(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 462 846 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
13.06.2012 Bulletin 2012/24

(51) Int Cl.:
A47F 5/00 *(2006.01)*

(21) Application number: **11009624.5**

(22) Date of filing: **06.12.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **13.12.2010 GB 201021090**

(71) Applicant: **ITAB SHOP CONCEPT UK LIMITED**
CITY HOUSE
Hemel Hempstead
Hertfordshire HP2 7EA (GB)

(72) Inventors:
- **Hoare, Andy**
  Hemel Hempstead
  Herts - HP2 7EA (GB)
- **Slatter, Nicholas**
  Hemel Hempstead
  Herts - HP2 7EA (GB)

(74) Representative: **Raynor, Simon Mark et al**
Urquhart-Dykes & Lord LLP
Altius House
1 North Fourth Street
Milton Keynes MK9 1NE (GB)

(54) Shelving unit

(57) A shelving unit (2) includes a plurality of shelves (18), a support structure (6,8) for the shelves and one or more feet (10) that are engageable with a floor surface. At least one of the feet (10) is suspended by a suspension mechanism (24) that permits movement of the suspended foot relative to the support structure, said suspension mechanism including a resilient element (38) and an indicator means (32) connected to the suspended foot (10) for movement therewith relative to the support structure (8) to provide an indication of the load carried by the shelving unit.

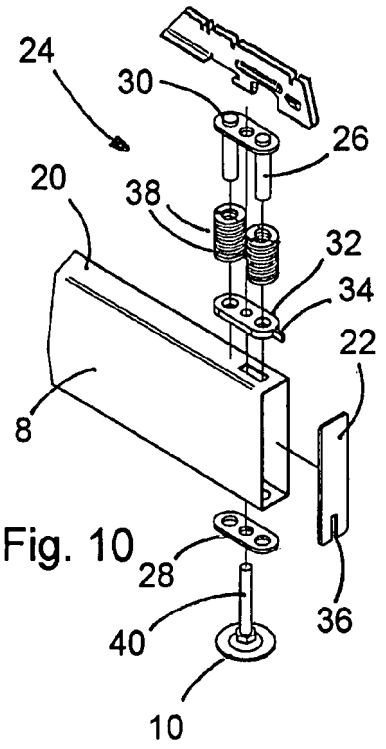

Fig. 10

EP 2 462 846 A1

Description

[0001] The present invention relates to a shelving unit, for example for supermarket shelving.

[0002] Standard supermarket shelving generally has a maximum safe working load (SWL) guideline, which relates to the maximum load that can be safely supported by the shelves. However, in practice it can be difficult to ascertain whether the weight of goods loaded onto the shelves exceeds the SWL guideline. Often, this is simply a matter of guesswork. As a result, the shelves may be accidentally over-loaded leading to risk of a collapse, or the shelves may be under-loaded to avoid the risk of over-loading, leading to under-use of their storage capacity.

[0003] It is an object of the present invention to provide a shelving unit that mitigates at least some of the aforesaid disadvantages.

[0004] According to the present invention there is provided a shelving unit including a plurality of shelves, a support structure for the shelves and one or more feet that are engageable with a floor surface, at least one of the feet being suspended by a suspension mechanism that permits movement of the suspended foot relative to the support structure, said suspension mechanism including a resilient element and an indicator means connected to the suspended foot for movement therewith relative to the support structure to provide an indication of the load carried by the shelving unit.

[0005] The indicator means allows a user to see easily what load is carried by the shelving unit and thus avoiding over-loading the shelves with goods. Under-use of the storage capacity of the shelving unit can also be avoided by allowing the user to stack goods on the shelves until the SWL limit is reached. Safe and economical use of the shelving unit is thus assured.

[0006] In a preferred example, the suspension mechanism is constructed and arranged such that the resilient element is deformed in response to the weight of the shelving unit and any goods supported by the shelving unit. The resilient element may for example be constructed and arranged to carry a compressive load. For example, the resilient member may comprise one or more helical springs. Belleville washers (discs springs) may be used for increased loading ranges

[0007] In a preferred example, the suspended foot is connected to the indicator means, which is constructed and arranged to transmit loads to the support structure via the resilient element.

[0008] The shelving unit preferably includes indicator markings adjacent the indicator element to indicate the load carried by the shelving unit. This allows the user to see easily the load carried by the shelving unit. Different kinds of marking may be used, including quantitative markings that provide an indication of the amount of load carried by the shelving unit, or simple graphical marking that indicate safe or excessive loads.

[0009] The shelving unit may include an adjusting mechanism for adjusting the position of the suspended foot relative to the indicator element, to allow for levelling on uneven floor surfaces.

[0010] In a preferred example, the shelving unit includes at least one compression spring, a connecting element connecting an upper end of the spring to the support structure and an indicator device connected to a lower end of the spring, wherein the suspended foot is connected to the indicator element for movement therewith relative to the support structure according to the load carried by the support structure.

[0011] The suspension mechanism preferably includes a matched pair of compression springs.

[0012] The indicator element may be constructed and arranged for sliding movement along a support element.

[0013] Preferably, the support element extends through the compression spring.

[0014] The suspension mechanism is preferably housed within a leg element of the support structure.

[0015] The indicator element may include a pointer that is visible through an aperture or window in the support structure.

[0016] In an embodiment, the indicator means is mounted for pivoting movement in response to movement of the suspended foot. Advantageously, the indicator means comprises a pivoting arm having an indicator element at one end thereof that moves in response to movement of the suspended foot, the indicator means being constructed and arranged such that the movement of the indicator element is greater than the movement of the suspended foot. Preferably, the indicator means is connected to a suspended foot located adjacent a first side of the shelving unit, and the indicator element is located adjacent a second side of the shelving unit remote from said first side.

[0017] This embodiment provides a number of advantages. For example, the pivoting movement of indicator means may be arranged to amplify the movement of the suspended foot so that the indicated load can be read more easily. The indicator means can be connected to a rear foot while the indicator element is located adjacent a front side of the shelving unit where it can be seen more easily. In this case it may be unnecessary to suspend all the feet of the shelving unit.

[0018] Advantageously, the indicator means is constructed and arranged to provide an indication of the load carried by the shelving unit, when the load is in the range 500kg — 1500kg for a single —sided shelving unit, or 1000kg — 3000kg for a double—sided shelving unit.

[0019] Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is an isometric view of a supermarket shelving unit according to a first embodiment of the invention;

Figure 2 is an isometric view of part of the shelving unit at an enlarged scale;

Figure 3 is a front elevation of the shelving unit;

Figure 4 is a side elevation of the shelving unit;

Figure 5 is a partially exploded isometric view of the shelving unit;

Figure 6 is an isometric view of a support leg, forming part of the base of the shelving unit;

Figure 7 is an end elevation of the support leg;

Figure 8 is a sectional view of the support leg, taken on line A-A of Figure 7;

Figure 9 is a sectional view on line A-A, showing a support foot mechanism of the support leg at an enlarged scale;

Figure 10 is an exploded isometric view showing part of the support leg;

Figures 11-17 illustrate various alternative indicator markings provided on an end of the support leg;

Figure 18 shows part of the indicator markings of Figure 15 at an enlarged scale;

Figure 19 is a sectional view of a support leg that forms part of a shelving unit according to a second embodiment of the invention, the support leg being shown in an unloaded configuration, and

Figure 20 is a sectional view showing the support leg of figure 19 in loaded configuration.

[0020] Figures 1-5 illustrate a double-sided supermarket shelving unit 2 (or "gondola"). The shelving unit 2 includes a pair of support frame members 4 which are located at opposite ends of the shelving unit, each support frame member 4 including an upright support element 6 and a pair of support legs 8 that extend horizontally from the lower end of the upright support element 6 to form a stable base. A plurality of feet 10 protrude downwards from the lower edge of the support legs 8 to engage a floor surface. The upright support elements 6 are interconnected by a pair of back panels 12 to form a rigid structure.

[0021] As shown in Figure 2, the front and rear edges of the upright support element 6 are provided with a set of slots 14, which are engageable by hook formations provided on each of a set of shelf support brackets 16. These hook and slot arrangements are entirely conventional and will not be described in detail. The brackets 16 support a set of shelves 18. In this example, shelves 18 are provided on both sides of the shelving unit 2. It should be understood that the invention is also applicable to shelving units having shelves on only one side of the unit.

[0022] Figures 6-10 show one of the support legs 8 in more detail. The leg 8 comprises a hollow rectangular section tube 20, which is closed at both ends by end plates 22. At each end of the leg 8 a foot suspension mechanism 24 is provided, which is housed within the tube 20. The foot suspension mechanism 24 includes a pair of cylindrical rods 26 which extend upwards from the lower edge of the tube 20. The lower ends of the rods 26 extend through holes in the bottom wall of the tube 20 and are welded to a lower connecting plate 28. The upper ends of the rods 26 are welded to an upper connecting plate 30, which holds the rods in a parallel configuration.

[0023] An indicator plate 32 is mounted for vertical sliding movement up and down the rods 26. The indicator plate 32 includes a pointer element 34 that extends horizontally through a vertical slot 36 in the adjacent end plate 22. Two heavy duty compression springs 38 are mounted on the rods 26 for compression between the upper connection plate 30 and the indicator plate 32.

[0024] The foot 10 includes a threaded shaft 40 that extends through plain holes in the lower connecting plate 28 and the lower wall of the leg tube 20, and is received in a threaded hole in the indicator plate 32. The screw-threaded engagement between the shaft 40 and the indicator plate 32 allows the vertical position of the foot 10 to be adjusted relative to the leg for levelling purposes.

[0025] In use, the weight of the shelving unit 2 and any goods supported by the shelves 18 is transferred to the feet 10 via the rods 26, the upper connecting plate 30, the springs 38 and the indicator plate 32. The springs 38 are therefore held in compression by the weight of the shelving unit 2 and the supported goods. The springs 38 are selected so that when the shelving unit 2 is empty, the pointer 34 is positioned at the lower end of the slot 36 and when the weight of goods supported by the shelving unit 2 is equal to the SWL of the shelving unit, the pointer 34 is positioned at the upper end of the slot 36. The weight of goods supported by the shelving unit 2 can therefore be assessed by viewing the position of the pointer 34 within the slot 36.

[0026] Preferably, one or more weight indicator markings 42 are provided on the end plate 22 adjacent the slot 36. These indicator markings 42 may take various different forms, as illustrated in Figures 11-18. The indicator markings 42 may for example consist of a set of red, yellow and green colour bars representing respectively fully loaded, part loaded and unloaded conditions (Figure 11), colour bars with indicated weight values (Figure 12), simple numeric weight values (Figure 13), numeric weight values with scale markings (Figure 14), symbolic graphical markings (Figures 15 and 16), or "zero", "half" and "max" values (Figure 17). The weight carried by the shelving unit 2 can be assessed by noting the position of the pointer 34 against the markings 42 (Figure 18).

[0027] Figures 19 and 20 are sectional views of a support leg 8 that forms part of a shelving unit according to a second embodiment of the invention, the support leg

being shown in an unloaded configuration in figure 19 and in a loaded configuration in figure 20.

[0028] The leg 8 comprises a hollow rectangular section tube 20, which is closed at both ends by end plates 22. At one end of the leg 8 (for example the rear end) a foot suspension mechanism 24 is provided, which is housed within the tube 20. Except as described below, the foot suspension mechanism 24 is similar to that shown in figure 9. At the opposite end of the leg 8 (for example the front end), a non-suspended foot 10a is provided. This may be either a fixed foot or a foot that can be adjusted, for example by rotating a screw, in order to level the shelving unit.

[0029] The foot suspension mechanism 24 is similar in most respects to that shown in figure 9, and includes a set of springs 38 and an indicator plate 32 that is mounted for vertical sliding movement up and down the guide rods 26. In this case, the indicator plate 32 is connected via a vertically sliding traveller 50 to a first end of an indicator arm 52, which is mounted for pivoting movement about a pivot point 54. The indicator arm extends forwards through the leg 8 to a second end 56 that passes through a vertical slot 58 in the front wall 22 of the leg. The second end 56 of the arm serves as an indicator element, which indicates the load supported by the suspended leg 10. Preferably, one or more weight indicator markings are provided on the end plate 22 adjacent the slot 58. These indicator markings may take various different forms, as illustrated in Figures 11-18.

[0030] In the example shown in figures 19 and 20, the pivot point 54 is located between the rear and front feet 10, 10a but is much closer to the rear foot 10 than the front foot 10a. The indicator arm 52 therefore amplifies the movement of the foot 10, a small movement of the foot 10 causing a much larger movement of the indicator element 56 at the opposite end of the arm. In this example, a 5mm deflection at the rear of the arm 52 causes a 68mm deflection at the front end of the arm. This makes the load indicator more sensitive and makes it much easier for a user to see the indicated load. It will be appreciated however that the pivot point 54 could be located elsewhere: for example nearer the centre of the leg or on the opposite side of the rear foot 10.

[0031] Various modifications of the apparatus described herein are of course possible. For example, a suspension mechanism may be provided for all of the feet or only some of the feet. Preferably, a suspension mechanism is provided for all of the feet so that the shelving unit does not tilt as the load carried by the shelves changes. The springs 38 may also be pre-stressed so that no movement of the pointer 34 takes place until the load carried by the shelving unit 2 exceeds a predetermined minimum value. The indicator mechanism may also take various different forms. For example, it may include one or more markings that are visible through a window in the end plate 22. The shelving unit may be single-sided or double-sided and it may be designed for use in a supermarket or other retail establishment, or in any other commercial or domestic situation.

Claims

1. A shelving unit including a plurality of shelves, a support structure for the shelves and one or more feet that are engageable with a floor surface, at least one of the feet being suspended by a suspension mechanism that permits movement of the suspended foot relative to the support structure, said suspension mechanism including a resilient element and an indicator means connected to the suspended foot for movement therewith relative to the support structure to provide an indication of the load carried by the shelving unit.

2. A shelving unit according to claim 1, in which the suspension mechanism is constructed and arranged such that the resilient element is deformed in response to the weight of the shelving unit and any goods supported by the shelving unit.

3. A shelving unit according to claim 1 or claim 2, in which the resilient element is constructed and arranged to carry a compressive load.

4. A shelving unit according to any one of the preceding claims in which the suspended foot is connected to the indicator means, which is constructed and arranged to transmit loads to the support structure via the resilient element.

5. A shelving unit according to any one of the preceding claims, including indicator markings adjacent the indicator element to indicate the load carried by the shelving unit.

6. A shelving unit according to any one of the preceding claims, including an adjusting mechanism for adjusting the position of the suspended foot relative to the indicator element.

7. A shelving unit according to any one of the preceding claims including at least one compression spring, a connecting element connecting an upper end of the spring to the support structure and an indicator device connected to a lower end of the spring, wherein the suspended foot is connected to the indicator element for movement therewith relative to the support structure, according to the load carried by the support structure.

8. A shelving unit according to claim 7, in which the suspension mechanism includes a matched pair of compression springs.

9. A shelving unit according to claim 7 or claim 8, in

which the indicator element is constructed and arranged for sliding movement along a support element.

10. A shelving unit according to claim 9, in which the support element extends through the compression spring.

11. A shelving unit according to any one of claims 7-10 in which the suspension mechanism is housed within a leg element of the support structure.

12. A shelving unit according to any one of claims 7-11, in which the indicator element includes a pointer that is visible through an aperture or window in the support structure.

13. A shelving unit according to any one of the preceding claims, in which the indicator means is mounted for pivoting movement in response to movement of the suspended foot.

14. A shelving unit according to claim 13, in which the indicator means comprises a pivoting arm having an indicator element at one end thereof that moves in response to movement of the suspended foot, the indicator means being constructed and arranged such that the movement of the indicator element is greater than the movement of the suspended foot.

15. A shelving unit according to claim 14, in which the indicator means is connected to a suspended foot located adjacent a first side of the shelving unit, and the indicator element is located adjacent a second side of the shelving unit remote from said first side.

16. A shelving unit according to any one of the preceding claims, wherein the indicator means is constructed and arranged to provide an indication of the load carried by the shelving unit, when the load is in the range 500kg — 1500kg for a single —sided shelving unit, or 1000kg — 3000kg for a double—sided shelving unit.

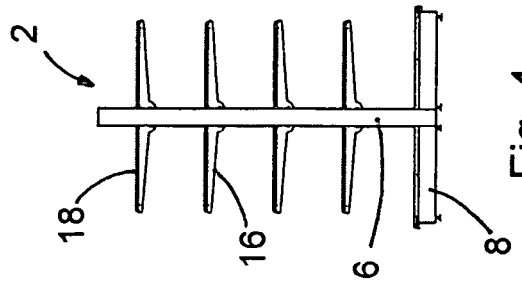

Fig. 4

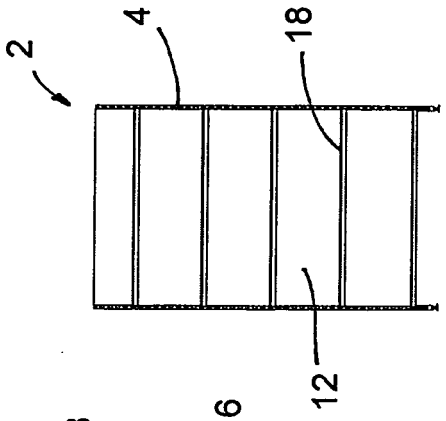

Fig. 3

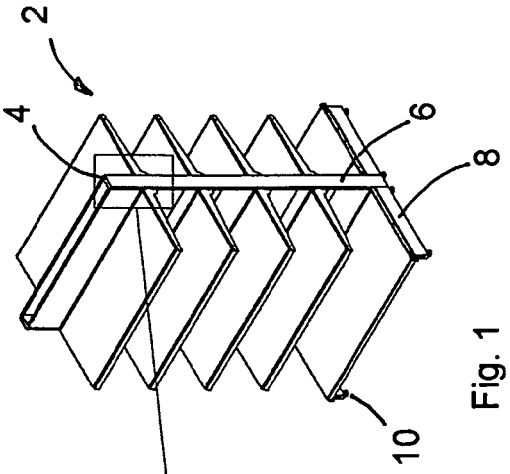

Fig. 1

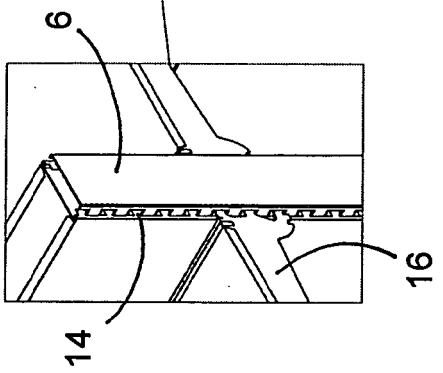

Fig. 2

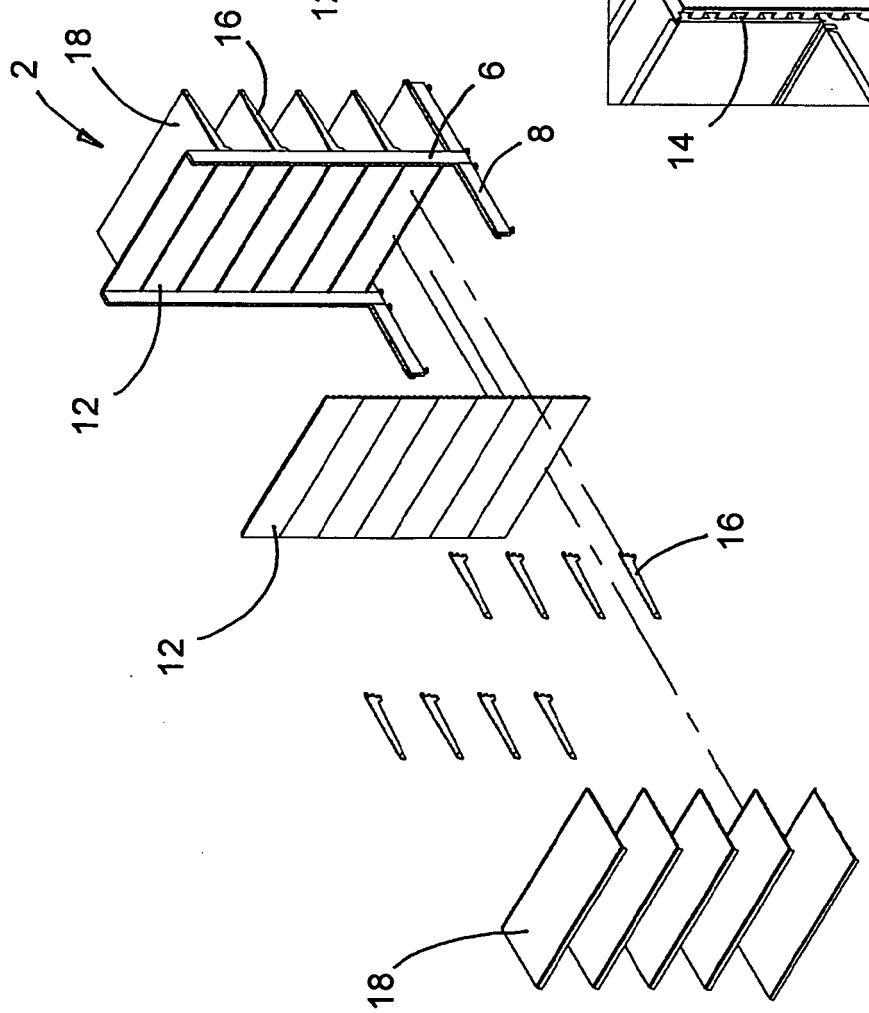

Fig. 5

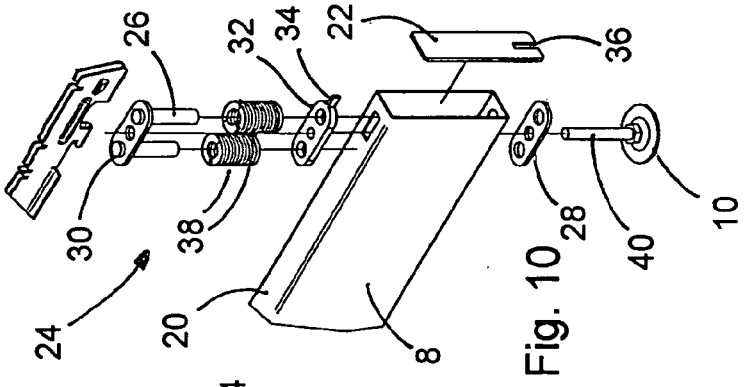

Fig. 10

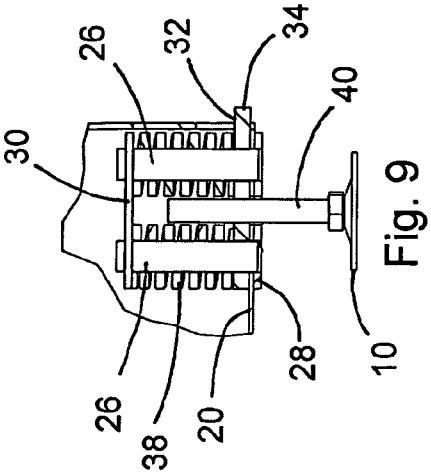

Fig. 9

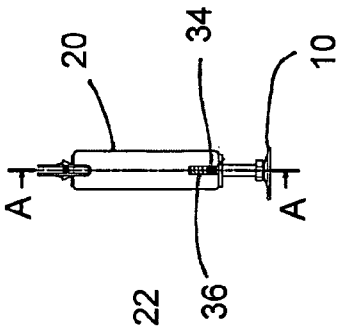

Fig. 7

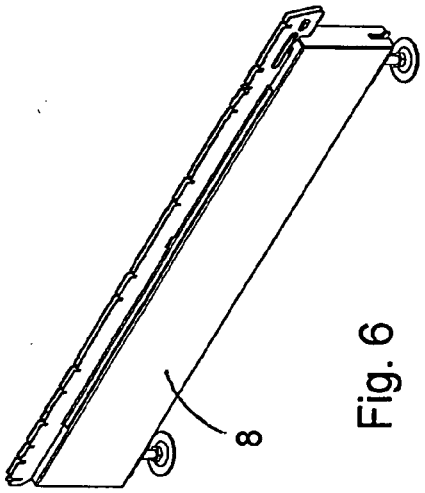

Fig. 6

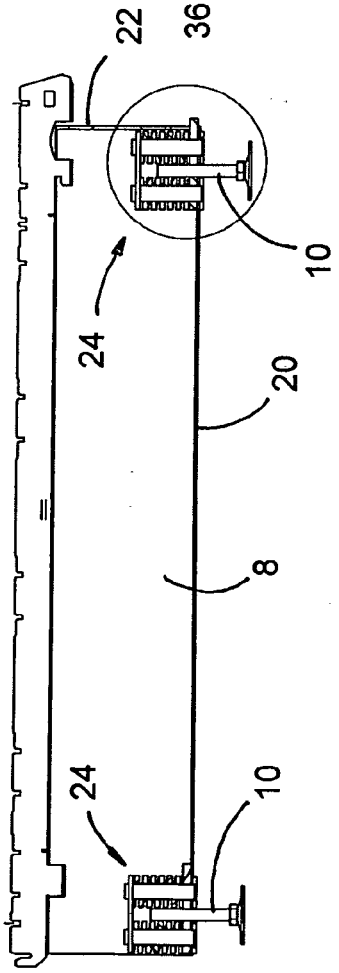

Fig. 8

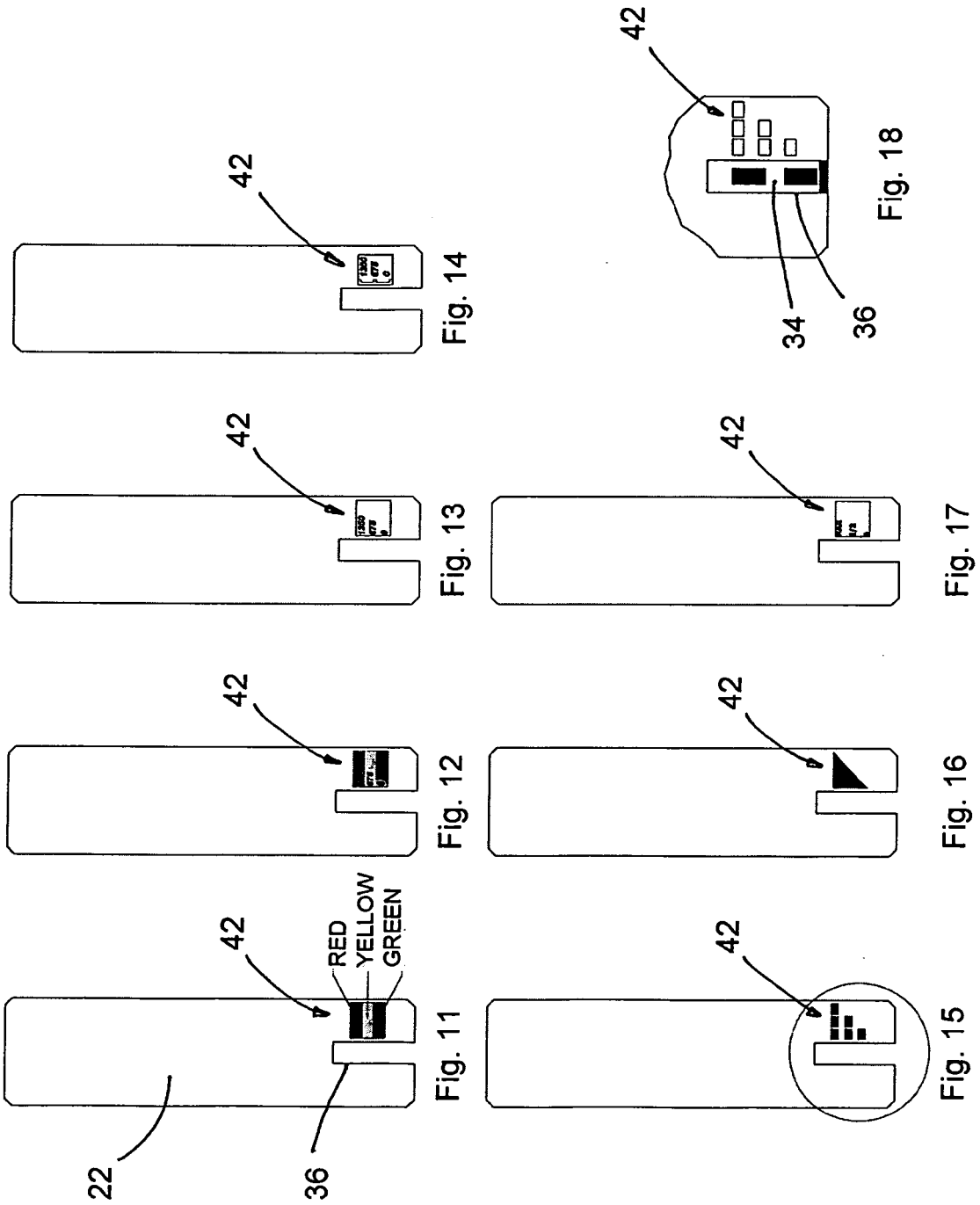

Fig. 11 Fig. 12 Fig. 13 Fig. 14 Fig. 15 Fig. 16 Fig. 17 Fig. 18

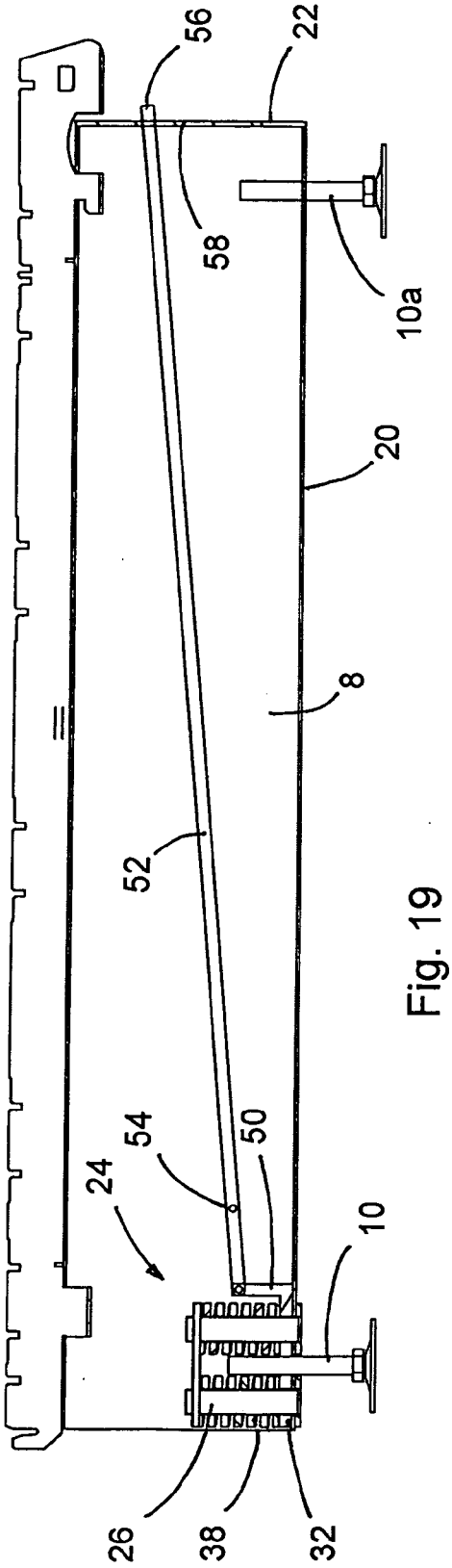
56
22
58
10a
20
8
52
54
50
24
10
26
38
32

Fig. 19

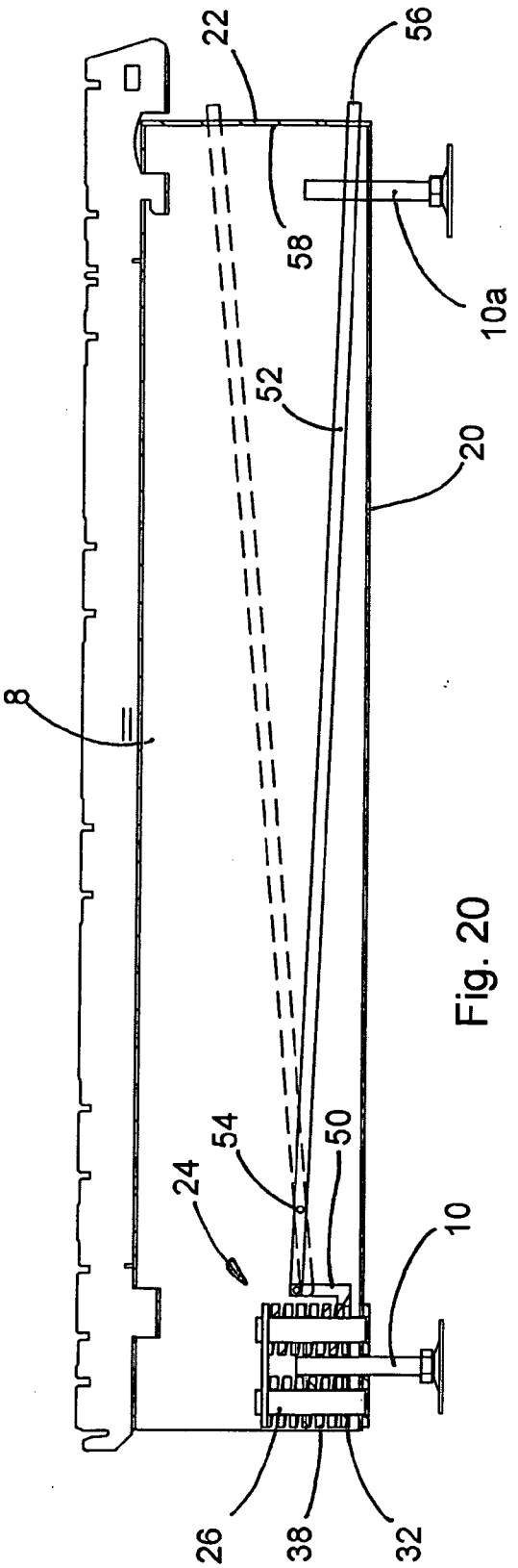
22
56
58
10a
52
20
8
54
50
24
10
26
38
32

Fig. 20

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 00 9624

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2007/101450 A1 (TEGOMETALL INT AG [CH]; BOHNACKER ULRICH [CH]) 13 September 2007 (2007-09-13) * the whole document *	1-16	INV. A47F5/00
A	EP 0 349 398 A1 (SAFIL [FR]) 3 January 1990 (1990-01-03) * the whole document *	1-16	
A	EP 1 532 893 A1 (STOREBEST GMBH & CO KG [DE]) 25 May 2005 (2005-05-25) * the whole document *	1-16	

TECHNICAL FIELDS SEARCHED (IPC)

A47F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	7 March 2012	Cardan, Cosmin

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

1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 00 9624

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

07-03-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007101450 A1	13-09-2007	NONE	
EP 0349398 A1	03-01-1990	DK 323089 A	30-12-1989
		EP 0349398 A1	03-01-1990
		FI 893165 A	30-12-1989
		FR 2633589 A1	05-01-1990
		NO 892662 A	02-01-1990
EP 1532893 A1	25-05-2005	AT 394968 T	15-05-2008
		DE 10355075 B3	25-05-2005
		EP 1532893 A1	25-05-2005

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82