

[54] CABLE-SUSPENSION DEVICE FOR APPARATUS TO BE PROTECTED FROM IMPACTS

[76] Inventor: Pablo M. Van Der Stricht, 42, Avenue des Rubepines, B-1180 Brussels, Belgium

[22] Filed: June 26, 1974

[21] Appl. No.: 483,324

2,256,004	9/1941	Thomas	248/370
2,428,285	9/1947	Lea	248/358 AA
2,717,134	9/1955	Ferber	248/358 R
3,204,897	9/1965	Lawrence	248/358 A X
3,212,745	10/1965	Lode	248/358 AA
3,244,393	4/1966	Wallerstein	248/358 AA
3,351,307	11/1967	Michel et al.	248/18
3,578,278	5/1971	Pickering	248/20
3,595,503	7/1971	Tibblad	108/136
3,720,392	3/1973	Kulander	248/20

[30] Foreign Application Priority Data
June 27, 1973 Belgium 801,491

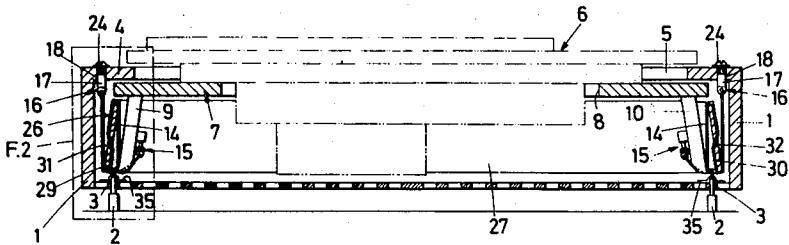
[52] U.S. Cl. 248/18; 108/136
[51] Int. Cl.² A47B 9/02
[58] Field of Search 248/20, 21, 358 R, 358 A, 248/358 AA, 370, 350, 18; 108/2, 136

[56] References Cited
UNITED STATES PATENTS
1,439,219 12/1922 Barnes 248/370

Primary Examiner—J. Franklin Foss
Attorney, Agent, or Firm—Sughrue, Rothwell, Mion, Zinn & Macpeak

[57] ABSTRACT
There is described a suspension device comprising in combination a fixed stand and a movable framing, said movable framing supporting said apparatus and being suspended from said stand by means of at least three cables running each in zigzag and having at least two substantially vertical sections.

16 Claims, 13 Drawing Figures



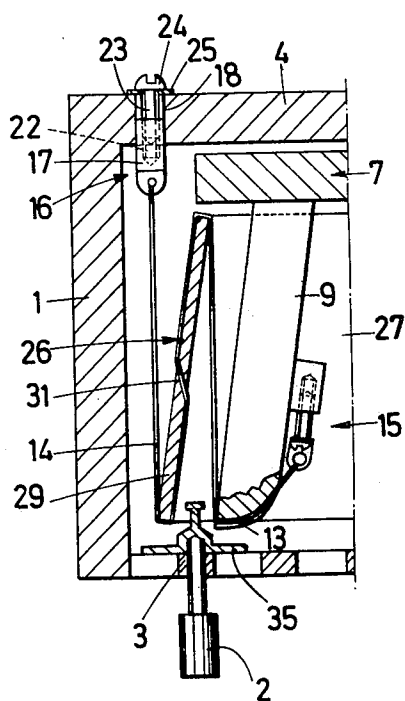


FIG. 2

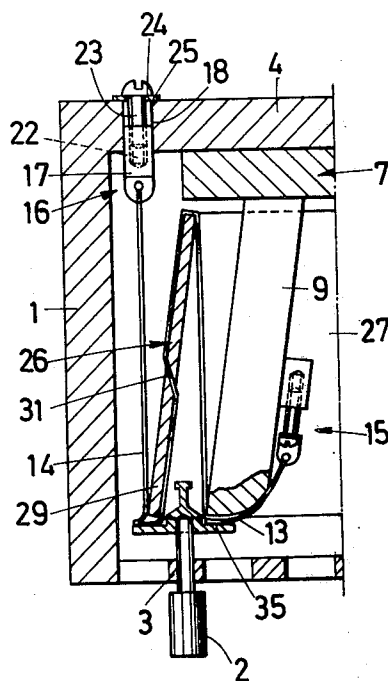
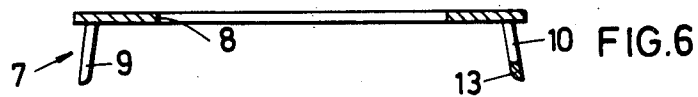
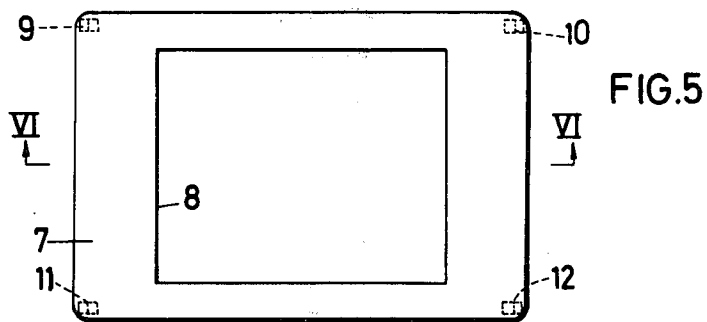
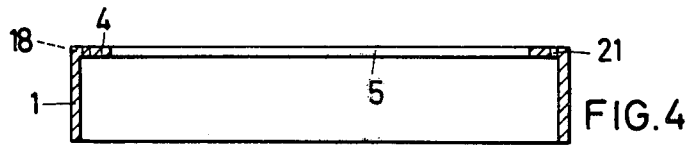
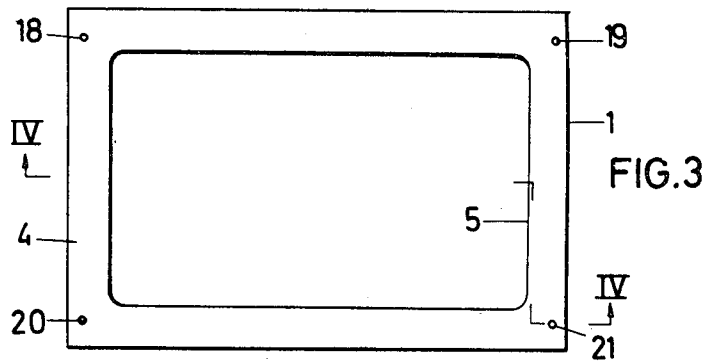
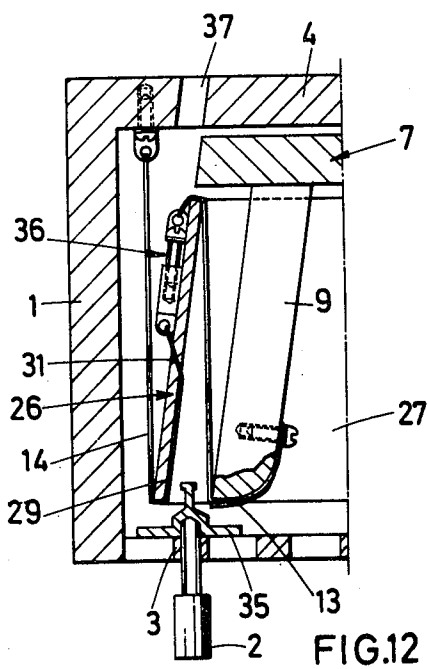
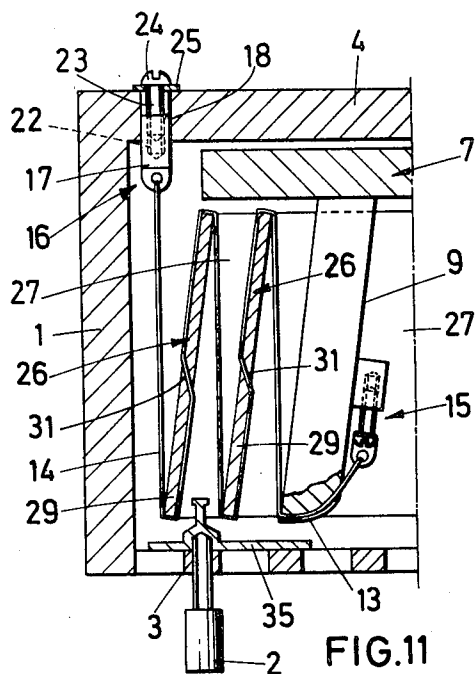


FIG. 10





CABLE-SUSPENSION DEVICE FOR APPARATUS TO BE PROTECTED FROM IMPACTS

The invention relates to a cable-suspension device for apparatus to be protected from impacts, said device being self-stabilizing with three-way movability.

Many precision apparatus are sensitive to occasional impacts which can occur during the operation thereof. For instance, an apparatus such as a playback deck is particularly sensitive to side impacts. Such impacts can cause undesirable sidewise movements of the pick-up arm.

Consequently, suspension devices have been designed for absorbing impacts without conveying same to the apparatus. However such devices as known up to now are not satisfactory in this respect.

The invention relates to a suspension device which allows to cancel substantially completely the conveying of impacts to the apparatus. In the case of a playback deck, the suspension device according to the invention allows to lower the needle pressure without the pick-up arm performing undesirable sidewise movements due to occasional stresses on the surrounding element or piece of furniture.

According to the invention, the suspension device comprises in combination a fixed stand and a movable framing, said movable framing supporting said apparatus and being suspended from said stand by means of at least three cables running each in zigzag and having at least two substantially vertical sections.

Other details and features of the invention will stand out from the description given below by way of non limitative example and with reference to the accompanying drawings, in which:

FIG. 1 is a lengthwise section through a playback deck provided with a suspension device according to the invention.

FIG. 2 is a section view on a larger scale of the deck portion shown in F2 in FIG. 1.

FIG. 3 is a plan view of the fixed stand of the playback deck as shown in FIG. 1.

FIG. 4 is a section view along line IV—IV in FIG. 3.

FIG. 5 is a plan view of the movable framing bearing the playback deck as shown in FIG. 1.

FIG. 6 is a section view along line VI—VI in FIG. 5.

FIG. 7 is a plan view of the movable frame which is part of the device according to the invention.

FIG. 8 is a section view along line VIII—VIII in FIG. 7.

FIG. 9 is a section view along line IX—IX in FIG. 7.

FIG. 10 is a view similar to FIG. 2 with the device according to the invention shown in a locked position for transporting thereof.

FIGS. 11 and 12 are views similar to FIG. 2 but showing other embodiments.

FIG. 13 is a section view through another embodiment of the suspension device.

The suspension device according to the invention is essentially comprised in the embodiment shown in FIGS. 1 to 10, of a fixed stand 1 which preferably bears on four feet 2, preferably in the shape of screws which can cooperate with threaded holes provided therefor in the lower part 3 of said stand 1. In the upper part 4 of the stand 1 is provided an opening 5 through which passes the playback deck 6. Said deck 6 is made fast to a movable framing 7 the upper platen of which is provided with an opening 8 for the passage of the underly-

ing portion such as the motor, of the playback deck 6.

In this embodiment, the movable framing is provided at each corner thereof, with a foot or extension 9, 10, 11 and 12, respectively, which preferably slants outwards, said feet being preferably provided at the lower end thereof, with a groove 13.

Each foot 9 to 12 is made fast to a cable 14 by means of an adjusting device 15 for example, the other end of said cable being made fast to a second adjusting device 16 which is formed in this case by a guide-rod 17 which is movable inside a hole 18, 19, 20 and 21 respectively, which is provided therefor in portion 4 of said stand 1 and in each guide-rod is provided a threaded hole 22 with which cooperates an adjusting screw 23 the head 24 of which bears for instance through a washer 25, on the lower surface of said portion 4 of stand 1. In a simpler embodiment, said adjusting devices could be dispensed with.

Between stand 1 and the movable framing 7 is provided a movable frame 26 formed by two vertical walls 27, 28 respectively, the outer spacing of which is approximately equal to the corresponding inner spacing of stand 1, and by two slanting walls 29, 30 respectively, which join the walls 27 and 28.

In the slanting walls 29 and 30 are provided holes 31, 32, 33 and 34 which extend from the outside to the inside of said frame.

Each cable 14 passes over the upper portion of the movable frame 26, is introduced in the corresponding hole 31, 32, 33, or 34 and then passes underneath the movable frame towards the corresponding guide-rod 17 to which it is made fast.

In such a way the playback deck is suspended in four points through zigzag cables, said zigzag arrangement being due to the presence of the movable frame 26.

It is clear that occasional stresses imparted to the piece of furniture or the stand 1 are without any action on the playback deck 6, the stresses being absorbed by said zigzag cable suspension.

To allow transporting a playback deck provided with a device according to the invention, a cap 35 is provided on each foot or adjusting screw 2. For transporting such a deck, the feet 2 are screwed up until the cap 35 bears on the corresponding foot 9 to 12 of the movable framing and clamps said framing against portion 4 of the stand 1.

It is clear that it is possible to provide more than one movable frame 26 as shown in FIG. 11, to increase the stress absorption by the device.

In FIG. 12 is shown an embodiment in which both ends of cable 14 are made fast respectively, to the corresponding feet of the movable framing and to the fixed stand 1 while an adjustment in the length of said cable 14 is provided by means of an adjusting device 36. In this case at least in the upper portion 4 of stand 1 is provided a hole 37 which gives access to said adjusting device 36.

The suspension device shown in FIG. 13 comprises a movable framing 38 having a flat upper surface 39 and side walls 40 arranged about a fixed stand 41. The movable framing 38 is suspended from the fixed stand 41 through four cables and two movable frames 26 as described above with reference to FIG. 11. The cables are attached by soldering.

The movable framing 38 has a lower wall 43 provided with openings 44 through which pass the feet 42. The size of the openings 44 is such that the movable framing

38 can perform sidewise movements with a large enough amplitude without the feet 42 abutting the wall 43.

To allow transporting without damage the suspension device, said device is provided with means for clamping the movable framing 38 against the fixed stand 31 and for clamping the movable frames 26 relative to the movable framing 38. For this purpose the feet 42 can be adjusted in height relative to the fixed stand and have extensions 42b which can bear on the edges of the openings 44. To secure the frames 26 in position, two clamping lugs 45 are provided underneath said frames 26 to bear thereon and through a set screw 46 on wall 43 of movable framing 38.

The suspension cables can be made fast to the movable framing or to the fixed stand through a resilient damping element, to let the movable frame perform a vertical movement with the required amplitude. Such resiliency can be due to the material used for making the intermediate movable frames.

In the embodiment shown in FIG. 13, each cable is made fast to the fixed stand by means of a return pulley 46 and of a tube 47 made of some resilient material such as rubber, the cable passing through a horizontal bore provided in the fixed stand and being retained by means of a washer 48 and solder or a knot 49.

The suspension device shown in FIG. 13 can be used as supporting table for various apparatus without any change in the apparatus stand; said device can have a very small height for instance from 2 to 6 cm. In such a case it could be advantageous to provide a larger number of movable frames to reach a sufficient operating length for the cables.

It must be understood that the invention is in no way limited to the above embodiments and that many changes can be brought therein without departing from the scope of the invention as defined in the appended claims.

I claim:

1. Cable-suspension device for apparatus to be protected from impacts, said device being self-stabilizing with three-way movability, which comprises in combination a fixed stand and a movable frame, said movable frame supporting said apparatus and being suspended from said fixed stand by means of at least three cables each running in a zigzag configuration and having at least two substantially vertical sections, said movable frame having a depending foot for each suspension cable to which is made fast one end of the corresponding suspension cable.

2. Suspension device as claimed in claim 1, in which the movable frame is suspended by means of four cables.

3. Suspension device as claimed in claim 1, in which said feet are slanted with the lower end thereof directed outwards.

4. Suspension device as claimed in claim 3, in which said feet are directed by pairs towards opposite surfaces of the movable frame.

5. Suspension device as claimed in claim 1, in which said cables are made fast respectively to said fixed stand and to the corresponding frame foot by means of an adjusting device for the cable length.

6. Suspension device as claimed in claim 1, in which said fixed stand is located about said movable frame.

7. Suspension device as claimed in claim 1, in which said movable frame is located about said fixed stand.

8. Suspension device as claimed in claim 7, in which said movable frame has a support surface for the apparatus to be protected against impacts, said support surface being arranged above said fixed stand.

9. Cable-suspension device for apparatus to be protected from impacts, said device being self-stabilizing with three-way movability, which comprises in combination a fixed stand and a movable frame, said movable frame supporting said apparatus and being suspended from said fixed stand by means of at least three cables each running in a zigzag configuration and having at least two substantially vertical sections, the zigzag configuration of said cables being obtained by means of at least one intermediate frame between said fixed stand and said movable frame, said intermediate frame comprising four walls, two of which are vertical and parallel, while the two other walls slant downward and outward.

10. Suspension device as claimed in claim 9, in which in the slanting walls are provided half-way up with passageways for said cables.

11. Suspension device as claimed in claim 10, in which said passageways are directed from the outside towards the inside and from top to bottom of said frame.

12. Suspension device as claimed in claim 9, in which each cable is provided with a length-adjusting device which is made fast to said intermediate frame.

13. Cable suspension device for apparatus to be protected from impacts, said device being self-stabilizing with three-way movability, which comprises in combination a fixed stand and a movable frame, said movable frame supporting said apparatus and being suspended from said fixed stand by means of at least three cables each running in a zigzag configuration and having at least two substantially vertical sections, said fixed stand bearing on four feet the height of which is adjustable, said feet being formed by screws, the inner end of each screw being provided with a locking part which acts at least on said movable frame during transport.

14. Suspension device as claimed in claim 13, in which said fixed stand has support feet passing through openings provided in the lower part of said movable frame, said openings being large enough to allow a sidewise movement of said movable frame relative to said fixed stand.

15. Suspension device as claimed in claim 14, in which said support feet are adjustable in the height thereof relative to the fixed stand and are provided with means for clamping the movable frame against said fixed stand.

16. Cable-suspension device for apparatus to be protected from impacts, said device being self-stabilizing with three-way movability, which comprises in combination a fixed stand and a movable frame, said movable frame supporting said apparatus and being suspended from said fixed stand by means of at least three cables each running in a zigzag configuration and having at least two substantially vertical sections, the zigzag configuration of said cables being obtained by means of at least one intermediate frame between said fixed stand and said movable frame, two clamping lugs being provided which can bear on the one hand against said intermediate frame and on the other hand against said movable frame, while set screws adjustable in height are associated respectively with said clamping lugs.

* * * * *