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(54) **Sun blind power unit with integral hand crank.**

(57) Sun blinds normally actuated manually by means of a hindle inserted in a crank (8) can be automated to open and close using the system for electric actuation of the blind by the action of separate push buttons (1) for opening and closing the blind by means of a motor (18) located externally on the blind with hand crank (8) positioned at the same end of the blind.

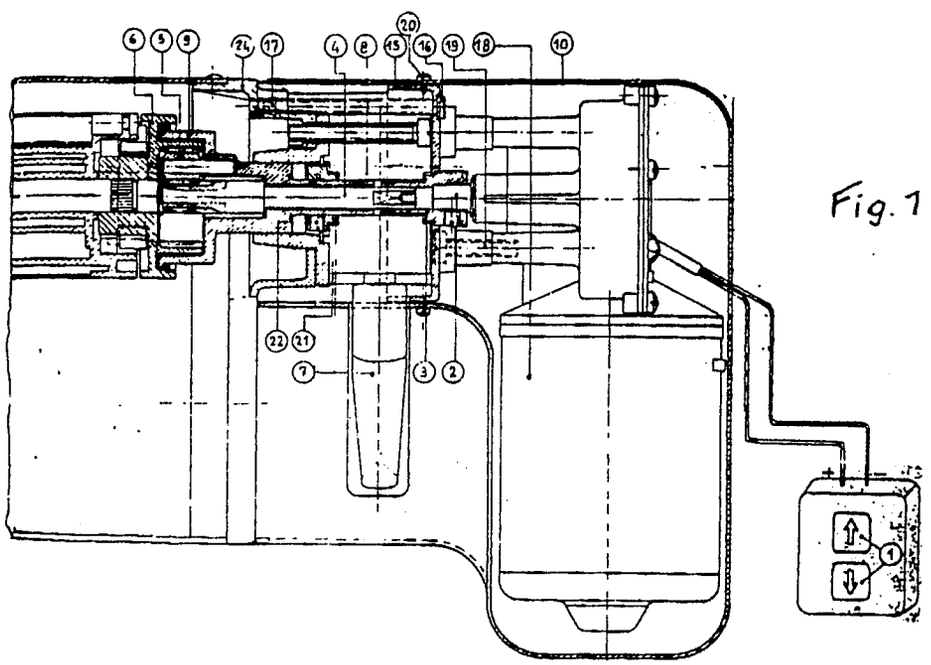

Fig. 1

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Sun blind power unit with integral hand crank

The invention relates to a sun blind power unit with integral hand crank provided with a manually actuated handle inserted in a crank. Such blinds, however, are disadvantageous, because they cannot be operated to automatically open and close them.

Therefore, the object underlying the invention is to provide an improved sun blind having a system which apart from permitting an conventional opening and closing the blind contents automatic electric actuation by the actuation of separate push buttons for opening and closing the blind. In this connection the device according the invention should also be retrofitted without having to modify the blind in any way. Fitting and operating the power unit should also be straight-forward and reduced to merely essential procedures.

This object will be solved by a system for automatic electric actuation of the blind by the action of separate push buttons for opening and closing the blind by means of a motor located externally on the blind with the hand crank positioned at the same of the two longitudinal ends of the blind.

Other advantages of the invention reside in that a limit switch is located near the close stop of the blind actuating a separate electric circuit to permit gentle closing in order to protect both the fabric of the blind and its constructive components, including the motor, from excessive forces which could otherwise result in damages.

Moreover, when the blind is opened the limit switch ensures that actuating the power unit longer than necessary will not result in the blind winding in the opposite direction. As soon as the position of maximum opening is attained further rotation of the blind pole is automatically prevented.

Further details of the invention can be gathered from the following description in connection with the drawings in which two embodiments of the invention are shown.

Fig. 1 is a longitudinal section of the right end of the housing of the sun blind power unit including the motor for driving the blind, constructed in accordance with the invention,

Fig. 2 is a longitudinal section of the right hand of the sun blind power unit without motor but only with a hand crank, constructed in an usual known manner,

Fig. 3 is an end cross-section view of the housing in accordance with the embodiment of the invention shown by Figure 1.

The complete sun blind power unit as shown in Fig. 1 is made up of an opening limit switch, a differential gear, a manual crank, a motor, a closing limit switch and a control unit.

The sequence in which these components function is clearer to understand by describing the movements involved in opening and closing the blind.

In order to automatically open the blind the operator presses the push button 1 and continues to hold it pressed as long as opening is proceeding. Should he release the push button, the blind will be held partially open. Rotation of the motor shaft 2 is imparted by the coupling 3 keyed to the end of the pinion gear 4 to rotate the three planetary gears 5 about the pinion, thus rotating also the flange 6 which is part of the limit switch by it being also geared to the three planetary gears in movement.

At this point the limit switch for opening located inside the tubular pole of the blind comes into action to permit opening of the blind.

If opening of the blind will not be accomplished automatically but manually the operator actuates the handle supplied in the kit, inserted in the lug 7 of the crank 8. This is used to turn the helical gear which causes the reason of its coupling to the square hole with the drum 9, rotation of the flange 6 which is part of the limit switch.

The planetary gears 5 rotating about the pinion gear 4 which remains stopped due to being rigidly secured to the motor shaft 2, render rotation impossible because of the coupling of the idle worm gear of the motor 18 itself.

In both cases of opening by motor action or by cranking the limit switch prevents rewinding of the blind in the opposite direction when the arms of the blind are fully open.

Opening in every case requires the safety device to be disinserted by manually actuating the lever located externally on the front of the veranda.

The motor 18 is secured by the screws 19 to the hood 15 which is secured to the veranda by screws 16 screwed into the seal insert 17 present in the side enclosures 24 of the veranda.

The closing procedure can also be accomplished automatically and manually. In order to close the opened blind automatically the operator presses the corresponding push button 1 and continues to hold it pressed as long as closing is proceeding. Should he release the push button, the blind will halt partially closed.

The interaction of the components of the system is identical to that already described in the opening phase. Merely the sense of direction is the opposite. Near to the fully closed position the edge of the blind actuates the limit switch 23.

The electric circuit contained in the control unit reduces the voltage of the power supply from 12V DC to approximately 8V DC, thus reducing the power output of the motor 18. This decelerates the closing speed and deminishes the closing torque. Even if the operator wrongly reacts or should accidently press the wrong button in attempting to fully close the blind (either opening or closing) the motor will thus have no effect, by not having sufficient torque.

If the blind should be operated manually, then acutation of the crank 8 and functioning of the system are the same as described in the opening phase. Merely the sense of direction is the opposite. In both cases of automatic or manual closing the safety device prevents accidental opening.

The cover 10 which is secured to the hood 15 by screws 20 protects the system from dust and facilitates removal and assembly for inspection of all components and maintenance.

Figure 2 shows the assembly of the blind in standard version without the power unit, the blind being prepared for installation of the unit.

The spacer 21 which can be adjusted by means of the screw 22 is used to eliminate any play in the blind resulting from any back lash in mating of the gears in the components.

Thus, the above-mentioned sun blind power unit apart from permitting conventional opening and closing the system consents automatic electric actuation by the actuation of separate push buttons for opening and closing. The unit requires 12V DC supply and thus permits connection to a battery which can be installed together with the sun blind.

In the second version (Fig. 2) the device can also be retrofitted without having to modify the blind in any way. Fitting and operation of the power unit is also straight-forward and reduced to merely essential procedures.

A limit switch located near the close stop of the blind actuates a separate electric circuit to permit gentle closing to protect both the fabric of the blind and its constructive components, including the motor, from excessive forces which could otherwise result in damage. When the blind is opened the limit switch ensures that actuating the power unit longer than necessary will not result in the blind winding in the opposite direction. As soon as the position of maximum opening is attained further rotation of the blind pole is automtically prevented.

Claims

1. Sun blind power unit with integral hand crank provided with a manually actuated handle inserted into the hand crank (8), characterized by a system for automatic electric actuation of the blind by the action of separate push buttons (1) for opening and closing the blind by means of a motor (18) located externally on the blind with the hand crank (8) positioned at the same of the two longitudinal ends of the blind.

2. Sun blind power unit according to claim 1, characterized in the provision of an opening limit switch incorporated in the winding pole of the blind and a closing limit switch by means of a micro switch actuated by the blind itself.

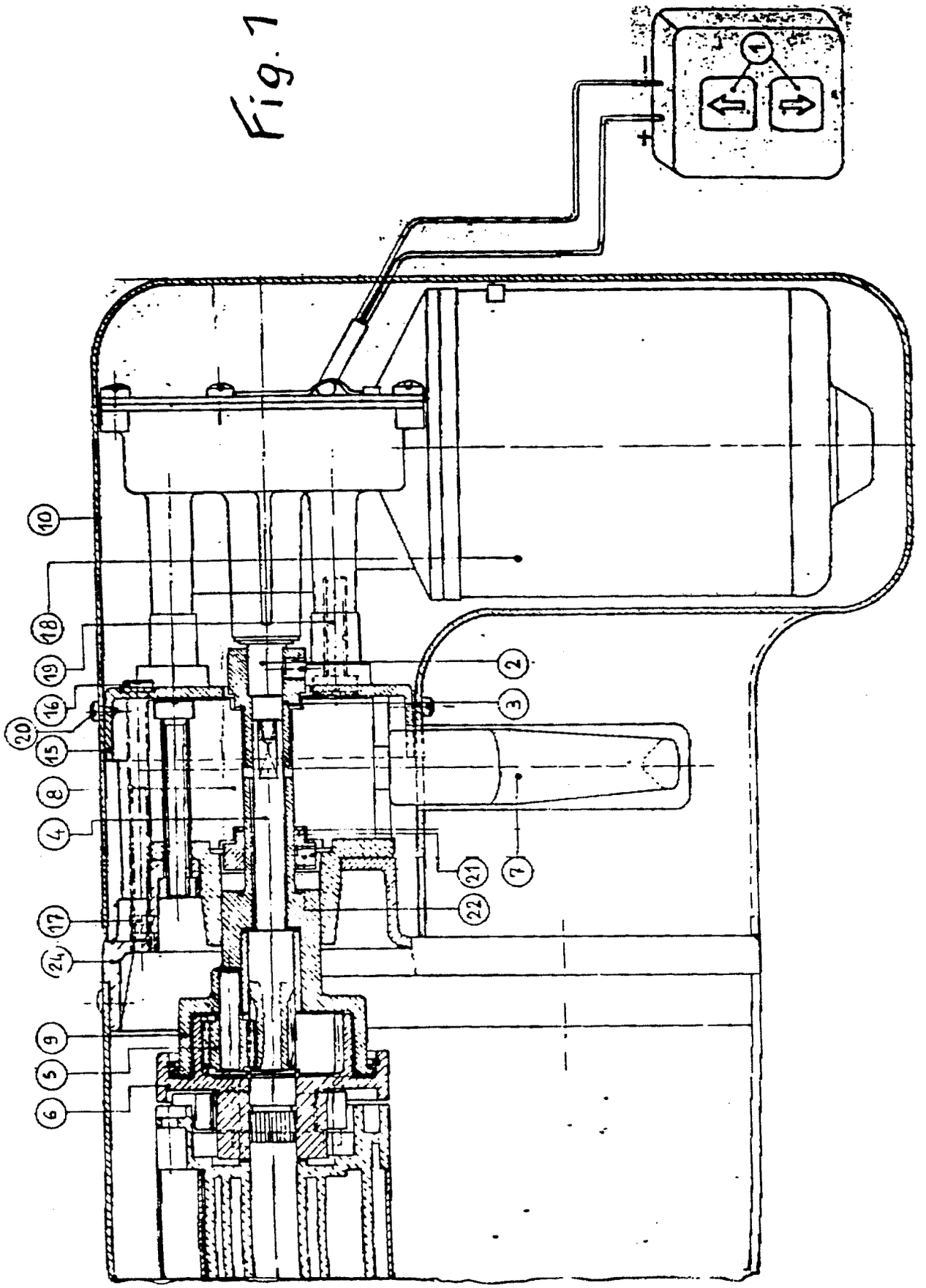
3. Sun blind power unit according to claim 2, characterized in that the closing limit switch changes the power output of the motor by means of an electric circuit incorporated in the control unit for fully automatic and safe handling even when wrongly operated accidentally by the operator.

4. Sun blind power unit according to claim 3, characterized in that the closing limit switch actuating the electric circuit permits gentle closing of the blind to protect both the fabric of the blind and its constructive components including the motor from excessive forces damaging the construction.

5. Sun blind power unit according to claim 2, characterized in that the opening limit switch ensures that actuating the powerd unit longer than necessary will not result in the blind winding in the opposite direction by preventing automatically further rotation of the blind pole as soon as the position of maximum opening is attained.

6. Sun blind power unit according to one of the claims 1-5, characterized by an optimum integration of all components of the system to consider it a single entity.

Fig. 1



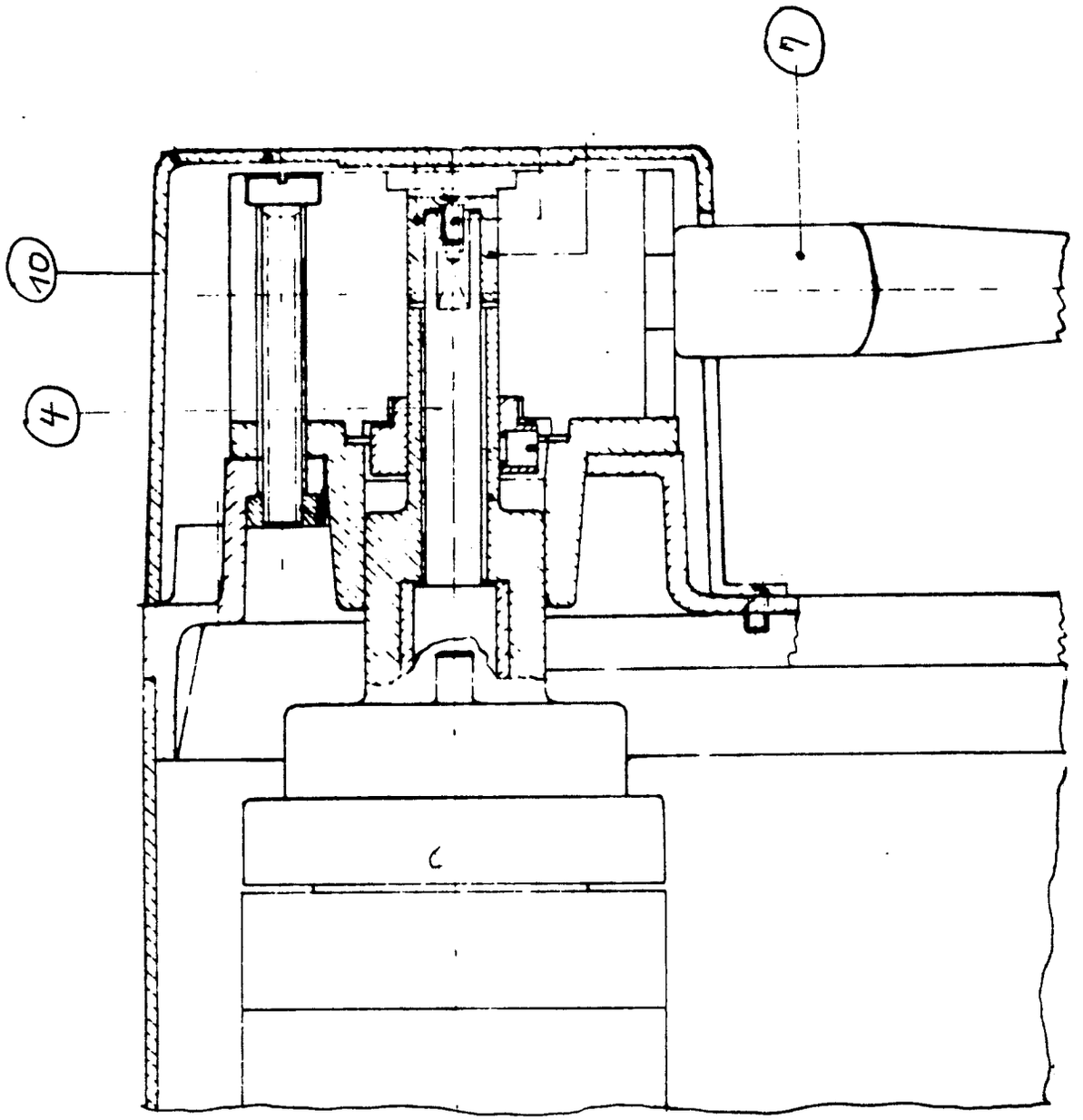
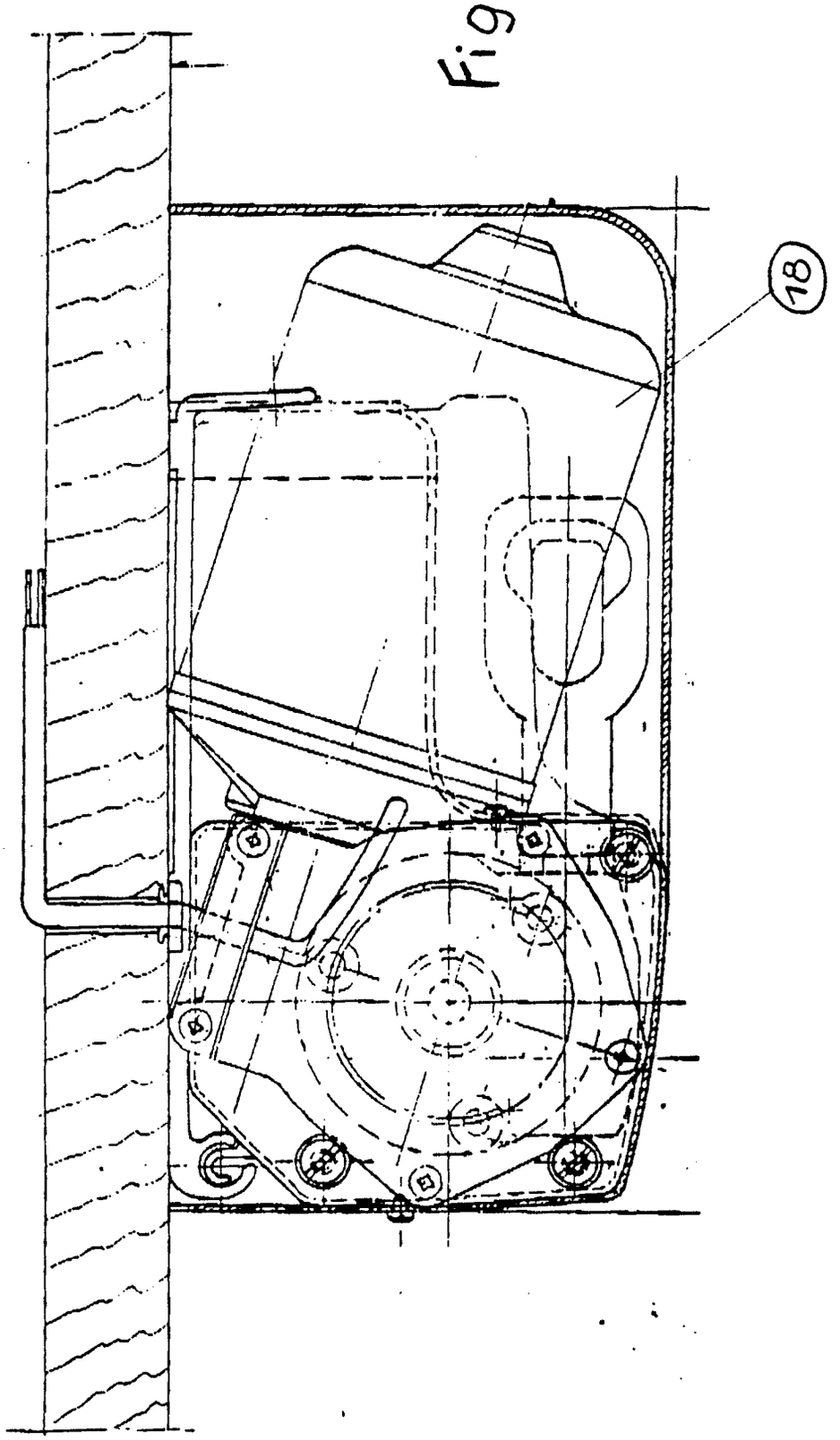


Fig. 2

Fig. 3



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EUROPEAN SEARCH REPORT

Application number

EP 86 11 0430

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-C- 433 708 (A. HARTRAMPF) * Whole document *	1	E 06 B 9/204
A		2-5	

X	FR-A- 984 357 (ETABLISSEMENTS MINEUR-BECOURT ET FILS) * Whole document *	1	
A		2-5	

X	DE-U-1 983 758 (H. WIEGELMANN et al.) * Figures 1,3; page 6, paragraph 2; page 7, paragraph 3; page 8 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A		2	E 06 B 9/00

A	DE-U-8 404 942 (ERNST SELVE GmbH & CO. KG) * Figure; claim 1 *		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	02-03-1987	KRABEL A.W.G.

CATEGORY OF CITED DOCUMENTS

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