

Aug. 5, 1969

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3,459,115

DROPPED CEILING CONSTRUCTION WITH CONDENSATE DISPOSAL MEANS

Filed Feb. 28, 1968

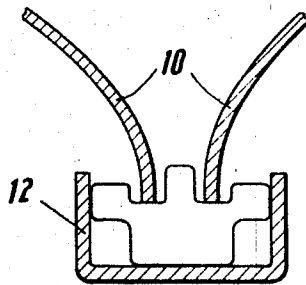
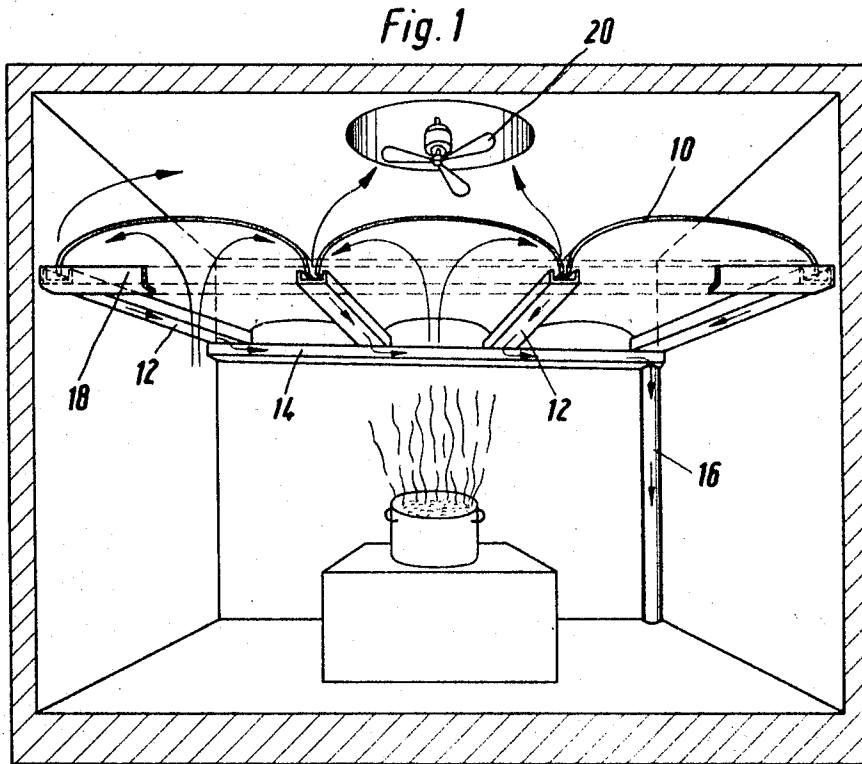


Fig. 2

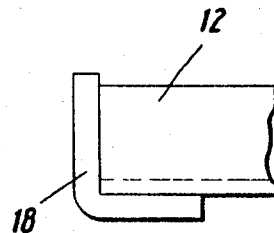


Fig. 3

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DROPPED CEILING CONSTRUCTION WITH CONDENSATE DISPOSAL MEANS

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Filed Feb. 28, 1968, Ser. No. 708,861

Claims priority, application Germany, Mar. 30, 1967,

G 49,701

Int. Cl. F23j 11/00; A47j 36/38; F24f 7/04

U.S. Cl. 98—43

5 Claims

ABSTRACT OF THE DISCLOSURE

A group of U-shaped troughs are located to span a room, and upwardly arched sheets of material, having a lower condensing surface, have their edges set into the troughs in such a manner that their lower parts are upwardly from the bottom of the troughs and the side edges are spaced from the sides of the troughs and from adjacent upwardly arched sheets, so that steam, which may contain substances suspended therein, will condense out and liquid and such substances will drip off into the trough, with air and uncondensed moisture being removed from above the arched sheets, and to prevent condensation on the full ceiling of the room.

The present invention relates to an intermediate dropped ceiling construction to shield the ceiling of rooms which have a substantial amount of steam, or vapors evolved therein, such as commercial kitchens, abattoirs, laundries, and the like.

Enclosed rooms such as commercial kitchens, laundries, and other installations in which a substantial amount of steam or vapor is generated present not only a problem of ventilation, but also of cleanliness and maintenance of the ceiling structure. Usually, the evolving steam or vapor has substances suspended therein which precipitate upon condensation at the ceiling structures, causing unhygienic or dirty coatings. These coatings usually arise at the ceiling, which has to be cleaned and redecorated frequently. Removal of dirt, or grease carried upwardly by evolving steam or vapor is difficult. Ceilings completely covered with ceramic or other sheets were of no particular advantage, since the rising steam condenses out at these surfaces and the water drips down. This dripping water is particularly disagreeable since it drips, at random, over the entire surface of the room. This uncontrolled drip cannot be tolerated in many instances, for example in kitchens, and may present a health or hygienic hazard.

Intermediate, or dropped ceilings of various constructions are known. They have previously been proposed to dampen noise, to act as a heat insulator, to contain illuminating fixtures or present a particular pleasing, or special optical appearance. Such dropped ceilings are not, however, useful in locations where the ceiling structure should be shielded against rising steam or moisture and where condensed liquid has to be removed and prevented from random dripping.

It is an object of the present invention to provide a dropped ceiling for rooms subject to steaming or condensation, to shield the ceiling of such rooms against condensation of moisture thereat and to provide for controlled removal of condensed liquids.

Subject matter of the present invention: Briefly, U-shaped troughs are arranged to span the room. These troughs are slightly pitched so that water will run off by gravity. Upwardly arched sheets of material forming a condensing surface then interconnect from one trough to the next, with the edges of the upwardly arching sheets resting in the troughs, but being so located that they are

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spaced both from the sidewalls as well as from the bottom of the troughs, as well as from the sidewalls of each other. According to a preferred embodiment, small spacer members inserted into the troughs can act as bearing supports for the edges of the upwardly arched sheets. In this manner, moisture condensing at the sheets is conducted towards the edges where it can drip off into the troughs, but ventilation is assured by the gap between the longitudinal edges of the sheets, the sides of the troughs, as well as the space between an adjacent edge of a sheet.

The ends of the troughs, at the high end, can be closed off; at the low end they can extend into another trough, in the form of a gutter, which can then be connected to a removal pipe.

The structure, organization, and operation of the invention will now be described more specifically with reference to the accompanying drawings, wherein:

FIG. 1 is a perspective view of a kitchen with the dropped ceiling of the present invention;

FIG. 2 is a transverse cross-sectional view of a trough and the edge portions of the ceiling members; and

FIG. 3 is an end view of the higher support for the troughs.

Referring now to the drawings, where the invention is illustrated in connection with a commercial kitchen: The dropped ceiling is formed of upwardly arched, thin walled sheets of material 10, having longitudinal edges 11 extending into U-shaped troughs 12 spanning the room. Edges 11 are supported on spacer or holding members 13, fitting into troughs 12. Spacer members 13 have an upper, corrugated profile, as best seen in FIG. 2, so that the longitudinal edges 11 are spaced both from the side walls of the U-shaped troughs, as well as from each other. The lower end of spacer members 13 is less wide than the width of the trough, also as best seen in FIG. 2, to leave a pair of channels at the side to provide for free circulation of moisture condensing along the under surface of arched members 10 and dripping off edges 11. Spacer members 13 may be located at suitable distances from each other and made of any suitable material, or may be shaped in the form of wire clips. Alternatively, the side walls of the U-shaped troughs 12 may be formed to support the edges 11.

The U-shaped troughs 14 are pitched slightly downwardly, for example, in the direction of the far end of the room (FIG. 1). The far end is supported by a cross trough, or gutter 14, which may be similar to the troughs 12. Condensed moisture can thus drip into the open trough 14. Troughs 14 are likewise pitched downwardly slightly and terminate in a drain pipe 16. The other end of troughs 12 is supported on a cross beam 18, of L-shape. This provides for a smooth finish of the dropped ceiling and further for covering the open side of the U-shaped profile of troughs 12.

Steam arising from the cooking operations in the kitchen will condense at the surface of the arched sheets 10. To assist in condensation, the arched pieces 10 are supplied with a cover of a material aiding condensation, or the entire arched pieces 10 may consist of such a material which may, for example, be: anodized aluminum sheets, coated plastic sheets or stainless steel.

Other suitable materials may be used, provided they have the property that condensates readily form at their surfaces. In addition, the material should have the property that it is not attacked by dissolved or dispersed substances in the steam being evolved in the room, so that maintenance problems are minimized. These sheets can be made light enough so that they can readily be removed for cleaning if this should be necessary.

Moisture or steam condensing at the lower surface of the arched sheets 10 runs, in little droplets, along the sur-

face and drips off along the longitudinal edges 11 into the troughs 12. Troughs 12, being pitched downwardly, conduct the condensate into the cross gutter 14 which, likewise being pitched, conducts the condensate into drainage pipe 16, for removal and disposal.

For large rooms, a plurality of parallel cross troughs 14 may be arranged to support the longitudinal troughs 12. Preferably, a connection is made for condensate at each cross-over point of troughs 12 and the cross gutter 14 therebeneath. In such an arrangement, the cross-gutters 14 are then again interconnected by a duct, likewise pitched downwardly, so that the condensate will collect at the lowest cross gutter for removal by the drainage pipe.

For purposes of appearance, the longitudinal troughs 12, as well as the cross troughs 14 may be formed in such a manner that they can be hung horizontally, with the inner surface being shaped to provide a slight downward grade.

The hung ceiling in accordance with the present invention does not insulate the full ceiling of the room from the space below the hung ceiling; on the contrary, the space between the longitudinal edges 11, and the sides of the trough, as well as between the longitudinal edges 11 of adjacent arched sheets provide for air circulation. This air circulation can be improved by locating a ventilator 20 above the arched sheets 10, in order to remove air, moisture and cooking smells. Moisture-laden air will pass along the arched sheets 10, simultaneously guiding condensate droplets into the direction where they can drip off, and then passes through the gaps between the longitudinal edges 11 of adjacent arched sheets 10, as indicated by the arrows in FIG. 1. In many installations, the temperature difference above, and beneath the dropped ceiling in accordance with the present invention may provide for sufficient ventilation in order to remove air, moisture, and cooking odors.

The dropped ceiling of the present invention has the advantage that the constructed ceiling of the room is shielded against steam, and against condensation of substances carried along thereby, so that frequent renewal and redecoration can be avoided.

The arched sheets 10 may be bowed in accordance with various shapes, such as circular or may have other similar forms, so long as the shape assists in run-off of condensate.

The present invention has been described in connection with a commercial kitchen; it is not intended to be limited to the details shown and various structural changes and modifications, as determined by the requirements of particular applications or uses may be made without departing from the inventive concept.

I claim:

1. Intermediate, dropped ceiling construction for rooms subject to steam development or provide an intermediate shield for the ceiling comprising

a plurality of U-shaped troughs (12) extending substantially parallel to the ceiling, located therebeneath and spanning the room, said troughs being slightly pitched downwardly to provide for gravity flow of liquid therein;

a plurality of upwardly arched sheets of material (10) having a condensing surface at the under surface thereof and terminating in end edges;

spacer and holding means locating and securing said edges within said U-shaped troughs upwardly of the bottom of said troughs and separated laterally from the side walls of said troughs as well as from an adjacent edge of an adjacent sheet;

and means removing condensation liquid dripped from said edges into said troughs at the lowermost point of said troughs.

2. Ceiling construction according to claim 1 wherein said U-shaped troughs span the room from wall to wall; an L-shaped holding member is provided secured to said wall transverse to said troughs and located at the higher location of said pitched troughs, the upstanding part of said L facing the open end of said U of said trough.

3. Ceiling construction according to claim 1 wherein said U-shaped troughs span the room from wall to wall, and the means removing condensation liquid includes a second U-shaped trough and holding member secured to said wall and extending transverse to said first named troughs and located at the lower location of said pitched troughs;

and drainage means are provided connecting said second trough to a drain.

4. Ceiling construction according to claim 1 including ventilating means creating suction located above said arched sheets.

5. Ceiling construction according to claim 1 wherein said spacer and holding means includes block insert elements located in said trough, said insert elements having a portion bearing against the bottom of said trough to transfer the weight of said arched sheets, said portion being of lesser width than the width of said trough to provide for liquid flow along the bottom of said trough, and having an upwardly grooved profile to accept and hold said edges in spaced relation from each other and from said wall of the trough.

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MEYER PERLIN, Primary Examiner

U.S. Cl. X.R.

98—115; 126—299