

Nov. 20, 1928.

1,692,129

A. LAMBRETTE

MACHINE FOR DRYING FABRICS AND PAPERS IN AN ENDLESS WEB

Filed Dec. 5, 1925

4 Sheets-Sheet 1

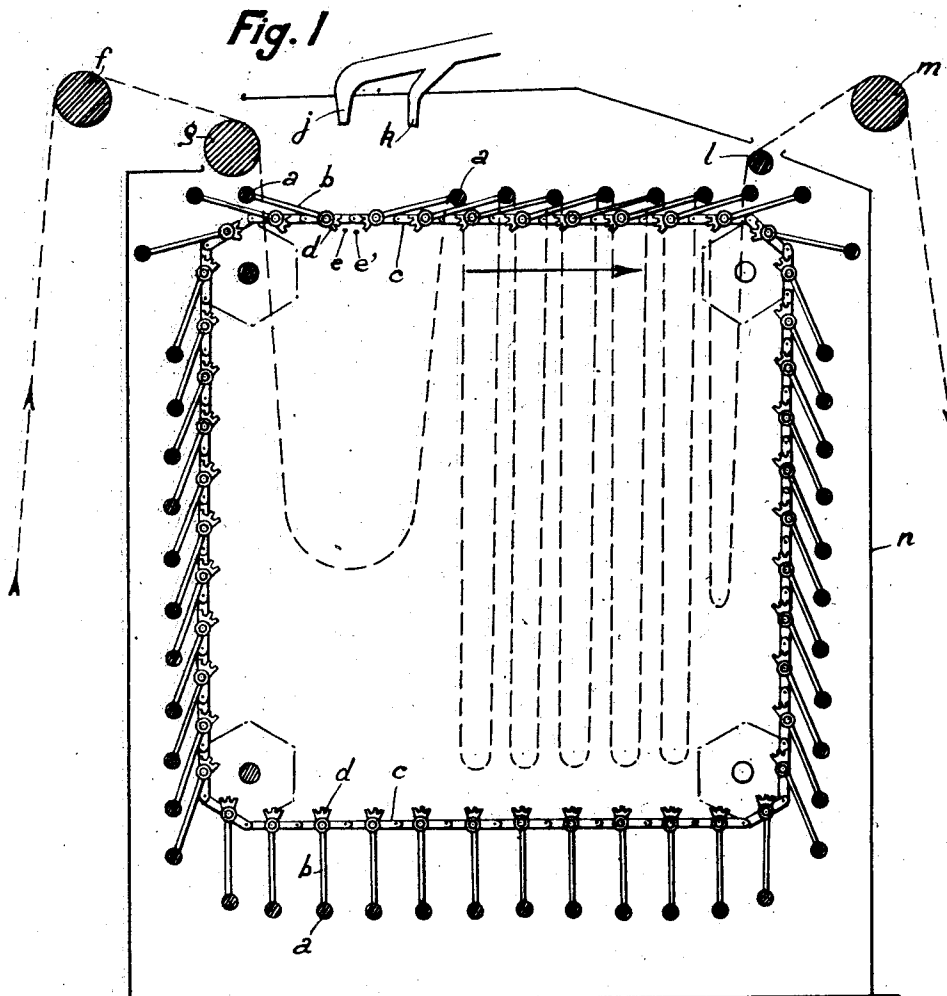
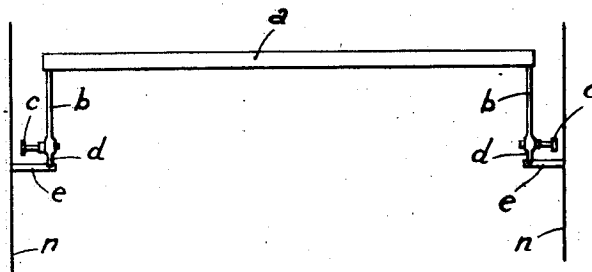


Fig. 2



Witnesses:
Henri Blouin
André Blouin

Inventor:
Aubin Lambrette

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Fig. 3

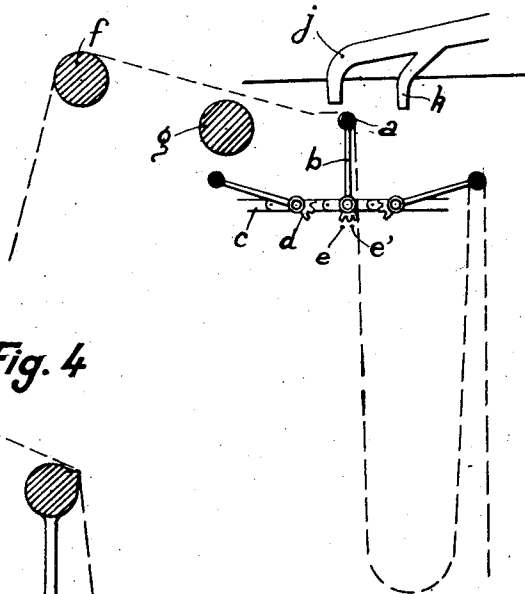


Fig. 4

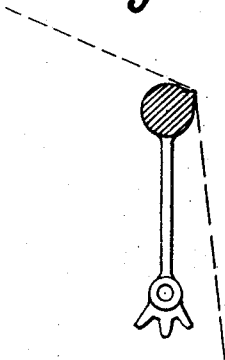


Fig. 5

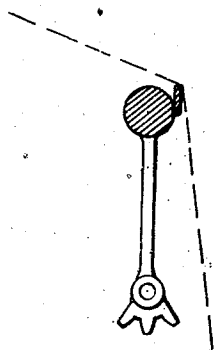
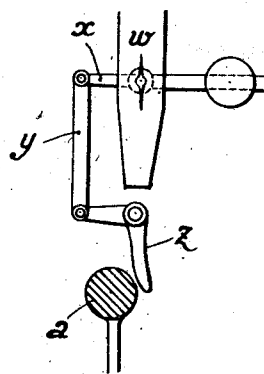


Fig. 8



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Fig. 6

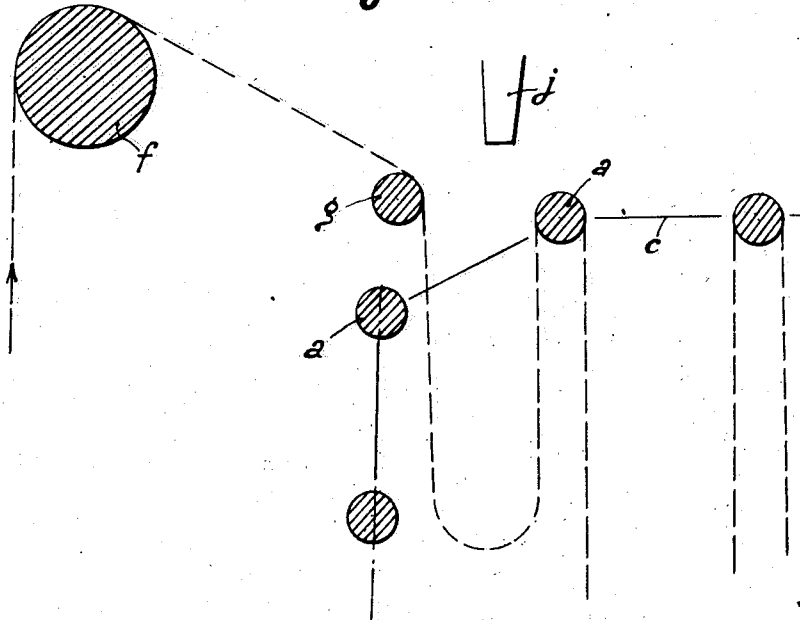
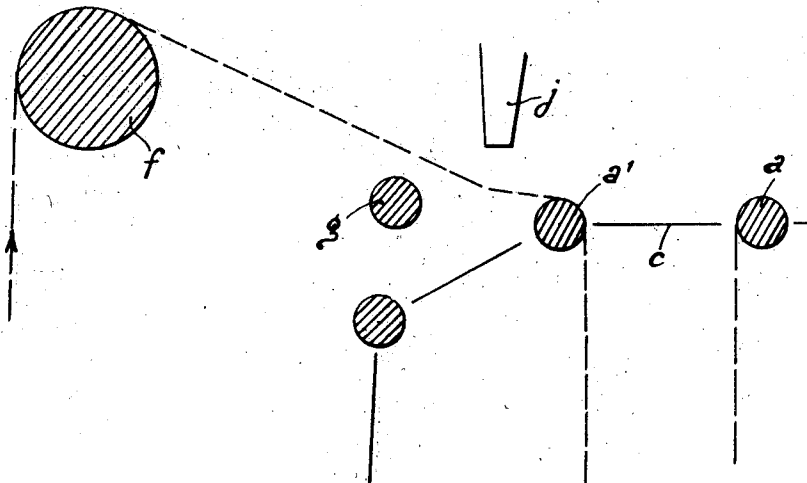


Fig. 7



Witnesses:
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4 Sheets-Sheet 4

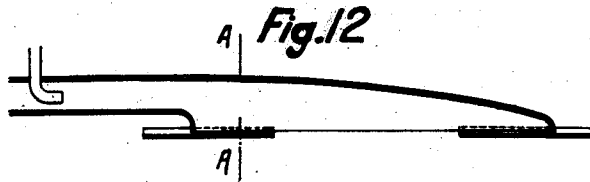
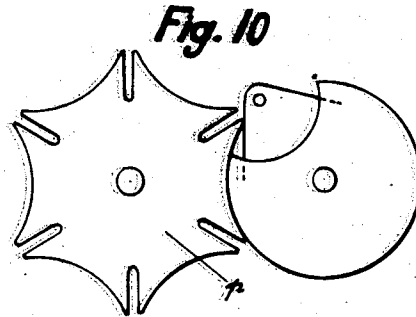
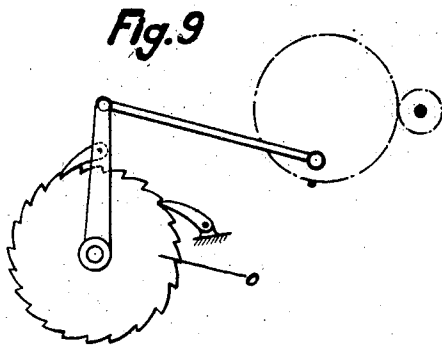


Fig. 11

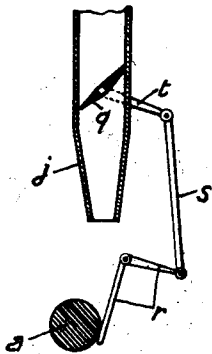


Fig. 14

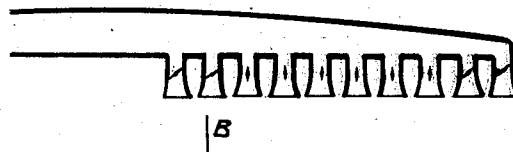


Fig. 13



Fig. 15

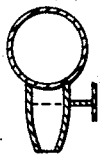


Fig. 16

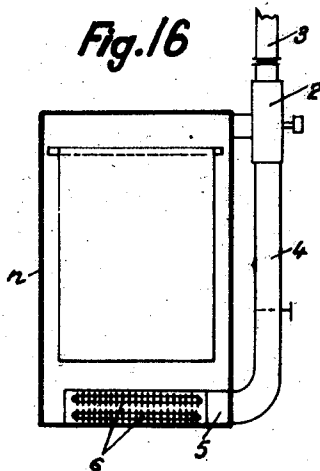
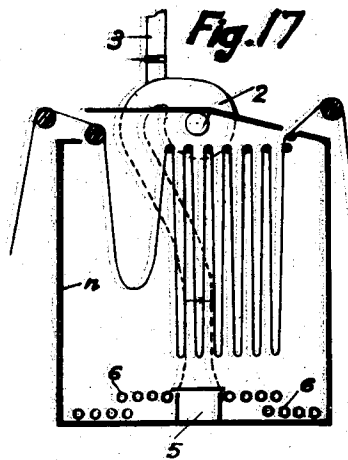


Fig. 17



Inventor:
A. Lambrette
By *[Signature]*
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UNITED STATES PATENT OFFICE.

AUBIN LAMBRETTE, OF MEMBAC-DOLHAIN, BELGIUM.

MACHINE FOR DRYING FABRICS AND PAPERS IN AN ENDLESS WEB.

Application filed December 5, 1925, Serial No. 73,513, and in France December 19, 1924.

This machine which is of the so called "catching" type operates by means of sticks which are fixed in a permanent manner to two endless chains and is principally characterized by the fact that the introduction of the fabric (or paper) is obtained by means of one or several air sprays or jets of air, the main object of which are to arrange the fabric (or paper) in regular folds, to stretch the same in the direction of the width and to prevent every contact of the right side of the cloth or fabric (or paper) with parts of the machine. The regular folding of the fabric (or paper) upon the sticks is secured by the fact that an air spray stops the fabric or paper upon the stick at the moment the latter is brought under this spray by the movement of the chains. The stretching or spreading in the direction of the width is obtained by the fact that the air strikes the middle of the fabric (or paper) and that it must escape at the right and at the left in swelling the fold and in tending to widen the same. These two effects which are obtained by means of the jets of air allow to do away with all devices which, in machines of this kind, are obliged to touch the right side of the fabric (or paper) so as to cause the same to fold itself about the sticks and to stretch or spread the same in such a manner that it will be flat or smooth.

The fact that every contact with the right side is avoided offers obvious advantages. The spreading in the direction of the width by means of air sprays or jets of air shows the advantage that this effect is produced during the formation of the fold and that it acts quite particularly at the place where the curvature assumed by the fabric (or paper) makes the formation of breakings particularly to be feared. The fabrics which have been strongly distorted by the dyeing upon stretchers cannot be better stretched in a machine than when they are hung or suspended by hand in the operation of stretching.

The accompanying drawings show, by way of example, two forms of construction of the invention.

Fig. 1 is a diagrammatic view of the whole of the machine according to a first form of construction.

Fig. 2 is a part cross section.

Fig. 3 is a part view similar to Fig. 1 but with another position of the sticks.

Figs. 4 and 5 show in section two modified forms of the sticks.

Figs. 6 and 7 are diagrams relating to a second form of construction of the machine.

Fig. 8 shows a closing device for the compressed air nozzle.

Figs. 9 and 10 show means for moving the chains stepwise.

Fig. 11 shows a device for closing the nozzle.

Fig. 12 shows in longitudinal section a nozzle having a slot.

Fig. 13 is a cross section on line A—A of Fig. 12.

Fig. 14 shows in longitudinal section a device for a row of nozzles.

Fig. 15 is a cross section on line B—B of Fig. 14.

Figs. 16 and 17 show the means for supplying heat to dry the web.

In the first form of construction (Figs. 1, 2 and 3), every stick *a* is carried by a pair of levers *b* which are articulated to the links of the two chains *c* which move in the direction of the arrow. Every lever *b* is provided with a toothed quadrant *d* with which can gear fixed abutments or stops *e—e'* which, at the moment of the formation of the fold, cause the stick *a* to move forwardly. The fabric (or paper) is brought by the rollers *f* and *g*; the roller *f* is placed sufficiently high so that the fabric (or paper) will no longer be in contact with the roller *g* when the stops *e—e'* have turned the levers *b* upwardly. In this position (Fig. 3), the stick *a* has just passed under the nozzle *j* to which air under pressure is supplied; in virtue of the tension produced by the pressure of the air and by the weight of the fabric (or of the paper) from *f* to *a*, there is such a large friction between the fabric (or the paper) and the stick *a*, that the fabric (or the paper) stops upon this stick and forms a new fold behind said stick. A second nozzle *k* blows into the preceding fold so as to keep the fabric in a stretched state as far as the end of the formation of the fold; in the case of paper as well as of fabrics to which the breakings are not detrimental, this second nozzle *k* can be omitted. When the stick *a* is entirely directed forwardly, the two nozzles *j* and *k* blow into the same fold (see Fig. 1) until the following stick passes under the nozzle *j* and the formation of a new fold begins.

At the end of the machine, the fabric (or the paper) is removed by the rollers *l* and *m* which have the same tangential speed as the rollers *f* and *g*, or which can be adjusted or

brought out of gear according as to whether the length of the fabric (or of the paper) is invariable or is altered by the drying or the hanging.

5 The course of the chains is enclosed within the drying chamber *n* which is provided with any system of heating and aerating apparatus.

10 The heating device, which is used comprises a fan 2 (Figs. 16 and 17) the suction hole of which is connected to the top end of the chamber *u* which encloses the machine; to the exhaust of this fan an exhaust pipe 3 fitted with a register is connected. The exhaust pipe 4 having also a register returns the greatest portion of the air into a box 5 which leads this air onto heating tubes 6 designed to distribute the same as regularly as possible over the entire extent of the chamber. The air designed to replace that which has been exhausted through the chimney 3 flows into the chamber through the two slots through which the fabric comes in and goes out eventually through openings arranged in the bottom portion of the chamber.

25 In this form of construction, the sticks can be of another shape than the cylindrical one and this with the object of facilitating the stopping of the fabric (or of the paper) upon the sticks and to accordingly allow of using a less powerful spray or jet of air. Fig. 4 shows the way in which the sticks can be provided with a ridge which is turned downwardly by the rotation of the levers *b* after the fold has been formed, so that it does not touch the fabric (or paper) during the drying operation and cannot spoil the same. This ridge can be replaced by an attached blade as shown in Fig. 5.

40 In the second form of construction (Figs. 6 and 7), the sticks are directly secured to the chains links and the roller *g* is of a small diameter and the chains are operated stepwise so that they suddenly move forward to an extent corresponding to a stick spacing. This motion is obtained through means which are known and already used in connection with similar machines for instance by means of a system of pawl and ratchet *o* (Fig. 9) or of a Maltese cross wheel *p* (Fig. 10); the second nozzle *k* would exert here but little effect and can be left aside. Fig. 6 shows the position of the fabric (or of the paper) during the formation of the fold, whilst the fabric (or the paper) delivered or supplied from the rollers *f* and *g* moves down between the sticks *a* and *a'* under the influence of the nozzle *j*. Fig. 7 shows what happens when the chains move forwardly, the fabric (or the paper) stops about the stick *a'* and a new fold begins to form itself. This second form of construction is more simple than the first one but does not spread or stretch as well the fabric (or the paper) and is not to be recommended when the breakings are seriously feared.

If the spreading or stretching in the direction of the width by means of jets of air or air sprays was to be abandoned, a shutting off flap *q* (Fig. 11) may be arranged in the nozzle *j* which would be operated by the sticks *a* or by the chain links and this in such a manner that the nozzle could only blow through the intermediary of an elbow lever *r* one arm of which is connected by a rod *s* to the lever *t* keyed on the axle of said shutting off flap *q*, but at the beginning of the formation of the folds. Up to now, practice has not justified this complication.

For drying long hair fabrics or cloths, or fabrics or papers which have received a thick coating or layer of sizing, the closing means can be devised in quite a different manner, that is to say so as to stop or reduce the jet or spray when the stick is just under the nozzle so that the jet or spray of air cannot disturb the hair or spoil the coating of size. Fig. 8 shows how easy it is to make a closing device. A throttle valve *w* is placed in the pipe of the nozzle *j*. The same is operated by the movement of the stick *a* acting through the medium of the lever *z*, of the connecting rod *y* and of the lever *z*, in such a manner that the throttle valve closes when the stick is under the nozzle. On the contrary, should it be desired for the nozzle to blow only for the purpose of stopping the fabric (or the paper) at the beginning of the formation of the fold, it would only be necessary to key the lever *w* in such a manner that the throttle valve would remain closed by itself and would be opened by the passage of the stick in using an analogous device to that which has been described above with reference to Fig. 11.

Should it be desired to obtain a chemical action besides the physical treatment, the air could be replaced by other gases or by vapours; hot air, wet air or hot gases could also be used for feeding the nozzles. In these cases, it might be useful to use wide nozzles, nozzles provided with a slot (Figs. 12 and 13) or rows of nozzles (Figs. 14 and 15), so that the effect would be equal over the whole width of the fabric (or of the paper).

The gas or the vapour may be employed alone and in this case the nozzles are directly fed by the apparatus which supplies this gas or vapour (boiler, reservoir under pressure or any other apparatus), or indirectly fed through the intermediary of a blower to which the gas or vapour is supplied from one of these sources. The gas or vapour might be used in mixture with the outer air which they draw along. In the one or other case the nozzle arrangement shown in Figs. 12 and 13 will be used. The same arrangement might be used when moist air has to be supplied to the nozzle, the small tube being then connected to a supply of water and terminating in an atomizer of known type.

When a machine is to treat two or several fabrics (or strips of paper) arranged side by side, the same is provided with as many nozzles or pairs of nozzles which act in the middle of each fabric (or of each strip of paper).

I claim:—

1. A machine of the catching type for drying fabric or paper in a continuous web, comprising in combination with two endless conveying chains, levers hingedly mounted each on the outer side of one of two corresponding links of said chain so that they turn when said chains move, a transverse stick fixed on the outer ends of every pair of levers, a feed roller for feeding the web of fabric or paper arranged at a certain height above said endless chains, a second feed roller between said first mentioned feed roller and said endless chains closer to said chains than said first mentioned feed roller, and two nozzles in front of said second mentioned feed roller arranged the one behind the other adapted to direct jets of air under pressure upon the web of fabric or paper to arrange the same about the stick which is just turning and to widely stretch and spread transversely the web in the fold formed between the preceding stick and the stick which is just turning.

2. A machine of the catching type for drying fabric or paper in a continuous web, comprising in combination with two endless conveying chains, levers hingedly mounted each on the outer side of one of two corresponding links of said chain so that they turn when said chains move, a transverse stick fixed on the outer ends of every pair of levers, a feed roller for feeding the web of fabric or paper arranged at a certain height above said endless chains, a second feed roller between said first mentioned feed roller and said endless chains closer to said chains than said first mentioned feed roller, and a nozzle in front of said second mentioned feed roller, adapted to direct jets of air under pressure upon the web of fabric or paper to arrange the same about the stick which is just turning and to

widely stretch and spread transversely the web in the fold formed between the preceding stick and the stick which is just turning.

3. A machine of the catching type for drying fabric or paper in a continuous web, comprising in combination with two endless conveying chains, levers hingedly mounted each on the outer side of one of two corresponding links of said chain so that they turn when said chains move, a transverse stick fixed on the outer ends of every pair of levers, a feed roller for feeding the web of fabric or paper arranged at a certain height above said endless chains, a second feed roller between said first mentioned feed roller and said endless chains closer to said chains than said first mentioned feed roller, a toothed sector at the lower end of each lever, stationary abutments under the upper horizontal side of said endless chains close to said second mentioned feed roller cooperating with said toothed sectors, and two nozzles in front of said second mentioned feed roller arranged the one behind the other adapted to direct jets of air under pressure upon the web of fabric or paper to arrange the same about the stick which is just turning and to widely stretch and spread transversely the web in the fold formed between the preceding stick and the stick which is just turning.

4. A machine of the catching type for drying fabric or paper in a continuous web, comprising in combination with the sticks and the nozzles for compressed air, a throttle valve in each nozzle, a transverse lever on said throttle valve, a link hingedly connected to one end of said transverse lever, and an elbow lever hingedly connected to the lower end of said link so that its other arm projects onto the path of the stick which is being turned and strikes against said elbow lever to open said throttle valve.

In testimony whereof I affix my signature.

AUBIN LAMBRETTE.