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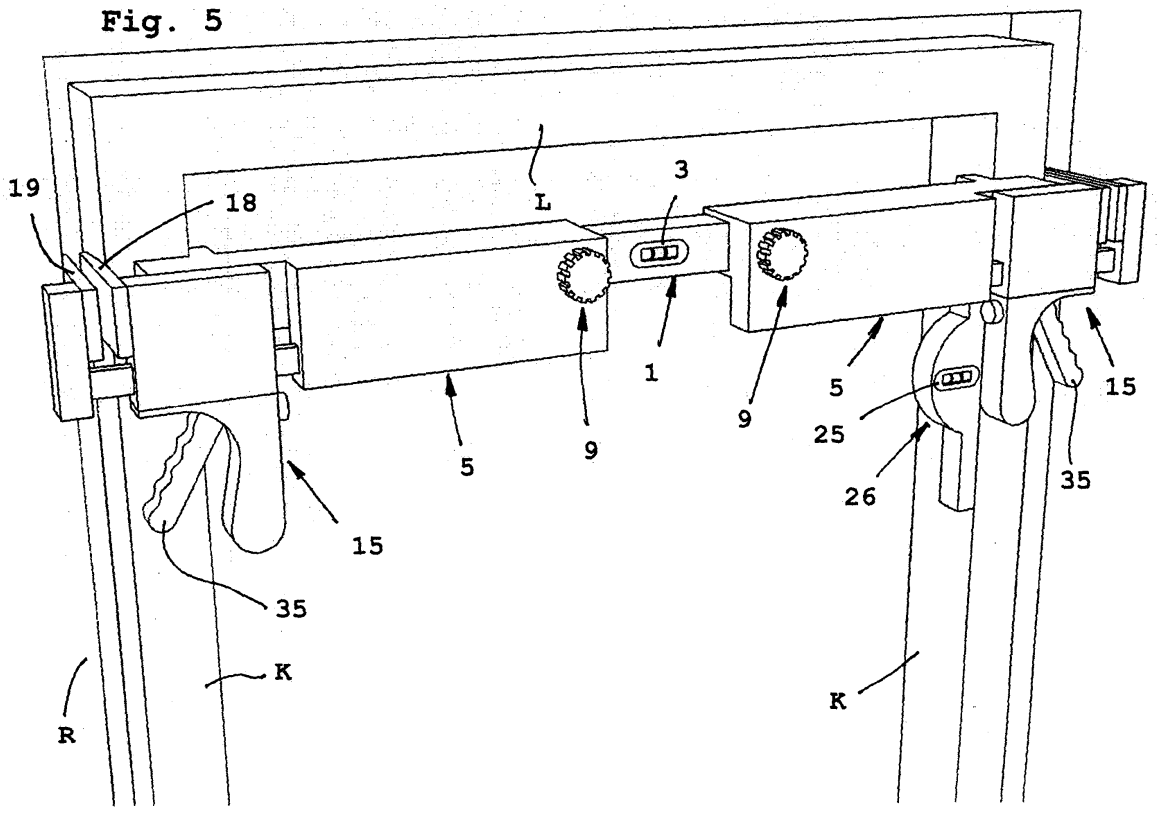
(54) **Tool**

(57) The present invention relates to a tool for fitting a frame, which tool comprises an element (1, 5) adjustable in length and means (9) for temporarily fixing the element (1, 5) at a certain given length.

Distinguishing features of the tool according to the present invention are that the adjustable element (1, 5) has two stop means (6), that the stop means (6) are disposed at a distance from one another, that the tool has two sets of expanding means (18, 19), and means (15) for activating the expanding means (18, 19) and that the distance between the sets of expanding means (18, 19) is greater than the distance between the stop means (6).

Fig. 5




EP 1 959 072 A2

## Description

### Technical field of the invention

**[0001]** The present invention relates to a tool for fitting a frame, which tool comprises an element adjustable in length and means for temporarily fixing the element at a certain given length, the adjustable element having two stop means which are disposed at a distance from one another. The tool is primarily intended for fitting of door frames, but it is also possible, for example, for the tool to be used in the fitting of window frames.

### State of the art

**[0002]** A tool previously known from DE 27 05 591 for fitting a door frame comprises in the region of one end of the tool a clamping plate activated by a clamp. The clamping plate abuts against the side of the frame which faces inwards towards the aperture which the frame defines. The function of the clamping plate and the clamp is to hold the tool firmly on the frame, and any expanding force in the space between the frame and the adjacent wall is exerted by the moulding foam introduced into said space.

**[0003]** Assembly clamps for fitting a door frame are previously known from DE 197 47 910. Those tools are applied close to the upper corner of the door frame. They comprise L-shaped clamping elements by which firm clamping is effected relative to the aperture in which door frame is being fitted. This involves a threaded rod acting upon one member of the L, while the other member is caused to abut against the contour of the aperture. These clamps seem to be only usable at the corner of the frame and they also have no means for fitting elements of the frame horizontally and vertically.

### Object and features of the invention

**[0004]** A primary object of the present invention is to propose a tool of the kind defined in the introduction which is extremely user-friendly.

**[0005]** Another object of the present invention is that the tool should satisfactorily assemble elements of the frame horizontally and vertically.

**[0006]** A further object of the present invention is that the tool should be of simple construction and therefore relatively inexpensive to manufacture.

**[0007]** At least the primary object of the present invention is achieved by a tool provided with the features indicated in the independent claim set out below. Preferred embodiments of the invention are defined in the dependent claims.

### Brief description of the drawings

**[0008]** An embodiment of the invention is described below with reference to the attached drawings, in which:

- Fig. 1 depicts a perspective view of a tool according to the present invention;
- Fig. 2 depicts a perspective view of the tool according to Fig. 1, as seen from the opposite side of the tool;
- Fig. 3 depicts a side view of the tool from the same side as in Fig. 1, with part of the tool cut away to reveal a clamping mechanism;
- Fig. 4 depicts a plan view of the tool according to the present invention;
- Fig. 5 depicts a perspective view of the tool according to the present invention when applied in its position of use;
- Fig. 6 depicts a view from above of the tool according to the present invention when applied in its position of use;
- Fig. 7 depicts a side view of the tool when applied in its position of use;
- Fig. 8 depicts a side view of an alternative embodiment of a tool according to the present invention;
- Fig. 9 depicts a plan view of the tool according to Fig. 8; and
- Fig. 10 depicts a detail of an eccentric mechanism which forms part of the tool according to Figs. 8 and 9.

### Detailed description of a preferred embodiment of the invention

**[0009]** The tool according to the present invention comprises a bar-like central element 1 which in the embodiment depicted is provided with a centrally situated first water level 3. The tool also comprises two elongation elements 5 provided with sleeve-like portions 7 in which the bar-like central element 1 is accommodated, as most clearly illustrated in Fig. 3, in which the portions of the bar-like central element 1 which are accommodated in the elongation elements 5 are represented by broken lines. The elongation elements 5 are thus movable relative to the central element 1, as indicated by the arrows P1, P2 in Figs. 3 and 4.

**[0010]** As most clearly illustrated in Fig. 4, each of the elongation elements 5 is provided with a locking means 9 which comprises a threaded portion 10 and a wheel 11 mounted on one end of the threaded portion 10. The other end of the threaded portion 10 can be caused to abut against the bar-like central element 1. By activating the locking means 9 it is therefore possible to lock the central element 1 relative to the elongation elements 5.

**[0011]** Each of the elongation elements 5 is also provided on one side with a stop means in the form of a protrusion 6.

**[0012]** The tool also comprises two clamp elements 15 and each elongation element 5 has a clamp element 15 associated with it. The clamp element 15 is fitted at the end of the elongation element 5 which points away from the bar-like central element 1. The clamp elements 15

are also disposed on the side of the elongation elements 5 which faces away from the protrusions 6. Each of the clamp elements 15 has a housing 16 in which a clamping mechanism similar to those in known quick-fix clamps/one-hand clamps is disposed. The clamping mechanism will be described in more detail below. The clamp elements 15 are each connected to their respective elongation element 5 by a stem 17 which is accommodated in a cavity in the elongation element 5 and is movable relative to the elongation element 5, as indicated in Fig. 4 by the arrows P3 and P4. Via the clamping mechanism, the housing 16 of the clamp element 15 is mounted movably on the respective stem 17. Each of the clamp elements 15 has on the opposite side from the respective elongation element 5 two clamping plates 18 and 19 which have an extent generally perpendicular to the longitudinal direction of the stem 17. The clamp elements 15 thus serve as means for activating the clamping plates 18, 19.

**[0013]** In the embodiment depicted, the clamping plates 18, 19 are chamfered at their free ends. A first clamping plate 18 is fixed to the housing 16, and a second clamping plate 19 is rigidly connected to the stem 17. In Figs. 1 and 2, the clamping plates 18, 19 are at some distance from one another, whereas in Figs. 3 and 4 the clamping plates 18, 19 abut against one another. The fact that the distance between the clamping plates 18, 19 can be varied is indicated by the arrows P5 and P6 in Figs. 3 and 4. The clamping plates 18, 19 thus serve as expanding means 18, 19.

**[0014]** The tool according to the present invention also comprises a second water level 25 disposed in a holder 26 which is fastened pivotably to one elongation element 7 via an articulation 27. When the holder 26 assumes the position depicted in Figs. 1-3, i.e. when the holder 26 is turned down, its longitudinal direction is perpendicular to that of the central element 1. This means that if the central element 1 is in a horizontal position, the holder 26 will be in a vertical position.

**[0015]** The clamping mechanism forming part of the clamp element 15 is depicted schematically in Fig. 3, in which the interior of the housing 16 of one clamp element 15 is illustrated. Thus the clamping mechanism comprises a first washer 30 and a second washer 31 which are disposed on the stem 17 at a certain distance from one another. The clamping mechanism further comprises a stop device 32 which is fixed relative to the housing 16 of the clamp element 15. The first washer 30 abuts against the stop device 32 in its inactive state. The clamping mechanism also comprises a first compression spring 33 which acts upon the first washer 30, and a second compression spring 34 which acts upon the second washer 31. The two compression springs 33, 34 surround the stem 17. The first compression spring 33 has its one end abutting against the first washer 30 and its other end abutting against the portion of the housing 16 which is directed away from the respective elongation element 5. The second compression spring 34 has its one end abutting against the second washer 31 and its other end abutting against the stop device 32. The clamping mechanism also comprises a handle 35 fastened pivotably to the housing 16. The handle 35 has a nose 36 which abuts against the first washer 30 in the inactive state of the clamping mechanism depicted in Fig. 3. The clamping mechanism also comprises a release button 37 disposed in the housing 16 of the clamp element 15. This release button 37 is adapted to being able to act upon the second washer 31, more specifically to being able to end the engagement between the second washer 31 and the stem 17.

**[0016]** Activation of the handle 35 activates the clamping mechanism. When the free end of the handle 35 is moved to the right in Fig. 3, the nose 36 will move the first washer 30 to the left in Fig. 3, thereby compressing the first compression spring 33. Since the nose 36 acts upon the lower portion of the first washer 30, the latter will be positioned obliquely relative to the stem 17. This means that the first washer 30 will carry the stem 17 with it, i.e. it will move the latter to the left in Fig. 3. When the handle 35 has been moved the maximum possible distance, the operator releases the handle 35, which reverts to the position depicted in Fig. 3 under the action of the first washer 30 being itself acted upon by the compressed first compression spring 33. The obliquely positioned second washer 31 provides assurance that the stem 17 will not be pushed back to the right but will, owing to the engagement between the second washer 31 and the stem 17, remain in the position to which it has been moved by the aforesaid movement of the handle 35. Thereafter the movement of the handle is repeated and a further movement of the stem 17 to the left in Fig. 3 takes place. This is repeated until the desired movement of the stem 17 has been achieved.

**[0017]** The movement described above of the stem 17 results in the second clamping plate 19 being moved to the left, while the first clamping plate 18 remains stationary. This results in a mutual expansion between the clamping plates 18, 19, and in the tool being clamped firmly when the sets of clamping plates 18, 19 on both sides expand.

**[0018]** To end the firm clamping effected by the mutually expanding clamping plates 18, 19, the release button 37 is activated, with the result that the second washer 31 assumes a position perpendicular to the stem 17 and the engagement between the second washer 31 and the stem 17 ceases. The stem can then be moved relative to the second washer 31.

**[0019]** The use of the frame tool according to the present invention is illustrated in Figs. 5-7, which schematically depict vertical wall uprights R forming part of an aperture, and a door frame which is placed in the aperture and comprises vertical door frame components K and a top component L. There is an intermediate space or slit S between each wall upright R and an adjacent door frame component K. Applying the tool according to the present invention causes the respective clamping

plates 18, 19 to abut against one another (see Fig. 6). During application of the tool, the locking means 9 are inactive, i.e. the elongation parts 5 are movable relative to the central element 1.

**[0020]** The first step is to apply the tool at the top of the door frame, causing the elongation elements 5 to abut against top component L. This stage is not depicted in Fig. 5, in which for reasons of clarity the tool is drawn some distance down from the top component L.

**[0021]** As most clearly illustrated in Fig. 6, the protrusions 6 are caused to abut against the inside of the frame components K, while at the same time the clamping plates 18, 19 are adjusted sideways so that they can be pushed into the slit S. The result is the state depicted in Fig. 6, in which the locking means are activated so that the central element 1 and the elongation elements 5 are fixed relative to one another. At this stage an adjustment is also applied to the tool on the basis of the first water level 3 so that the tool and hence also the elongation elements 5 assume a horizontal position. Since the elongation elements 5 abut against the top component L, this means that the latter also assumes a horizontal position.

**[0022]** When the clamping plates 18, 19 are in the slit S, a separation of the clamping plates 18, 19 is effected by activation of the clamping mechanism of the respective clamp element 15, which thus serves as a means for activating the clamping plates 18, 19. Mutual parting of the clamping plates 18, 19 in the slit S (see Figs. 5 and 7) will cause the tool to clamp the door frame components K of the door frame satisfactorily relative to the respective wall uprights R. The door frame components K can then be screwed firmly into the respective wall uprights R, the screws being situated with advantage in the immediate vicinity of the tool. The frame components K are thus firmly screwed in at the top of the wall uprights R.

**[0023]** The tool is then released from its applied position at the top by inactivation of the clamping mechanism of the clamp element 15, causing the clamping plates 18, 19 to abut against one another. The tool is then moved downwards and applied at a new position, followed by repeating the procedure described above for applying the tool. The tool is normally applied at four points along the height of the door frame. When the tool is applied satisfactorily at a new position, the frame components K are screwed firmly into the wall uprights R as close to the tool as possible. In this context it should be noted that the locking means 9 remain active, i.e. the distance between the protrusions 6 remains constant. Since the tool is in a horizontal position, it will now be easy to also adjust one door frame component K to a vertical position by turning down the holder 26 which contains the second water level 25. Causing the door frame component K to abut against the holder 26 results in the door frame component K being adjusted to a vertical position. Since the door frame components K are parallel, the two door frame components K both become vertical.

**[0024]** Figs. 8-10 depict an alternative embodiment of the tool according to the present invention. The tool according to the alternative embodiment comprises an elongate central element 101 which in the embodiment depicted is provided with apertures 102. The tool likewise comprises two elongation elements 105, each of which is accommodated in its respective aperture 102 and is movable relative to the central element 101 in its longitudinal direction.

**[0025]** Each of the elongation elements 105 is provided with a locking means 109 which comprises a first eccentric mechanism (not depicted) of conventional configuration. The locking means 109 accompanies the elongation element 105 when the latter is moved in its aperture 102 relative to the central element 101. By activating the locking means 109 it is therefore possible to lock the elongation elements 105 in a desired position relative to the central element 101.

**[0026]** Each of the elongation elements 105 is also provided with a stop means in the form of an angle-iron 106 which is directed towards the frame component K on which the tool is to be applied.

**[0027]** The tool also comprises two clamping elements 115 and each elongation element 105 has associated with it a clamping element 115. The clamping element 115 is fitted at the end of the elongation element 105 which points away from the central element 101. The clamping element 115 is also disposed on the opposite side of the central element 101 from the angle-iron 106.

**[0028]** Each of the clamping elements 115 has on its side facing towards the respective frame component K two clamping plates 118 and 119 which have an extent generally perpendicular to the longitudinal direction of the central element 101. As illustrated in Fig. 10, a first clamping plate 118 is fixed to a first supporting element 120 disposed within the clamping element 115, while a second clamping plate 119 is fixed to a second supporting element 121 disposed within the clamping element 115. In this context it should be noted that the clamping plates 118, 119 and respective supporting elements 120, 121 are disposed parallel but separate in the vertical direction when the tool is applied on a frame component K. The supporting elements 120, 121 are supported for movement in their longitudinal direction in the clamping element 115. A second eccentric mechanism 123 is disposed within the clamping element 115 and is adapted to cooperating with the supporting elements 120, 121. As illustrated in Fig. 10, the second eccentric mechanism 123 comprises an elongate activating means 124 which is supported for rotation. Each of the supporting elements 120, 121 is provided with a recess 128, the shape of which is adapted to the activating means 124. The recesses 128 are disposed on opposite sides of the supporting elements 120, 121 and at least partly overlap one another. This makes it possible for the activating means 124 to be in engagement with both of the recesses 128. A handle 129 is force-transmittingly connected to the activating means 124, i.e. when the handle 129 is turned the activating means 124 accompanies its movement. The handle 129 is not depicted in Fig. 9.

**[0029]** Fig. 10 depicts the second eccentric mechanism 123 in its initial state in which the clamping plates 118, 119 are at the same level sideways.

**[0030]** The tool according to Figs. 8-10 also comprises suspension means 140 by which the tool can be suspended from the top component L (see Fig. 8) of the frame.

**[0031]** The procedure for using the tool according to Figs. 8-10 corresponds in principle to that described above in connection with the embodiment according to Figs. 1-7. Thus the elongation elements 105 are moved outwards so that the angle-irons 106 come to abut against the respective insides of the frame components K. At the same time, care is taken to ensure that the clamping plates 118, 119 are accommodated in the intermediate space or slit S between the frame component K and the upright R. By activation of the first eccentric mechanisms 109 the elongation elements 105 are fixed relative to the central element 101 and the tool is applied on the frame. To ensure that the tool assumes a horizontal position, various types of auxiliary means may be used, e.g. water levels or laser-based orientation means. These are not depicted in the embodiment according to Figs. 8-10.

**[0032]** To clamp the frame components K firmly relative to the uprights R situated outside them, the second eccentric mechanism 123 is activated by turning the handle 129, which causes the clamping plates 118, 119 to separate from one another sideways. The eccentric mechanism 123 thus serves as means for activating the clamping plates 118, 119. When the handle 129 has been turned far enough for the door frame components K of the door frame to be satisfactorily Clamped relative to the respective wall uprights R, the handle 129 is locked, in the position reached, by being turned outwards, causing the eccentrically shaped head of the handle 129 to be clamped firmly against the clamping element 115. The door frame components K can then be screwed firmly into the respective wall uprights R. This procedure is repeated with the tool at different levels in the vertical direction.

## Conceivable modifications of the invention

**[0033]** In the embodiments described above, two cooperating and mutually expanding clamping plates 18, 19; 118, 119 are used to achieve clamping of the tool firmly in the slit S between the frame components K and the respective wall uprights R. Within the scope of the present invention it is possible to conceive of other types of means which achieve this clamping. By way of non-limitative example it is possible to cite the use of a separate clamping plate which effects expansion by being positioned obliquely in the slit S. To this end, the tool would of course comprise means for achieving this oblique positioning.

**[0034]** In the embodiments described above, modified quick-fix clamps or eccentric mechanisms are used for effecting separation of the clamping plates 18, 19; 118, 119. Within the scope of the present invention, other types of means are conceivable for effecting separation of the clamping plates 18, 19; 118, 119, and screw clamps or other types of threaded mechanisms may be cited as non-limitative examples.

## Claims

1. A tool for fitting a frame, which tool comprises an element adjustable in length (1, 5; 101, 105) and locking means (9; 109) for temporarily fixing the element (1, 5; 101, 105) at a certain given length, the adjustable element (1, 5; 101, 105) having two stop means (6; 106) disposed at a distance from one another, **characterized in that** the tool has two sets of expanding means (18, 19; 118, 119), and means (15) for activating the expanding means (18, 19; 118, 119), and that the distance between the sets of expanding means (18, 19; 118, 119) is greater than the distance between the stop means (6; 106).

2. A tool according to claim 1, **characterized in that** each set of expanding means comprises two clamping plates (18, 19; 118, 119), the mutual spacing of which is adjustable.

3. A tool according to claim 2, **characterized in that** the free ends of the clamping plates (18, 19) are chamfered.

4. A tool according to claim 2, **charactezized in that** the clamping plates (118, 119) are parted in the vertical direction when the tool is applied on a frame.

5. A tool according to any one of the above claims, **characterized in that** the means for activating a set of expanding means (18, 19; 118, 119) comprises a clamp element (15).

6. A tool according to any one of claims 1-4, **characterized in that** the means for activating a set of expanding means (18, 19; 118, 119) comprises an eccentric mechanism (123).

7. A tool according to any one of the above claims, **characterized in that** the element adjustable in length comprises a central element (1; 101) and two elongation elements (5; 105), that the elongation elements (5; 105) are movable relative to the central element (1; 101) and that locking means (9; 109) are provided for temporary locking of the elongation elements (5; 105) relative to the central element (1; 101).

8. A tool according to any one of the above claims, **characterized in that** the element (1, 5) adjustable

in length is provided with a first water level (3).

**9.** A tool according to claim 8, **characterized in that** the tool comprises a second water level (25) disposed in a holder (25) fastened pivotably to the element (1, 5) which is adjustable in length.

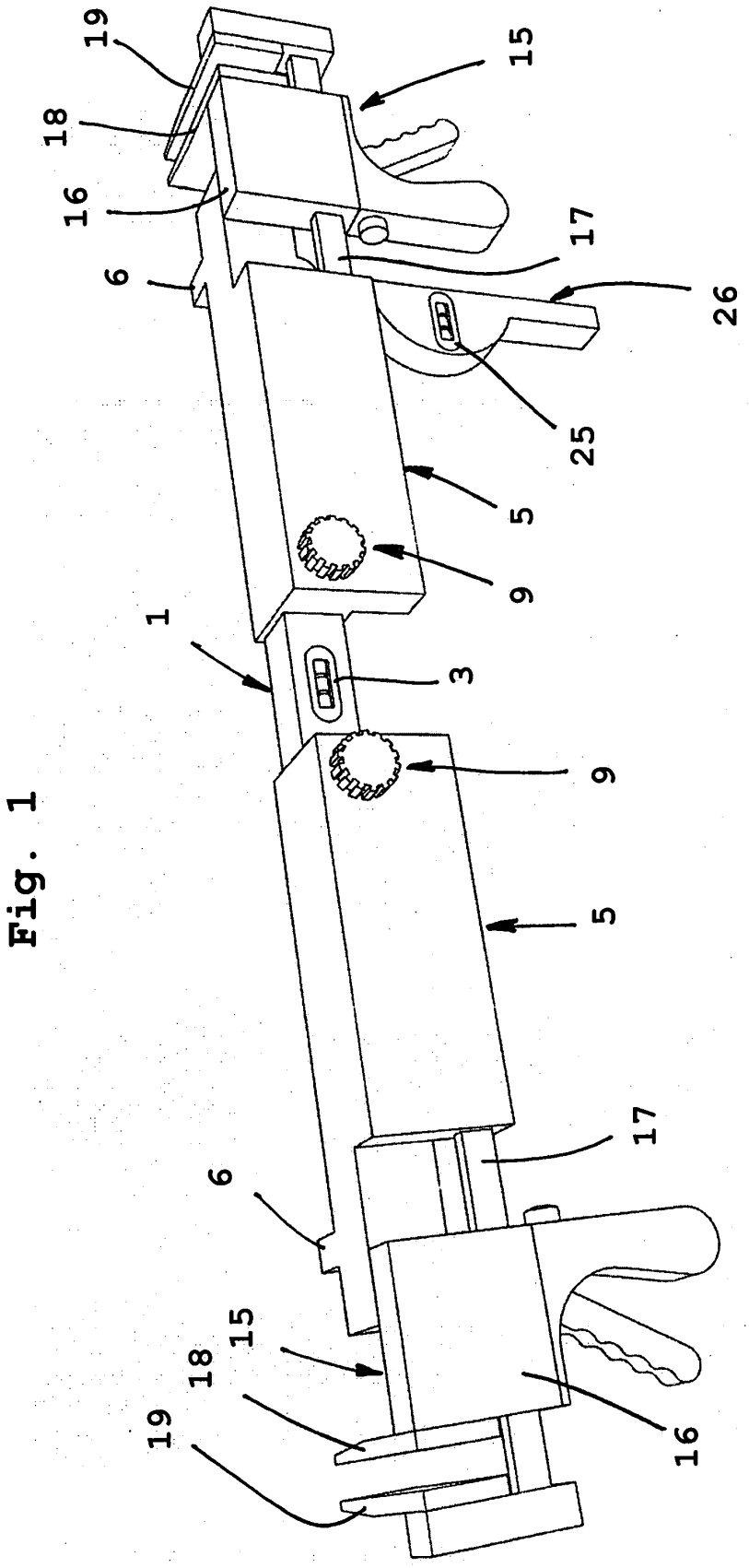



Fig. 1

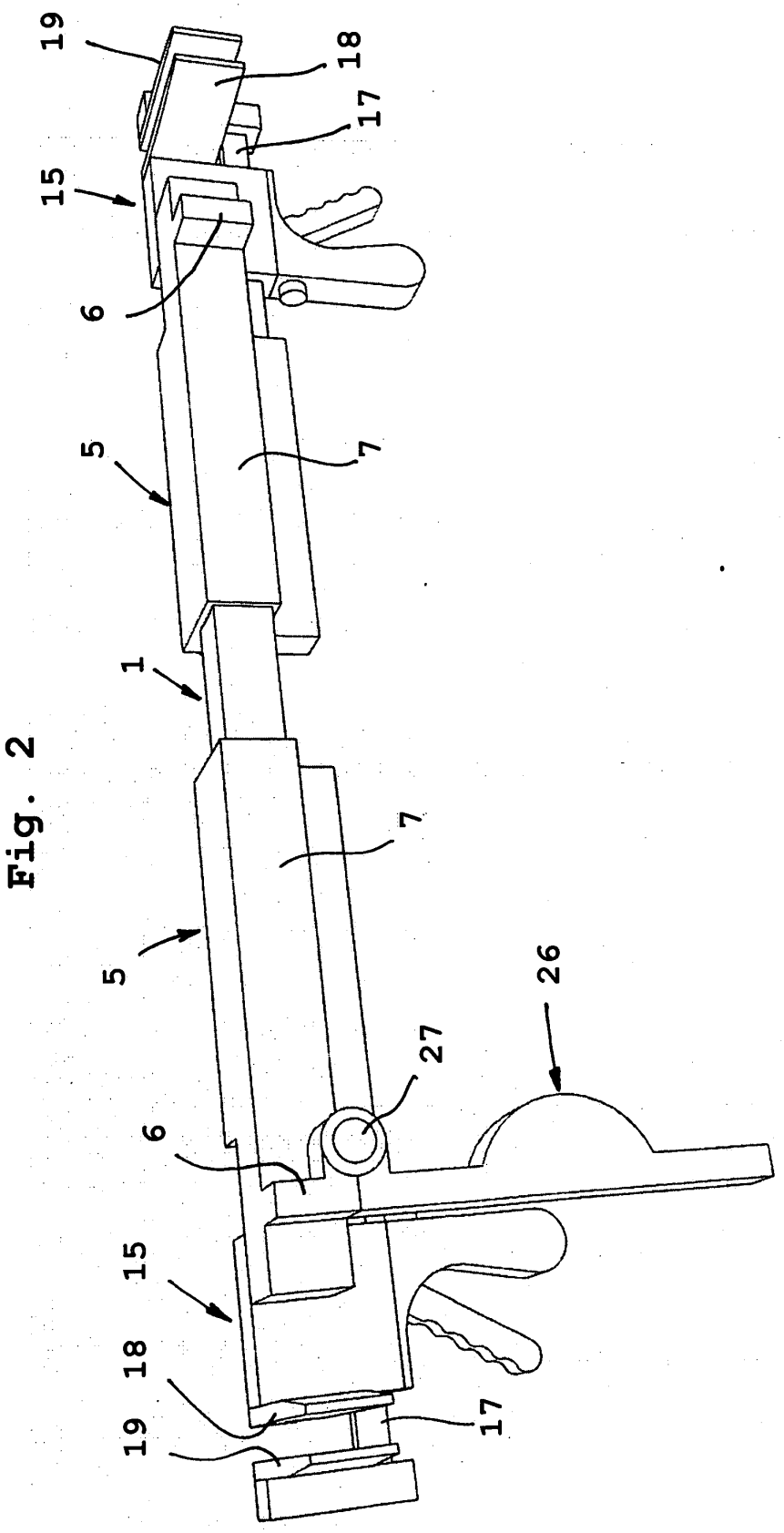



Fig. 2

Fig. 3

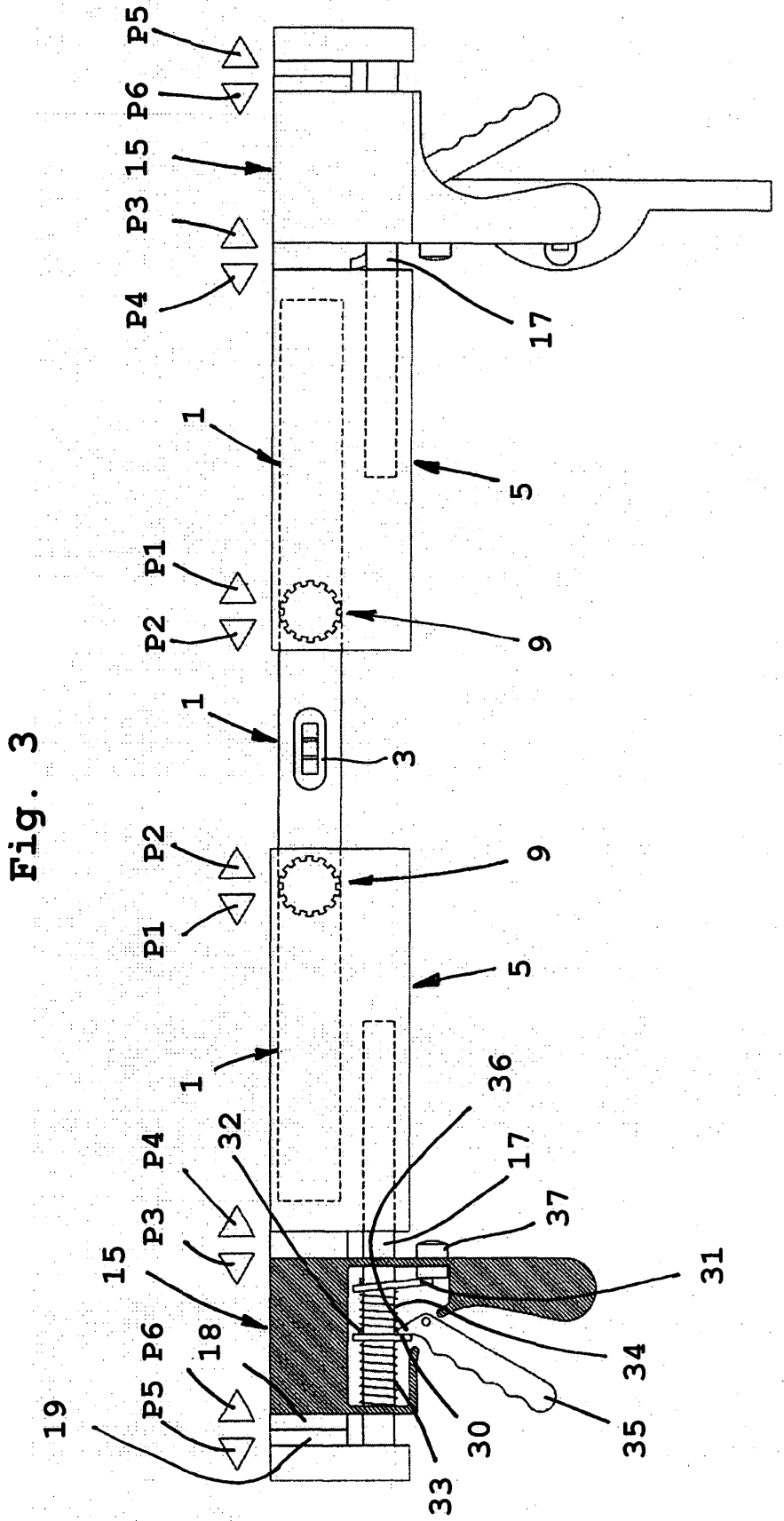

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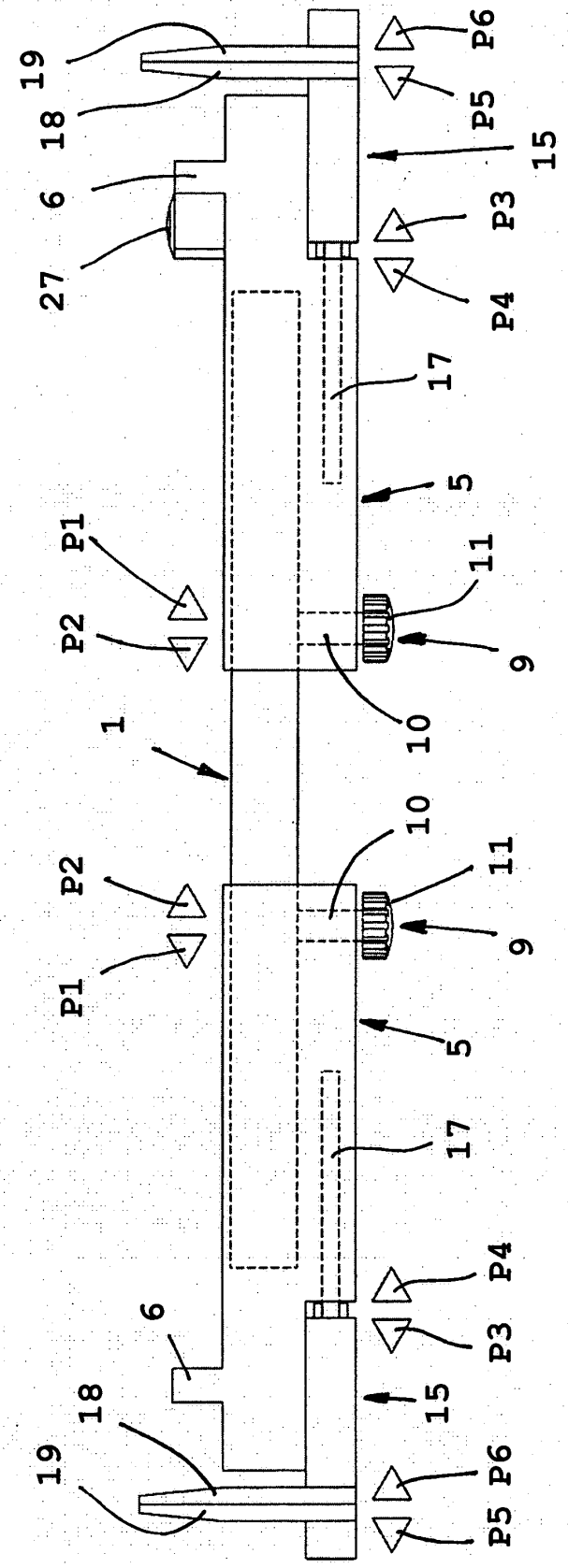
Fig. 4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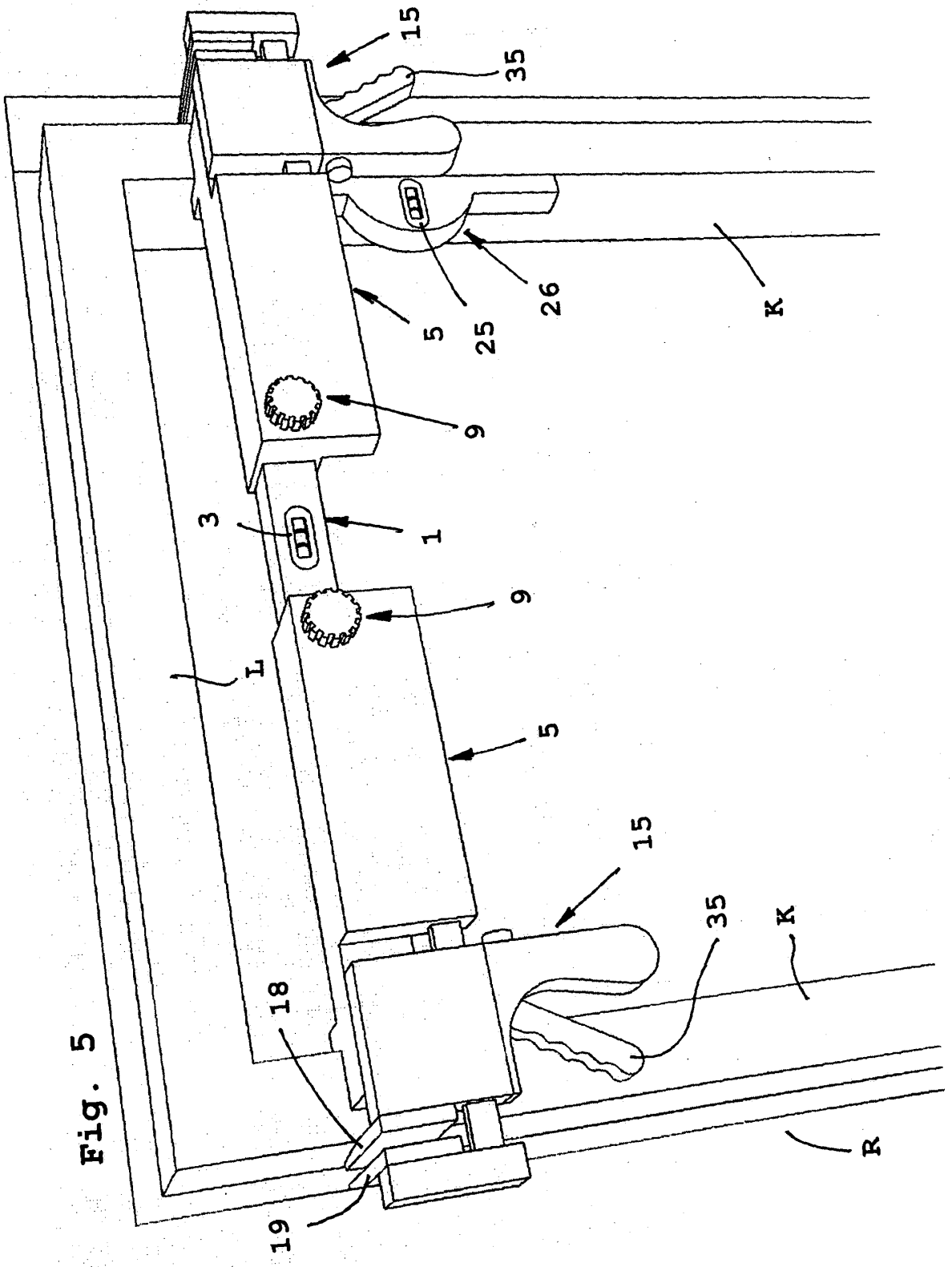


Fig. 5

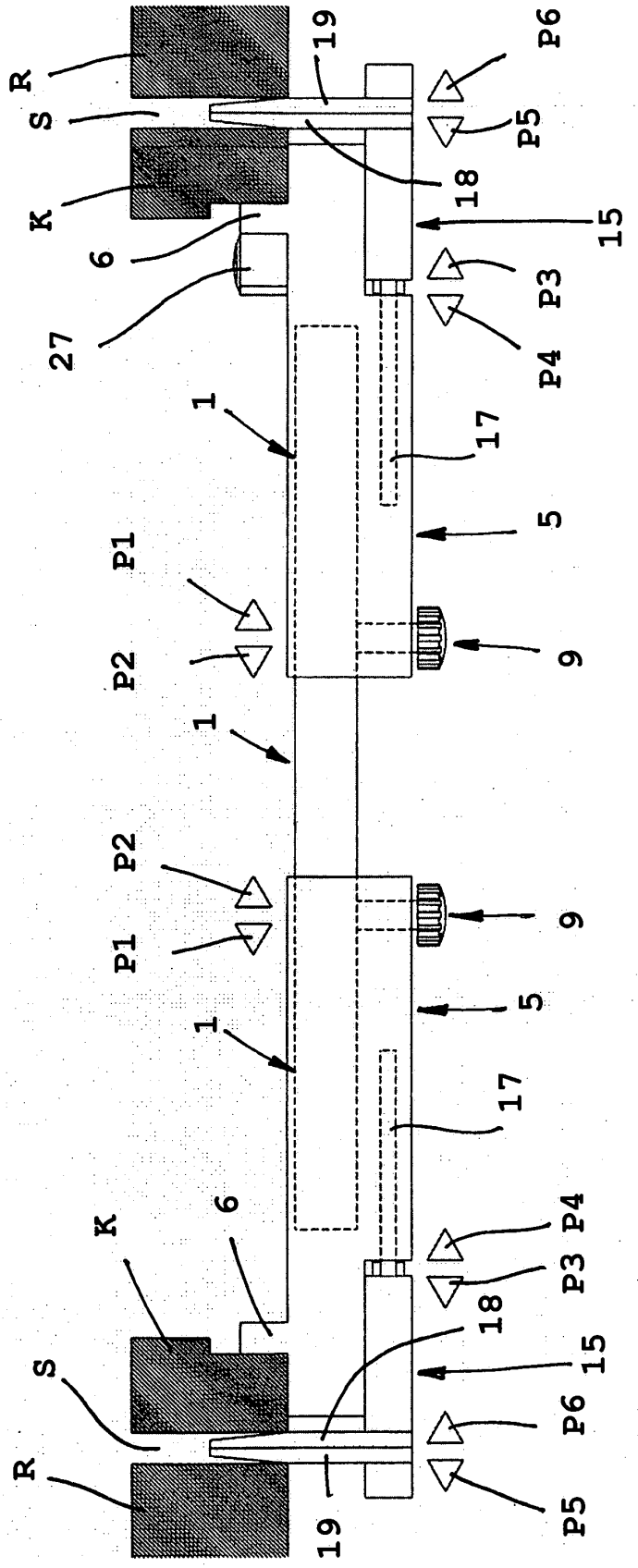
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Fig. 6

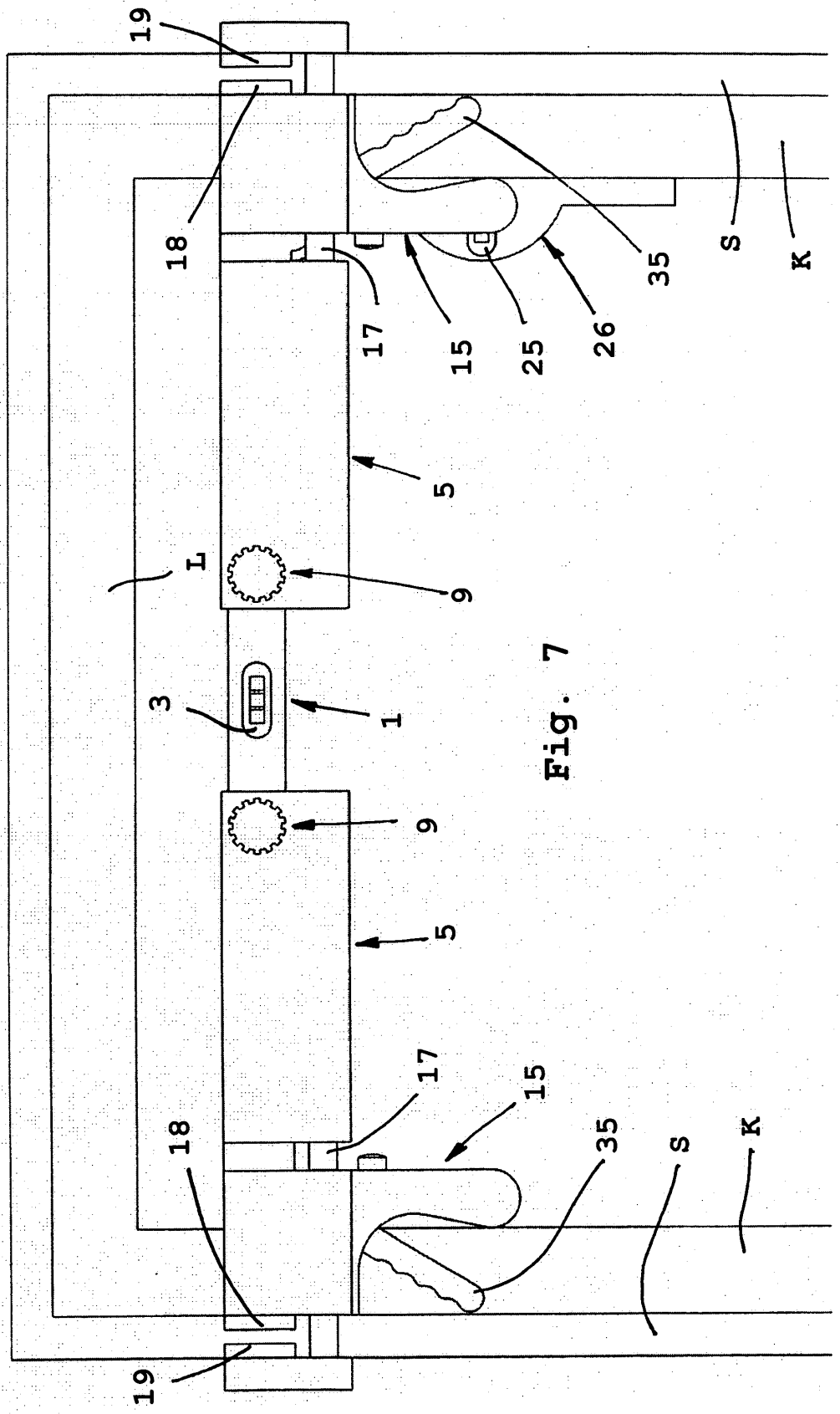


Fig. 7

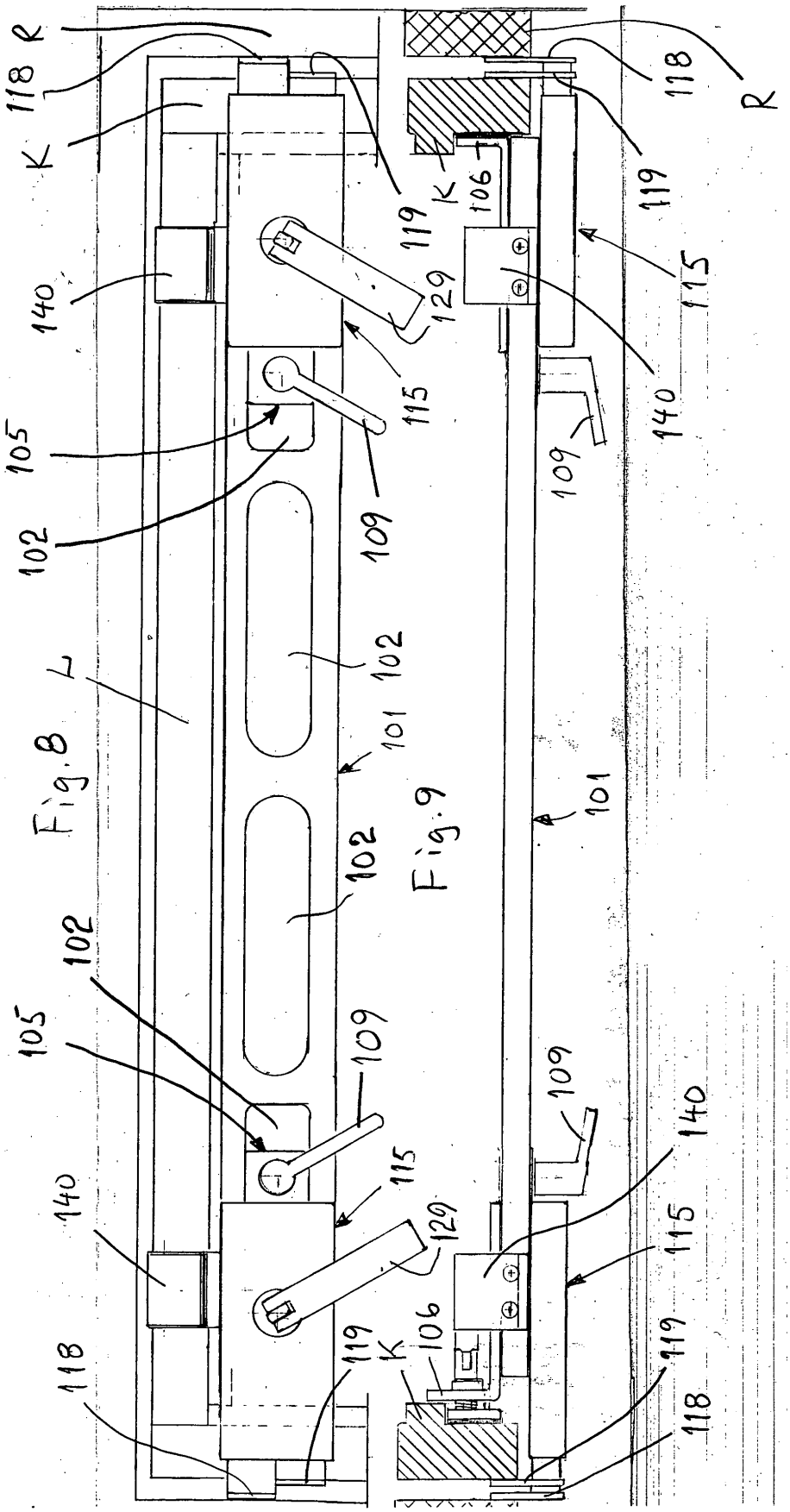
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Fig.8
Fig.9

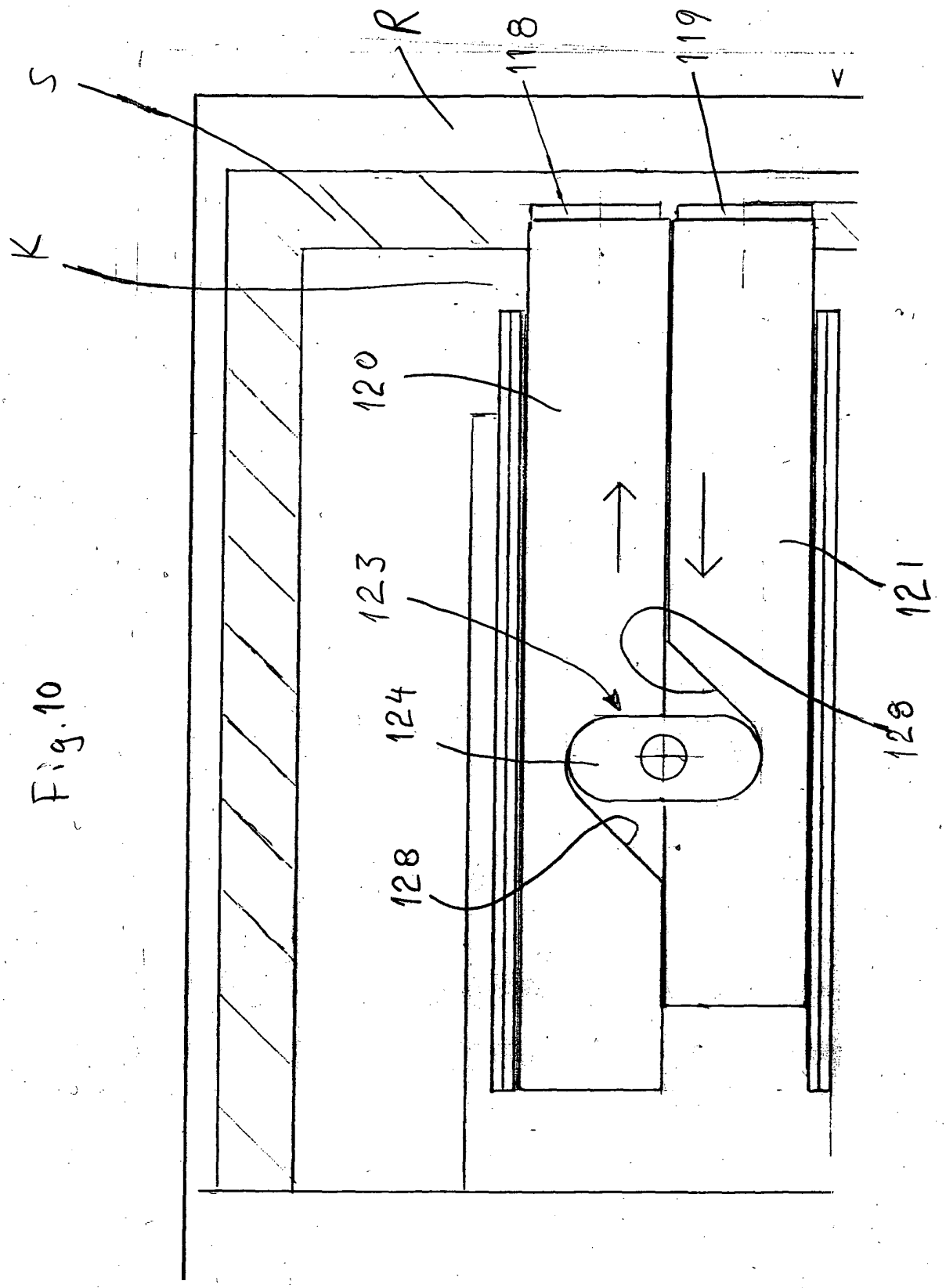


Fig.10

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


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- DE 19747910 **[0003]**