April 15, 1930. H. KRULL ET AL 1,755,066

DEVICE FOR DRYING CELLULOSE FILMS

Filed June 26, 1928 2 Sheets-Sheet 1

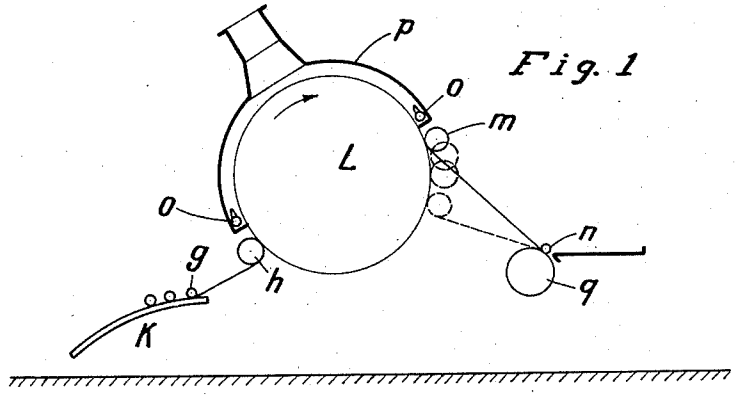


Fig. 1

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April 15, 1930. H. KRULL ET AL 1,755,066

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Filed June 26, 1928 2 Sheets-Sheet 2

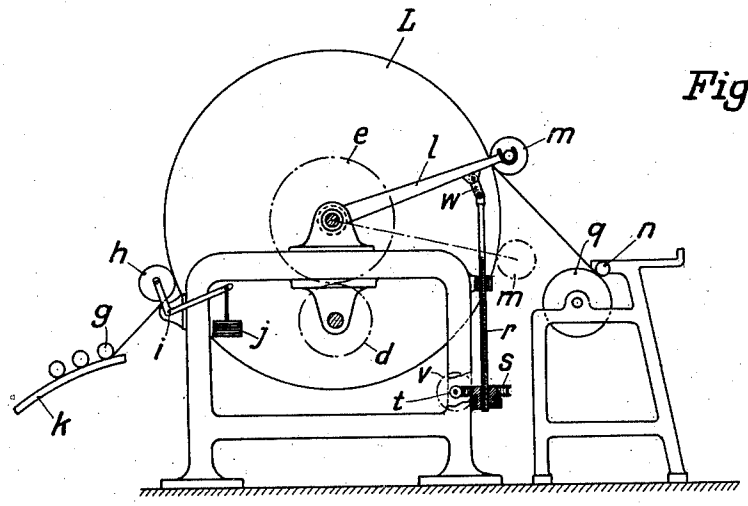


Fig. 3.

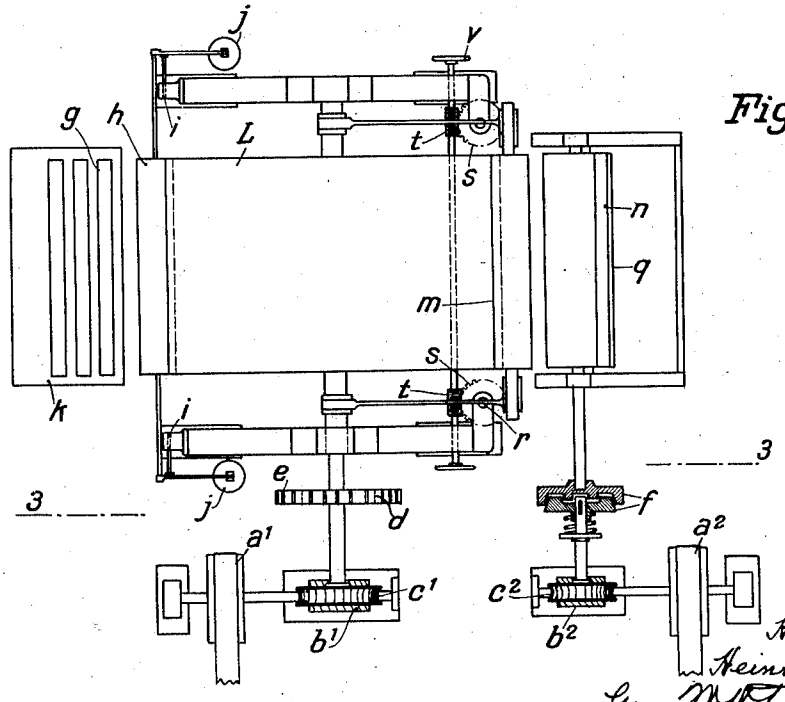


Fig. 2.

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UNITED STATES PATENT OFFICE

HANS KRULL, OF SCHOLWIN, NEAR STETTIN, AND HEINRICH DETHLOFF, OF MAXAU, GERMANY, ASSIGNORS TO THE FIRM OF FELDMÜHLE, PAPIER- UND ZELLSTOFF-WERKE AKTIENGESELLSCHAFT, OF SCHOLWIN, NEAR STETTIN, GERMANY

DEVICE FOR DRYING CELLULOSE FILMS

Application filed June 26, 1928, Serial No. 288,444, and in Germany May 12, 1927.

This invention relates to a device for the drying of cellulose films or foils, more particularly cellulose films or foils obtained from aqueous solutions (for instance viscose), and has for its purpose to avoid certain drawbacks inherent in previously known devices wherein the film during the drying operation is guided over a plurality of rollers.

According to the present invention, the drying device comprises a single drying roll of a large diameter into contact with which the moist film is brought by means of a pressing-on roller. During the whole process of drying, the film remains in constant contact with the cylinder, which is heated inside, and is taken off only when completely dry.

This removal is done by means of a taking off device so arranged as to permit variations in the position of the point of removal of the film from the cylinder in adaptation to varying circumstances such as the speed of travel, the thickness and the moisture content of the film. In order to assist the drying effect of the drying roll or cylinder which, as stated, is heated from inside, and to avoid undesired dimensions thereof, the film is heated and dried also from the outside. This is preferably done by means of a heating device closely surrounding the drying cylinder like a hood, or by means of hot air which passes through a hood-like guide over the film and carries away the evaporated water. It has been found advisable to dry the film first by moving it in the same direction as the direction of travel of the hot air, and afterwards in a direction opposite to the direction of travel of the hot air.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a diagrammatic representation of apparatus embodying our invention. Fig. 2 is a plan view showing the apparatus more in detail, and Fig. 3 is a sectional elevation of the apparatus taken substantially on line 3—3 of Fig. 2, the hood being omitted from Figs. 2 and 3 in the interest of clearness.

The drying device is constituted by an unwinding bracket K, a drying cylinder L heated inside and outside with steam and hot air, a pressing-on roller h and a taking off roller m as well as by a winding device n and q.

The film reels g which have been wound wet and rest on the unwinding bracket K, are transferred from the same by hand and by means of the pressing-on roller h to the heated rotating cylinder L. Owing to the pressing-on pressure, the wet film adheres to the cylinder and is carried round by the latter and dried while on its way. The pressing-on roller h is rotatable about a fixed point of support i and is pressed on in a suitable manner by weight j and rotated by the cylinder by friction. The cylinder L is heated with steam in the interior by any suitable means (not shown). It is surounded by a hood p closed in a tight manner. Into the space between the hood and the peripheral cylinder wall is introduced at the front and at the back, through nozzles o, hot air which together with the evaporated water is exhausted by a fan (not shown) through the upper opening. The taking-off roller m, which at the same time is formed as a cooling roller, can be adjusted (by means hereinafter described) so that lighter films can be removed at a higher point, and heavier films which require a greater time of drying for the same speed, at a lower point. From here the film, preferably after it has been cut at the sides, passes to a winding device n, q which, for the purpose of ensuring smooth and tight winding, is driven by means of a friction clutch f.

The rotation of the drying cylinder L and the roller g is effected by a suitable motor (not shown) by means of belt drives a_1, a_2 respectively. Each belt pulley has on its shaft a worm b_1, b_2, respectively, meshing with a worm wheel c_1, c_2. The shaft of worm wheel c_1 carries a gear d meshing with a gear e fixed on the shaft of cylinder L. The belt drive a_1 therefore transmits rotational movement to cylinder L.

In the drive mechanism for roller g we interpose the friction clutch f. The rotation of roller g is transmitted by friction to roller n, so that the film unrolled from reel g is drawn over and carried around upon dry-

ing cylinder L and unrolled therefrom upon roller *n*.

The taking-off roller *m* is mounted at the ends of two arms *l* pivotally mounted preferably on the shaft of the drying cylinder L. Each arm *l* is connected by a link *w* with a screwthreaded rod *r* passing through a nut *s*, rotatably mounted on the frame-work. These nuts *s* are formed as worm wheels which are in mesh with worms *t*. The worms *t* are fixed on a shaft carrying a hand-wheel *v*. By rotation of the hand-wheel *v* the worm wheel nuts *s* can be rotated with the effect that the screwed rods *r* are raised or lowered and thereby roller *m* is moved peripherally or circumferentially of cylinder L, a lower position of roller *m* being indicated in Fig. 3 in broken lines.

What we claim is:

A device for drying cellulose films, including an interiorly heated drying cylinder of a relatively large diameter, said cylinder provided for a considerable portion of its circumference with heat radiation preventing means, a stationary pressing-on roller for transferring the film to the drying cylinder, and a taking-off roller for the dried film, said last mentioned roller adjustable peripherally of the cylinder so as to permit variation of the length of the drying path of the film in contact with the cylinder outside of said radiation preventing means.

In witness whereof we affix our signatures.

HANS KRULL.

HEINRICH DETHLOFF.