

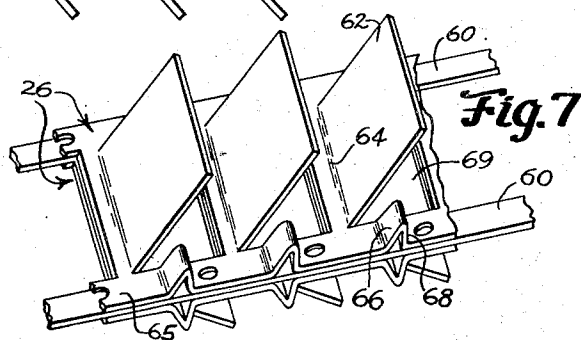
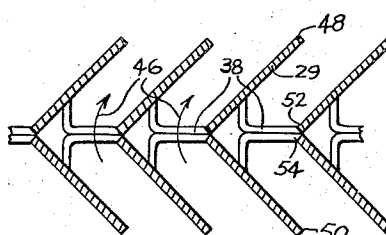
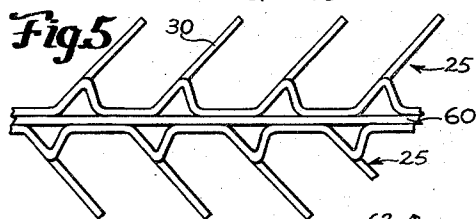
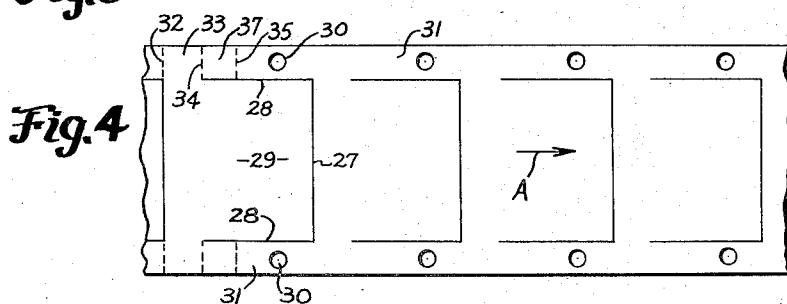
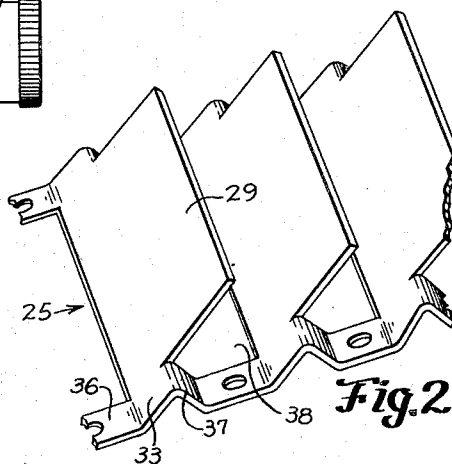
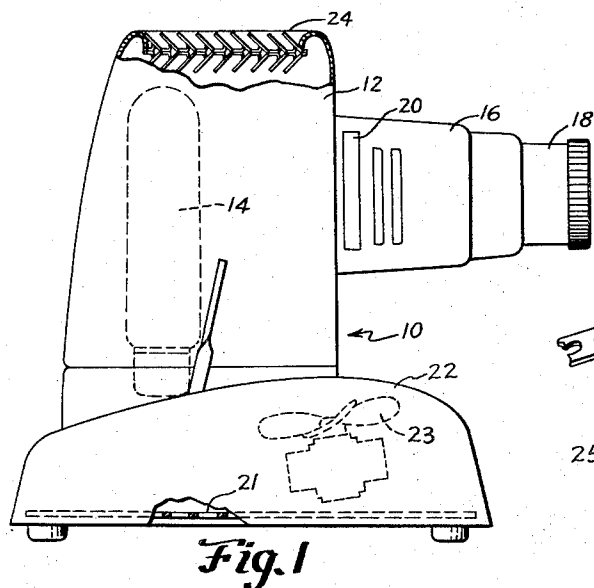
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PROJECTOR HOUSING LOUVER CONSTRUCTION

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PROJECTOR HOUSING LOUVER CONSTRUCTION

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This invention relates to projector lamp housing constructions and the like, and more particularly to means associated with such housing constructions for ventilating or cooling purposes and which means is not only comparatively easy and inexpensive to manufacture and assemble but which also will function in an efficient manner in allowing a relatively large volume of air to pass noiselessly into or out of the lamp housing or the like with which it is associated while preventing substantially completely the escape of direct light from the housing during operation thereof.

Various louver means have been employed heretofore for allowing the passage of air through an opening in a projector lamp housing or the like for cooling purposes without allowing the escape of light therefrom, but such louver means of earlier constructions which have functioned in fairly efficient and satisfactory manner have been composed of a relatively large number of parts and accordingly comparatively expensive to make and assemble. On the other hand, earlier louver means of simpler and less expensive constructions have not been as satisfactory as might be desired either from the standpoint of air flow efficiency and freedom from noise or when considered from the standpoint of light trapping ability. The louver means of the present invention, however, while being of economical construction and easy to assemble, being formed of a comparatively small number of easily fabricated parts, is nevertheless a complete light trap for light within the housing with which it is to be used. At the same time, this new louver construction provides a relatively large amount of free area therethrough for the efficient and noiseless passage of air for cooling of the projector.

It is, accordingly, an object of the present invention to provide a louver construction which is composed of only a few parts which are easy to manufacture and assemble and which will function thereafter efficiently as a light trap while still allowing relatively large quantities of air to pass noiselessly therethrough.

Other objects and advantages of the invention will become apparent from the detailed description which follows when taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevational view, partly in section, of a still projector embodying louver means of the present invention;

Fig. 2 is a perspective view of a strip of louver forming material which may be employed in the present invention;

Fig. 3 is a side view showing a strip of material employed in the manufacture of the louver means of Fig. 2;

Fig. 4 is a plan view of the strip material of Fig. 3;

Fig. 5 is a side elevational view of a louver construction employing strip material of the type shown in Fig. 2;

Fig. 6 is a longitudinal vertical sectional view of a louver construction employing strip material like that of Fig. 2 but assembled for use in a somewhat different manner; and

Fig. 7 is a perspective view showing a modified form of strip material assembled into a louver construction.

Referring to the drawings in detail and particularly to Fig. 1, it will be seen that a still projector or the like 10 may be provided with a main housing 12, which housing is arranged to enclose a light source 14. Associated with the front of the housing 12 is an auxiliary housing 16 for mounting a focusable objective 18 and which auxiliary

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housing may be provided with a pair of transversely aligned openings 20 for receiving a slide carrier or the like, of known construction, for picture projection purposes. If desired, this auxiliary housing might even be arranged to receive and support strip film positioning means, and might be made to pivot about the projection axis of the instrument, if desired also. Within the main housing 12 suitable condenser lenses and mounting means (not shown) of known construction may be provided.

It will be readily appreciated that in such picture projectors and the like considerable heat is generated during the operation thereof and this heat must be dissipated to the outside of the housing either by natural convection cooling of the housing 12 or by motor operated air circulating means for proper operation of the instrument.

In either case, large quantities of air must enter and leave the housing preferably through suitable openings formed therein and without allowing objectionable stray light to escape therefrom. In the projector of Fig. 1, for example, cooling air may enter through a foraminous bottom 21 of a base 22 of the instrument and then may pass upwardly through the housing 12 propelled by a motor operated fan 23 or the like positioned within the base, and suitable means such as an opening 24 in an upper portion of the housing 12 is desirable so that the heated air may escape from the projector. In this way, temperatures within the projector may be kept within safe operating limits. Such motor operated cooling means at times are most essential particularly when relatively large incandescent lamps are being used, since same generate considerable amounts of heat.

For efficient operation of such a projector and in order that stray light will not escape through air opening 24, it is desirable to provide louver means in or adjacent thereto. This new louver means forming the subject matter of the present invention will now be described in detail. It may comprise an assembly of one or preferably two strips of perforated sheet metal material such as shown at 25 in Fig. 2 (or in modified form at 26 in Fig. 7) and these strips are arranged and secured back to back in a manner which will be presently described. When the louver parts are assembled they may be mounted by suitable attaching means (not shown) to portions of the projector housing 12 preferably adjacent the sides of the associated opening.

The perforated strip material 25 may comprise initially a plain thin elongated piece of sheet metal which, by stamping operations performed preferably in a step-by-step manner, may be provided with a series of longitudinally aligned generally U-shaped cuts formed along cross line 27 and side lines 28 so as to form, as shown in Figs. 3 and 4, tabs or fin portions 29 integrally attached to the strip material along one transverse side 29a thereof. In order to insure proper positioning of the strip metal to be fabricated while successive steps are being performed thereon, a pair of transversely aligned holes 30 may be formed in side rail portions 31 adjacent the fin portion 29 while the cuts along lines 27 and 28 are being made. As the strip material is fed forwardly in step-by-step manner for forming successive fin portions these holes 30 will be engaged by aligning pins in the punch-press being used and thus no undesired shifting of the strip material will occur.

It will be readily understood that the punch-press operations may be easily arranged so that after a fin portion 29 has been cut, the strip material may be moved forwardly (preferably in the direction indicated by the arrow A in Fig. 4) one step and while the next fin portion is being cut, the already sheared fin portion may be bent upwardly by bending along transverse line 32. This will project parts 33 of each side rail portion 31 integral with the fin portion 29 upwardly at an appreciable angle. By simultaneously forming a reverse bend or crimp in each side rail portion 31 by bending along two transverse lines 34 and 35 while maintaining the side rail portions 36 (containing holes 30) fore and aft thereof in the original plane of the strip material, intermediate side rail portions 37 may also be caused to project upwardly as shown by Fig. 2.

In this manner there may be provided a pair of upward

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projections in each side rail to which the lower side edges of each fin portion is firmly attached. The upward projections formed by bent up portions 33 and 37 effect a foreshortening of the side rails adjacent each central air opening 38 with the result that the lower edge of one fin portion 29 may be conveniently caused to lie substantially beneath the outer free edge of the next adjacent fin portion or even to lie in slightly overlapping relation to each other. Thus light travelling in a direction normal to the general plane of the louver construction will be prevented from passing directly therethrough.

When an elongated strip of louver forming material has been formed, which may be done in a rapid and simple manner if a modern punch-press is employed, sections of this strip material may be cut to desired lengths and used as louvers, or more preferably assembled in back to back relation as shown by Fig. 6 to provide a louver construction having a plurality of openings 38 therein separated from one another by fin portions 29. As indicated by the curved arrow 46 air may flow freely through the openings and since the outer free edges 48 and 50 of the opposed pairs of fin portions have overlapping relation with respect to the inner edges 52 and 54 of the next adjacent fin portions no light will be allowed to pass there-through.

While the strips of louver forming material are shown in Fig. 6 in "aligned" relation so that the inner edges 52 and 54 of each pair are closely adjacent one another and large air passages are formed between each pair and the adjacent pairs fore and aft thereof, it will be noted in Fig. 5 that it is also possible to arrange the strips of louver forming material in "staggered" relation so that the inner edges of the individual fin portions of one strip will be located substantially intermediate the inner edges of the fin portions of the other strip. In such a staggered arrangement while the size of each free passage through the louver construction is only about half the original size, it has been found that even greater free travel of cooling air therethrough is provided and possibly this is because fewer eddy currents result. This arrangement likewise completely prevents light from within the lamp housing from passing therethrough.

In Fig. 5 there is shown at 60 one of a pair of thin elongated spacer or mounting strips intermediate the side rails of the assembled louver forming strips 25. Similarly mounting strips are indicated at 60 in Fig. 7. These strips 60 not only serve to support the pairs of louver forming strips 25, or 26, in spaced relation for free flow of cooling air therethrough but also serve as convenient means for attachment of the assembled louver construction to suitable parts of the projector housing with which the construction is to be used. An additional advantage from the use of such mounting strips 60 is obtained at times since these strips will function to close the aligning openings 30 and thus prevent the passage of stray light therethrough. These mounting strips 60 may be used advantageously with either single strips of louver forming material or when pairs are used back to back.

In Fig. 7 a modified louver construction is shown wherein the fin portions 62 of the strip 26 are formed by a bending of the material along dotted line 64 and by a foreshortening of the side rail portions 65 by a reverse bending of parts 66 and 68 adjacent the opposite sides of the air openings 69 and spaced from the associated fin portions.

It should be noted that the angle of inclination of the bent up fin portions relative to the "general plane" of the louver forming material may be varied appreciably, to change the directness with which the air can pass through the assembled construction. Also the lengths of the bent up side rail portions 33 and 37, or the bent up side rail portions 66 and 68, may be varied to effect different size air openings. These variations may be made without in any way departing from the spirit of the present invention. Furthermore, the general plane of the louver forming material may be at times longitudinally curved somewhat, if desired, without detriment. Accordingly when the words "general plane" are used throughout the specification and the claims which follow such words are intended to apply equally to both constructions which may be generally flat and those which may be curved slightly.

It will be appreciated that the louver constructions disclosed may be manufactured and assembled in a rapid and inexpensive manner but still will function efficiently

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as light traps while, on the other hand, allowing large quantities of cooling air to pass freely therethrough.

Having described our invention, we claim:

1. A louver construction for use in a projector lamp housing or the like for closing an opening therein to the passage of light directly therethrough while allowing air for cooling purposes to pass freely therethrough, said louver construction comprising a pair of unitary members each formed from a single elongated piece of sheet material having a series of longitudinally spaced fin portions carried thereby and extending outwardly from the general plane of the piece with which it is integrally associated, each of said fin portions being separated from adjacent fin portions on the same piece of material by longitudinally arranged openings, each of said spaced fin portions of each member being severed from the remainder of the piece with which it is connected along a pair of laterally spaced substantially parallel longitudinal lines intermediate the sides of the respective member and along a line extending transversely between said pair of lines so as to form a continuous side rail portion adjacent each side thereof, the fin portions of each member being bent outwardly to one side of the general plane of the respective member so as to extend at appreciable acute angles relative thereto and provide said longitudinally arranged openings, each of said side rail portions of each member being bent outwardly of the general plane of said member at the same side of said fin portions thereof and at locations transversely adjacent each of said openings so as to create a foreshortening of said side rail portions adjacent each opening sufficient to cause the outer free edge of each fin portion of each member to overlie a part of the member to which it is connected intermediate adjacent openings therein, said unitary members being secured together in back-to-back relation with said series of fin portions thereon extending outwardly from the general planes of said members at opposite sides thereof and with their acute angles directed longitudinally in the same direction, whereby substantially all light traveling toward said members will be intercepted thereby while air traveling toward said members will be allowed to pass freely through the openings therein.

2. A louver construction for use in a projector lamp housing or the like for closing an opening therein to the passage of light directly therethrough while allowing air for cooling purposes to pass freely therethrough, said louver construction comprising a pair of unitary members each formed from a single elongated piece of sheet material having a series of longitudinally spaced fin portions carried thereby and extending outwardly from the general plane of the piece with which it is integrally associated, each of said fin portions being separated from adjacent fin portions on the same piece of material by longitudinally arranged openings, each of said spaced fin portions of each member being severed from the remainder of the piece with which it is connected along a pair of laterally spaced substantially parallel longitudinal lines intermediate the sides of the respective member and along a line extending transversely between said pair of lines so as to form a continuous side rail portion adjacent each side thereof, the fin portions of each member being bent outwardly to one side of the general plane of the respective member so as to extend at appreciable acute angles relative thereto and provide said longitudinally arranged openings, each of said side rail portions of each member being bent outwardly of the general plane of said member at the same side of said fin portions thereof and at locations transversely adjacent each of said openings so as to create a foreshortening of said side rail portions adjacent each opening sufficient to cause the outer free edge of each fin portion of each member to overlie a part of the member to which it is connected intermediate adjacent openings therein, and a pair of elongated spacing strips, said unitary members being secured in back-to-back relation with said spacing strips positioned between adjacent side rail portions of said members and with said series of fin portions thereon extending outwardly from the general planes of said members at opposite sides thereof and with their acute angles directed longitudinally in the same direction, whereby substantially all light traveling toward said members will be intercepted thereby while air traveling toward said members will be allowed to pass freely through the openings therein.

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3. A louver construction for use in a projector lamp housing or the like for closing an opening therein to the passage of light directly therethrough while allowing air for cooling purposes to pass freely therethrough, said louver construction comprising a pair of unitary members each formed from a single elongated piece of sheet material having a series of longitudinally spaced fin portions carried thereby and extending outwardly from the general plane of the piece with which it is integrally associated, each of said fin portions being separated from adjacent fin portions on the same piece of material by longitudinally arranged openings, each of said spaced fin portions of each member being severed from the remainder of the piece with which it is connected along a pair of laterally spaced substantially parallel longitudinal lines intermediate the sides of the respective member and along a line extending transversely between said pair of lines so as to form a continuous side rail portion adjacent each side thereof, the fin portions of each member being bent outwardly to one side of the general plane of the respective member so as to extend at appreciable acute angles relative thereto and provide said longitudinally arranged openings, each of said side rail portions of each member being bent outwardly of the general plane of said member at the same side of said fin portions thereof and at locations transversely adjacent each of said openings so as to create a foreshortening of said side rail portions adjacent each opening sufficient to cause the outer free edge of each fin portion of each member to overlie a part of the member to which it is connected intermediate adjacent openings therein, and said unitary members being secured together in back-to-back relation with said series of fin portions thereon extending outwardly from the general planes of said members at opposite sides thereof and with their acute angles directed longitudinally in the same direction, the base of the fin portions on the respective members being disposed in adjacent relation to each other so as to provide relatively large air passages through said members, whereby substantially all light traveling toward said members will be intercepted thereby while air traveling toward said members will be allowed to pass freely through the openings therein.

4. A louver construction for use in a projector lamp housing or the like for closing an opening therein to the passage of light while allowing air for cooling purposes to pass freely therethrough, said louver construction comprising a pair of unitary members each formed from a single piece of sheet material having a series of longitudinally spaced fin portions carried thereby and extending outwardly from the general plane of the piece with which it is integrally associated, each of said fin portions being separated from adjacent fin portions on the same piece of material by longitudinally arranged openings, each of said spaced fin portions of each member being severed from the remainder of the piece with which it is connected along a pair of substantially parallel longitudinal lines intermediate the sides of the respective member and along a line extending transversely between said pair of lines so as to form a continuous side rail portion adjacent each side thereof, each fin portion of each member being bent outwardly from the general plane of the respective member so as to extend at an appreciable angle relative thereto and provide said openings, each of said side rail portions of each member being bent outwardly of the general plane of said member at locations transversely adjacent each of said openings so as to create a foreshortening of said side rail portions adjacent each opening sufficient to cause the outer free edge of each fin portion of each member to overlie a part of the member to which it is connected intermediate adjacent openings therein, and said members being secured together in back-to-back relation with said series of fin portions thereon extending outwardly from the general planes of said members at opposite sides thereof, the fin portions on the respective members being disposed in staggered relation to each other so as to dispose the bases of the fin portions of one series in spaced relation to the bases of the other series, whereby substantially all light traveling toward said members will be intercepted thereby while air traveling toward said members will be allowed to pass freely through the openings therein.

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5. A louver construction for use in a projector lamp housing or the like for closing an opening therein to the passage of light while allowing air for cooling purposes to pass freely therethrough, said louver construction comprising a pair of unitary members each formed from a single piece of sheet material having a series of longitudinally spaced fin portions carried thereby and extending outwardly from the general plane of the piece with which it is integrally associated, each of said fin portions being separated from adjacent fin portions on the same piece of material by longitudinally arranged openings, each of said spaced fin portions of each member being severed from the remainder of the piece with which it is connected along a pair of substantially parallel longitudinal lines intermediate the sides of the respective member and along a line extending transversely between said pair of lines so as to form a continuous side rail portion adjacent each side thereof, each fin portion of each member being bent outwardly from the general plane of the respective member so as to extend at an appreciable angle relative thereto and provide said openings, each of said side rail portions of each member being bent outwardly of the general plane of said member at locations transversely adjacent each of said openings and spaced from the connections of said fin portions with said side rail portions so as to create a foreshortening of said side rail portions adjacent each opening sufficient to cause the outer free edge of each fin portion of each member to overlie a part of the member to which it is connected intermediate adjacent openings therein, and said members being secured together in back-to-back relation with said series of fin portions thereon extending outwardly from the general planes of said members at opposite sides thereof, whereby substantially all light traveling toward said members will be intercepted thereby while air traveling toward said members will be allowed to pass freely through the openings therein.

6. A louver construction for use in a projector lamp housing or the like for closing an opening therein to the direct passage of light normal thereto while allowing air for cooling purposes to pass freely therethrough, said louver construction comprising a unitary strip of sheet material having a series of spaced pairs of cuts of a controlled length longitudinally thereof, the cuts of each pair being disposed inwardly a controlled amount with respect to the respective adjacent side edges of said sheet material, said sheet having transverse cuts connecting one end only of each of said respective pairs of cuts to provide adjacent transversely disposed edge portions, the areas of said sheet bounded by said cuts being bent outwardly in a sidewise direction with respect to the initial plane of the sheet to form angularly disposed fins substantially parallel to each other with each fin having a transversely disposed free edge, openings beneath said fins each having a transverse edge portion lying in a plane substantially parallel with a plane containing the free edges of said fins, the portions of said sheet which constitute the opposed sides of the openings being crimped to extend in the same sidewise direction as said angularly disposed fins an amount and in accordance with the length and angular disposition of said fins to cause said transverse free edges thereof and the transverse corresponding edges of the openings to assume a definite overlapping relation with each other in a direction substantially normal to the general plane of said initial sheet material whereby light travelling in said direction will be intercepted while air travelling in said general direction will be allowed to pass freely through said openings.

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