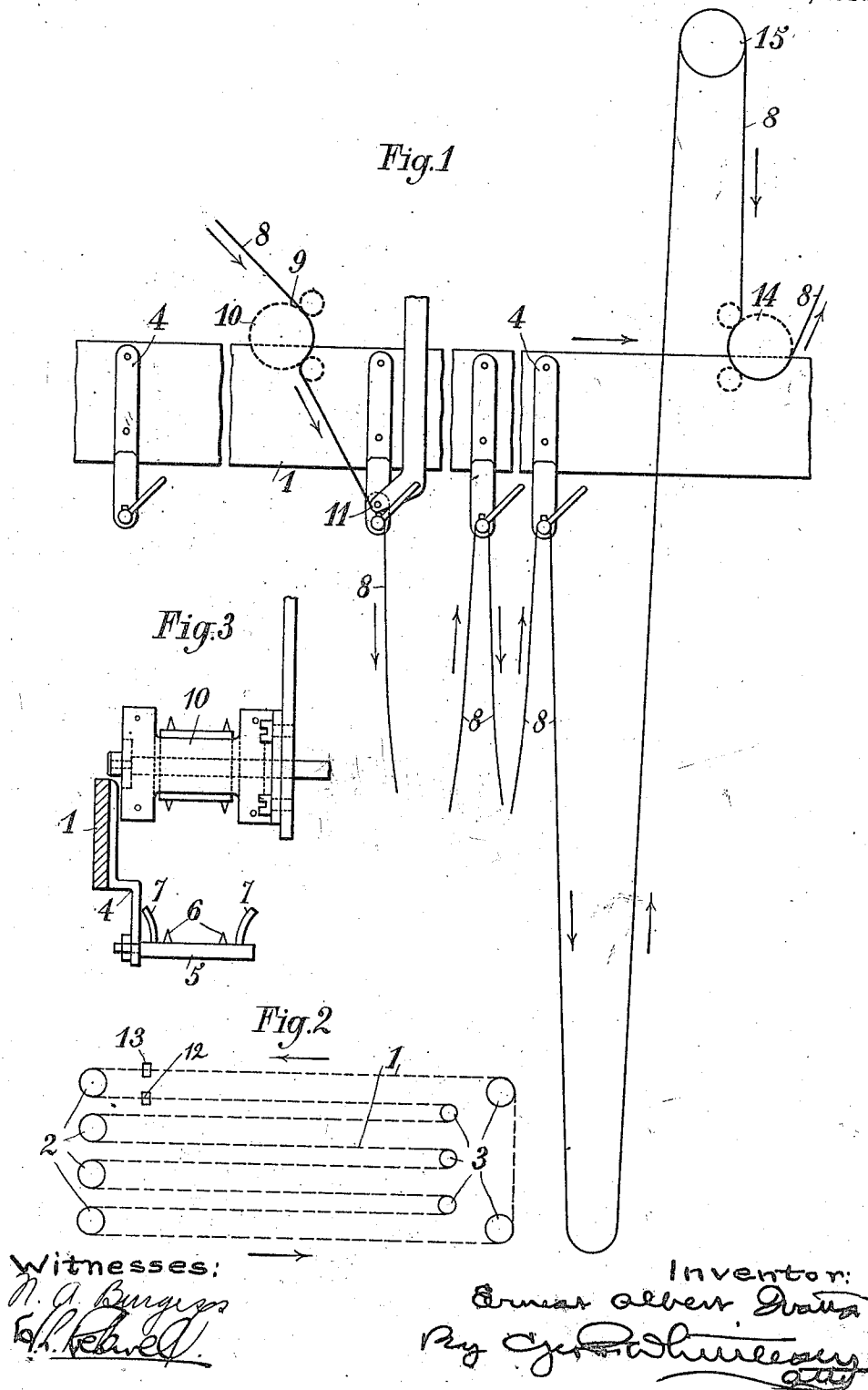


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 APPARATUS FOR THE CONTINUOUS DRYING OF PERFORATED KINEMATOGRAPHIC FILMS.
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948,731.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE CONTINUOUS DRYING OF PERFORATED KINEMATOGRAPHIC FILMS.

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Specification of Letters Patent.

Patented Feb. 8, 1910.

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To all whom it may concern:

Be it known that I, ERNEST ALBERT IVATTS, citizen of Great Britain, residing at Paris, in the Department of the Seine, France, have invented certain new and useful Improvements in Apparatus for the Continuous Drying of Perforated Kinematographic Films, of which the following is a specification.

The present invention consists of an apparatus for automatically and continuously drying perforated kinematographic films.

Continuous drying apparatus is already used in various industries, more particularly in that of the paper industry. Such apparatus is known under the name of "mechanical suspenders." In the paper industry for example the time required for drying paper bands is very considerable, but nevertheless the machines should be capable of a very high output, which is rendered possible by the use of the said suspenders.

It consists essentially of a transporter describing a circuit suitable to the dimensions of the drying apparatus; this transporter carries along a series of horizontal bars arranged parallel to each other and perpendicular to the movement of the transporter. These bars support the continuous band to be dried which forms loops between the said bars. At the same horizontal speed of the suspender the output of the machine will be greater as the bars are arranged nearer to each other and as the loops of the paper bands are longer. This continuous drying apparatus by means of mechanical suspending, has also been advantageously employed for the drying of emulsions coated on paper or other wide supports, but has never been utilized for drying perforated kinematographic films, in which, however, the slight width and the lateral perforations permit of considerably simplifying the mechanism.

At present in the kinematographic industry, the drying of the films is generally obtained by winding them by hand on cylinders or frames and then placing them in drying apparatus for as long as may be necessary. After drying, the films are again wound on to spools. These operations are accompanied by important waste owing to the necessity of cutting the films into short lengths, the commencement and end of each

of these small bands being slightly damaged; furthermore the films are very fragile when their gelatin is swollen with water and consequently are very liable to be scratched during the manipulations. To these disadvantages must also be added the fact that the operations are not continuous as well as also the considerable expense of hand labor.

The present invention is for the purpose of overcoming these disadvantages and consists in the utilization of a mechanical suspending device in the kinematographic industry, for the purpose of automatically and continuously drying perforated films.

I shall now describe my invention with reference to the accompanying drawing in which:

Figure 1 is an elevation of the part of the mechanical suspending apparatus showing the hooking and unhooking of the film. Fig. 2 is a plan view on a small scale of the endless belt carrying the hooking points. Fig. 3 is a cross-elevation showing the arrangement of the feeding device and of the hooking points with respect to the belt.

According to these drawings the mechanical suspending apparatus essentially consists of an endless belt 1 passing through, any horizontal course. For example, as shown in Fig. 2, this course is formed by means of grooved pulleys with vertical shaft. These pulleys are arranged so that the belt 1 traveling on edge cannot fall at any moment. In this arrangement the four pulleys 2 are rotated and drive the belt 1, the five pulleys 3 being merely guide pulleys. The belt 1 is driven at uniform speed, it is provided at suitable regular intervals with suspenders 4 essentially consisting of a metallic bar 5 provided with two pins 6 and with two curved rods 7. The pins 6 are for the purpose of engaging with the perforations of the film at the moment of suspension. The rods 7 constitute guide forks for causing perforations to engage with the points 6. The film 8 to be dried enters at 9, and is conducted over a feed cylinder 10 at a suitable speed so that a certain number of yards of the film sufficing to form the loop is fed while the belt 1 passes through a distance equal to the interval between two suspenders 4. At a certain distance from the

feed cylinder 10 a fixed suspending roller 11 or other device is arranged which permits the points 6 of the suspenders 4 to pass, and by a slight pressure on the film, stops the latter, and forces the points to penetrate into the perforations of the film when they are situated in front. The film 8 is then carried by the belt 1 in loops of equal or almost equal lengths.

The formation of loops of equal lengths is effected in the following manner: As may be seen from Fig. 1, the film 8 at the point where it comes into contact with the suspender 4 is rendered immovable at this spot on the bar 5 owing to it passing under the roller 11, by means of the points 6 penetrating into the perforations of the film. This suspender driven at a uniform speed upon the belt moves away from the roller 11, while the cylinder 10 feeds a definite uniform length of film at a definite speed. Until the second suspender 4 reaches the roller 11, the loop between the first suspender 4 and the feed cylinder 10 will continue to increase in length and finally the desired length of the loop will be reached at the precise moment in which the bar 5 of the second suspender 4 comes into contact with the roller 11.

From what precedes it can be seen that the adjustment of the length of a loop is obtained from the ratio existing between the speed of the belt carrying the suspender 4 and the speed of the feed cylinder 10. These operations are repeated successively for all the suspenders; the loops continue their course thus carried by the belt 1 and it can be seen that the drying will be continuous if a sufficient course is provided for the belt so that in a room suitably heated and ventilated, when one suspender 4, leaving the point 12, arrives at the point 13, the film carried by it will be dried. At this moment it only needs to be unhooked. The film 8, supposed to be dried on arriving at the point 13, is carried along by a second cylinder 14 rotated at exactly the same speed as the feed cylinder 10. Just as for the formation of the loop between two suspenders 4, the ratio between the speed of the suspenders and that of the cylinder 14 is such that when one suspender is brought to a suitable spot near the unhooking cylinder 14, the

loop comprised between this hook and that preceding it is entirely absorbed.

In order to allow for slight differences in the lengths of the loops which may result from the fact that the suspension or hooking on of the film cannot be effected mathematically at the determined spot, a guide roller 15 is arranged as high as possible or the cylinder 14 itself is arranged as high as possible. On leaving the cylinder 14 the dried film passes for example over guide rollers and from there to an automatic winder driven by friction; it may consequently be conducted as desired automatically and continuously to the spot where it has been used. As already stated this arrangement is for the purpose of drying perforated kinematographic films and may be advantageously employed for example either for the drying of the said perforated films as they come out of a continuous developing apparatus or for the drying of perforated films in which the pictures are obtained by any processes, or even and more particularly for the drying of gelatin or emulsified films of slight width, after perforation. In this latter case it is evident that the continuous drying device should be arranged in a dark room and that all necessary precautions should be taken for preventing the films being altered by the action of light or the like.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:

An apparatus for automatically and continuously drying perforated kinematograph films comprising a continuous traveling belt running edgewise, of suitable length to carry films so as to become dry, suitable suspenders being fitted upon the said traveling belt to hook on perforated films, together with arrangements for hooking on and unhooking the said films when entering and leaving the said suspender.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST ALBERT IVATTS.

Witnesses:

HENRY DANZER,
LUCIEN CRESPIN.