

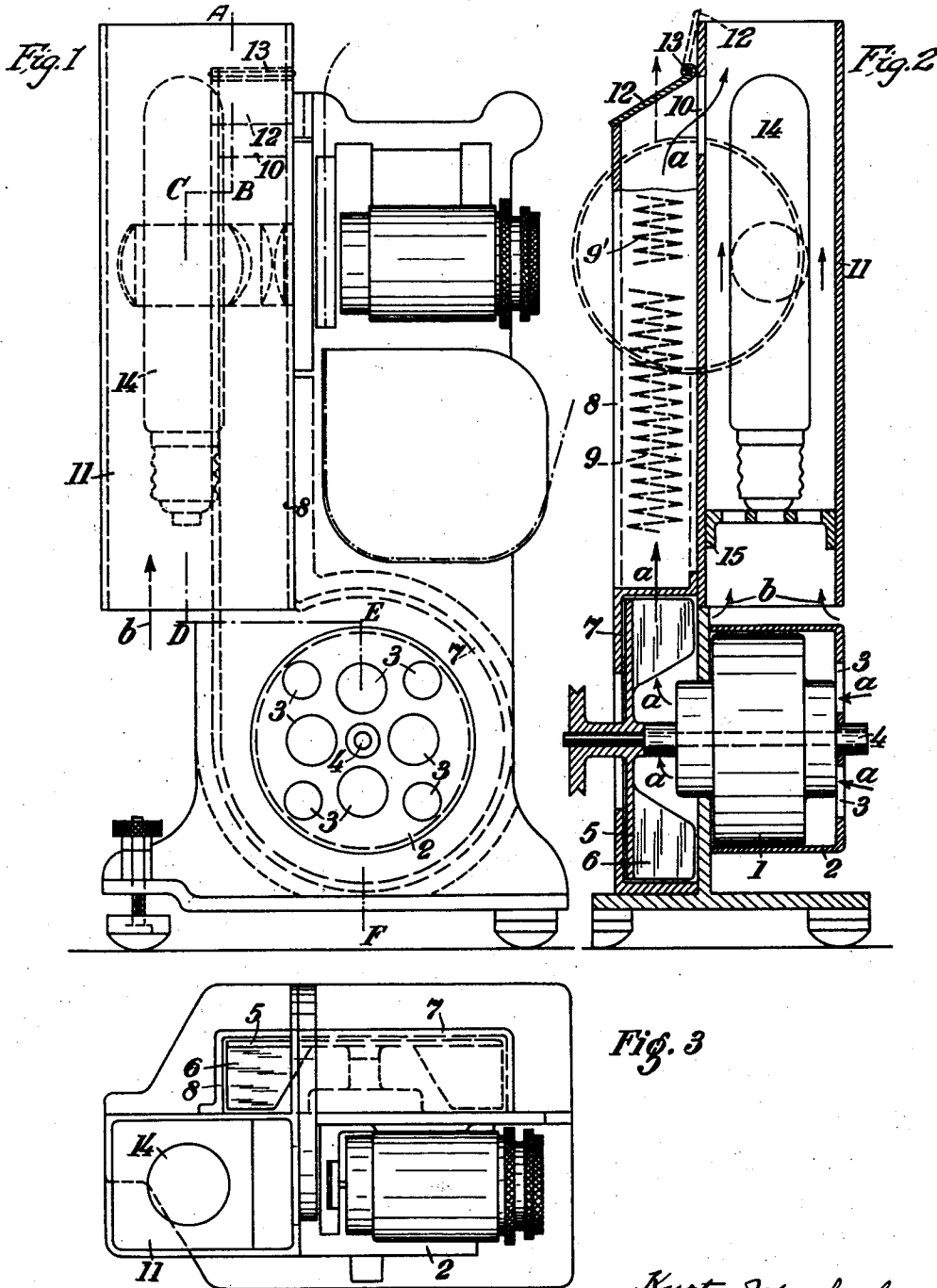
Dec. 20, 1932.

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1,891,683

MOVING PICTURE PROJECTION APPARATUS

Filed June 27, 1929



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UNITED STATES PATENT OFFICE

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MOVING PICTURE PROJECTION APPARATUS

Application filed June 27, 1929, Serial No. 374,158, and in Germany July 7, 1928.

The present invention relates to a motion picture projection apparatus, more particularly to a ventilation device intensely cooling all those parts of the apparatus which evolve a great amount of heat.

One object of my invention is to prevent any excessive evolution of heat by the series resistance placed between the net-work and the projector lamp and, first of all, its being fused. The resistance which has to be placed before the projector lamp if the latter is fed from the net-work with a current of 110 or 220 volts, because the lamp itself is constructed only for a considerably lower voltage, e. g., for 60 volts on the average, hitherto has been constructed in a comparatively large size and there has, especially, been incorporated into the resistance a large amount of resistance material so that, hitherto, on the one hand the space occupied by the lamp series resistance and on the other hand the costs of the material have been very considerable.

One feature of my invention is to reduce the size of the lamp series resistance to a minimum so that the costs of manufacturing it as well as the space occupied by it amount only to a fraction of the former costs and space requirement. According to my invention it is possible to largely reduce the size of the series resistance by exposing it permanently to a strong current of air which immediately removes the heat evolved by the resistance. In other words: according to my invention an air-cooled resistance of exceptionally small dimensions is used as lamp series resistance. As practical experiments over a long period have shown, it is possible by air-cooling the lamp series resistance to reduce it to about one tenth of the size in which it was hitherto made. As the material of which the resistance is made, is relatively very expensive, this reduction of the size of the resistance involves, as already mentioned, an extraordinary saving of costs apart from the saving of space required for its installation.

The current of air, which according to my invention, serves to cool the lamp series resistance can be produced by any conven-

ient means. Another feature of my invention is to produce this current of air with the aid of a ventilator mounted directly on the shaft of the motor driving the apparatus.

Another feature of my invention is to adapt the ventilator so as to suck in the cooling air from the atmosphere by way of and along the windings of the motor whereby there is also effected an intense cooling of the motor so that the latter can also be made in exceptionally small dimensions which will result in a considerable reduction of its costs.

A further object of my invention is that the current of air which serves to cool the series resistance, at the same time is utilized for cooling the casing of the lamp. Since, however, the current of air, after having passed along the resistance, has already risen to a comparatively high temperature, it is advantageous not to use it directly for cooling the projector lamp and the lamp casing but to utilize the hot current of air thus emanating from the resistance in such a manner that it produces an ejecting effect upon the lamp casing by which fresh air is driven through it.

A further feature of my invention is, that the series resistance with which the motor has to be provided in case the apparatus is fed from the net-work with a current of 110 volts as well as with one of 220 volts, can also be cooled by exposing it to the current of air which serves to cool the series resistance of the lamp. In this case the series resistance of the motor and that of the lamp are preferably mounted in one and the same air conduit. By cooling the series resistance of the motor it is possible to considerably reduce the size in which it has hitherto generally been made.

Beyond the above mentioned objects and features my invention consists in certain features of novelty in the construction, combination and arrangement of parts which will appear from the following detailed description in which reference is made to the accompanying drawing.

In the said drawing:

Fig. 1 shows a projector apparatus which

is provided with a ventilation device according to my invention;

Fig. 2 shows a longitudinal section on the lines A—B—C—D—E—F of Fig. 1;

Fig. 3 shows a horizontal plan of the projector apparatus.

In the drawing 1 represents the driving motor of the apparatus mounted in a casing 2. The right hand front-plate (Fig. 2) of the motor casing is provided with openings 3. On the left hand side of the motor (Fig. 2) a propeller is fitted on the motor shaft 4 which propeller serves as ventilator. It consists of a disc 5 and blades 6 fixed laterally to the disc. The propeller (5, 6) rotates in a casing 7. The side of the casing 7 adjoining the motor is open near the axis, while the side of the casing opposite the motor is closed by the disc 5 of the propeller. Above the casing of the propeller an air conduit 8 is provided within which the lamp series resistance 9 is mounted. If desired there also may be mounted in the air conduit a series resistance 9' for the motor, which is to be connected in series with the motor, if the motor is not fed from the net-work by a current of 110 volts but by one of 220 volts.

The air conduit 8 is provided at its upper end with an opening 10 which leads to the upper part of the lamp casing 11. Furthermore, there is fitted above the air conduit 8 a flap valve 12 which turns in a hinge 13 and which can either be placed in the position shown in the drawing in full lines or in dotted lines.

The projector lamp 14 is mounted in the lamp casing 11.

The latter is open at its upper and lower end and also the parts carrying the lamp support for instance the holder 15 are constructed in such a way that they do not prevent the current of air from passing through the lamp casing in its longitudinal direction.

The new ventilation device works as follows: As soon as the motor which serves to drive the projector apparatus has been set in motion, the propeller (5, 6) mounted on the motor shaft rotates. By the rotation of the said propeller (5, 6), the air is sucked in through the openings 3. The air thus passes through the windings of the motor 1 so that the latter are intensely cooled. After having left the motor windings the air enters the ventilator casing 7, whence it is driven by the propeller (5, 6) into the air conduit 8. Here it streams along the lamp series resistance 9 and any motor series resistance which, if desired, may also be placed in the air conduit 8 and thus absorbs the heat produced by the said series resistances. When the air conduit 8 is shut by the flap valve 12 the air which has become hot in the conduit 8 streams through the opening 10 into the upper part of the lamp casing 11 and thence into the open air. At the same time the hot air leav-

ing the air conduit 8 produces an ejecting effect upon the lamp casing 11, so that fresh air enters the lower end of the lamp casing, passes upwards along the lamp 14 and unites at the upper part of the lamp casing 11 with the air emanating from the air conduit 8 by which it is driven out of the lamp casing. The air which has been sucked by the warm current of air and passes through the lamp casing 11 produces an intense cooling effect upon the lamp casing and the lamp itself so that any detrimental accumulation of heat is avoided. The way which the current of air, entering through the openings 3 and leaving the lamp casing 11 at the upper end, takes, is schematically shown in Fig. 2 by the arrows *a*. When the flap valve 12 is open, part of the air for cooling the lamp series resistance does not stream through the lamp casing but directly into the open air through the upper end of the air conduit 8. By the hot air emanating from the air conduit 8 and entering the lamp casing 11, a current of air indicated by arrows *b* (Fig. 2) is produced in the lamp casing.

By the ventilation device according to the present invention an intense cooling of all heat evolving parts of the projecting apparatus is attained. Consequently the single elements of it can be of extraordinary small size. The possibility of reducing the size of the elements of the projector apparatus due to the air cooling not only involves a considerable decrease of costs but also a large saving of space.

For these reasons the present invention is of the highest importance in the construction of narrow film-apparatus in which it is an essential point that they be of a construction which is both cheap and requires only little space for the installation.

I claim:

1. In a projection apparatus, the combination of a projection lamp, a housing for said lamp, a resistance, a second housing for said resistance, a fan, a passage between said fan and second housing to conduct cooling air from said fan to said resistance, a connecting passage between said two housings and an outlet from said first named housing whereby the cooling air from said fan passes through said second housing, said connecting passage and said outlet to eject heated air from said first named housing.

2. In a projection apparatus, the combination of a projection lamp, a housing for said lamp, a resistance for said lamp, a second housing for said resistance, a driving motor having a shaft, a fan on said shaft, a passage between said fan and said second housing to conduct cooling air from said fan to said resistance, a connecting passage between said two housings, an outlet in said first named housing near said connecting passage and an inlet to said first named housing on the op-

posite side of said lamp from said outlet
whereby the flow of cooling air produced by
said fan, passing through the second housing,
the connecting passage and said outlet draws
5 cooling air through said inlet to cool said
lamp.

In testimony whereof, I affix my signature.
KURT MORSEBACH.

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