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APPARATUS FOR CUTTING ENDLESS GROOVES OR SLOTS.

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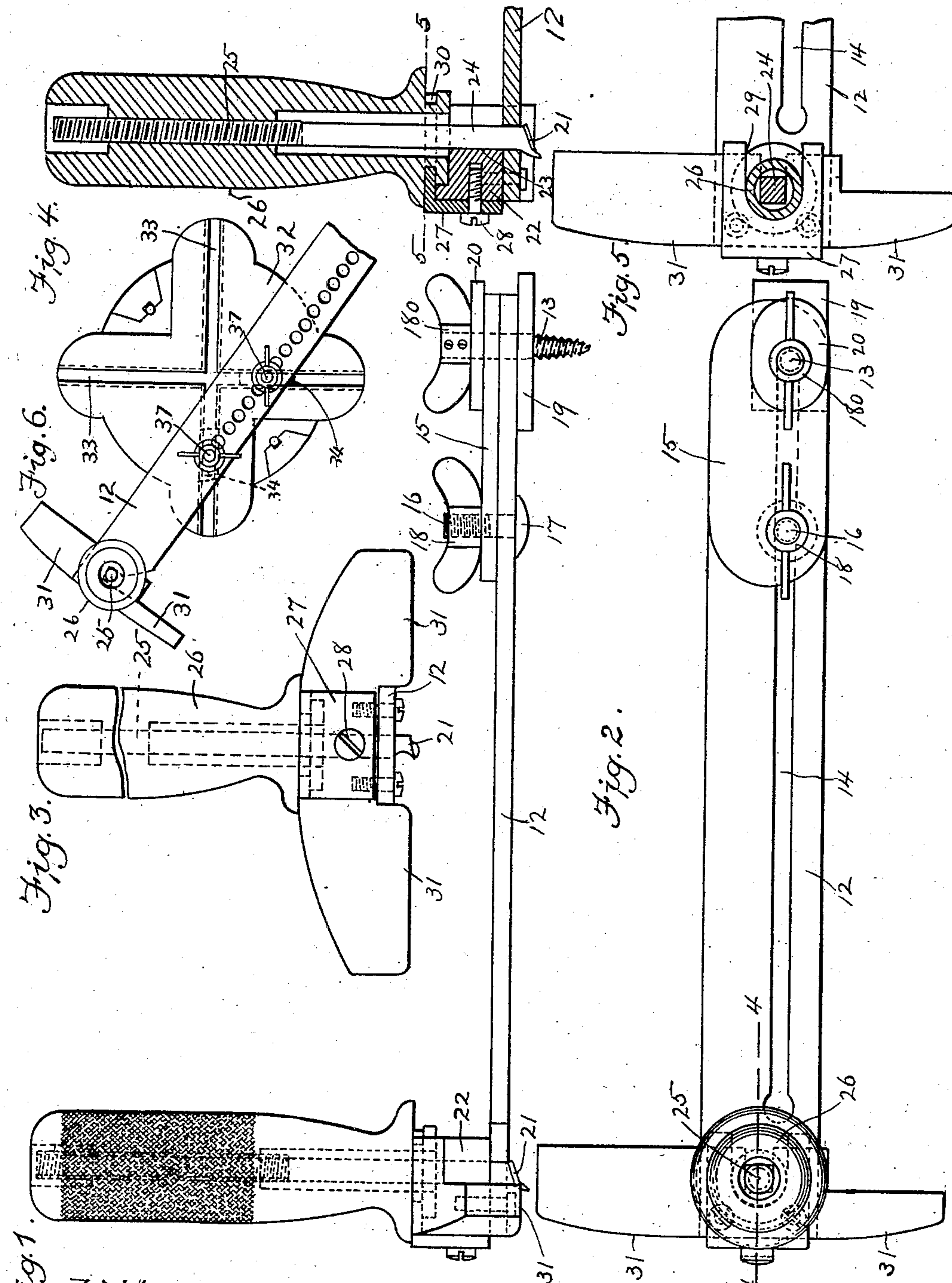


Fig. 1.

Witnesses.
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Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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APPARATUS FOR CUTTING ENDLESS GROOVES OR SLOTS.

No. 884,036.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HASWELL F. PACKARD, of Wakefield, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Cutting Endless Grooves or Slots, of which the following is a specification.

This invention relates to appliances for forming a circular or elliptical endless groove in a flat body.

The invention is adapted for cutting circular or elliptical orifices in wooden bodies, such as doors, by progressively deepening the groove until it cuts through the body and detaches the material surrounded by the endless groove from the main portion of the body, the margin of the orifice constituting the margin of a panel or the margin of a sight opening. The groove may be of lesser depth, and utilized as an ornament, the material surrounded by the groove remaining in place.

The invention has for its object to provide simple and effective means for guiding a cutter in an endless path, which may be either circular or elliptical, and for progressively feeding the cutter while it is in motion to gradually increase the depth of the endless groove or cut.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents a side view of a cutting device embodying my invention. Fig. 2 represents a top plan view of the same. Fig. 3 represents an elevation of the outer end of the device shown in Figs. 1 and 2. Fig. 4 represents a section on line 4—4 of Fig. 2. Fig. 5 represents a section on line 5—5 of Fig. 4. Fig. 6 represents a plan view of a cutting device embodying my invention adapted to form an elliptical groove.

The same letters of reference indicate the same parts in all the figures.

Referring to Figs. 1 to 5, inclusive, 12 represents a beam or bar, which is adapted to revolve about a center 13, the latter being shown as a bolt having a screw-threaded terminal adapted to be inserted in a wooden body, such as a door, in which an endless groove is to be cut. The beam 12 has a longitudinal slot 14, through which the center 13 passes.

15 represents a plate placed upon the outer side of the beam 12, and provided near one end with a hole which closely fits the center 13, and coincides with the slot 14, the plate and beam being adapted to rotate together on the center. The plate 15 is provided near the other end with a clamping device composed of a screw-threaded bolt 16 passing through the slot 14, and having a head 17 which bears on the under side of the beam 12, and a thumb nut 18 which bears upon the upper side of the plate 15. When the nut is loosened, the beam 12 may be moved endwise relatively to the plate 15 and the center 13 to vary the distance of its outer end from said center, and when the nut is tightened, the beam, while free to revolve about the center, is not capable of moving endwise.

19 represents a washer surrounding the center 13, at the under side of the beam 12, and adapted to bear upon the body to be cut, and 20 represents a washer surrounding said center above the plate 15, and serving as a bearing for a head 180 attached to the center 13, said head having wings like those of the thumb nut 18.

21 represents a cutter which is carried by the beam 12, and is located near the outer end thereof, the said cutter being movable vertically at right angles with the beam, and adapted to form a groove or furrow in the body with which the center 13 is engaged, the cutter being caused to move in an endless path about the center by the revolution of the beam on the center. The cutter is movable so that the distance between its cutting edge and the under side of the beam, may be progressively increased during the cutting operation to increase the depth of the groove until the material of the body being acted on is cut entirely through, and the portion of the body surrounded by the endless groove is thus detached from the body.

In the present embodiment of my invention, the cutter is mounted on the beam, and is given a progressive feed movement by the means next described.

22 represents a head which is affixed to the outer end portion of the beam, and projects above the same, or from the side of the beam opposite that from which the cutter projects. The head 22 is provided with a guide 23 having angular sides fitting three of the sides of a squared shank 24 formed on or

affixed to the cutter 21, the shank being thus adapted to slide in the guide, and held by the latter from turning on its own axis. The shank 24 has a screw-threaded outer portion 25, which is engaged by an elongated nut 26, the latter being formed to serve as a hand grip or handle adapted to be grasped by the operator. The nut 26 is rotatively engaged with the head 22 by means of a bracket 27 affixed by a screw 28 to the head, one arm of the bracket projecting over the outer end of the head, and having a recess 29, the inner end of which is concentric with the axis of the nut 26, and is engaged with a groove 30 formed in the periphery of the lower portion of the nut.

The head 22 is provided with runners 31, which project from opposite edges of the beam 12, and are adapted to bear upon the body being cut to steady the cutter, and prevent it from rocking or tipping forward or backward.

The operation of the described device is as follows: The cutter 21 being adjusted, so that its cutting edge is substantially flush with the faces of the runners 31, the center 13 is engaged with the body to be cut. The operator grasping the nut 26, then revolves the nut and beam about the center, thus causing the cutter to travel in a circular path, and to cut a circular groove in the body on which the device is acting. The hold exerted by the operator's hand on the handle-nut 26, causes the nut, while revolving about the center, to always face in one direction, while the cutter is caused by the described engagement of its shank with the head 22, to face in different directions during its orbit about the center, the result being a rotary movement of the nut relatively to the shank of the cutter, which causes the progressive feeding of the cutter downwardly, and the progressive deepening of the groove during the operation, until the cutter passes entirely through the body, and detaches therefrom the material surrounded by the groove.

In Fig. 6 I show the beam 12 mounted upon a base 32 having undercut grooves 33 in its upper surface formed at right angles with each other, and serving as guides for slides 34 having bolts 37 which project upwardly through orifices 35 in the beam, the bolts 37 being provided at their upper portions with thumb nuts 36. The base 32, with its grooves 33, and the slides 34 movable in said grooves and engaged at different points with the beam 12, constitute an embodiment of the well-known ellipsograph, the beam having two constantly-changing centers; viz., the bolts 37 which move with the slides 34, and cooperate with the grooves 33 in guiding the cutter in an elliptical path, the proportions of the ellipse being governed by the adjustment of the

beam upon the bolts 37, this adjustment being permitted by the plurality of holes 35. The cutter 21 and the operating and feeding means, including the elongated nut 26, may be constructed as shown in Figs. 1 to 5, inclusive.

The base 32, as here shown, is adapted to engage the body to be cut, by friction, aided, if necessary, by holding down pressure of the operator's hand. Said base is therefore the equivalent of the center 13, as a means for rotatively connecting the beam with the work.

Each of the parts, termed respectively the center and the base, constitutes a confining member about which the outer end of the beam and the cutter carried thereby, is revoluble.

The embodiments of my invention shown in the drawings are intended particularly for cutting circular or elliptical openings in bodies of wood or like relatively soft material. The invention may, however, be adapted for metal cutting with such modifications as will readily suggest themselves to a skilled mechanic.

It is obvious that the depth of the endless groove may be less than the thickness of the body in which it is formed, in which case the material surrounded by the groove will not be detached, but will remain in place to represent a panel.

The handle-nut 26, which may be termed a hand-grip, is a novel feature in apparatus of this character.

So far as I am aware, I am the first to provide a hand-grip carried by a bar which is revoluble about a fixed center, the grip being adapted to be held by the operator's hand so that any given side of the grip will always face in one direction, the result being, as stated, a rotative adjustment of the grip relatively to the beam when the grip and beam are moved in a circular path about the center. The feeding movement of the tool is therefore automatic; that is to say, it is effected wholly by the orbital movement of the hand-grip about the center.

I claim:

1. An appliance of the character specified, adapted to form an endless groove in a flat body, and comprising a beam, a confining member adapted to engage the body to be cut, the outer end of the beam being revoluble about said member, a cutter mounted on the outer end portion of the beam, and movable vertically at right angles with the beam, said cutter being adapted to form an endless groove when the beam is revolved about the confining member, and means for feeding the cutter to progressively increase the depth of the groove, said means including a cutter-feeding hand-grip mounted on the beam, and connections between said grip and the cutter, whereby the latter is fed automatically when

the grip is manipulated to revolve the beam and cutter.

2. An appliance of the character specified, adapted to form an endless groove in a flat body, and comprising a beam, a confining member adapted to engage the body to be cut, the outer end of the beam being revoluble about said member, a cutter mounted on the outer end portion of the beam, and movable vertically at right angles with the beam, said cutter being adapted to form an endless groove when the beam is revolved about the confining member, a screw-threaded shank projecting from the cutter outwardly from the beam, and an elongated nut journaled on the beam and engaged with said shank, the nut being adapted to serve not only as a hand-grip by which the beam and cutter may be revolved, but also as a cutter-feeding member as set forth.

3. An appliance of the character specified, adapted to form an endless groove in a flat body, and comprising a beam, a confining member adapted to engage the body to be cut, the outer end of the beam being revoluble about said member, a cutter mounted on the outer end portion of the beam and movable vertically at right angles with the beam, said cutter being adapted to form an endless groove when the beam is revolved about the confining member, a head affixed to the outer end portion of the beam, said head having a guide, a shank affixed to the cutter and having a squared inner portion movable in and prevented from rotating by the guide, and a screw-threaded outer portion, and a hand-grip rotatively engaged with the head, and having an internal screw thread engaged with the screw-threaded portion of the shank, said nut serving as a handle and as a cutter feeding member, as set forth.

4. An appliance of the character specified, adapted to form an endless groove in a flat body, and comprising a center adapted to en-

gage the body to be cut, a plate revoluble about said center, and having an orifice closely fitting the latter, a beam having a longitudinal slot, through which the center passes, the beam being adjustable endwise relatively to the plate and center, and revoluble with the plate about the center, means for rigidly securing the beam to the plate in the different positions to which the beam may be longitudinally adjusted, a cutter mounted on the outer end portion of the beam, and movable vertically at right angles with the beam, said cutter being adapted to form an endless groove when the beam is revolved about the center, a hand grip mounted on the beam, and connections between said grip and the cutter whereby the cutter is fed to progressively increase the depth of the groove, when the grip and beam are revolved about the center.

5. An appliance of the character specified, comprising a beam, a confining member adapted to engage the body to be cut, the outer end of the beam being revoluble about the said member, a head affixed to the outer end portion of the beam, said head having a guide, a cutter having a shank movable in said guide, said shank having a screw-threaded portion and a hand-grip rotatively engaged with the head, and having an internal thread engaged with the screw-threaded portion of the shank, whereby the manipulation of the hand-grip to revolve the beam about the confining member is caused to feed the cutter, and runners projecting from opposite sides of the head and from opposite edges of the beam, whereby the cutter and hand-grip are steadied and supported.

In testimony whereof I have affixed my signature, in presence of two witnesses.

HASWELL F. PACKARD.

Witnesses:

JOSEPH L. POWERS,
WILLIAM T. EATON.