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(71) Applicant: **SAVIO S.p.A.**
10050 Chiusa San Michele (IT)

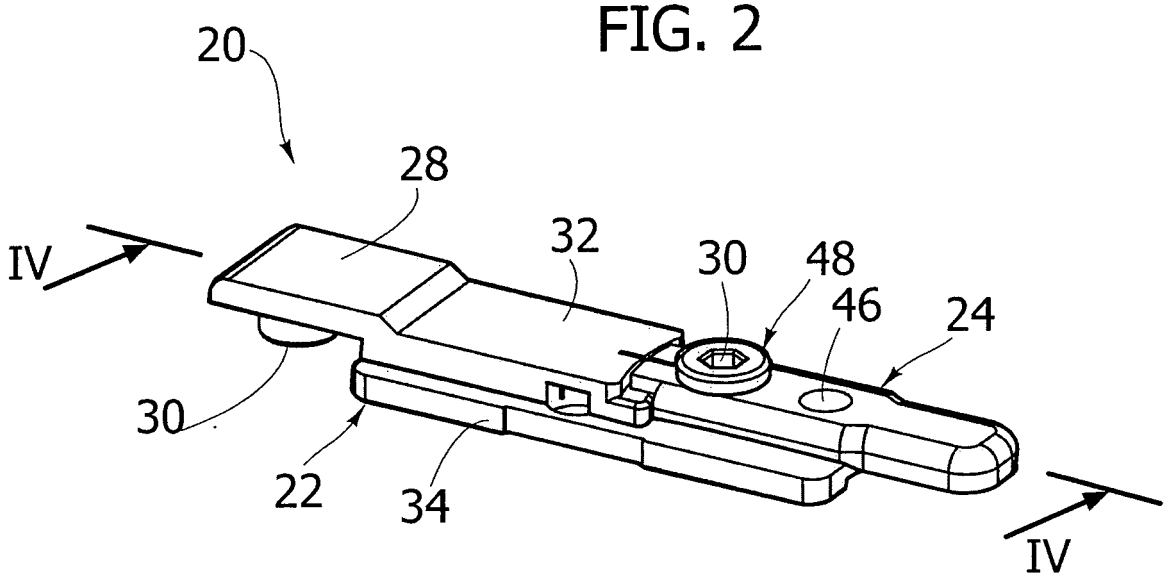
(72) Inventor: **Balbo Di Vinadio, Aimone**
I-10050 Chiusa San Michele (Torino= (IT)

(74) Representative: **Marchitelli, Mauro**
c/o Buzzi, Notaro & Antonielli d'Oulx Srl
Via Maria Vittoria 18
10123 Torino (IT)

(54) **Adjustable terminal piece for closure rods for door and window frames**

(57) Terminal piece for closure rods for door and window frames comprising: a slider (22); a catch (24); and means of connection and adjustment arranged between the slider (22) and the catch (24) and designed to enable adjustment of the position of the catch (24) with respect to the slider (22). The means of connection and adjustment comprise a first pin element and a second pin element (46, 48), wherein the first pin element (46) defines an axis of rotation, about which the catch (24) can perform movements of rotation, and in which the second pin element (48) is able to turn with respect to the slider (22) and comprises an eccentric portion (48"), designed to govern said movement of rotation of the catch (24). The first and second pin elements (46, 48) are connected in a permanent and not removable way to the slider (22) and to the catch (24) and provide a fixing of the catch (24) with respect to the slider (22) in the direction of the respective axes.

FIG. 2



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Description

[0001] The present invention relates to a terminal piece for closure rods for door and window frames, comprising:

- a slider that is adapted to slide in a channel formed on a peripheral wall of a mobile frame of the door or window frame and to be coupled at one end of a closure rod that can slide in the channel;
- a catch, which projects at one end of the slider and which is adapted to engage in a seat of a fixed strike; and
- means of connection and adjustment, which are arranged between the slider and the catch and are designed to enable an adjustment of the position of the catch with respect to the slider, said means of connection and adjustment comprising a first pin element and a second pin element with respective mutually parallel axes, in which the first pin element defines an axis of rotation about which the catch can perform movements of oscillation, and in which the second pin element is able to turn with respect to the slider and comprises an eccentric portion, designed to govern said movement of oscillation of the catch.

[0002] A terminal piece of the type referred to above is known from the Italian utility model No. 220647, filed in the name of the present applicant, which describes a solution in which the position of the catch is adjustable with respect to a part coupled with the rod for closing the door or window frame. The adjustment is made by manoeuvring an eccentric pin and blocking the catch with a screw in the desired position. Prior to blocking, the catch can still perform small oscillations in the neighbourhood determined by the position of the eccentric pin. In the known solution, blocking is obtained just by means of the friction between the surfaces in contact with the slider and with the catch, produced by the action of the screw. Extraordinary events, such as accidental impact on the frames or else strong gusts of wind, can cause relative movement between the catch and the slider, with the consequent loss of the adjustment.

[0003] There is hence felt the need to provide an adjustable terminal piece that presents an overall rigidity such as to prevent the relative movement between the catch and the slider following upon events of overloading.

[0004] The purpose of the present invention is to provide a terminal piece of the type considered that will enable a precise and reliable adjustment, which can be maintained even following upon occasional conditions of overloading.

[0005] According to the present invention, this purpose is achieved by means of a terminal piece of the type defined at the beginning of the description, characterized in that each of the pin elements is connected in a permanent and not removable way with respect to the slider and the catch and enables fixing of the catch with respect to the slider in the direction of the respective axis.

[0006] Thanks to this idea of solution, adjustment is maintained also in the presence of occasional conditions of overloading.

[0007] According to a preferred characteristic of the present invention, corresponding to a given angular position of the second pin element is a given angular position of the catch.

[0008] Further characteristics and advantages of the present invention will emerge clearly in the course of the ensuing detailed description, which is provided purely by way of non-limiting example, with reference to the annexed drawings, in which:

- Figure 1 is a partial perspective view of the top angle of a mobile frame of a door or window frame, provided with a terminal piece according to the present invention;
- Figure 2 is a perspective view of the terminal piece according to the invention, indicated by the arrow II in Figure 1;
- Figure 3 is an exploded perspective view of the terminal piece of Figure 2;
- Figure 4 is a longitudinal cross section taken in the plane IV-IV of Figure 2;
- Figure 5 is a partially sectioned plan view of the terminal piece according to the invention;
- Figures 6 and 7 are plan views similar to that of Figure 5, illustrating the terminal piece in the extreme position of the catch;
- Figure 8 is a diagram illustrating the plot of the force as a function of the displacement in a terminal piece according to the prior art; and
- Figure 9 is a diagram illustrating the plot of the force as a function of the displacement in a terminal piece according to the present invention.

[0009] Designated by 10 in Figure 1 is a mobile frame of a door or window frame, such as a window or a French window. The mobile frame 10 comprises an upright 12, which has, on its outer face, a channel 14 delimited, in a usual way, by undercut sides.

[0010] Slidably mounted in the channel 14 is a rod 16 for closing the door or window frame. The rod 16 is governed, together with a similar bottom rod, starting from a closure device, of the cremone-handle type (not shown).

[0011] At its top end, the rod 16 has a hole for engagement of a terminal piece, which is designated as a whole by 20 and will be described hereinafter. For the moment, it will suffice to say that the terminal piece 20 comprises a slider 22, which can slide in the channel 14, and a catch 24 which is designed to engage in a strike 26, of a known type. The strike 26 is fixed to the top cross member of the fixed frame of the door or window frame. The upright 12 is able to co-operate with a corresponding upright (not shown), which forms part of the opposite frame, which may be either fixed or mobile.

[0012] Figure 1 shows the application of a terminal piece according to the invention in the top angle of a

mobile frame. Usually, there is also provided an identical terminal piece installed in the corresponding bottom angle.

[0013] Figures 2 to 4 show the terminal piece 20 according to the invention as a whole.

[0014] The terminal piece 20 comprises a slider 22, which is formed by a flattened and elongated body, for example made of the material known as "Zama". The slider 22 has, in its bottom part, a projecting tab 28 that carries a pin 30, which is adapted to engage in a seat provided on the rod 16 of the door or window frame to connect the slider 22 to the rod 16. The projecting tab 28 is connected to an intermediate part 32, which carries, at the bottom, two runners 34 arranged longitudinally and adapted to engage the channel 14. The slider 22, in its top part, has a resting portion 36, which is further lowered with respect to the intermediate part and is set on the runners 34. In a position corresponding to the axis of symmetry, made in the resting portion 36 are a first coupling hole 38 and a second coupling hole 40.

[0015] The catch 24 is a shaped element made of plastically deformed metal plate. Provided in a position corresponding to the axis of the centre line of the catch 24 are a first seat 42 and a second seat 44, of circular or substantially circular shape.

[0016] The catch 24 is connected in an adjustable way to the slider 22 via a first pin element 46 and a second pin element 48.

[0017] The first pin element 46 has a head 46' and a stem 46" having circular cross sections coaxial with each other and with different diameters. The stem 46" has one end 47 opposite to the head 46'.

[0018] The second pin element 48 has a head 48', an eccentric portion 48", and a stem 48"', having circular cross sections of different diameters. The cross sections of the eccentric portion 48" and of the head 48', coaxial with each other, are arranged in an eccentric way with respect to the cross section of the stem 48"'. The stem 48"' has one end 49 opposite to the head 48'. Made in the head 48' is a seat 50 for engagement by a tool (not shown).

[0019] The bottom part of the catch 24 in its non-deformed area is designed to abut on the top surface of the resting portion 36 of the slider 22. The first pin element 46 engages the first hole 38 of the slider 22 and the first seat 42 of the catch 24, and the second pin element 48 engages the second hole 40 of the slider 22 and the second seat 44 of the catch 24. Definitive fixing is obtained by riveting the first end 47 of the first pin element 46 on the catch 24, and the second end 49 of the second pin element 48 on the slider 22.

[0020] Riveting of the first and second ends 47, 49 connects, in a permanent and not removable way, the catch 24 with respect to the slider 22, to obtain a fixing in a direction transverse with respect to the longitudinal axis of the slider 22.

[0021] The first pin element 46 defines an axis of rotation, about which the catch 24 can only rotate with respect to the slider 22. Adjustment of the terminal piece 20 is made by controlling, by means of a tool (not shown) that is inserted in the seat 50, a rotation of the second pin element 48 about the axis of rotation defined by the first hole 40. As a result of said rotation, the eccentric portion 48" acts as a cam against the second seat 44 of the catch 24, causing a rotation of the catch 24 about the axis defined by the first pin element 46.

[0022] Figures 5 to 7 show the terminal piece in the extreme positions of adjustment.

[0023] Maintenance of the relative position between the catch 24 and the slider 22 is ensured by the pin elements 46, 48, which provide an irreversible system of adjustment. According to how the riveting is performed, the torque that is necessary for making the adjustment is varied.

[0024] The solution according to the invention increases the rigidity of the terminal piece, as has emerged from loading tests conducted by the applicant. The tests were carried out constraining the slide and imposing a displacement upon the catch. The plot of the force necessary to perform the corresponding displacement is represented in a graph. The test was conducted by loading the terminal piece up to a limit value of force of 1.4 kN.

[0025] Figure 8 shows a graph which plots the displacement-force relation of a terminal piece according to the prior art. After a first portion of direct proportionality between displacement and force, the plot loses linearity until a maximum is reached. Between 3 mm and 4.2 mm of displacement, the graph denotes a relative movement (yielding) until a contrast between the elements is reached, when the characteristic resumes its rectilinearity. At the end of the cycle, after removal of the load, the terminal piece presents a residual displacement of approximately 4 mm.

[0026] Figure 9 illustrates a graph obtained in a way similar to the previous one for a terminal piece according to the invention. The continuity of the characteristic provides evidence of the lack of relative displacement (yielding) between the mobile parts making up the terminal piece. Also the residual displacement, given the same testing conditions, at the end of the loading cycle is reduced with respect to the terminal piece according to the prior art and is approximately 1.1 mm.

Claims

1. A terminal piece for closure rods for door and window frames comprising:

   - a slider (22) that is adapted to slide in a channel (14) formed on a peripheral wall of a mobile frame (10) of the door or window frame and to be coupled at one end of a closure rod (16) that can slide in the channel;
   - a catch (24), which projects at one end of the slider (22) and is to engage in a seat of a fixed

strike (26); and
- means of connection and adjustment arranged between the slider (22) and the catch (24) and designed to enable an adjustment of the position of the catch (24) with respect to the slider (22), said means of connection and adjustment comprising a first pin element (46) and a second pin element (48) with respective mutually parallel axes, in which the first pin element (46) defines an axis of rotation, about which the catch can perform movements of rotation, and in which the second pin element (48) is able to turn with respect to the slider (22) and comprises an eccentric portion (48"), designed to govern said movement of rotation of the catch (24);
said terminal piece being **characterized in that** each of said first pin element (46) and second pin element (48) is connected in a permanent and not removable way to the slider (22) and to the catch (24) and enables a fixing of the catch (24) with respect to the slider (22) in the direction of the respective axis.

2. The terminal piece according to Claim 1, **characterized in that** the second pin element (46) cooperates with the slider (22) and with the catch (24) in such a way that corresponding to each given angular position of the second pin element (48) is a given angular position of the catch (24) with respect to the slider (22).

3. The terminal piece according to Claim 1, **characterized in that** each of said first pin element (46) and second pin element (48) is connected with respect to the catch (24) and/or the slider (22) by means of riveting of one end.

4. The terminal piece according to Claim 1, **characterized in that** said first pin element (46) has a head (46') that engages the slider (22) and one end (47) that is riveted in a hole (42) of the catch (24).

5. The terminal piece according to Claim 1, **characterized in that** the second pin element (48) has a head (48') that withholds the catch (24) and one end (49) that is riveted in a hole (40) of the slider (22).

6. The terminal piece according to Claim 1, **characterized in that** said second pin element (48) has a seat (50) for insertion of an actuating tool.

FIG. 1

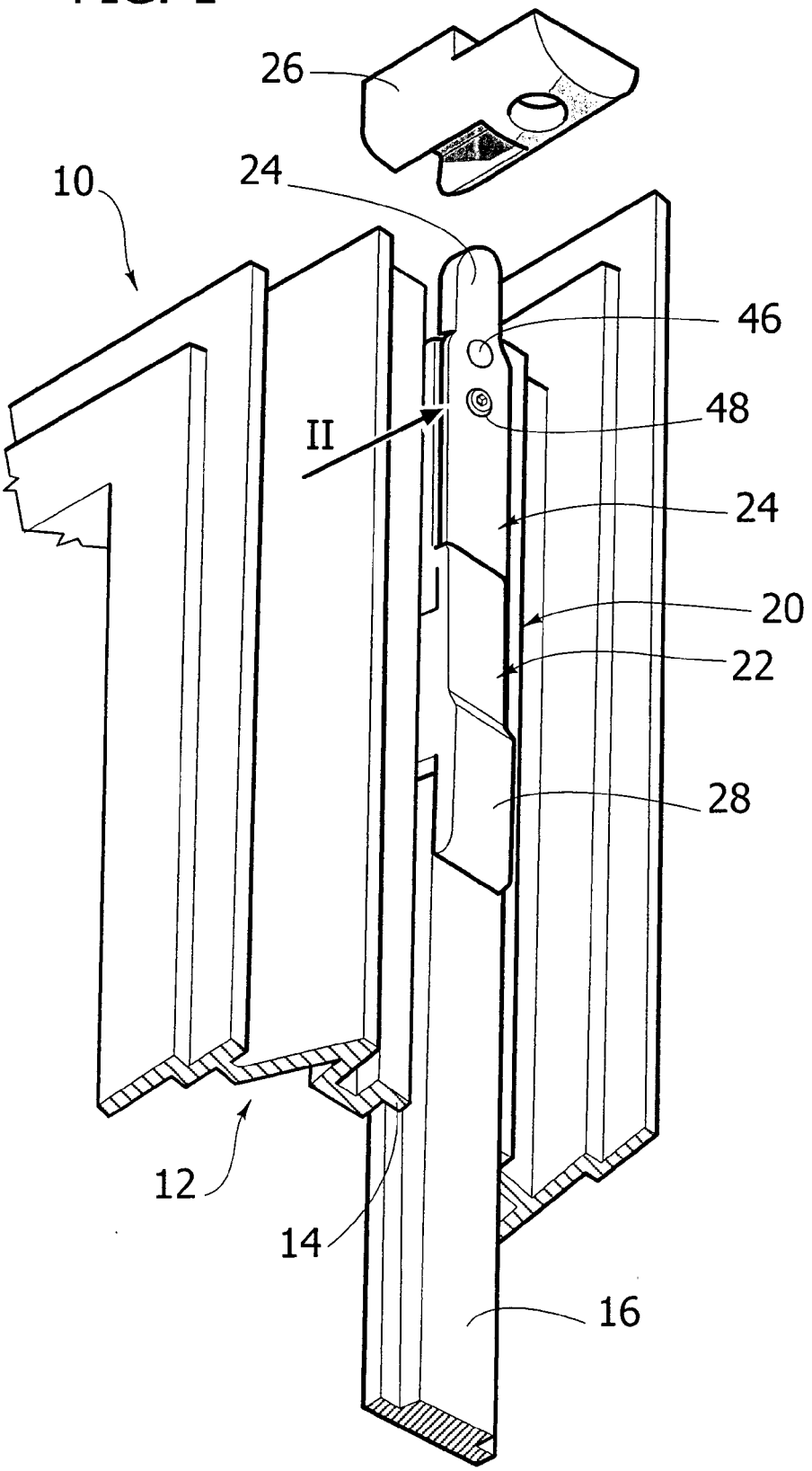
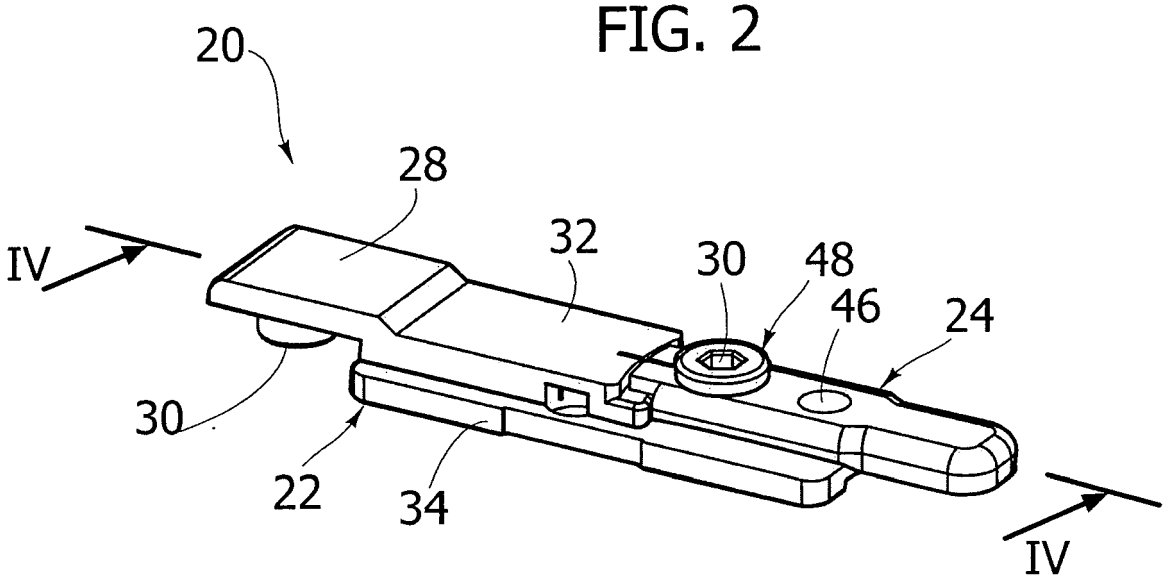


FIG. 2


20
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IV
32
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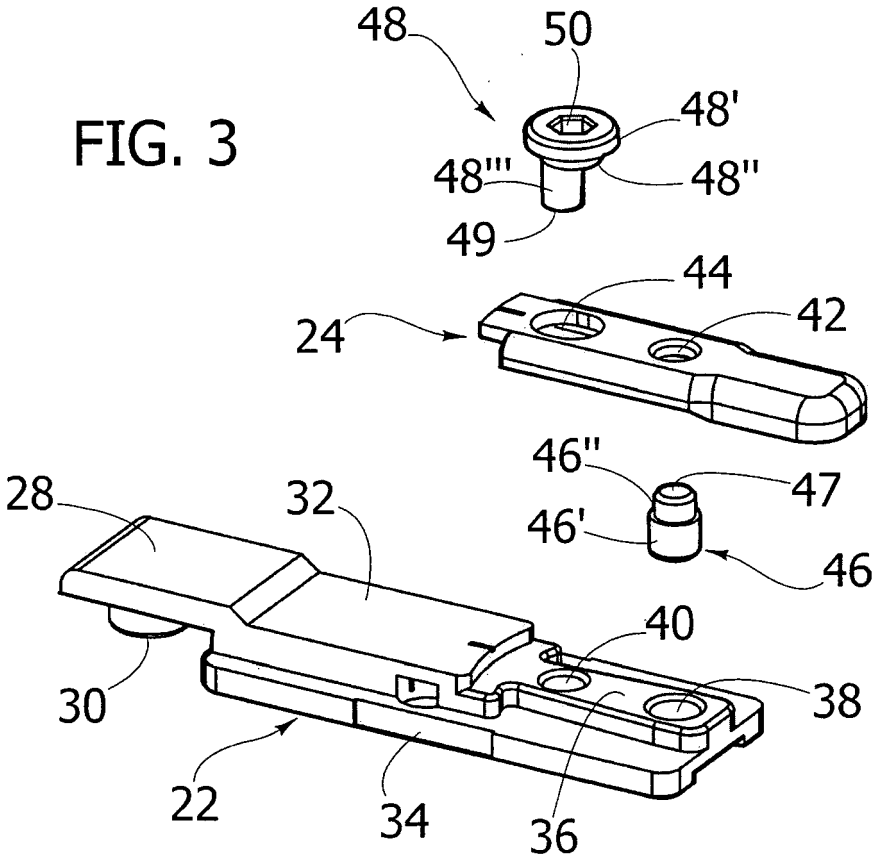
48
46
24
30
22
34
IV

FIG. 3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48'
48'''
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46'
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22
34
36

FIG. 4

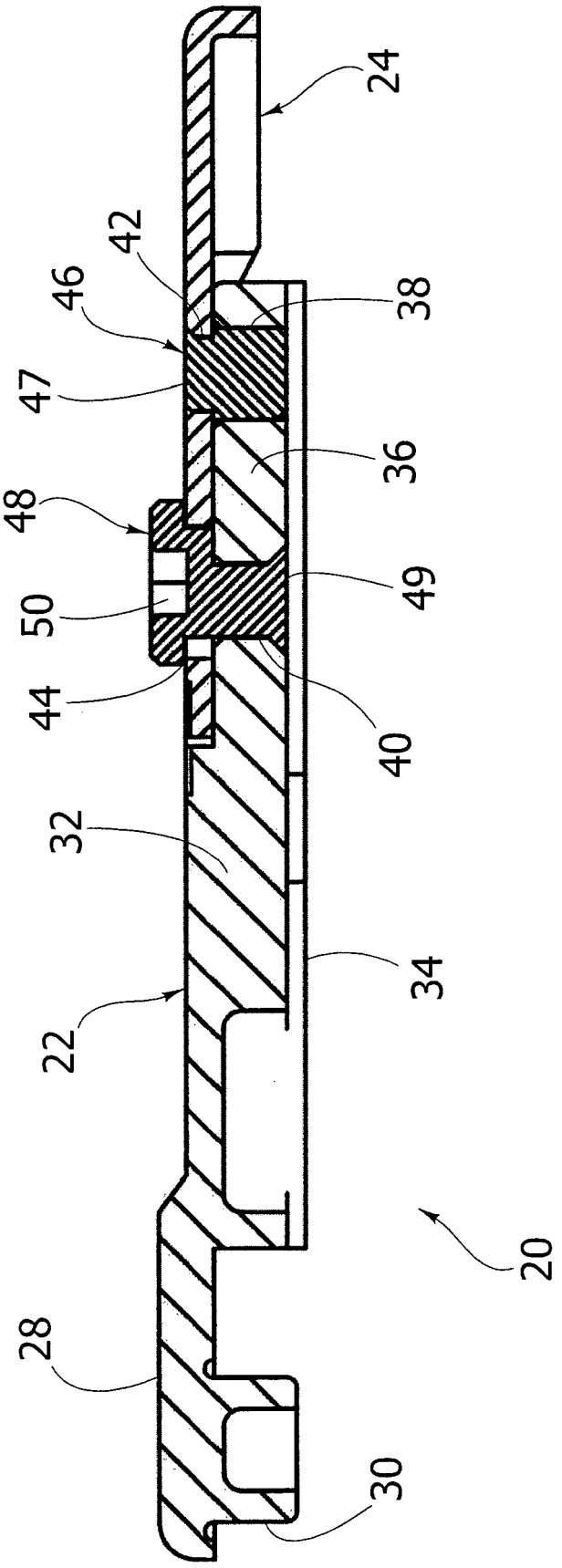

FIG. 7

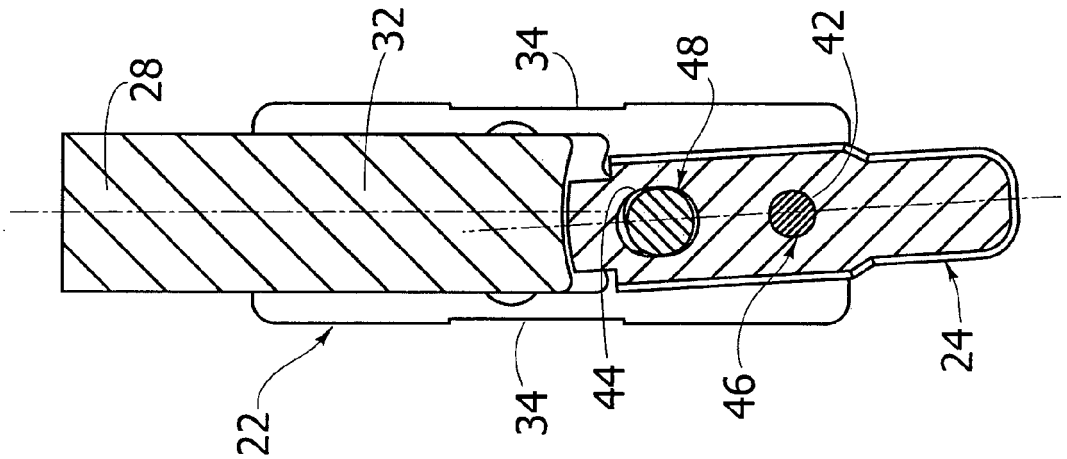

FIG. 5

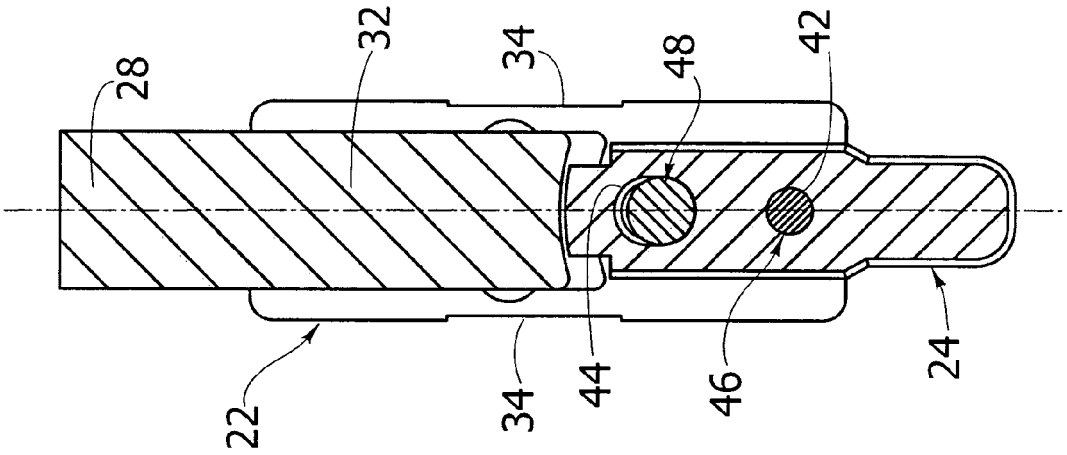

FIG. 6

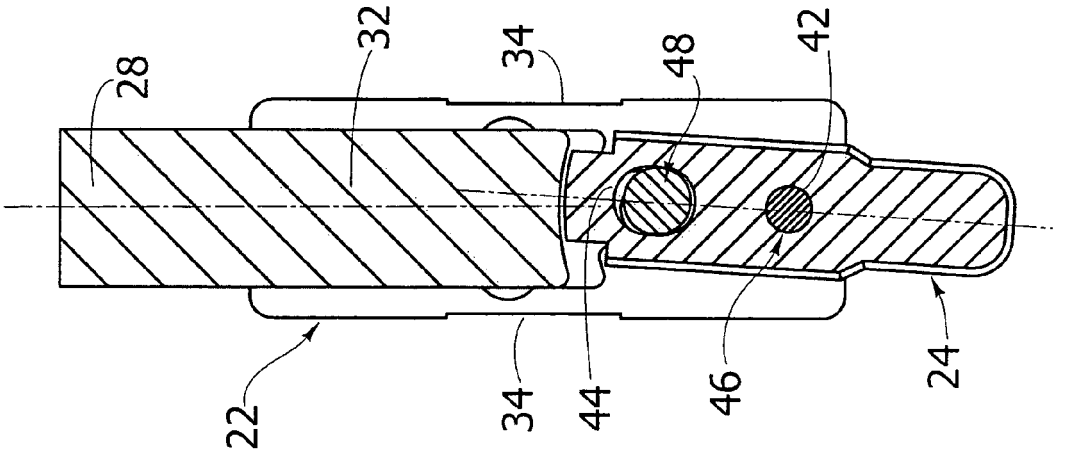

FIG. 8

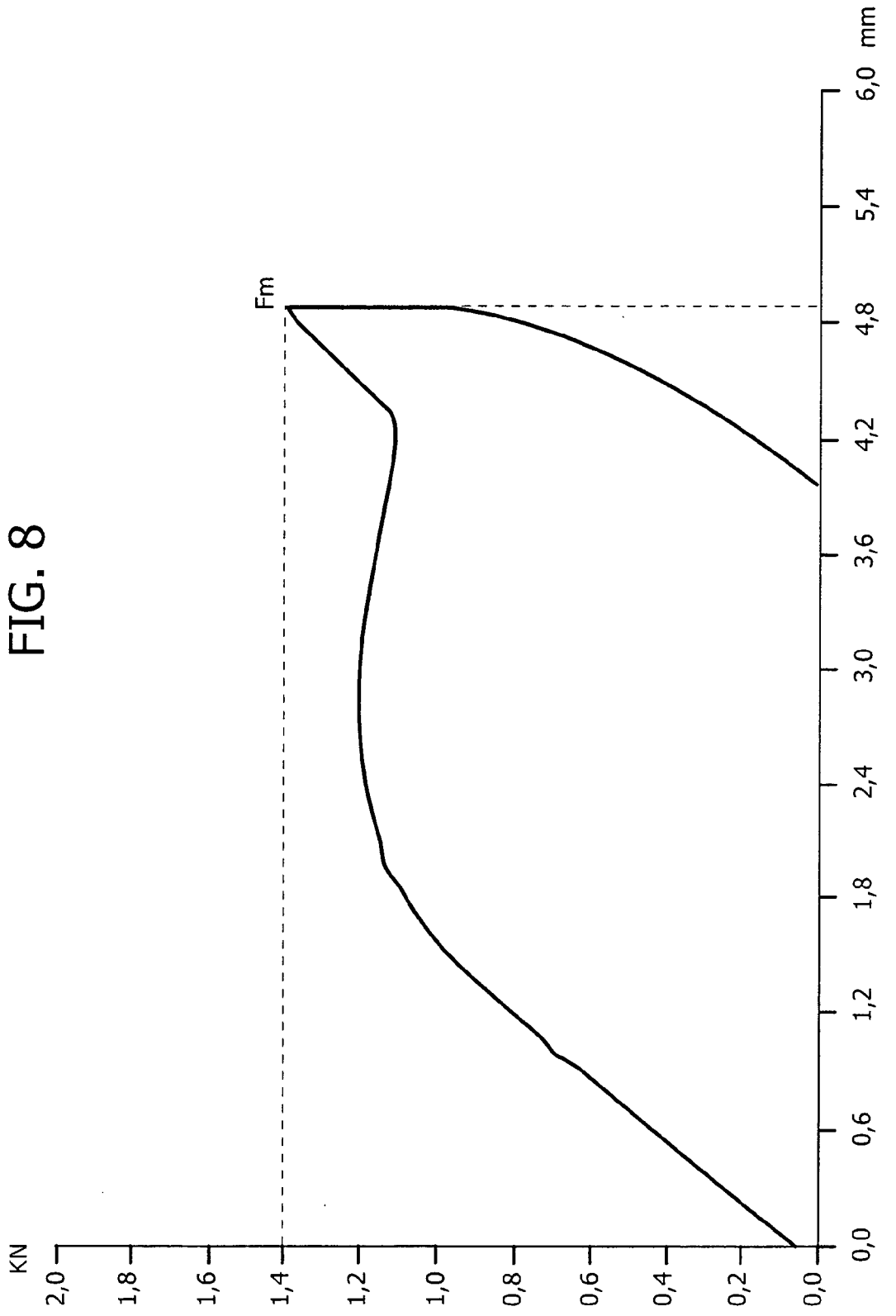
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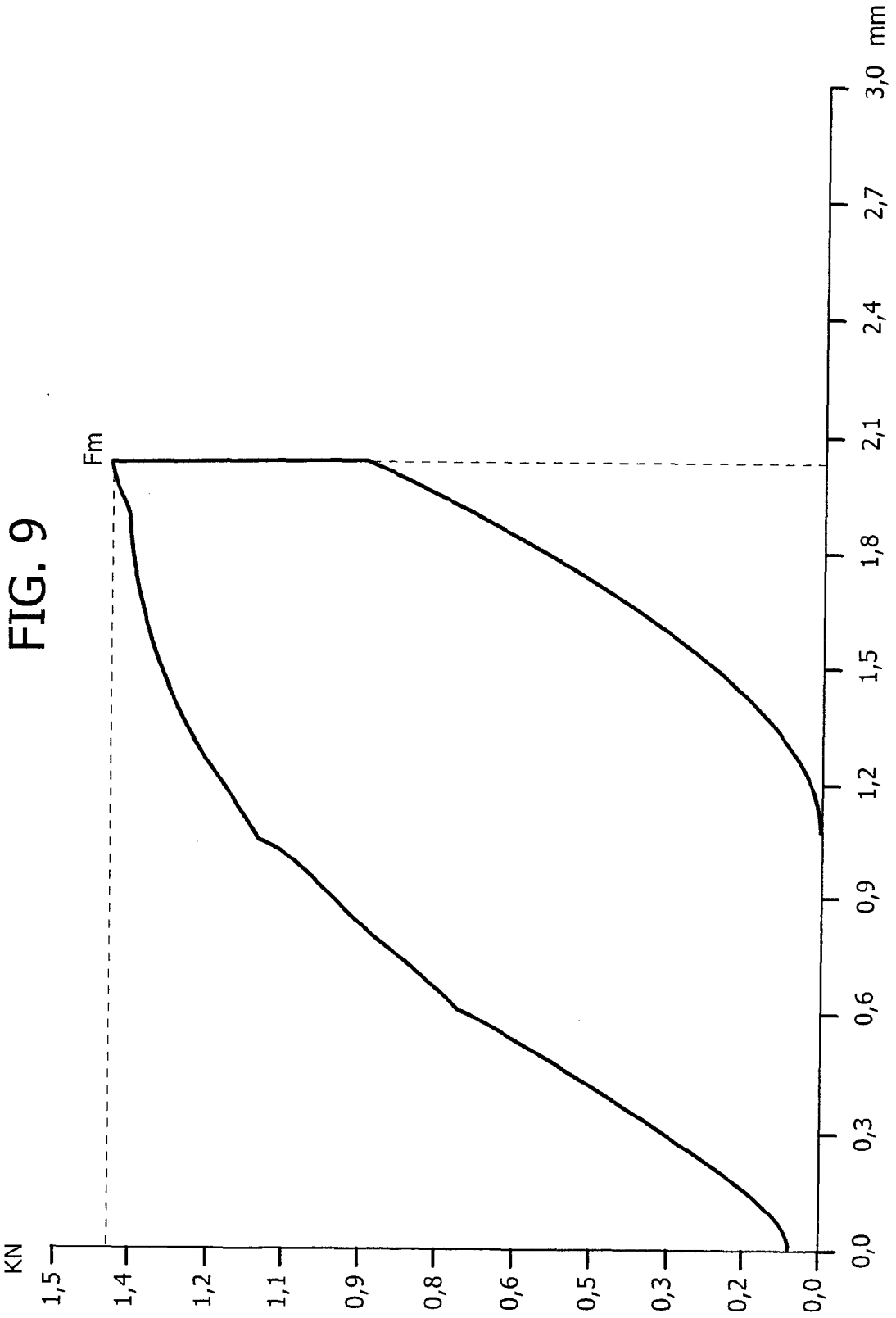
FIG. 9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mm

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EUROPEAN SEARCH REPORT

Application Number
EP 07 42 5008

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 July 2007	PEREZ MENDEZ, J

CATEGORY OF CITED DOCUMENTS

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