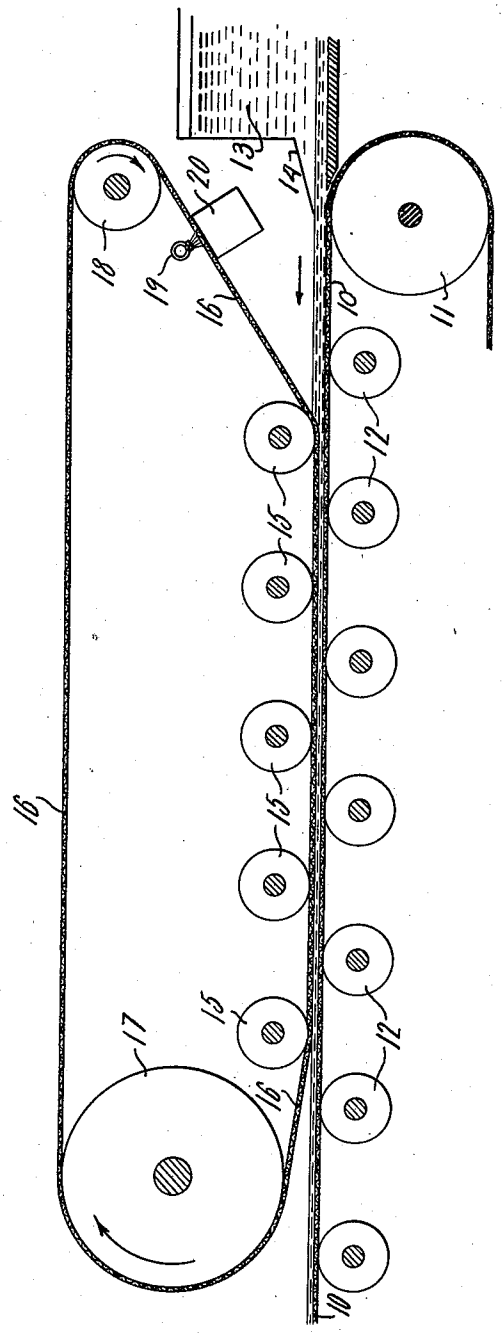
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APPARATUS FOR THE MANUFACTURE OF PAPER AND THE LIKE

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INVENTOR
EDWARD HUTCHINS
BY
Frank Tooley Jr.
ATTORNEY

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APPARATUS FOR THE MANUFACTURE OF PAPER AND THE LIKE

Edward Hutchins, Glens Falls, N. Y., assignor to International Paper Company, a corporation of New York

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This invention relates to improvements in the manufacture of paper and like products, and, more particularly, to an improved method of and apparatus for subjecting the web of fibrous material as it is being formed to the action of devices which will assist in distributing the fibres evenly throughout the web and to obtain a uniform felting or interlacing of the fibres so that the finished sheet of paper will possess uniform texture and finish.

In the manufacture of paper on a paper machine of the Fourdrinier type, a suitable prepared fibrous stock of the desired consistency is deposited on a moving endless screen or wire leaving the fibres thereon in the form of a web. Various mechanisms to assist in drawing the water through the wire such as tube rolls, suction boxes and the like are normally employed. To assist in the formation of a web having its fibres evenly distributed throughout and uniformly interlaced or matted, the paper making screen or wire has imparted thereto a shaking or vibratory motion by means of mechanism commonly known as a "shake". As the speed of a Fourdrinier paper machine is increased up to 1200 feet a minute the "shake" is usually dispensed with due to the impossibility, from a practical standpoint, of maintaining a high speed shake mechanism in proper working order. Moreover when the paper making screen or wire is travelling at 1200 feet a minute the forming web is travelling 20 feet a second so that a shake, unless of high frequency, would have no effect on the formation of the web and would be of very little assistance in settling the stock on the wire. From a commercial view point it is impractical to run a shake mechanism at high frequency due to injury to the mechanism constituting the so called "wet end" of the paper machine.

Accordingly a primary object of this invention resides in the provision of mechanism for distributing the fibres of the paper making stock evenly throughout the web during the formation period on the wire and to assist in felting or interlacing the fibres to the end that a finished sheet of paper having uniform formation, even texture and capable of receiving a saisfactory finish will be produced.

Another object of this invention relates to a new and improved method of forming a web of fibrous material wherein the fibres during the stages of forming the web are evenly distributed in the said web and thoroughly and uniformly interlaced and matted to the end that a sheet of paper having uniform formation, even texture and capable of receiving a satisfactory finish will be produced.

Another object of this invention resides in the provision of one or more rolls located above the paper making screen or wire and preferably in staggered relation to the table or tube rolls normally employed in supporting the same whereby to subject the forming web of fibrous material to a kneading or puddling action.

A further object of this invention resides in the provision of a supplementary travelling endless screen or wire positioned above the normal paper making screen or wire and having substantial portion of its working surface arranged in parallel relation and in close proximity to said paper making screen or wire. Contacting with and driven by said complementary screen are provided one or more rolls arranged preferably in staggered relation to table or tube rolls supporting said paper making screen whereby to impart to the forming web of material as it passes between said screen a kneading or puddling action.

A further object of this invention resides in the provision of one or more eccentrically mounted rolls located above the paper making screen or wire and in staggered relation to the table or tube rolls supporting the latter whereby to impart a puddling or kneading action to the forming web of fibrous material.

A still further object of this invention resides in the provision of one or more eccentrically mounted rolls located above the paper making screen or wire whereby to knead or puddle the fibrous paper making stock as it is carried under neath the said rolls and as the fibres are being formed into web form on the paper making screen or wire.

These and other objects of this invention will become more apparent from a study of the following description taken with reference to the accompanying drawing in which the figure shown represents in schematic side elevation so much of a Fourdrinier paper making machine as is necessary to a clear understanding of this invention.

Referring now more particularly to the drawing in which like numerals indicate like parts and the numeral 10 represents a paper making screen or Fourdrinier wire which at one end is passed around a breast roll 11 and at the other end around a couch roll (not shown) by means of which the said screen or wire is normally driven. The couch roll and driving mechanism therefor

have not been shown as they form no part of this invention. The screen or wire is supported at intervals by tube or table rolls 12 and conventional suction devices (not shown) to assist in draining water from the stock on the wire of the screen are used.

The invention, as will now be explained, pertains to means for distributing the fibres of the stock evenly throughout the web as it is being formed and to insure a uniform and satisfactory interlacing of the fibres so that the formation, strength, etc., of the finished sheet will be uniform. The stock of desired consistency and containing a high proportion of water flows from a head or flow box 13 under slice 14 and onto the paper making screen or wire. If desired, use may be made of the conventional apron, and the slice is regulated by any of the standard adjusting mechanisms. The puddling, kneading or fibre distributing mechanism is located over the wire and at a point where the amount of water in the stock can be controlled and extends a considerable distance over the paper making screen or wire.

This mechanism comprises a plurality of spaced eccentrically mounted rolls 15 located above the paper making screen or wire and arranged in staggered relation to the table or tube rolls 12 for a purpose to be hereinafter more fully described. In order to avoid any tendency on the part of these rolls to pick up the fibre forming the upper surface of the forming web a supplementary endless screen or wire 16 is interposed between the rolls and the forming web. This screen or wire is trained around, at one end, a driving roll 17 suitably geared to a differential drive and at the other end around a take-up roll 18 adjustably and rotatably mounted so that the tension of the wire may be varied as desired. To clean the wire a fresh water shower 19 and suction box 20 may be conveniently located so as to operate on the wire prior to its contact with the forming web of fibrous material.

In the embodiment shown the rolls 15 are driven by the screen or wire 16 and at a rate substantially equal to the rate of travel of the paper making screen or wire 10. It is also to be noted that the angle at which the wire 16 leaves the stock on its way to the drive roll is exceedingly small, not over 20°. By this construction any tendency of the wire to carry the stock with it is minimized.

As is well known in the art to which this invention pertains the table or tube rolls, by their rotation create a positive suction to assist in draining water through the screen or wire. As the screen or wire passes over each tube roll more and more water is drained over thereby causing a progressively increasing amount of stock to become settled in a form of a web on the wire. In a great many instances, especially noticeable at high wire speeds, the fibres are compacted in web form in an irregular manner so that the finished sheet when held in the light shows that the fibres instead of being evenly distributed throughout the sheet are clotted. Such a sheet is generally termed as having a "wild" formation. According to the present invention the location of rolls in staggered relation to the tube rolls counteracts a too rapid formation of the web and puddles or kneads the stock to distribute the fibres evenly across the wire. This result is due to the fact that the forming web is first subjected to a downward pull due to the drainage of the water and then to an upward pull due to the rotation of one of the upper rolls. As the web of fibrous material travels between the rolls this cycle is repeated so that when the web passes over the last tube roll it has been sufficiently formed and at the same time the fibre thereof have become evenly distributed and thoroughly interlaced or matted. A sheet formed by the present invention will not show any of the "wild" characteristics of the type described above.

In order to accentuate the kneading, puddling or fibre distributing action of the rolls they may be spirally fluted, perforated, or corrugated.

It will be understood by those skilled in the art of paper making that, while the invention has been described and set forth hereinabove by way of exemplification, with reference to a particular embodiment, the invention is not limited to the specific details of such embodiment or exemplification, but may be variously embodied within the scope of the claims hereinafter made.

Having now described my invention as required by the patent statutes, what I desire to claim as new is:

1. In a device of the class described, a paper making screen, spaced table rolls for supporting said screen and for draining water from fibrous stock carried by said screen to form a web, rotatably mounted means mounted above said screen and in staggered relation to said table rolls to impart a kneading and fibre distributing action to said stock, and an endless screen interposed between said means and paper making screen to drive said means.

2. In a device of the class described, a paper making screen, spaced table rolls for supporting said screen and for draining water from fibrous stock carried by said screen to form a web, eccentrically mounted means mounted above said screen and in staggered relation to said table rolls to impart a kneading and fibre distributing action to said stock, and an endless screen interposed between said means and paper making screen to drive said means.

3. In a device of the class described, a paper making screen, spaced table rolls for supporting said screen and for draining water from fibrous stock carried by said screen to form a web, eccentrically mounted rolls mounted above said screen and in staggered relation to said table rolls to impart a kneading and fibre distributing action to said stock, and an endless screen interposed between said rolls and paper making screen to drive said means.

EDWARD HUTCHINS.