

June 4, 1929.

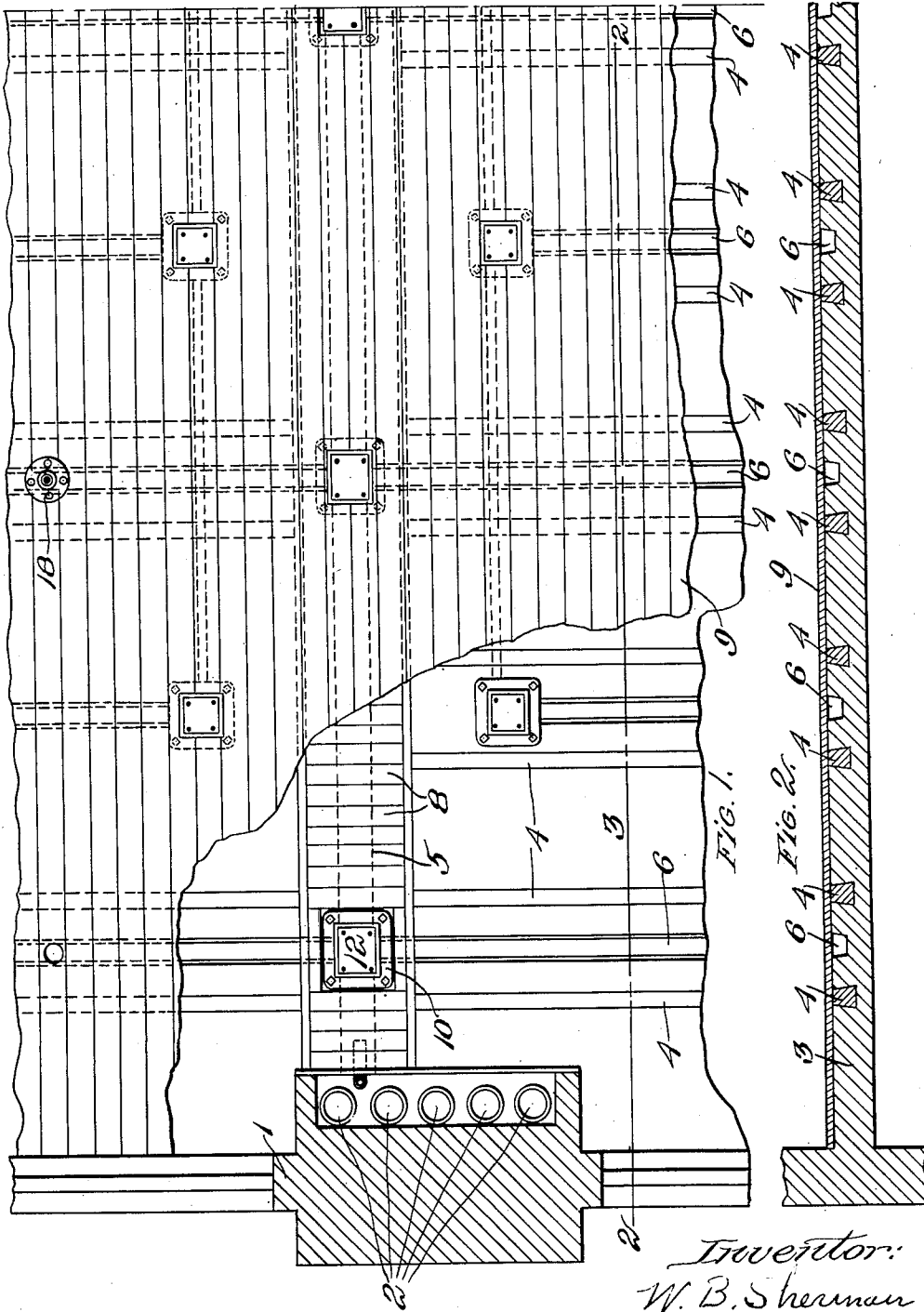
W. B. SHERMAN

1,715,474

ELECTRIC DISTRIBUTING DEVICE FOR FLOORS

Filed Jan. 2, 1924

3 Sheets-Sheet 1



Inventor:
W. B. Sherman
by Les. N. Goddard, atty.

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3 Sheets-Sheet 2

FIG. 5.

Inventor:
W. B. Sherman
by Geo. N. Goddard, atty

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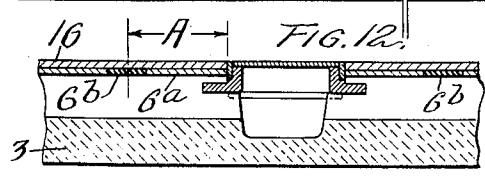
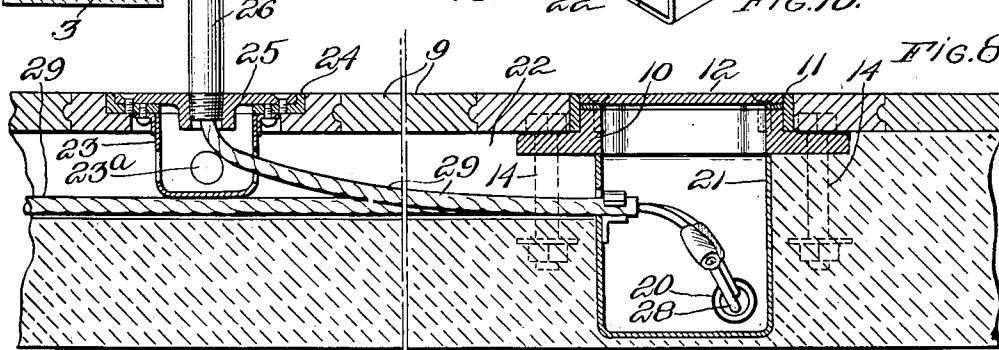
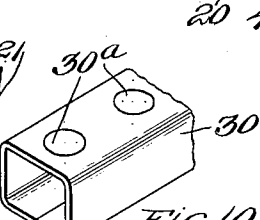
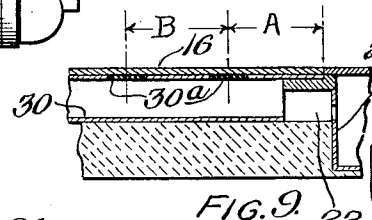
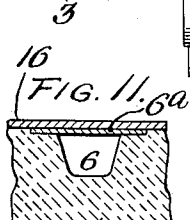
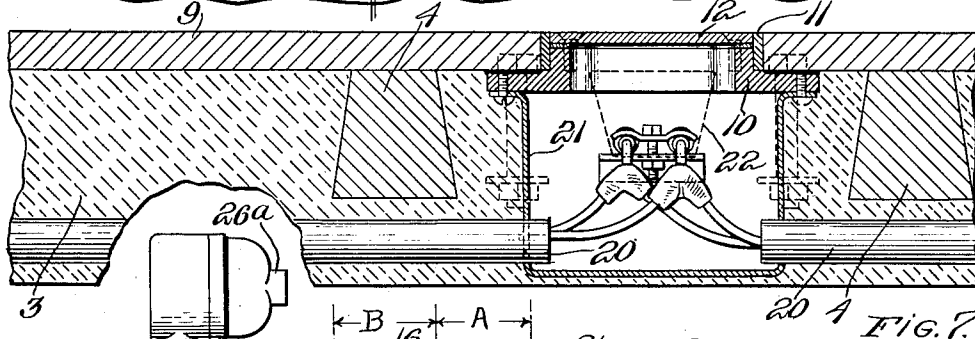
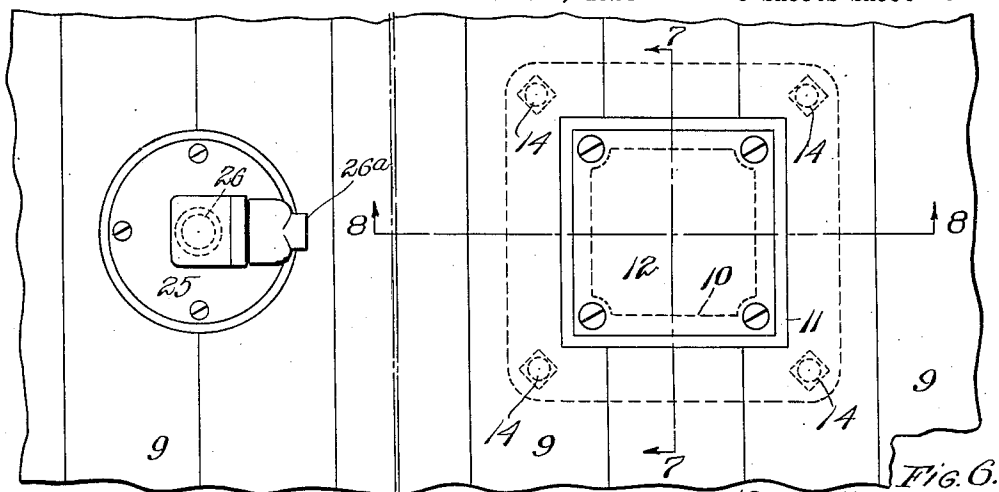
W. B. SHERMAN

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3 Sheets-Sheet 3



Inventor:
W. B. Sherman
by
Jes. N. Goddard, atty.

UNITED STATES PATENT OFFICE.

WILLIAM B. SHERMAN, OF BOSTON, MASSACHUSETTS.

ELECTRIC DISTRIBUTING DEVICE FOR FLOORS.

Application filed January 2, 1924. Serial No. 684,031.

This invention relates to the problem of securing the proper distribution of electric currents through the floor areas of office and other buildings where composite floors, such as re-enforced concrete or tiles with concrete, are used to form the flooring bed which is then covered over either with wood flooring or with linoleum or the like.

Heretofore it has been the practice to lay a series of iron conduits at spaced intervals so that they will be imbedded in the cement floor, said distributing conduits being provided at frequent intervals with suitable outlet fixtures projecting upwardly out of the cement or composite bed through a hole in the floor so as to provide a predetermined number of definitely located outlets which provide means for supplying light, telephone or other electric service to a nearby desk. As it is difficult to forecast just where these outlets should be located to serve particular needs, and as there is frequent need of changing the location, it will be seen that this system involves a great deal of expense because supplying a large number of permanent outlets with a corresponding number of wire connections to each of them.

It has also been proposed to imbed, below the surface of the cement, a system of fibroid conduits which can be broken or cut through when it is desired to locate an outlet fixture at any desired point in the floor, but this system is not only expensive to install by reason of the cost of the fibroid conduits, but the conduits themselves may often be broken down in the process of pouring the cement over them or through other causes, thus obstructing the drawing through the conduits of the distributing wires. In addition to this the conduits themselves occupy a considerable vertical space for which provision may not always be made owing to the shallow depth of the cement in some cases. A further difficulty is that where high and low tension wires cross, a dip-down fixture or tubing is provided which obstructs or renders difficult the drawing of an electric wire or cable through the conduit.

To overcome these and other practical difficulties experienced in the art I have provided a novel floor construction for electric distribution which permits the convenient location of an outlet for any part of a large floor area with a minimum of trouble and expense, and without tearing up or marring up the floor construction. In general my

invention embraces a floor comprising a bed or composite base provided with one or more main conduits provided at predetermined intervals with hand-hole openings or junction boxes normally covered by a plate, and having series of lateral or distributing channels formed in the top surface of the floor bed and covered by the surface flooring, whether of wood or linoleum, the main channels having placed therein permanent supply cables and at the junction spaces being accessible to permit carrying off a branch wire through a lateral channel to any desired distance from the main channel, as need may arise. A further feature of the improvement consists in the provision whereby both high and low tension distributing wires may be carried through a series of superficial channels at substantially the same level without either obstructing or deflecting the other.

These and other features of the invention will be described in the following specification and will be defined in the claims hereto annexed.

In the drawings I have illustrated a concrete arrangement embodying the principles of my invention as applied to the providing of a floor construction suitable for the complete and economical distribution of both high and low tension currents throughout the floor area, in which:

Figure 1 is a general plan view illustrating more or less diagrammatically an arrangement of conduits and junction boxes for distributing high tension or low tension wires over the floor area, a part of the floor covering being removed.

Figure 2 is a longitudinal section on sectional plane 2—2, Figure 1.

Figure 3 is a vertical cross section transversely of the main supply low tension conduit and the main supply high tension conduits on the plane 3—3 on Figure 5.

Figure 4 is a vertical cross section transversely of the main low tension and high tension on the plane 4—4 of Figure 5.

Figure 5 is a plan view showing the relative location of the main supplying conduits for both the high and low tension wires and also the arrangement of the low tension distributing branch with reference to its junction box.

Figure 6 is a plan view showing the location of a high tension junction box in relation to one of its distributing outlets.

Figure 7 is a vertical section longitudinally of the main high tension supply conduit on the plane indicated by line 7—7 of Figure 6.

5 Figure 8 is a vertical section taken at right angles to the plane of Figure 6 as indicated by section line 8—8 on Figure 6.

Figures 9 and 10 show a special form of conduit construction that may be employed for either high or low tension lateral branches where a linoleum floor covering is laid directly on the cement.

Figures 11 and 12 are detail vertical sectional views taken at right angles to each other showing a special covering plate for the low tension branch channels.

In the illustration of this invention in the drawings, the first eight figures show a preferred construction and arrangement employed in connection with an ordinary board flooring laid over a concrete or cement bed, in which style of floor construction it is common practice to use wooden strips or squeeds imbedded in the surface of the cement so as to form floor-attaching members to which the floor-boards may be nailed.

In practice a series of electric mains or supply cables are carried up in a vertical shaft formed in a wall 1, of the building as shown at 2 in Figure 1. In the present instance it is assumed that there is a series of low tension risers 2 at one side of the floor, while at the opposite side is a similar well containing the high tension risers or supply cables for the different floors.

Where conditions permit I prefer to form a main supply conduit in the form of an open channel or trough running from the well containing the low tension risers 2, to the opposite wall of the building; this main supply channel being indicated in Figure 1 by dotted lines 5. These channels 5 are formed in the top of the cement bed by laying suitable boards or strips and pouring the cement around them, just as the floor squeeds 4 are laid to be imbedded in the concrete or cement floor base, except that the strips used for forming the open channels are preferably wider at the top than at the bottom to facilitate their easy removal, whereas the squeeds are wider at the bottom to afford a secure and permanent anchorage in the cement bed.

The lateral or branch channels 6, are formed in the same manner, that is, by laying struts or scantling at right angles to each junction opening, these lateral branches or channels running off from the main conduit 5 at regular intervals of say 5 feet apart, and being carried to any desired distance from the main channels or until they reach an obstructing wall, the struts being likewise removed.

At the point of juncture or intersection of the main conduit with the branch passages

6, I place a hand-hole element or frame 10 which is anchored in place by suitable anchoring bolts 14 imbedded in the cement, and placed over the opening therethrough is a cover 12, usually in the form of a brass plate which rests preferably upon a gasket 13 to prevent rattling and is surrounded by a narrow border frame 11 which prevents the plate from chafing against the edges of the wood flooring. The plate can be screwed to the frame 10 by flush screws to avoid producing any projection above the floor level. The wooden flooring 9 is laid in the usual manner, being nailed to the squeeds 4, and lies flush with the top surface of the removable cover 12. On each side of the main low tension channel 5, may be placed parallel longitudinal squeeds 4 which support strips of sub-flooring 8 between parallel string pieces 8^a, and above this transverse sub-flooring 8, the floor-boards 9 are carried, this portion of the flooring being nailed to the sub-flooring as there are no transverse squeeds between the two longitudinal squeeds shown in Figure 3. If desired, the low tension channel may be loosely covered with longitudinal plates 5^a, between the hand-hole covers to exclude dust, but this is not essential.

The supply cables 15, for the low tension currents such as telephone circuits, call bells and the like, are laid in the open channels 5 when the floor is in course of construction, but it is unnecessary at that time to lay branch wires through the lateral channels or passages 6 since these can be supplied from the main cable when the office desks are placed in their desired location. In that case the location of the branch-distributing channels 6 can be determined by reference to cover plates 12, and any suitable marks or designations at the outer ends of the branch channels. If it is desired to place an outlet along a certain branch channel, say 12 feet distant from the main channel located by the covering plate 12, all that is necessary is to bore a smooth hole through the floor-board where it passes the open channel at that point, and insert either a floor base plug or an upwardly projecting outlet device, such as will be hereinafter referred to, and which is indicated at 18 in Figure 1.

For the purpose of carrying the high tension wires for electric lighting or motor service or the like there is laid, near the bottom of the cement bed on each side of the main low tension conduit 5, iron tubes or conduits 20, through which the permanent and main supply high tension cables are drawn.

As best shown in Figures 7 and 8, these iron conduits 20, imbedded in the bottom portion of the cement floor base, pass below the squeeds and project into open junction boxes which extend from the top of the ce-

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ment to a sufficient depth to receive the ends of the tube sections 20. By using the metal conduits the necessity of using armor insulated wire for the high tension main conductors is avoided, and a considerable number of insulated high tension wires can be carried in a small conduit. The junction boxes 21 are of metal and are attached to hand-hole frames 10, whose central openings are covered by screw-fastened covers 12, similar to the cover plates already described with reference to the low tension system of conduits. It will be observed, however, that the branch or lateral channels 22 for carrying the branch wires running off from the main supply cables, are in the form of open channels formed in the top surface of the cement bed portion of the floor construction, these channels being formed by pouring the cement around suitably arranged string pieces just as the channels for the low tension system are formed. These open lateral high tension channels 22 are bridged over by the floor-boards as in the case of the corresponding low tension channels, but where it is desired to place an outlet for the high tension circuit a knock-out box 23 is used, and in this case the branch conductors or wires 29, having been spliced to the main supply high tension cables 28, are carried out through the side of the upper portion of the junction box 21 and drawn through an aperture in the side of the knock-out box 23, the knock-out spot having been removed on the proper side to permit the introduction of the branch wire 29.

As shown in Figure 8, the outlet fixture, comprises a tubular standard 26, having at its upper end a socket member 26^a, for connection with the plug of a lamp cord or the like, the connection being made above the floor level to avoid clogging with dirt. The standard 26 is secured in the cover plate 25 which is fastened by screws to the centrally apertured frame 24 to which the knock-out box 23 is attached. The knock-out spots 23^a, are of sufficient size to admit an armored or B X wire since such armor should be used to protect the high tension wire against the superimposed floor-boards, according to underwriters' requirements.

It will be seen from the above arrangement that the high tension and low tension systems are completely segregated from each other and it is not even necessary for the high tension main supply cables to cross over the low tension supply cables in view of the arrangement of both sets in parallelism with the high tension cables on opposite sides of the intermediate low tension mains. The two-story junction box for the high tension cables allows the permanent main supply cables, laid or drawn through the main conduits 20, to be connected directly with the superficial branch channels 22, which are at

the same level as the branch-distributing channels of the low tension system but which do not interfere with the low tension channels in any way as there is no intersection of the two sets of branches. Moreover, the main conduits for the high tension mains are so deep below the surface of the floor that the low tension lateral channels are passed over them without requiring either of the conduits to be deflected from a straight line to dive down under the other and come up again. This is of great practical importance as it makes very easy the drawing of the branch wires through the lateral branches without any obstructions.

As junction holes or boxes are located at regular distances along each series of main supply conduits, say about 5 feet apart, and as lateral branches extend to the limit of the floor or building, and as the boring through the floor into either set of superficial channels is a clean and simple operation, it will be seen that the outlets for both the lighting circuit and the low tension circuit can be located practically at will throughout the whole floor area, and that this work need not be done until the floor construction is finished and then only to the extent necessary to supply the particular needs at any given time.

In cases where a linoleum floor is laid on the cement instead of a wooden floor a slightly modified form of construction may be employed as shown in Figures 9 to 12.

In this case there may be placed in the low tension open channels a metal conduit 30, provided at regular distances, say 1 foot apart, with knock-out spots 30. These relatively flat tubular conduits 30 afford a support for the linoleum 16 and also protect it against the high tension wires, and when it is desired to place an outlet fixture at any particular point along the branch high tension channel 22. It will be seen that as the knock-out spots 30^a are located at regular distance from the edge of the cover plate 12 it is possible, by measurement, to locate exactly the center of a convenient knock-out spot 30^a about the point where the connection with the lamp cord is desired, and in that case a mechanic merely bores or cuts through the linoleum, exposing the knock-out spot which can then be knocked out of place to permit drawing through the wire from the main junction box to that particular outlet, and fastening the outlet fixture at that point.

In Figures 11 and 12 I have shown the layer of linoleum 16 cemented over a bridge plate 6^a which covers the low branch passage 6, and as this plate 6^a is provided with knock-out spots 6^b, at regular predetermined distances along the length of the covering strip, the same measurement procedure will enable the mechanic to locate the most convenient knock-out spot in the covering strip,

cut away the linoleum, knock-out the spot and affix any suitable outlet fixture thereto for carrying the branch wire 15^a.

What I claim is:

- 5 1. An electric conduit construction for concrete floors having a composite overlayer, embracing in its construction a floor covering and a subjacent composite overlayer formed with two separate sets of
10 substantially parallel superficial open branch channels, one set leading to an open superficial main conduit extending transversely of the branch channels, the other set
15 leading to relatively deep junction boxes extending down to the level of a main conduit imbedded in the composite overlayer below the level of both sets of branches and transversely of the branches, whereby the two
20 sets of conduits are kept entirely separate, and accessible by merely boring through the floor covering, yet permitting the crossing of one main conduit by the superficial conduits of the other set without any dip under at the crossing point.
- 25 2. An electric conduit construction for concrete floors embracing a composite overlayer provided with a main conduit for low tension wires formed by an open superficial channel in the composite overlayer, an adjacent parallel main conduit for high tension
30 wires imbedded in the lower portion of the composite overlayer, a series of superficial open transverse channels leading off from the low tension main conduit, some of which
35 cross over the main high tension conduit, a second series of superficial open lateral transverse channels arranged between the said low tension branch channels and having communication with the upper portions of
40 deep junction boxes whose bottom portions are on the level with, and in communica-

tion with, the deeply imbedded high tension conduits.

3. An electric distributing conduit system for concrete floors having a covering 45 floor and a subjacent composite overlayer containing imbedded floor-attaching squeeds having two separate series of open distributing channels formed in the top face of the composite overlayer between, and in substantial parallelism with, the squeeds, a 50 transversely disposed metallic tube imbedded in the lower portion of the overlayer below the level of the open channels and of the squeeds to form a main conduit for high 55 tension cables, junction boxes extending down from the top of the composite layer to the level of and in communication with said metallic tubes to permit connection with branch wires leading into the high tension 60 branch conduits, and outlet fixtures embracing knock-out boxes inserted at any desired points in said branch conduits by boring through the superficial floor covering.

4. An electric conduit system for floors 65 embracing a composite overlayer formed with two sets of shallow open channels in its top face, one set leading to a similarly formed main conduit, the other set leading to vertical 70 wells extending down to and communicating with a deeply imbedded main conduit for high tension wires, a superficial flooring layer and a series of longitudinal covering plates arranged to cover said open channels and directly support the superficial flooring layer, 75 said cover plates being provided at intervals with knock-out spots that are readily dis- ruptable from the covers to provide the desired openings for an outlet fixture.

In witness whereof, I have subscribed the 80 above specification.

WILLIAM B. SHERMAN.