June 26, 1956 L. J. SEGIL 2,752,017

LIGHT DIFFUSING CEILING CONSTRUCTION

Filed Nov. 30, 1950

Fig. 1.

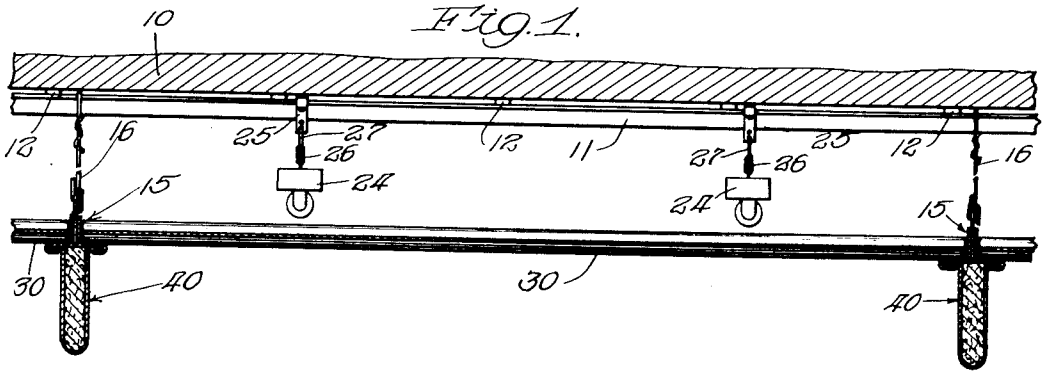


Fig. 2.

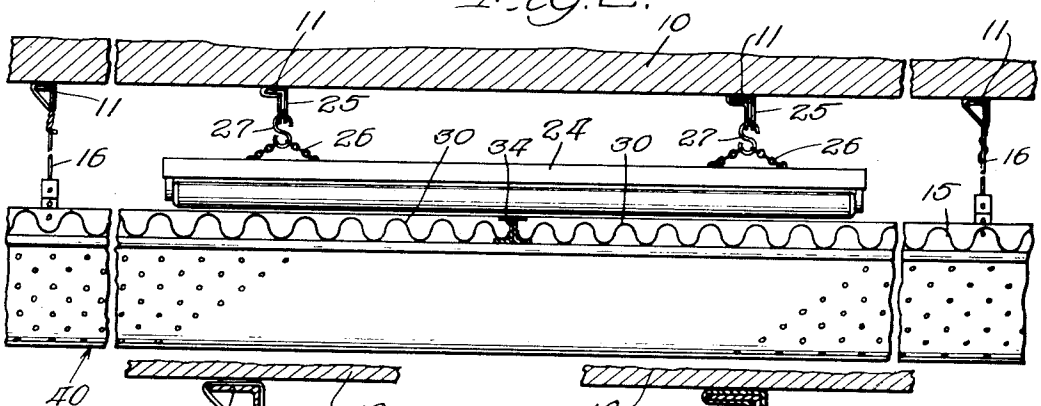


Fig. 3.

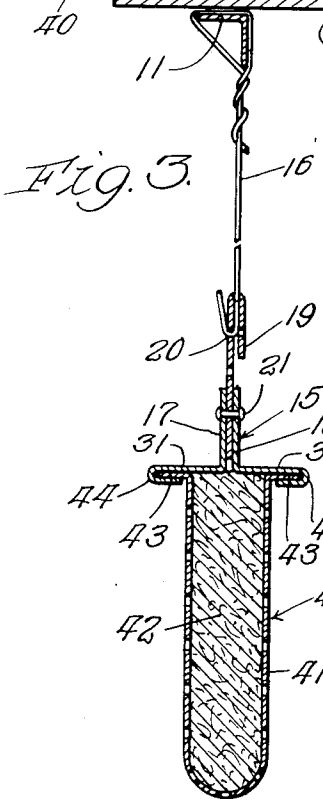


Fig. 4.

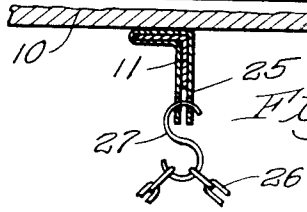


Fig. 5.

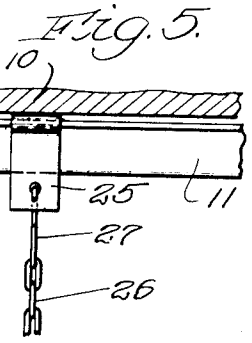
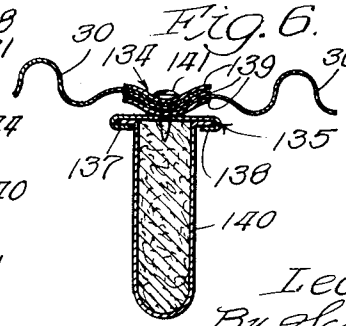


Fig. 6.



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2,752,017

LIGHT DIFFUSING CEILING CONSTRUCTION

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Application November 30, 1950, Serial No. 198,404

1 Claim. (Cl. 189—88)

This invention relates to ceiling structures and more particularly to such a structure including a source of light, a light transmitting surface and acoustically corrective devices.

Various forms of lighting have been used in the past, both in single units and in combination with acoustic treatment of walls. Apparatus previously used for treatment of a whole wall, such as a ceiling, has been cumbersome and expensive and has used either indirect or direct lighting fixtures. The desirable end result in lighting is to obtain a diffused light of adequate brightness ratio without shadow of any kind in any part of the room so illuminated. This lighting method has been termed "luminous-ceiling lighting."

It is the principal object of this invention to provide a wall, preferably a ceiling, constructed and arranged of a minimum of material and parts through which a room may be uniformly illuminated without shadow in any part and which may incorporate acoustically corrective devices.

Another object is to provide a structure of the character described which may be installed in an existing room with a minimum of cost and effort.

Another object is to provide a structure of the character described in which individual parts are independently supported and adjustable in position even after the structure has been installed in a room.

A further object is to provide a particular construction for a ceiling of the luminous type, made of parts permitting ready installation at a minimum expense.

Further objects will be apparent from the following description taken in connection with the accompanying drawings of an exemplary embodiment, in which:

Fig. 1 is a fragmentary vertical section through a ceiling having the structure of this invention attached thereto;

Fig. 2 is a view similar to Fig. 1 taken at approximately a right angle to the view of Fig. 1;

Fig. 3 is an enlarged fragmentary view of part of the structure shown in Fig. 1;

Fig. 4 is an enlarged fragmentary view of one support for a lighting unit as shown in Fig. 2;

Fig. 5 is a view similar to Fig. 4 taken at substantially a right angle to the view of Fig. 4; and

Fig. 6 is a fragmentary view showing an alternate form of spacing device and the manner of attaching cross baffles.

It is contemplated that the structure of this invention shall be used to cover the entire ceiling of a room desired to be illuminated and acoustically treated. In general, a translucent surface capable of diffusing light is suspended from the ceiling and lighting units are also suspended intermediate the ceiling and the translucent surface. Sound wave absorbing material is enclosed in fins attached to and depending below the translucent surface to provide an acoustical treatment for the room.

Referring particularly to the figures of the drawings, the ceiling 10 of the room is painted white prior to the incorporation of the structure of this invention. A system

of angle irons 11 is attached to the ceiling by suitable means such as screws or nails extending through openings in the angles and into the material comprising the ceiling or base 10. Small washers or spacing members 12 are placed between each angle and the ceiling to space the angle outwardly or downwardly slightly from the lower surface of the ceiling. This permits ready insertion of suspending devices as will more fully appear as the description proceeds. In Fig. 2 four angle irons 11 are shown. However, the entire ceiling will be covered with generally equally spaced angle irons 11 running between opposite walls of the room.

The first operation, as explained in the above paragraph, comprises the installation of the system of angles 11. Following this procedure a plurality of inverted T-tracks 15 are suspended a spaced distance from the ceiling on wires 16. Each T-track is made up of two similar portions 17 and 18 placed back-to-back and having a pivotally mounted hanger clip 19 secured between the adjacent legs of the two portions. The suspending wire 16 is passed over an angle 11 and is secured in position and then is passed through the hanger clip 19 and drawn up through an opening 20 in the clip to provide an easy means for adjusting the distance between the ceiling and the T-tracks 15. Each hanger clip is pivotally mounted on a bolt or rivet 21 so that it may be swung into registry with the upstanding legs of the T-track for shipment. The T-tracks are equally spaced and parallel and extend between opposite walls of the room, generally in a transverse direction with relation to the system of angles 11.

Lighting units 24, herein shown as fluorescent tube units, are suspended from the same angle system 11 as are the T-tracks 15. A U-shaped metal bracket 25 is passed over an angle 11 and because of the spacing members 12 between the angles and the ceiling, these members 25 may be moved within a limited space along the angle 11. Chains 26 are coupled by a retaining link 27 to the members 25 to support the lighting units 24 between the ceiling and the level of the T-tracks. Ordinarily, the spacing of the lighting units 24 will be determined by the desired illumination in the room and more or fewer lighting units may be used as desired. While the lighting units 24 are shown in the drawings as suspended from angles 11 other than those supporting the T-tracks, it is to be understood that generally the same angle may support both the lighting units and the T-tracks since the angles system runs in one direction and the T-tracks and lighting units in another direction.

After the T-tracks are in place and the lighting units 24 have been suspended from the angle system 11, a corrugated plastic sheet material 30 is placed to span the distance between the T-tracks and to rest upon the upwardly facing surfaces 31 of the T-track. The corrugated plastic sheets may be made by a method disclosed in my copending application, Serial No. 208,217, filed January 27, 1951, now Patent No. 2,695,652, patented November 30, 1954. For convenience in manufacture and handling, the plastic sheet material 30 is made in uniform strip lengths. At the end of each length of sheet material a spacing rod 34 having a generally H-shaped cross section is fastened to span the distance between adjacent T-tracks. The center web of the member is arranged vertically so that the legs of the member may receive and support the free edge of each strip 30. As many spacing rods are used as desired in accordance with the necessary number of strips of plastic material used in a particular ceiling. An angle similar to a ceiling angle is attached to the sidewalls of the room paralleling the T-tracks to provide a ledge for supporting one side of the plastic sheet at the wall, the T-track adjacent the wall being positioned to permit one strip of plastic sheet between the wall and T-track.

The acoustical treatment of the room is provided by fins 40 projecting downwardly below the level of the plastic sheet material 30 and attached to each of the T-tracks. As best seen in Fig. 3, the fin 40 comprises a perforated casing 41 of generally U-shaped cross section having a sound absorbent material 42 therein. The upper edges 43 of the container 41 are flared outwardly to be received in turned-under portions 44 of the T-track. Since the acoustical fins are relatively flexible, it is important that the T-tracks be suspended level and without twisting, since a very small deviation in this regard will cause a great amount of twisting of the acoustical fins. Thus, the adjusting means provided for suspending the T-tracks plays an important part in gaining a uniform appearance for the acoustical fins.

The ceiling structure may be utilized without any acoustical treatment by omitting all baffles 40 while using the previously described parts for suspending the light diffusing plastic material. The T-tracks 15 are generally provided with a baked enamel finish to blend in pleasing appearance with the plastic strip material.

Referring particularly to Fig. 6, the spacing device 134, may consist of a supporting base member 135 having legs 137 and 138 for receiving a cross-baffle 140 similar to baffles 40 but shorter in length to extend between and at right angles to baffles 40. The ends of members 135 rest on the T-tracks to support the cross-baffles. The ends of the plastic strips are overlapped above the member 135 with corrugated separators 139 between the strips and on the outside of the strips. The corrugations in the separators correspond to the corrugations of the plastic material 30 and a metal screw 141 may be used to secure the strips 30 and separators 139 to the member 135. By using this structure, cross-baffles 140 may be provided between baffles 40, if desired.

The foregoing detailed description is given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as variations will be obvious to those skilled in the art.

I claim:

A supporting structure for mounting removable light transmitting and diffusing false ceiling panels below the fixed flat ceiling of a room, comprising: a plurality of elongated structural shapes secured to the fixed ceiling and extending in general parallel spaced relation between opposite walls of the room, spacer members maintaining each structural shape spaced from the fixed ceiling, a plurality of depending flexible and adjustable hangers secured to the structural shapes, extending through the space between the structural shapes and the fixed ceiling and arranged in parallel rows extending generally transversely to said structural shapes, and an inverted T-track mounted upon each row of depending hangers, each track having upwardly extending hanger clips for direct attachment to the depending hangers, said hanger clips having an upper portion bent back upon itself with an opening therein at the bend and a second opening in the side thereof, said flexible hanger extending through the opening in the bend, between the bent back portions and outwardly through the second opening, the attachment being adjustable in elevation by flexing the hanger at a selected point along its length, the point of flexure of the hanger engaging the hanger clip at the point at which the hanger passes through the second opening to maintain the T-track level throughout its length without twisting, said T-tracks being supported in level parallel relation by said depending hangers and having laterally extending panel supporting surfaces so as to cooperatively support the false ceiling panels extending between them and loosely resting on said surfaces.

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