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(54) **Extensible suspension device.**

(57) For suspending an article or object such as a hanging basket normally in a raised disposition in such a manner that it can be drawn down and subsequently returned to its raised position, easily and without use of tools or disconnecting the article or object, the suspension device comprises a suspension band (32) wound upon a drum (20) biassed by a spring (62) towards its wound-up condition. A ratchet disc (30) turns with the drum (20) and has a pawl (44) co-operating with it. Lobes (50) of the disc (30), between adjacent notches (42), are of increasing height so that upon rapid draw-off of the band (32) the pawl (44) will tend to ride over the notches (42). Upon slowing down of the draw-off, the pawl (44) engages into the next subsequent notch (42) to retain the object suspended from the band (32) at the height down to which it has been drawn.

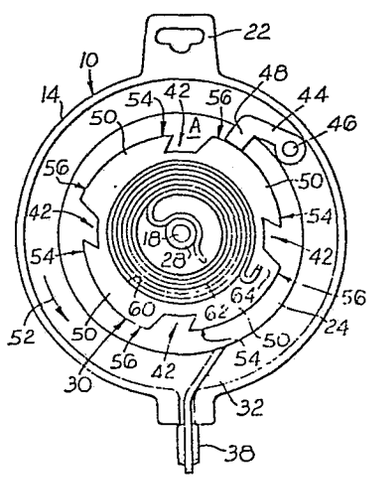

Fig. 3

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EXTENSIBLE SUSPENSION DEVICE

This invention concerns suspension devices, that is to say devices by means of which objects, or articles may be hung from over-head structures.

Certain hanging articles can, in everyday use, involve practical difficulties. For instance, access needs to be had, at regular intervals, to hanging flower baskets for the purpose of watering and/or tending the contents of the basket. If the basket is suspended from a hook, the basket can, in certain instances, be unhooked and taken down if desired. More frequently, however, users of hanging baskets usually stand on a suitable support such as a chair or steps, and reach up to the basket to attend thereto. This can be difficult even for agile persons; for older, frail or infirm persons, it may in practice be a very dangerous operation, involving a very high risk of accident or injury.

It will thus be appreciated that it would be of substantial advantage to have available a suspension device by which a hanging object or article such as a hanging basket, my be suspended in such a way that it can be drawn down to a lower position at which it is readily accessible e.g. from the ground or floor, and which will hold the object or article automatically in the lowered position until such time as it is desired to return it to a normal elevated position.

An object of this invention is to provide a suspension device by means of which this can be achieved.

With this object in view the present invention provides an extensible suspension device comprising a drum, a flexible member wound around said drum and extensible by drawing it from the device and thereby rotating the drum against the action of spring means biassing said drum towards a position in which the flexible member is wound up thereon, a ratchet disc rotatable in unison with the drum and spaced around which are a plurality of notches between each of which is a respective arcuate lobe which is shaped or so increases in height from the one notch to the other that drawing-off of the flexible member at a relatively fast speed causes or enables a pawl, co-operating with the ratchet disc, to ride over the notches, into one of which the pawl will engage upon drawing off at relatively slower speed to

arrest the drum and prevent further drawing-off.

For ease of manufacture, the drum is advantageously formed integrally with the ratchet disc, the drum and ratchet disc being provided, for instance, one at each side of an integral flange.

To ensure security of the connection of the flexible member to the drum, the flexible member conveniently extends by one end through an opening in the drum and is anchored to a central boss of the drum.

So that the suspension device of the invention may be used for hanging relatively heavy articles or objects, the flexible member is preferably a reinforced plastics tape.

The arrangement may, of course, be such that the article or object to be hung is attached directly to the free end of the flexible member. For ease of use and convenience, however, the flexible member advantageously has, through its free end, an eyelet or other connector whereby an article or object to be suspended may be connected thereto, e.g. by hooking into the eye or the like.

The spring means which serves to bias the drum towards

the wound-up position conveniently comprises a spiral spring accommodated in a substantially circular recess in the ratchet disc, and the pawl is advantageously freely located on a pivot pin to engage with the ratchet disc under the influence of gravity. This latter feature eliminates the need for providing a spring or the like to load the pawl towards the surface of the ratchet disc.

The invention will be described further, by way of example, with reference to the accompanying drawing, in which:

Fig. 1 is a perspective view illustrating a preferred embodiment of the suspension device of the invention;

Fig. 2 is a front view of the device of Fig. 1, but with the front half ot its casing omitted to enable the interior components to be seen from one side;

Fig. 3 is a rear view of the device of Figs, 1 and 2, but with the rear half of the casing omitted os as to enable the interior components to be seen from the other side; and

Fig. 4 is a diagrammatic front view illustrating an alternative peripheral shape for the ratchet disc of the device of Figs. 1 to 3.

As illustrated in Figs. 1 to 3 of the drawings, a preferred embodiment of the extensible suspension device of the invention comprises a casing indicated generally by the reference numeral 10 and composed, for instance, of two shell halves 12 and 14 which fit together and are cemented or welded together. Projecting from wall 16 of the rear shell half 12 is a stub 18 which locates into a boss (not visible) on the other shell half and provides a turning axis for a drum which is indicated generally by the reference numeral 20. The top of the casing 10 is formed with an integral eye 22 whereby the entire device can be hung in any suitable manner from an overhead structure, such as a beam, ceiling or the like, e.g. by means of a hook, screw, nail or other suitable fastener.

The drum 20 is formed integrally with a circular flange 24 and has a radial gap as at 26, the drum 20 projecting at one side of the flange 24 which has an integral central bush 28 whereby it is rotatably mounted on the stub 18. Formed integrally with the flange 24, at the side thereof remote from the drum 20 is a ratchet disc which is indicated generally in Fig. 3 by the reference numeral 30.

A flexible member in the form of a fabric reinforced plastics band 32 is wound around the drum 20. Adjacent one end, this band extends through the gap 26 in the drum 20 and it

terminates in a loop 34 (Fig. 2) which is anchored by locating over the bush 28. This arrangement prevents the band 32 from being pulled completely off the drum 20 when being unwound from the latter, as will be described later. Adjacent its other end, the band 32 extends to the outside of the casing 10 through a further gap 36 at the bottom of the casing 10 and opposite the eye 22, and said other end is secured to a robust eyelet 38 having therethrough an aperture whereby an object or article to be suspended (not shown) can be connected to the device.

Referring now in particular to Fig. 3, the ratchet disc 30 is formed at equispaced intervals therearound with four inclined recessed notches 42 for co-operation with a pawl 44 which is freely swingable upon a fulcrum pin 46 fixed into the casing 10 at a position such that nose 48 of the pawl 44 rests loosely upon the outer peripheral surface of the ratchet disc 30 under the influence of gravity. Each adjacent pair of the notches 42 defines, between said notches, a respective lobe 50. As will clearly be appreciated from Fig. 3, considered in the anti-clockwise direction as indicated by the arrow 52, each lobe 50 is of gradually increasing radial height so that beginning 54 of each lobe is shallower than the remote end 56 thereof.

The ratchet disc 30 has a central circular recess 60 and this accommodates a spiral spring 62 one end of which is located

by the bush 28 and the other end is formed into a hook 64 engaging into a complementary notch in the disc 30. The spring 62 is, of course, pretensioned so as normally to retain the band 32 fully wound up onto the drum 20 as shown in Fig. 3, corresponding to the pawl nose 48 being located on the outer periphery of the ratchet disc 30 and at a spacing from the nearest notch 42.

The manner of use of the illustrated device will readily be appreciated from the foregoing description. Assuming the device to be hung in an overhead position, for example by the eye 22 being engaged onto a hook (not shown) secured to a ceiling beam (not shown) and an article, such as a hanging flower basket, to be suspended therefrom by being engaged with the eyelet 38 to hang therefrom, the basket will normally be in a raised position. Tension on the band 32 arising from the weight of the basket will have caused the drum 20 and the ratchet disc 30 to have been rotated through a small angle such that the nose 48 of the pawl 44 has engaged into the first notch 42 which is indicated at A. The basket is, accordingly, held in the raised position by the interaction of the pawl 44 and the ratchet disc 30.

Should, now, it be desired to lower the basket, a user firstly relieves the device of the weight of the basket, with the

result that the ratchet disc 30 is rotated to the illustrated position with the nose 48 of the pawl 44 resting on the corresponding lobe 50 at a small spacing from its highest end 56. Thereupon, the basket is pulled downwards relatively rapidly, thereby causing the band 32 to be drawn relatively quickly from the drum 20 and causing the ratchet disc 30 to rotate rapidly in the anticlockwise direction of the arrow 52, as considered in Fig. 3. Because the pawl 44 is simply resting on the periphery of the ratchet disc 30 and there is a little friction between it and its fulcrum pin 46, its speed of swinging in the anticlockwise direction in Fig. 3 upon encountering a notch 42 is finite and accordingly so long as the band 32 is pulled down quickly enough and the ratchet disc 30 is rotated rapidly enough, the pawl nose 48 will not drop into such notch but will ride onto the lower end 54 of the next subsequent lobe 50. Thus, the basket can be pulled downwards so far as one may require to permit ready access thereto. When it has been brought down to the desired height, the speed of drawing down is decelerated, with the result that the pawl 44 can then drop into the next subsequent notch 42 to arrest the band 32 and prevent the basket from descending further. The basket is then held at the desired height and can be worked on as desired.

When work thereon has been completed, the basket can be returned to its elevated position simply by lifting it up, thereby to permit the spring 62 to wind the band 32 back to is initial

position.

It will thus be understood that the device of the invention permits the basket to be suspended at any desired height, by appropriate manipulation of the basket to ensure that the pawl 44 is engaged with the apposite notch 42. The location of the suspended article, in this case the basket, is always positive and is independent of the weight of the basket. It is in this respect that the arrangement of the invention is particularly advantageous in comparison with counterbalanced devices which cannot practically be used with hanging baskets or the like because the weight thereof changes with watering, and modification of the counterweight would frequently be necessary.

Naturally the invention is not confined to the precise details of the foregoing example, of which the details may be varied as desired or practical, nor is its application restricted to hanging baskets. It can be applied to any suspended article or object where ease of vertical adjustment can be of advantage, for instance for over-desk lamps, over-bed lamps, dental drill suspensions, and in other practical environments.

The shape of the ratchet disc 30 does not have to be such that each lobe increases in height gradually between its lower end 54 and its upper end 56. Thus, as shown diagrammatically in Fig. 4 the same effect can be achieved by providing, at the

appropriate end of each lobe 70 a respective tooth or deflector 72 adjacent the respective notch 74. Except at its tooth or deflector 72, each lobe 70 in this embodiment is of substantially constant effective height.

CLAIMS

1. An extensible suspension device comprising a drum, a flexible member wound around said drum and extensible by drawing it from the device and thereby rotating the drum against the action of spring means biassing said drum towards a position in which the flexible member is wound up thereon, characterised by a ratchet disc (30) rotatable in unison with the drum (20) and spaced around which are a plurality of notches (42, 74) between each of which is a respective arcuate lobe (50,70) which so increases in height from the one notch (42,74) to the next that drawing-off of the flexible member (32) at a relatively fast speed causes or enables a pawl (44) co-operating with the ratchet disc (30), to ride over the notches (42,74), into one of which the pawl (44) will engage upon drawing off at relatively slower speed to arrest the drum (20) and prevent further drawing-off.

2. A suspension device according to claim 1 wherein the drum (20) is formed integrally with the ratchet disc (30).

3. A suspension device according to claim 1 or 2 wherein the drum (20) and the ratchet disc (30) are provided one at each side of an integral flange (24).

4. A suspension device according to claim 1, 2 or 3 wherein the

flexible member (32) extends by one end through an opening (26) in the drum (20) and is anchored to a central bush (28) of the drum (20).

5. A suspension device according to any preceding claim wherein the flexible member (32) is a reinforced plastics tape.

6. A suspension device according to any preceding claim wherein the flexible member (32) has, on its free end, an eyelet (38) or other connector whereby an article to be suspended may be connected thereto.

7. A suspension device according to any preceding claim wherein the spring means comprises a spiral spring (62) accommodated in a substantially circular recess (60) in the ratchet disc (30).

8. A suspension device according to any preceding claim wherein the pawl (44) is freely located on a pivot pin (46) to engage with the ratchet disc (30) under the influence of gravity.

9. A suspension device according to any preceding claim wherein the drum (20) is mounted for rotation upon a stub (18) which projects from a wall (16) of an enclosing casing (10), the flexible member (32) extending out of the casing (10) through a slot (36) therein.

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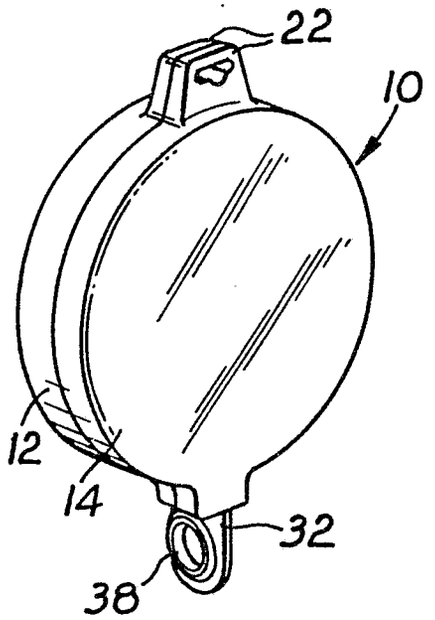

Fig. 1

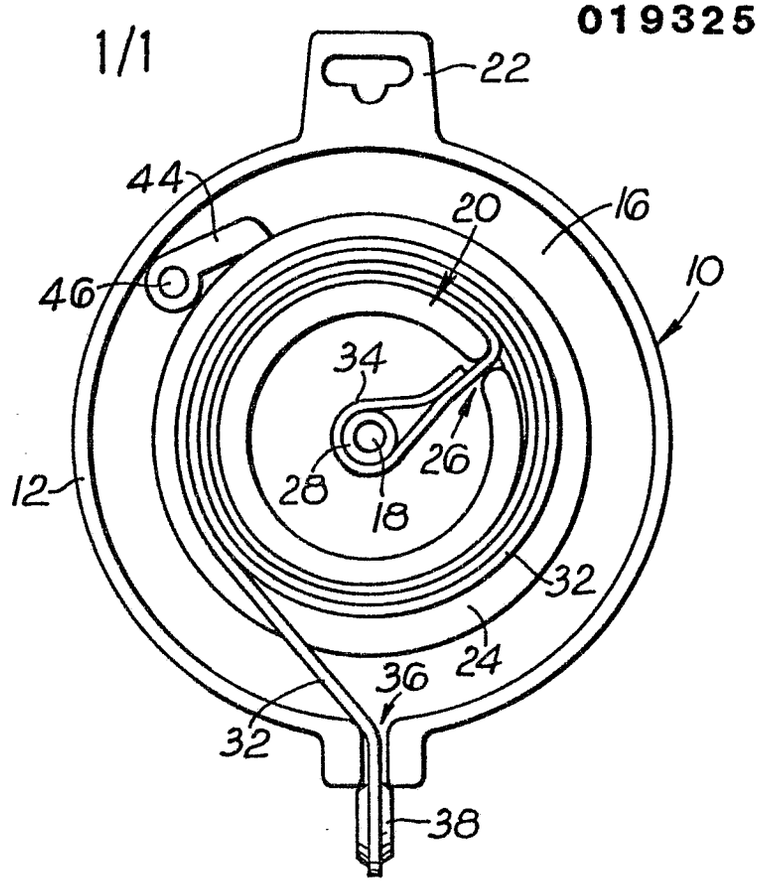

Fig. 2

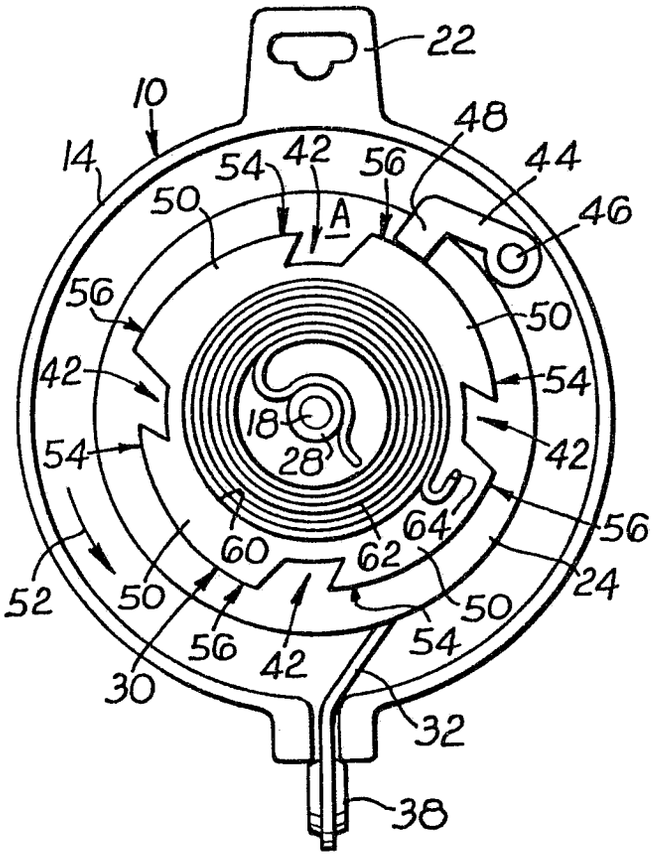

Fig. 3

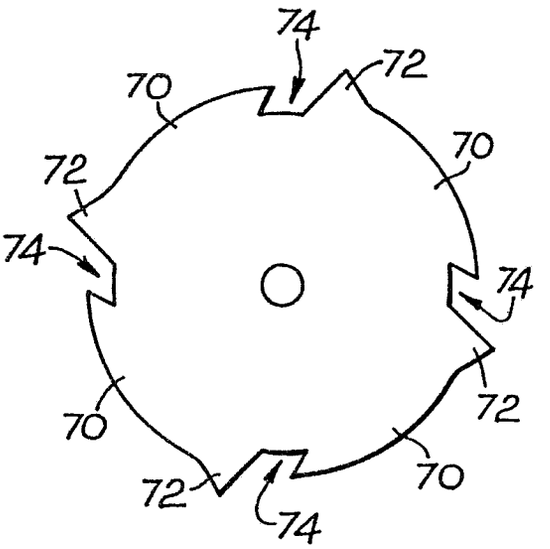

Fig. 4

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EUROPEAN SEARCH REPORT

0193253

Application number

EP 86 30 0035

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl.4)
X	FR-A-2 315 643 (KING & KING) * Figure 1; claim 3 *	1,4,8,9	A 47 G 7/04 F 21 V 21/18 B 65 H 75/44 A 61 G 15/00
X	US-A-2 907 534 (BENSTEIN) * Figure 2; column 2, lines 14-16 *	1,3,4,9	
X	GB-A- 723 703 (J.B. PILLIN LTD.) * Figure 4; page 2, line 119 - page 3, line 19 *	1,4,8	
A	DE-C- 726 223 (KRAGELOH & CO.) * Figure 2; page 2, lines 1-31 *	1-3,8,9	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	US-A-1 559 092 (HALLBERG) * Figures 2-4 *	1-3,6,8,9	A 47 G F 21 V B 65 H
A	DE-A-2 053 130 (ROST) * Claim 16; figure 2 *	1,4,7,9	
A	US-A-4 202 510 (STANISH) * Column 4, line 20 *	1-3,5,6,9	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24-06-1986	BEUGELING G.L.H.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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