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[54] **RESILIENTLY SUPPORTED AERIAL CABLEWAY CAR**

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[51] **Int. Cl.**..... **B61b 3/00,** B61b 7/00, B61b 7/10

[58] **Field of Search**..... 105/150, 157 R, 329 S, 105/329 SC, 148; 280/81; 104/89, 112

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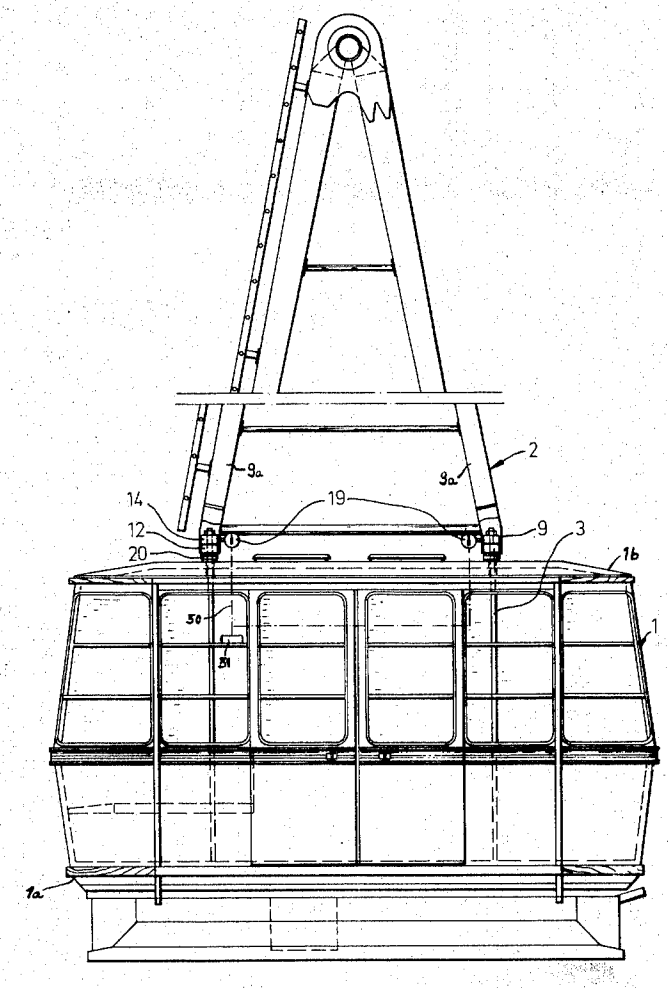
[57] **ABSTRACT**

A cabin arrangement for an elevated transport system or cable car, such as an overhead railway or aerial cableway, wherein the resilient suspension device thereof is provided with at least one elastic pressure cell or pressure pickup means which completely or partially takes-up the weight of the cabin, and this pressure cell is connected with an indicator device.

6 Claims, 4 Drawing Figures



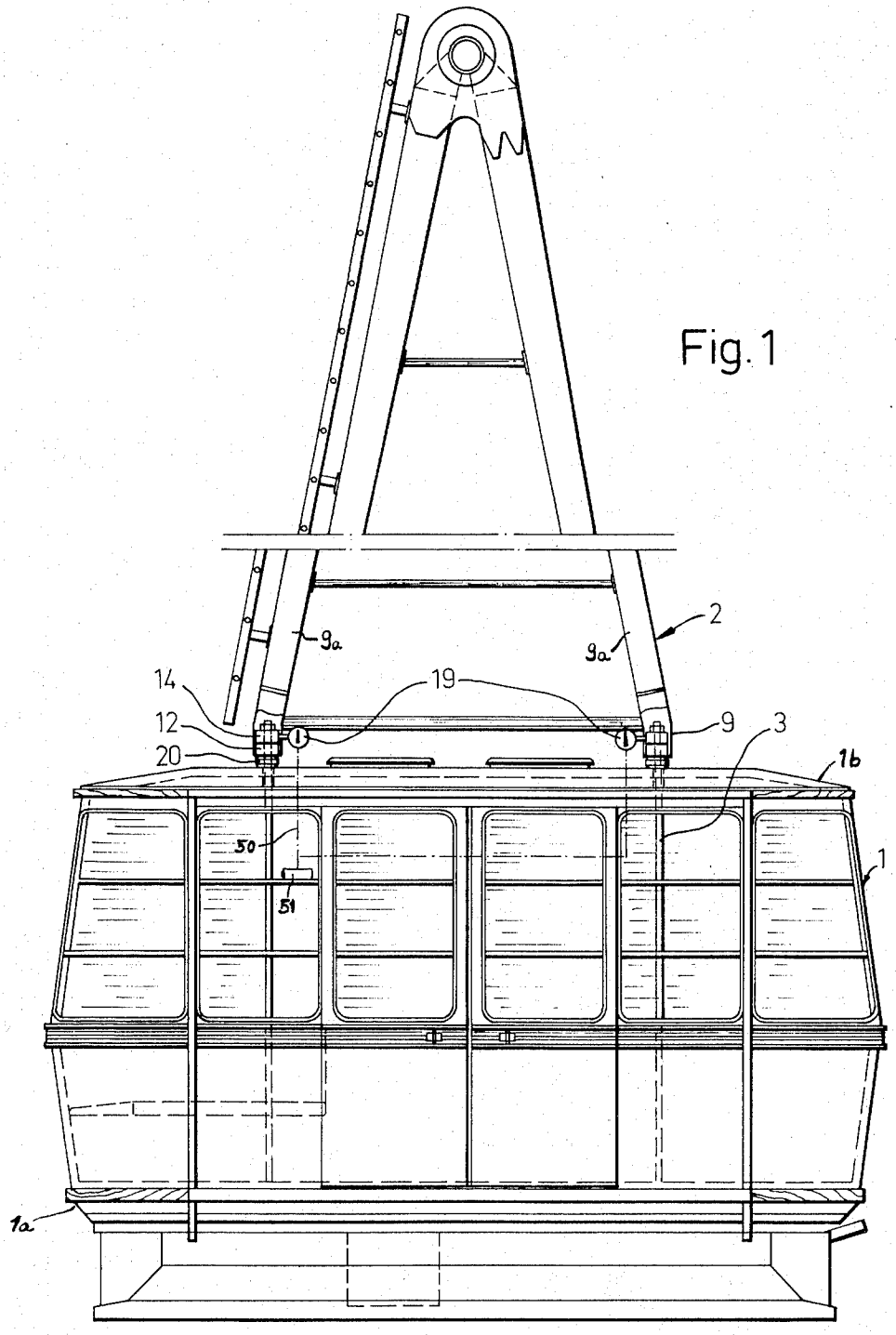


Fig. 1

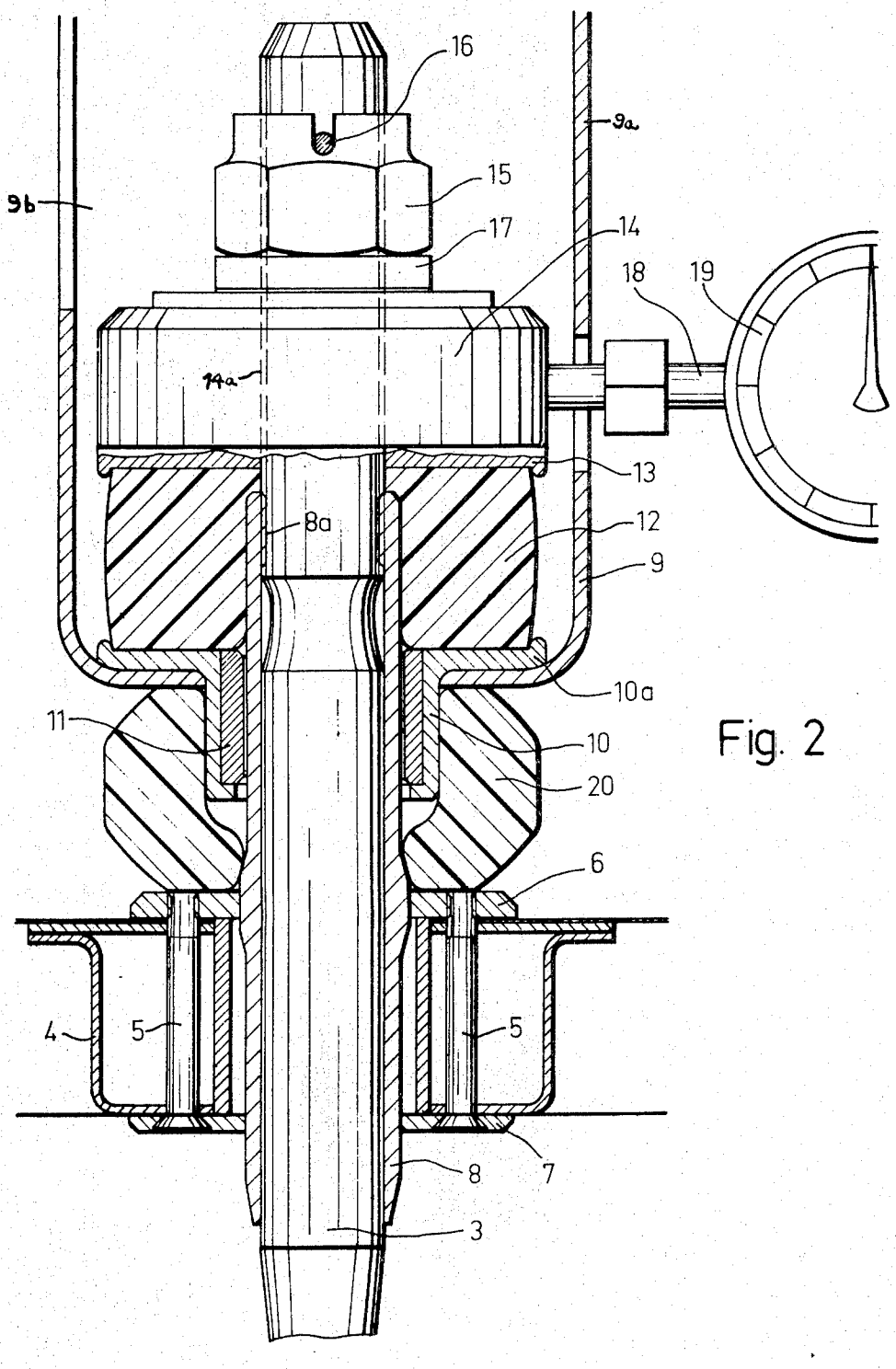


Fig. 2

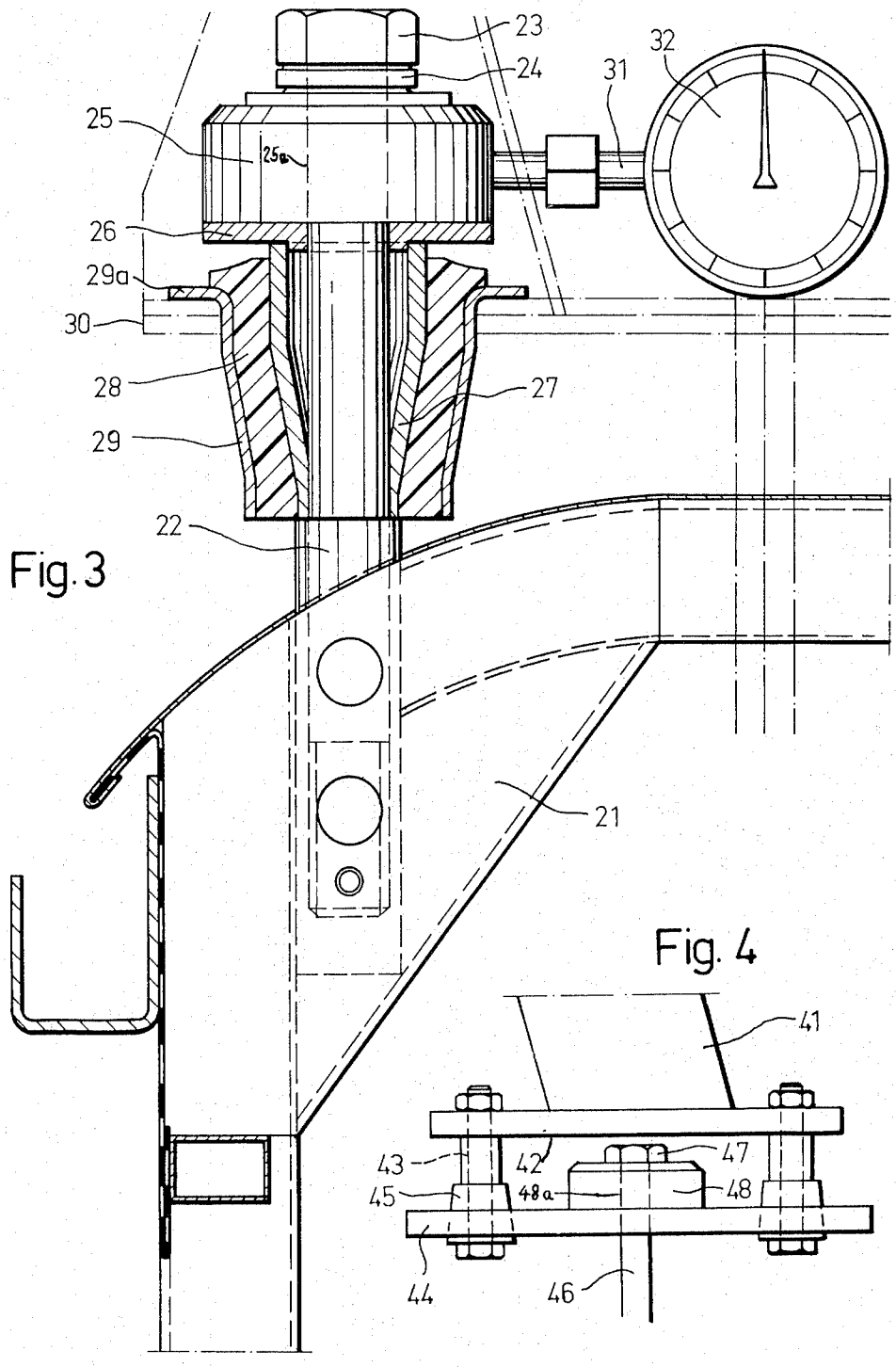


Fig. 3

Fig. 4

RESILIENTLY SUPPORTED AERIAL CABLEWAY CAR

BACKGROUND OF THE INVENTION

The present invention relates to a new and improved cabin arrangement for elevated transport systems, such as overhead railways of aerial cableways.

The ever increasing tourist trade has brought with it a continuous increase in size of the cabins of aerial cableways and overhead railways. While previously overloading of such aerial cableways or overhead railways was simply not possible for the reason that the cabins themselves were so small in size that they could not even be overloaded, with the modern day larger size more comfortable cabins it is readily possible to transport a much larger number of persons than otherwise would allow for a comfortable trip and the precalculated loading of the support construction and support cable of the system. Consequently, owing to such overloading it can happen that while still no actual damage arises, nonetheless there can readily arise a much too great hanging-through of the support cable. As a result, the cabin itself is suspended too low, under circumstances this can result in accidents. Furthermore, the modern day large size cabins are oftentimes loaded with liquid containers which, for the previously mentioned reasons, only then can be transported in their filled condition when the cabin is so to speak empty.

Now for the purpose of preventing the previously explained dangers there have already been proposed many different overload safety devices which, however, owing to their complicated construction either have not proven themselves to be practical at all or are much too functionally unreliable owing to the oftentimes difficult weather conditions which arise in mountainous terrain.

SUMMARY OF THE INVENTION

Hence, from what has been stated above it will be recognized that there is still a real need in the art for a cabin construction for an elevated transport system, such as an overhead railway or aerial cableway, which is not associated with the aforementioned drawbacks and limitations present in the state-of-the-art constructions. Therefore, a primary object of the present invention is to provide a cabin arrangement of the aforementioned type which effectively and reliably fulfills the existing need in the art and overcomes the aforementioned drawbacks and limitations discussed above.

Another and more specific object of the present invention is to provide a novel construction of cabin for use in conjunction with an overhead railway or aerial cableway which does not exhibit the previously explained drawbacks of the prior art.

Yet a further significant object of the present invention relates to a novel cabin arrangement for elevated transport systems, such as overhead railways and aerial cableways, which affords a reliable and safe mode of transportation, and possessing means providing an accurate, quick and reliable indication of at least any overload condition which may be present at the cabin.

Still a further significant object of the present invention relates to a novel cabin arrangement for an elevated transport system, such as an overhead railway or aerial cableway, equipped with mechanism for indicating, for instance, (a) a pressureless condition attributable to a defect in a pressure measuring cell of the cabin arrangement, a defect at the indicator mechanism for the pressure measuring cell or in a pressure line of the system, (b) the permissible load condition encompassing the entire range from an empty cabin up to a normally filled cabin, (c) a warning zone corresponding to a small yet permissible overload, and (d) a danger zone corresponding to an impermissible overload condition at the cabin.

Now in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, the inventive cabin arrangement is manifested by the features that its suspension device is equipped with at least on elastic pressure measuring cell which completely or partially takes-up the weight of the cabin, and this pressure measuring cell is connected with an indicator device.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is schematic side view of a large size cabin used in an elevated transport system, such as an aerial cableway or overhead railway;

FIG. 2 is an enlarged fragmentary detail sectional view of the suspension system of the cabin arrangement of FIG. 1;

FIG. 3 is an enlarged fragmentary view, partly in section, of a modified version of suspension system for the cabin arrangement of FIG. 1; and

FIG. 4 is a schematic fragmentary view of still a third embodiment of suspension device for the cabin arrangement of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Describing now the drawings, in FIGS. 1 and 2 there is illustrated a first embodiment of inventive cabin arrangement for an elevated transport system, here shown as an aerial cableway or overhead railway, wherein the cabin proper has been designated by reference numeral 1 and the suspension device or system by reference numeral 2. The cabin 1 is equipped with four tension or or tie rods 3 which are fixedly connected with the floor 1*a* of the cabin 1 as well as with its roof 1*b*, as will be more fully explained hereinafter, thereby providing good stability for such cabin. More specifically, it will be understood that at the roof profile rib member 4 a respective upper and lower flange 6 and 7 are fixedly retained at four locations of the cabin roof through the agency of the screw means 5, and one such location being shown in detail in FIG. 2. Of these upper and lower flanges 6 and 7 at least the first-mentioned upper flanges 6 are each welded to a respective associated sleeve member 8. Each of these sleeve members 8 is provided at its upper end with internal threading 8*a* into which can be threadably connected the upper end of the respective associated tension or tie rod 3. The attachment of the lower end of each such tension rod 3 with the floor of the cabin 1 can be perfected in a similar manner, although a different type and mode of attachment could be equally well provided.

Continuing, it will be understood that the suspension device **2** has four downwardly depending legs **9***a*, with the free or lower end of each of these four legs **9***a* designated by reference character **9.** Each of the leg ends **9** of the legs **9***a* of the suspension device **2** is connected with one of the tension or tie rods **3** in the manner to be described hereinafter. Now in a bore or compartment **9***b* of each suspension leg **9***a* there is seated a sleeve member **10** provided with a large collar **10***a*. A bearing bushing **11** is located in sleeve member **10** and ensures for a faultless gliding or sliding of the sleeve **8.** A substantially ring-shaped resilient or rubber body member **12** serving as a resilient or spring element is supported at the collar **10***a* of the sleeve member **10.** A clamping plate **13** bears against the top of this resilient or rubber body **12,** as best seen by referring to FIG. **2.** A hydraulic and elastic pressure sensor means, cell or pressure pick-up device **14** equipped with a central bore **14***a* for the associated tension or tie rod **3** is seated upon this plate **13** and is thus arranged elevationally or sequentially with respect to the resilient body **12.** A crown nut **15** or equivalent is threaded onto the upper end of the tension rod **3,** this nut **15** being secured in position by a splint or wedge **16** or some other suitable device. Between the crown nut **15** and the pressure cell **14** there is located a pressure disc **17.** The pressure cell **14** is operatively coupled through the agency of a pressure transmission line or conduit **18** with a manometer **19** serving as an indicator device. The pressure cell **14,** the pressure transmission line **18** and the manometer **19** are filled with any suitable pressure transmission fluid which, of course, is non-compressable and possesses a viscosity permitting its use throughout all temperatures which are to be expected in the area where the cabin is functioning.

Apart from the resilient or rubber spring **12** the hanging or suspension device additionally contains a rubber spring **20** which is spanned between the associated suspension leg foot **9** and the upper flange **6.** Both of the springs **12** and **20** not only serve the purpose of absorbing all of the impacts which arise when travelling over the suspension rollers, but additionally act as noise dampening devices or sound barriers, that is to say, prevent the transmission of the noises emanating from the travelling mechanism to the cabin **1.**

The indicator devices **19** are advantageously constructed as electrical contact vacuum gauges or pressure switches. Each of such can be connected by a control line with the master power control box or installation in the cabin **1,** as such has been schematically indicated by the control line **50** and control installation **51** for the indicator device **19** at the left-side of the cabin arrangement of FIG. **1.** Thus, for instance, four different load conditions can be indicated:

a. the pressureless condition indicative of a defect at the pressure cell, at the indicator device or the pressure line;
b. the proper load condition which encompasses the range between the empty cabin up to the normally loaded or filled cabin;
c. the warning zone corresponding to a small but yet permissible overload; and
d. the danger zone corresponding to an impermissible overload.

The electrical circuitry which can be of conventional design can be constructed and arranged such that the four load conditions of each pressure cell are not only apparent from any given one of the indicator means at the control installation **51,** rather simultaneously also functions such that during the presence of the load conditions (a) and (d) noted above at a single one of the pressure cells causes blockage of the control installation **51** by cutting off the motive power source to the transport system, so that the transport system cannot be placed into operation when the cabin is overloaded or when for some reason the minimum load has not been indicated. This can be easily accomplished, for instance, through opening of a power switch in the electrical circuit or other safety interlock means known to those skilled in the art.

As should be apparent from the discussion above of the inventive cabin arrangement there is afforded an extremely simple constructionally and operationally reliable device by means of which it is possible to faultlessly determine each overload condition present at the system.

Turning now to FIG. **3** there is illustrated a further embodiment of the invention for a somewhat modified construction of the suspension device, wherein here likewise once again four such suspension or hanging elements connect the cabin **21** with the suspension legs. Each suspension bolt **22** which is appropriately fastened to the cabin **21** is provided at its upper end with threading onto which there is threadably connected a nut member **23** secured against rotation by any suitable and therefore here not particularly shown means. Beneath the nut member **23** there is located the pressure disc **24** and below such pressure disc there is located the pressure cell or pick-up **25** equipped with a central bore **25***a*. A downwardly tapering sleeve **27** bears from below and through the intermediary of a support disc **26** against its associated pressure cell **25.** This sleeve **27** in turn is surrounded by an elastic rubber collar **28** serving as the spring or resilient means. This rubber elastic collar **28** is seated in a downwardly tapering sleeve **29,** the upper edge **29***a* of which bears upon the edge or marginal portion of a bore of the associated suspension leg **30,** as shown. Also in this case each such pressure cell **25** is connected through the agency of a line or conduit **31** with a suitable associated indicator device **32,** which can be similarly assumed to be an electrical contact vacuum guage like that considered with the first embodiment of FIGS. **1** and **2** and which also in the manner described previously or in a similar manner is connected with the control cabin.

FIG. **4** illustrates a further embodiment of the invention wherein, of course, it is also possible to carry out a separation of the rubber springs from the pressure cell. The suspension device **41** is equipped at its lower end with a support plate **42** at which there is suspended through the agency of two, three or four threaded bolts **43** or equivalent a free support plate **44,** and specifically in such a manner that between the threaded bolts **43** and the free support plate **44** there is arranged a so-called silent block **45** functioning as a spring-, sound- and impact dampening means. A suspension or attachment bolt **46** penetrates the free support plate **44** and bears with its nut member **47** upon a pressure cell **48** provided with a central bore **48***a* and lying against the free support plate **44.** This pressure cell or pressure pick-up device **48** is also in this case connected, of course, with a suitable indicator device, similar to the indicator devices **19** and **32** of FIGS. **1** and **3** respectively, and thus not particularly shown.

Naturally, a great many different constructional modifications are possible within the framework of the teachings of this development, even those in which the pressure cell does not require any central bore. When using a number of pressure cells it is also possible to conjointly switch such into operable association with a single pressure measuring device which then indicates the total pressure. Also, the pressure cell can be arranged either elevationally below or above its associated resilient element or elements.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims.

What is claimed is:

1. A car for aerial cableway or the like comprising a cabin, a suspension means for supporting said cabin, at least one elastic pressure sensor means arranged sequentially with respect to resilient elements provided for said suspension means, said at least one elastic pressure sensor means at least partially taking up the weight of the cabin, indicator means responsive to said at least one pressure sensor means for indicating the load conditions carried by said suspension means, means for connecting said at least one elastic pressure sensor means with said indicator means, a control installation for said cabin, and a control line connecting said indicator means with said control installation, whereby operation of the aerial cableway may be controlled in response to predetermined load conditions carried by said suspension means.

2. A car as defined in claim **1,** wherein said connecting means comprises a pressure line coupling said at least one pressure sensor means with said indicator means, said at least one pressure sensor means and said pressure line being filled with a pressure transmitting fluid.

3. A car as defined in claim **1,** wherein said cabin is provided with a cabin roof and a cabin floor, tie rod means secured with said cabin roof and said cabin floor, said suspension means incorporating suspension feet means, and said resilient elements supporting said tie rods at said suspension feet means, and wherein said at least one pressure sensor means is elevationally arranged with respect to said resilient elements.

4. A car as defined in claim **3,** wherein said at least one pressure sensor means is arranged above said resilient elements.

5. A car as defined in claim **1** wherein there is provided a plurality of said pressure sensor means each of which is adapted to take up an equal part of the weight of the cabin, and wherein said indicator means are adapted to measure the weight carried by each of said pressure sensor means whereby the distribution of the load may be monitored.

6. A car as defined in claim **1** including safety interlock means for preventing operation of the transport system upon occurrence of predetermined load conditions measured by said indicator means.

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