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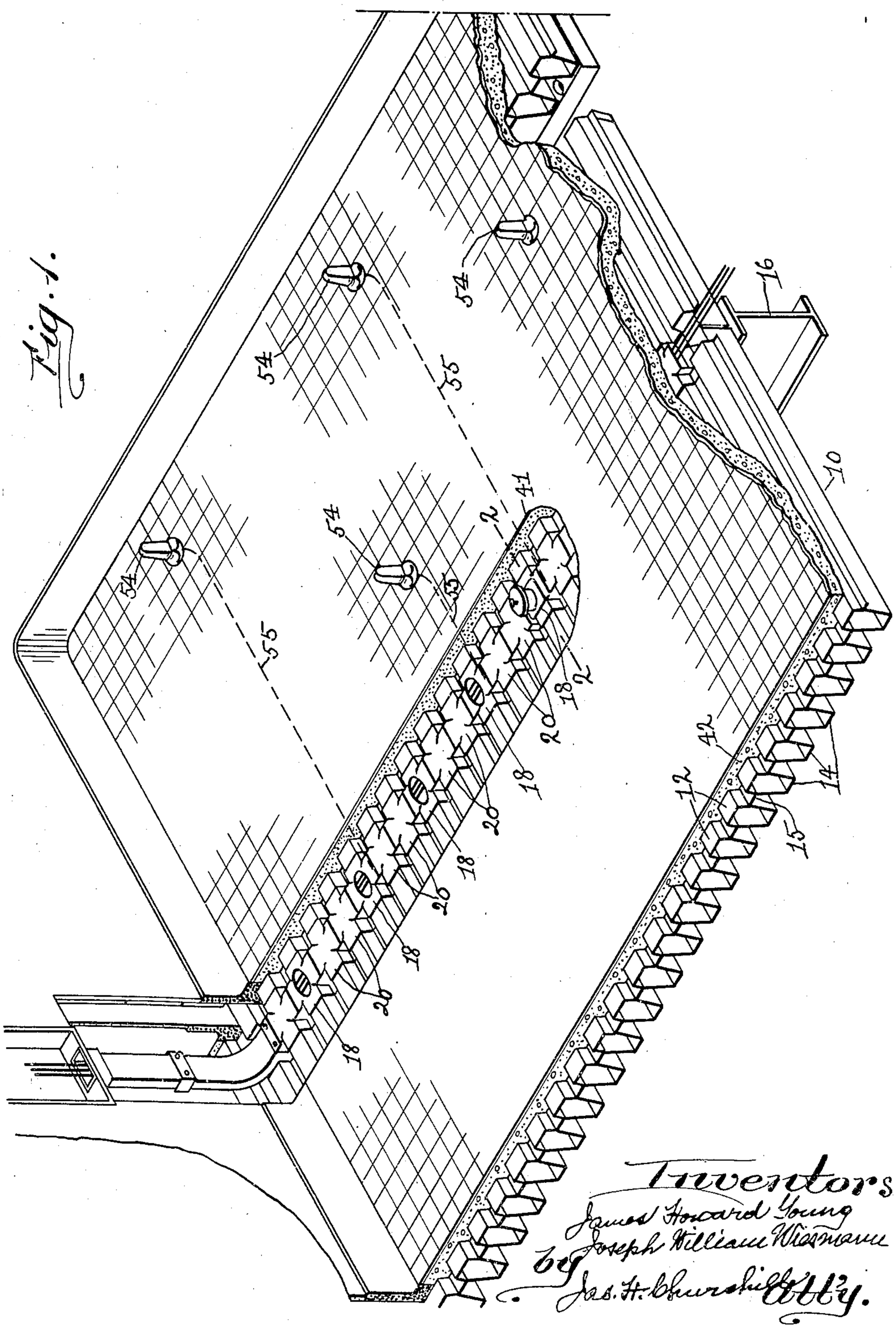
CROSS-OVER DUCT FOR MULTICELLULAR STRUCTURES

Filed March 17, 1934 3 Sheets-Sheet 1

Fig. 1.



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CROSS-OVER DUCT FOR MULTICELLULAR STRUCTURES

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Fig. 2.

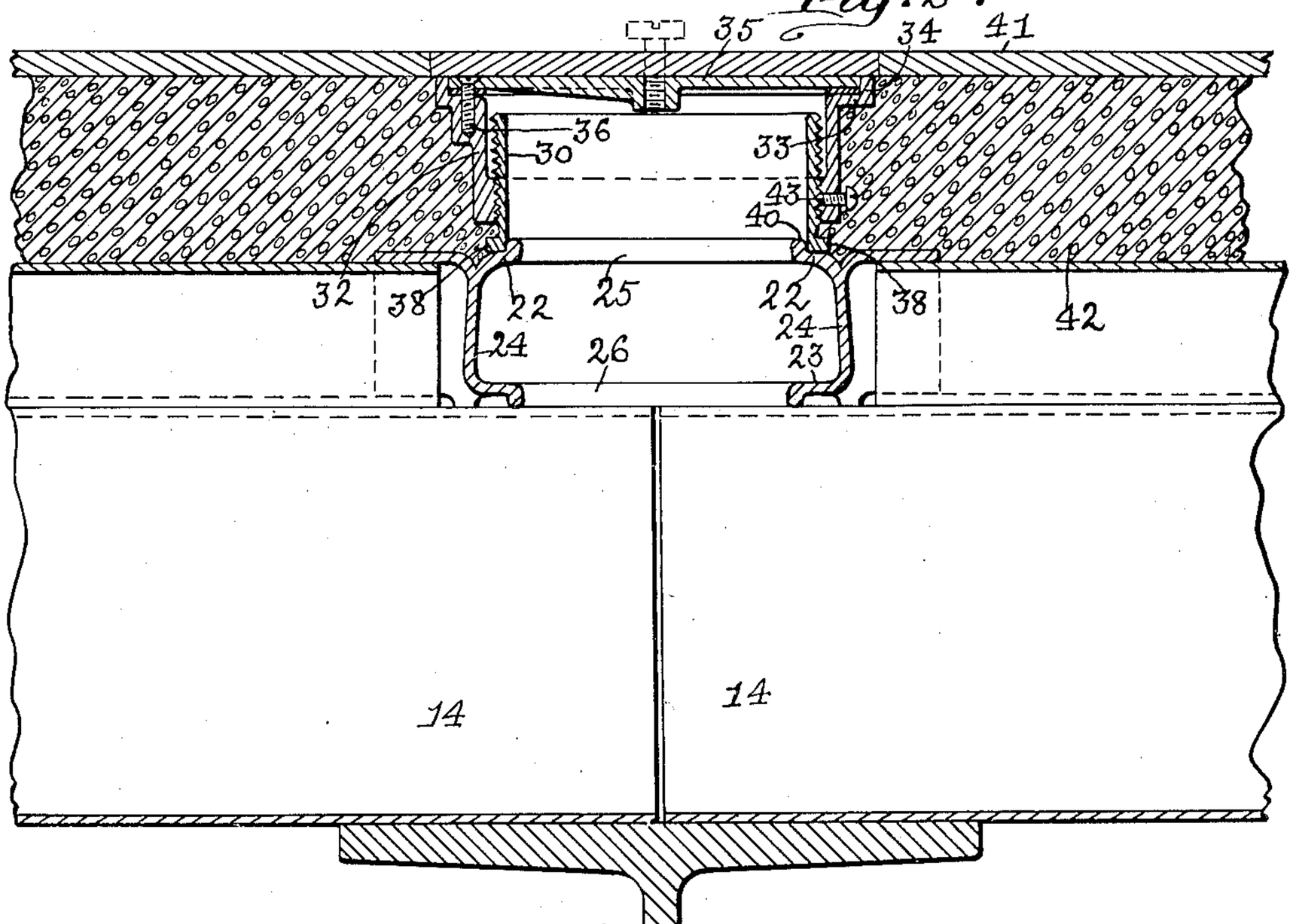


Fig. 4.

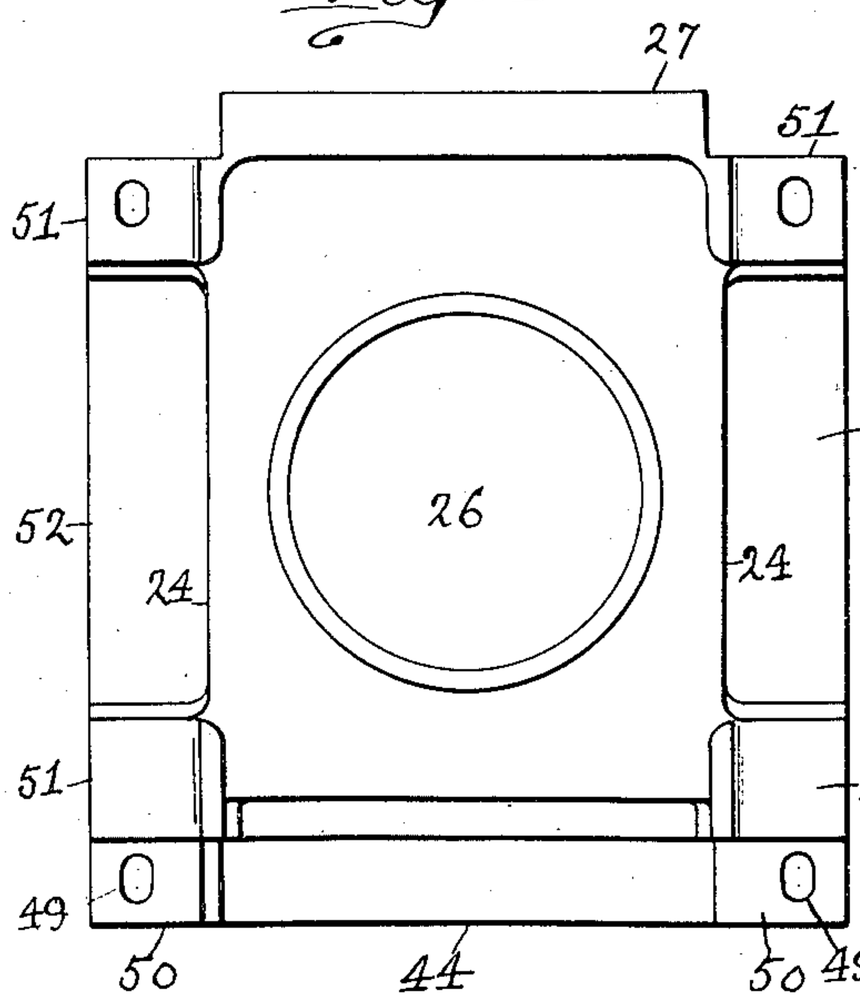
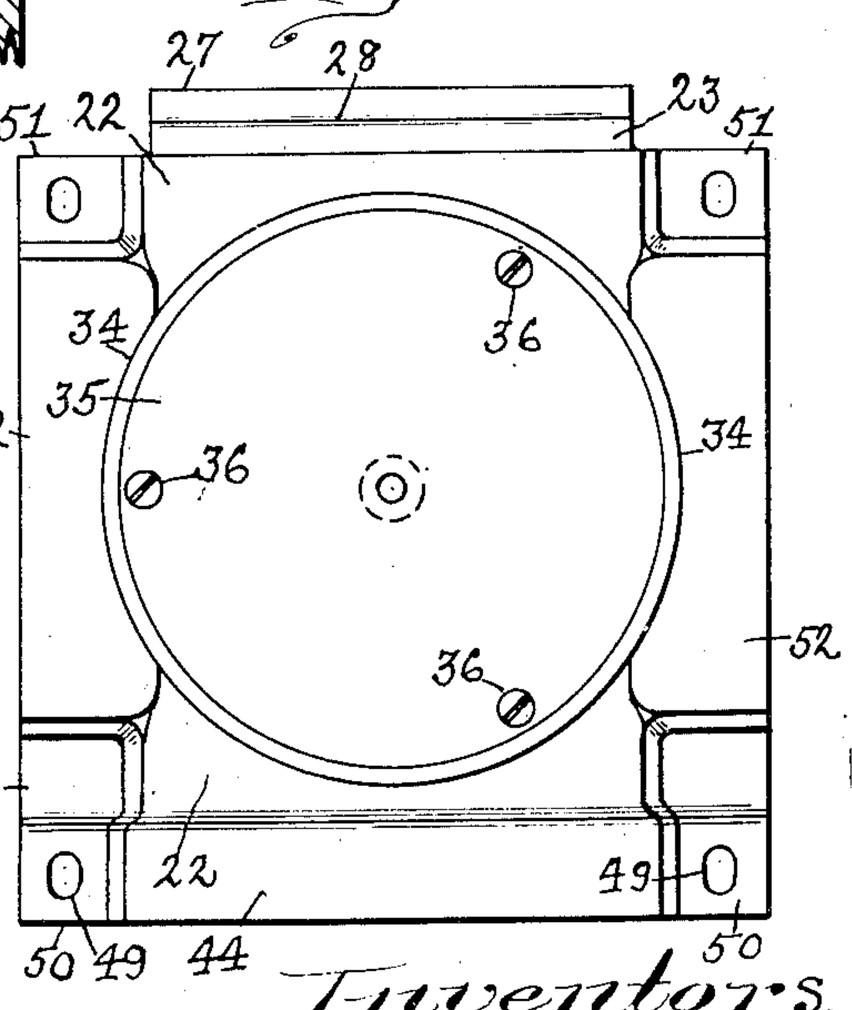


Fig. 3.



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CROSS-OVER DUCT FOR MULTICELLULAR STRUCTURES

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Fig. 5.

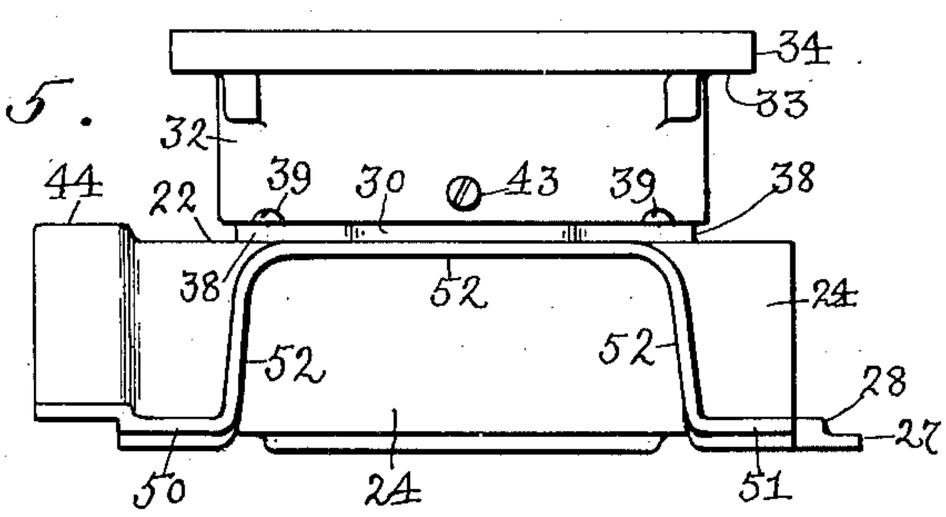


Fig. 6.

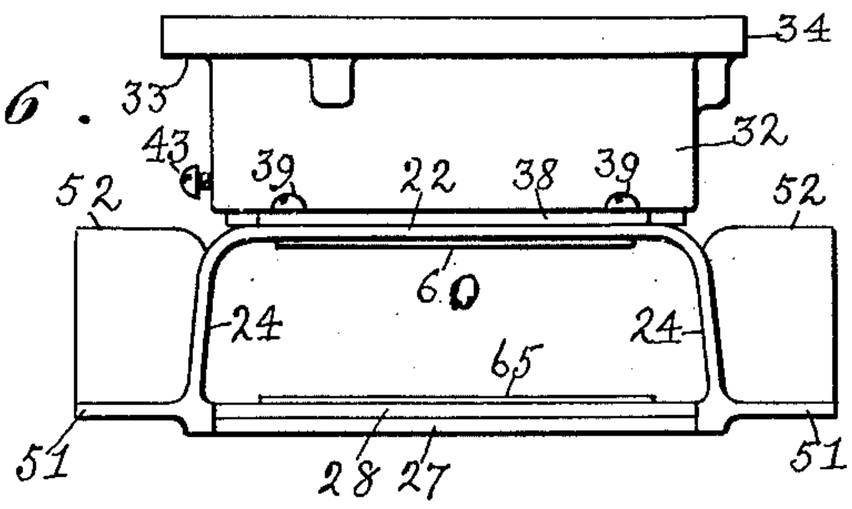


Fig. 7.

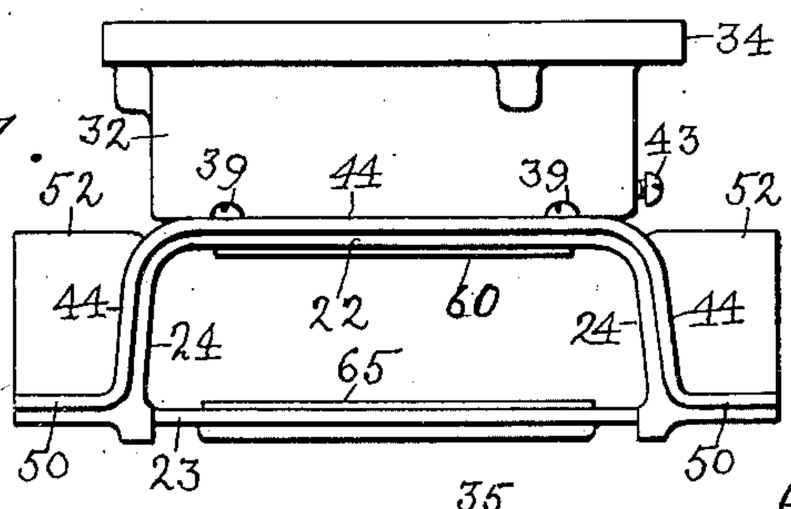


Fig. 9.

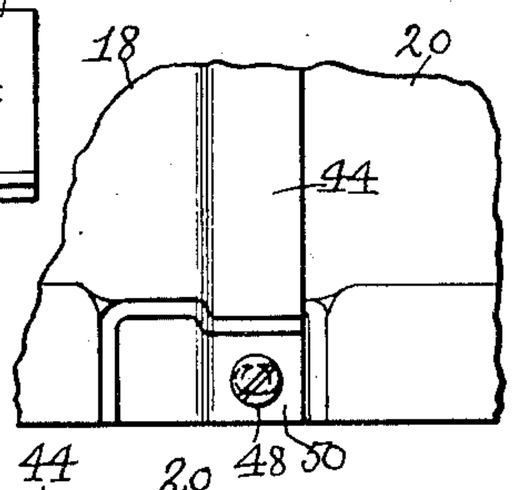


Fig. 8.

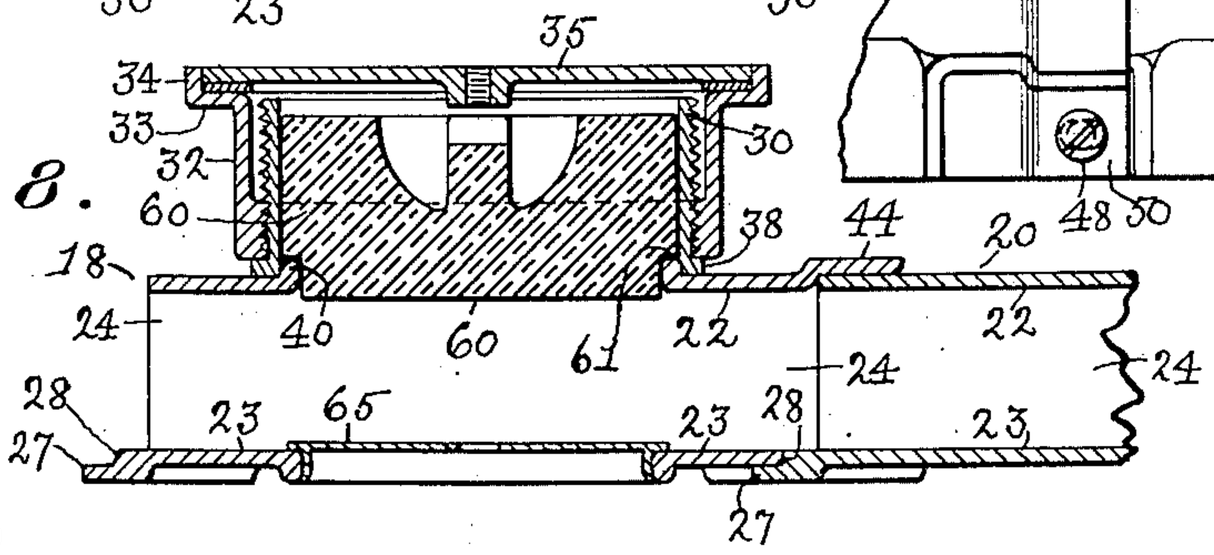
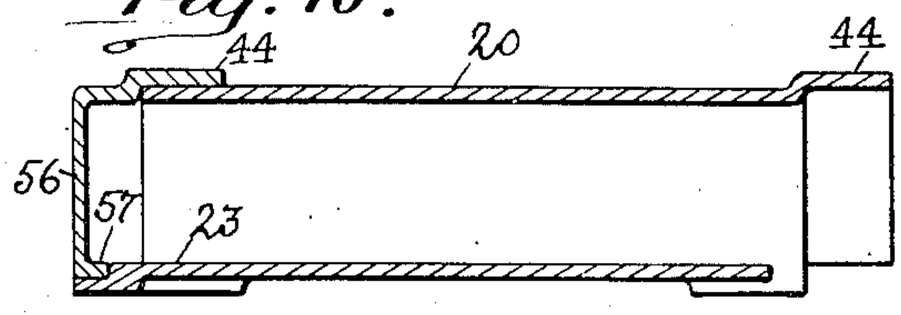


Fig. 10.



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Patented Aug. 2, 1938 2,125,366

UNITED STATES PATENT OFFICE

2,125,366

CROSS-OVER DUCT FOR MULTICELLULAR STRUCTURES

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Application March 17, 1934, Serial No. 716,146

12 Claims. (Cl. 247—3)

This invention relates to a multicellular floor construction of the type disclosed in United States Patents Nos. 1,855,082 and 1,867,433, and has for its object to provide such floor with a cross over duct of novel construction as will be described, whereby electrical service may be furnished selected cells of the floor in a simple, economical, and most efficient manner.

Another feature of the invention consists in providing the cross-over duct with interchangeable units or sections which are constructed and arranged to provide the sectional duct with a substantially continuous wall for the length of the duct over which the wires or conductors may be readily and easily fished or moved.

The invention also has for its object to render some or all of the sections of the duct accessible from above the finished floor of the building or other structure in which the multicellular floor is used.

The invention further has for its object to provide the accessible sections with a fire-resisting member as will be described.

The sections of the cross over duct are preferably overlapping and interchangeable, and those sections which are accessible from above the finished floor are provided with openings for communication with selected cells of the multicellular floor.

These and other features of the invention will be pointed out in the claims at the end of this specification.

In the accompanying drawings,

Fig. 1 represents a portion of a building or other structure having a multicellular metal floor provided with a cross over duct embodying this invention;

Fig. 2, a section on an enlarged scale to illustrate one of the accessible units, the section being taken on the line 2—2, Fig. 1;

Fig. 3, a plan view of the accessible unit shown in Fig. 2;

Fig. 4, an inverted plan of the unit shown in Fig. 3;

Fig. 5, a side elevation of the accessible unit shown in Fig. 3, looking toward the left;

Fig. 6, a front elevation of the unit shown in Fig. 5;

Fig. 7, a rear elevation of the unit shown in Fig. 5;

Fig. 8, a longitudinal section of the eccessible unit provided with a fire-resisting member;

Fig. 9, a detail in plan to show a preferred method of fastening the units together, and

Fig. 10, a detail to show a closure member for the end of the cross over duct.

Referring now to the drawings which as above stated illustrate the preferred embodiment of the invention, 10 represents a cellular metal floor of the structure illustrated in the patents above referred to and which comprises a plurality of units formed by assembling and uniting together, preferably by welding, an upper corrugated sheet 12 and a lower corrugated sheet 14 to form in effect a series of hollow beams connected together by intervening web portions 15, as illustrated. In practice, it is preferred to manufacture the cellular metal floor in units of varying lengths according to the steel fabrication of the building in which the floor is to be incorporated, and during the erection of the floor the units are laid end to end, preferably being supported upon girders 16 so that the joints between the ends of adjacent units come over the girders 16 and so that the cells of one unit co-operate with and form extensions of the cells of a second unit to provide a plurality of continuous conduits extending across the building and through which wiring for electrical service of various sorts may be drawn, as set forth in Patent No. 1,855,082 above referred to.

The present invention comprises an improvement upon the building construction and particularly the wire-distributing means disclosed in Patent No. 1,855,082 and is designed to permit electrical service to be furnished selected of the floor conduits in a simple, economical and most convenient and efficient manner.

To this end is employed a cross over duct composed of units or sections 18, 20, which preferably interlock as will be described to form a continuous duct extended transversely of the floor conduits or cells and which are interchangeable.

Each of the sections or units 18, 20 is provided with a hollow body portion closed at its sides and open at its ends and having a top wall 22, bottom wall 23, and side walls 24. In the preferred construction the top and bottom walls 22, 23 of some of the units, such as the units 18 are provided with relatively large openings 25, 26 respectively, (see Fig. 2). The opening 26 is designed to communicate with a cell or conduit 14 of the floor, and affords opportunity for a wire or conductor in the conduit 14 to be connected with a conductor or wire in the cross over duct. The opening 25 in the top wall affords access to the cross over duct from outside the same.

If desired, each unit or section of the cross over conduit may be provided with the openings 25, 26

in the top and bottom walls 22, 23 of its body portion, but inasmuch as present building-wiring systems often employ different types of wiring, each of which it is desirable to segregate, we have shown in Fig. 1, the cross over duct arranged for one of such types of wiring, to wit: one in which three wires or conductors are used. With such a type of wiring, it is preferred to provide the cross over duct between two adjacent sections 18, with sections 20 which do not communicate directly with a floor or cell and are not accessible directly from above the finished floor, and therefore the sections 20 are provided with top and bottom walls 22, 23, from which the openings 25, 26 are omitted. The sections 18 which communicate directly with a floor cell and afford access directly to such cell, may be designated as accessible sections and the intermediate sections 20 as inaccessible sections.

It is to be understood that the number of inaccessible sections 20 used will vary according to the type of wiring used, and in some instances, such sections 20 may be entirely omitted and the cross over duct may be composed of the accessible sections 18 alone, but for sake of economy it is preferred to employ one or more of the inaccessible sections 20 when desirable and permitted by the wiring system used.

It is preferred to interlock adjacent sections or units of the cross over duct so that they may be maintained in alignment and also so that the cross over duct may have a substantially smooth continuous bottom wall over which the wires may be drawn or fished without injuring the insulation thereof.

To this end, the bottom wall 23 of each section or unit of the cross over duct terminates short of one end of the side walls 24 (see Fig. 8), which end may be designated the rear end, while the front end of the bottom wall is extended beyond the front end of the side walls, and is provided with a lip 27 which forms a shoulder 28 with the bottom wall 23. The lip 27 of one unit is designed to extend under the rear end of the bottom wall of an adjacent unit (see Fig. 8), and said rear end is designed to abut against the shoulder 28 of the bottom wall 23.

The top wall 22 of the accessible unit 18 has erected upon it a hollow member 30 (see Fig. 2), which is externally threaded to be engaged by an internally threaded member 32 having at its upper end an outwardly extended flange 33 provided with an upturned annular lip 34, for the reception of a cap or cover plate 35, which rests upon and is secured to the flange 33 by screws 36.

The hollow member 30 is provided at its lower end with an outwardly extended flange 38 which is secured to the top wall 22 by screws 39. The hollow member 30 is centered with relation to the opening 25 in the top wall 22 by an annular lip 40 around said opening. Access may be had to the hollow body portion of the accessible duct unit or section 18 through the tubular member 30 after the cap or cover 35 has been removed. The members 30, 32 form a monitor top for the accessible units, and the member 32 forms an adjustable extension of the member 30 to enable the cap or cover 35 to be positioned in close proximity to the finishing floor 41 and thereby compensate for variations in the depth of the space between the cross over duct and the finishing floor, within limits. This space is usually filled with concrete, cinders, or like material 42. The tubular member 32 may be secured in its adjusted posiiton on the member 30 by a screw 43 (see Figs. 2 and 5).

The top wall 22 of the units or sections of the cross over duct is provided at its rear end with a flange 44 which projects beyond the top and side walls 24 of the unit and forms a substantially arch-shaped flange (see Fig. 7).

The front ends of the top and side walls 22, 24 of the body portion are unflanged and are designed to enter the arch-shaped flange 44 at the rear end of an adjacent unit.

It will thus be seen that the body portion of each duct unit is provided at its rear end with a flange 44 which overlies the unflanged front end of the body portion of an adjacent unit, which enables the duct units to be interlocked after the manner represented in Fig. 8.

The duct units or sections are designed to be fastened or secured to the multicellular floor upon which they are laid, and this may be effected by means of suitable screws 48, which are passed through holes 49 in horizontal extensions 50 of the rear end flange 44, and preferably through like holes in horizontal flanges 51 extended from the side walls 24 at their front end. The holes 49 may and preferably will be elongated to enable the interlocking sections or units to be adjusted so that the screws 48 may pass through the extension 50 and the underlying side flanges 51 on an adjacent unit or section.

The side walls 24 of the duct units or sections are preferably provided with outwardly extended substantially arch-shaped flanges 52, which may and preferably will be integral with the flanges 51, so that when the cross over duct is used with a multicellular floor having the corrugations in the upper member 12 opposed to the corrugations in the lower member 14 as represented in Fig. 1, the body members of the cross over duct can rest on the lower corrugated members 14 between sections of the upper corrugated members 12 and have the ends of the corrugated sections 12 extended into and be overlapped by the side wall flanges 52.

As a result of this arrangement, the cross over duct cooperates with the corrugated upper member 12 of the multicellular floor to form a continuous support for the filling material 42.

When the cross over duct is used with a multicellular floor having its upper member made as a flat metal sheet, the arch-shaped side flanges 52 on the side walls 24 of the units or sections may be omitted if desired.

In Fig. 1, the cross over duct is more or less conventionally represented and only one of the accessible units 18 is shown with its monitor top, the other accessible units being shown without their monitor tops to enable the wires within the cross over duct to be shown.

At selected points over the finished floor are located outlet fixtures 54, which are connected with accessible units by wires indicated by the dotted lines 55.

The cross over duct may be closed at its end by a closure member having a vertical wall 56 from which extends an overlying flange 44 and a bottom flange 57 corresponding to the bottom wall 23 of the units (see Fig. 10).

From the above description, it will be observed that the units or sections of the cross over duct are interchangeable so that the accessible units 18 may be properly positioned to afford access to a floor cell according to the type of wiring employed in the building and to enable any or all of the cells of the multicellular floor to be ren-

dered accessible and utilized as a wiring conduit. The accessible units 18 may be provided within their monitor tops with a heat-insulating member or fire-stop to conform to the requirements of the authorities. The fire-stops may be of gypsum or like material molded into the form of a plug 60 (see Fig. 8), which substantially fills the member 30 of the monitor top and is provided at its lower end with a bottom portion 61 forming a shoulder which rests upon the upturned lip or rim 40. The opening 26 in the bottom wall of the accessible unit 18 may be closed by a metal cover member 65 to cut off communication with the floor cell when the accessible unit is not being used as such.

It will also be observed that the cross duct may be made at a minimum cost, inasmuch as the body portion of the accessible and inaccessible units are of similar construction except as to the openings 25, 26 in the top and bottom walls of the accessible units, and said body portions are interchangeable which enables the body portions of the units to be arranged to meet conditions of use, and further said sections co-operate to provide the cross duct with a substantially smooth and continuous wall to facilitate fishing of the wires or conductors lengthwise of the duct.

It will also be observed that the monitor tops for the accessible units are secured to the top walls of the accessible units and may be made of any desired length to meet variations in the depth of the filler space.

The screws 48 are designed to enter threaded holes in the webs 15 of the multicellular floor, so as to firmly secure the sections or units of the cross over duct to the metal floor and form a continuous practically one-piece duct.

Having thus described the invention, what is claimed is:

1. The combination with a multicellular floor having a corrugated lower metal member and a corrugated upper metal member having its corrugations opposed to the corrugations of the lower metal member and provided with a channel extended transversely of the said cells below the upper surface of the corrugated upper member, of a cross over duct in said channel composed of sections having body portions communicating with one another and provided with bottom walls located below the level of the upper surface of the corrugated upper member of said floor and co-operating to form a substantially continuous bottom wall for said duct, some of said body portions communicating with the corrugations of the lower member of said floor, and having hollow members extended upwardly above the upper surface of the upper corrugated member of said floor.

2. In a duct of the character described, a unit or section having a body portion provided with top, bottom and side walls and open at its opposite ends, said top and bottom walls connecting said side walls and having openings to afford ready access to the interior of said body portion through said top and bottom walls and independently of the open ends of said body portion, a hollow member extended upwardly from said top wall and forming an extension of the opening in said top wall, a closure member for the opening in said bottom wall, and a heat insulating member in said hollow member forming a closure member for the opening in said top wall.

3. In a duct of the character described, a unit or section having a body portion provided with top, bottom and side walls and open at its opposite ends, said body portion having substantially horizontal flanges projecting laterally from said side walls and provided with openings for the passage of devices for fastening said unit to an underlying support and also having arch-shaped flanges intermediate said horizontal flanges.

4. In a duct of the character described, a unit or section having a body portion open at its ends and provided with top, bottom and side walls and with arch-shaped flanges projecting laterally from said side walls and longitudinally from the ends of said top wall, said top and bottom walls having openings of substantial size to enable access to be had to a floor cell upon which the unit is supported.

5. In a duct of the character described, a unit or section having a body portion open at its ends and provided with top, bottom and side walls, said top and bottom walls connecting said side walls and having openings in them between their ends, and an extensible monitor-top secured to said top wall and forming an extension of the opening therein.

6. In a duct of the character described, a plurality of units arranged end to end and open at their ends to communicate with one another and each provided with a top and bottom wall, the bottom walls of said units being in substantially the same horizontal plane and cooperating to form a substantially continuous bottom wall for said duct, the bottom walls of some of said units having openings in them and the top walls of some of said units having openings in them to afford ready access into the units independently of their open ends.

7. In a duct of the character described, a unit or section having a body portion provided with top, bottom and side walls and open at its opposite ends, said body portion at one open end having its top and side walls flanged to form with the ends of said wall an internal shoulder, and said body portion having its top and side walls at the other end unflanged, said body portion at its unflanged end having the bottom wall extended beyond the ends of the side walls to engage the bottom wall of the flanged end of an adjacent unit or section and co-operate with the flanged end of said adjacent unit or section to interlock said units or sections together.

8. In a duct of the character described, a plurality of units each having a body portion provided with integral top, side and bottom walls and open at its ends, overlapping flanges on the adjacent ends of adjacent units to interlock said units together and maintain them in alignment, the top and bottom walls of certain of said units having opposing openings of substantial size between their ends to permit of ready access into the duct through openings in the top wall thereof and ready access to the outside of the duct through the opening in the bottom wall thereof.

9. The combination with a multicellular floor having longitudinally extended cells forming potential wiring ducts, and having the cells provided with a channel extended transversely below a surface thereof, of a cross over duct in said channel composed of sections having body portions communicating with one another and provided with bottom walls located below said surfaces of the cells and cooperating to form the bottom wall of the cross over duct, some of said body portions being provided with openings communicating with the interior of selected of said cells.

10. The combination with a multicellular floor

having longitudinally extended cells forming potential wiring ducts, and having the cells provided with a channel extended transversely below a surface thereof, of a cross over duct in said channel composed of sections having body portions communicating with one another and provided with bottom walls located below said surfaces of the cells and cooperating to form the bottom wall of the cross over duct, some of said body portions being provided with openings communicating with the interior of selected of said cells, and some of said body portions having means affording access to the interior of the cross over duct from outside of the duct.

11. The combination with a multicellular floor having longitudinally extended cells forming potential wiring ducts, and having the cells provided with a channel extended transversely below a surface thereof, of a cross over duct in said channel composed of sections, one section being associated with each cell, having body portions communicating with one another and provided with bottom walls located below said surfaces of the cells and cooperating to form the bottom wall of the cross over duct, some of said body portions being provided with openings communicating with the interior of selected of said cells, and some of said body portions having means affording access to the interior of the cross over duct from outside of the duct.

12. The combination with a multicellular floor having longitudinally extended cells forming potential wiring ducts, portions of said cells being formed to provide a channel extended transversely below a surface thereof, of a cross over duct in said channel provided with openings therein arranged to afford communication with the interior of the cross over duct from the outside thereof, and also from selected ones of said cells.

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