

No. 753,904.

PATENTED MAR. 8, 1904.

T. W. MoFARLAND.
MACHINE FOR DRYING PAPER BOARD.

APPLICATION FILED JAN. 2, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

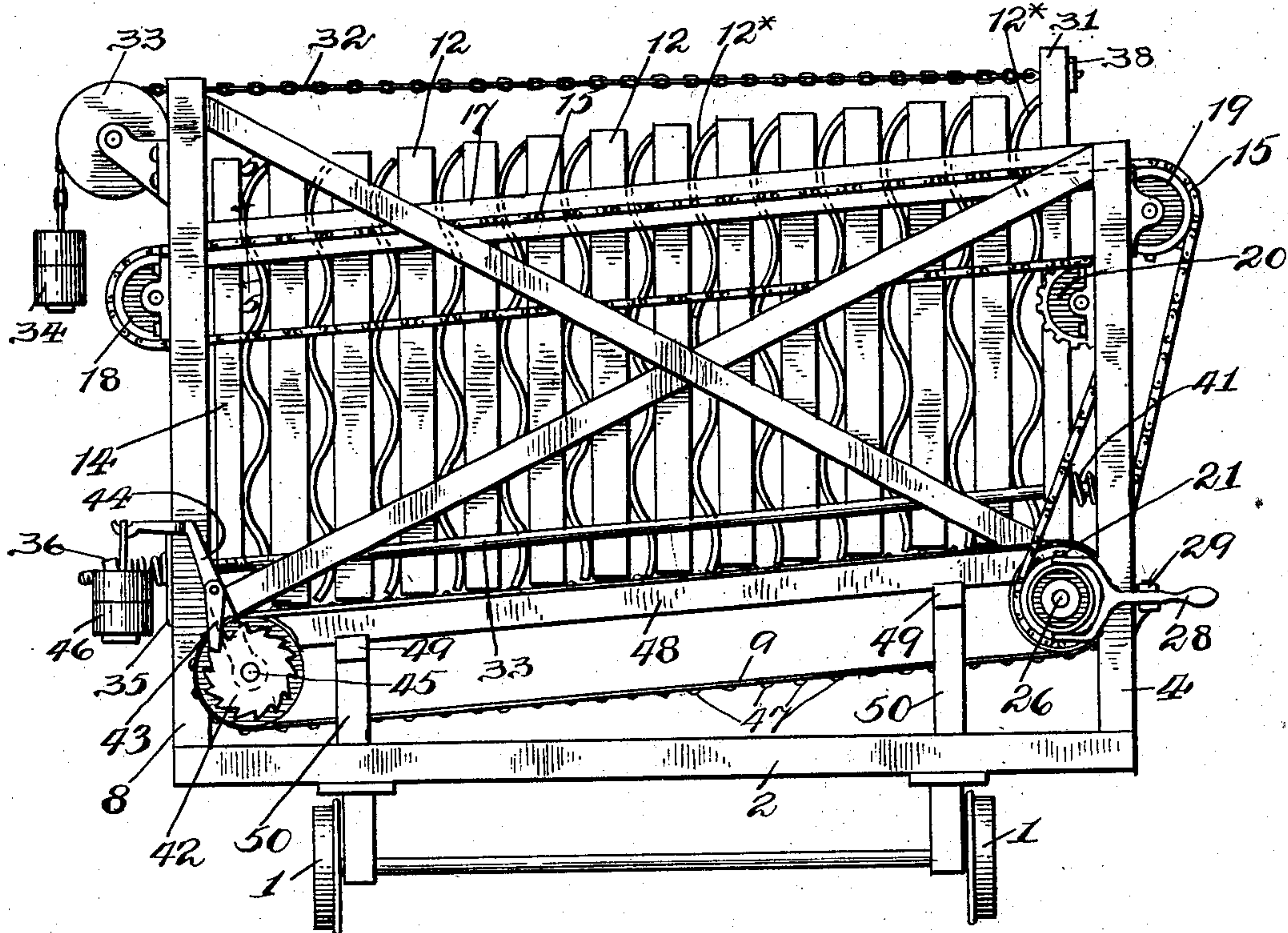


Fig. 2.

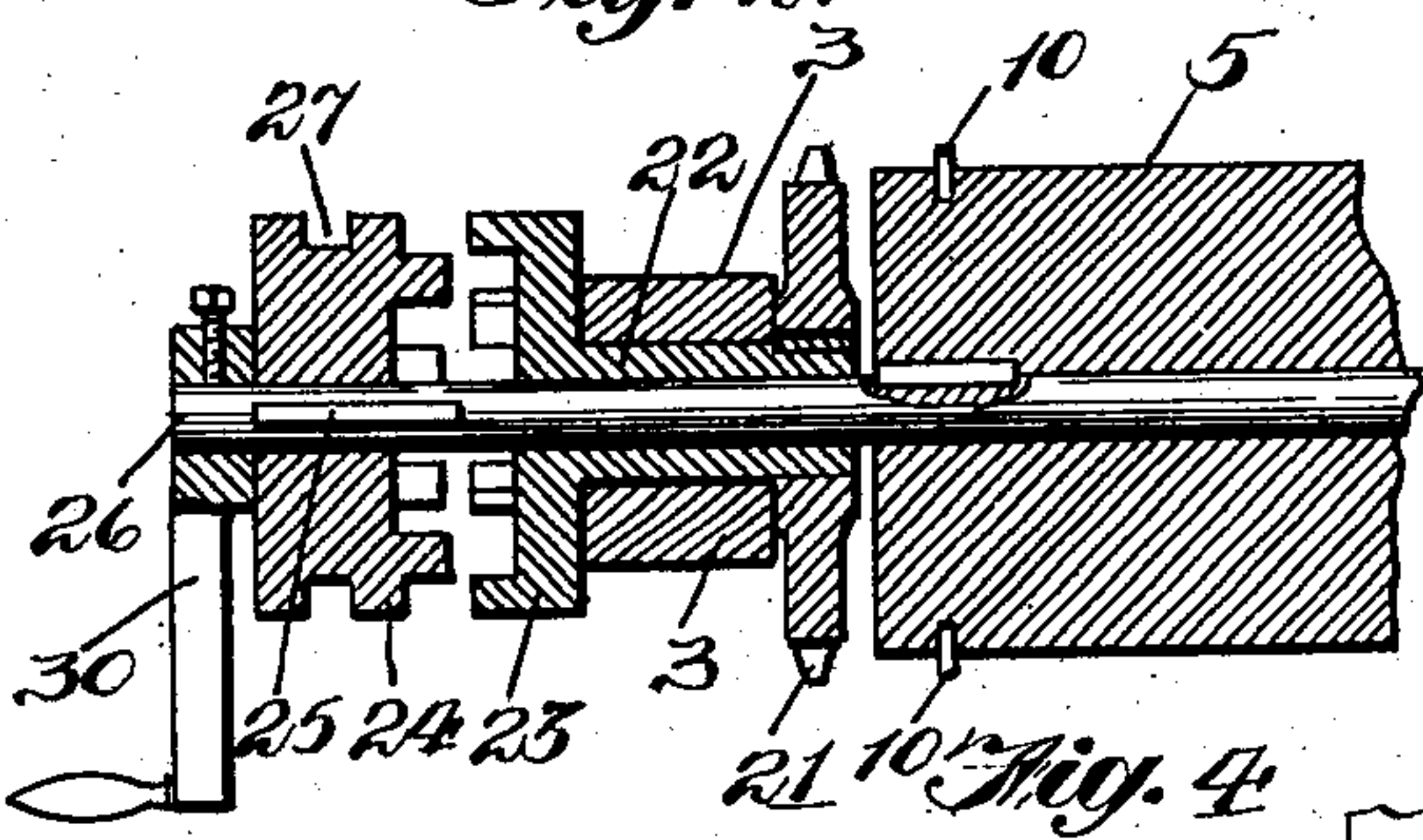


Fig. 3.

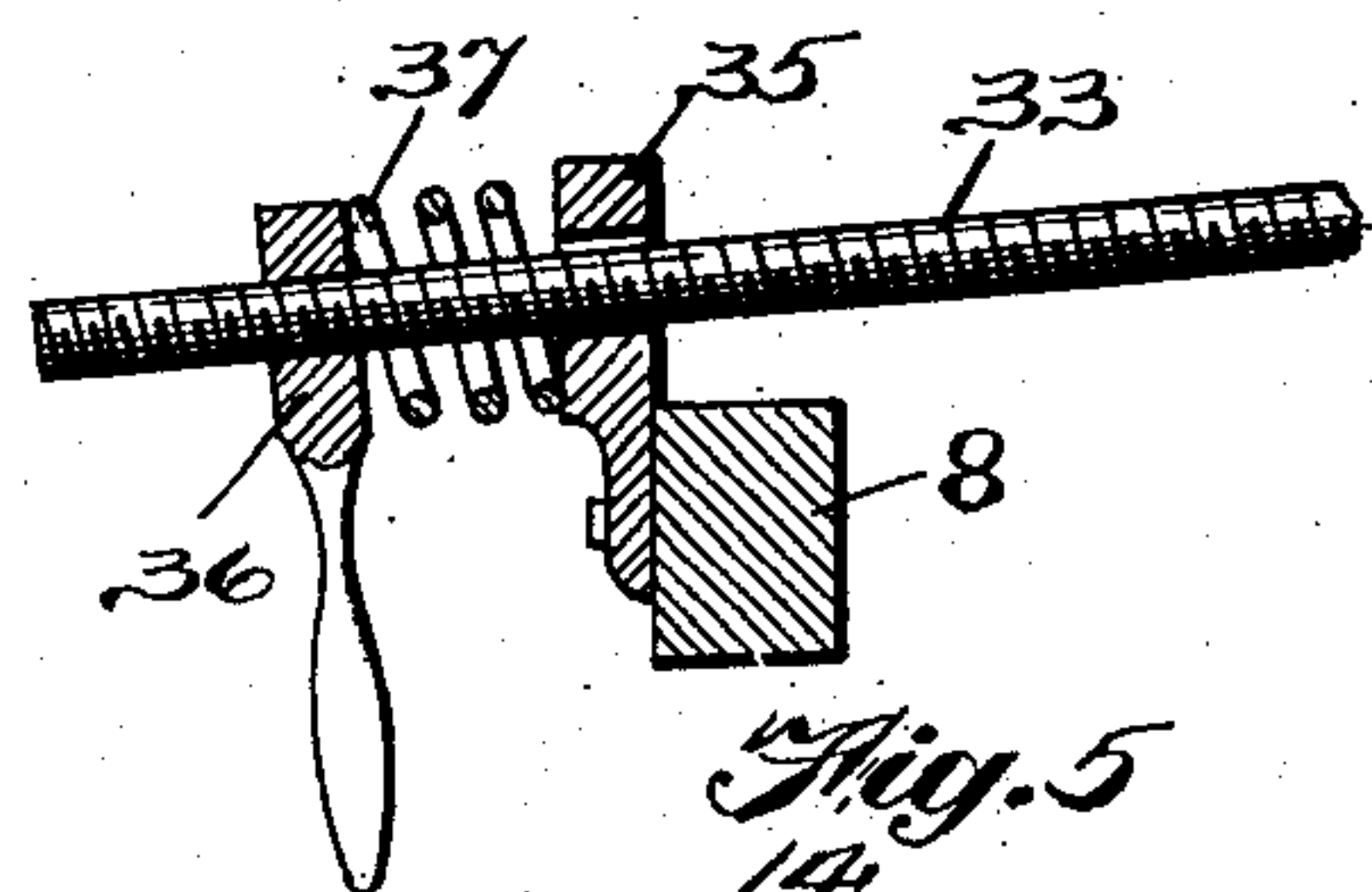


Fig. 5

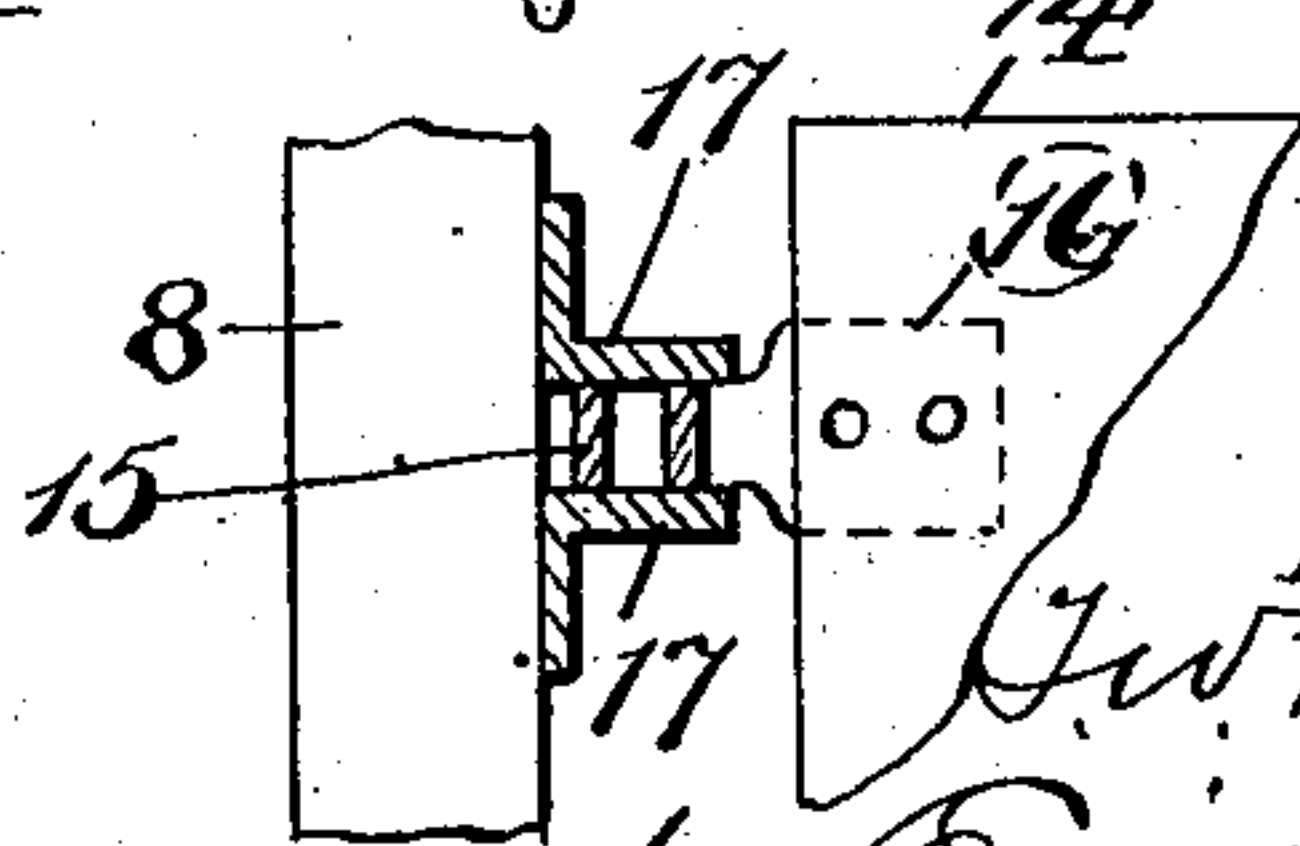
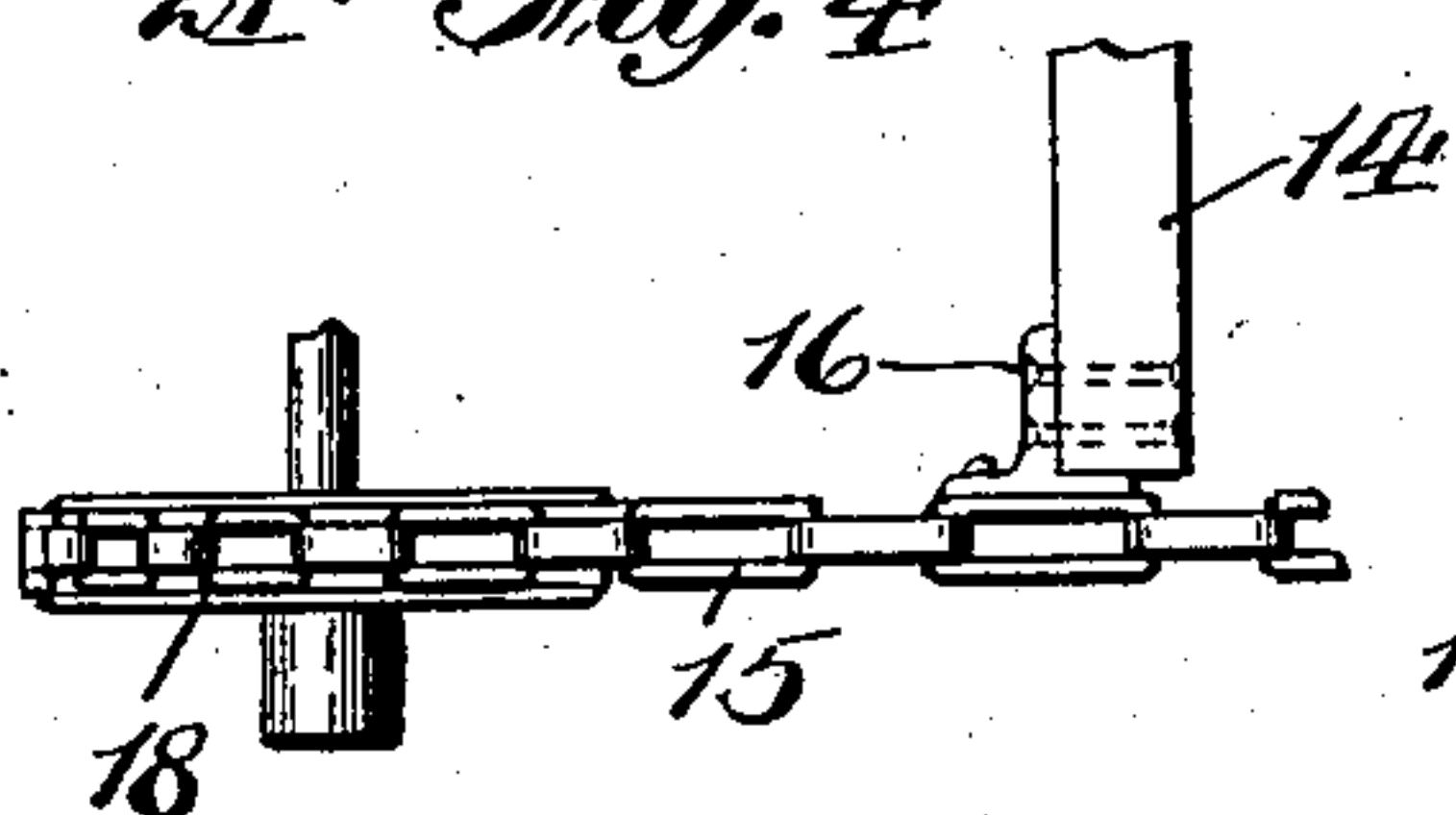


Fig. 4.



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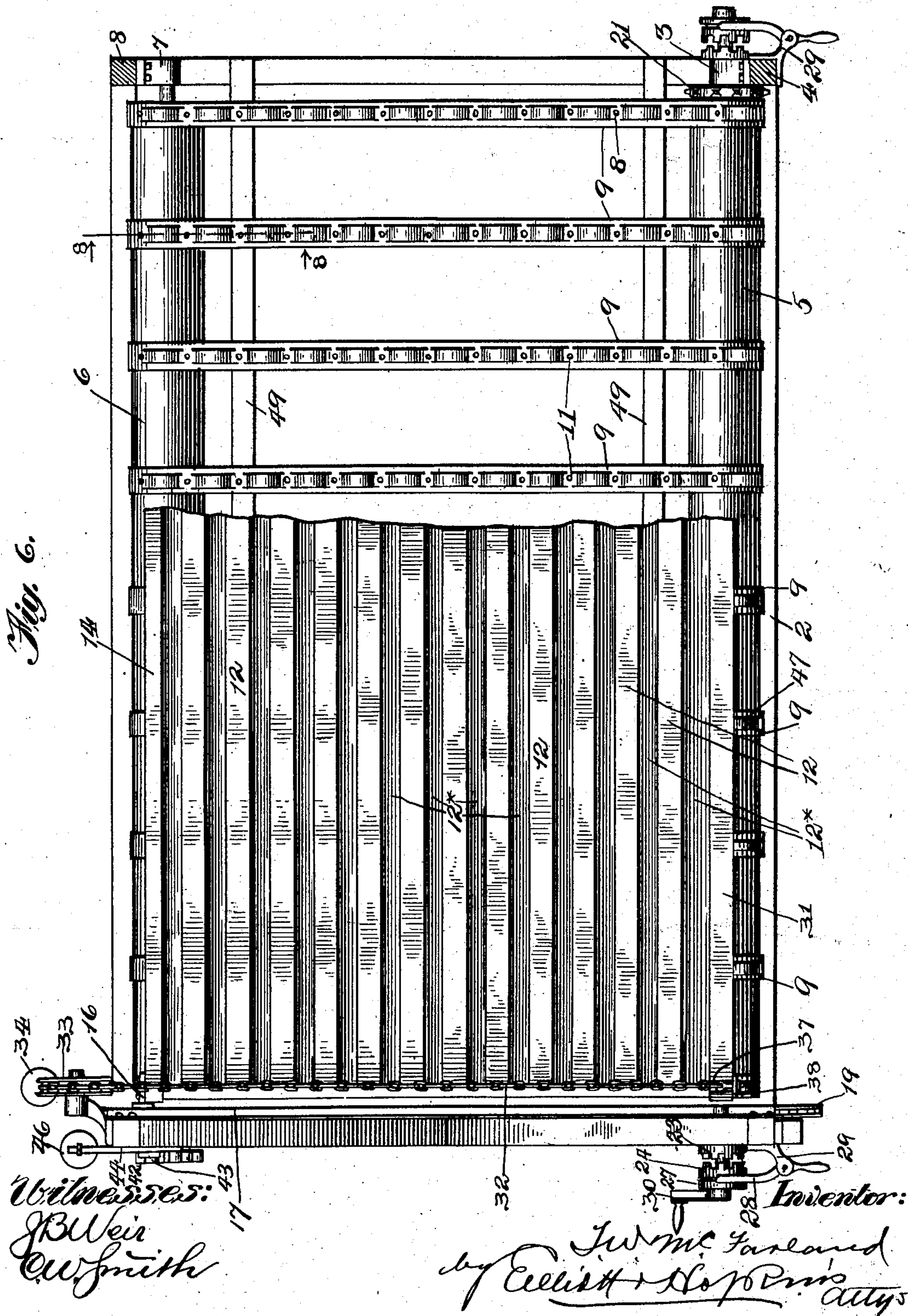
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3-SHEETS-SHEET 2.



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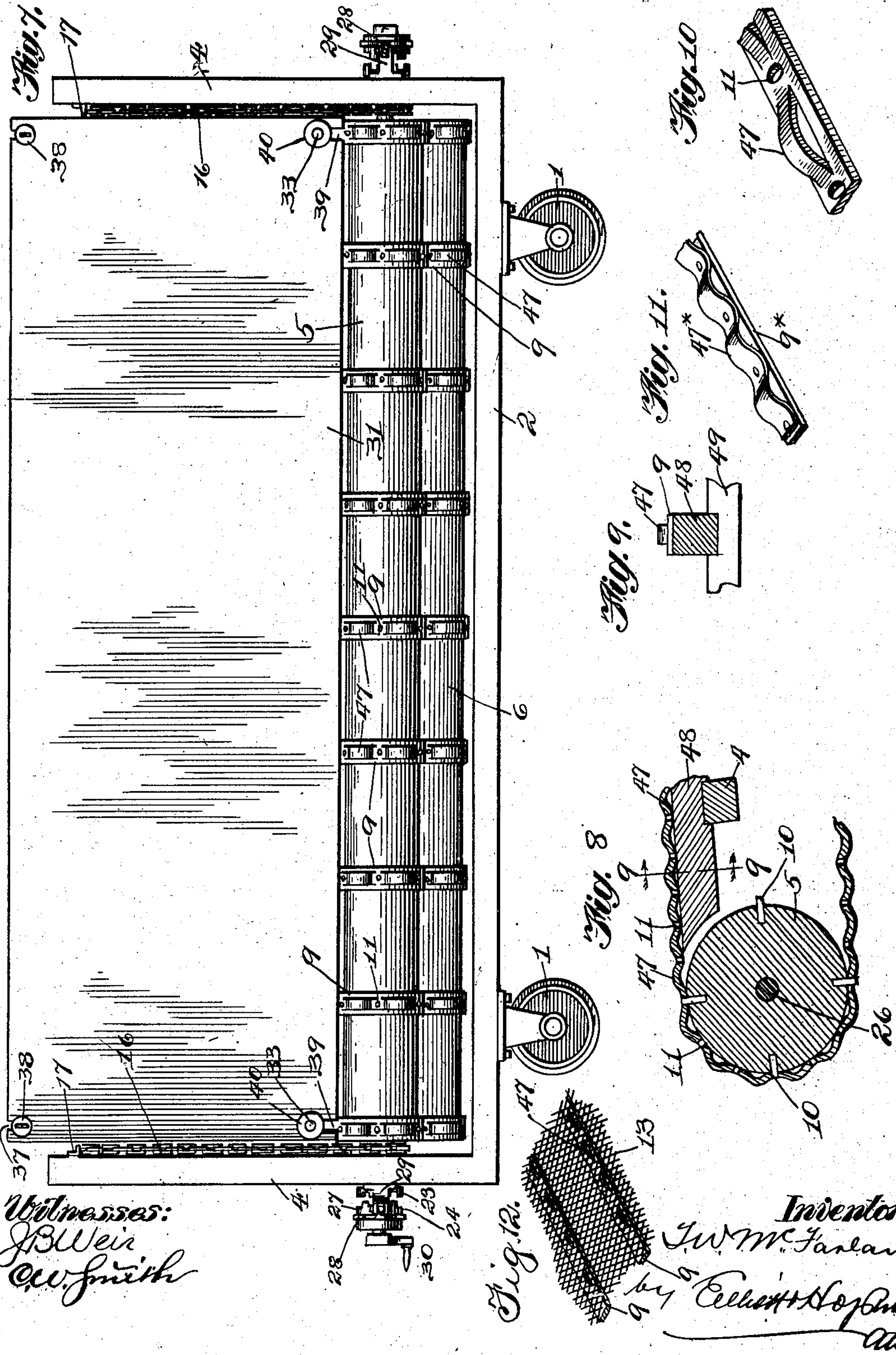
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

THOMAS W. McFARLAND, OF CHICAGO, ILLINOIS.

MACHINE FOR DRYING PAPER-BOARD.

SPECIFICATION forming part of Letters Patent No. 753,904, dated March 8, 1904.

Application filed January 2, 1903. Serial No. 137,475. (No model.)

To all whom it may concern:

Be it known that I, THOMAS W. McFARLAND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Drying Paper-Board, &c., of which the following is a full, clear, and exact specification.

My invention relates more especially to means for drying large pieces of paper-board; but it is equally applicable for drying other material; and it has for its primary object to provide improved and convenient means for holding the pieces of board flat and in a compact form while they are subjected to the drying process.

Another object of the invention is to provide means for holding boards on edge in a compact form and taking up the shrinkage thereof as the drying process proceeds.

A further object of the invention is to provide improved means for conveniently loading and unloading the pieces of board from the car or other device on which they are supported while in the drying-kiln.

With these ends in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is an end elevation of a car or truck for holding the boards while being dried provided with my improvements. Fig. 2 is an enlarged longitudinal sectional view of one of the drums and clutch mechanisms hereinafter described. Fig. 3 is an enlarged detail sectional view of one of the rod-tighteners hereinafter described. Fig. 4 is an enlarged detail view showing the manner of attaching the follower to its operating-chains. Fig. 5 is a detail cross-section taken on the line 5 5, Fig. 1, on an enlarged scale. Fig. 6 is a plan view of the machine loaded with a part broken away and shown in section. Fig. 7 is a side elevation of the complete machine looking from the right in Fig.

1. Fig. 8 is an enlarged cross-section taken on the line 8 8, Fig. 6. Fig. 9 is a cross-section on the line 9 9, Fig. 8. Fig. 10 is an enlarged detail perspective view of one of the belts hereinafter described. Fig. 11 is a similar view of a modified form thereof, and Fig. 12 is a perspective view of a still further modification.

In drying large pieces of paper-board it is desirable to load the same on a truck or other suitable vehicle and then run the whole into a drying-kiln. 1 represents the wheels of such a truck, and 2 the horizontal frame thereof, which is of rectangular formation and open over the truck, so as to allow the free passage of air up through it. Extending along one side of this frame and journaled in any suitable bearings 3 on standards 4 is a drum or roller 5, and along the opposite side of the frame is arranged a drum or roller 6, which is journaled in any suitable bearings 7, secured to corner-standards 8, the corner-standards 4 8 being mounted on the horizontal frame 2. Around these drums pass a number of bands or belts 9, which travel with the drums when either of the latter is rotated, and in order that they may have better purchase on the drums for imparting the motion of one drum to the other one the drums are provided with pins or teeth 10 and the belts with perforations 11, which engage with said pins, and thus, in effect, constitute sprocket wheels and chains. These belts constitute the support for the pieces of board 12 or other material to be dried, and they may be arranged at intervals throughout the length of the drums at any desired distance apart; but ordinarily it is preferable to place around and secure to the belts a continuous apron 13, composed of wire cloth or screen, which will serve to support the edges of the boards 12 at points between the belts 9, and thereby prevent the belts from cutting into such edges an objectionable extent. The screen or apron 13 may be secured to the belts in any desired way or left loose, if desired.

14 is a follower-board which is arranged on its edge over the belts 9 and is attached at each end near its upper edge to a continuous

sprocket chain or belt 15 by means of a lug 16 (see Fig. 4) or any other suitable device, and its lower edge rests upon the belts 9 or, if the screen 13 be used, upon the screen.

Two of these chain belts 15 are employed, one at each end of the follower 14, and the upper fold of each is supported and guided between two bars 17, secured to the inner sides of the standards 4 8. One end of each of the belts 15 is supported by a sprocket-wheel 18, secured to each of the standards 8, while the other end is brought down past two idlers 19 20, journaled on opposite sides of each of the standards 4, and thence passes around a sprocket-wheel 21 at each end of the drum or roller 5. The construction and arrangement of these two sprocket-wheels 21 at opposite ends of the drum 5 are similar, and the description of one with reference to Fig. 2 will suffice for both. It will be seen from this figure that the sprocket-wheel is secured by a sleeve 22 to one member 23 of a clutch whose other member 24 is connected by spline 25 to a shaft 26, on which the drum or roller 5 is secured, the sliding clutch member 24, which is also the driven clutch member, being provided with groove 27, in which engages a shifting fork 28, fulcrumed in bracket 29 on standards 4, so that by shifting member 24 in one direction the sprocket-wheel may be disconnected from the drum or roller 5. One of the drums 5 6 may be provided with a crank for imparting motion to the bands 9, together with the screen 13 thereon, and also causing the follower 14 to move back and forth. This crank is shown at 30 secured to the end of shaft 26.

In loading the car or truck with the boards to be dried the follower 14 is moved to the opposite side to that on which it is now shown in Fig. 1 by turning the crank 30 so that the top of the follower will be carried by the movement of the chains 15 and the bottom by the movement of the belts 9. The boards 14 are then stood on edge against the follower, and in order that the air may circulate between the boards I place between them sheets of corrugated iron 12^x or any other suitable material which will serve to hold the boards apart while affording a firm support against which the boards may rest. The corrugations may be arranged either horizontally or vertically. As the boards are thus placed against the follower the latter is advanced until it arrives at the position now shown in Fig. 1 on the opposite side of the car, when the car will be full, and the last board may be held in its upright position by means of a second follower 31, which is removably secured at its upper edge to two chains 32, which pass over idlers 33 at the opposite side of the car and are provided with weights 34 for holding the follower 31 firmly against the last board in the series or against one of the corrugated spacing members 12^x

placed on the outer side of the last board. The lower edge of the follower 31 is removably secured to two pull-rods 33, whose ends opposite follower 31 pass through suitable brackets 35, secured to the standards 8, and are provided with tightening-nuts 36, screw-threaded thereon and bearing against springs 37, interposed between said nuts 36 and the brackets 35, so as to act in conjunction with the weights 34 in pulling the follower 31 against the series of boards with a yielding pressure. The chains 32 are attached to the follower 31 by being let into slots or notches 37 in the upper edge thereof, the chains being provided with washers 38 to prevent them from being pulled through. The pull-rods 33 pass through similar notches 39 in the lower edge of follower 31 and are provided with washers 40, springs 41 being interposed between the washers and the follower-board for increasing the elasticity of the action of the rods 33, if desired.

After the car or truck has been loaded and the follower-board 31 secured in place by the described means in the manner shown in Fig. 1 the car is run into the kiln and there allowed to remain until the boards are dried. As the boards dry they of course decrease in thickness, and in order to prevent them from leaning over and also sagging down between their spacing members 12^x the follower 31 must be moved up to take up the extra space. This is partially accomplished by the weights 34 and springs 37 41; but owing to the great friction of the lower edges of the boards against their support it is necessary, in order to accomplish the desired end properly, to move all of the boards bodily at their lower edges, and this is effected by causing the bands or belts 9 to travel toward the follower 14 by turning the crank 30 from time to time; but in order that this may be accomplished automatically one of the drums or rollers 5 6—the roller 6, for example—is provided with a ratchet-wheel 42, which is engaged by a pawl 43, pivoted to a lever 44, journaled loosely on shaft 45 of drum 6 and carrying a weight 46, which is adapted to impart to the drum 6 a continual tendency to rotate in such a direction as to pull the lower edges of all of the boards 12 toward the follower 13, and it will be seen that by arranging the lever 14 just a little to one side of the perpendicular at the beginning the initial pressure against the boards will be very light, and consequently avoid squeezing the boards excessively when they are wet and green and liable to be damaged by excessive pressure.

In some instances the wire screen 13 may afford sufficient friction against the lower edges of the boards to cause them to travel toward the follower 14 when the drum 6 is rotated, as described, and to cause them to travel in the opposite direction when it is desired to

take the boards off the car; but in order to insure the positive movement of the boards at their lower edges the bands or belts 9 are provided with corrugations or lugs, which may be formed in any suitable way, but are preferably rounded, so as to be capable of slipping past the boards after they arrive at a position of sufficient compactness against one another, and thus permit the bands to continue to rotate without injuring the boards. These lugs or corrugations are shown at 47, and they may be formed, as shown in Fig. 10, by striking up loops from the bands 9, the rough effect of these loops or corrugations being produced through the wire screen 13.

In order to accelerate the inward movement of the boards 12 toward the follower 14, the bands 9 are arranged in an inclined position, as shown in Fig. 1, and in order that the bands may not sag at their mid-lengths they are supported by slats 48, arranged thereunder and held by longitudinal beams 49, which are supported at their ends by short standards 50, (see Fig. 1,) thus affording adequate support for the load of boards, while providing ample openings for the circulation of air.

In the modification shown in Fig. 11 the lugs or corrugations are produced on the bands, which are shown at 9^x in this figure, by a corrugated strip of sheet metal 47^x, riveted or otherwise secured to the band at the points where depressed thereagainst.

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

1. In a device for drying boards the combination of means for holding the boards in an upright position and means for engaging the edges of the boards, movable toward said first means for crowding the boards thereagainst and taking up the shrinkage of the boards, substantially as set forth.

2. In a device for drying boards the combination of means for holding the boards in an upright position and a support for the lower edges of the boards, movable toward said first means for crowding the boards toward the latter, substantially as set forth.

3. In a device for drying boards the combination of means for holding the boards in an upright position and a support for the lower edges of the boards having lugs or corrugations for engaging the boards and advancing them toward said first means, substantially as set forth.

4. In a device for drying boards the combination of means for holding the boards in an upright position and an endless movable support for the lower edges of the boards movable toward said first means, substantially as set forth.

5. In a device for drying boards the combination of means for holding the boards in

an upright position, a movable device for engaging the lower ends of the boards for moving them toward said first means and means for producing continual pressure against the boards toward said first means, substantially as set forth.

6. In a device for drying boards the combination of means for holding the boards in an upright position, a movable device for engaging the lower ends of the boards and moving them toward said first means and means for imparting to said movable device a continual tendency to move toward said first means, substantially as set forth.

7. In a device for drying boards the combination of means for holding the boards in an upright position, a movable device for engaging the lower ends of the boards for moving them toward said means and means for imparting motion to said movable device with gradually-increasing pressure, substantially as set forth.

8. In a device for drying boards the combination of means for holding the boards in an upright position, a movable device for engaging the lower ends of the boards for moving them toward said means, a pawl and ratchet for imparting motion to said device and a weighted lever for imparting motion to said pawl, substantially as set forth.

9. In a device for drying boards the combination of means for holding the boards in an upright position, a roughened flexible surface for supporting the lower edges of the boards and means for winding said surface past the lower edges of the boards toward said first means, substantially as set forth.

10. In a device for drying boards the combination of means for holding the boards in an upright position, an endless roughened belt engaging the lower edges of the boards, drums for supporting and moving said belt and means for rotating said drums, substantially as set forth.

11. In a device for drying boards the combination of means for holding the boards in an upright position, a screen for supporting the lower edges of the boards and means for supporting said screen and moving it toward said first means, substantially as set forth.

12. In a device for drying boards the combination of means for holding the boards in an upright position, a screen for supporting the lower edges of said boards, means for moving said screen toward said first means, and slats arranged under and supporting said screen at intervals throughout its length, substantially as set forth.

13. In a device for drying boards the combination of means for holding the boards in an upright position, a movable support for the lower edges of said boards movable toward said first means, a follower engaging said movable support and adapted to be moved thereby

for crowding the boards toward said first means, and means for moving said movable support, substantially as set forth.

14. In a device for drying boards the combination of means for holding the boards in an upright position, a movable support for the lower edges of the boards, a follower resting upon said support and adapted to move therewith and a weight flexibly connected with said follower for crowding it against the boards, substantially as set forth.

15. In a device for drying boards the combination of means for holding the boards in an upright position on one side, a follower adapted to engage the boards on the other side, a pull-rod engaging the lower edge of said follower for crowding the follower against the boards and a weight flexibly connected with the upper edge of the follower for moving the upper edge toward the boards, substantially as set forth.

16. In a device for drying boards the combination of means for supporting the lower edges of the boards, means for moving said support, a follower for holding the boards in

an upright position on said support and means for moving said follower with said first means, substantially as set forth.

17. In a device for drying boards the combination of means for supporting the lower edges of the boards, means for moving said support, a follower for holding the boards in an upright position on said support and means operatively connected with said supporting means and also disengageable therefrom, for moving said follower with said supporting means, substantially as set forth.

18. In a device for drying boards the combination of a support for the lower edges of the boards, a follower for holding the boards in an upright position on said support, belts connected with the ends of said follower for moving the same and means disengageably connected with said belt and support for moving the latter and said belt, substantially as set forth.

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Witnesses:

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