

Feb. 6, 1923.

C. J. H. PENNING,
ROTARY CUTTING AND LEVELING KNIFE.
FILED JUNE 30, 1922.

1,444,035

2 SHEETS-SHEET 1

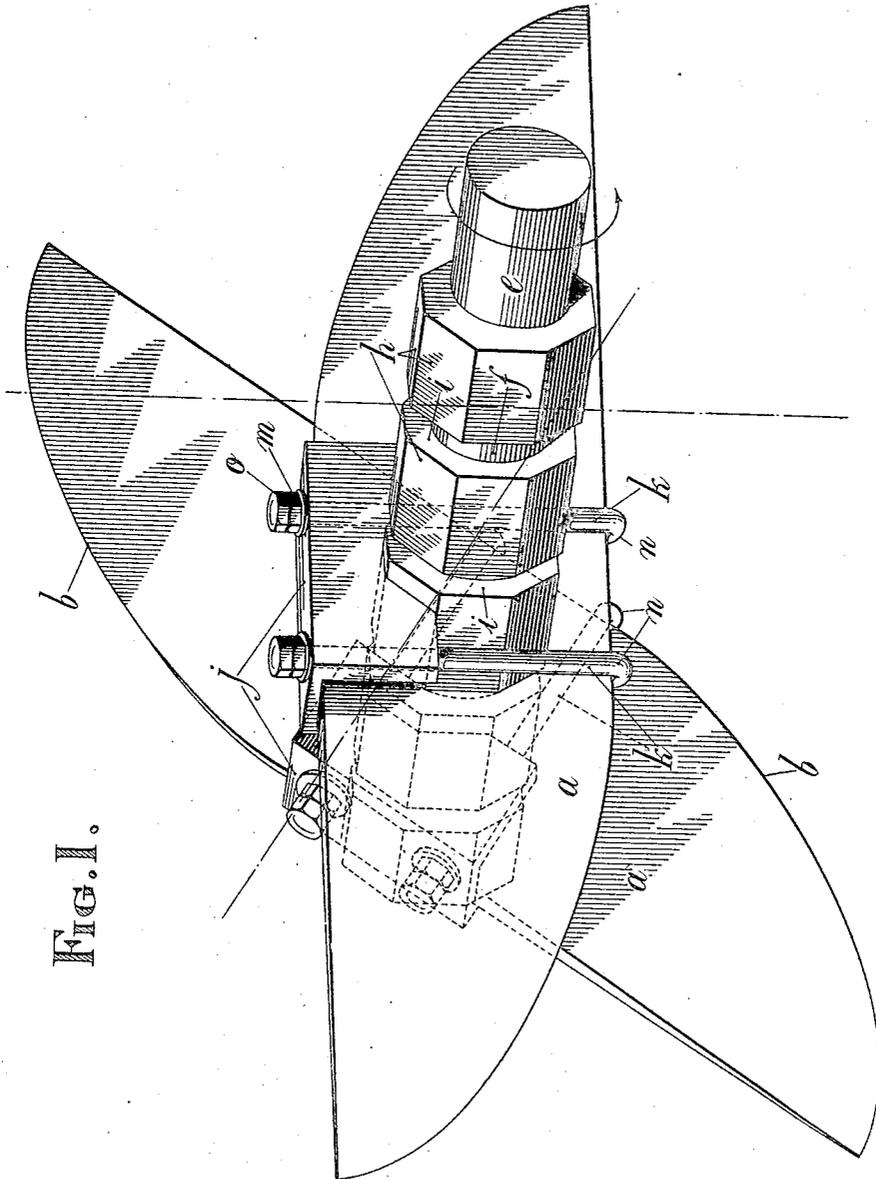


FIG. 1.

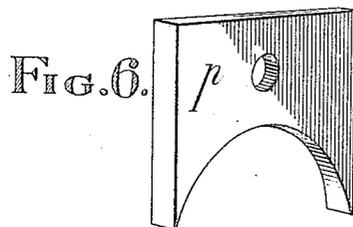
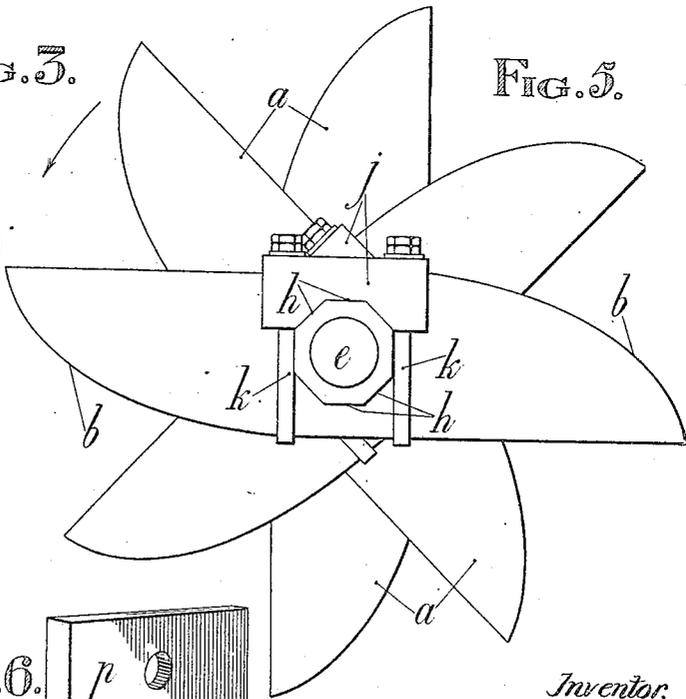
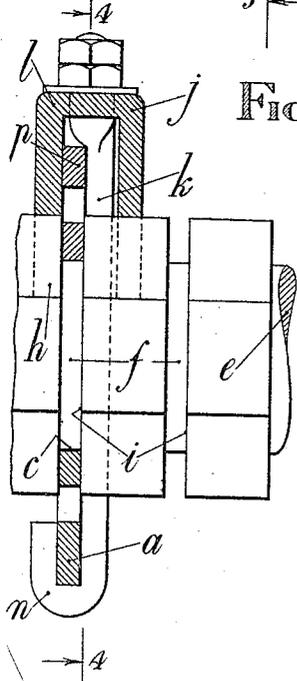
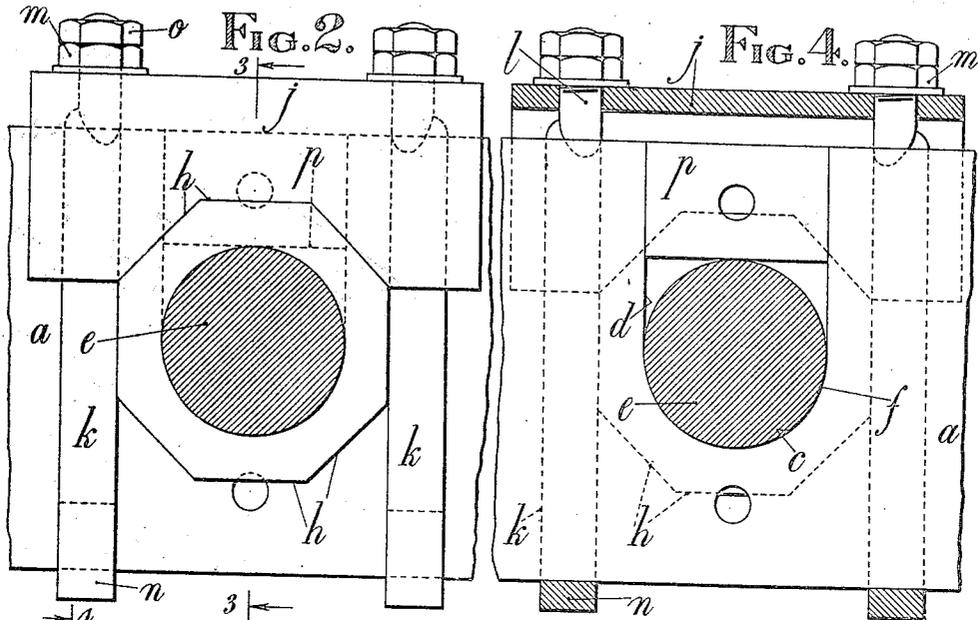
Inventor
C. J. H. Penning
By *[Signature]*
Atty.

Feb. 6, 1923.

1,444,035

C. J. H. PENNING.
ROTARY CUTTING AND LEVELING KNIFE
FILED JUNE 30, 1922.

2 SHEETS-SHEET 2



Inventor:
C. J. H. Penning.
By *J. L. Merri*
Atty.

UNITED STATES PATENT OFFICE.

CORNELIS JOANNES HUGO PENNING, OF MANILA, PHILIPPINE ISLANDS.

ROTARY CUTTING AND LEVELING KNIFE.

Application filed June 30, 1922. Serial No. 572,023.

To all whom it may concern:

Be it known that I, CORNELIS JOANNES HUGO PENNING, a subject of the Queen of Holland, and resident of 503 Chaco Buildings, Plaza Gervantes, Manila, Philippine Islands, have invented certain new and useful Improvements in or Connected with Rotary Cutting and Leveling Knives, of which the following is a specification.

10 This invention relates to rotary cutting and leveling knives.

The invention has for its object to provide rotary cutting and leveling knives which are of improved, strong and simple construction and cheap to manufacture, and are especially applicable for use in cane sugar factories for rotating above the cane carrier to level and prepare the cane and ensure an even and regular feeding of the latter to the rollers of the crushing plant, but they are equally adaptable to other industries and for other purposes for which rotary knives are or can be employed.

15 The present invention provides a rotary cutting and leveling device in which a plurality of slotted or recessed knives are fitted directly on a shaft or other rotary member adapted to support them, each knife is secured on the shaft or member by devices which engage the shaft on one side and are extended to clamp the knife on the other side of the shaft or member, and each knife cannot rotate in relation to the said shaft or member, but can be detached from and adjusted around and/or along the latter independently of the other knife or knives.

The invention will now be described with reference to the accompanying drawings, in which:—

20 Figure 1 is a perspective view illustrating a suitable manner of carrying out the invention;

Figure 2 is an end elevation showing a slight modification;

25 Figure 3 is a section on the line 3—3 of Figure 2, and

Figure 4 is a section on the line 4—4 of Figure 3;

30 Figure 5 is an end elevation of a complete unit constructed in accordance with Figures 2 to 4;

Figure 6 is a perspective view of a modified form of spacing piece.

35 Thus, in carrying out the invention in accordance with the drawings, the knife consists of a double bladed knife *a*, that is, it

is formed with a cutting edge *b* at each end, the edge at one end being oppositely directed to that at the other end. The knife may be made of boiler plate provided with tool-steel cutting edges welded on, or of case hardened mild steel, and is formed at its centre with a hole *c* which is extended in the form of a slot *d* to one longitudinal or side edge of the knife so that the latter can be slipped into position upon a shaft *e* and be centrally located thereon and at right angles thereto. The bottom *c* of the slot *d* can be partly circular, square, hexagonal, octagonal or of other suitable shape to suit and correspond with the shape of the shaft to which the knife is applied, but it is preferred that the slot is adapted to fit a shaft of circular cross-section as illustrated at *f*.

40 The shaft upon which the knife or knives is or are assembled to form the complete rotating unit is provided with portions which may be of square, hexagonal, octagonal or other suitable cross-sectional shape, to furnish flat surfaces *h*, and grooves or recesses *i* are formed in said shaft to receive the knives and at equal or unequal distances apart according to the number of knives to be employed, and to the desired spacing between the several knives to be assembled on the shaft, the grooves or recesses being preferably of the same width as that of the or each knife. When the slot *d* in the knife is provided with a square, hexagonal, octagonal or like inner end the grooves or recesses *i* in the shaft could be formed by a milling, shaping or planing machine. The grooves or recesses *i* formed in the shaft may be slightly wider at their outer portions than at their bottom portions, so that the knife or knives will more or less jam inside said grooves or recesses when fitted therein. The diameter or thickness of the shaft at the bottom of the grooves or recesses *i* corresponds with the width of the slot or slots *d* in the knife or knives, and the cross-sectional shape of the shaft at these parts is made to correspond with the shape of the bottom of the or each slot.

45 The means for clamping or securing the knife upon the shaft may consist of an iron or other block or bridge-piece *j* of U-shape in cross-section and adapted to engage over the slotted edge of the knife and to rest upon two or more of the flat surfaces *h* on the shaft, and of hook bolts *k* embracing the opposite edge of the knife, passing through

holes l formed in said block or bridge-piece for their reception, and tightened up by nuts m screwed upon their ends remote from their hooked ends n , with or without the assistance of spring washers or lock nuts o . By screwing up the nuts the knife is drawn into the corresponding groove or recess i provided in the shaft and into firm engagement with the latter. The knife is prevented from turning around the shaft because the block or bridge-piece j engages some of the flat surfaces k on the shaft, and the bolts l engage the flat sides of the knife and other flat surfaces of the shaft. In order to change, detach or adjust a knife it is necessary only to slacken back or remove the nuts on the hook bolts l , disengage the hooked ends n of the bolts from the knife, and to knock the latter out of its groove or recess i in the shaft.

To prevent the outer end of the slot d in the knife closing under the strain of the clamping devices a distance piece p may be fitted within said end and over the shaft before the block or bridge-piece j is placed in position, said block or bridge-piece engaging over and serving to hold said distance piece in place.

The shaft is preferably formed with journals at its ends, and it can be driven directly or indirectly from an engine or motor in any known or convenient manner.

The means for clamping or securing the knife or knives upon the shaft can be varied within wide limits.

From the above it will be appreciated how the knife can be adjusted around and/or along the shaft. The knife is properly balanced upon the shaft, and when a plurality of knives are employed the removal of one or more from the shaft does not interfere with the balance of the rotary unit. The spacing of the knives can be altered to suit existing conditions by increasing or decreasing the number of the knives fitted upon the shaft.

The bolts l may be of circular cross-sectional shape as shown in Figure 1, or of rectangular shape as illustrated in Figures 2 to 4. The inner edge of the distance piece p may be straight as in Figures 2 to 4, or curved as in Figure 6.

What I claim is:—

1. The combination with a shaft having spaced non-circular portions of angularly related flat surfaces to provide an intervening groove, a blade recessed through one edge, the recessed portion fitting the shaft between adjacent non-circular portions, and means wholly free of connection with the blade to engage the edge of the blade opposite said recess and to engage the shaft throughout a plurality of flat surfaces on both sides of the blade.

2. The combination with a shaft having

spaced non-circular portions of angularly related flat surfaces to provide an intervening recess of a double bladed knife recessed through one edge to engage the shaft between adjacent non-circular portions, a member overlying the edge of the knife opposite the recess and bearing upon a plurality of flat surfaces of said non-circular portions on opposite sides of the knife, and means projecting through said member and having hook engagement with the edge of the blade opposite that edge through which the recess opens.

3. The combination with a shaft having spaced polygonal portions to provide an intervening recess of a double bladed knife recessed through one edge to engage the shaft between adjacent polygonal portions, a member overlying the edge of the knife opposite the recess and bearing upon a plurality of surfaces of said polygonal portions on opposite sides of the knife, and hook bolts projecting through said member and extending on opposite sides of the shaft and having their hook terminals engaged with the edge of the blade opposite that edge through which the recess opens, and means for tightening the hook bolts.

4. The combination with a shaft having spaced polygonal portions to provide an intervening recess of a double bladed knife recessed through one edge to engage the shaft between adjacent polygonal portions, a member overlying the edge of the knife opposite the recess and bearing upon a plurality of surfaces of said polygonal portions on opposite sides of the knife, and hook bolts projecting through said member and extending on opposite sides of the shaft and having their hook terminals engaged with the edge of the blade opposite that edge through which the recess opens, and means for tightening the hook bolts, said hook bolts bearing against the surface of one of the polygonal portions.

5. The combination with a shaft having spaced polygonal portions to provide an intervening recess of a double bladed knife recessed through one edge to engage the shaft between adjacent polygonal portions, a member overlying the edge of the knife opposite the recess and bearing upon a plurality of surfaces of said polygonal portions on opposite sides of the knife, and hook bolts projecting through said member and extending on opposite sides of the shaft and having their hook terminals engaged with the edge of the blade opposite that edge through which the recess opens, and means for tightening the hook bolts, and a distance piece fitting in said recess and bearing between the blade and said member.

In testimony whereof I have hereunto signed my name.

CORNELIS JOANNES HUGO PENNING.