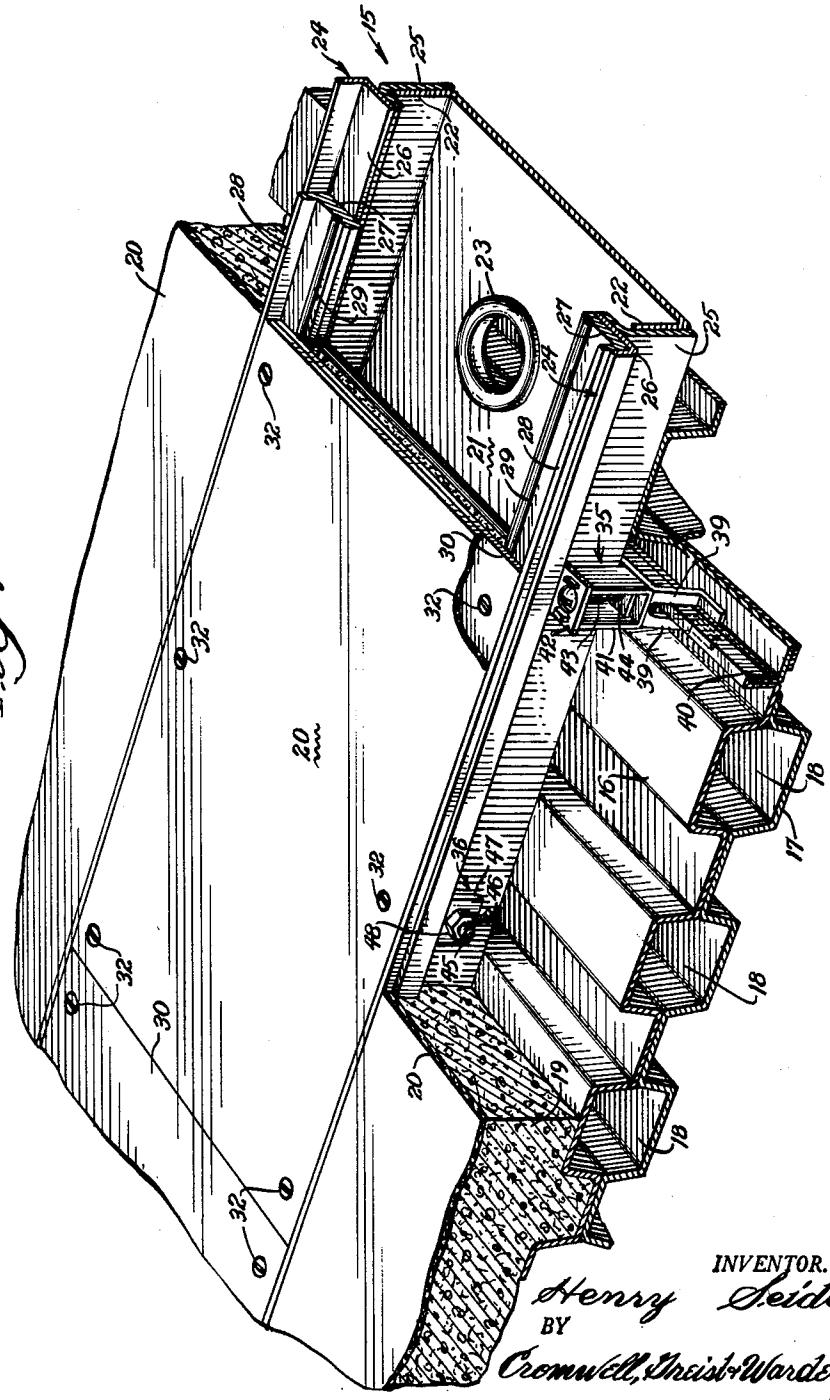
Jan. 22, 1963 H. SEIDEL 3,074,208

CELLULAR FLOOR HEADERTROUGH

Filed March 9, 1959 4 Sheets-Sheet 1

Fig-1



INVENTOR.
Henry Seidel
BY
Cromwell, Greist & Warden
Attys.

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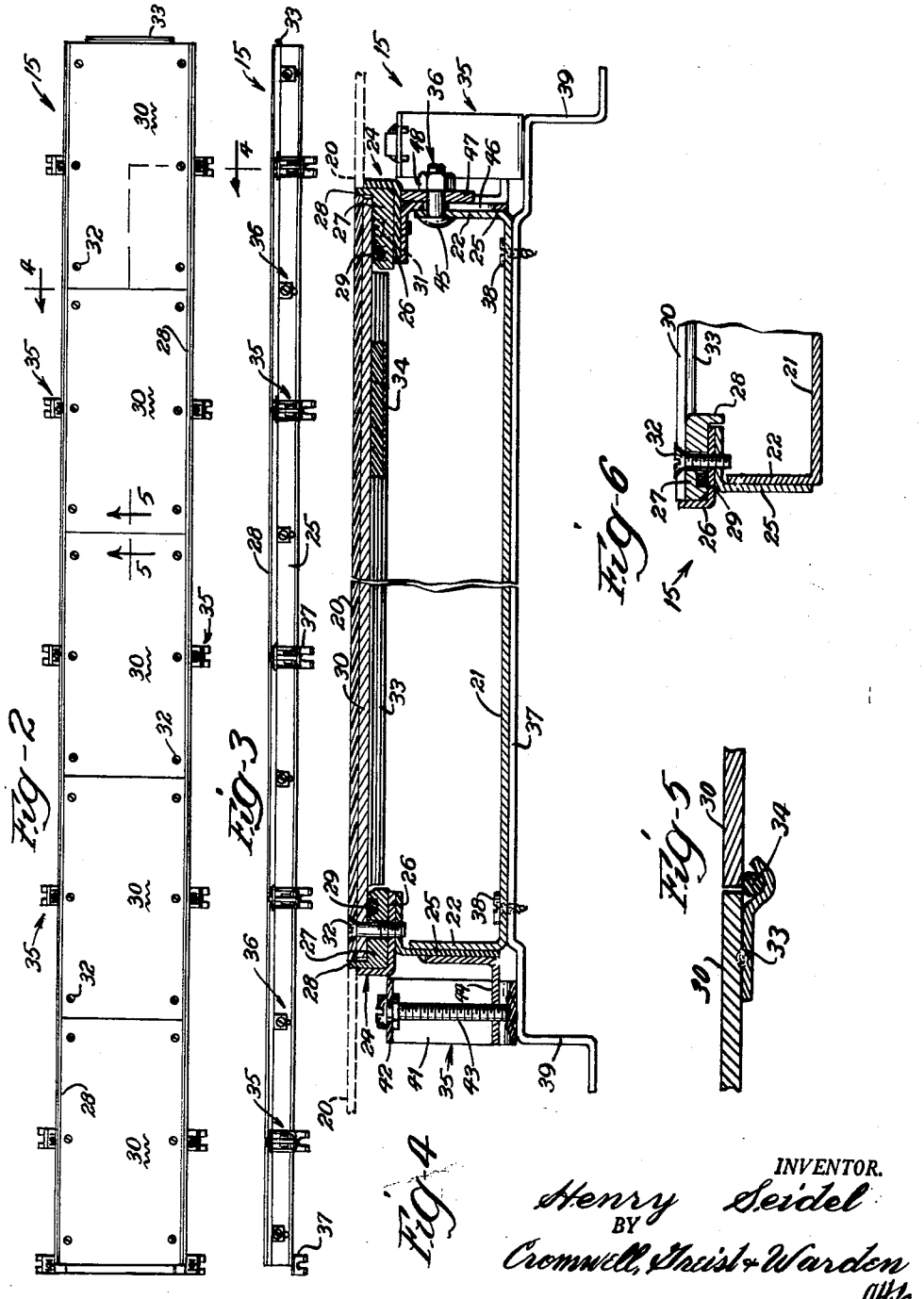

Fig-2

Fig-3

Fig-4

Fig-5

Fig-6

INVENTOR.
Henry Seidel
BY
Cromwell, Greist & Warden
Attys.

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CELLULAR FLOOR HEADERTROUGH

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Fig-7

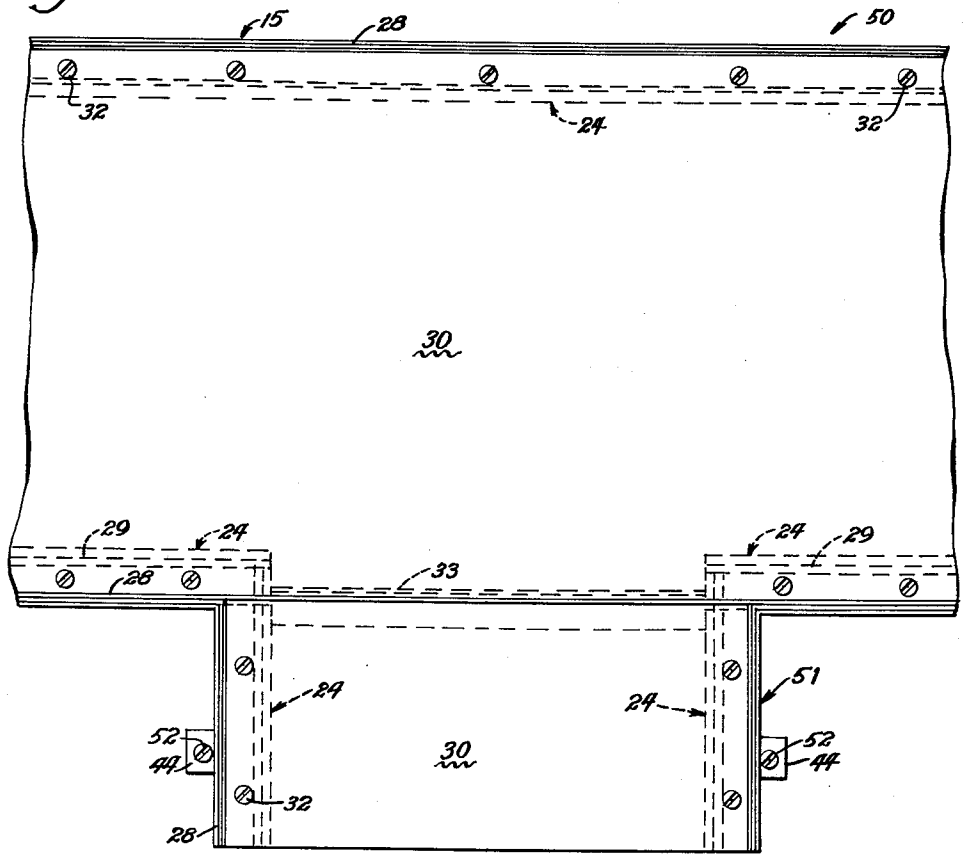
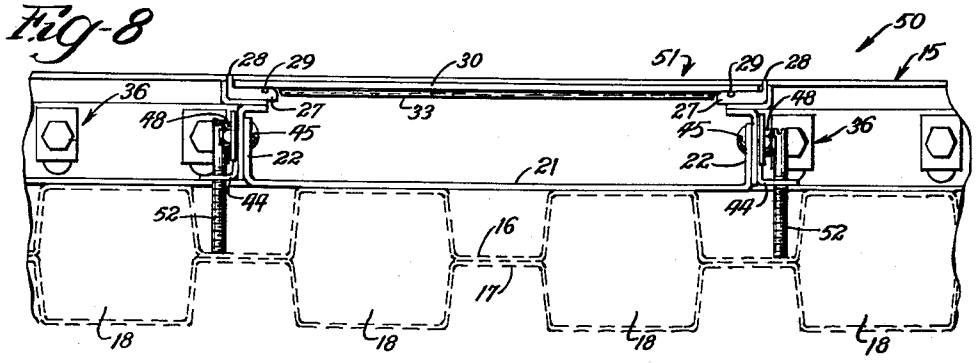


Fig-8



INVENTOR.
Henry Seidel
BY
Cromwell, Greist + Warden
Attys.

Jan. 22, 1963 H. SEIDEL 3,074,208

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Fig-10

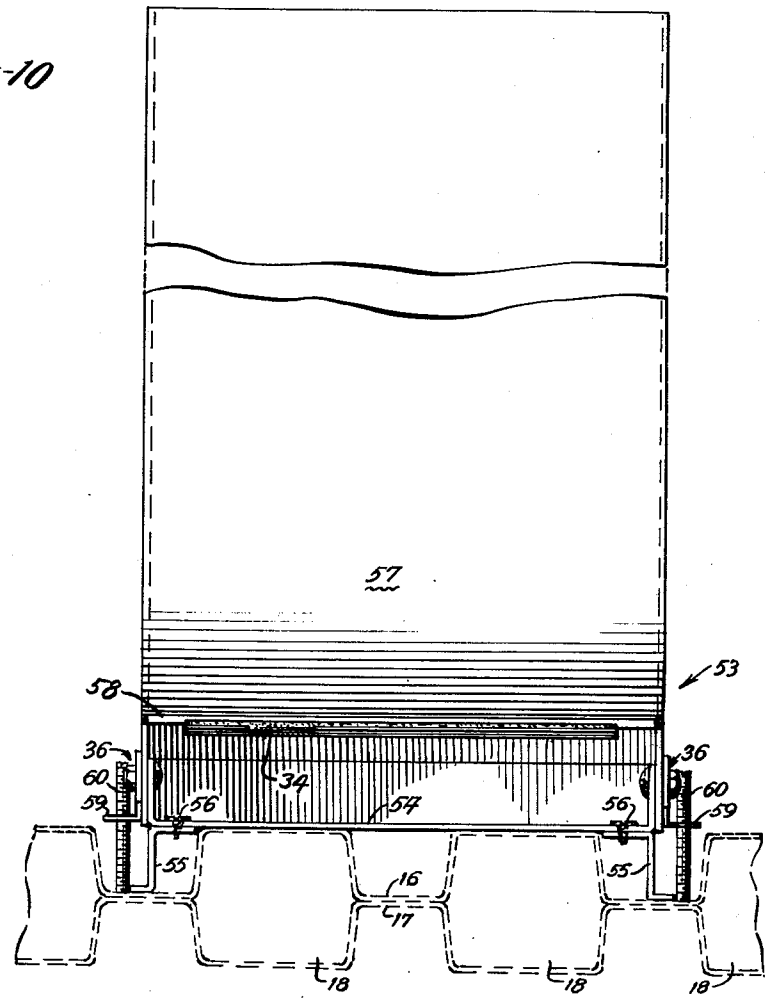
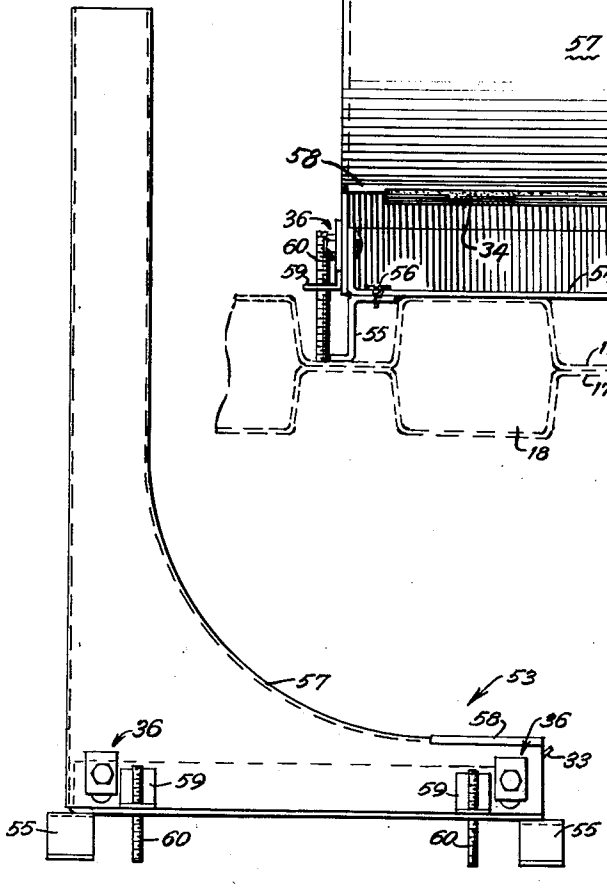


Fig-9



INVENTOR.
Henry Seidel
BY
Cromwell, Thrasher & Warden
Attys.

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CELLULAR FLOOR HEADERTROUGH

Henry Seidel, Pittsburgh, Pa., assignor, by mesne assignments, to Rome Cable Corporation, Rome, N.Y., a corporation of Delaware

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3 Claims. (Cl. 50—127)

The present invention is directed to a new and improved form of headertrough equipment for use with cellular floor structures to interconnect the cells thereof for wiring purposes. More specifically, the invention is directed to headertrough equipment of improved utility and design, the equipment including straight troughs for cell interconnection purposes, trough T's and wall trough elbows.

As a part of present day building construction methods, cellular steel flooring is widely used due to the two-fold use afforded by the same. Cellular base flooring construction is readily formed from structural steel to provide a strong subflooring base onto which aggregate flooring material, such as concrete, is poured with floor covering material applied to the top surface thereof. A cellular steel base in its most common form is constructed from connected steel sheets which when arranged with one another define spaced, longitudinally extending cells in the form of continuous hollow ducts. The cell structure not only increases the overall strength of the subflooring but further provides means for distributing wiring throughout the floor area.

With the use of cellular floor construction for wire distribution purposes, it is necessary to provide means extending transversely across the cellular floor construction and connected to the separate cells thereof to feed or dispense wiring thereinto. The cellular floor construction is usually buried at a substantial depth below the top surface of the floor and, consequently, wire feeding or distributing means in the form of a headertrough must be provided which not only communicates with the separate cells of the floor construction but further is readily accessible from the top surface of the floor.

In its simplest form, a headertrough may be nothing more than a channel-shaped bottom member provided with removable cover means, the side walls of the bottom member being of adequate height to locate the cover means in flush alignment with the top surface of the floor. The cover means may also carry floor covering material to prevent undue interruption of the floor covering for appearance purposes. Observable marker means are generally provided to indicate the location of the cover means to permit removal of the same when access into the headertrough and individual cells for maintenance and rewiring is desired.

The type of headertrough described is inexpensive but when used is difficult to install properly due to variations in floor depth. In order to be effective, the headertrough must communicate the buried cells with the top of the floor and in constructing large floor areas there is always at least some variation in depth through the entire area. Consequently, an entirely suitable and readily installable headertrough should be provided with means whereby the effective height of the same may be varied to accommodate variations in floor depth. Furthermore, the height adjustment should be effective to different degrees throughout the length of the headertrough. In large floor areas, a single headertrough may be of substantial length and throughout this length the effective depth of the floor may increase or decrease. Accordingly, the height of the headertrough should change throughout its length with certain portions thereof being of different height than others.

It is an object of the present invention to provide a

new and improved headertrough for use with cellular floor structures in interconnecting the cells thereof for wiring purposes, the headertrough being height adjustable to accommodate variations in floor depth throughout a given floor area.

A further object is to provide new and improved headertrough equipment including straight ductwork, T's and elbows which comprises basically a vertically expandable body portion having expansion controlling means to accommodate the equipment to meet floor depth variations to provide communication from the floor surface directly with buried floor cells.

Other objects not specifically set forth will become apparent from the following detailed description made in conjunction with the drawings wherein:

FIG. 1 is a fragmentary perspective of the headertrough of the present invention illustrating the same in its operative position in a cellular floor construction;

FIG. 2 is a plan view on reduced scale of a portion of an assembled headertrough section;

FIG. 3 is a side elevation of the headertrough section of FIG. 2;

FIG. 4 is an enlarged fragmentary transverse section of the headertrough section taken generally along line 4—4 in FIG. 2;

FIG. 5 is an enlarged fragmentary section taken generally along line 5—5 in FIG. 2 illustrating a detail of the headertrough;

FIG. 6 is a fragmentary section of one side portion of the headertrough illustrating positioning of certain of the elements thereof during shipment of the same;

FIG. 7 is a fragmentary plan view of a headertrough T structure incorporating therein the improved features of the present invention;

FIG. 8 is a fragmentary end elevation of the T assembly;

FIG. 9 is a side elevation of a wall elbow assembly incorporating therein the improved structural features of the present invention; and

FIG. 10 is an enlarged fragmentary end elevation of the wall elbow of FIG. 9.

As illustrative of environmental use, FIG. 1 illustrates the headertrough 15 of the present invention imbedded in a floor construction of standard arrangement. Basically, the floor construction includes a subflooring base of cellular steel formed from combined corrugated steel plates 16 and 17. The combined plates define therebetween a plurality of separate and parallel ducts or cells 18 which extend the full length of a floor area. Received on top of the cellular portion of the floor construction is a layer of concrete 19 which normally is of rather substantial depth. The floor construction is completed by the application of suitable floor covering material 20 along the top surface of the poured concrete 19. The covering may be of any suitable material such as linoleum or tile.

Referring particularly to FIGS. 1 and 4, the headertrough 15 includes a vertically expandable body portion formed from telescoped members which consists of a one-piece, elongated, channel-shaped bottom member 21 provided with upstanding side walls 22. The flat bottom wall extends in engagement with the outer surfaces of the top walls of the cells 18 of the cellular floor construction transversely thereof as particularly shown in FIG. 1. At any desired intervals, the interior of the headertrough 15 is placed in communication with the cells 18 through openings drilled through the bottom wall of the bottom member 21 and the adjacent top wall of a cell 18. These openings have received therein a known type of bushing 23 through which wires are drawn or fed for underfloor wiring purposes.

Separate rim strips generally designated by the nu-

meral 24 are telescopically mounted on each of the side walls 22 for vertical movement relative thereto. Each of the rim strips 24 includes a downwardly directed side skirt wall portion 25 which is slidingly received over the outer surface of its associated side wall 22 with the top portion of the skirt 25 being inwardly flanged to define a mounting ledge on which is mounted an L-shaped angle member 26 defining an inwardly and upwardly opening recess which is continuous along each top side of the headertrough.

Each recess defined by the angle members 26 has received therein a cover plate section seating means 27 which is of blocklike shape provided along the outer top edge thereof with a continuous, upwardly projecting marker rib 28 of adequate length to place its top surface in flush alignment with the top surface of floor covering material 20 surrounding the same. The inner portion of each seating means 27 is provided with an upwardly opening, longitudinal groove in which is received a strip gasket 29 in sealing engagement with the inner surface of a plurality of cover plate sections 30 received on the seating means 27 in spanning relation across the headertrough and in end-to-end relation longitudinally therealong. As particularly shown in FIG. 4, the seating means 27 may be attached to the rim strips 24 by screws 31 and the cover plate sections 30 are suitably attached to the rim strips 24 by screws 32 extending through the seating means 27 and into threaded engagement with portions of the rim strips 24. The top surface of each cover plate section 30 is designed to receive thereon a section of floor covering material 20 with this section being held thereto by the screws 32.

To provide for a complete seal against the entry of water or other foreign material into the headertrough 15, the juxtaposed ends of the cover plate sections 30 are sealed as shown in FIG. 5 by the provision on one of these ends of a projecting bracket 33 with the projecting portion thereof being of generally V-shape in cross section to retain therein a strip gasket 34. The bracket 33 is suitably attached to the bottom surface of a plate section 30 and extends substantially the full width thereof as particularly shown in FIG. 4 The bracket 33 projects sufficiently under the juxtaposed end of an adjacent plate section 30 to place the strip gasket 34 in sealing engagement with the juxtaposed edges of the plate sections. The combination of the strip seals 29 and 34 adequately protects the wiring received in the headertrough 15 from the damaging effects of water or other undesirable material. These seals do not interfere with efficient plate section application or removal and it will be noted that the combined plate sections upon removal provide for full access into the interior of the headertrough. Furthermore, with the arrangement described, any single plate section 30 may be removed without disturbing adjacent plate sections.

The seating means 27 are preferably formed from material which is a good electrical conductor, such as aluminum, for the purpose of providing a fully grounded system. Furthermore, with the use of a non-corrostive material such as aluminum, the marker ribs 28 require no special maintenance to prevent dulling and tarnishing. As these ribs project rather substantially upwardly from the headertrough 15 following assembly of the same and prior to installation thereof, care must be taken to prevent damage to the ribs during shipment. In order to avoid the expense involved in special handling of readily damageable material, the particular design of the seating means 27 lends itself to reverse inverting in each rim strip recess for storage and shipping purposes as illustrated in FIG. 6. With reverse inverting of each seating means 27, the cover plate sections 30 may be applied by use of the screws 32 and the ribs 28 are well received within the interior of the headertrough 15 in completely protected condition.

To provide for controlled height variation of the headertrough 15, positioning means 35 and guide means 36 are provided along each side of the headertrough. Preferably, as shown in FIGS. 2 and 3, the positioning means 35 and guide means 36 are alternately spaced along each side of the headertrough with opposite pairs of the means 35 being generally centrally located relative to each cover plate section 30 and opposite pairs of the means 36 being located at each junction of the cover plate sections 30.

The positioning means 35 are in the form of a captive screw structure supported on projecting ends of headertrough support brackets 37 which extend across the bottom surface of the bottom member 21 and are suitably attached thereto by metal screws 38. Each end of a bracket 37 is provided with bifurcated leg sections 39 which are dimensioned to be received between the cells 18 of the cellular floor structure to place the bottom surface of headertrough 15 in engagement with the top surfaces of the cells 18. The bifurcation is preferred in the event that it is necessary to accommodate an upwardly projecting flange-like connection 40 (FIG. 1) which may be present in a cellular floor construction for use in interconnecting segments of corrugated plates.

Each positioning means 35 includes a generally U-shaped bracket 41 which is mounted at its base on a projecting end of a headertrough supporting bracket 37. The top ends of the legs of the bracket 41 carry ears which are received through slots formed in a screw plate 42 held on the bracket by suitable crimping of the ears of the legs. A screw 43 is received through a suitable aperture in the plate 42 and extends downwardly into seated abutment with the bottom of the bracket 41. Suitable locking means are utilized to retain the screw 43 within the bracket 41 while permitting rotation thereof. The screw 43 is threaded through an angle member 44 which is fixedly secured to the outer side surface of a skirt 25 of a rim strip 24. With this arrangement, rotation of the screw 43 results in threaded movement of the angle member 44 along its shank with this movement being translated to the rim strips 24 to raise or lower the same relative to the fixed bottom member 21.

The guide means 36 function to provide controlled vertical movement of each rim strip while maintaining proper alignment of the various headertrough elements for efficient functioning thereof. As particularly shown in FIG. 4, each guide means 36 includes a screw 45 which is mounted in a side wall 22 to project outwardly thereof and is fixed therein against rotation. The screw 45 extends through a vertical slot 46 in the skirt 25 of a rim strip 24 and has received thereabout a guide washer 47 which is radially flanged to overextend the vertical slot 46 on both sides thereof. The outermost end of the screw 45 has threadedly received thereon a nut 48 and the washer 47 prevents excessive tightening of the nut 48 to an extent that suitable vertical movement of each rim strip 24 is prevented.

The position controlling means 35 and 36 defined function to raise or lower each rim strip 24 in a controlled and efficient manner. The engaged threads of the screws 43 and angle members 44 support the rim strips 24 relative to the bottom member 21. In raising and lowering the rim strips, the guide means 36 provide for uniform action and prevent the possibility of side wall buckling. The rim strips 24 may be raised or lowered to varying degrees throughout the entire length of a given headertrough 15. This permits segmental variation of the effective height of a headertrough to accommodate floor depth variations in a given floor area.

FIGS. 7 and 8 illustrate the utilization of the structural features described above in the forming of a headertrough T 50. Where appropriate, similar structural features are identified by the same reference numerals. Assuming that the headertrough 15 extends transversely of the underfloor cells 18 in the manner previously described, a headertrough section 51 in the form of a leg of a T may be readily placed in communication with the main header-

trough 15. A portion of the side of headertrough 15 is removed and the body portion of the headertrough section 51 is connected thereto at right angles. The rim strips 24 of the section 51 extend into contact with the rim strips 24 of the main headertrough 15 as generally illustrated in FIG. 7. The skirts 25 of the rim strips 24 are suitably interconnected between the main headertrough 15 and headertrough section 51. The side walls 22 of the bottom portion 21 of each of the headertrough portions are also interconnected and the result is a unitized assembly with the interconnected rim strips 24 thereof being vertically movable with one another in unison.

To provide vertical adjustment to the headertrough section 51 which extends parallel with the underfloor cells 18, the angle members 44 fixed to the rim strip skirts 25 have threadedly received therethrough adjustment screws 52 of greater length which extend downwardly into abutment with the recessed surface portions of the cellular floor structure located in between the cells 18. To raise the rim strips of the headertrough section 51 in accompanying vertical adjustment of the main headertrough 15, the screws 52 are rotated and due to their being in seated abutment with the floor construction, the angle members 44 threadedly advance therealong and the attached rim strips 24 are raised. In all other respects, the structural elements of the headertrough section 51 function in the manner previously described.

FIGS. 9 and 10 illustrate a headertrough wall elbow structure 53 which is arranged for end attachment to the headertrough section 51 of the T 50 described in connection with FIGS. 7 and 8 above. Where possible, like reference numerals are used to identify the same elements which have been described in detail above. Generally, the elbow structure 53 includes a channel-shaped bottom member 54 having upstanding side walls and being supported by leg brackets 55 suitably attached thereto by metal screws 56. The leg brackets 55 extend downwardly in between the cell structures 18 of the cellular floor in engagement with suitable surfaces thereof.

Telescopically received about the side walls of the bottom member 54 are depending side walls of an elbow cover means 57 which is of generally L-shape in silhouette as illustrated in FIG. 9. The foremost edge portion of the top surface of the cover means 57 is defined by a thicker plate-like section 58 which is of the same structure as the cover plate sections 30 previously described. The plate section 58 is fixedly secured to the cover means 57 but is provided along its free edge with the underslung projecting flange 33 which carries the strip gasket 34 for sealing engagement with the juxtaposed edge of a cover plate section 30. The telescoped side walls of the bottom member 54 and the cover means 57 are interconnected by a plurality of guide means 36 in the same manner as previously described. To adjust the height of the cover means 57 relative to the bottom member 54, the side walls of the cover means 57 have secured thereto a plurality of angle plates 59 which have threadedly received therethrough long screws 60 which engage the top surface of the floor construction in the recessed areas thereof between the cells 18. Suitable vertical adjustment of the cover means 57 relative to the bottom member 54 is accomplished by rotation of the screws 60 with the movement being guided and controlled by the guide means 36.

The vertical adjustment principle accomplished by the specific means described above is readily applicable to various forms of headertrough equipment required to provide for efficient wire distribution. The main headertrough structure 15 may have suitably attached thereto at any portion thereof the headertrough section 51 to provide a T for the purpose of redirecting wire as, for example, to a wall elbow 53 for distribution of the wiring within a wall structure. In each unit there is complete adjustment and efficient sealing of the interior portion through which the wires are distributed. The structures are of generally uncomplicated arrangement for economic fabrication and for ready installation and maintenance.

Obviously certain modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A headertrough comprising a longitudinally extending trough-like member formed from a horizontal bottom wall interconnected with a pair of spaced vertical side walls, the longitudinally extending top marginal portion of each of said side walls being provided with longitudinal rim strips formed from a horizontal plate portion terminating along the outer margin thereof in an upstanding rim-like portion, a series of horizontally extending cover plate sections spanning the top portion of said trough-like member with opposite side margins of said cover plate sections overlying the horizontal plate portions of said rim strips but terminating short of said rim-like portions, and spaced parallel longitudinal cover plate section seating means between said cover plate sections and said rim strip horizontal plate portions, each of said seating means including a horizontal plate-like body portion provided along one longitudinal side margin only thereof with a vertically directed marker rib which terminates above the terminal edge of said rim strip rim-like portions, the bottom surface of the body portion of said seating means being flat and the top surface of said seating means being flat inwardly of said marker rib for selective reversible positioning of said body portion between said cover plate sections and said rim strip horizontal plate portions for placing the marker rib thereof in upright projecting relation between a side margin of a cover plate section and an adjacent rim-like portion and in downwardly projecting protected relation inwardly of an inner edge of a rim strip horizontal plate portion whereby the marker rib, in downwardly projecting relation, is protected during handling.

2. The headertrough of claim 1 wherein at least portions of said side walls are interconnected to said bottom wall by adjustment means providing for vertical adjustment of the rim strips.

3. The headertrough of claim 1 wherein said seating means are provided with longitudinally extending sealing means on the horizontal plate-like body portions thereof for engagement with said cover plate sections.

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