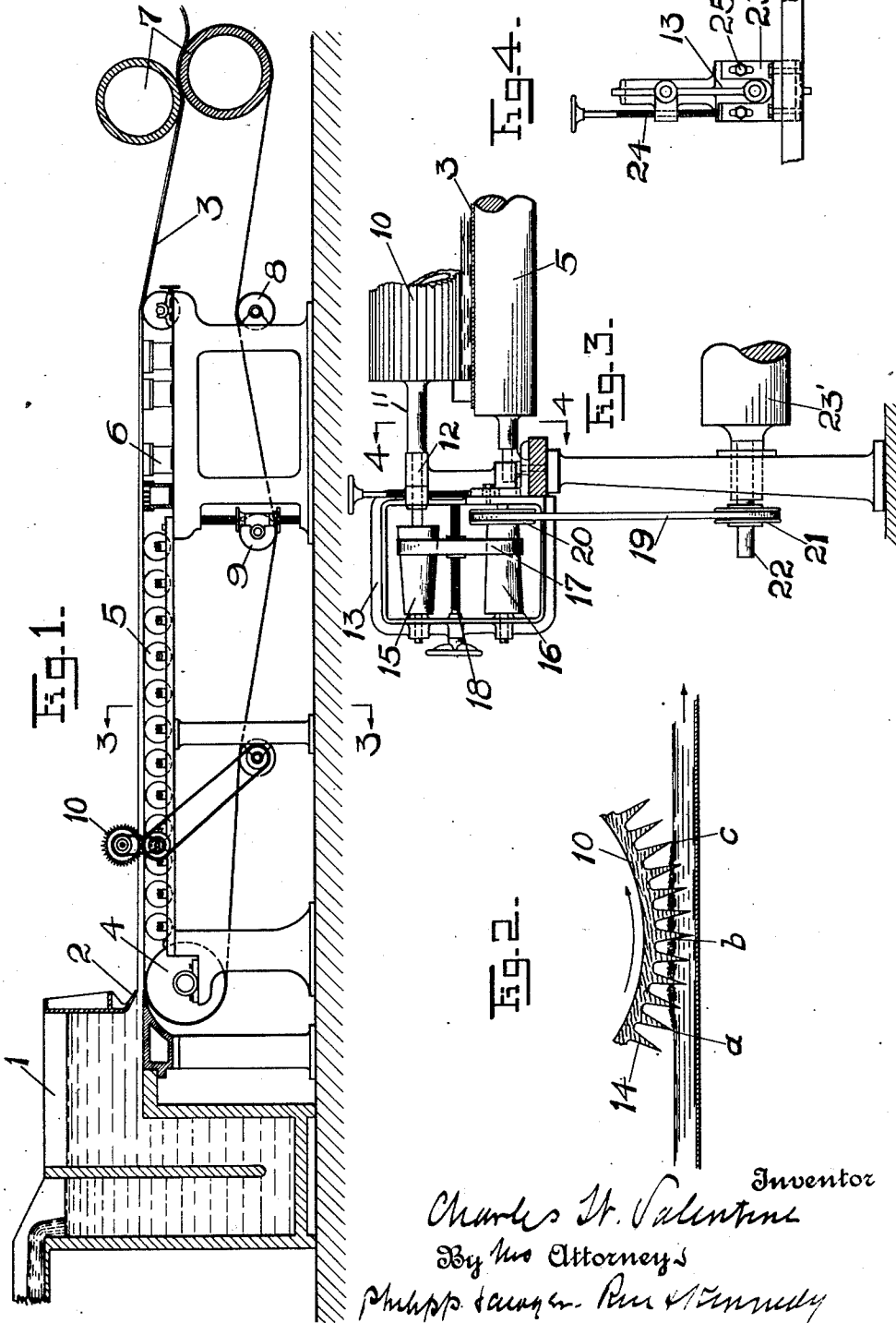


Jan. 17, 1928.

C. W. VALENTINE
PAPER MAKING MACHINE

Filed May 31 1927

1,656,766



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Patented Jan. 17, 1928.

1,656,766

UNITED STATES PATENT OFFICE.

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PAPER-MAKING MACHINE.

Application filed May 31, 1927. Serial No. 195,172.

This invention relates to certain improvements in paper making machines.

In the manufacture of a paper web, particularly on fast running machines of the Fourdrinier type, the pulp or stock is delivered from the head box to the wire under what is known as the slice, the web or sheet being formed on this wire. In making paper on this type of machine, difficulties are frequently experienced due to the formation of bubbles at the point where the stock discharges under the slice onto the making wire. These bubbles cause spots to appear in the finished sheet which are undesirable. Furthermore, in making paper on the Fourdrinier type machine, the stock has a tendency to so arrange itself that the fibers run in one direction, as longitudinally of the stock flow. This tendency of the fibers to arrange themselves lengthwise produces a finished web or sheet having undesirable characteristics, which it is desirable to eliminate.

It is the especial object of the present invention to provide an improved construction by the use of which the objectionable bubbles are eliminated so as to avoid spotty places in the finished sheet, and an intermingling of the stock is obtained so as to overcome the tendency of the fibers to arrange themselves lengthwise.

A further object of the present invention is to provide a construction of simple form which can be readily and easily applied to a Fourdrinier paper making machine.

With these and other objects not specifically referred to in view, the invention consists in certain novel parts, arrangements and combinations which will be described in connection with the accompanying drawings and the novel features pointed out in the claims hereunto annexed.

In these drawings,—

Figure 1 is a side elevation, partly in section, of a paper making machine embodying the invention;

Figure 2 is a partially broken view of part of the construction shown in Figure 1, this being shown on an enlarged scale;

Figure 3 is a detail view, partly in section and partly broken away, of the mechanism for adjusting the wiper roll, and

Figure 4 is a detail view looking in the direction of arrows 4—4 of Figure 3.

Referring now to these drawings, the machine selected to illustrate the invention is a Fourdrinier machine provided with a head box 1 and a slice 2, under which the stock is delivered to the making wire 3 of the machine. This making wire passes over the usual breast roll 4, located beneath the slice, and over table rolls 5 and suction boxes 6 by which the water is removed from the stock to form the sheet, the making wire also passing over and between couch rolls 7. The making wire also passes over supporting rolls 8 and under adjusting or stretch rolls 9 by which the wire may be kept under the proper tension, all this construction being the usual one in Fourdrinier machines.

In accordance with the invention, means are provided whereby the bubbles formed in the stock may be broken or eliminated, and in the best constructions this is effected by what may be termed a wiping action. In accordance with the invention, therefore, there is provided a carrier in the form of a roll, and this roll will be hereinafter referred to as a wiper roll, this name having been selected as well expressing the function of this roll, such roll being indicated at 10, and it is mounted above the wire at a suitable point adjacent the slice, the roll being carried on a shaft 11 supported in bearings 12, one of which is illustrated in the drawings, this bearing being carried in a frame 13. The roll 10 extends across the wire and is provided with a plurality of projections, shown in the form of fins having thin edges which extend across the roll, pockets being formed between the fins. These fins are marked 14 in the drawings and are provided in suitable numbers to effect the results desired. Preferably the fins are provided in such numbers that a plurality of them engage with the stock on the wire at the same time.

The fin carrier or wiper roll may be of any suitable material, but preferably this roll will be made of rubber. The roll is a driven roll and means are provided for driving the roll at a predetermined speed with respect to the speed of the stock, the peripheral speed of the roll being slightly less than that

of the wire and the stock on it. This roll is rotated in the direction of the flow of the stock and as each of the fins leaves the stock the surface of this fin has a wiping action 5 on the stock surface, thus breaking down any bubbles that may be moving along on the surface of the stock. Various means may be employed for rotating the roll at the desired speed relatively to the speed of the 10 wire. In the particular construction shown, there is provided a pair of variable speed cones 15, 16 mounted in the frame 13, before referred to, one of these cones, as 15, being connected to the shaft 11 of the wiper roll 15 10. The pulley 15 is driven from the pulley 16 by a belt 17 and this belt is shiftable to vary the driven speed of the pulley 15 by means of a belt shifter, indicated at 18. The pulley 16 may be driven from any suitable 20 part of the machine, as by a belt 19 passing over a pulley 20 on the shaft of the cone 16 and a pulley 21 on a shaft 22 of a driving roll 23, this roll being driven by the making wire 3, which is driven from the lower couch 25 roll 7.

With this construction, therefore, the wiper roll 10 may be driven at a speed having a predetermined ratio to the speed of the wire, this being, as before stated, somewhat 30 slightly less than that of the wire. In machines embodying the invention in its best form, means are provided for adjusting the wiper roll to and from the wire. This is conveniently effected by mounting the frame 35 13 so it can have a sliding movement in bracket 23, this movement being effected by an adjusting screw 24, and the parts being held in adjusted position in any suitable manner, as by bolts 25.

Machines constructed in accordance with the present invention will include means for effecting a slight mixing or puddling action of the stock on the wire so as to overcome the tendency of the stock to arrange itself 45 lengthwise during the formation of the sheet. While this may be effected in various ways, in the preferred construction this is effected by the wiping roll. It will be observed that this roll is so constructed that a plurality of the fins are in contact with the stock on the wire at the same time. As these 50 fins are moving at a speed slightly less than the speed of the stock on the wire, a slight checking or retarding action in the movement of the stock is effected. The fins enter the stock at the point marked *a* in Figure 2 and, because these fins move along at a slightly slower speed than the stock, there is a tendency of the stock to pile up behind the 60 fins, this retarding action reaching its maximum at the center *b* of the roll, where the fins dip the deepest into the stock, and being gradually reduced at the point marked *c*, where the fins leave the stock. This slight 65 checking or retarding of the stock causes an

intermingling of the fibers which overcomes the tendency to distribute themselves lengthwise and effects the formation of a better sheet or web of paper.

While the invention has been shown and 70 described in what is believed to be its best form, it will be understood that variations and changes may be made in the construction and arrangement of the wiper roll and in the means for adjusting it and that such changes 75 are within the scope of the invention as defined in the appended claims.

What I claim is:

1. In a paper making machine, the combination with the making wire, of a rotary carrier mounted above the wire and provided with a plurality of thin edged projections extending widthwise of the carrier and radially from its surface and dipping into the stock on the wire, means for driving the carrier, and means for regulating the speed of the carrier so that it may be given a speed having a predetermined ratio to the speed of the stock on the wire. 80 85

2. In a paper making machine, the combination with the making wire, of a rotary carrier mounted above the wire and provided with a plurality of thin edged projections extending widthwise of the carrier and radially from its surface and dipping into the stock on the wire, means for driving the carrier, and means for regulating the speed of the carrier so that its surface speed is slightly less than the surface speed of the stock on the wire so that each successive projection 100 has a wiping action on the stock. 90 95

3. In a paper making machine, the combination with the making wire, of a rotary carrier mounted above the wire and provided with a plurality of thin edged projections extending widthwise of the carrier and radially from its surface and so arranged that a number of the projections dip in the stock simultaneously, means for rotating the carrier, and means for regulating the speed of the roll so that its surface speed is slightly less than the surface speed of the stock on the wire, so that the projections tend to slightly retard the stock and thus produce a mixing action on the stock as each successive pair of projections move through the stock. 105 110 115

4. In a paper making machine, the combination with the making wire, of a roll mounted above the wire and formed with a plurality of thin radial fins dipping into the stock on the wire, and means for rotating the roll at a surface speed having a predetermined ratio to the speed of the stock on the wire. 120 125

5. In a paper making machine, the combination with the making wire, of a roll mounted above the wire and formed with a plurality of thin radial fins dipping into the stock on the wire, means for rotating the roll 130

at a surface speed having a predetermined ratio to the speed of the stock on the wire, and means for adjusting the roll toward and from the wire.

- 5 6. A wiping and mixing roll for Four-drinier paper making machines, comprising a rubber roll provided with a plurality of thin edged fins.

7. A wiping and mixing roll for Four-drinier paper making machines, comprising 10 a rubber roll provided with a plurality of fins thinner at their outer edges than at their bases.

In testimony whereof, I have hereunto set my hand.

CHARLES W. VALENTINE.