(No Model.)

6 Sheets—Sheet 1.

E. & B. HOLMES.

Barrel Trussing Machine.

No. 241,139. Patented May 10, 1881.

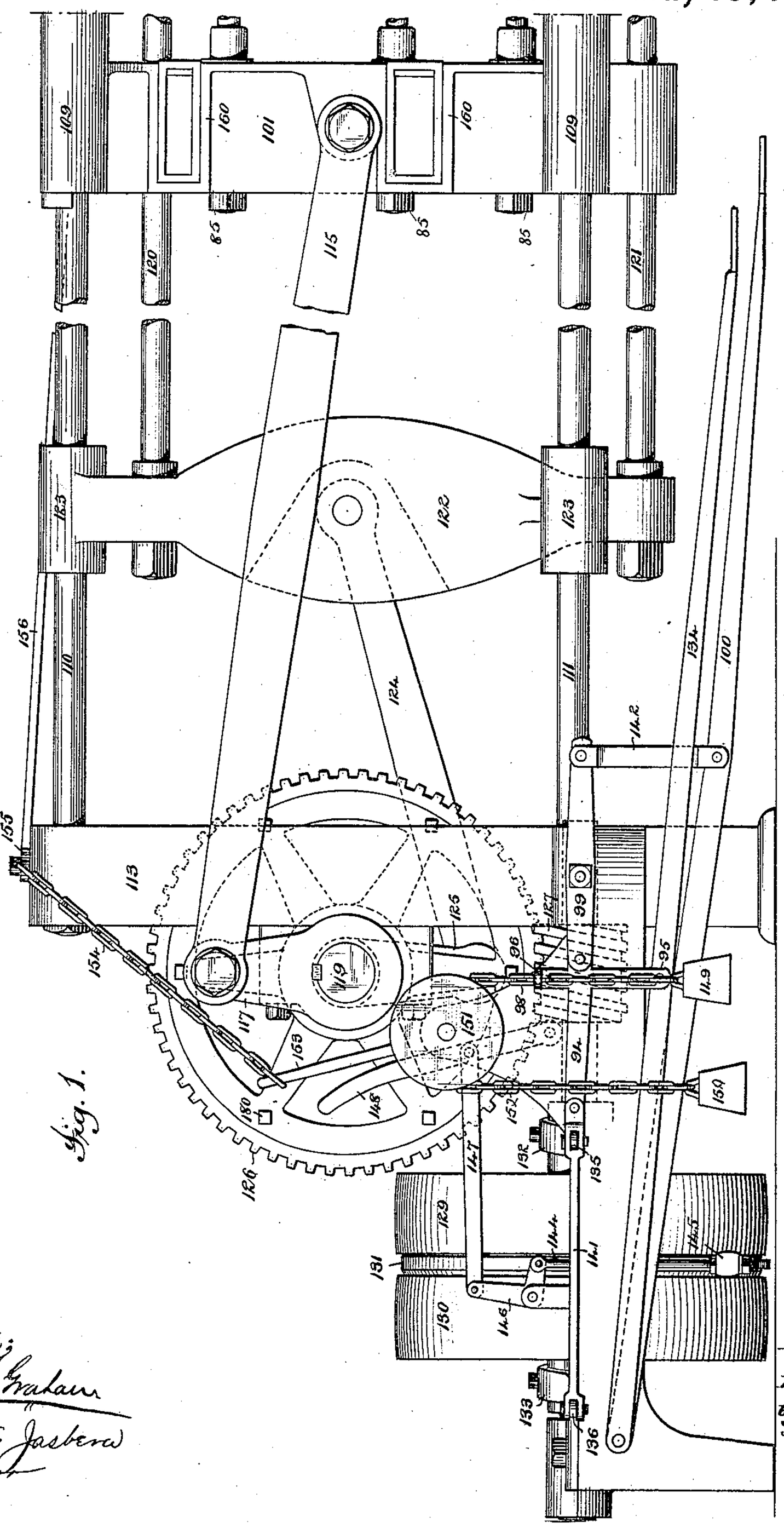

Fig. 1.

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(No Model.)

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E. & B. HOLMES.

Barrel Trussing Machine.

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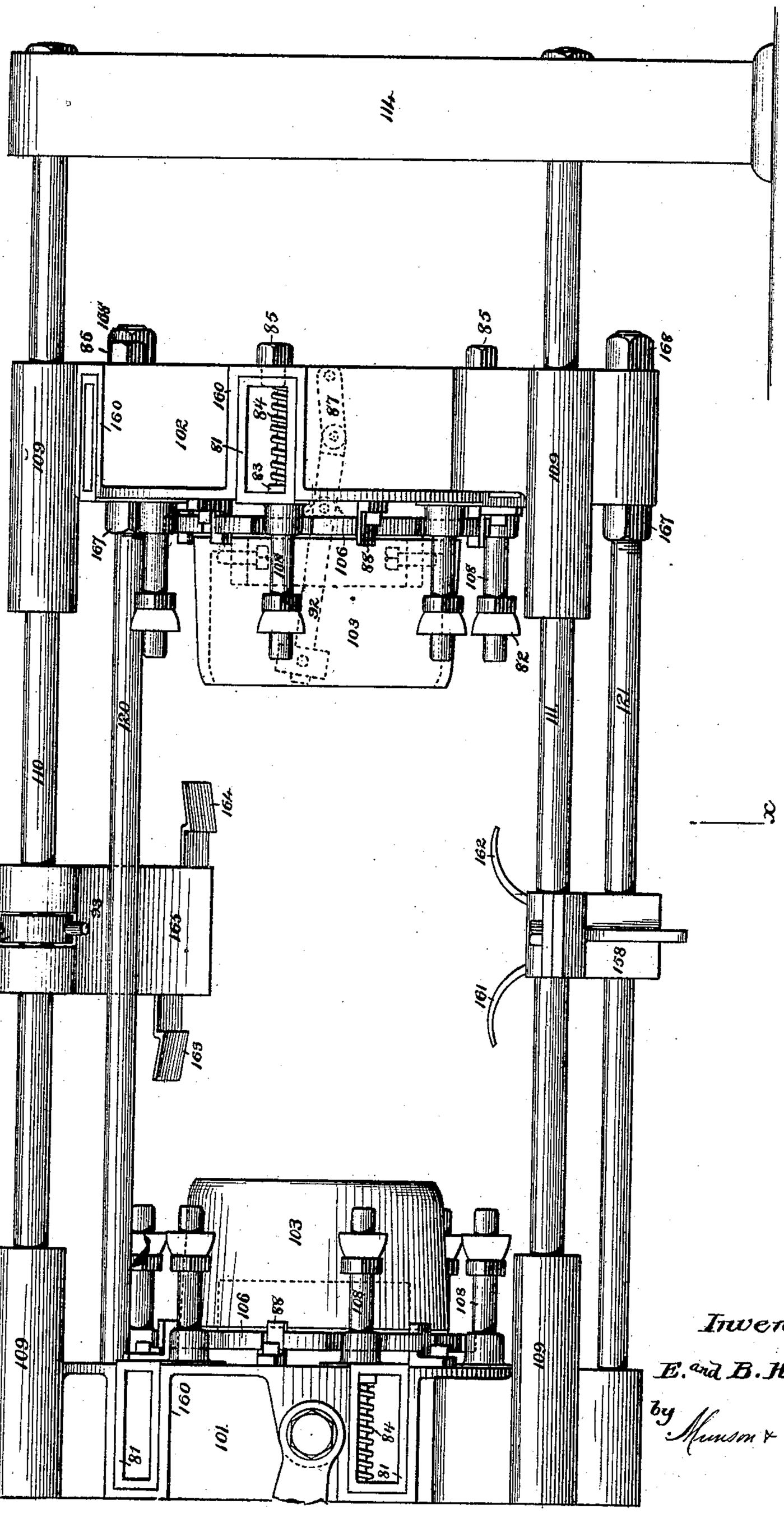

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E. & B. HOLMES.

Barrel Trussing Machine.

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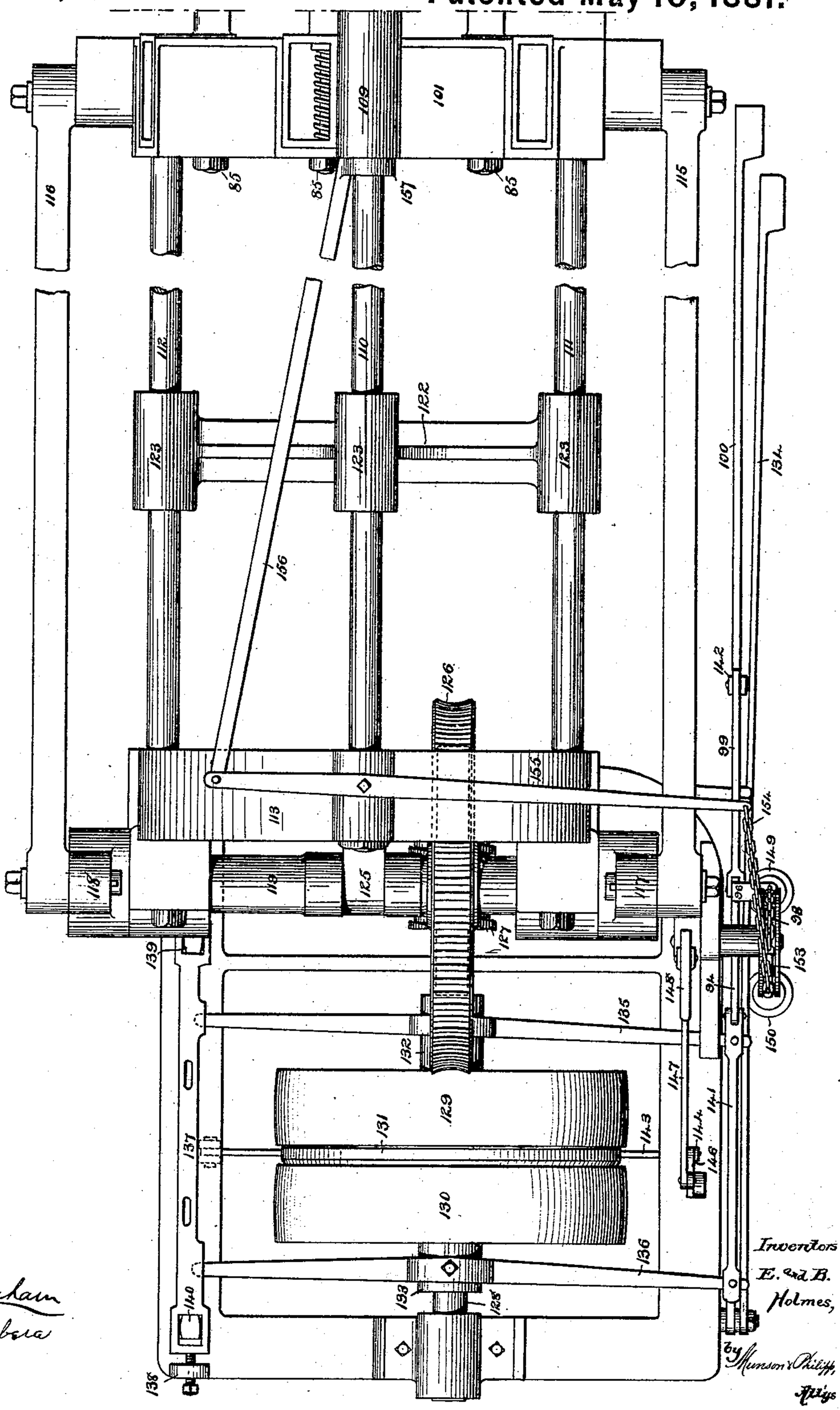

Fig. 3.

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Att'ys

(No Model.) 6 Sheets—Sheet 4.

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Barrel Trussing Machine.

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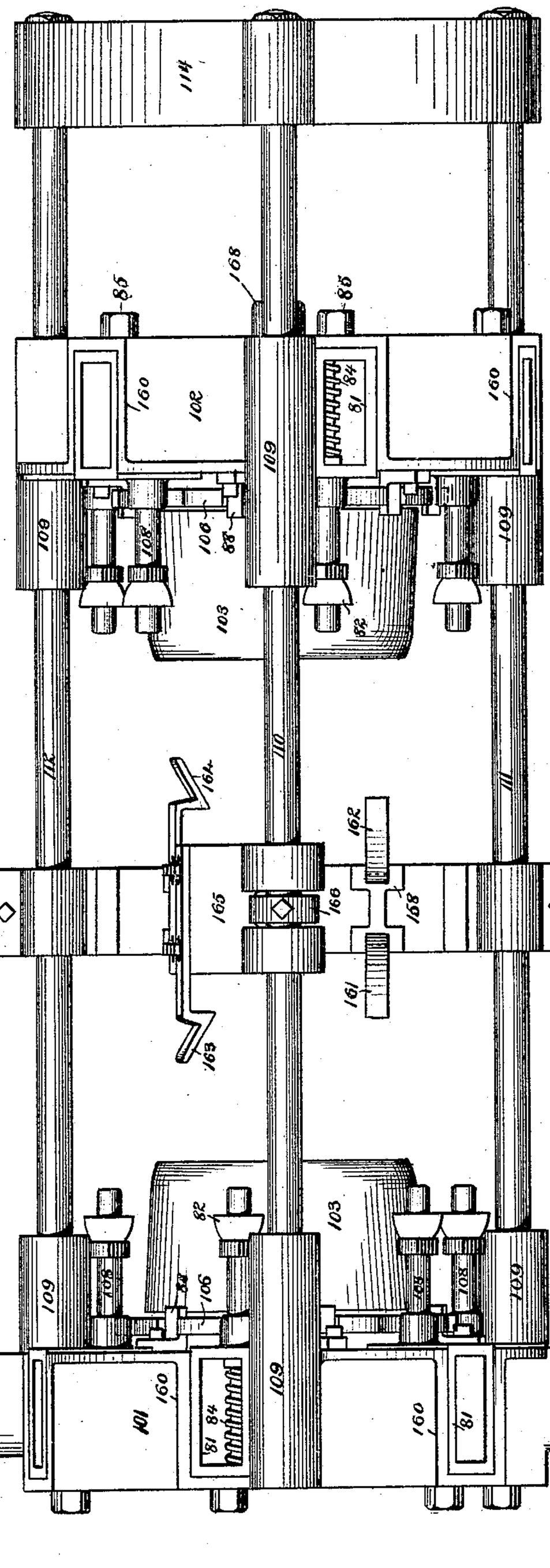

Fig. 4.

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Barrel Trussing Machine.

No. 241,139. Patented May 10, 1881.

Fig. 6.

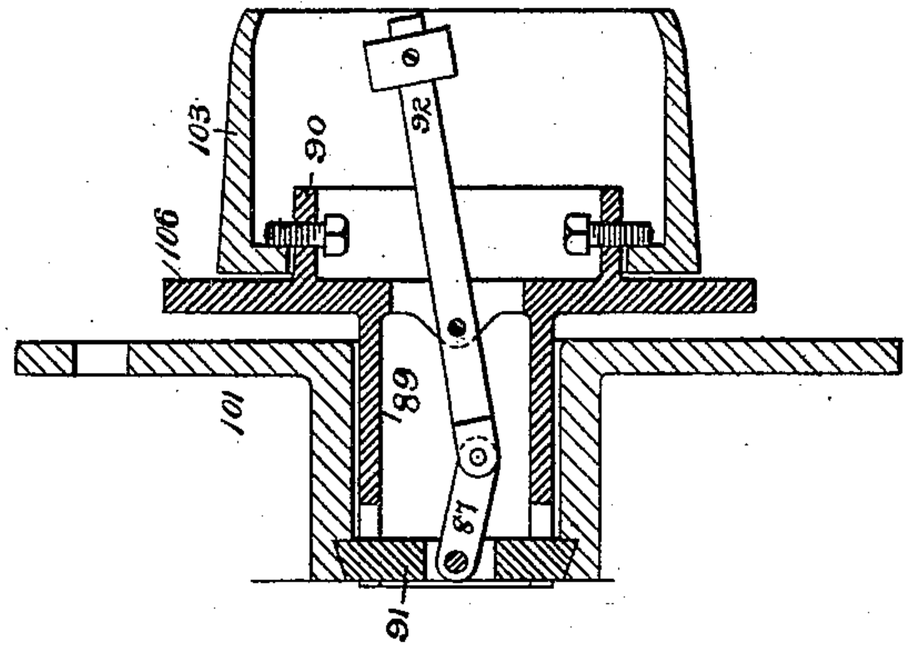


Fig. 10

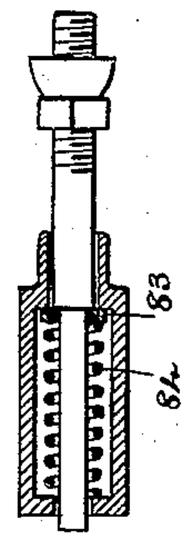
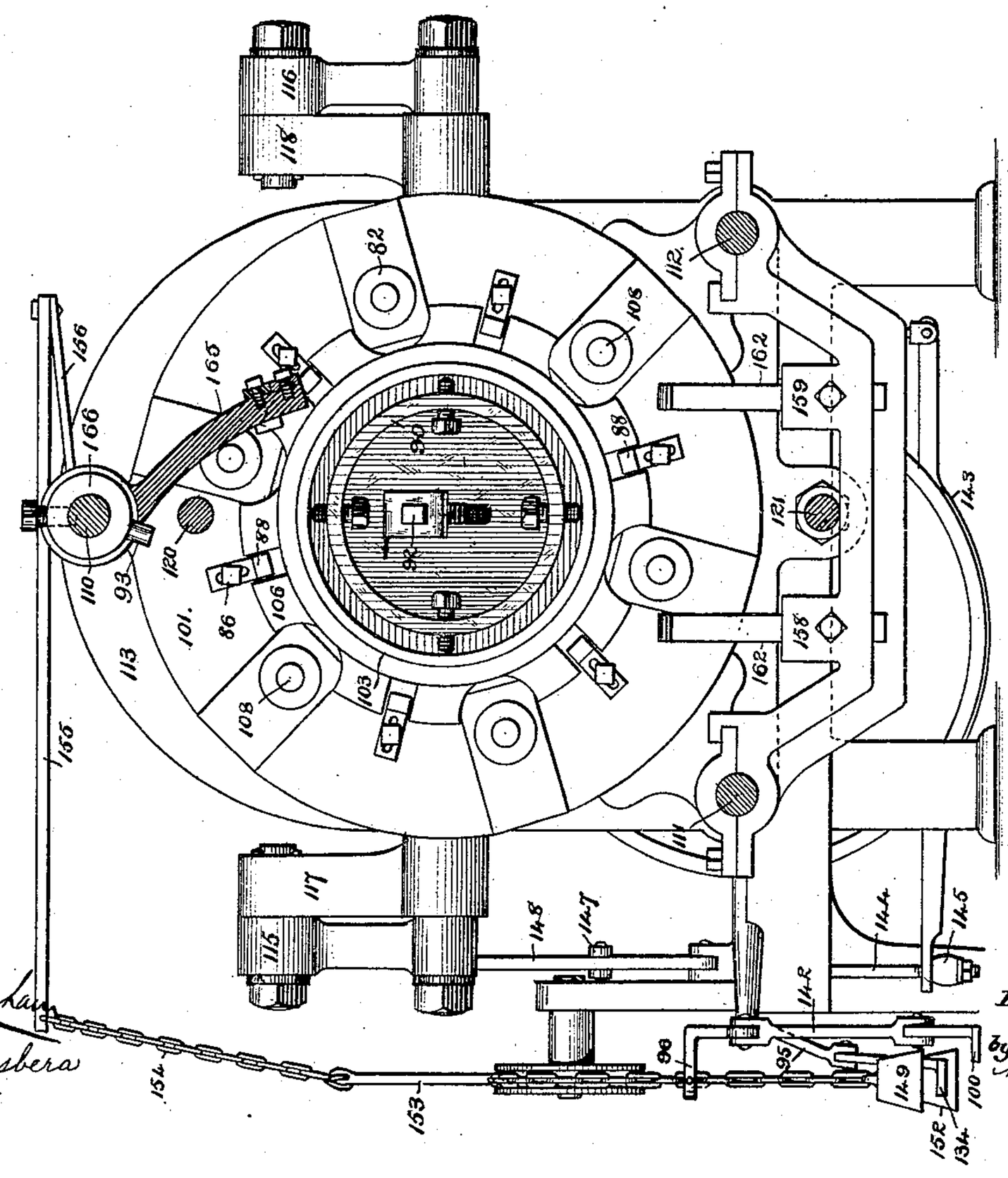


Fig. 5.



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Barrel Trussing Machine.

No. 241,139. Patented May 10, 1881.

Fig. 8.

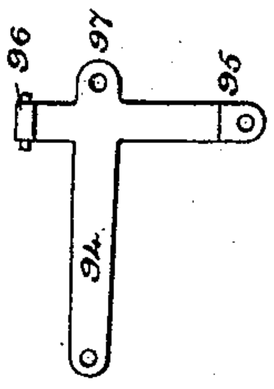


Fig. 9.

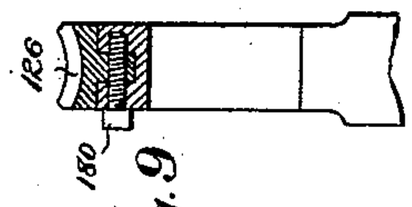
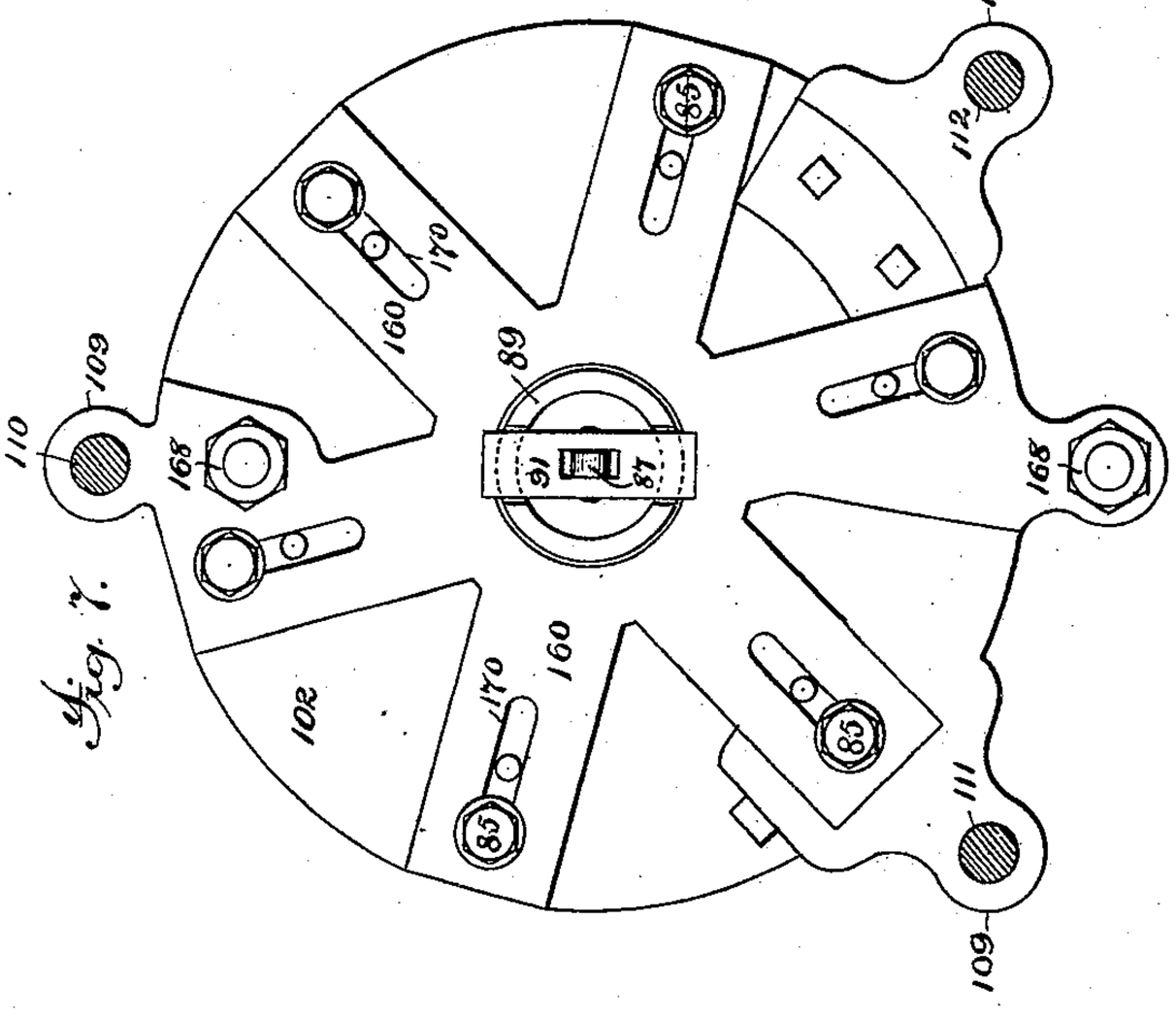


Fig. 7.



Attest,
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UNITED STATES PATENT OFFICE.

EDWARD HOLMES AND BRITAIN HOLMES, OF BUFFALO, NEW YORK.

BARREL-TRUSSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 241,139, dated May 10, 1881.

Application filed July 16, 1880. (No model.)

To all whom it may concern:

Be it known that we, EDWARD HOLMES and BRITAIN HOLMES, citizens of the United States, residing in the city of Buffalo, county of Erie, and State of New York, have invented certain new and useful Improvements in Barrel-Trussing Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

In said drawings, Figure 1 illustrates a side elevation of the left-hand or driving end of the machine. Fig. 2 is a similar view of the right-hand end of the machine. Fig. 3 is a plan view of the left-hand or driving end of the machine, and Fig. 4 a similar view of the right-hand end of the machine. Fig. 5 is an elevation on the section line X of Fig. 2, looking toward the driving end of the machine. Fig. 6 is a vertical sectional elevation of one of the driving-heads, its leveling-plate, and centering-cone. Fig. 7 is a rear elevation of one of the driving-heads. Fig. 8 represents a portion of the toggle that operates the shipping-levers. Fig. 9 is a cross-section of the worm-wheel. Fig. 10 is a plan view of one of the body-trussing arms and its box.

This invention relates to that class of machines in which the staves of a barrel-body are leveled and the truss-hoops are driven at one complete operation of the mechanisms.

The invention consists, principally, in an improved construction of the leveling and trussing heads, and the means for operating the same, so that, by a continuous movement of the mechanisms, the stave ends are evened and the truss-hoops driven. Other constructions and various combinations of parts are also embraced in the invention; but the same are too fully hereinafter described to need further preliminary explanation.

The driving-heads 101 102 each support a centering-cone, 103, a leveling-plate, 106, and a series of body-trussing arms, 108. Each head 101 102 is provided with three bearings, 109, whereby said heads are guided upon rods 110 111 112, as they are moved toward and from each other, which rods 110 111 112 are securely fixed in the end frames, 113 114.

The movements of the driving-heads 101 102 are accomplished simultaneously as follows: The head 101 is provided at its opposite sides with pivoted connecting-rods 115 116, the rear ends of which are pivoted to cranks 117 118, carried at the opposite ends of a crank-shaft, 119, by the operation of which cranks at each revolution of the shaft 119 the said head 101 is reciprocated to and from the center of the machine. The head 102 is rigidly attached, by means of rods 120 121, to a sliding head, 122, that is provided with three bearings, 123, so that it may move upon the guide-rods 110 111 112; and the driving-head 101 is provided at top and bottom with suitable holes, which admit the unobstructed movement of the rods 120 121 through it. The sliding head 122 has a connecting-rod, 124, pivoted to it, which rod, at its rear end, is pivoted to a crank, 125, that is rigidly attached to the crank-shaft 119. As the crank-shaft is rotated to reciprocate the head 101, it operates the crank 125 to reciprocate the head 102 through the sliding head 122 and the rods 120 121 connecting it with said head 122. These cranks 117, 118, and 125 are so related to each other that the heads 101 102 are simultaneously reciprocated, thus moving toward each other in performing the trussing and leveling operation, and away from each other in releasing the barrel-body operated upon.

The crank-shaft 119 carries a worm-wheel, 126, that is engaged by a worm, 127, secured on the driving-shaft 128. This latter shaft also supports two belt-pulleys, 129 130, that revolve freely upon bearings 132 133, by which the pulleys may slide laterally upon said shaft. Either of these pulleys may therefore be moved into frictional contact with the face of a driving friction-disk, 131, fast upon the driving-shaft, and thus, through the gearing, rotate the crank-shaft 119 in one direction or the other, to operatively drive the trussing mechanisms or reverse their movement. The lateral or sliding movement of these pulleys into contact with the friction-disk 131 is accomplished by a controlling mechanism, whereby the active movements of the mechanisms are governed. This controlling mechanism is constructed as follows: The shipping-lever 135 of the pulley 129 is pivoted to the pulley-bearing 132 and

fulcrumed in a bar, 137, and the shipping-lever 136 of the pulley 130 is likewise pivoted to the pulley-bearing 133 and fulcrumed in the bar 137. This frulcrum-bar 137 is arranged to slide upon bolts projecting from an ear, 138, at one end and a companion ear at the other end, and is seated at each end upon a rubber spring, as 139 140, so that any undue strain exerted through either of the levers 135 136 upon said bar may be compensated for by the elasticity of such springs. The power ends of the levers 135 136 are pivoted to a bar, 141, that in turn is connected, by a toggle, to each of the foot-levers 100 134, as follows: One member of the toggle has four branches, (see Fig. 8,) one, 94, pivoted to the end of the lever 141, another depending one, 95, that is pivoted to the lever 134, another upwardly-extending one, 96, to which a chain, 98, is secured, and a fourth, 97, to which is attached the second member, 99, of the toggle. This latter member 99 is pivoted to the side frame and connected to the foot-lever 100 by means of a rod, 142.

By means of this construction of devices, pressure applied to the foot-levers 100 will straighten the toggle and thus throw the shipping-levers 135 136 in a direction that will move the pulley 130 away from or out of contact with the friction-disk 131, and the pulley 129 toward said disk, and if moved far enough will carry the pulley 129 into frictional contact with the disk 131, and thus drive the shaft 128 and rotate the crank-shaft 119 in a direction to effect the trussing operation. By depressing the foot-lever 134 the contrary effect is produced—that is, said lever operates to open the toggle—thus throwing the shipping-levers 135 136 in a direction that will move the pulley 129 away from or out of contact with the friction-disk 131 and the pulley 130 toward said disk, and if moved far enough will carry said pulley into frictional contact with said disk and drive the shaft 119 in a contrary direction, to cause a reverse or returning movement of the mechanisms. Said foot-levers may thus be used to drive the crank-shaft in either direction or suspend its movement.

An arrangement is supplied to accomplish the automatic stopping of the machine each time the crank-shaft 119 makes a revolution by throwing the pulley then engaged with the driving-disk 131 out of frictional or driving contact therewith, and bringing into action a friction-brake. This is accomplished as follows: The friction-brake is a lever, 143, properly curved to fit the perimeter of the friction driving-disk 131. It is pivoted at one end to the side frame, and at the other is attached to a rod, 144, a relieving rubber spring, 145, being interposed. The rod 144 is pivoted to one end of a bell-crank, 146, which at the other end is pivoted to a rod, 147, connected to a lever, 148, that normally stands inclined, so as to adapt it to be engaged by the crank 117 during the rearward movement of the latter, which thus vibrates the lever 148 and applies the brake 143. When relieved of the pressure of this crank, the lever 148 is moved forward by the gravitating movement of the said brake.

The arm 96 of the toggle has a chain, 98, attached to it, which chain carries at its lower end a weight, 149, and is secured at the other end to a sheave, 151. Another chain, 152, secured to this sheave so as to depend from its opposite side, carries at its lower end a weight, 150. A lever, 153, fast to the sheave 151, projects upwardly therefrom, and is connected, by a chain, 154, to one end of a horizontal lever, 155, that is pivoted upon the top surface of the end frame, 113. The other end of the lever 155 is pivoted to a rod, 156, the forward end of which has a bearing, 157, whereby it may slide upon the rod 110, and thus be maintained in the path of travel of the driving-head 101.

Each of the driving-heads 101 102 consists of a face-disk secured to a central hub, from which project hollow ribs 160, which provide radial recesses that are open at their front ends and closed at the rear ends, and operate as seats for the boxes 81 that support the body-trussing arms 108, of which arms there may be six, as shown, or any other desired number. These trussing-arms are bolts, having at their forward ends circular screw-threaded heads 82, which are adjustable on the bolts or arms 108 by simple rotation. The bolt of each trussing-arm 108 is properly guided by projecting through the front and rear walls of its box 81, and at its rear end it protrudes through a slot, 170, in the driving-head. Between the said walls of the box the bolt is diminished, to provide a shoulder, against which rests a washer, 83. This washer furnishes a seat for one end of a spiral spring, 84, that encircles the said bolt, and which bears at its other end against the rear wall of the box. The forward movement of each bolt may be limited by pinning the washer 83 to it, or by providing a nut on the extended rear end of the bolt to bear against the driving-head. Each box 81 is adjustable in its radial seat or recess to and from the center of the driving-head by means of a clamp-screw, 85, that passes through the slot 170 in the driving-head and enters a tapped hole in the rear wall of the box, whereby it is fixed in position. These body-trussing arms 108 are thus elastically seated, and may be adjusted radially to suit the size of barrel-body they are to operate upon.

Each of the leveling-plates 106 is a circular disk, the edge of which is provided with recesses to admit the passage of the body-trussing arms 108, and with slots to admit the passage of the end-trussing arms 88, which leveling-plates are provided with circular hubs, as 89, by which they are supported in a central bearing in each driving-head, so as to slide therein. (See Fig. 6.) The trussing-arms 88 have forward-projecting ends, affording bearings to engage the end hoops, and at their rear ends they are slotted to embrace screw-bolts 86, by which they are secured to the driv-

ing-head at points between the body-trussing arms 107 108, and so as to be radially adjustable. The centering-cones 103 are bolted to rims 90, projecting forward from the leveling-plates 106. The leveling-plates 106 are each provided with a toggle, one arm, 87, of which is pivoted to a bar, 91, that is seated in the hub of a driving-head, so as to bridge its circular bearing, to which arm 87 the other arm, 92, of the toggle is jointed. Said arm 92 is pivoted in ears projecting from the leveling-head, passes through said head, and carries a weight on its forwardly-projecting end. This weight thus acts to straighten the toggle and hold the leveling-head with the centering-cone in their forward position.

The barrel-body is supported in the machine by means of a cradle consisting of carriers 158 159, that are secured by a frame to the rods 111 112, each carrier being supplied with spring-like plates or arms 161 162, that project upward and curve outward in opposite directions, which arms 161 162 are adjustable vertically in their carriers 158 159 by set-screws, so as to adapt them to support different sizes of barrels.

As the centering-cones 103 103 are required to fit the barrel ends snugly, the barrel-body, after being trussed, requires to be held stationary while the cones are being withdrawn from it. The means for accomplishing this consists of a double-branched latch, the opposite members, 163 164, of which catch over the body truss-hoops as the same are driven home, and thus hold the barrel-body sufficiently to secure it against endwise movement when the driving-heads retire and carry the centering-heads with them. The members of this latch are adjustable longitudinally in the carrier 165 that supports them, which carrier swings upon the rod 110, its forward movement being limited by means of a stop-pin, 93, that projects from a hub, 166, with which the body of the carrier engages. This carrier 165 is bifurcated to embrace the hub 166, which is secured to the rod 110 by a set-screw and thus holds the latches in their proper central position.

In addition to the various adjustments described to suit different sizes of barrels, the driving-head 102 is adjustable in its relation to the head 101 by means of the screw-threaded ends of the rods 120 121, upon which adjusting-nuts 167 and 168 are placed. By adjusting the position of this head 102 upon the rods 120 121 the extent of its inward throw toward the head 101 may be determined. Assuming such adjustments to have been made, and the supporting-cradle and holding-latches to have been adjusted to a proper central position, and the driving-heads to have been moved to their rearmost positions, at which time the machine will be at rest, with the pulleys 129 130 out of engagement with the driving-disk 143, the operation will be as follows: A barrel-body, which, having been "set up," consists of staves temporarily held together by two body and two end hoops, is placed onto the arms 161 162 of cradle, where it is supported with the latches 163 164 resting upon its rearward side. The machine is then started by pressure applied to the foot-lever 100, which straightens the toggle and carries the pulley 129 into contact with the driving-disk 131, whereupon the crank-shaft 119 is set in motion to move the heads 101 102. The depression of the lever will have raised the weight 149 and released the weight 152 so that it will fall and partially rotate the sheave 151, as the head 109 moving forward permits the rod 156 to follow it up and thus release the strain upon the chain 154 and lever 153, the weights 152 149 then balancing each other and holding the toggle straight and locked. The crank-shaft 119 in making a complete revolution causes the driving-heads 101 102 to first move centrally or toward each other, and then to retract or move away from each other. As these heads move forward the centering-cones 103 104 are first entered into the ends of the barrel-body, thus acting to center the same with respect to the trussing-arms. The further forward movement of the driving-heads brings the leveling-disks 106 into contact with the stave ends, whereby they are pressed toward the center and brought into a common plane, or evened with relation to each other, and when this is accomplished or the pressure is great enough, the leveling-heads are forced rearwardly, guided by their hubs 89, which are recessed to pass the bar 91, in which movement of them their weighted toggle-arms 92 are raised. In this forward movement the trussing-arms 108 and 88 engage the truss-hoops and force them onto the barrel-body, thus compressing the staves together and finishing the barrel-body ready to receive its permanent heads and hoops. When the body truss-hoops have been moved centrally far enough, the latches 163 164 which ride over them fall so as to engage behind them. As the finishing half-revolution of the crank-shaft is effected, the driving-heads 101 102 retire or move outward, thus withdrawing the centering-heads, the trussing-arms, and finally the leveling-disks, which relieved from pressure are moved slightly forward by their weighted toggle-arms 92. In this rearward movement the barrel-body is held in its central position against any endwise movement by the latches 163 164, which clasp upon its body truss-hoops. As the driving-head 101 moves outward it will engage and move the rod 156 rearward, thus vibrating the lever 155 and, through the chain 154, drawing forward the lever 153. The forward movement of the lever 153 causes the sheave 151 to rotate, whereby the weight 152 is drawn upward and the weight 149 is permitted to fall, thus opening the toggle and moving the pulley 129 out of driving contact with the friction-disk 131, and the rearward movement of the crank 117 simultaneously engages the lever 148, thus moving it rearward and causing the brake 143 to be drawn upward to arrest the movement of the driving-disk 131, thus suspending the driv-

ing action of the mechanisms. The trussed barrel-body is now removed from the machine by pushing it off from the cradle rearward (the latches 163 164 being raised by swinging on the rod 110) and permitting its exit from the machine. A second barrel-body is now placed upon the cradle and the operation is repeated. If at any time it is desired to reverse the machine, pressure applied to the lever 134 will effect it by imparting a reverse movement to the crank-shaft through the means already described.

It will be observed that the worm-wheel 126 during most of its revolution simply acts to move the heads to and from each other, but that during a slight portion of its revolution, or at that time when the trussing-arms are acting to drive the hoops, it must exert great pressure. This in time causes great wear of its teeth throughout a small extent of its circumference. In order to equalize this wear and provide a worm-wheel that will last as long as the other parts of the machine, it is provided with a toothed rim that is adjustable circumferentially, so that any part of it may be adjusted to the greatest wearing-point. This rim is made with a rib that fits within a groove in the wheel proper in which it is secured in the desired position of adjustment by means of screws 180. (See Fig. 8.)

What is claimed is—

1. In a trussing-machine, the combination of two reciprocating driving-heads arranged to slide to and from each other and actuated by rods connected with a crank-shaft at one end of the machine, which shaft thus sustains the end strain induced by the trussing operation, substantially as described.

2. The combination, with the driving-heads 101 102 and the single crank-shaft 119 at one end of the machine, of the cranks 117 118 125, and rods connecting said cranks and heads, whereby the latter are reciprocated, substantially as described.

3. The combination, with the driving-heads 101 102, cranks 117 118 125, and intermediate connecting-rods, of the single crank-shaft 119, worm-wheel 126, and worm 127, substantially as described.

4. The combination, with the driving-heads 101 102, the crank-shaft 119, the carrying-cranks 117 118 125, connected by rods with said heads, of the driving-shaft 128, the sliding pulleys 129 130, and the driving friction-disk 131, the shipping-levers 132 133, the toggle, and the levers 100 134, substantially as described.

5. The combination, with the driving-heads 101 102, the crank-shaft 119, the carrying-cranks 117 118 125, connected by rods with said heads, of the driving-shaft 128, the friction-disk 131, and the pulleys 129 130, the toggle, and the intermediate mechanisms whereby the same is automatically operated to control the movements of the machine, substantially as described.

6. The combination, with the shaft 128, disk 131, pulleys 129 130, and the brake 143, of the toggle and the intermediate means, substantially as described, extending within the path of travel, of the head 101 and its crank 117, whereby said head and crank in moving rearward cause the driving power to be suspended and the brake to arrest the movements of the machine.

7. The combination, with the reciprocating head 101, the shaft 128, disk 131, pulleys 129 130, and toggle, of the sheave 151, chains 98 154, and levers 155 156, substantially as described.

8. The combination, with the reciprocating head 101, the shaft 128, pulleys 129 130, disk 131, and brake 143, and toggle, of the sheave 151, chains 98 154, and levers 155 156, substantially as described.

9. The combination, with the driving-heads, of the body-trussing arms spring-seated in guiding-boxes that are provided with means for radially adjusting them to fixed positions, whereby arms are adapted to operate upon different-sized barrels, substantially as described.

10. The combination, with the driving-heads, of boxes, as 81, adjustable radially in recesses therein, said boxes supporting spring-seated trussing-arms, substantially as described.

11. The combination, with a driving-head and driving-crank, of a toothed wheel the rim whereof is constructed so as to be adjustable circumferentially upon its body or hub, whereby said rim may be adjusted to bring various parts of the same to the point where the greatest strain is exerted upon it, and thus cause its equal wear, substantially as described.

12. The combination, with the driving-heads supporting the trussing-arms, of the leveling-plates and toggle-levers, or equivalent means automatically operating to maintain said plates in their forward position relative to said heads, subtantially as described.

13. The combination, with the driving-heads, of leveling-plates sliding in bearings therein, and connected thereto by weighted toggles, substantially as described.

14. The combination, with the driving-heads and their trussing-arms, of centering-cones carried by said heads and projecting beyond their trussing-arms, said cones being constructed to enter within the barrel and operate to raise and guide the same into such position that its truss-hoops shall be properly and evenly engaged by the trussing-arms, substantially as described.

15. The combination, with the driving-heads and the trussing mechanisms carried by them, of a barrel-supporting cradle consisting of two sets of branching arms, each set being arranged to support the barrel-body longitudinally and to be independently adjustable, substantially as described.

16. The combination, with two driving-heads carrying trussing-arms, of two barrel-holding latches constructed to engage with the trussing-hoops and prevent the barrel-body from being

carried in either direction during the retiring movement of the driving-heads, substantially as described.

17. The combination, with the adjustable driving-heads, of the barrel-supporting cradle, adjustable longitudinally relatively to said driving-heads, substantially as described.

18. The combination, with the adjustable driving-heads, of the barrel-holding latches, adjustable longitudinally relatively to said driving-heads, substantially as described.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

EDWARD HOLMES.
BRITAIN HOLMES.

Witnesses:
FREDK. HOWARD,
HENRY B. HOLMES.