Sept. 14, 1937. C. E. BEECHER 2,093,347

MEANS FOR APPLYING DOPE TO PAPER

Filed July 18, 1935 2 Sheets-Sheet 1

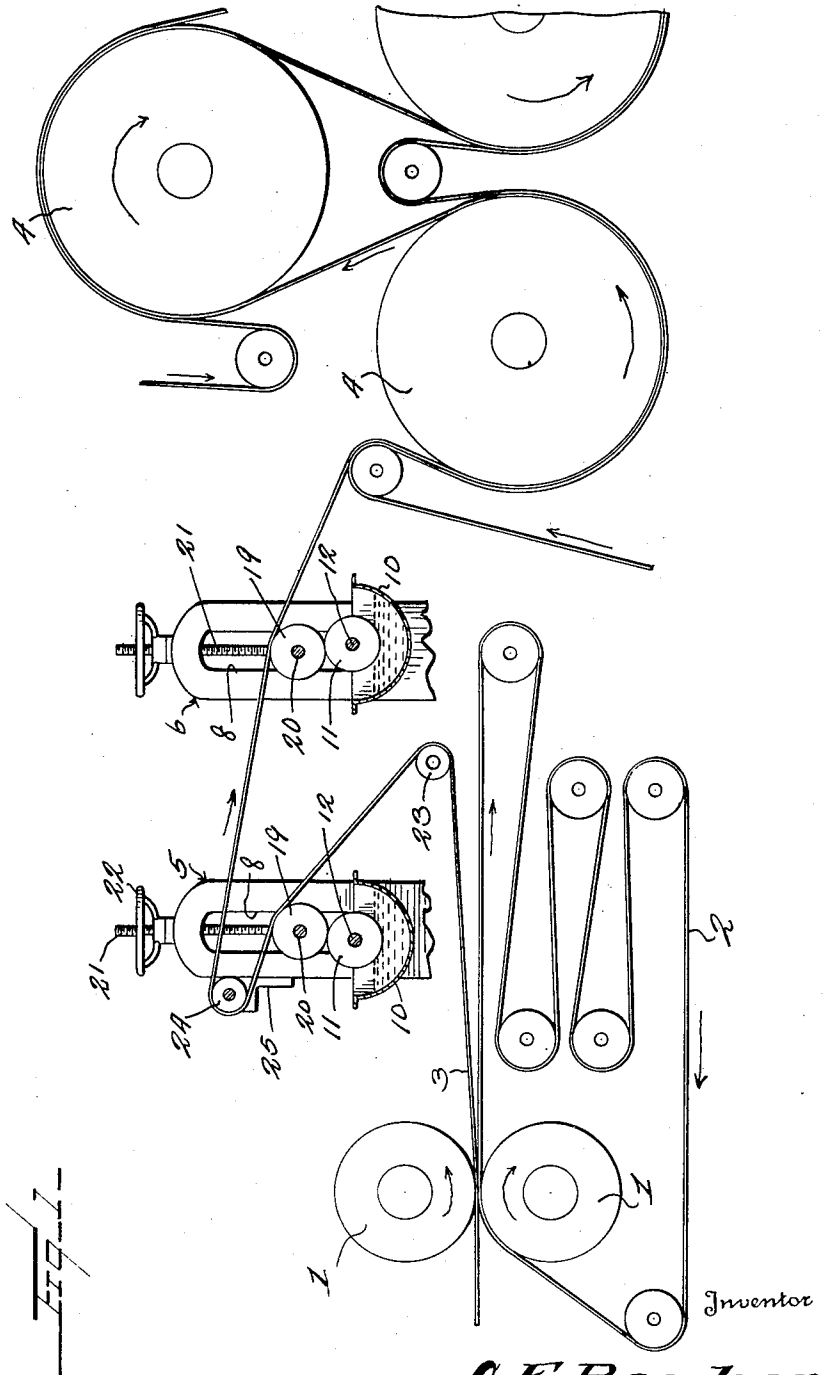


Fig. 1

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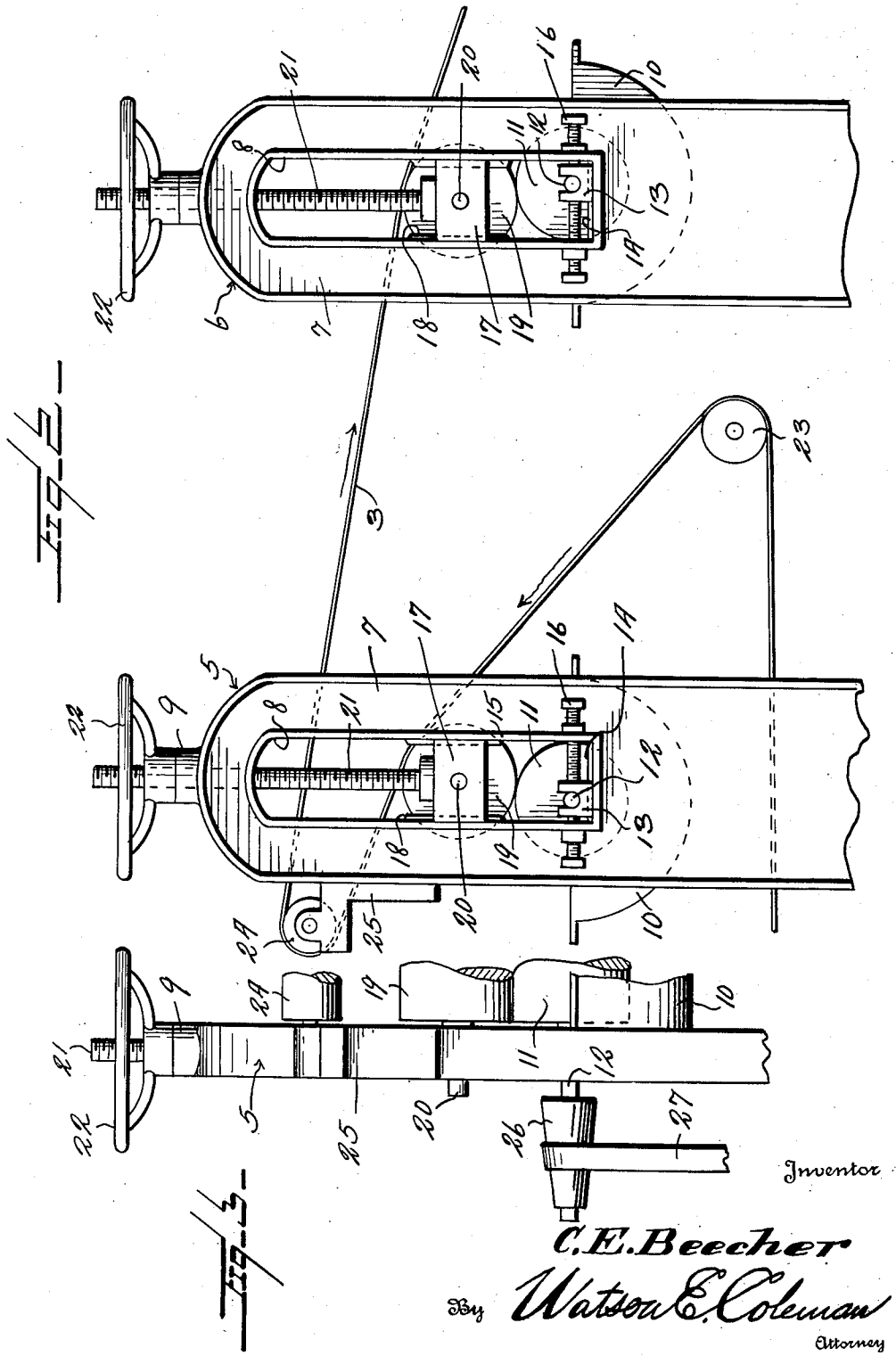
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MEANS FOR APPLYING DOPE TO PAPER

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3 Claims. (Cl. 91—50)

This invention relates to the class of paper manufacture and pertains particularly to an improved apparatus for applying dope to paper.

In the manufacture of paper, the standard practice in applying dope to the paper is to make the application after the paper has passed through the dryers of the paper machine. The finished paper is then run through converting machines which apply the necessary dope material in any one of several manners.

The primary object of the present invention is to provide an improved apparatus for applying dope to the paper which consists in passing the paper over dope applying rolls before it reaches the dryers of the paper machine and while the paper is still in a wet condition.

Heretofore, attempts to apply dope to the paper while wet have failed because the attempts were made by passing the paper between doping rolls and this is impossible, because of the moisture which the paper carries.

The invention has for a further object to provide a means whereby an even distribution of dope material may be made over one or both surfaces of the paper while it is being made and before it goes to the dryers, whereby a more thorough penetration of the paper by the dope is obtained.

A still further object of the invention is to provide a novel arrangement of dope applying rolls whereby relative adjustment of the rolls may be made to obtain an even contact therebetween throughout the entire lengths of the same.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 represents diagrammatically the press rolls and dryers at the wet end of a paper making machine in association with which the dope applying rolls of the present invention are shown in transverse section;

Figure 2 illustrates in end elevation the dope applying units for the present invention;

Figure 3 is a view in side elevation of one end of a dope applying unit.

In the illustration of the apparatus for carrying out the present invention by the use of the apparatus shown, there is shown in Figure 1, diagrammatically, presser or couch rolls 1 at the wet end of a paper making machine over the lower one of which the endless web 2 passes and over which web and between the rolls the strip of wet paper 3 passes in moving toward the dryer rolls of the machine which are indicated by the numerals 4.

Heretofore the application of dope solutions to a paper body has been made after the paper passes through or between the dryer rolls 4 of the machine and because of the dried condition of the paper, the even distribution of dope thereover and the thorough penetration of the paper by the dope has been difficult to obtain. The present invention consists in the provision of a novel apparatus which facilitates the application of the doping solution to the paper web before it reaches the dryers and while it is in a wet condition. This method results in a more satisfactory product because of the fact that, the paper being wet, after the dope is applied and the paper passes to the dryers, the dope will follow into the paper as the water is being dried out, thereby giving a more uniformly treated sheet.

It is not possible to pass the wet paper web between dope applying rolls because of the large amount of moisture which the paper carries. For the carrying out of the present process, therefore, there are provided the two units indicated by the numerals 5 and 6 wherein the wet paper web passes over the top of a dope applying roll and wherein means is provided in the construction of the units facilitating the contact between a dope picking up roll and a dope applying roll of such a character that an even distribution or film of constant thickness of the dope over the applying roll is assured.

Each of the units 5 and 6 comprises a pair of standards, each of which is indicated by the numeral 7 and which are disposed at opposite sides of the paper machine. Each of these standards has a vertically extending bearing guide or recess 8 therein and a bearing collar 9 upon its upper end which is alined with an opening leading downwardly through the upper end of the standard into the guide 8. Supported between each pair of standards to extend transversely of the paper machine is a dope trough 10 and lying above each of these troughs is a dope pick-up roll 11 which has a large proportion of its peripheral surface within the trough so as to dip into dope liquid placed therein. Each of these rolls 11 has

a shaft passing therethrough which forms supporting trunnions at the ends, as indicated at 12, and each of these shaft ends or trunnions rests in a sliding bearing block 13 which is supported upon the bottom edge of the recess 8 where a guide rib 14 may be provided extending transversely of the standard and engaging in a groove in the bearing block so that the latter may be moved transversely of the standard in the opening 8 but will not slip out of the opening.

An outwardly projecting flange surrounding the bearing guide opening 8, as indicated at 15, provides means for the support of a pair of screws 16 between the opposed ends of which a sliding bearing block 13 is disposed. These screws have constant engagement with the adjacent blocks 13 so that the latter, by the manipulation of the screws, may be shifted transversely of the bearing opening 8 as hereinafter more fully described.

In each of the bearing openings 8 above the laterally shiftable bearing 13 therein is a vertically movable bearing 17 which is retained in position by any suitable means such as the guide ribs 18 formed on the opposed inner surfaces of the opening 8. Between each pair of standards 7 above the roll 11 is a dope applying roll 19 having a shaft 20, the ends of which are supported in the sliding bearings 17. Each bearing 17 has swivelly attached thereto an end of an adjusting screw 21 which passes upwardly through the collar 9 and through the hub of an adjusting wheel 22 with which it is threadably engaged. By this means, the vertical adjustment of each roll 19 may be made and by means of the screws 16, lateral adjustment may be made of the bearings 13 and of the ends of the rolls 11 supported thereby.

In practice the units 5 and 6 are set up so that the troughs 10 and the rollers of the units will extend across the paper making machine in the area between the presser rolls and the dryer rolls, as shown in Figure 1. Where it is desired to apply dope mixture to both sides of the paper web, both units are employed, but it will be obvious that if one side only is to be doped, one unit only need be set up. In using both of the units, the paper web after leaving the presser rolls is passed about an idler roll which extends transversely of the machine, as indicated at 23, and is then brought back between the standards of the unit 5 across the top of the dope applying roll 19 of this unit. This unit has on one side, the side opposite from the idler roll 23, an idler roll 24 which is rotatably supported at its ends in bearings 25 carried upon the standards of the unit. This idler roll 24 is for reversing the direction of travel of the paper so that, after it has passed over the roller 19 of the unit 5, it will again move forwardly between the standards of the unit 6 and over the top or dope applying roll 19 of this unit, passing then to the dryers in the usual manner. With this arrangement, it will be apparent that the paper web in being reversed and then carried forward has each of its faces moved over or in contact with a dope applying roll so that both sides will receive the dope mixture.

In order that an accurate and even distribution of the dope solution may be obtained on each of the dope applying rollers, the lateral adjustment of the bearings for the ends of the dope pick-up rollers 11 is provided. It is found that it is practically impossible to grind the surface of two contacting rolls such as the rolls 11 and 19 with the proper crown so as to pick up and cause an even distribution of dope over the dope applying roll from the dope pick-up roll. By forming or grinding both rolls perfectly straight and providing the lateral adjustments for the bearings of the pick-up roll in the manner illustrated, one end of the bottom or pick-up roll may be shifted one way and the other end of the roll shifted in the reverse or opposite way so as to cause the surfaces of the two rolls to come to a point where they are absolutely in perfect line as far as the bearing is concerned. This will eliminate any springing in the center as it will let the center of both rolls come together in order to cause a perfect distribution of the dope. It will thus be seen that while the upper roll of each pair may be moved vertically, the lower roll may be shifted transversely relative thereto so that it may be adjusted from a parallel relation to any desired angular or oblique relation.

It will, of course, be understood that any suitable means may be employed for rotating the dope applying rolls at the same speed as the rolls 1 and 4 of the paper machine so that the paper web 3 will move steadily through the machine. In Figure 3, the shaft of a dope pick-up roll 11 is shown as extended and having a cone 26 thereon over which a driving belt 27 is engaged. By shifting the belt, the speed of rotation of the dope applying rolls may be varied, as desired. This is merely one means which may be employed and it is to be understood that it is not to be taken as limiting the invention in any respect.

It has been previously stated that the present apparatus for applying the dope to the paper web before the latter reaches the dryers produces a more satisfactory product and the reason for this is as follows. When the paper comes through the press to the dope rolls, it will contain approximately 75% water. While it is passing over the dope rolls, the wet paper will act as a blotter and will absorb the dope after which the paper passes onto the dryers. The evaporation point of water being much lower than that of the dope, the water will start to leave the paper and as this continues, the dope will follow in to replace the evaporated water. By this apparatus, a natural thorough impregnation of the paper with the dope is obtained and a more uniform distribution of the dope through the paper results. In the old apparatus, the paper is passed between squeeze rolls on a converting machine where reliance is placed on the pressure of the rolls on the paper to press the dope into the paper and this is difficult and sometimes impossible of accomplishment.

What is claimed is:—

1. In the art of paper making, a dope applying mechanism adapted to be disposed in a paper making machine between the presser rolls and dryer rolls, comprising a pair of rolls extending transversely of the machine, a dope receptacle having one of said pair of rolls extending thereinto, the other of the pair of rolls lying above and contacting the first roll, the said other roll contacting the underside of the paper web passing through the paper machine, and means for establishing an even distribution of dope over the periphery of the upper one of the pair of rolls comprising supporting bearings for the lower one of the pair of rolls which are independently shiftable in a plane perpendicular to the vertical.

2. In the device of the character described for applying a dope solution to a continuously moving sheet of material a dope solution containing

trough, a pair of standards disposed vertically at each end of said trough and each having a vertically disposed bearing recess therein, a dope pick-up roller extending longitudinally of and dipping into the trough, a pair of bearing blocks each mounted in the lower end of a bearing opening of a standard for movement transversely of the standard, means facilitating the said movement of the bearing blocks independently one of the other, each of said bearing blocks supporting an end of said roll, a dope applying roll extending longitudinally of and contacting the first roll, a pair of bearing blocks each mounted for vertical sliding movement in the bearing opening of a standard and each supporting an end of the dope applying roll, and means for vertically shifting each of said last mentioned bearing blocks, the said sheet of material passing over and contacting with said dope applying roll.

3. In paper manufacture, mechanism for applying an evenly distributed dope layer to a paper web, comprising a pair of superimposed rollers disposed to have the web pass over and in contact with the top one thereof, means for applying dope liquid to the under one of the rolls, bearing means supporting the ends of one roll, which bearing means are adapted to be independently shifted whereby the ends of said one roll may be moved in the same or opposite directions and in a plane paralleling the other roll, and bearing means supporting the ends of the other roll, said last bearing means being mounted to be shiftable in a plane perpendicular to the plane of movement of the first bearing means.

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