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Hultberg et al.

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[54]	SUSPENSION OF ARTICLES				
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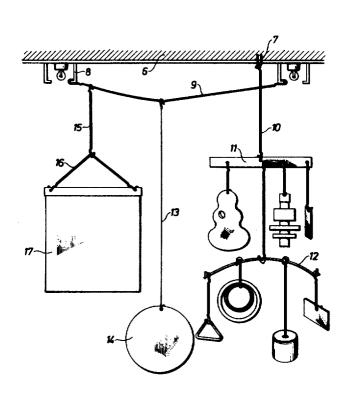
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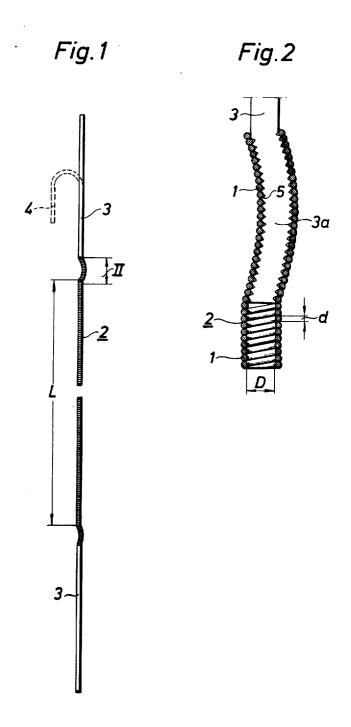
[57] ABSTRACT

This invention provides a method and means for suspension of articles at an arbitrarily chosen level below a given suspension point by using an at least partly helically wound metal wire. In carrying out the method the turns of said metal wire are straightened out by being manually pulled in the longitudinal direction of the wire until the length of wire desired for each article has been reached, the wire being so dimensioned with respect to diameter and the diameter of the turns that it can retain its altered shape even when extended to at least 10 times its original length when stored spirally.

3 Claims, 5 Drawing Figures



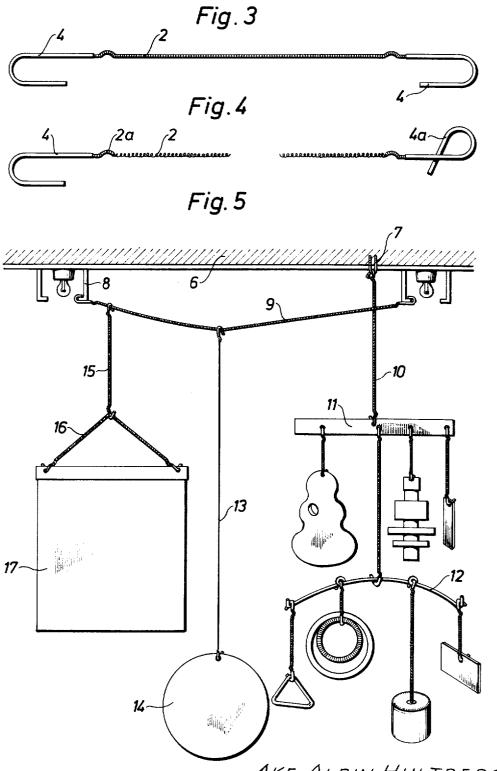
SLICET 1 OF 2



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SHEET 2 OF 2



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SUSPENSION OF ARTICLES

The present invention relates to a method and means for the suspension of articles, for example so-called mobiles or the like, at an arbitrarily chosen height 5 below a certain suspension point, by the use of a metal wire which is tightly helically wound. The present invention can preferably be used for the suspension of signs and articles for display in shops and other decorative objects, such as packages, advertisement frames, 10 etc.

In the retail trade, for example, since its now almost complete transition to self-service stores, there is a great need for information, advertisement and display signs to guide the customer. So that this information 15 shall be observed by the customer it must be placed on a certain level above the assortment of goods so that the information can be absorbed by the customer from quite a distance. Placing such information signs at various levels in such premises has so far caused consider- 20 able difficulty and taken a great deal of time since the wire used for hanging is kept coiled up on a reel and each time it is to be used it must be cut manually and the required length of wire must be measured and tied sign in question.

The object of the present invention is to avoid the disadvantages mentioned and provide an efficient, simple way of hanging up such information signs, preferably light or easily moved objects.

The novelty of the invention is substantially that the turns of metal wire forming the wire supply are straightened out by being manually pulled in the longitudinal direction of the wire until the length of wire desired for each article has been reached, the wire being so dimensioned with respect to diameter and the diameter of the turns that it can retain its altered shape even when extended to at least 10 times its original length when stored spirally.

The coiled metal wire used to carry out the method is substantially characterised in that the diameter of the tightly wound coil of wire is at least 3 times greater than the diameter of the wire so that the wire in the coil retains its altered shape when extended to at least 10 times its length when coiled for storing.

According to a suitable embodiment of the invention there may be a number of tightly wound coils of wire spaced from each other along the wire and according to the invention the tightly wound wire supply may have an arbitrary cross-section. They may, for example, be circular, triangular or square in cross-section.

The foregoing objects and advantages of the present invention will be more clearly understood when considered in conjunction with the accompanying drawings, 55 in which

FIG. 1 is a view of the suspension wire embodying a preferred form of the invention in approximately its normal size;

FIG. 2 is a cross-sectional view of the wire in FIG. 1 enlarged about 10 times and partly in section from the

FIG. 3 is a view of the wire when not extended and FIG. 4 when extended, and

position together with several so-called motiles.

The wire illustrated in FIGS. 1 and 2 consists of a tightly coiled, hollow, central filament 2, extremely fine and suitably of soft metal wire 1, in the form of an elongate helical spring. Each end of the filament is firmly attached to one end of another soft metal wire or end thread 3 which at its opposite end is bent or can be bent to form an attachment hook 4, indicated on the top end thread. The attachment between the central filament and the end thread according to FIG. 2 is such that the part 3a of the end thread 3 which protrudes into the central filament 2 is curved and provided with transverse ridges 5 into which the turns of the wire 1 can fit when fitted around the part 3a. Together with the curve of the part 3a, this forms an extremely strong joint.

The central filament 2 may be wound with prestressing and between the two end threads there is a length L within which it can be freely extended to greater length. It is so dimensioned with respect to its inner diameter D and wire thickness d that it can be pulled out by hand to any desired length, within the limits of its fully extended length, past its elasticity limit, after extension in unloaded condition. The wire shown as an example of suitable dimensioning has a diameter D of about 1 mm and a wire thickness d of about 0.2 mm, thus giving a fully extended length of about 19 L. Thus, with a wire according to the invention where the length between an attachment in the roof and the information 25 L is limited to about 1 dm, it is possible to keep wire for arbitrary hanging lengths of up to about 2 m which should be quite sufficient for all practical purposes.

It is clear that a wire of this type can only be extended, not shortened, and it is therefore unusable 30 once it has been extended past its useful suspension length. Since it is therefore to be considered as a more or less expendible article it is extremely important that it is cheap to manufacture. Consisting only of a coil of wire and two simple wires joined in the simple manner described, it fulfils even high requirements in this respect.

In principle the structure shown in FIGS. 3 and 4 is similar to the wire structure shown in FIG. 1. FIG. 4 shows some parts 2a of the wire in non-extended condition. It is possible in this way to adapt the effective length of the wire. The design of the attachment hook 4a differs slightly from that of the hook 4.

FIG. 5 shows a wire 9 similar to the wire 2 suspended horizontally between supports 8 in a roof 6 or the like. Wires 13, 15 are in turn suspended from this wire 9. The wire 15 may, for example, carry a sign 17 having a helical hook 16, and the wire 13 may carry an arbitrary object 14. A vertical wire 10 is also shown, attached to a point 7 and carrying a bar 11 with objects 12 suspended from it.

The wire used according to the invention consists of a helically coiled metal wire, i.e., a tight helical coil, of, say, one decimetre in length. At each end of the helical coil is a hook of slightly thicker metal wire. Such a helical coil, i.e., helically wound wire, offers limited elastic expansibility with a reasonable load. If the load is increased, not further than is easily possible manually, however, the yield point of the wire is exceeded and the expansion will be plastic. Thus the helical coil can be pulled out to the desired length and will remain at this length because of the plastic deformation.

So that the helically coiled wire proposed shall have these properties its elastic expansibility range is rela-FIG. 5 shows the use of the present wire in horizontal 65 tively little in comparison with the plastic deformation range. This can be achieved by winding a metal wire of suitable hardness in the form of a helical coil. The thinner this wire is the less force is required to give it such

torsional stress that it will exceed its yield point. If the diameter of the helical coil is not large in relation to the diameter of the wire, the wire will be plastically deformed upon only a reasonable extension. On the other hand, it is desirable for the coil diameter to be large so 5 that the quantity of wire coiled up is as great as possible. If the diameter of the wire is d and the coil diameter D, the plastic extension which can be maximally achieved will be $\pi D/d$. For example, if d is chosen as 0.2 mm and D = 1 mm, a maximum extension is ob- 10 tained of 5 π = 15.7 times. With these diameters for wire and coil the elastic range will be limited to a load of 5 - 10 Newtons and the wire can be pulled out to its full length with a force of some tens of Newtons.

It should be noted that the wire according to the in- 15 one of the turns in the coil. vention does not have the same function as a conventional curtain wire. In the latter case the elastic properties are utilized so that the coil of wire can be stretched between two attachment points located horizontally in justed and it is also possible to apply a vertical load, for example a curtain, without the coil sagging to any great extent. In the present invention, however, it is presumed that the wire is usually hanging vertically and is loaded in the longitudinal direction of the coil axis. In 25 this case the elastic deformation of the helical coil is not sought for, the coil only having the function of providing a supply of wire which can be used by plastically deforming the wire.

The coil of wire proposed according to the invention 30 provides a supply from which wire can be taken to give the desired length, in which the coil diameter is preferably 3 - 10 times the diameter of the wire and the wire diameter is chosen with consideration to the intended the yield point, so that the wire having the selected diameters can retain their altered shape when extended to preferably 10 - 30 times their original length.

The invention is not limited, however, to the embodiments shown in the drawings and can be varied in many 40 ways within the scope of the following claims. For instance, the cross-section of the coiled wire, i.e., of the

turns, may be any shape at all, for example square, oval or triangular. Furthermore, such storage coils can be arranged spaced from each other along the wire so that there is a straight length of wire between two consecutive coils. It is not imperative for the coil to finish in a hook. A straight piece of wire may also be used which can easily be bent by hand to the desired shape. Of course, a number of suspension means stored in coils may also be connected together by engaging the hooks in each other or, if straight pieces of wire are used, by bending these as desired.

Since the wire is coiled, it is possible when hanging it up on a nail to position it so that the object does not hang unevenly. This is done by putting the nail through

We claim:

1. A device for the suspension of articles at a desired distance from a support comprising a tightly helically wound supply coil of soft wire having a hook at each relation to each other. In this way the length can be ad- 20 end, the coil having a elastic range for longitudinal extension which is relatively small with respect to the plastic deformation range of the coil upon longitudinal extension, so that the coil may be readily extended beyond its elastic limit and will retain its extended length. the diameter of the coils of said coil of wire being at least 3 times the thickness of the wore so that the coil may be extended to an extended length at least 10 times the unextended length of the coil in tightly coiled condition, each end of the wire being secured to said hook at each end by a multiplicity of turns of said wire, said turns interfitting with and holding said wire tightly in contact with a plurality of ridges formed in a curved portion of an elongated part of said hook.

2. The device according to claim 1 wherein the elasload and available force for pulling the wire out over 35 tic range of the coil is limited to a longitudinal force not exceeding about 10 Newtons, whereby the application of a longitudinal force greater than 10 Newtons results in permanent deformation of the wire and extension of the coil.

3. The device of claim 1 wherein the diameter of said coil of wire is about 5 times the thickness of the wire.

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