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MANUFACTURE OF PAPER

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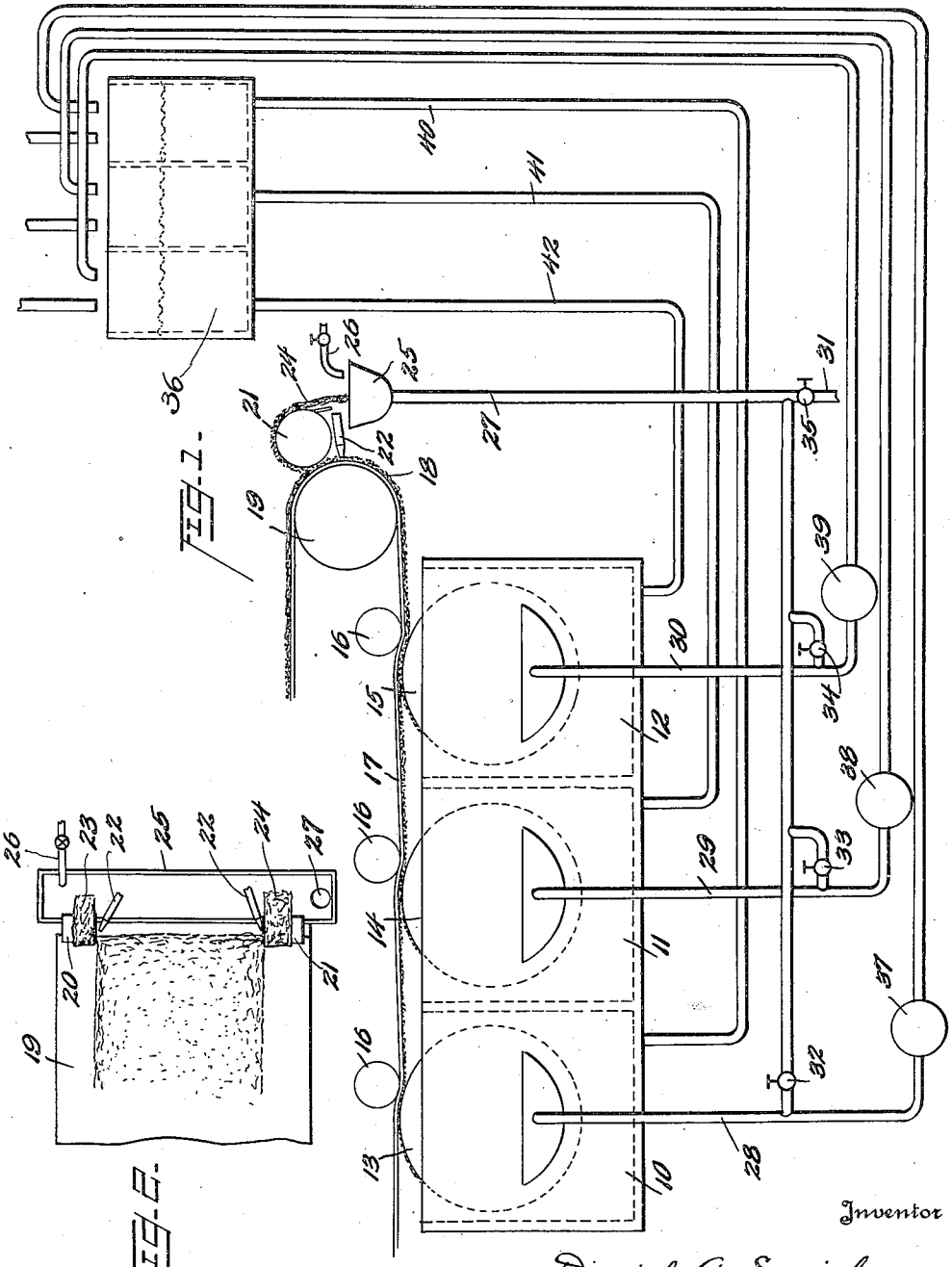


FIG. 1.

FIG. 2.

Inventor

Daniel A. Smith.

By Wm. D. Shoemaker

Attorney

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MANUFACTURE OF PAPER

Daniel A. Smith, Chevy Chase, Md., assignor to District of Columbia Paper Manufacturing Company, Washington, D. C., a corporation of Virginia

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10 Claims. (Cl. 92—43)

This invention has relation to the manufacture of paper and more particularly to a method and apparatus for cutting the paper to width during the fabrication thereof.

The invention has for its object the production of paper of any given width of roll, the accomplishment of this object during the fabrication of the paper, and the altering of the width to satisfy any demand without interrupting the process or stopping the machine used in making the paper.

Another object of the invention is the formation of a superior deckled edge to the paper, which edge is free of unevenness and therefore less liable to tear and require the rethreading in the machine. A still further object of the invention is the cutting of paper to width during the process of making, and the saving of the material of the edge strips, and its return to the stock of pulp.

A further object of the invention is the avoidance of the necessity of banding or deckling the cylinder mould in paper making for the purpose of obtaining a narrower width of paper. A still further object of the invention is the avoidance of banking of pulp stock adjacent the banded ends of the cylinder mould.

A further object of the invention is the effecting of a substantial saving in expense in the making of paper, divided between a saving in labor cost and a saving due to the reclaiming of the cut edges without the necessity of reworking.

A further object of the invention is the production of a method and apparatus for leading back into the general supply, in a selective manner, the cut edges to a supply which will absorb it from a color point of view.

Other objects and advantages of the invention will hereinafter appear in the following description and the novel features thereof will be particularly pointed out in the appended claims.

Like reference numerals indicate like parts throughout the several figures of the drawing, in which:

Fig. 1 is a diagrammatic representation of a paper making machine for carrying out the invention, and

Fig. 2 is a similar view of a portion of that machine.

In a series of vats 10, 11 and 12, are revolvably mounted a series of cylinder moulds 13, 14 and 15. In a manner well known in the paper industry there is supplied to each of these vats pulp fibers in suspension and upon the rotation of the moulds these fibers will be taken up and transferred by the aid of the couching rolls 16 on to a felt 17 in sheet form. As shown in the drawing the sheet 18 is made up of a layer produced from the vat 10, a second layer produced from the vat 11, and a third from the vat 12, and these layers may be of different colors whereby paper is formed which will have a face of one color and a back of another. An idler roll 19 directs the sheet toward other parts of the machine comprising press, calender, and drying rolls, all well known.

It is in conjunction with the idler roll 19 that an important feature of the invention resides. This idler roll is indicated in Fig. 2 as being mounted in pressure contact with a pair of baby couching rolls 20 and 21 and below each of said rolls is a nozzle 22 through which a very small stream of water is forced to impinge upon the newly formed paper sheet 18. The pressure of this stream of water is sufficient to cut the delicate sheet as it leaves the cylinders. The two nozzles are adjustable across the width of the idler roll so that the cuts made thereby may be separated any distance desired. This adjustment is made without stopping the machine in its operation.

The baby couching rolls are used in connection with the nozzles and are likewise adjustable. They are made of a material to which the cut edges 23 and 24 will adhere the more readily than they would to the material of the felt 17. So that in the travel of the sheet and the felt over the idler the edges cut from the sheet by the streams of water are turned from the idler over the baby couching rolls from which they are removed by a scraper or doctor into a trough 25 where sufficient water is admitted through a nozzle 26 to break up and convey the pulp strip through a conduit 27 to cylinder discharge pipes 28, 29 and 30, or to a sewer lead 31. It will be appreciated that valves 32, 33, 34 and 35 control the selected disposal of the pulp from the edges of the sheet.

It will be appreciated that the discharge pipes 28, 29 and 30 are conventional in paper making machines and carry away the white water removed in the felting of the web of paper on the cylinder wire back to the stock supply vat 36, and in this process the pulp from the edges severed from the sheet 18 will be carried and broken up to this supply vat to be used again in the making of the paper. Heretofore it was customary to lose this material by having it removed from the finished paper and thrown away.

It will be appreciated that the selective dis-

position of this edge pulp is of importance when a sheet is being formed of two colors, one for the face and another for the back, and for the purpose of illustration we will say that such a sheet is comprised of a white face and a blue back. It will be apparent that the edge pulp will then consist of blue and white fibers and it would not produce a satisfactory result to have this proportion of blue and white fibers returned to the supply of white pulp, but it would be quite satisfactory to return such a constituted edge pulp to the blue supply, and this can be done by the opening of the proper valve. If the blue is in the vat 10 then the opening of the valve 32 would produce the return of all of the edge pulp to the supply of blue pulp. If a single color multiple layer strip is being made then it is immaterial to which supply the saved pulp is added.

The pumps 37, 38 and 39 are utilized to maintain the proper flow of discharge and saved material to the general supply. If, now, a sheet is being made in which one of the colors is black or of a very dark hue, it is apparent that it would be inadvisable to pump the saved pulp to any supply and hence the valve 35 is opened rather than any of the others which permits the discharge of the saved pulp to a sewer or to a device for reclaiming it.

It will be understood that the pipes 40, 41 and 42 are the supply pipes for pulp material whereby pulp stock with a sufficient quantity of water for its suspension is supplied to the vats 10, 11 and 12. It will be further appreciated that the amount of water supplied for the various operations is carefully calculated as is well known in paper manufacturing.

The several mechanical features of the invention have been set forth and their individual functions pointed out. It will be appreciated from this description how the apparatus works as a whole. A résumé will suffice to complete the disclosure of the invention.

Paper in sheet form is made as is usual in machine operations for the manufacture of paper emoodying cylinder moulds. At a point adjacent in time to the formation of the sheet, it is cut by the employment of a fluid stream and the cut away edges of the sheet are directed back into the general supply of pulp, in a selective manner, whereby this saved pulp will have no deterrent effect upon the coloring of the paper being made. This cutting of the sheet may be done in any suitable manner, but as illustrative of the idea an adjustable nozzle and baby couching rolls, likewise adjustable, are employed to sever and properly direct the severed portions, and as the means for returning is shown a trough into which the saved pulp is deposited and a water supply for moving the same out of the trough into the general conduits of the machine.

As is well known it has been a common practice to band the cylinder moulds in order that for a given distance to either end of the roll no pulp will adhere. In this banding operation the machine has to be stopped, access obtained to the cylinder mould for this purpose which is not usually convenient and tacks have been employed to attach the bands to the roll which tacks have in time injured the mould to an extent that it has to be replaced. Again when these bands are used there is a banking of pulp at the ends of the vats with the result that the paper produced is of uneven thickness. These defects are avoided by permitting the moulds to make the full sized sheet or web of which it is capable and then cutting off enough from the web and returning it to the stock supply to produce the required width of sheet.

Another important advantage attained is the forming of a superior edge to the paper. It is not unusual in paper making that an imperfect edge is formed on a paper sheet, which imperfect edge will, under the strains produced upon the sheet in passing from one set of rolls to another, tear and crumple. There is then made necessary a rethreading of the paper through the machine and a loss of pulp in this operation. Sheets cut according to this invention will permit the cylinder mould to supply a well nigh perfect sheet and the edges as they leave the cutting operation are true and perfect with the result that few if any rethreadings of the paper through the machine become necessary.

Another important advantage of the invention lies in the fact that heretofore in obtaining a roll of paper of a definite width it has been necessary to cut away considerable portions thereof, and this has been wasted. With the present invention the cutting is done immediately after forming the sheet and the cut edges are returned to stock to be used again.

A still further advantage of the invention is the ability to return stock so cut to a selected supply so that no ill effects of color will be experienced.

What is claimed is:

1. In a process for paper making, the method of securing sheets of selected width, comprising the formation of an over-sized sheet, the cutting of a strip therefrom at a point removed from the cylinder mould, and returning the pulp of the cut strip to the stock supply vat.

2. In a process for paper making the method of producing a sheet with even deckled edges and of a given width comprising the formation of an over-sized sheet, immediately cutting from either side of the moisture laden sheet a strip and removing the pulp of the cut portions to a point remote from the cylinder vat.

3. The process of claim 2 in which the edge strips are severed while still on the felt before being passed through press rolls, and wherein the cutting is done upon the felt whereby the cut portions are removed from the felt and the main body of the sheet permitted to continue with the felt.

4. In a process for making paper economically and of securing paper sheets of predetermined width, the forming of an oversized sheet upon the mould, the cutting of the over-sized sheet to the required width while the sheet is still laden with moisture, directing the cut portion of the sheet to a conduit and returning it with the discharge from the cylinder moulds to the stock supply vat.

5. The employment of the process of claim 4 in the making of paper wherein the sheet is made up of layers of different colors, and returning the cut strip from the multicolored sheet to the pulp supply of that color which will be unaffected by the mixture.

6. In a process for making paper economically and of securing paper sheets of predetermined width and having even deckled edges, the process of forming an over-sized sheet by the use of cylinder moulds and felt, immediately cutting the sheet to the predetermined width by severing therefrom edge strips, permitting the main body of the sheet to proceed to the press rolls and reclaiming the pulp of the cut strips by directing it into a water

conduit and returning it to the stock supply vat for re-use.

7. The process of claim 6 in which the severing is accomplished by impinging upon the moistened sheet a stream of water and using a narrow couching roll to remove the severed strip from the felt.

8. In a paper making machine, the combination of a sheet forming mechanism, a cutting mechanism comprising a nozzle directing an impinging fluid stream upon the paper sheet and a couching mechanism for removing the cut strip.

9. In a paper making machine comprising cylinder moulds, couching rolls, and felt, a turning or idler roll, baby couching rolls bearing upon either end of the idler roll, and nozzles for directing a severing fluid stream upon the sheet in advance of the baby couching rolls, whereby the moisture laden sheet is cut to a predetermined width before it proceeds to the press rolls.

10. In a paper making machine, the combination of a sheet forming mechanism, a cutting mechanism acting upon the sheet immediately after it is formed and comprising nozzles and baby couching rolls adjustable along the width of the sheet to form sheets of different widths without stopping of the machine, means for removing the cut portions of the sheet and for conveying the pulp therein away from the cylinder vat preparatory to its return to the stock supply vat.

DANIEL A. SMITH.