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(54) A leaktight electrical wiring system usable particularly for halogen lighting systems, preferably arranged on support plates and/or the like

(57) A leaktight electrical wiring system usable particularly for halogen lighting systems, preferably arranged on support plates and/or the like, comprises a support and wiring element (1) for switches/sockets (31), a transformer (32), etc., formed by a piece of metal section which can be fitted in a covering element 2 formed by a piece of channel section made of rigid plastics material of appropriate length for housing the wires (33) supplying the lamps (34) which are mounted on a support plate (4) on the upper surface (3) of which two hollow end elements (5) bear, the end elements (5) being in the form of hollow caps disposed at the ends of the covering element after the interposition of resilient seals (6) and fixed to the support plate (4) by screws (V) fixing the covering element to the support plate (4), forming thereon a perfect seal owing to the action of the resilient seals (6) and of the lateral lips (22) of the covering element which are coextruded in soft plastics material and may be fixed by further screws (V1).

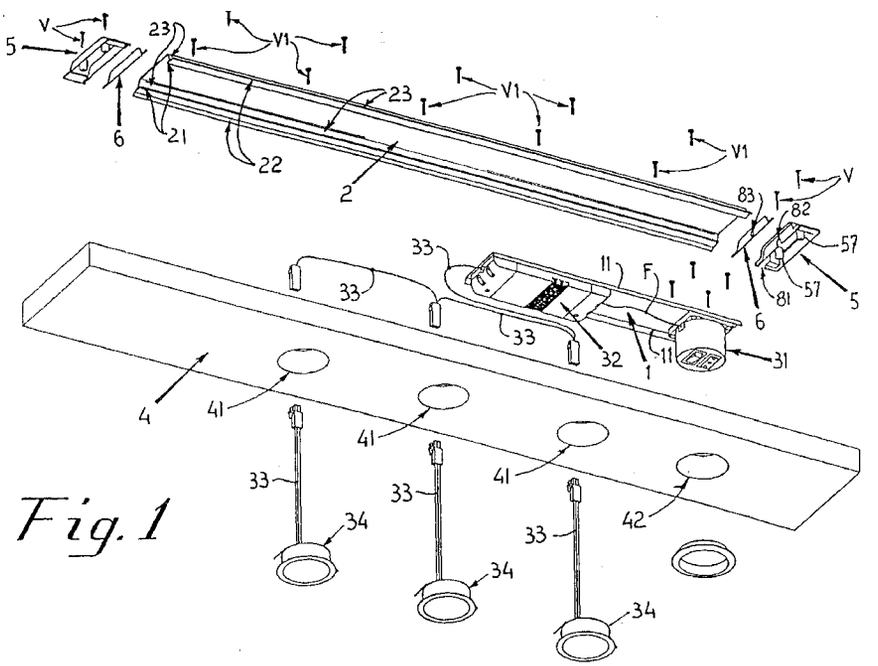

Fig. 1

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Description

The subject of the present invention is a system for the support, fixing and wiring of electrical components such as transformers, switches and lamps, particularly halogen lamps, the system being able, in particular, to offer a perfect leaktight seal fully complying with the current norms in the event of any accidental contact with water. In particular, the system relates to possible mounting on pre-drilled support plates which house the lighting components.

The components of the system are preferably fixed and wired on a suitable metal section of appropriate dimensions, pre-drilled for the fixing of the components of the lighting system such as transformers and various other accessories and coupled with a second covering section by being slid into the second covering section which is made, preferably extruded, from plastics material and does not necessarily have the same dimensions as the aforementioned metal section, the covering section bearing a suitable inner lip which is rigid like the whole of the remaining portion for the fixing of the metal section and an outer, less rigid lip which, when squashed by suitable closure end elements can achieve a perfect leaktight seal, the system having two end seals made of plastics material ("gaskets") which can be fitted on the ends of the section and which are placed in abutment by means of the two end elements which, as well as squashing the entire system by means of suitable fixing screws fitted thereto and inserted in suitable locating seats thereof, also urge the seal into abutment between the end element and the covering section.

Systems for the wiring of electrical components for the purposes in question, that is, for lighting with halogen lamps or lamps of other types, are usually support and wiring systems formed by box-like elements which are produced essentially from a metal channel section of appropriate dimensions and the two lateral lips of which bear against the mounting element (for example, a support plate), two portions at the ends of its central portion being bent forming respective lips the outer sides of which contact the corresponding ends of the lateral lips, thus forming corresponding closure "ends" at both ends of the metal element.

Since these "ends" merely bear on the longitudinal lips of the element, they have to be sealed on the latter in the corresponding adjacent portions by suitable sealing agents such as silicones or other waterproofing resins. Moreover, the elements are fixed with screws extending through the metal section, possibly creating deformations and/or lack of sealing therein since the screws placed in the upper portion of the section may allow any water striking the section to penetrate through the holes housing the screws. In addition to possible deformation of the flat surface of the metal section and hence possible weakening of its seal, the peripheral sealing of this fixing system is based solely on the high specific pressure arising between the bearing edge of the section and the support element which is usually made of a softer material, normally wood or the like. To prevent this system giving rise to infiltrations of water, silicone sealing is also carried out along the entire periphery of the resulting box-like element with questionable technical, aesthetic and functional results. As well as being of dubious appearance, which may not be influential since these systems are usually fitted on support plates at points which are not visible, these solutions achieve, in particular, unpredictable and unreliable watertightness and do not therefore comply with the current norms.

Moreover, from the installation point of view, they do not permit easy technical intervention since, as stated, the bearing periphery is sealed for safety and, in the event of a technical intervention, it is necessary to remove the seal and, should the system be put back in place, if the peripheral regions are not resealed there is all the more reason for the deformations of the bearing surface not to permit perfect sealing of the support and wiring system. Moreover, since the systems currently on the market are made of metal, although the components they contain are certainly insulated, these systems do not ensure the necessary external insulation in the event of accidental detachment of an electrical wire or of any electrical leakages of transformers, switches and/or other electrical components, so that an operator touching the system accidentally, for example, in order to dust the support plate of the element, would be struck by a dangerous electrical discharge and if water were to strike it for any reason, there would also be dangerous leakages.

The object of the present invention is to provide a system for the wiring and support of electrical lighting components such as, preferably halogen lighting components, which can prevent all of the problems described above, ensuring a perfect leaktight seal, safe electrical insulation, and easy assembly, dismantling and/or maintenance thereof, as well as notably pleasing aesthetic attributes, particularly in the case of "visible" installations so that it can be used without requiring particular aesthetic covering solutions, the system finally also enabling the lengths of the support and covering sections to be selected in situ by adaptation in the most appropriate manner.

This and other objects are achieved by means of the system of the present invention, the advantages and characteristics of which will be understood better from the description of a possible preferred embodiment thereof given purely by way of non-limiting example below, with reference to the appended drawings, in which:

Figure 1 shows the various elements included in the system of the invention in an exploded perspective view,

Figure 2 shows the system of the invention in a longitudinally-sectioned view showing the various elements making it up, with a suitably enlarged detail

relating to one end,

Figure 3 is a transverse section taken on the line I-I of Figure 2.

With reference to the drawings and particularly to Figure 1, there can be seen: a support and wiring element 1 which is preferably constituted essentially by a metal channel section of appropriate dimensions on which there are mounted by suitable fixing means the respective electrical components, such as a switch/socket unit 31 and a transformer 32 from which supply wires 33 for lamps 34 extend.

The support and wiring element 1 is coupled, as shown particularly in Figures 1 and 3, with a covering element 2 constituted by a section which is produced by the extrusion of suitable plastics material and which, like the wiring support element 1, is channel-shaped but with internal dimensions suitable for housing the wiring and support element 1 which can be slid therein with its lateral flanges 11 bearing on two corresponding inner lips 21 which extend from the ends of the lateral flanges 23 of the covering element 2 and which are extended further outwardly by respective lateral lips 22 for bearing on the support surface 3 of the support plate 4 so as to achieve a perfect lateral seal.

These lateral lips 22 are produced by various techniques for rendering them more resilient than the rest of the covering element 2, for example, by processes for the coextrusion of materials with different stiffnesses, etc. This assembly of the support and wiring element 1 fitted in the covering element 2 is placed, with all of the components which make up the lighting system, on a suitable support surface 3 such as that of a support plate 4, as shown by way of example in the drawings and referred to herein.

At this point, in order not only to fix to the surface 3 the structure constituted by the element 1 slid into the element 2, but also to achieve a perfect lateral seal of the system thus formed, as shown in particular by Figures 1 and 2, two seals 6 are fitted on the ends of the covering element 2 and are urged into abutment against the ends of the element 2 by means of two end elements 5, thus being clamped between the ends of the element 2 and the closure end elements 5.

As can be seen in particular from Figure 1, the end elements 5 are constituted basically by substantially parallelepipedal caps having cross-sections practically complementary with that of the covering element 2, that is, such that the profiles of their internal surfaces are the same as that of the external surface of the covering element 2, each cap also being closed on its side which faces outwardly in use by an outer transverse wall 51 connected to the respective upper wall 52 (see Figure 1 and particularly Figure 2), as well as to the side wall 53 (see Figure 3), terminating at its free end a in lateral lip 54 which extends outwardly in order to bear on the support surface 3 whereas, on the side which faces the covering element 2 in use, the cap is closed by an inner transverse wall 55 (see Figures 1 and 2) disposed slightly inside the respective end so as to form a projecting edge 56 for engaging and adhering with its internal profile on a corresponding portion of the respective end of the covering element 2.

Moreover, two cylindrical, tubular elements 57, in the internal holes of which suitable screws V are inserted as described below (see Figure 1) for fixing to the support plate 4, extend inwardly from the upper wall 52 (see Figures 1 and 2).

As can be seen clearly particularly from Figure 1, the end elements 5 are practically identical to one another and can be fitted on the ends of the covering element 2 so as to be symmetrically opposed.

It is pointed out that, since both the support and wiring element 1 and the covering element 2 are constituted by longitudinal sections, they can be cut to various lengths, thus achieving wide variability of application.

In practice, the system described above is used in the following manner.

First of all, a piece of suitable length is formed by cutting of the respective metal section to form the support and wiring element 1 to which the appropriate electrical components, such as a switch/socket unit 31, a transformer 32 and/or the like are fixed and these are then wired by means of suitable electrical wires F and the connections to the supply wires 33 of the lamps 34 and to the supply cable (not shown) are made.

A piece of the respective plastics section of a length suitable for housing the entire electrical system to be protected is formed, again by cutting, thus forming the covering element 2 and, as stated, the support and wiring element 1 is inserted therein and positioned suitably therein, the supply wires 33 for the lamps 34 being inserted through the holes 41 for the mounting of the lamps 34, the switch/socket unit 31 (or other devices such as further sockets) at the same time being inserted in the respective hole (or holes) 42.

The entire unit formed by the covering element 2 with the respective support and wiring element 1 is then positioned so as to bear on the support surface 3 on the upper portion of the support plate 4.

At this point, respective seals 6 are fitted on the ends of the covering element 2, the seals 6 being constituted by walls made of a suitable elastomer and having an appropriate thickness and a profile suitable for covering the holes in these ends and, more precisely, an upper portion which follows the external profile of the end of the covering element 2 and a lower straight portion disposed between the ends of the upper portion.

Finally, the end elements 5 are fitted by being urged against the ends of the covering element 2, and are fixed to the surface 3 of the support plate 4 by suitable screws V which are inserted in the respective cylindrical, tubular elements 57 and are engaged in the body of the support plate 4.

The covering element 2 is thus fixed to the support plate 4, its lateral lips 22 forming a seal on the surface

thereof and, moreover, the seals 6 disposed at its ends are urged against its ends and against the surface 3 by the clamping action of the end elements 5, ensuring further sealing thereof in these portions.

It should be noted that, particularly if the covering element 2 is of moderate length, its lateral lips 22 may appropriately also be fixed by further screws V1 (see Figure 3) suitably spaced apart, as shown in Figure 1.

At this point, it should be noted that, naturally, to allow for an electrical supply, the respective supply cable, not shown, will have to extend through one of the end elements 5 and the respective seal 6 and, as can be seen clearly from Figure 1, respective holes 81, 82, 83 are therefore formed in an outer wall (51-53) and in the inner transverse wall 55 of one of the end elements 5 and in the corresponding seal 6.

It should also be noted that the entire unit forming the system described can be used without requiring any sealing with silicone mastics as in known systems and, if necessary, can be removed and then re-fitted very easily and quickly.

It is clear from the foregoing that the system of the invention achieves considerable advantages of construction, application and use which are listed briefly below:

a) a small number of easily produced components;
b) a capability for considerable variation of the lengths both of the support and wiring element 1 and of the covering element 2, permitting a corresponding wide variability of application;
c) perfect leaktight sealing of the entire unit without the need to carry out any sealing with mastics;
d) perfect and complete electrical insulation from the exterior;
e) safety and complete reliability in use;
f) compliance with current norms;
g) improved overall aesthetic appearance.

Naturally, further variations may be applied to the system forming the subject of the present invention without thereby departing from the scope of the description and the following claims and hence from the scope of protection of the present industrial invention.

Claims

1. A leaktight electrical wiring system usable particularly for halogen lighting systems preferably arranged on support plates and/or the like, characterized in that it comprises a support and wiring element (1) for electrical components of the lighting system such as switches/sockets (31), transformers (32) and/or the like, the support and wiring element (1) being insertable in a covering element (2) and positionable variably therein, and two end elements (5) which can be fitted on the ends of the covering element (2) after the interposition of suitable seals (6), the end elements (5) being releasably fixable to the support plate (4) or other mounting element, at the same time fixing the covering element (2), the longitudinal edges of the covering element (2) and the seals (6) being pressed onto the respective mounting surface (3) forming a seal thereon, and the clamping of the seals (6) between the end elements (5) and the respective ends of the covering element (2) also completing the sealing in the corresponding regions.

2. A system according to Claim 1, characterized in that the covering element (2) is constituted by a piece of a rigid extruded plastics channel section from the longitudinal ends of the lateral flanges (23) of which two internal lips (21) extend, the lips (21) being further extended outwardly by respective lateral lips (22) for bearing on the mounting surface (3), the said support and wiring element (1), the shape of which is substantially complementary to that of the internal portion of the said covering element (2), being insertable and positionable in the covering element by sliding and being supported therein by the respective internal lips (21) on which it bears with the longitudinal edges of its lateral flanges (11), the lateral lips (21) preferably being made of soft plastics material and being obtainable with the rest of the section forming thecovering element (2) by means of known techniques such as coextrusion.

3. A system according to the preceding claims, characterized in that the end elements (5) are constituted by respective elements each in the form of a substantially parallelepipedal cap having an edge (56) projecting from its side which, during assembly, faces a corresponding end of the piece of section forming the covering element (2), the inner surface of the edge (56) being engageable against a corresponding outer surface portion at the corresponding end of the covering element (2), each end element (5) also having at least one internal cylindrical, tubular element (7) which extends from the respective upper wall (52) and in the cavity of which a respective screw (V) can be inserted, the screwing of the screw (V) into the body of the mounting element such as a support plate (4) or the like fixing the end element and at the same time also fixing the covering element (2) housed therein, by means of the respective projecting edges (56).

4. A system according to the preceding claims, characterized in that, particularly if the covering element (2) is of moderate length, it may also be fixed to the support plate (4) or other mounting elements by means of further screws (V1) applied to its lateral lips (22).

5. A system according to Claims 1, 2 and 3, characterized in that suitable seals (6) are disposed between the ends of the covering element (2) and the respective end elements (5) fitted on its ends, the seals being made of a suitable soft material such as an elastomer and being clamped between the end elements (5) and the respective ends of the covering element (2) and also being urged against the mounting surface (3) ensuring, in the respective regions, a perfect leaktight seal which completes the leaktight sealing of the rest of the covering element (2) achieved by the bearing of its lateral lips (22) against the surface (3), possibly also with fixing by means of suitable screws (V1).

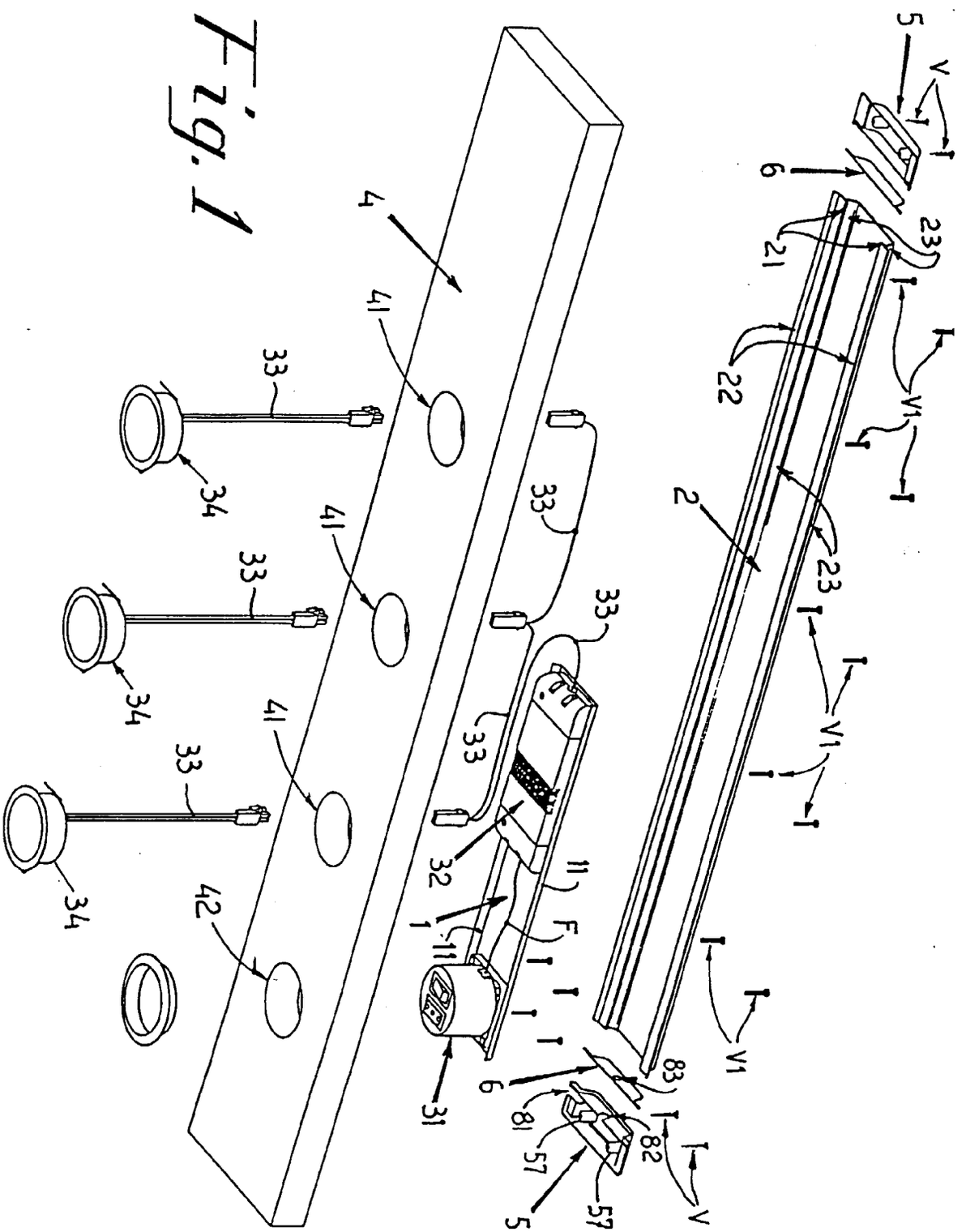

Fig. 1

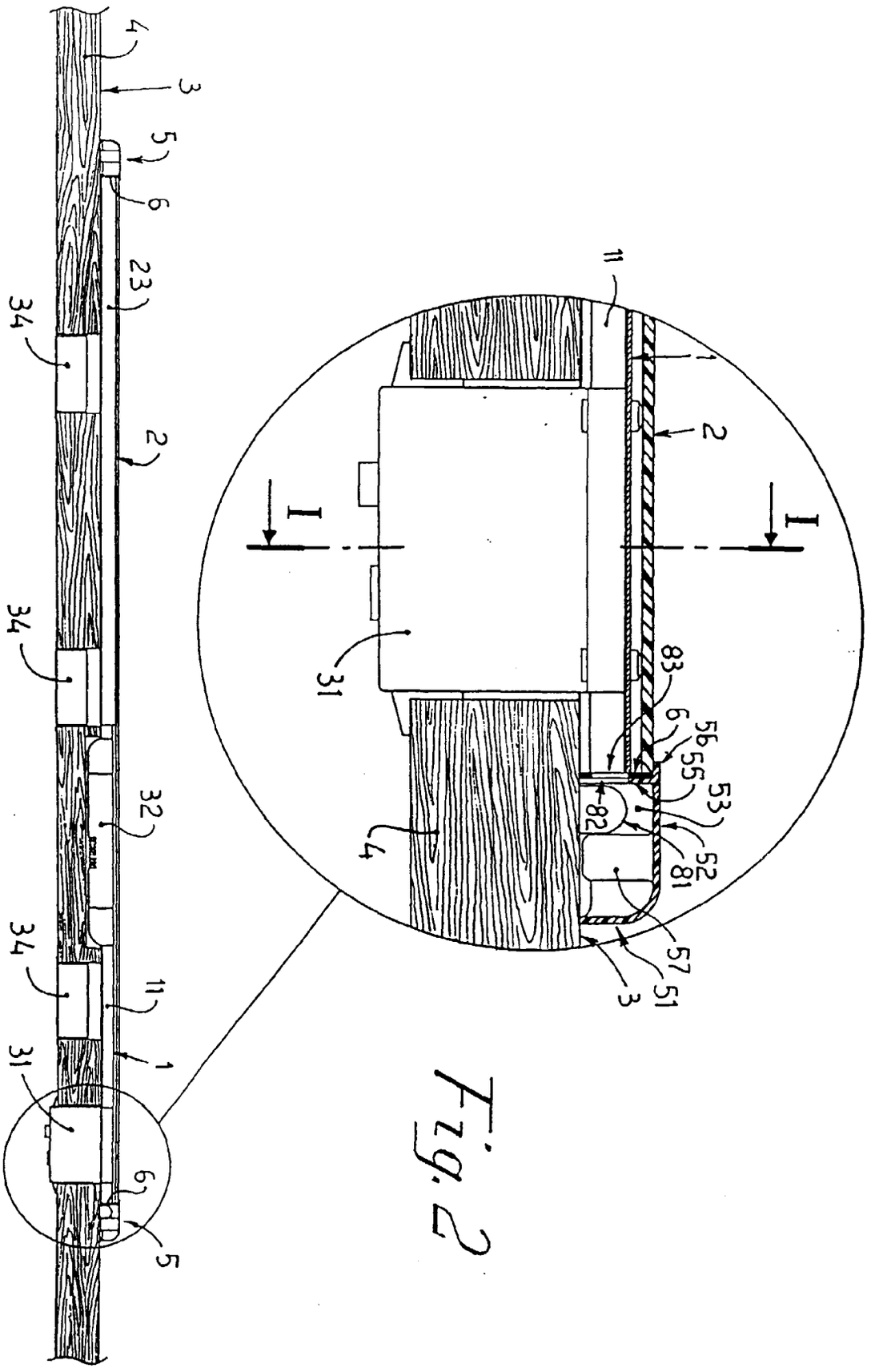
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Fig. 2

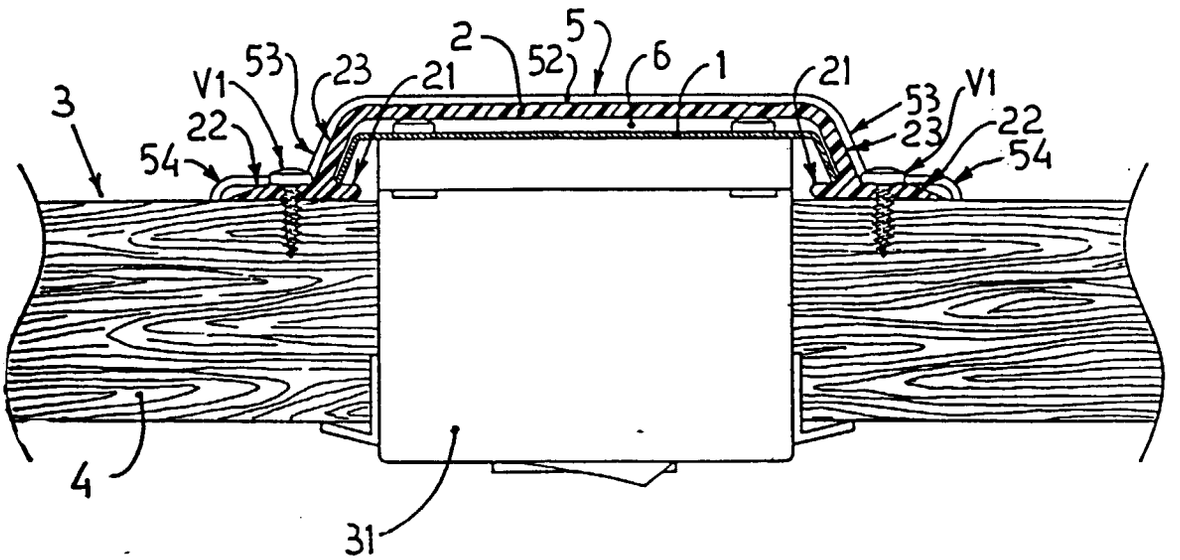

Fig. 3