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(54) Anti-reverse device for the lever in a remote control apparatus

(57) An anti-reverse device for the lever in a remote control apparatus, which is placed in a box (11a, 11b), by means of a trailing cable (14), which can be connected to an outer structure of a driving machine, wherein the box has a first opening (12) for the passage of an operating lever (13) for a single cable core (14) movable within a holding reaction, connected to the box, the lever (13) can oscillate around a pivot (16) between a central position and two positions placed on opposite sides to the central position, and locking means of the lever position (13), which can be easily unlocked, are provided on the outer structure of said box wherein said locking means comprises an external knob (21), to which an elastically flexible ball is joined (28, 29), said ball is snap inserted into cavities (31-33) obtained on the box (11a, 11b), and a shaped plate (35, 36, 37, 38), placed at the end of a rotation shaft (23) of the knob (21), selectively interactive with a pin (34) projecting from the lever (13).

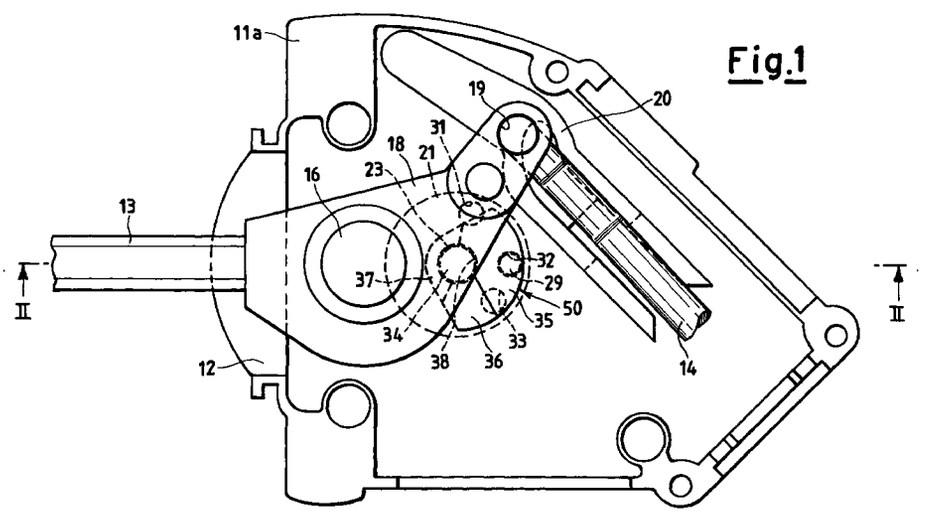

Fig.1

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Description

[0001] The present invention refers to an anti-reverse device for the lever in a remote control apparatus.

[0002] In the remote control device field, it is possible to determine different operations of these same devices by means of levers.

[0003] Presently, various types of lever devices are known for operating two rigid tension bars or alternatively a single flexible or non flexible cable, and these devices are commonly known as "push-pull".

[0004] These devices are known and used for operating oil-pressure valves of driving machines or similarly for operating mechanical reduction units, usually known as gear devices.

[0005] The devices are placed in a box, where on one side, a control lever extends outwards and from, the other side, a remote transmission cable extends. Naturally, a transmission cable reaction sheath is joined to the box.

[0006] Further, the remote control device box has a knob or a similar element that interacts between the lever and the box so as to cause a required reciprocal positioning which is more or less firm, avoiding possible reverse motions.

[0007] This positioning is necessary since it must be certain that the control position is not changed in the case Of vibrations or, on the other hand, that it can be changed when necessary and required by the user.

[0008] For this reason, knobs have been made which are connected to the box, and which work by rotation in order to move locking elements which can be freely unlocked between an area of the lever and an area off the box.

[0009] As said, in these known devices, as said, the presence of vibration, can cause a movement of the control reverse knob plus an accidental movement of the lever and of all that is connected to it, therefore creating danger for the operators in charge.

[0010] A purpose of the present invention is therefore to realise an anti-reverse device for the lever in a remote control apparatus that will avoid these technical problems relative to the unstable and firm positioning shown by the known devices.

[0011] Another purpose is to realise an anti-reverse device for the lever in a remote control apparatus that allows, in any case, a safe positioning, and suitable to stand external stresses even when accidental, like in the case of vibrations.

[0012] These purposes, according to the present invention, are achieved by realising an anti-reverse device for the lever in a remote control apparatus placed in a box, by means of trailing cable, which can be connected to an outer structure of a driving machine, wherein said box has a first opening for the passage of an operating lever for a single cable core movable within a reaction sheath, connected to said box, said lever being able to oscillate around a pivot, and locking means of the lever position which can be easily unlocked are provided outside said box, characterised in that said locking means comprise an external knob, to which an elastically flexible ball is joined and said bail is snap inserted into cavities provided on said box, and a shaped plate, placed at the end of a rotation shaft of said knob, selectively interactive with a pin projecting from said lever.

[0013] The characteristics and the advantages of an anti-reverse device for the lever in a remote control apparatus according to the present invention will be made more evident from the following description of a non limiting example which refers to the attached schematic drawings, in which:

- Figure 1 is a schematic elevation view of an anti-reverse device for the lever in a remote control apparatus, according to the present invention,
- Figure 2 is a side elevation view, in the partial section off the device along arrows II-II of figure 1,
- Figures 3-5 are schematic views that show three different positions of the anti-reverse device of the invention, one central position for the locked position and two side positions which allow the movement in only one rotating direction in operation.

[0014] With reference to figures 1 and 2, a box 11a, 11b is shown in which a remote control apparatus driven by means of a single trailing cable is placed.

[0015] In particular, the box-shaped element or box, realised for example in two coupled pieces 11a and 11b, which can be connected to a driving machine outer structure. In box 11a, 11b there is a first opening 12 wherefrom an operating lever 13 extends for a single cable core, which is shown as a curved end in the shape of a hook 14 and, as known, which is movable within a reaction sheath (not shown) connected to the box.

[0016] It should be observed that the operating lever 13 can oscillate around a pivot 16, which ends can be placed in two opposite seats 15, which have bushings or similar supports 17, provided inside the two opposite halves of the box 11, 11b.

[0017] The lever 13, in particular, can oscillate around the pivot 16 between a central position and two positions placed on opposite sides with respects to said central position.

[0018] The lever 13 has an extension 18 in a hole 19 where the hooked end part of the cable 14 is placed. An enlargement 20 is also positioned or obtained in one half of the box 11a underneath the curved hook shaped end 14. The enlargement 20, which has various slanting and shapes in height, has, at least in part, a curved shape that follows the oscillations of hole 19 of the operating lever 13. This configuration ensures the engagement of the curved end 14 inside the hole 19 for small oscillations of the lever.

[0019] An anti-reverse device for the lever of a remote control apparatus is placed on the half box 11a, accord-

ing to the present invention.

[0020] This device comprises a knob 21, locked, by means of a radial dowel 22, on a first shaft end 23 placed in a hole 25 of the knob 21 and aligned to a hole 24 of the half box 11a.

[0021] Further, the knob 21 has a through hole 26, coaxial to hole 25, in which a spring 28, held by means of a another dowel 27, acts upon a small ball 29. An outer structure 30 of the half box 11a has, placed on an arc portion of a circle, a series of three rounded cavities 31, 32 and 33 to partially receive said ball 29. In this way, the ball 29, elastically movable by means of the spring 28, is snap inserted into the cavities.

[0022] In accordance with this invention, the lever position 13 locking means, which can be easily unlocked, have been realised on the outer structure off box 11a, 11b, which are activated through the position of the knob 21. In fact, at the second end, the shaft 23 has an eccentric integral plate 50, shaped to be able to interact with the extension 18 of the lever 13 that has, in a lowered area 41, a projecting pin 34.

[0023] This plate 50, having a shape of a sector with rounded edges at about 90°, has tooth portions at different heights. Equally, there could be just one tooth element that extends for the entire sector with a central cavity indicated by 38, which is suitable to receive the projecting pin 34.

[0024] In the illustrated example, for problems relating to dimensions and eventual rotations of the various parts, a tooth element with several portions is provided. There is, in fact, a first maximum height tooth portion 35, that occupies a good part of the centre and one side of the sector, a second intermediate height tooth portion 36 towards the remaining sector end and a third minimum height tooth portion 37. This last portion 37 is placed behind the other two, in the area where the sector is attached to the shaft 23 and is suitable to receive the pin 34.

[0025] The first two tooth portions 35 and 36 have a rounded cavity 38 on the side facing the centre of the plate, said cavity is in relation with the third tooth portion 37, wherein the projecting pin 34 can be received, only when the central locking position of the lever 13 is in place.

[0026] In such a locking position, the ball 29 is housed inside the central cavity 32 of the outer surface 30 of the half box 11a, as shown in figures 1-3.

[0027] If the knob 21 is rotated to the position of figure 4, which means locking the ball 29 into the cavity 33, the lever can be rotated between the central position and the slanting position towards a first operating side, as shown by the arrow 39 in figure 4. An eventual accidental rotation of the knob 21, returning it towards its initial intermediate position, will not cause any problems.

[0028] In fact, the lever 13, when it is activated through the interaction of the pin 34 with one of the bevelled slanting surfaces 35' of the first tooth portion 35, returns the shaped plate 50 to its initial position rotated towards the side.

[0029] In this way, it is impossible that the lever 13 locks since this operation is only possible when the lever 13 is placed in the central position (as in figure 3) and the knob 21 is rotated from the lateral position so that its cavity 38 can receive the pin 34.

[0030] The same thing occurs in the second case where, starting from said central locking position of the lever 13, the knob 21 is rotated to the position of figure 5, which means that the ball 29 is locked into the cavity 31. The lever 13 can be rotated between the central position and the slanting position towards a second operating side, as shown by the arrow 40 in figure 5.

[0031] The knob 21 is rotated in a way to move the second intermediate height tooth portion 36 away from the central position. If the knob accidentally rotates taking the sector plate 50 with it and returning said plate towards the central position, because the lever 13 has been turned back, the sector 50 is returned to its initial rotated position. This happens because the projecting pin 34 of the lever 13 abuts on one of the end surfaces 36' of the second tooth portion 36.

[0032] Also in this case, it is impossible that the lever 13 locks since this operation is only possible when the lever 13 is placed in the central position and the knob 21 is rotated from this second lateral position towards the central position so that its cavity 38 can receive the pin 34.

[0033] In both cases it is necessary to place the lever 13 in a central position (figure 3), in order to change the position off the knob 21 and to realise the locking of the lever 13.

[0034] In this Way, a safe anti-reverse device for the lever in a remote control apparatus is realised and said device, contrary to the known devices, does not allow the locking off the lever if the lever is not placed in its central locking position as in figure 3.

[0035] This particular device solves the problems of the presently known devices.

Claims

1. Anti-reverse device for the lever in a remote control apparatus, which is placed in a box (11a, 11b), by means of a trailing cable (14), which can be connected to an outer structure of a driving machine, wherein said box (11a, 11b) has a first opening (12) for the passage of an operating lever (13) for a single cable core (14) movable within a holding reaction, connected to said box, said lever (13) can oscillate around a pivot (16) between a central position and two positions placed on opposite sides to the central position, and locking means of the lever position (13), which can be easily unlocked, are provided on the outer structure of said box (11a, 11b), characterised in that said locking means comprise an external knob (21), to which an elastically flexible ball is joined (28, 29), said ball is snap

inserted into the cavities (31-33) obtained on the box (11a, 11b), and a shaped plate (50, 35, 36, 37, 38), placed at the end of a rotation shaft (23) of the knob (21), selectively interactive with a pin (34) projecting from the lever (13).

2. Anti-reverse device as claimed in claim 1, characterised in that said shaped plate has a shape of a sector with rounded edges and has at least one tooth portion (35, 36, 37), selectively interactive with said pin (34), and a central cavity (38) to house said pin (34) with said lever in a central position.

3. Anti-reverse device as claimed in claim 2, characterised in that only when said lever (13) is placed in its central position it is possible to rotate said knob (21) to said central position in order to house said pin (34) in said cavity (38) thus locking said lever (13).

4. Anti-reverse device as claimed in claim 2, characterised in that there are several tooth portions comprising one first maximum height tooth portion (35), that occupies a good part of the centre and one side of the sector, a second intermediate height tooth portion (36), towards the remaining said sector end, and a third minimum height tooth portion (37) behind the other two, placed in the area wherein said sector is attached to said shaft (23) and wherein said pin (34) can be moved.

5. Anti-reverse device as claimed in claim 2, characterised in that said knob (21), when it is rotated so as to move at least one said tooth portion (35, 36, 37) away from said central position, does not allow the housing of said pin (34) in said central cavity (38).

6. Anti-reverse device as claimed in claim 4, characterised in that said knob (21), when it is rotated so as to move said first maximum height tooth portion (35) or said second middle height tooth portion (36) away from a central position, in case of an accidental return of the knob and of the respective tooth portions (35, 36) to their intermediate central position, does not allow the locking of the lever (13) since said pin (34) of said lever (13) interacts with at least one bevelled slanting surface (35', 36') of said tooth portion (35, 36).

Fig.1

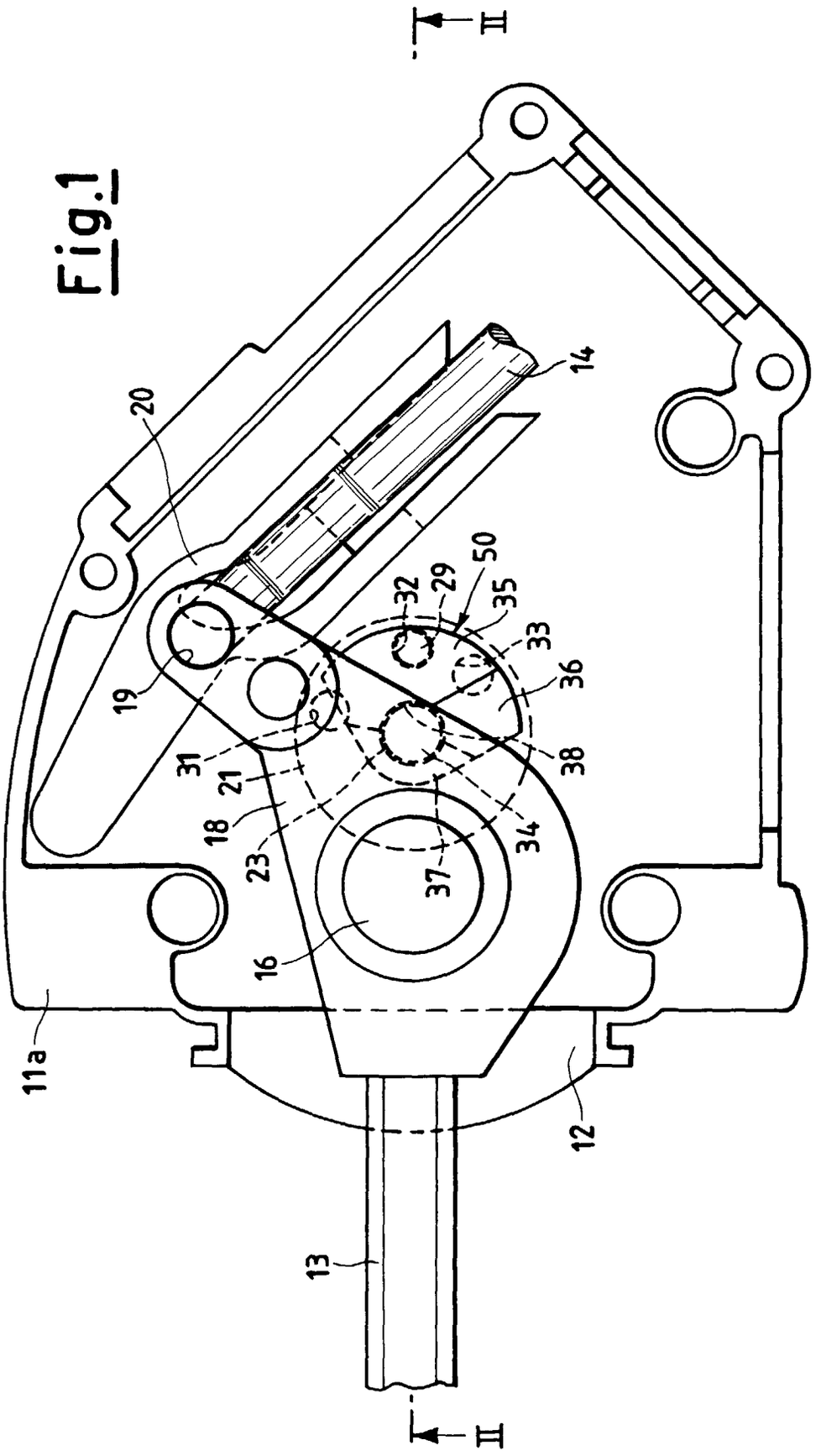
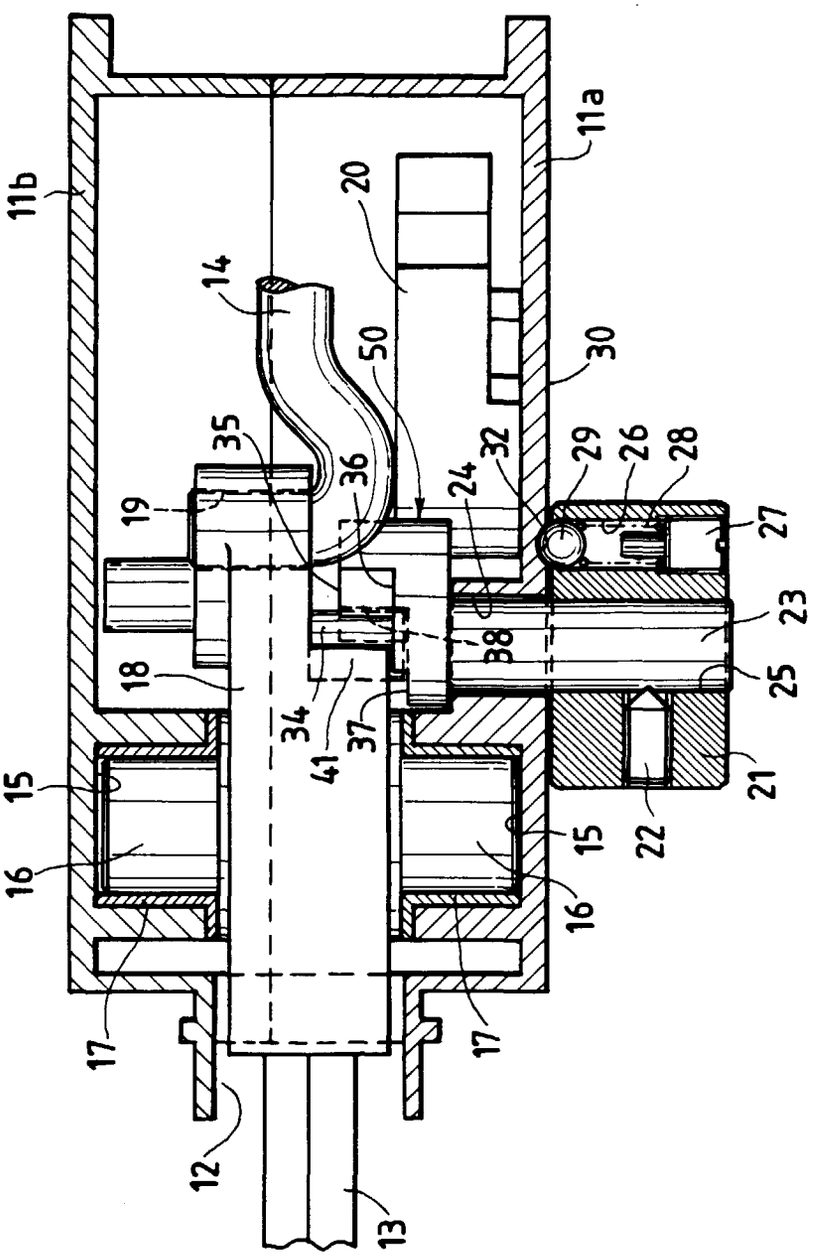


Fig.2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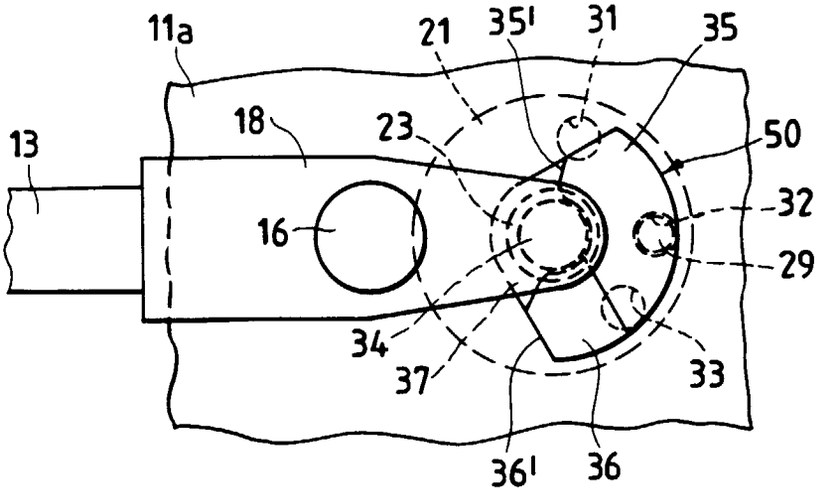

Fig.3

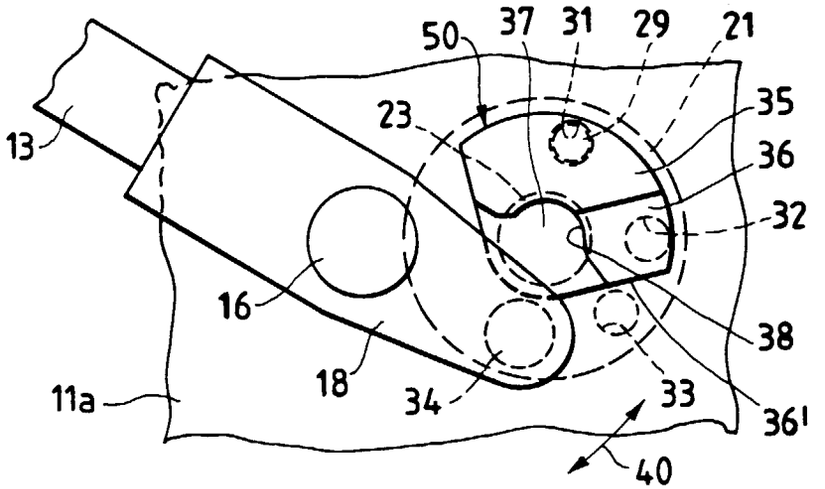

Fig.5

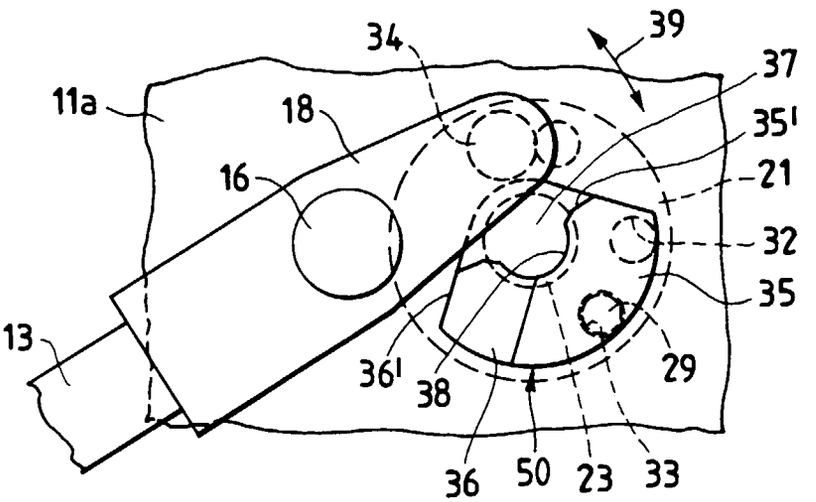

Fig.4