(No Model.) 4 Sheets—Sheet 1.

H. DANIELS.

LUMBER PILING MACHINE.

No. 461,323. Patented Oct. 13, 1891.

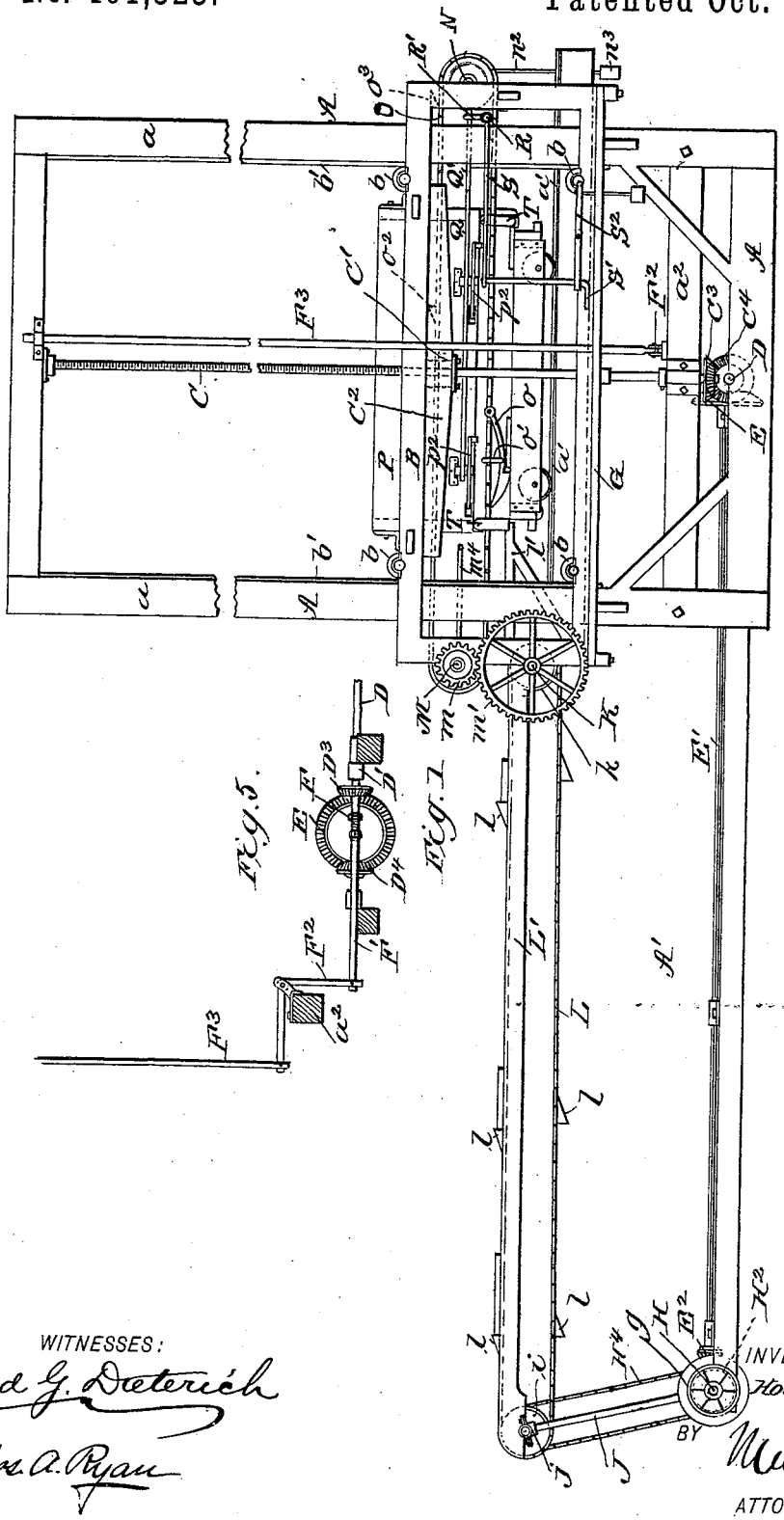

Fig. 5.

Fig. 1.

WITNESSES:

Fred G. Dieterich

Jos. A. Ryan

INVENTOR:

Howard Daniels.

BY Munn & Co

ATTORNEYS

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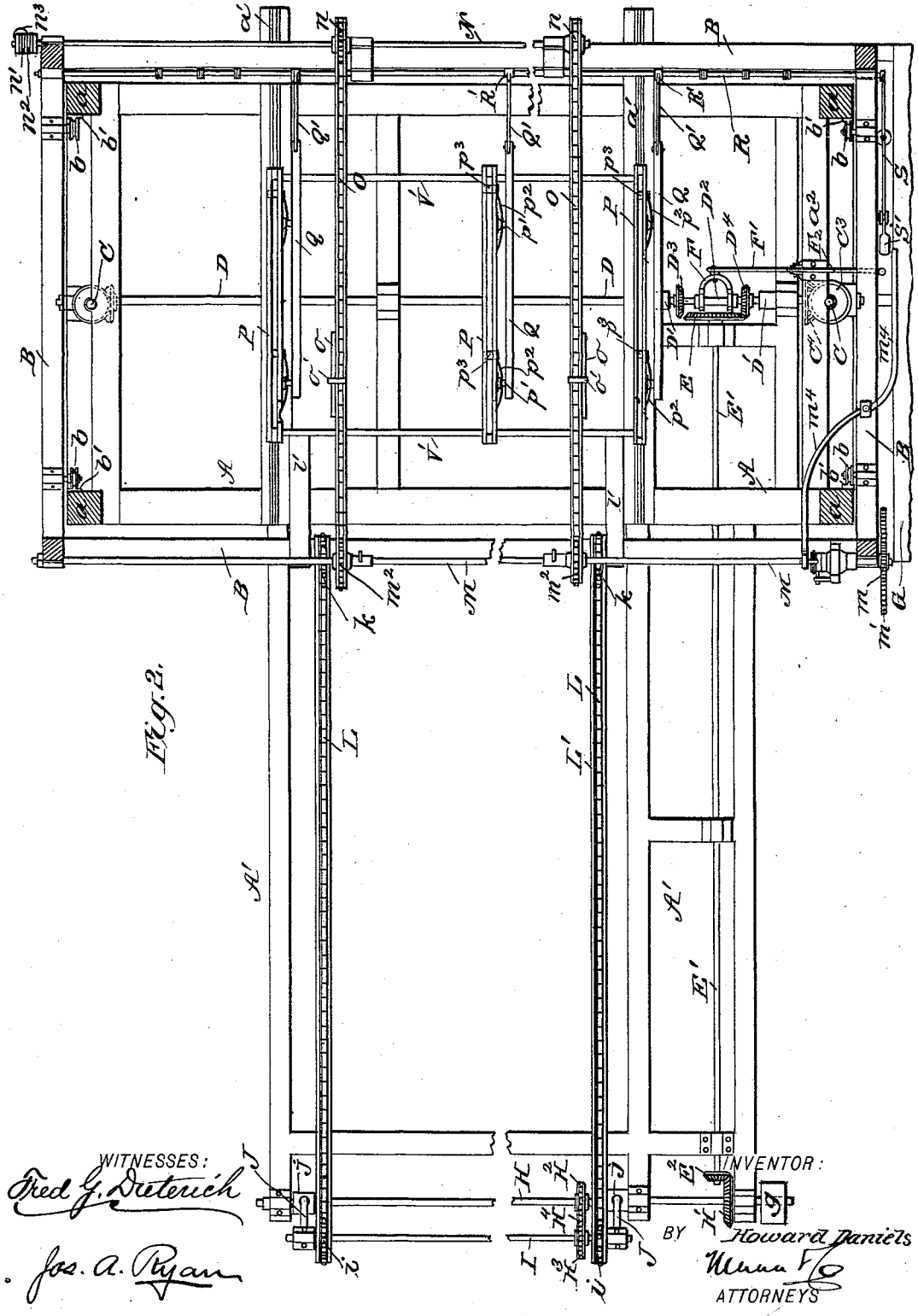

Fig. 2.

WITNESSES:
Fred G. Dieterich
Jos. A. Ryan

INVENTOR:
Howard Daniels
BY Munn & Co
ATTORNEYS

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H. DANIELS.

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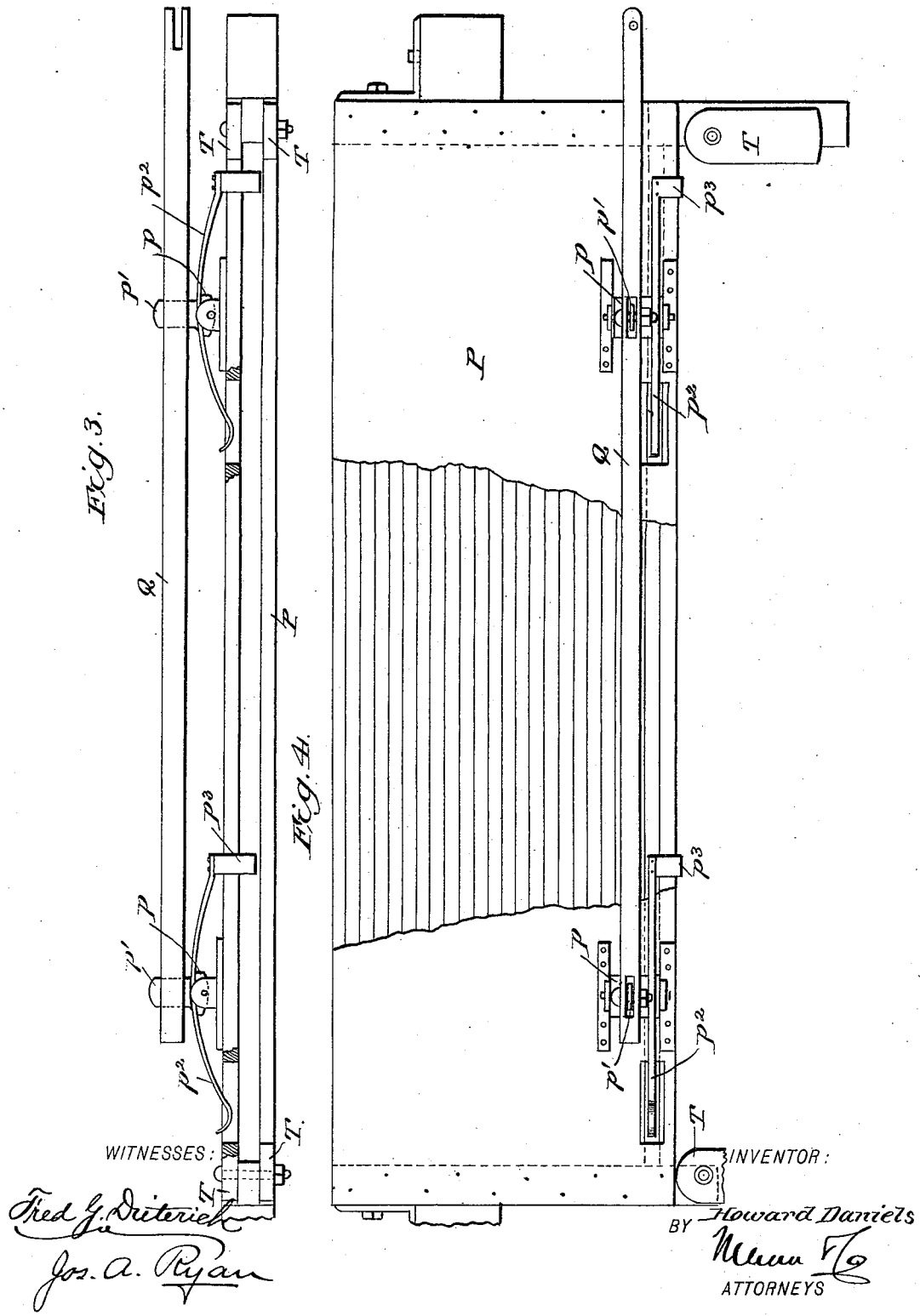

WITNESSES:

Fred G. Dieterich

Jos. A. Ryan

INVENTOR:

BY Howard Daniels

Munn & Co

ATTORNEYS

(No Model.)

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H. DANIELS.

LUMBER PILING MACHINE.

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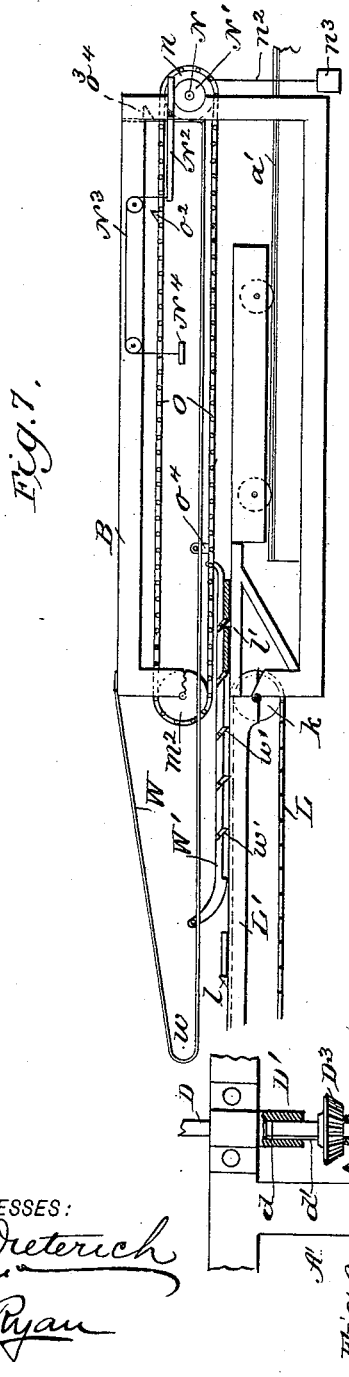

Fig. 7.

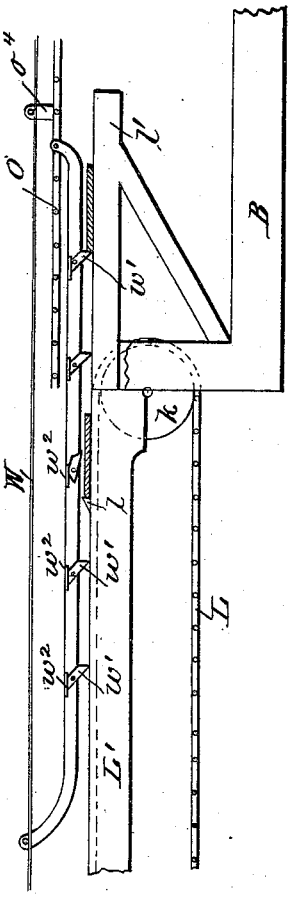

Fig. 8.

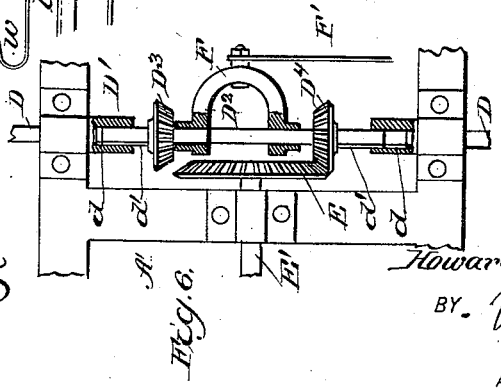

Fig. 6.

WITNESSES:

Fred G. Dieterich

Jos. A. Ryan

INVENTOR:

Howard Daniels

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

HOWARD DANIELS, OF GREENVILLE, SOUTH CAROLINA, ASSIGNOR OF ONE-HALF TO JAMES H. SIMONSON, OF FORT WAYNE, INDIANA.

LUMBER-PILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 461,323, dated October 13, 1891.

Application filed April 9, 1891. Serial No. 388,332. (No model.)

To all whom it may concern:

Be it known that I, HOWARD DANIELS, of Greenville, in the county of Greenville and State of South Carolina, have invented a new and useful Improvement in Lumber-Piling Machines, of which the following is a specification.

This invention relates to an improved machine for piling lumber on cars, preparatory to being dried in a kiln or otherwise.

The object of my invention is to construct a machine which shall quickly and evenly pile the lumber, depositing the separating-strips in a uniform manner, the machine requiring the attendance of a single operator to accomplish these results.

With this object in view my invention consists in the peculiar construction of the several parts, their novel combination or arrangement, all of which will be more fully hereinafter described and claimed.

In the drawings forming a part of this specification, Figure 1 is a side elevation of my improved machine. Fig. 2 is a top plan view. Fig. 3 is a top view of the strip-holding box. Fig. 4 is a side elevation of the same. Fig. 5 is a view of the gear-operating mechanism. Fig. 6 is an enlarged view of the gearing. Fig. 7 is a detail view of the lumber-hook-operating mechanism somewhat modified. Fig. 8 is an enlarged view of the modified form of hook.

In carrying out my invention I employ a main frame A, composed of the four uprights *a*, properly connected and braced at their upper and lower ends, and near the bottom of said frame are arranged the tracks *a'*, upon which the lumber-car is adapted to travel. The main frame A is essentially rectangular in shape, and surrounding the same is a vertically-movable rectangular frame B, said frame having wheels *b* journaled near the corners of the same, which wheels are arranged within the frame and adapted to travel upon the tracks *b'*, secured to the opposite inner sides of the four uprights. The movable frame B is thus adapted to be moved upon the main frame, and in order to operate said movable frame I employ the vertical threaded rods C, which work through the nuts C', said nuts being arranged in timbers C^2, rigidly secured to the opposite ends of the movable frame and forming a part thereof. The upper ends of the threaded shafts are journaled in the opposite upper cross-beams, the lower ends being journaled in cross-beams a^2, arranged near the bottom of the main frame and below the tracks *a'*. A horizontal gear C^3 is mounted upon the lower end of each threaded shaft, said gears meshing with the vertical gears C^4, mounted upon the ends of the horizontal shaft D, journaled in the bottom cross-beams of the main frame. The horizontal shaft D is divided near one end of the same, and upon the opposing ends of the divided portions are secured the collars D', the free ends of said collars being formed with a feather-groove *d*, and between the collars D' is interposed a shaft D^2, the ends of said shaft working in the collars D', the feather or spline *d'* sliding in the groove *d*, whereby the shaft D^2 will rotate with the divided portions of the shaft D, but have a longitudinal movement between the same.

Gear-wheels D^3 and D^4 are mounted upon the shaft D^2 near the ends of the same, and between the said gears D^3 and D^4 is arranged a gear E, said gear E being mounted upon the end of a shaft E', arranged at right angles to the shafts D' and D^2. The shaft E' is revolved by means hereinafter described, and as the gear E revolves the gears D^3 and D^4 are brought alternately into mesh with the same by moving the shaft D^2 longitudinally in the collars D', and in order to operate the said shaft I employ a yoke F, arranged between the gears D^3 and D^4, the shaft D^2 turning loosely in the members of the same. A pitman-rod F' is attached to the bow of the yoke, the opposite end of the rod being connected to an arm of an elbow-lever F^2, pivoted upon one of the cross-beams a^2, and connected with the said elbow-lever is a hand-rod F^3, said rod extending upward upon the exterior of the movable frame, its upper end being slidably attached to the upper portion of the main frame.

A platform G is secured to the lower portion of the movable frame adjacent to the hand-rod F^3, the operator standing on this platform to regulate the operations of the machine. It will now be seen that the hand-

rod is within easy reach of the operator and by moving the same up or down the gear D^3 or D^4 will be thrown into mesh with the wheel E, thus revolving the shafts D and D^2, the gears C^3 and C^4 and the screw C elevating or lowering the movable frame according to the direction the screw is turned, and it will of course be understood that the hand-rod may be moved and held at an intermediate position, when neither of the gears D^3 nor D^4 will mesh with wheel E and the movable frame or carriage will remain stationary.

A horizontal rectangular frame A′ is arranged upon one side of the main frame, the shaft E′ being journaled in the lower timbers of said frame, and upon the outer end of this shaft is mounted a gear E^2. A horizontal shaft H is also journaled in the bottom timbers of the frame A′ near the outer end of the same, said shaft being arranged at right angles to the shaft E′, and upon its outer end is provided with a drive-pulley *g*. A gear H′ is also mounted upon the shaft H, said gear meshing with the wheel E^2 and revolving the shaft E′, which operates to raise and lower the carriage. The shaft H is provided also with a sprocket-wheel H^2 intermediate its ends. A shaft I is arranged above the shaft H and parallel with the same, said shaft I being supported the proper distance from shaft H by means of the rods J J, said rods having journal-boxes *j j* at their ends, in which the shafts H and I revolve. The shaft I is also provided with a sprocket-wheel H^3, a belt H^4 connecting the wheels H^2 and H^3 and transmitting motion from the shaft H to the shaft I.

A horizontal shaft K is journaled at the side of the movable frame or carriage adjacent to the horizontal frame A′, and upon the said shaft are mounted the sprocket-wheels *k k*. Similar wheels *i i* are mounted upon the shaft I in alignment with the wheels *k k*, and over said wheels are passed the chain belts L, said belts running in grooved timbers L′, which connect the shafts I and K. The belts L are provided with cleats *l*, which catch the boards as they are deposited and carry them to the movable frame where they are deposited upon the drier-car in a manner hereinafter described, and it will be seen that as the movable frame, moves upward the shaft I will be moved inward toward the main frame, thus permitting the inner end of the belt to be moved upward with the frame or carriage. The timbers L′ support the weight of the boards, thus preventing breakage of the belt.

Brackets or supports *l′* are attached to the movable frame adjacent to the sprocket-wheels *k k*, said supports projecting inwardly and adapted to receive the boards as they are transferred from the belt preparatory to being deposited upon the car, and the heights of the supports are such that their upper faces are flush with the upper face of the car or layer of lumber held thereon.

Above the shaft K is journaled a shaft M, said shaft M carrying a pinion *m* upon one end, which meshes with a gear *m′*, mounted upon the end of the shaft K. The shaft M is divided near the pinion *m*, and is provided at that point with any preferred form of clutch mechanism, by means of which the major portion of the shaft M may be thrown in and out of operation. Sprocket-wheels m^2 are mounted upon the shaft M between the sprockets *k k*. A shaft N is journaled upon the opposite side of the movable frame in horizontal alignment with the shaft M, said shaft N having sprockets *n n* mounted thereupon in alignment with the sprockets m^2, and over the said sprockets are passed the chain belts O. The end of the shaft N is provided with a drum *n′*, which carries a rope n^2, and to the end of said rope is attached a weight n^3. The lower portions of the endless belts are provided with lumber-hooks *o*, said hooks having stops *o′* to prevent them dropping too low, and upon the upper portions of the belts are arranged the stops o^2, which are adapted to engage stops o^3, arranged in the upper portion of the movable frame, the purposes of which will appear further on. A hand-lever m^4 is connected with the clutch mechanism and extends within reach of the operator standing upon the platform.

The machine being in operation and lumber being placed upon the feed-belt, the boards will be carried up and deposited upon the brackets or supports, one of the boards being pushed under the lumber-hooks. The clutch mechanism is now out of gear and the stops o^2 and o^3 are in engagement with each other, the cord and weight operating to effect this result. The lumber-hooks are by this means forced over the brackets and by throwing the clutch into gear the sprockets m^2 are caused to revolve, moving the lumber-hooks away from the supports and over the car, and as the hooks engage a board it is carried back from the supports and deposited upon the car in any particular place, the cord carrying the weight having been wound upon the drum as the board was being placed. When the board has been properly placed upon the car, the operator throws the clutch out of operation and the cord and weight will return the lumber-hooks to their normal position, ready to catch another board, and by throwing the clutch in, this board is carried back and placed upon the car. These operations are continued until one layer of boards is placed upon the car, when the operator works the hand-rod, revolving the screws, and elevating the movable frame, ready for the next layer of boards. Before this layer is deposited, however, it is necessary to place a series of spacing-strips upon the layer previously laid. These strips I prefer to place by machine, as it can be done much more easily and accurately. In order to place the spacing-strips by machine I arrange the said strips in boxes P, any desired number of boxes being used, which boxes are suspended at a suitable height within the movable frame or carriage.

The boxes P are bottomless, and upon one side of each box, near its lower ends, are journaled casting-pieces p, each casting-piece having an outwardly horizontally-projecting lug p' formed thereon. A curved spring-arm p^2 is secured to each casting-piece below the lug p', one end of said arm having a downwardly-curved finger p^3 attached thereto, said fingers extending beneath the box and adapted to support the strips held within said box. The side of the box adjacent to the opposite end of the spring-arm is cut away to allow the said end to bear against the next lowest strip held within the box. The lugs p' are connected by a pitman Q, said pitman having a link-rod Q′ attached thereto, and upon the side of the movable frame is pivoted a rock-shaft R, having lever-arms R′, to which the link-rods Q′ are attached. A lever S is attached to the end of the rock-shaft, said lever being connected with a treadle S′, and connected with said treadle is a weighted lever S^2. By depressing the treadle S′ the lever S is operated, rocking the shaft P, and by working the lever-arms R′, link-rod Q′, and pitman Q the spring-arms p^2 are operated, throwing the fingers out from beneath the lowest strip and binding the opposite end of the spring-arm against the next lowest, holding said strip in the box until the fingers are again placed beneath the box, ready to catch the strip as it drops when the binding-end is released. The moment the treadle is released of the pressure the weighted lever will throw the parts to their normal positions. As the treadle is operated by foot, the strips may be deposited while the carriage is being raised.

In order to deposit the strips with accuracy I employ guides T, attached to the lower corners of the box, the guides at the end adjacent to the brackets or supports being pivoted to allow the boards to pass under, while at the opposite end a swinging guide is pivoted to the rigid piece extending below the top of the car. This pivoted guide hangs in a vertical position until the first board of the course is placed. Placing the board swings it out of vertical. The weight of board then holds that end of the strip.

By means of the guides T, I am enabled to deposit the separating-strips exactly in vertical alignment with the strips previously laid.

The machine can be regulated to suit the capacity of the mill by increasing or decreasing the number of lugs on the feed-chain.

In the drawings I have shown a construction by means of which an entire layer of boards may be deposited upon the car at one time, and also a construction which prevents the chain sagging as it moves back and forth over the car.

Referring to the drawings, W indicates iron bars bent upon themselves at w and secured at their ends to the movable frame B, as clearly shown, the lower portion of said rods extending entirely across the movable frame, and upon said lower portions are supported the hangers O^4, which are connected with the chain belts O, and by this means the chain is prevented sagging as it moves back and forth over the car. Parallel bars W′ are pivoted to the chain belts in the same maner as the lumber-hooks, said bars extending out beyond the movable frame and are curved upwardly at their forward ends to pass freely over the boards held upon the conveyer-belt. A series of dogs w' are pivoted to the bars W′, said dogs being adapted to engage the boards, and above each dog the bars are formed with flanges w^2, against which the upper ends of the dogs engage when bound against the boards. The forward ends of the bars W′ extend above the lower portions of the rods W, and carry at their said ends pins which play upon the said rods, thus guiding the bars in their reciprocation. The end of the shaft N adjacent to the operator is extended beyond the movable frame B and upon said end is mounted a wheel N′ and pivoted to the side of the said movable frame is a brake-lever N^2, which is held upon the wheel N′ by means of the cord N^3 and weight N^4. The weight N^4 is of such size that it will prevent the weight n^3 unwinding the cord from the drum n', so that when the clutch used in moving the hooks is released belts will not be drawn back but remain stationary. The weight required at N^4 is not heavy and hangs in reach of the operator as he stands on the operating-platform, and when it is desired to run the hooks backward a slight force applied under the weight N^4 with the hand will allow them to do so.

The manner of operation is as follows: The bars W′ being in operation, so that the stops O^2 and O^3 are in contact and the first pivoted dog (counting from the right) is over the place of delivery on the receiving-brackets, the feed-chains shove the board along under all the dogs and in front of the first one. The clutch mechanism being applied, the bars are drawn toward the car far enough for the second dog to receive the second board, and the brake N^2 holds them in that position. When the second board has been received, they are moved forward to receive the third, and so on until the bars are full, when the whole course is drawn onto the car. The operator now lifts the weight and the hooks go back for another course. While the course is being collected the frame B can be raised and the separating-strips placed ready to receive it by the time is is ready to be placed onto the car.

Having thus described my invention, what I claim as new is—

1. The combination, with the main frame A and horizontal frame A′, of the vertically-movable frame or carriage, the shaft K, journaled at the side of the said frame or carriage, the shaft I, having bearings pivotally connected with the frame A′, the belt L, and gearing devices for operating the said belt and the movable frame or carriage, substantially as shown and described.

2. The combination, with a shaft mounted in pivotal bearings, of a vertically-movable frame, a shaft mounted thereon, an endless belt connecting the shafts, and grooved timbers also connecting the shafts and in which the belt runs, substantially as and for the purpose set forth.

3. The combination, with a main frame adapted to receive a car, of a vertically-movable frame adapted to travel on the main frame, the supports thereon adapted to receive the lumber, and a raking device on the movable frame adapted to rake the boards off the supports and place them upon the car, substantially as shown and described.

4. The combination, with a main frame adapted to receive a car, of a support adapted to receive the boards preparatory to being deposited upon the car, a chain carrying lumber-hooks adapted to be moved back and forth over the supports and car, and means for operating the chain, substantially as shown and described.

5. The combination, with a main frame adapted to receive a car, of a vertically-movable frame adapted to travel upon the main frame, the adjustable feed-belt, the supports, the endless belt carrying the lumber-hooks, stops for limiting the movements of said belt, and means for operating the belts, substantially as shown and described.

6. The combination, with the vertically-movable frame, of the guide-rods secured thereto, the chain belts, and the hangers connecting the chain belt and guide, substantially as shown and described.

7. The combination, with the vertically-movable frame, of the belts mounted thereon, the parallel bars secured to said belts, the series of dogs pivoted to the said bars, and the flanges arranged above the said dogs, substantially as shown and described.

8. The combination, with the movable frame, of the chain belts, guide-rods, hangers, parallel bars, dogs pivoted thereto, and the flanges, all arranged substantially as shown and described.

9. The combination, with the bottomless box, of the casting-pieces pivoted near the lower ends of the same, the spring-arms attached to the casting-pieces, one end of said arm carrying a finger adapted to extend beneath the box and the other end adapted to engage a strip, a pitman connecting the casting-pieces, and means for operating the pitman, substantially as shown and described.

HOWARD DANIELS.

Witnesses:
THOS. L. WOODSIDE,
GEO. B. THRUSTON.