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(71) Applicant: **Grainger, John Edward
Stowmarket IP14 3AT (GB)**

(72) Inventor: **Grainger, John Edward
Stowmarket IP14 3AT (GB)**

(74) Representative: **Copp, David Christopher et al
Dummett Copp,
25 The Square,
Martlesham Heath
Ipswich IP5 3SL (GB)**

(54) **Anchor roller**

(57) An anchor roller 20 for use on a boat to indicate the length of anchor cable paid out has a sheave 28 which will be mounted for example in a stemhead fitting 18. The sheave is arranged so that it rotates with the

anchor cable as the cable is being paid out or pulled in. A counter mechanism counts the number of rotations of the sheave and has a readout 24 as part of the stem-head fitting itself.

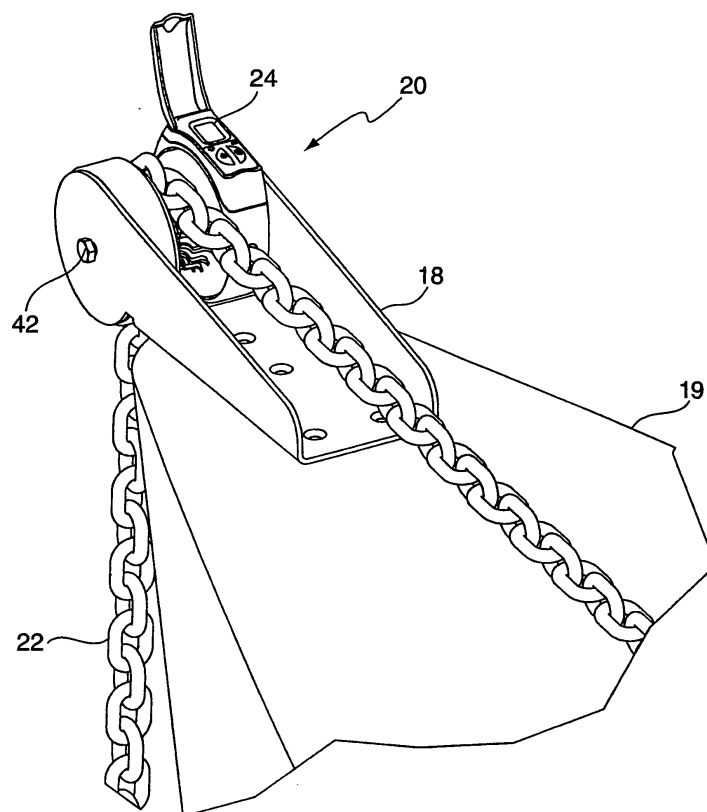


Fig. 2

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Description

[0001] The invention relates to an anchor roller for guiding anchor cable from the bow (or stern) of a boat.

[0002] Boats are moored to an anchor sometimes using rope, sometimes using chain, sometimes using a combination of these two. In this specification, the mooring connection between the anchor and the boat with which the anchor is being used will be referred to as 'cable' but this is not to be taken as implying any limitation to the physical nature of the connecting member.

[0003] It is well known to have a roller at the bow of a boat over which the anchor cable is guided when the boat is being anchored. The roller both acts to provide a location point for the anchor cable at the bow of a boat, so that the take off point stays at the bow at all times and to provide a cable guide when the cable is pulled in or let out. When a boat is to be anchored, the anchor is lowered over the side until enough cable is paid out to make sure the anchor is properly bedded in the sea bed. The length of cable to let out is a function of a number of factors, including the depth of the water, the nature of the sea bottom and any tidal rise and fall. It is therefore always important to know how much cable has been let out between the boat and the anchor. Many yachtsmen mark their anchor cable at regular intervals with sequentially coloured markings (usually paint) and then count these markings as the cable is let out.

[0004] According to the invention, there is provided an anchor roller for guiding anchor cable from the deck of a boat, wherein the roller includes a sheave from which the anchor cable passes directly off the boat, and a counter mechanism for measuring the length of the cable that has been let out, and wherein the counter mechanism is powered by batteries mounted within the anchor roller.

[0005] The roller is preferably a bow roller mounted in a stemhead fitting.

[0006] By positioning a counter as part of the roller, an accurate indication of the length of cable paid out is available to the person on the deck of the boat, as the cable is being paid out.

[0007] The counter mechanism is preferably powered by batteries mounted within the roller.

[0008] The roller may be adapted to be mounted between two cheeks of a stemhead fitting, and can have compliant faces which make contact with the cheeks and compensate for different spacings between the cheeks and/or a lack of parallelism. As the roller may be retrofitted into existing stemhead fittings, the ability to cope with fittings of differing dimensions can be important.

[0009] Alternatively, the roller may be carried between two cheeks in a bracket adapted to be mounted directly to a deck.

[0010] The compliant faces can be bodies of polyurethane or similar plastics in which metal skeletons are embedded, with the bodies being received within axially

open recesses in roller cheeks so that when a bolt is tightened between the outside of a stemhead fitting and the metal skeleton, the polyurethane body is compressed and expands radially to frictionally grip inner surfaces of the roller cheek recesses.

[0011] The counter mechanism preferably comprises a magnet mounted near the circumference of the roller sheave, and a proximity detector in the roller cheek, so that the length of cable paid out over the sheave is indicated as a function of the number of revolutions of the sheave. There may be two sensors on the roller cheek, so that the counting mechanism can detect the direction of rotation of the sheave.

[0012] The sheave may be configured in the manner of a chain gypsy, ie with indentations in the sheave surface to positively engage with each chain link. Preferably however the sheave has a surface adapted to make frictional contact with the cable (rope or chain), and bearings so that the sheave will be driven in rotation by the cable passing over it. The sheave may have a central circumferential groove for accepting thin line, and outer circumferential surfaces either side of the groove, against which chain or thicker line will lie. All of the surfaces can have friction enhancing ribs.

[0013] The counter mechanism may include circuitry to switch the mechanism on as soon as any rotation of the sheave takes place.

[0014] The counter mechanism can also include a calibration facility to fine tune the counter reading against the actual chain length paid out. This facility can be used when the sheave is used with particularly thick or particularly thin cable.

[0015] The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a representation of a yacht at anchor;

Figure 2 is a perspective view of a bow fitting incorporating a bow roller according to the invention;

Figure 3 is a cross-sectional view of the bow roller of Figure 2;

Figure 4 is a perspective exploded view of the bow roller;

Figure 5 is a view of the bow roller from above;

Figure 6 is a perspective view of the bow roller from above;

Figure 7 is a cross-sectional, perspective view of an elastic body which forms part of the bow roller;

Figure 8 is a perspective view of a second embodi-

ment; and

Figure 9 is a schematic illustration showing operating modes.

[0016] Figure 1 shows a yacht 10 moored via an anchor 12 to the river or sea bed 14. The anchor 12 is attached to the yacht 10 by a cable 16 which may be rope or chain or both. The cable 16 passes along a bow fitting 18 located at the bow of yacht 10, and over a bow roller.

[0017] Figure 2 shows more details of the bow fitting 18 which is fitted at the extremity of the bow of the yacht 10. The bow fitting comprises a folded stainless steel channel 18 which is mounted on the front of the deck 19 of the yacht 10. At the extreme front end of the channel 18 where it overhangs the bow of the yacht, a bow roller 20 is mounted by bolts 42 which pass through the sides of the channel 18 into threaded bushes in the bow roller. The roller allows the cable 22 to run freely both from the yacht into the water when the anchor is being lowered, and from the water into the yacht, when the anchor is being hoisted.

[0018] The bow roller has a display unit at 24 which displays the length of cable paid out, in a manner to be described below.

[0019] Figure 3 shows the bow roller 20 in section. The roller comprises a pair of cheeks 26a, 26b, and a sheave 28 mounted on bearings 30 between the cheeks 26. The sheave 28 is constructed so that it will make frictional engagement with the links of a conventional anchor chain and/or with an anchor rope, so that the sheave rotates in register with the anchor chain or rope as it is paid out. To promote the frictional engagement, the sheave has high-friction ribs 29 moulded into the sheave surface. The sheave may be moulded from glass-filled nylon, and the ribs can be of polyurethane, moulded into the sheave.

[0020] It will also be noted that the sheave has a central circumferential groove 31, into which thinner roles will run, and main sheave surfaces 33 either side of the groove, so that thicker ropes and chain can run over the sheave. Mounting the sheave 28 on bearings 30 helps to ensure that there is no resistance to rotation of the sheave, so that the sheave rotates at the same speed as the cable passing over it.

[0021] At one point around its circumference, the sheave 28 carries a magnet 32 (Figure 4), and the cheek 26b has a sensor which detects each time the magnet 32 completes a revolution. Appropriate circuitry converts this into a reading on the display 24.

[0022] The cheeks 26 are held in position within the channel 18 by moulded elastic bodies 34 on each side. One of these bodies 34 is shown, in section, in Figure 7. They comprise a body of resilient plastics, typically polyurethane, within which is embedded a sheet metal skeleton 36. A threaded bush 38 is attached to the metal skeleton 36. The outer surface of the body 34 has moulded pimples 40 which will make contact with the

internal cheeks of the channel 18.

[0023] In use, the bolts 42 (with their washers 44) are separated from the elastic bodies 34, and the roller is positioned between the two cheeks of the bow fitting 18.

The bolts 42 are then replaced through the cheeks and tightened into threaded bushes 38. Tightening these bolts will produce contact between the pimples 40 of the bodies 34 and the channel 18, and will also compress the elastic material of the bodies between the skeleton 36 and the adjacent cheek of the channel 18. This will result in a radial expansion of the elastic bodies 34 which will itself produce frictional contact with walls 46 within the cheeks 26, so that the cheeks 26 will be held against rotation relative to the bow fitting 18.

[0024] The use of these moulded bodies 34 ensures that the cheeks 26 will be correctly held relative to the fitting 18, irrespective of any manufacturing tolerances of the channel 18. This fixing method can accommodate variations in spacing between the cheeks of the channel 18, and variations in parallelism between these cheeks.

[0025] The exploded view of Figure 4 shows the various components of the bow roller. The cheeks 26a, 26b are plastics mouldings with internal recesses for receiving the moulded elastic bodies 34. When bolted up, the elastic bodies 34 will expand to make frictional contact with the peripheral internal walls 46 of these internal recesses. The recesses are not circular, and the part of the circumference of the cheeks 26 not occupied by the elastic bodies provides, on one cheek 26b, accommodation for a counting mechanism generally indicated at 48.

[0026] The counting mechanism comprises a counter housing 50 with a recess 52 for receiving a circuit board 54. The circuit board 54 also carries a battery 56 to power the circuitry. An LCD display unit 58 has a cover panel 62 with a window 64 which fits over the display unit 58. A gasket 66 provides water tightness.

[0027] The counter housing 50 is secured to the cheek 26b by screws 68, and a hinged cover 70 completes the assembly of the counting mechanism 48.

[0028] On the opposite cheek 26a, the corresponding space is enclosed by a cover moulding 72 secured by screws 74. It will thus be seen that the cheeks 26a and 26b are identical, i.e. they are non-handed and are the same moulding.

[0029] The sheave 28 is also a moulded part and may for example be of glass-filled nylon. A socket 76 is provided in one end face of the sheave for receiving a magnet 32. As previously mentioned, the magnet 32 and the circuitry on the circuit board 54 will work together to trigger a signal on each revolution of the sheave 28 to count the length of cable which has been paid out. The counter mechanism 48 preferably has two sensors sensitive to the passing of the magnet 32, so that the direction of rotation of the sheave can be determined.

[0030] The sheave 28 is mounted on a spindle 80, and the spindle is held in place between the cheeks 26a and 26b by flush head bolts 82. The spindle 80 has flats at

each end which engage in corresponding non-round recesses 84 on the inside faces of the cheeks 26.

[0031] As can be seen in Figure 5, the outer cover panel 62 of the counter mechanism has a two buttons 86 and 88. the primary function of the button 86 is to switch the mechanism on and off, and the primary function of the button 88 is to switch a back light on and off to illuminate the display 24 through the window 64, in poor light conditions. The ON/OFF button 86 can be pressed to activate the display 24. The circuitry may include an automatic OFF function to switch off the display after a predetermined time delay.

[0032] The buttons 86 and 88 can also be used to activate a secondary menu to enter a calibration routine and to carry out certain other tasks, as depicted in Figure 9.

[0033] The circuitry in the mechanism will be pre-calibrated for a particular chain/rope specification, but there may be a need for a user either to check this calibration or to adjust it slightly if the chain/rope being used is of a slightly different specification. To achieve this calibration, both buttons 86 and 88 are pressed together until the display flashes. Then, the button 86 assumes a '+' function and the button 88 a '-' function so that these buttons can be used to calibrate the mechanism. To do this, a known length of rope or chain is run over the roller. If the length displayed by the counting mechanism is greater than the actual length paid out, then the minus button is pressed until the two figures agree. If the reading is less than the actual length paid out, then the plus button is pressed in the same way.

[0034] The bow roller described can be readily retrofitted at the bow of an existing boat and requires no cables or wires. It is a complete operative unit in itself. To fit the unit it is only necessary to fasten the two bolts 42 through the cheeks of a suitable bow fitting.

[0035] The roller can also be deck mounted, as shown in Figure 8. The roller will then be mounted on the deck of a boat, between an anchor winch and a bow roller or other stemhead fitting, using bolts 90 passing through apertures 92 in cheeks 26. The apertures may be present also in the previously described embodiment, so that one cheek moulding can be either bow mounted (Figures 1 to 7) or deck mounted (Figure 8). The head of the bolt 90 can be engaged in an anti-rotation moulding 94 so that the unit can be tightened down onto a deck by tightening a nut on the end of the bolt 90 below the deck. For this embodiment, a cradle 96 is provided to accommodate the curved shape of the cheeks 26, and a cap 98 closes the end face of the cheeks 26.

[0036] Although the roller has been described here for use as a bow roller, over which the anchor cable for the main anchor will be lowered, the roller can also be used at other positions on a boat, eg for lowering a kedge anchor over the stern of a boat.

[0037] The rollers described here provide a direct indication of length of cable paid out, exactly where that information is needed, i.e. right in front of the eyes of

the person paying out the anchor cable.

[0038] It would also be possible for the reading from the mechanism to be supplied to a remote position, eg in the cockpit of a boat or to a portable readout which can be carried on the person. This could be through hard wiring from the bow roller, or through a wireless link. If remote reading is preferred, the display at the bow may be omitted, but it could also be present to permit either local or remote reading.

Claims

1. An anchor roller for guiding anchor cable from the deck of a boat, wherein the roller includes a sheave from which the anchor cable passes directly off the boat, and a counter mechanism for measuring the length of the cable that has been let out, and wherein the counter mechanism is powered by batteries mounted within the anchor roller.
2. An anchor roller as claimed in Claim 1, which is adapted to be mounted in a stemhead fitting.
3. An anchor roller as claimed in Claim 2, wherein the roller has compliant faces which make contact with cheeks of a stemhead fitting and compensate for different spacings between the cheeks and/or a lack of parallelism.
4. An anchor roller as claimed in Claim 3, wherein the compliant faces are bodies of polyurethane or similar plastics in which metal skeletons are embedded, with the bodies being received within axially open recesses in roller cheeks so that when a bolt is tightened between the outside of a stemhead fitting and the metal skeleton, the polyurethane body is compressed and expands radially to frictionally grip inner surfaces of the roller cheek recesses.
5. An anchor roller as claimed in any preceding claim, wherein the counter mechanism comprises a magnet mounted near the circumference of the roller sheave, and a proximity detector in the roller cheek, so that the length of cable paid out over the sheave is indicated as a function of the number of revolutions of the sheave.
6. An anchor roller as claimed in Claim 5, wherein two sensors are provided on the roller cheek, so that the counting mechanism can detect the direction of rotation of the sheave.
7. An anchor roller as claimed in any preceding claim, wherein the sheave is configured in the manner of a chain gypsy.
8. An anchor roller as claimed in any one of Claims 1

to 6, wherein the sheave has a surface adapted to make frictional contact with the cable (rope or chain), and bearings so that the sheave will be driven in rotation by the cable passing over it.

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9. An anchor roller as claimed in Claim 8, wherein the sheave has a central circumferential groove for accepting thin line, and outer circumferential surfaces either side of the groove, against which chain or thicker line will lie. 10
10. An anchor roller as claimed in Claim 8 or Claim 9, wherein the sheave surfaces which can come into contact with the cable have friction enhancing ribs. 15
11. An anchor roller as claimed in any preceding claim, wherein the counter mechanism includes circuitry to switch the mechanism on as soon as any rotation of the sheave takes place. 20
12. An anchor roller as claimed in any preceding claim, wherein the counter mechanism includes a calibration facility to fine tune the counter reading against the actual chain length paid out. 25
13. An anchor roller as claimed in Claim 1, which is adapted to be mounted directly to a deck.
14. An anchor roller for guiding anchor cable from the bow of a boat, substantially as herein described with reference to any one embodiment shown in the accompanying drawings. 30

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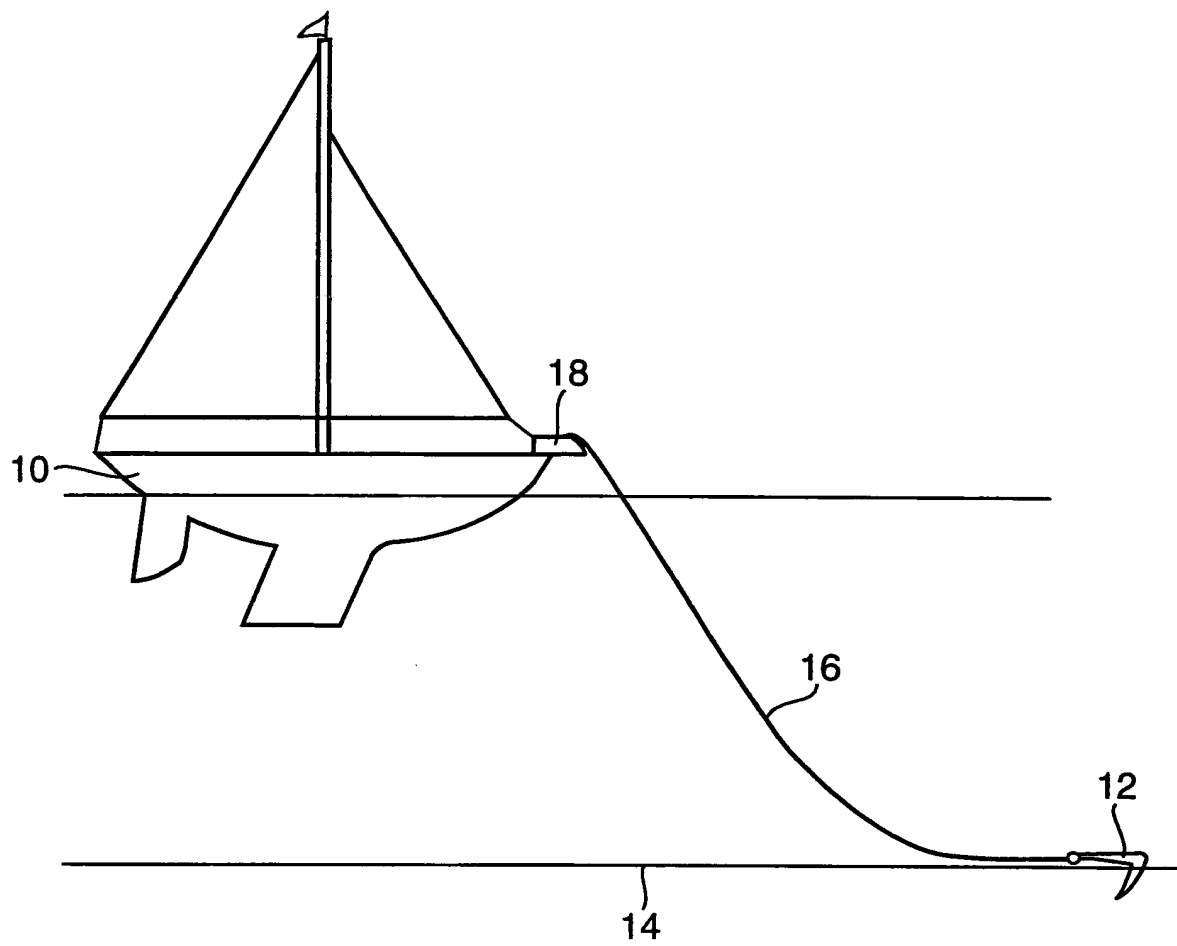


Fig. 1

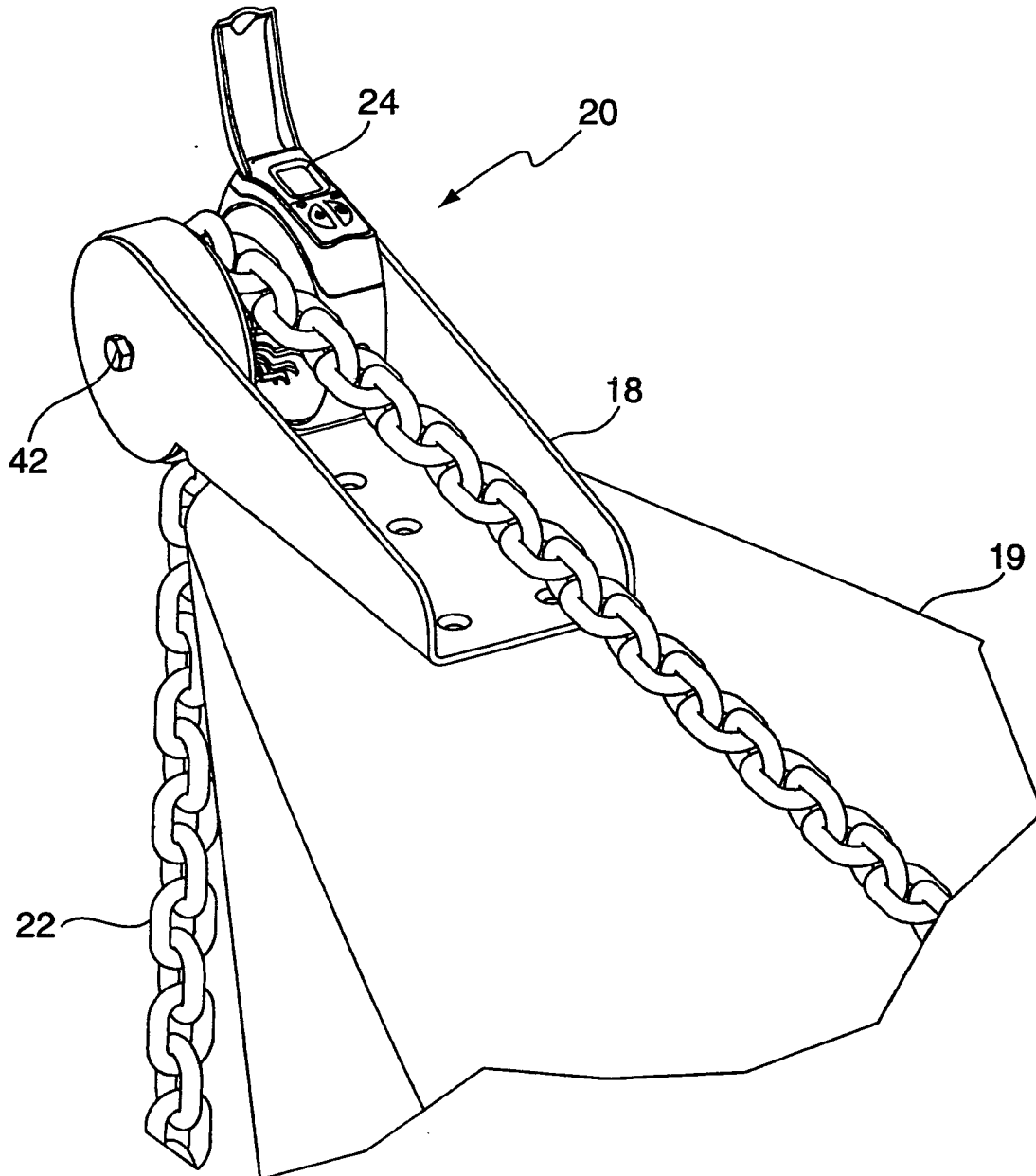


Fig. 2

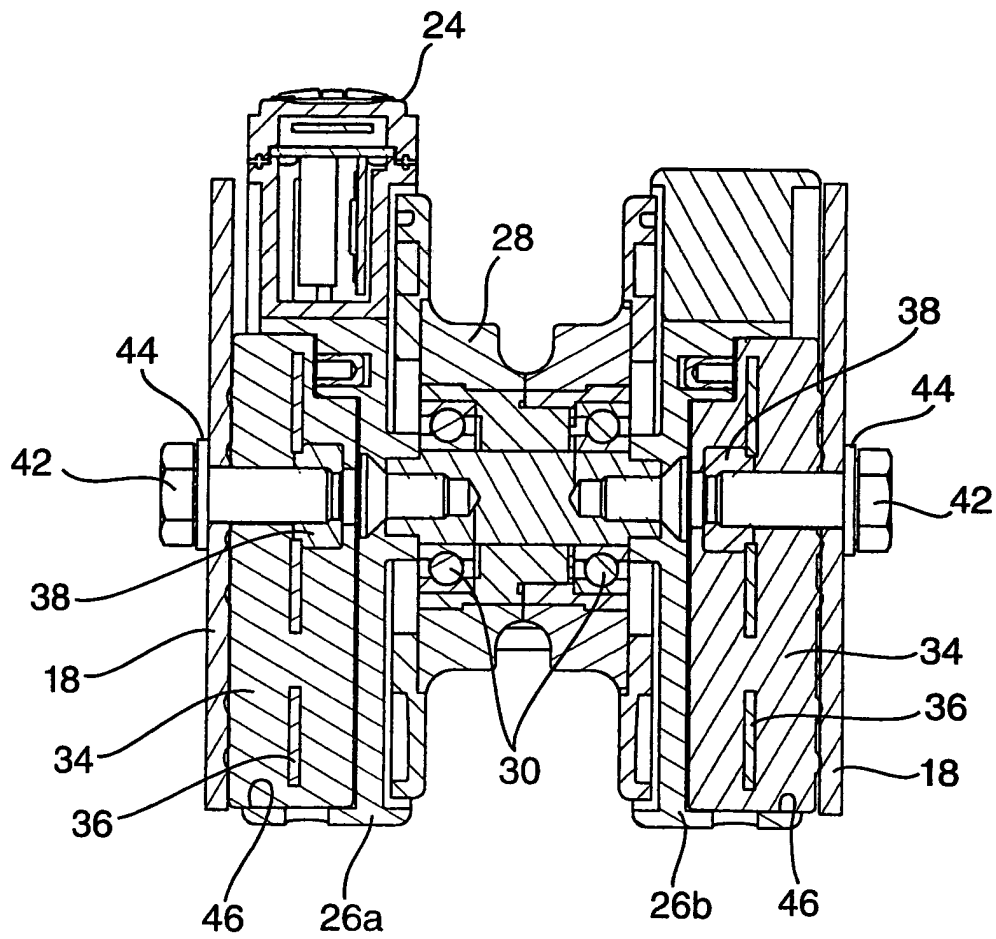


Fig. 3

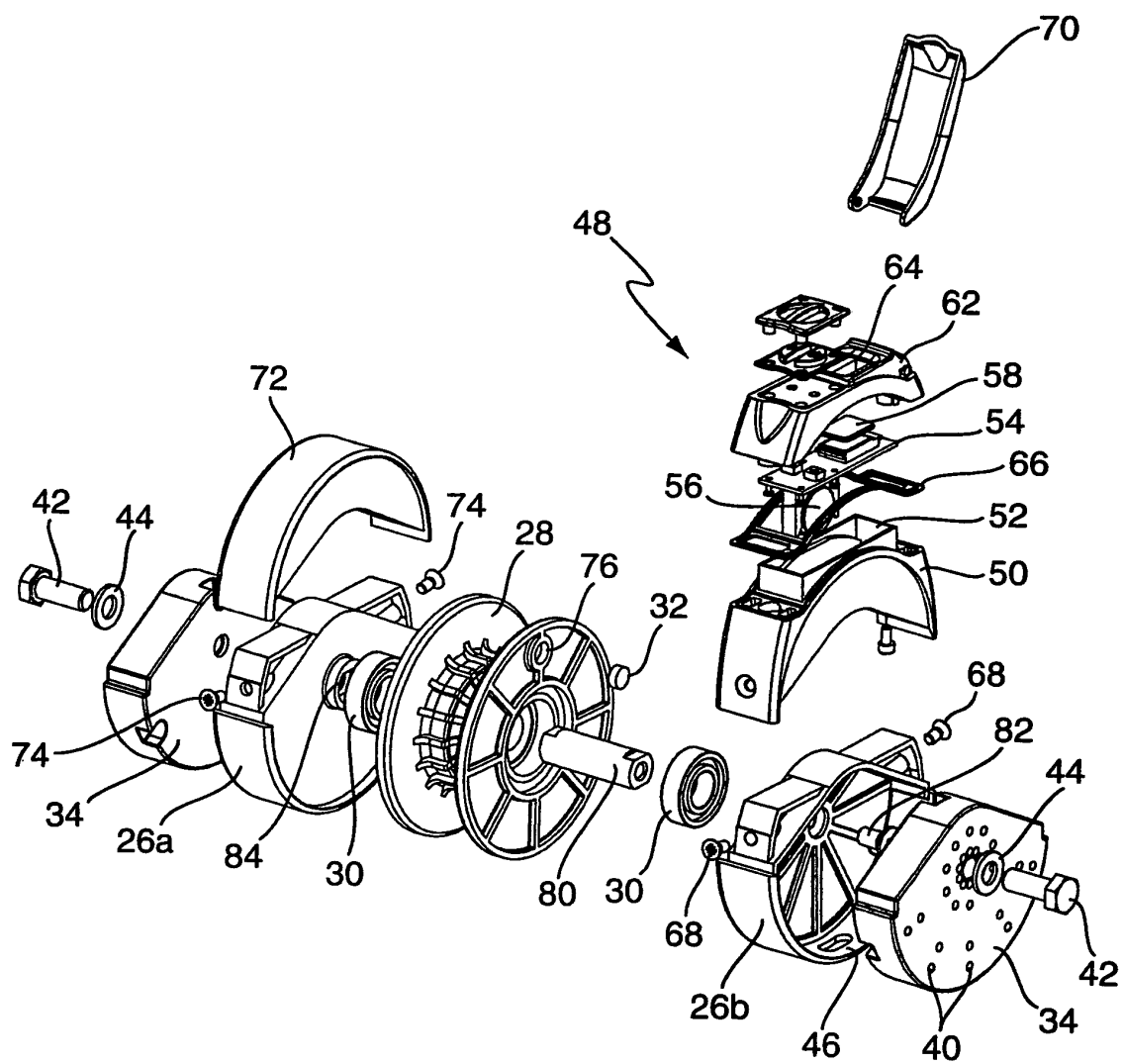


Fig. 4

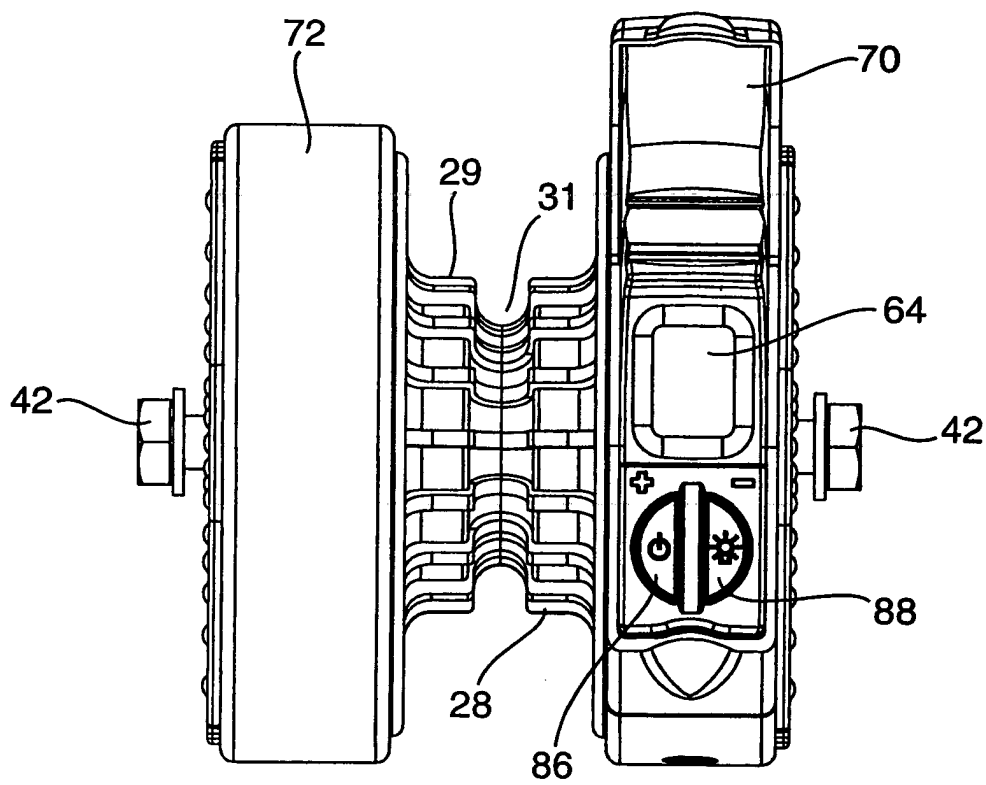


Fig. 5

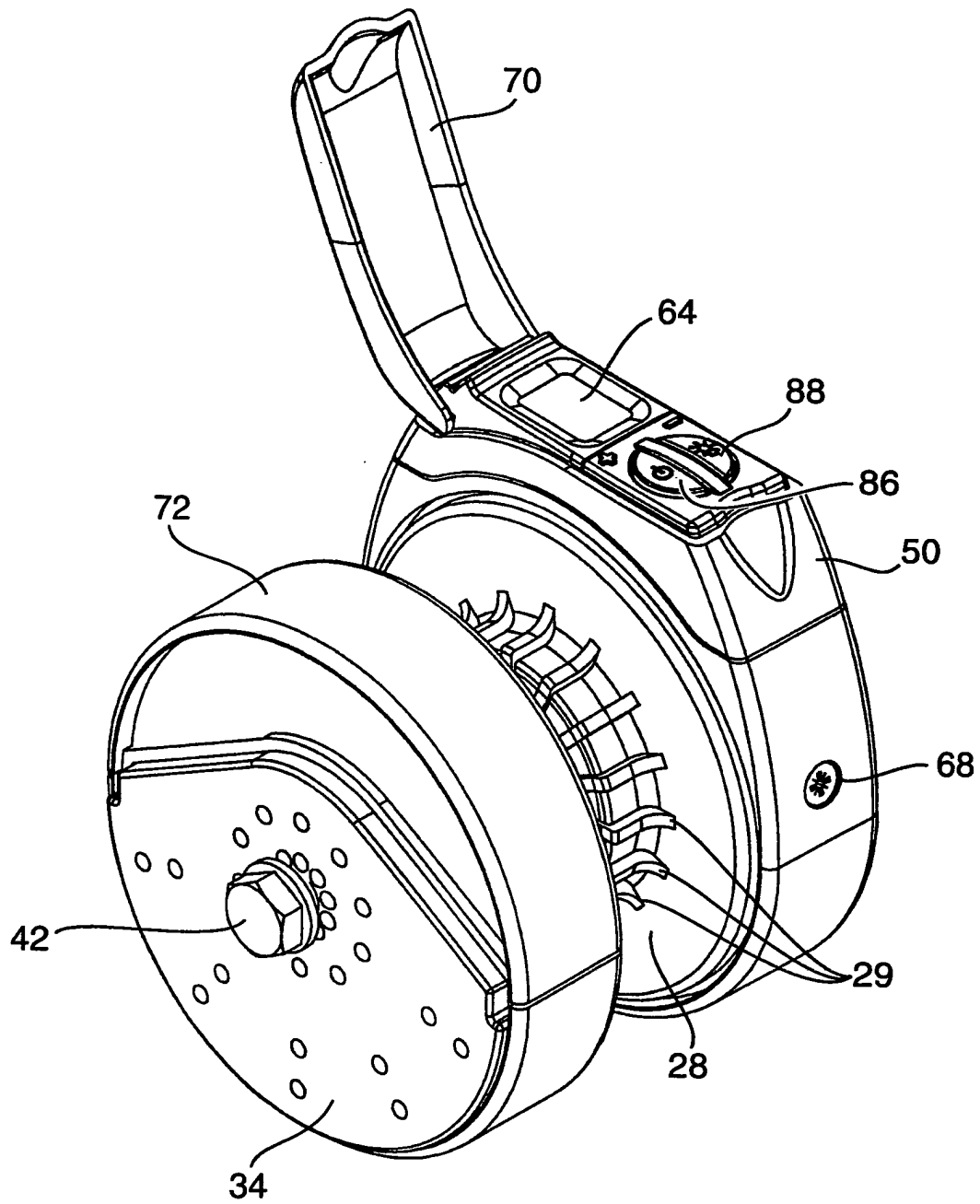


Fig. 6

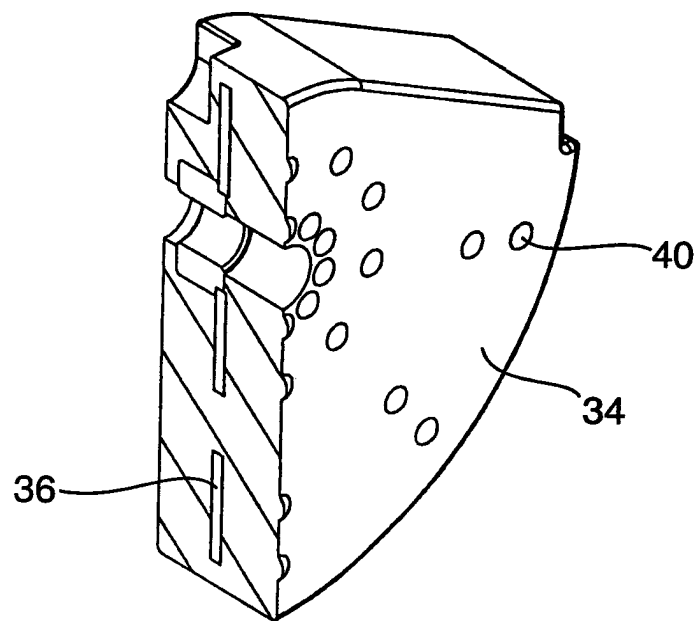


Fig. 7

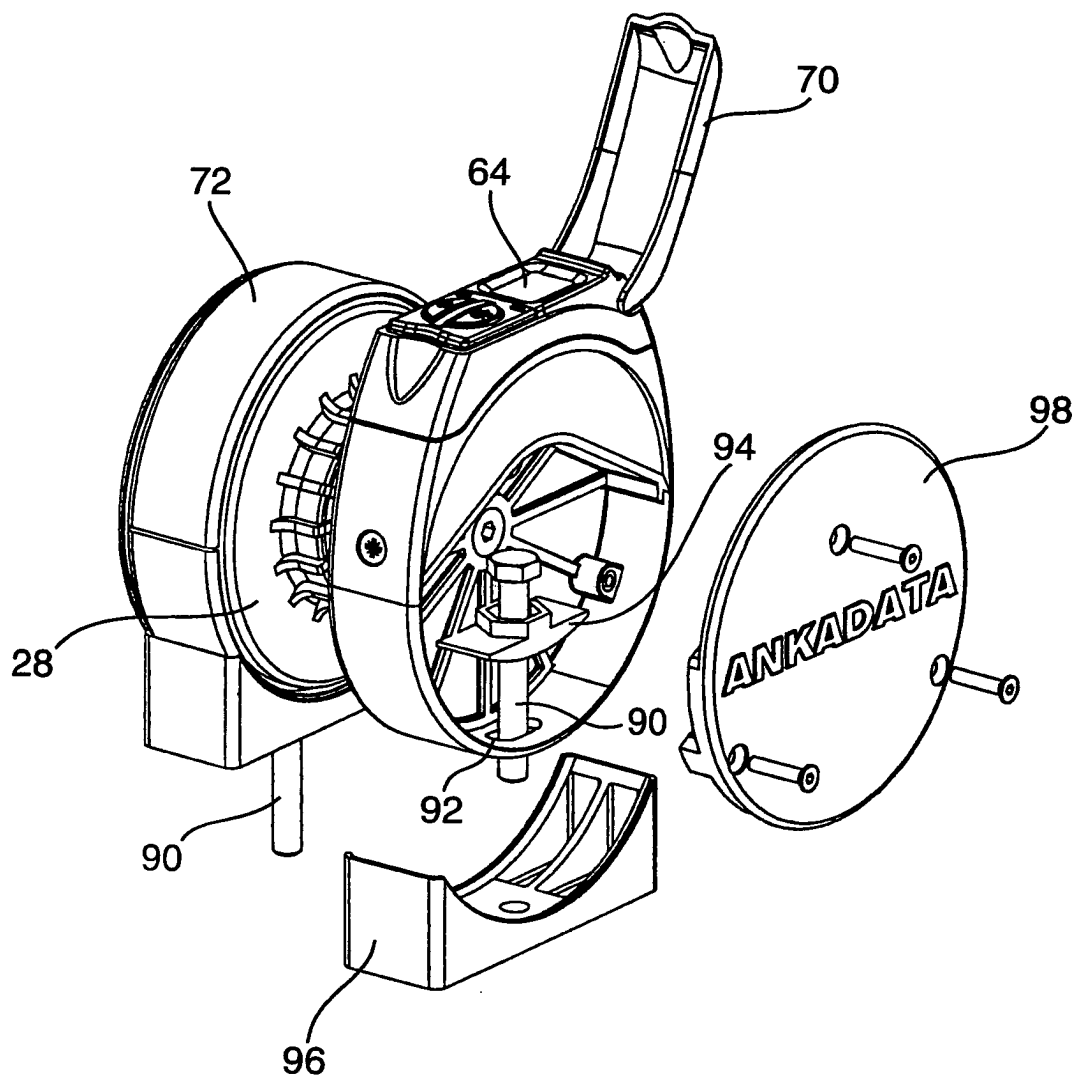


Fig. 8

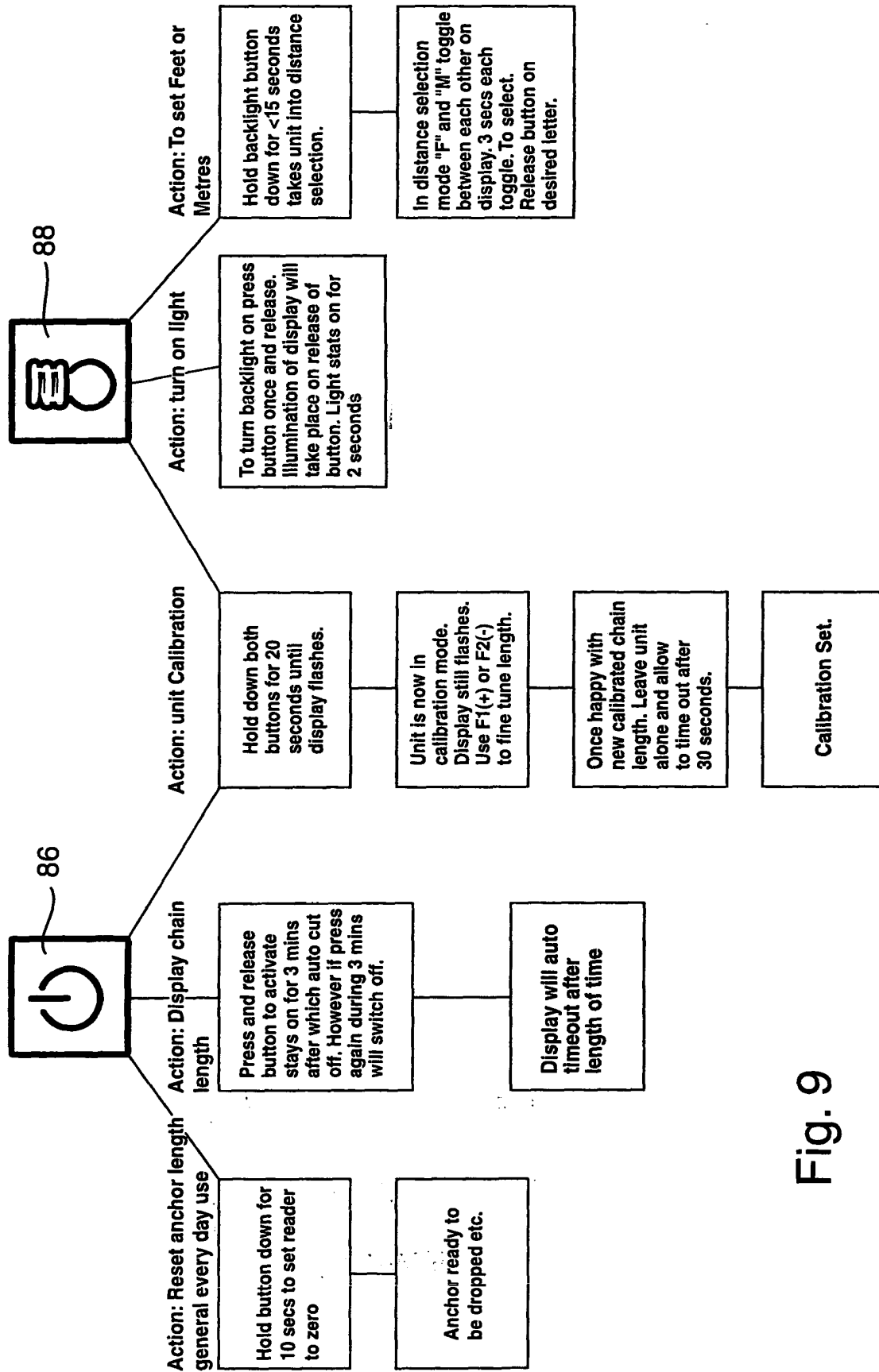


Fig. 9



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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 July 2004	Examiner Vermeulen, T
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