

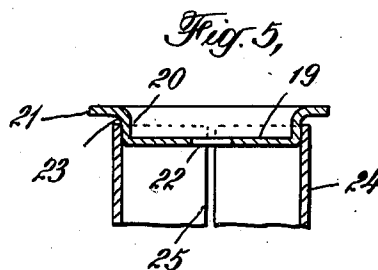
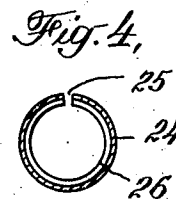
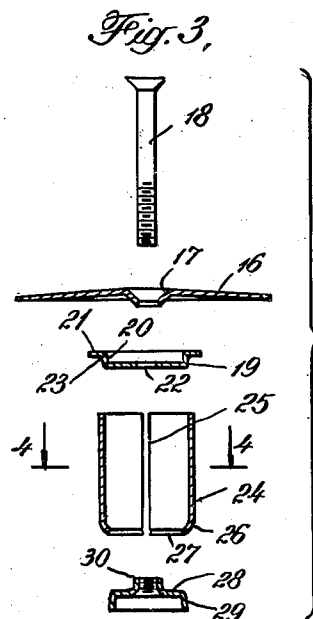
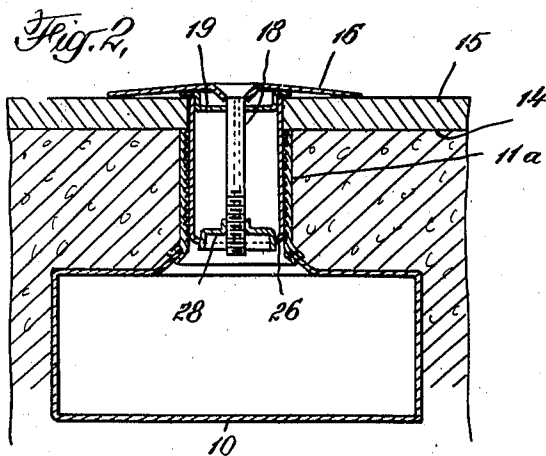
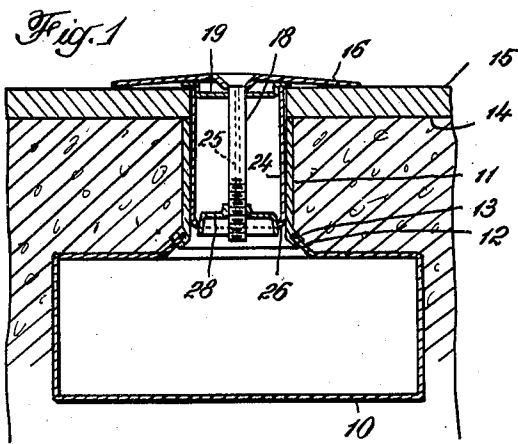
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2,335,906

UNDERFLOOR DUCT SYSTEM

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2,335,906

UNDERFLOOR DUCT SYSTEM

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This invention relates to underfloor duct systems employed for the purpose of supplying electrical service at different locations on a floor area and is concerned more particularly with an accessory to be used in such systems to close outlets, the use of which has been discontinued for any reason. While the utility of the new accessory is not limited to any particular system, the accessory may be used to advantage in the system described and claimed in Patent No. 1,592,548, issued July 13, 1926, to Hervey S. Walker and a form of the accessory especially useful in connection with the system of that patent will, accordingly, be illustrated and described in detail for purposes of explanation.

The system of ducts of the patent includes a network of main and branch circuit ducts installed in the floor during the construction of the latter and each duct is provided with a plurality of outlets spaced at predetermined uniform intervals which, in practice, may be 24" or 30" for ordinary purposes. These outlets preferably take the form of tubular inserts mounted in the top wall of the duct during the manufacture of the latter and, in the installation of such a system in a concrete floor structure, it is the common practice to lay the ducts on the top of the rough floor slab, so that the ducts are embedded in the usual cinder fill and lie a substantial distance beneath the finished floor surface. The outlet inserts then project upwardly toward the floor surface and preferably terminate even with that surface, although their upper ends may lie a short distance beneath it. At the time of installation, the ends of the inserts are closed by small caps held in place frictionally and easily removable.

The runs of main and branch circuit ducts of the system intersect at floor boxes, the tops of which are flush with the finished surface of the floor and the wiring is drawn through the ducts in the ordinary way and connections are made at the boxes. Whenever service is desired at a point along a duct, the cap of the nearest outlet insert is removed, connections are made in the nearest box, and conductors are fished from the box and out through the duct and open insert. The provision of service is then ordinarily completed by installing a standpipe fitting in the end of the insert through which the wires may be led out of the duct system to a point a few inches above the floor surface. Frequently the finished floor surface is covered with linoleum and, in some cases, wood flooring is employed. In such instances, an opening must be made in

the linoleum or wood flooring to expose the cap, and the standpipe fitting is provided with a flange which overlies the linoleum or wood flooring so as to provide a substantially water-tight closure for the insert.

On occasion, the use of a connection made as above described may be discontinued and, in that event, the standpipe and wires are removed. The end of the insert could then be closed by means of the original cap, but that would leave an opening in the floor covering which would be undesirable. An accessory for closing such a discontinued outlet and concealing the hole in the floor covering is disclosed in Walker Patent No. 1,809,613, issued June 9, 1931, and while the accessory of the Walker patent serves its intended purpose satisfactorily, it has heretofore commonly been made of brass, which is now difficult to obtain and expensive in any event.

The present invention is, accordingly, directed to the provision of an accessory which serves the same general purpose as that disclosed in Walker Patent No. 1,809,613 but is an improvement thereon, in that it can be manufactured at less cost and of readily available materials.

For a better understanding of the invention, reference may be had to the accompanying drawing in which

Fig. 1 is a sectional view through a duct and insert with the new accessory in place;

Fig. 2 is a similar view, showing the accessory employed with an insert of a slightly different type;

Fig. 3 is a sectional view through the accessory showing the parts disassembled;

Fig. 4 is a sectional view on the line 4-4 of Fig. 3; and

Fig. 5 is a longitudinal sectional view on an enlarged scale through two parts of the accessory.

The underfloor duct system illustrated in the drawing includes a metal duct 10 of rectangular cross-section which is provided with a plurality of inserts 11 spaced lengthwise along it. In the mounting of the inserts, openings are made in the upper wall of the duct and the metal around the openings is forced upwardly as indicated at 12. The inserts 11 are lengths of tubing and their lower ends are provided with outwardly extending spaced flanges 13 which are forced against the inner and outer faces of the dished-out portions of the duct so as to secure the inserts firmly in position. The inserts are of such a height that when the duct is installed in the floor during the construction of the latter,

the tops of the inserts lie substantially in the level 14 of the finished floor surface. During installation of the duct system and completion of the floor structure, the inserts are closed by small caps having central depressions in which floor material may be received, so that the only portions of the runs of ducts ordinarily visible in the floor surface are the rims of the caps. When the floor is covered by linoleum 15, the caps lie concealed beneath it.

Whenever service is desired at a particular location on the floor, the nearest outlet is located, as, for example, by measuring along a run of duct from the nearest junction box, an opening is made in the linoleum above the upper end of the insert, and the cap is removed from the insert. The wiring is drawn through the duct from the nearest box and out through the open insert and ordinarily a standpipe is installed in the insert, so that the wiring may leave the standpipe a few inches above the floor or may be led to a receptacle in the upper end of the standpipe. When service at a particular outlet is discontinued, the removal of the standpipe leaves the insert open and the accessory of the present invention is employed to close the insert and to conceal the hole in the linoleum.

The accessory includes a thin plate 16 of sheet metal which is of a diameter greater than the opening through the linoleum and is bulged upwardly. The plate has a central depression 17 leading to an opening for the passage of a screw 18, the head of which lies in the depression with the upper surface of its head flush with the surface of the plate. Lying against the under surface of the plate is a centering member 19 which may be a disc of metal stamped to form a cup having a side wall 20 terminating in a peripheral flange 21 and having a central opening 22 for the passage of the screw. In the formation of the cup, the side wall 20 is shaped to join the peripheral flange along a relatively long radius curve so that a fillet 23 is formed in the crevice between the outer surface of the wall 20 and the under surface of the flange 22. The flange 22 is of such a diameter that the flange ordinarily overlies the linoleum around the opening leading to the outlet, but since the plate 16 is bulged upwardly and the flange lies within the concavity of the plate, the presence of the flange does not prevent the rim of the plate from seating flat against the linoleum.

An expansible tubular member 24 is mounted on the plate 16 with the depressed portion of the centering member entering the upper end of the tubular member. The tubular member is made of sheet metal and it is preferably slotted lengthwise as indicated at 25. At its lower end, the tubular member is turned inwardly, as indicated at 26, so that its lower end opening 27 is of considerably less diameter than its upper end opening.

Mounted at the lower end of the tube 24 is an expansion member 28 which may take the form of a metal disc formed to cup shape with a flaring side wall 29 and a central neck 30 which is internally threaded. The flared wall of the expansion member is so shaped that, when the member is drawn upwardly, the engagement of the wall with the lower end of the tube causes expansion of the latter. The expansion member is mounted on the lower end of screw 18, which passes through the centering member and tube into the neck 30 of the expansion member.

The accessory used for closing a particular insert is one having a tubular member 24, the outer diameter of which is a little less than the inner diameter of the insert and when the accessory is to be installed, the screw is turned into the expansion member 28 sufficiently to cause the tubular member to be seated snugly against the centering member. The tubular member is then inserted into the insert until the plate rests against the upper surface of the floor covering. The screw is then turned in to draw the expansion member into the lower end of the tubular member and cause the latter to be expanded to grip the inner wall of the insert tightly. In this action, the lower end of the slot 25 in the tubular member opens and the upper end of the slot is kept from closing by the side wall 20 of the centering member. The forcing of the expansion member into the slotted tube also tends to force the latter upwardly along the fillet 23 so that the upper end of the slot is opened slightly. By turning the screw as described, the tube 24 can be expanded to make firm contact with the inner wall of the insert and the plate is then held firmly in place and cannot be accidentally dislodged.

In some instances, the insert 11a may be internally threaded to receive the threaded neck on a standpipe, but the presence of the threading does not interfere with the use of the new accessory. The reason is that the tubular member of the accessory has a substantial length and although it makes contact only with the ridges of the threads, it can be forced sufficiently firmly against the threads to insure that the plate will be held securely in position.

By turning in the lower end of the slotted tubular member as indicated at 26, it is possible to use an expansion member 28, the outer diameter of which is substantially less than the inner diameter of the insert and this insures that, when the accessory is to be installed, the expansion member will not bear against the inner wall of the insert and interfere with the insertion of the accessory, as, for example, by catching on the threads of a threaded insert. Also, by forming the expansion member in cup form, the length of the screw may be less than would otherwise be necessary and this permits the use of a tubular member which engages the inner wall of the accessory throughout the greater part of the length of the latter without the end of the screw entering the duct.

The seating member 19 serves to insure not only that the tubular member will be properly centered relative to the plate but also that the plate will not be tilted as the tubular member is expanded. The provision of the fillet on the centering member acts to expand the upper end of the tube slightly as the tube is drawn upward against the under surface of the flange 22 of the member and when the screw is backed out, the tube slips down the fillet and this permits contraction of the tube to its original size so that it will not stick against the inner wall of the insert when the accessory is to be removed.

Except for the screw, the new accessory is made throughout of sheet stock and the several parts may be readily formed of sheet steel by conventional operations. The accessory is, therefore, made of inexpensive and readily available materials and it performs its intended function with complete satisfaction.

I claim:

1. In an underfloor duct system including a duct embedded within a floor and an outlet lead-

ing from the duct toward the floor surface and having an open upper end, an accessory for closing the upper end of the outlet, which comprises a plate resting on the floor surface and of greater diameter than said outlet end, a centering member having the form of a cup with a peripheral flange, the peripheral flange of the centering member being secured against the underside of the plate, an expansible tubular member lying wholly within the outlet, the cup of the centering member entering the upper end of the tubular member and engaging the inner surface thereof, and means carried by the plate and engaging the lower end of the tubular member for expanding said member against the inner wall of the outlet, said cup of the centering member preventing contraction of the upper end of the tubular member as the latter is expanded.

2. In an underfloor duct system including a duct embedded within a floor and an outlet leading from the duct toward the floor surface and having an open upper end, an accessory for closing the upper end of the outlet, which comprises a plate resting on the floor surface and of greater diameter than said outlet end, a centering member having the form of a cup with a peripheral flange, the peripheral flange of the centering member being secured against the underside of the plate, the outer wall of the cup merging with the under wall of the flange in the form of a fillet, an expansible tubular member lying wholly within the outlet, the cup of the centering member entering the upper end of the tubular member and engaging the inner surface thereof, and means carried by the plate and engaging the lower end of the tubular member for expanding said member and moving it upward relatively to the centering member, the upper end of the tubular member riding up said fillet and being expanded slightly thereby as said means are operated.

3. In an underfloor duct system including a duct embedded within a floor and an outlet leading from the duct toward the floor surface and having an open upper end, an accessory for closing the upper end of the outlet, which comprises a plate resting on the floor surface and of greater diameter than said outlet end, a centering member secured against the under surface of the plate, a tube of flexible but relatively incompressible material lying wholly within said outlet, the tube being slotted lengthwise and the centering member entering the upper end of the tube and engaging the inner wall thereof, and means carried by the plate and lying wholly within the outlet for expanding the tube against the inner wall of the outlet.

4. In an underfloor duct system including a duct embedded within a floor and an outlet leading from the duct toward the floor surface and having an open upper end, an accessory for closing the upper end of the outlet, which comprises a plate resting on the floor surface and of greater diameter than said outlet end, a centering member secured against the under surface of the plate, a tube of flexible but relatively incompressible material lying wholly within said outlet, the

tube being slotted lengthwise and the centering member entering the upper end of the tube and engaging the inner wall thereof, and means carried by the plate and lying wholly within the outlet for engaging the lower end of the tube and expanding the tube against the inner wall of the outlet, said portion of the centering member preventing contraction of the upper end of the tube as the latter is expanded.

5. In an underfloor duct system including a duct embedded within a floor and an outlet leading from the duct toward the floor surface and having an open upper end, an accessory for closing the upper end of the outlet, which comprises a plate resting on the floor surface and of greater diameter than said outlet end, a centering member secured against the under surface of the plate, a tube of flexible but relatively incompressible material lying wholly within said outlet, the tube being slotted lengthwise and the centering member entering the upper end of the tube and engaging the inner wall thereof, and means carried by the plate and lying wholly within the outlet for engaging the lower end of the tube and expanding the tube against the inner wall of the outlet.

6. In an underfloor duct system including a duct embedded within a floor and an outlet leading from the duct toward the floor surface and having an open upper end, an accessory for closing the upper end of the outlet, which comprises a plate resting on the floor surface and of greater diameter than said outlet end, a centering member secured against the under surface of the plate, a tube of flexible but relatively incompressible material lying wholly within the outlet and slotted lengthwise, the upper end of the tube receiving and engaging a portion of the centering member and the lower end of the tube being of reduced diameter, an expansion member lying within the outlet and engaging the lower end of the tube, and a screw passing through the plate and threaded into the expansion member for moving said expansion member upwardly to expand the tube against the inner wall of the outlet.

7. In an underfloor duct system including a duct embedded within a floor and an outlet leading from the duct toward the floor surface and having an open upper end, an accessory for closing the upper end of the outlet, which comprises a plate resting on the floor surface and of greater diameter than said outlet end, a centering member secured against the under surface of the plate, a tube of flexible but relatively incompressible material lying wholly within the outlet and slotted lengthwise, the upper end of the tube receiving and engaging a portion of the centering member and the lower end of the tube being of reduced diameter, an expansion member of less diameter than the inner diameter of the outlet mounted at the lower end of the tube and within the outlet, and a screw passing through the plate and engaging the expansion member, the screw being operable to draw up the expansion member and expand the tube against the inner wall of the outlet.

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