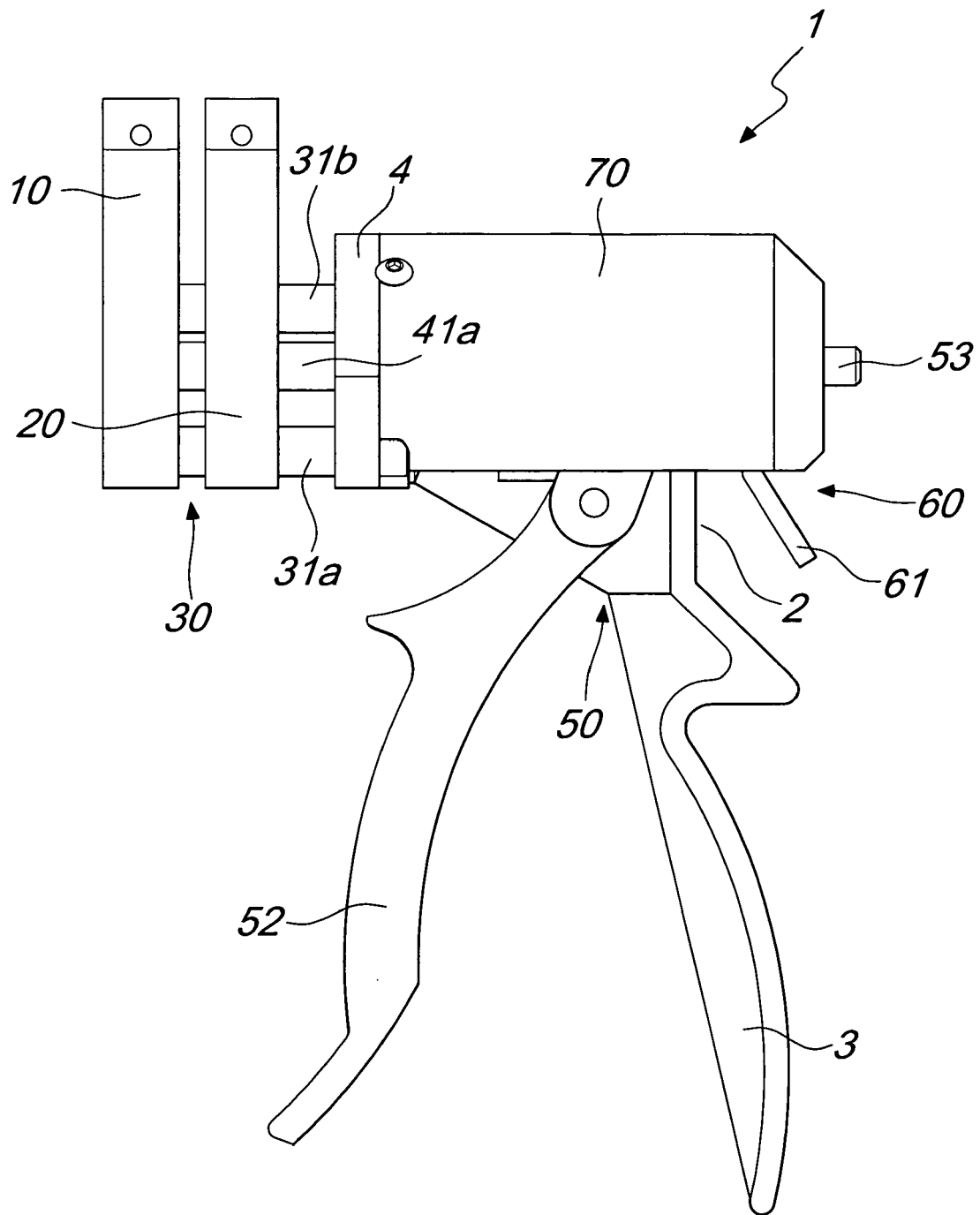


Fig. 2

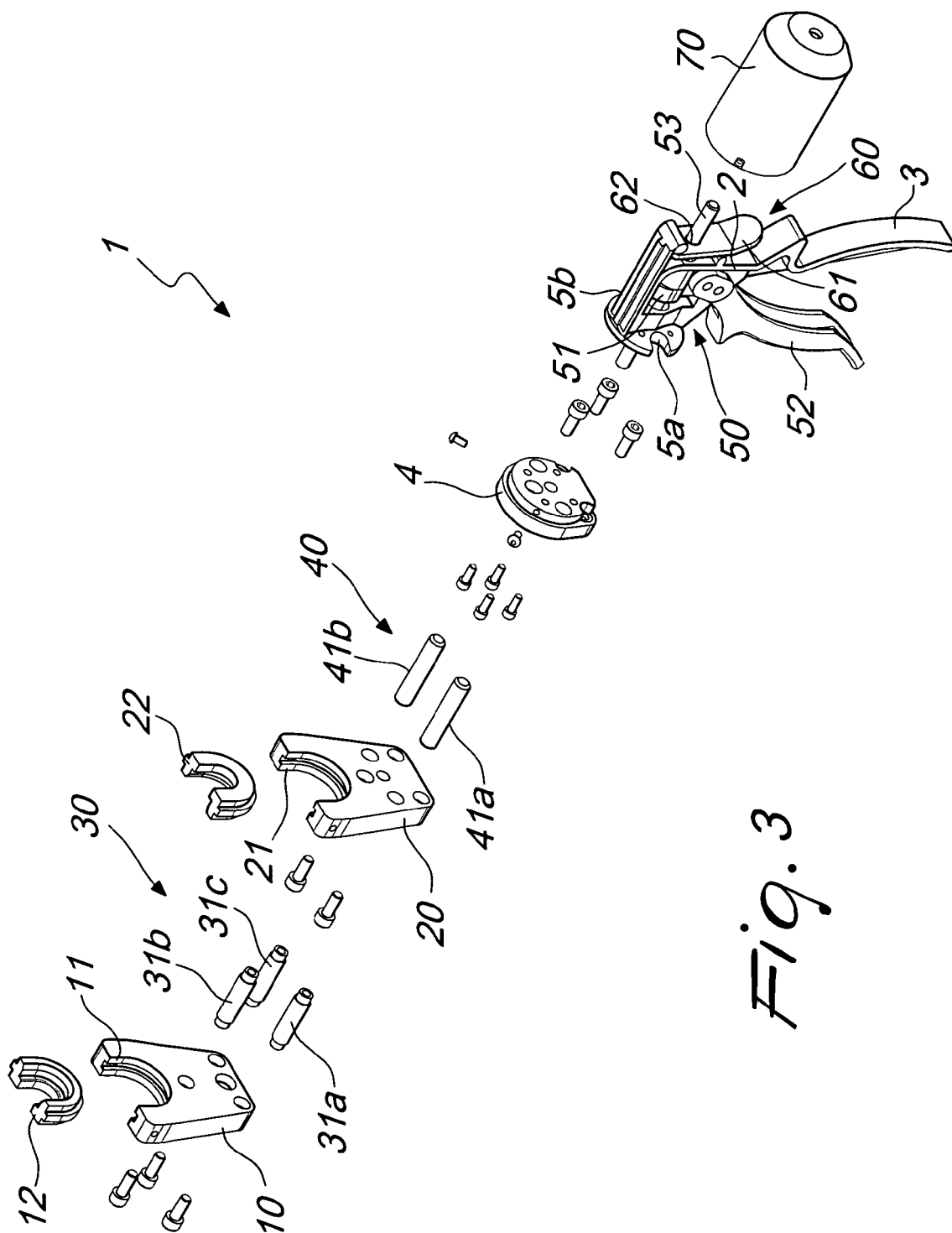
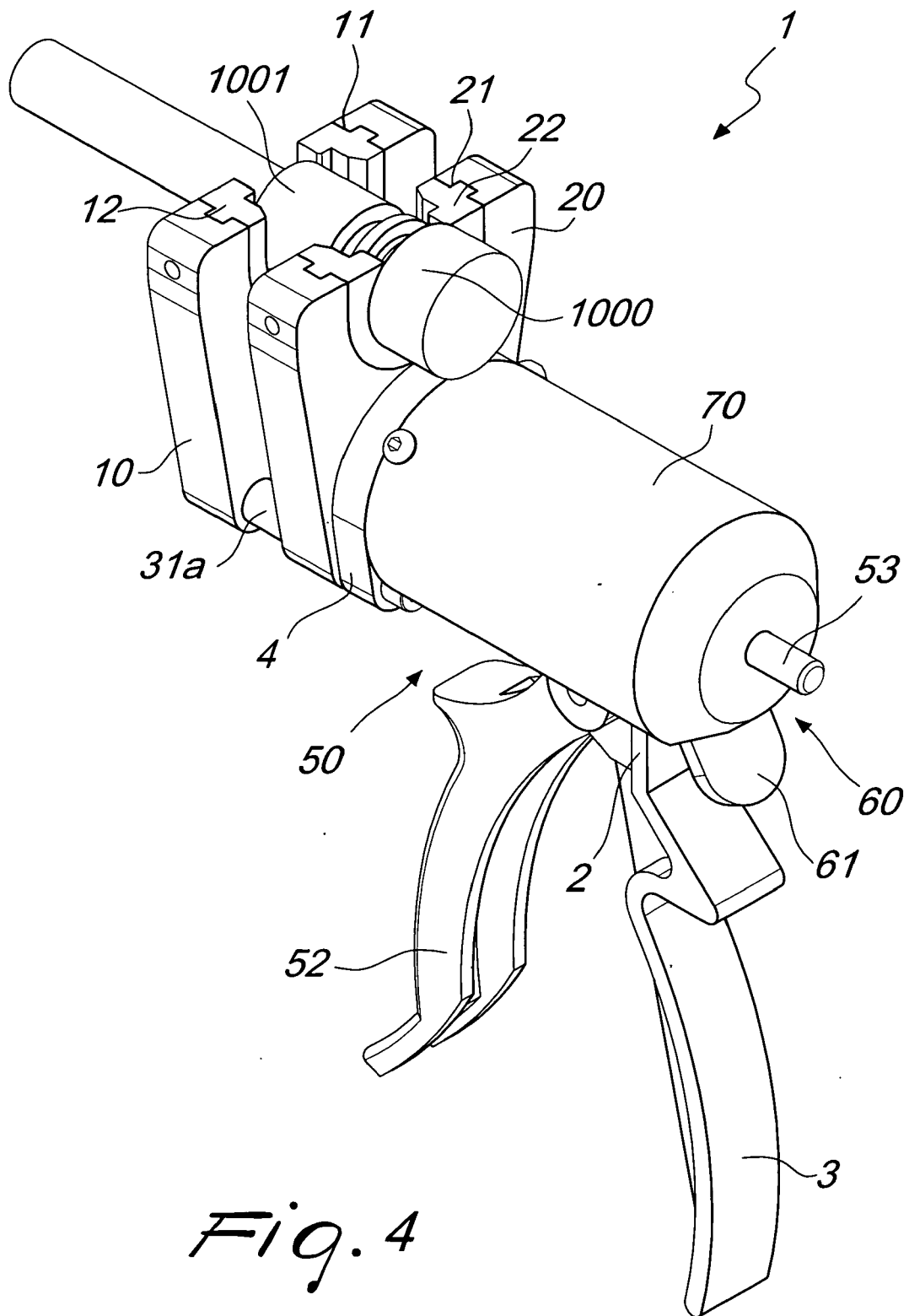


Fig. 3



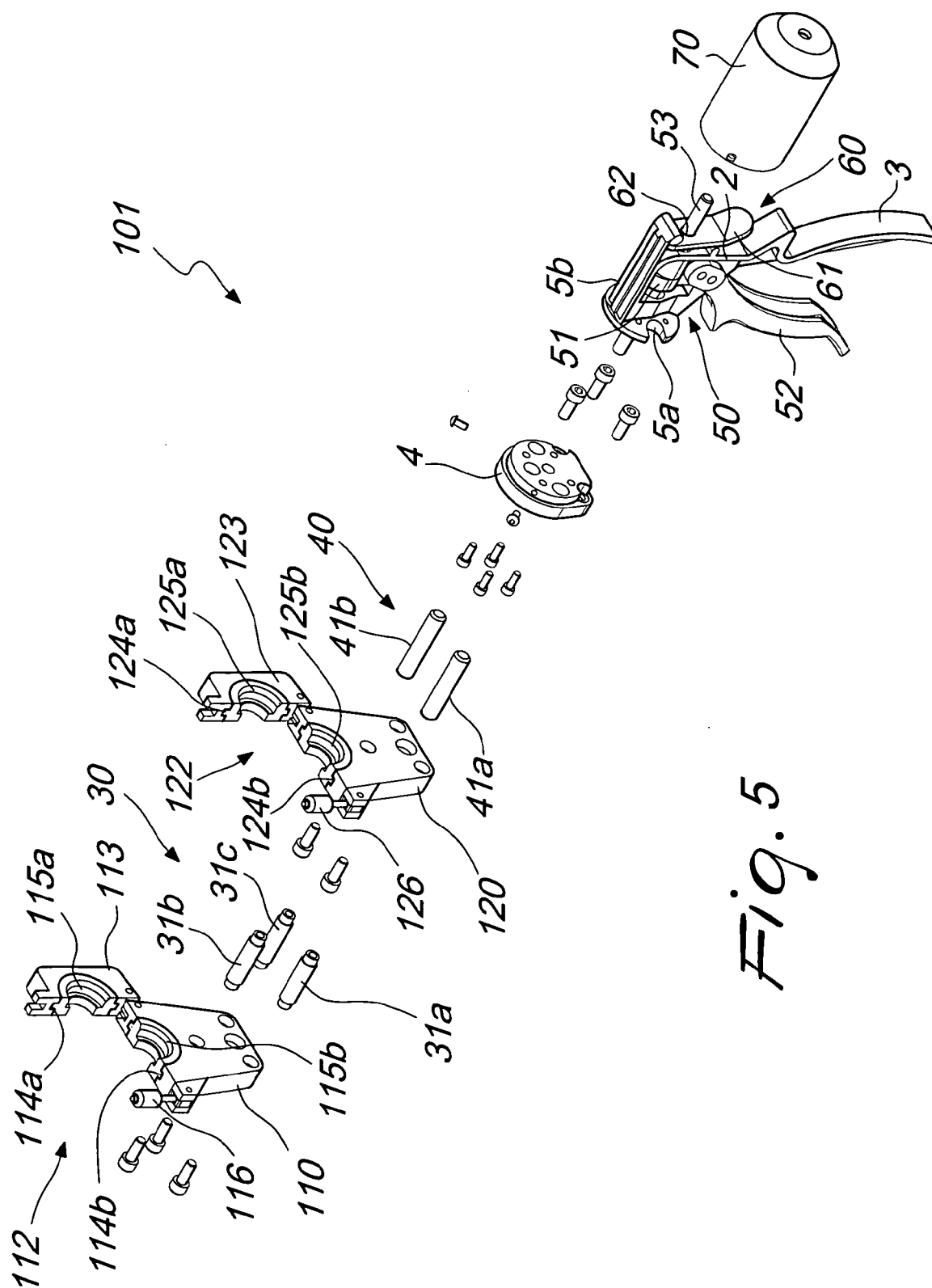


Fig. 5



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Application Number
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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