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(54) **Ejector applicable to drawers for furniture and the like**

(57) Ejector applicable to drawers for furniture and the like, it consists of a square tubular element 11, within which there slides a parallelepipedon element 12 provided with a housing cavity 121, said housing cavity consisting of two consequent and connected housing cavities: the cavity (121a) being horizontal and achieving the stroke of the ejector, whilst the cavity (121b) is shaped in a

known manner to hook and unhook the "cam" (14); on said square tubular element (11) being provided with a housing cavity (13) of a cam (14) that with the portion (143) thereof running in the cavity (121) defines, owing to the portion of cavity (121a) the stroke of the parallelepipedon element (12), said stroke being obtained with a compression spring M or with a traction spring (M1).

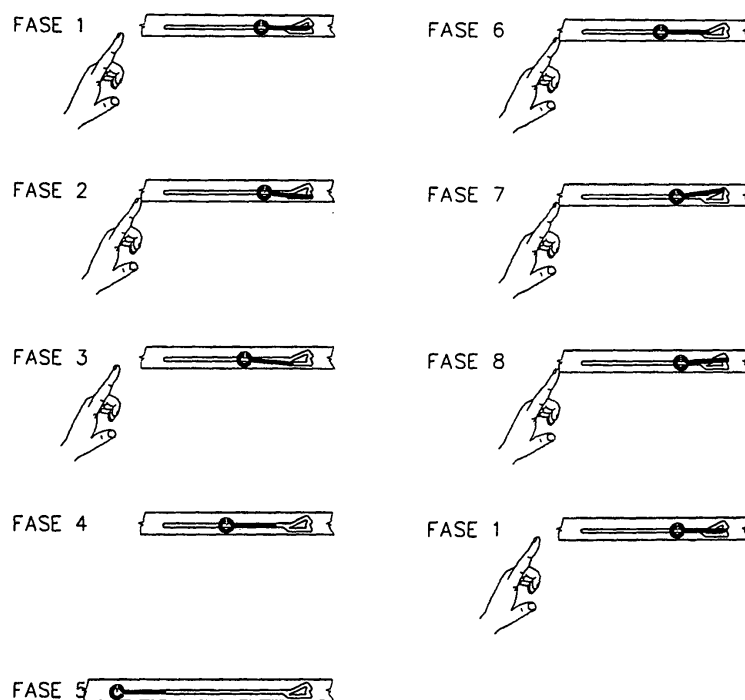


Fig. 4

Description

[0001] The present invention relates to a particular type of ejector applicable to drawers for furniture and the like basically consisting of two elements that are slideable in relation to one another, one inside the other. Said elements that are slideable within one another being moved by a spring through possible compression or traction. The movement thereof being controlled by a "cam" provided with a protruding pawl that slides in a suitable groove obtained in the internal slideable element and applied within a housing cavity made on the external slideable element.

[0002] The various types of ejection or shock absorbing systems are known above all for opening and closing drawers, they are made of an extensive plurality of pieces and have significant constructional complication. An example of this are the various types of system consisting of electric motors that eject the drawers for a few centimetres in a known and complex manner, complex inasmuch as these systems need to be connected to the main power supply, the use of motors and reduction gears for said motors, the installation thereof, which is also very complex, and the consequent reliable operating reliability. Equally, the ejection stroke is short and not always effective from the point of view of extracting the drawer. Not only, but also in use systems of ejection and shock absorption in extraction and consequent reintroduction of the drawers into the furniture that consist of a significant number of pieces. Said ejectors are further often considerable only as recalling and/or retaining elements that recall and/or retain the drawers, not actually absorbing the extraction or introduction stroke thereof, but which act on the drawers with a force, above all as an impulsive recall that is thus not constant and homogenous, often causing the user problems. Often, the drawer being pulled out and entering, in the initial stroke portion, suddenly accelerates the stroke thereof, with consequent problems for the user such as the clearest and most banal risk of fingers becoming jammed between the drawer and the furniture.

[0003] No further time shall be spent disclosing limitations and drawbacks of conventional ejection or "opening" systems of drawers inasmuch as they are known and familiar.

[0004] The object of the present invention is therefore to surmount the aforesaid known drawbacks and this is achieved through the present ejector that is the object of the present invention.

[0005] In order to understand the features and advantages and the advantages of use of this invention, a preferred embodiment thereof is disclosed below and only by way of non-limiting example with reference to the attached drawings in which:

- figure 1 shows a perspective view of one of the ejectors, showing the housing cavity containing the control "cam" of the stroke of the ejector including said

cam;

- figure 2 is the same perspective view figure 1 in which the control "cam" has been removed to indicate the sliding cavity of the cam part that slides therein;
- figure 3 illustrates in a perspective view the control "cam", showing the conformation thereof;
- figure 4 illustrates the sequences of the movement steps of the cam in figure 3, which are moreover known;
- figure 5 shows a side view of the ejector with compression spring in all movement steps thereof, enumerating the steps in a progressive manner with reference to the steps of figure 4.
- figure 6 also shows a side view of an ejector with traction spring that like the ejector in figure 5 will show all the movement steps, enumerating them in a progressive manner with reference to the steps of figure 4;
- figure 7 is a further view of the ejector in figure 5 that shows all the movement steps but with a suitable plate applied for fixing thereof to furniture;
- figure 8 is also a view of the ejector in figure 6 that has the same plates applied to the ejector in figure 7.

[0006] It should be noted that the common details will be indicated by the same numeric references.

[0007] With particular reference to figure 1, the ejector 1 will be noted that consists of a tubular element, preferably with a square external section 11, which contains inside itself a second parallelepipedon element 12 with a square section of dimensions that are suitable for introducing it longitudinally inside the aforesaid tubular element 11.

[0008] Also in figure 1 it will be noted that on a face of the tubular element 11 a through cavity 13 will be made that is suitably shaped for housing the "cam" 14 in the interior of the cavity (13). It is clear that, as shown in figure 1, following the description also in the other figures, the "cam" 14 that is introduced into the through housing cavity 13 does not have any type of pivot as the cavity 13 keeps said "cam" 14 guided and in a stable and correct position.

[0009] In figure 2 the ejector 1 will be illustrated without the "cam" 14 and will show the housing cavity 121, which is disclosed briefly below as it is known, obtained on one of the longitudinal faces of the parallelepipedon element 12.

[0010] The importance of the housing cavity 121 is due to the fact that it can be considered to be divisible into two zones, i.e. a first hollow zone that definitively makes the ejector stroke and will be due to the rectilinear portion 121a thereof and behind the second hollow zone 121b that makes all the locking and release points of the cam 14. The two portions 121a and 121b together make the cavity 121, as indicated above.

[0011] In figure 3 there is shown the conformation of the "cam" 14, which is formed of a circular part 141, to which a rectilinear portion 142 is joined at the part oppo-

site which a short portion leads away that is orthogonal 143 to the rectilinear portion (142) that engages in the housing cavity 121 of the parallelepipedon element 12 as disclosed below.

[0012] Before embarking on a complete description of the ejector with traction or compression spring and of the operation thereof reference is made to figure 4 in which the various movement steps are shown, which are more-over known, of the cam 14 with the portion 143 thereof within the cavity 121 of the parallelepipedon element 12, which are divided into 8 steps.

[0013] Starting from the position that corresponds to step 1, in which the ejector keeps the possible drawer in the closed position, to the other step 2 that is obtained after brief pressure on the drawer that transmits the short movement to the ejector and moves the cam 14 and the portion thereof 143 to a first unhooking position of the portion 143 from the anchoring provided in the housing cavity 121 (portion 121b). After determining, in step 2, the unhooking of the portion 143 of the cam 14 the step 3 is passed through in which said portion 143 will slide for a further short portion (121b), and will then pass to step 4, in which the portion 143 will start to slide within a portion of fairly long horizontal housing cavity (portion 121a), the length of which will be equal to about the ejection length that will be determined in step 5. At the end of the step 5 the drawer is expelled completely for the entire length of the ejector. In order to obtain the closing of the drawers, there is a change from step 5 to step 6 in which it is seen that the portion 143 of the "cam" 14 will travel back along the path made for the entire horizontal portion 121a of the cavity of the parallelepipedon element 12, then step 7 is embarked upon, in which the portion 143 of the "cam" 14 will start to rise within the portion 121b of the cavity 121 along a suitably tilted plane at the end of which the step 8 is obtained that enables position 1 of step 1 to be returned to, i.e. closing of the drawer.

[0014] With reference to figures 5, 6, 7 and 8 all the movement steps of the ejector 1 and the single movements of the components thereof corresponding to the steps and positions of figure 4 will be noted, it is further pointed out that in said figures the springs M and M1 are shown that are applied to give the movements that are necessary for ejection after the hand of the operator has initialised them.

[0015] It is pointed out that as the springs M and M1 can work both in compression and traction in the following figures and descriptions the extraction steps are not discussed, only initially will it be specified that the movement steps and the reaching of the various positions by the extractor will be due to the aforesaid springs M and M1. Further, in the attached figures show fragmentary schematised springs M and M1 for ease of presentation. If reference is now made to the aforesaid figures, it will be noted that precisely in position 1 the ejector 1 is in a position that in the case of application to a drawer C will be the closure position of the drawer C (step 1) i.e. a

position in which the portion 143 of the cam 14 will be in an anchoring position within the housing cavity 121 (portion 121b) of the element 12. In the following position 2 a hand is schematised that approaches and rests on the front portion of the drawer C and moves the element 12 of the ejector 1 for a few tenths of a millimetre in order to apply thereto moderate pressure that will move the portion 143 of the "cam" 14 inside the housing cavity 121 (portion 121b) to a position in which by releasing the drawer, i.e. by removing the pressure from the front of the drawer, the latter will start to exit, i.e. the extraction of said drawer (step 2) will commence. Consequently, position 3 shows the hand that moves away and the element 12 (step 3) will start to slide in a first short portion (portion 121b), controlled by the portion 143 of the cam 14 that slides in the housing cavity 121 (portion 121b) of the element 12 and thus in the consequent position. Moving to position 4 and 5 (steps 4 and 5), it will be noted that the element 12 will start to slide within the tubular element 11 to the end of the housing cavity 121 (portion 121a) of the element 12, and the drawer C will then be ejected completely,

[0016] At this point position 6 will indicate the completely extended ejector 1 and therefore the drawer C detached from the ejector 1, namely from the parallelepipedon element 12.

[0017] It is pointed out that the joining or detaching element between the drawer and the ejector may consist of a magnet Ma as in the illustrated figures or of elastic hooking systems of known type that are illustrated and not numbered in the attached figures.

[0018] Obviously, for the drawer to be closed, steps 5 to 8 will follow to return to the position of step 1, the steps are not disclosed and are illustrated through short descriptions, but the operating concept is clear thanks to the schematic drawings.

[0019] It is pointed out that the operating principle of the extractor 1 may be achieved equally with compression or traction springs M as shown in figures 5, 6, 7 and 8.

[0020] It is also further shown that the length of the ejection stroke of the drawer or of any element to which the ejector is applied is made and due to the cavity part 121a of the cavity 121 and it will be this (121a) that by varying the length thereof will vary the ejection length.

[0021] It is pointed out that the ejectors shown in figures 5, 6, 7 and 8 are shown separately or joined to plates P to fix them to any type of furniture or anything else, obviously other equivalent fixing means being further envisaged.

[0022] Particularly in figures 5 and 7 it will be noted that the ejector 1 "will work" with a compression spring M and will therefore be very thin and will any way permit a significant stroke.

[0023] Figures 6 and 8, on the other hand, show that the ejector 1 "will work" with a traction spring M1, said application system will be less "thin" than the previous one, but shorter and with the same operating principle will achieve a greater ejector stroke than the compression

ejector.

[0024] It is also pointed out, with particular reference to figure 1, that the "cam" 14 is devoid of a rotation pivot, in fact the latter was eliminated due to the creation, in the tubular element 11, of a cavity 13, that (13) "guides" the "cam" 14 without the need for a rotation and positioning pivot, and fixing pivot of the "cam" (14) to the extractor body 1, everything illustrated above leads to a reduction in pieces and therefore a significant reduction in the costs of making ejectors.

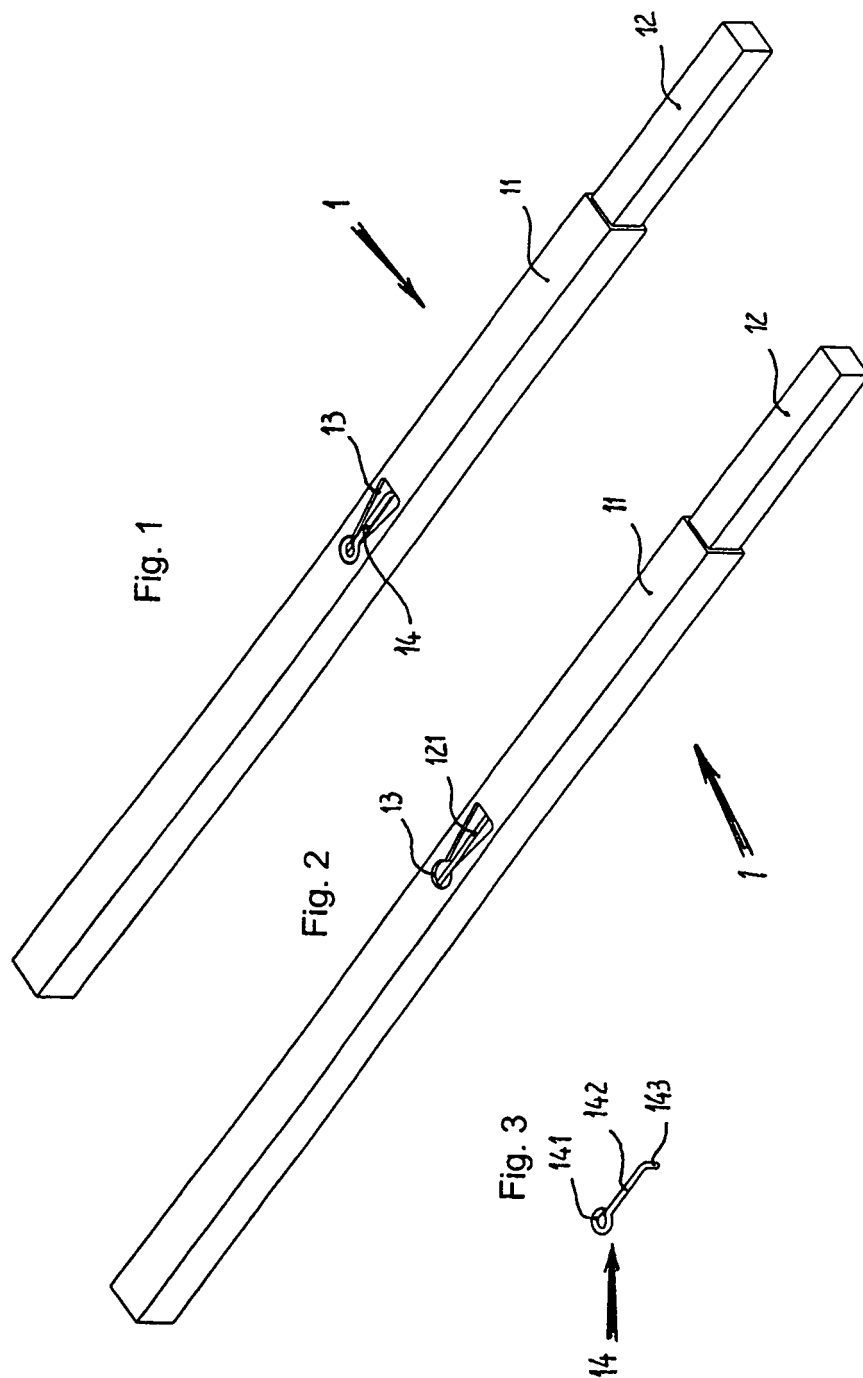
[0025] The aforesaid system thus enables ejectors 1 to be made with limited costs through the use of a smaller number of pieces, with consequent significantly lower manpower costs, in addition, the ejectors thus made will be of significantly reduced dimensions and be applicable to positions and to solutions where traditional ejectors cannot be used.

[0026] The main and significant final advantage is a significant increase in the ejection stroke, which is not obtained with conventional ejectors as the space that is obtainable from the cam is limited.

[0027] It is readily understood that these and other variations can be made to the present invention without thereby falling outside the description and what is claimed below and therefore outside the protective scope of this patent.

Claims

1. Ejector applicable to drawers for furniture and the like **characterised in that** it consists of a square tubular element 11, within which there slides a parallelepipedon element 12 provided with a housing cavity 121, said housing cavity consisting of two consequent and connected housing cavities: the cavity (121a) being horizontal and achieving the stroke of the ejector, whilst the cavity (121b) is shaped in a known manner to hook and unhook the "cam" (14); on said square tubular element (11) being provided with a housing cavity (13) of a cam (14) that with the portion (143) thereof running in the cavity (121) defines, owing to the portion of cavity (121a) the stroke of the parallelepipedon element (12), said stroke being obtained with a compression spring M or with a traction spring (M1).



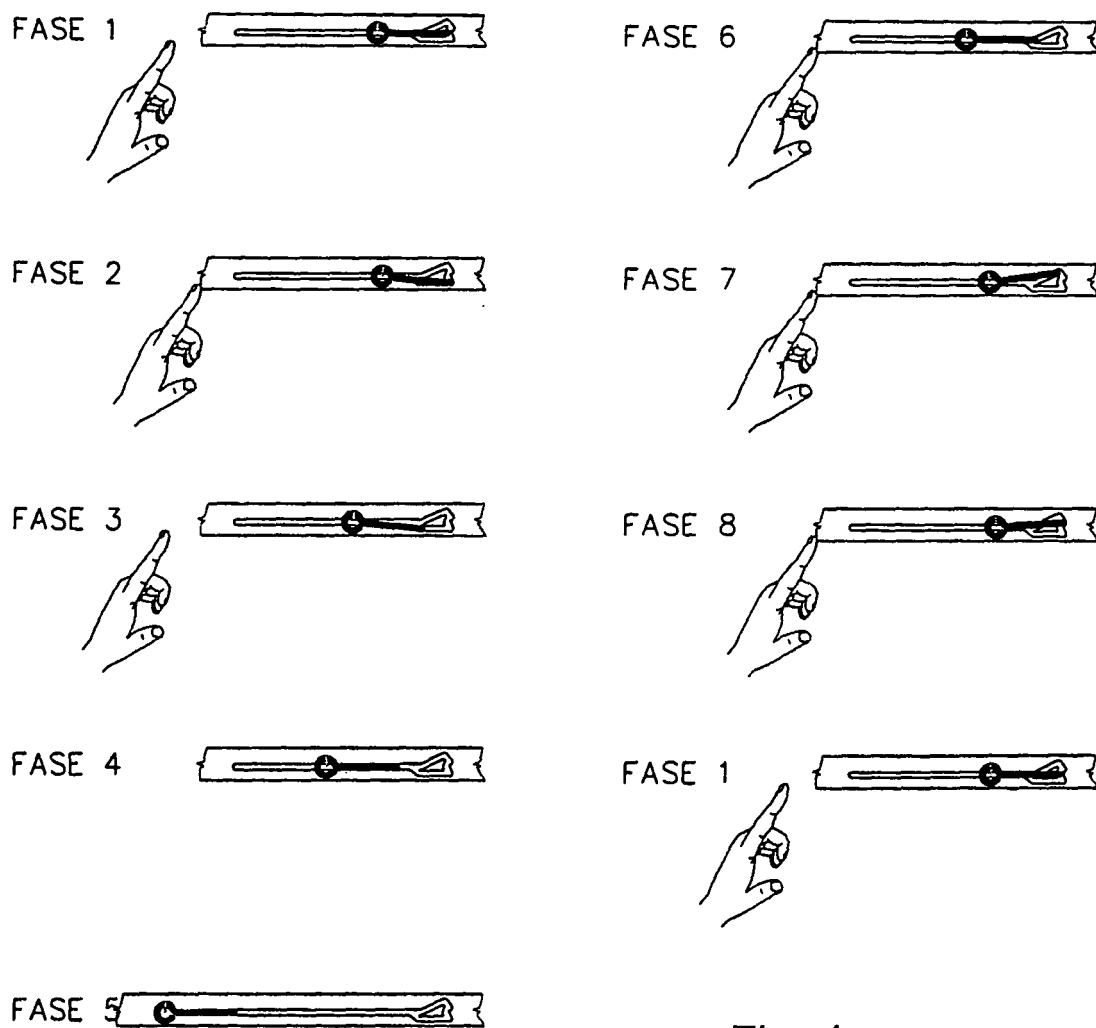


Fig. 4

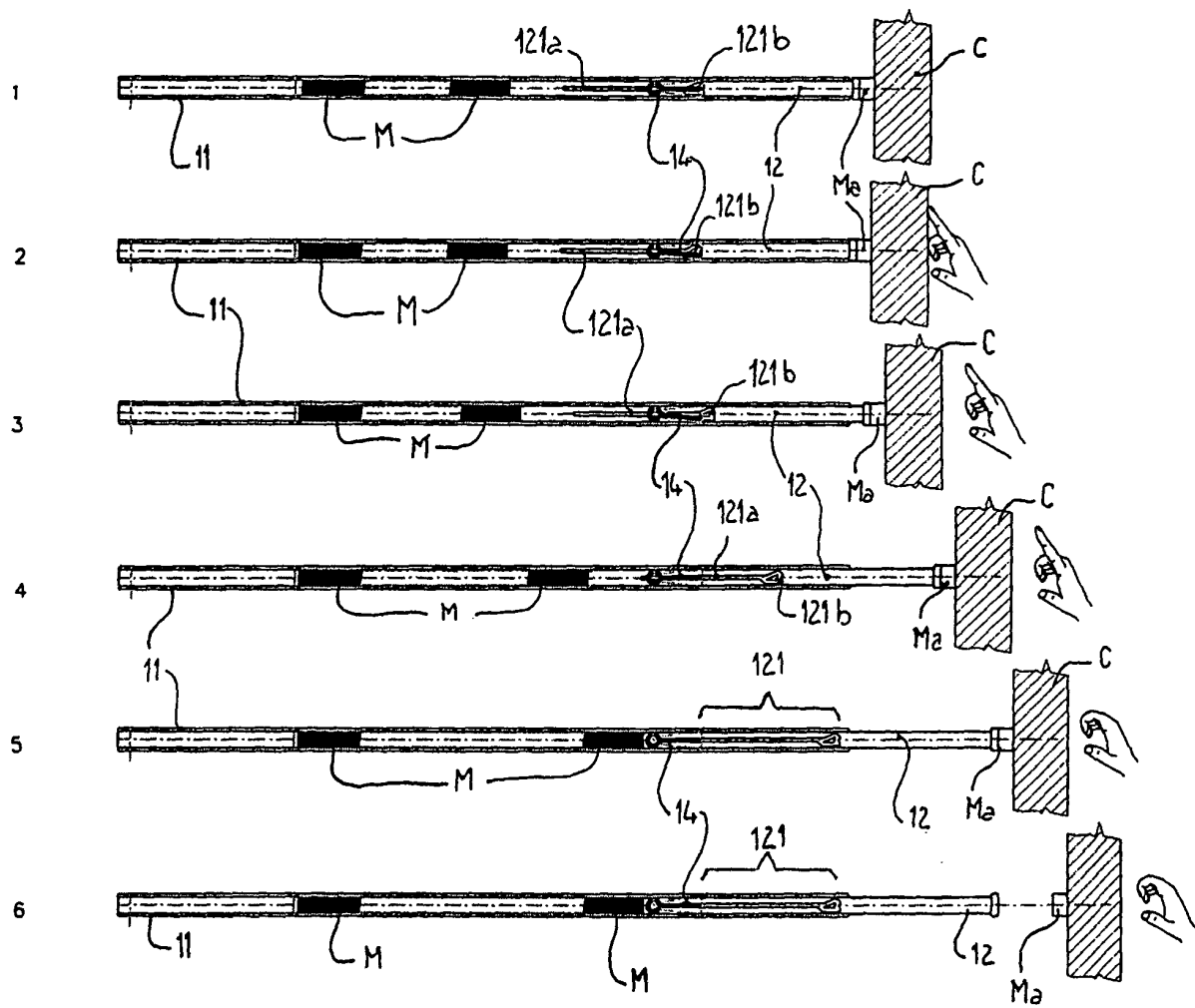


Fig. 5

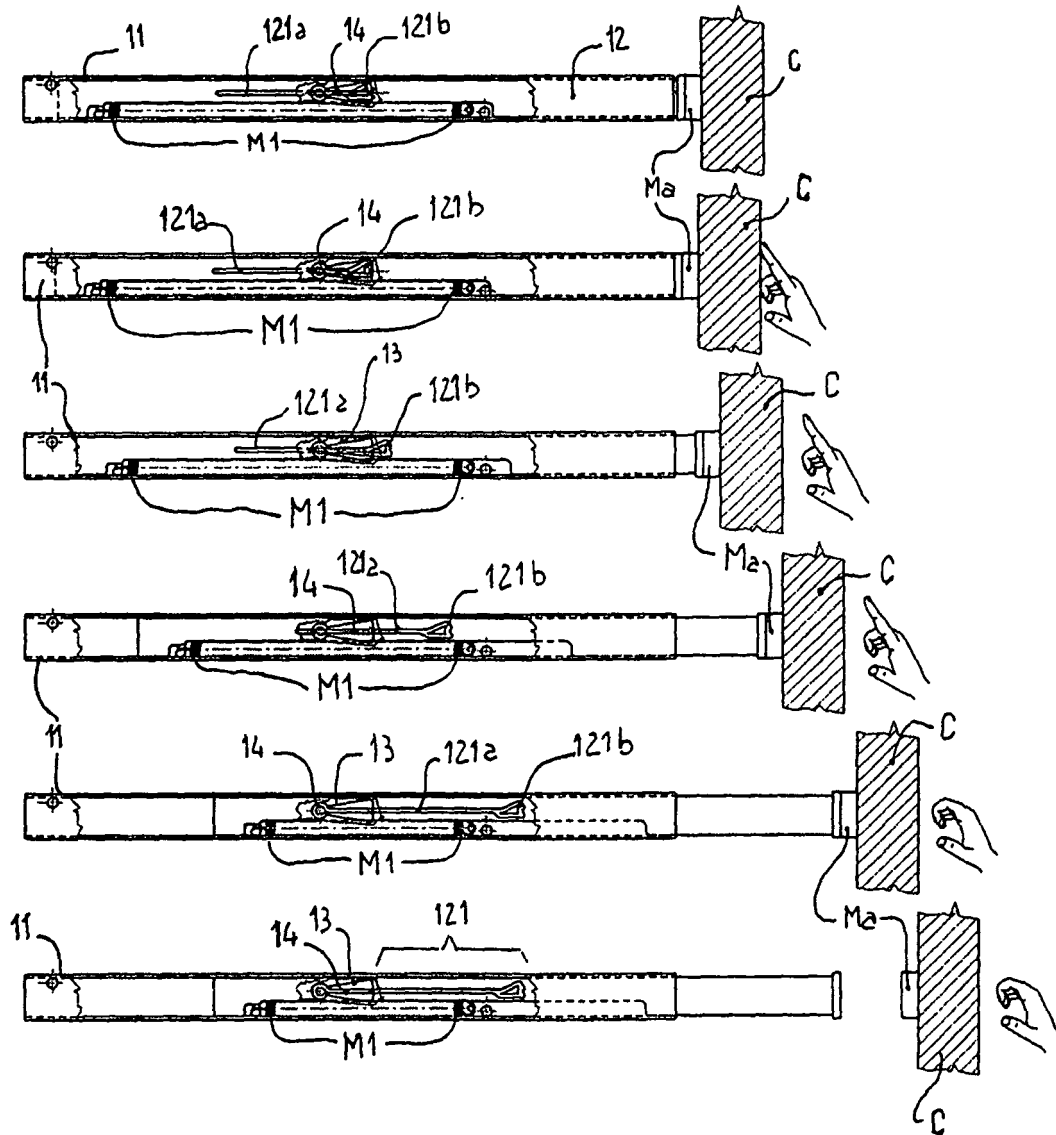


Fig. 6

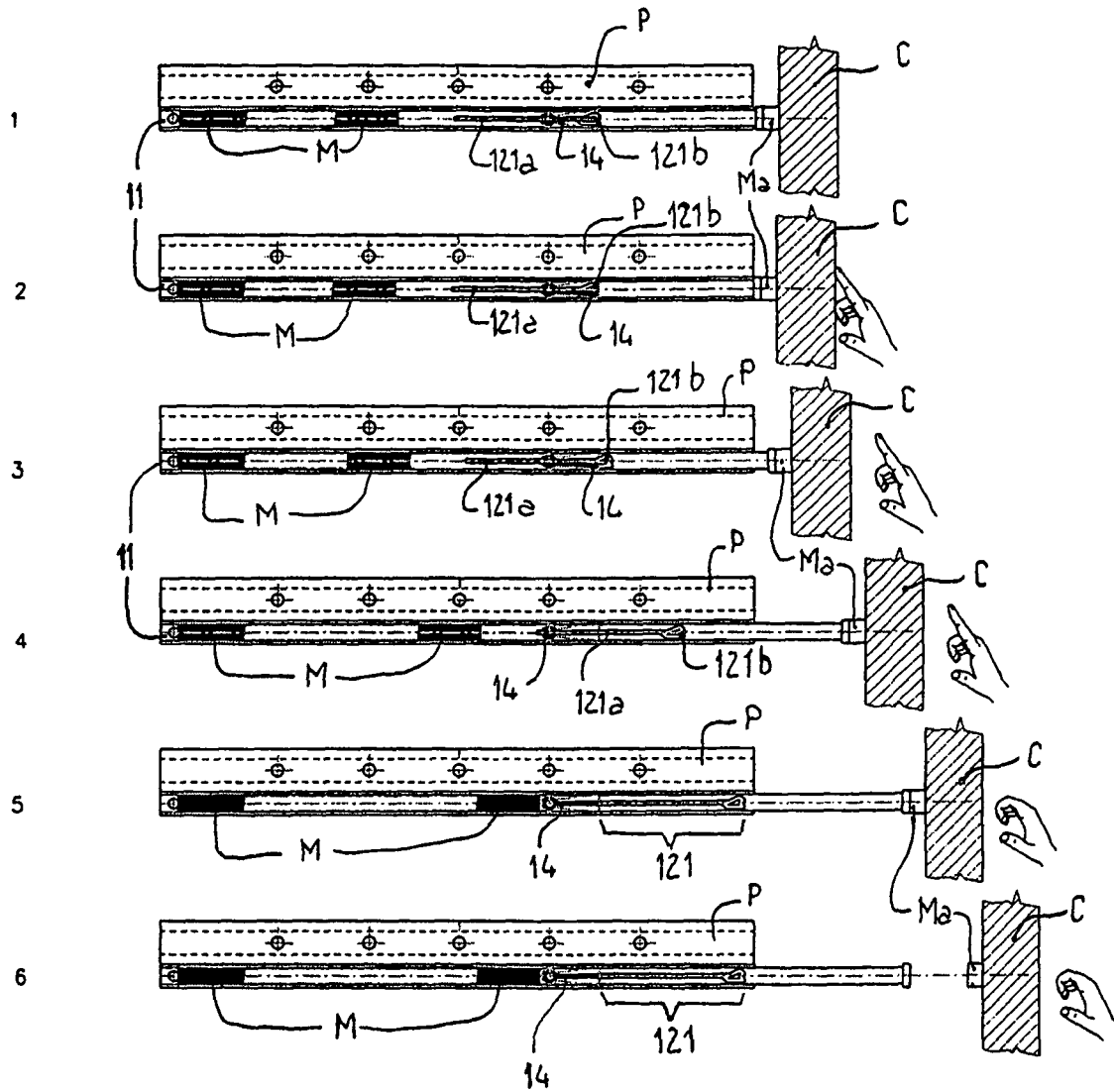


Fig. 7

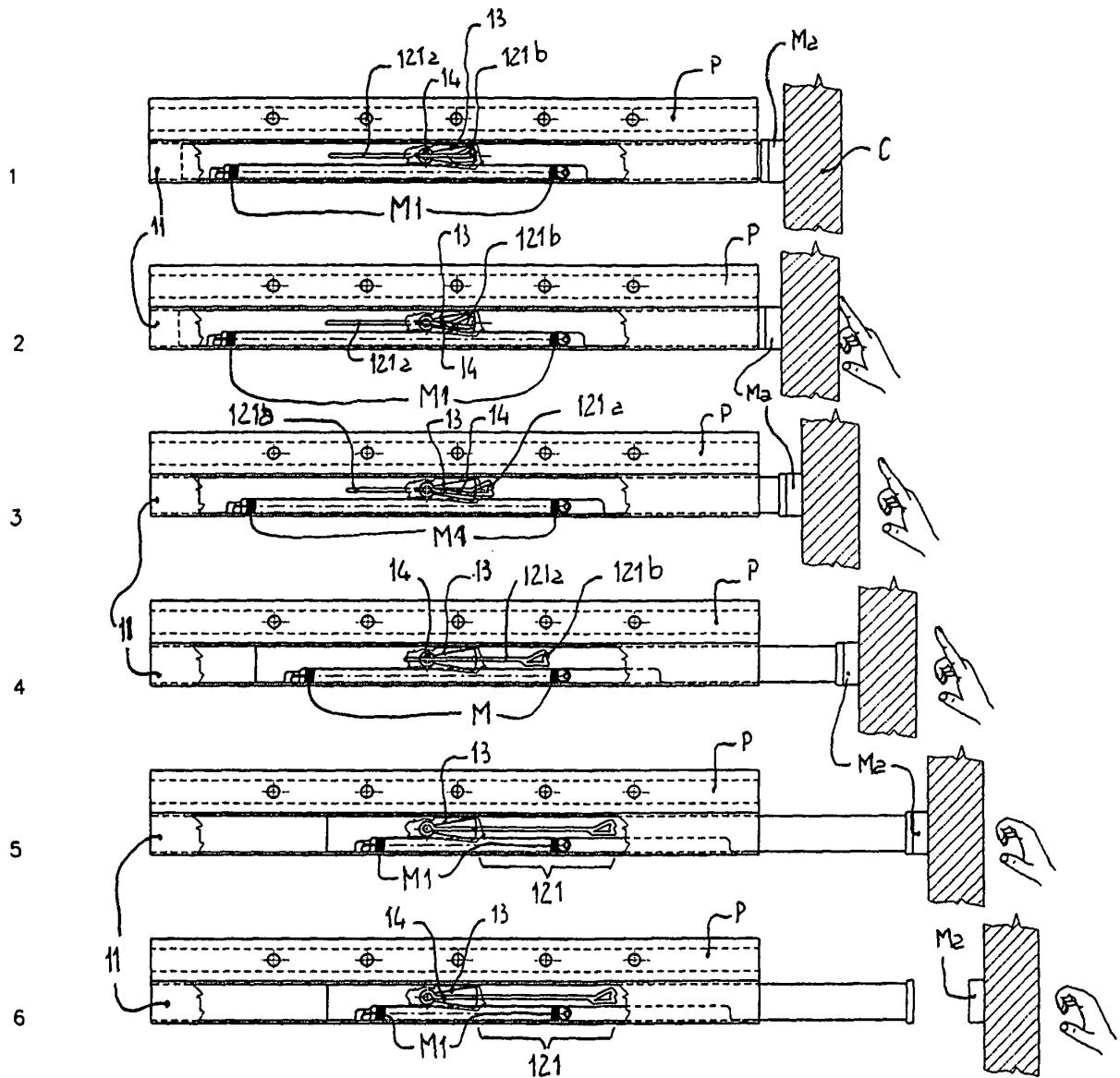


Fig. 8



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 00 6195

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 818 691 A (MCMAHAN ROBERT L [US] ET AL) 6 October 1998 (1998-10-06) * abstract; figure 8 * * column 10, line 18 - column 11, paragraph 2 *	1	INV. A47B88/04
A	DE 198 22 694 A1 (VOLKSWAGEN AG [DE]) 25 November 1999 (1999-11-25) * column 5, paragraph 2 - column 6, paragraph 1; figure 5 *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E05C A47B
Place of search		Date of completion of the search	Examiner
The Hague		13 August 2007	Jones, Clive
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 00 6195

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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13-08-2007

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