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F. A. PESCHL

PAPER MAKING MACHINE

Filed June 29, 1926

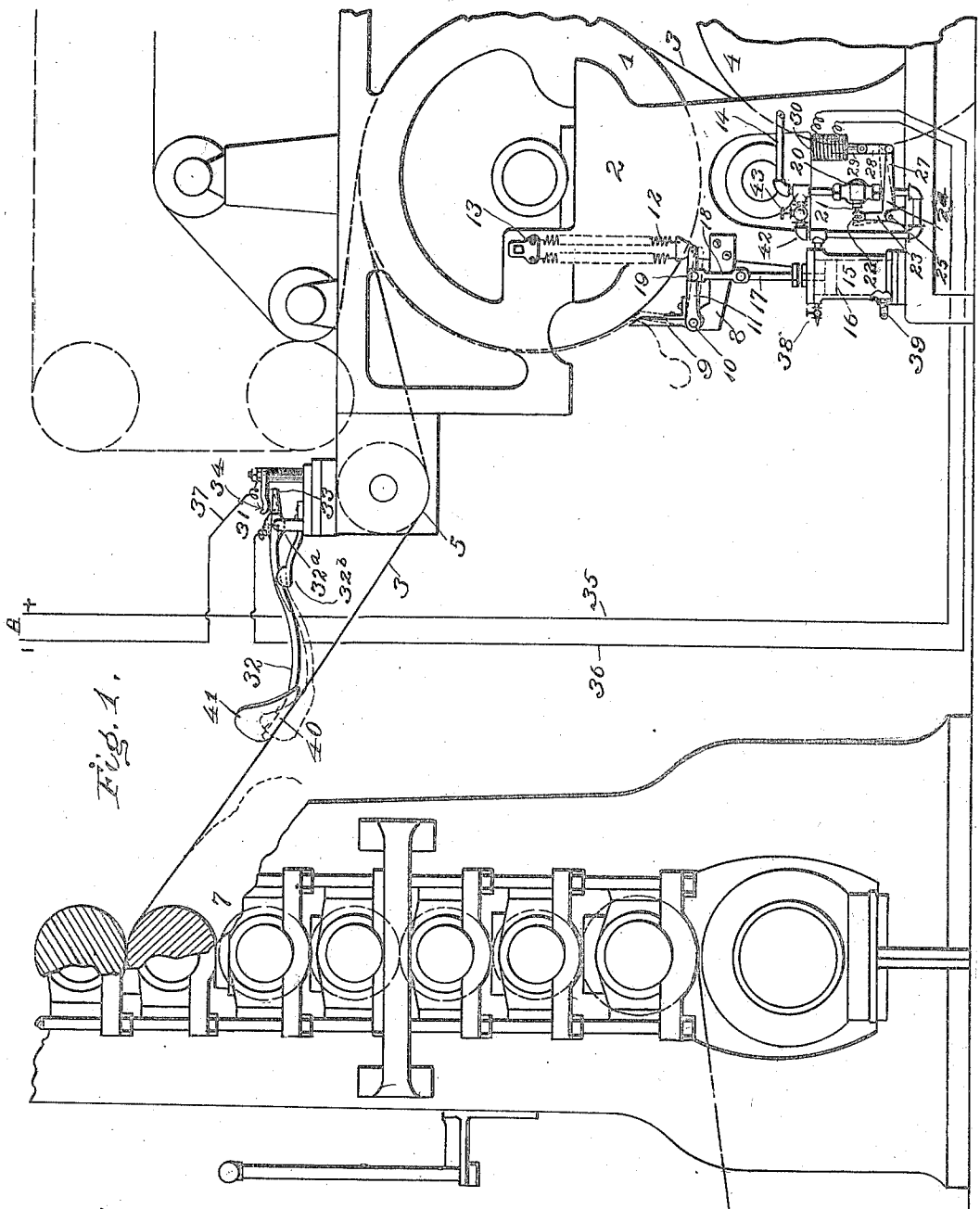


Fig. 1.

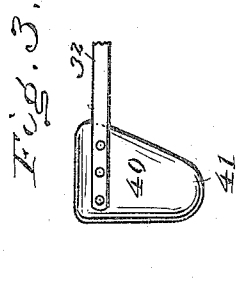


Fig. 3.

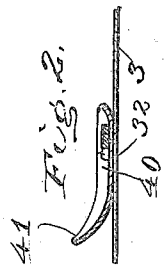


Fig. 2.

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UNITED STATES PATENT OFFICE.

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PAPER-MAKING MACHINE.

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This invention relates to paper making machines, and has for its object to prevent the paper web, in the event of the break or parting of the same at a point between the last drier cylinder and calender stack, from adhering to and following around with the said cylinder in the rotation of the same.

In the operation of paper making machines, it is customary to heat all of the drying cylinders, with the exception of the last one of the series, by the introduction of a heating medium, such as steam, into the interior thereof, and to introduce into the last cylinder a cooling medium, such as cold water, in order to produce a condensation and moisture on its surface, so that the paper in passing over the moist cylinder and thence directly to the calender rolls, will absorb a certain amount of moisture which will facilitate the calendering action of the rolls in imparting to the paper its calendered surface. The presence of moisture however on the drier cylinder will in the event of the breakage or parting of the paper web between the cylinder and calender stack, cause the web to adhere to the cylinder and the paper will be carried around with and wound thereon in the continued rotation thereof, and the paper will accumulate to such extent as to cause injury to the parts, stoppage of the machine, waste of material, and other objections.

The present invention obviates these objections by the provision of a member, preferably in the form of a doctor knife, which, when the machine is operating properly with the paper web passing intact from the drier cylinder to the calender stack, is sustained out of contact with the cylinder so as not to displace the moisture thereon, but which, by a controlling mechanism of improved form, will be automatically thrown into action into contact with the cylinder, when the paper breaks, and will then act, in the continued rotation of the cylinder, to lift the adhering paper therefrom and deflect it away from the cylinder, and prevent it from being carried around and wound thereon.

The detailed form and arrangement of parts for accomplishing this result will be fully set forth in the specification to follow, and the novel features thereof pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation of the last drying cylinder of a paper making machine, and the calender stack to which the paper passes from said cylinder, the same having my invention applied thereto.

Fig. 2 is a section on an enlarged scale through a portion of the paper web and a portion of the electric circuit controlling arm resting thereon.

Fig. 3 is a plan view of the end of said arm.

Referring to the drawings:

1 designates the last drying cylinder of the series in a paper making machine, mounted as usual for rotation in the frame 2, and 3 designates the paper web which passes over the cylinder 1 after leaving the next adjacent cylinder 4; and from the cylinder 1 the paper passes under a small guide roll 5, commonly called spring roll, mounted in bearings on the machine frame, and thence upwardly to the bite of the upper rollers of the calender stack 7.

In applying my invention, I pivotally mount in arms 8 fixed to and projecting rearwardly from the frame 2, a doctor knife or blade 9, on a horizontal transverse axis as at 10, in such position in relation to the cylinder 2, that by rocking the knife on its axis, its upper active end may be caused to contact with the surface of the cylinder, or may be disengaged from and stand free of the same as shown in Fig. 1, it being understood that this knife extends preferably throughout the length of the cylinder so as to act along the entire surface of the same. At one end, the pivot of the knife has fixed to it an arm 11 which extends forwardly, and to the free end of the arm the lower ends of springs 12 are attached and have their upper ends attached to the frame 2 as at 13, the springs thus tending to hold the knife in an inactive position with its active edge disengaged and spaced from the surface of the cylinder. Means and mechanism are provided, according to my invention, whereby, in the event of the parting or breaking of the paper web at a point between the cylinder 2 and the entrance to the calender stack, the doctor knife 9 will be rocked on its axis and its active edge engaged with the surface of the cylinder, and this mechanism will now be described.

The mechanism which I prefer to employ for this purpose is operated by compressed air, and its operation controlled by electrically operated magnetic means, but it will be understood that means and mechanism of

other forms, and controlled by other means, may be adopted without departing from the limits of the invention. As shown, compressed air from a suitable source is admitted by means of a pipe 14 to the upper end of an air cylinder 15 supported on the machine frame 2, in which cylinder, slides a piston 16 whose piston rod 17 extends upwardly through the cylinder head, and is pivoted to the lower end of a link 18 which is pivoted at its upper end, as at 19, to the arm 11 before alluded to, between the ends of the same. The form and relative arrangement of these parts are such that when the piston descends, on the admission of air to the cylinder above the piston, the arm 11 will be drawn down and will place the springs 12 under tension, thereby rocking the knife 9 on its axis and causing its active edge to engage the cylinder 2; and when the air pressure is cut off from the cylinder, the tension of the springs 12 will pull up on the arm 11 and thereby swing the knife out of engagement with the cylinder to the position shown in Fig. 1.

The supply of air to the cylinder 15 is controlled by a valve 20 applied in the pipe 14, the stem 21 of which valve extends to the outside of the valve casing and is furnished with a pin engaging loosely in a fork 22 on the end of a vertical arm 23 of a two-armed lever 24 pivoted, as at 25, to a bracket on the frame 2. The other arm 27 of this lever extends horizontally to the right in Fig. 1, and has pivoted to its free end, the lower end of a link 28 whose upper end is pivoted to the lower end of a solenoid core 29 movable vertically in a solenoid coil 30 fixedly supported on the machine frame, the form and relation of the parts being such that when the coil is energized, the core, by being pulled upwardly, will rock the two-armed lever to the dotted line position shown in Fig. 1 and thereby open valve 20 and admit air to the air cylinder; and when the coil is deenergized, the core and connected parts will return by gravity to their former positions and the valve closed.

The coil is connected in an electric circuit supplied with electricity from a suitable source or line as at A, which circuit also includes a controlling switch or contactor 31 comprising a contact arm 32 pivoted between its ends, as at 32^a to the machine frame and insulated therefrom, and adapted at its rear end to rest on the traveling paper web in the stretch of the same between the drier cylinder 2 and calender stack, said arm being provided at its opposite end with an insulated contact finger 33; and a contact finger 34 extending over the finger 33 and fixed to and insulated from the machine frame, and adapted to be engaged by the finger 33. The said circuit including this contactor device and the coil 30, is traced as follows: From the source of power, the current passes by conductor 35 to the solenoid coil 30, and leaving the coil by a conductor 36, passes to the contact finger 33, a conductor 37 being connected to the contact finger 34 and leading therefrom back to the source of power, the circuit being thus opened by the contact fingers 33 and 34, but adapted to be closed on the pivotal motion of the contact arm 32 when the paper web breaks, as will be presently described.

The form and relation of the contactor arm 32 to the paper web passing between the cylinder 2 and calender stack, are such, that, when the paper is passing between these points in the normal operation of the machine, with the rear end of the contactor arm resting thereon, said arm will be so supported that its contact finger 33 will be spaced from and held out of contact with the finger 34, and the circuit will be opened. When however the paper web breaks, the rear end of the arm 32 being no longer supported, will move down by gravity until arrested by a stop finger 32^b fixed to the frame, thereby rocking the arm on its axis and causing its contact finger 33 to move upwardly and make electric contact with the finger 34 and thus close the circuit. On the closure of the circuit, the solenoid coil will be energized, and its core being pulled up, will act, through the connections of the core with the valve 20, to open the latter, thereby admitting air to the air cylinder. This will force the piston down in the cylinder, and by the connections of the piston with the arm on the doctor knife, the latter will be swung into contact with the cylinder 2, at the same time placing the springs 12 under tension. The broken end of the paper web adhering to the moist cylinder, will, as it is carried to the knife by the rotation of the cylinder, be lifted therefrom and will pass downwardly and may be received in a suitable receptacle or pit (not shown) at the base of the frame.

From this description it will be seen that the doctor knife, normally free of contact with the moist cylinder, is, on the breaking or parting of the paper web, instantly and automatically thrown into contact therewith, so that there will be no opportunity for the paper to be carried around with the cylinder, with the objectionable results heretofore referred to.

After the operation of the mechanism as described, the workman, in reestablishing the travel of the paper through the machine, will form a marginal lead strip on the paper web by incising the latter at a point somewhere on the last drier cylinder, and as this lead strip emerges from the last cylinder, he will take hold of it and enter it in the bite of the upper calender rolls, and when the

pull on the strip becomes effective and the paper web begins its normal travel, the incision in the web is continued transversely throughout the width of the same. As the web now continues to feed, the gradually widened portion of the same will pass under and lift the rear end of the contactor arm. This movement of the arm will lower its contact finger 33 out of engagement with the fixed finger 34, and will break the circuit, thereby deenergizing the solenoid coil, whereupon the core will drop, and the valve actuating parts connected therewith will resume their former positions and thereby close the valve. The supply of air to the cylinder being thus cut off, the tension of the springs 12 will pull up on the arm 11 and raise the piston in the cylinder, thereby swinging the doctor knife out of contact with the drier cylinder to the position shown in Fig. 1. In order that the piston will be permitted to rise in this action under the influence of the springs 12, the upper end of the same is furnished with a restricted opening as at 38 in order to permit the air to "bleed" therethrough. The opposite end of the cylinder is provided with a vent opening 39 to permit of the escape of the air beneath the piston when the latter is forced down.

The rear end of the contactor arm 32 where it rests on the traveling paper web is in the form of a plate 40 one end of which plate is curved upwardly as at 41 so as not to interfere with the passage of the paper web beneath the arm in reestablishing the travel of the paper after the breakage, the upwardly bent or curved portion permitting the web as it widens gradually to its full width from the lead strip, to pass beneath the plate without contacting with or being obstructed by the edge of the same.

The air supply pipe 14 is shown as provided with a by-pass 42 having applied in it a hand-operated controlling valve 43, the purpose of which is to enable air to be admitted manually to the cylinder to throw the doctor knife into action, in the event of the automatically operating parts getting out of order.

While in the foregoing description and accompanying drawings I have set forth my invention as applicable particularly in connection with the last drying cylinder of the series, with the contactor cooperating with the stretch of paper web passing between this cylinder and the calender stack, the invention is not limited in its use at this particular point in the machine, although for the reasons heretofore stated, it is of peculiar advantage when so employed. It may be applied also, without departing from the spirit of the invention, at other points in the machine such for instance at the presses, drier cylinder, calender stack, etc., to automatically throw a doctor knife into engagement with a cylinder or other traveling member by which the paper web is supported, when said web breaks, so that the web will be prevented from being carried by said member beyond its proper point and accumulating in the machine.

While a certain detailed form and construction of the parts has been described and illustrated as an exemplification of the invention, it will be understood that the invention is not limited to such details, and that they may be variously modified and changed without departing from the spirit of the invention, which 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 traveling member on which the paper web is supported, a doctor member normally disengaged from said traveling member, and means controlled by the paper web for automatically engaging the doctor member with the traveling member.

2. In a paper making machine, the combination of a traveling member on which the paper web is supported, a doctor member normally disengaged from said traveling member, and means acting, in the event of the breakage of the paper web, to automatically engage the doctor member with the traveling member.

3. In a paper making machine, the combination of a rotary cylinder on which the paper web is supported, a doctor knife normally disengaged from said cylinder and movable into contact with the same, and means operative automatically, in the event of the parting of the web, to move the doctor knife into contact with the cylinder.

4. In a paper making machine, the combination of a drier cylinder on which the paper web is supported, a doctor knife normally disengaged from said cylinder and movable into contact with the same, and means operative automatically in the event of the parting of the web, to move the doctor knife into contact with the drier cylinder.

5. In a paper making machine, the combination with the last drier cylinder and the calender stack, of a doctor knife normally disengaged from the drier cylinder and movable into contact therewith, and means operative automatically in the event of the breakage of the paper web at a point between the cylinder and stack, to move said doctor knife into contact with the cylinder.

6. In a paper making machine, the combination with the last drier cylinder and the calender stack, of a doctor knife normally disengaged from the cylinder and movable into contact therewith, power means for moving said doctor knife, and controlling

means for said power means, cooperative with the paper web in its passage from the drier cylinder to the calender stack.

7. In a paper making machine, the combination with the last drier cylinder and the calender stack, of a doctor knife normally disengaged from the cylinder and movable into contact therewith, power means for moving said doctor knife to engage the cylinder, and means cooperative with the paper web between the cylinder and stack for controlling the power means, said controlling means being adapted, in the event of the parting of the paper web, to initiate the action of the power means.

8. In a paper making machine, the combination of a traveling member on which the paper web is supported, a doctor member normally disengaged from said traveling member and movable into contact therewith, fluid pressure means for moving the doctor member, and electrically operated controlling means for the fluid pressure means, said controlling means being governed in its action by the paper web.

9. In a paper making machine, the combination of a traveling member on which the paper web is supported, a doctor member normally disengaged from said traveling member and movable into contact therewith, means for moving the doctor member, and electrically operated means governed in its action by the paper web, for controlling the doctor member moving means.

10. In a paper making machine, the combination of a traveling member on which the paper web is supported, a doctor member normally disengaged from said traveling member and movable into contact therewith, power means for moving the doctor member, and electrically operated means cooperative with the paper web to control the power means, and adapted on the parting of the web, to automatically throw the power means into action.

11. In a paper making machine, the combination with the last drier cylinder and the calender stack, of a doctor knife normally disengaged from the cylinder and movable into contact therewith, power means for moving said doctor knife, and electrically operated means cooperative with the paper web between the last drier cylinder and calender stack to control the power means, said electrically operated means being adapted on the parting of the web, to automatically throw the power means into action.

12. In a paper making machine, the combination of a traveling member on which the paper web is supported, a doctor member normally disengaged from the traveling member and movable into contact therewith, and electrically controlled means, adapted, in the event of the parting of the web, to automatically move the doctor member into contact with the traveling member.

13. In a paper making machine, the combination with the last drier cylinder and the calender stack, of a doctor knife normally disengaged from the cylinder and movable into contact therewith, and electrically controlled means adapted, in the event of the parting of the web between the last drier cylinder and calender stack, to automatically move the doctor knife into engagement with the drier cylinder.

14. In a paper making machine, the combination of a drier cylinder, a doctor knife normally disengaged therefrom and movable into contact therewith, a pressure fluid cylinder provided with a piston operatively connected with the doctor knife for moving the same, a valve for controlling the admission of pressure fluid to the cylinder, and electrically operated means for actuating the valve and governed in its action by the paper web.

15. In a paper making machine, the combination of a drier cylinder, a doctor knife normally disengaged therefrom and movable into contact therewith, a pressure fluid cylinder provided with a piston operatively connected with the doctor knife for moving the same, a valve for controlling the admission of pressure fluid to the cylinder, and electrically operated means for actuating the valve, said means being adapted, in the event of the parting of the web, to automatically operate the valve and admit pressure fluid to the cylinder.

16. In a paper making machine, the combination of a traveling member on which the paper web is supported, a doctor knife normally disengaged from said member and movable into contact therewith, a pressure fluid cylinder provided with a piston operatively connected with the doctor knife for moving it, a valve for the admission of pressure fluid to the cylinder to move the doctor knife into contact with the traveling member, a spring acting on the doctor knife and adapted to be placed under tension when the knife is moved into contact with the traveling member, and means for controlling the action of said valve; whereby when the supply of pressure fluid to the cylinder is cut off, the spring will move the doctor knife out of contact with the traveling member.

17. In a paper making machine, the combination of a traveling member on which the paper web is supported, a doctor knife normally disengaged from the traveling member and movable into contact therewith, a pressure fluid cylinder provided at one end with a vent and at the other end with a bleeding orifice, a piston movable in the cylinder between the vent and orifice and operatively connected with the doctor knife for moving it, a valve for controlling the

admission of pressure fluid to the cylinder between the piston and the bleeding orifice to move the doctor knife into contact with the traveling member, and a spring connected with the doctor knife and adapted to be placed under tension when the doctor knife is moved into contact with the traveling member; whereby when the supply of pressure fluid to the cylinder is cut off, the spring will act to move the doctor knife out of contact with the traveling member.

18. In a paper making machine, the combination with the last drier cylinder and the calender stack, of a doctor knife normally disengaged from the cylinder and movable into contact therewith, power means for moving said doctor knife, electrically operated magnetic means for controlling the power means, a normally open power circuit including said magnetic means, and adapted when closed to operate the magnetic means and cause the doctor knife to be moved into contact with the drier cylinder, and means acting when the paper web breaks between the drier cylinder and calender stack, to close said circuit; whereby on the breakage of the paper the doctor knife will be automatically moved into contact with the drier cylinder.

19. In a paper making machine, the combination with the last drier cylinder and the calender stack, of a doctor knife normally disengaged from the cylinder and movable into contact therewith, power means for moving said doctor knife, electrically operated magnetic means for controlling the power means, a power circuit including said magnetic means, a contactor in said power circuit comprising a fixed contact finger and a movable contact finger, said latter finger being held out of contact with the fixed finger by the stretch of paper in its passage from the drier cylinder to the calender stack in the normal operation of the machine, and said movable finger being adapted, when said stretch of paper breaks, to make electrical contact with the fixed contact finger and thereby close the power circuit, said power circuit when closed acting to operate the magnetic means and cause the doctor knife to be moved into contact with the drier cylinder.

20. In a paper making machine, the combination with the last drier cylinder and the calender stack, of a doctor knife normally disengaged from the drier cylinder and movable into contact therewith, electrically operated means for so moving the doctor knife, and an electric circuit including said electrically operated means and held normally open by the stretch of traveling paper web between the drier cylinder and calender stack, and adapted to be closed when the paper web breaks, to actuate the electrically operated means; whereby the doctor knife will be automatically engaged with the cylinder on the breakage of the paper web.

In testimony whereof, I have affixed my signature hereto.

FRANK A. PESCHL.