July 30, 1929. L. KIRSCHBRAUN 1,722,432

APPARATUS FOR MAKING PAPER

Filed March 27, 1924

Fig. 1.

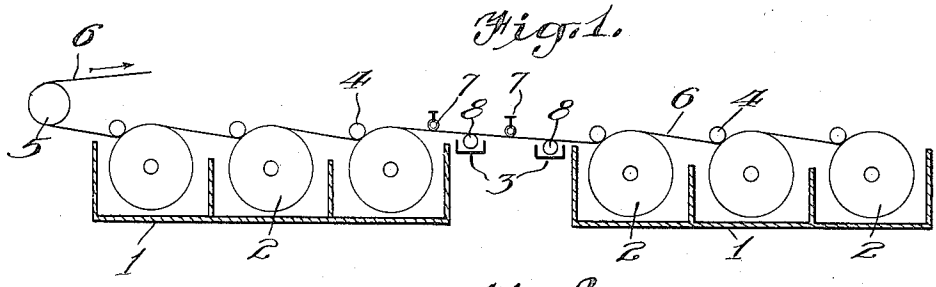


Fig. 2.

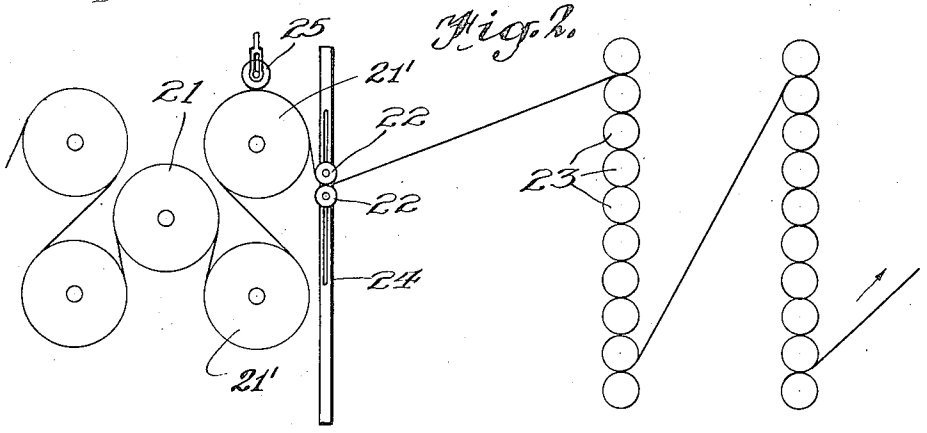
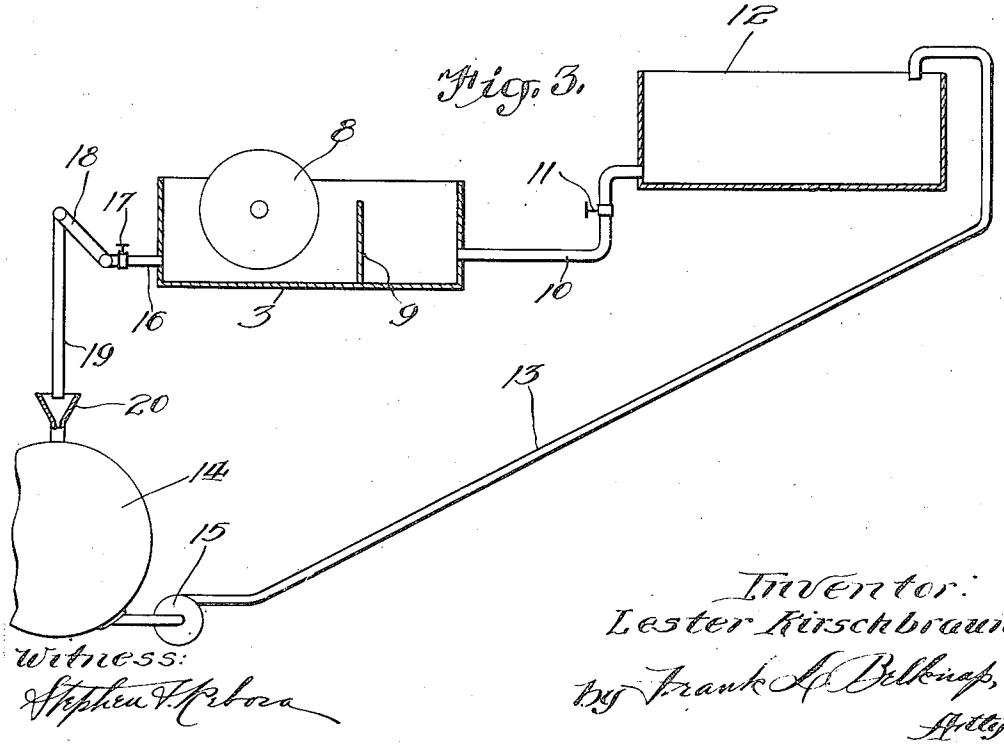


Fig. 3.



Witness:
Stephen V. Ribera

Inventor:
Lester Kirschbraun,
by Frank A. Belknap,
Atty

Patented July 30, 1929. 1,722,432

UNITED STATES PATENT OFFICE.

LESTER KIRSCHBRAUN, OF CHICAGO, ILLINOIS.

APPARATUS FOR MAKING PAPER.

Application filed March 27, 1924. Serial No. 702,315.

This invention relates to improvements in apparatus for making paper, and refers more particularly to an apparatus by which an asphalt or bituminous layer is interposed between the intermediate plies of the sheet. One of the specific objects of the invention is to provide apparatus for making a waterproof or moisture-proof sheet, by means of which a liquid repellent layer is interposed between the plies and not exposed on the exterior surfaces of the sheet. The advantages of the invention will be apparent from the following description, in which

Fig. 1 is a somewhat diagrammatic view, partly in side elevation and partly in vertical section, of cylinder molds and application boxes, constituting part of the apparatus.

Fig. 2 is a similar view of the dry end of the machine showing a portion of the driers and calendars.

Fig. 3 is an enlarged somewhat similar view of one of the application boxes, showing in detail the feeding means.

Referring to the drawings, 1 designates the vats and 2 the cylinder molds. In this instance, I have shown the right hand and left hand sets of cylinder molds spaced apart to accommodate the application boxes 3, hereinafter more particularly described. 4 designates the couch rolls, 5 the drum roll and 6 the blankets. 7 designates the adjustable contact rolls, there being one for each of the application rolls 8.

Describing the application boxes and rolls, and referring more particularly to Fig. 3, each box 3 may be provided with a dam 9, feed line 10, having suitable control valve 11, leading from the head box 12. Emulsion previously prepared is fed into the head box through the pipe 13 from the storage tank 14 by means of the feed pump 15. The overflow on the box 3 is drawn out through the outlet pipe 16 and suitable valve 17. This pipe 16 is connected by suitable swinging joint 18 to swinging pipe 19 which deliver to the funnel 20, through which funnel 20 the excess emulsion in the head box is returned to the storage tank 14. The object of the swinging joint is to maintain any desired level in the application box. By providing two application boxes, one can be used when the other is being cleaned without stopping the operation of the rest of the apparatus, and also, if desired, both application rolls can be used simultaneously.

The application rolls may be covered with a plurality of suitable layers of wire mesh, the inner layer of which may be of, say 14 mesh and the outer screens, say 50 mesh. The application rolls are suitably rotated and the arrangement is such that asphalt or bituminous emulsion may be continuously applied to the under face of the ply as it leaves the last of the right hand cylinder molds. As the upper plies pass by the application rolls and are suitably coated, as stated, they meet the plies formed on the left hand cylinder molds and the result is that all of the plies are forced together to form a single sheet between which is interposed a waterproof layer of asphalt or suitable bitumen. As the sheet passes over the driers, the water is removed from the emulsion, as well as from the sheet, finally coming to the end driers 21 and 21′. From the last drier 21′ the sheet passes between the pressure rolls 22 and thence through the calendars 23 to the reels (not shown) in the usual manner. The pressure rolls 22 are vertically adjustable on the rack 24, the arrangement being such as to insure uniform tension as the rolls travel from the last drier to the calendars. For example, it may be necessary either to raise or lower the pressure rolls 22 in order to get a uniform tension between the upper and lower plies. If desired, adjustable pressure rolls 25 are also provided. As the sheet is passed over the driers the water is removed from the bituminous layer and the bitumen coalesces. It may however, be desirable to have the bitumen set before the paper reaches the calendar rolls and accordingly, instead of having the last driers 21′ hot, they may be cooled instead of heated. The number of driers used to cool and the extent to which the paper will be cooled will, of course, vary with the operating conditions but this is a matter which will be readily adjusted by a skilled operator.

The manner in which the apparatus is operated will be apparent from the foregoing description and need not, therefore, be further described in detail. It should be noted, however, that the finished sheet has an interposed waterproof or liquid repellent layer of bitumen, which, however, is not on the outside surface and which, therefore, does not discolor such outer surface. While I have described apparatus for interposing bitumen between the innermost sheets, it is to be understood that the apparatus is suitable

for interposing bitumen between say, the second and third plies of a 6 ply sheet, or between the third and fourth plies of say, an 8 ply sheet; also, it may be interposed between both the third and fourth, and fifth and sixth plies of, say an 8 ply sheet, by suitably positioning the application rolls between the cylinder molds. It is not necessary to mix the bituminous emulsion with the fibrous pulp before the sheet is formed, but nevertheless, a suitable waterproof layer is formed between the plies as the paper is being made. The emulsion may be made in accordance with my previously issued patents and is preferably of a non-adhesive character so that it will not tend to gum or discolor the blankets or the rolls through which the paper passes.

In the actual production of a sheet of this character, it has been noted at times that there may be a tendency to separate or split at the bituminous layer, probably due, in some instances, to differences in fibrous stock used for the ply on either side of the bituminous layer, which will cause uneven shrinkage. Also due to uneven drying if the bituminous ply is positioned not exactly central of the thickness of the entire sheet so that the amount of stock on one side of the bituminous ply differs somewhat from the amount of stock on the other side of the bituminous ply. These difficulties can be practically obviated by adjusting the tension roll 25 so as to throw compensating strain to either side of the sheet.

The process carried out by the herein described apparatus is the subject of a copending application, Serial No. 702,314 filed March 27th, 1924.

I claim as my invention:

1. In an apparatus for making paper, in combination, cylinder molds forming individual plies, means between certain molds for applying a liquid repellant layer between certain inner plies, driers around which the sheet passes, pressure rolls, means for varying the tension imposed on the portion of the sheet on one side of the liquid repellant layer relative to the tension maintained on the portion of the sheet on the other side of the liquid repellant layer.

2. In an apparatus for making paper, the combination with cylinder molds for forming plies of paper, application rolls between said cylinder molds for applying a liquid repellant layer between opposed plies, driers, tension adjusting means operating on the sheet, and cooling means registering with the sheet.

3. In an apparatus for making paper, in combination, cylinder molds for forming individual plies, means including an application roll between certain molds for applying a liquid repellant material between certain plies and adjustable means acting to regulate contact pressure between the already formed plies and application roll.

4. In an apparatus for making paper, in combination, cylinder molds for forming individual plies, means including an application roll between certain molds for applying a liquid repellant material between certain plies, means for supplying the application roll or rolls with liquid repellant material, including liquid-repellant-containing-means, and means for regulating the level of the liquid repellant material in said containing means.

5. An apparatus for making paper, including in combination, mechanism for applying liquid repellant material to the paper and comprising a container, an application roll mounted therein, means for applying liquid repellant material to said container, and means for regulating the level of said liquid repellant material in said container.

6. An apparatus for making paper, including in combination, mechanism for applying liquid repellant material to the paper and comprising a container, an application roll mounted therein, means for applying liquid repellant material to said container, means for regulating the level of said liquid repellant material in said container, and liquid repellant storage means communicating with said container, means for returning the excess of liquid repellant material from said container to said storage means, and means for maintaining a circulation from and to said container.

LESTER KIRSCHBRAUN.