Dec. 29, 1925. 1,567,377

H D. MARTINDALE

PAPER DRIER AND THE LIKE

Filed July 10, 1925 2 Sheets-Sheet 1

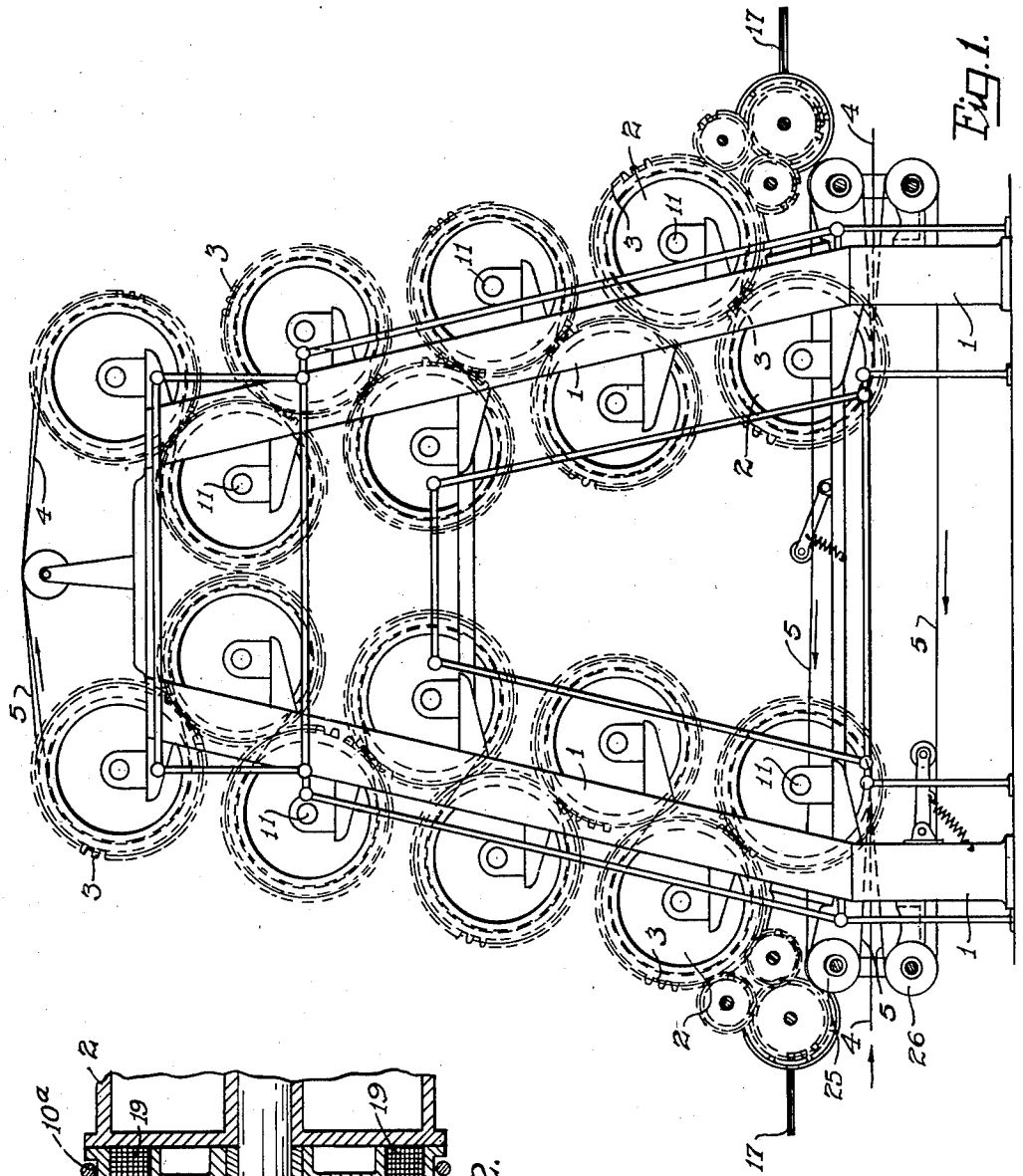


Fig. 1.

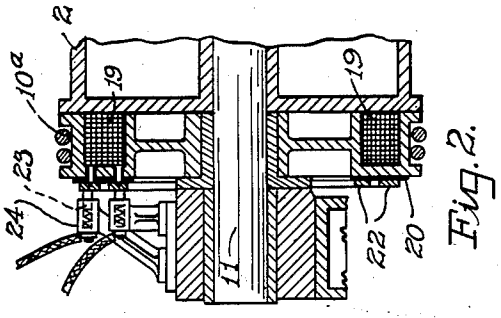


Fig. 2.

INVENTOR

BY Howard D. Martindale

ATTORNEY

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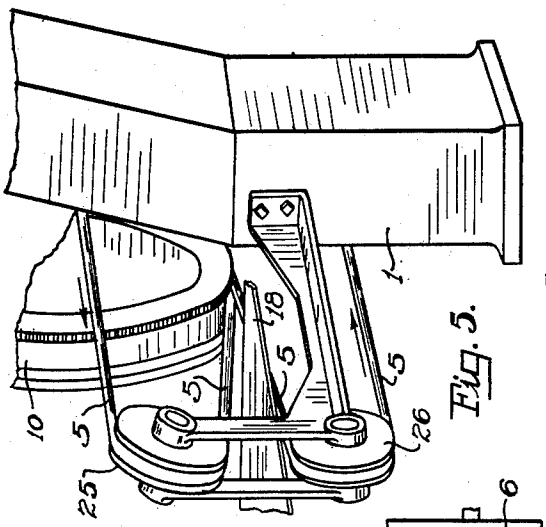


Fig. 5.

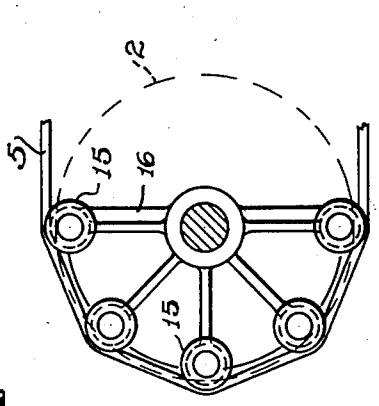


Fig. 7.

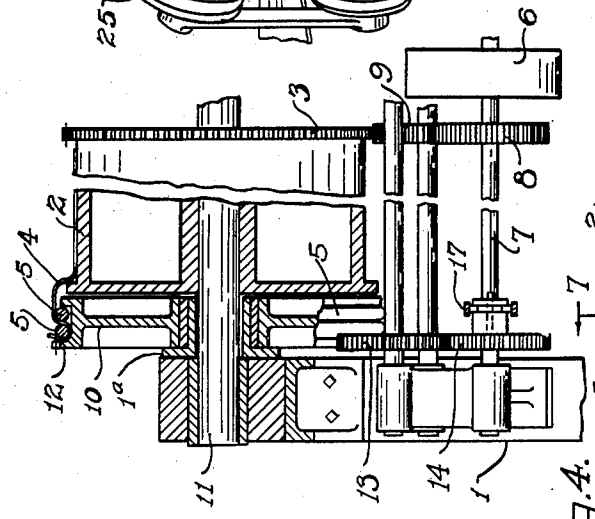


Fig. 4.

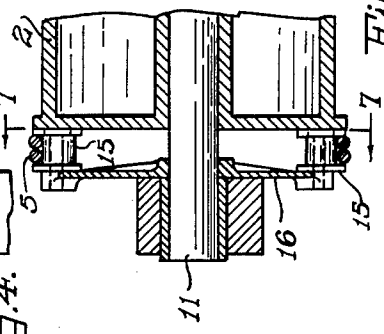


Fig. 6.

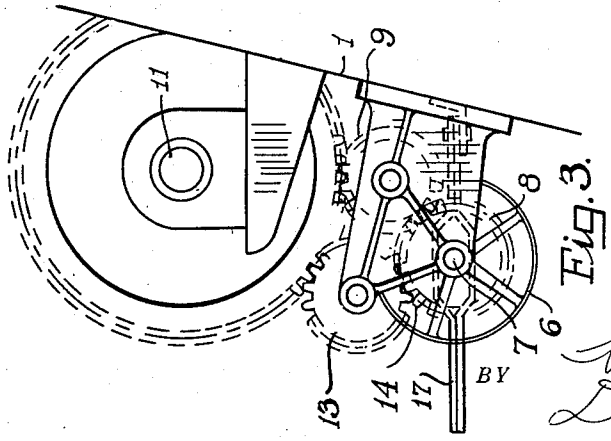


Fig. 3.

INVENTOR

Homer D. Martindale

BY

D. W. Thistler

ATTORNEY

Patented Dec. 29, 1925. 1,567,377

UNITED STATES PATENT OFFICE.

HOMER D. MARTINDALE, OF MIDDLETOWN, OHIO.

PAPER DRIER AND THE LIKE.

Application filed July 10, 1925. Serial No. 42,701.

To all whom it may concern:

Be it known that I, HOMER D. MARTINDALE, a citizen of the United States, residing in Middletown, in the county of Butler and State of Ohio, have invented certain new and useful Improvements in Paper Driers and the like, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to paper driers having particular reference to improved means for threading the paper web on the drier rolls.

A well known arrangement for threading the paper web on the drier rolls consists in endless carriers, suitable belts or cables traversing grooved portions arranged at one end of the drier rolls, their being two carriers running side by side in such relation one to the other that the leading end of the paper, when the web is threaded on the machine, will be engaged by the carriers and the web drawn forward in a threading movement over the rolls.

To prevent tearing of the paper, this method of putting the paper on the machine requires that the carriers and the periphery of the drier rolls shall have the same speed, which is accomplished in the best known practice, by making the grooves in the drier rolls in which the carriers operate the required depth to cause the outer surface of the carriers to be substantially flush with the periphery of the rolls.

The web threading mechanism functions only when the paper is being put on the machine, the carriers running idly over the ends of the drums during the period the paper is drying. This is more or less objectionable from the viewpoint of wear during the idle running period of the carriers, and it is an object, among others, of my invention to provide an improved web threading mechanism which will be operative only during the time of putting the paper on the machine, the mechanism standing at rest during the drying period, with the result that wear of the parts by idle operation is avoided.

A further object attained by my invention is an arrangement of the web threading mechanism which makes it immaterial whether the web carriers run in the axial plane of the periphery of the drier drums, this latter arrangement tending to simplify and cheapen the construction of the web threading mechanism and also to influence favorably its effectiveness of operation, the improvement also lending itself to several forms of modified construction which gives the invention an enlarged scope of practical application.

In the accompanying drawings, my invention is shown in a preferred and in a modified form of construction which serve to illustrate the principle upon which the objects of the invention have been attained, the construction and operation of the apparatus being more particularly described in their coordinated relations of the mechanism in the following specification and the appended claims.

In the drawings:

Fig. 1 is a side elevation of one unit of a paper drier in which the application of my improved web threading mechanism is illustrated;

Fig. 2 is a detail sectional view illustrating means for electrically connecting the carrier pulleys with the drier rolls;

Fig. 3 is a detail view in side elevation of the carrier actuating mechanism;

Fig. 4 is a front elevation partly in section of Fig. 3;

Fig. 5 is a detail perspective view of the carrier guides at the rear end of the machine;

Figs. 6 and 7 are detail views of a modified form of carrier guides.

The preferred form of construction of the invention, illustrated in Figs. 1, 3, 4, 5, consists of a suitable frame structure 1 which, as here shown, is pyramidal or A-shaped for each section or unit of the machine, only one unit being shown to illustrate the invention.

The drier rolls 2 are supported in suitable bearings in frame 1, the arrangement of the rolls being in double series to each unit of the machine, each series comprising a double set of rolls in staggered relation one to another, the coacting series being inclined one toward the other upwardly according to the inclination of the A-shaped frame. The course of the paper over the drier rolls of each unit is in a serpentine path upward over one set of rolls and downward over the other set, the drier rolls being operated in the well-known manner of drying machines by being geared, as illustrated at 3, one roll with another.

No novelty is here claimed with respect to the construction of the frame of the ma-

chine and the arrangement of the drier rolls. The invention relates to the means for threading the paper web 4 over the drier rolls when the paper is put on the machine.

The paper threading mechanism consists of two endless carriers 5 arranged one opposite the other along the course of the paper at one end of the drier rolls, the gears 3 being at the opposite end of the rolls.

The carriers and the drier drums are actuated by a pulley 6 supported on a drive shaft 7 which also supports a drive gear 8 connected to one of the drums 2 by means of gears 3 and 9. The carrier pulleys 10 are supported rotatably on a bearing sleeve 1^a fixed to frame 1, and are driven from shaft 7 through gears 12, 13, and 14, gears 12 being fixed to drums 10.

In order to obtain the right relation between the paper web carriers and the periphery of the drier rolls to thread the paper on the machine, it is necessary that the carriers have the same speed of forward travel at the rotation speed of the rolls, otherwise the paper would tear as a result of the difference of movement. To this end, the ratio of gears 12, 13 and 14 one to the other is such as will give the carriers the same speed of travel as the peripheral rotation speed of the drier drums.

While the pulleys 10 are here shown as being geared one with another, each pulley thus acting as an additional driver for the carriers 5, it is obvious that certain of the gears may be omitted and that an effective driving action can be given to the carriers, on a single unit machine by means only of the drive pulley 6, the free pulleys 10 then operating idly under the friction of carriers 5.

The course of the paper and the carriers relative to the drier rolls, as illustrated in Fig. 1, will be from left to right, the paper and carriers following the rolls in an ascending serpentine path over the first series of rolls and in a descending path over the second series of rolls. As best shown in Fig. 5, the course of one of the carriers 5 at the rear end of the machine is upward over a guide pulley 25 and that of the opposite carrier downward over a pulley 26, thus the carriers are spread one from the other and the tail 18 of the paper is released, permitting the web to take its normal course as delivered from the machine. At the front end of the machine the upper carrier is directed downward over a pulley 25 and the lower carrier is directed upward over a pulley 26, the two being thus brought together, as they approach the lower roll 2, into normal relation to engage the paper in its upward threading course over the first series of drier rolls and downward over the other series.

The modified construction, illustrated in Figs. 6 and 7, consists in an arrangement of a series of idle guide pulleys 15 adjacent the ends of each drier roll along the course of the paper, the pulleys as here shown being supported on a webbed plate 16 secured to the frame of the machine. The travel of the carriers 5 over the guide pulleys 15 will be the same as over the pulleys 10 when the latter are not gear entrained.

A clutch 17 is provided in connection with gear 14 to render the carriers inoperative during the drying operating of the machine, it being understood that the carriers have no function other than to coact with the drier rolls in threading the paper on the machine.

In Fig. 5 the manner of connecting the paper web to the carriers is illustrated. A "tail" 18 of the paper is formed at one corner of the leading end of the web and is turned outwardly and inserted between the carriers, the friction between the carriers being sufficient to grip the paper and carry the end of the web along through the threading movement.

Fig. 2 illustrates one of the driving pulleys 10^a for carriers 5, equipped with an electro-magnetic clutch, for causing a driving relation between the paper drier rolls 2 and the drive pulley. The electro-magnetic clutch consists of an electro-magnet 19 confined within a recess formed in one face of the drive pulley, the opposite face of the pulley having secured thereto an insulating disc 20 of any other suitable material, upon which two concentric collector rings 22 are mounted. The rings 22 are arranged to coact with brushes 23 supported by the brush holders 24—24 and forming a means to conduct the electric current to the coil 19.

The end of the roll 2 adjacent to the drive pulley serves as an armature for the electro-magnet formed within the pulley and the action of said magnet is sufficient to cause a driving relation between the two.

Any suitable switch will serve for controlling the current to coil 19, for effecting and disrupting driving relation between pulley 10^a and the adjacent drums 2, to cause carriers 5 to operate only when paper is being put on the machine.

Having described my invention, I claim:

1. In a drying machine, including in combination with drier rolls, web carriers, normally disconnected from the rolls into synchronized operative relation with said rolls and to carry the leading end of said web as the same is threaded thereon.

2. In a paper drier machine, including in combination with drier rolls, web carriers, normally disconnected from the rolls, operable over carrier actuating devices coacting with the drier rolls, and adapted to carry the leading end of the web as the same is put on said machine and means for connecting the web carriers operatively with the rolls.

3. In a paper drier machine, including in combination with drier rolls, web carriers, operable over carrier actuating devices, independently of said rolls and means for operatively associating the movements of the carriers and rolls whereby to adapt the carriers to thread the paper web on said rolls.

4. In a paper drier machine, including in combination with drier rolls, endless paper web carriers, normally in idle relation relative to the rolls, operable over carrier guiding devices associated with each roll and means to coordinate the movement of the carriers and the rolls whereby to thread the paper web in the machine.

5. In a paper drier machine, including in combination with drier rolls, paper web carriers arranged along the course of the paper over said rolls, timed to the movement of the paper and adapted to coact with the rolls to thread the web on the machine, and means for controlling the operation of the web carriers independently of the operation of the drier rolls.

6. In a paper drier machine, including in combination with drier rolls, paper web carriers arranged along the course of the paper over said rolls and adapted to coact with the rolls in threading the paper web thereon, means operable independently of the rolls to actuate said carriers and means associated with each roll acting to guide the carriers along said course.

7. Web threading mechanism for paper driers including endless carriers arranged along the path of the paper and adapted to engage an end of the paper web and to carry the same along in a threading movement over the drier rolls, and means for actuating the web carriers comprising a drive pulley adapted to be electrically connected with one of the drier rolls whereby the carriers will be caused to travel at the same speed as the paper over said rolls.

In testimony whereof, I affix my signature,

HOMER D. MARTINDALE.