Nov. 16, 1954 H. H. CRAFTON 2,694,475

CELLULAR STEEL FLOOR

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Fig. 1

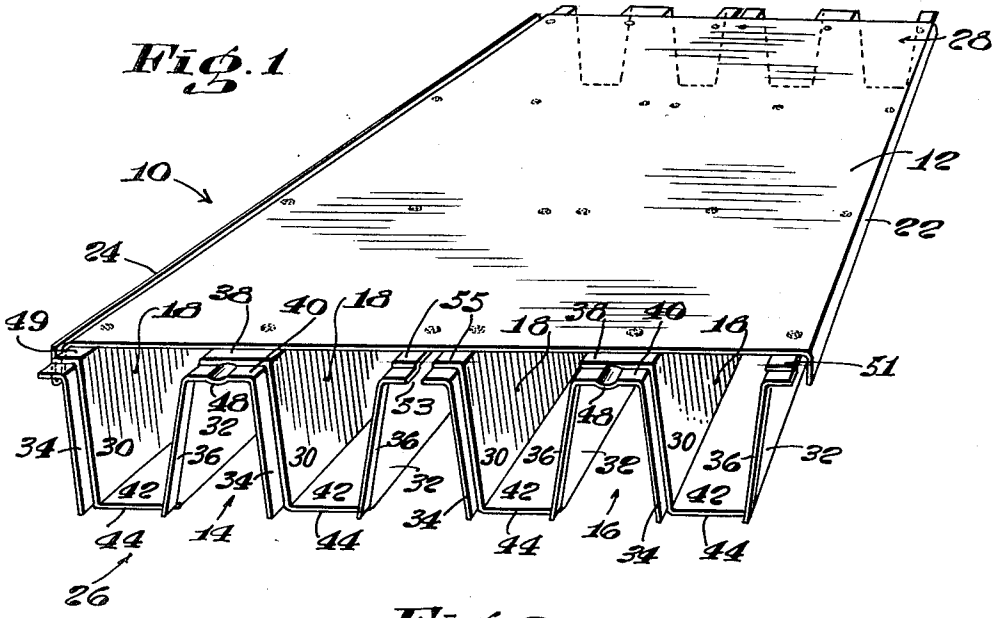
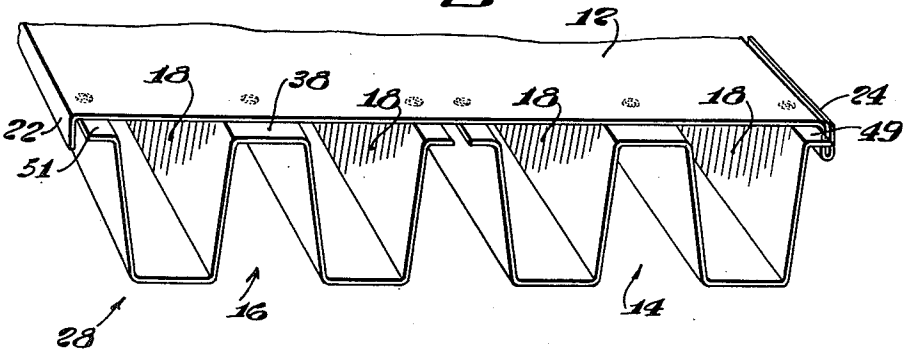


Fig. 2



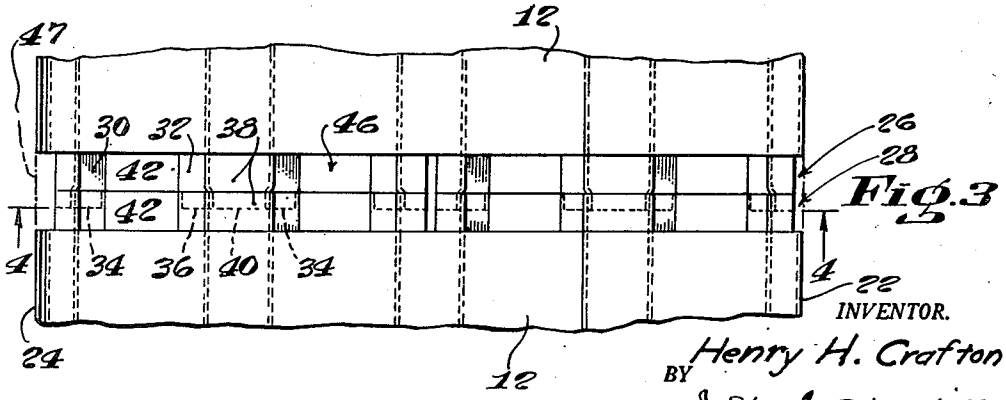


Fig. 3

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Fig. 4

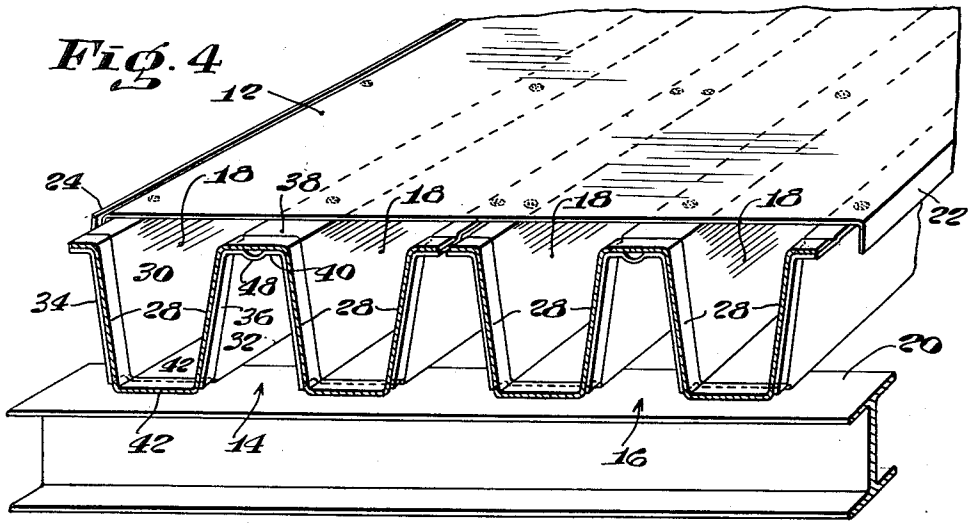
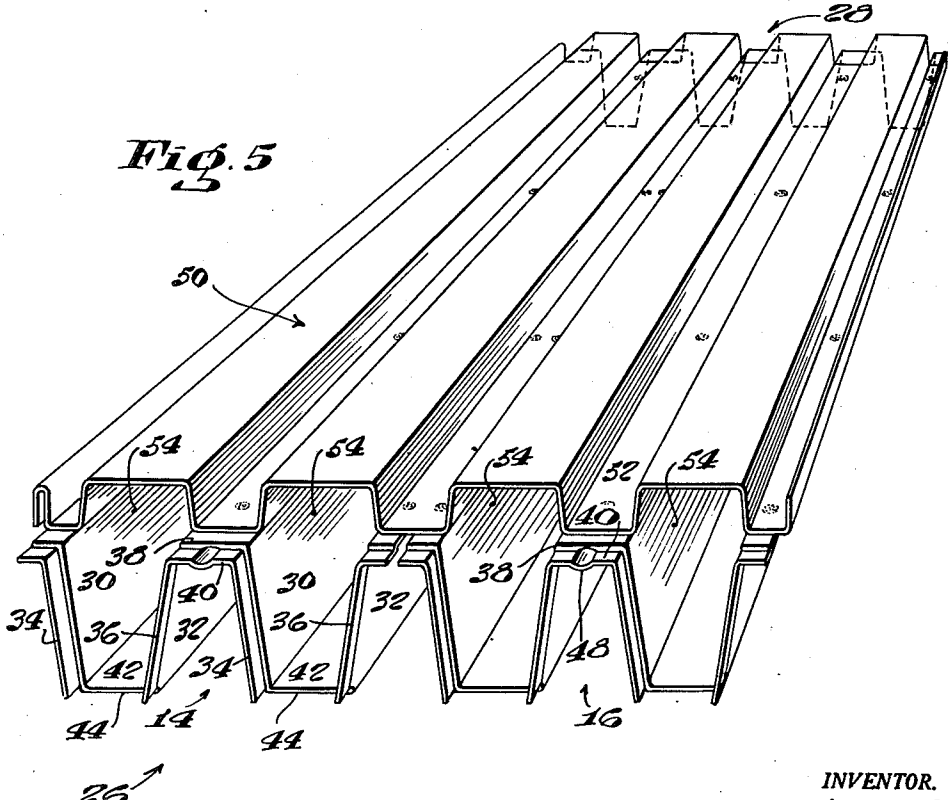


Fig. 5



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CELLULAR STEEL FLOOR

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Application November 19, 1948, Serial No. 60,875

2 Claims. (Cl. 189—34)

This invention relates to a building construction and more particularly to a cellular steel floor construction.

The invention has for an object to provide a novel and improved floor construction embodying multicellular metal floor units having a plurality of spaced and longitudinally extended wire distributing cells and in which provision is made for connecting the units end to end in a simple and efficient manner to form end joints adapted to assure positive alignment of the cells of the connected units and in a manner such as to provide smooth and flush interior surfaces at the cell joints whereby to enable electrical conductors to be drawn through the cells without obstruction at the connecting joints.

With this general object in view and such others as may hereinafter appear, the invention consists in the floor construction hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a perspective view of a cellular metal floor unit embodying the present invention and illustrating the structure of one connecting end of the unit; Fig. 2 is a perspective view illustrating the structure of the other connecting end of the floor unit shown in Fig. 1; Fig. 3 is a plan view showing the end joint formed by connecting two floor units end to end in accordance with the present invention; Fig. 4 is a perspective view, partly in cross-section, as taken on the line 4—4 of Fig. 3, and Fig. 5 is a perspective view of a modified form of a cellular metal floor unit embodying the present invention.

In general, the present invention contemplates a floor construction embodying cellular metal floor units for use in erecting a load supporting and wire distributing floor of the type illustrated in the United States Patents Nos. 1,855,082 and 1,867,433. In practice it is preferred to manufacture the cellular metal floor in units of varying lengths, and during the erection of the floor the units are laid end to end, preferably being supported upon girders so that the joints between the ends of adjacent units come over the girders and so that the cells of one unit cooperate with and form extensions of the cells of a second unit to provide a plurality of continuous ducts or 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.

Prior to the present invention, it has been the practice to lay successive load supporting and wire distributing floor units end to end in substantially abutting relation which required careful and accurate placing of the units and maintenance of the units in their placed position while they were being secured to the structural supports to effect the desired alignment of the cells of successive units. However, in actual practice, if the units were not properly aligned, or if a space occurred between the ends of adjacent units, the unaligned or open portions of the joint caused difficulty in fishing the wiring through the cells, the imperfect joint forming an obstruction to the fishing tool.

In accordance with the present invention, the leading and trailing ends of the multicellular floor units are particularly designed for mutual interconnection with cooperating units to form an end joint arranged to assure positive alignment of the cells of the connected units and in a manner such as to provide smooth and flush interior cell surfaces at the joints to enable the wiring to be drawn through the cells without obstruction to the fishing tool or injury to the wires.

In practice the present end joint structures of the cellular wire distributing floor units may be economically and accurately manufactured in existing sheet forming machines in which the ends of the sheets are cut square in a resquaring press and in which the interconnecting end portions may be formed by suitable dies arranged to cooperate with the resquaring press whereby to assure perfectly square end portions and positive and accurate end to end alignment of the assembled units.

Referring now to the drawings, **10** represents one type of cellular metal floor used in the erection of buildings and which comprises a multicellular unit formed by assembling and uniting together, preferably by welding, an upper flat sheet **12** and lower corrugated sheets **14**, **16** to form in effect a series of closely spaced parallel hollow beams or cells **18**. In erecting the floor, the individual building units extend between the structural steel supporting elements of the building with the ends of the units resting on and preferably welded to the steel framework of the building herein shown as comprising girders **20**, a plurality of units being laid end to end to form continuous elongated wiring cells. Adjacent units may be laid side by side and connected in interlocking relation by the cooperation of marginal lip portions **22**, **24** formed on opposite sides of the upper flat sheet **12**, as illustrated.

In accordance with the present invention, in order to assure positive alignment of the cells **18** and to provide smooth and flush interior cell surfaces at the connected ends, the leading and trailing ends **26**, **28** of the building units are particularly designed for mutual interconnection with corresponding end portions of adjacent units, preferably in a manner such that the trailing end portion **28** of one unit may be fitted into nesting relation with the leading end portion **26** of the adjacent unit. In the illustrated embodiment of the invention, the side and top walls of the corrugated sheets **14**, **16** are preferably arranged in overlapping relation and the bottom walls thereof are arranged to meet in abutting relation.

As illustrated in Fig. 2, the trailing ends **28** of the lower corrugated sheets **14**, **16** are cut perfectly square, and as illustrated in Fig. 1, the leading ends **26** of the corrugated sheets are provided with offset and die set portions **34**, **36**, **40** extending from the side walls **30**, **32** and upper walls **38** respectively of the corrugations. The bottom wall **42** of each cell is provided with a cut out portion **44**, the cut back being substantially equal to the length of the offset portions, as illustrated. The die set portions **34**, **36** respectively formed in the side walls **30**, **32** are offset outwardly from the cell walls a distance substantially equal to the thickness of the sheet metal forming the corrugated sheets, and the die set portions **40** in the upper walls **38** are offset downwardly a similar distance. Thus, in erecting the flooring, the cell portions of the trailing end **28** may be dropped into position between the offset side wall portions **34**, **36** of the leading end **26** and on top of the offset upper wall portions **40** formed between adjacent cells and with the edges of the cut out portions **44** of the bottom walls meeting in aligned and abutting relation with the ends of the bottom walls of the trailing end of the cooperating unit. The edges of the cut back portions **44** are preferably cut perfectly square in the resquaring press in order to assure accurate alignment with the abutting square cut edges of the lower walls of the trailing end **28**. It will be observed that the abutting relation of the lower walls of the corrugations provide a flush undersurface for the ends of the units which are arranged to rest on and are secured to the supporting girder **20**.

In erecting the flooring the ends of the units are arranged to rest upon the structural supporting girders **20** so that the joints occur above the girders, the ends of the units being welded to the girders during the progress of the erection, and as herein shown, the upper sheet **12** of each unit is preferably shorter in length than the underlying corrugated sheets **14**, **16** the ends thereof being set back a short distance from the ends of the underlying sheets in order to provide an opening along the top of the units above the joint, as indicated at **46** in Fig. 3,

whereby to permit access to the ends of the units to permit them to be conveniently welded to the girders **20** and also to permit inspection of the wiring in the cells during installation of the system. The opening **46** is subsequently closed by a cover plate, indicated by dot and dash lines **47** in Fig. 3, and comprising a flat strip of sheet metal of substantially the same thickness as the upper sheet **12** and which is extended across the width of the units and welded or otherwise secured to the top walls of the corrugations and to the marginal edges **49**, **51** at the joint. Thus, it will be observed that the downwardly offset disposition of the die set portions **40** permit the adjacent upper surfaces **38** of the connected units to present a flush upper surface to which the cover plates may be secured. As illustrated in Figs. 1 and 5, in order to take up some of the metal forced out of alignment with the walls of the cells during the die setting operation, the offset portions **40** in the upper walls **38** of the corrugations may be relieved by concave or inwardly bent portions **48**. While the lower or corrugated portions of the building unit are herein shown as comprising two sections **14**, **16** for convenience in manufacture, and providing a space **53** between the inner marginal edges **55**, it will be understood that the two units **14**, **16** may be made in one continuous section if desired.

A modified form of the invention, as illustrated in Fig. 5, is similar to the above described structure except that the upper member of the assembled building unit comprises a corrugated sheet **50** having its lower walls or connecting web portions **52** welded or otherwise secured to the upper walls **38** of the lower corrugated sheets **14**, **16** to form elongated wiring cells **54**. The lower corrugated sheets **14**, **16** are shaped to form leading and trailing ends **26**, **28** arranged for mutual interconnection with adjacent units in the manner previously described, and the upper corrugated sheet **50** may be shorter in length than the underlying corrugated sheets to provide temporary openings in the tops of the cells at the joints which are subsequently closed by suitable corrugated cover plates. It will be understood that, in practice, the proportions of the various elements may vary to provide units having either deep or shallow corrugations, and that some of the units, such as that illustrated in Fig. 1, may be erected in an inverted position.

From the above description it will be observed that the present wire distributing floor units are provided with novel end joint structures adapted for mutual interconnections whereby to facilitate assembly of successive flooring units and to assure positive alignment of the cells of successive units, and to provide a closed joint having smooth and flush interior cell surfaces at the joint to permit electrical conductors to be drawn through the cells with minimum obstruction and minimum damage to the wiring being drawn through the cells. It will also be observed that the present joint structure presents a flush undersurface at the joint for cooperation with the underlying supporting beams or girders to which the ends of the units are attached.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a building construction, a flooring structure comprising a plurality of multi-cellular sheet metal flooring units erected side by side and in end to end abutting relation upon a supporting framework to form the flooring, each of the flooring units comprising an upper sheet and a lower corrugated sheet secured thereto and forming spaced and longitudinally extended cells comprising wiring ducts, each corrugation including substantially straight upper, side and bottom walls, one end only of each lower sheet having outwardly extended offset portions in the side walls of the corrugations thereof and having downwardly offset portions in the upper walls thereof, the bottom walls of the corrugations at said one end being cut back a distance substantially equal to the length of said extended offset portions, said outwardly and downwardly offset portions being offset an equal amount to the thickness of the metal of the units, the corrugations at the other end of each unit being free of offset portions and having the tops and the sides of the corrugations thereof received by the offset top and side portions of the corrugations of a cooperating unit in nesting and over-lapping relation and having the bottom walls of the corrugations thereof in aligned and substantially abutting relation with the bottom walls of the corrugations of said cooperating unit, thereby forming a connecting joint between the units having smooth and flush side and bottom interior cell surfaces.

2. A building construction as defined in claim 1 wherein the upper sheet of each unit is set back from the ends of the underlying sheet thereof forming transverse openings in the erected floor above the joints between adjacent units, and elongated strip means extending over the exposed ends of the corrugations and forming a cover for said opening.

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