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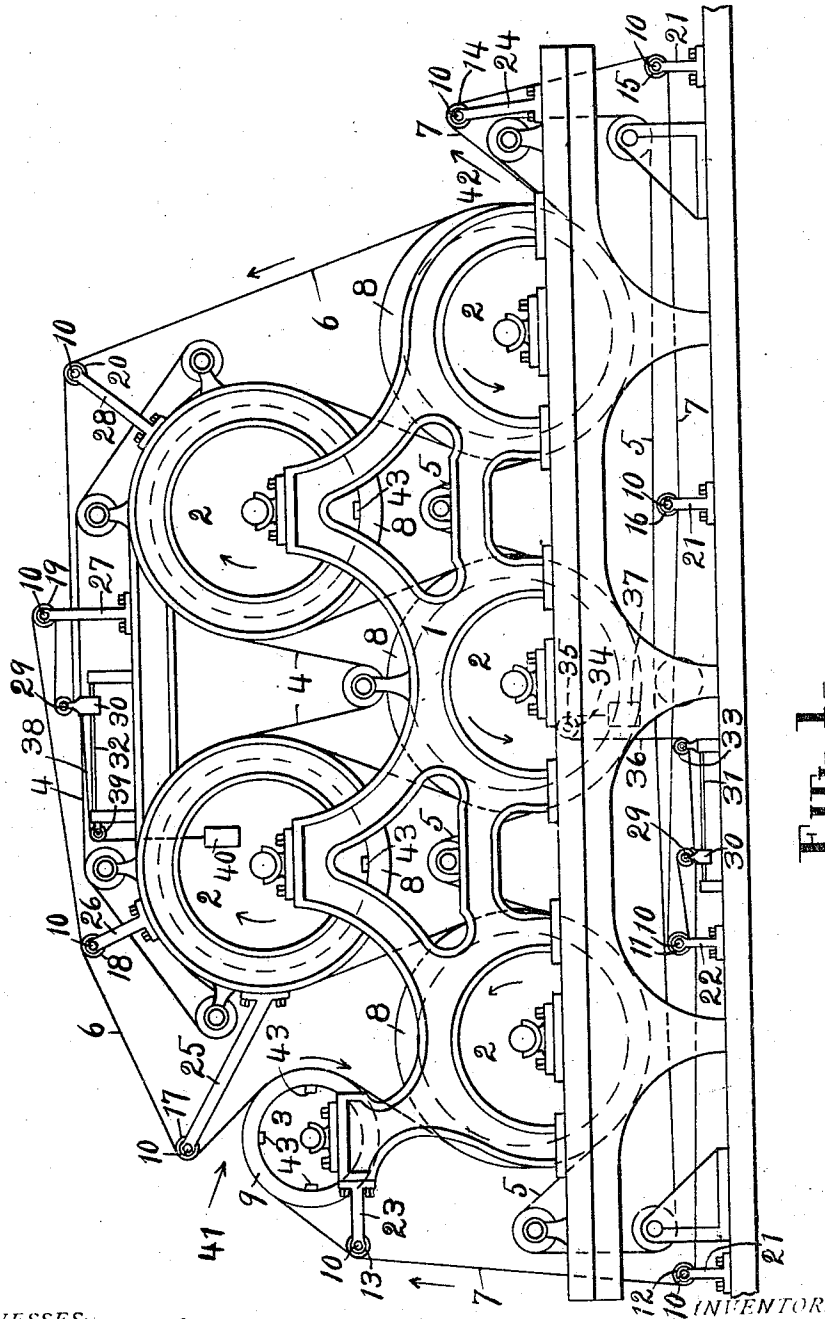


FIG. 1.

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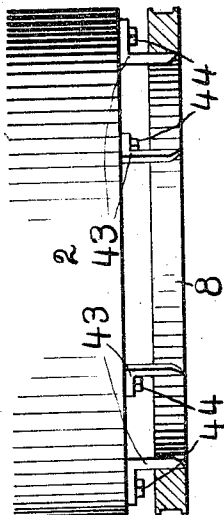
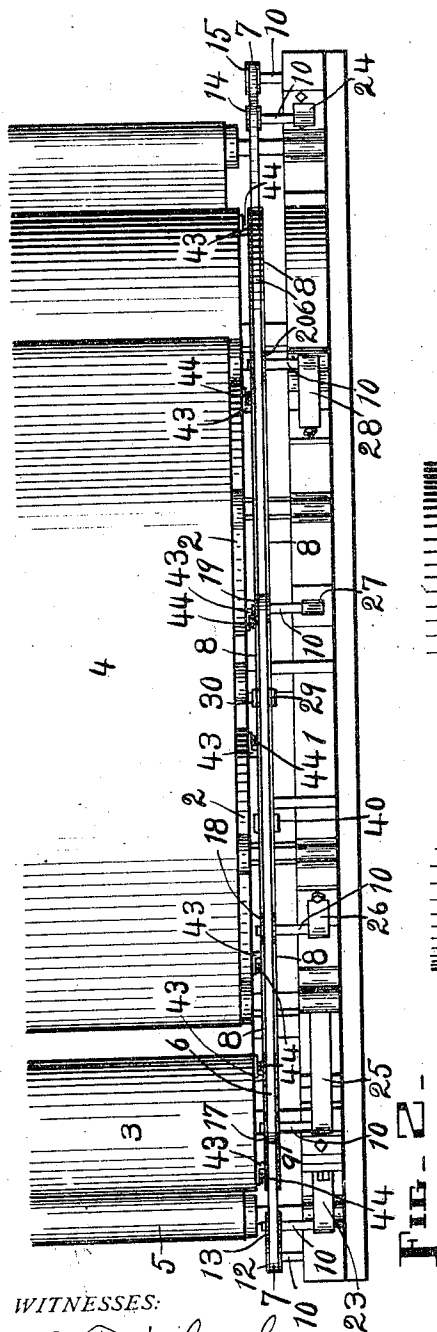
BY

Webster & Co.,
ATTORNEYS.

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E. J. CROWSON.
CYLINDER DRIER.
APPLICATION FILED JULY 14, 1910.

Patented Dec. 27, 1910.
2 SHEETS-SHEET 2.



WITNESSES:
A. C. Fairbanks.
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UNITED STATES PATENT OFFICE.

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CYLINDER-DRIER.

979,827.

Specification of Letters Patent. Patented Dec. 27, 1910.

Application filed July 14, 1910. Serial No. 571,921.

To all whom it may concern:

Be it known that I, EDWARD J. CROWSON; a subject of the King of Great Britain, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Cylinder-Driers, of which the following is a specification.

My invention relates to improvements in the driers, located between the presses and calendars, of paper making machines, and consists of certain peculiar means for automatically conducting the paper through such driers, as hereinafter set forth.

In paper making the paper after it leaves the press is passed over and under the heated drums or cylinders of the drier, and the operation of leading or conducting the paper through the drier has heretofore been performed by hand, the forward end of the paper upon leaving the press being seized by the operator and hastily prepared in such a way as to form a projection or tail which extends beyond the front edge at the aforesaid forward end of the paper, and the paper held by this tail being guided by the operator between the cylinders and the associated felts. The operation requires the exercise of considerable skill on the part of the operator, is more or less hazardous, and entails more or less waste of paper and loss of time in the event the operator fails as he frequently does to properly guide the paper in its course through the drier.

The primary object of my invention is, therefore, to provide extremely simple but highly efficient means or mechanism for performing this work automatically and so eliminating all danger and loss.

Other objects will appear in the course of the following description.

I attain the objects and secure the advantages of my invention by the means illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of a drier equipped with a practical form of my invention; Fig. 2, a top plan of that part of said drier with which said invention is most intimately associated and of the invention itself, and, Fig. 3, an enlarged detail showing one of the grooved pulleys (in section) and the means whereby the same is secured to one end of one of the cylinders.

Similar figures refer to similar parts throughout the several views.

Although cylinder driers vary to a considerable extent in construction and in the number of cylinders, there are certain broad or general features common to all, and my improvements are adaptable and applicable to any of them.

In Figs. 1 and 2 I show a front-side drier frame 1, five large drier cylinders 2 and a small or "baby" drier cylinder 3, and upper and under drier felts 4 and 5, respectively, together with the necessary idlers, axial supports, bearings, and other auxiliary parts and members, all of usual and well-known construction, arranged in the customary manner, and adapted to function as heretofore.

The new mechanism or appliance consists of two contacting tapes 6 and 7 supported on and driven by grooved pulleys 8 at the front ends of the cylinders 2 and a similar pulley 9 at the end of the cylinder 3, together with such idlers as may be required and of certain tighteners presently to be described. The tapes 6 and 7 are held to their courses by the grooved pulleys 8 and 9 and by two sets of grooved idlers mounted on studs 10 carried by suitable stands and brackets which are suitably supported on the frame 1, the idlers in one set being represented by the reference figures 11, 12, 13, 14, 15 and 16, and those in the other set by the figures 17, 18, 19 and 20. Three vertical supports or stands for the idlers 12, 16 and 15 appear at 21, which stands with a stand 22 for the idler 11 are mounted on the base of the frame 1, two of said stands 21, those for said idlers 12 and 15, being at the ends of such base, and the third stand 21 and said stand 22 being intermediate of such ends. A horizontal bracket 23 extends from the back end of the frame 1 adjacent to the cylinder 3 to support the idler 13, and a vertical stand 24 is mounted on the bed of said frame at the forward end adjacent to the lower front cylinder 2 to support the idler 14. An oblique bracket 25 projects rearwardly from the upper part of the frame 1 at the back end to support the idler 17 over the pulley 9. The idlers 18 and 19 are respectively supported by stands 26 and 27 mounted on top of the frame 1, and the idler 20 is supported by an oblique bracket 28 secured to the top of said frame near the forward end of the same. In addition to the idlers just mentioned and which it should be noted will greatly vary in number and position in different ma-

chines, there is a grooved tightener idler 29 for each tape, such tightener idler being mounted on a slide 30. All of the grooved pulleys and idlers are in the same vertical plane, of course, which plane is in front of the vertical plane of the front ends of the drier cylinders.

The lower slide 30 is mounted to reciprocate on a horizontal track 31 fastened to the base of the frame 1, and the upper slide 30 is mounted to reciprocate on a track 32 secured to the top of said frame. A pulley 33 is arranged above the right-hand end of the track 31, and a second pulley 34 is mounted on a stud 35 which projects inwardly from the bed of the frame 1. A rope or cable 36 has one end fastened to the lower slide 30, extends from said slide to the right, passes under the pulley 33 and upward over the pulley 34, and has a weight 37 suspended from its free end. Thus the lower slide is under constant tension to the right and the tape 7 is kept taut throughout its entire length, the weight 37 being heavy enough for that purpose. In a similar manner and by similar means the upper slide 30 is under constant tension to the left and the tape 6 is kept taut, the rope or cable which appears at 38 in this case being represented as passing from said upper slide to the left, over a pulley 39 supported from the left-hand end of the track 32, and then downward, with a weight 40 at its lower end.

I will next trace the courses of the tapes 6 and 7, in the directions of their travel, to show how they act in conjunction with each other and how they are acted on by the tightening devices just described, also to assist in a better understanding of the invention generally.

Starting at the lower tightener idler 29, the course of the tape 7 is as follows: Said tape extends to the left or rearwardly from the bottom of such idler to the idler 12, passes under the latter and up over the idler 13 and the pulley 9, then under and over respectively the bottom and top pulleys 8 in order from back to front, forwardly over the idler 14 from underneath the rearmost bottom pulley 8, down and under the idler 15, rearwardly under the idler 16, and finally over and under the idler 11 and forwardly to said tightener idler. Thus it is seen that the tape 7 is looped around the idlers 29 and 11, and that the bottom tightener acts on these looped parts, through the medium of the weight 37 and the cable 36, to maintain said tape always in a taut condition.

Starting at the upper tightener idler 29, the course of the tape 6 is as follows: Said tape extends to the right or forwardly from the top of such idler to the idler 19, up over the latter and rearwardly to and over the idler 18 and to and over the idler 17, then downwardly in a forwardly direc-

tion in front of the pulley 9 outside of the tape 7 on such pulley, under the adjacent bottom pulley 8 between said pulley and said tape 7, over the first top pulley 8 outside of the tape 7, under and over in the same manner the next bottom and top pulleys 8 respectively, under the third bottom pulley 8 between it and the tape 7, upwardly to and over the idler 20, and finally rearwardly to said tightener pulley. The tape 6 is looped around its tightener pulley and the adjacent idler in the same way and for the same reason explained in connection with the tape 7.

Obviously the two tapes are in close contact between the entrance end, indicated by the arrow 41, and the exit end indicated by the arrow 42, of the machine, so that the tail of a strip of paper of the usual width properly entered at 41 will be firmly grasped by and between said tapes and carried with them in their tortuous course through the machine until it emerges at 42 where such tail passes out of such grasp.

The diameter of the flanges of the pulley 9 corresponds with that of the cylinder 3, and the same thing is true in regard to the flanges of each pulley 8 and the cylinder 2 to which the same is attached, and in each case the peripheral surfaces of the pulley flanges and the intervening peripheral surface plus the thickness of one tape are in agreement with each other and with the peripheral surface of the associated cylinder. This provision enables the paper to be actuated through the drier without the liability of twisting and wrinkling that would be present in the event the aforesaid peripheral surfaces were out of agreement and the tail of the paper were consequently guided on different planes or in different courses from those traversed by the main body of the paper.

As will be understood by all who are familiar with the construction of drier cylinders, it is not feasible either to mount the tape pulleys on the axial supports of such cylinders or to place such pulleys directly against the ends of such cylinders, hence I prefer to employ pulleys in the form of grooved rings, and to provide such rings with projecting members which can be secured to the cylinder ends and when thus secured will hold the rings or pulleys off from the cylinders. Specifically and having reference more particularly to Fig. 3, this arrangement is the result of providing the ring pulley 8 (or 9) with a plurality of angular lugs 43, which lugs extend rearwardly from said pulley and then turn at right angles outwardly or radially. The radial portions of the lugs 43 are bolted at 44 to the adjacent end of the cylinder 8 (or 9).

Since the pulleys 8 and 9 are attached to

the drier cylinders, said pulleys revolve with said cylinders and actuate the tapes 6 and 7 in corresponding directions, and because said pulleys so support said tapes that the course represented by the contacting surfaces of the tapes is in agreement with the course of the main body of the paper under and over said cylinders, said tapes travel at the same speed as do said peripheral surfaces. By thus driving the tapes at the same rate of speed as the cylinders it is possible to actuate the paper through the drier evenly and smoothly and without deviation from its proper course.

In practice the tail of the paper is introduced into the bite formed by the tapes 6 and 7 at 41. and is then drawn by said tapes through the machine, carrying with it the main body of the paper from the cylinder 3 to the first cylinder 2 in the bottom row, thence to the first cylinder 2 at the top, and so on until the last cylinder 2 is passed and the paper emerges at 42. Thus the paper is automatically actuated through the drier, after being once introduced therein, and the operator is not required to touch the paper from start to finish.

Various changes, especially in the arrangement of the tape-supporting and carrying members and in the tighteners, are necessary in order to adapt my improvement to different driers, as has already been intimated, and all such changes, together with any others, whether in shape, size or construction, that may be required, which fall within the scope of my claims, are to be considered as forming parts of my invention and are to be included therein.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a cylinder drier, with the rotary cylinders of the drier, of traveling paper-actuating members juxtaposed to but offset from the ends of said cylinders.

2. The combination, in a cylinder drier, with the rotary cylinders of the drier, of

contacting tapes, and means to support and drive such tapes in juxtaposition but offset relation to the ends of said cylinders.

3. The combination, in a cylinder drier, with the cylinders of the drier, of contacting tapes, pulleys attached to the ends of said cylinders for said tapes, and suitable guide means for said tapes.

4. The combination, in a cylinder drier, with the cylinders of the drier, of contacting tapes, pulleys and idlers arranged to support and drive said tapes in juxtaposition to the ends of said cylinders, and means to keep said tapes taut.

5. The combination, in a cylinder drier, with the cylinders of the drier, of tapes adapted to receive and hold paper between them, and means to support and drive such tapes in juxtaposition to the ends of said cylinders, such means maintaining said tapes in normal contact throughout the length of their paper-grasping course, and further maintaining such course in agreement with the adjacent peripheries of said cylinders.

6. The combination, in a cylinder drier, with the cylinders of the drier, of tapes capable of receiving and holding paper between them, and means to support such tapes in juxtaposition to the ends of said cylinders and to drive them at approximately the same rate of speed as that of the cylinder peripheries, such means maintaining said tapes in normal contact throughout the length of their paper-grasping course.

7. The combination, in a cylinder drier, with a cylinder, of a pulley provided with lugs adapted to be secured to one end of said cylinder and to support said pulley from such end with a space between the two latter members.

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Witnesses:

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