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(71) Applicant: TENGBOMS ARKITEKTKONTOR AB
Kornhamnstorg 6
S-111 27 Stockholm(SE)

(72) Inventor: Bejne, Ake Erik
Ramundvägen 32
S-179 00 Stenhamra(SE)

(74) Representative: Nilsson, Karl et al,
Stenhagen Patentbyra AB Karlavägen 18
S-114 31 Stockholm(SE)

(54) A composite section.

(57) A room attemperating and sound-damping multi-functional composite section (10) adapted to be suspended from a false or a main ceiling (67) comprises at least one pipe loop (11) arranged to conduct an attemperating medium and having pipe parts (14 - 17) which extend in the longitudinal direction of said section (10). These pipe parts (14 - 17) are arranged in mutually horizontal spaced relationship in, and in heat-conducting contact with a section part (19, 20) incorporated in the composite section (10). Connected to opposite sides of said section part (19, 20) are sound absorbers (23, 24) which extend along the length of the composite section (10) and project outwardly from said section part (19, 20) in mutually opposite directions. The upper surfaces of the sound absorbers form shelf surfaces (25, 26) which are separated by the aforementioned section part (19, 20) and which are arranged to carry electrical, telephone, data supply lines (27 - 30) etc., and optionally also sprinkler lines. The lines (27-30) can be passed downwardly to respective socket output means or the like through the interspace (31) between the horizontally separated pipe parts (14 - 17).

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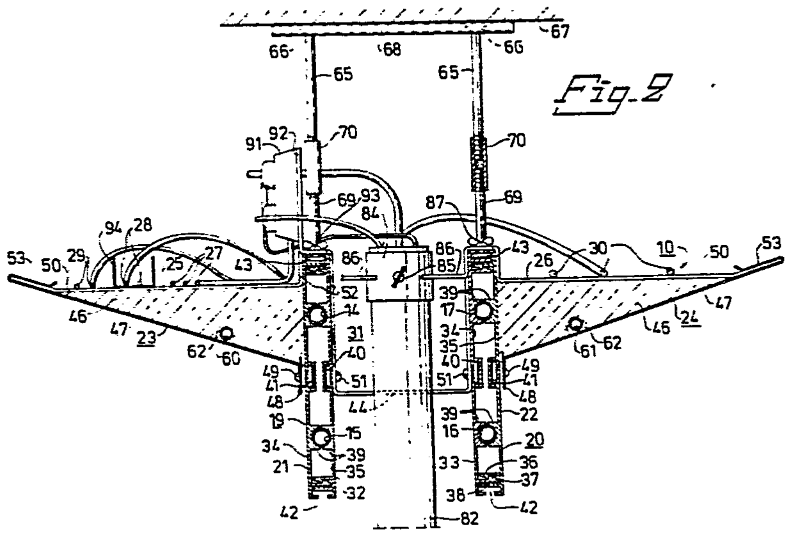
Fig.2

A COMPOSITE SECTION

The present invention relates to a room attemperating and sound-damping, multi-functional composite section adapted to be suspended from a false or a main ceiling and comprising at least one pipe loop arranged to convey attemperating medium and having pipe parts which extend substantially in the longitudinal direction of said section and which are arranged in horizontal spaced relationship in, and in heat-conducting contact with a section part incorporated in said composite section.

The object of the invention is to provide a novel and useful multi-functional composite section, particularly for use in office buildings and large rooms, which can be designed to be highly aesthetic and which can be given an increased number of functions in relation to conventional devices of the kind in question, therewith to facilitate installation work normally occurring during construction and rendering such work less expensive.

To this end, it is proposed in accordance with the invention that there is connected to opposite remote sides of said section part of a composite section of the kind described in the introduction sound absorbers which project outwardly in mutually opposite directions and extend along the length of said composite section and the upper sides of which sound absorbers form shelf surfaces separated by said section part and intended to support electrical lines, telephone lines, data-supply lines etc., and optionally also sprinkler lines, the distance between the horizontally separated pipe parts being such as to permit said lines to be passed down to respective output means or the like via the interspace between said pipe parts. This arrangement enables, inter alia, electrical supply lines, data-supply lines and telephone lines to be hidden from view when carried by the composite section and yet still be readily accessible, the construction enabling the data-supply lines to be placed on a separate shelf surface remote from the influence of disturbances

emanating from the telephone and electrical supply lines.

Further characterizing features of the invention and advantages afforded thereby are set forth in the claims and will be apparent from the following description, which is made with reference to an exemplary embodiment of the invention illustrated in the accompanying drawings.

Figure 1 illustrates schematically an office having mounted to the ceiling thereof a composite section according to the invention, said section being shown in perspective and in sectional view.

Figure 2 is a cross-sectional view of a section according to Figure 1 in larger scale and in more detail.

Figure 3 illustrates a central portion of the composite section according to Figure 2 with a modified design of the means for connecting together two box-sections which form the center part of the composite section, and for supporting two sound absorbers incorporated in the composite section.

Figure 4 is a perspective view of an end-piece for the composite section.

Figure 5 illustrates schematically and in perspective the manner in which the pipe loops extend in the composite section.

The room attemperating and sound-damping composite section 10 intended to be suspended from a ceiling and illustrated in the Figures comprises a pipe loop 11 (Figure 5) for conveying attemperating medium and having an inlet and an outlet 12, 13, respectively. The pipe loop 11 has pipe parts 14 - 17 which extend longitudinally of the composite section, and the ends of which are coupled together by means of elbows 18. The pipe parts 14, 15 are arranged one above the other, in horizontal spaced realtionship with the similarly superposed pipe part 16, 17, said pipe parts being accommodated in and in heat-conductive contact with a central section part formed by separate box-sections 19, 20 incorporated in the section 10.

Connected to the opposite remote sides 21, 22 of said section part 19, 20 are sound absorbers 23, 24 which project outwardly in mutually opposite directions and extend along the section 10, the upper surfaces of said sound absorbers

forming laterally separated shelf surfaces 25, 26, of which the shelf surface 25 is shown to carry, for example, electrical supply lines and internal and external telephone lines 27, 28 and 29 respectively, while the other shelf surface 26 separated from the shelf surface 25 by the central section part 19, 20 carries data-supply lines 30 out of range of disturbances set-up by the lines 27, 28, 29. The shelf surfaces 25, 26 may also carry other lines, for example sprinkler lines, telex lines etc. (not shown), thereby to facilitate drawing of such lines and to facilitate installation work, besides making such work less expensive. The lines 27 - 30 can be extended down to respective outputs or the like via lead-through openings formed by the space 31 between the horizontally separated pipe parts 14, 15 and 16, 17, i.e. between the opposite facing sides 32, 33 of the box-sections 19, 20 accommodating the pipe parts 14 - 17.

The sides 21, 32 and 22, 33 of the box-sections 19, 20 are substantially vertical and the height of the box-sections is great in relation to the width of said box-sections, so as to form sound-damping baffles. Each of the illustrated box-sections 19, 20 comprises two mutually identical box-section halves 34, 35 provided with mutually co-acting snap-coupling means 36, 37, 38 arranged to enable the box-section halves to be snapped together to form the box-sections 19, 20. The box-section halves also exhibit longitudinally extending parts 39 provided with recesses which, when seen in cross-section, have a semi-circular configuration and which, when the box-section halves are joined together, are located opposite one another in the resultant box-sections 19, 20, said recesses forming fittings which firmly embrace the pipe parts 14 - 17. Arranged in the vertical and horizontal sides of the box-sections 19, 20 are mounting grooves or channels 40 - 43 which are widened towards the respective bottom thereof and with the aid of which objects can be connected to the composite section 10 or said section can be mounted to a supporting structure in a manner hereinafter described. Attached in the mounting grooves 40, arranged in the sides 32, 33 of the box-sections, at two or more locations along the length of the section 10, are coupling means which couple

the box-sections 19, 20 together and which have an extension which is small in relation to the length of the section 10. A first embodiment of these coupling means is illustrated at 44 in Figures 1 and 2, while a second embodiment is illustrated at 45 in Figure 3.

Each of the sound absorbers 23, 24 comprises an open-top channel having arranged therein a sound-absorbing material 46, preferably having the form of an insert comprising, for example, fibre-glass. In the illustrated embodiment, the channels are formed by the upper part of the vertical sides 21, 22 of the box-sections 19, 20 and sheet-metal strips 47, which are preferably perforated, as illustrated in Figure 1, and which may be provided with decorative, stiffening grooves or flutes, etc. (not shown), said sheet-metal strips extending along the side 21 or 22 of a respective box-section and being connected at one edge 48 to said respective box-sections by means of bolts or screws 49 arranged to co-act with nuts held in the grooves 41. The sheet-metal strips 47 are held at separate locations along their mutually opposite edges by stirrup-like holders 50 which, in turn, are carried by the box-sections 19, 20. As illustrated in Figure 2, these holders may be formed integrally with the coupling means 44, which is connected to the box-sections 19, 20 by means of bolts or screws 51 arranged to co-act with nuts inserted in the grooves 40, and which coupling means 44 is connected to the parts of the holders 50 resting on the upper surface of the bodies of sound-absorbing material 46 via parts 52 which extend upwardly along the sides 32, 33 and engage around the upper edges of the box-sections. In this case, the outer edge portions 53 of strips 47 are bent to form fittings which resiliently engage the outer end portions of the holders 50.

Alternatively, as illustrated in Figure 3, the means 45 for connecting the box-sections 19, 20 together can be arranged separately from the stirrup-like holders 50, it still being possible to join the holders 50 in pairs with central parts 54 engaging around the upper portions of the box-

sections 19, 20. In the embodiment illstrated in Figure 3, said central parts are also connected to the box-sections by means of bolts or screws 55 which engage nuts held in the mounting grooves 43.

A particular advantage is gained from an acoustic and aesthetic aspect when the sheet-metal strips 47 are substantially planar, as illustrated, and extend obliquely outwardly and upwardly from the sides 21, 22 of respective box-sections, so as together form a duct of triangular cross-section.

The pipe loop 11 formed by the pipe parts 14 - 17 and pipe elbows 18 is preferably intended for conveying a coolant capable of removing normally occurring surplus heat from the room, in which one or more composite sections 10 according to the invention are installed, the illustrated arrangement resulting in a large part of the cooling surface of the box-sections 19, 20 being exposed. For the purpose of heating the room in question, there is suitably arranged a separate heating loop 56, such as that schematically illustrated in Figure 5, for conveying a heating medium, the loop 56 of the Figure 5 embodiment comprising an inlet and outlet 57, 58 respectively and pipe parts 60 and 61 joined together by pipe elbows 59. These pipe parts 60, 61 may also advantageously extend in the longitudinal direction of the composite section 10 and, in this respect, are each carried by a respective one of the perforated sheet-metal strips 47 and are in heat-conducting contact with an associated sheet-metal strip 47 along at least part of their length via supports 62, said sheet-metal strip 47 thus forming a heat-emitting surface when wishing to heat the room. The sound-absorbing material 46 insulates the pipe parts 60, 61 in an upward direction, so that the lines 27 - 30 are not exposed to heat.

Provision for the accommodation of the pipe elbows 18, 59 within the composite section 10 can be made by milling suitable grooves in the box-sections 19, 20. Alternatively, one or more of the pipe elbows 18, 59 can be arranged externally of the ends of the composite section and hidden from view by means of separate end pieces, which can be fitted onto respectiv ends of the composite section and of which one

is illustrated at 63 in Figure 4. In the illustrated embodiment, the end piece 63 is attached to the box-sections by means of bolts or screws 64 which engage nuts (not shown) held in mounting grooves, inter alia in grooves 43.

For the purpose of mounting the composite section 10 there is suitably provided two or more pairs of two-part mouting stays located in spaced arrangement along the length of the composite section and each arranged to co-act with a respective box-section 19, 20, each of said stays comprising an upper part 65 having at its upper end a head 66 which is received in a transverse anchor bar 68 attached to the overlying ceiling structure 67, and a lower part 69 having provided at its lower end a head (not shown) which is received in the mounting groove 43 of an associated box-section 19, 20. The mutually opposing ends of the stay parts 65, 69 are connected together by means of a stretching-screw arrangement 70, thereby enabling the position of the device 10 to be adjusted precisely as desired.

The preferred arrangement of the composite section 10 in a room or locale is shown in Figure 1, which illustrates an office having a face wall 71 with a windown therein, and walls 72, 73 extending at right angles from the face wall 71. Shown at 74 is a desk, while tables or benches carrying telephone 75 and data-processor 76 are referenced 77 and 78 respectively. Two composite sections 10 are mounted on the ceiling 79 parallel with one another and parallel with walls 72, 73, said sections having one end located at a distance from the wall 71 and suitably extending towards the viewer of Figure 1 and transverely through the whole building, for example transverely through a corridor located outside the illustrated office, and through a further room located on the other side of the building remote from face wall 71. The inlets and outlets 12, 13, 57, 58 for the attemperating medium, together with lines for supplying said attemperating medium to and passing said medium away from a plurality of composite sections 10, together with electrical supply lines, telephone lines, data-supply lines etc. extending to and from the rooms

on either side of the corridor can be arranged in the corridor, adjacent the ceiling thereof, suitably hidden by a false ceiling.

For the purpose of leading the aforementioned electrical, telephone, and data-supply lines etc., 27 - 30 downwardly from respective composite section there is arranged in the interspace 31 in the manner illustrated in Figures 1 and 2 a down-lead conduit, the lower end of which rests against the floor 80 and which is shown to include an upper part 82 and a lower part 83 which extend parallel with one another but which are offset relative to one another and joined via an obliquely positioned intermediate member 81. The conduit 81 - 83 is firmly held at its upper end in a selected position of rotation by means of a holder means only partially shown in the drawings. This holder means comprises a sleeve 84 arranged to receive the conduit part 82, which can be locked in a selected position by means of a screw 85. Extending from the sleeve 84 are arms 86 which are locked securely to a respective one of the box-sections 19, 20 by means of nuts or screws 87 arranged to co-act with nuts held in the mounting grooves 43. The holder means 84 - 87 can be mounted at any location whatsoever along the length of the composite sections 10 and the extent to which the mutually parallel conduit parts 82, 83 are offset relative to one another is suitably selected so as to correspond to half the centre distance between the composite sections 10, thereby enabling the conduit part 83 with its outlets 88 for said electrical, telephone, data supply lines etc. to be positioned at any selected location in the room.

The mounting grooves 40 - 43 can be used for mounting or suspending additional objects. Thus, Figure 1 illustrates overhead light-fittings 89, 90 suspended from the lower mounting grooves 42 in box-sections 19, 20, while Figure 2 illustrates intermediate supply sockets 91 arranged on an L-shaped bracket structure 92, which in turn is fastened to the box-section 19 by means of screws or bolts, of which one is shown at 93 and engages a nut held in the upper mounting groove 43 of the box-section 19.

As shown at 94, the shelf surfaces 25, 26 can carry channel-sections along the length of the device 10 for accommodating supply lines 27 - 30. It is preferred, however, that as large an area as possible of the upper side of the inserts of sound-absorbing material 46 is left free, so that said material is able to absorb effectively sound energy reflected against the ceiling 67.

The invention is not restricted to the aforedescribed and illustrated embodiment but can be realized in many other ways within the scope of the invention as set forth in the claims.

Thus, the sound absorbers may be arranged at any selected level in relation to the section part 19, 20 and may comprise channels containing sound absorbing material which channels have a substantially horizontal bottom and may be laterally spaced from a respective one of the outer sides 21, 22 of said section part. The attempering medium or media preferably comprises liquid, such as water, and the section part 19, 20 of the composite section 10 may be provided with means (not shown) for ventilating the room equipped with said composite section.

C L A I M S

1. A room attemperating and sound-damping, multifunctional composite section adapted to be suspended from a false or a main ceiling and comprising at least one pipe loop (11) arranged to convey attemperating medium and having pipe parts (14 - 17) which extend substantially in the longitudinal direction of said section (10) and which are arranged in horizontal spaced relationship in, and in heat-conducting contact with a section part (19, 20) incorporated in said composite section, characterized in that connected to opposite remote sides of said section part (19, 20) of the composite section are sound absorbers (23, 24) which project outwardly in mutually opposite directions and extend along the length of said composite section and the upper sides of which sound absorbers form shelf surfaces (25, 26) separated by said section part (19, 20) and intended to support electrical lines, telephone lines, data-supply lines etc., and optionally also sprinkler lines, the distance between the horizontally separated pipe parts (14 - 17) being such as to permit said lines to be passed down to respective output means or the like via the interspace (31) between said pipe parts.

2. A composite section according to claim 1, characterized in that said section part is formed by two separate box-sections (19, 20) having substantially vertical sides (21, 22, 32, 33) and a height which is great in relation to their width, and which box-sections are joined together at a mutual distance apart at two or more locations along the length of the composite section by means of connecting means (44, 45) whose extension is preferably small in relation to the length of said composite section.

3. A composite section according to claim 2, characterized in that each of said box-sections (19, 20) comprises two mutually identical box-section halves (34, 35) provided with means for snap-coupling said halves together.

4. A composite section according to any one of claims 1 - 3, characterized in that said section part (19, 20) is

provided with fittings (39) which encircle said pipe parts (14 - 17).

5. A composite section according to any one of claims 1 - 4, characterized in that said sound absorbers (23, 24) have the form of upwardly open and preferably perforated channels containing sound-absorbing material (46), said channels extending along a respective one of the opposite remote sides (21, 22) of said section part (19, 20) in contact with or laterally spaced therefrom and being supported at mutually separate locations along their outer edge portions (53) by stirrup-like holder means (50) carried by said section part (19, 20).

6. A composite section according to claim 5, characterized in that said channels are formed by substantially planar sheet-metal strips (47) extending obliquely outwardly and upwardly from respective sides (21, 22) of said section part, so as to form together a channel of triangular cross-section.

7. A multi-functional device according to claim 5 or claim 6, characterized in that the outer edge portions (53) of said channels are bent to form fittings which engage around the outer portions of said stirrup-like holder means (50).

8. A composite section according to any one of claims 5 - 7, characterized in that said stirrup-like holder means (50) rest on said section part (19, 20) via central portions (52; 54) engaging around the upper portions of said section part and exhibit legs which project outwardly in mutually opposite directions and which support the channels arranged on the opposite sides of the section part (10) at the outer edge portions (53) of said channels.

9. A composite section according to any one of claims 2 - 8, characterized in that the box-sections (19, 20) are provided in their horizontal and vertical sides with longitudinally extending mounting grooves (40 - 44) which are widened towards respective bottoms thereof.

10. A composite section according to any one of claims 5 - 9, characterized in that said channels also carry pipe parts (60, 61) for conveying attemperating medium, particularly a heating medium, said pipe parts extending in the longitudinal direction of the composite section (10) and being in heat-conducting contact along at least a part of their length with an associated channel.

11. A composite section according to any one of claims 1 - 10, characterized in that it is provided with separate end pieces (63) arranged to conseal pipe-elbows (18, 59) joining said pipe parts (14 - 17, 60, 61) together.

12. A composite section according to any one of claims 1 - 11, characterized in that for the purpose of leading electrical, telephone, and data-supply lines (27 - 30) etc. downwardly from said composite section (10) there is arranged in the interspace between said horizontally separated pipe parts (14 - 17) a lead-down conduit (81 - 83) which preferably exhibits a plurality of mutually separate channels and which is secured at an upper end thereof in a selected position of rotation by means of a holder means (84 - 87) carried by said section part (19, 20), and the lower end of which rests against a floor or some other support surface, said lead-down conduit comprising mutually parallel upper and lower parts (82, 83) which are offset relative to one another and joined by an intermediate, obliquely positioned member (81), of which upper and lower parts (82, 83) the latter (83) carries output socket means for electrical, telephone, data supply lines, etc.

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Fig. 1

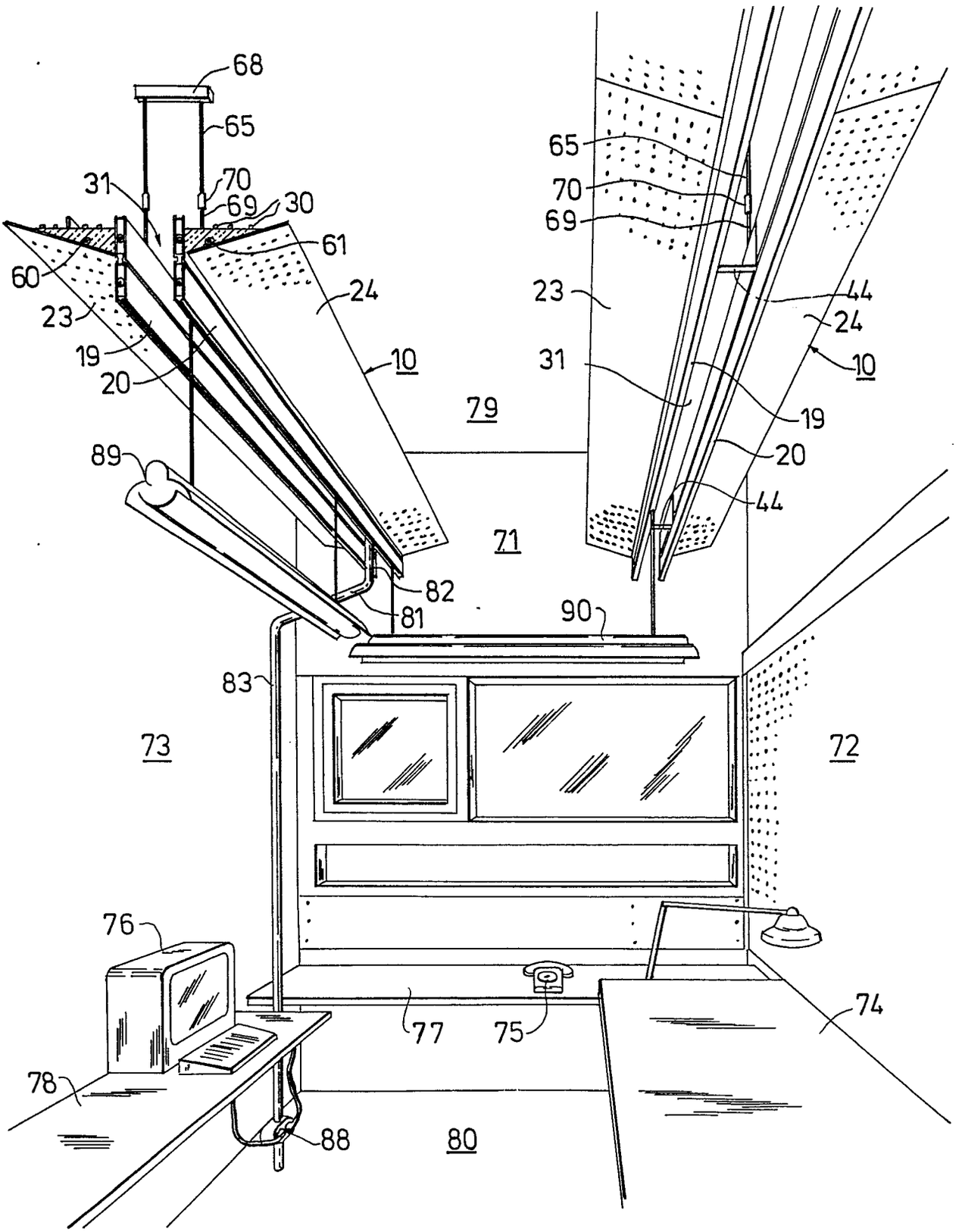

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Fig. 2

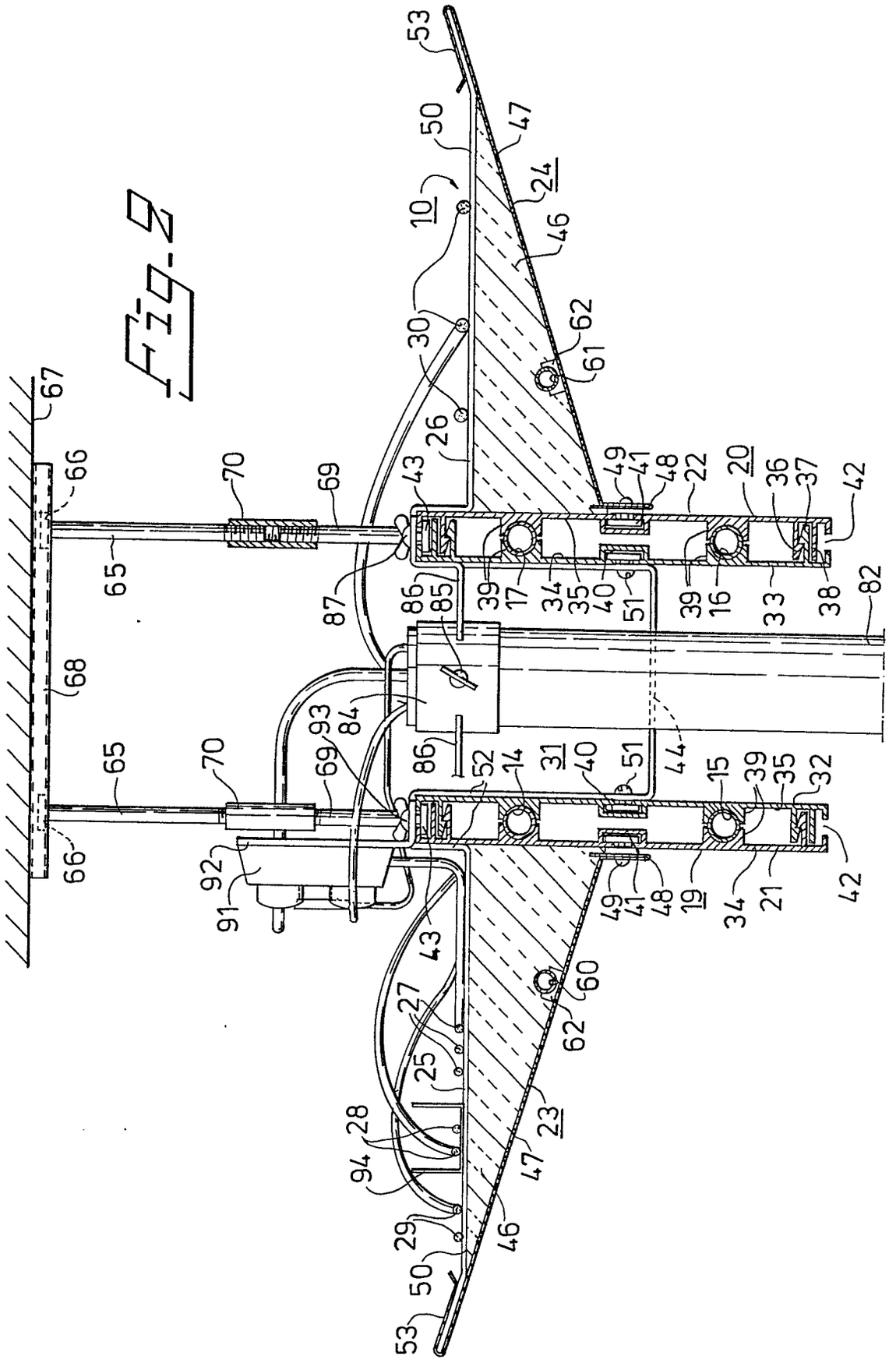

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Fig_3

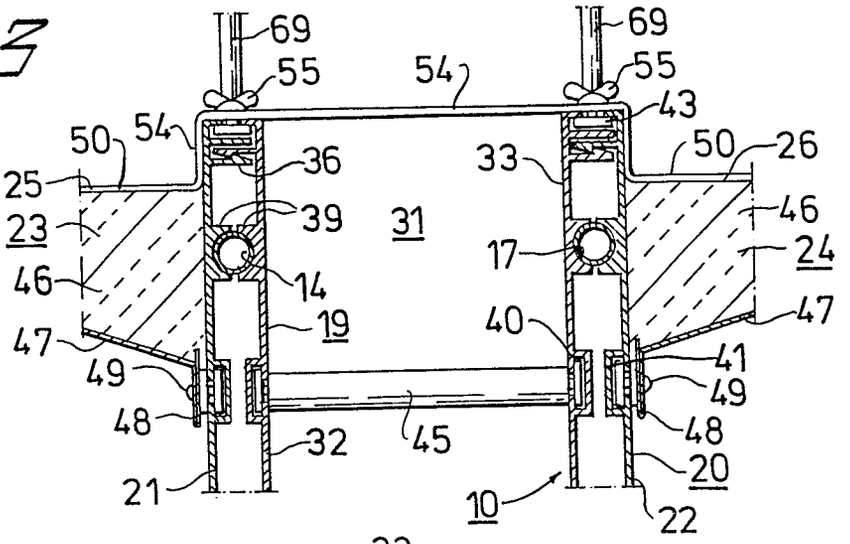


Fig_4

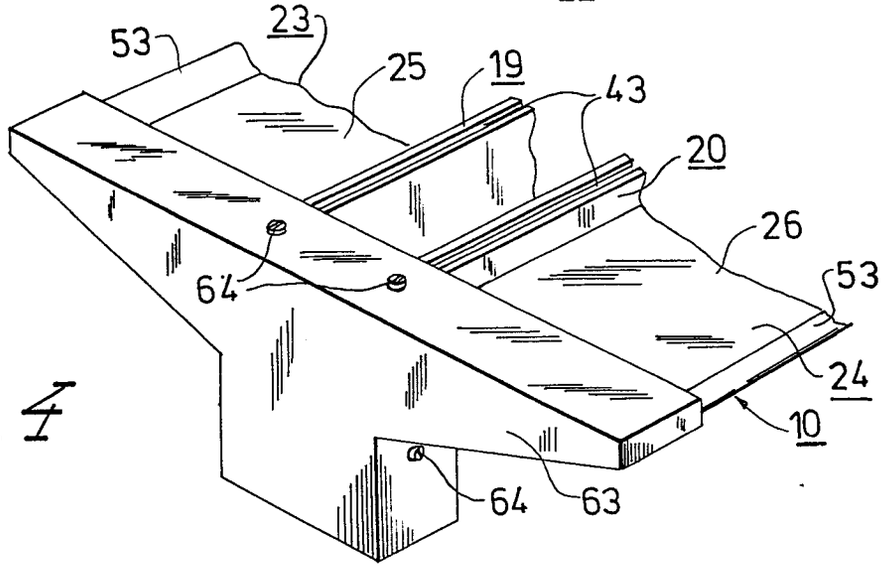
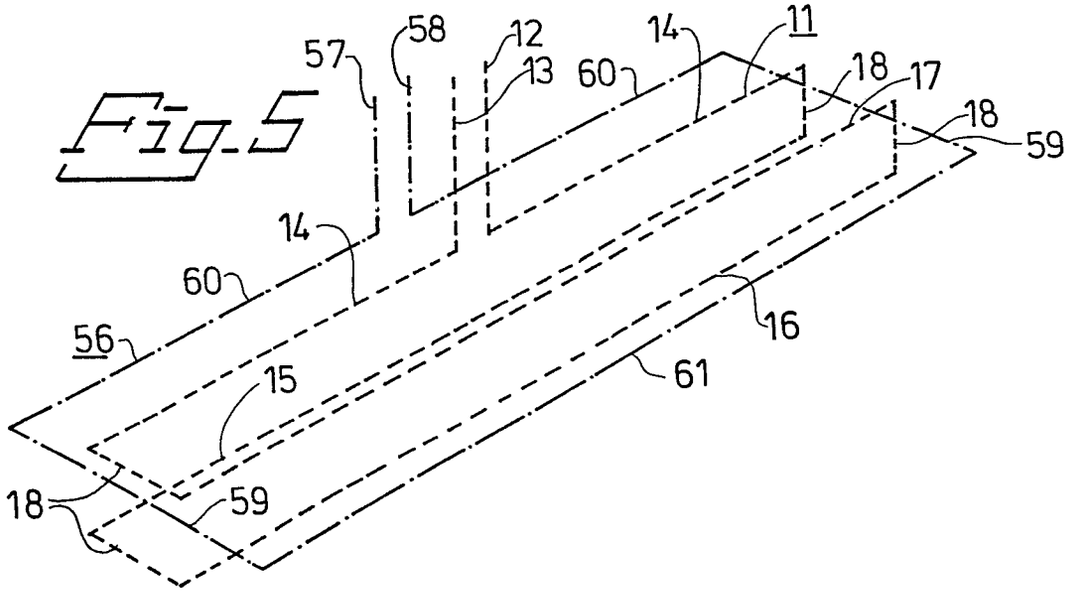


Fig_5



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Application number

EUROPEAN SEARCH REPORT

EP 82 85 0198.1

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. 3)
A	US - A - 3 409 766 (G. MECKLER) * fig. 23, 26 * --	1,2,5, 10	E 04 B 5/52
A	DE - A1 - 2 825 746 (B. NORELL et al.) * claim 1 ; page 8, paragraphs 1, 2 ; fig. 4 * --		
A	US - A - 3 848 385 (N.J. THOMPSON) * column 2, lines 63 to 67 ; fig. 1 * ----		TECHNICAL FIELDS SEARCHED (Int.Cl. 3) E 04 B 1/00 E 04 B 5/00

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

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	29-11-1982	KRABEL