

R. M. SCANLAN.
 MULTIPLE PLY PAPER BOARD MAKING MACHINE.
 APPLICATION FILED NOV. 7, 1910.

997,011.

Patented July 4, 1911

2 SHEETS—SHEET 1.

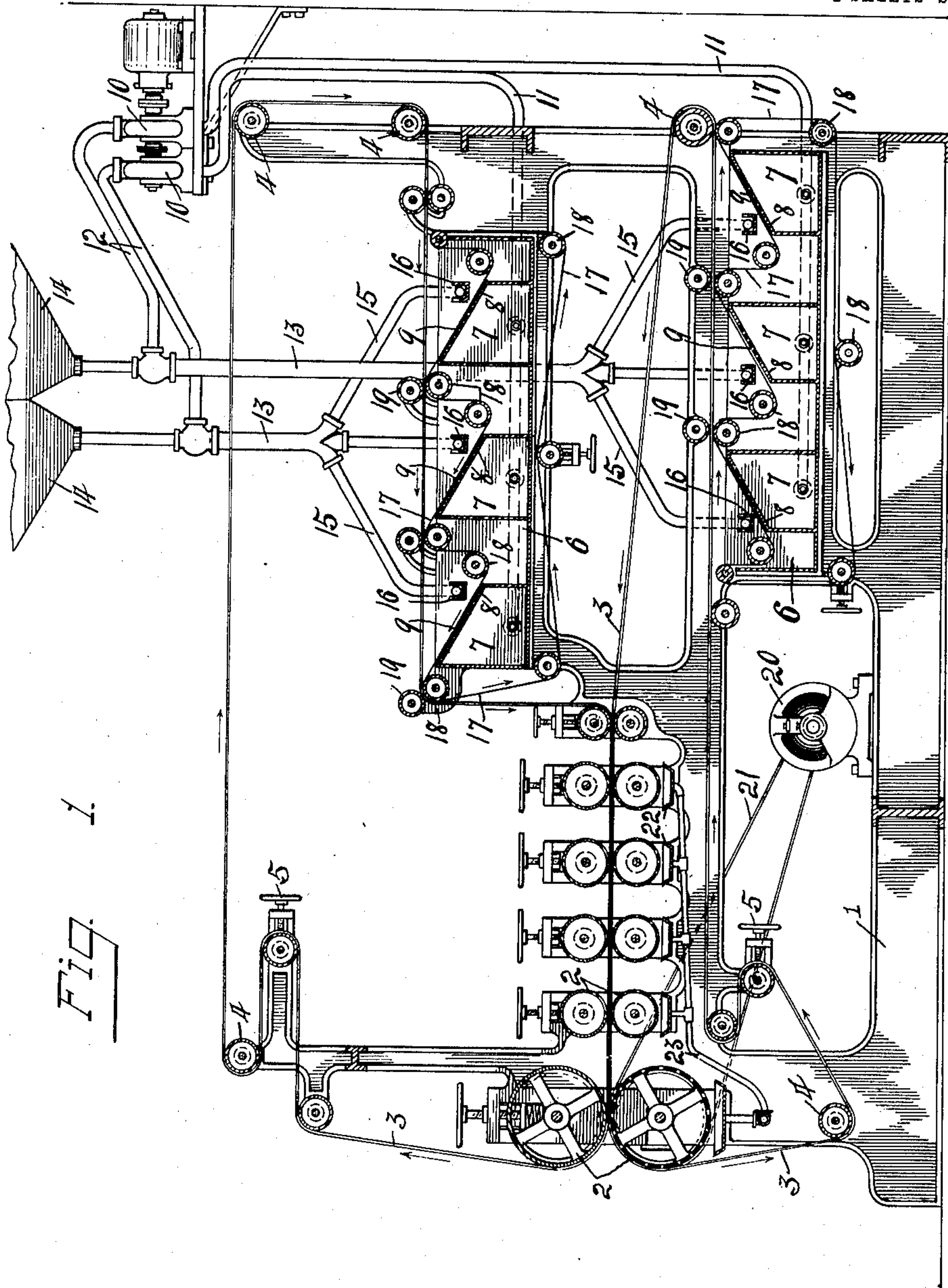


Fig. 1

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 By Owen & Owen,
 His attys.

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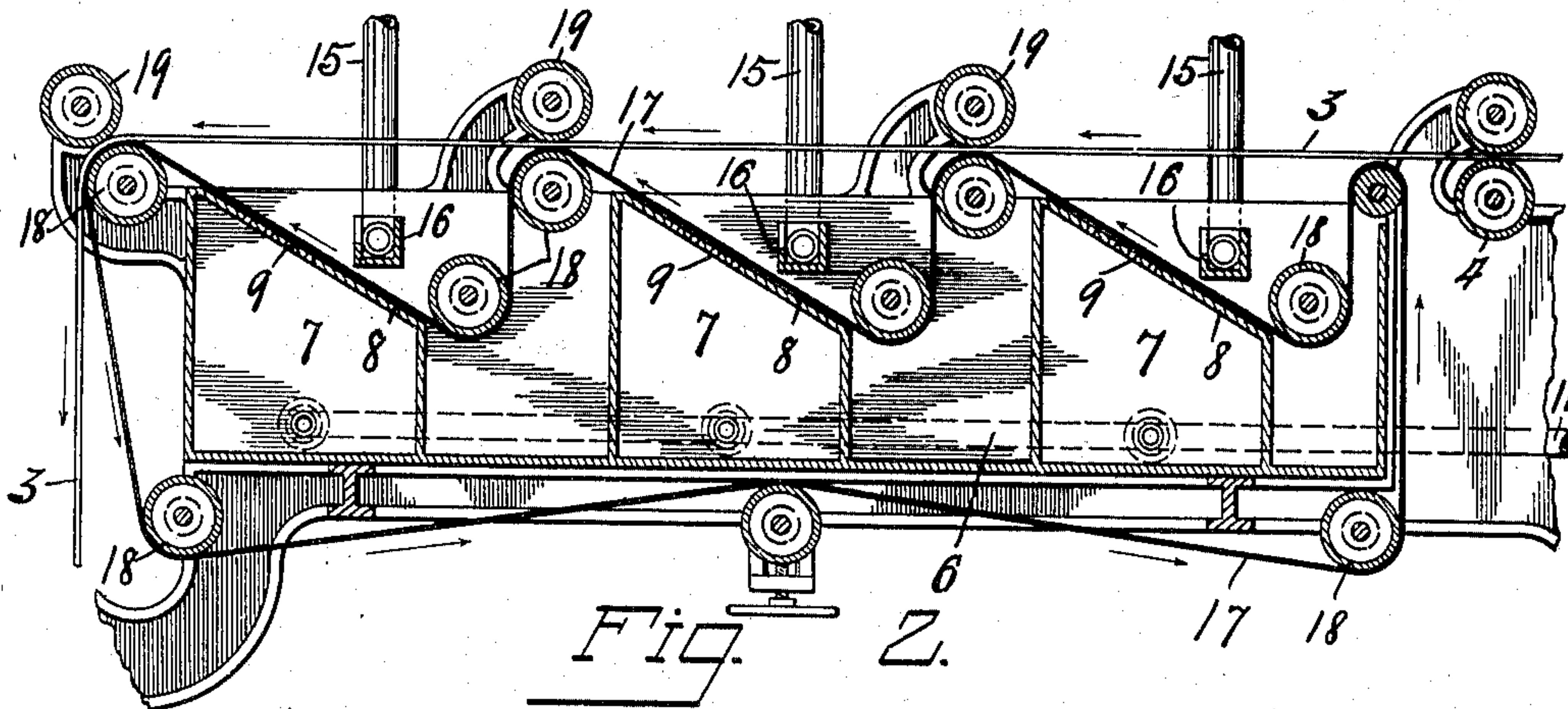


Fig. 3.

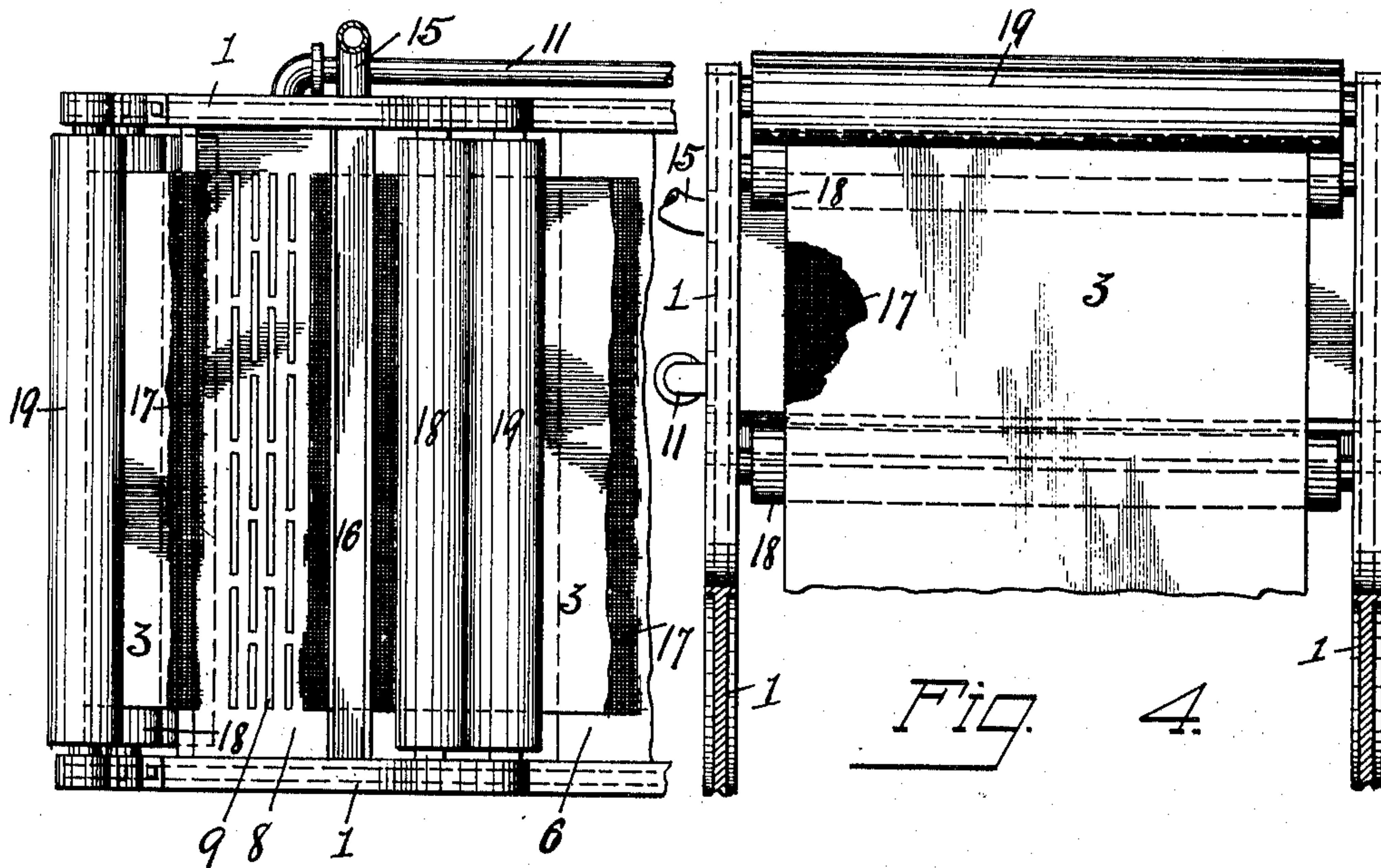


Fig. 4.

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UNITED STATES PATENT OFFICE.

ROBERT M. SCANLAN, OF TOLEDO, OHIO, ASSIGNOR OF ONE-HALF TO JOHN B. SHEPLER,
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MULTIPLE-PLY-PAPER-BOARD-MAKING MACHINE.

997,011.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed November 7, 1910. Serial No. 591,064.

To all whom it may concern:

Be it known that I, ROBERT M. SCANLAN, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Multiple-Ply-Paper-Board-Making Machine; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to paper making machines, and particularly to machines of the class adapted for the making of multiple-ply board or the like.

The object of my invention is the provision of a simple and efficient machine of this class, which is adapted for the manufacture of multiple-ply paper or board in continuous flat sheet form, the plies of the paper or board being successively applied to a carrying belt as it moves along.

Further objects of my invention will be apparent by reference to the following specification.

The invention is fully described in the following specification, and while, in its broader aspect it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a vertical longitudinal section of a machine embodying my invention. Fig. 2 is an enlarged longitudinal sectional view of the pulp applying mechanism of the machine. Fig. 3 is an enlarged plan view of one end portion of such mechanism with parts broken away, and Fig. 4 is a front elevation of such mechanism with a portion of the pulp carrying apron broken away.

Referring to the drawings, 1 designates the frame of a machine in which are mounted a plurality of sets of rolls 2 which in the present instance are adapted to serve both as compression rolls for the endless aprons 3, 3, which pass therebetween, and as means for extracting liquid from such aprons and the pulp sheet disposed therebetween, as hereinafter described. Coöperating with the sets of rolls 2 to guide the course of movements of each apron 3 is a set of idler rolls 4, one at least of which is adjustable by

means of a screw 5 to facilitate a tightening of the associated apron.

Mounted in convenient position beneath a portion of each apron 3 preferably to the rear of the point of entrance of the aprons between the compressing rolls 2 is a tank 6 which has its interior provided longitudinally thereof with a series of chambers or compartments 7, the tops 8 of which are disposed beneath the upper edge of the tank and inclined upwardly longitudinally of the tank in the direction of movement of the associated portion of the respective aprons 3. The tops of these chambers are each provided intermediate their upper and lower edges with a series of openings or perforations 9, which provide the only communication between the tank proper and the interior of the chambers 7 thereof, and are disposed beneath the water or liquid line of the tank to permit water or liquid within the tank 6 to flow therefrom into the chambers 7 through said perforations.

A circulation of liquid is created from the tank through the perforations 9 and chambers 7 by a pump 10, one of which is provided for each tank 6 and communicates with the chambers 7 thereof through a pipe 11 which taps into each of such chambers in a suitable manner. The outlet pipes 12 of the pumps 10 connect with pipes 13 leading from associated pulp vats 14, and each pipe 13 has its discharge end provided with a plurality of branches 15 one of which leads to and has its discharge into a trough 16 disposed transversely of the associated tank 6 over each chamber 7 therein, as indicated.

An endless belt or apron 17 of perforate material, such for instance as wire screening, is guided for movement longitudinally around each tank 6 by suitably positioned idler rolls 18 which are so disposed over the upper portion of the tank as to cause the belt to travel down into the tank within the liquid therein to the rear of each chamber 7 and thence upwardly on an incline over the top 8 of each chamber 7 in close parallelism therewith as indicated. The belt 17 passes beneath each of the discharge troughs 16 so that the matter discharged therefrom flows upon the top of the belt over the top 8 of each chamber 7. The upper or forward end of each inclined portion of a belt 17 is disposed above the top of the tank 6 by different ones of the guide rolls 18, and the asso-

ciated apron 3, which passes over the tank 6, is held in contact with the guide rolls 18 at the top of the tank by pressure rolls 19, one of which is disposed over each guide roll 18 which is disposed at the upper ends of the pulp receiving portions of the associated pulp applying belt 17. It is apparent that the plural contact of the belt 17 with the apron 3 and the successive passage down into the tank of the portions of the belt to the rear of such points of contact causes pulp layers to be successively applied to the apron 3 by the belt 17 so that the belt after passing over the tank 6 has a number of pulp layers attached thereto corresponding to the number of inclined pulp applying portions of the belt 17.

As the two tanks 6 of the machine and the associated pulp applying parts are the same except that the inclined portions of the belts 17 are reversely inclined, due to the reverse driving of the two belts, only one of such pulp applying mechanisms will be described. It will also be noted that the upper apron 3 of the machine after passing over the forward end of the associated tank 6 extends downwardly to its point of entrance between the sets of rolls 2, whereas the lower apron 3 after passing over the associated tank 6 passes around one of the guide rolls 4 which also serves the function of a pressure roll 19 above described, and thence continues forward to its point of entrance between the sets of rolls 2.

The entrance of the two aprons 3, 3 between the pressure rolls 2 after passing over the respective pulp applying units of the machine causes the pulp layers which adhere to their contiguous sides to be closely pressed together and to pass from the forward end of such set of rolls in continuous single sheet form.

The belts 3, 3 are shown as being driven by a motor 20 which is connected by a belt 21 to a pulley on the shaft with one of the forward rolls 2 of the machine. The belts 17 are driven by reason of their frictional contact with the apron 3 at their point of contact therewith, as is apparent. The lower ones of the rolls 2 are shown as having their peripheries provided with perforations for the passage of liquid therethrough. Beneath each set of rolls 2 is a trough or pan 22 for catching the liquid flowing from the lower rolls 2 and these pans are connected to the drainage pipe 23 by means of which the liquid is carried to a suitable point of discharge.

In the operation of my machine the operator starts the motor 20 which effects a driving of the aprons 3, 3, the pulp applying belts 17, 17 being driven due to their frictional contact with the respective aprons 3. The pulp within the vats 14 discharges therefrom through the pipes 13 and branches

15 leading to the respective tanks 6 and the liquid which is maintained in continuous circulation within said tanks is pumped from each of the chambers 7 therein through the pipes 11 and thence through the pipes 12 and into the discharge pipes 13 where it commingles with the pulp flowing through said discharge pipes from the vats 14. The pulp and liquid then discharge together from the branch pipes 15 into the distributing troughs 16 of the respective tanks 6 and flow over a side of such troughs upon the subjacent inclined portions of the belts 17. As the portions of the belts 17 upon which the pulp and liquid flow pass over the perforations 9 in the tops 8 of the chambers 7 which are disposed within the tanks 6, a circulation of liquid through such perforations causes an even distribution of the pulp over the perforated surfaces of the belts 17. As the belts 17 continue their endless travel each inclined portion thereof which has previously received its layer of pulp moves over the associated guide roll 18 at the top of the tank and into contact with the under surface of the associated apron 3, or in contact with the layer of pulp applied to the apron by the preceding inclined portion of the belt, being pressed thereto by the cooperating action of the sets of pressure rolls 18, 19. The aprons 3 being of a character adapting the pulp to more readily adhere thereto than to the screens or belts 17 draw the pulp layers from the contacting portions of the belts 17 and causes such layers to be carried with the aprons 3 in adherence thereto. The continued movements of the aprons 3 after passing over the pulp applying units of the machine cause the pulp layers carried thereby to enter therewith between the pressure and liquid extracting rolls 2 by which the pulp thus carried is pressed into a continuous flat sheet of heavy paper, binder's board or the like. While each pulp applying unit of the machine is adapted for the affixing of three pulp layers in successive order to the aprons 3 so that when the layers carried by the two aprons when pressed together will form a six-ply board, it is apparent that the machine may be adapted for the applying of any number of pulp layers or plies to the aprons without departing from the spirit of the present invention.

I wish it understood that my invention is not limited to any specific construction or arrangement of the parts except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. In a machine of the class described, the combination of a movable endless apron, means guiding the course of movement of such apron, and a pulp applying belt having a plurality of points of contact with said

apron, and means for applying matter in layer form to said apron to the rear of at least a portion of the points of contact of the belt with the apron.

2. In a machine of the class described, the combination of a movable endless apron, means guiding the course of movement of said apron, a tank, a pulp applying belt associated with said tank and having successive portions guided for movement into the tank and then into contact with the apron for successively receiving and applying pulp layers to the apron as the apron and belt are moved, means for applying matter in layer form to the portions of the belt extending within the tank, and means for driving said apron.

3. In a machine of the class described, the combination of a movable endless apron, means guiding the course of movement of such apron, and mechanism having a single pulp applying belt for successively applying matter in layer form to said apron.

4. In a machine of the class described, the combination of a movable endless apron, means guiding the movement of such apron, and mechanism having an endless perforate belt for successively applying layers of matter to said apron to form a multiple-ply paper board thereon.

5. In a machine of the class described, the combination of a movable endless apron, means guiding the course of movement of said apron, means for creating a pressure on said apron and cooperating with said first means to guide the apron, a liquid receptacle, a perforate belt guided for successive movements down into said receptacle and thence into position to have contact with said apron, means guiding the course of movement of said belt, and means for discharging matter in layer form upon said belt to the rear of its points of contact with the apron whereby such layers are transferred from the belt to the apron at the points of contact thereof.

6. In a machine of the class described, the combination with a movable pulp layer carrying medium, of a mechanism for applying successive layers of pulp to said medium, said mechanism having an endless pulp applying belt which has a plurality of points of contact with said medium, and means for supplying said belt with pulp layers to the rear of its points of contact with said medium.

7. In a machine of the class described, the combination with a movable endless apron, of a tank, an endless perforate belt associated with said tank and having successive portions guided for movements down into said tank and then into contact with said apron, means for discharging matter upon the portions of said belt extending down into the tank, and means cooperating with said pulp discharging means for creating a cir-

ulation of liquid through the portions of the belt upon which the matter is discharged.

8. In a machine of the class described, the combination with a movable endless apron of a tank having a plurality of chambers arranged in successive order longitudinally thereof, said chambers having perforate tops, an endless perforate belt associated with said tank, means guiding said belt to move over the tops of said chambers in close proximity thereto and to have contact with the apron after its passage over each chamber, means for discharging matter in layer form upon said belt over each chamber, and means cooperating with said matter discharging means for creating a circulation of liquid through the tank, said chambers and the perforated tops thereof.

9. In a machine of the class described, the combination with a movable endless apron, of a tank having a plurality of circulating chambers therein, said chambers having perforate inclined tops, an endless perforate belt associated with said tank, means guiding said belt to move over the tops of said chambers in close proximity thereto and to have contact with the apron after its passage over each chamber, means for discharging matter in layer form upon said belt in its passage over each chamber, and means cooperating with said matter discharging means for creating a circulation of liquid through the tank and chamber.

10. In a machine of the class described, the combination with a movable endless apron, of a tank having a plurality of inclined surfaces disposed therein and arranged in successive order, an endless perforate belt, means guiding said belt for movement around the tank and causing it to successively dip into the tank and thence to pass over said inclined surfaces and to have contact with the apron, and means for discharging matter in layer form upon said belt over each of said inclined surfaces.

11. In a machine of the class described, the combination with two movable endless aprons, of means guiding the movements of said aprons and pressing portions of the two aprons together, and a pulp applying mechanism associated with each apron and having an endless belt which has successive contact with the respective apron to apply pulp in layer form thereto prior to the point of entrance of the aprons between said compressing means.

12. In a machine of the class described, the combination of a set of pressure rolls, a pair of endless aprons having coacting portions passing between said compressing rolls, means cooperating with said rolls in guiding the movements of said aprons, a liquid tank associated with each apron, means associated with such tank for successively applying matter in layer form to the

apron, and means for discharging matter within the tank upon said applying means, the matter applied to each apron passing with the aprons between said pressure rolls and being united into a single sheet thereby.

13. In a machine of the class described, the combination of a plurality of pressure rolls, aprons passing between such rolls, means assisting said rolls in guiding the movements of said aprons, a liquid tank associated with each apron, an endless perforate belt guided for movement around said tank and to successively dip into the tank and have contact with the apron to apply a plurality of pulp layers to the apron one over another, means for applying pulp to the belt to the rear of each point of contact thereof with the associated apron, the matter applied to the aprons being adapted to pass between the pressure rolls with the aprons and to be united into a single sheet thereby.

14. In a machine of the class described, the combination of a pair of movable endless aprons, a liquid tank associated with each apron, and having a plurality of chambers arranged in successive order therein, said chambers having perforate inclined tops, an endless perforate belt associated with each tank, means guiding the movements of each belt and causing it to dip a plurality of

times into its tank and after each dip into the tank to pass over the top of the chamber therein and have contact with the associated apron, means for applying pulp in layer form to the belt to the rear of each point of contact thereof with the apron, means for creating a circulation through the tank and chambers, means cooperating with the guide means of each of said belts to press the belts and aprons together at the points of contact thereof, and means guiding the movements of the aprons and cooperating therewith to unite the matter applied to the two aprons into a single sheet.

15. In a machine of the class described, the combination with a movable apron, of a pulp applying unit comprising a tank, an endless perforate belt guided for movement through said tank and having a plurality of points of contact with said apron during its passage through the tank, and means for applying a liquid pulp to the belt within the tank, said pulp being transferred in layer form to the apron by said belt.

In testimony whereof, I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

ROBERT M. SCANLAN.

Witnesses:

C. W. OWEN,
M. G. GASKELL.