The present invention relates in general to an auxiliary or suspended ceiling construction and, in particular, to such a ceiling construction having provision for an access opening therein which is provided with a removable closure.

Ceilings of the type to which the present invention relates are formed of a plurality of tiles which are mounted in juxtaposed or abutting relation. Such a ceiling is illustrated and described in my prior application Serial No. 2,203,750, filed April 27, 1914, and in said application, there is illustrated and described such a ceiling construction in which there is provided an access opening in the ceiling. The access opening construction required the utilization of a bracket means which was retained within the channel defined by a Z-member or bar. Due to the fact that different types or dimensions of Z-bars could be used with various different ceiling constructions, there arose the necessity for providing for each type of Z-bar, a companion bracket or holder which would fit precisely within the associated Z-bar. As a result, it became necessary to maintain a relatively large stock of brackets or holders for the various different sizes or types of Z-bars.

Pursuant to the present invention, the necessity for maintaining various different sizes and types of holders or brackets has been obviated. This constitutes a primary object of the present invention.

In accordance with the foregoing object of the invention, it is another object of the present invention to provide a single bracket or holder for a removable tile which is normally disposed within the access opening of the ceiling, which bracket or holder can be used with Z-bars of various different sizes or types.

It is another object of the present invention to provide a suspended ceiling construction having a highly novel closable access opening means provided therein which is highly efficient in operation and which can be provided in the ceiling at a relatively low cost.

It is a further object of the present invention to provide a suspended or auxiliary ceiling of the described type which is provided with closable access opening defining means which is economical to manufacture, to mount in position and which presents a highly attractive and decorative appearance.

Other and further objects and advantages of the present invention will be readily apparent to those skilled in the art from a consideration of the following specification, taken in connection with the appended drawings which illustrate the best mode presently contemplated for carrying out the invention.

In the drawings:

FIGURE 1 is a fragmentary, exploded view partially in section of a suspended ceiling construction provided with means which define a readily closable access opening therein pursuant to the present invention;

FIGURE 2 is a fragmentary, sectional view through that portion of the suspended ceiling construction which is provided with a closable access opening means pursuant to the present invention;

FIGURE 3 is a view similar to FIGURE 1 and illustrates a modified form of suspended ceiling construction;

FIGURE 4 is a fragmentary view through that portion of the suspended ceiling construction illustrated in FIGURE 3, which is provided with the closable access opening means pursuant to the present invention; and

FIGURE 5 is a perspective view of a bracket or holder for the removable tile which closes the ceiling access opening.

A suspended ceiling construction of the type to which the present invention relates is illustrated and described in my previously identified co-pending application. Such a ceiling construction includes a plurality of square tiles of conventional construction. The tiles are each provided with a continuous peripheral groove which is defined therein. As best shown in FIGURES 1 and 2, the lower peripheral side portions 16 of the tiles 12 extend outwardly for a greater distance than the upper peripheral side portions 18. As is well known to those skilled in the art, the set-back conformation of the upper portions relative to the lower portions permits the sides of the tiles to be readily mounted on adjacent supporting channels or Z-bars 20.

Said Z-bars are of the type illustrated and described in my previously identified application and, as best shown in FIGURES 1 and 2, each channel or Z-bar 20, which is preferably formed from suitable sheet metal, comprises a vertical wall 22 which is provided at the upper end thereof with a lateral flange 24 which extends from one side of the wall 22. Inwardly from the free longitudinal marginal ledge 26 thereof, the flange 24 is provided with a depressed portion 28 which extends parallel to the adjacent marginal edge 26. It will be understood that each channel member 20 is preferably formed of a single strip of sheet metal and, in addition to the flange 24 which is provided preferably by bending at the upper end of the vertical wall 22, is provided also with a flange 30 which is formed by bending and doubling the strip upon itself at the lower end of the vertical wall 22, so that the flange 30 extends from the wall 22 in a direction opposite the direction of the upper flange 24. The material of the strip from which the channel member 20 is formed continues laterally of the wall 22 in the same direction as the upper flange 24 so as to define a single layer flange 32 which underlies and is spaced from the upper flange 24. The free longitudinal marginal edge of the flange 32 is bent upon itself to define a bead 34 which is spaced laterally from the wall 22. It will be readily apparent that the vertical wall 22 provided with an upper flange 24 and a lower flange 32 both extending in the same direction therefrom defines a channel construction. The flanges 30 and 32 respectively define a spline and fit in opposed grooves 14 of the abutting sides of adjacent tiles 12 which define the suspended ceiling, as illustrated in my co-pending application and as is well known in the art.

In order to mount the suspended ceiling construction from an overlying permanent ceiling 36, the Z-bars 20 are mounted on the lower surface of the ceiling by means of leaf springs 38. Each leaf spring 38 is provided with a central body portion 40 and with opposite end portions 42 and 44 which are bent upwardly from the body portion 40. An aperture 46 is defined in the body portion 40. The leaf spring 38 is secured on the lower surface of the main ceiling 36 by means of a screw or bolt 48 which passes through the aperture 46 and is threaded in the main ceiling 36. In order to mount the Z-bars 20 on the lower surface of the ceiling 36, the upwardly-bent end 42 of the spring 38 is engaged under the upper flange 24 in abutment with depressed portion 28 thereof, as best shown in FIGURE 2, so that the depression 28 defines a detent for the free marginal edge of the end portion 42. It will be readily apparent that as the screw 48 is threaded into the ceiling 36, the spring 38 will be stressed so as to retain the Z-members or bars 20 in engagement with the main ceiling 36. It will be understood that a sufficient number of springs 38 are mounted in spaced relation longitudinally of each member 20 to provide for the adequate...
securement of the latter to the under-surface of the main ceiling 36.

From the foregoing, and as illustrated and described in my prior application, it will be apparent that a suspended ceiling is defined by means of a plurality of tiles 12 which are mounted by the lower flanges 30 and 32 of the Z-bars 20, the latter being engaged against the undersurface of the ceiling 36 by the engagement of the leaf springs 38 with the upper flange 24 of the Z-bar. The distance between the upper ceiling 36 and the suspended ceiling depends upon the longitudinal dimension of the wall 22.

In order to secure the suspended ceiling to the walls of the building, the latter are provided with suitable channels secured thereto as illustrated and described in my prior application. Such channels engage the outer sides of the end tiles 12 which define the suspended ceiling so as to support the end tiles of such ceiling in position.

Pursuant to the basic inventive concept of the present invention, provision is made for obtaining access to the area between the suspended ceiling, which is generally indicated by the reference numeral 10 and the main ceiling 36. For this purpose, provision is made for modified tiles 56. The tiles 56 are in all respects similar to the tiles 12 except that the upper peripheral portion 18 along one marginal side edge thereof is broken away or removed so that along one marginal edge thereof the tile 56 has only the lower peripheral portion or kerf of the tile 12, which remaining portion is also designated by the reference numeral 16. The removal of the upper portion 18 provides a right angular step 58 at the marginal edge from which that portion 18 has been removed. Said right angular step 58 is defined by the upper surface 60 of the underlying kerf or lower peripheral portion 16 and by the adjacent vertical surface 62 which rises upwardly from the surface 60 and which was defined by the removal of the upper peripheral portion 18. In addition to the removal of said upper peripheral portion 18 from the tile 12 to form a modified tile 56, there is also provided in the latter an aperture 64 adjacent or inwardly of the right angular step 58 which extends completely through the modified tile 56. Consequently, it will be understood that except for the removal of the one of the upper peripheral portions 18 and the formation of an aperture 64, the tile 56 is in all other respects similar to the tile 12. In addition, it will be understood that along its marginal side edge in opposition to the marginal side edge in which there is defined the right angular step 58, the tile 56 is mounted in the same manner as previously described in connection with the tiles 12, namely by the insertion of the double-layer flange 30 of the Z-bar 20 into the peripheral groove 14 in the opposing side marginal edge, as illustrated in my prior application.

As previously explained, it will be understood that in connection with a normal tile 12 the single thickness flange 32 of the Z-bar 20 is insertable into the peripheral groove 14 thereof while the double thickness flange 30 of the Z-bar is insertable into the adjacent groove 14 of an adjacent tile 12. However, with the removal of the upper peripheral extension 18 from one marginal edge of the modified tile 56, it will be apparent that the tile 56 can no longer be supported along its marginal side edge by means of the single flange 32 or by means of the double flange 30 since the groove 14 is no longer present at said modified edge. For this purpose, and pursuant to a highly novel feature of the present invention, there is provided a bracket or holder 66 for mounting a tile 56 along the marginal edge thereof which is provided with a right angular step 58. As best shown in FIGURE 5, the bracket or holder 66 is a substantially S-shaped member preferably formed of sheet metal. As here shown, the bracket 66 comprises a vertical center or body portion 68 provided at the upper end thereof with the laterally-extending flange 70. Flange 70 is provided with an aperture 72 defined therein for the purpose hereinafter described in detail. At the lower end thereof, the body portion 68 is provided with a generally U-shaped flange 74. The U-shaped flange 74 is defined by an arm 76 which extends from the body portion 68 in the same direction as the flange 70 and by an opposing arm 78 which extends in an opposite direction, said arms being interconnected by the integral bight 80.

In order to mount the access opening closure tile 56 in position, the suspended ceiling construction, the holder 66 is engaged on a Z-bar 20. More specifically, the U-shaped flange 74 of the holder 66 is engaged over the bead 34 and the flange 32 of the Z-bar 20 so that the bead and the flange 32 are seated within the recess 82 defined by the opposing arms 76 and 78. As best shown in FIGURES 1 and 2, when the bead and flange 32 and 34, respectively, are engaged within the recess 82, the arm 78 of the bracket 66 underlies both flanges 30 and 32 of the Z-bar, the arm 76 overlies the bead 34 which fits within the bight 80 and the body portion 68 of the bracket 66 abuts the vertically-extending body portion 22 of the Z-bar 20. As a result, the bracket 66 is frictionally engaged with the Z-bar 20, the lower flanges of which are seated within the recessed portion 82 of the bracket 66 and the vertical wall 68 of the bracket being in abutting engagement with the vertical wall 22 of the Z-bar. Consequently, it will be appreciated that the bracket need not be precisely dimensioned to fit within the channel of the Z-bar 20 defined by the opposing flanges 32 and 34 thereof, and as a result, the distance between said flanges is not critical in so far as the construction of the holder 66 is concerned. Consequently, the bracket or holder 66 need not be designed pursuant to the present invention to fit specifically in firm engagement between the opposing flanges 32 and 34 of the Z-bar. With the bracket 66 so engaged on the Z-bar 20, a bolt 84 is then utilized to secure or mount the tile 56 in position. More specifically, the step portion 88 of the tile 56 is engaged with the U-shaped flange 74 of the bracket 66 in the manner illustrated in FIGURE 2. The bolt is inserted through the aperture 72 of the flange 70 of the bracket 66 and a nut 86 is disposed immediately underneath the flange 70.

The bolt 84 extends through the aperture 64 defined in the tile 56 and extends below the latter. A threaded cap 88 is threaded onto the exposed portion of the bolt 84 so as to securely seat and mount the tile 56 in position to the bracket 66 which, in turn, is frictionally engaged or seated on the Z-bar 20. When it is desired to obtain access to the opening in the ceiling 10, it is necessary only to disengage the cap 88 from the bolt 84. The tile 56 may thereafter be removed from the bracket 66 by moving the tile downwardly, as indicated by the arrow 90 in FIGURE 2.

Referring now to FIGURES 3 and 4 in detail, there is shown a modified construction. In the construction illustrated in FIGURES 3 and 4, it will be understood that the various parts and components illustrated in FIGURES 3 and 4 are exactly the same as those shown in FIGURES 1 and 2 except for the fact that in FIGURES 3 and 4 the Z-bars 20 are not shown. More specifically and as best shown in FIGURE 3, the tiles 12 are provided in the four corners thereof with splines 92 which are used to interengage in conventional manner tiles 12. More specifically, and as well known in the art, the splines 92 extend into the opposing groove 14 of mating tiles 12 in conventional fashion. Accordingly, in order to mount the tile 56 to close an access opening, the holder 66, being shown as a ceiling having tiles 12 provided with splines 92, the bracket 66 is engaged on the exposed portion of the spline 92. More specifically, the exposed portion of the spline 92 is engaged or seated within the recess 82 defined in the U-shaped flange of the holder, as best shown in FIGURES 3 and 4. More specifically, it will be noted that the lower arm 78 of the U-shaped flange 74 extends and underlies the lower surface of the spline 92 and that the upper arm 76 overlies the exposed portion of the spline 92. It will be understood that when the spline
92 is seated within the recess 82. The bracket 66 is in firm frictional engagement therewith. With the bracket 66 so engaged on the spline 92, the tile 56 is engaged with the bracket 66 in the same manner as previously described in connection with the construction illustrated in FIGURES 1 and 2. Consequently, and as best shown in FIGURE 4, it will be apparent that the tile 56 is engaged in position on the holder 66 by means of the bolt 84 and cap 88, the holder being, in turn, frictionally engaged on the spline 92 which is engaged in the groove 14 defined in the tile 12, it being noted that the spline and the lower flange arm 78 substantially fill the groove so as to provide for the firm frictional engagement of the holder 66 in position relative to the tile 12.

In view of the foregoing, it will be apparent that pursuant to the present invention there has been provided a highly novel and efficient arrangement for providing a removable access opening closure in a dropped ceiling of the type which is described. It will be understood that various changes and modifications may be made there in without, however, departing from the inventive concept thereof, as set forth in the appended claims.

1. A suspended tile ceiling construction comprising a plurality of tiles mounted in spaced relation below a main ceiling, said tiles being interconnected along their edges by means of splines and a closure tile provided with closure bracket means, said bracket means comprising an S shaped bracket having a recessed portion formed at its bottom end below the top surface of said closure tile wherein a portion of a spline is received and a flange at its top end overlying said closure tile, said flange being provided with a bolt secured thereto, said bolt extending downwardly through an opening in said closure tile and being provided with a fastening means on the bolt portion projecting below said closure tile.

2. In a suspended tile ceiling construction comprising a plurality of tiles mounted in spaced relation below a main ceiling adjacent tiles being interconnected along their abutting edges by means of splines, said tiles including at least one closure tile provided with closure bracket means said bracket means comprising an S shaped bracket having a recessed portion formed at its bottom end disposed below the top surface of the closure tile and receiving a portion of a spline and a flange at its top end overlying said closure tile, said flange having a bolt secured thereto, said bolt extending downwardly through an aperture in the closure tile and being provided with fastening means on the bolt portion extending through the aperture in the closure tile.

3. Bracket means for supporting a closure tile in a suspended ceiling tile construction wherein adjacent tiles are provided with interconnecting means, said bracket means comprising a substantially S shaped member comprised of a vertical body portion which is provided at the upper end thereof with a horizontally extending first flange, said flange being provided with a bolt attached thereto, the lower end of said body portion being provided with a generally U shaped flange defined by an arm which extends in the same direction as said first named flange and an opposing arm which extends from the body portion in the opposite direction, said arms being interconnected by a bight portion, said U shaped flange defining a recess adapted to receive a complementary portion of a tile interconnecting means in frictional engagement therewith.

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