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(54) **Block-support head for corking machine**

(57) Block-support head for a machine for corking bottles with stoppers made of cork or synthetic material, which comprises a fixed slide (3) and a movable slide (5). The fixed slide (3) and the movable slide (5) are provided, respectively, with a first and second pair of blocks (8,9), which define a receiving opening (10) for compressing a stopper. Each pair of blocks (8, 9) comprises a movable block (13), able to slide on the respective slide (3,5), and at least one compression block (14),

which is associated with said respective slide (3,5) and acts with pressure against a first sliding surface (16) of said movable block (14) associated with the respective slide (3,5). First resiliently yielding means (17) are envisaged for pushing the compression block (14) against the movable block (13). The latter slides inside a first seat (21) formed on each slide (3,5), resting against a plate (25) of self-lubricating material able to favour sliding without the need to use lubricants.

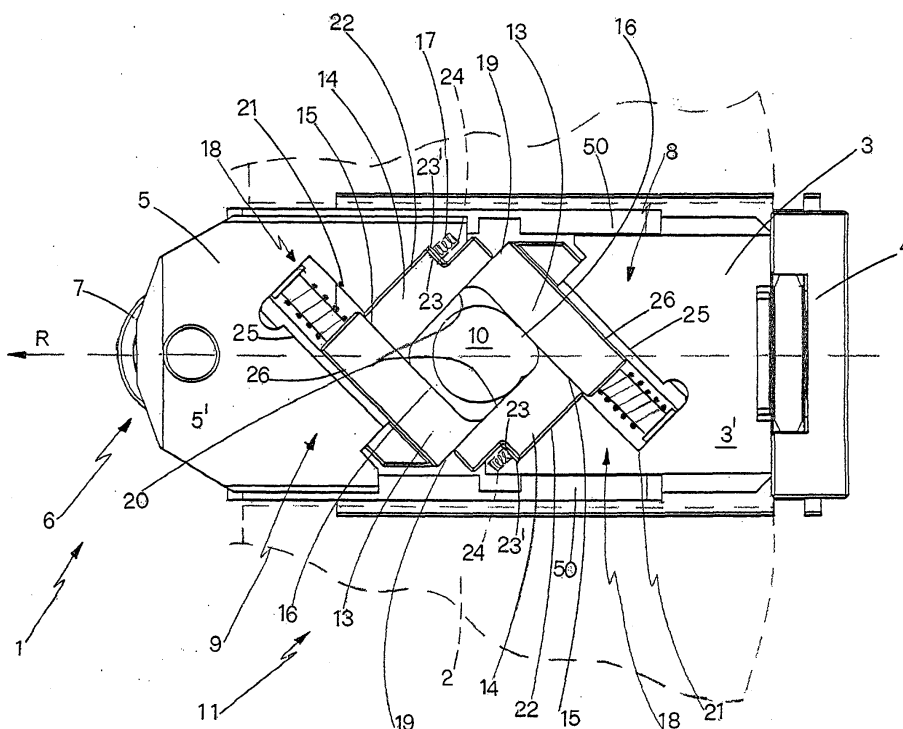


Fig. 10

Description

[0001] The present invention relates to a block-support head for a corking machine.

[0002] More particularly, the head in question is intended to be used advantageously in the bottling industry for compressing stoppers made of cork or synthetic material until they have a size slightly smaller than the mouth of the neck of the bottle to be corked.

[0003] At present, as is known, conventional corking machines envisage the use of a plurality of corking heads mounted rotatably in the form of carousel about a fixed vertical shaft on which a pusher cam is concentrically keyed in order to impart the necessary movement to the components of the head which perform corking.

[0004] Each head comprises gripping members able to compress the stoppers supplied from a suitable loading hopper until they have a size suitable to allow them to be inserted inside the neck of the bottles under the vertical thrust of pusher elements.

[0005] As is known, each head is composed of two block-supporting slides, one of which is movable, being mechanically connected to a cam by means of a guide and a counter-guide, and the other fixed, being fastened on the housing structure of the machine by means of key-type retaining means.

[0006] The same housing structure of the machine allows guiding of the to-and-fro movement of the movable slide actuated by the cam with respect to the fixed slide.

[0007] In greater detail, in accordance with the technology known hitherto, the gripping means are generally formed by two pairs of blocks, each associated with a respective slide, by means of which they define with their form a cavity for receiving the stopper.

[0008] As a result of the to-and-fro movement of the movable slide, the blocks vary their arrangement and, therewith, the size of the opening for receiving the stopper. In particular, the blocks may assume an open configuration, where the opening has a cross-section which is sufficiently wide to receive a stopper inside it, and a closed configuration where the receiving opening is narrowed so as to define a cross-section slightly smaller than the mouth of the bottle neck so as to allow the compressed stopper to be inserted inside it.

[0009] Conventionally the movable blocks are mounted on respective slides by means of guides with a specific shape, generally dovetail shape, able to keep the said slides perfectly positioned along the whole of their travel path during the to-and-fro movement.

[0010] The block-support heads known hitherto of the type described briefly above have proved to have certain drawbacks.

[0011] A first drawback arises from the fact that manufacture of blocks with a shaped part for engagement in the dovetail guide requires very precise mechanical machining of the said blocks, which is somewhat difficult to achieve and therefore, ultimately, costly. Normally the

four blocks (2+2) are made of special stainless steel, which is tempered and ground to a degree of precision of hundredths.

[0012] Machining with a small tolerance may result in seizing of the blocks, whereas too large a tolerance is the cause of malfunctioning due to insertion, in the free space, of agglomerations of dust or small pieces of stopper or other material such as a lubricating product, which may cause scoring or pricking of the stopper, adversely affecting correct corking.

[0013] Moreover, excessive or poorly distributed lubrication of the blocks may result in over-lubrication of the stoppers and therefore also prevent correct execution of the corking operations.

[0014] The presence of the guide poses a certain degree of difficulty with regard to disassembly of the head and rapid extraction of the blocks, for example necessary in order to perform maintenance operations, cleaning or sterilisation operations or replacement of the blocks in order to modify the corking procedure.

[0015] A second drawback arises from the fact that, with time, after a certain number of hours of operation, the blocks start to wear and therefore need to be replaced. Before being replaced, they may also result in malfunctions of the type mentioned above which may negatively affect the quality or the efficiency of the corking operations.

[0016] Obviously, the fairly frequent replacement of the blocks represents a major operational drawback of the current block-support heads and results in an overall increase in the costs of the corking process.

[0017] The main object the present invention is therefore that of overcoming the drawbacks associated with the solutions of the known type mentioned above, by providing a block-support head for a corking machine, which is constructionally simple and inexpensive to manufacture and operationally entirely reliable.

[0018] Another object of the present invention is that of providing a block-support head, the components of which, such as the blocks, can be easily manufactured by means of simple mechanical machining processes.

[0019] A further object of the present invention is that of providing a block-support head which requires a limited amount of maintenance.

[0020] A further object of the present invention is that of providing a block-support head, the components of which, such as the blocks, do not give rise, even after numerous hours of operation, to significant variations in the quality or the efficiency of the corking operations.

[0021] These and other objects are all achieved by the block-support head in question, which is intended to be mounted on a housing structure of a corking machine and which comprises a fixed slide substantially integral with the housing structure and provided with a first pair of blocks; a movable slide which can be actuated with a relative to-and-fro movement with respect to the fixed slide and is provided with a second pair of blocks. The first pair of blocks and the second pair of blocks define

a receiving opening for a stopper and are able to vary their arrangement during the to-and-fro movement, between an open configuration, where the receiving opening is able to receive a stopper inside it, and a closed configuration, where the receiving opening compresses the abovementioned stopper.

[0022] According to the invention, the block-support head is characterized in that each pair of blocks comprises at least one movable block, able to slide on the respective slide over a first travel path, and at least one compression block, which is associated with one of the slides and acts with pressure against a first sliding surface of the movable block associated with the other slide. First resiliently yielding means are envisaged for pushing the compression block against the movable block.

[0023] The technical characteristics of the invention, in accordance with the abovementioned objects, may be determined from the contents of the claims indicated below, and the advantages thereof will emerge more clearly from the detailed description which follows, provided with reference to the accompanying drawings, which show a purely exemplary and non-limiting example of embodiment in which:

- Figure 1 shows schematically a top plan view of a first example of embodiment of the block-support head according to the present invention with the blocks in a partially open configuration and with some parts removed so that other parts are more clearly visible;
- Figure 2 shows the block-support head according to Figure 1 with the blocks in a closed configuration;
- Figure 3 shows the block-support head according to Figure 1, with some parts removed and others shown cross-sectioned so that other parts are more clearly visible;
- Figure 4 shows a cross-sectional view of the block-support head according to Figure 2 along the line IV-IV in Figure 2;
- Figures 5 and 6 show enlarged details of the block-support head according to the preceding figures, consisting of a perspective view of a movable block and compression block;
- Figure 7 shows an enlarged detail of the preceding figures, relating to a self-lubricating plate;
- Figure 8 shows in schematic form a bottom perspective view of a second example of embodiment of the block-support head according to the present invention;
- Figure 9 shows a side view of the block-support head according to Fig. 8;
- Figure 10 shows a bottom plan view of the block-support head according to Figure 8, inserted inside a housing structure of a corking machine, with the blocks in the open configuration;
- Figure 11 shows an overall view of several heads operationally associated with each other inside a

housing structure of a corking machine.

[0024] In accordance with the figures in the accompanying drawings, the block-support head forming the subject of the present invention is denoted in its entirety by 1.

[0025] It is intended to be mounted on a corking machine, in particular of the rotating carousel type provided with a housing structure 2 having, arranged inside it, several block-support heads 1 which are spaced from each other circumferentially (see Figure 11).

[0026] The housing structure 2, which has been shown only partially in broken lines in Figure 10, allows the heads 1 to be supported rotatably about the shaft of the rotating carousel of the corking machine, absorbing the compressive forces exerted by the heads 1 during the corking operations.

[0027] Each head 1 is suitable for use in association with stoppers made of any material (cork, synthetic material, as well as "technical stoppers" made of cork composites, both of the flat and sparkling wine type).

[0028] The head 1 is essentially composed of a fixed slide 3 which is removably mounted in the housing structure 2 by means of key-type retaining means 4 of the type known per se and a movable slide 5 which can be actuated with a relative to-and-fro movement in a radial direction R with respect to the fixed slide 3, by suitable actuating means 6.

[0029] The latter, which are only partly shown in the accompanying figures, advantageously comprise a wheel 7, which is mounted on the movable slide 5 and is free to rotate about a vertical axis Z perpendicular with respect to the radial direction R and capable of imparting the to-and-fro movement to the movable slide 5 as a result of interaction with a cam 70.

[0030] Suitable guide means allow the movable slide 5 to slide with respect to the fixed slide 3 inside the seat formed in the housing structure 2. These means may for example comprise, in accordance with a possible constructional solution, two plates 50 fixed laterally to the movable slide 5.

[0031] Two pairs of blocks are also envisaged, i.e. a first pair 8, mechanically and operationally associated with the fixed slide 3, and a second pair 9, mechanically and operationally associated with the movable slide 5, said pairs defining a receiving opening 10 inside which a stopper (not shown in the accompanying figures) is intended to be inserted.

[0032] Owing to the effect of the to-and-fro movement imparted to the movable slide 5, the blocks vary their arrangement between an open configuration 11, shown in Figure 1 and Figure 10, where a stopper may be conveyed inside the receiving opening 10, and a closed configuration 12, shown in Figure 2, where the side walls of the receiving opening 10 compress the stopper to a size slightly smaller than the mouth of a bottle neck, so as to allow suitable pusher means to push the stopper inside the said neck.

[0033] According to the invention, the block-support head 1 is characterized in that both the pairs of blocks comprise a movable block 13, able to slide on its associated slide 3, 5 along a first travel path A, and a compression block 14. Each compression block associated with a slide 3, 5 presses with its associated front surface 15 against a first sliding surface 16 of the movable block 13 associated with the other slide 5, 3 and is thereby pushed by resiliently yielding means 17, in particular consisting of an ordinary first spring (see Figs. 3 and 10).

[0034] The first travel path A has a length such as to allow the blocks to be displaced between the open configuration 11 and the closed configuration 12.

[0035] In order to allow the return of the movable blocks 13 into the open configuration 11, second resiliently yielding means 18 are provided, said means consisting for example of a second spring and acting so as to compress the movable block 13 of a slide 3, 5 against the compression block 14 of the other slide 5, 3.

[0036] For this purpose, a second front surface 19 of the movable block 13 presses against a second sliding surface 20 of the compression block 14. In greater detail, both the slides 3, 5 each comprise a metal, preferably steel, support body 3', 5', in which a first and a second seat 21, 22, respectively, for seating inside them the movable block 13 and the compression block 14 are formed.

[0037] In accordance with a preferred embodiment of the present invention, the compression block 14 is provided with a shoulder 23 against which the abovementioned resiliently yielding means 17 engage. Advantageously, the second seat 22 has a form corresponding to that of the compression block 14 and therefore has a similar shoulder 23' which is counter-shaped with respect to that of the block 14.

[0038] On the support body 3', 5' it is thus possible to form a cavity 24 inside which the first spring 17 is inserted so that it acts on the shoulder 23 of the compression block 14.

[0039] In accordance with an important characteristic feature of the present invention, it is envisaged using a plate 25 of self-lubricating material inserted inside each first seat 21 and arranged between the support body 3', 5' of the respective slide 3, 5 and a side surface 26 of the movable block 13, in order to favour sliding of the latter during its travel path A.

[0040] The self-lubricating plate may be advantageously made of PTFE (polytetrafluoroethylene, better known by the registered trademark Teflon®) or special sintered bronze or also of any other self-lubricating material with a low coefficient of friction.

[0041] In accordance with a first embodiment of the present invention, illustrated in Figures 1-7, the self-lubricating plate 25 is fixed onto the side surface 26 of the movable block 13 by means of the screws inserted in holes 60.

[0042] In accordance with a further embodiment of the present invention, illustrated in Figures 8-10, the self-

lubricating plate 25 is removably fixed inside a housing 27 formed on the support body 3', 5'. Removable fixing may be performed, for example, by means of a guide or by means of screwing means.

[0043] The purpose of this plate 25 is to favour sliding of the movable block 13 inside its first seat 21, without requiring the use of lubricants.

[0044] Moreover, in accordance with the invention, once the plate 25 has become worn following numerous hours of operation, it may be easily replaced at very little cost and very quickly.

[0045] It should also be noted that, as the plate 25 diminishes in thickness as a result of wear, the compression block 14 is nevertheless always able to compensate for this variation as a result of the first spring 17 which always presses it against the movable block 13, without the formation of dangerous play resulting in the possibility of accumulation of dust from the stopper or other undesirable material.

[0046] Therefore, during operation of the block-support head 1, the compression block 14 also performs, as the self-lubricating plate 25 becomes worn, a second associated travel movement.

[0047] Advantageously the side surface 26 of the movable block 13 which rests in a sliding manner on the plate 25 is substantially flat. This obviously helps reduce the difficulty of machining.

[0048] The self-lubricating plate 15 may advantageously be provided with grooves 61 on its sliding surface, able to receive dust or other material, therefore avoiding any risk of seizing.

[0049] It should also be remembered that the prior constructional solutions of movable blocks envisaged forming a portion of the block so that the latter was inserted into a guide generally in the form of a dovetail provided in the slide. This requirement, in accordance with the present invention, is less essential in view of the force exerted by the compression block 14 on the movable block 13.

[0050] In fact, in accordance with the present invention, the movable block does not particularly need to be guided, as in the solutions of the prior art, since it is prevented from rotating about the axis of forward movement X of its travel path A by the pressing force exerted by the compression block 14.

[0051] Alternatively, however, in order to ensure a greater degree of precision of movement of the movable block 13 and compression block 14, it is equally and advantageously possible to envisage configuring an upper portion thereof in the form of a slide 80 able to engage slidably in a corresponding counter-shaped guide 81 formed in the slides 3, 5, as can be seen in Figures 4-6.

[0052] Operationally speaking, the block-support head 1 in question is functionally more reliable than the heads known hitherto, avoiding entirely the risk of seizing of the blocks and damaging of the stoppers during the corking operation.

[0053] Advantageously, the head 1 according to the

present invention has low production costs, since it does not require complex mechanical machining operations for its manufacture, and low maintenance costs since, in the event of wear, it is possible to replace simply only the self-lubricating plate 25.

[0054] The invention this conceived therefore achieves the predefined objects.

[0055] Obviously, it may also assume, in its practical embodiment, forms and configurations different from that illustrated above, without thereby departing from the present scope of protection. Moreover, all the details may be replaced by technically equivalent elements and the forms, dimensions and materials used may be of any nature according to requirements.

Claims

1. Block-support head for a machine for corking bottles with stoppers, of the type intended to be mounted on a housing structure (2) of a corking machine, comprising a fixed slide (3) substantially integral with said housing structure (2) and provided with a first pair of blocks (8), a movable slide (5) which can be actuated with a relative to-and-fro movement with respect to said fixed slide (3) and is provided with a second pair of blocks (9), said first pair of blocks (8) and said second pair of blocks (9) defining a receiving opening (10) for a stopper and being able to vary their arrangement during said to-and-fro movements, between an open configuration (11), where said receiving opening (10) is able to receive a stopper inside it, and a closed configuration (12), where said receiving opening (10) compresses said stopper, **characterized in that** each said pair of blocks (8, 9) comprises at least one movable block (13), able to slide on the respective slide (3, 5) along a first travel path (A), and at least one compression block (14), which is associated with one of said slides (3, 5) and acts with pressure against a first sliding surface (16) of the movable block (13) associated with the other slide (5, 3), first resiliently yielding means (17) being envisaged for pushing said compression block (14) against said movable block (13).
2. Head according to Claim 1, **characterized in that** said movable block (13) associated with one of said slides (3, 5) presses against a second sliding surface (20) of the compression block (14) associated with the other slide (5, 3), second resiliently yielding means (18) being envisaged for pushing said movable block (13) against said compression block (14).
3. Head according to Claim 1, **characterized in that** said fixed slide (3) and said movable slide (5) each comprise a support body (3', 5') provided with a first

seat (21), in which said movable block (13) is housed, and a second seat (22), in which said compression block (14) is housed.

4. Head according to Claim 1, **characterized in that** said compression block (14) is provided with a shoulder (23) against which said first resiliently yielding means (17) engage.
5. Head according to Claim 1, **characterized in that** said resiliently yielding means (17) comprise at least one first spring.
6. Head according to Claim 1, **characterized in that** it comprises at least one plate (25) of self-lubricating material inserted inside said first seat (21) and arranged between the support body (3', 5') of said slide (3, 5) and a side surface (26) of said movable block (13), in order to favour sliding of the latter along its travel path (A).
7. Head according to Claim 6, **characterized in that** said self-lubricating plate (25) is removably fixed inside a housing (27) formed on said support body (3', 5').
8. Head according to Claim 3 or Claim 6, **characterized in that** the side surface (26) of said movable block (13) capable of sliding in a supported manner inside said first seat (21) is substantially flat.
9. Head according to Claim 1, **characterized in that** said movable block (13) is prevented from rotating about the axis of forward movement (X) of its travel path (A) by the pressing force exerted on it by said compression block (14).
10. Head according to Claim 6, **characterized in that** said self-lubricating plate (25) is removably fixed to said movable slide (13).
11. Head according to Claim 1, **characterized in that** said movable block (13) and/or said compression block (14) are provided with a slide (80) able to engage slidably in a corresponding guide (81) provided on said slides (3, 5).
12. Head according to Claim 1, **characterized in that** said self-lubricating plate (25) is provided with grooves (61).

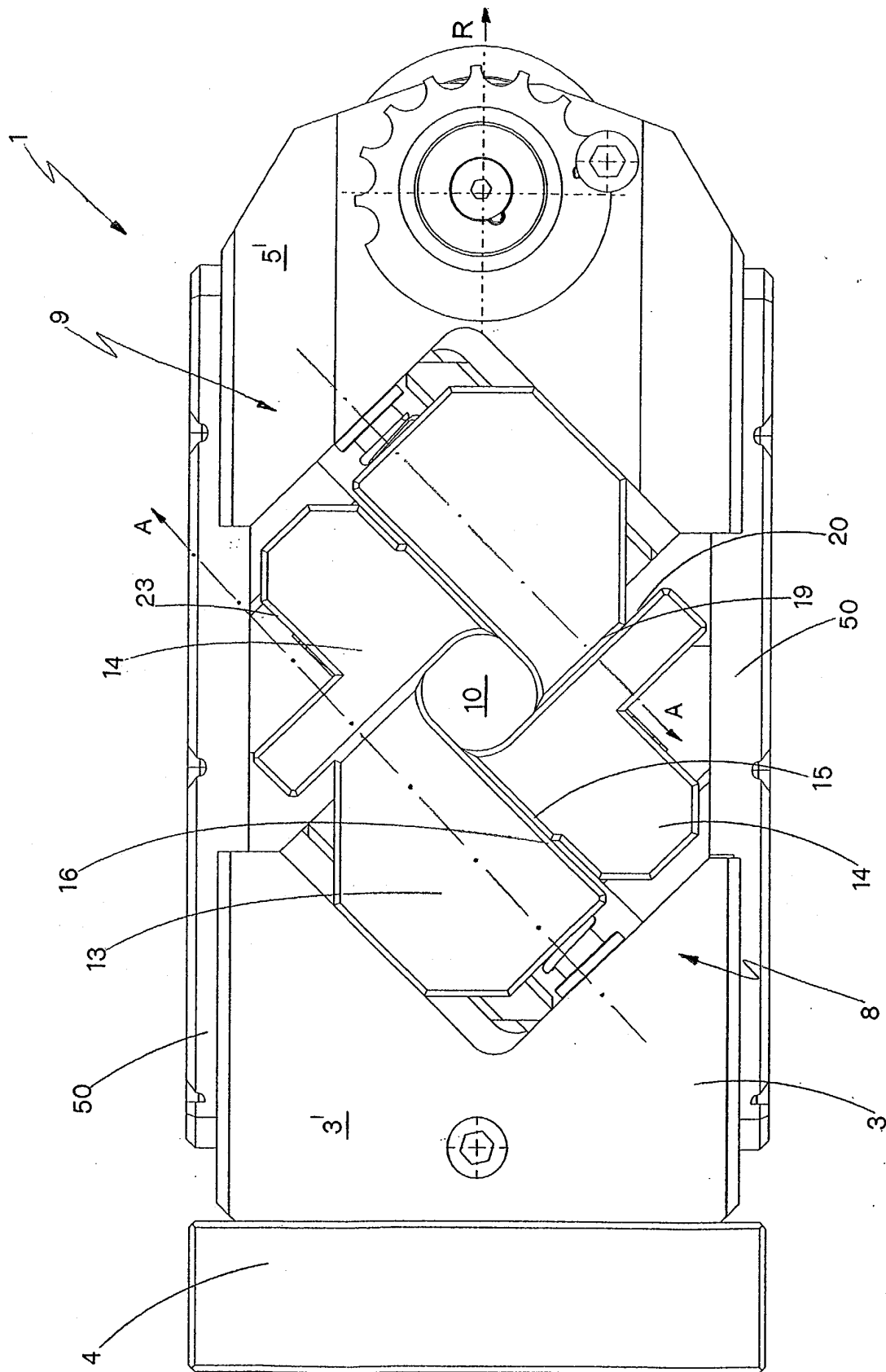


Fig. 1

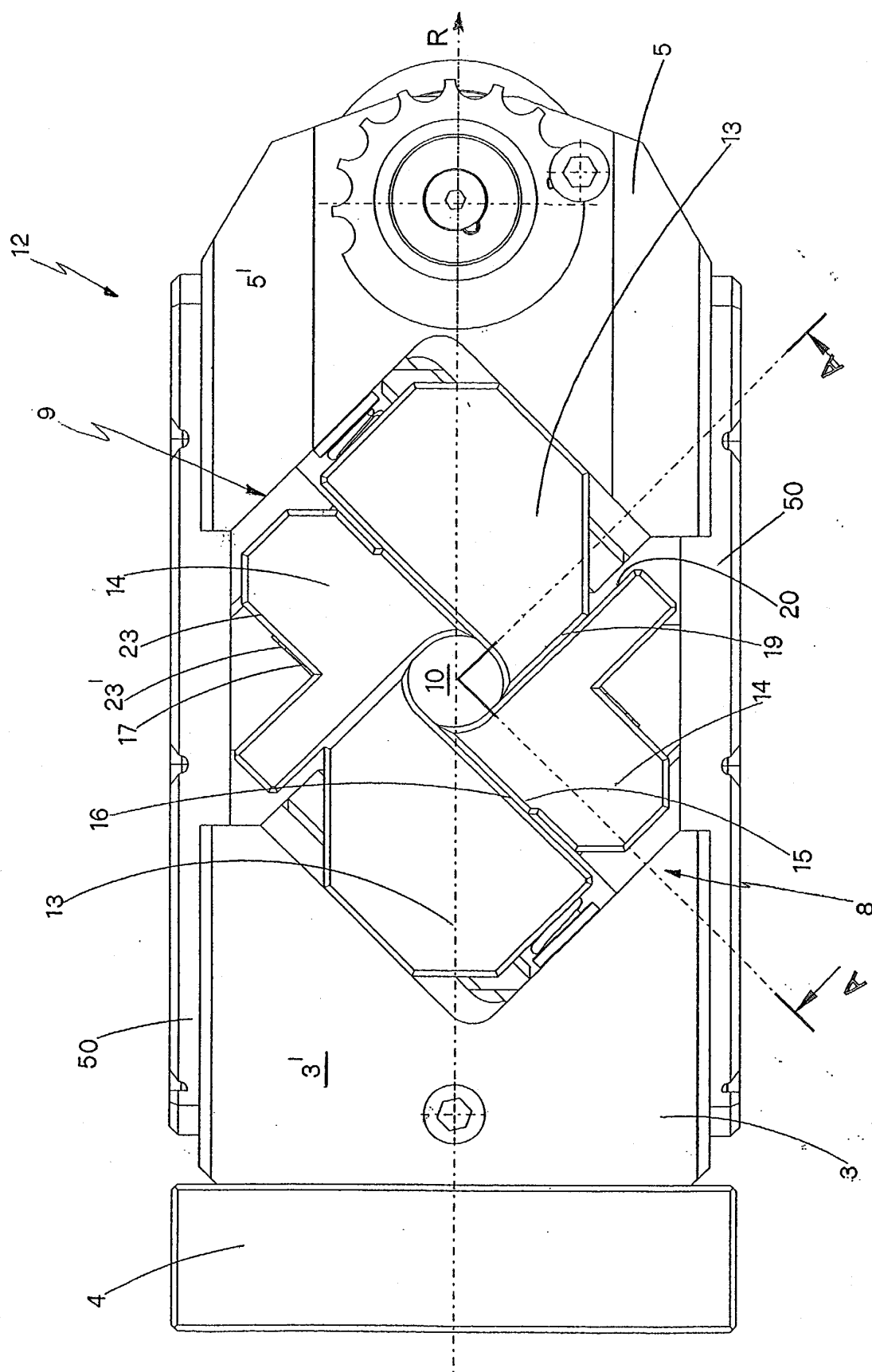


Fig. 2

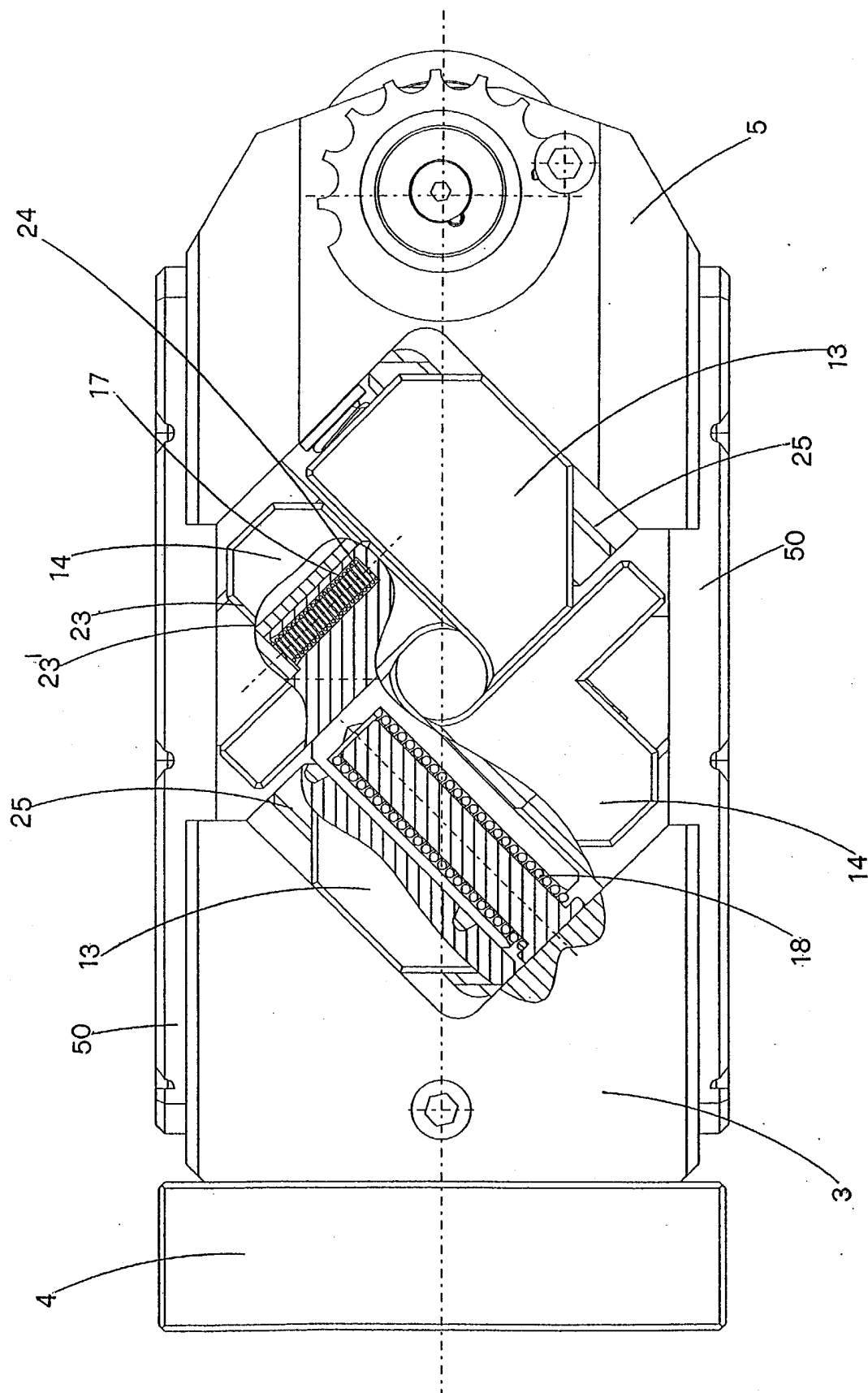


Fig. 3

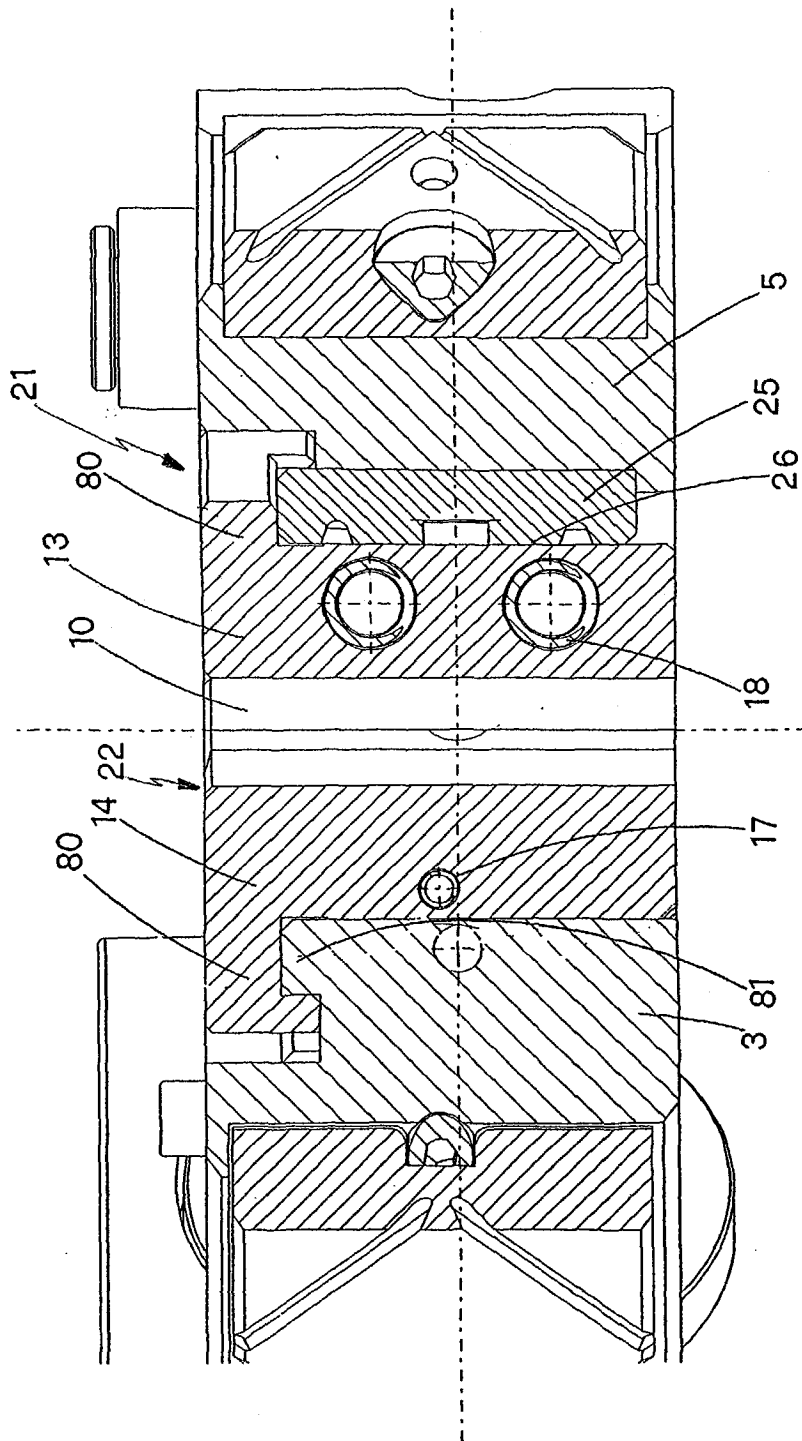


Fig. 4

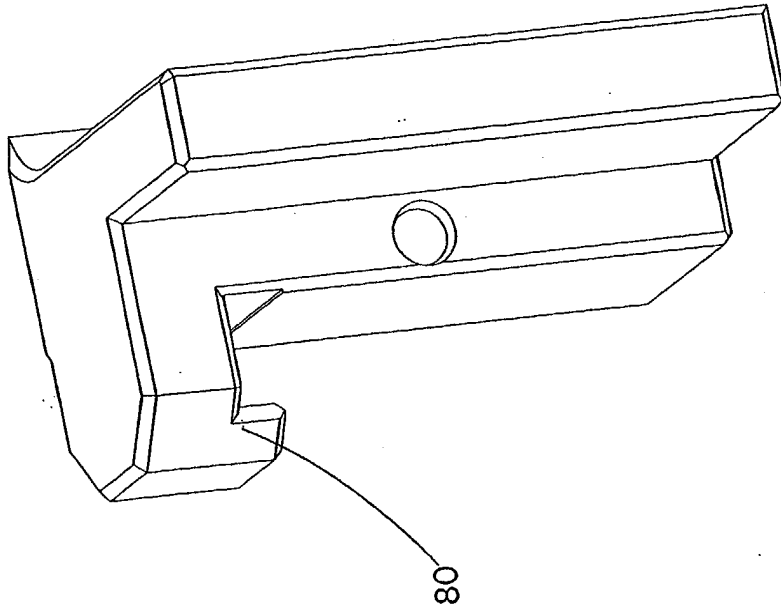


Fig. 6

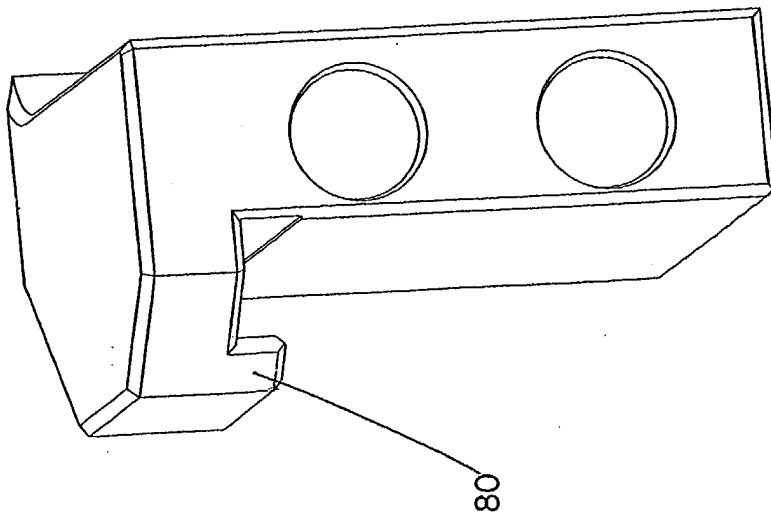


Fig. 5

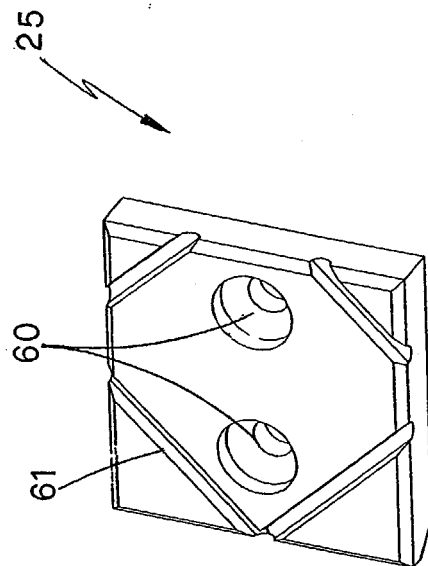


Fig. 7

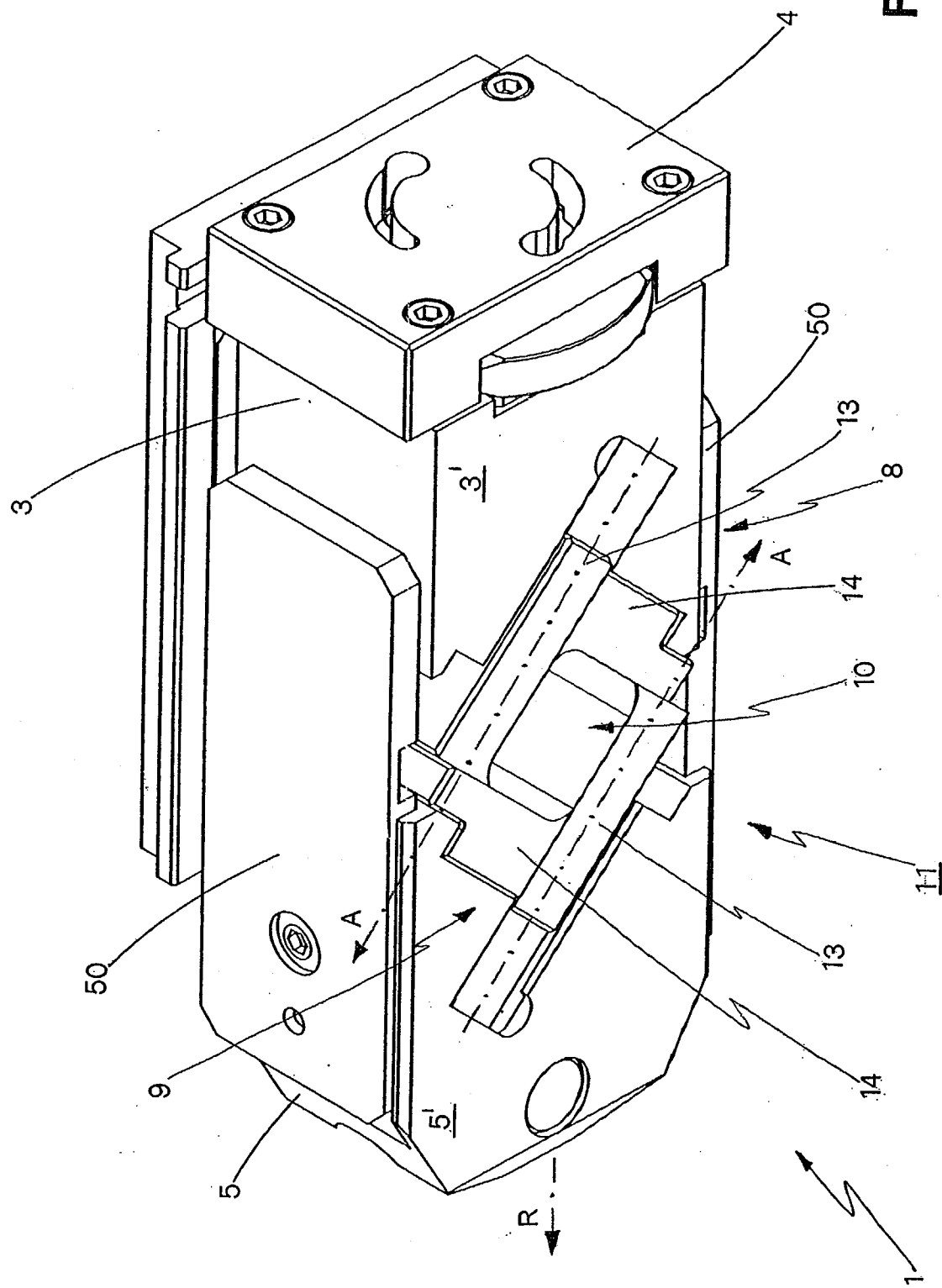


Fig. 8

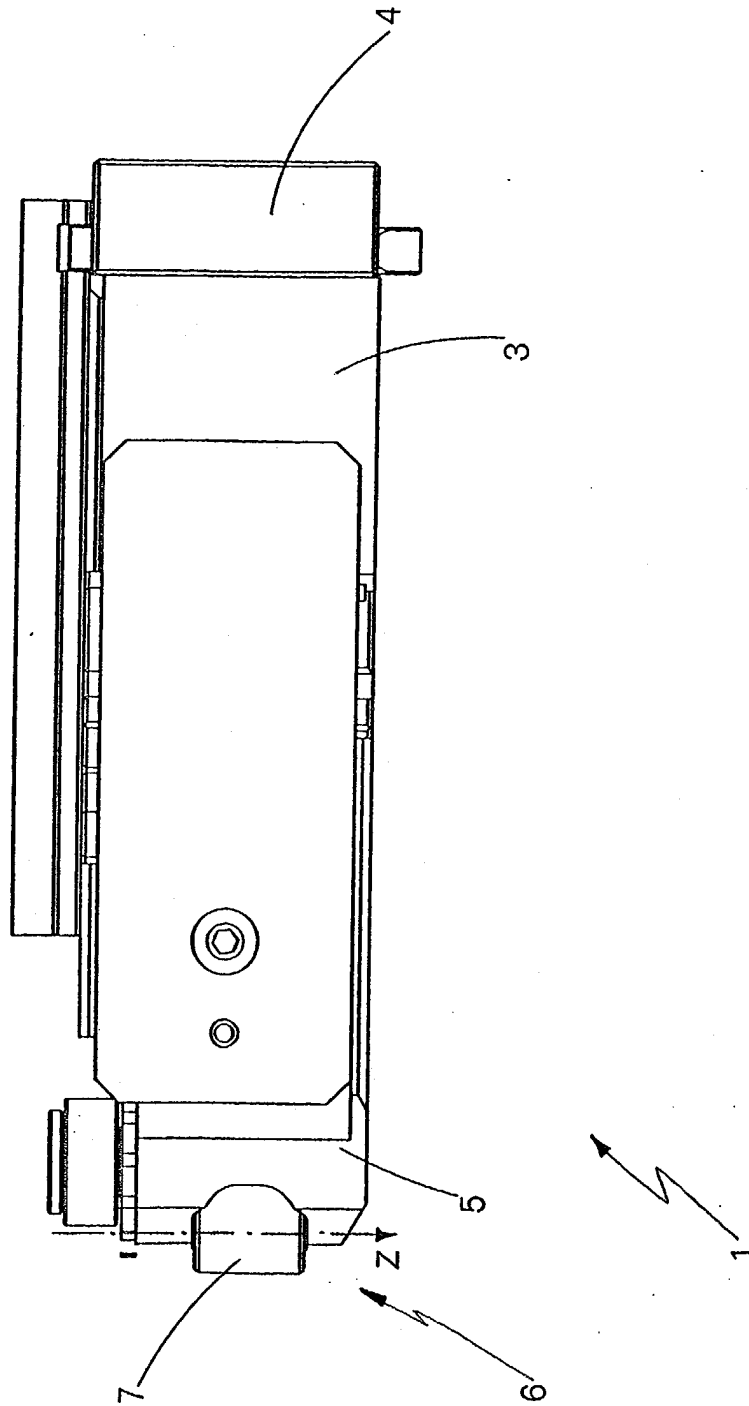


Fig. 9

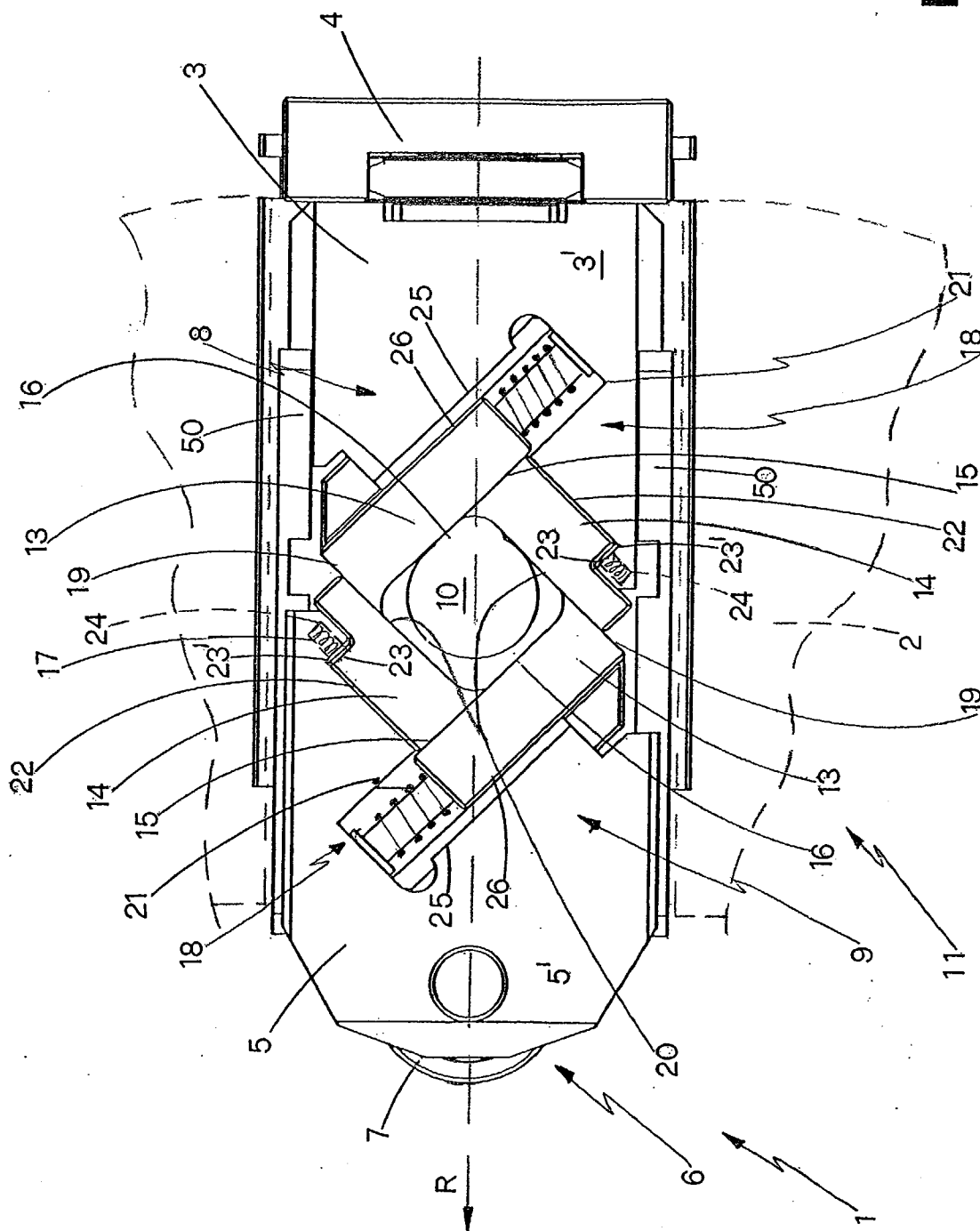


Fig. 10

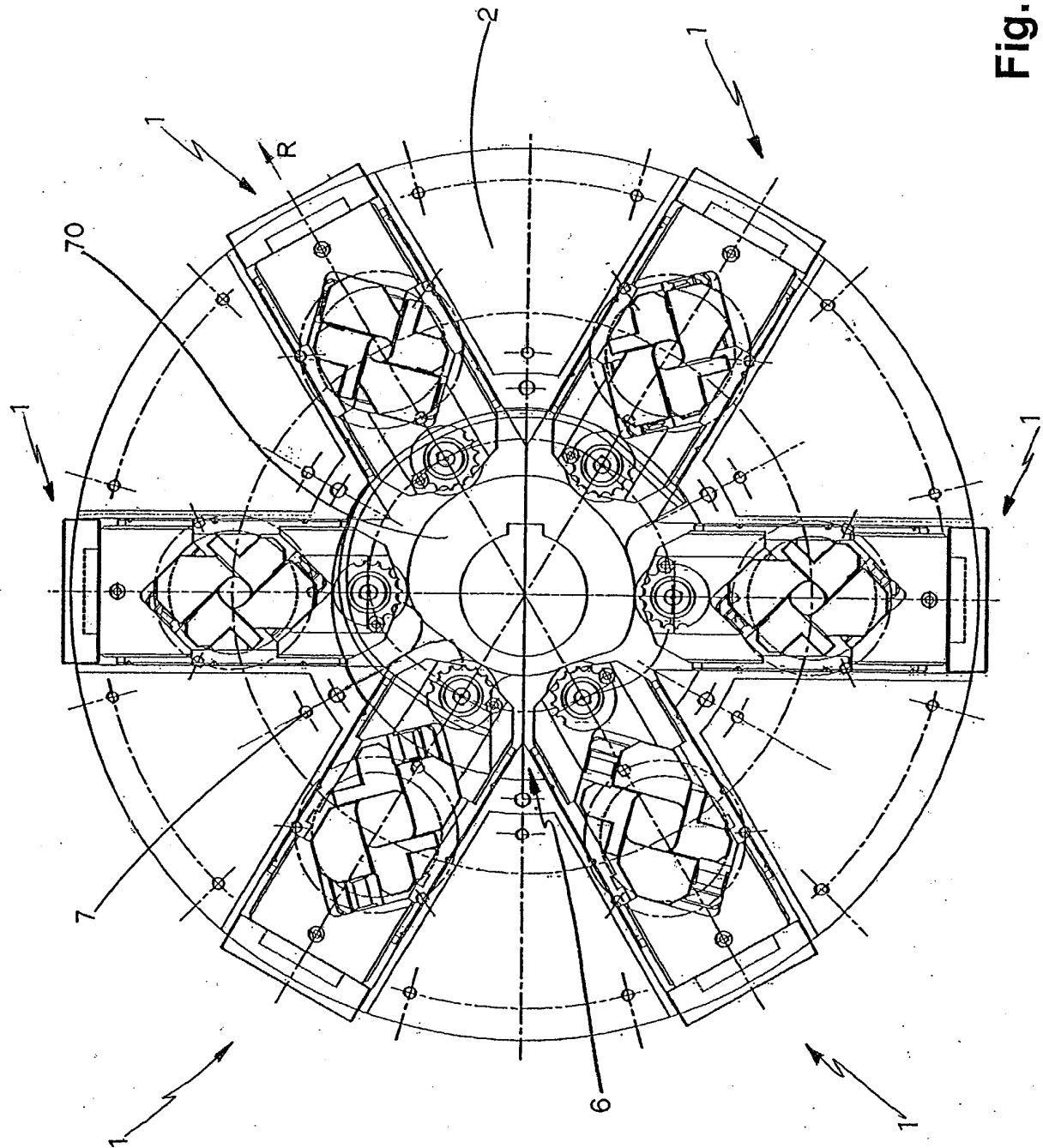


Fig. 11



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 03 07 7859

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B67B
Place of search THE HAGUE		Date of completion of the search 23 March 2004	Examiner Wartenhorst, F
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