Oct. 12, 1937. E. A. CHARLTON 2,095,378

APPARATUS FOR THE MANUFACTURE OF PAPER

Filed Dec. 17, 1934

Fig. 1.

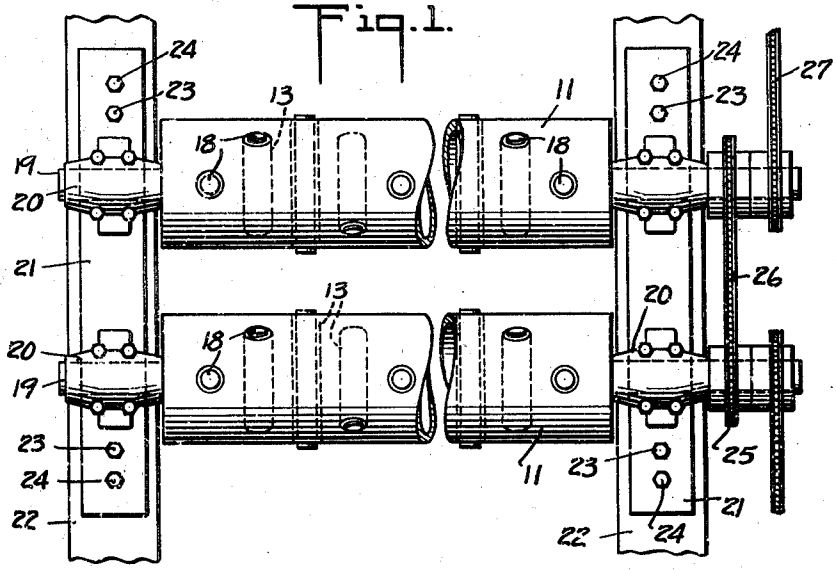
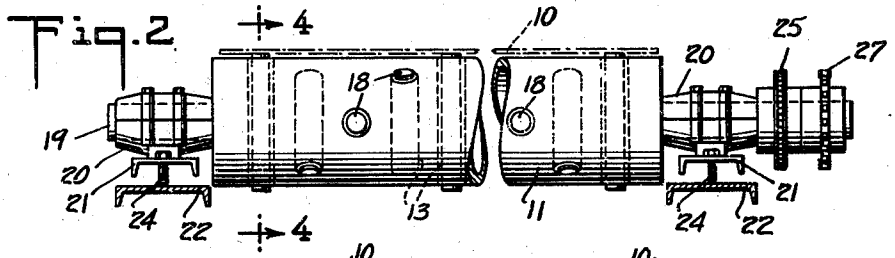


Fig. 2.



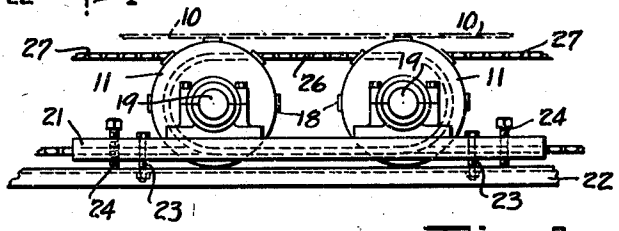


Fig. 3.

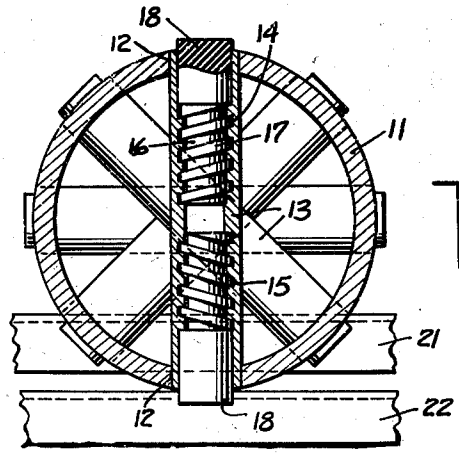


Fig. 4.

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APPARATUS FOR THE MANUFACTURE OF PAPER

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2 Claims. (Cl. 92—45)

This invention relates to improvements in the manufacture of paper and more particularly to an improved apparatus for imparting to the paper forming screen or wire a shake or vibration to the end that a more even distribution of the fibres making up the stock will take place.

In the manufacture of paper wherein use is made of a paper machine of the Fourdrinier type a suitably prepared fibre stock is deposited on a moving screen or wire and there subjected to suction or other means to drain the water in the stock from the wire, leaving the fibres of the stock on the wire in the form of a web. Various mechanisms have been devised to impart to the Fourdrinier screen or wire a shaking or vibratory motion to the end that a more even distribution of the fibres will take place. However, all of the known devices are costly to make and are somewhat complicated in their structure. When paper is to be produced at high speeds, it has been found inadvisable to use a shake or vibratory action, not because such action is undesirable but because of the frequent mechanical breakdowns of the conventional shake mechanism because of high frequency.

It is accordingly an object of this invention to provide a device for imparting a shaking motion to the wire of a paper machine and which will require little change to existing paper making machinery which is simple in construction and operation.

Another object of this invention resides in the provision of a rotatable member having raised portions which contact with the under surface of the Fourdrinier screen. Rotation of this device either by positively driving the same, or by driving it through the medium of the screen, will impart to the screen a rapid vertical vibration or shake. The fibrous stock on the wire, when subjected to this action, will be settled and evenly distributed on the said screen. Moreover the vibration or shake of the fibres of the stock will cause them to become thoroughly interlaced and matted with one another.

A further object of this invention resides in the provision of one or more rotatable members provided with removable plugs which, extending beyond the peripheral surface of the roll, will, when in contact with the wire, subject the latter to a vibratory or shaking motion. These removable plugs are located at spaced intervals on the periphery of the rotatable member and subject the wire to a series of hammer-like or tapping blows across the wire. These plugs may also be ranged so that the tapping action will take place in series across the wire to the end that an improved settling of the fibres of the paper making stock thereon will take place.

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

Fig. 1 is a top plan view of the invention showing so much of a conventional Fourdrinier paper making machine as is necessary to a clear understanding of the invention;

Fig. 2 is a side elevation of the tapping rolls;

Fig. 3 is an end elevation of the same; and Figure 4 is a sectional view taken along the lines 4—4 of Figure 2.

Referring now to the drawing in which like numerals indicate like parts, and more specifically to Figure 1, the numeral 10 represents a Fourdrinier wire or paper making wire, which, at one end, is usually passed around a breast roll and at the other end around a couch roll by means of which the wire is normally driven. Inasmuch as the breast roll, couch roll and driving mechanism form no part of this invention they have not been shown. According to standard practice the Fourdrinier screen is supported at intervals on table or tube rolls and at the couch end of the wire the usual suction boxes may be employed.

The invention, as will now be explained, pertains to means for imparting a "shake" or vibratory movement to the stock deposited on the paper making wire in such a manner that the fibres making up the stock are evenly deposited across the wire in web form and are thoroughly interlaced or matted together. The stock, containing a very high proportion of water and of the desired consistency, is deposited on the wire through conventional head boxes and slice mechanisms. If desired, use may be made of a conventional apron and in standard practice the slice is made adjustable. The agitating or shake device 11 constituting the subject matter of this invention, may be positioned at intervals under the wire. Preferably these shake devices are so located with respect to the wire as to assist in the initial formation of the paper web. Accordingly they are positioned either between the table rolls or used as substitute for certain of the table rolls.

Each shake device comprises a hollow cylinder formed of any suitable material and provided at spaced points on its periphery with openings 12. Referring specifically to Figure 4, it will be noted that the openings are arranged so as to be complementary, that is, the openings are arranged in pairs spaced 180° apart. In each com-

plementary pair of openings a hollow core 13 is provided having its inner surface threaded as at 14 and 15. Plugs, constituting the actual vibration elements, comprise a stem 16 which is threaded as at 17. This stem is preferably made of metal and has secured thereto at one end the plug 18, which is made preferably of hard rubber. It will be appreciated, however, that the particular construction of the plug may vary. Thus, the plug may constitute an integral unit, being provided with a head and threaded portion. A plug is inserted in each of the openings 12, the stem thread being in threaded engagement with the thread provided in the hollow core 13.

Each vibration device or shake roll is provided at each end with a stub shaft 19 which is journaled in bearing 20 carried by a frame member 21. Each of the frame members are secured to the frame 22 of the machine in any suitable manner, as by being bolted thereto as indicated at 23. In order to obtain the desirable and necessary vertical adjustments of the frame members adjusting screws 24 may be used.

Preferably a plurality of shake devices or rolls are used and are positively driven through suitable mechanism. In the embodiment shown the shafts of the shake rolls are provided with sprockets 25 which are connected together by means of chains 26. The entire set of shake rolls may be driven from any suitable source of power through any single one of the rolls. Preferably, however, each group of shake rolls will be driven by the end roll of that group, through a chain drive 27.

In some instances, it may be further desirable to arrange the shake rolls so that their peripheral speed increases or decreases progressively from one end of the machine to the other. Moreover, it may be desirable to vary the peripheral speed of the rolls to be equal to, greater than or less than the speed of the paper making wire. The desired variation may be obtained by using graduated sprockets on the shake roll shafts or by using individual drive for the shake rolls. It has also been found desirable not to drive the shake rolls positively but to have them driven through contact with the wire. If such be the method of operation desired, it will be appreciated that a driving mechanism for the rolls will not be used.

It will be understood by those skilled in the art that while the invention has been described and set forth hereinbefore by way of exemplification with reference to a particular embodiment thereof, that 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.

What is claimed as new is:

1. In an apparatus of the class described, a paper making wire, a roll positioned beneath said wire and provided with spaced openings, members removably secured in said openings and projecting beyond the periphery of said roll into contact with said wire and means for rotating said roll at a different rate than the rate of travel of said wire.

2. As a substitute for a table roll of a papermaking machine, a tubular roll provided at spaced intervals with openings, said openings being arranged in pairs spaced 180° apart, a core connecting each pair of openings and provided adjacent each opening with locking means, a plug located in each opening and having means to interlock with the locking means of said core, each plug extending beyond the periphery of said roll, and said locking means being of such construction as to permit adjustment of the end of said plug with respect to the periphery of said roll.

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