

993,692.

H. L. KUTTER.
PAPER MAKING MACHINE.
APPLICATION FILED AUG. 29, 1910.

Patented May 30, 1911.

2 SHEETS—SHEET 1.

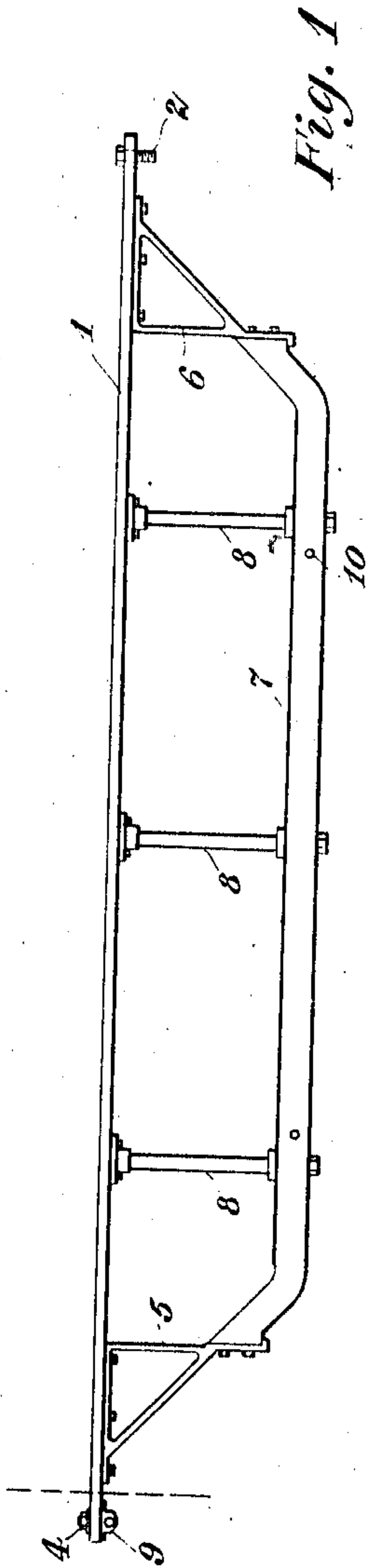


Fig. 1

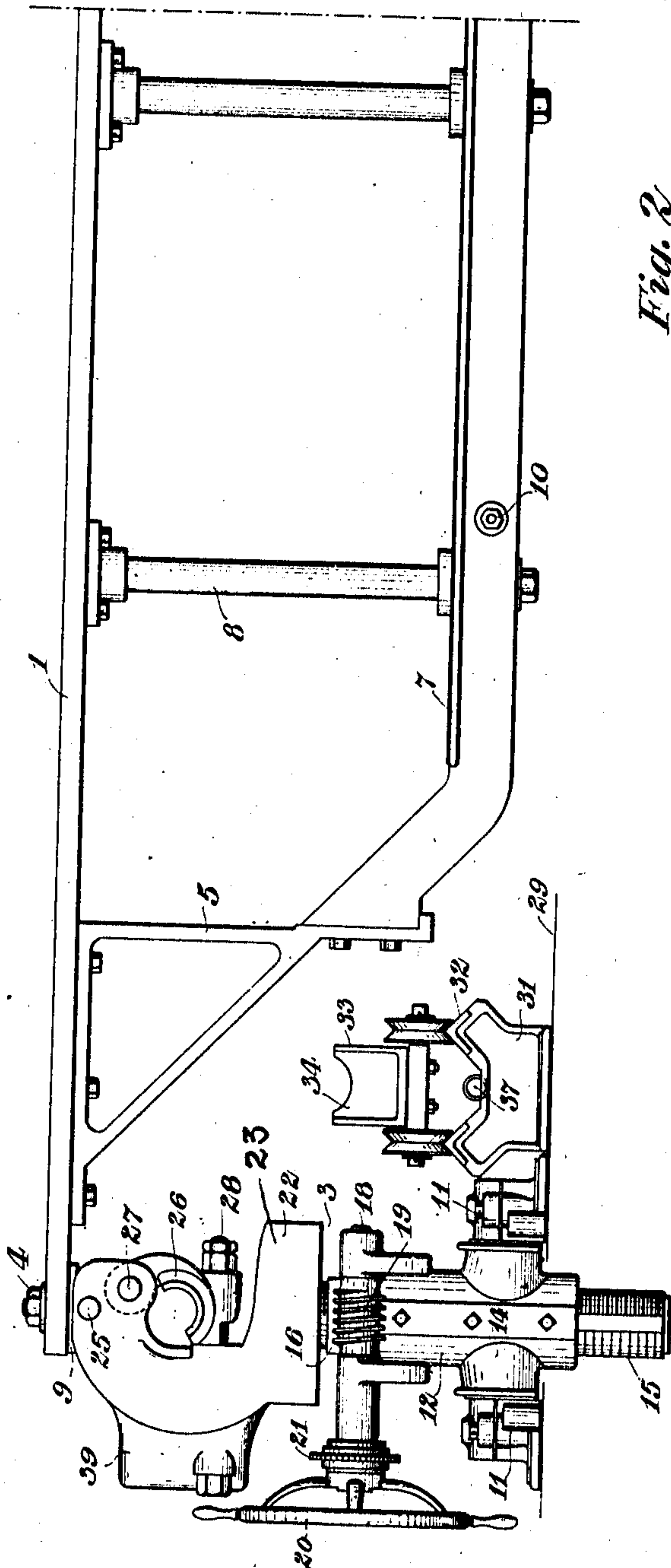


Fig. 2

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Charles Johannes Meyer.
Jas. Wm Johnson

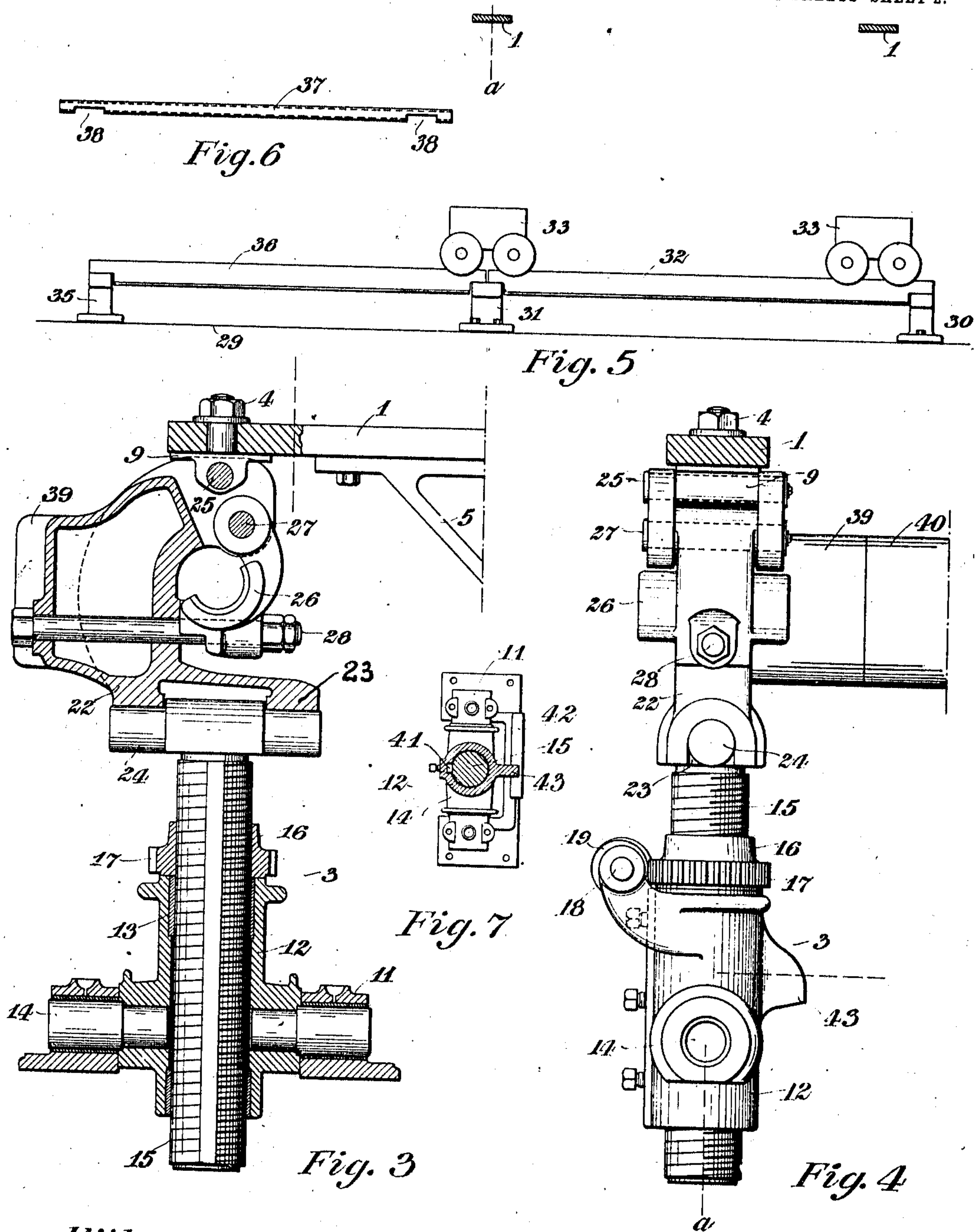
Inventor
Herman L. Kutter.
by James W. See
Attorney.

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UNITED STATES PATENT OFFICE.

HERMAN L. KUTTER, OF HAMILTON, OHIO, ASSIGNOR OF ONE-HALF TO FRANK C. TROWBRIDGE, OF HAMILTON, OHIO.

PAPER-MAKING MACHINE.

993,692.

Specification of Letters Patent.

Patented May 30, 1911.

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To all whom it may concern:

Be it known that I, HERMAN L. KUTTER, a citizen of the United States, residing at Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Paper-Making Machines, of which the following is a specification.

This invention pertains to Fourdrinier paper-making machines and relates to improvements upon the construction of the Fourdrinier frame set forth in my United States Patent No. 654,651, of July 31st, 1900.

The present improvements relate to the construction of the shake-rail trusses, to the construction of the shake-legs, to the mounting of the breast-roll, and to the construction of the breast-roll truck-mechanism.

The invention will be readily understood from the following description taken in connection with the accompanying drawings in which:—

Figure 1, is a front elevation of one of the shake-rail trusses: Fig. 2, a side elevation of the head portion of the same in conjunction with the shake-leg and the breast-roll truck: Fig. 3, a vertical section of one of the shake-legs, in the plane of lines *a* of Figs. 4 and 5: Fig. 4, an elevation of one of the shake-legs as viewed from the right in Fig. 2: Fig. 5, a side elevation of the breast-roll truck-mechanism as viewed from the right in Fig. 2: Fig. 6, a side view of the guide-pipe of the truck-mechanism. The various figures of the drawings involve a diversity of scales. As both sides of the machine are to be alike the showing and description will be in the singular, and Fig. 7, a horizontal section of one of the shake-legs.

In the drawings:—1, indicates one of the shaking side rails of a Fourdrinier machine: 2, its heel-pivot on which the rail oscillates: 3, the shake-leg, considered as a general structure, under the free end of the shake-rail: 4, the vertical pivot uniting the free end of the shake-rail to the shake-leg: 5, a strong bracket rigidly secured to the lower surface of the shake-rail at its free end, this bracket presenting a vertical surface tailward of the shake-rail: 6, a similar bracket at the heel-end of the shake-rail and presenting a vertical surface toward the first bracket: 7, a truss-bar disposed below the shake-rail and having its two ends rigidly secured to the vertical faces of the brackets: 8, struts firmly connected with the shake-rail

and truss bar: 9, a horizontal pivot-bearing for connecting the free end of the shake-rail with the shake-leg, this bearing being swiveled to the shake-rail by the pivot 4: and 10, stretchers extending across from the truss-bar on one side to the truss-bar on the other side of the machine to prevent the truss-bars vibrating independently of each other.

The brackets at the ends of the shake-rail of themselves endow the ends of the shake-rail with very great vertical stiffness and the truss-bar completes the trussing of the shake-rail, the inner vertical members of the brackets forming vertical strut-members at the ends of the truss-bar. The struts 8, further stiffen the structure but are not needed on very short machines. The two brackets being located at the ends of the shake-bar close to the two supports of the bar, at pivots 2 and 4, effectually guard against deflection of the bar at points near its end. In practice I construct the brackets of steel castings, and I construct the truss bar of cast iron of inverted channel section. The ends of the truss-bar abut against the inwardly presenting faces of the brackets and are there solidly bolted, the ends of the truss-bar resting on hooks projecting inwardly from the flat inner faces of the brackets.

Proceeding with the drawings:—11, indicates a pair of bearings in a common line length-wise of the machine, these bearings being secured to the mill floor below the free end of the shake-rail, the two bearings being, preferably, cast in one piece: 12, a vertical tube disposed between the two bearings and forming the lower member of the shake-leg: 13, bushings in the upper and lower ends of the tube: 14, trunnions projecting from the tube and journaled in the bearings, the tube projecting some distance below the bearings, and freely through suitable floor-openings provided for them: 15, a screw mounted for vertical sliding motion in the tube, the periphery of the screw nicely fitting the bushings of the tube: 16, a nut threaded upon the screw and resting upon the upper end of the tube: 17, a worm-gear carried by the nut: 18, a worm-shaft journaled in suitable bearings projecting from the tube: 19, a worm carried by the worm-shaft and engaging the worm-gear: 20, a hand-wheel on the worm-shaft, by means of which the nut can be turned and the screw raised and lowered in the tube: 21, a sprocket-wheel on the worm

shaft to provide for a chain transmitting the worm motion to the worm at the opposite shake-leg, as in my earlier patent: 22, a shake-leg head-casting having a large gap 5 open, preferably, toward the tail end of the shake-rail, this casting being bifurcated at its upper end to receive the pivot-bearing 9 of the shake-rail, the casting 22 forming the end of the rigid breast roll frame extending 10 across the machine: 23, a pair of separated fore and aft downwardly open bearings in the base of the head-casting: 24, trunnions projecting fore and aft from the head of the screw and engaging the bearings 23, the 15 head of the screw being of a width a trifle less than the distance between the two trunnion bearings: 25, a pivot engaging the pivot bearing 9 of the shake-rail and passing through the two side members of the bifurcated upper end of the head casting: 26, 20 a breast-roll bearing disposed in the gap of the head-casting, this bearing comprising about half of the circle of the bearing so as to engage the lower and forward portion of the breast roll journal, the bearing having 25 an arm projecting upwardly between the side-members of the bifurcated upper portion of the head-casting: 27, a pivot pin engaging the arm of the breast-roll bearing and the two side members of the head-casting, the bearing being suspended by this 30 pivot-pin: 28, a bolt passing fore and aft through the rear portion of the head-casting and through a lug projecting down from the breast-roll bearing: and 29, the general level of the mill floor.

The vibrating motion of the shake-rail is provided for by the oscillation of the tube and screw on trunnions 14 and by the rocking of the screw-head trunnions in the head-casting, the head-casting being quite disconnected from the tube except through the medium of the screw and its trunnions. The head of the screw, being less in width than 45 the distance between trunnion bearings 23 permits of a trifle of endwise shifting of the head-casting on the screw trunnions as incident to the vibrating motion of the shake-rail, pivots 4 and 25 connecting the shake-rail with the head casting also providing for the slight changes in angular relationship between the shake-rail and head-casting.

The breast-roll journal has its bearing forwardly and downwardly in bearing 26 so 55 as to properly take the strain of the making wire, the bearing being held in this normal working position by bolt 28. When the breast roll is to be removed, bolt 28 is first displaced, thus permitting the bearing to 60 swing downwardly and forwardly on its pivot 27. But the relationship of pivot 27 to the segmental bearing is such that when the bearing thus swings downwardly, so as to bring the center of gravity of the breast-roll under the pivots 27, the bearings will

still have such complete hooking engagement with the breast-roll journals as to hold the breast-roll suspended. Then, by lifting the roll and swinging the bearing forwardly and upwardly, the roll may be removed forwardly and downwardly so as to be withdrawn endwise from the machine. And, similarly, when the roll is to be placed in the machine, its journals are passed into the gaps in the head-castings and then the bearings are swung into hooking engagement below the journals, after which the bearings are pushed rearwardly and the bolts 28 applied. This system of temporarily supporting the breast-roll by bearings under free 80 suspension is manifestly available in machines gapped to the rear as well as to machines having the breast-roll frame gapped forwardly as in the illustration.

It is to be particularly observed that the 85 mounting of the breast-roll is such that all of the strains and strengths are in a single vertical line, that is to say, the axes of screw 15 and pivot 4 coincide and intersect the axes of the breast-roll journal and 90 trunnions 24 and 14. A substantial adherence to the plan of disposing the axis of the breast-roll in the plane of the general vertical axis of the shake-legs is found in practice to give a very much better balance 95 and easy working of parts than when the roll is some distance to the front or rear of the axis of the shake-legs.

If the breast-roll, instead of being disposed substantially below pivot 25, be any 100 material distance to the rear or to the front of the vertical plane of that pivot the effect, as the shake-rails are raised and lowered, would be to slightly alter the relationship between the making-wire and the 105 slices and thus disturb the delicate slice adjustment. In the present construction not only may the wire be raised and lowered while the machine is in operation, but no attention need be given to the slices by 110 reason of such adjustment.

Proceeding with the drawings, and giving particular attention to Figs. 5 and 6:— 30, indicates a low floor stand disposed below the rear one of the two shake-rails 1, 115 this floor stand presenting upwardly a pair of angular projections, the pair being arranged fore and aft of the machine: 31, a similar but preferably wider floor-stand disposed substantially below the front one 120 of the shake-rails, the floor stands 30 and 31 being rigidly secured in place; 32, a pair of rails loosely supported by the two floor stands 30 and 31, these rails being in the form of angle bars presenting their 125 corners upwardly, the flanges of the bars being notched so that when laid in place upon the floor-stands they will not be liable to endwise displacement: 33, a pair of trucks arranged to run upon these track- 130

rails and carry the breast-roll when being placed and removed: 34, wooden bearing blocks in the trucks to receive the breast-roll journals: 35, a third floor-stand temporarily placed at some distance from the front of the machine and in line with the other floor stands: 36, a pair of track-rails similar to the other rails, supported by floor stands 31 and 35: 37, a light pipe having a length somewhat greater than from the outside of floor-stands 30 to the outside of floor-stand 31: 38, notches cut in this pipe to freely engage over the intermediate portions of floor-stands 30 and 31: 39, an elbow projecting rigidly inward and, preferably, from the rear of the shake-leg head-casting 22: 40, a frame-bar to be rigidly connected with the two elbows, this frame-bar and the two head-castings forming the breast-roll frame which is articulated to the shake-rails and to the leg screws as has been described: 41, a feather disposed in the groove in tube 12 and bearing against a flattened side of screw 15, this feather being pressed to the screw by means of side-screws: 42, the bridge-piece connecting the two floor-bearings 11: and 43, a lug projecting from the inner side of tube 12 and adapted to engage the bridge-piece and limit the inward rocking of the tube upon its trunnions.

The vibrating motion is to be gotten to the general structure by any suitable means, but my preference is to employ a lever projecting outwardly from the base of the rear shake-legs, as in my earlier patent. The length of the shake-legs, and the consequent inclination or declination of the making-wire may be adjusted at both sides of the machine simultaneously by manipulating the mechanism giving rotation to the nuts 16, and without interrupting the running of the machine. This vertical adjustment of the shake-legs requires that the screw shall slide in its tube, and the character of the shaking motion is such as to tend to beget looseness at this fit and to be itself more or less seriously effected by the looseness. Renewable bushings 13 provide for keeping this fit in pretty good condition, but perfect rigidity of the fit is secured by means of the feather and set-screws, the latter being loosened up when the adjustment is to be made.

The height of the floor-stands of the truck-mechanism is to be such as to support the track-rails 32 in position over the lower portion of the making-wire when the wire is down. Under normal conditions nothing of the truck-mechanism will be present except floor-stands 30 and 31.

When putting the breast-roll in place, pipe 37 is to be placed on floor-stands 30 and 31, and this pipe being a light affair can be easily handled without danger of injury to

the costly wire. The pipe, when in position on the floor-stand, is to be over the lower member of the making-wire. One of the rails 32 is now to be slid in on this pipe as a safe supporting guide, the angular form of the track well lending itself to coöperative engagement with the guide-pipe, and a man at the rear of the machine may then help the front man to place the track-rail on projections of the floor-stands, and the same with the other track-rail 32. Temporary floor-stand 35 and front track-rails 36 are now to be placed in position and the trucks placed on the front rails, and the breast-roll placed on the trucks. The trucks with the breast-roll are now to be run in under the machine-frame, in position between the upper and lower members of the making-wire. The breast-roll bearings, hanging in free suspension, are to be raised and the breast-roll is to be raised and moved rearwardly so that the bearings may be swung under the breast-roll journals, thus supporting the breast-roll by suspension. The bolt 28 is now to be applied, clamping the breast-roll bearing firmly to the breast-roll frame and drawing the breast-roll to its farthest rearward position. It is to be observed that by this system the making-wire does not, in the operation of getting the breast-roll to place, require to be stretched rearwardly beyond its working point. When the breast-roll is lifted free of the trucks they may be run out to the front of the machine and all of the truck-mechanism removed except the permanent floor-stands 30 and 31, and in this operation of removal the guide-pipe 37 again serves in protecting the wire while the comparatively heavy truck-rails are being removed.

In erecting the Fourdrinier frame, or at any time when it is seriously dismantled and disconnected from the shake-imparting mechanism, there is a tendency for the shake-leg system to topple on the floor-trunnions. In the present case the lugs 43 engaging the bridges of the floor-bearings limit this toppling motion, thereby preventing damaging twisting strains of the shake-rails and guarding against other damage likely to result from the unrestrained side swinging of the structure.

I claim:—

1. A frame member for a paper-making machine or the like comprising a shake-rail, a truss-bar, and integral triangular brackets, one at each end of the frame member, connecting the truss bar with the shake rail.

2. A frame member for a paper making machine or the like comprising a shake-rail, a truss-bar, and integral right-triangular brackets, one at each end of the frame member connecting the truss bar with the shake rail.

3. A frame member for a paper-making

machine or the like comprising a shake-rail, a truss-bar, and separate integral triangular brackets having seats to engage the shake-rail and the truss-bar and bolted between the bar and rail at each end thereof.

4. A frame member for a paper making machine or the like comprising, a shake-rail, a pair of integral right-angled triangular brackets rigidly secured by their bases at both ends of the shake-rail in such a manner that the hypotenusal sides of the brackets mutually converge, the lower portions of the brackets being provided with shoulders, and a truss-bar disposed below the shake-rail and having its ends separably secured to the lower portions of the brackets and resting on the shoulders thereof.

5. A paper-making machine comprising, a shake-rail, a breast-roll frame disposed below and connected with the free end of the shake-rail and having a pair of separated fore and aft downwardly open bearings under the shake-rail, a pair of floor bearings under the end of the breast-roll frame, a vertical tube trunnioned in said floor-bearings, a screw fitted to slide vertically in the tube and having its head disposed fore and aft between said downwardly open bearings, trunnions projecting from the screw head and engaging said downwardly open bearings, a nut engaging the screw, and mechanism for turning the nut, the breast-roll frame being disconnected from the tube except through the medium of the screw.

6. A paper-making machine comprising, a shake-rail, a breast-roll frame disposed below and connected with the free end of the shake-rail and having a pair of separated fore and aft downwardly open bearings under the shake-rail, a pair of floor-bearings under the end of the breast-roll frame, a vertical tube trunnioned in said floor-bearings, a screw fitted to slide vertically in the tube, a head on the screw disposed fore and aft between said downwardly open bearings and having a width less than the distance between said downwardly open bearings, trunnions projecting from the screw-head and engaging said downwardly open bearings, a nut engaging the screw, and mechanism for turning the nut, combined substantially as set forth.

7. A paper-making machine comprising, a shake-rail, a breast-roll frame disposed below and connected with the free end of the shake-rail, a shake-leg disposed below the free end of the shake-rail and trunnioned to the breast-roll frame and to fixed floor bearings, and a breast-roll bearing supported by the breast-roll frame in a position falling within both the longitudinal and lateral vertical planes of the shake-leg.

8. A paper-making machine comprising, a shake-rail, a breast-roll frame connected therewith and having an open gap below the

rail, a shake-leg for supporting the end of the breast-roll frame, a horizontal pivot supported by the breast-roll frame over said gap, a segmental breast-roll bearing suspended from said pivot, and a bolt securing said bearing rigidly to the breast-roll frame, the relation of said segmental bearing and its supporting pivot being such that when the bearing is released and in free suspension the bearing will have hooking engagement with the breast-roll journal combined substantially as set forth.

9. A paper-making machine comprising, a shake-rail, a breast-roll frame connected with the free end thereof, a breast-roll bearing carried by the breast-roll frame, a pair of floor-bearings under the breast-roll frame, a vertical tube trunnioned in said floor-bearings, a screw fitted to slide vertically in the tube and having a flattened side, trunnions projecting from the end of the screw and engaging bearings in the breast-roll frame, a nut engaging the screw and supported by the tube, mechanism for turning the nut, a feather disposed in a groove in said tube and adapted to bear against the flattened portion of said screw, and set screws for forcing the feather toward the screw, combined substantially as set forth.

10. A paper-making machine comprising, a Fourdrinier frame, a breast-roll frame forming a part thereof and gapped to permit the forward and downward removal of the breast-roll supported by it, floor-stands disposed forward of the breast-roll frame, removable track-rails supported by said floor-stands, trucks mounted to run on said track-rails and adapted to receive the journals of the breast-roll of the machine, and a removable light guide-rail adapted to be supported by the floor-stands and to serve as guides in placing and removing said track-rails, combined substantially as set forth.

11. A paper-making machine comprising, a Fourdrinier frame, a breast-roll frame forming a part thereof and forwardly and downwardly gapped to permit the forward and downward removal of the breast-roll supported by it, floor-stands disposed forward of the breast-roll frame and having angular rail-supports projecting upwardly, removable angle-iron track-rails supported by the angular projections of said floor-stands, and trucks mounted to run on said track-rails and adapted to receive the journals of the breast-roll of the machine, combined substantially as set forth.

12. A paper-making machine comprising, a Fourdrinier frame, a breast-roll frame forming a part thereof and gapped to permit the forward and downward removal of the breast-roll supported by it, floor-stands disposed forward of the breast-roll frame and having angular rail-supports projecting

upwardly, removable angle-iron track-rails supported by the angular projections of said floor-stands, trucks mounted to run on said track-rails and adapted to receive the journals of the breast-roll of the machine, and a notched tube adapted to be removably supported by said floor-stands over the wire and to serve as a guide-rail for said angular iron track-rails, combined substantially as set forth.

13. A paper-making machine comprising, a shake-rail, a vertically adjustable shake-leg disposed thereunder, a pivot uniting the shake-rail and shake-leg and having its axis parallel with the breast-roll, and a breast-roll bearing supported by the shake-leg and having its axis substantially in the same vertical plane as said pivot, combined substantially as set forth.

14. A paper-making machine comprising, a shake-rail, a breast-roll frame connected

therewith and having an open gap below the rail, a shake-leg for supporting the end of the breast-roll frame, a breast-roll bearing pivoted to the breast-roll frame, and means for securing said bearing rigidly to the breast-roll frame.

15. A paper-making machine comprising, a shake-rail, a breast-roll frame connected therewith and having an open gap below the rail, a shake-leg for supporting the end of the breast-roll frame, a breast-roll bearing pivoted to the breast-roll frame, and means for securing said bearing rigidly to the breast-roll frame, the construction being such that when the bearing is released and in free suspension the bearing will have hooking engagement with the breast-roll journal.

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Witnesses:

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