Aug. 24, 1948. H. L. FINCH 2,447,694

CEILING AND WALL CONSTRUCTION

Filed July 6, 1944 3 Sheets-Sheet 1

Fig. 1.

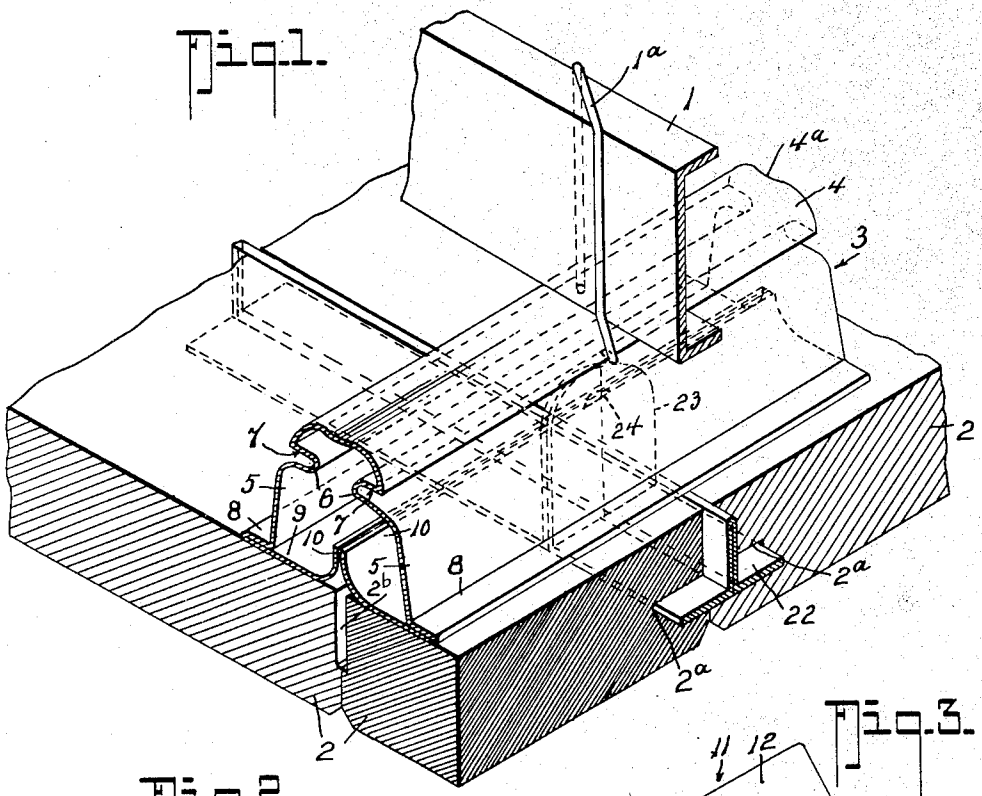


Fig. 2.

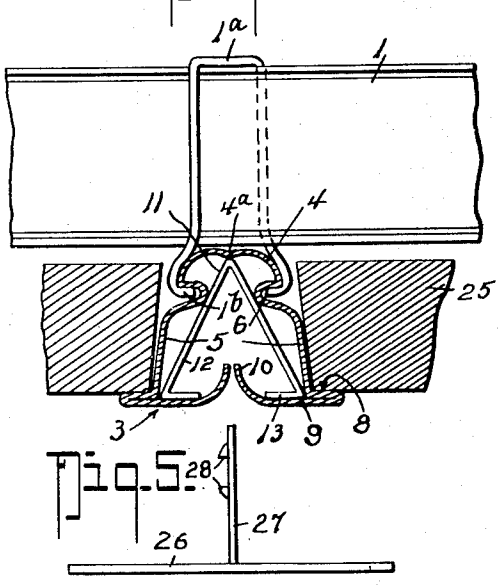


Fig. 3.

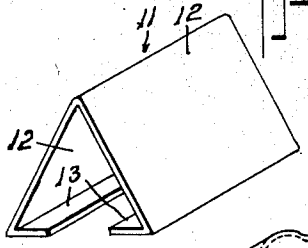


Fig. 4.

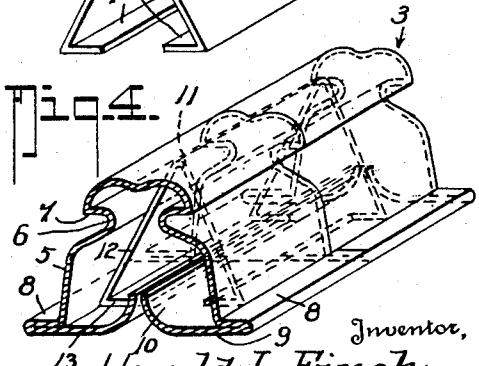


Fig. 5.

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CEILING AND WALL CONSTRUCTION

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Fig. 6.

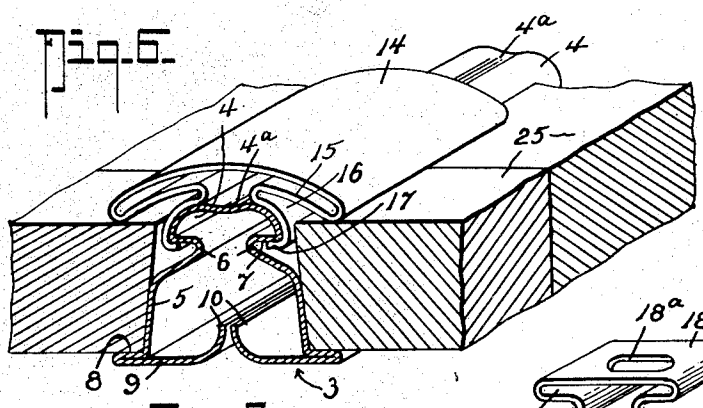


Fig. 10.

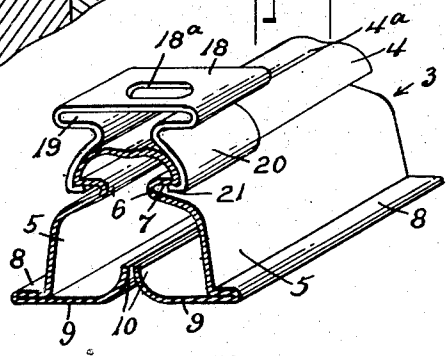


Fig. 7.

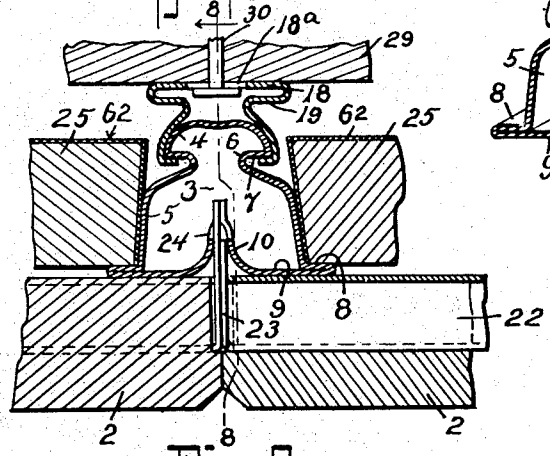


Fig. 11.

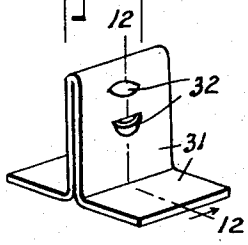


Fig. 12.

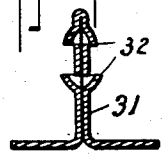


Fig. 8.

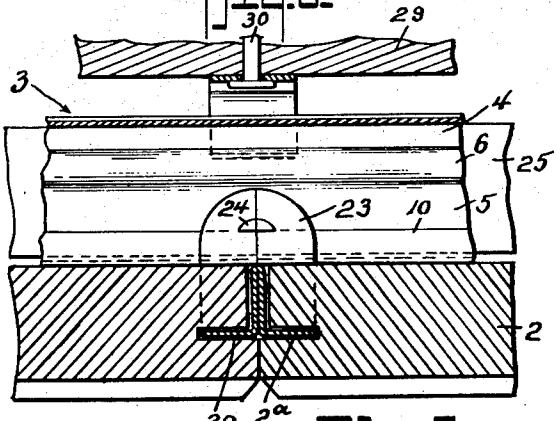
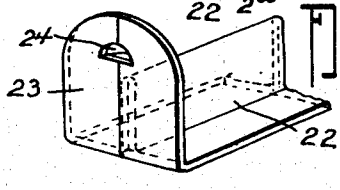


Fig. 9.



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Fig. 13.

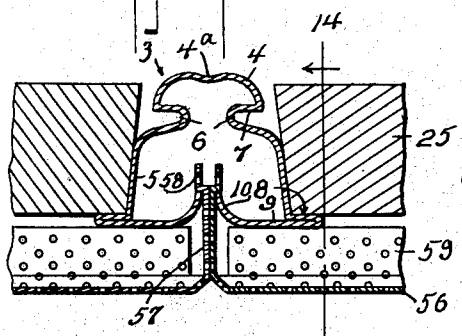


Fig. 15.

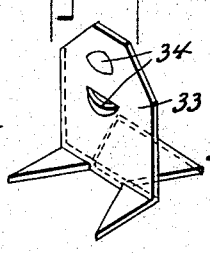


Fig. 17.

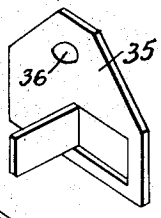


Fig. 18.

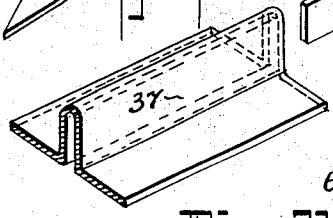


Fig. 14.

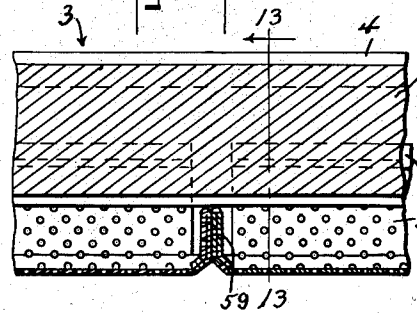


Fig. 16.

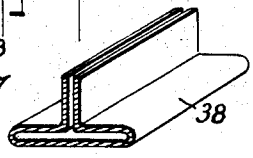


Fig. 21.

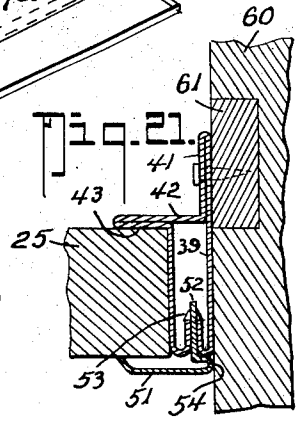


Fig. 20.

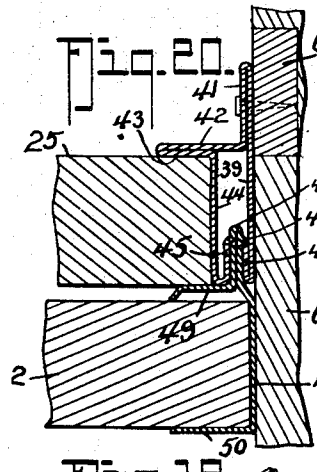


Fig. 23.

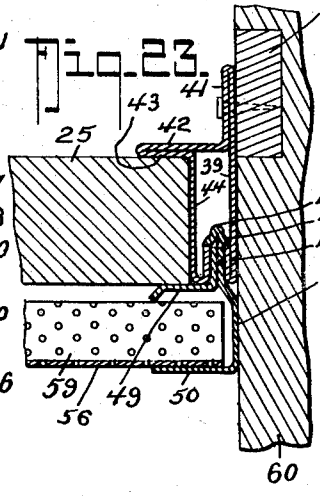


Fig. 22.

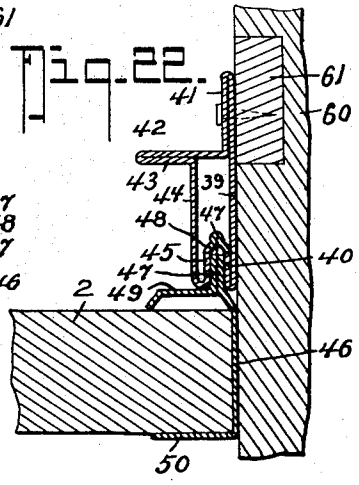
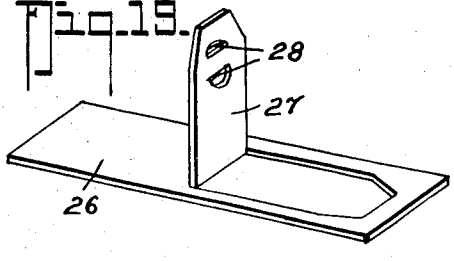


Fig. 19.



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Patented Aug. 24, 1948 2,447,694

UNITED STATES PATENT OFFICE

2,447,694

CEILING AND WALL CONSTRUCTION

Harold L. Finch, Davenport, Iowa

Application July 6, 1944, Serial No. 543,643

21 Claims. (Cl. 189—85)

1

My invention relates to a mechanical system of ceiling and/or wall construction combining thermal insulation, sound insulation and noise control.

Primarily it is an object of my invention to provide a new and novel snap-on furring runner which is so flexible in design that it affords means of installing several types or combinations of construction that include: 1, thermal insulation with supplementary acoustical treatment; 2, combination rigid thermal and sound insulation with perforated metal facing; 3, acoustical treatment only; and 4, a combination of rigid thermal insulation and sound insulation material without necessarily using the supplementary material for facing.

A further object is to provide a snap-on furring runner so designed as to obtain a base with laterally projecting flanges, also sidewalls which may be parallel, but preferably converging toward each other as the walls approach the top of the runner; thereby providing a natural support to hold rigid thermal insulating material and sound insulating material or thermal or sound insulating material alone without using further appurtenances.

A further object is to provide an improved perforated metal pan ceiling with rigid insulating backing wherein large slabs of rigid insulation can be placed in a self-supporting manner on and in between furring runners instead of using small individual non-rigid insulation pads being supported by the metal pans which makes it necessary to introduce a further appurtenance to properly space and hold the insulation above the metal pan.

A further object is to provide an improved unit method of installing suspended non-breathing acoustical ceilings with a minimum number of appurtenances; namely, snap-on furring runner and combination single piece T spline-clip.

A further object is to obtain a suspended ceiling which will, for all practical purposes, result in sealing in the air space above the suspended ceiling from the air in the room below the ceiling.

Another object of the invention is to provide a snap-on furring runner that can be installed without using a great many tools.

Other objects will in part be obvious and in part be pointed out in the detailed description to follow.

To the attainment of the aforesaid objects and ends the invention further resides in those novel combinations, details of construction, and arrangement of parts which will be hereinafter

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fully described and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings in which:

Fig. 1 is a detail perspective view of one embodiment of the invention.

Fig. 2 is a detail section and part elevation of another embodiment of the invention.

Fig. 3 is a detail perspective view of one of the runner splicers.

Fig. 4 is a detail sectional-perspective view showing two furring runners connected by a runner splice.

Fig. 5 is an elevation of one of the double leg spline clips which may be used with my furring runner. This same spline clip is also shown in perspective in Fig. 19.

Fig. 6 is a detail perspective view and part section showing a new snap-on clip for holding material in the runner.

Fig. 7 is a detail cross section showing a ceiling construction that includes thermal insulation with supplementary acoustical treatment.

Fig. 8 is a section on the line 8—8 of Fig. 7.

Fig. 9 is a detail perspective view of one end of a T spline having integral single leg clips at the ends.

Fig. 10 is a detail perspective view and part section showing a furring runner with a snap-on clip for wood cross-grillage.

Fig. 11 is a detail perspective view of a double leg spline clip which may be employed with my new and improved snap-on furring runner.

Fig. 12 is a section on the line 12—12 of Fig. 11.

Fig. 13 is a detail sectional view of my invention designed as a combined thermal and sound insulation with metal facing taken on the line 13—13 of Fig. 14.

Fig. 14 is a section on the line 14—14 of Fig. 13.

Fig. 15 is a perspective view of another form of double leg spline clip.

Fig. 16 is a detail sectional-perspective of form of T spline, which may be used in conjunction with spline clips shown in Figs. 11, 15 and 19.

Fig. 17 is a perspective view of a single leg spline clip for use with the T spline shown in Fig. 18.

Fig. 18 is a detail sectional perspective view of a third form of T spline that may be used in my invention.

Fig. 19 is a perspective view of double leg spline clip shown in elevation in Fig. 5.

Fig. 20 is a detail cross section showing the furring strip that is used in place of the furring runner shown in Fig. 1 at the ceiling intersection with all vertical surfaces, the construction shown

being for a ceiling embodying thermal insulation with supplemental acoustical insulation.

Fig. 21 is a view similar to Fig. 20 designed for a ceiling having thermal insulation only.

Fig. 22 is a view similar to Fig. 20 for a ceiling embodying acoustical insulation only.

Fig. 23 is a view similar to Fig. 20 embodying a ceiling arranged for thermal and sound insulation with metal facing.

In the drawings in which like numerals of reference indicate like parts in all the figures, 1 represents channel supports beneath which the snap-on furring runners 3 are secured by means of wire clips 1a.

Each furring runner 3 includes a head 4 having a curved top surface provided with a longitudinal depression 4a and with straight horizontal under surfaces 7. The runner also has side walls 5 with inwardly projecting longitudinal groove-forming portions 6 which merge with the surfaces 7 and form a neck for the head 4. The walls 5 preferably diverge, more or less, from the head 4. From the lowermost parts of the side walls 5 flanges 8 project laterally in a plane parallel to that containing the surfaces 7. Under the flanges 8 the metal of the runner is folded back to form two inwardly extending base-flanges 9 the inner edges of which are curved upwardly toward each other to comprise the resilient clip-receiving members 10.

Triangular runner splicers 11 are provided for insertion into the abutting ends of two runners (Figs. 3 and 4). Each splicer 11 includes the downwardly diverging walls 12 and the inturned base flanges 13; the splicer is so proportioned that the sides 12 will fit snugly between the inturned groove-forming parts 6 of the runner while the peak of the splicer engages the depressed part 4a of the head 4 of the runner. The corners formed by the sides 11 and flanges 13 will fit snugly against the lower ends of the side walls 5 and the base flanges 13 will rest on the base flanges 9 as best shown in Fig. 2. In this way the splicers 11 will fit within the runner ends with retaining friction.

As shown in Fig. 2 the flanges 8 constitute rests for the rigid thermal insulation tiles 25. In order to hold the tiles 25 on the flanges 8 where two or more tiles meet I provide snap-on clips as best shown in Fig. 6. These clips each comprise metal bodies bent to form a top wall 14, two inwardly bent walls 15 and two downwardly-outwardly bent legs 16 terminating in inwardly bent hook ends 17. The legs are curved to conform substantially to the curvature of the head 4 of the runner while the walls 14 and 15 are bowed upwardly and the walls 15 are preferably spaced from the walls 14. This structure permits a sufficient degree of resiliency to enable the clip to be snapped over the head when putting the clip on.

When the runners 3 are to be mounted on wood cross-grillage, clips of a cross-sectional form similar to that of the clips 14, etc. are used. The snap-on clips for cross-grillage are constructed as best shown in Figs. 7, 8 and 10 to which reference is now made. Each clip comprises the flat top wall 18 having a laterally elongated nail or screw receiving hole 18a, flat inwardly projecting wall portions 19 and downwardly-laterally extending legs 20 terminating in inwardly directed hook portions 21, the legs 20 preferably conforming in curvature to that of the head 4 of the runner.

In Figs. 7 and 8 is shown a ceiling supported from wood cross-grillage 29. Screws or nails 30 are driven through the holes 18a in the clips 18 and then the runners 3 are snapped in place. As the holes 18a are laterally elongated the several clips 18 used to mount one row of runners 3 become self aligned. Tiles 25 are then placed in runners 3. If the ceiling is to be a thermally, sound and acoustically insulated one, as shown in these figures, the acoustical tile 2 is then mounted on the furring runners by assembling the tiles and T splines 22 and forcing the clips 23 into the runners as shown.

In Fig. 9 is disclosed one end of the integrally formed T spline and clip for use with my new runner. This combined T spline and clip comprises the T spline proper 22 and the integrally formed clips 23 each having a stop 24 stamped therein.

Fig. 5 discloses one form of double leg clips for holding T spline 38 shown in Fig. 16. This clip comprises the legs 26 and the tongue 27 having stops 28. The tongue 27 is designed to be pushed up into the runner between the clip-receiving members 10 until the upper lug 28 rests on the same, leaving the legs 26 spaced below the base flanges 9 to receive the T spline 38 (Fig. 16). The tile 2 has grooves 2a and 2b to receive T splines 22, 37 or 38.

Fig. 11 shows another form of double leg clips for use with spline 38. The clip shown in this figure and in Fig. 12 comprises the legs and tongue 31 and the stops 32 and is bent from a single piece of metal, the stops being stamped on both sides of the tongue as shown in Fig. 12.

The double leg clip 33 shown in Fig. 15 is another form stamped from sheet metal and having a single thickness tongue provided with stops 34. This clip is also designed to be used with spline 38.

Fig. 16 shows a portion of a T spline 38 with which clips Figs. 11, 15 or 19 is used. Spline 38 is formed from a single piece of sheet metal. The base is formed with a hollow slot opening to receive clip shown in either Figs. 11, 15 or 19.

In Fig. 18 is shown a portion of a T spline 37 of a somewhat different form than that shown in Fig. 9 or Fig. 16, and Fig. 17 shows a single leg clip 35 for use with the spline 37.

Figs. 20 to 23 inclusive show how the border joints are made. In these figures 39 designates the vertical wall plate of the border furring runners, the lower edge of which is turned inwardly-upwardly to form one of the clip-holding elements; the metal from which the wall 39 is formed is bent back upon itself, as at 41, and then at right angles, as at 42, and after extending a predetermined distance is bent under and back upon itself, as at 43, for a suitable distance; the metal is then carried down parallel to but spaced from the wall 39, as at 44, and the lower edge is bent back inwardly upon the wall 44 to form the other clip-holding element 45.

Different forms of mouldings are used depending on the type of ceiling used. In Figs. 20 and 22 the molding used consists of a sheet metal structure 46 which includes a tongue 47 with stops 48 to enter and be held by the furring strip 39—45, and upper and lower parallel flanges 49 and 50 respectively. The flange 49 is spaced from the flange formed by the parts 42 and 43 to receive the rigid thermal insulation tiles or slabs 25, while the acoustical tile 2 is held between the flanges 49 and 50. When the thermal or sound insulation tiles 25 are installed with perforated

pans the moulding is proportioned accordingly (see Fig. 23).

When a ceiling with only thermal or sound insulation is installed the moulding shown in section in Fig. 21 is employed. This moulding includes a tongue 52 and flange 51 which contacts the side wall 60 as shown. The tongue 52 has stops 53.

Fig. 22 shows the arrangement when only sound insulation is employed.

Wooden blocks 61 are set into the wall 60 to which blocks the runners 39—45 are secured by nailing or with screws or in any other suitable way.

The pan 56 (Fig. 13) is constructed of perforated sheet material the sides of which are doubled back upon themselves as at 59 (Fig. 14) while the ends 57 (Fig. 13) have offsets 58 and form tongues to enter and interlock with the resilient member 10 of furring runner 3. Further, offsets 58 prevent rough cut edges of two adjacent pans from touching each other. This affords easier alignment of pans. The sides of the pans form positive stops to prevent pushing the pans too far into the furring strips.

The top and sides of the rigid insulation tile 25 may, as indicated in Fig. 7, be coated with asphaltic composition 62, thus sealing off air from above the insulation and that below the same.

From the foregoing description taken in connection with the accompanying drawings it is thought that the complete construction, uses and advantages of my invention will be clear to those skilled in the art to which it appertains.

What I claim is:

1. In ceiling construction: furring runners each comprising a sheet metal body having a head, side walls having grooves adjacent the head, the grooves extending inwardly of the strip, lateral flanges at the bottom of the side walls, base flanges extending inwardly from the side walls and terminating in upwardly-inwardly turned clip-receiving members.

2. In ceiling construction: furring runners each comprising a sheet metal body having a head, side walls having grooves adjacent the head, the grooves extending inwardly of the strip, lateral flanges at the bottom of the side walls, base flanges extending inwardly from the side walls and terminating in upwardly-inwardly turned clip-receiving members; in combination with a four-corner-holding clip which includes spring arms to embrace the head of a runner and a top to lay over tile held between said lateral flanges and the clip.

3. In ceiling construction: the improvement which includes furring runners, said runners each including a body having a head portion and side walls below the head portion, said side walls having grooves adjacent the head defining straight bottom faces for the head, laterally projecting flanges at the bottom of the side walls, inwardly projected base flanges terminating in upwardly-inwardly extending clip-holding elements between which suitable holding clips may be inserted.

4. In ceiling construction: the improvement which includes furring runners, said runners each including a body having a head portion and side walls below the head portion, said side walls having grooves adjacent the head defining straight bottom faces for the head, laterally projecting flanges at the bottom of the side walls, inwardly projected base flanges terminating in upwardly-inwardly extending clip-holding elements between which suitable holding clips may be inserted; and mounting clips for securing the furring runners beneath a fixed superstructure.

5. In ceiling construction: the improvement which includes furring runners, said runners each including a body having a head portion and side walls below the head portion, said side walls having grooves adjacent the head defining straight bottom faces for the head, laterally projecting flanges at the bottom of the side walls, inwardly projected base flanges terminating in upwardly-inwardly extending clip-holding elements between which suitable holding clips may be inserted; and mounting clips for securing the furring runners beneath a fixed superstructure, said clips each including a flat top wall having a laterally elongated slot, springy legs having hook edges to fit the furring runner heads and hook under the same in the side wall grooves.

6. In ceiling construction: the improvement which includes furring runners, said runners each including a body having a head portion and side walls below the head portion, said side walls having grooves adjacent the head defining straight bottom faces for the head, laterally projecting flanges at the bottom of the side walls, inwardly projected base flanges terminating in upwardly-inwardly extending clip-holding elements between which suitable holding clips may be inserted; suitable insulation tile held on the laterally projecting flanges of adjacent furring runners.

7. In ceiling construction: the improvement which includes furring runners, said runners each including a body having a head portion and side walls below the head portion, said side walls having grooves adjacent the head defining straight bottom faces for the head, laterally projecting flanges at the bottom of the side walls, inwardly projected base flanges terminating in upwardly-inwardly extending clip-holding elements between which suitable holding clips may be inserted; suitable insulation tile held on the laterally projecting flanges of adjacent furring runners, and insulation corner holding clips each comprising a sheet metal member having a top wall, inwardly bent portions lying under the top wall and downwardly extended legs terminating in inwardly bent hook portions, the legs conforming to the shape of the head portion of the furring runners.

8. In ceiling construction: furring runners each comprising a sheet metal body having a head, side walls having grooves adjacent the head, the grooves extending inwardly of the strip, lateral flanges at bottom of the side walls, base flanges extending inwardly from the side walls and terminating in upwardly-inwardly turned receiving members; in combination with perforated or plain metal pan in which sides are doubled back upon themselves at predetermined distance to stop against base of furring runner when ends of pan are inserted in receiving member in base of furring runner, the ends of pan projecting inwardly and upwardly forming lock in receiving member of furring runner.

9. In ceiling construction: a T spline formed of a single piece of sheet metal folded back upon itself to constitute a rib, the longitudinal edges of the rib metal being laterally extended to constitute base flanges, and the ends of the base flanges being extended upwardly at right angles to the base flanges to constitute furring-runner-

entering clips, said clips having stops for purposes described.

10. In ceiling construction: snap-on furring runners having a passage through the same and including a head portion, side walls, laterally extended base flanges and inwardly-upwardly extended clip-supporting flanges; means for supporting said runners beneath a fixedly located superstructure; rigid insulation supported on said base flanges to either side of the furring runners; T splines fitted into grooves in acoustical tile and having clips extended into the passages of said furring runners and interlocked with the same.

11. In ceiling construction: means for holding ceiling material in place at the intersection with vertical surfaces, said means including furring strips each having a vertical wall, a horizontal wall, and two spaced-apart vertical walls below the horizontal wall, said vertical walls at their lower extremities having inwardly bent-back portions constituting clip-receiving and retaining elements, and means passing through the vertical wall for securing the furring strips to the vertical surfaces.

12. In ceiling construction: means for holding ceiling material in place at the intersection with vertical surfaces, said means including furring strips each having a vertical wall, a horizontal wall, and two spaced-apart vertical walls below the horizontal wall, said vertical walls at their lower extremities having inwardly bent-back portions constituting clip-receiving and retaining elements, and means passing through the vertical wall for securing the furring strips to the vertical surfaces; and moulding strips having tongues with stops inserted in said furring strips and having at least one flange projecting below and parallel to the horizontal wall of said furring strip, and insulation slabs held between said flange and said horizontal wall.

13. In ceiling construction: means for holding ceiling material in place at the intersection with vertical surfaces, said means including furring strips each having a vertical wall, a horizontal wall, and two spaced-apart vertical walls below the horizontal wall, said vertical walls at their lower extremities having inwardly bent-back portions constituting clip-receiving and retaining elements, and means passing through the vertical wall for securing the furring strips to the vertical surfaces; and moulding strips each including a tongue for projecting into the furring strip and interlocking with the same, and including two spaced-apart horizontal flanges; and insulating material held by and between said two spaced-apart horizontal flanges.

14. In ceiling construction: means for holding ceiling material in place at the intersection with vertical surfaces, said means including furring strips each having a vertical wall, a horizontal wall, and two spaced-apart vertical walls below the horizontal wall, said vertical walls at their lower extremities having inwardly bent-back portions constituting clip-receiving and retaining elements, and means passing through the vertical wall for securing the furring strips to the vertical surfaces; and moulding strips each including a tongue for projecting into the furring strip and interlocking with the same, and including two spaced-apart horizontal flanges; and insulating material held by and between said two spaced-apart horizontal flanges; and insulation held by and between said horizontal wall of the furring strip and one of said two spaced-apart horizontal flanges.

15. In ceiling construction: the improvement which includes furring runners, said runners each including a body having a head portion and side walls below the head portion, said side walls having grooves adjacent the head defining straight bottom faces for the head, laterally projecting flanges at the bottom of the side walls, inwardly projected base flanges terminating in upwardly-inwardly extending clip-holding elements between which suitable holding clips may be inserted; suitable insulation tile held on the laterally projecting flanges of adjacent furring runners; and means for sealing in the air above said tile from the air in the space below the tile.

16. In ceiling construction: snap-on furring runners having a passage through the same and including a head portion, side walls, laterally extended base flanges and inwardly-upwardly extended clip-supporting flanges; means for supporting said runners beneath a fixedly located superstructure; insulation supported on said base flanges to either side of the furring runners; splines each formed of a single piece of sheet metal folded back upon itself to constitute a rib and laterally extended flanges and having spline-clip-receiving ends; and spline clips having base portions projected into said spline-clip-receiving ends, said spline clips also having furring-runner-entering portions that are provided with stops for the purposes described.

17. The construction of claim 16 wherein said spline-clip-receiving ends are of slot-like form to receive therein the base portions of said spline clips.

18. In ceiling construction: snap-on furring runners each having a passage through the same and including a head portion, a neck, side walls, laterally extending flanges at the bottom of said side walls, inwardly projected base flanges terminating in upwardly-inwardly extending holding elements between which supplementary facing material may be inserted; means for supporting said runners beneath a fixedly located superstructure; suitable rigid acoustical insulation supported on said base flanges to either side of the furring runner; in combination with perforated pans of suitable material, the sides of which are doubled back upon themselves at predetermined distances to stop against the base flanges of the furring runners when the ends of the pans are inserted in the receiving parts of the furring runners, the ends of each pan projecting upwardly and having provisions to interlock with said holding elements.

19. In ceiling construction: snap-on furring runners having a passage through the same and including a head portion, a neck, side walls, laterally extended base flanges and inwardly-upwardly extended clip-supporting flanges; means for supporting said runners beneath a fixedly located superstructure; rigid insulation supported on said base flanges to either side of the furring runners; and means for sealing in the air above said rigid insulation from the air in the space below the same; in combination with supplementary ceiling facing material invisibly attached to the bottom of the furring runner by T splines fitted into grooves in the facing material and having clips extended from the ends of the T splines into the passages of said furring runners and interlocked with the same.

20. In ceiling construction: snap-on furring runners having a passage through the same and including a head portion, a neck portion, and side wall portions below the neck portion, laterally

extended base flanges and inwardly-upwardly extended clip-supporting flanges, the dimension between the outside surfaces of the head portion taken on a line parallel to the base flanges being smaller than the least dimension between the outside surfaces of said side wall portions taken along a parallel line; means for supporting said runners beneath a fixedly located superstructure; and rigid insulation supported on said base flanges to either side of the furring runners.

21. In ceiling construction: snap-on furring runners having a passage through the same and including a head portion, a neck portion, and side wall portions below the neck portion, laterally extended base flanges and inwardly-upwardly extended clip-supporting flanges, the dimension between the outside surfaces of the head portion taken on a line parallel to the base flanges being smaller than the least dimension between the outside surfaces of said side wall portions taken along a parallel line; means for supporting said runners beneath a fixedly located superstructure; rigid insulation supported on said base flanges to either side of the furring runners; and an asphaltic coating on the top and sides of the rigid insulation.

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REFERENCES CITED

The following references are of record in the file of this patent:

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