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DEVICE FOR PREVENTING OVERHEATING IN CINEMA PROJECTION APPARATUS

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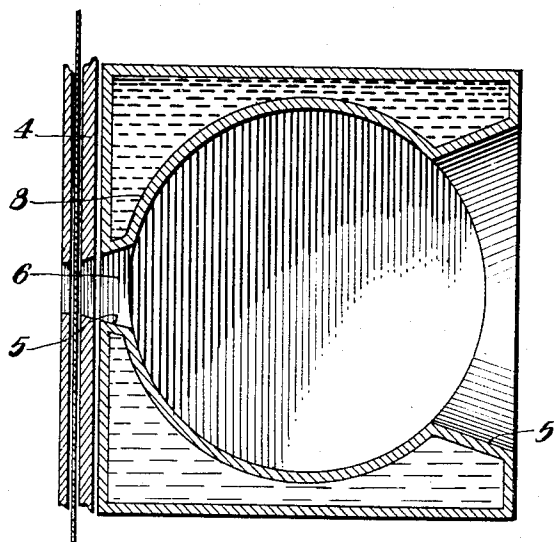
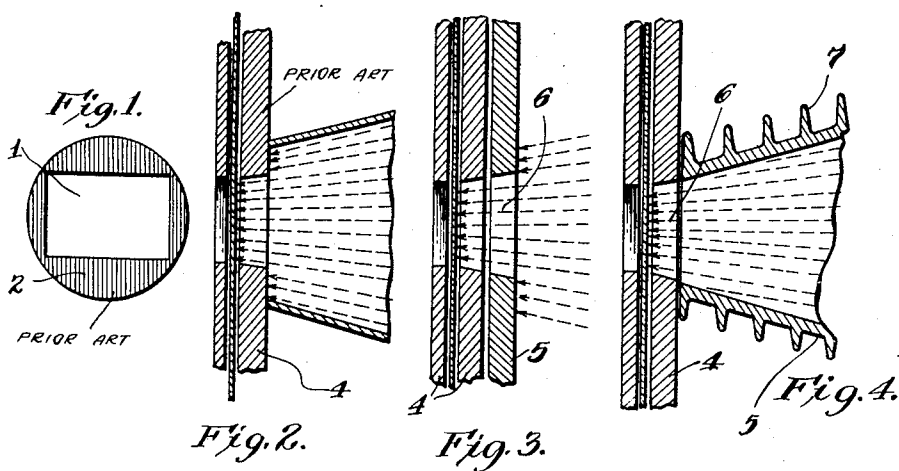


Fig. 6.

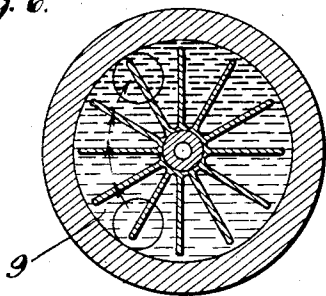
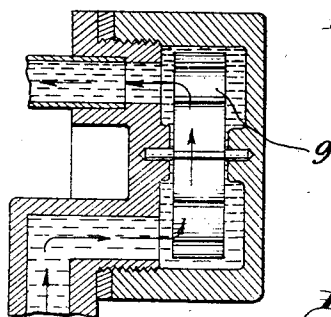


Fig. 7.



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DEVICE FOR PREVENTING OVERHEATING
IN CINEMA PROJECTION APPARATUSAgostino D. Derossi, Turin, Italy, assignor to Soc.
An. Microtecnica, Turin, Italy, a corporationApplication May 9, 1939, Serial No. 272,690
In Italy May 14, 1938

1 Claim. (Cl. 88—17)

With the increase in the power of cinematographic projection apparatus, the danger of setting fire to the film, which becomes strongly heated by the action of the heat-bearing rays which accompany the luminous rays of the projector, also increases.

The heating of the film-guiding device and connected parts is chiefly due to the rays which do not fall on the photogram and which represent over 40% of the luminous cone, which latter is of circular section whilst the aperture, corresponding generally to the photogram, is of rectangular shape.

This considerable quantity of heat can no longer be sufficiently dissipated by radiation from the metallic parts, above a certain power, and consequently the temperature of the whole film-guiding mechanism becomes dangerously high.

Various means have been proposed to obviate this inconvenience; the present stage of technics has even considered cooling the film-guide by means of water circulating inside its parts or inside members directly connected with and dependent on it.

According to the present invention it is proposed, instead of cooling the film-guide support in order to carry off the heat imparted to it by the luminous and heat bearing cone, to prevent the said heat from reaching it, by stopping it during its course.

This result is attained, according to the invention, by arranging between the source of light and the film-guide support, close to the latter but insulated from it, a screen designed to arrest all the rays not included in the rectangle corresponding to the photogram aperture. By such an arrangement the problem is solved rationally and radically: any abnormal heating of the film-guide support is avoided by abolishing its cause.

For the unavoidable direct heating of the film, which is however quite small owing to the low thermic capacity and low power of absorption of the film, the usual means of ventilation, which at present also have to take care of the carrying away of the heat transmitted by the film-guide device to the film, are more than sufficient.

The attached drawing illustrates the conception of the invention and a general example of the practical execution of the same.

Figs. 1 and 2 show diagrammatically the behaviour of the luminous-caloriferous rays, showing the cause of the heating of the film-guide device in known systems.

Figs. 3 and 4 are similar diagrams, showing

how such cause is eliminated according to the invention.

Fig. 5 shows an example of practical execution of the invention.

Figs. 6 and 7 show a device for indicating the circulation.

Numeral 1 indicates the rectangular aperture of the film-guide support corresponding as to shape and size to the photogram of the film. This rectangle is, under the most favourable conditions, circumscribed by a circle 2 which represents the minor base of the truncated cone formed by the sheaf of light rays. As appears in the diagrams Figs. 1 and 2, all the rays which fall outside the rectangle 1, i. e. over 40% of them, impinge directly on the film-guide support 4 and heat it. This heat is, in part, dissipated by radiation and by convection through the surrounding atmosphere, or is carried away by eventual cooling means, and in part is transmitted to the film.

According to the invention, as may be seen in Fig. 3, between the source of light and the film-guide support 4, is interposed a new part, that is, a screen 5, provided with a rectangular aperture 6 of dimensions corresponding to those of the aperture in the film-guiding device 4, in such a manner that no luminous or calorific rays can impinge upon the support.

The calorific rays which impinge upon the screen 5 can be absorbed by this latter, and the heat so absorbed can be dissipated by natural radiation and convection, or else by means of a circulated fluid. In practice the screen 5 may assume the form of a hollow truncated conical body, having, that is, a large circular base and a small rectangle forming the aperture 6.

The cooling means may consist, according to circumstances and the power, of radiating fins 7, eventually cooperating with a fan; of the forced circulation of a fluid (gas or liquid) or yet again in the evaporation and condensation in a closed cycle of a volatile liquid (for example, ether, alcohol, ethyl chloride, etc.).

In Fig. 5 is seen a practical example of realisation in which, in the path of the luminous cone, is situated the revolving light shutter of the cylindrical type.

In this case the screen consists of a hollow body 8 in which is formed a part of the conical screen 5, intersected by a chamber in which the shutter revolves.

The screening body 5 may be simply placed near the film-guiding device 4, but preferably between them an insulating layer is placed in order

to avoid, to the aims of the invention, any transmission of heat to the said device.

Control of the circulation of the cooling means is afforded by placing at a suitable point in the path of the fluid a rotor 9, which is kept in motion by the flow of the circulating fluid. The rotor is arranged behind a glass spy-hole so that, by observing its motion, the operator is informed of the efficiency of the cooling circulation.

I claim:

A device for preventing heating of the film-guide support in cinematographic projection apparatus which comprises a screen device interposed between a source of light and said support and arranged, in ray-intercepting relationship, in

the path of all light rays coming from said source except those rays which impinge on the subject to be projected, whereby the heat of said intercepted rays is absorbed by said screen device, said device consisting essentially of a hollow chamber having a truncated-conical passageway therethrough, said passageway being intersected transversely by a cylindrical cavity adapted to house a conventional light shutter of the cylindrical type, cooling means in said housing around said passageway and cavity, means to effect circulation of said cooling means, and means to indicate such circulation.

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