

Jan. 1, 1924

1,479,073

I. T. HOWARD

MILLING MACHINE

Filed Dec. 22, 1920

3 Sheets-Sheet 1

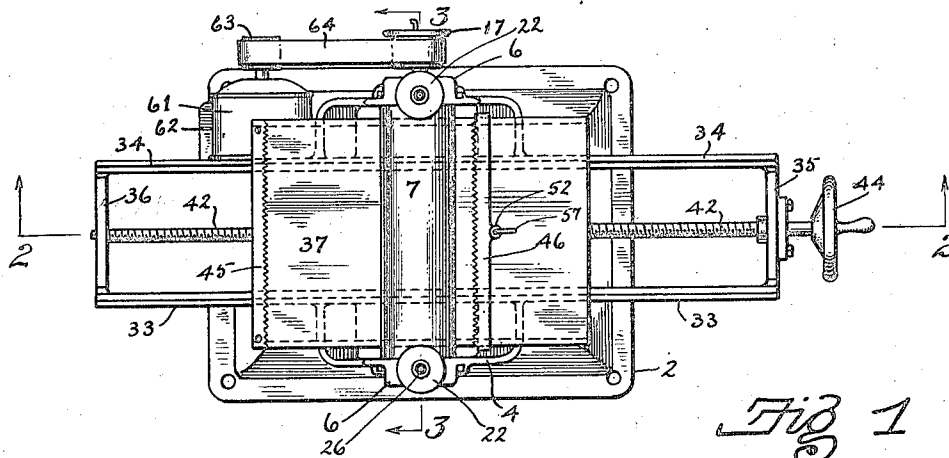


Fig 1

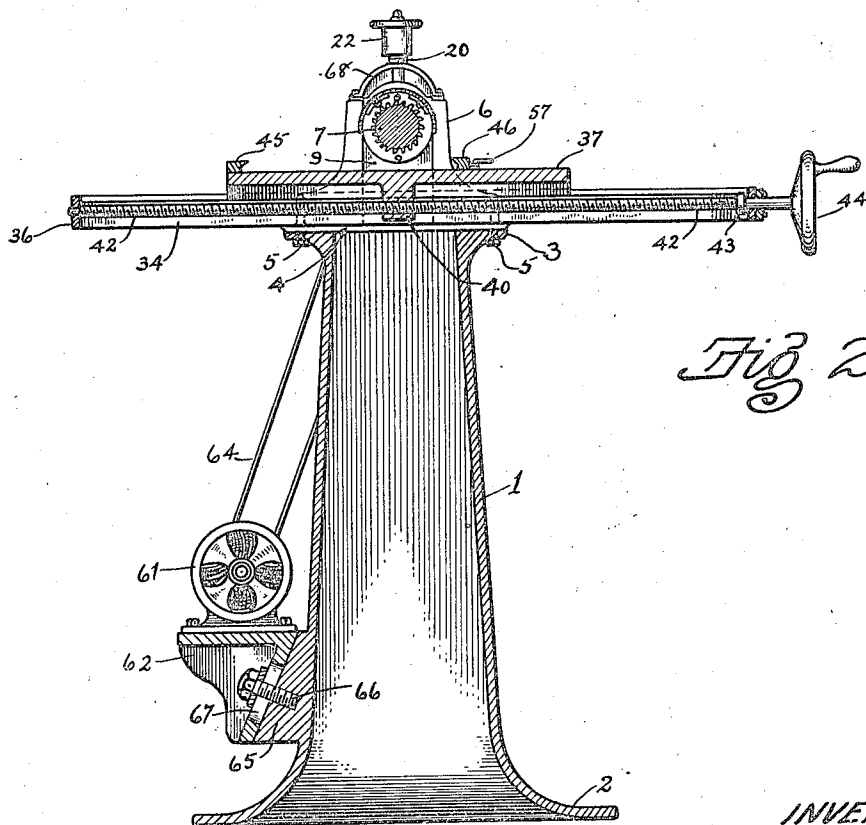


Fig 2

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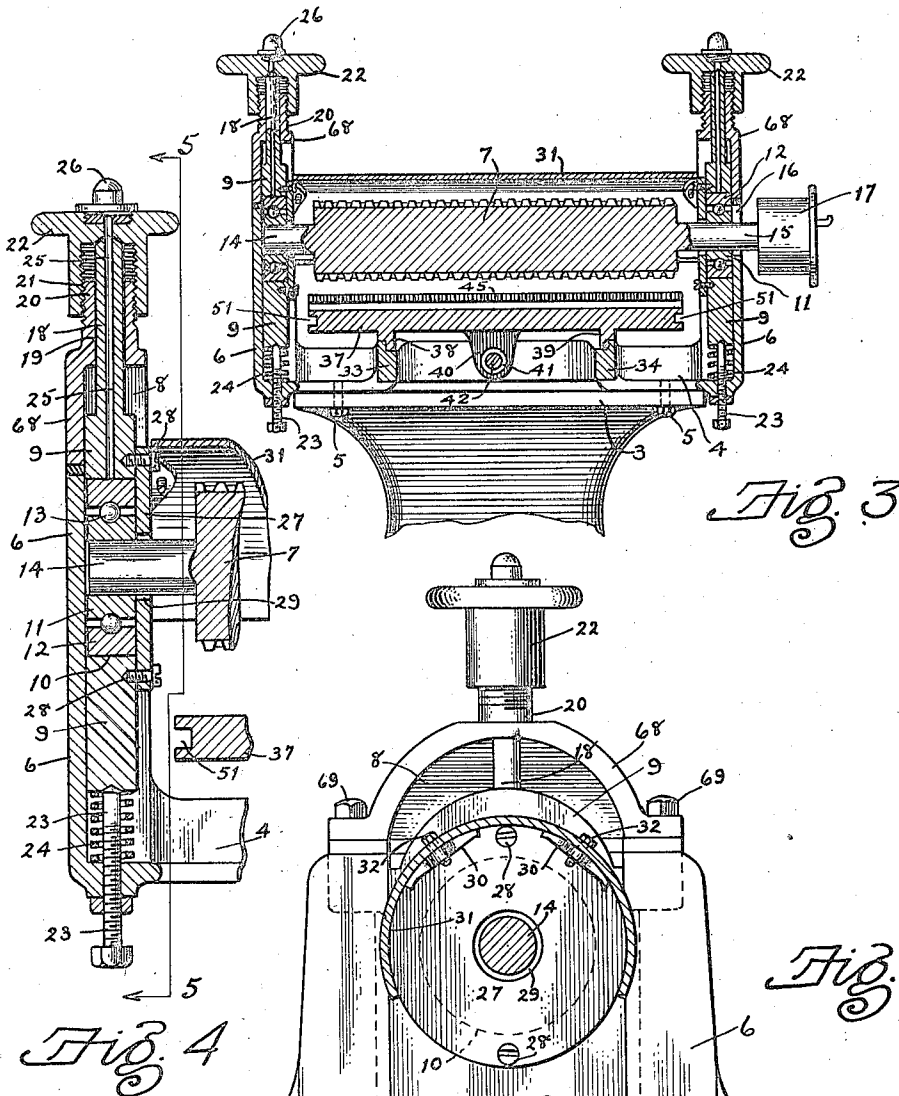
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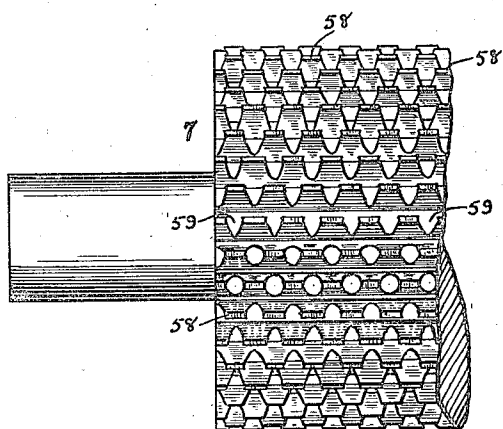


Fig. 6

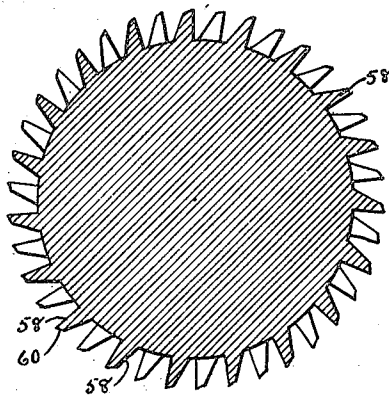


Fig. 7

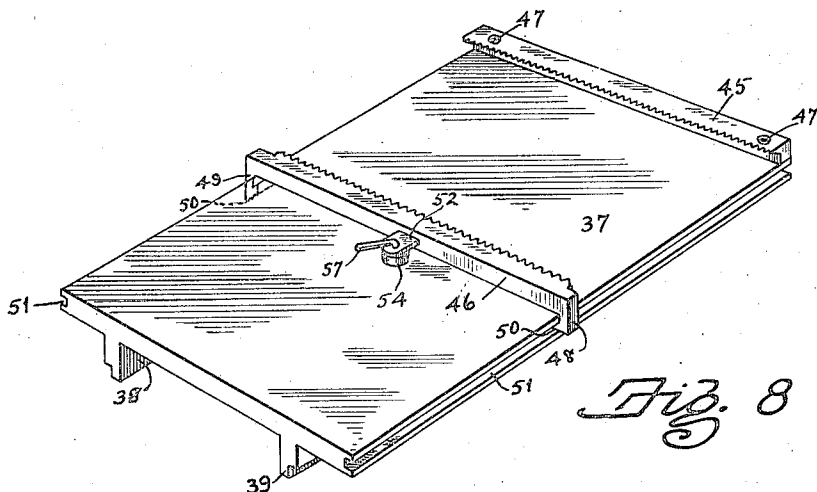


Fig. 8

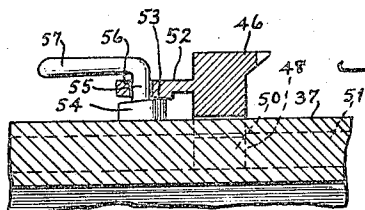


Fig. 9

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UNITED STATES PATENT OFFICE.

IRA T. HOWARD, OF GOSHEN, INDIANA.

MILLING MACHINE.

Application filed December 22, 1920. Serial No. 432,594.

To all whom it may concern:

Be it known that I, IRA T. HOWARD, a citizen of the United States, residing in Goshen, county of Elkhart, State of Indiana, have invented certain new and useful Improvements in Milling Machines, of which the following is a specification.

My invention relates to improvements in planers, especially so-called type-high machines, and is particularly designed to plane or dress stereotype and wood mounted cuts, or the like, to type height.

Other objects of my invention are mentioned and described herein.

The preferred embodiment of my invention is illustrated in the accompanying drawings, in which Figure 1 is a top plan view of the machine; Fig. 2 is a section taken on the line 2—2 of Fig. 1; Fig. 3 is an enlarged section taken on the line 3—3 of Fig. 1; Fig. 4 is a fragment showing a section of the adjustable bearing on an enlarged scale; Fig. 5 is a section in elevation on the line 5—5 of Fig. 4 when viewed as indicated by the arrows; Fig. 6 is an elevation of one end of the cutter; Fig. 7 is a section taken through the cutter diametrically thereof; Fig. 8 is a perspective view of the sliding table and adjustable rack; and Fig. 9 is a fragment in section showing the cam lock.

Similar numerals of reference indicate like members throughout the several views on the drawings.

Referring to the drawings in detail, the numeral 1 indicates the machine pedestal which may have the flanged base 2 and the top flange 3. The numeral 4 indicates generally the carriage frame of the machine which is rigidly mounted upon the pedestal flange 3 and may be fastened thereto by bolts 5, or otherwise in any suitable manner. The carriage frame 4 is provided with the two opposed upright bearing housings 6, 6 adapted to contain the adjustable bearings of the cutter element 7, as hereinafter described.

Each of the housings 6 is provided with a block chamber 8 in which a bearing block 9 is slidably arranged for vertical adjustment therein, as hereinafter described. Each block 9 is provided with a ball bearing chamber or recess 10 adapted to carry the ball bearing element which comprises the hub section 11, the ring section 12 and a plurality of anti-friction balls 13, which

structure is well known in the art. The cutter element 7 is provided with the end spindles 14 and 15, upon each of which spindles a hub member 11 is rigidly secured, the spindle section 15 of said cutter element being somewhat extended and projecting through the aperture 16 formed in one of the housings 6 to enable the driving pulley 17 to be rigidly mounted thereon. Normally, there is sufficient clearance between the upper and lower walls of the aperture 16 and the spindle 15 to enable substantial vertical movement of the latter when adjusted, as hereinafter described.

Each of the blocks 9 may be provided with an upwardly extending stud or neck portion 18, a portion of which is slidably mounted or arranged within the bore 19 of the stud guide portion 20 carried by the housing 6, said guide portion 20 being externally threaded at 21, which threads are engaged by the threaded adjusting cap or nut 22. Numerals 23, 23 indicate a plurality of screws threaded into the housings 6 below the blocks 9 and projecting upwardly into the lower end of the chamber 8 to engage the lower end of each block 9 for adjustment and stop members. A coil tension spring 24 is carried by each of the screws 23 and bears against the lower end of the block 9, whereby the end of the stud 18 is projected upwardly and held against the cap member 22. Obviously, vertical adjustment either way of the block 9 may be effected by the manipulation of the members 22 and 23, and when downwardly adjusted against the screw 23, the latter may be retracted to enable further downward adjustment of said block. In such manner the cutter 7 may be elevated or depressed, as desired.

The block stud 18 may be provided with an oil channel 25, the upper end whereof may be normally concealed by a detachable dust cap 26 screwed into the member 22, the lower end of said oil channel being in communication with the chamber in which the ball bearing element is disposed, whereby lubricant may be fed to the latter. To prevent axial movement or displacement of the ball bearing members from the chamber plates 27, 27 may be fastened to the inner face of each block 9 to bear against the members 11 and 12 or to serve as an abutment to the lateral movement thereof, said

plates being centrally apertured at 29 to permit the passage of the cutter spindles 14 and 15. Each plate 27 may be provided with a plurality of lugs 30, 30 to which a guard or cutter cover plate 31 may be fastened by screws 32, or otherwise, to screen the cutter 7, and thereby prevent possible injury to the machine operator. Screws 28 may secure the plate 27 to block 9.

10 The carriage frame 4 is provided with the horizontal parallel track members 33 and 34 which may be rigidly connected at their outer ends by the transverse members or sections 35 and 36. Numeral 37 indicates a work bearing table provided with the parallel bearing rails, which may be L-shaped in cross-section, 38 and 39 adapted to engage the L-shaped tracks 33 and 34 to enable longitudinal sliding movement of said table backward and forward on said tracks. Numeral 40 indicates a depending lug carried on the under side of the table 37, which lug is provided with a threaded aperture 41, said aperture being engaged by an adjusting screw 42 horizontally disposed beneath said table and journaled in the end sections 35 and 36 of the track frame. The screw 42 is provided with a collar 43 adjacent one end thereof and a shouldered portion adjacent the bearing thereof in member 36 to have said screw function as a non-advancing screw when rotated in its bearings. A hand-wheel 44 may be mounted on the extension of the screw to enable rotation thereof by the operator to move the table 37 back and forth beneath the cutter 7.

For removably securing the work (stereotype) to be planed on the movable table 37, a pair of saw tooth racks 45 and 46 are provided, the former being rigidly secured to and transversely of one end of the table by screws 47. The rack 46 is disposed transversely of the top surface of the table 37 and is provided with the depending tongued members 48 and 49 at its opposite ends, the tongues 50 whereof project inwardly of the table sides into slots 51 formed in the opposite side edges of the table, in which slots said rack tongues are slidably arranged. A cam lock bracket 52 may project from the rack 46 and have the cam face 53 on its under surface which cam face is spaced from the table 37. A handled cam member 54 is rotatably mounted beneath the cam face 53, said cam having a stub shaft 55 which is journaled in the aperture 56 in bracket 52, and provided also with the handle 57 to enable manual actuation of said cam. Obviously, engagement by the point of the cam 54 with the cam face 53 by rotation of the former effects a slight upward movement of the rack 46, thereby clamping or binding the rack tongues 50 against the upper wall of the table slots 51, whereby the rack is or may be releasably locked in any desired position

along the table 37. The ability to move and lock the rack 46 in any desired position will enable the operator to mount on the table 37 for planing many varied sizes and shapes of electrotypes.

The cutter 7, as shown in Figures 6 and 7, is preferably made from a single piece of suitable metal formed cylindrically in which longitudinal ridges for tooth sets are cut at predetermined intervals around the cutter body periphery. Thereafter, a plurality of teeth 58 are cut from each ridge by forming the V shaped recesses 59 therein at intervals therein, the recesses of each ridge being formed out of circumferential alignment with the adjacent ridge recesses, whereby a staggered relation of the teeth in different sets is effected. The teeth are then sharpened by beveling the tooth edge at 60.

The width of the recesses 59 is less than the width of the cutting edge of each tooth disposed circumferentially adjacent, that is, just ahead of and behind said recess, whereby the cutting plane of the teeth overlaps slightly and effects a remarkably smooth finish to the work.

An electric motor 61 is provided for driving the cutter 7, which motor may be suitably mounted upon the bracket 62, said motor having a driving pulley 63 on the outer end of its driving shaft. A driving belt 64 operatively connects the motor pulley 63 with the cutter driving pulley 17 carried on the cutter spindle 15. For taking up slack in the belt 63 the motor bracket 62 is adjustably mounted upon the pedestal boss 65 to which it may be secured by a headed screw or tap bolt 66 which is threaded into said boss and which engages an elongated slot 67 in said bracket, whereby vertical movement of said bracket and motor may be effected on the inclined face of said boss.

The preferred construction of the housing 6 may include a detachable cap member 68 adapted to be fastened to the upper portion of the housing by cap screws 69, 69, to which cap the stud or post member 20 is connected or with which it may be integral. The cap 68 may include the upper end of the block chamber 8 and through which the block stud 18 extends.

I claim:

1. In a machine of the character described, the combination of a work support, a rotary tool and a bearing structure for the rotary tool, the structure including a housing, a bearing block, a ball bearing supported in said bearing block, means for adjusting the location of said bearing block with respect to the housing, and means for adjustably limiting the movement of said bearing block, said last named means and the bearing block being provided with a lubricating passage, terminating on the bearing in said bearing block, said passage being

straight and uninterrupted independently of the adjustment of the bearing block in the housing.

2. In a machine of the character described, the combination of a work support, a rotary tool, a support for the rotary tool including a ball bearing and a bearing block in which said ball bearing is mounted, a retaining disk adapted to prevent axial displacement of the ball bearing within the bearing block and a tool guard associated with said retaining disk.

3. In a machine of the character described, the combination of a work support, a rotary tool, a bearing structure for the rotary tool, including a bearing block, a support for the same, a ball bearing within the bearing block, a retaining disk for the ball bearing attached to said bearing block, lugs on the retaining disk and a tool guard removably connected to said lugs.

4. In a machine of the character described, the combination of a rotary cutter, a work supporting table, the table being provided with a stationary abutment, a movable abutment, guiding elements at the edge of the table in engagement with portions of the movable abutment, and means on the movable abutment, between said edges, for locking it in selectively determined position on the table.

5. In a machine of the character described, the combination of a rotary cutter and a work supporting table, said work supporting table including a stationary abutment and having a pair of guiding grooves along its longitudinal edges, a movable abutment, portions of said movable abutment being in engagement with said guiding grooves, and a locking device, said locking device being adapted to force the movable abutment upwardly against a wall portion of said guiding grooves.

6. In a machine of the character de-

scribed, the combination of a rotary cutter and a work supporting table, said work supporting table including a stationary abutment, a movable abutment, and having guiding elements along the edges for the movable abutment, and a clamp adapted to lock the movable abutment in selectively determined position with respect to the stationary abutment, said clamp being carried by the movable abutment midway between the guiding edges of the table and being adapted to coact with the table surface in locking the movable abutment in selectively determined position.

7. In a machine of the character described, the combination of a rotary cutter and a work supporting table, the work supporting table including a stationary abutment, a movable abutment, guiding elements for the movable abutment, a cam lock bracket carried by the movable abutment midway between the edges thereof and having an inclined lower surface, and a rotary clamping head secured in said lug having an inclined upper surface and adapted to coact with the surface of the table for locking the movable abutment against displacement.

8. In a machine of the character described, the combination of a frame, having a slanting wall portion, a rotary cutter, a work supporting table, a motor, a bracket having a horizontal wall for supporting the motor and an inclined wall in engagement with the slanting wall portion of the frame, said slanting wall of the bracket being provided with a slot, and means extending through said slot into the wall portion of the frame for securing the motor adjustably in position with respect to the cutter.

In testimony whereof I have hereunto affixed my signature this 20th day of Dec., 1920.

IRA T. HOWARD.