(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 049 727**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **80850154.8**

(22) Date of filing: **15.10.80**

(51) Int. Cl.³: **B 25 D 11/06**

(43) Date of publication of application:
21.04.82 Bulletin 82/16

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL

(71) Applicant: **ELMATEC TRADING AG**
Fischmarkt 15-17
Ch-6300 Zug(CH)

(72) Inventor: **Jönsson, Johan**
Kungsgatan 1
S-211 49 Malmö(SE)

(74) Representative: **Asketorp, Göran P. et al,**
Lars Holmqvist Patentbyra AB Box 4289
S-203 14 Malmö 4(SE)

(54) An apparatus for removing putty from window frames.

(57) Apparatus in the form of an attachment device for an electric drill machine, for removing putty and other residuals in a window frame at the exchange of a window pane. The apparatus comprises a transmission (1), which transforms the rotational movement of a power source into reciprocating movement, which is imparted to a tool. The reciprocating movement is a linear movement having a saw-tooth-shaped form with a rapid, instantaneous movement outwards and a slower returning movement. At the output spindle of the power source a cam member (3) is attached having a helically shaped cam surface (5), which is ended by a radial step (6). The transmission includes further a cam follower (7) and an angle link (9), which connects the cam follower (7) with the impact shaft (15), at which the tool is mounted. The spring device (16) urges the impact shaft outwards and the cam follower (7) against the cam surface (5). When the cam follower (7) follows the helical path of the cam surface (5), the impact shaft (15) is pulled inwards and the spring device (16) is comprimated. When the cam follower (7) reaches the radial step (6) the spring device (16) is released and a rapid movement outwards is imparted to the impact shaft.

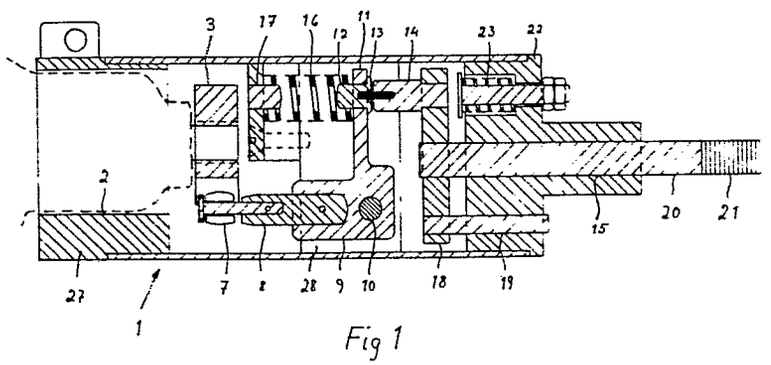

Fig 1

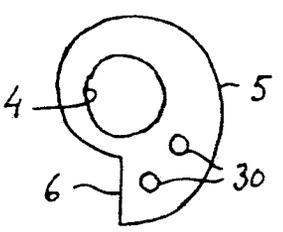

Fig 13

EP 0 049 727 A1

AN APPARATUS FOR REMOVING PUTTY FROM WINDOW FRAMES

The present invention relates to an apparatus for removing putty and other residuals from a window frame, e.g. at the exchange of a window pane.

At the exchange of an old window pane, the removal of the putty at the window frames was often made by hand with a mortice chisel and hammer. The drawback of this method is that the wrists of the hand holding the mortice chisel is exposed to heavy blows and vibrations, which can easily damage the wrist. Moreover, a careful work is required not to damage the window frame, which means that the working costs will be high. Thus, there is a need of a simple machine, which can simplify this working moment.

It is previously known to use a compressed-air operated chisel, but it is bulky as well as difficult to bring a compressed-air plant to the working place, which plant often makes heavy noise. Previously, a rotating milling cutter has also been used, but this has the drawback of pieces of putty and glas whirling about, which may injure the operator. Moreover, there are difficulties to reach the corners of the window frame. These cutters must be driven at high rotational speeds in the range of up to 25 000 revolutions/minute to be effective, which generates high noise levels.

The object of the present invention is to achieve a simple apparatus which can effectively remove putty and other residuals from a window frame. The apparatus is preferably an attachment unit for an electric drill machine, which is often an ordinary equipment for a craftsman.

The apparatus according to the invention comprises a power source, preferably in the nature of an electric drill machine, a transmission, which is adapted to transform the rotational movement of the power source

into a reciprocating movement, and a tool, to which said reciprocating movement is imparted.

Such an apparatus is previously known per se from the Swedish patent specification 7704725-6. The machine according to said patent specification impart to the tool a reciprocating or oscillating movement. This movement is essentially sinusoidal. If one tries to use this machine for removing putty from window frames, one finds that it is rather inefficient and easily jams. According to the present invention this problem is solved by imparting to the tool a movement, which is essentially a saw-tooth-shaped movement having a rapid instantaneous movement outwards in the form of an impact and a slower return movement. Our experiments have shown that the apparatus according to the invention is much more effective for removing putty from window frames.

Thus, according to the invention an apparatus is provided for removing putty from window frames, wherein the power source is a rotating power source and the transmission includes a member, which is adapted to transform the rotational movement of the power source into a linear, reciprocating movement at the tool arranged at the output shaft of the transmission. The movement of the tool is a saw-tooth-shaped movement having a rapid, instantaneous movement outwards, and a slower returning movement. Said member is a cam member adapted at the output spindle of the power source, and includes a helically shaped cam surface, which ends in a radial step. The cam member is followed by a cam follower, which is adapted to compress a spring device when the cam follower follows the helically shaped surface of the cam member, and when the cam follower reaches the radial step, the power accumulated in the spring device is released. The cam follower is connected via one or several links to the output shaft of the transmission, which slowly retracts when the cam follows the helically shaped surface of the cam member, whereupon a rapid movement outwards is imparted to it when the energy accumulated in the spring device is released.

Preferably, the cam follower is adapted as a first leg of an angle link, the second leg of which is perpendicular to the first leg. The angle link is pivotally journalled at a trunion, which is stationary in the transmission. To the second leg a vacillating movement is imparted when the cam follower follows the cam surface. Said movement is essentially parallel with the longitudinal axis of the transmission. The second leg of the angle link is provided with a head at its end, which cooperates

with an anvil, which is adapted at the output shaft. The head and the anvil are urged against each other by means of a spring device. The output shaft is guided in a guiding in such a way that the vacillating movement of the head is transmitted through the anvil into a linear movement of the output shaft. When the output shaft reaches its most extended limit position, it reaches a damping means, which damps and decelerates the movement outwards of the output shaft.

The tool comprises a support and a cutting blade, the sharp edge of which includes two edge portions, which are perpendicular to each other. Thus, the blade has a shape corresponding to the shape of the window frame.

In order to elucidate the invention, a preferred embodiment of the invention is described below with reference to the appended drawings. Fig. 1 is a longitudinal sectional view through the apparatus according to the invention. Figs. 2 to 14 are side views, end views and sectional views of details of the apparatus according to Fig. 1. Figs. 15 to 18 are sectional views and perspective views of the different embodiments of the tool or cape chisel.

The apparatus according to the invention comprises a housing 1 having an engagement portion 27, which is adapted to cooperate with and be jammed at the fore portion of an electric drill machine. The drill machine is introduced into the opening 2 in such a way that the threaded spindle of the drill machine cooperates with a cam member 3 for rotating it. The member 3 is shown in side view in Fig. 13 and comprises a threaded hole 4 for cooperation with the spindle of the drill, and a helically shaped cam surface 5. The cam surface is terminated by a radial step 6.

A cam follower 7 is adapted to follow the cam surface 5. The cam follower 7 comprises a roller, which is rotatably journalled on a trunnion 8. The trunnion is attached to an angle link 9, which is journalled around a trunnion 10, which is rigidly attached in the housing 1 of the apparatus. At rotation of the cam member 3, an oscillating movement is imparted to the angle link around the trunnion 10, as is more closely described below.

The second leg 11 of the angle link is provided at its outer end with a shank 12 having a head 13. The head cooperates with an anvil 14 of an impact member 15. By means of a spring 16, the angle link 10 is urged in such a way that the cam follower 7 abuts the cam surface 5 of the cam member 3, i.e. the angle link 10 is urged in a clockwise direction around the trunnion 10 as shown in Fig. 1. The spring 16 abuts

at its other end, to a stud 17, which is fixed at the housing 1.

The impact member 15 comprises a plate 18, one or several guidings 19, the anvil 14, and an impact shaft 20, which at its outer end is provided with threads 21. The impact shaft 20 and the impact member 15 are movable back and forth in relation to the housing 1.

The housing 1 is closed at its aft end by a cover 22, which includes openings for the guidings 19. Moreover, the closure comprises a spring 23, which extends beyond the left surface of the closure as shown in Fig. 1. The spring damps the movement to the right of the impact member 15 and prevents the plate 18 to hit the closure 22 during its movement.

The impact member 15 includes an opening 24 and the angle link 9 includes a similar opening 25. The openings 24 and 25 are connected to each other by means of a strong clamp spring 26, which prevents separation of the anvil 14 from the head 13 during normal operation.

The apparatus operates as follows. The drill machine rotates the cam member 3. The cam follower 7 follows the helically shaped cam surface 5 of the cam member from the lowest position and reaches the highest position before the step 6. During this movement, the angle link 9 is pivoted counterclockwise around the trunnion 10 and the spring 16 is comprimated. At the same time the impact member 15 is retracted by means of the spring 26. When the cam follower 7 passes the step 6, the angle link moves clockwise arou d the trunnion 10, whereupon the force accumulated in the spring 16 is released instantly and moves the impact member 15 by a strong force in the outward direction until the plate 18 reaches the spring 23 and the movement at right is damped. Simultaneously or immediately thereafter, the cam follower 7 reaches the cam surface 5 after the step 6, whereby the movement to the right is stopped. The cycle is repeated.

In Fig. 2 the closure 22 is shown for closing the right side of the house 1 as shown in Fig. 1. The closure is provided with a through opening 20a for the impact shaft 20. Moreover, the closure includes an opening 23a för a spring 23 and two openings 19a for the guidings 19. The closure 22 is screw-attached from the side of tne housing 1, as indicated in Fig. 1. In fig. 3 the closure 22 is shown from the right side of Fig. 1.

Fig. 4 shows the impact member 15 with the impact shaft 20, the plate 18, the guidings 19 and the anvil 14. Fig. 5 shows the cooperation between

the openings 24 of the impact member 15 and the opening 25 of the angle link 9. A clamp spring 26 is introduced in the openings 24 and 25, whereby a separation of the anvil 14 from the head 13 of the angle link 9 is prevented.

The angle link 9 is shown in Figs. 6 and 7. The angle link 9 includes the leg 11, which is provided with a shank 12 having a head 13, which abuts the anvil 14. A hole 10a for the trunnion 10 is bored through the angle link 9. The centrum of the opening 10a is positioned at a line, which makes a tangent with the abutment surface between the head 13 and the anvil 14. By this fact there is achieved the advantage of getting as little relative movement as possible between the head 13 and the anvil 14 during the impact movement, which minimizes the wear of those surfaces. The angle link 9 includes a hole 8a, wherein a spindle 8 is introduced with interference fit. The spindle 8 can be further locked to the angle link 9 by means of a cotter 8b. The spindle 8 includes a hole 7b, wherein a trunnion 7a is introduced having interference fit, and being further locked by a cotter 7c. The trunnion 7a rotatably supports the cam follower 7. The cam follower 7 consists of a roller having a slightly crowned outer surface. The symmetry axis of the roller 7 extends through the centrum of the hole 10a.

Figs. 8 to 10 show a support member 28, which is screw-attached to the housing 1 by means of screws in holes 28a. The support member includes a first portion 28 in the form of a segment. The segment includes a hole 10b, wherein the trunnion 10 is introduced with interferience fit. Moreover the support member includes a middle portion 30, which has the same height as the portion 28 and is a part of the segment, whereby the portion 28 and the portion 30 form a common upper surface. At the end of the portion 30 an upright plate 28 is attached by screws 31. The plate 28 supports the shank 17, which fixes the spring 16 according to Fig. 1. The plate 29 extends above the surface of the portions 28 and 30, as appears from Fig. 8.

Fig. 11 shows the engagement portion 27 at the left of Fig. 1. The engagement portion has a hole 2, which is eccentric and is adapted to cooperate with the neck of an electric drill machine, which is used for driving the apparatus. The engagement portion 27 is provided with two extended ears 32 and 33, which are interconnected with a screw 34. At the tightening of the screw 34 the apparatus is jammed around the neck of the drill.

Figs. 13 and 14 show the cam member 3. The cam member has been described in all details above. The cam member includes preferably some openings or holes 30, which serve to balance the cam member 3, such that the spindle of the drill will not be exposed for radial vibrations.

Figs. 15 and 16 show a cape chisel according to the present invention. The cape chisel includes a threaded hole 30, which cooperates with the threads 21 of the impact shaft 20 and attaches the cape chisel at the impact shaft 20. The cape chisel consists of a square shaft, which is provided with a recess 37, as appears from Fig. 16. The perpendicular edges 38 and 39 of the recess are made sharp. The cape chisel can also be provided with separate cutting inserts, as appears from Fig. 17. If so, the square shaft is provided with recesses for the inserts 40 and 41 of hard metal. The inserts are e.g. welded to the square shaft 35. By means of the cape chisel according to Fig. 17, also nails, which are in the window frame and normally hold the pane together with the putty, may be removed and cut without any problem.

Fig. 18 shows another embodiment of the cape chisel according to the present invention. The sleeve 35 is provided with two recesses 42, 43, which are perpendicular to each other. Each recess supports one a cutting insert 45, 46. As appears from the figure the cutting edge of the cutting inserts are essentially perpendicular to the londitudinal axis of the chisel, but have a slight inclination backwards, which makes it easier to reach the corners of the window frame. From Fig. 18 it appears that the cutting edges of the cutting inserts are dull and is terminated by a transversal surface having a width of about 0.5 mm. The support 35 is provided with a hole 47, which is conical in order to suit the corresponding portion of the impact shaft 20 (not shown).

The embodiments described above can of course be modified in many respects without departing from the idea of the invention. The cam follower 7 may for instance be journalled at needle bearings. Moreover, the surface 5 of the cam member can be partially inclined in relation to the longitudinal axis of the transmission in order to correspond closely to the surface of the cam follower over the entire movement range. The drive spring 16 can also be placed in connection with the output shaft 20. The invention is only limited by the appended patent claims.

C L A I M S

1. An apparatus for removing putty from window frames, comprising a rotating power source, a transmission, which is adapted to transform the movement of the power source into a linear, reciprocating movement, and a tool, to which said reciprocating movement is imparted, c h a r a c t e r i z e d in that the transmission (1) includes a member (3), which is adapted to transform the rotating movement of the power source into a linear, reciprocating movement at the tool (35), which is arranged at the output shaft (20) of the transmission, said member being a cam member (3) arranged at the output spindle of the power source and having an essentially helical-shaped cam surface (5) with a step (6); and that the transmission further includes a cam follower (7), which is connected to the output shaft (20) and is adapted to follow the cam surface (5) of the cam member, whereby a saw-tooth-shaped movement with a rapid, instantaneous movement outwards and a slower returning movement is imparted to the output shaft.

2. An apparatus according to claim 1, c h a r a c t e r i z e d in that the power source is an electric drill machine.

3. An apparatus according to claim 1 or 2, c h a r a c t e r i z e d in that the cam follower (7) is connected via one or several links (9) to the output shaft (20) of the transmission; and that the transmission includes a spring device (16), which urges the output shaft outwards and the cam follower against the cam surface, whereby the cam follower follows during the slow movement inwards of the output shaft the helical cam surface and the spring device is loaded with potential energy, whereupon the energy of the spring device when the cam follower reaches the step, is released and a rapid movement outwards is imparted to the output shaft.

4. An apparatus according to claim 3, c h a r a c t e r i z e d in that the cam follower (7) is arranged at a first leg (8) of an angle link (9), the second leg (11) of which is perpendicular to the first leg, said angle link being pivotally journalled in a trunnion (10), which is stationary in the transmission (1), whereby a vaccilating movement is imparted to the second leg (11) when the cam follower follows the cam surface, said movement being essentially parallel with the longitudinal axis of the transmission; and that the second leg (11) of the angle link is provided at its end with a head (13), which cooperates with an anvil (14), which is arranged at the output shaft (20), whereby the head (13)

and the anvil (14) are urged against each other by means of a spring device (26); and that the output shaft (20) is guided in a guiding (20a), so that the movement of the head is transformed via the anvil into a linear movement of the output shaft.

5. An apparatus according to claim 3 or 4, c h a r a c t e r i z e d in that the output shaft (20) in its most extended end positon reaches a damping device (23), which damps, breaks and turns the movement outwards of the output shaft.

6. An apparatus according to anyone of the preceding claims, c h a r a c t e r i z e d in that the tool comprises a support (35), which is adapted to be connected to the output shaft of the transmission, and a cutting tool (37-41), the sharp edge of which is essentially perpendicular to the longitudinal axis of the shaft, whereby the edge includes two edge portions, which are essentially perpendicular to each other.

7. An apparatus according to claim 6, c h a r a c t e r i z e d in that the sharp edge (38-41) is relatively dull.

8. An apparatus according to claim 6 or 7, c h a r a c t e r i z e d in that the cutting tool includes two cutting inserts (40, 41), which are attached to the support (35) and are perpendicular.

9. An apparatus according to claim 6 or 7, c h a r a c t e r i z e d in that the cutting tool is a plate (48) bent into an angle and attached to the support (35)..

0049727

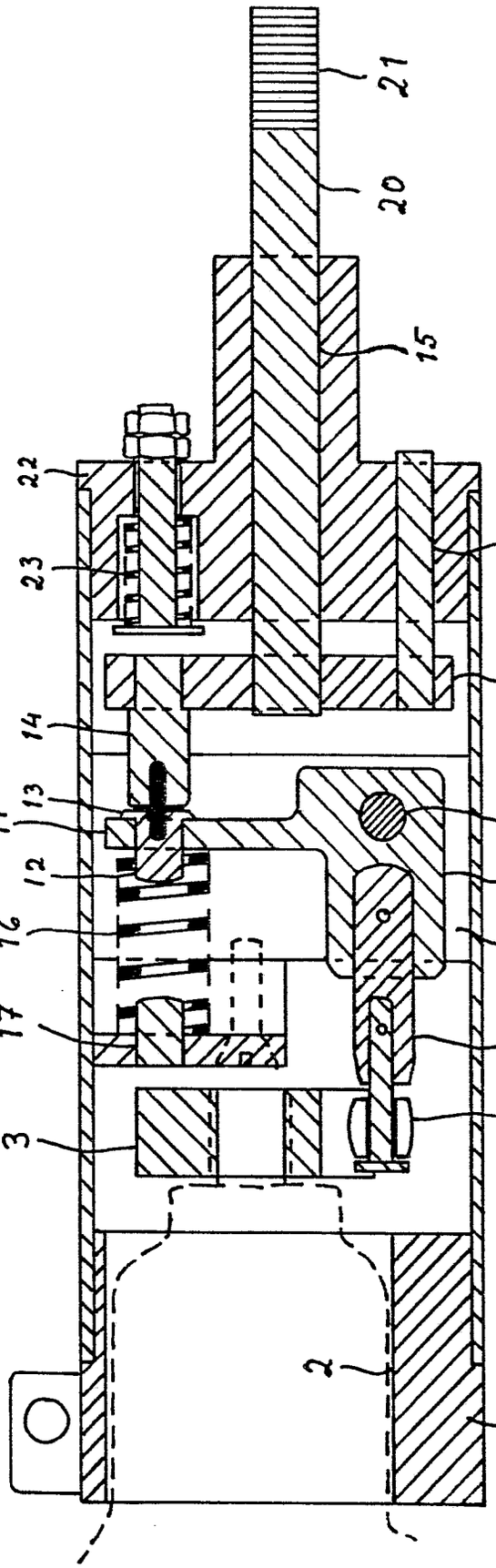

Fig 1

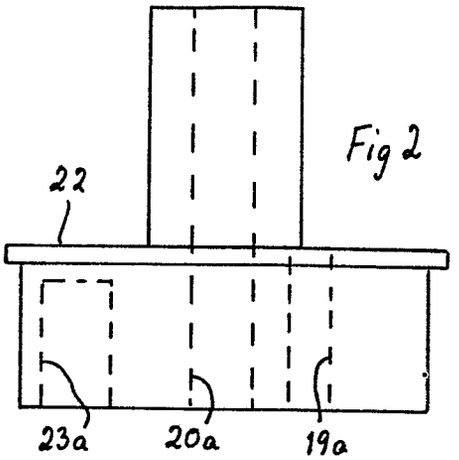

Fig 2

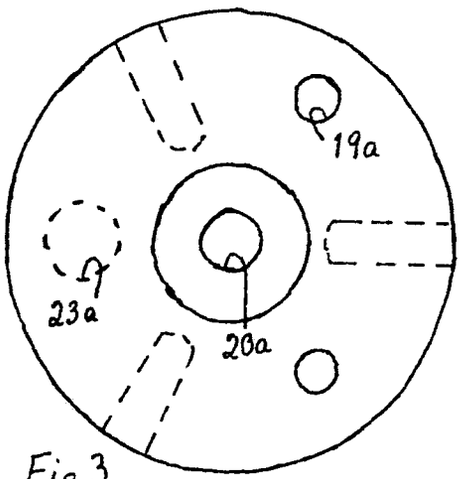

Fig 3

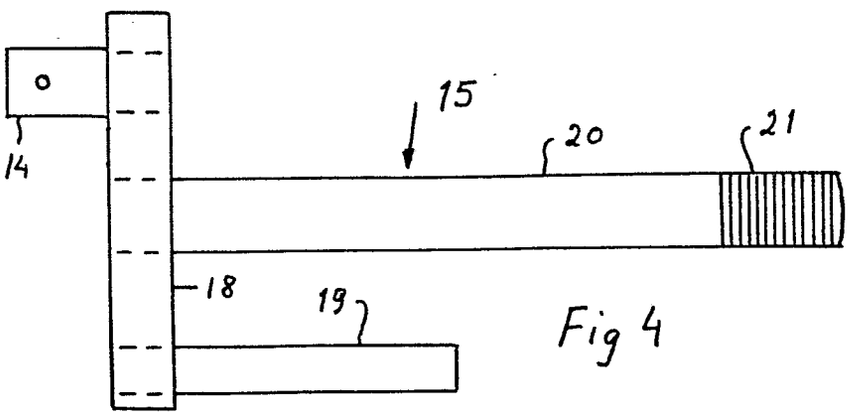

Fig 4

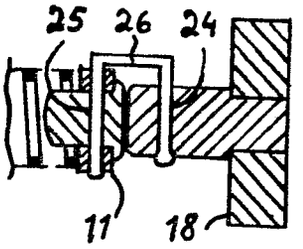

Fig 5

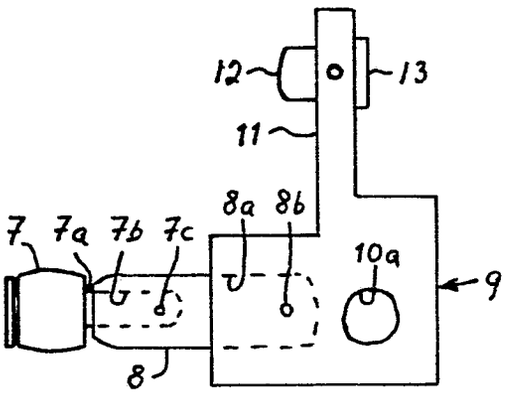

Fig 6

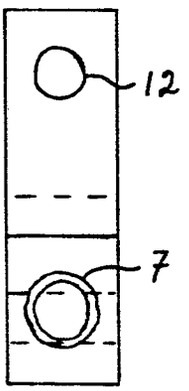

Fig 7

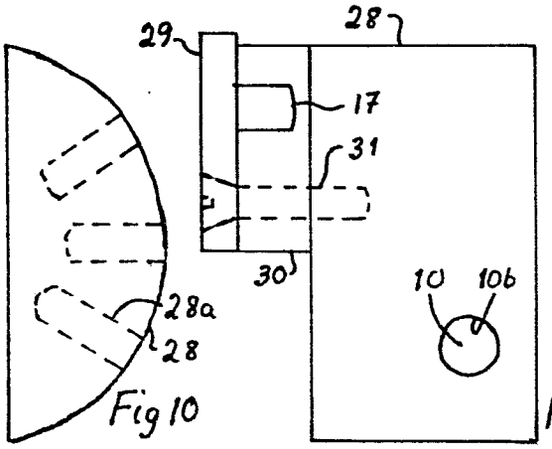

Fig 10

Fig 9

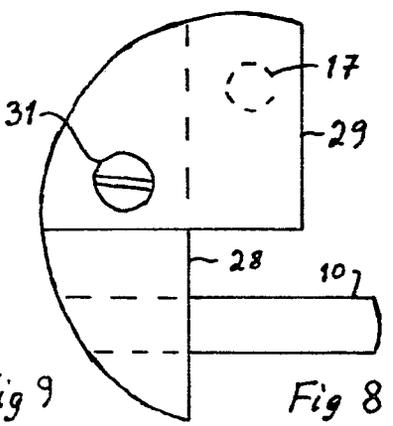

Fig 8

0049727

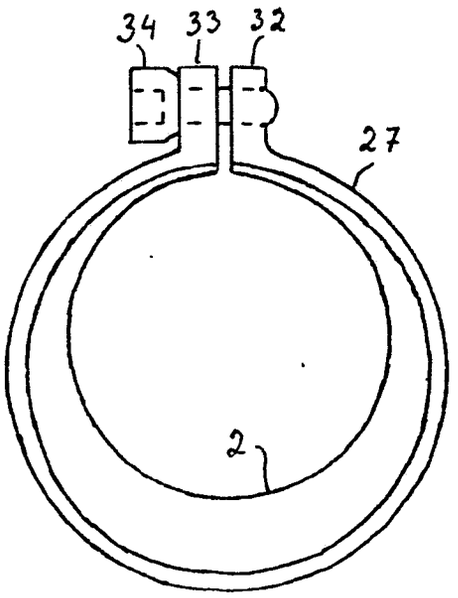

Fig 12

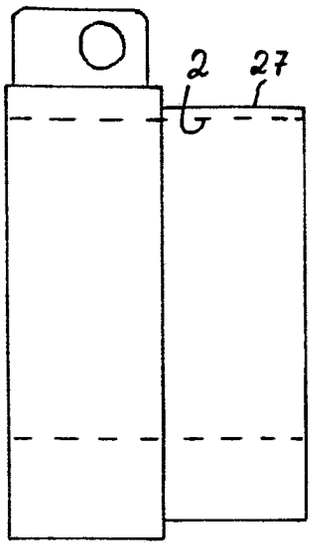

Fig 11

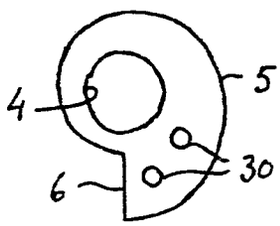

Fig 13

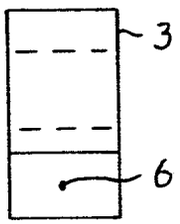

Fig 14

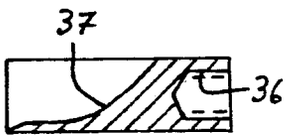

Fig 15

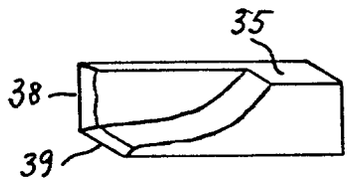

Fig 16

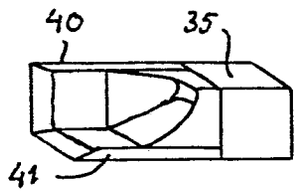

Fig 17

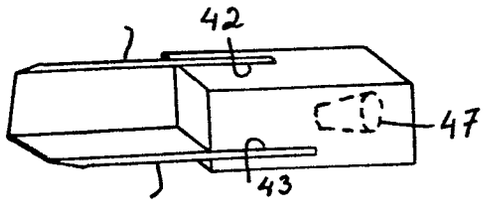

Fig 18

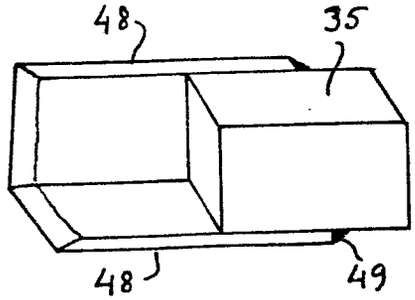

Fig 19

0049727

Application number

EP 80 85 0154.8

European Patent Office

EUROPEAN SEARCH REPORT

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 ³)
X	US - A - 2 220 195 (E. AMUNDSEN) * page 1, line 12 to page 2, line 74; fig. 2, 3 * --	1,3,5	B 25 D 11/06
	US - A - 2 286 521 (E.N. WALTER) * claims 1 to 3; fig. 1, 4 * --	1-3	
A	DE - A1 - 2 609 466 (H.J. GRASSKAMP) --		TECHNICAL FIELDS SEARCHED (Int. Cl.³)
A	US - A - 4 111 060 (F. NERINI) --		B 25 D 11/00
A	FR - A - 2 172 033 (J. CAMPGUILHEM) --		
A	DE - A1 - 2 846 887 (NATIONAL RESEARCH DEVELOPMENT CORP.) ----		

CATEGORY OF CITED DOCUMENTS

- X: particularly relevant
- A: technological background
- O: non-written disclosure
- P: intermediate document
- T: theory or principle underlying the invention
- E: conflicting application
- D: document cited in the application
- L: citation for other reasons
- &: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	11-06-1981	HOFFMANN