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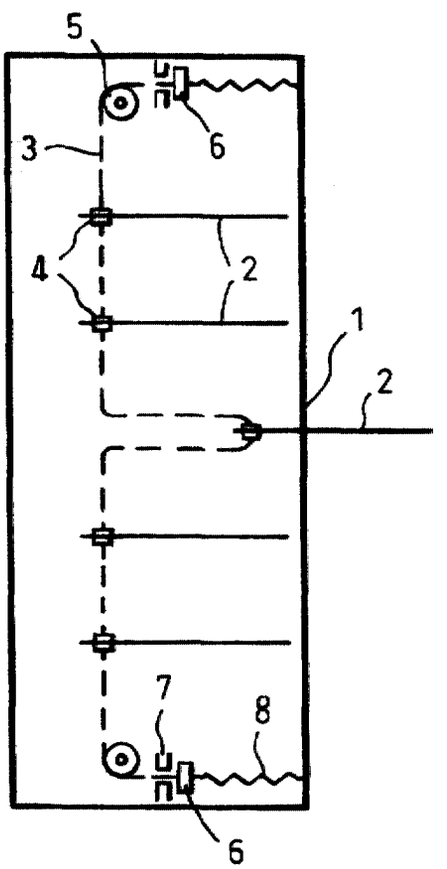
(54) Safety mechanism for telescopic shelves

(57) A mechanism for limiting the number of telescopic shelves which can be extended simultaneously from a cabinet, the mechanism comprising: two or more telescopic shelves arranged one above another: and means for limiting the number of shelves which can be fully extended at any one time, said means including an elongate flexible member connected to each of the shelves.

Fig.2.



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Description

[0001] This invention relates to a safety mechanism for use with telescopic shelves and, more particularly, to a mechanism which limits the number of shelves which can be extended simultaneously from a cabinet.

[0002] It is well known that multiple telescopic shelf facilities such as filing cabinets or storage cabinets for telecommunications devices, can often be heavily loaded with equipment. It has long been recognised that such shelf facilities are susceptible to tipping if too many shelves are extended at any one time. This is especially relevant if it is the upper shelves which are extended.

[0003] This problem has increased dramatically as the growth in data networking and the Internet has greatly increased the volume of computers, switches, modems and the like which need to be accommodated in office buildings. As a result, multiple telescopic shelf facilities are being produced in much taller heights than previously. In such instances, the need for foolproof control of the telescopic shelf extension is particularly important.

[0004] Accordingly, it is well known by users of the shelf facilities that only the minimum number of telescopic shelves should be extended at any one time as, if too many shelves are extended, the shelf facility can easily tip over with dangerous consequences to both people and equipment. Unfortunately, some users may forget the inherent dangers of extending too many shelves and therefore the risks associated with tipping cabinets may still occur.

[0005] Prior devices for limiting the number of shelves or drawers which can be extended at any one time have been restricted to use in filing cabinets in which the drawer position is fixed, or at least can only be varied in a stepwise manner. For example, as a drawer is extended, extension of the remaining drawers may be prevented by a bar or bars vertically movable into engagement with the drawer or drawers which is (are) not being extended. However, such a device is complex and, once in place, does not allow for minor adjustments in shelf height.

[0006] The present invention is aimed at overcoming the above problems.

[0007] According to the present invention, there is provided a mechanism for limiting the number of telescopic shelves which can be extended simultaneously from a cabinet, the mechanism comprising:

> two or more telescopic shelves arranged one above another: and
>
> means for limiting the number of shelves which can be fully extended at any one time, said means including an elongate flexible member connected to each of the shelves.

[0008] A further advantage of such an arrangement is that the height of each shelf can be infinitely adjusted within the confines of the cabinet to maximise the available space without the need to reconfigure extensively the mechanism for limiting multiple shelf extension.

[0009] Preferably, the mechanism limits the number of shelves which can be extended to one. Alternatively, when the shelves are not heavily loaded, the mechanism may be arranged to allow more than one shelf to be extended.

[0010] The flexible member may be a closed loop and may be connected to each of the shelves twice, once on each side of the loop, preferably at the rear of the shelf, such that as a shelf is pulled forward, one side of the loop is extended and the other side is retracted along the line of the shelf.

[0011] Preferably, the flexible member passes either through eyelets or round quick release hooks in or on the telescopic shelves.

[0012] Eyelets or pulleys, through which the flexible member may pass, or bars around which the flexible member can run, can be fixed at the top and bottom respectively of a cabinet in which the telescopic shelves are mounted.

[0013] The telescopic shelves may be provided with locking means for retaining the shelves in the fully extended position.

[0014] The flexible member may be provided with a stop end which may be arranged such that it is in contact with its respective eyelet when one of the telescopic shelves is in its fully extended position. In this way, the amount of slack available is limited to allow only the permitted number of shelves to be extended. If an additional telescopic shelf is pulled out at this stage, this action will effectively try to shorten the flexible member and will result in either pulling the already extended shelf or shelves back into the retracted position or prevent the additional shelf from moving, if the original shelf or shelves is (are) locked out.

[0015] The flexible member may be positioned at one of the rear corners or at the side of the shelves so that the maximum space is left for electrical wiring or the like. The mechanism may be constructed such that it is as compact as possible to reduce the space taken up within a cabinet. For example, when the flexible member is in a closed loop, the two sides of the loop may be almost touching.

[0016] Additionally, a tensioning system may be added to control the slack in the flexible member, particularly when no shelves are in the extended position.

[0017] The tensioning system may include elastic or spring end details to the flexible member. Alternatively or additionally, coiling devices may be provided for retaining excess slack. Such coiling devices or the spare cable may be weighted such that it will fall to the base of the cabinet.

[0018] Alternatively, the flexible member itself may be elastic or have elastic regions such that it can be stretched to allow only the required amount of extension to accommodate the extension of the permitted number

of shelves.

[0019] In a further embodiment, fixed eyelets, pulleys or bars may be provided on the housing of a cabinet, adjacent to each telescopic shelf. If the flexible member is fed through or around these fixings, the resultant installation prevents multiple shelves being partially extended and also reduces the sharing of the slack cable. Alternatively, the flexible member may run within a cable tray which may be provided with holes which may function in a similar manner to the eyelets, pulleys or bars.

[0020] In a still further embodiment, the lower end of the mechanism may be linked to a telescopic plinth. The plinth may be movable between a retracted position in which it is retained within the cabinet in which the mechanism is housed and an extended position in which it projects from the cabinet on the same side as the telescopic shelves. By passing the flexible member around two fixed points which may be pulleys, bars or eyelets and fastening the end of the flexible member to the rear of the plinth, the slack which would normally allow the permitted number of shelves to extend is taken up by the inward locking movement of the plinth. Thus, when the plinth is in the closed position, the flexible member is taut and no shelf is free to extend. However, when the plinth is extended, the permitted amount of slack is created in the flexible member and the permitted number of shelves can be extended out from the cabinet. As the plinth is extended on the same side of the cabinet as the shelves, the cabinet is additionally stabilised by the plinth. In this embodiment, a tensioning device may be released when the plinth is extended. Additionally, the plinth may be lockable in each of the retracted and extended positions for additional control.

[0021] In a yet further embodiment, one or more of the shelves may comprise two half shelves. Each half shelf may be connected to the same point on the flexible member so that if one half shelf is extended, the other shelf can also be extended without requiring additional slack. Alternatively, each half shelf may be connected to different points on the flexible member such that they function as independent shelves, each requiring their own slack when extended.

[0022] Embodiments of the present invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is a schematic side view of a cabinet using the mechanism according to the present invention and in which the shelves are in the closed position;

Fig. 2 is a side view of the cabinet of Fig. 1 with a shelf in the extended position;

Figs. 3A, 3B, 4 and 5 show different tensioning means for use with the mechanism according to the present invention;

Fig. 6 shows the addition of a telescopic plinth, in the retracted position;

Fig. 7 shows the telescopic plinth in the extended position together with a tensioning means;

Fig. 8 shows an alternative embodiment of the present invention in which the flexible member forms a closed loop;

Fig. 9 shows a yet further embodiment of the present invention in which the flexible member forms a closed loop; and

Fig. 10 shows a perspective view from above and one side of a yet further embodiment of the present invention.

[0023] The cabinet 1 shown in Figs. 1 and 2 is provided with a number of shelves or drawers 2 which can be positioned at any height within the cabinet 1. Towards the rear of the cabinet 1, a flexible member 3 runs vertically and passes through eyelets 4 on the shelves 2. The flexible member 3 passes through further eyelets 5 at the top and bottom of the cabinet 1. The flexible member 3 is attached at each end to a stop end 6 which, when a shelf 2 is fully extended, abuts with bushings 7. Tension is maintained in the flexible member 3 by springs 8 which are attached between the cabinet and the stop ends 5.

[0024] Fig. 3A shows a weighted end 9 attached to the flexible member 3 to provide the required tension. In Fig. 3B, the slack flexible member 3 can be seen at the base of the cabinet 1. A retractable coiling device 10 can be seen in Fig. 4 and this ensures that any slack in the flexible member 3, when the shelves 2 are in the retracted position, is stowed away. In Fig. 5, the flexible member 3 is elastic so that it can extend by a limited length which provides sufficient slack for a single shelf to be extended. A plinth 11 can be seen in Figs. 6 and 7. The flexible member 3 passes through the lower eyelet 5 and then doubles back around an additional point 12, which may also be an eyelet and is then fixed to the end of the plinth 11. In Fig. 6, when the plinth 11 is moved from its shown retracted position, to its extended position (not shown), slack is created within flexible member 3 such that one of the shelves 2 can be extended.

[0025] Alternatively, as can be seen in Fig. 7, when the plinth is in its extended position, it may allow sufficient slack to be created in flexible member 3 against the action of a spring 8 which will maintain tension in flexible member 3. In this arrangement, the flexible member 3 is not connected to the plinth 11 but to the spring 8. When the plinth 11 is in the retracted position, the spring 8 is at rest and the slack in flexible member 3 is taken up, thus preventing any shelf from being extended.

[0026] Alternative arrangements can be seen in Figs. 8 and 9 in which the flexible member 3 forms a closed loop linking the shelves. In this way, it is not necessary to provide non-fixed ends such as the stop ends 6. The arrangement of Fig. 8 is provided with a tensioning spring 13 for maintaining tension within the flexible member 3 and for taking up any slack. An additional flexible member 14 is connected to the flexible member 3 adjacent to its connection to the tensioning spring 13.

This additional flexible member 14 is then connected to a plinth 11 by a similar mechanism to that described in Fig. 6.

[0027] The arrangement of Fig. 9 shows the flexible member 3 in an alternative closed loop arrangement such that it passes through additional eyelets (not shown) to contact each shelf 2, towards its rear, in two locations such that as a shelf is extended, one side of the loop is extended and the other side is retracted along the line of the shelf 2.

[0028] In Fig. 10, two half shelves 2a, 2b can clearly be seen. Each half shelf 2a, 2b is connected to the flexible member 3 by respective ties 3a, 3b. The arrangement given in solid line shows how each half shelf 2a, 2b can be joined to the same point on the flexible member 3. In this arrangement, as one half shelf 2a is extended, slack is created in the tie 3b such that the other half shelf 2b could be extended if required. The alternative arrangement given in broken line shows how each half shelf could be connected to different points on the flexible member. In this arrangement, when one half shelf 2a is extended, the other half shelf 2b cannot be extended unless there is additional slack in flexible member 3. The half shelves 2a, 2b are shown attached to a closed loop flexible member but they could also be used with the flexible member as shown in any of Figs 1 to 7.

[0029] Whilst the embodiments described above are related to the permitted extension of only a single shelf or, in the case of Fig. 10, two half shelves, the mechanism of the present invention may be used to permit a greater number of shelves to be extended by increasing the amount of slack that is made available.

Claims

1. A mechanism for limiting the number of telescopic shelves which can be extended simultaneously from a cabinet, the mechanism comprising:

   two or more telescopic shelves arranged one above another: and
   means for limiting the number of shelves which can be fully extended at any one time, said means including an elongate flexible member connected to each of the shelves.

2. A mechanism according to claim 1, wherein only a single shelf can be extended at any one time.

3. A mechanism according to either claim 1 or claim 2, wherein the flexible member forms a closed loop.

4. A mechanism according to claim 3, wherein the flexible member connects to each shelf twice, once on each side of the loop, such that as a shelf is extended, one side of the loop is extended and the other side of the loop is retracted along the line of the shelf.

5. A mechanism according to any one of the preceding claims, wherein the flexible member passes through eyelets or around quick release hooks in or on the telescopic shelves.

6. A mechanism according to any one of the preceding claims, wherein eyelets, pulleys or bars are fixed at the top and bottom respectively of a cabinet in which the telescopic shelves are mounted, and through or around which the flexible member may pass.

7. A mechanism according to any one any one of the preceding claims, wherein the flexible member is provided with a stop end which abuts with its respective eyelet, pulley or bar when one of the telescopic shelves is in its fully extended position.

8. A mechanism according to any one of the preceding claims, wherein the telescopic shelves are provided with locking means for retaining the shelves in the fully extended position.

9. A mechanism according to any one of the preceding claims, further comprising a tensioning system for controlling the slack in the flexible member.

10. A mechanism according to claim 9, wherein the tensioning system includes one of the following: elastic or spring end details to the flexible member, flexible member coiling devices or weighting means.

11. A mechanism according to claim 9, wherein the flexible member is elastic or has elastic regions such that it can be stretched to allow only the required amount of extension to accommodate the extension of the permitted number of shelves.

12. A mechanism according to any one of the preceding claims, wherein fixed eyelets are provided on the housing of a cabinet adjacent to each telescopic shelf.

13. A mechanism according to any one of the preceding claims, wherein the lower end of the mechanism is linked to a telescopic plinth, and wherein the plinth is movable between a retracted position in which it is retained within the cabinet in which the mechanism is housed and an extended position in which it projects from the cabinet on the same side as the telescopic shelves.

14. A mechanism according to claim 13, further comprising a tensioning device which is released when the plinth is extended.

15. A mechanism according to either claim 13 or claim 14, wherein the plinth is lockable in each of the retracted and extended positions for additional control.

16. A mechanism according to any one of the preceding claims, wherein one or more of the shelves may comprise two half shelves.

17. A mechanism according to claim 16, wherein each half shelf is connected to the same point on the flexible member so that if one half shelf is extended, the other shelf can also be extended without requiring additional slack.

18. A mechanism according to claim 16, wherein each half shelf is connected to different points on the flexible member such that they function as independent shelves, each requiring their own slack when extended.

Fig.1.

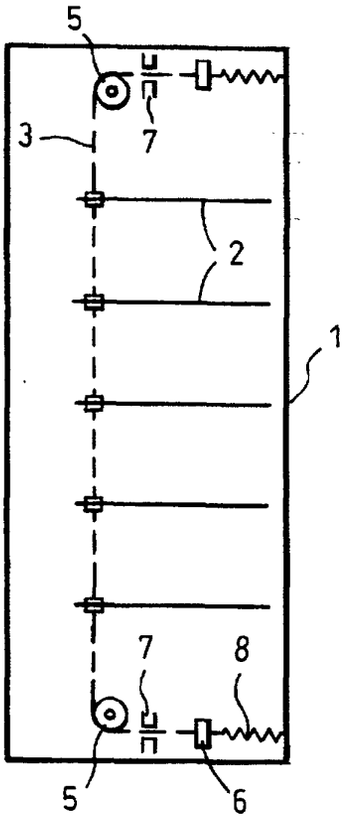


Fig.2.

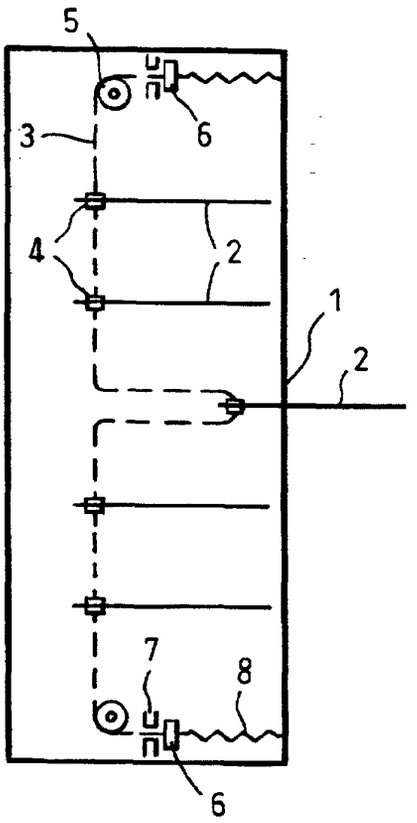


Fig.3A.

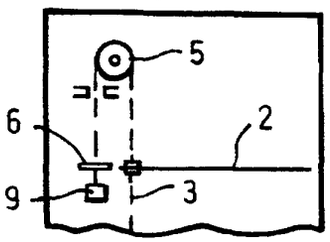


Fig.3B.

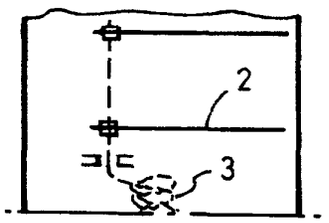


Fig.4.

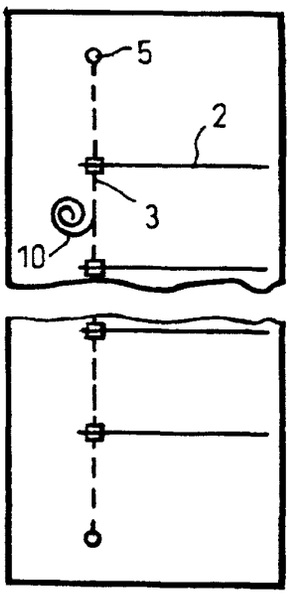


Fig.5.

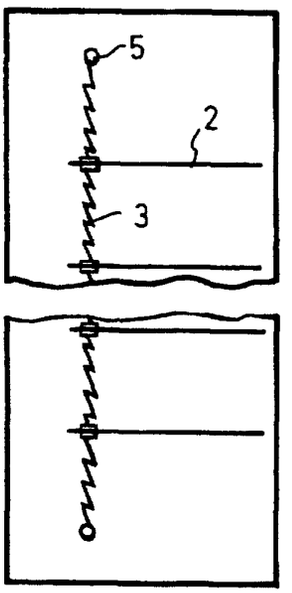


Fig.6.

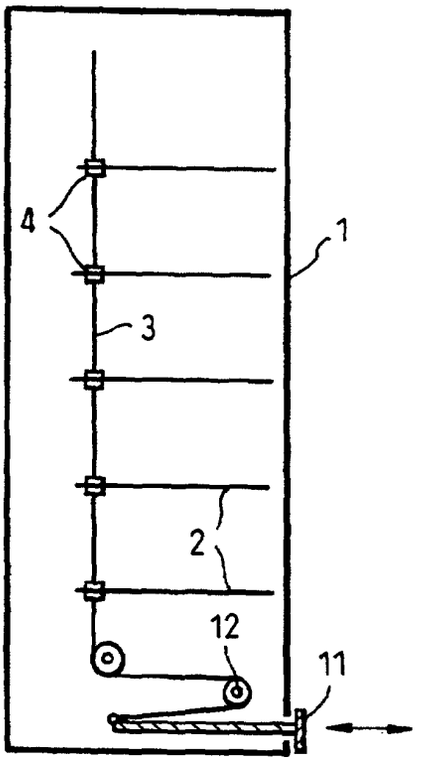


Fig.7.

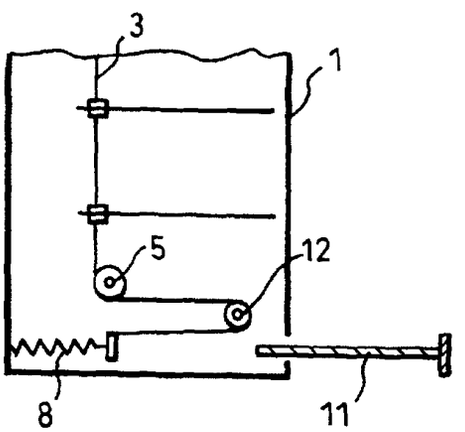


Fig.8.

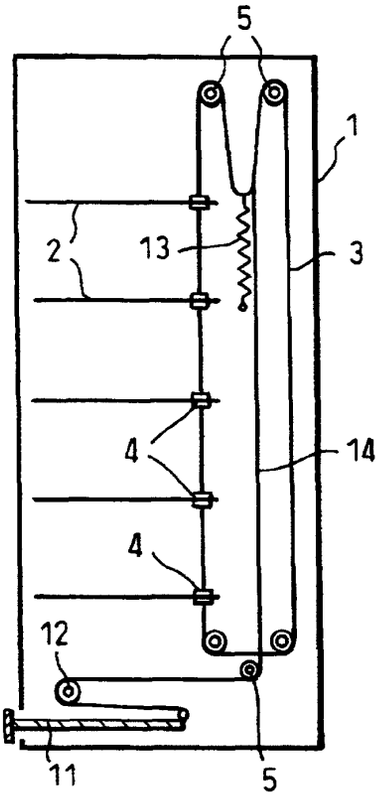


Fig.9.

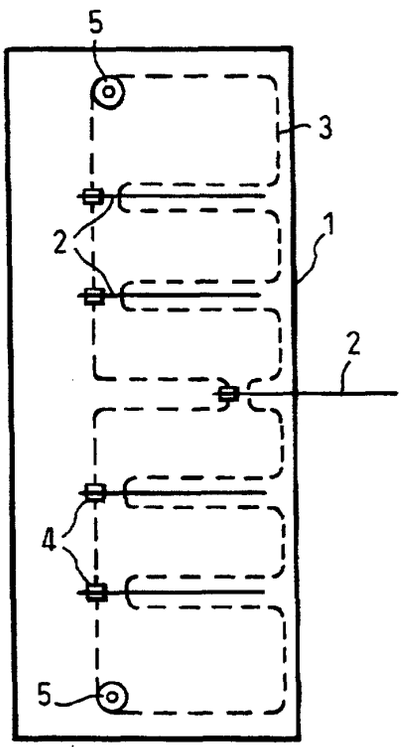
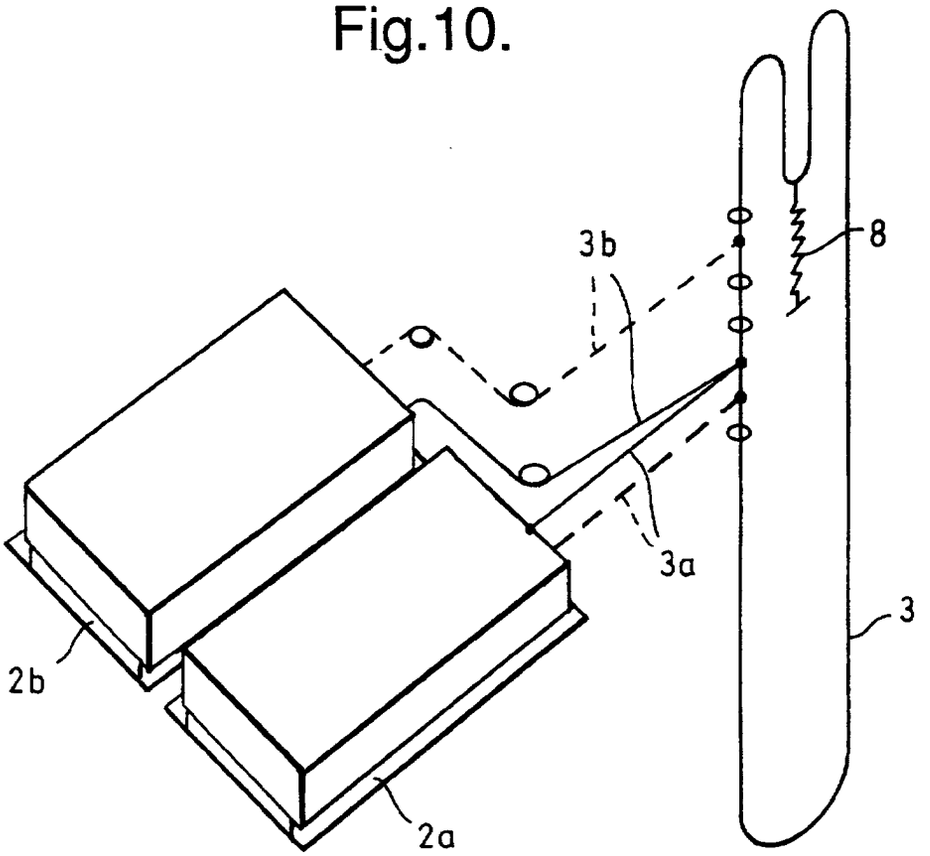


Fig.10.



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EUROPEAN SEARCH REPORT

Application Number
EP 00 30 3556

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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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	18 August 2000	PEREZ MENDEZ, J

CATEGORY OF CITED DOCUMENTS

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