

(No Model.)

4 Sheets—Sheet 1.

E. R. MARSHALL.
PAPER MAKING MACHINE.

No. 507,744.

Patented Oct. 31, 1893.

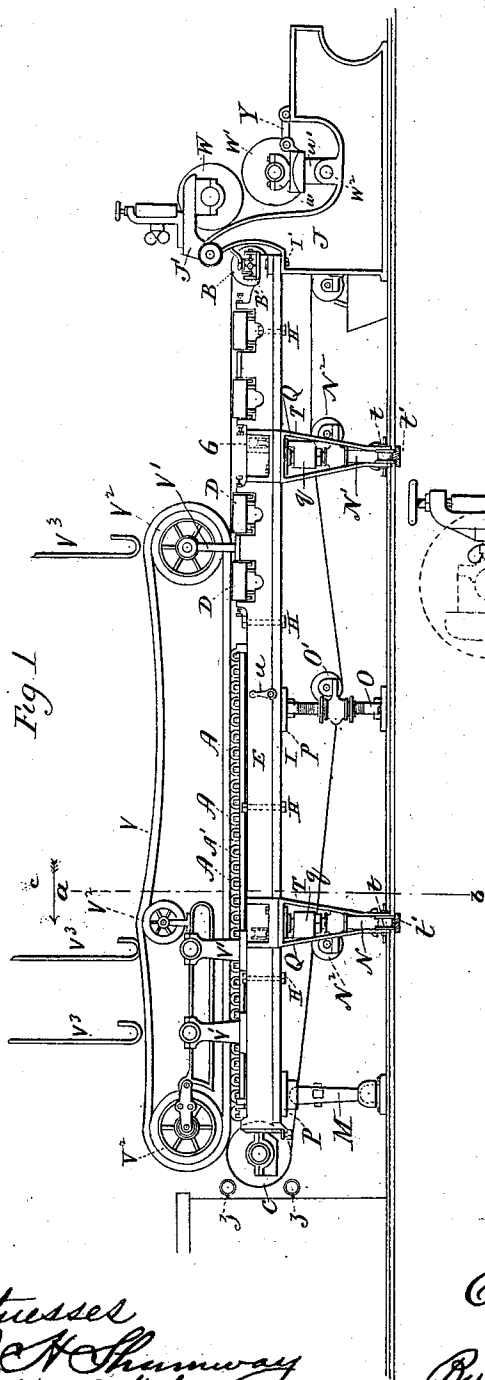


Fig. 1

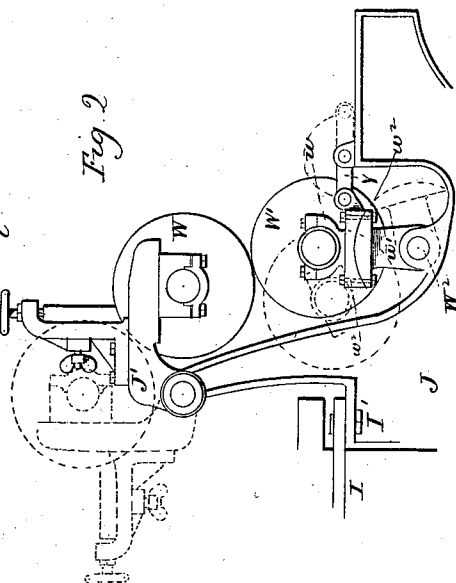
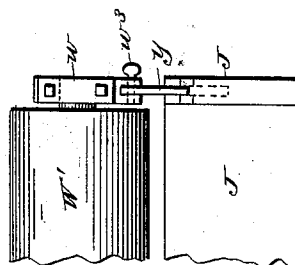


Fig. 2

Fig. 2a.



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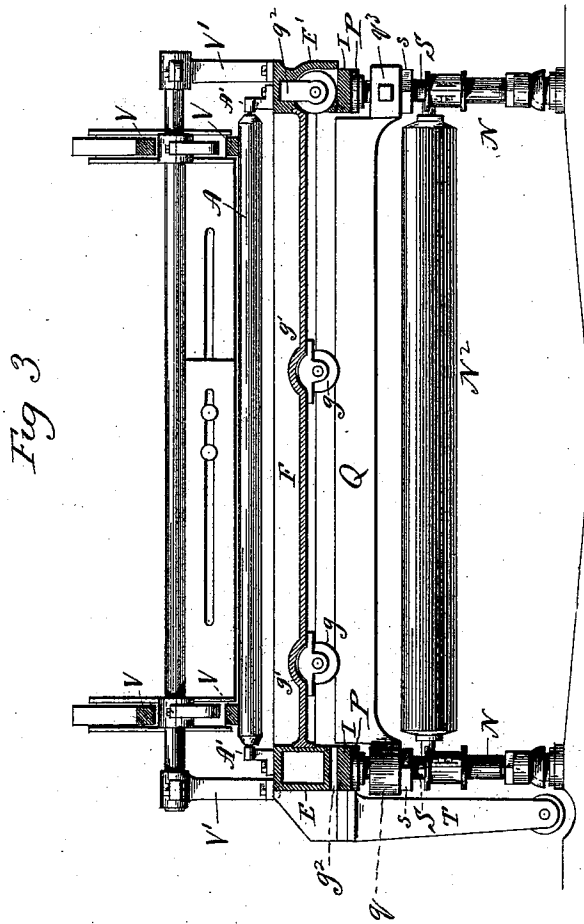
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4 Sheets—Sheet 2.

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By atty *Earle Seymour*

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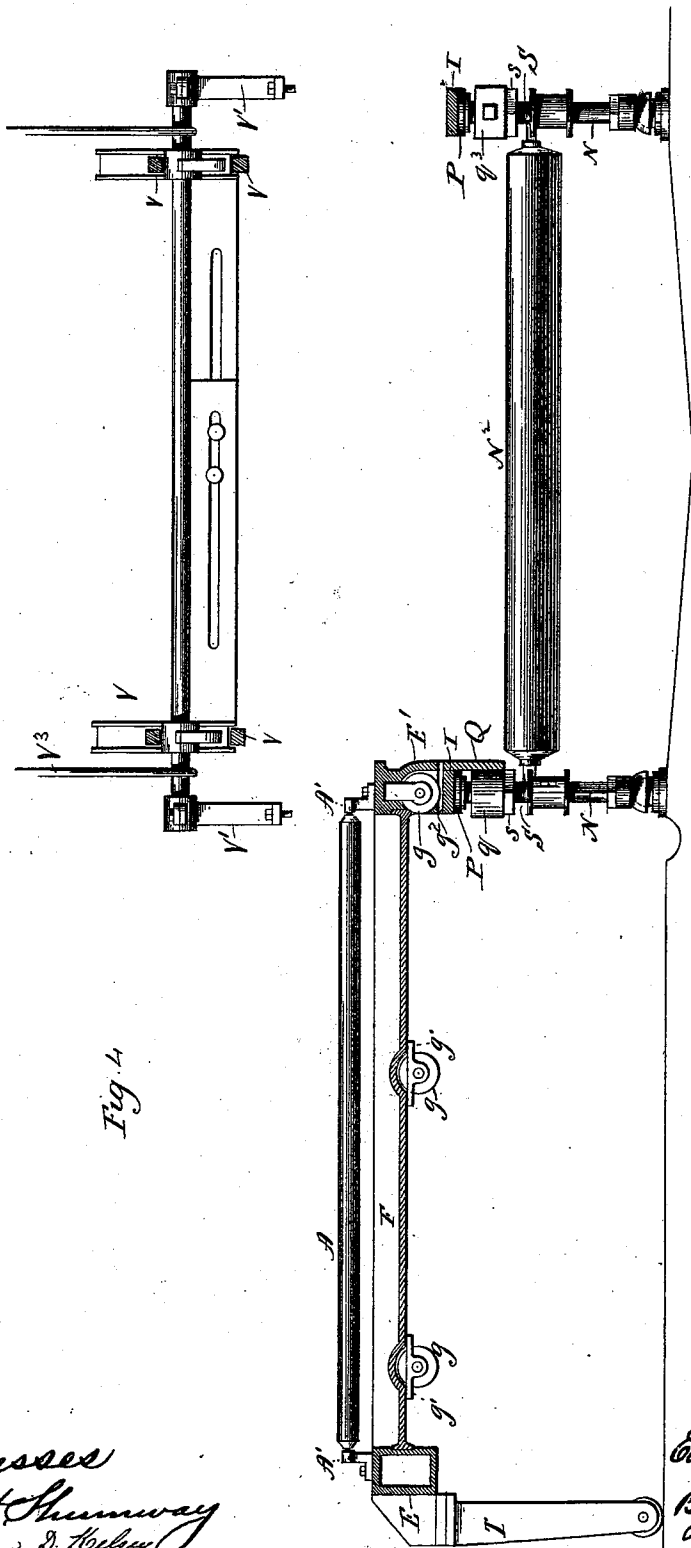


Fig. 4

Witnesses
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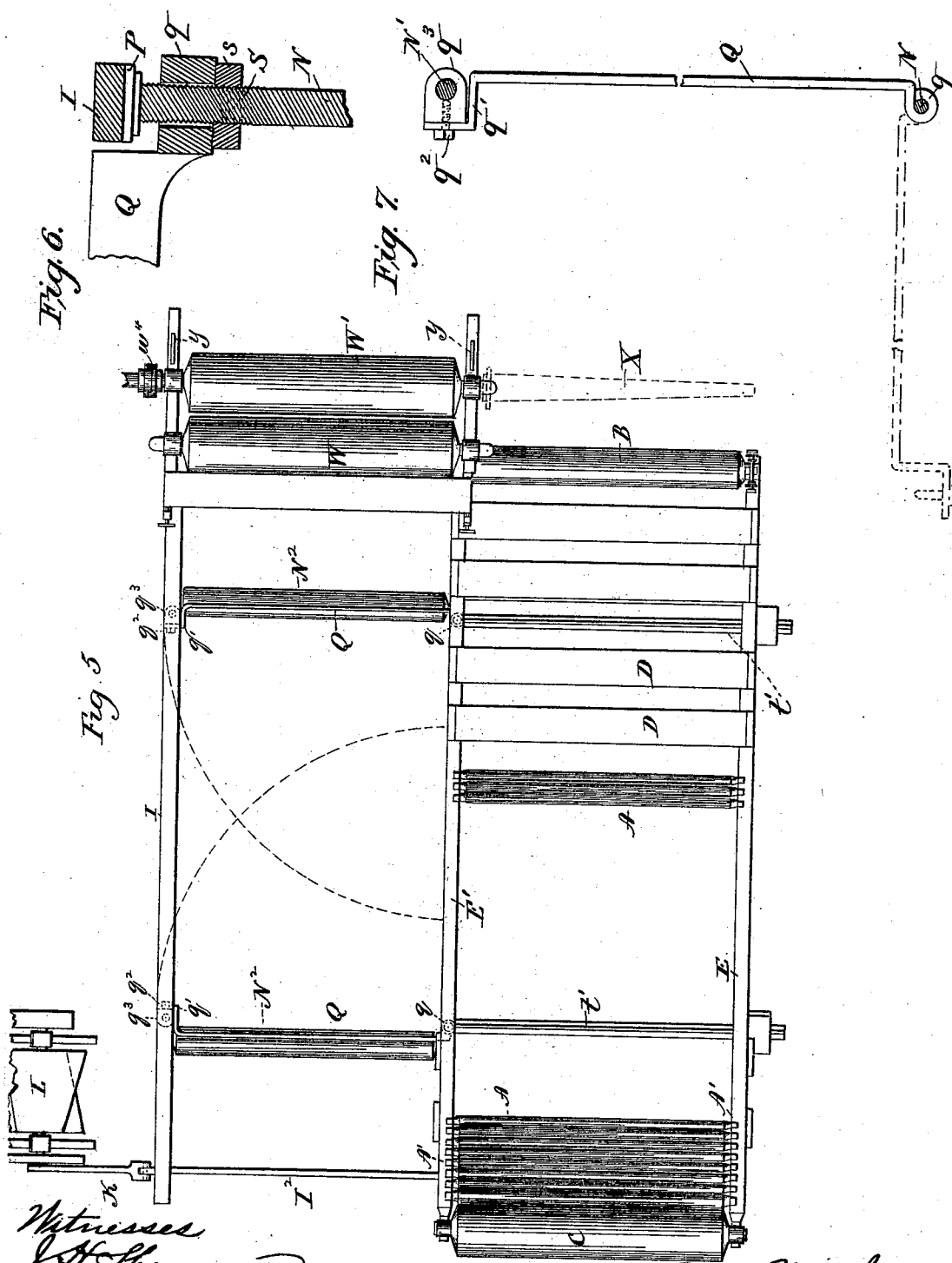
(No Model.)

4 Sheets—Sheet 4.

E. R. MARSHALL.
PAPER MAKING MACHINE.

No. 507,744.

Patented Oct. 31, 1893.



Witnesses
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UNITED STATES PATENT OFFICE.

EDWARD R. MARSHALL, OF TURNER'S FALLS, MASSACHUSETTS.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 507,744, dated October 31, 1893.

Application filed February 8, 1892. Serial No. 420,715. (No model.)

To all whom it may concern:

Be it known that I, EDWARD R. MARSHALL, of Turner's Falls, in the county of Franklin and State of Massachusetts, have invented new
5 Improvements in Paper-Making Machines; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description
10 of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in side elevation of an endless-web paper-machine constructed in accordance with my invention; Fig. 2, a similar
15 broken view on a larger scale, of the top and bottom coucher-rollers which are also shown in their shifted positions by broken lines; Fig. 2^a, a broken plan view showing the supporting-arm Y, connected with the box *w*, of
20 the outer swinging bearing of the lower coucher-roll *W'*, which, as well as the coucher-frame J, are also shown; Fig. 3, a view of the machine in transverse section on the line
25 *a—b* of Fig. 1, looking in the direction of the arrow *c*, and showing the machine in operative adjustment; Fig. 4, a similar view of the machine showing its laterally movable main-frame shunted to one side for the renewal of
30 its endless web or screen, the dekle-straps and their related parts being at this time elevated; Fig. 5, a plan view of the machine showing its main-frame in its shunted position; Fig. 6, a detailed view in vertical section, showing the swiveling of one of the track-
35 rails upon its post, and the means provided for raising and lowering it, and Fig. 7, a detached plan view of one of the track-rails, showing it in its normal position by full lines,
40 and in its retired position by broken lines.

As endless-web paper-making machines have been constructed heretofore, it has been necessary, in order to renew their webs, to individually remove and replace their tube,
45 guide and breast-rollers and their vacuum pans, and to otherwise dismantle the machines to an extent requiring so much time and labor that the operation of renewing the webs in machines of this class has involved a great
50 loss.

The object of my present invention is to overcome the objections before referred to,

and to enable the renewal of the webs to be effected with the minimum expenditure of time and labor, and it consists in certain details of construction and combinations of parts, whereby the said rollers and pans may be collectively shunted out of the machine, as it were, and the web renewed, with the minimum outlay for time and labor.

In carrying out my invention, I mount the horizontal series of tube-rollers A, the guide-roller B, the breast-roller C, and the vacuum boxes D, in a frame, forming the main-frame of the machine, and consisting, in part, as
65 herein shown, of two long side beams *E E'*, made hollow for lightness, and secured together at their forward ends, and for something more than half their length, by means of a flooring F, which is set into their inner
70 faces below their upper edges, and forms the bottom of the "save-all" of the machine, the side walls of the said "save-all" being formed by the said beams, as shown by Fig. 3 of the drawings.

The tube-rollers A, before mentioned, are journaled in bearings A', bolted to the upper edges of the said hollow beams *E E'*, while the guide-roller B, is journaled in suitable bearings B', mounted upon the extreme rear
80 ends of the said beams, and the breast-roll C, in bearings bolted to the extreme forward ends thereof. The vacuum boxes D, are of any suitable construction, and mounted in any approved manner in the upper edges of
85 the rear ends of the beams. A heavy cross-beam G, extending laterally between the side beams *E E'*, toward their rear ends, assists in securing them together, and is provided with rollers *g*, arranged transversely with the
90 length of the machine. Corresponding rollers *g* are mounted in bearings *g'*, secured to the lower face of the flooring F, in a similar position toward the forward ends of the beams. The main-frame of the machine, thus described, and composed of the said side beams and their interposed connections, is normally secured by means of vertical bolts H to two parallel corresponding shake-rails I I, which are of ordinary construction, their extreme rear ends swinging on bolts I' I', mounted in the coucher-frame J of the machine, while their forward ends, which are united by a rod I², are connected by a pitman K,

with a mechanism L, which imparts an oscillating movement in a horizontal plane to both rails, the main-frame of the machine, all of the rollers and the vacuum-boxes mounted therein, partaking of this movement, which is slight. The said shake-rails and the weight imposed upon them are supported, as herein shown, by eight posts, four on each side of the machine. These posts I have lettered M, N, O and N', the posts N and N' corresponding to each other. Each of these posts is provided at its upper end with a flat bearing P, upon which the shake-rail above it rests, and all of them are constructed and arranged to partake of the oscillating movement of the rails and the main-frame. I will not describe their detailed construction in that respect, as it is well shown by the drawings, and is a matter of obvious arrangement. The posts N and N', under the side beam E, which may be considered the outer beam of the main-frame, are each provided with a swinging track-rail Q, the outer ends of the said rails being constructed to form vertical sleeves q , to fit over the said posts, while their inner ends are offset as at q' , and horizontally perforated to adapt them to receive bolts q^2 , by means of which they are detachably connected with sleeves q^3 , loosely mounted upon the corresponding posts N and N', under the inner, side beam E'. I may herestate that I regard that side of the machine from which the operation of changing the web is conducted, as its outer side, and the side opposite thereto, its inner side, the driving mechanism being located on the inner side of the machine, though not shown herein. The said posts N and N' of which there are four in all, are constructed near their upper ends with screw threads S, and provided with nuts s, upon which the sleeves q and q^3 before mentioned are supported. It will be apparent that by rightly turning all of these nuts, the respective ends of the two track-rails Q may be uniformly elevated, the first effect of such elevation being to engage them with the small rollers g , before mentioned, after which continued turning of the nuts will lift the whole main frame above the shake-rails, from which it has previously been detached, by the removal of the bolts H, before referred to. The main-frame is thus freed for shunting to one side.

The outer beam E, of the main-frame has secured to it two skeleton legs T T, in the lower ends of which are mounted small rollers t , which run upon rails t' , extending transversely to the length of the machine, and sunk into the floor on which the same is supported. These legs support the outer edge of the main-frame as the same is shunted to one side, as shown by Fig. 4 of the drawings, for the introduction of the endless wire web or screen U, the weight of the frame, in being shunted to one side, as described, and restored to its normal position, being supported by the small rollers g , which rest upon the

track-rails Q Q, and by the rollers t , which run upon the tracks t' in the floor. Preferably I shall employ some means for assisting in moving the frame, such, for instance as one or more screws. I do not however illustrate any such mechanism, more than to indicate a handle-lever u , in Fig. 1 of the drawings, the same to be attached to the outer end of a horizontal screw, which is not shown but which would operate in winding the main frame in and out, so to speak. Such a device is not broadly new, and I do not show it in detail.

The posts N and N' carry two guide-rolls N² over which the web or screen passes while the posts O, carry a vertically movable tension roll O', by which the screen which passes under it, is regulated in tension. The deklestraps V V, which are located above the web, and which are laterally adjustable for controlling the width of the paper being made, are associated with carrying devices of any approved construction. As herein shown, they comprise three upright bearings V', supporting wheels V², the said bearings being normally bolted to the upper edges of the movable main-frame, from which they are detached, when the same is to be shunted, and elevated, by means of hooks V³. I do not, however, limit myself to any way of arranging or operating the dekle-straps, as they form no part of my present invention.

The coucher-frame J, located at the rear end of the machine, is furnished at its extreme upper end with a pivotal arm J', carrying the top coucher-roll W, whereby the same may be thrown over into the position in which it is shown by broken lines in Fig. 2 of the drawings, but this is not peculiar to my present invention, and I do not claim it as new.

The lower coucher-roll W' is mounted in two swinging bearings, of a construction novel with me, the lower ends of the said bearings being hung on large horizontal pivots W², journaled in the coucher-frame J. The outer of these two bearings, which is the one on the same side of the machine with the outer beam E of the movable main-frame, is made in two parts, and comprises a box w , and an arm w' , the lower edge of the former being concaved, and the upper edge of the latter being similarly convexed, and the two parts being normally secured together by bolts w^2 , so that when the said bolts are removed and the outer end of the roll W' is supported by a pole X, as seen in Fig. 5 of the drawings, the arm w' may be thrown down into the position in which it is shown by the broken lines in Fig. 2 of the drawings, so as to leave the lower edge of the roll W' free, whereby an endless web may be slipped over it from the said pole, as will be hereinafter described. The rear bearing w^4 (Fig. 5) of the roll W', swings on the shaft W² as before mentioned, and may be of any approved construction, as it is not necessary to have it made in two parts for the clearance of the lower edge of the roll during the operation of renewing the web. The

said swinging bearings of the bottom coucher-roll are held in their normal positions by two corresponding, swinging holding arms Y Y, detachably connected by removable pins w^3 with their upper ends and also with the coucher-frame J, the said detachable connection of the said arms with the bearings permitting the same to be disconnected from the arms, so as to allow the bearings to be tipped forward, as shown by broken lines in Fig. 2 of the drawings. The said arms are pivotally connected by horizontal pivots with the coucher-frame to permit them to be moved outward, as shown by broken lines in Fig. 2, to clear the edge of the bottom coucher-roll W' when a new web or screen is being slipped over the same. They are separated, in their attachment to the frame J, by the distance apart of the said swinging bearings which are at the opposite ends of the lower coucher-roll W'.

Having now described the detailed construction of my improved machine, I will set forth its operation so far as my present improvement is concerned.

In the normal operation of the machine, the main-frame is bolted to the shake-rails, and the bearings of the dekle-strap wheels are rigidly secured to the side beams of the said frame. Now when it is desired to renew the endless web or screen the tension roll O is removed, the main-frame detached from the shake-rails by the removal of the bolts H, and the associated mechanism of the dekle-straps detached from the main-frame, and lifted above the same. The track-rails Q Q, are then lifted by the nuts s, to engage with the small rollers g, located beneath the main-frame, and carried thereby, the said nuts being operated until the frame has been lifted above and cleared from the shake-rails, after which it is moved laterally, entirely to one side of the said rails, and the coucher-roll and the coucher-frame, as shown by Fig. 5 of the drawings. The outer edge of the frame is supported in this, its shunted position, as shown by Fig. 4 of the drawings, by the legs T T, while its inner edge is supported upon the outer shake-rail upon which its rear rollers g g rest, the said rails being provided with transverse ribs located in line with the track-rails when they are in their normal positions for the rollers g to run upon. One of the ribs g^3 is shown by Fig. 4 of the drawings. The said track-rails now have their inner ends detached from the sleeves q^3 with which they are normally connected, and are swung outwardly and under the inner edge of the said outer shake-rails on the broken curved lines shown by Fig. 5, in order to entirely clear the space between the shake-rails for the introduction of the endless web. The pivotal arm J', of the coucher-frame J, is now thrown over into the position in which it is shown by broken lines in Fig. 2, whereby the top coucher-roll W, is cleared from its engagement with the bottom coucher-roll W'.

The pole X, is now attached to the box w, which forms the upper member of the outer swinging bearing of the bottom coucher-roll W'. The inner ends of the pivotal supporting-arms Y are now detached from the swinging bearings of the lower coucher-roll by the removal of the removable pins w^3 , one of which is shown in Fig. 2^a of the drawings, and whereby the said swinging bearings and the lower coucher-roll are permitted to tip forward, as shown by broken lines in Fig. 2 of the drawings, thus shortening the distance between the said roll W', and the breast-roller C. The bolts w^2 are then removed, and the swinging arm W', of the said bearing is thrown to one side, so as to afford free access to the outer end of the said roll, which is meanwhile supported at the said end by the pole before mentioned. One end of the endless web or screen which it is desired to place in the machine, is passed over the said pole and slipped therefrom over the said bottom coucher-roll, after which the swinging arm w', is lifted and again bolted to the box w. The opposite end of the screen is carried to the opposite end of the machine, and separated by removable shafts Z Z. The web having now been introduced into the machine, and being supported at one end by the bottom coucher-roll, and at its opposite end by the temporarily removable shafts Z Z, the track-rails are swung back to their normal positions, and their inner ends connected with the sleeves q^3 mounted upon the rear posts N and N'. The main-frame is then moved back into its normal position over the shake-rails, and between the upper and lower lengths of the screen, which are therefrom separated in any convenient manner. The nuts s, are then operated to let the main-frame down upon the shake-rails, to which it is then rigidly attached by the bolts H. The mechanism of the dekle-straps is then lowered, and again connected with the main-frame. The temporary shafts Z Z are then removed to permit the screen to fall into place on the breast-roller C, after which the bottom coucher-roll is lifted into its normal position, to take up the excess of slack, and recoupled with the coucher-frame through the supporting-arms Y. The machine is now ready for operation again with its new web or screen.

It will be apparent from the foregoing description that the operation of renewing the screen is, under my improved construction, comparatively simple, and that it may be effected with a great saving of time and labor, over the same operation in machines of the same class as before constructed, inasmuch as in my machine there is no necessity of individually removing the small tube-rollers, the breast-roller, the guide-roller and the vacuum boxes, all of these parts being heavy, and some of them very heavy, and making their individual handling slow and laborious.

It is apparent that in carrying out my invention, I may change the specific construc-

tion and arrangement herein shown and described according to the dictates of circumstances and convenience, without departing from the spirit of my invention which broadly
 5 comprehends the construction of an endless web paper-making machine, with a main-frame carrying the tube-rollers, the breast and guide-rollers, and the vacuum boxes and adapted to be shunted to one side of the
 10 shake-rails during the renewal of the web or screen; and also particular means for mounting the bottom coucher-roll.

Having fully described my invention, what I claim as new, and desire to secure by Letters
 15 Patent, is—

1. In an endless web paper-making machine, the combination with the shake-rails thereof, of a main-frame, carrying tube, breast and guide rollers, and vacuum boxes, and adapted
 20 to be moved or shunted laterally to one side of the said shake-rails, to which it is normally attached, and means for supporting the said main-frame while being shunted, and when in its shunted position, substantially as set forth,
 25 and whereby the said rolls and boxes may be collectively moved to one side for the renewal of the web, instead of being individually removed, as heretofore.

2. In an endless web paper-making machine, the combination with the shake-rails thereof,
 30 of a main-frame, carrying tube, breast and guide-rollers, and vacuum boxes, and adapted to be shunted to one side of the said shake-rails, after it has been disconnected therefrom,
 35 means for lifting the said frame after its disconnection from the said shake-rails and devices for supporting the said frame while being shunted, and when in its shunted position, substantially as set forth.

40 3. In an endless web paper-making machine,

the combination with the shake-rails thereof, of a main frame, carrying tube, breast and guide-rollers and vacuum boxes, adapted to be shunted to one side of the said shake-rails,
 45 to which it is normally attached, and having legs for supporting its outer edge; vertically movable, swinging track-rails, normally extending laterally under the said frame, and supported independently thereof, and means
 50 for lifting the said track-rails to lift the frame above the shake-rails, when it is disconnected therefrom, substantially as set forth.

4. In an endless web paper-making machine, the combination with the lower coucher-roll thereof, of swinging bearings for the said roll,
 55 one of the said bearings being made in two separable parts, substantially as set forth, and whereby the entire end of the roll may be cleared for slipping the web over it, by swinging the lower part of the said two-part bearing
 60 to one side.

5. In an endless web paper-making machine, the combination with the lower coucher-roll thereof, of swinging bearings therefor, one of the said bearings being composed of a box
 65 having its lower edge concaved and a pivotal arm having its upper edge correspondingly convexed, the said box and arm being normally bolted together, substantially as described, and whereby when the said parts are
 70 disconnected, the arm may be swung to one side, for affording free access to the roll.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EDWARD R. MARSHALL.

Witnesses:

W. O. CROCKER,
 F. J. MARSHALL.