No. 682,849. Patented Sept. 17, 1901.

D. A. GREENE.

WOOD BUNDLING MACHINE.

(Application filed Mar. 23, 1901.)

(No Model.) 2 Sheets—Sheet 1.

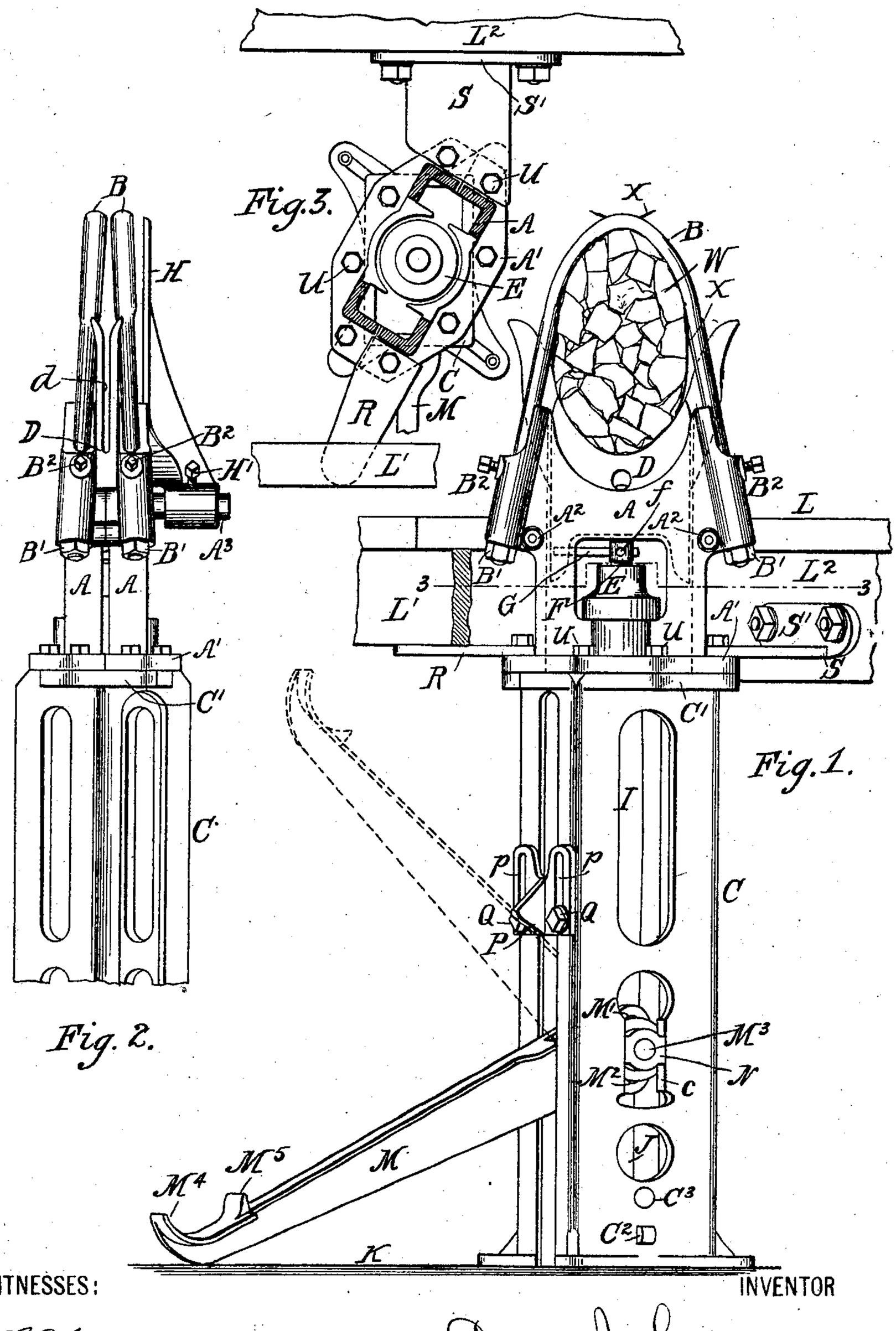

Fig. 2.

Fig. 1.

WITNESSES:

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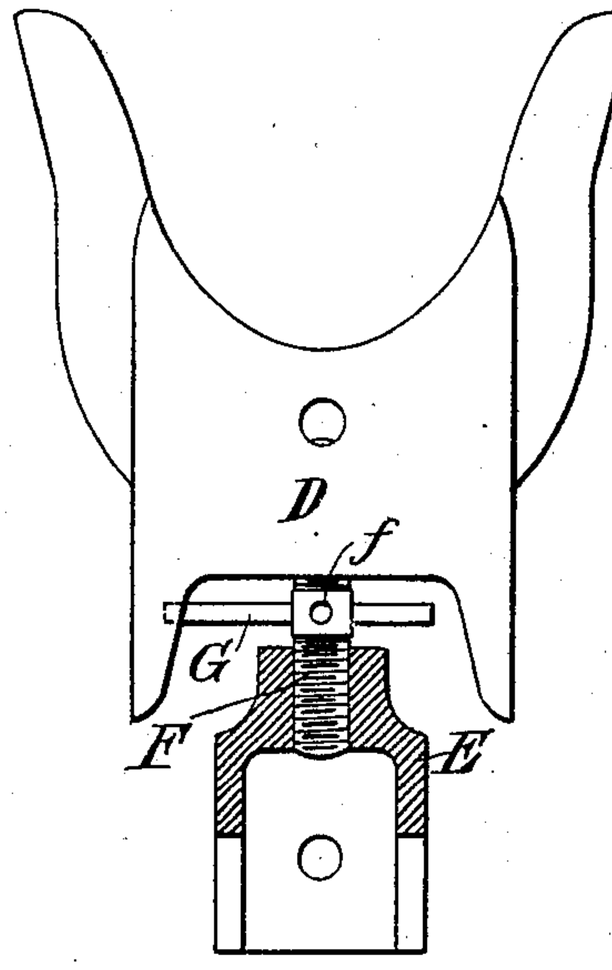

Fig. 5.

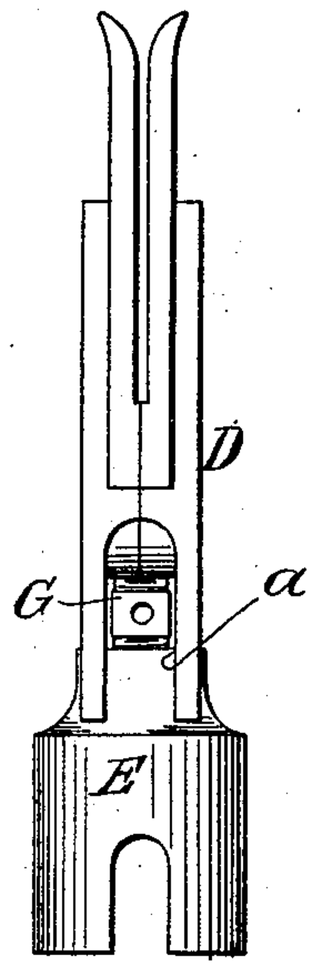

Fig. 6.

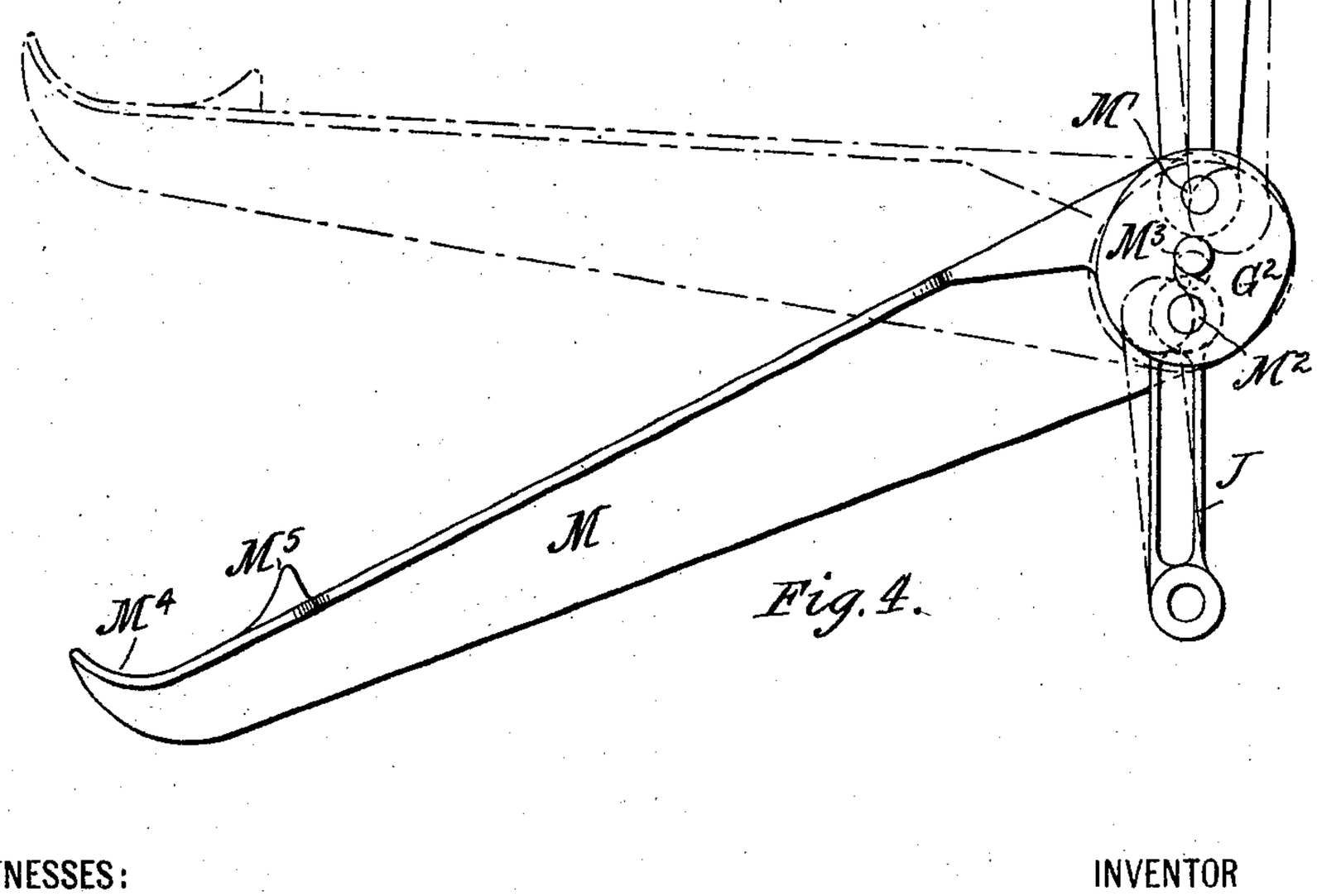

Fig. 4.

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DARWIN A. GREENE, OF BROOKLYN, NEW YORK.

WOOD-BUNDLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 682,849, dated September 17, 1901.

Application filed March 23, 1901. Serial No. 52,484. (No model.)

To all whom it may concern:

Be it known that I, DARWIN A. GREENE, a citizen of the United States, residing in the borough of Brooklyn, in the city and State of New York, have invented a certain new and useful Improvement in Wood-Bundling Machines, of which the following is a specification.

My improved machine is intended more particularly for bundling the short and irregularly-split pieces used for kindling fires, and I will describe it as thus applied.

It is important to be able to operate by the foot, as distinguished from the more bulky and costly machines operating by steam or other power. In all machines for this purpose the strong compressive force is applied through toggle-links, and in all the approximately horizontal lever which actuates the toggles is urged downward by the gravity of the working parts. I have in a patent to me, dated June 23, 1896, shown a power-machine having a construction of head in which the bows of steel which extend over the bundle are secured to the stationary framing of the machine, and the compression of the bundle is effected by the rising of the cradle in which the wood is piled; but even in that machine the gravity of the cradle tended to force the lever down. I have discovered that it is practicable to have the gravity of the cradle conspire with the expansive elasticity of the bundle on its release so that both shall act in the direction to lift instead of to depress the lever. I have based my invention on this and produce a treadle-machine in which the upward motion of the lever is automatic. Ordinarily the lever requires no lifting; but if such is ever required the slight force necessary can be given by the toe of the operator. The machine is easier to operate, both in closing and opening, than any of the previously-known treadle mechanisms and involves the marked advantage that the lever will stay up and the wood-space will remain reliably open by the gravity of the parts, thus avoiding all risk of injury to the operator by any catch failing to hold. It is also a practical advantage of my construction that the lever will remain in its lowest position if so left when the machine is out of use. While the wood-space is full of wood its elastic expansion so lifts on the lever that the latter must be held down by the operator continuing to stand on it with one foot or both feet while he ties the string; but when my machines are standing idle and it is necessary to pass and repass them in a crowded space it is important to have the levers down to the floor, so that they may easily be walked over. My improvement facilitates the gaging of the size of the aperture presented to receive the wood, and therefore the regulation of the quantity received, and allows the bundles to be compressed more forcibly with a shorter and lighter lever and by a lighter operator and with smaller expenditure of dynamic power.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is an elevation, portions of the bench being broken away. Fig. 2 is an elevation of the portion at right angles to the view in Fig. 1. Fig. 3 is a horizontal section on the crooked line 3 3 in Fig. 1. The remaining figures show certain portions detached. They are on a somewhat larger scale. In Fig. 4 the strong lines show the lever and the links in the position they assume when the bundle is fully compressed. The dotted lines show the parts in position when the pressure has been relaxed and the lever has partially risen under the combined force of the expansion of the wood and the gravity of the cradle and its attachments. Fig. 5 is a side view of the cradle and its supporting parts, partly in section. Fig. 6 is a view in the direction at right angles to that in Fig. 5.

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

I use a head much like the head of my previous power-machine of 1896 and combine with it pedal mechanism with a new arrangement of the lever.

A A are the castings constituting the head.

B B are the bows which mold the upper portion of the bundle. I set the bows firmly in the head and compress the bundle by raising the cradle which molds the lower portion of the bundle.

C is the main body or lower frame of cast-iron, made in two parts. The head, made also in two parts, each divided vertically, is set askew relatively to the body, so that the joints cross each other, and the flange A′ of each half at the base of the head, by the aid of the bolts U, rigidly joins the head to the corresponding flanges C′ at the top of each part of the body and also rigidly unites the parts of each together laterally. The parts of the head are further united above the base by bolts A^2, and the parts of the lower frame are united near the bottom by a bolt C^2.

D is the cradle, presenting a deep transverse groove *d*, arranged to receive the cord X, which is introduced by the attendant so soon as the previously-formed bundle has been removed. The pieces of wood W for the next bundle are introduced loosely by the attendant into the approximately oval space of the required capacity provided between the cradle and the bows, and the compression is effected by raising the cradle, exerting great force in the last part of the motion.

E is a circular nut which is loosely inclosed with liberty to rise and sink in a corresponding vertical passage in the base of the head. This nut receives the lower end of the right-and-left screw F, the upper end of which screw is correspondingly tapped into the cradle D. The mid-length of the screw F is provided with holes *f*, one of which holes receives a loose transverse pin G. The length of this pin is sufficient to allow the force of the hand to be applied by its aid to turn the screw in one direction or the other when it is required to adjust the machine by increasing or diminishing the space between the nut and the cradle, but it must not be too short. The head is formed with the joint between the two parts open along the mid-height, as indicated by *a*, on each side of sufficient width to receive the pin and of sufficient height to allow the pin to traverse freely up and down therein when the machine is operated. By turning the screw into the proper position and then moving the pin G horizontally through the screw to the proper extent one end of the pin is engaged in one of the open joints *a*. This arrangement insures that the screw will retain the position in which it is set. It can be adjusted to the extent of a half-turn or to any number of half-turns of the screw at any time by simply moving the pin inward so as to liberate it from the open joint *a* and turning it, and after the adjustment it can be again secured by moving the pin again endwise into the same open joint or into the corresponding one on the opposite side. It can be adjusted with only a quarter-turn by inserting the pin in the other hole.

The lower portion of the nut E is knuckled to the long link I. The lower end of the latter is knuckled to the foot-lever M at the point M′. A shorter link J is knuckled below to the lower frame C at C^3 and extends upward therefrom to a knuckle at the point M^2 in the lever M. Short trunnions M^3, cast integral with M, one on each side, between these knuckles M′ and M^2, are received each in a block N, allowed to traverse up and down in a vertical way *c*, provided in the lower frame C. The treadle end of the lever M extends outward in the proper direction through a liberal opening in the framing C and is adapted to receive a strong force from the feet of the operator when a bundle is being compressed. I arrange the knuckle G^2 at so low a point and have the link J so short that the lever M strikes the floor at the end of the act of compressing a bundle. I proportion the parts so that the compression of the wood W by the straightening of the toggle-levers shall offer the greatest resistance to the operating-lever at about the middle of the movement of the latter. My lever M is in a level position at that period, and thus allows the weight of the operator to be applied on the treadle with much effect.

The lever M is curved near the outer end, as shown by M^4, and is provided with a short arm M^5 extending upward. This construction is important in aiding the operator at the commencement of the downward motion when the lever stands at a great inclination, as shown in dotted lines in Fig. 1. The resistance of the wood to compression is so great that the operator usually mounts upon the lever, steadying himself by his hands upon the bows or other convenient part, and planting both feet upon the lever makes a succession of half-jumping movements, depressing the lever a little each time until the lever is down to and a little below the level position, when the nearly-erect positions of the links I and J so increases the toggle effect that the lever is depressed more easily until it rests on the floor. In the early and late portions of the movements the curve M^4 and the arm M^5 greatly aid in making and keeping a foothold. These features are especially essential in the commencement of the closing movement. They allow the lever M to be made effective at an angle which would be otherwise impracticable.

P is a separate casting secured adjustably on the lower toggle-frame C by the screws Q inserted through the slots *p*, which allow the stop to be shifted up and down. Slacking the screw Q and setting this stop higher lets the cradle sink lower, and thus receives more wood without affecting at all the height to which the cradle is raised when the lever M is pressed downward and strikes the floor, and consequently without affecting the size to which the bundle is compressed.

I make the upper link I long. This is of advantage in giving a more direct lifting action in closing the machine. It is also of advantage by bringing the action of the lever M at a low point in the frame, so that it is more easily worked, especially by girls, and it pre-

sents the lever in its horizontal position, so as to be most efficient at a late stage in the closing motion when the resistance is greatest.

By extending the lower or main frame C down to the floor K, I am able to make it contribute to support the work bench or table L. The engagement with the bench is effected by the aid of sufficiently stout plates R and S. The plate R is plane and horizontal and is bolted under a joist L′ of the table. The plate S is right-angled, having one portion horizontal and another vertical. The vertical portion S′ is bolted to another joist L^2 of the table or to the side of the kiln or bin when such are sufficiently near. The plane part of each of these plates applies over the flange A′ and may be secured by the same bolts U which hold the flanges A′ and C′ together. The fastening is very simple, takes hold of a large portion of the table, and makes the machine and the table mutually self-supporting.

I can use wire with the ends twisted together or any other ordinary or suitable means for confining the bundle permanently together. I will describe the means as the ordinary tarred cord (rope-yarn) for the reason, among others, that the cord itself when the bundle is opened makes a valuable addition to the kindling material. It is applied and adjusted, as usual, while the wood is held in its most compressed condition, and as it is usually applied with only gentle tightness it follows that the freshly-compressed wood expands appreciably by its elasticity when the pressure of the foot on the lever is relaxed and continues to thus expand until it has tightened the knot and the bundle is confined only by the tension of the cord. My arrangement of the parts causes such expansion to depress the knuckle M′ and throw up the outer end of the lever M. This lifting force is very efficient at first. To open the machine and take out the bundle, the operator will, if necessary, assist its rise; but the gravity of the cradle and its attachments, including the long link I, aids in the lifting of the lever, so a slight effort by his hand or foot will suffice to carry it up farther, and the parts proportioned about as shown will certainly continue the opening motion automatically when the lever approaches its highest elevation. The fact that the pivots M′ M^2 are not located in the line of the length of the lever M, but in a line nearly at right angles to the length of such lever, as most clearly shown in Fig. 4, exercises an important influence in that when the long arm of the lever M is up these centers M′ and M^2 are nearly on a level and the gravity of the cradle D and of the upper link I exerts its greatest effect. In consequence of this arrangement gravity will hold the treadle end of the lever M up when it is in its highest position. The arrangement also insures that when the long arm or treadle end of the lever M is down the centers M′ M^2 are in a nearly-vertical line. In this condition the gravity of the cradle will exert so little influence that it cannot lift the lever.

I esteem it a special advantage of the invention that when I arrest its rise by the stop P at any elevation required for practical work the lever will be held up reliably by the gravity of the parts, so that no catch or other device need be used and the lever may be forcibly depressed again when the wood has been supplied for the next bundle without the trouble of detaching any fastening.

The bows B are held down in the head by nuts B′ and further held by pinching-screws B^2, allowing of liberal adjustment in addition to the provisions for adjusting the rise of the cradle.

The gage-plate H, sometimes called the "back plate," is of a proper size and form to serve for all ordinary adjustments of the main parts and can be set nearer to or farther away from the head by slacking the screw H′ and shifting it on the rigid horizontal arm A^3, cast integral with one of the parts of the head and tightening it again.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. Parts may be used without others. I can omit the adjustable stop P and regulate the amount of space to receive the wood with a given adjustment of the screw F by raising and lowering the bows B alone.

I claim as my invention—

1. In a wood-bundling machine, the lever M and the links I and J pivoted thereto, and movable cradle D operated thereby, having the weight of the cradle received through the link I apply on the short arm of the lever J, so that the weight of the cradle lifts the lever, all substantially as herein specified.

2. In a wood-bundling machine, the lever M and the links I and J pivoted thereto, and movable cradle D operated thereby having the weight of the cradle received through the link I apply on the short arm of the lever J, so that the weight of the cradle lifts the lever and with the centers of the pivots M′ and M^2 arranged as shown, so that when out of use the lever will be held either in its elevated or in its depressed position by gravity, all substantially as herein specified.

3. In a wood-bundling machine the lever M and the links I and J pivoted thereto, and movable cradle D operated thereby having the weight of the cradle received through the link I apply on the short arm of the lever J, so that the weight of the cradle lifts the lever and that the elastic expansion of the freshly-compressed wood contributes to initiate such motion, all substantially as herein specified.

4. In a wood-bundling machine having a frame C, the lever M and links I and J pivoted thereto, and movable cradle D operated thereby, the stop-piece P and adjustable holding means Q therefor adapted to allow the ad-

justment of the depth to which the cradle is allowed to sink, all substantially as herein specified.

5. In a wood-bundling machine having a foot-lever and mechanism for compressing the wood, the main frame C extending down to and adapted to be supported on the floor, and equipped with means for engaging strongly with the bench so that the bench and the frame are mutually supported, all substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

DARWIN A. GREENE.

Witnesses:

J. B. CLAUTICE,

PHILIP H. FETT.