

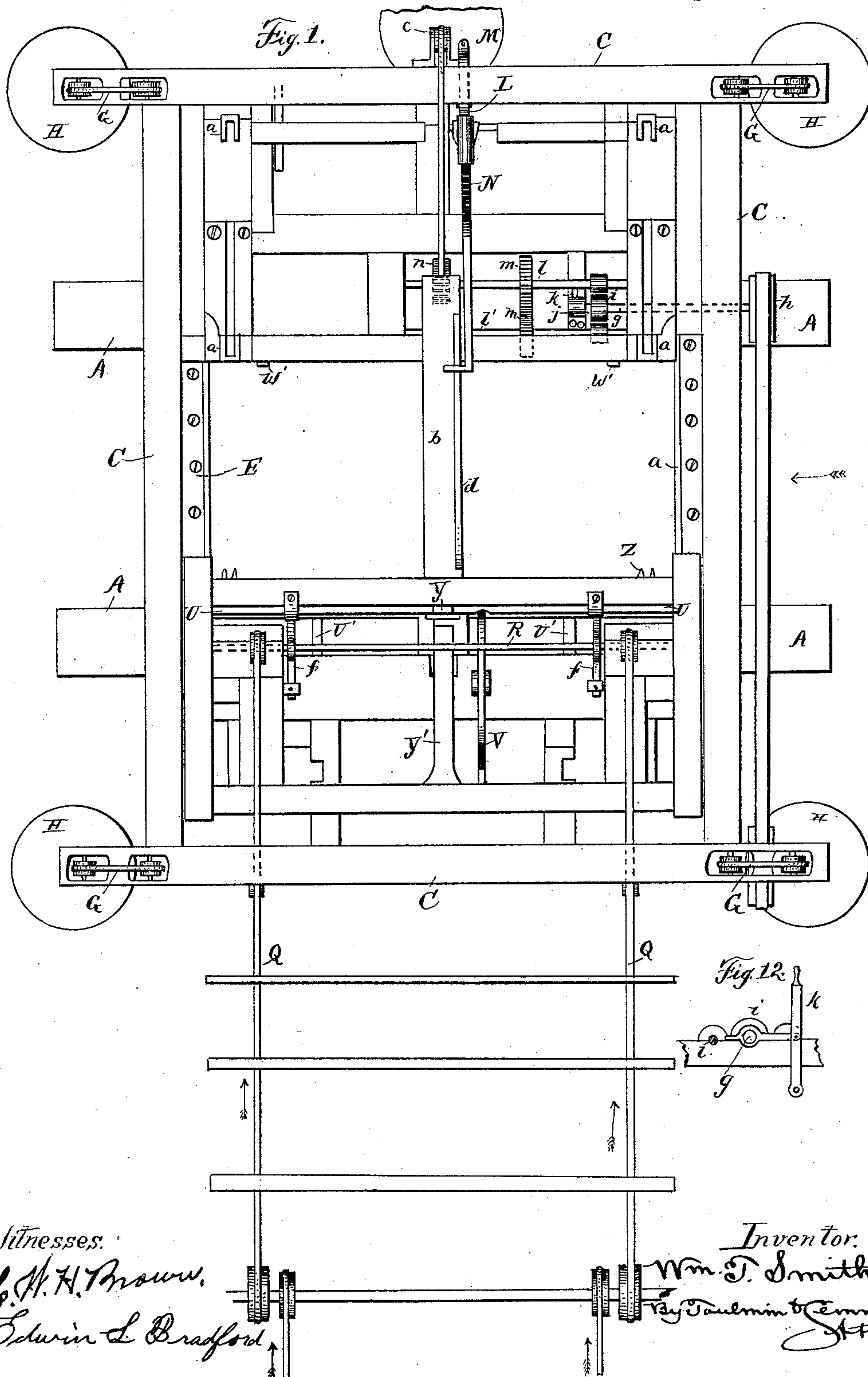
(No Model.)

4 Sheets—Sheet 1.

W. T. SMITH.
LUMBER STACKER.

No. 304,760.

Patented Sept. 9, 1884.



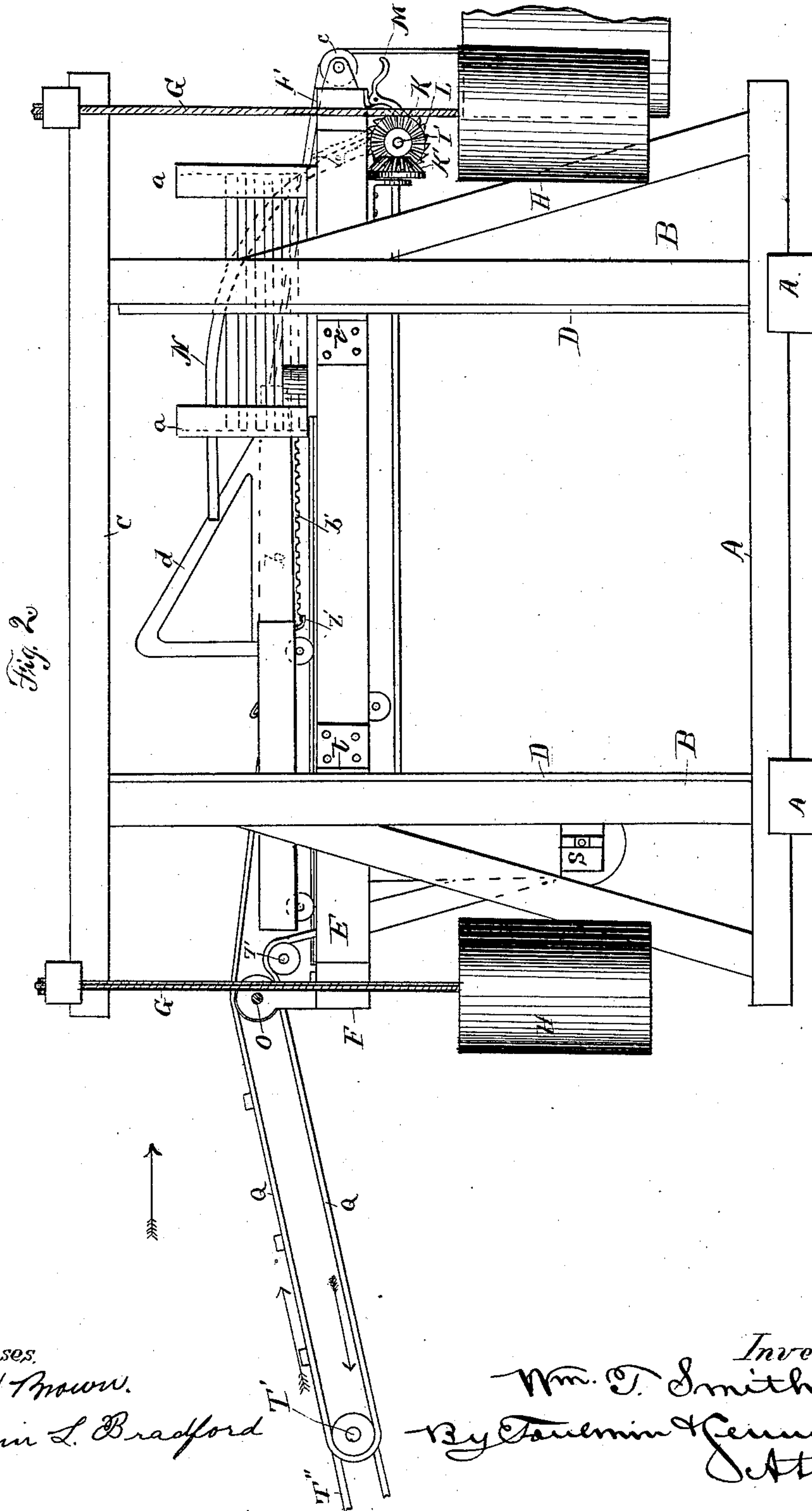
(No Model.)

4 Sheets—Sheet 2.

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Witnesses:

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Edwin L. Bradford

Inventor:

Wm. T. Smith.

By T. L. Smith & Co.
Attys.

4 Sheets—Sheet 3.

No. 304,760.

Patented Sept. 9, 1884.

Fig. 3.

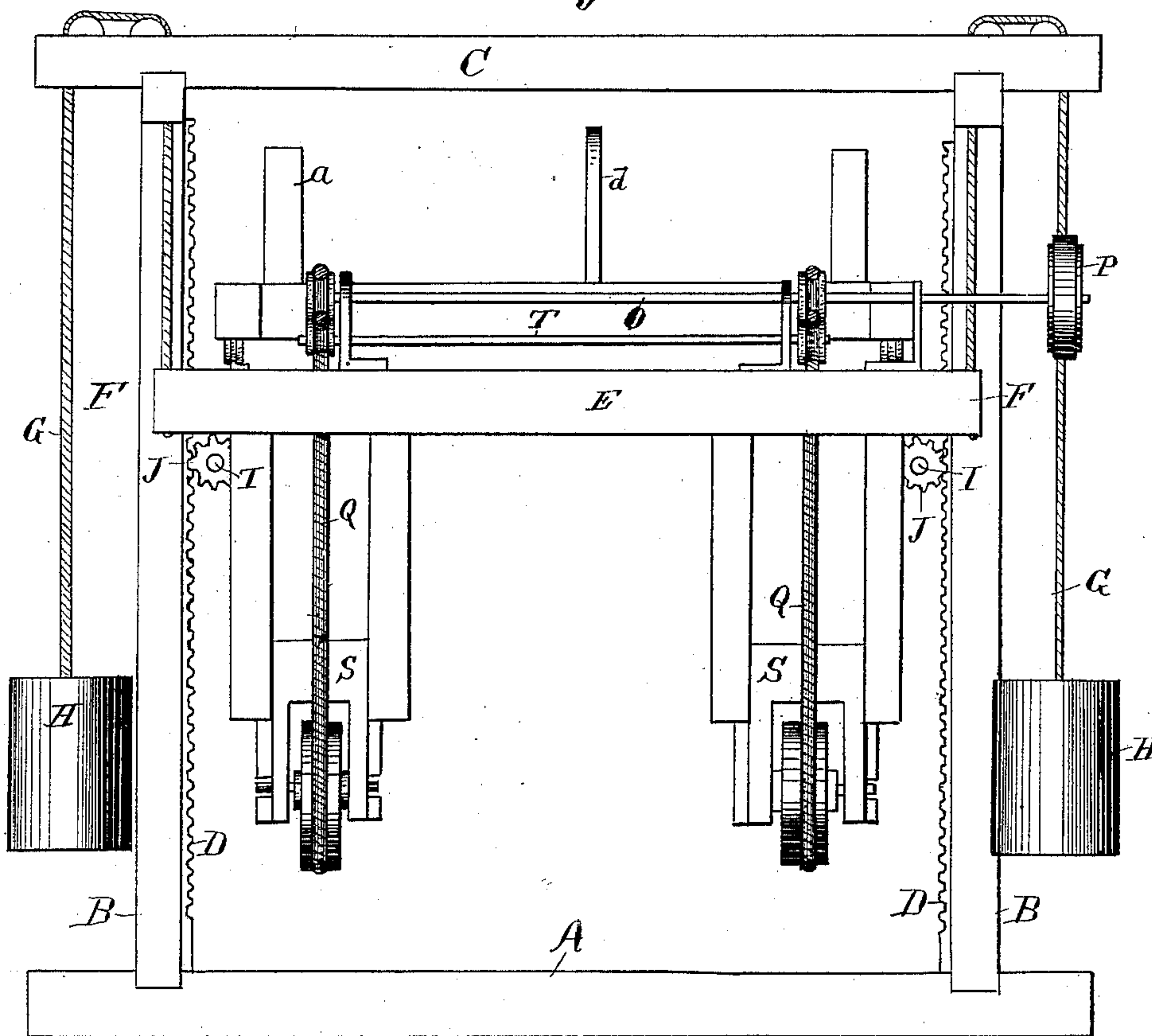


Fig. 4.

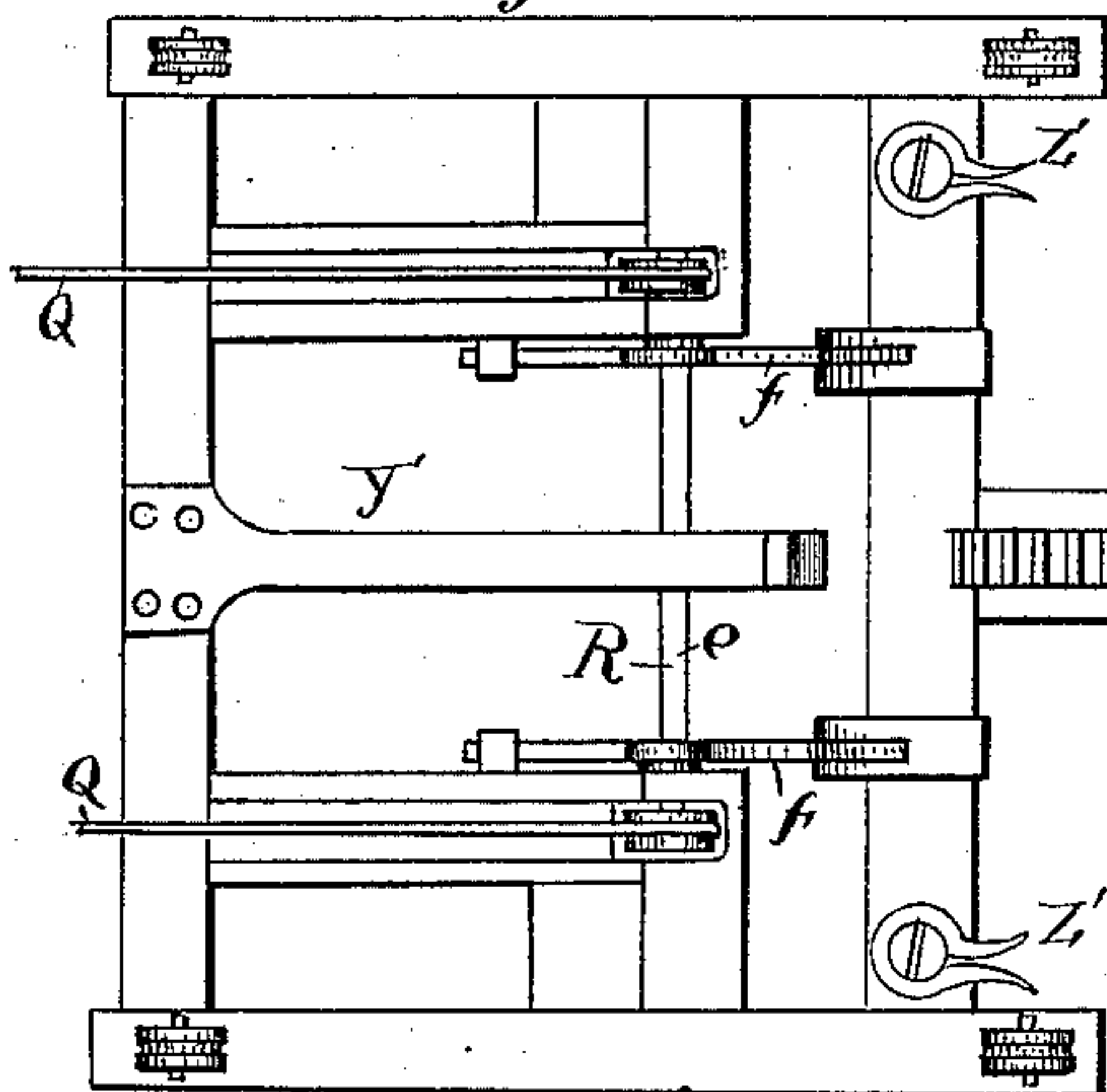
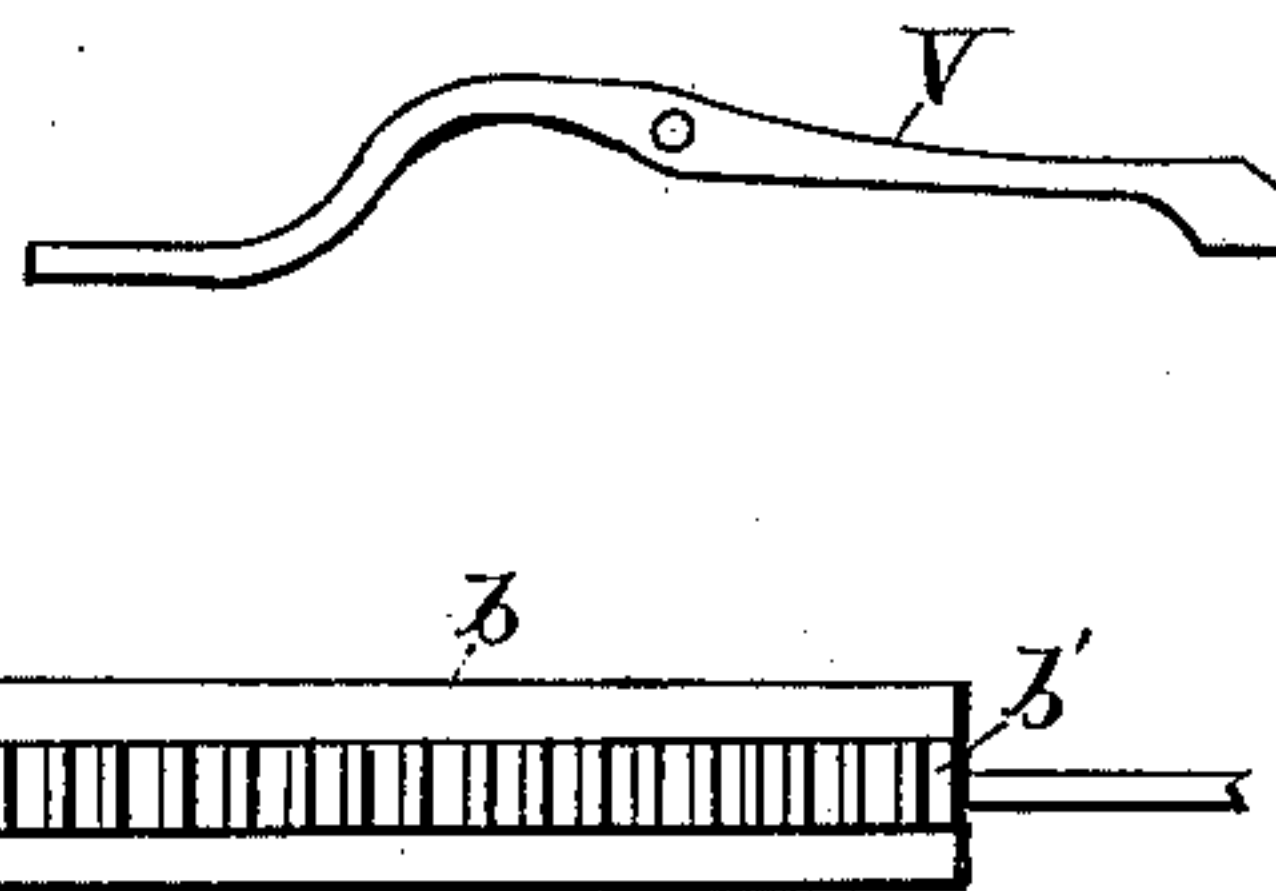


Fig. 7.



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(No Model.)

4 Sheets—Sheet 4.

W. T. SMITH.
LUMBER STACKER.

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Fig. 5.

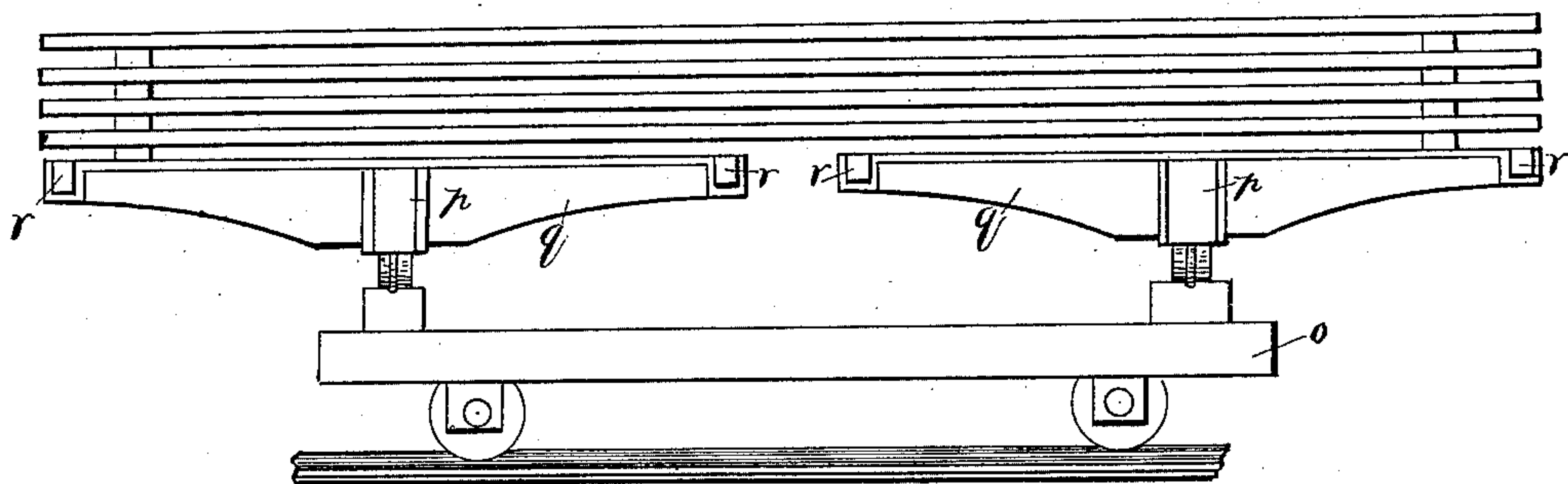


Fig. 8.

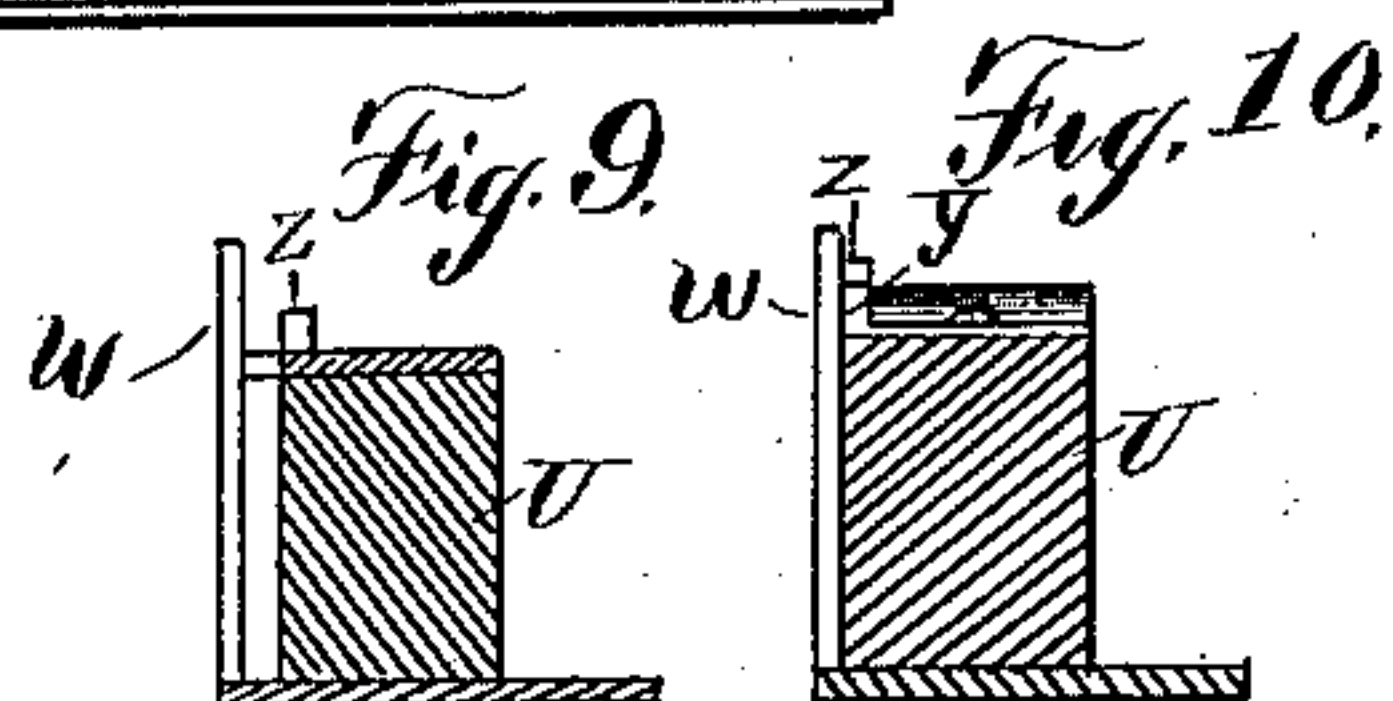
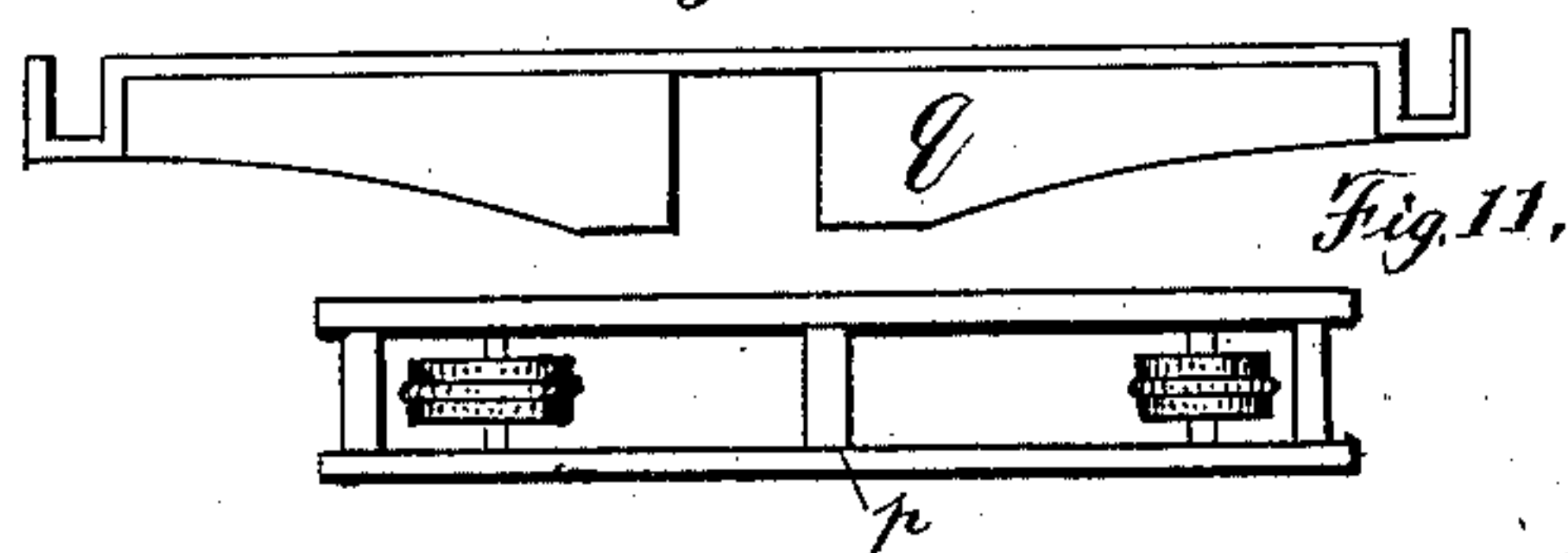
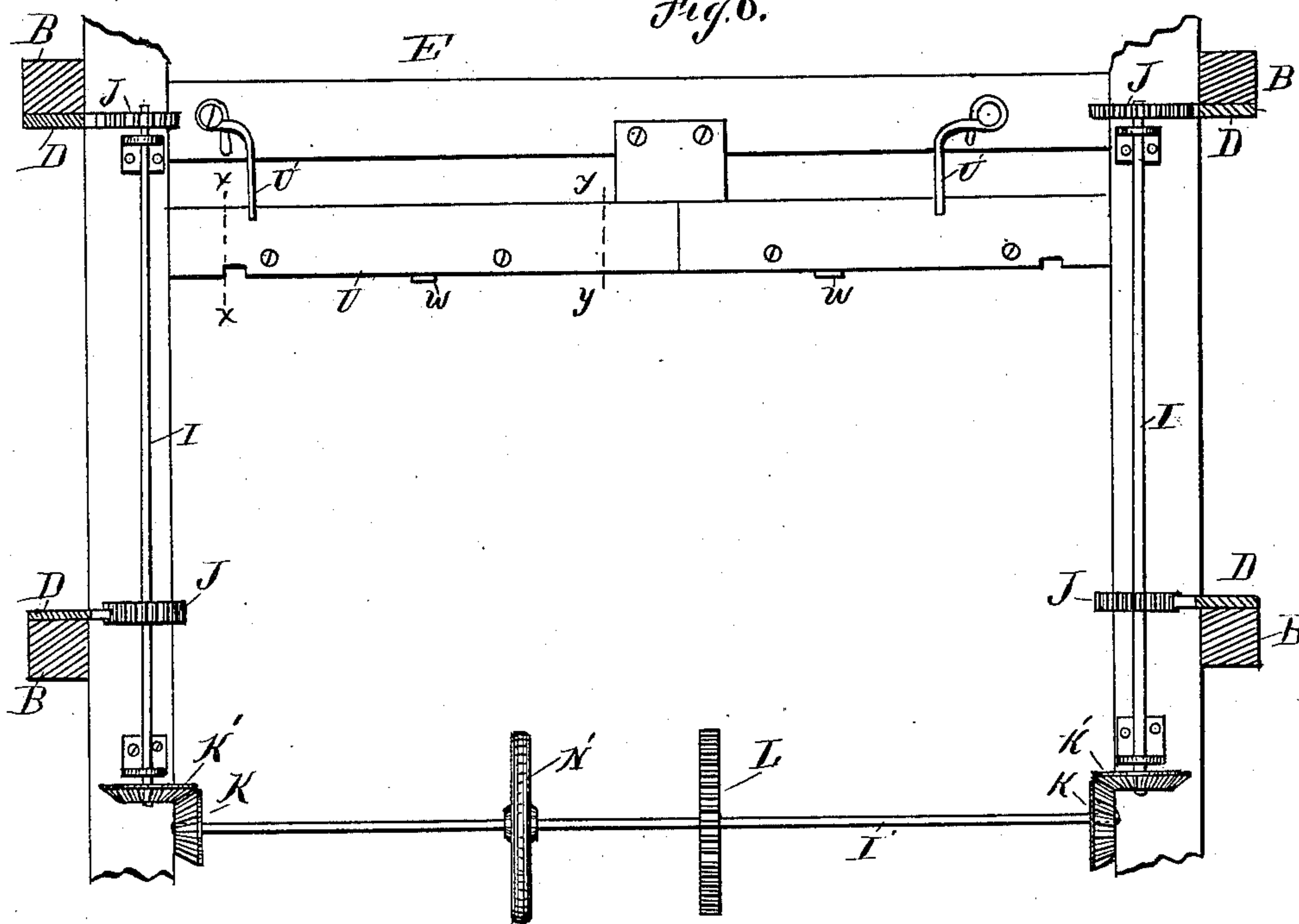


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM T. SMITH, OF BOZEMAN, ALABAMA.

LUMBER-STACKER.

SPECIFICATION forming part of Letters Patent No. 304,760, dated September 9, 1884.

Application filed July 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM T. SMITH, a citizen of the United States, residing at Bozeman, in the county of Autauga and State of Alabama, have invented certain new and useful Improvements in Lumber-Stackers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in machines for elevating and stacking lumber; and it has for its objects, first, to provide means whereby the lumber as it comes from the trimming-machine
15 may be carried forward, so as to be operated upon by the mechanism described in the second object of my invention; second, to provide means whereby the lumber may be properly stacked and the usual interposed sticks
20 or strips of board laid upon the respective layers of lumber; and, third, to provide mechanism whereby the respective portions of the machine, which, co-operating together, effect the stacking of the lumber, may be elevated
25 as each layer is completed, so that the machine itself and the uppermost layer of lumber will be on or about the same horizontal plane.

In carrying out the first object of my invention, I construct endless belts or chains running under idlers, to take up any lost motion, on which the lumber falls as it comes from the trimming-machine, and is conducted to the mechanism, which deposits it in layers.

35 In carrying out the second object of my invention, I provide a movable carriage adapted to travel in a horizontal plane across the upper face of the machine, having endless chains extending over and under it, which are given
40 motion by means of a shaft situated in the front of the machine. These chains carry the boards, and, as the carriage travels from the rear toward the front of the machine, cause the boards to be deposited side by side across
45 the pile of lumber. At the same time the movable carriage at the commencement of its travel, by means of suitable fingers, grasps and draws across the pile the strips used in stacking.

50 In carrying out the third object of my invention, I provide the respective standards of

the frame of my machine with rack-bars, which are acted upon by cog-wheels situated beneath the traveling frame, and when motion is imparted to said wheels the traveling frame
55 itself moves in a vertical plane, either up or down, as desired.

In the accompanying drawings, forming a part of this specification, and on which like letters of reference indicate the same or corresponding features, Figure 1 represents a plan view of my invention, showing also the belts which convey the boards from the trimming-machine; Fig. 2, a side elevation of the same, looking in the direction of the arrow in Fig. 1; Fig. 3, a front view of the machine, looking in the direction of the arrow in Fig. 2; Fig. 4, an inverted plan view of the movable carriage. Fig. 5 is a view of the truck used in stacking the lumber; Fig. 6, an inverted
60 plan and sectional view of the machine, showing the rack-bars, shafts, and gear-wheels used for raising and lowering the machine; Fig. 7, a view of the dog for firmly holding the tumbling-bar in an upright position; Fig. 8, a side
65 elevation of the detachable end of the truck; Fig. 9, a cross-sectional view of the tumbling-bar, taken on the line X X of Fig. 6; Fig. 10, another cross-sectional view of the same, taken on the line Y Y of Fig. 6; Fig. 11, a
70 detached view of the central portion of one of the smaller trucks, and Fig. 12 a detached view of the friction mechanism and co-operating shafts.

The letter A designates the main frame of
85 my machine; and it consists of two or more bed-pieces, in which are mortised or otherwise secured four uprights or standards, B, the same being connected together at their upper and lower ends by cross-pieces C. The uprights
90 B, as seen in Figs. 4 and 6, are provided on their inner sides with rack-bars D, which extend nearly the whole length of the uprights.

The letter E refers to the traveling frame, its outer ends, F F, being attached to ropes or
95 chains G, extending upwardly and passing over pulleys in the top cross-pieces of the main frame, said ropes being provided on their free ends with weights H, so as to balance the
100 heft of the traveling frame. The frame is also provided with guides *t*, for the purpose of guiding its up and down movement (to be

presently described) in the main frame. On the under side of the frame, as seen in Figs. 2, 3, and 6, extending along both sides of the machine, are shafts I, having cog-wheels J, which intergear with the rack-bars, and on the under side of the rear of the machine is a similar shaft, I', provided with miter-wheels K at each end, which engage miter-wheels K' on the ends of the shafts I. This shaft I', about its center, is provided with a ratchet-wheel, L, and the frame just above it with a detent, M, adapted to engage the ratchet-wheel and hold it.

Loosely attached to the shaft I, and embracing the ratchet, is a lever, N, having its lower extremity bifurcated, so as to fit over the ratchet-wheel, and provided just above the bifurcation with a detent, which is also adapted to engage the teeth of the said ratchet-wheel. Now suppose the frame to be at its lowest position and it is desired to elevate it; the lever N is thrown toward the rear of the machine, and the detent thereon engaging the ratchet-wheel moves it one tooth. The ratchet-wheel, being rigidly secured to the shaft I', moves that shaft, and its miter-wheels, engaging the miter-wheels of the shafts on the sides of the machine, operate their respective shafts, and their cogs, in turn engaging with the rack-bars, move one tooth on said bars, thus elevating the frame the distance of one tooth. As the frame is balanced, or nearly so, by the weights H, it will be seen that the labor required to move the shafts, as above described, is comparatively trifling. Should it be desired to elevate the frame more than one tooth, it is only necessary to again move the lever, when the same operation is repeated.

I have provided a hand-wheel on the shaft I', which, should it be necessary, may be used to assist in elevating and depressing the traveling frame.

The shaft O, journaled in bearings secured to the traveling frame, as seen in Fig. 3, is given motion, by means of steam or other power, through the medium of the belt passing over the pulley P. The function of this shaft is to drive the belts or chains Q, on which the boards are laid, as they come from the trimming-machine. These belts or chains pass over the shaft O to the pulleys on the shaft R of the movable carriage, as seen in Fig. 1; thence over pulleys on the upper surface of the traveling frame; thence down and under the weighted idlers S, sliding in depending brackets over the pulleys mounted on the supplemental shaft T; thence over the shaft T' back to the shaft O.

It is to be observed that the shaft T' forms a portion of the trimming-machine, its purpose being to impart motion to the chains or belts T'' of that machine, and also to assist in giving motion to the belts Q, which take the boards from the belts T'' and transport them to my stacking-machine.

I propose to place the trimming-machine at a point about one-half the height of the pile

of lumber to be stacked, so that when the pile is commenced the chains or belts will slightly descend, and as the pile grows higher they will ascend with the traveling frame.

The letter U, as seen in Fig. 6, refers to the tumbling-bar; and it consists of a bar pivotally mounted in the sides of the traveling frame, and it is provided on its under side with strips, preferably of metal, extending beyond the edge of said bar and toward the front of the machine.

Secured to the under side of the traveling frame are springs U', which overlap the strips just mentioned, the function of which springs is to hold the tumbling-bar in its normal position. To the rear side of the bar, as seen in Figs. 9 and 10, are attached metallic strips W, similar to the strips W' on the opposite portion of the traveling frame, the purpose of which is to guide the boards as they are laid down and keep the sides of the pile which is being made straight. The side of this bar near its ends is provided with a groove across its face, as is also that portion of the traveling frame which is situated opposite, the purpose of which is to guide the strips as they are laid upon the boards. The top of this bar is provided at its center with a tumbler, Y, adapted to be engaged by a catch, Y', attached to the carriage, and at or near its ends is provided with upwardly-projecting lugs Z, which pass between the fingers Z', attached to the carriage. The upper side bars of the traveling frame for the greater portion of their length are provided with tracks on which the carriage runs, said carriage having its side beams on their under side provided with rollers.

As seen in Fig. 1, there is a dog, V, pivotally mounted on the traveling frame, the purpose of which is to arrest the motion of the tumbling-bar toward the front of the machine when the carriage is moving in that direction.

Mounted on the rear portion of the traveling frame, and on each side thereof, are two oppositely-disposed pockets, a, extending in an upward direction, the office of which is to hold the strips, as seen in Fig. 2, which are laid between each successive layer of lumber, the lower portion of the pockets facing the front of the machine being cut away, so as to allow of the entrance of the fingers on the tumbling-bar when they reach for the strip.

The carriage, as already observed, runs on tracks on the traveling frame, and its rear portion is attached to a beam, b, as seen in Fig. 4, the under side of which is provided with a rack-bar, b', and to the extremity of the said beam is secured a rope or chain, which passes over a pulley, as seen at c, on the rear of the machine. The free end of this rope is attached to a weight, so as to counterbalance the weight of the carriage and draw it toward the rear of the machine.

To the beam b is also secured an incline, d, whose office is to raise the lever N as it passes toward the rear of the machine, which raising of the lever, as before observed, causes the

detent thereon to engage the ratchet-wheel on the shaft I' and throw into action the devices which elevate the traveling frame, so that at the time the carriage passes toward the rear end of the frame, to begin the laying of another layer of the lumber, the machine is elevated sufficiently to admit of the laying of such layer. The carriage is provided near its rear end, just in the rear of the beam *b*, with a shaft, R, having pulleys, over which pass the belts or chains for carrying the boards. This shaft has loosely mounted thereon, at each end, the lever-arms *f*, weighted at one end, so as to nearly balance the weight of the board, which, when it reaches the curved portion, overcomes this weight and drops upon the pile beneath, said curved portion dragging upon the top of the pile of lumber.

Journalled in bearings in the rear portion of the traveling frame is a shaft, *g*, provided on one end with a pulley, *h*, and near the other with a friction-pulley, *i*. The inner bearing, *j*, of this shaft is provided with a lever, *k*, and the bearing itself is capable of a slight lateral movement, the object of which will presently appear. On each side of this shaft are the shafts *l l'*, the same being provided with pulleys opposite the friction-pulley *i*, and with cog-wheels *m m*, adapted to intergear with each other, the one on the shaft *l* being of larger diameter than the other, so that it will impart a slower motion to the shaft *l'* when the wheels intergear. The shaft *l* is further provided with a cog-wheel, *n*, which engages the rack-bar on the beam *b*. The belt passing over the pulley *h* is twisted, so as to cause the pulley to travel toward the front of the machine.

The operation of my invention is as follows:
The truck (to be presently described) being run under the traveling frame, and motion being given to the shaft T', the shaft O, through the belts Q, is caused to revolve, and the pulley P, through the medium of the belts Q', imparts motion to the pulley *h*, that pulley, the belt being twisted, revolving toward the front of the machine. The operator, by means of the lever *k*, throws the friction-pulley *i* against a similar pulley on the shaft *l*, and turns that shaft in a rearward direction, and this shaft, through the cog *n*, assists the weight in rapidly moving the carriage toward the rear of the machine. This operation takes but the space of a moment or two. As soon as the carriage reaches its farthest rearward point, the operator reverses the lever *k* and throws it against the pulley on the shaft *l'*. This turns that shaft toward the rear of the machine, and the cogs *m m*, intergearing, cause the cog *n* on the end of the shaft *l* to intergear with the rack-bar on the beam *b* and move the carriage toward the front of the machine. The small cog on the shaft *l'* causes that shaft to revolve slowly, and as the carriage moves toward the front of the machine the boards on the belts Q are dropped, one

after the other, at regular distances, across the pile of lumber. The catch Y on the carriage engages the tooth on the tumbling-bar and draws that bar toward the front of the machine; but as it continues its movement it releases the bar and deposits the last board (which in the act of laying has fallen on the metallic strips on the bar when said bar was out of normal position) on an even edge with the side boards of the pile beneath. The carriage having now reached its farthest point in a forward direction, the operator throws the lever, so that the pulleys on the shafts *g* and *l* will again become engaged, and the operation, as above described, is repeated.

The truck illustrated in Fig. 5 consists of a rectangular frame, *o*, mounted on axles provided with wheels, so as to run a track placed over the bed-pieces of my machine. This lower truck is provided with two smaller trucks, running, respectively, upon parallel opposite cross-pieces of the frame *o*, and the lumber is deposited by the machine across these smaller trucks.

I shall now describe one of the smaller trucks. As seen in Fig. 11, it consists of a central portion, *p*, and the end pieces, *q*. The central portion is composed of side beams having interposed strips at their ends and at the middle, suitably attached to the said beams, and at each side of the middle strip, journaled into the beams, are wheels provided with grooves adapted to run upon tracks on the lower frame. As shown in Fig. 8, the end pieces are slotted, so as to fit over the central portion of the truck just described, and the extremities of the end pieces terminate in brackets adapted to hold the bars *r*, which connect the respective end pieces together, and on which and the central portion the lumber rests as it is deposited from the machine. It will be observed that by this arrangement the lumber has a number of bearings upon which to rest, and the weight is thus more evenly distributed.

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

1. In a lumber-stacker, the combination, with the uprights provided with rack-bars, of the traveling frame provided with shafts having cog-wheels, and means to lock and unlock said cog-wheels, and the counterbalance-weights, whereby the traveling frame is balanced.

2. In a lumber-stacker, the combination, with the traveling frame, of the chains weighted at their free ends, whereby the traveling frame is balanced.

3. In a lumber-stacker, the combination, with the traveling frame capable of an up and down movement, of the carriage provided with rollers and means to move said carriage.

4. In a lumber-stacker, the combination, with the traveling frame provided with a shaft and pulleys, and the carriage provided with

a shaft and pulleys, of an endless chain or apron adapted to pass over said pulleys and carry the boards.

5 5. In a lumber-stacker, the combination, with the traveling frame provided on its sides with tracks, of the carriage provided on its under side with rollers, and means to move said carriage.

10 6. In a lumber-stacker, the combination, with the traveling frame provided with a shaft and pulleys, and the carriage provided with a shaft and pulleys, of an endless chain or apron adapted to pass over said pulleys and carry the boards, and an idler or idlers.

15 7. In a lumber-stacker, the combination, with the traveling frame provided with brackets having idlers loosely mounted therein, of a chain or chains passing over said idlers and adapted to carry the boards.

20 8. In a lumber-stacker, the combination, with the traveling frame provided with pockets to hold the sticks or strips, of the fingers to grasp the strips and lay them upon the layer of lumber.

25 9. In a lumber-stacker, the combination, with the carriage provided with an incline, and the traveling frame, of the lever adapted to ride upon said incline and operate the means to elevate the traveling frame.

30 10. In a lumber-stacker, the combination, with the traveling frame and its shafts, one of which is provided with a ratchet-wheel, of a lever provided with a detent adapted to engage the ratchet-wheel and hold the shafts.

35 11. In a lumber-stacker, the combination, with the uprights having rack-bars and the traveling frame provided with shafts and cog-wheels adapted to engage the rack-bars, of the guides to direct the traveling frame in its
40 movements.

12. In a lumber-stacker, the combination, with the traveling frame and the carriage adapted to move thereon, and provided with a catch, of the tumbling-bar pivotally mounted in the traveling frame, and provided with a
45 tooth adapted to be engaged by the catch.

13. In a lumber-stacker, the combination, with the tumbling-bar having a tooth and pivotally mounted in the traveling frame, and
50 the carriage capable of a movement on said frame, and provided with a catch, of the springs secured to the traveling frame and

adapted to be engaged by the tumbling-bar to throw said bar into normal position when the catch releases the bar.

14. In a lumber-stacker, the combination, with the tumbling-bar provided with lugs, of the carriage provided with fingers to grasp the strips, whereby as the carriage reaches the side of the pile of lumber the lugs free
60 the grasp of the fingers upon the strips.

15. In a lumber-stacker, the combination therewith of a strip-layer constructed to lay the strips upon each successive tier of lumber.

16. In a lumber-stacker, the combination, with the traveling frame provided with pockets, and guides to direct the strips, of the tumbling-bar provided with guides to act in conjunction with the guides on the traveling
70 frame.

17. In a lumber-stacker, the combination, with the main frame and the traveling frame, of a truck adapted to enter beneath the traveling frame and receive the lumber as it is deposited therefrom.

18. In a lumber-stacker, the combination, with the main frame, of a truck consisting of a frame provided with wheels, and having its upper sides grooved, and two smaller trucks adapted to run in the grooves, the said smaller trucks being provided with end pieces having
80 suitable connecting-bars, whereby a greater bearing-surface is presented to the lumber, and the pressure thereof more evenly distributed.

19. In a lumber-stacker, the combination, with the traveling frame capable of an up and down movement, of the carriage capable of a reciprocating movement, and means to operate the carriage.

20. In a lumber-stacker, the combination, with the traveling frame constructed to hold the sticks or strips, of the carriage capable of reciprocation, and provided with strip-graspers constructed to grasp the strips and lay
95 them upon the lumber, and means to disengage the graspers from the strips, whereby the strips are laid upon the lumber.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM T. SMITH.

Witnesses:

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