(No Model.)

2 Sheets—Sheet 1.

J. W. CARVER.

WOOD WORKING MACHINERY.

No. 432,975. Patented July 29, 1890.

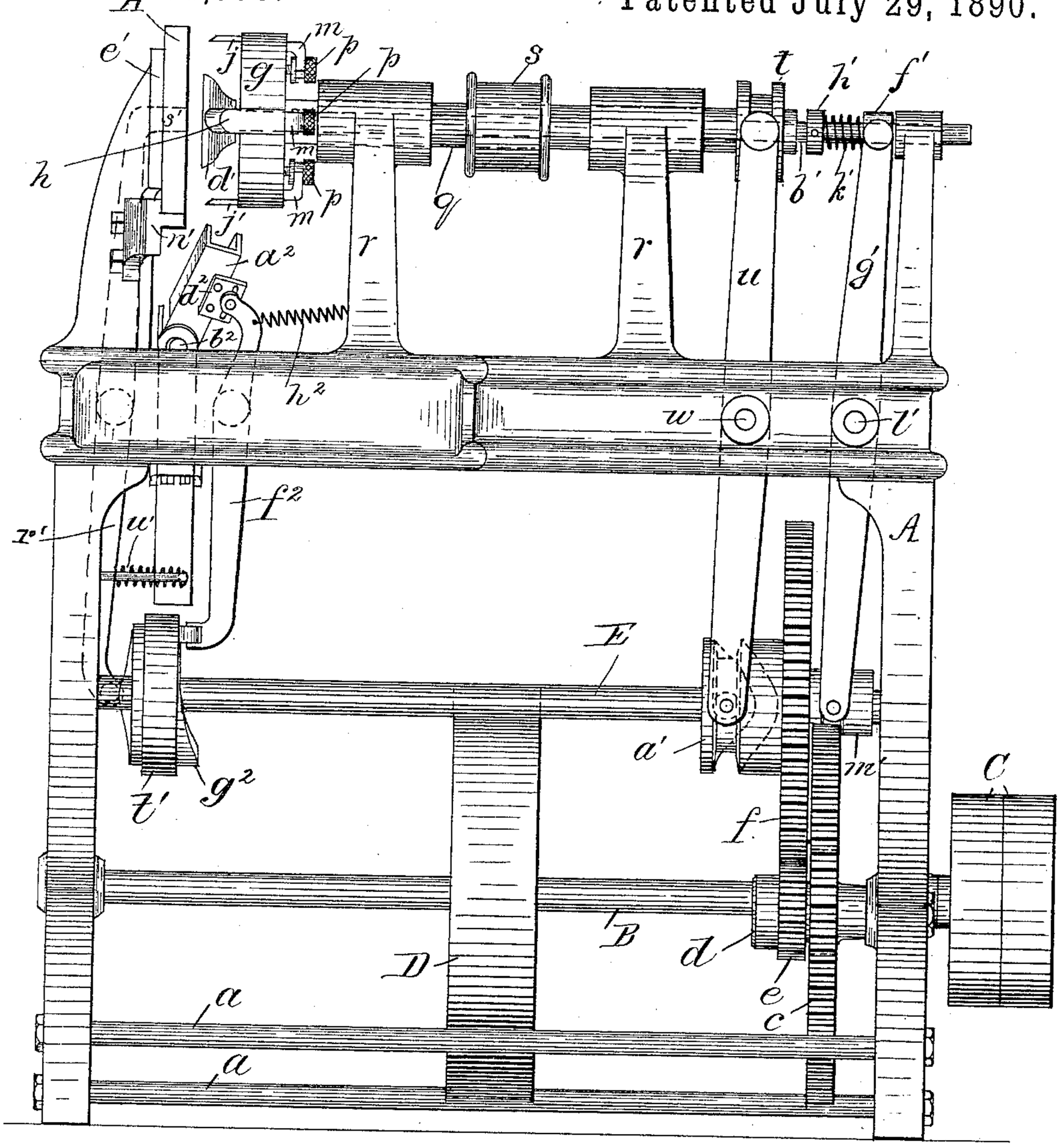
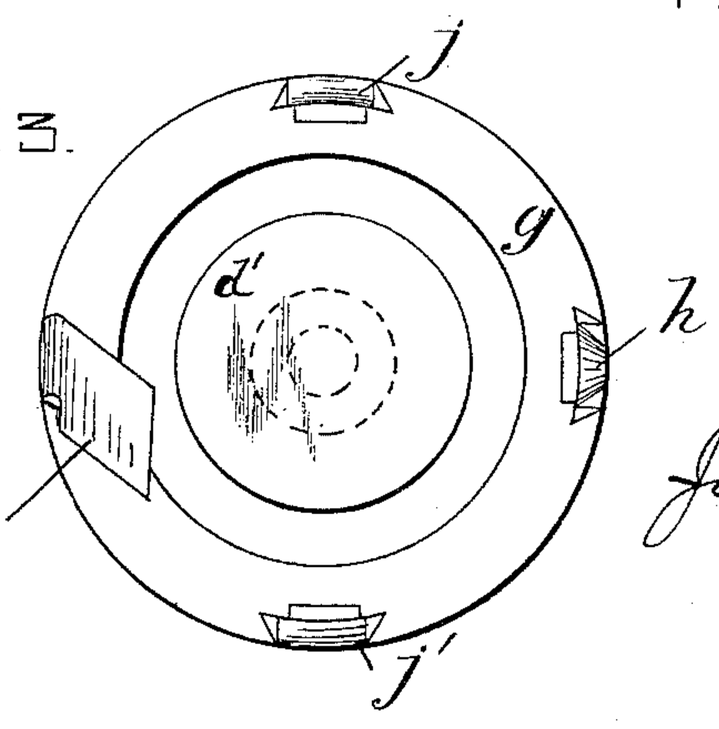


Fig. 1.

Fig. 3.



WITNESSES.

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(No Model.) 2 Sheets—Sheet 2.

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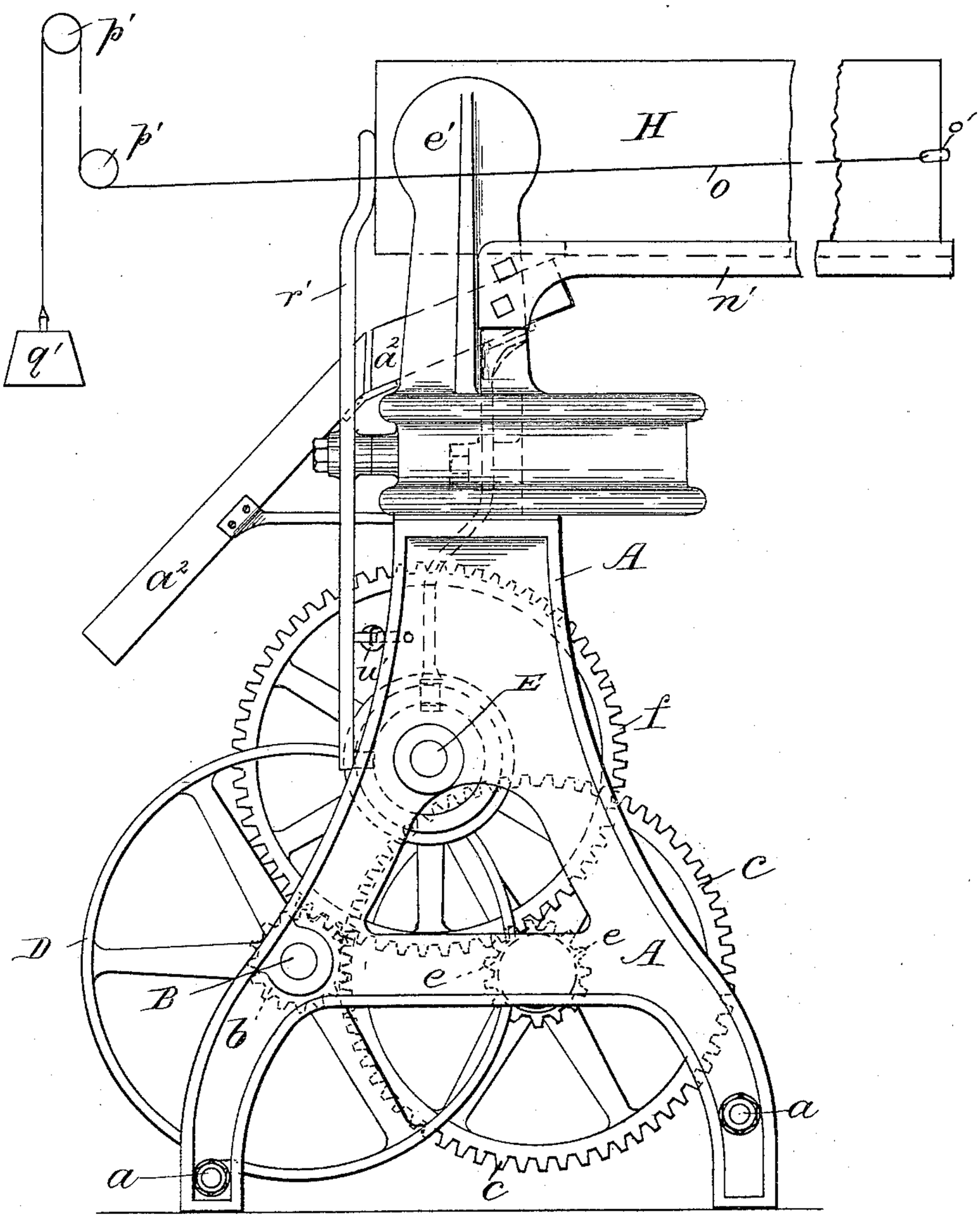

Fig. 2.

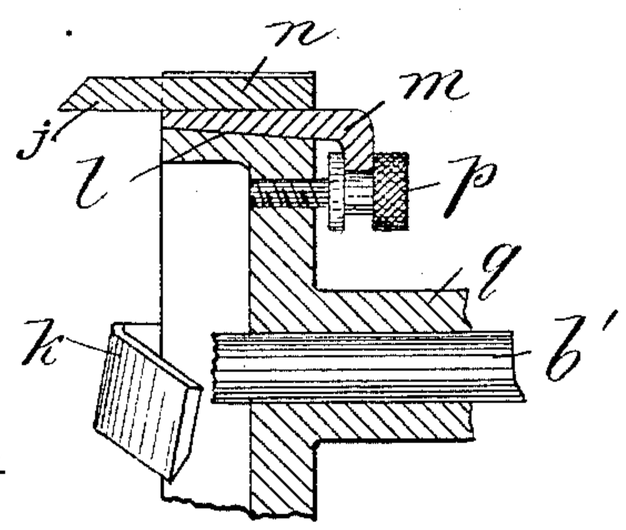

Fig. 4

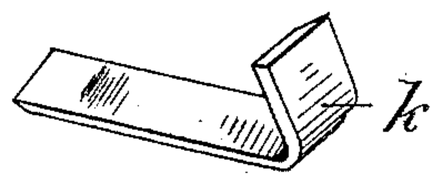

Fig. 5.

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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. 432,975, dated July 29, 1890.

Application filed December 31, 1888. Serial No. 295,019. (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 side elevation of a machine embodying my improvements. Fig. 2 is an end elevation thereof. Fig. 3 is a plan view of the cutter-head, showing a series of cutters in position. Fig. 4 is a section through part of the cutter-head, showing the method of securing the cutters in place. Fig. 5 is a perspective of one of the cutters, showing a cutter which may be used to bevel the edge or periphery of the disks which are cut by the machine.

The object of my invention is the production of a machine for cutting circular forms—such as disks or cylinders—from wood and for beveling or grooving or otherwise forming the face of these forms or disks; and it consists in the mechanism hereinafter described and in the arrangement and construction of the various parts thereof comprising a clamping device for firmly securing the wood while it is under the action of the cutters; a cutting device consisting of a head or plate carrying one or more cutting-tools and adapted not only to be rotated in a plane parallel or substantially parallel to the face of the wood, but also to be moved toward and from the wood; mechanism for actuating the cutter-head in both directions, as also for actuating the clamping device automatically; mechanism for supporting the wood and for feeding it into the machine and for stopping it at the proper times as it is fed forward, and mechanism for separating the articles formed from the waste pieces of wood as they leave the machine, the whole co-operating in an organized machine, as hereinafter explained.

In the accompanying drawings, in which like letters of reference indicate like parts, I have shown my invention as embodied in the best form of machine now known to me, and I will describe it as therein shown.

The frame of the machine, which may be of any suitable form, is shown at A. It consists of suitable uprights supporting a table, above which the operative parts of the mechanism are placed, and from which they are supported. The feet or lower parts of the uprights are provided with tie-rods *a*, which serve to strengthen the frame. The main shaft (shown at B) is journaled in the frame, and is provided at one end with the fast and loose pulleys C. Toward the central portion of the main shaft a belt pulley D is secured, from which power is applied by a belt (not shown) to the cutter-head shaft. The main shaft is also provided with a pinion *b*, which meshes with the gear *c*, set on a stud *d*, projecting from the frame A. The stud *d* also carries pinion *e*, which revolves with the gear *c*, and which is in mesh with the gear *f* on the secondary shaft E, which is journaled in the frame above the main shaft.

The secondary shaft E carries a series of cams which actuate the clamping device, the device for stopping the wood at the proper place as it is fed in, the chute, the movement of which separates the waste wood from the formed articles, and a cam which gives the cutters their lateral movement toward and from the wood, and as these operations are performed only once each time a disk is cut the secondary shaft E runs at a relatively low speed, and this low speed is obtained by means of the train of gears already described.

The cutting mechanism consists of a head or plate *g*, which is shown as circular, and which carries a series of one or more cutters. The cutter-head shown is provided with four cutters, which are set in the head in the manner shown, Fig. 4, all of which will be hereinafter described. As will be obvious, the precise form and position of these cutters may be varied, as required, the cutters shown being adapted to cut a disk from a board. For this purpose I make the cutter shown at *h* slightly longer than the others and with a rounded edge, so that it will cut slightly in advance of the other cutters. This secures a smooth periphery to the disk which is formed. The cutters shown at *j j'* are reversely beveled and act in a manner similar to a pair of sawteeth to separate the disk from the board.

The cutter shown at k is provided with a cutting-face projecting obliquely over the edge of the disk which is being cut and acts to bevel the edge thereof to a greater or less degree, as may be desired, the amount of bevel being determined by the size of the knife and the distance at which it is set from the face of the cutter-head. Disks of wood which are slightly skived or beveled at the periphery are used for many purposes, such as pail and tub bottoms and the like. As will be clear, the cutter-head may be provided with knives adapted to produce a disk having an ornamented face, such as concentric lines of beading and the like.

My method of securing the knives in the cutter-head is shown in Fig. 4. An aperture is cut through the head, the inner face or wall of the aperture being beveled somewhat, as shown at l. The shank n of the cutter is inserted in the aperture and secured by a wedge m, which is forced in from the back of the cutter-head by means of a screw p, having an annular groove in its head to receive a projection or offset from the thick edge of the wedge. By setting in the screw p the wedge is forced inwardly and is firmly held in place and prevented from loosening when the machine is in operation. I prefer this method of securing the cutters; but, as will be clear, they may be secured in other ways, and I do not deem the method of securing the cutters as essential to my invention. The cutter-head g is mounted on the end of a shaft q, which is journaled in bearings on the uprights r, (see Fig. 1,) and which is provided with a pulley s, by which power to rotate the cutter-head is applied, as previously described, from the large pulley D on the main shaft. The cutter-head shaft q is also provided with a pulley t, having an annular groove thereon, which receives a stud fast in the upper end of the lever u, which is pivoted about midway of its length at w in the frame.

The lower end of the lever u is provided with a cam-stud, which engages with a cam cut in the periphery of the cam-wheel a'. As the cam a' revolves, the lever u is vibrated, thus moving the cutter-head and its shaft laterally, and causing the cutters to approach and recede from the wood, which is in position to be cut. The cutter-head shaft q is hollow, and receives the shaft b', which carries at its forward end the movable member d' of the clamping device, which member consists of a block or piece of the shape shown having a flat face, which comes in contact with the wood and acts to clamp the wood securely between it and the stationary clamp e'. The rear end of the shaft b' is provided with a collar f', which engages with the upper end of the lever g'. In front of the collar f' a collar h' is secured to the shaft b', and between the said collars a spiral spring k' encircles the shaft, as shown, Fig. 1. The lever g' is pivoted at l' in the frame, and the lower end of the lever is provided with a cam-stud, which engages with the cam in the periphery of the cam-wheel m', set on the shaft E. The throw of the cam m' vibrates the lever g', causing it to move the shaft b' endwise, and thus to force the clamp d' against the wood which is in position to be cut, and hold the wood securely in place. The spring k' permits the movement of the clamp d' to vary relatively to the throw of the lever g', and thus without special adjustment to accommodate boards of different thicknesses.

The piece of wood or board is shown at H, and is supported on a horizontal arm or support n', which is fast to the upright portion of the stationary member e' of the clamping device. (See Fig. 2.) For the purpose of feeding the board forward I use a weighted cord or rope o, which is made fast to the rear end of the board by means of a hook o' or similar device, and which cord or rope passes over sheaves p', located in any suitable position in which the action of the weight q' will move the board forward when it is not clamped and when the stop-lever r' is thrown back out of its path. The stop-lever r' is pivoted on a stud projecting from the frame, (see Fig. 2,) and is bent at its upper end, as shown at s', Fig. 1, in order that it may project into the path of the board, and thus stop the board when it has been moved forward a sufficient distance and hold it until it is clamped by the clamping device. The lever r' projects downwardly, as shown, and is provided at its lower end with a cam-roll, which engages with a throw-cam on one face of the cam-wheel t', mounted on the shaft E. A spring u' is secured to the lever r' and to a projection on the frame, and acts to hold the lower end of the lever r' against its cam. As the cam revolves, it will be clear that the upper end of the lever r' will be thrown at one point in the revolution of the cam into the path of the board H, and will at other times be moved out of the path of the board.

A chute a^2, which is secured to an arm on the frame of the machine, is provided to receive the disks which are formed. The upper portion of the chute a^2 is pivoted to the lower portion at b^2, Fig. 1, and is secured, as shown at d^2, to the upper end of a lever f^2, which is pivoted in the frame, and the lower end of which is provided with a cam-roll, which engages with a cam g^2 on the face of the cam-wheel t'. The lever f^2 is held in engagement with its said cam by means of the spiral spring h^2, which is fast to the upper end of the lever and to one of the uprights r. By means of this mechanism the upper portion of the chute a^2 is in position to receive the disk which has been formed by the machine as it is discharged by the next forward movement of the board, after which the upper portion of the chute a^2 is swung out of the way, where it remains until after the waste pieces formed in cutting the disks from the board have dropped off the board out of the way.

The operation of the machine is as follows: A board is placed in position on its support n', and the rope o is made fast to the rear or projecting end of it. The forward end of the board, when it is fed forward a sufficient distance, is stopped by contact with the stop-lever r'. The movable member of the clamping device approaches the board simultaneously with and slightly in advance of the cutters and clamps the board securely in place. The stop-lever r' is then moved to one side. The cutters are then forced through the board, cutting out a disk, after which they are withdrawn. The clamping device then moves back, freeing the board. The upper portion of the chute a^2 is swung into place to receive the disk, which has been cut as it is moved forward by the advance of the board under the action of the rope and weight mechanism. After the disk has dropped into and passes down the chute the movable part of the chute is swung to one side, and the stop-lever r' is again swung into the path of the board in position to stop it, when it has been again moved forward the proper distance, and the operation is repeated. In this manner a disk is formed at every revolution of the secondary shaft E.

What I claim is—

1. In a wood-working machine, the combination, with the driving-shaft B, provided with pulley D, of the shaft E, carrying the cam a', a set of reducing-gears connecting said shafts B and E, the longitudinal movable shaft q, carrying the cutter-head g, the grooved pulley t, and the driving-pulley s, and the lever u for imparting lengthwise movement to said shaft q from said cam a', substantially as set forth.

2. In a wood-working machine, the combination, with the driving-shaft B, provided with the pulley D, of the shaft E, provided with the cams a' and m', a set of reducing-gears connecting said shafts B and E, the longitudinally-movable hollow shaft q, provided with the grooved pulley t, the driving-pulley s, and the cutter-head g, the longitudinally-movable clamp-carrying shaft or rod b', the levers u and g' for imparting longitudinal movements to said shafts q and b' from said cams, and a stationary clamp co-operating with the movable clamp carried by the said shaft or rod b', substantially as set forth.

3. In a wood-working machine, the combination, with the driving-shaft B, provided with the pulley D, of the shaft E, provided with the cams a' and m', a set of reducing-gears connecting said shafts B and E, the longitudinally-movable hollow shaft q, provided with the grooved pulley t, the driving-pulley s, and the cutter-head g, the longitudinally-movable clamp-carrying shaft or rod b', the levers u and g' for imparting longitudinal movements to said shafts q and b' from said cams, a stationary clamp co-operating with the movable clamp carried by the said shaft or rod b', and feeding and stopping devices whereby the wood to be cut is fed forward and stopped in position to be seized by the clamps, substantially as set forth.

4. In a wood-working machine, the combination, with the clamping and cutting devices, of a pivoted stop-lever, said lever projecting while in one position into the path of the wood which is fed into the machine, and an actuating-cam engaging said lever, whereby at one point in the movement of the cam the stop-lever is thrown into the path of the wood, for the purposes and substantially as described.

5. In a wood-working machine, the combination, with the clamping and cutting devices, of a chute, the upper portion of said chute being movable relatively to the lower or stationary portion thereof, an actuating-lever pivoted at one end to the movable portion of said chute and at the other end engaging with a cam, whereby the movable portion of said chute is moved into position to receive a disk as it is discharged from the machine, substantially as shown and described.

6. In a wood-working machine, the combination, with the stationary clamp e', of the moving clamp d', its shaft b', the actuating-lever g' and its cam, and the spring k', interposed between said shaft and said lever, whereby the moving clamp d' is allowed to accommodate itself to wood of different thicknesses, substantially as shown and described.

JAMES W. CARVER.

Witnesses:
WM. A. MACLEOD,
ROBERT WALLACE.