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(54) Multi-purpose electric cleaner with foldaway handle, for floors, walls, padded furniture and similar uses

(57) Multi-purpose electric cleaner (10) for floors, walls, padded funiture and similar uses, in which the foldaway handle (35), turning on an uppermost hinge (30), can assume two positions, the first an open position for cleaning floors and the like being substantially aligned with the axis of the cleaner, and the second a closed position for cleaning padded furniture in particular or when the appliance is out of use, matching when in that position with a housing of substantially the same shape and dimensions made in the back (13) of the appliance, so that said handle can substantially become part of the structure of the body of the appliance into which it practically "disappears".

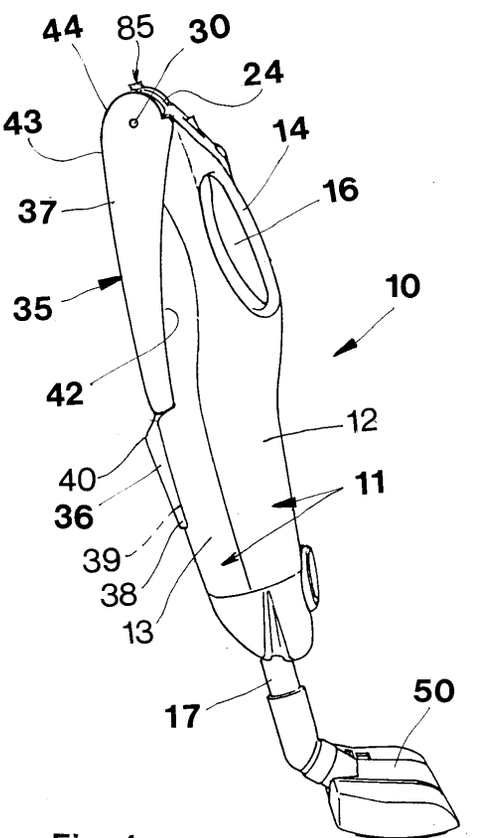

Fig. 4

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Description

[0001] The invention concerns electric domestic appliances for cleaning purposes in general by means of suction.

[0002] Widely used are the so-called electric brooms, namely appliances designed to replace the ordinary brooms, consisting of a head, covered with natural or artificial filaments fixed to the end of a handle, that sweeps up the dirt to a point where it can be collected.

[0003] The electric broom is more convenient and efficient as it draws up the dirt instead of sweeping it, after which it is filtered into a bag placed for the purpose inside the appliance.

[0004] This appliance can obviously be used to clean not only floors but also remove dust from articles of furniture such as the various forms of padded seating.

[0005] According to whether the appliance is used for a floor or an article of padded furniture, the handle should either be fully extended to cover the distance between operator and floor or else be stowed out of the way when the appliance is used for padded furniture in which case it is more convenient to hold it by a laterally placed handle situated substantially at the centre of gravity of the appliance.

[0006] The two positions could give rise to structural and functional difficulties, it being no easy matter to place a handle, necessarily of some considerable length, in two substantially opposite positions.

[0007] Purpose of the above invention is to devise a way of changing from one position to another so as to satisfy functional and aesthetic necessities as will now be explained.

[0008] Subject of the invention is a multi-purpose electric cleaner for floors, walls, padded furniture and the like.

[0009] The fold-away handle, turned on a hinge at the top, can be used in two positions: one, here called the open position when the cleaner is used for floors and walls, practically aligned with the axis of the body of the appliance, and the other, here called the closed position, when the appliance is used particularly for cleaning padded furniture or is out of use, when it can be stowed away in a recess made in the back of the body, said recess being of substantially the same shape and size as the handle.

[0010] When the appliance is closed, the handle can be fitted inside the volume of the appliance and so practically "disappear".

[0011] The handle is shaped substantially like a tuning fork with prongs that form a fork the arms of which are articulated at the upper end of the sides of the body of the cleaner.

[0012] At the centre of the "tuning fork" is a handgrip whose end, when the cleaner is in its closed position, fits into a seat in the above recess made in the body of the cleaner, while the central portion of the handgrip is raised to allow the hand to grasp it.

[0013] The body of the invented electric cleaner is tapered to make it more manageable, especially for cleaning padded furniture, when held by a handle placed laterally at the front substantially at said body's centre of gravity.

[0014] The hinge on the handle, in relation to the body of the cleaner, is formed of a transversal shaft having a cross-shaped section, fixed to said handle by a pair of convex heads with hollow extensions whose external shape and internal cavities are both cross-shaped.

[0015] Dimensions and shape of the external cross correspond to those of the crosswise holes passing through the ends of the arms of the handle.

[0016] Dimensions and shape of the internal crosswise cavity in the extensions correspond to those of the shaft ends.

[0017] The hinge is therefore assembled by inserting said extensions into the holes in the arms of the handle while the ends of the shaft are inserted into the internal crosswise cavity in said extensions.

[0018] The assembled parts are held in place by screws that pass through an axial hole in the convex heads and are tightened in holes at the ends of the shaft.

[0019] Length of said extensions is greater than the thickness of the arms of the fork, it being possible to circumscribe said extensions by a circle. The part of the extensions emerging from the arms, towards the inside of the fork, is used to permit rotation of the whole piece, consisting of the shaft, the fork of the handle and the extensions, inside the circular housings created by opposing semicircles in the upper ends of the two matching halves of the electric cleaner.

[0020] Substantially at the centre of said transversal shaft of a cross-shaped section, is a transversal locking disk on whose rim are two open radial notches the position of which corresponds to the two positions - open and closed - of the handle.

[0021] Said two positions can be locked by the internal tooth of a slider control device with an internal head, said slider translating parallel to the shaft inside a slit made at the upper end of the body of the cleaner where the two halves match.

[0022] Inside said slider control device is a support with a cylindrical cavity to take a helical compression spring that, making contact with a bracket on the body of the cleaner, tends to keep the slider, and therefore its internal tooth, opposite to the locking disk so that said tooth fits into one or other of the notches according to the position desired for the handle.

[0023] Said spring ensures spontaneous stability of this lock which can be easily undone by pressing with the fingers on the external head of the slider in the direction opposite to the extension of the spring.

[0024] The motor can advantageously be replaced by another of different power and size, this being done by simply reversing the motor's upper stabilizing plate comprising a square tubular body which, by means of a transversal baffle forming two superimposed and

aligned chambers of equal transversal area but of different depth that open one on either side of the plate, creates space for a small head with a cavity of a size suitable for housing the head of the motor.

[0025] Therefore, according to the type of motor mounted in the appliance and therefore also according to its length, the plate can be placed inside the body of the cleaner in one position, or in another overturned in relation to the first, so that the chamber of greater depth is available for the motor of greater length.

[0026] The invention offers evident advantages.

[0027] The tapered and harmonious lines of the cleaner, whether the handle is fully out or turned back on the body of the appliance, give excellent results from both the aesthetic and practical standpoints.

[0028] Ease of handling and effectiveness in use are ensured both when the handle is out for cleaning floors or when the cleaner is used to draw dust out of padded articles of furniture.

[0029] The technical solutions adopted, such as the handle's hinge, the positions and shapes of essential parts like the handle, handgrip, body of the cleaner, the easy alternative for motors of different power, make for great simplicity, easy assembly and therefore low costs combined with high efficiency and a comfortable position for any user.

[0030] The appliance represents an excellent example of 'functional aesthetics'. Characteristics and purposes of the invention will be made still clearer by the following examples of its execution illustrated by diagrammatically drawn figures.

Fig. 1 Electric cleaner with the handle fully extended, in its position for cleaning floors, side view.

Fig. 2 The same, seen from the front.

Fig. 3 The electric cleaner while the handle is being turned back on the rear of the body, side view.

Fig. 4 The electric cleaner with the handle closed, out of sight, seen from the side.

Fig. 5 As in Fig. 4, rear view.

Fig. 6 The electric cleaner fitted with a nozzle, in use on a padded chair

Fig. 7 The electric cleaner cut through lengthwise at the handgrip.

Fig. 8 As in Fig,. 7 with a low-powered motor, longitudinal section.

Fig. 9 As above, cross section at the upper end of the electric motor.

Fig.10 Detail of the cleaner at the hinge of the foldaway handle, a partially exploded perspective.

Fig.11 Detail of the handle hinge, exploded perspective.

Fig.12 Detail of the cleaner at the handle's hinge and of its means for locking it in the open position, cross section.

Fig.13 As in Fig. 12 with the handle folded away, cross section.

Fig.14 Enlarged detail of the locking system, cross section.

Fig.15 As in Fig. 14, longitudinal section.

Fig.16 As above when releasing the locking device by hand, longitudinal section.

[0031] The electric cleaner 10 comprises a body 11 and a foldaway handle 35 that can either be used in an extended position aligned with the body for cleaning floors, or be folded away in the rear of said body assuming its closed position, when cleaning padded furniture or when out of use.

[0032] Said body 11 consists of two halves, 12 and 13, one front and one back that match at a line marked 19.

[0033] A brush 50 or other accessories, such as the nozzle 51 (Fig. 6), can be fitted on as required at the lower mouth 17.

[0034] To use the appliance as a hand cleaner for items such as padded furniture, a handgrip 14 is provided, raised above a bowl-shaped recess 16 to receive the hand.

[0035] The shape of the foldaway handle 35 is substantially that of a tuning fork, with arms 37 in the form of a "U" and a central handgrip 36, articulated in the hinge 30 at the top of the body 11 of the appliance.

[0036] A groove 20 (see also Fig. 5) runs along the upper part of the rear half 13 of the body, shaped to correspond with the fork of the handle 35 which, in the closed position, perfectly fits into said groove and practically "disappears" inside the volume of said half 13 of the body.

[0037] This close matching is obtained by:

- the concave surface 42 inside the arms of the above fork that matches with the convex surface 22 in the arms of said groove 20;
- the convex surface 42 outside the arms of the fork that substantially corresponds with the convexity of the rear half 13 of the cleaner;
- the lower arched end 44 of the handle that corresponds with the convexity 24 at the upper end of the appliance (Fig. 4).

[0038] The end 38 of the handgrip 36 of the handle 35 fits almost completely into the central part 39 (Figs 4 and 5) of said groove 20, the central part 40 of said handgrip being slightly raised to allow space for the fingers. In the closed position the handle fits into the groove 20 and practically "disappears", from both the aesthetic and functional standpoints, since it thereby becomes an integral part of said body 11, thus facilitating (Fig. 6) use of the appliance, when held by the lateral handgrip 14, further favoured by its compact and rounded shape.

[0039] The depression 16 under the handgrip 14 is formed of the cover over the filter 111 placed on the concave grill 120 fixed to the edges of the aperture 121 by means 122.

[0040] Substantially behind said depression 16 is the

motor 105 supported by a lower plate 118, with a grill filter 113 fixed to the supports 114 and 115 placed respectively on the opposing internal walls of the halves 12 and 13 of the appliance.

[0041] Above, the motor is kept stable by the plate 100 inserted in supports 99. Said plate 100 comprises the square tubular body 101 which, with the baffle 102, forms two chambers, an upper one 103 and a lower one 104, of equal transversal area but different depth, to house a small head 108 whose cylindrical cavity is sized to receive the head 107 of the motor 105. The motor 105 can be replaced by one of lower power indicated by 106 in Figure 8.

[0042] To insert this latter motor the plate 100 must be turned over. The head 108 is then inserted into chamber 103 which, when the plate is overturned, becomes the lower one and is therefore closer to the lower plate 188 to compensate for the lesser height of that motor.

[0043] An insulating pad 112 is fixed between the motor and the wall of the rear half 13 of the appliance.

[0044] A door 27, in the lower part of the front half 12 of the appliance, opens to reach the filter bag 28 with flange 29 inserted in the bottom supports 26. The hinge for the fork-shaped handle 35 is formed of the shaft 60 with a crosswise transversal section, by means of convex heads 75 mounted on extensions shaped like a cross both inside 79 and out 76.

[0045] The dimensions and shape of the external cross 76 correspond to those of the cross-shaped holes 32 through the ends of the arms 37 of the handle 35 while the dimensions and shape of the internal cross-shaped cavity 79 correspond to those of the cross-shaped ends of the shaft 60. Said extensions 76 of the convex heads 75 become inserted in the holes 31 in the arms of the fork, while the ends of the shaft 60 fit into the cross-shaped cavity 79 of said extensions 76.

[0046] This assembly is made stable by screws 63 that screw into the threaded axial hole 62 made in the cylindrical axial body 61, present at said ends. Length of said extensions 76 is greater than the width of the arms of the handle 35 and they project inward from said arms and, as they can be circumscribed by a circle, they are used to permit rotation of the fork 37 of the handle 35 in the circular space created by the two semicircles 68 and 69 present in the upper ends of the halves 12 and 13 of the body of the electric cleaner.

[0047] Substantially at the centre of said shaft 60 is the locking disk 70 with two substantially diametral notches, one 71 for the open position of the handle and therefore practically aligned with the body 11 of the cleaner; the other notch 72, at a slight angle in relation to the first, is used for the handle's idle position when it is turned back on the body of the cleaner. To hold the handle firm in its two positions, a slider device 85 is placed at the upper end of the body where the two halves 12 and 13 match, said device having an inner tooth 91 that can translate parallel to said shaft 60 when the fingers of the hand press on the head 84 with a curved side Said slider 85 can be moved from its inactive position (Fig. 16) to a position (Fig. 15) locking the handle so that it is aligned with the body of the appliance or turned back on it, this being done by overcoming resistance from the helical compression spring 90 inside the housing 89 in the lower part of said slider 85.

[0048] As said spring makes contact against the bracket 96 with its pin 97 in line with the helical spring, the freed slider tends to move towards the locking disk 70 and therefore, if the slider's inner tooth 91 has been inserted in one of the notches 71, 72 on the disk that locks the shaft 60 for rotating the handle 35, said spring fixes the tooth 91 inside one notch partly assisted by the lower bracket 92, alongside said tooth 91, that makes contact with the surface of the locking disk 70.

[0049] To rotate the handle from the open to the closed position, the hand must necessarily press the slider device 85 to free the tooth 91 from the notch 71 leaving the slider free to permit entry of tooth 91 in the other notch 72. To return to the open position these movements are made in the reverse order.

[0050] The slider device 85 moves in the guide 18 through the square tang 87 joining said slider to the lower body 88 housing the spring 90 and carrying the locking tooth 91.

[0051] The on-off switch 56, the knob 55 to vary suction power by means of the electronic card 58, the device 57 for opening the door in front of the bag 28 with its supporting plate 29, are all situated in the lower part of the cleaner.

[0052] As subject disclosure has been described and explained solely as an example of its use without limitations, and to show its essential features, it is understood that numerous variations may be made to it according to industrial, commercial and other requirements, while other systems and means may be included therein without thereby any causing departure from its sphere of use.

[0053] It must therefore be agreed that the application to patent shall include any equivalent application of its concepts and any equivalent product executed and/or in operation according to any one or more of the following claims.

Claims

1. Multi-purpose electric cleaner (10) for floors, walls, padded furniture and similar uses,
   characterized in that it has a tapered body (11) formed of two longitudinal halves (12, 13), a front half (12) and a rear half (13) that match substantially on a geometrical plane passing through the geometrical axis of said body (11), and a handle (35) that can turn back on an uppermost hinge (30) giving the cleaner two positions, the first here called the open position for cleaning floors and the like, when the handle is substantially aligned with the ap-

pliance, and the second, here called the closed position, used especially for cleaning padded furniture or when the cleaner is out of use, in which position the handle turns back to fit into a housing (20) of substantially the same shape and size made in the back (13) of the cleaner (10), so that it becomes structurally inserted in the body (11) of the appliance (10) seeming practically to "disappear".

2. Multi-purpose electric cleaner (10) as in claim 1, characterized in that the form of the handle (35) is practically that of an overturned tuning fork whose prongs are the arms (37) of a fork, with an articulation (30) at the upper ends of the two halves (12, 13) of the body (11) of the cleaner (10).

3. Multi-purpose electric cleaner (10) as in claims 1 and 2,
characterized in that at the central part of the fork there is a handgrip (36) the end (38) of which, when the handle (35) is closed, fits into a seat (39) made for it in the housing (20) for the handle (35) on the back (13) of the cleaner (10) while the intermediate part of said handgrip (36) still projects to allow the hand to hold it.

4. Multi-purpose electric cleaner (10) as in claim 1, characterized in that a longitudinal handgrip (14) is placed on the front half (12) at substantially the centre of gravity of the body (11) to assist carrying the cleaner and directing suction, especially on padded furniture, said handgrip remaining substantially within the front half (12) placed above a recess (16) in said half (12) to allow passage of the fingers underneath it.

5. Multi-purpose electric cleaner (10) as in claim 1, characterized in that the hinge (30) of the main handle (35) in relation to the body (11) is made of a short transversal shaft (60) with a section in the form of a cross, fixed to said handle (35) by a pair of externally convex heads (75) and hollow extensions (76) whose outer form and inner cavity (79) are cross-shaped, the dimensions and shape of the external cross (76) corresponding to those of the cross-shaped holes (31) passing through the end of the arms (37) of the fork of the handle (35), the dimensions and shape of the internal cross-shaped cavity (79) in the extensions (76) corresponding to those of the ends of the shaft (60) so that the hinge (30) is assembled by inserting said extensions (76) in the holes (31) in the arms (37) of the fork of the handle (35) while the ends of the shaft (60) fit into the internal cross-shaped cavity (79) in said extensions (76), assembly being stabilzed by screws (63) that pass through an axial hole in the convex heads (75) and are tightened in a hole made for them in the ends of the shaft (60).

6. Multi-purpose electric cleaner (10) as in claim 5, characterized in that length of said extensions (76) is greater than the thickness of the arms (37) of the fork and can be circumscribed by a circle so that the part of said extensions (76) that emerges from the arms (37) towards the inside of the fork serves to permit rotation of the complex formed of the shaft (60), the fork of the handle (35) and said extensions (76) inside the circular housing formed of the opposing semicircles (68, 69) in the upper ends of the matching halves (12,.13) of the electric cleaner (10).

7. Multi-purpose electric cleaner (10) as in claim 5, characterized in that substantially at the centre of said shaft (60) of a cross-shaped transversal section, is a transversal locking disk (70) on whose edge are two radial notches (71, 72) the positions of which correspond to the two positions, respectively open and closed, of the handle (35), it being possible to lock said two positions by the inner tooth (91) of a slider (85) whose external head (84) translates parallel to the shaft (60) within a slit (18) formed at the upper end of the body (11) of the cleaner where the two halves (12, 13)of the cleaner's body match, said slider (85) having an internal support (88) in which is a cylindrical cavity (89) for a helical compression spring (90) that, by making contact with a bracket (96) in the body (11) of the cleaner (10), tends to keep the slider (85) and therefore the internal tooth (91), in one (72) or the other of the locking notches (71, 72) according to the desired position of the handle (35), spontaneous stability of said lock being assured by the spring (90) while release is easily obtained by pressing with the fingers of one hand on the external head (84) of the slider (85) in the direction opposite to that of expansion of the spring (90).

8. Multi-purpose electric cleaner (10) as in claim 1, characterized in that the motor (105) can be replaced by another (106) of a different power and size by simply reversing an upper stabilizing plate (100) that comprises a square tubular body (101) which, by means of its transversal baffle (102) forms two square tubular chambers (103, 104), superimposed and aligned, of equal area but of different depth, that open one on either side of said plate (100), to house a head (108) in which is a cavity of a size to correspond to the head of the motor (105, 106) so that according to which motor (105, 106) is mounted in the appliance (10) and therefore according to its length, the plate (100) is inserted in the body (11) of the cleaner (10) in one position, or in another position overturned in relation to the first, so that the chamber (103) of greater depth corresponds to the greater length of the motor (105).

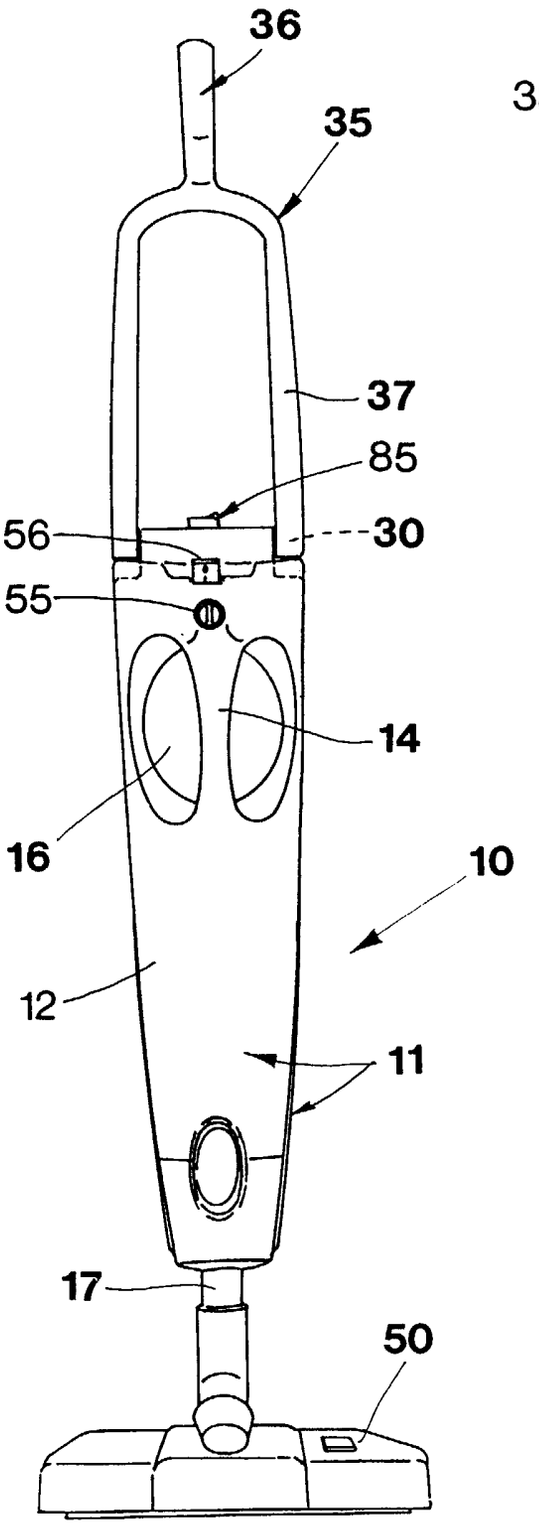
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Fig. 2

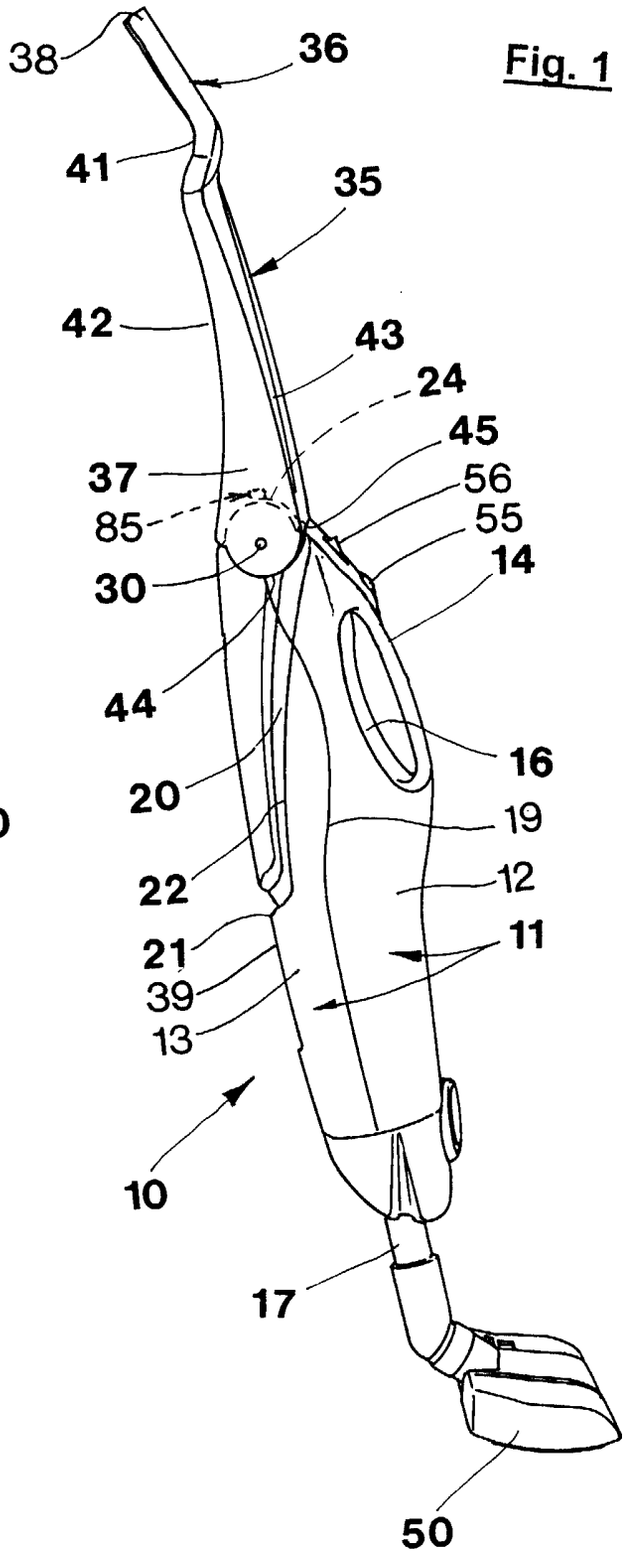
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Fig. 1

Fig. 3

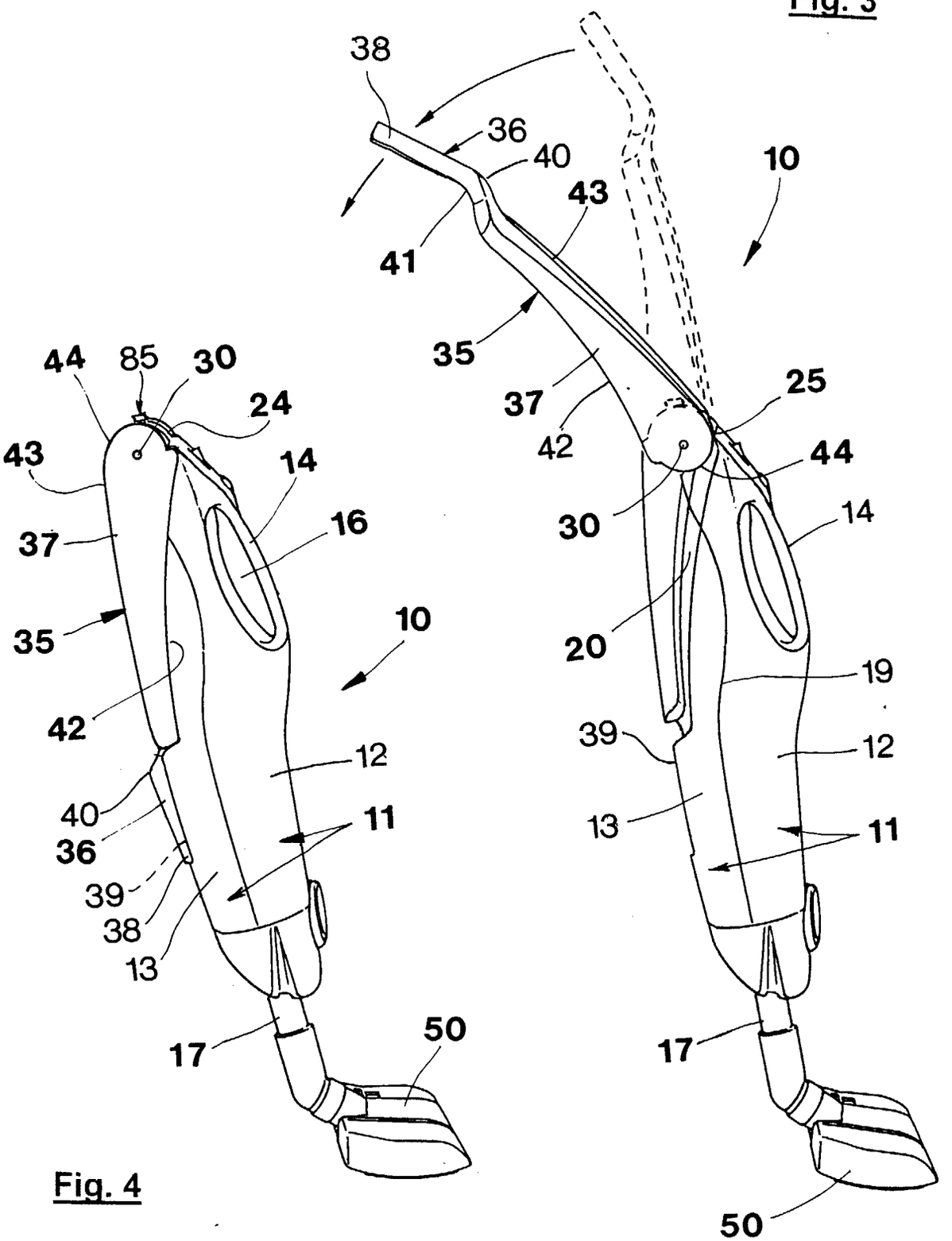
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Fig. 4

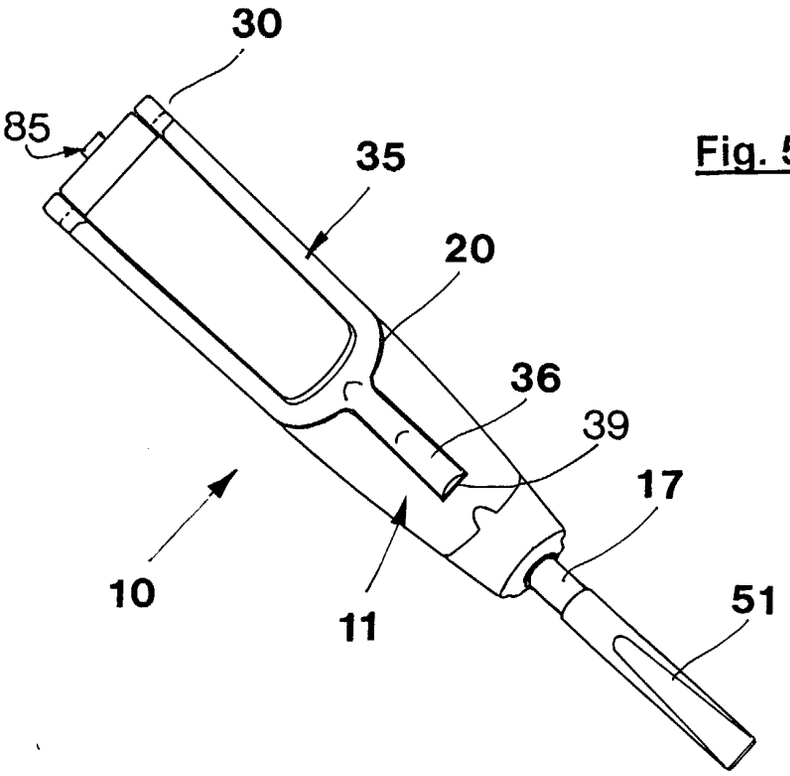

Fig. 5

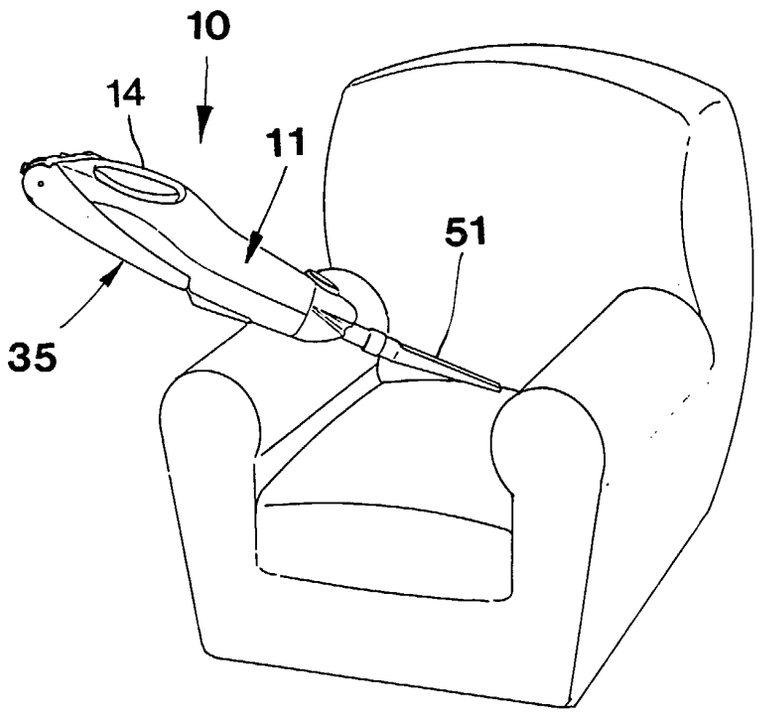

Fig. 6

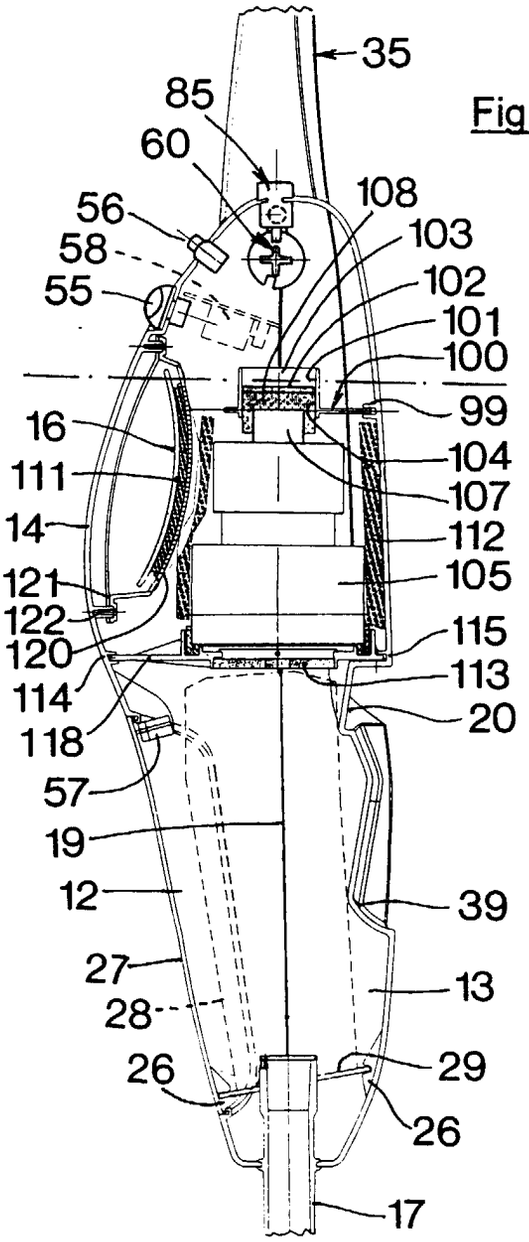

Fig. 7

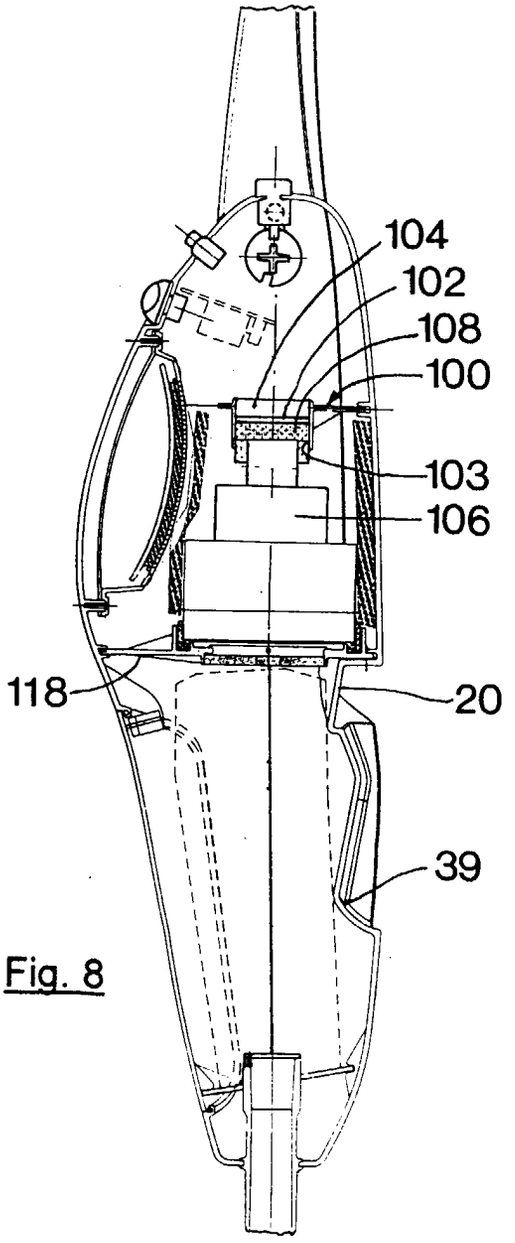

Fig. 8

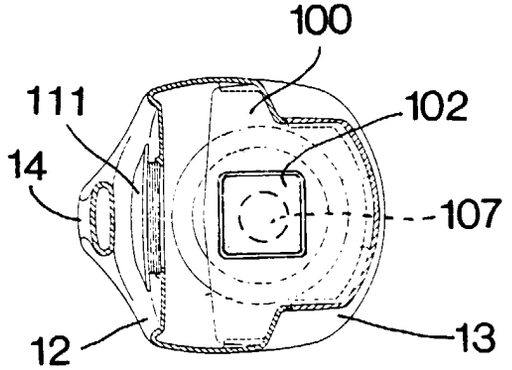

Fig. 9

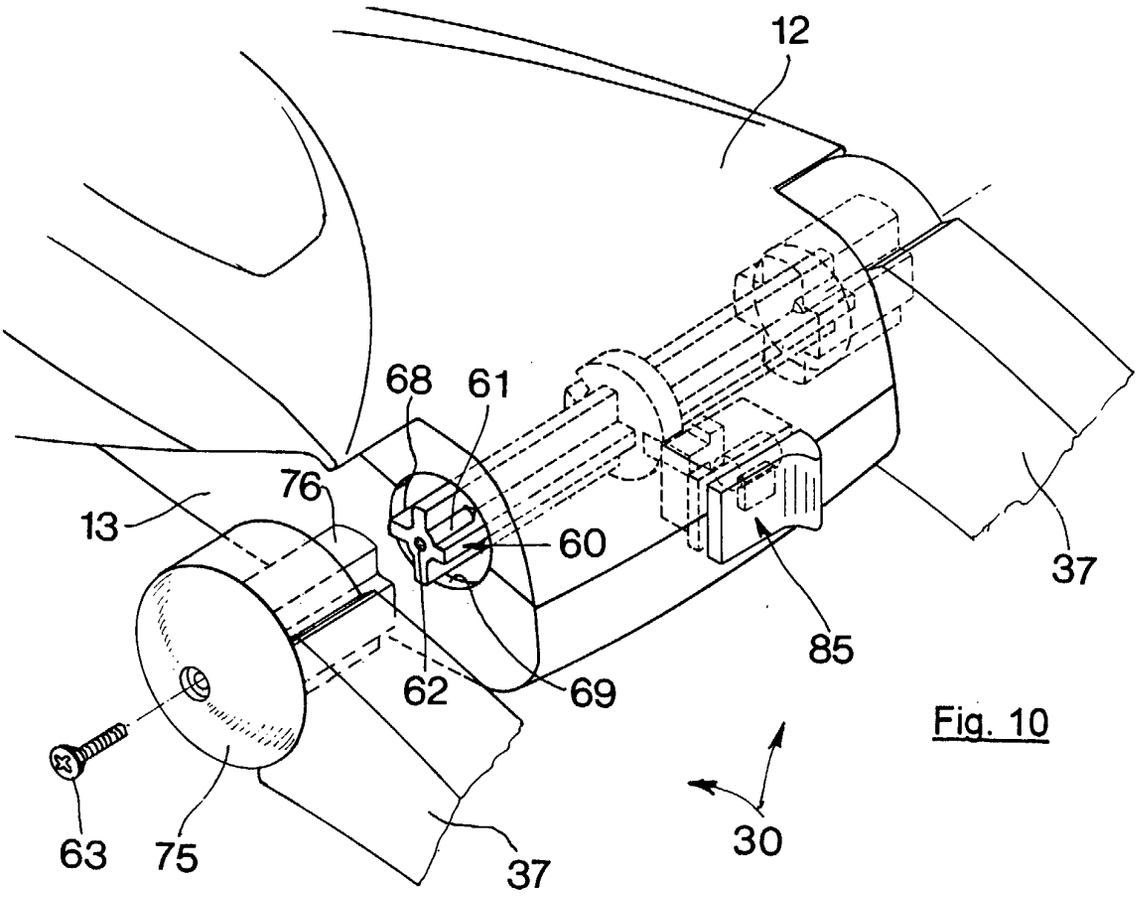
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Fig. 10

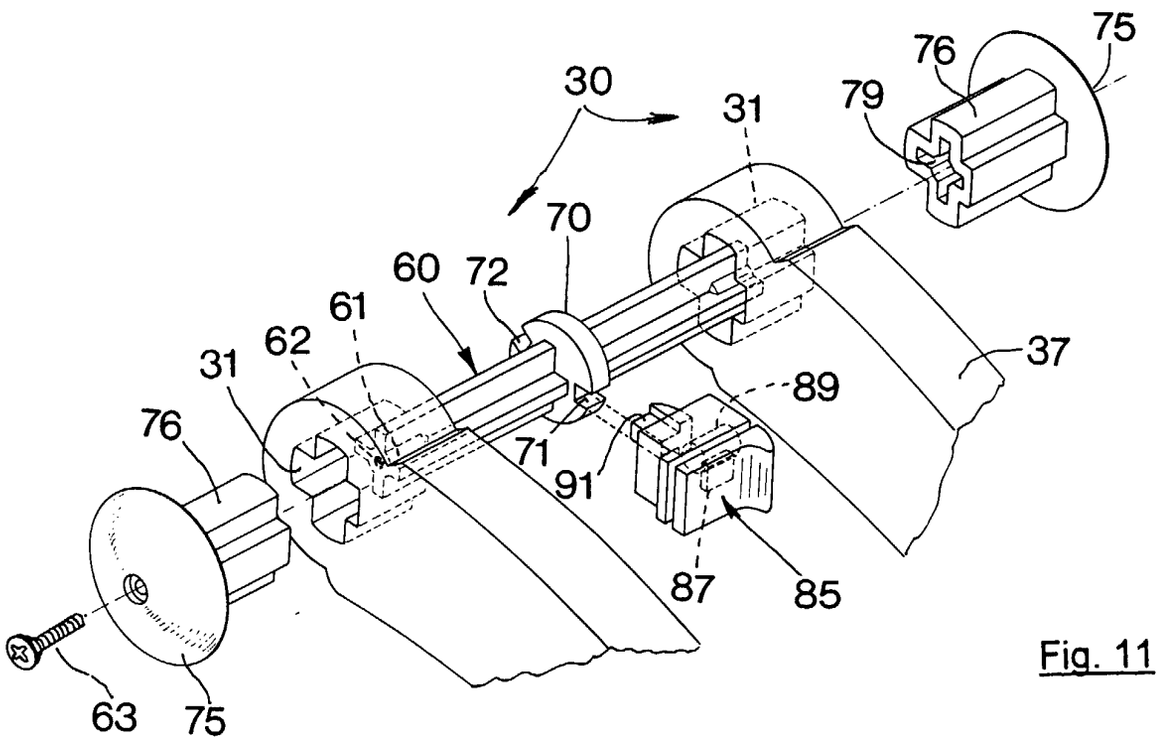
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Fig. 11

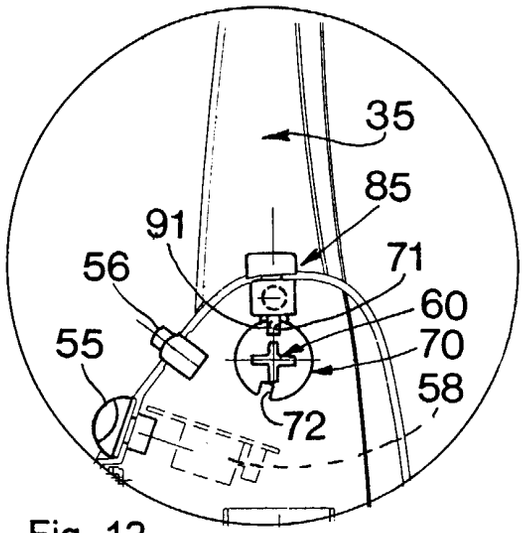

Fig. 12

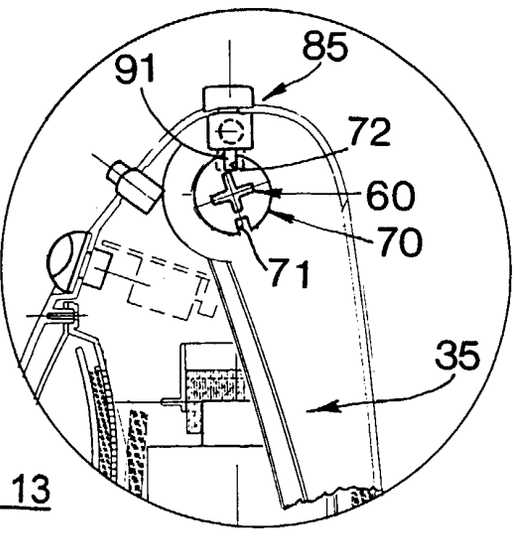

Fig. 13

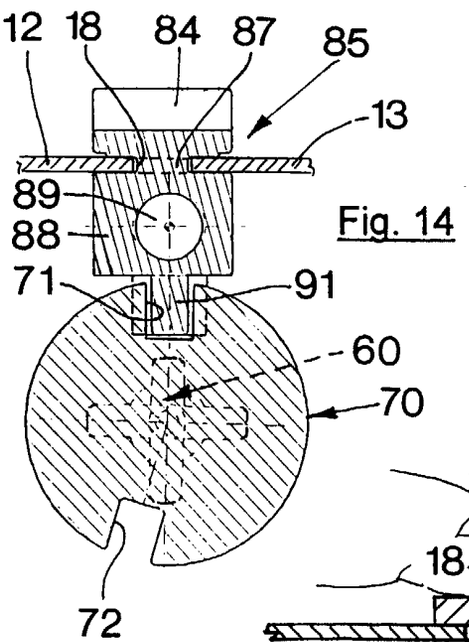

Fig. 14

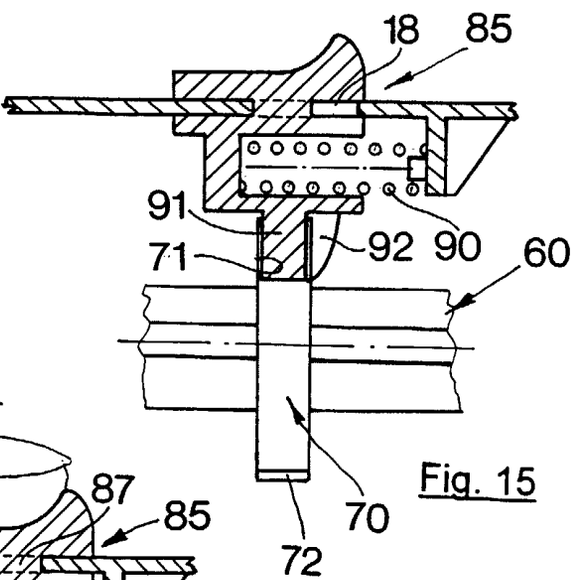

Fig. 15

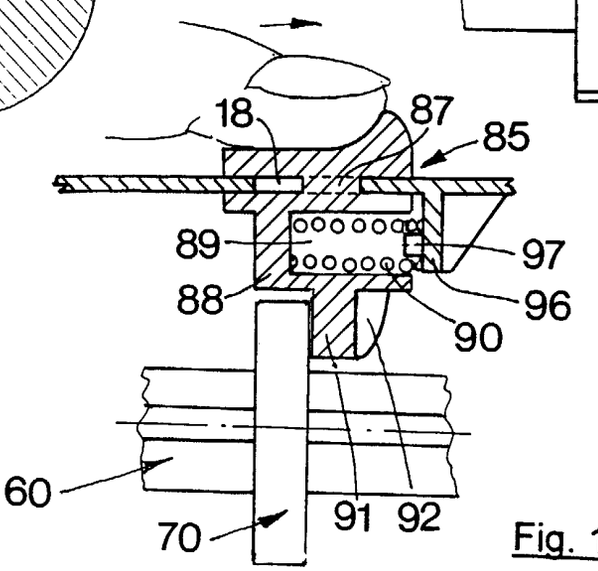

Fig. 16