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SUSPENDED CEILING CONSTRUCTION

Filed Jan. 23, 1964

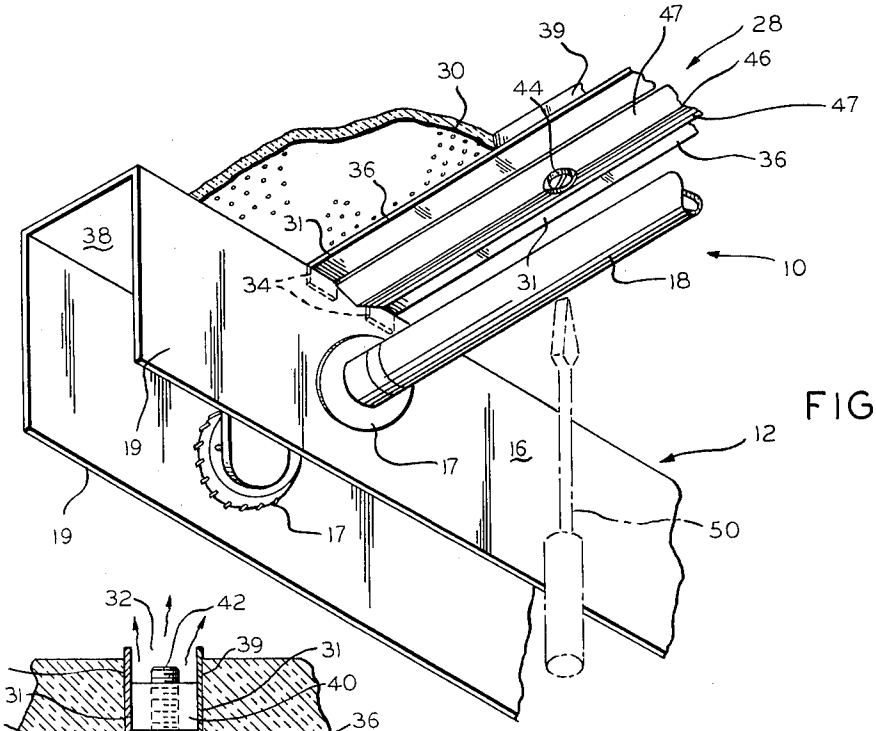

FIG. 1

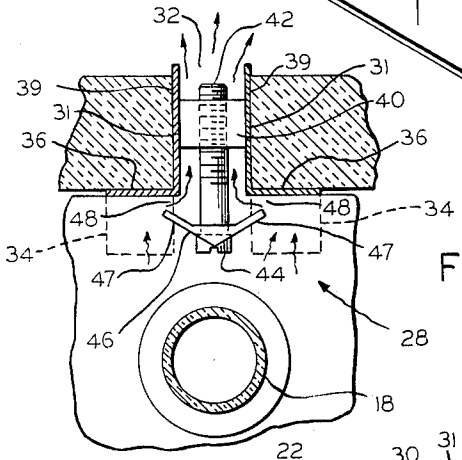

FIG. 2

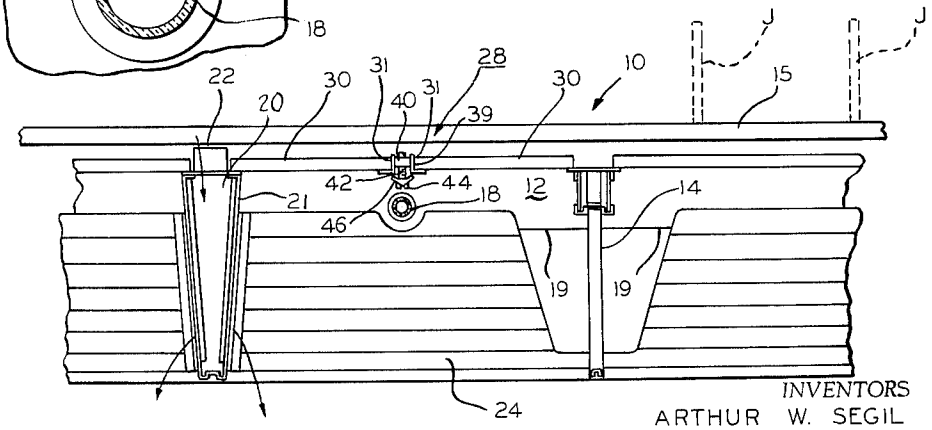

FIG. 3

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SUSPENDED CEILING CONSTRUCTION

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This invention relates in general to improvements in constructions for suspended ceilings, and particularly to structure for removing the warm air generated by lighting apparatus supported in such ceilings.

Suspended ceiling constructions usually employ a modular construction in which each of a series of modules has one or more fluorescent tubes carried between opposite side members of each module. Sometimes the suspended ceiling is made part of cool air circulating plenums providing input air to the room, the exhausting of the warm air being done at points remote from the ceiling, at the same time providing good circulation. A considerable amount of heat is generated in the room from the operation of the tubes, and improvement in efficiency may therefore be accomplished by removing the warm air from the vicinity of the tubes as soon as possible, and before it is circulated in the room cooling system.

It is therefore an object of this invention to provide an improved and more economical arrangement for removing the warm air generated by the lighting apparatus in a suspended ceiling.

It is another object to provide an improved arrangement for removing warm air generated by the lighting apparatus in a suspended ceiling from the vicinity of the lighting apparatus.

It is another object to provide an arrangement for removing warm air from the vicinity of light apparatus in a suspended ceiling at an adjustable or desired rate, and before the air is circulated in the room cooling system.

Briefly, the objects of the present invention are accomplished by providing an air return conduit directly above and parallel to the long axis of the fluorescent tube. Access to the conduit is provided by aligned passageways defined by a cap or closure member which is adjustably movable by means of a simple screw for permitting air flow at a desired rate.

Other objects and features of the present invention will become apparent on examination of the following specifications and drawing, which describe and illustrate a preferred embodiment of the invention, and what is now considered to be the best mode of practicing the principles thereof. The scope of the invention is defined by the subjoined claims.

In the drawing:

FIG. 1 is a perspective view illustrating a portion of a suspended ceiling module assembly in which the principles of the present invention are utilized;

FIG. 2 is a cross-sectional view through the module assembly of FIG. 1 illustrating details of the invention; and

FIG. 3 is an elevational view illustrating a suspended ceiling module with the apparatus of the invention corporated therein.

In FIGS. 1 and 3 a suspended ceiling module and a portion thereof having the improvements according to the present invention are indicated generally by the reference numeral **10**. The module **10** comprises a plu-

rality of spaced apart prewired fluorescent tube socket supporting channels **12** which intersect a modular baffle member **14**. The supporting channel **12** and baffle member **14** are properly fastened to and depend from a strut **15** extending across in situ joists J and secured to the underside thereof. The details of securing the aforesaid assembly together and to the joists J are well known in the art, and need not be described further.

The tube socket supporting channels **12** each include inverted U-shaped channel member **16** having spaced vertical side walls **19** supporting a plurality of electrical sockets **17**. The spaced side walls **19** enclose buses powering sockets **17**, and the opening into channel **16** may be covered by a suitable closure, not shown. Sockets **17** support one end of a fluorescent tube **18** which extends to a similar support channel and socket **17** thereat.

A V-shaped air diffusing assembly **20** having light reflecting surfaces **21** and a plenum connection **22** therefor is supported from the modular baffile member **14** and extends between the socket supporting channels **12**.

One or more light reflecting baffles **24** are supported at their ends between the diffusing assembly **20** and modular baffle member **14**, details of which are illustrated in Thompson and Smith application Serial No. 349,627, filed March 5, 1964.

The air diffusing assembly **20** has openings, not shown, in the sides thereof for directing cool or warm air, according to the season, from the plenum connection **22** to the space beneath ceiling module **10**, and as indicated by the arrows thereat.

Each of the fluorescent tubes **18** is positioned adjacent an overlying warm air return assembly indicated generally by reference numeral **28**, details of which will be described. Air return assembly **28** is adapted together with air deflecting assembly **20** and modular baffle member **14** to support acoustical tile and light reflective members **30**. These are supported along their ends on the socket supporting channels **12** and along their sides on the air return assemblies **28** and the air diffusing assemblies **20** or the modular baffle members **14**.

The warm air return assemblies **28** provide the double functions of improving the starting of the tubes **18** by reason of extending for the length thereof, and being the electrical ground required by rapid start lamps, and of enabling the warm air from the heat generated by the tube to be readily withdrawn from proximity thereto to avoid the need of circulating such heated air in the cooling system.

To this end, air return apparatus **28** comprises a pair of spaced apart angle members **31** having upstanding legs **39** as shown, these defining an air conduit or return passageway **32** therebetween as seen in FIG. 2. Members **31** are directly above and parallel to the axis of tube **18**, and tabs **34** on each end of horizontal legs **36** of members **31** enable the return apparatus **28** to be supported from atop a web **38** connecting the side walls **19** of support channels **12**. The tabs **34** are bent downward in the manner shown, and engage in corresponding openings, not shown in the web **38**.

The angle members **31** are maintained in proper spaced apart relationship by square holding nuts **40** having opposed faces which are welded to the facing vertical legs **39** of the angle members **31**. A screw **42** having a slotted head **44** is threaded into nut **40** and supports by its head **44** an elongated adjustable track **46**. As seen in FIG. 2, track **46** has essentially a flattened V-cross section with wings **47** extending laterally and spaced from the

bottom legs 36 of angle members 31 to define passageways 48 which connect with return air passageway 32.

By adjusting the screws 42 the width of passages 48 may be suitably adjusted to vary the rate at which air is returned to the space above the suspended ceiling module 10. Screwdriver 50 shown is for such purpose. It will thus be seen that the heat emanating from tube 18 is rapidly and directly carried away from the enclosure beneath the suspended ceiling module 10 without such heat being required to load the cooling apparatus supplying the enclosure.

It may be noted also that the configuration of the track 46 is such that the line of intersection of the wings 47 is closest to the tube 18. In the operation of such tubes it is extremely important to have grounded metal extend for the length of the tube and spaced but a small distance therefrom to improve the starting characteristics thereof. Such distance of the track 46 should be of the order of one inch (1") or less, and such spacing of the track 46 from the tube 18 can be maintained while still maintaining a rate of direct return of heated air from tube 18.

While the invention has been described in terms of a preferred embodiment thereof, its scope is to be determined only by the claims here appended.

We claim:

1. In a suspended ceiling including means for securing same to in situ framing members, said suspended ceiling including modular members at least two of which include power conducting spaced members having elongated lighting elements extending therebetween and supported thereby, the improvement which comprises structure for removing warmed air resulting from the operation of said lighting elements and directing the same to the space above said suspended ceiling and for improving the starting characteristics of said lighting elements, said structure comprising a pair of elongated laterally spaced angle members extending between said power conducting spaced members and overlying said lighting elements, means comprising a threaded member secured between said spaced angle members for maintaining said members in spaced apart relationship electrically grounded elongated metal means supported by said last named members and adjustable in position with respect thereto, said elongated means having wing-elements which underlie said spaced angle members and overlie said lighting element, and means for adjusting the position of said elongated means comprising a screw cooperating with said elongated means and said threaded member.

2. In a suspended ceiling including means for securing same to in situ framing members, said suspended ceiling including modular members at least two of which include power conducting spaced members having elongated lighting elements extending therebetween and supported thereby, the improvement which comprises structure for removing warmed air resulting from the operation of said lighting elements and directing the same to the space above said suspended ceiling and for improving the starting characteristics of said lighting elements, said structure comprising a pair of elongated laterally spaced angle members extending between said power conducting spaced members and overlying said lighting elements, means comprising a threaded member secured to said spaced angle members for maintaining said members in spaced apart relationship, electrically grounded elongated metal means supported by said last named members and adjustable in position with respect thereto, and means for adjusting the position of said elongated means comprising a screw cooperating with said elongated means and said threaded member.

3. In a suspended ceiling including means for securing same to in situ framing members, said suspended ceiling including modular members at least two of which include power conducting spaced members having elongated lighting elements extending therebetween and supported thereby, the improvement which comprises structure for removing warmed air resulting from the operation of said lighting elements and directing the same to the space above said suspended ceiling and for improving the starting characteristics of said lighting element, said structure comprising an electrically grounded elongated metal member extending between said power conducting spaced members and overlying said lighting element, a longitudinal passageway therein, and an elongated adjustable member supported by said first named elongated member and adjustable in position with respect thereto, said elongated adjustable member having wing-elements which underlie said longitudinal passage, and which together with said first named elongated member regulate the effective area of said passageway.

4. In a suspended ceiling including means for securing same to in situ framing members, said suspended ceiling including modular members at least two of which include power conducting spaced members having elongated lighting elements extending therebetween and supported thereby, the improvement which comprises structure for removing warmed air resulting from the operation of said lighting elements and directing the same to the space above said suspended ceiling, said structure comprising an elongated member extending between said power conducting spaced members and overlying said lighting element, a longitudinal passageway therein in coplanar relationship with an elongated lighting element, and means supported by said last named member in overlying relationship to said lighting element in coplanar relationship therewith and adjustable in position with respect thereto to provide a longitudinal passageway which is varied in extent by the adjustment of said last named means with respect to said longitudinal passageway.

5. In a suspended ceiling including means for securing same to in situ framing members, said suspended ceiling including modular members at least two of which include power conducting spaced members having elongated lighting elements extending therebetween and supported thereby, the improvement which comprises structure for removing warmed air resulting from the operation of said lighting elements and directing the same to the space above said suspended ceiling, said structure comprising a pair of elongated laterally spaced members extending between said power conducting spaced members and overlying said lighting element to define a passageway which is coplanar with said lighting element, means for maintaining said members in spaced apart relationship, and means supported by said last named members in overlying relationship to said lighting element and adjustable in position with respect thereto to provide a longitudinal passageway which is varied in extent by the adjustment of said last named means with respect to said longitudinal passageway.

6. In a suspended ceiling including means for securing same to in situ framing members, said suspended ceiling including modular members at least two of which include power conducting spaced members having elongated lighting elements extending therebetween and supported thereby, the improvement which comprises structure for removing warmed air resulting from the operation of said lighting elements and directing the same to the space above said suspended ceiling, said structure comprising a pair of elongated laterally spaced members extending between said power conducting spaced members and overlying said lighting elements to provide a longitudinal passageway which is coplanar with said lighting element for movement of heated air therein, means for maintaining said members in spaced apart relationship, and means supported by said last named members and adjustable in position with respect thereto to provide a second coplanar passageway which is varied in extent by the ad-

justment of said last named means with respect to said last named members.

References Cited by the Examiner

UNITED STATES PATENTS

Re. 25,352	3/1963	Rachlin	98—40
2,845,854	8/1958	Kurek	240—9 X
2,845,855	8/1958	Burns	240—9 X
3,051,073	8/1962	Kennedy	98—40
3,094,285	6/1963	Kruger	240—9

FOREIGN PATENTS

816,078	7/1959	Great Britain.

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