Nov. 2, 1926. 1,605,067

R. E. READ

PAPER MAKING MACHINE

Filed Dec. 24, 1925 2 Sheets-Sheet 1

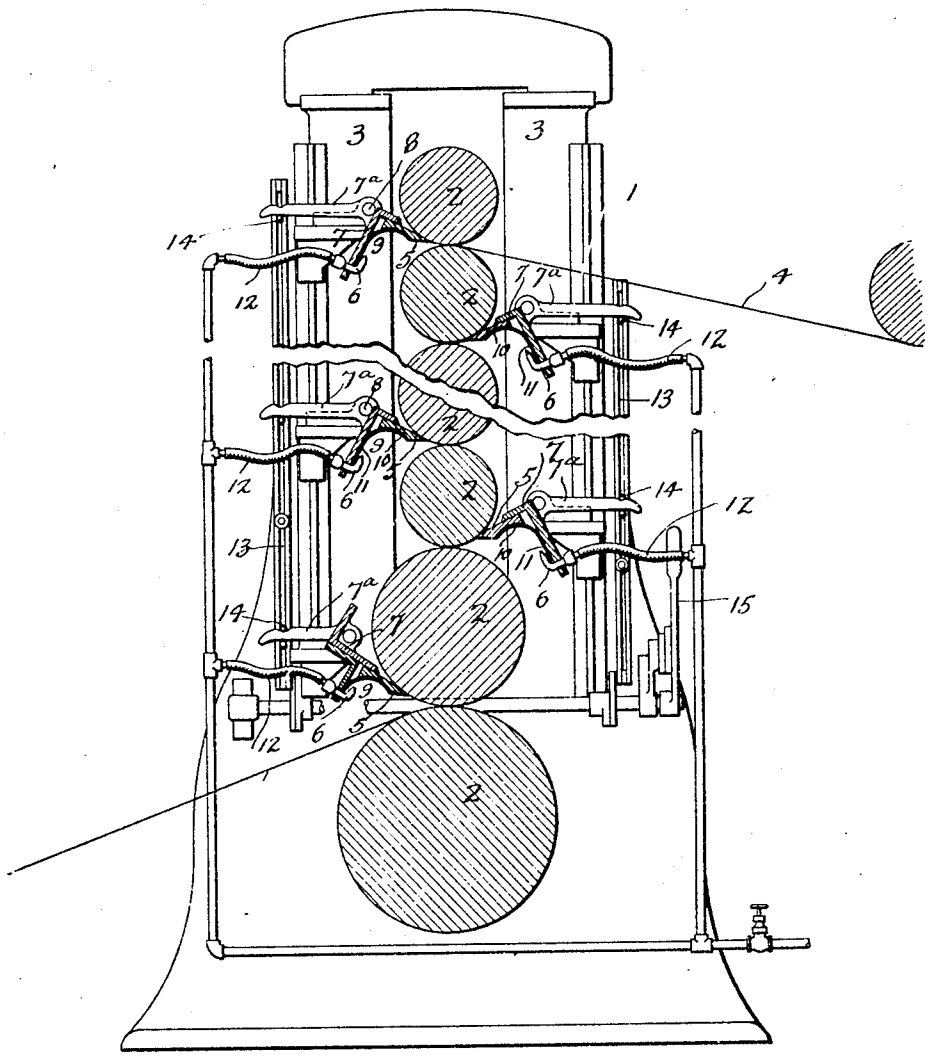

FIG. 1.

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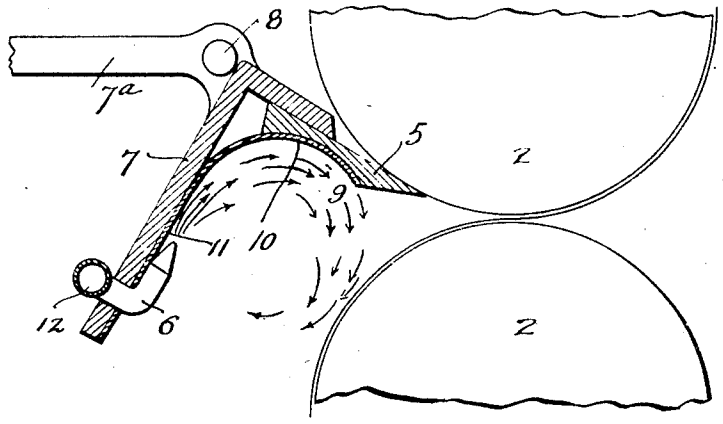

FIG. 2.

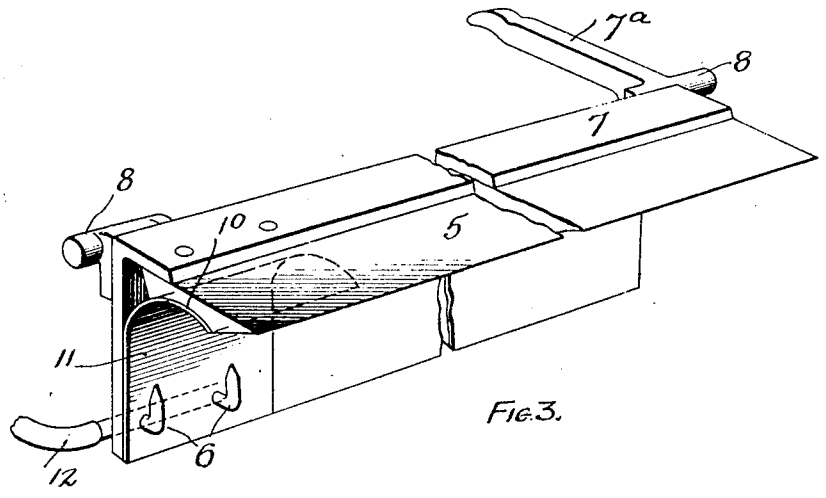

FIG. 3.

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UNITED STATES PATENT OFFICE.

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PAPER-MAKING MACHINE.

Application filed December 24, 1925. Serial No. 77,503.

This invention relates to paper making machines, and is particularly concerned with the means for establishing the travel of the paper web through the machine in starting the operation of the machine in the first instance, and in reestablishing the travel of the web in the event of the breakage or parting of the same. It is customary in these operations to form a relatively narrow lead strip on the web by incising or slitting the same longitudinally near one edge, and to start the travel of this lead strip through the machine, and when the travel of the same has become fully established, to gradually widen out the lead strip to the full width of the web. In this operation there is a tendency of the lead strip to adhere to the rotary roll of the machine with which, for the time being, it is in contact, and thus fail to follow its proper course through the machine. For instance in the travel of the strip through the presses, the strip is liable to adhere to and follow around with the upper press roll and thus fail to pass to the conveying belt below; and in the calender stack there is a tendency of the strip to adhere to and follow each upper calender roll and thus fail to pass, as it should, to the next roll beneath.

The present invention is designed to overcome this objectionable action, and to insure that in the event of the lead strip adhering to the roll, it will be automatically detached or lifted therefrom and directed to its proper path of travel, and with this end in view the invention consists of a doctor knife of improved form cooperating with the roll in the machine to which there is a tendency of the lead strip to adhere, and acting to lift the lead strip from the roll, and in combination therewith, fluid blast means acting to prevent adherence of the lifted lead strip to the knife, and operating to direct said strip to its proper path of travel. The detailed form and construction of these parts will be fully set forth in the specification to follow, and the novel features thereof will be pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a sectional elevation of a calender stack of a paper making machine having my invention applied thereto.

Fig. 2 is a sectional elevation, on an enlarged scale, of portions of adjacent calender rolls and the improved doctor knife and fluid blast means associated therewith.

Fig. 3 is a perspective view of the doctor knife removed.

Referring to the drawings:

In the accompanying drawings I have shown my invention applied, by way of example, in connection with the calender stack of a paper making machine to insure the passage of the lead strip from each calender roll to the next one below, but it will be manifest to the skilled mechanic that the invention is not limited to this particular part of the machine, but is applicable as well in other locations, for instance in connection with the upper press rolls to insure the passage of the lead strip to the traveling felt beneath; and is also applicable to other parts or members of the machine to which the lead strip is liable to adhere.

Referring to Fig. 1, the calendar stack 1 therein shown comprises the usual horizontal calender rolls 2 journaled in bearings in uprights 3 of the calender stack frame, the uncalendered paper web 4 from the driers (not shown) entering the bite of the upper calender rolls and traveling back and forth around the rolls below and finally issuing from the bite of the lower rolls, whence the calendered web is lead to the winding reel (not shown).

My improved doctor knife 5 and cooperating fluid blast nozzles 6 are shown associated with each of the calender rolls and disposed alternately on opposite sides of the same, so that the advancing end of the lead strip will, due to the action of these devices, be compelled to pass from each upper roll to the lower roll beneath and thus pursue its proper course of travel through the stack, and as these several devices are identical both in construction and operation, a description of one will suffice.

The doctor knife 5 is fixed to the upper edge of an angular frame or carrier 7 formed at its ends with journal studs 8 mounted in bearings in the uprights of the calender stack frame, so that the doctor knives may be swung to operative relations to the rolls in contact therewith as shown, or may be adjusted out of contact with the rolls when not in use and when the paper web is traveling normally and properly through the machine, as well known in this

art. The doctor knife proper extends throughout the length of the roll as usual, and when adjusted in operative relation in contact with the roll as shown, the knife will keep the roll free from adhering matters and will act also to lift therefrom any portion of the web, such as the lead strip, which may adhere thereto instead of passing to the next roll or traveling member.

In order that the lead strip when lifted from the roll by the doctor knife will be prevented from adhering to the knife and will be directed to the next roll, I form the doctor knife with a fluid deflecting surface 9 and I arrange the blast nozzles 6 so that the fluid blasts will be directed against said surface, which latter is of such form and so related to the blast directing nozzles that the blasts will act to lift or detach the strip if it adheres to the knife, and will operate to throw it down in contact with the calender roll beneath. The construction and operation of these parts is best shown in Figs. 2 and 3 where it will be seen that the knife near one end has fixed to it a shield or extension constituting the deflecting surface 9 referred to, which extension, starting near the active edge of the knife, curves outwardly and downwardly therefrom as at 10 and terminates in a straight portion 11 extending tangentially to the curved portion 10. The curvature of this extension is such in relation to the two adjacent calender rolls, that if the extension were continued at its inner end on the same curvature, it would extend tangentially to the surface of the lower roll. The action of this curved deflecting extension or surface is, when the fluid blasts from the nozzles 6 are directed along the straight portion 11 tangential to the curved portion 10, to deflect said blasts away from the upper roll and toward the lower roll as indicated by the arrows in Fig. 2, with the result that in the event of the end of the lead strip lifted from the upper roll by the knife, adhering to the latter, it will be detached from the knife and thrown down towards and in contact with the lower roll. To bring this action about the blast nozzles 6 are sustained by the carrier frame 7 parallel to and at the inner side of the straight portion 11 of the extension, and are supplied by a pipe 12 with fluid under pressure, preferably air, from any suitable source of supply.

It will be observed as best illustrated in Fig. 2 that the blast currents deflected by the curved extension 10 will pursue after leaving the inner end of the extension, a path which will intersect the plane 5^a of the outer surface of the knife which is adjacent its active edge and to which the lead strip is liable to adhere after it is lifted from the roll by the active edge of the knife. As a result of this action of the blast currents, just as soon as the end of the lead strip lifted by the knife, passes beyond the outer edge of the surface 5^a, the projecting end of the strip will be struck by the blast currents, will be stripped from the surface 5^a of the knife, and at the same time will be thrown down to the lower roll. In this way the strip is prevented from running along the surface of the knife and accumulating in a position away from the lower or next roll, the path of travel of the blast currents in their intersecting relation to the surface 5^a of the knife, insuring the passage of the lead strip to the next roll and the prevention of its continued adherence to the knife.

The deflecting extension is of peculiar importance and advantage in connection with the blasts from the nozzles, in that the blasts by impinging against the extension, will be broken up and distributed over the area of the lead strip, and will not be confined to definite areas or spots as they would if impinged directly against the lead strip.

It will be understood that the doctor knives and blast means are only thrown into action when either starting the operation of the paper making machine in the first instance, or in reestablishing the travel of the paper web after breakage or parting of the same, and when by the operation of the devices the travel of the lead strip has been fully established and the same has been widened to the full width of the web, the doctor knives are swung to inoperative positions free of the rolls. To effect this adjustment I have shown each of the carrier frames 7 provided with a handle 7^a for adjusting the same, and I have shown means for adjusting the series on each side of the rolls in unison. On reference to Fig. 1 it will be seen that on each side of the rolls a vertical movable slide 13 is provided, moving in suitable guides on the frame uprights. The slides are formed with lugs 14 engaging beneath the handles 7^a so that when the slides are moved upwardly, which may be effected by a hand lever 15 operatively connected with both slides, all of the handles will be raised and the doctor knives swung downwardly free of the rolls to inoperative positions, and when the slides are moved downwardly, the doctor knives will swing back to operative positions in contact with the rolls. The arrangement shown provides for the independent adjustment of certain of the doctor knives as occasion may require.

In the foregoing description and accompanying drawings I have set forth my invention in the particular detailed form which I prefer to adopt. It will be understood that these details may be variously changed and modified within the spirit of the invention; and further it will be understood that the invention is not limited to any particular form or construction of the parts

except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim is:

1. In a paper making machine, the combination of a rotary roll, a traveling member in position to receive the paper web from the roll, a doctor knife cooperating with said roll to lift a lead strip of the paper web therefrom, a fluid deflecting extension associated with said doctor knife, and means for directing a fluid blast against the extension, said extension being shaped to deflect said blast away from the roll and toward said traveling member.

2. In a paper making machine, the combination of adjacent calender rolls between which the paper web passes, a doctor knife cooperating with one of said rolls to lift a lead strip of the paper web therefrom, a fluid deflecting extension on said doctor knife, and means for directing a fluid blast against said extension to prevent the adherence of the lead strip thereto, the said extension being shaped to deflect said blast away from the roll with which the doctor knife cooperates and direct it toward the other roll; whereby the blast will act to carry the lifted lead strip to the latter roll.

3. In a paper making machine, the combination of a rotary roll, a traveling member in position to receive the paper web from the roll, a doctor knife cooperating with said roll to lift a lead strip of the paper web therefrom, a fluid deflecting extension on said knife curved outwardly and downwardly therefrom, and means for directing a fluid blast against said extension in a direction toward the roll; whereby said blast will be deflected toward said traveling member and will carry the lifted lead strip thereto.

4. In a paper making machine, the combination of a rotary roll, a traveling member in position to receive the paper web from the roll, a doctor knife cooperating with the roll to lift a lead strip of the paper web therefrom, said doctor knife being provided with a fluid deflecting surface, and means for directing a fluid blast against said deflecting surface to prevent the adherence of the lead strip, said deflecting surface being shaped to deflect said blast away from the roll and toward the traveling member; whereby the blast will act to carry the lead strip to the traveling member.

5. In a paper making machine, the combination of upper and lower calender rolls between which the paper web passes in its downward travel through the calender stack, a doctor knife cooperating with the upper roll to lift a lead strip of the paper web therefrom, a fluid deflecting surface on said doctor knife extending outwardly therefrom in a curve which is continued inwardly at its inner end would leave the upper roll and approach the lower roll, and means for directing a fluid blast against said deflecting surface; whereby the blast will act to prevent the adherence of the lead strip to the doctor knife and will direct the same to the lower roll.

6. In a paper making machine, the combination of calender rolls between which the paper web passes in its downward travel through the calender stack, a doctor knife cooperating with each roll to lift a lead strip of the paper web therefrom, fluid deflecting surfaces associated with the doctor knives and curved outwardly and downwardly therefrom, and fluid blast nozzles in position to direct fluid blasts against the outer portions of said surfaces; whereby the blasts will act to prevent the adherence of the lead strip to said surfaces and will direct said strip to the rolls beneath.

In testimony whereof, I have affixed my signature hereto.

ROBERT E. READ.