(No Model.)

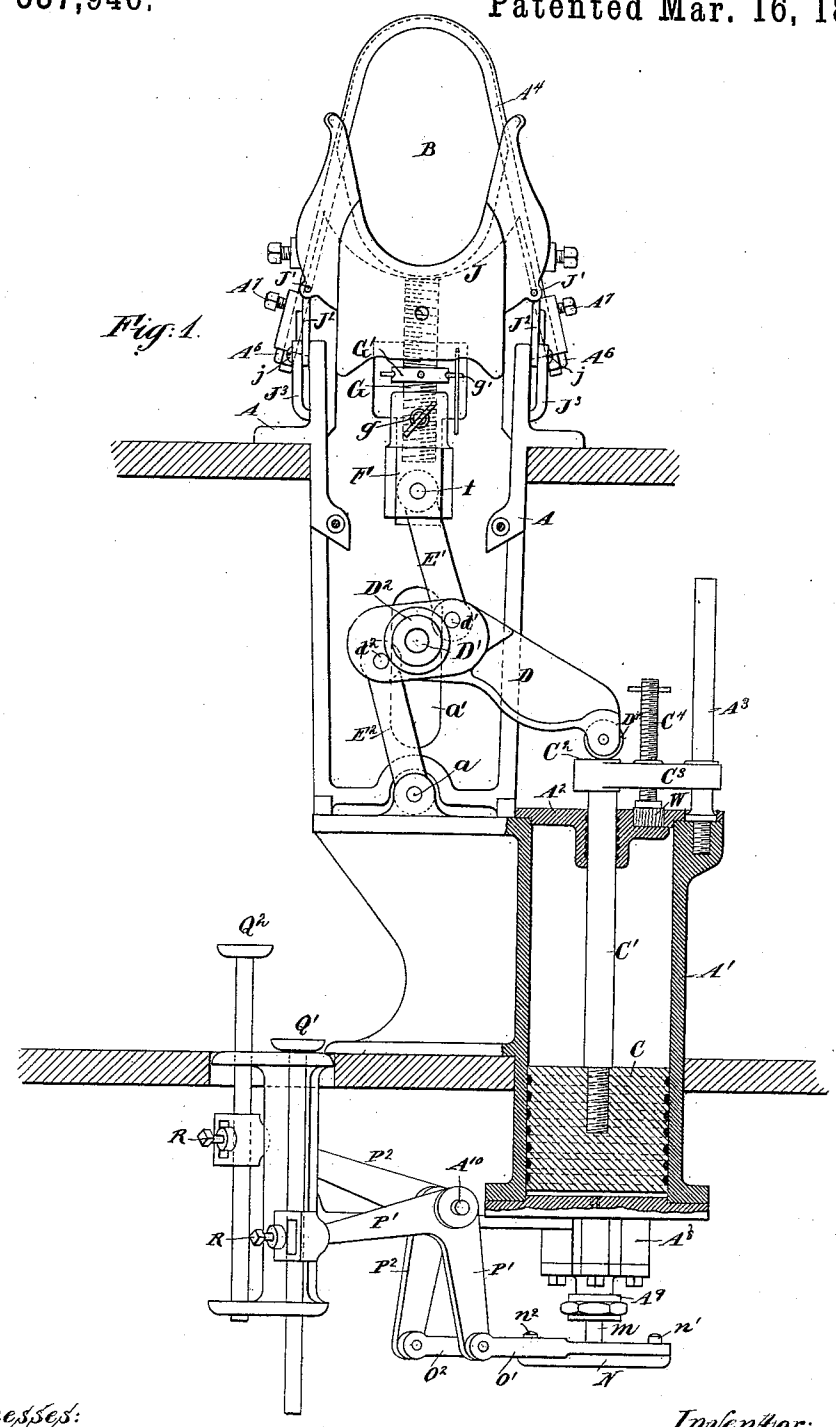
2 Sheets—Sheet 1.

D. A. GREENE.

MACHINE FOR BUNDLING WOOD.

No. 337,946. Patented Mar. 16, 1886.

Fig. 1.



Witnesses:
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E. J. Griswold.

Inventor:
Darwin A. Greene
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Thomas Drew Stetson

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(No Model.) 2 Sheets—Sheet 2.

D. A. GREENE.

MACHINE FOR BUNDLING WOOD.

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Fig. 2.

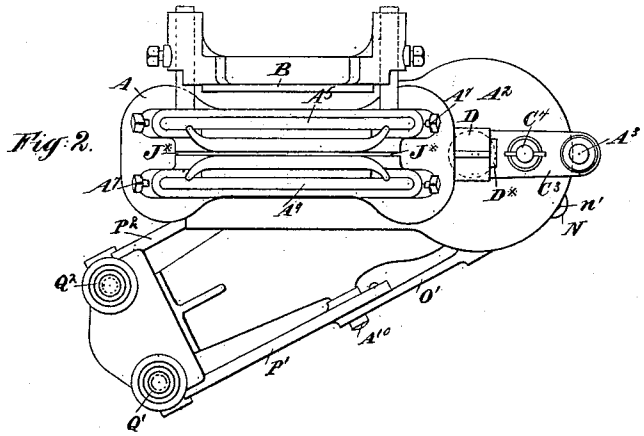


Fig. 3.

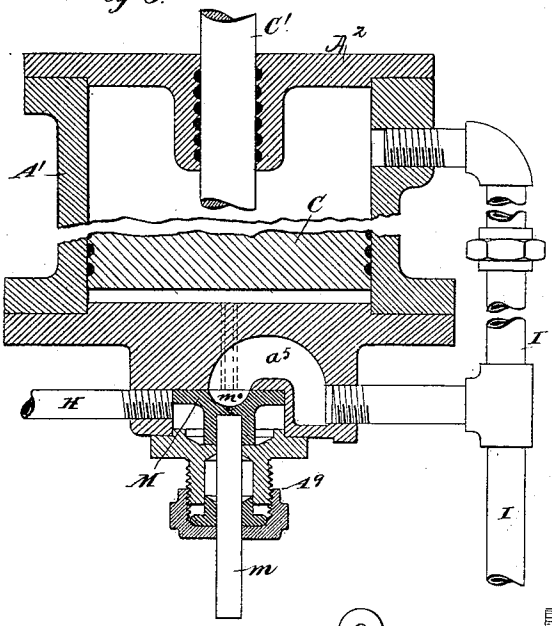


Fig. 4.

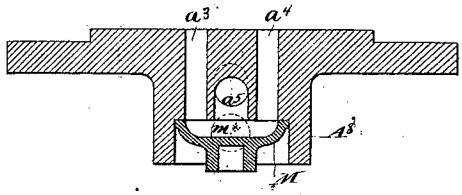


Fig. 5.

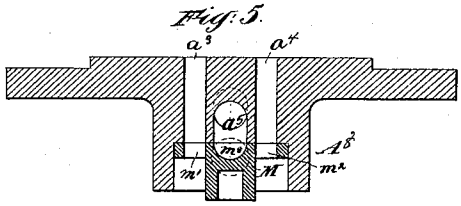


Fig. 6.

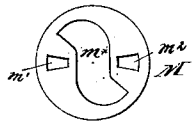


Fig. 7.

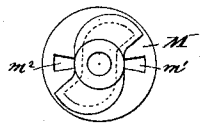


Fig. 8.

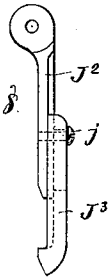


Fig. 9.

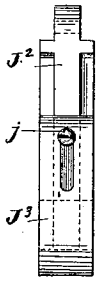


Fig. 10.



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UNITED STATES PATENT OFFICE.

DARWIN A. GREENE, OF NEW YORK, N. Y.

MACHINE FOR BUNDLING WOOD.

SPECIFICATION forming part of Letters Patent No. 337,946, dated March 16, 1886.

Application filed July 2, 1885. Serial No. 170,555. (No model.)

To all whom it may concern:

Be it known that I, DARWIN A. GREENE, of the city and county of New York, in the State of New York, have invented a certain new and useful Improvement in Steam-Power for Bundling Wood, of which the following is a specification.

I work a heavy piston in an upright cylinder, admitting the steam below to force it up, and letting it descend by gravity when the pressure above and below is equalized by opening the exhaust. The piston operates the wood-compressing device through a lever and toggles.

I provide an adjustable device for arresting the descent of the piston.

I employ a partially-rotating valve, operated by treadles, to admit and exhaust the steam.

My wood-compressing devices are partially semicircular and partially V-shaped, so that the rise of the piston compresses the wood not only vertically but laterally.

I provide for conveniently adjusting the connections to adapt the piston and connections to compress different-sized bundles of wood.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out this invention.

Figure 1 is a vertical section with certain portions in elevation, the front plate being removed, and Fig. 2 is a corresponding plan view. The succeeding figures are on a larger scale, and represent certain portions detached. Fig. 3 is a vertical section. Fig. 4 is a section through the valve and immediately adjacent parts in a plane at right angles to that in Fig. 3. Fig. 5 is a corresponding section with the valve turned in a different position. Figs. 6 and 7 represent the valve detached. Fig. 6 shows the upper face, and Fig. 7 the lower face. Figs. 8, 9, and 10 represent a provision for excluding chips and dirt from the working parts. There are two of these, as shown on Fig. 1. Each is a counterpart of the other. Fig. 8 is a side elevation, Fig. 9 an outer or face view, and Fig. 10 a horizontal section.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is a fixed frame-work, certain portions being distinguished, when necessary, by additional marks, as A′ A^2, &c. An upright cylinder, A′, is nicely finished in its interior to receive a close-fitting piston, C, which is a thick solid casting grooved circumferentially on its exterior, instead of receiving packing. The piston-rod C′ extends out through a correspondingly-equipped hole in the cover A^2, thus avoiding the use of packing or stuffing box. Its upper end presents a considerable plane surface, C^2, with a rigid arm, C^3, extending out horizontally, and taking hold of a vertical guide, A^3. A screw, C^4, tapped through the arm C^3, rests at each descent of the piston on a block of wood, W, inserted in a suitable pocket in the cylinder-cover A^2. The steam admitted and discharged at will by devices to be described further on, acts on the lower face of the piston when required. The ascent of the piston acts by the plane surface C^2 on a roller, D*, carried on the free end of a lever, D, which latter is provided with a cross-pin or trunnions, D′, carrying rollers D^2, which are received each in a slot, *a′*, in the fixed frame-work. The lever D connects by a pin, *d′*, to a link, E′, extending upward. It also connects by a pin, d^2, to a link, E^2, extending downward. The latter connects to a pin, *a*, on the fixed frame-work. The former connects by a pin, *f*, to a carriage, F, which is guided in suitable ways in the fixed frame-work, so as to have only a rising and sinking motion. A stout right-and-left screw, G, connects the carriage F with a cradle, J, in which the wood to be bundled is placed in proper quantities by hand or by any suitable means, one end of each stick resting against a back gage, B, which performs the usual function of holding the ends even, being adjustable to adapt for different lengths of wood. The right-and-left screw G, with its connections, governs the size of the bundle of wood by determining the height to which the cradle J shall be raised at each rise of the piston. On admitting the steam, the piston C is driven up and the lever D turned, bringing the links E′ E^2 nearly into line, elevating the carriage F and the connected cradle J. The elevation of the center *d* is accommodated by the slot *a′*. The arrangement makes a double toggle-joint, affording great compressive power with little friction or wear. While the wood

is strongly compressed, the string previously introduced is tied, as will be readily understood. On allowing the steam to escape, the piston C sinks and the lever D turns again into the position shown, allowing the carriage F and the cradle J to sink. The bundle of wood is now removed and a new lot of wood supplied, and the operation repeated. The straps A^4 A^5, which extend over the bundle of wood, are fixed adjustably to the framing A by extending through sockets at the point represented. The nuts A^6 are engaged on the lower end. Pinching-screws A^7 contribute to hold them firmly.

I attach importance to the form of the aperture in which the wood is inserted. There is a half-round space in the cradle J, and a corresponding half-round space under the straps A^4 A^5. Between these portions the surfaces at the sides of the space are inclined, as shown. This form gives the advantage that when the steam is let on, and the cradle J is forced strongly upward, the wood is not only compressed vertically between the semicylindrical portions, but is also compressed between the inclined portions of the inclosed surfaces. The result is a nearly uniform compression of the bundle of wood in all directions. It also releases the bundle perfectly when the cradle descends, enabling the completed bundle to be easily removed by relaxing all pressure against its sides. This avoids the need of any mechanical device to eject the bundle, even after the most severe pressure and the most elastic wood. The space above the piston is alternately filled and emptied at each movement with steam at atmospheric pressure, received through the pipe I, (see Fig. 3,) which communicates with the chimney. This arrangement—there being a sufficient quantity of steam in the pipe—insures that the atmospheric pressure alone is felt on the upper side of the piston without admitting air or dust.

The valve and mode of operating it to admit live steam from the boiler are peculiar.

A^8 is the valve-chest, M the valve, and m the stem thereof, extending out through a stuffing-box, A^9, and carrying on its lower end a cross-piece, N, having two pins, n' n^2, in which are connected two links, O' O^2, which severally connect with bell-crank levers P' P^2, which turn on a fixed center, A^{10}, and connect, respectively, with the treadles Q' Q^2. On depressing one treadle, Q', by the foot, the stem m will be turned in one direction, elevating the other treadle. Liberating that treadle and stepping on the other reverses the movement.

The valve-chest receives steam from the boiler through a pipe, H. (See Fig. 3.)

The valve M has a hollow throat, m^*, of the form shown in strong lines in Fig. 6, and in dotted lines in Fig. 7. The valve has also two orifices, m' and m^2.

On turning the valve into the position shown in Figs. 3 and 4, the steam may exhaust freely through the ports a^3 a^4, flowing inward through the hollow throat m^* of the valve, and rising from the center of the latter and escaping through the port a^5 into the exhaust-pipe I. In this condition of the parts the piston sinks.

On operating the treadle to partially rotate the valve to induce the condition shown in Fig. 5, live steam is allowed to enter through the ports a^3 a^4, and the piston rises, with the effects above described.

The junctions of the levers P' P^2 with the treadles Q' Q^2, may be adjusted by means of pinching-screws R R, to allow the valve to be always thrown to exactly the right position by a full depression of the proper treadle.

The straps A^4 A^5 may be raised or lowered by properly operating the pinching-screws A^7 and nuts A^6.

The height of the cradle J relatively to the carriage F may be adjusted by turning the screw G. When the right position is secured, the pinching-screw g confines it. One of the most important adjustments is attained by the screw C^4. This should always receive the concussion when the piston sinks to the lowest point allowed. In making large bundles the piston should be allowed to sink to the bottom of the cylinder. When smaller ones are desired, the screw C^4 may be turned downward, so as to arrest the descent by striking on the block W earlier. The rollers D^2 are each formed with a flange, which, engaging in the inside of the frame A, keeps the roller in place on the pin D', on which latter it serves as an anti-friction roller in allowing the slight vertical motion of the center.

It is important to prevent chips and dirt from getting into the mechanism. The fixed frame-work A extends upward and forms a casing inclosing the toggle-links E' E^2 and their connections. This casing matches closely to the thick portion of the cradle J. A thinner portion of the cradle extends out farther, as plainly shown in Fig. 1. To allow the cradle to run up and down, there is a slot or opening in the side of the casing of sufficient width and depth to accommodate these thin parts of the cradle. When the cradle goes up, it leaves the lower portion of the slot open.

I provide means for covering in the form of an extensible curtain on each side. The two are counterparts of each other. A description of one will suffice for both.

J' is a pin inserted through knuckles formed in the edge of the thin portion of the cradle. J^2 is a piece of cast-iron or other suitable material hanging loosely from the pin J'. A screw, j, is tapped in the lower end, which connects an additional piece, J^3, by being inserted through a slot in the latter. A vertical web or ridge on the outer face of the piece J^2 matches in a corresponding groove in the lower portion, J^3, and aids in guiding it. As the cradle rises and sinks, the extensible curtain, composed of the parts J^2 and J^3, stretches and contracts, so as to keep the aperture in the framing practically closed. A rectangular aperture is made in the back of the framing,

through which a screw, *g*, may be operated. A vertical guide, which may be composed of a wire folded upon itself so as to form two parallel guides, is suspended to the cradle, and, hanging down parallel to the screw G, receives a wire pin, *g'*, inserted in one of the holes in the collar G', and aids to prevent it from becoming loosened. It will be seen that the cradle operates between the straps A^4 A^5. A recess, J*, is formed in the cradle J to receive the string. It extends down to such depth that the string lies entirely below the wood while the latter is being piled in. After the compression is effected the ends of the string are brought together over the bundle and tied. On relaxing the pressure on the wood it expands until restrained by the string and forms a properly-compacted bundle. The upper ends of the cradle are turned outward, as indicated in Fig. 2. This greatly facilitates the rapid and easy insertion of a fresh string after each bundle is removed.

Modifications may be made in the forms and proportions without departing from the principle or sacrificing the advantages of the invention. I can dispense with some of the provisions for adjusting. Thus, for example, the straps A^4 A^5 may be immovably connected and the adjustment of the size of the bundle may be made by operating the screw G to work the cradle higher or lower.

Some kind of a stop, in place of the screw C^4, I consider very important by its function of gently arresting the descent of the heavy piston, however rapidly and unskillfully the machine is worked, and I prefer that it be a screw, as shown, so as to allow of ready adjustment; but a stop set immovably in the arm C^3 may serve.

I claim as my invention—

1. In a wood-bundling machine, the combination, with a steam-actuated piston having a horizontal plane, as at C^2, of a lever pivoted to two toggles, the one pivoted stationarily to the frame and the other to the movable wood-carrying cradle, the said lever carrying a friction-roller which rides upon the plane surface of the piston, as set forth.

2. The combination, with the piston, the lever, and toggles, as described, of the cradle J, the stationary strap A^4, and a right-and-left screw, G, arranged between the cradle and toggles, to adjust the throw of the cradle, as set forth.

3. The combination, with the piston having a horizontal arm, and with the lever D and toggles, as described, of an adjustable threaded vertical pin, C^4, operating through the arm of the piston, and an elastic stop, W, arranged to stop the descent of the piston yieldingly, as set forth.

4. In a bundling-machine, as described, the cradle J, having lower semicircular contour and sides curving outwardly and upwardly, and the adjustable straps A^4 A^5, having semicircular upper contour with sides curving outwardly and downwardly, combined and arranged, as shown, to compress and release laterally as well as vertically, as herein specified.

5. The combination, with the compressing-cradle J, the cylinder and piston, and suitable connections between said parts, substantially as shown, of the oscillating valve M, arranged at the lower end of the cylinder and adapted to control the supply of steam thereto, the cross-bar N, rigid with the valve-stem, crank-levers P' P^2, links O' O^2, connecting said levers with the cross-bar N, and treadles Q' Q^2, for operating the crank-levers to admit or exhaust steam at will, as and for the purposes specified.

6. In a wood-bundling machine, substantially as described, the combination, with the cradle J, of the curtains formed by the parts J^2 J^3, adjustably secured together by screw-and-slot connection, and pivoted at J' to the sides of the cradle, to exclude dust and dirt from the working parts, as set forth.

7. In a bundling-machine, as described, the combination, with the guide A^3 and yielding stop W, recessed in the cylinder-head, of the piston C C', having a horizontal arm, an adjustable pin working through said arm and against said stop, a cradle, J, a lever and toggles, as described, transmitting power from the piston to the cradle, and a right-and-left screw, G, arranged between the cradle and toggles, to adjust the throw of the cradle, as herein set forth.

In testimony whereof I have hereunto set my hand, at New York city, this 30th day of June, 1885, in the presence of two subscribing witnesses.

DARWIN A. GREENE.

Witnesses:

CHARLES R. SEARLE,

MANIENE ELLISON.