

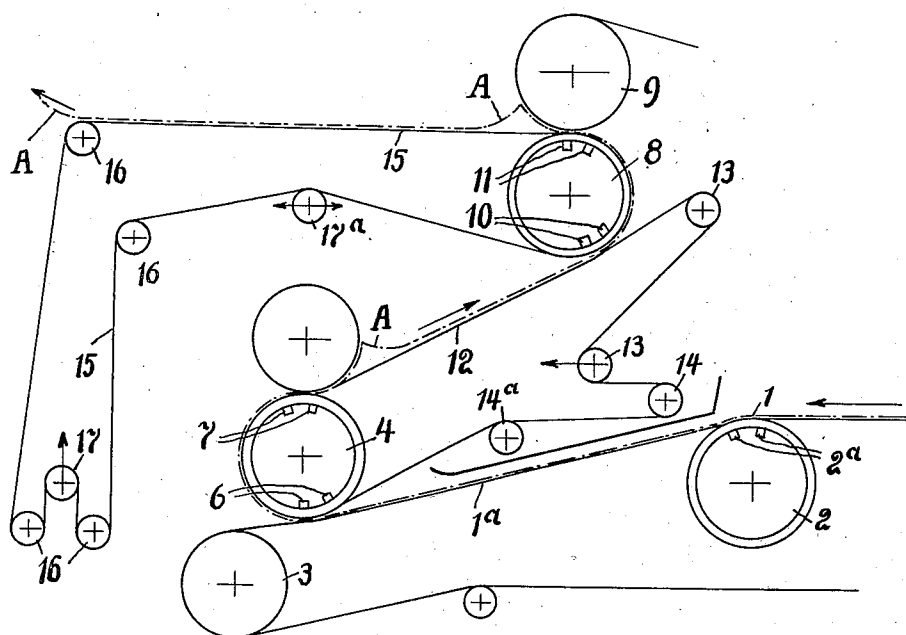
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PAPER MAKING MACHINE

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PAPER MAKING MACHINE

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In Patent No. 1,930,104 granted to me, there is described a paper making machine including a making wire, a couch roll over which the forward portion of the making wire passes, a press arranged beyond the couch roll and spaced therefrom, and comprising three superposed rolls, namely, a lower suction roll, an upper suction roll and a plain top roll, and two press felts, the arrangement being such that the first wet pressing of a wet web of paper formed on the making wire takes place after the said web has passed over the couch roll and has been transferred to the first press felt by the action of a suction transfer box in the lower portion of the lower suction roll of the press. With the construction of press described, the wet web of paper transferred to the first press felt is carried thereby upward to the bite between the two suction rolls where it is met by a second endless felt and carried between the two felts through the bite, the first felt then leaving the wet web of paper which is transferred by a stationary transfer suction box within the lower portion of the upper suction roll to the second felt which carries it upward and through the bite between the upper suction roll and the top press roll, the wet web of paper being partly dewatered at the first bite and further dewatered at the second bite. The arrangement is such that the two sides of the wet web of paper are reversed in position at the first bite and again reversed in position at the second bite, so that water pressed from the web will be drawn in one direction through the web at the first bite and in the opposite direction at the second bite, which is desirable. Such an arrangement is very successful for producing many classes of paper, but the wire side of the wet web of paper is uppermost and between the two felts at the first bite and lowermost at the second bite so that it does not come at any time in contact with a plain press roll that can act to roll or iron out effectively, the wire marks therein. For some classes of papers it is however desirable to remove the wire marks from the wet web of paper and this can most effectively be done at the first pressing after the web has left the couch roll, and is thus still in a wet condition. This has not heretofore been considered possible. An object of the present invention is, however, to enable this desirable object to be successfully attained.

For this purpose, in a paper making machine constructed according to the present invention, there is associated with the making wire of the machine, which may be of various types, as for example a machine of the Fourdrinier type, or of the vacuum forming-cylinder type, and a couch roll over which the forward portion of the making wire passes, a press arranged beyond the couch roll and comprising two superposed rolls, namely a lower suction roll and an upper plain roll, that

is to say, an imperforate roll, the suction roll having within it a lower stationary suction box adapted to act as a suction transfer box and an upper stationary suction box adapted to act as a water and air withdrawal box, and an endless press felt arranged to travel forwardly between the portion of the making wire extending forwardly from the couch roll and the lower side of the suction roll of the press and then upwardly and through the bite between the said suction roll and plain top roll. In this way, when the machine is in action, a wet web of paper will be transferred continuously from the said portion of the making wire to the felt and be carried onward thereby through the bite between the said suction roll and plain top press roll, without the aid of a second endless felt and where its opposite sides will be reversed in position and the wire side of the sheet be acted upon by the plain top roll which will act to roll or iron out the wire marks on the web. Water expressed from the web and felt at the bite will be withdrawn through the upper suction box in the suction roll by the suction action set up therein, assisted by inflowing air from the external atmosphere, whereby the sheet of paper will be partially dewatered.

One or more additional pairs of superposed press rolls, with one or more additional press felts, may be associated with the aforesaid press rolls and felt for effecting further dewatering of the partly dewatered web of paper, or for conditioning it for subsequent treatment, or for both these purposes.

The accompanying illustrative drawing shows, diagrammatically, part of a paper making machine embodying the invention above set forth.

In this example, 1 is the making wire of a paper making machine, as for instance of the Fourdrinier type, or of the vacuum forming-cylinder type, the forward end portion of which extends over a couch roll 2 and then over and under a turning roll 3, both of which are driven rolls, so as to leave a portion 1^a of the wire suspended between the two rolls. Above and adjacent to the portion 1^a of the making wire is a press comprising a lower suction roll 4 and an upper plain roll 5, the lower suction roll 4 having within it, lower and upper stationary suction boxes 6 and 7 respectively, of which the lower one is adapted to serve as a suction transfer box, and the upper one as a water withdrawal suction box arranged at the inlet side of the bite between the two rolls. When the paper making machine is of the Fourdrinier type the couch roll 2 will be a suction couch roll having a stationary suction box within its upper portion, as indicated at 2^a. When the paper making machine is of the vacuum forming-cylinder type, the roll 2 is a plain roll driven by the wire. In the example shown, arranged at a distance from the said press 4-5, is

a second similar press comprising a lower suction roll 8 and an upper plain roll 9, the suction roll having within it, lower and upper stationary suction boxes 10 and 11 respectively, similar to the suction boxes 6 and 7 of the suction roll 4 of the first press and for like purposes. In this case, the first endless felt 12, with partly dewatered web of paper, after leaving the bite between the suction press roll 4 and plain top roll 5, travels onward and against the lower side of the suction roll 8 of the second press and thence returns around felt rolls 13, a stretch roll 14 and a guide roll 14^a, to the first suction press roll 4. 15 is a second endless press felt extending between the lower side of the suction roll 8 of the second press and the adjacent portion of the first press felt 12 with the partly dewatered web of paper thereon, then upward and onward through the bite between the suction roll 8 and its associated plain top roll 9 and thence returning around felt rolls 16, a stretch roll 17, and a guide roll 17^a to the said suction roll 8.

The arrangement is such that after a wet sheet of paper carried by the making wire 1 has passed over the couch roll 2, where it will be partly dewatered and its component fibres settled or consolidated by the suction action of the roll, if a suction couch roll be used, passes onward to the lower side of the suction roll 4 of the first press where the suction transfer box 6 of that roll transfers it continuously to the first press felt 12 which carries it onwardly through the bite between the said suction roll 4 and its associated plain top roll 5. As will be seen by the arrangement described, what was the lower side of the wet web of paper will, upon reaching the bite between the first press rolls 4 and 5 with the first felt 12, have become the upper side of the web, where the wire marks therein, if any, will effectively be rolled or ironed out by the plain top roll 5, the water expressed from the web and felt being drawn off by the suction box 7, which, as before stated, is arranged at the inlet side of the bite. The partly dewatered and rolled wet web of paper is then carried onward by the first press felt 12 to the lower side of the suction roll 8 of the second press where it is met by the second press felt 15 to which it will be transferred from the first felt 12 by the action of the suction transfer box 10 of the suction roll 8 of the second press and be carried onward by the second felt, without the first felt 12, through the bite between the suction roll 8 and plain roll 9 where it will be further dewatered, the expressed water being drawn off through the upper suction box 11 arranged at the inlet side of the bite. The partly dewatered web of paper, indicated at A, is then carried onward by the upper portion of the felt 15 and delivered to driers associated with the machine. As will be understood, the water expressed from the web of paper will be drawn off through the web and the first felt 12 in one direction at the first bite, and in the opposite direction through the web and the second felt 15 at the second bite, which is advantageous for the formation of the web.

The first press 4—5 may be arranged adjacent to any portion of the length of the making wire 1 after it has passed over the couch roll 2. The web of partly dewatered paper A after leaving the second press, may be delivered direct to the

driers, or, it may be delivered by the second felt 15 through a third or smoothing press, not shown, consisting of two superposed plain rolls by which both of its surfaces may be rolled smooth and thus further conditioned before passing to the driers.

It is necessary that the making wire 1 and endless felt 12 to which the wet web of paper is transferred from the making wire by the suction action of the lower suction transfer box in the suction roll 4 should travel at the same speed in order that the wet sheet of paper shall be transferred from the wire to the felt in a continuous and successful manner. For this purpose the couch roll 2, or turning roll 3, whichever of these rolls is positively driven, and the suction press roll 4, should be caused to rotate at the same peripheral speed. Arrangements of variable speed or synchronising mechanism suitable for attaining this result are known. Suitable arrangements of such mechanism are described and shown in the specification of another application Serial No. 86,168 for Letters Patent filed by me.

What I claim is:

1. A paper making machine comprising a Fourdrinier making wire, a first press comprising a lower suction roll and an upper smooth surfaced pressure roll, said suction roll having an upper suction box adjacent the bottom of the smooth surfaced pressure roll adapted for water removal, and an endless felt arranged to travel forwardly between the making wire and the suction roll and then upwardly and backwardly through the bite between the two rolls to present the wire side of a wet web of paper taken from said making wire directly to the smooth surfaced roll at the first press bite, a second press above and back of the first press and comprising an upper roll and a lower roll having a stationary lower suction box arranged to transfer the web from said endless felt after the web passes through the bite of the first press.

2. A paper making machine comprising a couch roll, a making wire extending over and forwardly from said couch roll, a first press comprising a lower suction roll having a lower transfer suction box and having an upper suction box adapted for water removal, and an upper smooth surfaced pressure roll, an endless felt arranged to travel forwardly between the portion of the making wire which extends forwardly from the couch roll and the suction roll itself departing from the making wire substantially at the location of said lower transfer suction box and then moving upwardly and backwardly through the bite between the two rolls to present the wire side of a wet web of paper taken from said making wire directly to the smooth surfaced roll at the first bite of the press, a second press comprising an upper roll and a lower suction roll having a stationary lower suction box arranged to transfer the web from said endless felt after the web passes through the bite of the first press, and a second endless felt extending around the suction roll of said second press and receiving the web from said first felt and conducting the web forwardly through the bite of the second press.

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