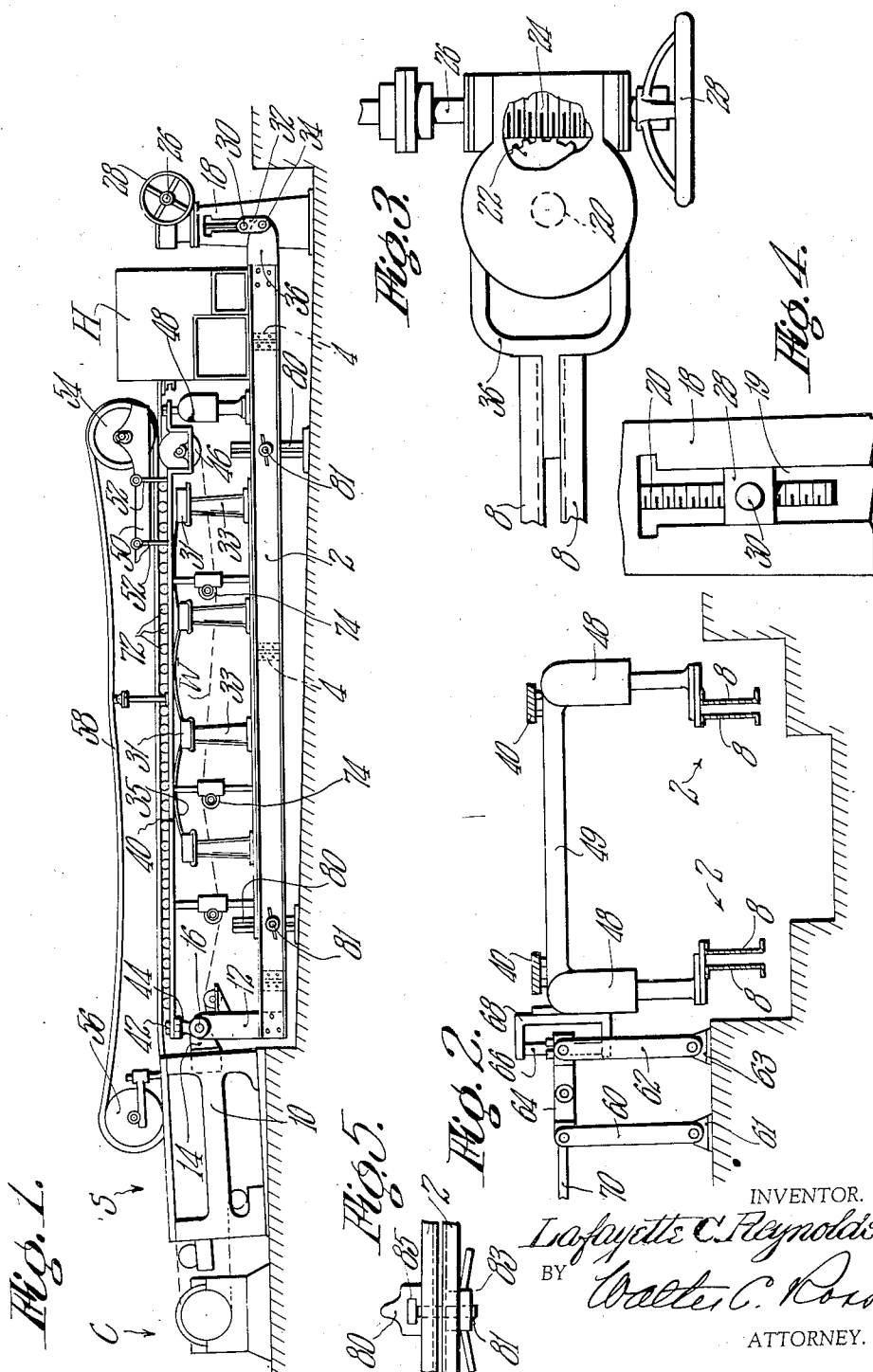


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PAPER MAKING APPARATUS

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PAPER MAKING APPARATUS

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This invention relates to improvements in paper-making apparatus and is directed more particularly to improvements in paper-making apparatus of the Fourdrinier type.

The principal objects of the invention are directed to the provision of a paper-making machine of the Fourdrinier type wherein the parts for forming a web such as the shake rails, deckle straps, head box and related units are supported by a structure which is pivoted for up and down movements. In this way the related parts are moved simultaneously and novel means affects the up and down movements thereof so that the upper paper-forming run of the Fourdrinier wire may be disposed in various angular positions or in various planes at an incline relative to the horizontal as may be desired. The up and down movements of the supporting rails is readily and easily affected so that the inclination of the Fourdrinier wire may readily assume different inclined positions to accommodate different kinds of stock received thereby from the head box and/or bring about various other desired results.

As a special feature of the invention, the principal parts of the web-forming mechanism, such as the head box, Fourdrinier structure, etc., are supported by supporting rails and movable thereby in their proper relation. This eliminates the necessity of adjustable connections between the Fourdrinier wire, head box and other related units which would be required if the Fourdrinier wire were moved up and down relative to the co-operating web-forming parts. As one novel feature of the invention means is provided to guide and steady the supporting rails whereby they may be secured in various positions of adjustment.

Various novel features and advantages of the invention will be hereinafter more fully referred to in connection with the accompanying description taken in connection with the accompanying drawings which, for purposes of disclosure, illustrate the present preferred form of the invention. In the drawing:

Fig. 1 is a side elevational view of a paper-making machine embodying the novel features of the invention.

Fig. 2 is a sectional elevational view showing certain details of construction of the vibrating mechanism for the shake rails of the machine.

Fig. 3 is an enlarged plan view of the adjusting mechanism of the machine taken at one side of the forward end thereof.

Fig. 4 is a fragmentary elevational view of one of the columns to show certain details of construction, and

Fig. 5 is an elevational view of one of the guide and steady devices for the supporting rails.

Referring now to the drawing more in detail the invention will be fully described.

Supporting rails 2 are provided at the forward and rear sides of the machine which are spaced apart by cross rails or tie members 4. The members 4 are suitably secured to the rails to provide therewith a strong rigid supporting structure.

The supporting rails 2 may consist of I beams or any other suitable longitudinally extending members but in the preferred form of the invention however they are shown as comprising a pair of channel members such as 3 disposed in back to back relation as in Fig. 2. These rails, as will appear, support the head box, shake rails, carrying rolls for the Fourdrinier wire, suction boxes, etc.

The stationary end of the machine is represented by S and may include front and rear side frames of any suitable form such as 10. A couch of usual form is represented by C. Pivot brackets 12 are suitably secured to and extend upwardly from the ends of the supporting rails 2 adjacent the stationary end of the machine. Other brackets 14 extend forwardly from the frames 10 and are pivoted as at 16 to the brackets 12. In this way, the rails 2 are hinged or pivoted to frames 10 at the stationary end of the machine so that they may be moved up and down to change the plane of the paper-making run of the Fourdrinier wire or to incline it more or less with respect to the horizontal.

The head box of usual form is represented at H. It is from here that the paper-making material is delivered onto the Fourdrinier wire. Spaced columns 18 are located at the front and back of the machine adjacent the forward ends of the rails 2. Each column may include a shaft 20 carrying on its upper end a gear 22 which meshes with a worm or gear 24 carried by a horizontally disposed shaft 26.

The shaft 26 is preferably rotatable by means of a hand wheel 28 and extends from the column 18 at the front side of the machine to the column at the rear side of the machine. In this way, the gears 22 of both columns may be operated simultaneously.

The front side of the columns 18 may be slotted as shown at 19 in Fig. 4 and block members 28 may be slidable up and down therein. The shafts 20 are threaded as shown and are in threaded engagement with the block 28. In this way, as the horizontal shaft 26 is rotated in one direction

or the other, the blocks 28 may be raised or lowered.

Pins such as 30 carried by the blocks have links 32 thereon, the lower ends of which are pivoted at 5 34 to extensions such as 36 of the supporting rails 2. The forward ends of both rails are, of course, similarly connected to the block 28 of the column adjacent thereto so that both of the rails are moved up or down simultaneously. Of course, 10 means other than that described may be employed for raising and lowering the rails, it only being sufficient for the purposes of this invention that both rails be acted upon simultaneously.

Shake rails of usual form 40 have their rear 15 ends pivoted by such means as a stud or bolt 42 or the like to extensions 44 of the brackets 12 so that the rails may be vibrated in a horizontal plane or in a plane substantially parallel to that of the upper run of the Fourdrinier wire. The 20 forward ends of the rails 40 have associated therewith a breast roll 46 while their foremost end portions are associated with suitable supports 48 as shown so that the forward ends may move slightly in a horizontal plane.

Deckle frames 50 are carried by supports 52 25 and deckle pulleys 54 are associated with the deckle frames 50. Other deckle pulleys 56 are suitably associated with the stationary end S of the machine and support deckle straps 58 in such a way that one is located on the front and 30 one on the back side of the machine in proper relation with respect to the wire. The rails are vibrated by novel means more clearly shown in Fig. 2.

Save-all pans and trays are represented by 31 35 and 35 supported as usual by standards 33.

The shake rails may be vibrated by means of the mechanism now to be described. Links 60 61 and 62 are pivoted at their lower ends in brackets 61 and 63 respectively while their upper ends are pivoted to a member 64 which slidably embraces a vertically disposed rod member 66 carried by a bracket 68 associated with one of the supports 48. 45 A connecting rod 70 is connected to the vibrating structure and may be operated back and forth by any well-known means so as to vibrate or swing the shake rails slightly in a horizontal plane while the structure permits the up and down movement of the opposite ends of the rails 50 without interference with the operation of the vibrating mechanism.

The Fourdrinier wire is represented by W. Its upper run is supported by the usual rollers 72 55 and its lower run passes over and under carrying rolls 74. The wire W passes up and around the breast roll 46 in the usual manner into position to receive paper-making material.

It will be observed that the supporting rails are arranged and adapted to form a rigid supporting 60 structure and that the said structure supports the shake rails, deckle frame, head box and other parts usually associated therewith in such a way that the same may be moved up and down and the making run of the Fourdrinier wire may 65 be positioned at various inclined planes relative to the horizontal.

Thus, the inclination of the paper-making run of the wire may be changed at will and the Fourdrinier wire, head box and associated parts may 70 co-operate for the paper-forming operation at any position of inclination without the necessity of making various adjustments between the wire and the head box and associated parts. Both supporting rails are moved simultaneously by 75 means of the mechanism associated with the

columns. It will be appreciated that if desired the shaft 20 may be threaded in the gear 22 or any other means may be adapted to facilitate the raising and lowering of the ends of the frames.

It is desired to guide the rails 2 for up and down 5 movements and to steady them in various positions of adjustment. To that end steadying members 80 are provided which extend in a vertical direction and are disposed adjacent the rails or may pass through the space between the 10 channels thereof when channels are used to form the supports. As shown in Fig. 5 tighteners 81 in the form of screws are associated with the rails and have their heads slidable in slots 85 of the 15 members 80, as shown. Nuts 83 in threaded engagement with the screws bear on the rails and in this way, the members 81 may be loosened to facilitate movements of the rails 2 and subsequently tightened so that the rails 2 are clamped 20 to the members 80 and thereby held against slight movements or vibration as might be caused by the operation of the machine. This is important as it is necessary to hold the rails or steady them against such movements as may be caused by the 25 shaking of the rails. Any suitable means may be employed for guiding the rails in their up and down movements and to steady or clamp the rails in adjusted position.

It is desired to point out that by means of the invention the Fourdrinier wire, the supporting 30 means thereof, the head box and related parts are supported in such a manner that a complete machine is movable into various adjusted positions. This is to be distinguished from merely changing or adjusting the inclination of the 35 Fourdrinier wire in which case various adjustments and connections must be made to provide the proper functioning of the related units.

By mounting the important related units on the supporting structure so that their relation 40 is unaffected by movements of the supporting structure it is possible to readily and easily make such adjustments as may be required. Even while the apparatus is in operation the whole 45 structure may be raised or lowered to cause the Fourdrinier wire to be inclined to suit different conditions or requirements.

While I have described my invention in great detail and with respect to preferred embodiments 50 thereof, I do not desire to be limited to such detail or embodiments since many changes or modifications may be made without departing from the spirit and scope of the invention in its broader aspects. What I desire to claim as new and 55 secure by Letters Patent of the United States is:

1. Paper-making apparatus comprising in combination, stationary end frames, a pair of spaced supporting rails extending forwardly from said frames in parallelism with one another and each 60 having its inner end pivoted thereto for swinging movements into and out of adjusted positions at an incline relative to the horizontal, Fourdrinier wire-supporting means and a head box mounted on said rails so as to be movable therewith, a pair of relatively stationary spaced supports adjacent the outer ends of said rails, members movable up and down in said supports, means 65 to effect simultaneous up and down movements of said members in said supports, connections between said rails and said members whereby movements of said members cause said swinging movements of said rails, steadying means adjacent said rails for steadying said swinging movements and clamping means associated with said steady- 75

ing means and rails for clamping the rails to the steadying means in various positions of adjustment.

5 2. Paper-making apparatus comprising in combination, a relatively rigid and substantially horizontal supporting surface, stationary end frames rigidly associated with said supporting surface, a pair of spaced supporting rails extending forwardly from said frames in substantial parallelism with one another and each having its inner end pivoted thereto for swinging movements into and out of adjusted positions at an incline relative to said horizontal supporting surface, Fourdrinier wire-supporting means and a head-box mounted on said rails so as to be movable therewith, a pair of relatively stationary spaced supports rigidly associated with said supporting sur-

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face adjacent the outer ends of said rails and provided with slots therein, block members movable up and down in said slots, means to effect simultaneous vertical movements of said block members in said slots, connections between said rails and said block members whereby movements of said members cause said swinging movements of said rails, steadying means adjacent said rails for guiding the rails in their said swinging movements, and clamping means associated with said steadying means and rails for clamping the rails against the steadying means in various positions of adjustment, said clamping means including bolts on said rails which are slidable in the steadying means and tighteners in engagement with said bolts.

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