



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ³:

E05D 11/10; E04F 10/06

A1

(11) International Publication Number: WO 80/01493

(43) International Publication Date: 24 July 1980 (24.07.80)

(21) International Application Number: PCT/NO80/00002

(22) International Filing Date: 9 January 1980 (09.01.80)

(31) Priority Application Number: 790082

(32) Priority Date: 11 January 1979 (11.01.79)

(33) Priority Country: NO

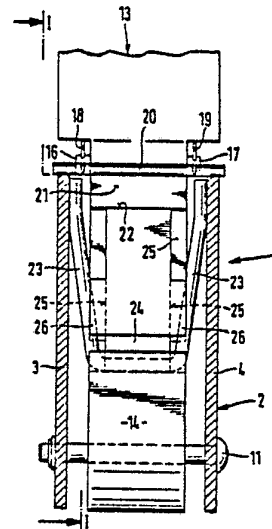
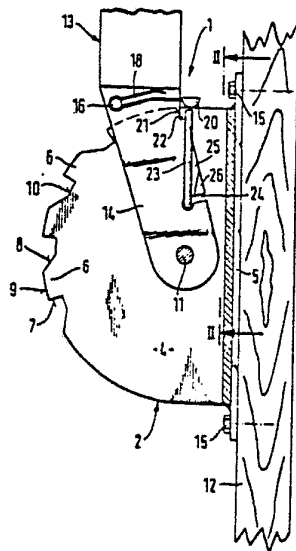
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(81) Designated States: AT (European patent), CH (European patent), DE (European patent), DK, FR (European patent), NL (European patent), SE (European patent), US.

Published*With international search report**In English translation (filed in Norwegian)*

(54) Title: RATCHET DEVICE, ESPECIALLY FOR AWNINGS



(57) Abstract

Ratchet device, especially for awnings, comprising two rotatably interconnected elements (2, 14), one element (2) having a portion formed as a sector of a ratchet wheel and the other element (14) being provided with a pawl (20) cooperating with the teeth (6) of the first element (2), and a movable member (23) which prevents resp. permits interengagement of the pawl and the teeth due to relative rotation in the elements. In a known device of this type, the movable member is a control tooth rotatably connected to the pawl. This demands a complicated construction which, when the parts are subjected to wear, may cause malfunction of the device. In the device according to the invention, the movable member (23) is arranged movably in relation to the second element (14) and is adapted to be moved upon influence of the frictional force which is brought about between the member (23) and the first element (2) during relative rotation of the element (2, 14).

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Ratchet device, especially for awnings.

The invention concerns a ratchet device, especially for awnings, comprising two rotatably interconnected elements, one element having at least one portion formed as a sector of a ratchet wheel and the other element being provided with a pawl cooperating with the teeth of the first element, and a member which is movable in relation to the second element between a first and a second position, whereby the member in its first position prevents inter-engagement of the pawl of the second element and the teeth of the first element, and in its second position permits such engagement, which member is adapted to be brought from the first position to the other and vice versa, due to relative rotation of the element in the one resp. the other direction.

Usually awnings comprise a roll which extends horizontally and is rotatably fastened through brackets to the house wall above the window which is to be shielded against direct sunlight, and to which roll an edge of the awning cloth is fastened for the winding thereof on the roll. The opposite edge of the awning cloth may over its length be connected to a rod, e.g. an aluminium section, which in turn is fastened to the house wall through arms rotatably connected thereto below the roll.

There may be provided a manoeuvring line winded on the roll for winding the awning on or off, which line may be fastened by means of a suitable device.

When the awning cloth is to be brought in position in front of the window in order to shield against sun, the line is given out, whereby the cloth is winded off the roll, e.g. due to the weight of the said rod, the arms guiding the rod in a circular path away from the house wall until the desired degree of shielding is achieved.



If the said rotatable connection between the arms and the house wall is formed as a ratchet device which permits rotation of the arms in one direction in order to wind the awning cloth off the roll, but prevents movement of the arms in the other direction, the awning cloth may be
5 tightened by means of the line which thereafter is fastened when the desired degree of shielding is obtained.

10 Before the awning cloth again may be winded on the roll, either for complete winding on or in order to bring it to a position in which it is not shielding so much, the pawl of the ratchet device must be brought out of engagement with the teeth thereof.

15 From NO-PS no. 112995 it is known a toggle joint which, when it is applied to awnings, permits such winding on of the awning cloth, without first winding this off until the arms are completely swung out, whereby already a
20 small angular displacement provides disengagement of the pawl and the teeth of the ratchet wheel.

This toggle joint is very complicated and comprises parts which when in use are subjected to wear which may pre-
25 vent the function of the device.

The object of the invention is to provide a ratchet device of the abovementioned type, which is not burdened with the abovementioned drawbacks.

30 The characteristic features of the device according to the invention are evident from the claims.

The invention will be explained in detail in the following description with reference to the accompanying
35 drawings, which show an embodiment of a device according to the invention, and in which

Fig. 1 is a side view of a ratchet device for awnings, fastened to a house wall, one sideplate or string thereof being removed,

Fig. 2 is an enlarged sectional view taken along the line
5 II-II in fig. 1 and

Fig. 3 - 6 are views similar to the one which is shown in fig. 1, but where the parts of the device are shown in other relative positions.

10 The stationary part of the shown ratchet device 1 comprises a U-shaped element 2, consisting of two parallel, spaced, plateshaped strings 3,4 fixedly connected to a bottom or mounting plate 5. The element 2 may be made of a plate of e.g. aluminium bent to U-shape.

15

The strings are equal in profile and shaped as a half ratchet wheel which through a rectangular extension thereof is connected to the bottom plate 5, and the saw-tooth shaped teeth 6 of the ratchet wheel have a first flank 7
20 extending radially in relation to the centre of the wheel, and a second flank 8 which is inclined in relation to a radial line extending through this flank, which flanks are interconnected through a top portion 9 of the teeth 6, extending mainly along the circumference.

25

Between each tooth 6 there is formed a bottom portion 10 extending mainly along the circumference.

In each approximately semi-circular string 3,4 of the
30 U-shaped element 2 there is formed a concentric bore, the diameter of which is adapted to the diameter of a hinge pin 11.

For use in connection with an awning (not shown), the
35 element 2 is e.g. by means of screws 15 fastened to the house wall 12, in such a way that the plate plane of the strings is vertical and the radially extending tooth flanks 7 are partly facing away from the wall, partly downwards.

An arm 13, one end of which is fastened to a rod which is connected to the outer portion, i.e. the portion facing away from the house wall 12, of the awning cloth when this is stretched out from the wall, is in its other end provided with an elongated end piece 14 introduced between the strings of the element, which end piece forms an extension of the arm 13, and in which there likewise is formed a throughgoing hole, the diameter of which is adapted to the diameter of the hinge pin 11. The hinge pin 11 is introduced into the holes in the strings 3, 4 and the interposed end piece 14, so that the arm 13 can be rotated about the hinge pin 11. The hinge pin 11 may be secured by means of a nut, a cotter pin or the like.

The end piece 14 has two parallel side faces extending perpendicularly to the longitudinal axis of the bore formed through this, the distance between the side faces being somewhat less than the distance between the interopposing side faces of the strings 3, 4 of the element 2.

Directly radially outside the top portion 9 of the teeth 6 each side face of the end piece is provided with a protruding guide pin 16 resp. 17 for an approximately U-shaped spring 18, 19, e.g. made of metal thread, arranged around this. One leg of the springs 18, 19 is resting against a shoulder formed by the end portion of the arm 13, and the other leg of the springs is fixedly connected to the respective end of an elongated blocking element or pawl 20. This pawl extends perpendicularly to the said parallel side faces of the end piece 14, and may, due to the mounting of the springs 18, 19, on the guide pins 16, 17 resiliently be moved close to and along a surface portion 21 of the end piece, which portion extends in a plane which likewise is perpendicular to these side faces and which extends approximately radially in a relation to the longitudinal axis of the bore formed in the end piece.

As is evident from the drawings, the pawl 20 and the surface portion 21 of the end piece are positioned at the side of the end piece 14 facing towards the radially extending flank of a tooth 6, when the arm 13 is rotated anticlockwise until its end piece 14 has passed the tooth 6 in question.

The springs 18, 19 are prestressed in such a way that they seek to press the pawl 20 radially inwards towards the said longitudinal axis.

In order to limit the radially inwards movement of the pawl 20, the end piece 14 is preferably provided with an outwards, from the surface portion 21 protruding shoulder 22, the radial distance of which from the longitudinal axis of the said bore is somewhat larger than the radial distance between the bottom portion 10 between the teeth 6 and this longitudinal axis.

Preferably the cross section shape of the pawl 20 is rectangular and the pawl 20 arranged with one side face facing the adjacent surface portion 21 of the end piece 14. Further the longitudinal side edges facing the axis of rotation of the element 14 are preferably chamfered.

For reception of the central portion of a U-shaped spring 23, e.g. made of spring steel, which portion extends parallel to the longitudinal axis of the bore of the end piece, the end piece 14 has a transverse recess 24, the bottom portion of which forms a support for the central portion of the spring 23, and which is located approximately at a radial line between the longitudinal axis of the said bore and the pawl 20, in which support the spring 23 is adapted to rotate in planes parallel to the side faces of the end piece 14.

The legs of the spring 23 are directed approximately radially outwards, and in order to limit the angular



movement thereof in relation to the end piece 14, this is provided with stops for the spring legs. Preferably, however, each of the parallel side faces of the end piece 14 is provided with a groove 25 extending from the bottom portion of the recess 24 for reception of the legs of the spring 23, the side portion 26 of which grooves forming stops for limitation of the angular movement of the spring legs.

10 The spring legs are terminated directly radially inside of the top portions 9 of the teeth 6, and the width of the grooves 25 resp. the distance between the stops is so large that the spring 23 may be rotated between a first position, in which the ends of the spring legs are positioned directly radially inside of the pawl 20, and a second position, in which the ends of the spring legs are not positioned radially inside of the pawl 20, the spring legs in the second position being rotated clockwise in relation to the end piece 14 from the first position, as shown in Fig. 1 and 3-6.

The spring 23 is prestressed so that the spring legs exert an outwards directed force towards the inner face of the strings 3, 4 of the element 2, the force being so large that it provides sufficient frictional force between the spring legs and the strings 3, 4 to cause rotation of the spring legs in one direction or the other in relation to the end piece upon rotation thereof.

30 The function of the ratchet device is as follows:

Fig. 1 shows the position of the device when the awning cloth is completely winded on its roll which is arranged above the window. In this position the arm 13 extends to close to the roll, parallel to the house wall. The ends of the spring legs are positioned directly radially inside of the pawl 20, as the arm 13 is brought to this position upon clockwise rotation about the hinge pin 11.

and the spring 23 is thereby rotated inwards on the end piece 14 of the arm 13 to its above mentioned, first position due to the friction between the spring legs and the strings 3, 4. The pawl 20 is in this position pressed
5 against the upper edge of the strings 3, 4 and is therefore not resting upon the ends of the spring legs, which is better shown in Fig. 2.

Fig. 3 shows the position of the device after the arms
10 13 are moved anticlockwise a small angular distance from the position shown in Fig. 1 in order to bring the awning cloth to a position in which it shields against sunlight.

Because the pawl 20 through the springs 18, 19 is fastened
15 to the guide pins 16, 17, which are fixedly connected to the end piece 14, the pawl is also pulled anticlockwise, sliding on the upper edge of the strings 3, 4, while the outer portions of the legs of the spring 23 during this initial phase is firmly held and causes the spring 23 to
20 rotate outwards from the end piece 14 of the arm 13, until the legs reach their abovementioned second position, in which they are resting against the stops 26.

If the arm 13 is moved further anticlockwise, past the
25 teeth 6, the pawl will successively alternately be pressed into the spaces between the teeth 6 due to the force exerted by the springs 18, 19, and thereafter moved up to the top portions 9 of the teeth, gliding on the inclined flanks 8 thereof.

30 When the desired degree of shielding is obtained and if the pawl 20 is hereby not positioned in a space between teeth 6, the arm 13 is moved a small angular distance anticlockwise in order to bring the pawl 20 into the
35 next space between the teeth 6, whereupon the awning cloth is stretched by means of the manoeuvring line, see Fig. 4. The pawl is thereby squeezed between the surface portion 21 of the end piece 14 and the radial

flank 7 of the adjacent tooth 6, the springs 18, 19, due to their elasticity, practically not loading the guide pins 16, 17.

5 If another position of the awning cloth is desired, in which it is not shielding so much against sunlight, the arm 13 is first moved anticlockwise by means of manoeuvring line until the pawl 20 rests on the top portion 9 of the adjacent tooth 6 and the leg ends of the spring
10 23 are positioned radially inside this top portion 9, as shown in Fig. 5. The arm 13 is then moved clockwise, whereby the spring legs, due to the abovementioned frictional force, initially rotates inwards towards the end piece 14 to the said first position in which the leg
15 ends are positioned radially inside of the pawl 20, as shown in Fig. 6. The arm may now freely be swung clockwise, the legs of the spring 23 preventing introduction of the pawl 20 into the passing spaces, and the pawl 20
20 alternately resting on the ends of the spring legs and sliding on the top portions 9 of the teeth 6, until it has passed the tooth space into which introduction is desired and rests on the top portion 9 of the adjacent tooth 6 in a position which corresponds to the one which is shown in Fig. 1.

25

This procedure may also be used in order to bring the arm 13 to the position shown in Fig. 1. During this clockwise movement of the pawl 20, the chamfered, radial inner edges of the pawl 20 effects easy gliding thereof onto
30 the top portions 9 of the teeth 6. For this purpose the radial outer edge of the radial flank 7 of the teeth may of course also be chamfered.

The arm 13 is then moved anticlockwise whereby the spring
35 23 initially rotates outwards in relation to the end piece 14, to the said second position, in which the ends of the spring legs are not positioned radially inside of the pawl 20, whereupon the pawl under further rotation of

the arm 13 reaches and is introduced into the desired tooth space, and the manoeuvring line again may be tightened and fastened.

5 The above description concerns a device in which the end piece 14 of the arm 13 is guided between two strings formed as a sector of a ratchet wheel. The device may, however, instead be provided with a U-shaped arm end piece between the legs of which there is arranged a
10 plate formed as a sector of a ratchet wheel. The device may then e.g. be provided with a solid pawl of the usual type arranged between the legs of the end piece, one end of the pawl having a bore through which there is introduced a hinge pin connected to the end piece.

15

Further, the spring 23 may consist of only one L-shaped spring thread, the short leg of which being rotatably supported in the outer portion of the long leg resting against one of the strings 3, 4 or the plate formed as a
20 sector of a ratchet wheel.

The ratchet device according to the invention is in the above described for use in connection with awnings, but it may of course be used in connection with other
25 collapsible objects e.g. chairs, tables, beds, hood frames, stands etc.

WHAT I CLAIM IS:

1. Ratchet device, especially for awnings, comprising two rotatably interconnected elements (2, 14), one element (2) having at least one portion (3, 4) formed as a sector of a ratchet wheel and the other element (14) being provided with a pawl (20) cooperating with the teeth (6) of the first element (2), and a member (23) which is movable in relation to the second element between a first and a second position, whereby the member (23) in its first position prevents interengagement of the pawl (20) of the second element (14) and the teeth (6) of the first element (2), and in its second position permits such an engagement, which member is adapted to be brought from the first position to the other and vice versa, due to relative rotation of the elements in the one resp. the other direction, characterized in that the movable member (23) comprises at least one portion which is forced to rest against a cooperating portion of the first element (2), and that the member (23) is adapted to be moved between its two positions in relation to the second element (14) upon influence of the frictional force which is brought about between the cooperating portions during relative rotation of the elements (2, 14), said portion of the member (23) gliding on the cooperating portion of the first element (2) after having reached one of the said positions, during continued relative rotation of the elements.

30

2. Device according to claim 1, characterized in that the movable member (23) is rotatably connected to the second element (14) and is adapted to rotate in relation to this upon relative rotation of the elements (2, 14).

35

3. Device according to claim 1 or 2, characterized in that the first element (2) comprises two, in

profile identical, parallel, approximately semi-circular strings (3, 4) provided with saw-tooth shaped teeth (6) along its circumference, between which strings the second element (14) is rotatably arranged.

5

4. Device according to claim 3, characterized in that the movable member is a U-shaped spring (23), the between the strings (3, 4) arranged central portion of which is extending perpendicularly to the plateplane of the strings and forming a shaft which is supported in the second element (14), and the legs of which is protruding radially outwards in relation to the axis of rotation (11) of the second element (14) in the intermediate space between adjacent surfaces of the element (14) and the strings (3, 4), the legs being prestressed and having portions resting against the surface of the strings.

5. Device according to claim 4, characterized in that the rotary motion of the spring (23) is limited by means of stops (26) which are arranged on those sides of the end piece (14) which are facing the strings (3, 4).

6. Device according to claim 5, characterized in that the legs of the spring (23) are terminated directly radially inside of the top portion (9) of the teeth (6), the ends of the legs being adapted to be brought into resp. out of engagement with the pawl (20).

7. Device according to one of the claims 1 - 6, characterized in that the pawl comprises a rod (20), which is connected to the second element (14) by means of springs (18, 19), and which extends perpendicular to the plane of rotation of the element, which springs seek to press the rod towards the axis of rotation of the element.

8. Device according to claim 7, characterized in that the cross section of the rod (20) is rectangular, one side of the rod is facing the adjacent surface portion (21) of the second element (14), and that the longitudinal side edges facing the axis of rotation (11) of the element
5 are chamfered...

Fig. 1

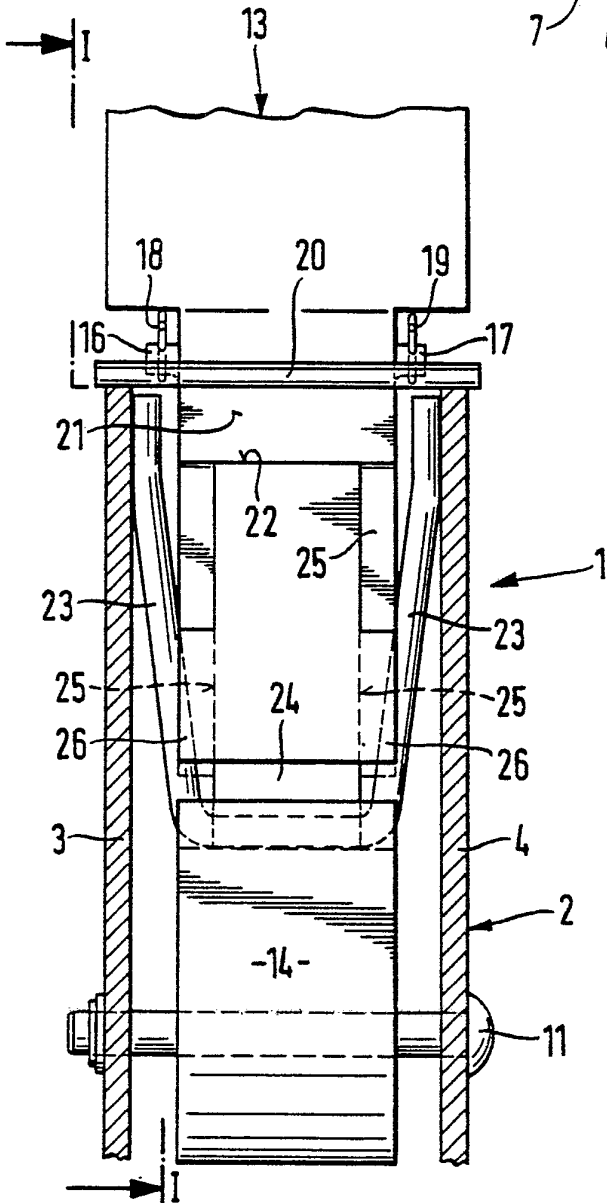
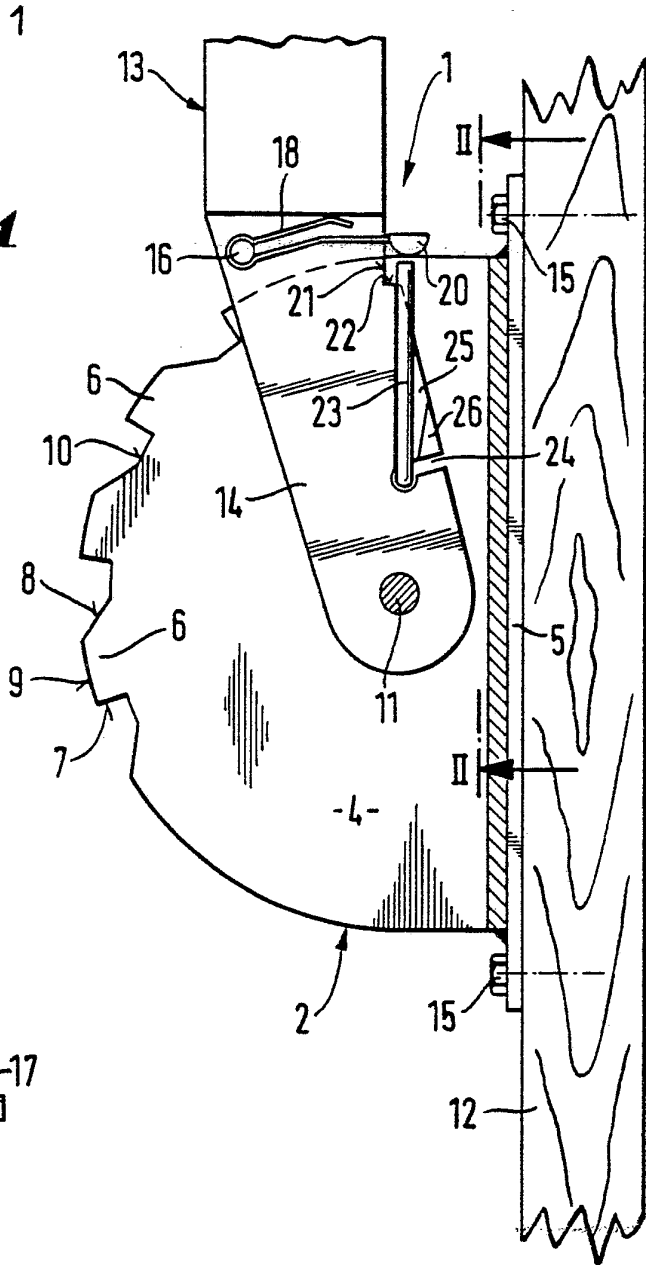


Fig. 2

Fig. 3

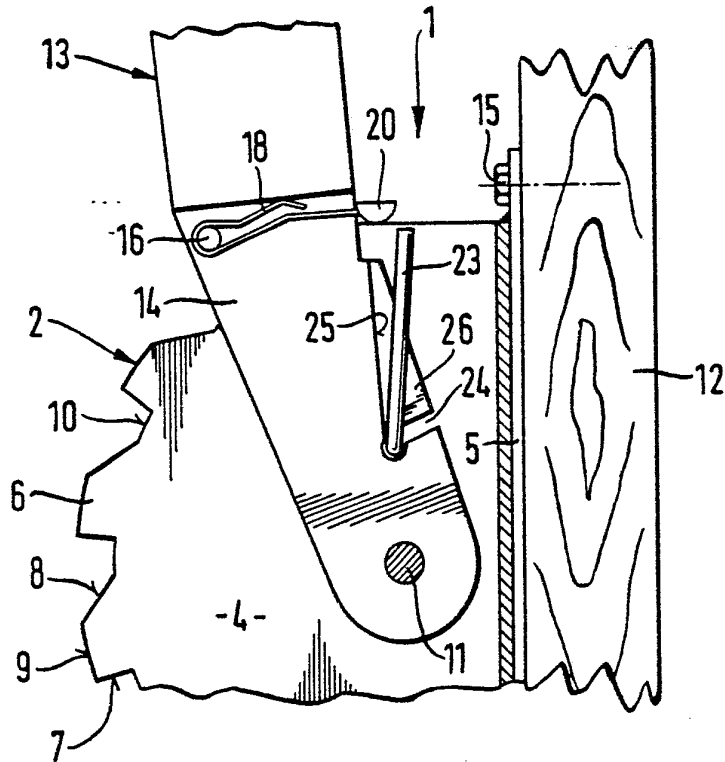


Fig. 4

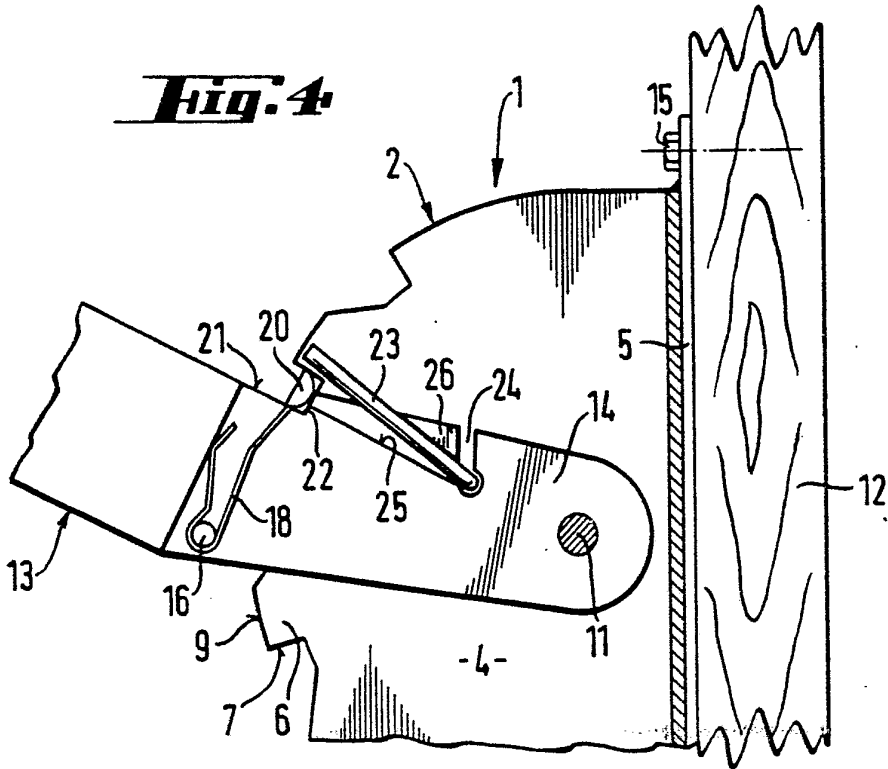


Fig. 5

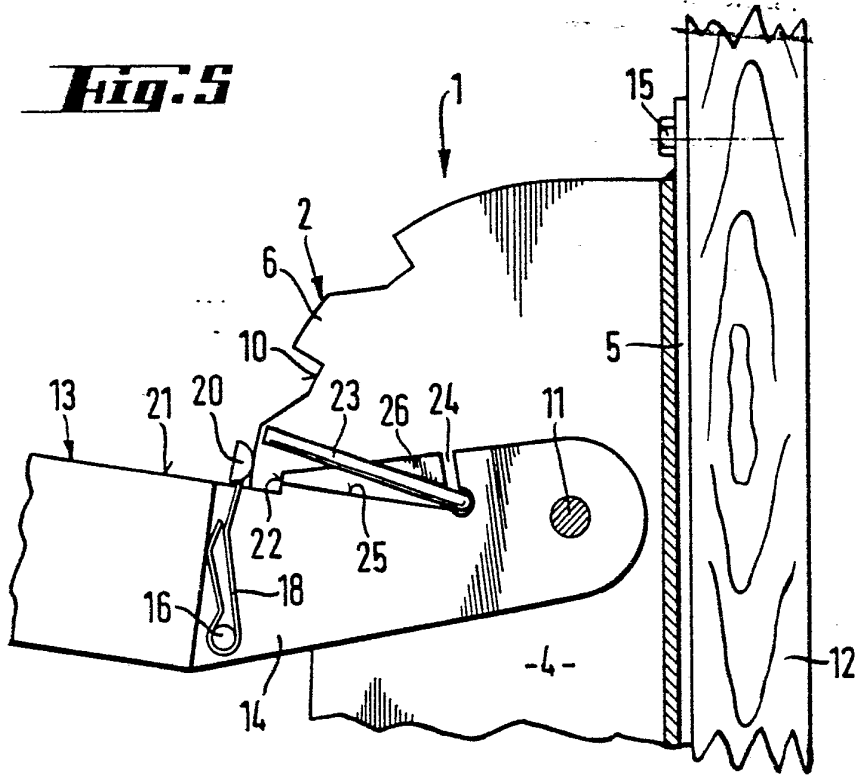
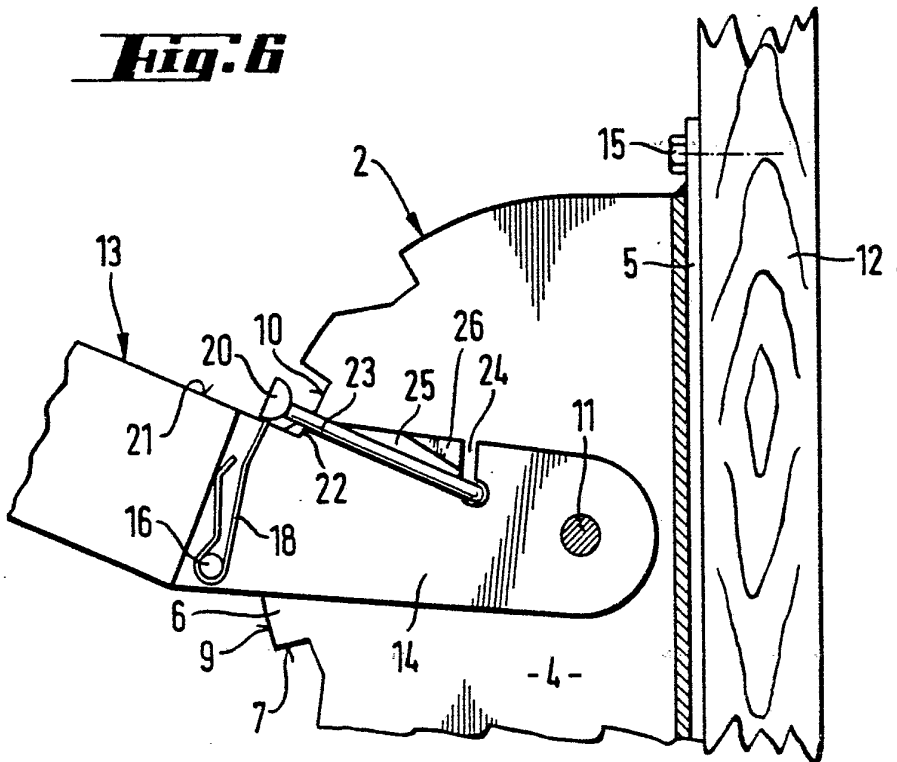
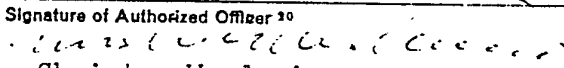


Fig. 6



INTERNATIONAL SEARCH REPORT

International Application No PCT/E080/00002

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ³				
According to International Patent Classification (IPC) or to both National Classification and IPC 3				
E 05 D 11/10, E 04 F 10/06				
II. FIELDS SEARCHED				
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Classification System	Classification Symbols			
IPC ⁵	E 05 D 11/10, E 04 F 10/00-06, A 47 C 17/70			
Deutsche Kl	68d:34, 24; 34g:15/03			
US Cl	16:139, 143-146; 160:73			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁶				
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴				
Category [*]	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸		
X	US, A, 3 643 292 published 1972, February 22, O Mayer	1-8		
X	DE, A, 1 429 385 published 1969, January 2, G Rauschenberg	1-3, 6		
X	FR, A, 2 002 884 published 1969, October 31, Ital-Bed Costruzione Letti Ed Affini S.R.L.	1-2, 6		
x	US, A, 3 969 789 published 1976, July 20 G Wize	1-2, 6,7		
X	US, A, 3 849 834 published 1974, November 26, O Mayer	1-3, 5-8		
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IV. CERTIFICATION				
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