

E. BRANDENBERGER.
MANUFACTURE OF CELLULOSIC FILMS.
APPLICATION FILED JULY 23, 1909.

1,002,634.

Patented Sept. 5, 1911.

2 SHEETS—SHEET 1.

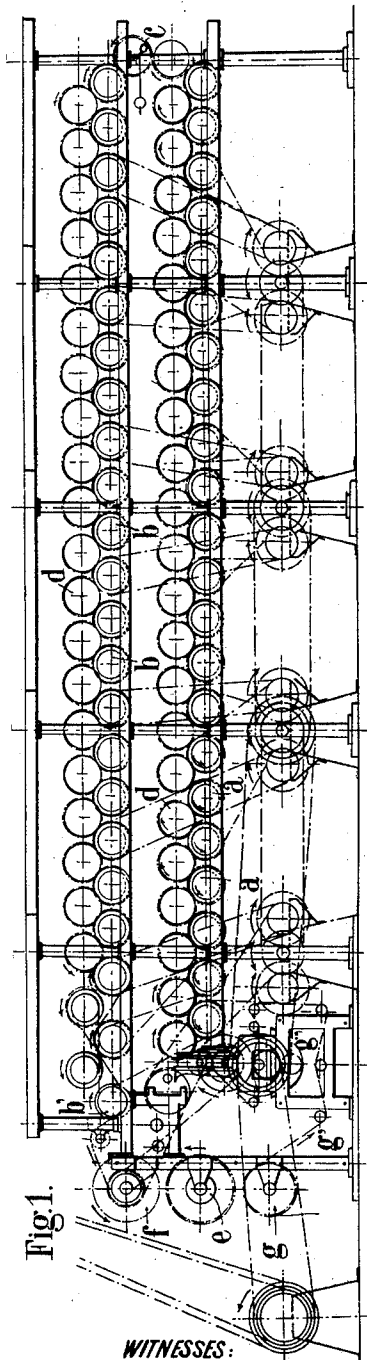


Fig. 1.

WITNESSES:

J. A. Cook

H. M. Kilpatrick

Fig. 3.

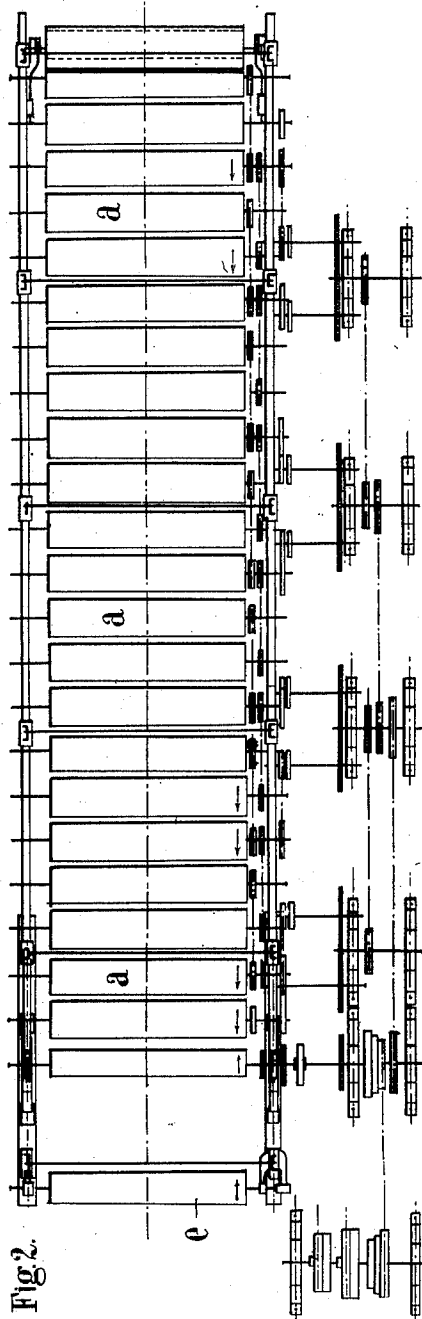
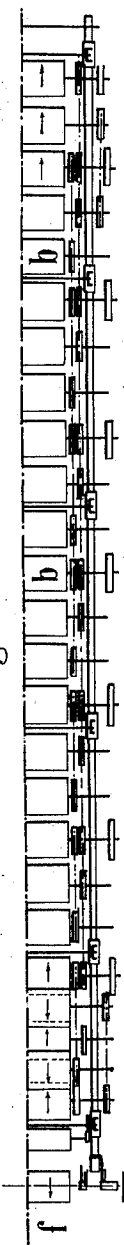


Fig. 2.

INVENTOR

Edwin Brandenberger

BY

James Hogue
ATTORNEYS.

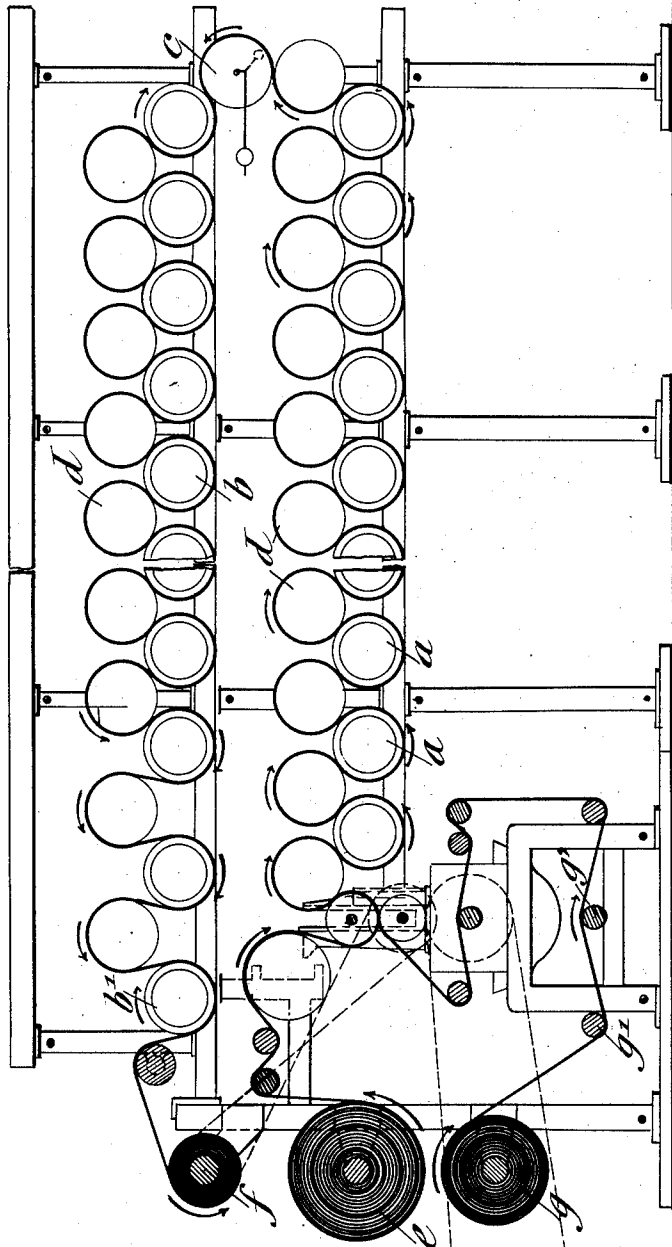
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2 SHEETS—SHEET 2.

Fig. 4.



Witnesses:
John Murtagh
L. J. Murphy

Inventor
Edwin
Brandenburger
By his Attorneys
Samuel G. Hall

UNITED STATES PATENT OFFICE.

EDWIN BRANDENBERGER, OF THAON-LES-VOSGES, FRANCE.

MANUFACTURE OF CELLULOSIC FILMS.

1,002,634.

Specification of Letters Patent.

Patented Sept. 5, 1911.

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To all whom it may concern:

Be it known that I, EDWIN BRANDENBERGER, chemist, a citizen of the Swiss Republic, and resident of Thaon-les-Vosges, Vosges, France, have invented new and useful Improvements in or Relating to the Manufacture of Cellulosic Films, which improvement is fully set forth in the following specification.

10 This invention relates to a machine intended for drying cellulosic films obtained from a water solution of cellulose, such as for instance cellulosic films obtained from a water solution of cellulose xanthate.

15 It is known that it is possible to manufacture continuously cellulosic film which, as it is made, can be rolled up, the length of the film in each roll being as great as desired.

20 After their manufacture, cellulosic films must be dried before they can be utilized industrially. The said drying presents great difficulties in practice. If the cellulosic film is simply exposed to the action of the
25 air, it shrinks and loses all its transparency, becomes warped and absolutely useless for industrial purposes. If it is stretched at its edges while being dried it cracks and breaks, either during drying, or at the moment when
30 it is detached.

This invention relates to a machine in which any lengths of film can be treated, the drying taking place in such conditions that the film does not shrink and on emerging
35 from the machine has a remarkable transparency, remaining absolutely smooth at the same time.

In the machine according to this invention the cellulosic film is held during the drying
40 operation at every point by means of parts which, without exercising a great and consequently injurious pressure on it are arranged so as simply to hold the film in contact with rigid surfaces, on both faces.

45 A machine according to this invention is illustrated by way of example in the accompanying drawing, in which—

Figure 1 is an elevation, Fig. 2 a plan, Fig. 3 a partial plan of the driving gear of
50 the second or upper level, Fig. 4 is a view similar to Fig. 1 but on an enlarged scale and with parts omitted and broken away, and Fig. 5 is a perspective view of one of the rollers.

55 This machine has two floors or levels. The object is merely to avoid making the

machine excessively long, but it is obvious that the machine according to this invention could be provided either with one, three or four floors etc: if it were considered necessary.

As will be seen in the drawings, the machine comprises a series of rollers *a* which, by means of a suitable gear (see plan in Fig. 2) consisting of driving belts and toothed
65 wheels, are operated so as to rotate in the direction of the arrows shown in Fig. 1, that is to say, in the direction required, as will be hereinafter described, for the advance of the film in the machine.

The second floor of the machine also comprises rollers *b* which are also driven by means of a suitable gear; the construction of which need not be described and which is besides shown in detail in Fig. 3. The
75 driving gear is arranged so that the rollers *b* rotate in the direction shown by the arrows (Fig. 1) that is to say the direction required for the advance of the film in the machine from the back forward.

A roller *c* arranged at the back of the machine, forms an intermediate support for the passage of the film from the lower floor to the upper.

The rollers *a* and *b* are hollow and can be
85 heated either by circulation of a hot fluid, or by the direct action of a flame, or in any other suitable manner. Above the rollers *a*, as well as above the rollers *b*, are arranged hollow rollers *d* which are quite free, that
90 is to say, not driven in any way and rest simply by gravity on two consecutive rollers *b* or *a*, as shown in Fig. 5. These rollers are of suitable light weight, and are held in the transverse direction of the machine
95 by means of flanges at the ends of the rollers *a* and *b*. It will be understood, moreover, that the rollers *d* which are constituted by simple tubes, could be held by flanges secured to the rollers *a* and *b*. The rollers *d*
100 of the bottom floor, owing to their contact with the rollers *a*, will rotate in the direction indicated by the arrows, and the rollers *d* of the upper floor, in contact with the rollers
105 *b*, will rotate in the direction shown by the arrows, which is the direction opposite to the direction of rotation of the rollers *d* of the bottom floor. The air about the rollers should be raised to a temperature of the desired degree for bringing about a complete
110 drying of the cellulosic film to be treated. This method of drying could be used alone

or in combination with the means provided for heating rollers *a* and *b*.

The roller containing the cellulosic film to be dried, is mounted in the machine at *e*, and the end of the said cellulosic film is secured by any suitable means to a fabric of a suitable length which, in its turn, is attached to a strap which follows in the machine the path shown by the chain dotted lines, that is to say, passing successively around the rollers *d a*, on the one hand, for the first floor, and the rollers *b d*, on the other hand, for the second floor. The strap comes out at the front of the apparatus after the last roller *b'*.

The different driving rollers *a b* having been started, the film is unwound from the roller *e* following the fabric to which it is attached, in order to travel in the machine along the path hereinbefore specified, that is the path followed by the strap around the rollers *d a* and *b d*.

When the end of the film, after having traveled through the whole machine, arrives at the upper roller *b'*, the attendant detaches the fabric from the edge of the film and winds the latter on the winder *f*. The machine is then in complete operation. The damp cellulosic film is unwound from the roller *e* in order to be wound on the roller *f* after having traveled from the front to the back through the first floor of the machine and from the back to the front through the second floor, the said film being supported throughout its length by the rollers *a d* and *b d* during its passage through the machine, for the purpose of obtaining, as already stated, a transparent cellulosic film without creases or shrinkage. The apparatus described can also be used, as will be readily understood, for securing at the same time the film to any support, paper or fabric for instance. To that end, at the bottom of the machine at *g*, is arranged a roller on which is wound the band of paper. The latter, after having passed guide rollers *g'* and received the necessary

finish, or the glue required for fixing the film, arrives in contact with the latter between the rollers *a* and *d*. The band of paper follows the same path as the cellulosic film. It adheres to the latter, and finally a band of cellulosic film glued to a band of paper, is stored on the roller *f*.

Stretching or regulating parts can be provided, as will be readily understood, for the purpose of insuring uniform working of the machine.

The drying machine described, instead of being fed by rollers containing the film could receive it direct on its leaving the machine in which the said film was manufactured or otherwise handled.

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:—

1. In a machine for drying cellulosic films, the combination of a series of lower driving rollers, mechanical means for rotating the same, and a series of free upper rollers located above and between and resting upon said driving rollers, said rollers of said upper and lower series forming between each other alternately a continuous drying surface for the film.

2. In a machine for drying cellulosic films, a series of lower drying rollers, mechanical means for rotating the same, a series of free upper rollers located above and between and resting upon said lower rollers, and means for preventing lateral movement of said upper rollers, said rollers of said upper and lower series forming between each other alternately a continuous drying surface for the film.

Dated this 29th day of June 1909.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EDWIN BRANDENBERGER.

Witnesses:

EMILE LEDRET,
H. C. COXE.