April 19, 1932. J. H. YOUNG 1,855,082

BUILDING CONSTRUCTION AND MEANS FOR WIRING A BUILDING

Filed Aug. 26, 1931 2 Sheets-Sheet 1

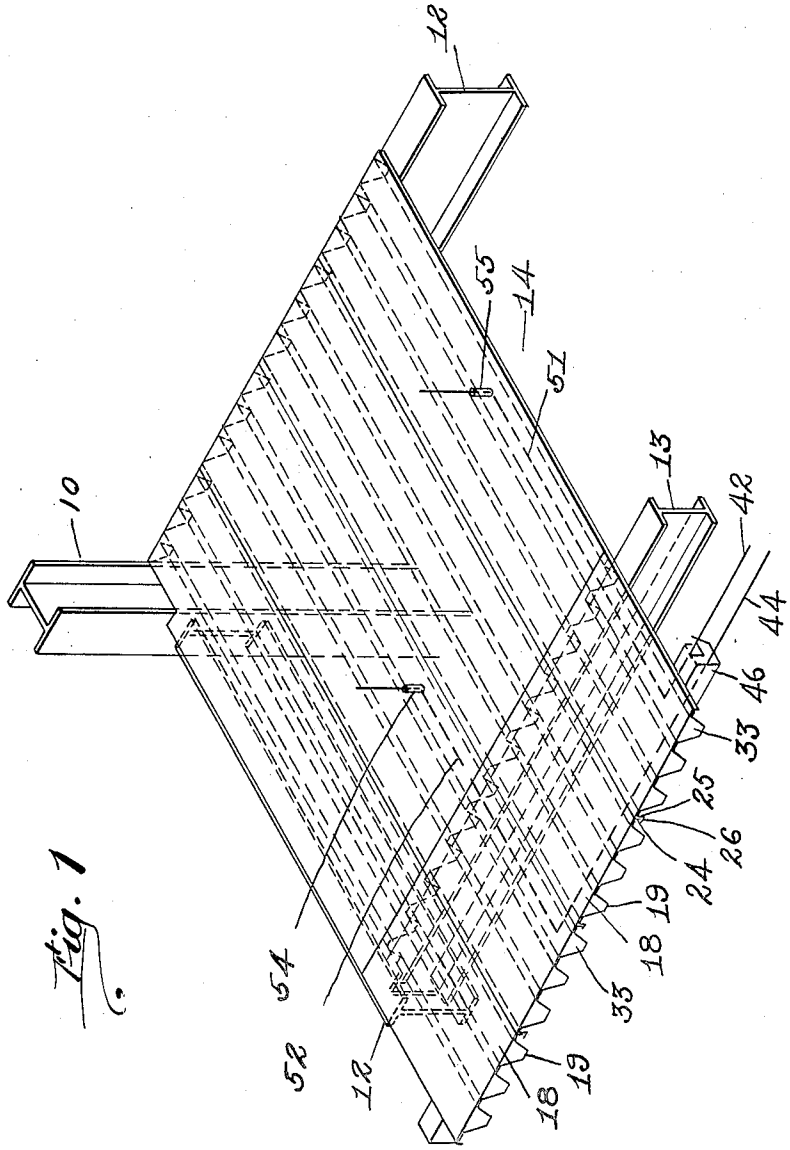

Fig. 1.

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Fig. 4.

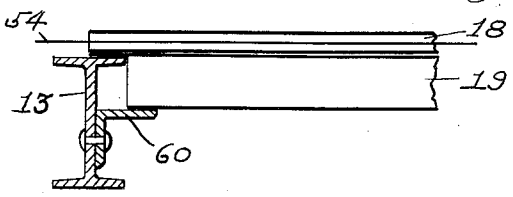


Fig. 5.

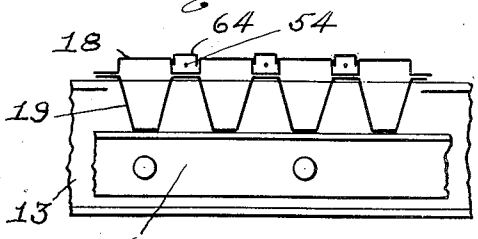
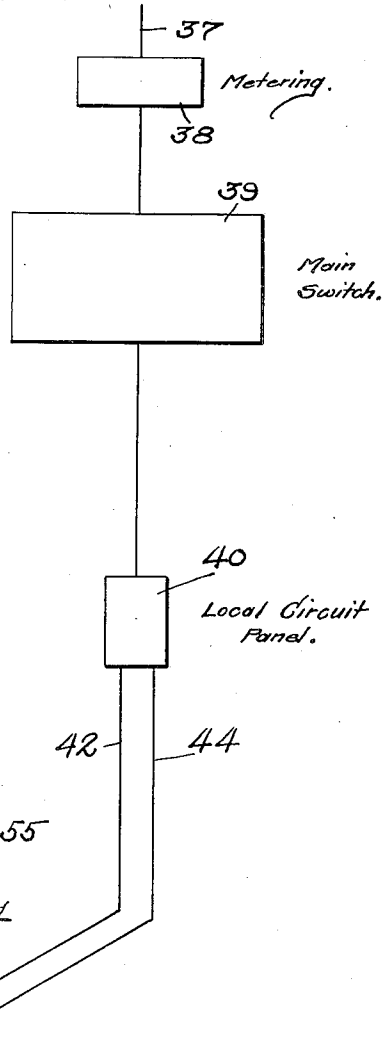


Fig. 2.



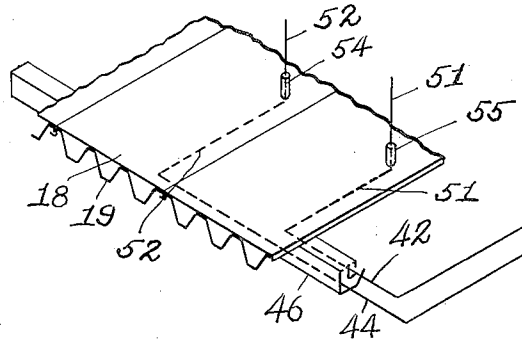
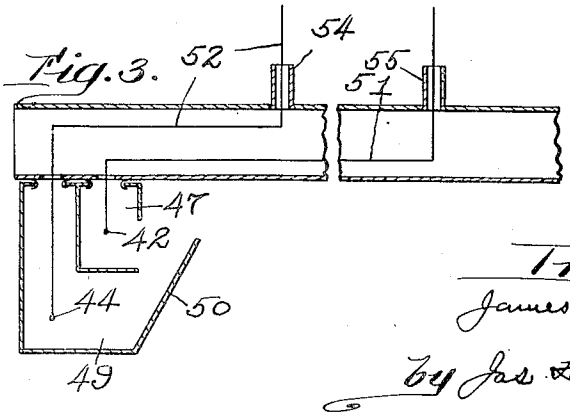


Fig. 3.



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UNITED STATES PATENT OFFICE

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BUILDING CONSTRUCTION AND MEANS FOR WIRING A BUILDING

Application filed August 26, 1931. Serial No. 559,425.

This invention relates to a building construction and to a method of wiring a building.

In general, one object of the invention is to provide a novel and improved building construction which may be economically erected and the construction of which is adapted to enable electrical service to be furnished to different desired locations in the building with a maximum flexibility, simplicity, convenience and economy.

Another object of the invention is to provide a novel method of wiring a building for electrical service and by which the service may be economically furnished in a simple, efficient, and most flexible manner to any desired location in the building.

With these objects in view and such others as may hereinafter appear, the invention consists in the building construction, method of wiring the building and in the various structures, arrangements and combinations of parts, hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiments of the invention—

Fig. 1 is a perspective of a portion of the building construction embodying the present invention;

Fig. 2, a diagrammatic view illustrating the method of wiring forming a part of the present invention;

Fig. 3, a sectional view through one of the flooring conduits taken on the line 3—3, Fig. 1;

Figs. 4 and 5, details in side and end elevation respectively of a modified construction of flooring, as will be described.

In the construction of modern buildings, the general practice in wiring the building has heretofore included the installation of elaborate special wiring ducts under the usual concrete flooring of the building. These wiring ducts have heretofore been made of metal and have been installed after the supporting flooring has been formed and before the finished concrete flooring has been poured. This duct system of the prior art has generally been referred to as an underfloor duct system. The ducts of themselves do not function as floor members and merely serve as conduits through which electric wiring may be run to provide electrical service, whether it be light, telephone, or other service, at different points in the offices or floors throughout the building. These ducts have been located at relatively wide intervals across the floor, as for example every four to six feet, and in some instances at greater distances and have been in practice provided with outlets usually in the form of short pipe sections designed to extend upwardly through the concrete floor and to receive a special fitting if electrical service is desired at the particular location of the outlet. It has been the practice to locate such outlets at intervals of a few feet along the several ducts.

The expense of installation and the cost of such duct systems add considerably to the cost of the floor, and the number of such ducts is necessarily limited by the expense involved. As a result very definite limits are inherent in these prior under-floor duct systems in furnishing service to any desired point within the building, and the user of the service is required to more or less adapt the location of his desk, switchboard, or other apparatus, to the location of the outlets at definite intervals in the spaced-apart ducts of the system.

In accordance with the present invention, a building construction is provided with a flooring having a plurality of conduits and with electric conductors located in said conduits and from which electrical apparatus within the building may be supplied with current. The flooring is preferably composed of a plurality of preformed units, each including a corrugated sheet and with certain of the units arranged end to end with the corrugations in substantial alignment and forming substantially continuous conduits extending from one part of the building to another.

In its preferred form, the invention is incorporated in a building construction of the type having a metal framework provided with substantially parallel side and end

members to form a series of panels at each floor of the building, and the flooring is of the construction illustrated in and which forms the subject matter of my co-pending application Serial Number 524,813.

As fully set forth in my co-pending application referred to, the metal flooring may and preferably will comprise a V-beam corrugated under sheet and a metal upper sheet united together to form a unit, and such units are arranged so that certain of the units are located end to end and certain of the units side by side, the whole forming the complete floor. The units may and preferably will be mounted upon the panel in a manner such that the corrugations of aligning units co-operate to form continuous conduits from one part of the building to the other, and electric conductors are located in and extended through some of the conduits to enable electric service to be furnished to desired locations within the building.

The conduits may and preferably will be provided with outlets at desired locations, permitting electrical wiring to be extended outwardly therethrough for connection to electrical apparatus within the building and to facilitate the running of the wiring through the conduits, provision is preferably made for establishing communication between a plurality of the conduits and for running a supply line to a position convenient for connection thereto of the individual connectors or wires located in the conduits.

Referring now to the drawings, which as above stated illustrate the preferred embodiment of the invention, a portion of a building, such for instance as an office building is shown in Fig. 1, which is provided with a steel framework consisting of steel upright members or columns one of which is shown at 10 and horizontal steel members usually girders 12 and beams 13. The girders 12 and beams 13 form panels or openings at each floor of the building, a portion of one of which is shown in Fig. 1.

In Fig. 1, the longitudinal girders 12 form the side members of the panels 14, and the cross girders 12 and the intermediate beams 13 connecting the longitudinal girders 12 form the end members of the panels 14. Each panel 14 has co-operating with it a sheet metal flooring, which is composed of a plurality of units capable of being fabricated in the shop, transported to the job and laid in place. Each floor unit comprises a sheet metal upper member 18 and a corrugated sheet metal under member 19, which is spot welded or otherwise secured to the underside of the upper sheet metal member 18.

The under-sheet metal member 19 is preferably provided with substantially V-beam corrugations which may be of varying depths according to the load to be carried, and the upper sheet metal member 18 is preferably made to present a substantially flat upper surface and co-operates with the upper corrugations to close the same.

The panels 14 are of such a width as to require the use of a plurality of sheet metal floor units, and these floor units may be designated the outside and intermediate units. The intermediate units when laid in the panel are preferably constructed to mechanically interlock with one another and with the outside units. To this end, the upper member 18 of the intermediate unit is provided on one side with a straight depending flange 24 and on its opposite side with a depending flange 25 having a channel 26 into which the straight flange 24 of an adjacent unit is extended, after the manner represented in Fig. 1.

The sheet metal units when laid in place are designed to have their sides in contact or in close proximity to one another and when thus positioned the upper metal sheets of contiguous units may be spot welded together, so as to provide the panel with a sheet metal flooring having a unitary upper sheet metal member of substantially the area of the panel, and having attached to its under side a plurality of independent or separate corrugated sheet metal load-supporting members which extend lengthwise of the panel for substantially the length thereof substantially parallel with one another.

The sheet metal members 18, 19 forming the units are in accordance with the present invention arranged so that the corrugations of one are in substantial alignment with the corrugations of the remainder of the units in the row, and the units are supported upon the framework so that the ends are in abutting relation or, if the ends thereof are spaced apart, the intervening space is preferably closed by a suitable closure member preferably of sheet metal and of a shape to correspond to the corrugations.

With this construction a plurality of conduits indicated generally at 33 are provided, which extend in one direction such as lengthwise of the building from one part thereof to another and which in some instances may extend from one side of the building to the other. These conduits 33, it will be observed, are spaced a relatively short distance apart, and in practice may be spaced upon six-inch centers.

In accordance with the present invention the flooring having the multiplicity of conduits 33, is provided with electrical conductors in selected ones of the conduits, and from which conductors current may be supplied to electrical apparatus within the building. Provision is made for running electric wiring through some of said conduits to provide electric service to desired locations within the building, such for example as floor outlets, ceiling outlets, or outlets located in the walls. As diagrammatically illustrated in

Fig. 2, the electrical service to the building may be represented by the line 37 passing through the usual meters 38 and main switchboard 39, and thence to a local circuit panel 40 located at one of the floors of the building. From the local circuit panel two supply lines 42, 44, which may be for the same or different kinds of electrical service, are represented as being run into a transversely-extended box or conduit 46, the latter being provided with two compartments 47, 49, each in open communication with the floor conduits, and within which the supply lines 42 and 44 respectively may be located. The box or conduit 46 may be provided with a door 50 for affording access to the interior of the compartments 47, 49 and to enable lead lines 51, 52 to be connected to the supply lines 42, 44, respectively, as illustrated in Figs. 2 and 3. With the usual "snake" the lead lines 51, 52 may be drawn through the desired floor conduits 33, as illustrated in Figs. 1 and 2, and extended outwardly from the conduits through outlets 54, 55, permitting electrical service to be furnished to any apparatus located in the vicinity of the outlets 54, 55.

While for purposes of illustration I have illustrated in Fig. 2 two supply lines 42, 44, it will of course be understood that any desired number of electrical conductors may be extended through the transversely-extended box or conduit 46, and that any desired number of outlets may be provided in any selected number of conduits according to the type and location of electrical service to be furnished.

The outlets may be installed after the finished floor has been erected, and after the desired locations of the outlets have been determined upon, it being merely necessary to drill down through the concrete flooring and through the top of the floor conduits.

While in Figs. 1 and 2 the corrugated metal flooring is illustrated as resting on top of the supporting I-beams, in some instances I may prefer to operatively support the flooring upon angle shelves 60 such as is illustrated in Figs. 4 and 5. In those instances the flooring will preferably be supported so that the intermediate corrugations 59 of the type of flooring illustrated in Figs. 4 and 5 are positioned above the top of the I-beam and suitable cover members 64 may be provided to close the corrugations 59 and the electrical conductors may be located in the conduits formed by such intermediate corrugations, as clearly illustrated in Figs. 4 and 5.

From the description thus far it will be observed that the present building construction and present method of wiring a building possesses important economic advantages as compared with prior art constructions involving the use of separate wiring ducts.

The multiplicity of conduits formed as a part of the floor affords maximum flexibility in wiring for any kind of electric service and enable electrical apparatus to be positioned and connections to be made thereto in a most simple, economical and practical manner.

While the preferred embodiments of the invention have 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, in combination, a combination metal floor and wire distributing structure comprising a plurality of connected hollow cells closed in cross section and forming load supporting beams, supporting means for said floor, some of said cells being positioned in alignment and forming substantially continuous unobstructed ducts and provided intermediate the ends thereof with outlets for electrical wiring extending into said ducts.

2. In a building construction, in combination, a combination metal flooring and wire distributing structure comprising a plurality of connected hollow cells closed in cross section and forming load supporting beams, supporting means for said floor, some of said cells being positioned in alignment and forming substantially continuous unobstructed ducts, a transversely extended conduit in open communication with a plurality of the aforesaid hollow cells, an electrical supply line extending through said transverse conduit, electrical wiring connected to said supply line and extended through some of said ducts, said ducts being provided with outlets for said wiring at the desired locations within the building.

3. In a building construction, in combination, a framework arranged to form floor panels, a metallic flooring supported thereon, said flooring comprising a plurality of prefabricated units, each unit having a plurality of hollow cells closed in cross section and forming load supporting beams and with a plurality of said units arranged end to end with a plurality of said hollow cells in alignment and forming substantially continuous unobstructed ducts, some of said ducts being provided with outlets for electrical wiring extended into the ducts.

4. In a building construction, in combination, a combination metal floor and wire distributing structure comprising a plurality of hollow cells closed in cross section and forming load supporting beams, supporting means for said floor, some of said cells being positioned in alignment and forming substantially continuous unobstructed ducts and provided intermediate the ends thereof with outlets for electrical wiring extended into said ducts.

5. In a building construction, in combina-

tion, a combination metal floor and wire distributing structure comprising a plurality of hollow cells closed in cross section and forming load supporting beams, supporting means for said floor, some of said cells being provided with outlets intermediate the ends thereof and electrical wiring extended into said cells and extended therefrom through said outlets.

6. In a building construction, in combination, a combination metal floor and wire distributing structure comprising a plurality of hollow cells closed in cross-section, floor supporting means, some of said cells being aligned and forming substantially continuous unobstructed ducts and provided with outlets through which wiring may be led outwardly from within such cells.

7. In a building construction, in combination, a supporting framework, a combination floor and wire distributing structure supported upon the framework comprising a plurality of prefabricated metal units, each unit having a plurality of closely spaced hollow cells closed in cross section and the walls of the cells constituting load supporting beams for imparting to the structure strength as a floor, and with a plurality of said units arranged end to end with a plurality of hollow cells in alignment and forming substantially continuous unobstructed ducts, a plurality of such aligned units being arranged side by side to provide the structure with a relatively large number of spaced potential wiring ducts, some of said cells being provided with electrical outlets, and a service conduit communicating with said cells and being extended transversely of the units but displaced vertically with relation thereto.

8. In a building construction, in combination, a supporting frame, and a combination floor and wire distributing structure supported upon the frame, and comprising a multi-cellular metallic floor having a relatively large number of spaced hollow cells closed in cross section, said cells forming a relatively large number of potential wiring ducts and the walls of said cells constituting load supporting beams for imparting to the structure strength as a floor, some of said cells being provided with electrical outlets to form wiring conduits.

9. In a building construction, in combination, a combination metal floor and wire distributing structure comprising a multi-cellular metallic floor having a relatively large number of cells, the walls of which form a part of the load carrying structure of the floor, said cells being disposed transversely of the floor to provide the floor structure with a relatively large number of ducts, supporting means for the floor, some of the ducts being provided with outlets to form wiring conduits leading into the building and through which electrical wiring may be fished lengthwise of the conduits and outwardly through said outlets.

In testimony whereof I have signed my name to this specification.

JAMES HOWARD YOUNG.