Sept. 4, 1934. H. J. BLUM 1,972,437

FIRE EXTINGUISHER FOR FILMS

Filed Nov. 6, 1931

Fig. 1.

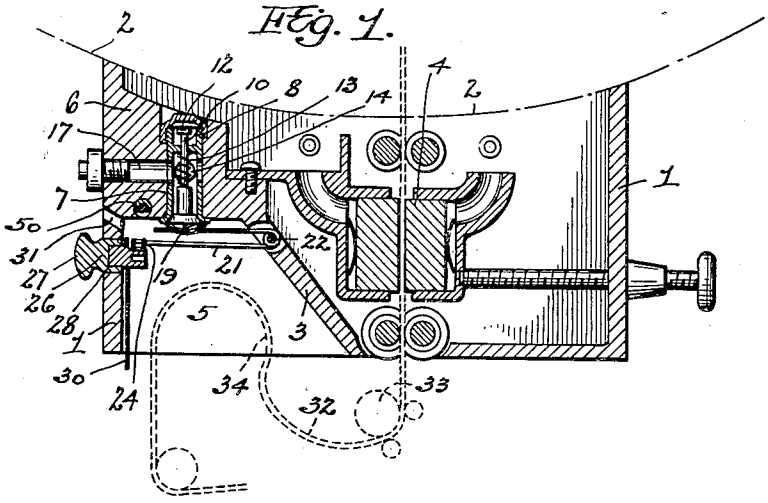


Fig. 2.

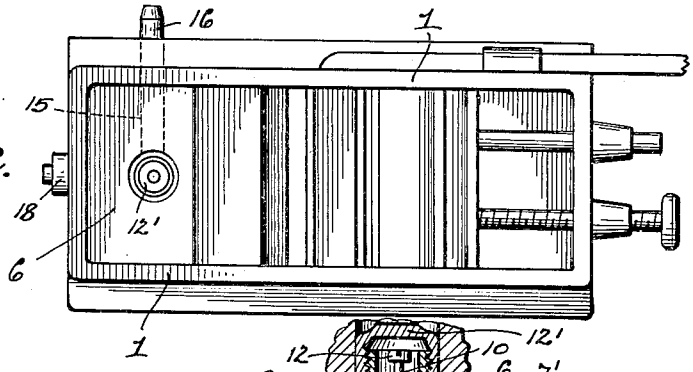


Fig. 6.

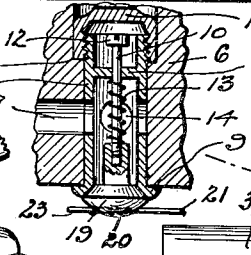


Fig. 5.

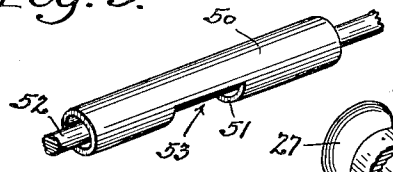


Fig. 3.

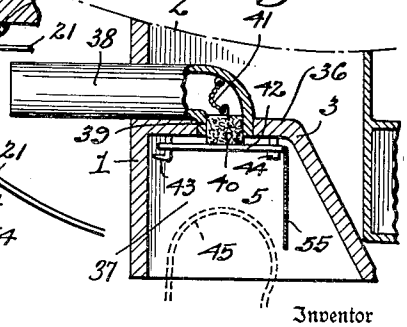
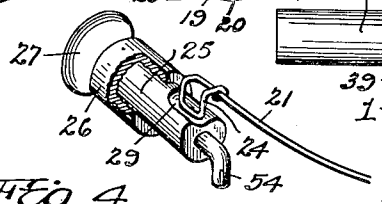


Fig. 4.



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FIRE EXTINGUISHER FOR FILMS

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Application November 6, 1931, Serial No. 573,471

12 Claims. (Cl. 169—2)

This invention is directed to an apparatus designed for the elimination of fire hazard within the housing of a film projection apparatus.

The primary object of the present invention is the provision of means by which, in the event the film becomes ignited within the projection apparatus, automatic extinguishment of the fire is immediately inaugurated, the automatic control means for the release of the fire extinguishing agent being as sensitive to the influence of the fire, if not more so, than the film itself, thereby insuring practically instantaneous functioning of the extinguishing agent in the event of fire within the projection apparatus.

A further object of the invention is the provision of means for normally holding the fire extinguishing agent against admission to the projection apparatus, with the holding means adapted for immediate release in the presence of fire in order that the extinguishing agent may become immediately active practically at the moment the fire starts in order to avoid possibility of fire spread and insure an easy and rapid extinguishment of the fire.

A still further object of the present invention is the provision of means by which the flame, no matter at what portion of the projection apparatus the fire starts, is immediately held to the element for controlling the admission of the extinguishing agent, thus increasing the rapidity with which such agent is admitted and materially reducing the time between the inauguration of the fire and the release of such agent as ordinarily contemplated in devices of this character.

The invention is illustrated in the accompanying drawing, wherein:—

Figure 1 is a view in vertical section, with parts in elevation, showing the fire extinguishing apparatus, with the parts in inoperative or normal position;

Figure 2 is a plan of the same;

Figure 3 is a view similar to Figure 1, showing a slightly modified form of apparatus;

Figure 4 is a perspective view of the element for holding the valve-retaining spring in normal position, the element being shown carried in a holder;

Figure 5 is a perspective view of the insulating tube arranged in the apparatus for the passage of the motor service wires, the tube being shown cut away to permit access of the flame or heat from the flame directly to the interior of the tube;

Figure 6 is a section of the control valve.

The improved fire extinguisher forming the subject-matter of this invention is arranged in a casing 1, the upper surface of which is curved to conform to the exterior of the upper film reel chamber 2, while the lower surface of the casing 1 rests directly on and is open to the casing of the projector proper. The casing 1 is of hollow form and divided by a transverse, preferably inclined, partition 3, on one side of which is arranged a film cleaning apparatus, indicated, generally at 4, which apparatus forms the subject-matter of a copending application filed January 27, 1931, Serial #511,624.

The interior of the casing on the side of the partition opposite the film cleaning apparatus defines a chamber 5 of less height than the similar dimension of the casing, the upper portion of the chamber being formed by a solid, integral wall 6 which is of block-like form, and provides a thickened top wall of the chamber 5. The block 6 is formed with a vertically ranging opening 7 extending entirely therethrough and communicating at the lower end with the chamber 5. The upper edge of the opening is circumferentially enlarged to provide a shoulder 8.

A valve element is mounted in the opening 7 including a sleeve 9 having an exterior diameter corresponding to the interior diameter of the opening, and a lower flanged end 9' to bear against the lower surface of the block 6, the upper end of the sleeve extending above the shoulder 8 of the opening 7 and exteriorly threaded, as shown. A partition 7' extends transverse the sleeve and slidably supports a valve stem 11 headed beyond the partition, as at 12, and threaded at its lower end for adjustable connection with a valve 10 having a peripheral formation to cooperate with an appropriately formed seat in the lower end of the sleeve 9. A spring 13 bears between the partition 7' and the valve proper to insure opening movement of the valve when the spring is free of restraining influence. A cap 12' has threaded cooperation with the upper end of the sleeve 9, the lower edge of the cap bearing on the shoulder 8 to thus fixedly, though removably, secure the valve parts in position. The interior of the sleeve communicates through an opening 14 with a lateral passage 15 in the block, to which one end of a pipe 16 leading from a suitable source of supply, as a tank, (not shown) for containing the extinguishing agent is connected.

A clean-out opening 17 closed by a plug 18 may also be formed in the block, opening through one end of the latter and communicating at the inner end with the opening 7. The valve 10 below the valve seat cooperating portion is formed as a

somewhat enlarged button 19 having a transverse kerf 20.

Means are provided for normally holding the valve in closed position in the absence of fire in the chamber 5, which means includes a leaf spring 21 coiled about a pin 22 mounted in the partition 3, with one end 23 of the leaf spring seated in the kerf 20 of the button 19, while the opposite end 24 extends to and overlies a retainer, indicated at 25. The retainer 25 is in the form of a tube or stick-like element made up of powder or other highly inflammable material, such retainer proper being frictionally held within a holder 26 having a knob end 27, with the holder adapted to frictionally seat in an opening 28 formed in that wall of the casing 1 defining the end of the chamber 5.

The relation of the retainer 25 is such that when the terminal of the spring arm 24 is resting thereon, the opposite arm is held under tension, and through its engagement with the valve button serves to hold the valve in closed position. For convenience in retaining the free end of the spring arm 24 and to prevent casual displacement of such arm, the upper surface of the retainer is preferably recessed, as at 29, to form a shallow depression in which the end of the spring may be seated, though, if desired and as preferred, the end of the spring may have a lateral, integral or other extension to bear in the shallow depression to facilitate the release of the spring on the destruction of the retainer.

To further insure that the flame shall quickly reach the retainer 25, it is preferred that the retainer proper be formed to frictionally receive and hold a short section of film, indicated at 30, which will depend vertically of the chamber 5 and which, owing to its highly inflammable character, will in the presence of fire immediately direct the flame to the retainer 25 and, through the inflammable character of this retainer, immediately destroy it, leaving the spring free to act, that is, swing about its pin 22, and thus release the valve 10 to the influence of the spring 13 and permit the fire extinguishing fluid to flow through the pipe 15, passage 14, opening 7, and into the chamber 5 for the extinguishment of the flame.

The chamber 5 is preferably provided, for example in the end wall thereof and immediately below the block 6, with small openings 31 providing air outlets to prevent an unduly heated condition within the casing 5 and further to carry off any gases incident to the initial flame or the use of the fire extinguishing agent. The openings 31 are preferably covered with proper screening to prevent the flame from passing through the opening. As indicated in Figure 1, the film 32 is led from the upper reel, through the cleaner, over the projection guide 33, and then looped at 34 before passing through the usual feeding guides of the projection apparatus. This loop 34 is conventionally for the purpose of avoiding undue strain on the film in operation, and advantage is taken of this conventional loop and in the particular arrangement of the casing forming part of this invention so that the loop 34 extends partially into the chamber 5, whereby under ignition of the film, there is a more direct and speedy influence of the flame on the spring retainer 25 and thus a quicker release of the fire extinguishing agent and a more ready extinguishment of the fire.

In the form indicated in Figure 3, the partition 3 of the preferred form is continued horizontally of the casing at a point somewhat below the top of the casing to provide a wall 36 which, together with the end wall of the casing and partition 3, defines a chamber 37 similar to the chamber 5 of the preferred form. A pipe 38 for the delivery of the fire extinguishing agent from the tank, as in the preferred form, extends through the end wall of the casing 1 above the wall 36 and is then projected downwardly through an opening in the wall, the free end of the pipe providing a valve seat 39. A valve 40 cooperates with the seat, being freed from the seat by downward movement, and is connected to the pipe by a chain or like element 41 to prevent complete separation of the valve, the length of the chain, however, not interfering with a full opening of the valve.

The valve-retaining element in the modified form is preferably a short section of film 42, one edge of which cooperates with hooks 43 carried by the wall 36 beyond the pipe outlet, the opposite edge of the film overlying an opening in the wall into which and through the opening in the film is introduced a headed stud 44. It is to be understood that the valve-retaining film section 42 is the conventional film and that the openings which cooperate with the hooks 43 and receive the stud 44 are the usual sprocket openings in the edges of the film.

In this form, as in the preferred form, the loop 45 of the film 46 extends within the chamber 37, and in the presence of flame and incident to the highly inflammable character of the film section 42, which, of course, underlies and retains the valve 40 in closed position, the valve is released and under the pressure of the flame extinguishing fluid from the tank is moved from its seat, permitting the fluid to be freely delivered into the chamber 37 and extinguish the flame.

An important feature of the modified form is the use of a valve-retaining agent which is a part of a conventional film, and that in the use of such section of conventional film the release of the valve is extremely sensitive to the presence of fire. It is to be particularly noted that where the means for the rapid release of the valve-holding spring in the presence of fire includes the hanging or depending section of film, indicated at 30, which is the preferred construction, the film section must be so located as to be entirely free of contact with the adjacent wall of the casing, otherwise it is difficult to burn the depending film section with the rapidity desired. Hence, the complete free hanging of the film section is a very essential and important detail of this feature of the invention. Furthermore, as the important result sought by the arrangement is the extremely rapid release of the valve on the starting of the fire, it may be found desirable to longitudinally core the powder retainer 25 (or the powder retainer may be in tube form) and arrange therein a rapidly burning fuse 54, shown more particularly in Figure 4, which may depend below the retainer 25 and serve to assist, or more particularly increase, the rapidity with which the flame reaches the powder retainer. Either or both of the additional flame directing elements 30 or 54 are contemplated for use. It will, of course, be appreciated that a depending section of film serving as a flame deflecting element may also be utilized in connection with the modified form, such depending section of film being indicated at 55 in Figure 3.

In order to utilize the flame or the heat thereof for interrupting the motor circuit, the surface of the block 6 defining the upper limit of the chamber 5 is formed with an opening extending trans-

versely through the block, the lower margin of the opening extending through the lower surface of the block. A porcelain or other insulating tube 50 is inserted and frictionally held within this opening, this tube being cut away at 51 on its lower side so that the interior of the tube communicates with the chamber 5 through such cut away portion. A circuiting wire 52 of the motor or motors for operating the projection apparatus is passed through the tube 50 and in line with the opening 51 is formed as part of a readily fusible connector 53. Obviously, under the action of the flame or the excessive heat incident to the flame, the fusible element 53 is melted and the circuit to the motor interrupted. This detail, while a desirable part of the protecting device, is nevertheless not an absolutely essential part to the flame extinguisher and, therefore, the construction is contemplated as usable with or without the circuit interrupting element.

A particularly important feature of the invention is the provision of the chamber 5 which is closed against flame spread in the upward or lateral direction and the cooperation with such chamber of a loop of film which, considered from the reel end, is led upwardly into the chamber and then downwardly to the projection feed. As the ignition of the film when occurring is practically always initiated within the projection apparatus, it is apparent that the flame will travel upwardly and will be compelled to proceed throughout the length of the loop within the chamber before there is any possibility of this flame reaching that portion of the film from which it may follow upwardly to the reel. Thus, there is within the chamber a substantially double length of film which, under ignition of the film below the chamber, will require an appreciable interval of time to permit the flame to travel throughout the length of this loop.

It will, of course, be appreciated that from a practical standpoint an appreciable interval of time is required in which to release the valve by the flame or the heat of the flame and permit the extinguishing fluid to enter the chamber. By the formation of the loop within the chamber and the further fact that the flame is confined against upward or lateral movement and must travel throughout the length of the loop before reaching the upwardly extending portion of the film, the interval of time necessary to open the valve and permit the extinguishing fluid to enter the chamber is somewhat less than that necessary for the flame to travel from its point of generation to and throughout the length of the loop. Therefore, the extinguishing influence of the fluid will be directed onto the flaming film before the flame of the latter will have an opportunity to proceed throughout the length of the loop or to reach that portion of the film in which it is beyond the influence of the extinguishing fluid and would otherwise be permitted under favorable circumstances to reach the film on the reel.

It is, therefore, of the utmost importance to have the chamber constructed to provide against flame spread upwardly or laterally with respect to that portion of the film within the chamber and to have the loop of the film within the chamber so as to permit an appreciable period of time before the flame can consume the loop and extend toward the film on the reel, within which appreciable period of time the valve is opened and the extinguishing fluid released. Therefore, there is a direct relation between the chamber and the loop of the film, and if the parts are arranged in proper correlation, as described and as is contemplated, the extinguishing fluid will have reached and extinguished the flame of the film before such flame can travel throughout the length of the loop. Of course, it will be understood that if the flame starts, as usual, adjacent to the projection point, the flame and heat of the flaming film will reach within the chamber before the flame actually reaches the loop of the film within the chamber. Thus the automatic action of releasing the valve to permit the flow of the extinguishing fluid will be inaugurated at least at the time the flame reaches the end of the loop within the chamber from which the film extends to the projection apparatus, so that the period of time necessary to open the valve and release the fluid for flow into the chamber will be in practice less than that necessary for the flame to destroy all of the film of the loop. The fire is thus confined between the projection apparatus and the reel end of the loop within the chamber, and there is no possibility, assuming proper action of the parts, of the flame reaching that portion of the film, which under favorable circumstances might permit such flame to extend to that portion of the film on the reel.

I claim:—

1. A fire extinguishing apparatus for film projectors or the like including a casing formed to define a chamber in which a loop of the film being projected passes, a fire extinguishing agent control valve governing the admission of such agent to said chamber, means tending to move the valve toward open position, means for retaining the valve normally closed, said means including a rigid powder element to be destroyed by and in the event of fire in the casing, and a spring element supported by the powder element and engaging and holding the valve in closed position.

2. A fire extinguishing apparatus for film projectors or the like including a casing formed to define a chamber in which a loop of the film being projected passes, a fire extinguishing agent control valve governing the admission of such agent to said chamber, means for normally influencing the valve toward open position, means for retaining the valve normally closed, said means including a rigid powder element to be destroyed by and in the event of fire in the casing, and a spring element supported by the powder element and underlying and holding the valve in closed position, said spring element being swingingly supported beyond the valve.

3. A fire extinguishing apparatus for film projectors or the like including a casing formed to define a chamber in which a loop of the film being projected passes, a fire extinguishing agent control valve governing the admission of such agent to said chamber, means for normally influencing the valve toward open position, means for retaining the valve normally closed, said means including a rigid powder element to be destroyed by and in the event of fire in the casing, and a swinging member interposed between said powder element and the valve, and a section of inflammable material depending from the powder element.

4. A fire extinguishing apparatus for film projectors or the like including a casing formed to define a chamber in which a loop of the film being projected passes, a fire extinguishing agent control valve governing the admission of such agent to said chamber, means for normally influencing the valve toward open position, means for retaining the valve normally closed, said

means including a rigid powder element to be destroyed by and in the event of fire in the casing, and a swinging member interposed between said powder element and the valve, and a section of film depending from the powder element.

5. A fire extinguishing apparatus for film projectors or the like including a casing formed to define a chamber in which a loop of the film being projected passes, a fire extinguishing agent control valve governing the admission of such agent to said chamber, means for normally influencing the valve toward open position, means for retaining the valve normally closed, said means including a rigid powder element to be destroyed by and in the event of fire in the casing, and a swinging member interposed between said powder element and the valve, and means for frictionally and removably holding the powder element in position.

6. An apparatus for treating cinematographic films including a casing designed to underlie the upper film reel, said casing being formed with a chamber constructed to prevent the spread of the flame within the chamber upwardly or laterally with respect to the chamber, the film being looped within the chamber, a pipe leading into the chamber and communicating with a source of supply for a fire extinguishing agent, a valve normally closing the pipe against said chamber, and a section of film underlying and normally holding the valve in operative position, a section of film being destroyed to permit opening of the valve by any flame tending to consume the loop of film within the chamber, the length of the film loop within the chamber being such as to require for its flame consumption a length of time in excess of that necessary to open the valve and admit the extinguishing medium into the chamber.

7. A fire preventing means for use in connection with cinematographic films including a casing immediately underlying the upper film reel, means in the casing for guiding the film from said reel through the casing, the casing being formed to provide a chamber constructed to prevent the spread of a flame within the chamber upwardly or laterally with respect to the chamber, a pipe open to a supply of fire extinguishing agent and opening within said chamber, a valve normally closing the pipe, and a film section removably secured to the wall and underlying and holding the valve in operative position, a section of film being destroyed to permit opening of the valve by any flame tending to consume the loop of film within the chamber, the length of the film loop within the chamber being such as to require for its flame consumption a length of time in excess of that necessary to open the valve and admit the extinguishing medium into the chamber.

8. A fire preventing means for use in connection with cinematographic films including a casing immediately underlying the upper film reel, means in the casing for guiding the film from said reel through the casing, the casing being formed to provide a chamber constructed to prevent the spread of a flame within the chamber upwardly or laterally with respect to the chamber, a pipe open to a supply of fire extinguishing agent and opening within said chamber, a valve normally closing the pipe, hooks carried by the wall at one side of the valve to be engaged by the sprocket holes in a film section, a screw threaded into the wall on the opposite side of the valve and adapted to pass through an opposing sprocket hole of a film section, and a film section having the sprocket holes on one side engaged with said hooks and the sprocket hole on the other side engaged by the threaded screw, said film section underlying and holding the valve in operative position, a section of film being destroyed to permit opening of the valve by any flame tending to consume the loop of film within the chamber, the length of the film loop within the chamber being such as to require for its flame consumption a length of time in excess of that necessary to open the valve and admit the extinguishing medium into the chamber.

9. A film extinguishing apparatus including a box-like housing to be interposed between the film reel and projection apparatus and through which the film from the reel is guided, said housing being formed with a chamber constructed to prevent the spread of a flame within the chamber upwardly or laterally with respect to the chamber, means responsive to the action of a flame in said chamber to deliver an extinguishing fluid within the chamber, the film being looped within the chamber and led from the loop to the projection apparatus, the loop of the film within the chamber providing a relatively increased length of film within the chamber to relatively increase the time period of flame consumption of the film length within the chamber to enable a sufficient period of time necessary for the flame or heat release of the extinguishing fluid before the film loop has been completely destroyed.

10. A fire extinguishing apparatus for projection machines including a member interposed between the film reel and projection apparatus and through which the film is led from the reel, said member being formed to provide a chamber open at the bottom and otherwise closed against flame passage, means carried by the member and opening into the chamber for delivering an extinguishing fluid to the chamber, flame control means for governing the entry of the extinguishing fluid into the chamber, said film being looped into the chamber and proceeding from the loop to the projection apparatus, the length of the loop within the chamber being such as to insure that flame consumption of the loop will require a period of time in excess of that necessary for such flame to permit introduction of the extinguishing fluid into the chamber.

11. A film extinguishing apparatus including a box-like housing to be interposed between the film reel and projection apparatus and through which the film is guided, said housing being formed with a chamber into which a loop of the film is directed, means for delivering a fire extinguishing fluid into said chamber, a valve for controlling said admission, and means in the chamber responsive to a fire condition therein to relieve the fluid flow from control by the valve to permit said fluid to flow into the chamber, the walls of the chamber preventing the flame spreading upwardly or laterally beyond the chamber, the length of the film loop within the chamber being such as to require for its flame consumption a length of time in excess of that necessary to open the valve and admit the extinguishing fluid into the chamber.

12. A fire extinguishing apparatus including a member to be interposed between the reel and the projection apparatus and through which the film is fed, said member being formed with a chamber closed at the sides, ends and top against flame spread, said chamber being designed to receive a loop of the film to dispose a portion of the film within the chamber above the open bottom thereof, means for delivering an extinguishing fluid to the chamber, a valve controlling said fluid flow,

means for normally influencing the valve toward open position, and means for holding the valve in closed position against said influencing means, said valve holding means being responsive to a fire condition within the chamber to release the valve to its influencing means to permit fluid flow into the chamber, the length of the film loop within the chamber being such as to require for its flame consumption a length of time in excess of that necessary to open the valve and admit the extinguishing fluid into the chamber.

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