(No Model.) 3 Sheets—Sheet 1.

J. W. CARVER.

WOOD WORKING MACHINERY.

No. 432,976. Patented July 29, 1890.

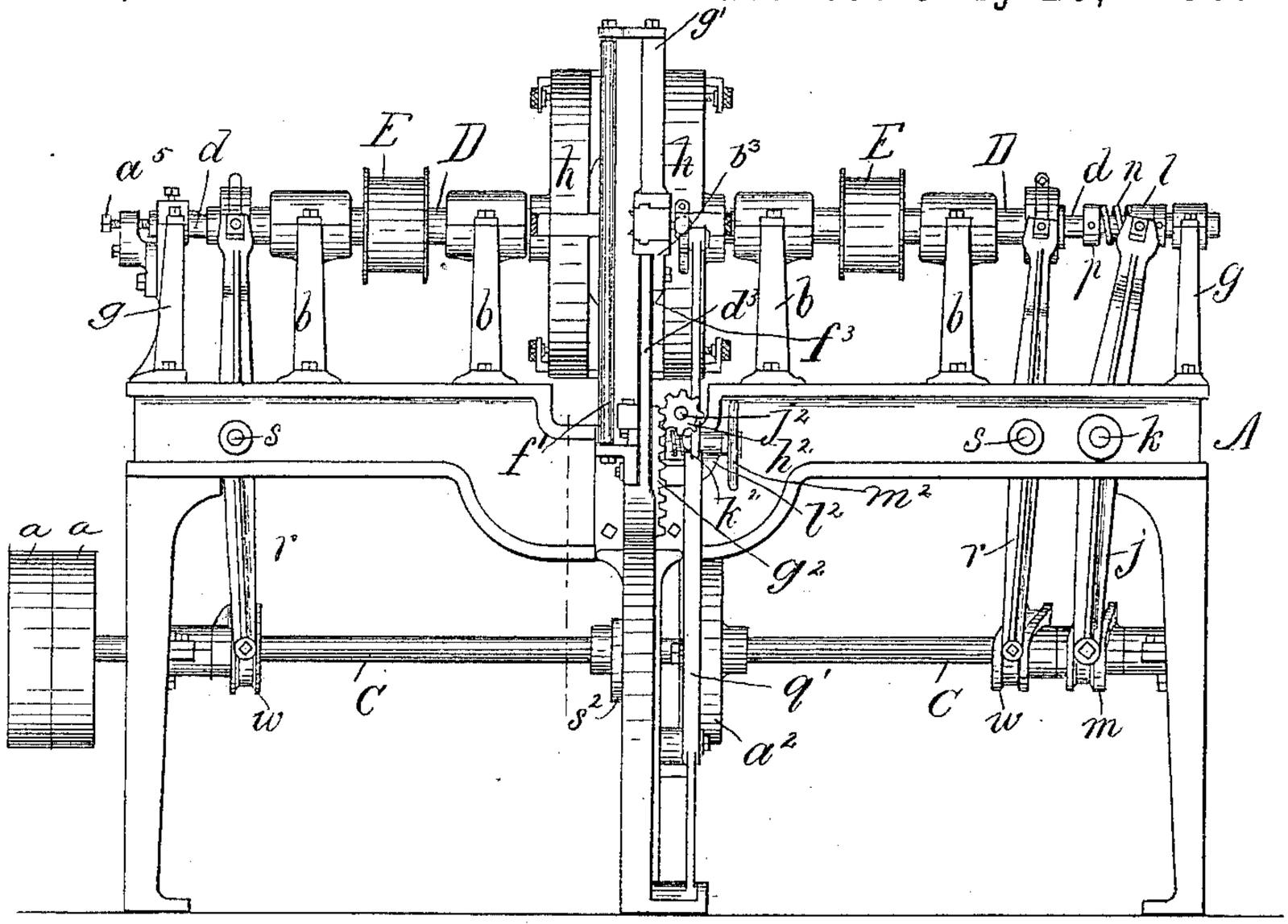
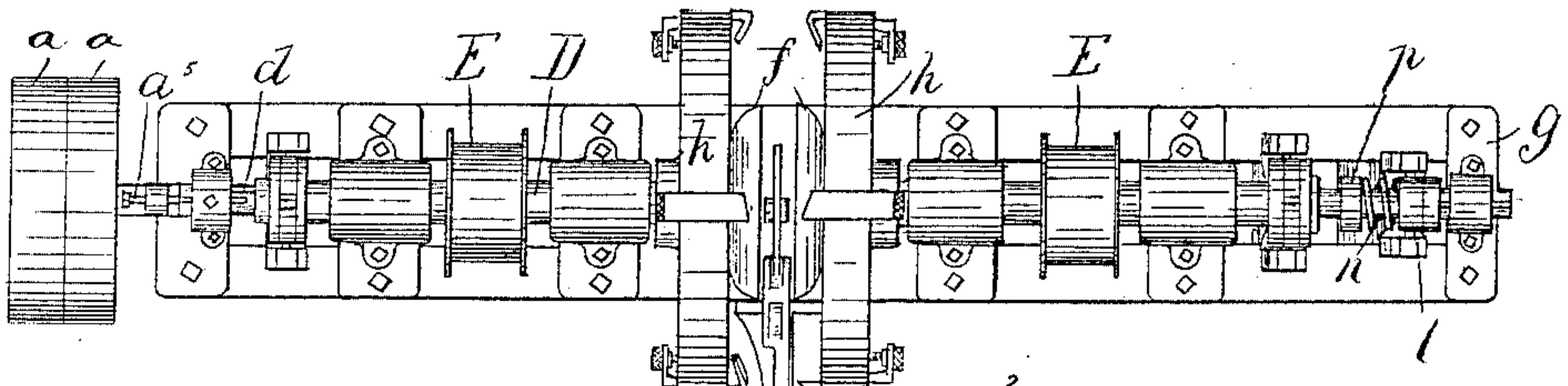


Fig. 1.



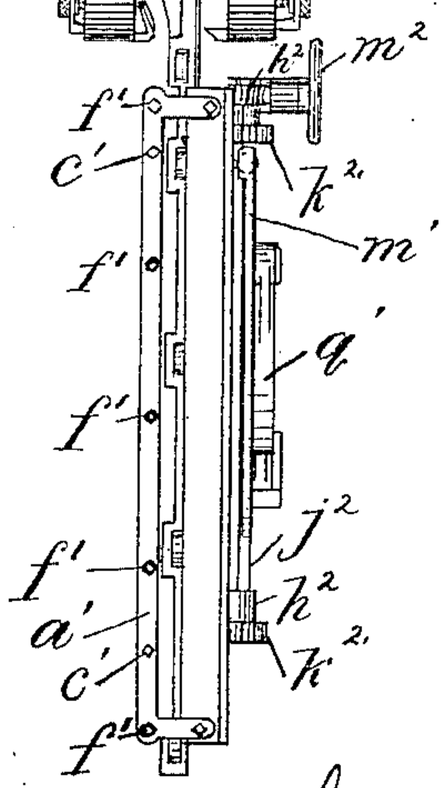


Fig. 2.

WITNESSES.

Robert Wallace.

E. L. Ferrina

INVENTOR.

James W. Carver

by Wm. A. Macleod

his atty

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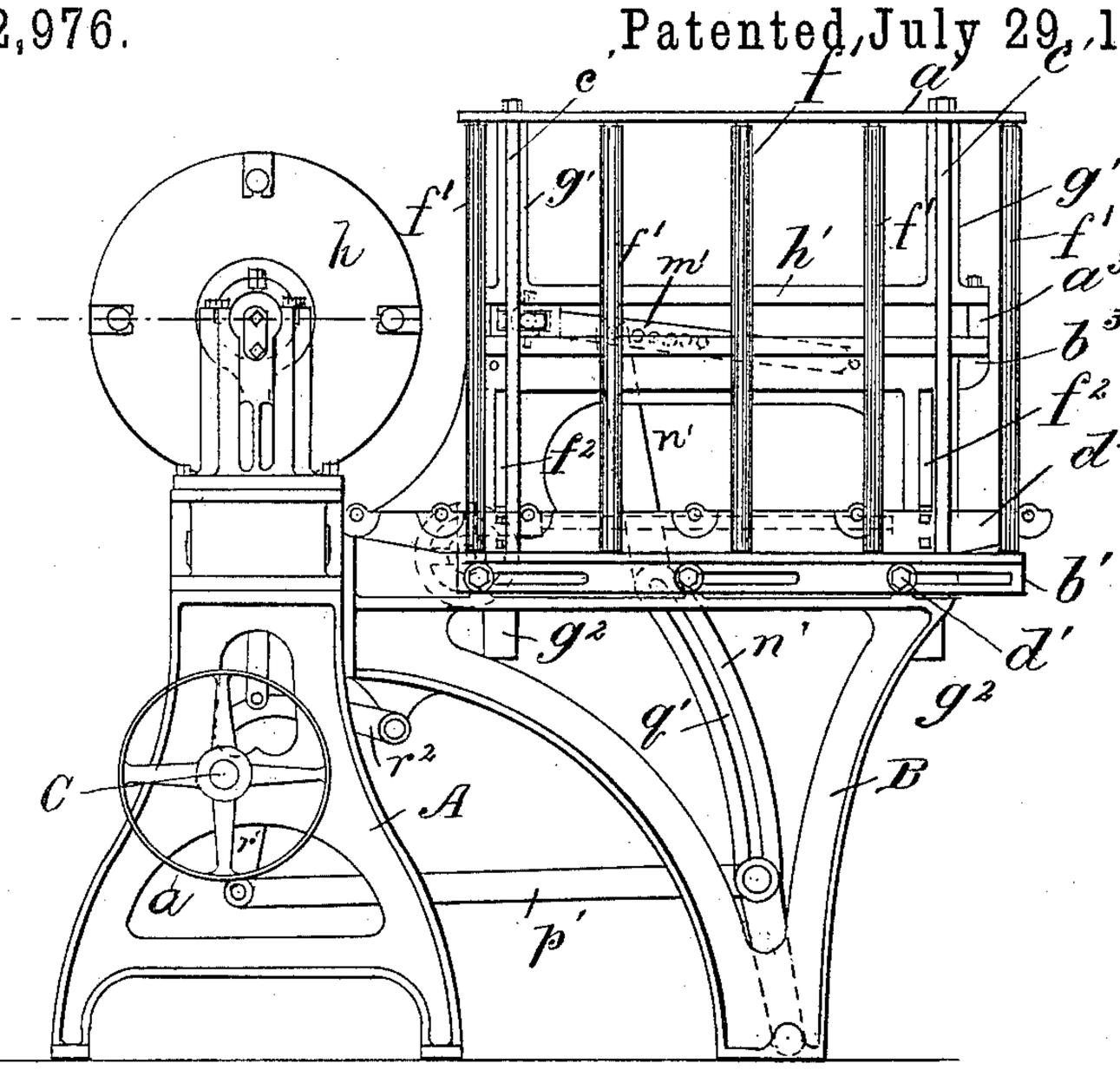

Fig. 3.

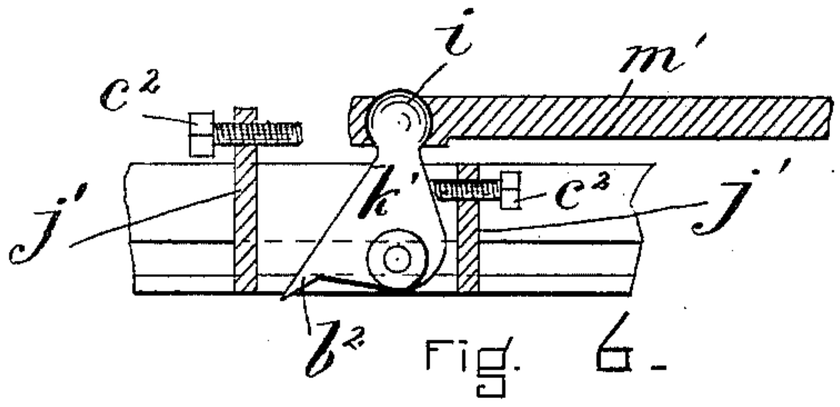

Fig. 6.

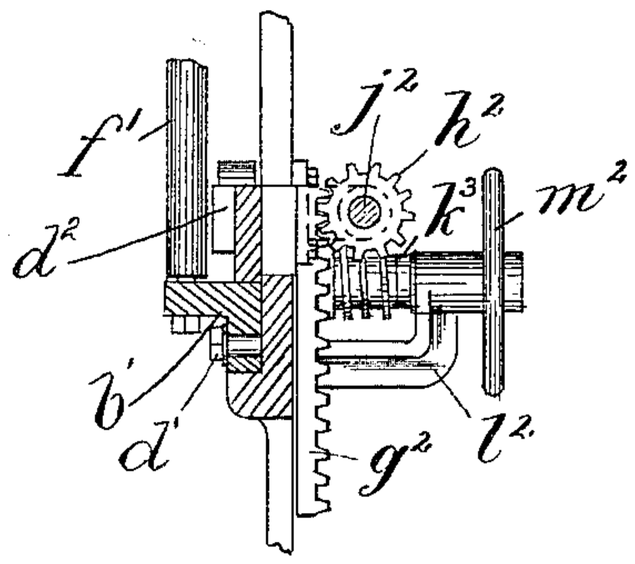

Fig. 7.

WITNESSES.

Robert Wallace.
E. L. Ferreira.

INVENTOR.

James W. Carver
by Wm. A. Macleod.
his atty

(No Model.)

3 Sheets—Sheet 3.

J. W. CARVER.

WOOD WORKING MACHINERY.

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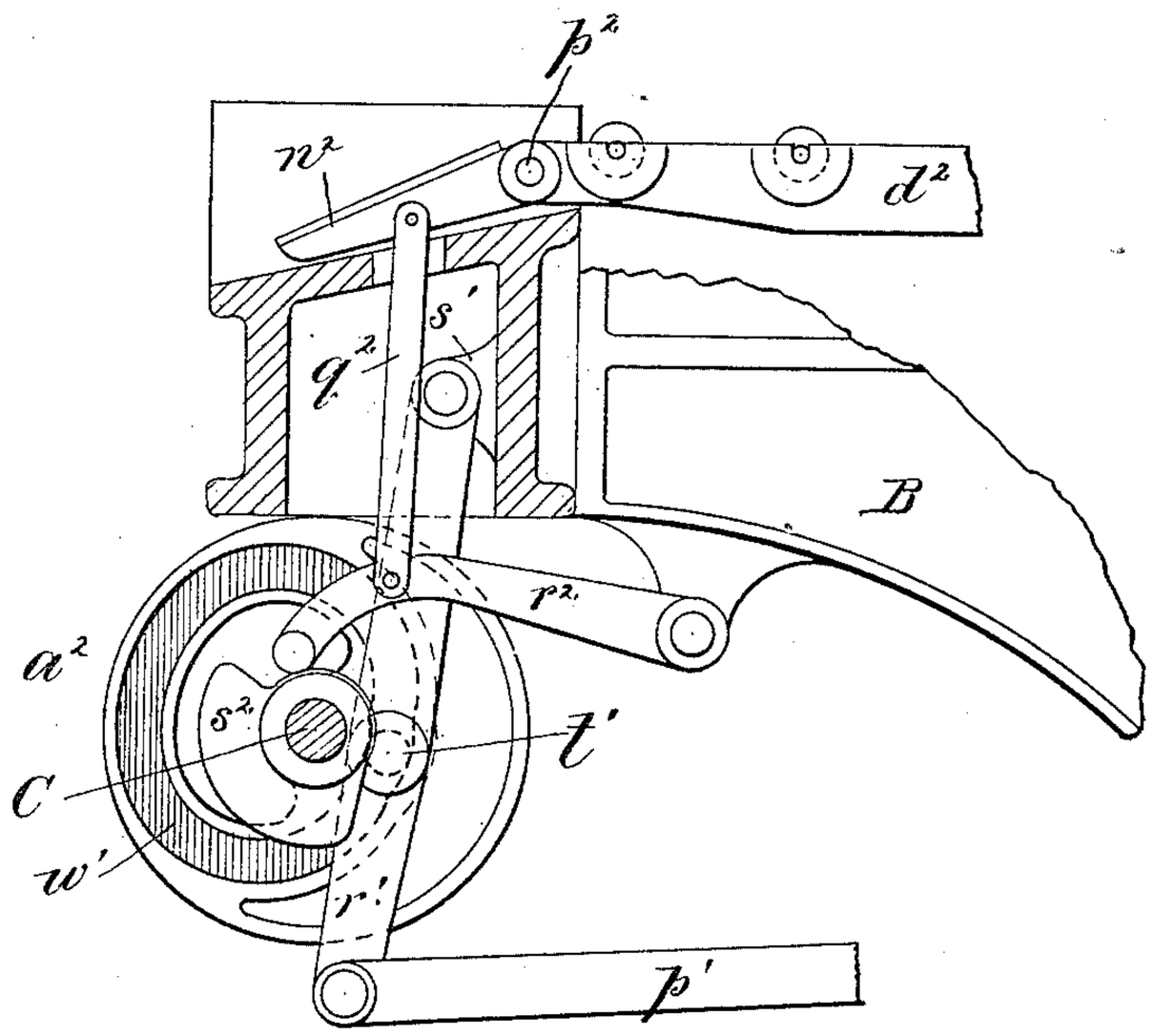

Fig. 4

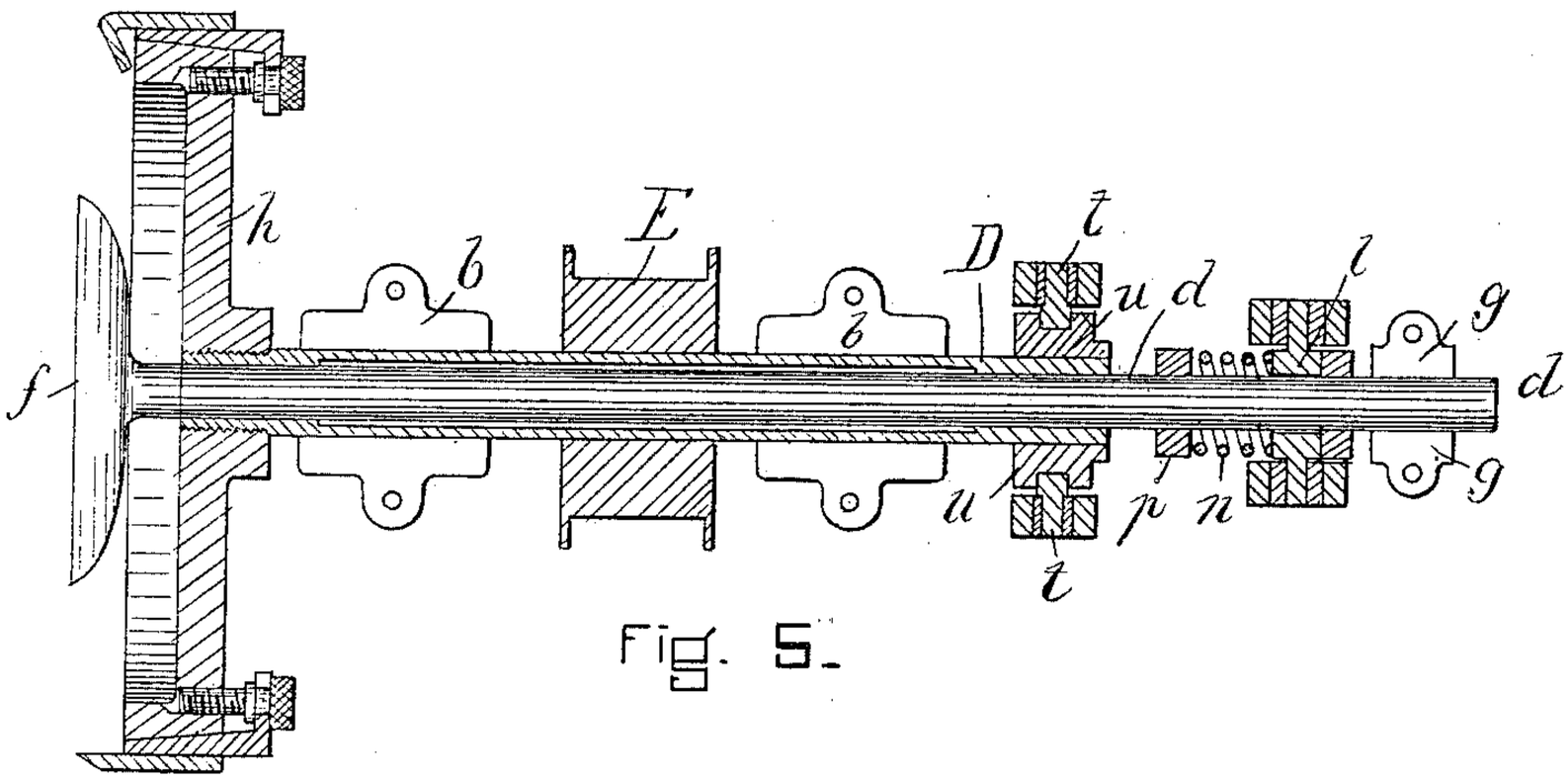

Fig. 5.

WITNESSES.

Robert Wallace

E. L. Ferreira.

INVENTOR.

James W. Carver

by Wm. A. Macleod.

his atty

UNITED STATES PATENT OFFICE.

JAMES W. CARVER, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN HEADING MANUFACTURING COMPANY, OF MAINE.

WOOD-WORKING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 432,976, dated July 29, 1890.

Application filed July 27, 1889. Serial No. 318,927. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. CARVER, of Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Wood-Working Machinery, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof, in which—

Figure 1 is a front elevation. Fig. 2 is a plan view. Fig. 3 is an end elevation from the left of Fig. 1. Fig. 4 is a detail of the cam mechanism which allows the wooden disk, after it is formed by the cutters, to drop out of the machine. Fig. 5 is a central longitudinal section of the cutter-head and its shaft. Fig. 6 is a detail of the feed-dog. Fig. 7 is a detail of the mechanism for raising and lowering the guideway which supports the board as it is fed into the machine.

The object of my invention is the construction of a machine for cutting circular forms or disks—such as are used for tub and pail bottoms, barrel-heads, and the like—from wood or similar material; and it consists in the machine shown and hereinafter described, which comprises mechanism for supporting and feeding the plank from which the circular forms are cut to the cutters, clamps by which the portion of the board which is being cut is securely held during the operation of cutting, cutting mechanism comprising a head supplied with cutters and mounted upon a revolving and sliding shaft, by means of which the cutters are moved against the board as they revolve, said cutter mechanism being in duplicate and so arranged as to approach the board which is being cut from either side thereof, so that a disk beveled on both faces at its periphery may be produced at one operation of the machine, said feeding, clamping, and cutting mechanism being constructed, arranged, and organized into a machine, all as hereinafter described.

In the following description like letters of reference are used to indicate like parts throughout the drawings.

A is the frame of the machine, which is supported on suitable legs.

B is a projection or additional frame secured to the central portion of the main frame and supported by a suitable leg or standard.

C is a shaft mounted in bearings in the lower part of the frame and provided with fast and loose belt-pulleys *a*. On this shaft are set cams, which operate levers which actuate the clamps and cutters longitudinally, as hereinafter described.

On the top of the frame and projecting above the same are uprights *b*, in which are journaled the shafts D, which carry the cutter-heads. These shafts are hollow, as shown Fig. 5, and have a longitudinal sliding movement in their bearings to permit of the revolving cutters being made to approach or recede from the board or plank which is being cut. On these cutter-shafts are mounted belt-pulleys E, by which the shafts are driven, said shafts being actuated independently of the lower shaft C.

Inside the hollow cutter-shafts D are mounted longitudinally-sliding rods *d*, the proximate ends of which are provided with clamps *f*, which are thus mounted centrally of the cutter-heads, as shown, Fig. 5, the outer ends of the rods *d* being mounted in bearings in the upper ends of the uprights *g*, so as to slide longitudinally therein.

The cutter-heads *h* are set opposite each other in the center of the machine, and are screwed or are otherwise suitably secured to the proximate ends of the cutter-head shafts D, as shown, the clamps and cutter-heads being only a sufficient distance apart to admit of the thickest boards or planks which are used being fed between them.

When the plank is fed between the clamps, they are then caused to approach each other, in order to hold the plank firmly in place. To effect this, one of the clamp-rods *d* is moved longitudinally by means of a lever *j*, (see Fig. 1,) which is pivoted centrally at *k* in the frame, and the upper end of which is forked and pivoted to a collar *l*, which is fast to the rod *d*. The lower end of the lever *k* is provided with a cam truck or pin, which travels in a cam-path in the periphery of the cam-wheel *m*. As the movement of the lever *k* is positive, while the length of longitudinal

movement of the clamp must vary with the thickness of the wood which is being cut, a spiral spring n, encircling the rod d, is placed in front of the collar l between said collar and another collar p, fast on said rod. (See Figs. 1, 2, and 5.) This spring permits the clamp to yield and takes up the extra movement of the lever k. The opposing clamp may be similarly arranged, or it may, as shown in the drawings, have its rod seated against an adjusting-screw a^5, so that the clamp may be adjusted relatively to the cutters by moving it toward or from the opposing clamp, and thus the clamps be made to exert greater or less pressure in holding the wood. Similar means are provided to move the cutter-shafts longitudinally, each shaft being actuated by a lever r, pivoted centrally in the frame at s, the upper ends of said levers being forked and provided with pins t, which travel in a groove in the periphery of a collar u, fast on the outer end of the cutter-shaft. (See Fig. 5.) The lower ends of said levers r are provided with cam pins or trucks, which co-operate with cam-wheels w, fast on the shaft C. It will be clear that at each revolution of the shaft C the clamps will be caused to approach and clamp the wood, while the cutters will also be caused to approach each other and cut the disk from the wood. The precise form and size of the clamps may of course be varied.

The mechanism for supporting and feeding the plank as it is being cut is constructed as follows: A vertical frame, comprising a piece b', a cross-piece a', and vertical connecting-rods c', is adjustably clamped by means of screw-bolts d', which pass through slots in the piece b' to the projection B of the frame of the machine. (See Figs. 2 and 3.) This frame contains vertical rolls f', which are journaled therein, and which are thus permitted to revolve as the plank rolls against them in passing to the cutters. The top piece a' of this frame is provided with a projection at either end thereof (see Fig. 2) by means of which it is secured to the top of the uprights g', which rise from the horizontal piece h', which forms the top of the slideway in which the carrier j', which carries the feed-dog, slides. The piece h' rests at either end on blocks a^3, through which it is bolted to the horizontal piece b^3, which forms the bottom or lower side of the slideway for the feed-dog carrier. The piece b^3 rests on a vertical portion d^3 of the frame B, (see Fig. 1,) and is provided with a downwardly-projecting flange, the lower edge of which rests on a bracket or projection f^3 on said upright d^3, and is secured to said upright by means of clamping-bolts, which pass through horizontal slots in the piece b^3. By this arrangement the feed-frame may be moved horizontally a distance equal to the length of the slots in the pieces b' and b^3, the clamping-bolts which pass through both said pieces requiring to be loosened before the frame can be adjusted horizontally toward or from the cutters. The feed-dog carrier j' is arranged to slide in the slideway, and it carries the feed-dog k', which is pivoted vertically therein, and the rear end of which is secured by a ball-and-socket joint to a connecting-rod m', as shown at i, Fig. 6. The connecting-rod m' is pivoted to the upper end of a lever n', said lever being pivoted at its lower end at a point near the foot of the part B of the frame, as shown in Fig. 3. By means of a series of holes in the connecting-rod m' (see Fig. 3) the path of movement of the dog k' may be changed, as will be clear. The lever n' is reciprocated by means of a connecting-rod p', which is pivoted at one end in the curved slot q' in the said lever and at the other end to a lever r', which is pivoted at its upper end to a lug on the frame of the machine. (Shown at s', Fig. 4.) The lever r' is provided about midway of its length with a cam-truck t', which co-operates with a cam w' in the face of the cam-wheel a^2, which is set on the shaft C. By raising or lowering the connecting-rod p' in the slot q' of the lever n' the length of throw of the lever, and consequently the length of the movement of the dog k', may be varied.

The machine, as shown in Fig. 3, is set to produce disks of the largest size—that is, the feed mechanism is adjusted to the longest range of movement. It will be clear that the feed-dog k' must feed the plank forward at each feed movement at least a distance equal to the diameter of the disk which is cut, and the movement of the dog may be adjusted for this purpose accurately by changing the position of the connecting-rod p' in the slot q', as heretofore described. The dog k' is provided with one or more teeth b^2 and is so pivoted, as shown, Fig. 6, that the first movement of the dog when acted upon by the connecting-rod m' is to swing slightly on its pivot, thus causing the teeth of the dog to be forced into the plank if the movement of the connecting-rod m' be in one direction or withdrawn from the plank if said movement be in the opposite direction. The subsequent movement of the rod m' acts to move the dog and its carrier in the carrier-slideway. To limit the movement of the dog on its pivot, screw-stops c^2 (see Fig. 6) are set in either end of the sliding frame or carrier j', which carries the dog. By setting in these screws the swing of the dog on its pivot, and consequently the bite of its teeth in the wood, may be lessened, as will be clear. As it is preferable in feeding the plank forward that the dog should come in contact with it centrally, the carrier j' and its slideway are placed in line with the center of the cutter-heads, and thus whatever the diameter of the cutter-head and whatever the width of the plank the dog seizes the plank centrally in feeding it to the cutters.

When comparatively small disks are to be

cut, much narrower stock may be used, and it thus becomes desirable that the rollway upon which the plank is supported should be capable of vertical adjustment. This is obtained as follows: The rollway or support for the wood consists of a piece d^2, provided with anti-friction rolls and set horizontally between the vertical rolls f' and the frame in which the feed-dog carrier slides, said piece d^2 being secured at either end to blocks which slide in the vertical slots f^2. (See Fig. 3.) To the rear faces of these blocks are secured the racks g^2, which mesh with the pinions h^2, which are fast at either end of a shaft j^2, which is journaled in supports k^2 on the stationary part B of the frame. Underneath one of the gears h^2 and in mesh therewith is a worm k^3, which is set in the projection l^2 from the frame, and which is provided with a hand-wheel m^2, by means of which it may be turned. By turning the worm the gears h^2 are moved, raising and lowering the racks g^2, and thus raising or lowering the rollway d^2.

The bottom piece b' of the frame which carries the vertical rolls f' is slotted, as previously described, to receive the clamping-bolts which secure it in place. By means of these slots this frame may be adjusted toward or from the cutters, so that when disks of small diameter are being cut this frame may be moved toward the cutters, thus enabling the end of the board or plank to be held and fed forward as perfectly as any other portion thereof.

After a disk is cut the waste drops clear of the machine, and as soon as the clamps are loosened it is desirable that the disk should drop out of the machine. This is insured by the movement of the inner end of the rollway or support, which consists of a piece n^2, (see Fig. 4,) which is pivoted to the piece d^2 at p^2, and is connected by a pivoted connecting-rod q^2 with a lever r^2, which is pivoted at one end to a projection on the frame of the machine, and is provided at the other end with a cam-truck, which bears on a cam s^2, formed on the periphery of the hub of the cam-wheel a^2. As the cam revolves on the shaft C, the piece n^2, onto which the disk falls when the cams are loosened, is dropped down into the inclined position shown in Fig. 4, and the disk rolls therefrom and is discharged from the machine. As soon as the disk clears the piece n^2 the cam acts to raise the piece again to a horizontal position.

What I claim is—

1. In a wood-working machine, the combination of duplicate clamping and cutting mechanism arranged to act simultaneously on both sides of the wood with supporting and feeding mechanism, consisting of a horizontal frame for holding the wood in position and a horizontally-reciprocating feed-dog, whereby the wood is securely held while the disk is being cut, and is then fed forward to bring a new portion of the wood into position between the cutters.

2. In a wood-working machine, the combination, with two rotary cutter-heads movable toward and from each other and clamps for holding the said work for the said cutter-heads to operate upon, of a holding and guiding frame for the wood having a guideway central of the said cutters, a vertically-adjustable support d^2, on which the wood is fed to the cutting and clamping mechanism, and a horizontally-reciprocating feed-dog for advancing the work to said mechanisms, whereby strips of wood of various widths may be supported and fed centrally in line with the cutters.

3. In a wood-working machine, the combination, with a guiding-frame for the wood, of a feed-dog carrier j', a feed-dog pivoted to said carrier and provided with one or more teeth b^2 forward of its pivotal point, and a reciprocating rod m', to which the outer end of said feed-dog is pivotally attached, whereby as the said rod is moved forward or backward said feed-dog is first turned on the pivot by which it is attached to its carrier to be engaged with or disengaged from the work, and the said carrier and feed-dog are moved bodily forward or backward.

4. In a wood-working machine, the combination, with a wood supporting and guiding frame, of a feed-dog carrier j', provided with regulating-screws c^2, a feed-dog pivoted to said carrier between said screws and having one or more teeth b^2 forward of its pivotal point, and a reciprocating rod m', to which the outer end of said feed-dog is pivotally attached, whereby the feed-dog and its carrier may be reciprocated and the rocking movement of the feed-dog on its pivotal point of attachment to its carrier may be governed.

5. The combination, with a wood supporting and guiding frame, of a reciprocating feed-dog co-operating therewith, a connecting-rod carrying said feed-dog, a lever adjustably connected at its upper end with said connecting-rod, and actuating mechanism for said lever, whereby the path of movement of said feed-dog may be changed.

6. The combination, with a wood supporting and guiding frame, of a reciprocating feed-dog co-operating therewith, a connecting-rod secured to said feed-dog and adjustably connected with a lever, a connecting-rod for operating said lever adjustably secured thereto at one end, and operating mechanism for said connecting-rod whereby by adjusting said connecting-rod relatively to said lever the throw of the feed-dog may be increased or diminished.

7. The combination, with a wood supporting and guiding frame, of a reciprocating feed-dog co-operating therewith, the connecting-rod m', the lever n', the connecting-rod p', the lever r' and its actuating-cam, and the shaft C, whereby at each revolution of the shaft the feed-dog is reciprocated.

8. In a wood-working machine, the combination, with duplicate rotary cutters and a

pair of clamps co-operating therewith, of a wood supporting and guiding frame arranged to deliver the wood centrally of said cutters and clamps and having a bottom piece d^2, on which the wood is fed, said bottom piece being provided with the pivoted piece n^2, the lever r^2, the cam s^2, by which said lever is operated, and the rod q^2, connecting said lever with the said piece n^2.

JAMES W. CARVER.

Witnesses:
CHARLES LEIGHTON,
IRA B. KEITH.