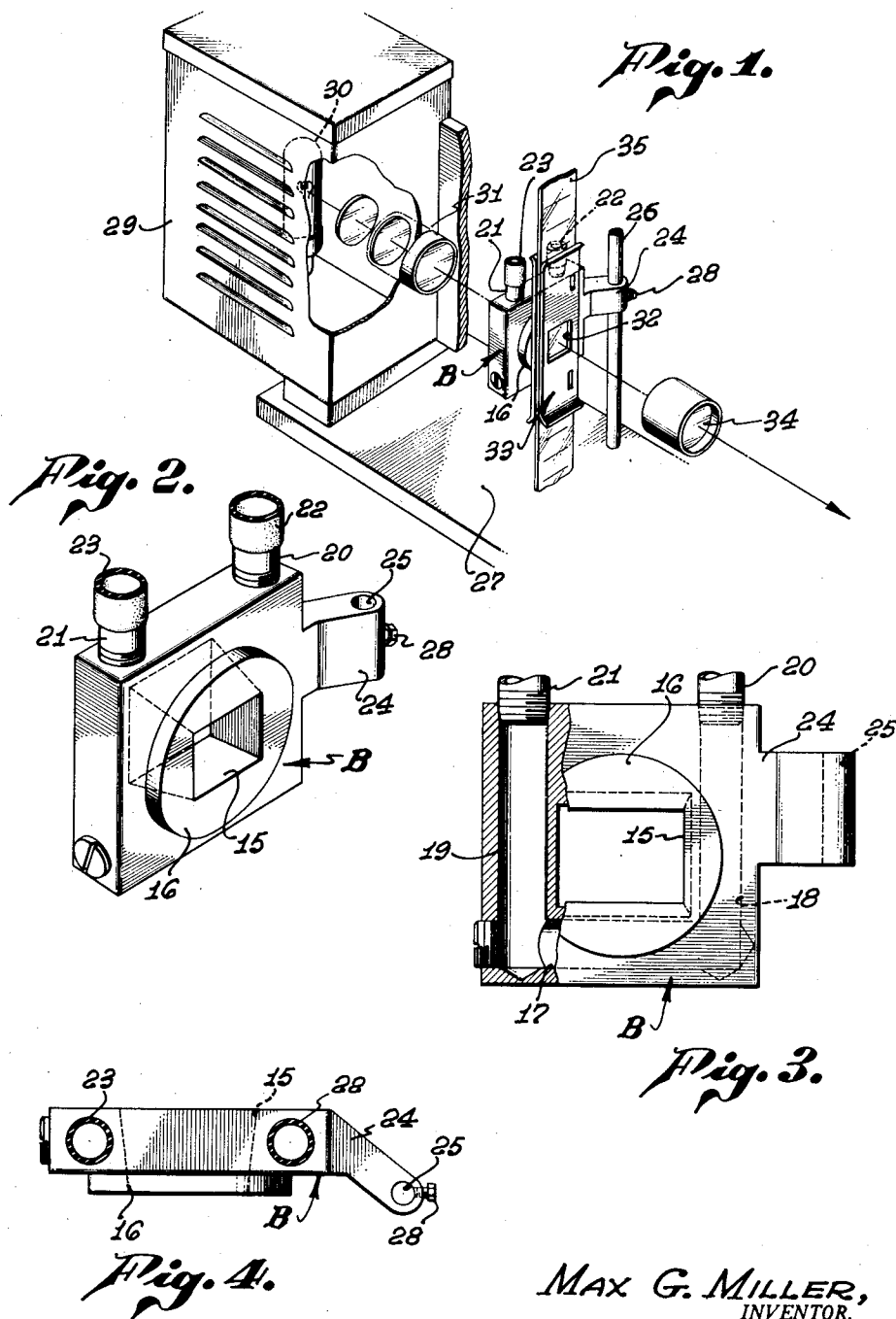


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M. G. MILLER
HEAT ABSORBING DEVICE FOR MOTION-PICTURE
PROJECTING MACHINES
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HEAT ABSORBING DEVICE FOR MOTION-
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1

In large motion picture theatres and particularly in "drive-in" or "out-door" motion picture theatres where the screens are great distances from the projecting machines, difficulty has been encountered in the projection of motion pictures onto screens with sufficient light to render them clearly visible to that part of the audience in the rear of the theatre. This handicap has prevented the building of larger theatres, particularly of the "drive-in" type.

The aforesaid lighting difficulty, is due in the main to the restriction placed upon the candle-power of the light source employed in the projection machine, inasmuch as the greater the candle-power the greater the heat generated and, hence, the greater the danger of setting a highly inflammable film afire or at least buckling the film, or in the case of color film to crack the heavy emulsion thereon as well as causing its colors to fade.

It is a purpose of my invention to provide in a motion picture projecting machine a device which allows the use of a source of light of unprecedented candle-power in motion picture projection to attain greater luminosity of the pictures as projected onto screens at present distances from the projecting machines in relative large theatres so as to render them clearly visible from all points therein, and also onto screens with the same clarity at much greater distances than heretofore possible, thus permitting the building of theatres and particularly "drive-in" theatres of much greater seating or automobile capacity. In the attainment of these advantages, the film fire hazard as well as any injury to the film, colored or otherwise as a result of the increased heat is eliminated, and the film gate of the projecting machine is likewise protected against excessive heating so that reloading of the machine with film is not impeded.

I will described only one form of heat absorbing device embodying my invention in association with the conventional form of motion picture projecting machine and will then point out the novel features thereof in claims.

In the accompanying drawings:

Fig. 1 is a somewhat schematic view showing in perspective a motion picture projecting machine having applied thereto one form of heat absorbing device embodying my invention.

Fig. 2 is an enlarged perspective view of the heat absorbing device of Fig. 1.

Fig. 3 is an elevational view of the heat absorbing device with a portion thereof in section.

2

Fig. 4 is a top plan view of the heat absorbing device.

Having specific reference to the drawings, my device in its present embodiment comprises a body B preferably rectangular in form and constructed of any good heat conducting metal. This body is formed with a central opening or aperture 15 which, as better shown in Fig. 2, is tapered from end to end. On that side of the body corresponding to the narrow end of the aperture, is formed a circular boss 16 which serves as a spacing element for the body when associated with the film gate of a motion picture projecting machine.

The body B is bored to form therein a bottom passage or duct 17, and two vertical passages or ducts 18 and 19, which at their lower ends communicate with opposite ends of the passage 17. Thus the three passages are placed in communication one with the other to form a U-shaped duct along three sides of the aperture 15. The open end of the passage 17 is closed by a screw plug 18 which can be removed from time to time for cleaning all of the passages.

The upper ends of the passages 18 and 19 have threaded therein short lengths of pipes 20 and 21, respectively, which serve to connect flexible tubes or hoses 22 and 23, respectively, to the body and in communication with the passages 18 and 19. The hoses 22 and 23 are of suitable length so that the hose 22 may be connected to a water faucet (not shown) for supplying water continuously to the passage 17, while the hose 23 may be connected to a sink drain (not shown) to which the water after traversing the passages may be discharged.

For mounting the device in proper position between the film gate and the light source of a motion picture projecting machine, as will be later described, the body B is cast with an integral arm 24 which extends laterally from one vertical edge of the body and is shaped to dispose its free end to the boss side of the body where it is provided with a vertical opening 25. A vertical post or rod 26 (Fig. 1) is fixed at its lower end on a platform or base 27, and this post extends through the opening 25 so that by manipulation of a set-screw 28 the arm, and, hence, the body B can be supported on the post for horizontal as well as vertical adjustment to fixedly position it in proper position with relation to the film gate of the projector.

The motion picture projecting machine shown in Fig. 1 is conventional, and includes the platform or base 27 on which is supported a housing

29 for an electric lamp 30 positioned therein to project its rays through a series of condensing lenses 31, then through the aperture 32 of the film gate 33, and finally through the objective lense 34 onto a remotely disposed motion picture screen (not shown). The gate 33 is shown with a length of photographic film 35 therein which is adapted to be moved downwardly across the aperture 32 from one film reel to another as will be understood.

My device as applied to the projecting machine of Fig. 1 has the post 26 fixed to the platform 27 at one side of the film gate 33 so that through loosening of the set-screw 28 the body B can be adjusted vertically and horizontally until the boss 16 is adjacent to or in contact with the lamp side of the film gate 33, and the aperture 15 in registration with the aperture 32 of the film gate. With the body B so interposed between the lamp 30 and the gate 33 the light rays from the lamp are free to pass through the aperture 15 and then through the film frame in the gate aperture.

In operation, with water at tap temperature, constantly flowing from the hose 22 into the passage 18, it is caused to traverse the passages 18, 17, and 19, and finally from the body through the hose 23 to a point of discharge. Thus as the heat emanating from the lamp is absorbed by the metal of which the body B is formed, it is transferred to the water in the body, and because this water is being constantly displaced by cool water, the heat of the lamp 30 in its passage to the gate and film is effectively intercepted, absorbed, and carried off by the water. This resultant heat dissipation is so effective that the film, is kept at such a low temperature as to prevent damage of any character or to any degree of the film as it passes through the gate. Consequently, any possibility of the film catching afire, buckling, or the emulsion thereon cracking, as when color film is used, is entirely eliminated. Also the metal of which the gate is made is maintained cool to allow the immediate insertion of a succeeding film when reloading the projector. This avoids delay in such reloading occasioned by waiting until the gate cools as would be the case without the use of my device.

In practice, it has been found that with my device it is possible, without injury to the film or excess heating of the gate, to employ an electric lamp of a candle-power far in excess of any lamp heretofore used. I have used a lamp producing over 35,000 lumens which is unprecedented in motion picture projection since without my heat absorbing device it would develop at the film gate aperture a temperature of 1725 degrees F. and, hence, quickly burn the film and possibly distort the film gate. With a lamp of such great candle power two outstanding advantages are provided. One is that in large theatres where the screen is at such a great distance from the projector that the candle-power of the lamp employed is insufficient to give clear visibility to the pictures as projected onto the screen to those persons at the rear of the theatre, and the candle-power of the lamp cannot be increased to give the requisite visibility, without excess heating of the film and gate, my device allows the use of a lamp of sufficient candle-power to effect proper picture illumination and without injury to the film or excess heating of the gate.

The second advantage provided by my device is that it permits "drive-in" theatres to be built with larger car capacity than heretofore possible, and still attain adequate screen illumination for

clear picture visibility at the increased distance necessary to such theatre enlargement, and still not subject the film or the gate to detrimental temperatures.

While I have described my invention as employing water as the cooling medium, it is to be understood that any suitable heat dissipating fluid may be employed, so long as it operates to effectively transfer the heat accumulated in the body B to the fluid and away from the body through circulation of the fluid therethrough. The tapered form of the aperture 15 presents an increased surface area to the heat passing through the aperture and, therefore, increased heat absorption to produce more rapid dissipation of the heat before it reaches the film or film gate. If the body B is positioned so that the boss 16 has contact with the confronting side of the film gate it serves to conduct heat from the film gate to the body to be removed therefrom by the circulating water.

What I claim is:

1. A heat absorbing device for motion picture projectors, including a body having an aperture therethrough, and passages around the aperture connected one to the other so that fluid can be circulated into and out of the passages; an arm fixed to and extending laterally from one side of said body; a vertical fixed support upon which the arm is vertically and horizontally adjustable; and fastening means carried by the arm and engaging the support for securing the arm in adjusted position on the support.

2. A heat absorbing device for motion picture projectors, including: a solid body of heat conducting material having a centrally located aperture transversely therethrough, two vertical passages at opposite sides of the aperture, and a horizontal passage at another side of the aperture and communicating at its ends with the adjacent ends of the vertical passages, and extending through one edge of the body; and a removable plug closing that end of the horizontal passage extending through one edge of the body.

3. A heat absorbing device for motion picture projectors, including: a solid body of heat conducting material having a centrally located aperture transversely therethrough, two vertical passages at opposite sides of the aperture, and a horizontal passage at another side of the aperture and communicating at its ends with the adjacent ends of the vertical passages, and extending through one edge of the body; a removable plug closing that end of the horizontal passage extending through one edge of the body; and an arm integral with and extending laterally from one vertical edge of the body and having a vertical opening therethrough for the reception of a vertical post to support the body in vertical position.

4. A heat absorbing device for motion picture projectors, including: a solid body of heat conducting material having a centrally located and integral boss on one side thereof, a tapered aperture extending transversely and centrally through the body and the boss with the small end thereof in the boss, two vertical passages at opposite sides of the aperture, and a horizontal passage at another side of the aperture which communicates at its ends with the adjacent ends of the vertical passages to form therewith a U-shaped duct in the body.

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