Aug. 22, 1933. E. T. FRANZEN ET AL 1,923,142

DEVICE FOR DRYING MOTION PICTURE FILM

Filed March 12, 1931 3 Sheets-Sheet 1

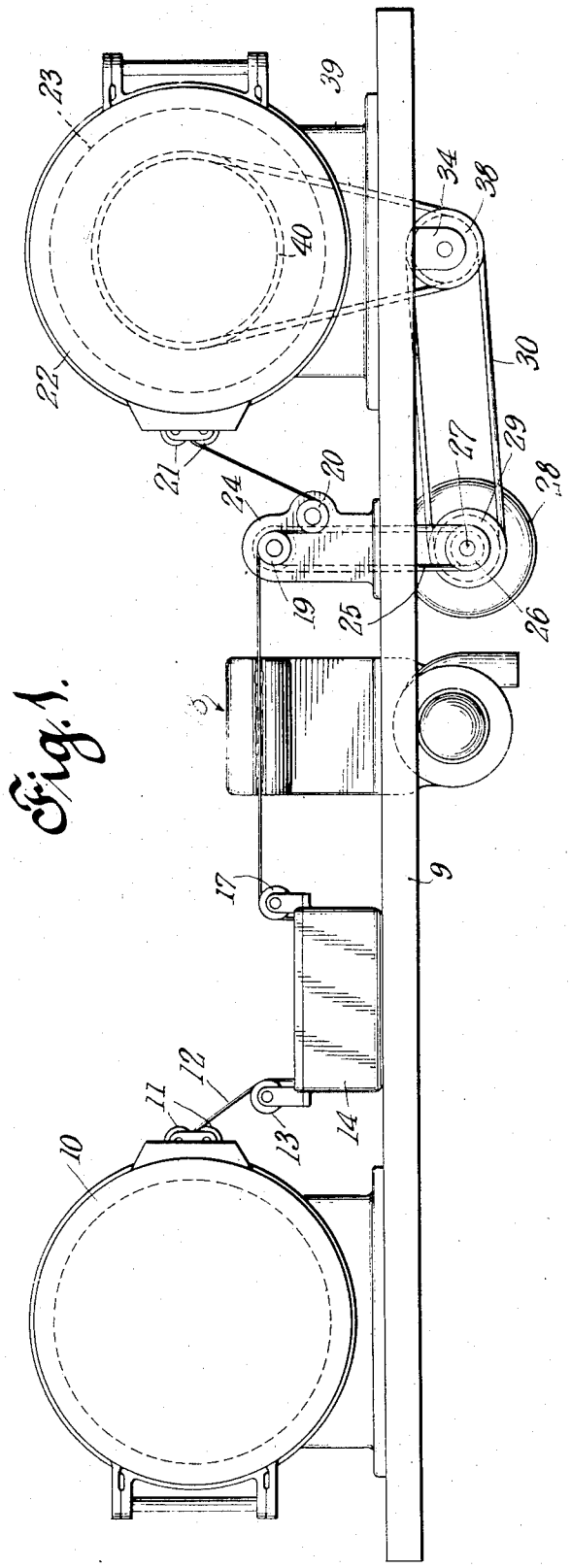



Fig. 1.

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Filed March 12, 1931 3 Sheets-Sheet 2

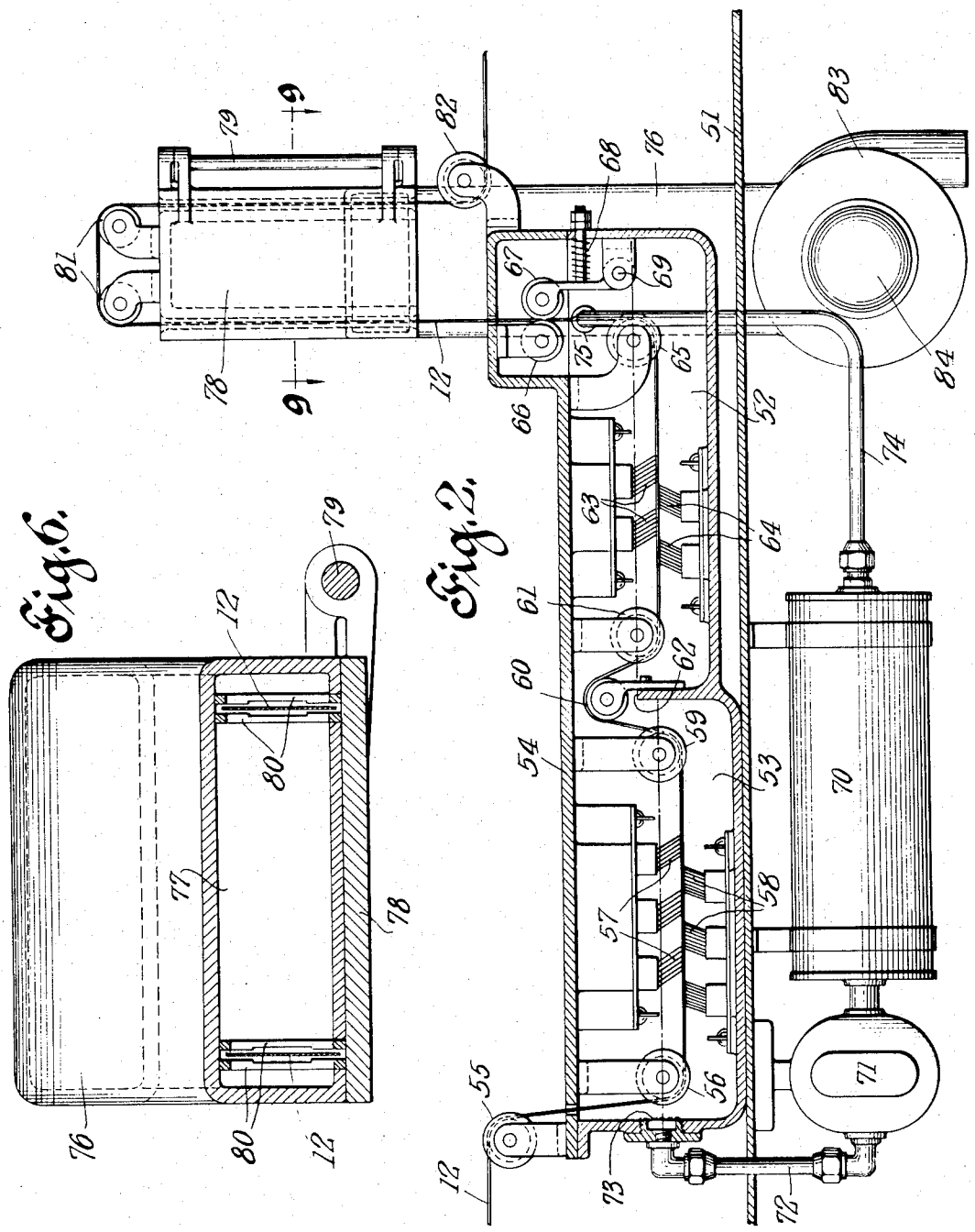



Fig. 2.

Fig. 6.

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Filed March 12, 1931 3 Sheets-Sheet 3

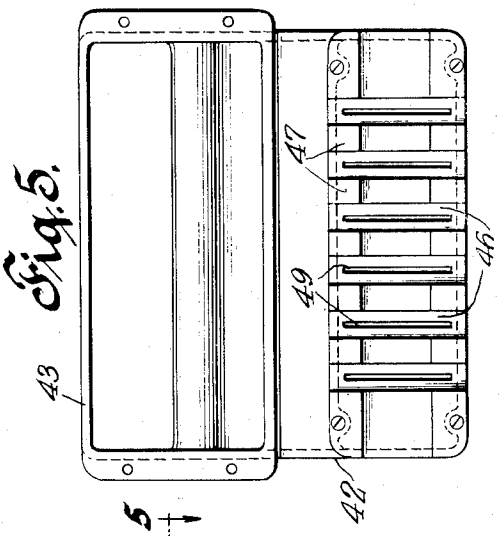



Fig. 5.

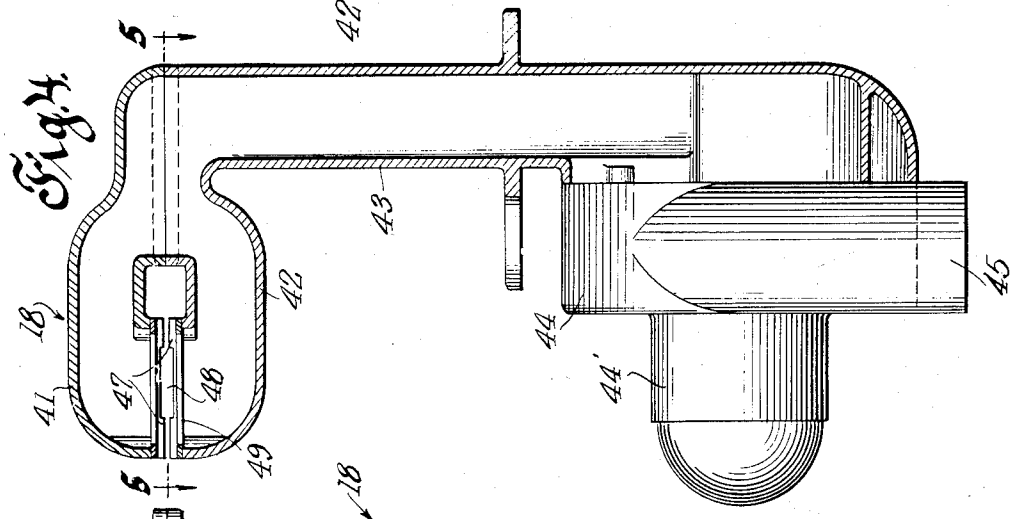



Fig. 4.

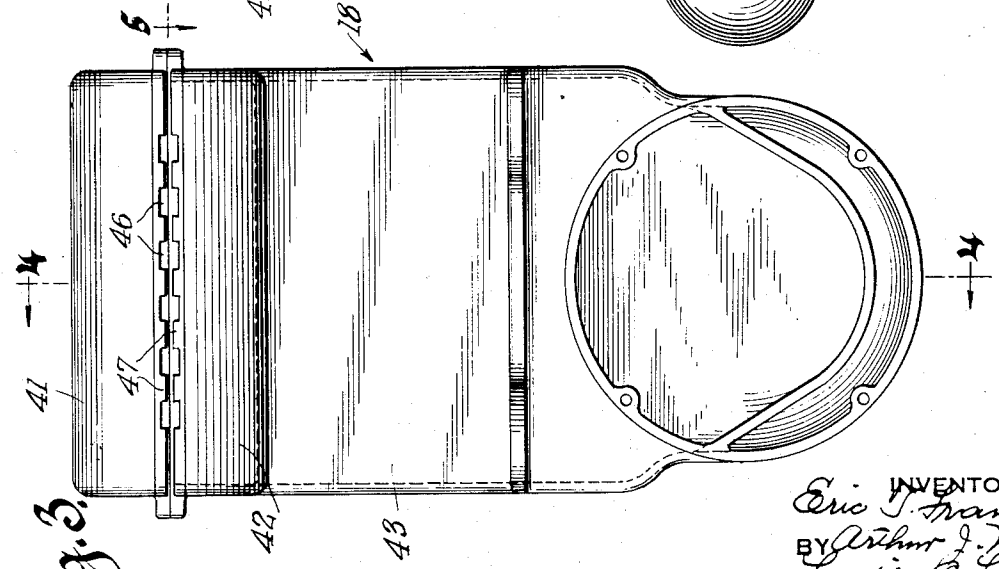



Fig. 3.

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# UNITED STATES PATENT OFFICE

1,923,142

## DEVICE FOR DRYING MOTION PICTURE FILM

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2 Claims. (Cl. 34—48)

This invention relates to apparatus for drying motion picture film and the like.

It is an object of this invention to provide a device for cleaning motion picture film and the like and rapidly drying the same by means of a strong draft of air.

In the apparatus herein described the motion picture film is passed through the cleansing bath and drier at a constant speed, and then wound upon a reel of the type commonly used for such films.

These and other advantageous objects, which will later appear, are accomplished by the simple and practical construction and arrangement of parts hereinafter described and exhibited in the accompanying drawings, forming part hereof, and in which:

Figure 1 represents an elevational view of the apparatus.

Figure 2 represents a sectional view of a modified arrangement of the device.

Figure 3 represents an elevational view of the drier used in the device.

Figure 4 represents a sectional view taken on line 4—4 of Figure 3.

Figure 5 represents a view taken on line 5—5 of Figure 4.

Figure 6 represents a sectional view taken on line 9—9 of Figure 2.

Referring to the drawings, the apparatus is shown to include a table 9 supporting a casing 10 in which is rotatably mounted an unwinding reel of a type commonly used for motion picture film. Also mounted on the casing are guide rollers 11, between which the film 12 passes to a guide roller 13 mounted on the cover of receptacle 14 containing a quantity of cleansing liquid such as carbon tetrachloride. The film passes through the liquid and between opposed brushes and thence over a guide roller 17 to a drying device generally indicated at 18.

From the drier 18, the film passes over a friction roller 19, then down and around a guide roller 20 which is rotatably mounted below and slightly to one side of the roller 19. The film is then passed through rollers 21 to the winding reel 23 in casing 22.

The drive roller 19 is fixed to a shaft to which is also fixed a pulley 24 over which passes a belt 25, the latter also passing over a pulley 26 fixed to the shaft 27 of an electric motor 28 supported by the table 9. The motor is driven at a constant speed and consequently the roller 19 will be driven at a constant speed to move the film 12 at the same speed through the cleansing bath and drier. As shown in Figure 1, the film 12 passes over roller 19 and then down and under a roller 20 mounted below roller 19. The arrangement of the rollers insures a firm and positive grip of roller 19 on the film for driving purposes.

Also fixed to motor shaft 27 is a pulley 29 connected by a belt 30 to a pulley rotatably mounted on a shaft supported by brackets depending from the under side of table 9.

Pulley 38 is connected by a belt 39 with pulley 40 fixed to the stub shaft upon which the winding reel 23 is mounted.

Referring to Figure 5, the drier 18 is shown to include two substantially similar casings 41 and 42 communicating with a tube 43, which in turn is connected to a vacuum creating device 44, of a common type, driven by an electric motor 44', and having an exhaust 45.

The adjacent faces of the casings 41 and 42 have a plurality of ribs 47, the spaces between the ribs providing apertures 46 through which air is drawn over both sides of the film to cause rapid evaporation of liquid which may be thereon, the air and evaporated liquid being then drawn through slots 49 into the tube 43 and out through the exhaust.

The fumes of the cleansing liquids are usually disagreeable, and they may be passed to the exterior of the room containing the apparatus by attaching a hose to the exhaust 45. The ribs 47 have their central portions cut away to provide a passage 48 for the film, the edges of which pass over the ribs, while the picture portion of the film does not contact with the metal so that there is no danger of scratching the film.

From the above description it is seen that there has been provided an effective device for drying motion picture film. By creating a vacuum around the film as it moves through passage 48 in the drier 18, a strong draft of air is drawn over both sides of the film to cause substantially immediate evaporation of the cleansing liquid remaining on the film after it has passed through the bath.

By drawing the air simultaneously over both sides of the film, the pressure is equalized and dragging of the film prevented. As is seen, the apparatus is compact and requires no bulky and inconvenient drying devices to enable the cleansing and drying operations to be rapidly performed. Also, the slipping clutch arrangement in connection with the winding reel insures a smooth winding and prevents breaking of the film due to excessive tension.

In Figure 2 are shown details of a drier ar-

ranged so that the film will be subjected to a drying action for a longer period than is the case with the arrangement shown in Figure 1.

Referring to Figure 2, the film 12 to be cleaned, is drawn from an unwinding reel such as shown in Figure 1. The film passes over a roller 55, mounted on the cover 54 of a receptacle which is divided into two compartments 52 and 53. From roller 55, the film is passed under a roller 56, between the stationary brushes 57 and 28, under roller 59, up over roller 60, then down under roller 61, between brushes 63 and 64, and under roller 65. Rollers 56, 59, 61 and 65 are mounted on supports depending from the cover 54, while roller 60 is mounted on the wall 62 which divides the receptacle into two compartments. Brushes 57 and 63 are mounted on supports depending from cover 54, and brushes 58 and 64 are mounted on the bottom of the receptacle.

From roller 65, the film is directed upwardly between rollers 66 and 67, thence through the ribs 80 on one side of the drier, where the film is partially dried, thence over the rollers 81, and down between ribs 80', where the drying operation is completed, thence under roller 82 to a winding reel, (not shown) which may be manually driven, or driven by means of a motor as shown in Figure 1.

The roller 66 is stationary, but the roller 67 is mounted on an arm pivoted at 69 to a lug projecting from the end wall of the receptacle. The roller 67 is resiliently maintained in engagement with roller 66 by a compression spring 68 which abuts the arm and the wall.

The cleansing fluid is first introduced into the compartment 52 by opposed sprays 75 at the upper extremities of pipes 74, which lead from a filter 70. When the liquid in compartment 52 reaches the height of the wall 62, it overflows into compartment 53; and when the liquid in compartment 53 attains the height of a strainer 73 in the end wall of the receptacle, it flows down through pipe 72 into a motor driven pump 71, from which it is forced through the filter 70 and back to the sprays 75.

The film 12 passes first through compartment 53, where most of the dirt is removed. It then passes into the compartment 52, which contains liquid which is much cleaner than the liquid in compartment 53, and the remaining dirt is removed. The film is then given a further washing when it passes through the sprays 75.

It will be seen that as the film progresses and becomes cleaner, it is subjected to a cleaner fluid, so that when it passes through the drier, and the liquid is evaporated, there will be no sediment deposited on the film due to a dirty fluid in the cleansing bath. The pressure of rollers 66 and 67, on the film as it leaves the baths, also serves to remove a large quantity of the fluid.

In practice, it has been found that the film is quite dirty, and consequently, when passed through a single stationary bath, the bath becomes considerably dirty due to the sediment deposited therein. This sediment accumulates and it is necessary to stop the operation of the machine from time to time to clean the bath.

It is readily seen that my arrangement as described above provides a circulating bath, and it is not necessary to stop the operation of the machine to clean the baths, for the cleansing fluid is being constantly drawn from bath 53, which is the dirtiest of the baths, down through the pump and forced through the filter 70, where all sediment and dirt is removed, and then the clean fluid is returned to bath 53 by way of the sprays 75.

The drying apparatus shown in Figure 6 consists of two driers having substantially the same structure as the drier shown in Figures 3, 4 and 5, both driers being connected by means of a chamber 77 to a common suction tube 76, connected with a blower 83, the latter being operated by a motor 84.

The blower 83 and motor 84 are generally indicated as they may be of any common and well known structure for creating a vacuum. The air is drawn in through the top and bottom of the drier, and over both sides of the film to equalize the pressure and prevent drag. The drier is provided with a cover 78, which is hinged at 79 so that it may be swung outwardly to enable the film to be conveniently positioned in the drier and around the guide rollers 81. The essential advantage of the arrangement of the drier as above described is that the film is subjected to the drying action for a considerable time, without necessitating a large space for the drier.

The foregoing disclosure is to be regarded as descriptive and illustrative only, and not as restrictive or limitative of the invention, of which obviously an embodiment may be constructed including many modifications without departing from the general scope herein indicated and denoted in the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. A device for drying motion picture film, comprising an upper casing and a lower casing, said casings having a plurality of slots in their adjacent faces, a tube communicating with the casings, a vacuum creating device connected to the tube, and a plurality of spaced ribs on the adjacent faces of the casings, the spaces between the ribs providing apertures through which air is drawn through said slots and over both sides of a film passing through the device, said ribs having their central portions cut-away so that the picture portion of the film will not engage the ribs.

2. A device for drying motion picture film, comprising an upper casing and a lower casing, said casings having a plurality of slots in their adjacent faces, a tube communicating with the casings, a vacuum creating device connected to the tube, and flanges along the edges of the adjacent faces of the casings, said flanges being spaced so that the picture portion of a film will not contact the flanges, said flanges having a plurality of passages cut therein through which air is drawn through said slots and over both sides of a film passing through the device.

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