

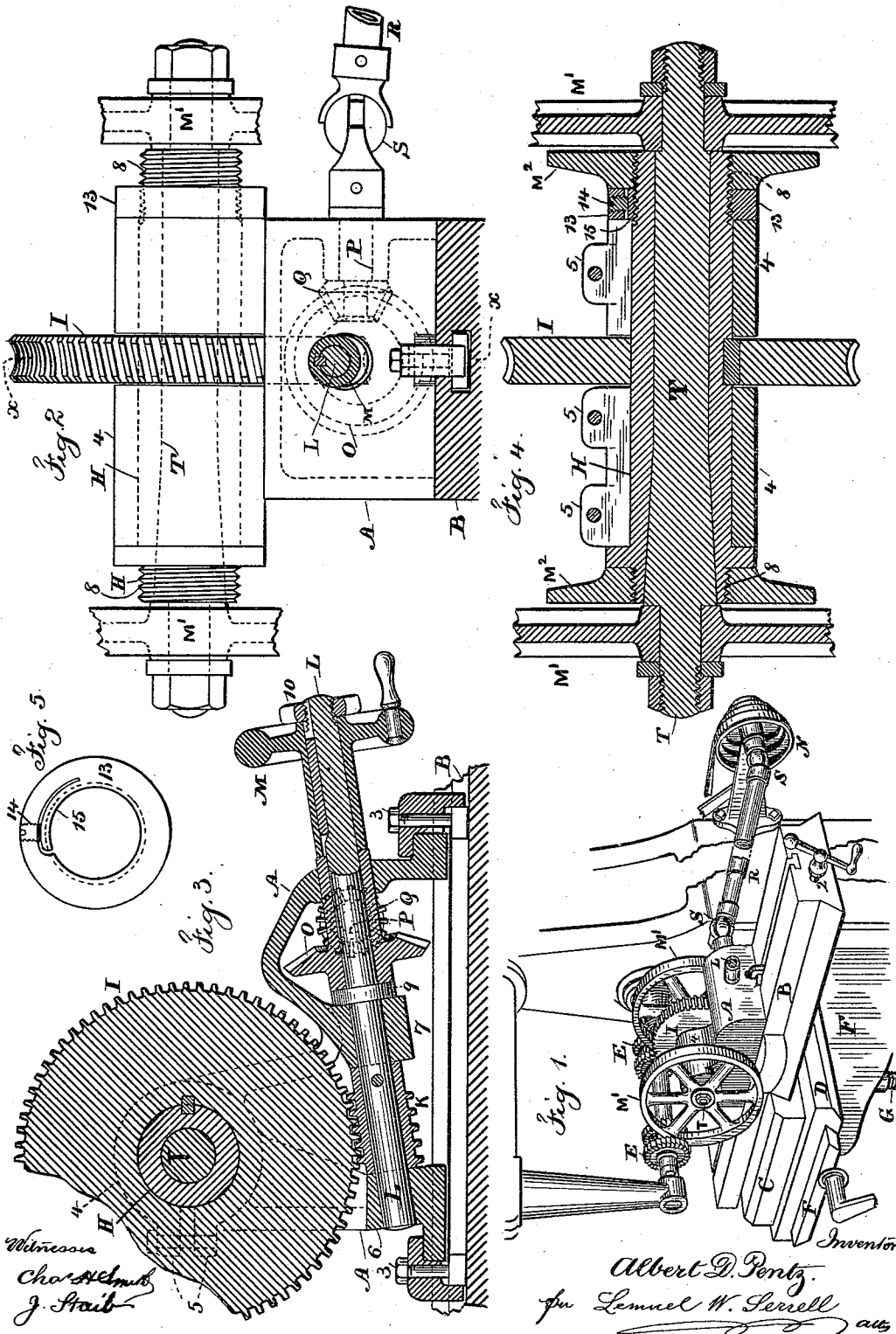
(No Model.)

A. D. PENTZ.

ROTARY ATTACHMENT FOR MILLING MACHINES.

No. 461,201.

Patented Oct. 13, 1891.



UNITED STATES PATENT OFFICE.

ALBERT D. PENTZ, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO HIMSELF,
AND ABRAHAM VANDERBEEK, OF NEW YORK, N. Y.

ROTARY ATTACHMENT FOR MILLING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 461,201, dated October 13, 1891.

Application filed February 20, 1891. Serial No. 382,138. (No model.)

To all whom it may concern:

Be it known that I, ALBERT D. PENTZ, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented an Improvement in Rotary Attachments for Milling-Machines, of which the following is a specification.

The object of this invention is to provide for milling the faces and edges of gear-blanks, pistons, pulleys, wheels, and other circular articles with reliability and rapidity, and this device is usually employed as an attachment to a universal milling-machine, and by this improvement one or two circular articles can be mounted upon a shaft that is progressively rotated to present the article to the action of the milling-tools, and this attachment is adapted to be placed upon slide rests or beds capable of adjustment in two directions horizontally, so as to bring the article in the proper position for the milling-tools, and usually a vertical adjustment is also provided for convenience in presenting the article to the tools. I have reduced this invention to practice by constructing the mechanisms illustrated in the accompanying drawings.

In the drawings, Figure 1 is a perspective view. Fig. 2 is an elevation; Fig. 3, a section at the line xx , and Fig. 4 is a horizontal section through the actuating-shaft. Fig. 5 is a separate view of the screw-collar.

The stock or bed A of the machine is a hollow casting, the bottom surface of which is flat and adapted to rest upon and be secured to a platen or slide-rest B, which is adjustable longitudinally in the swivel-plate C by a screw 2, and this swivel-plate C is connected with the saddle D, so that the milling attachment and the article carried by it can be adjusted horizontally and placed in the proper position in relation to the milling-tools E, and it is also advantageous for the saddle D to be supported by a knee-plate and bracket F, that is adjustable vertically upon the column G, so as to raise and lower the milling attachment and the articles carried by it and place the same in any desired position in relation to the milling-tools E.

I do not in this application lay claim to any

peculiarity in the universal milling-machine to which this attachment is especially adapted.

It is preferable to provide on the under edges of the bed A lugs passing down into the groove in the platen B, and clamping-screws 3 are also used for holding the attachment in position upon the platen or slide-rest.

The upper part of the bed or base A is made with a tubular bearing 4 for a supporting shaft or spindle H. This tubular bearing has projecting flanges 5 at one side, and in the construction of the attachment the hole for the supporting-shaft H is bored out accurately, after which the projecting flanges 5 are slotted in a horizontal plane parallel to the axis of the shaft H, and there are tightening-screws passing through these projecting flanges, so that the bearing for the shaft H can be tightened up from time to time to prevent any looseness. This point is of importance, because the articles that are to be milled are upon this shaft H and such shaft is rotated progressively, and if any looseness exists the work will be imperfect in consequence of vibration.

The base or bed A has a central vertical opening or mortise adapted to receive a wheel I, which is permanently connected to the shaft H. It is preferable to make this shaft H of uniform size throughout and fit into the same rigidly a key adapted to pass into the key-seat in the worm-wheel I, and this key is of a width to slide lengthwise through the slot or opening in the flanges 5 before the screws are inserted into the same, so that the wheel I can be placed into its mortise or recess and then the shaft slipped into and through the same and the connection will be permanent. This wheel I is rotated by a screw or worm K upon a shaft L, which is preferably at an inclination in a plane perpendicular to the axis of the shaft H, and such shaft L and the worm K are permanently connected, preferably by a cross-pin, and there are bearings 6 and 7 upon the bed or base A through which this shaft L passes, and it also passes out through the outer casing or end portion of the base A for the reception of a hand-wheel M, by which such shaft L can be rotated, and in so doing the wheel I, shaft H, and articles

carried by it can be rotated, and this worm or screw gear K and the wheel I are accurately fitted in order that the rotation may be regular and without any looseness or vibration under the action of the milling-tools.

The articles to be milled are connected with the projecting ends of the supporting-shaft H. I have represented two gear-blanks M', that are being acted upon by the milling-tools E. It is preferable to provide screw-threads 8 around the ends of the shaft H for face-plates, chucks, or similar devices M² and a clamp-screw or mandrel, which passes through the hubs or central openings of the gear-blanks or other articles that are to be attached to the shaft H and milled. I remark that any desired clamping or attaching device may be provided at the ends of the shaft H; but I prefer to make such shaft H hollow, with the tubular opening tapering at one end, so that a mandrel, shaft, tool-holder, or other device can be passed through or into this shaft H. I have shown a mandrel T in such shaft H with clamping-nuts to hold the mandrel in place and to clamp the article to be milled.

In performing the milling operation it is preferable to drive the worm or screw gear K by power. To effect this I put upon the shaft L a bevel gear-wheel O, which is loose thereon, and it is between a collar 9 and the hub of the hand-wheel M. This hand-wheel M is upon a feather or key, so as always to turn with the shaft L; but it may be moved end-wise upon such shaft L by a nut 10 upon the outer end of the shaft L, which nut may be turned by hand to cause the hub of the hand-wheel M to clamp the tubular shaft of the bevel-gear O firmly between itself and the collar 9, and the shaft P and its bevel-pinion Q, which gears into the wheel O, are rotated by suitable power. Hence the said shaft P, bevel-pinion Q, and gear O may be constantly rotated, and the milling operation will be started by tightening the nut 10 or stopped by loosening it; and the hand-wheel M may be made use of in turning the shaft L, wheel I, shaft H, and the article supported by it in either one direction or the other.

It will now be apparent that the gear-blanks M' or other articles to be milled are to be fastened upon the ends of the shaft H, and by the platen, swivel-plate, saddle, and knee-plate the milling attachment as a whole can be raised or lowered, or moved horizontally, or turned in either direction to bring the articles that are to be milled to their proper positions in relation to the milling-tools, after which the slide-rests or other supporting devices may be clamped firmly, and the milling operations can be performed successively and with great rapidity and accuracy and two articles can be milled simultaneously, and in applying or removing the articles to be milled it is not necessary to stop the milling-engine, because the rotation of the shaft H and article carried by it can be stopped by loosening the nut 10, and then the milling attach-

ment can be drawn back from the tools by rotating the screw 2 of the platen B and the finished articles removed and others applied in their stead, and then brought up to position, and the nut 10 is tightened to effect the rotation of the articles being milled.

The shaft P may receive its rotary motion from any suitable device; but I find it advantageous to employ an extension-shaft R and universal joints S, one of which is connected with the projecting end of the shaft P and the other universal joint is connected with any suitable rotating or feed shaft upon the milling-engine, such as the shaft of the pulley N. By this construction the rotation of the shaft P is easily maintained, and at the same time the platen B and the other supports for the milling attachment can be moved without interfering with the connection through the extension-shaft and universal joints employed in rotating the shaft P.

The swivel-plate C allows the platen and milling attachment to be placed with the axis of the shaft H at an inclination to the axis of the milling-tool to adapt the device to milling bevels, such as bevel gear-blanks, &c., and the rotating tool may be used for ornamenting the surfaces of cylinder-heads, disks, &c., with cycloidal striations by presenting such articles to a rotating mill or other tool, the axis of the tool being perpendicular to the surface to be smoothed, dressed, or ornamented and receiving a rotary motion on its own axis simultaneously with the rotary movement given to the article.

The various purposes for which the attachment may be used will be apparent to the machinist, and in employing the improvement the screw 2 may be either used or disconnected.

Two collars are needed on the shaft H adjacent to the ends of its bearings, and in order to hold the screw-collar 13 upon the shaft H in position, so that it may not tighten or loosen, I saw or cut in the inner portion of the collar a tongue, 15 and tap in a screw 14 to act upon the end portion of the tongue, so that after the collar has been set up to place the screw 14 is tightened and clamps the collar in place by forcing the tongue upon the screw-threads to furnish the friction required to keep the collar from turning.

I claim as my invention—

1. The bed or base A, having the slotted tubular bearing 4 and tightening-screws, in combination with the supporting-shaft H, passing through such tubular bearing and adapted to receive at its ends the articles to be milled, a worm-wheel I, surrounding the shaft H and within a central mortise or opening in the bed A, a screw or worm pinion K, engaging the wheel I, and a shaft for rotating the pinion, substantially as set forth.

2. The combination, with the bed or base A, having bearings, of the shaft H within such bearings and adapted to receive at its ends the article to be milled; the worm-wheel I,

5 occupying the central mortise or opening in the bed or base, a worm-pinion K and its shaft for rotating the worm-wheel, a hand-wheel, and a loose bevel gear-wheel upon the shaft of the worm-pinion, a nut for clamping the hand-wheel and the bevel-wheel, and a driving-shaft and bevel-pinion, substantially as set forth.

10 3. The combination, with the supporting bed or base and the shaft H, of the worm-wheel upon the shaft, a worm-pinion for rotating the same, a hand-wheel and shaft for the worm-pinion, a loose gear-wheel upon said shaft, a nut for clamping the hand-wheel and gear-wheel to the shaft, and mechanism for rotating such gear-wheel, substantially as set forth.

20 4. The combination, with the bed or base, of the shaft H, passing through a bearing upon such base, and clamping attachments at both ends of such shaft for the article to be milled, a wheel, worm-pinion, and bevel-gearing for rotating such shaft and article, an extension-shaft and universal joints at both ends of such shaft for rotating the gearing, and an adjustable platen or support for the base for holding the same and presenting the article to the milling-tool, substantially as set forth.

30 5. The combination, with the bed or base, of the tubular shaft H, the worm wheel and pinion for rotating the same, a mandrel passing through such shaft and having a tapering

portion fitting the taper of the hole and projecting at each end for receiving the articles 35 to be operated on, and nuts at both ends of the mandrel for clamping the arbor and the parts connected with the same, substantially as set forth.

6. The combination, with the milling-machine having a tool-spindle, a platen, and adjustable and swiveling beds or rests, of a supporting stock or base and means for securing the same to the platen, a work spindle or shaft supported in bearings on such base 45 and mechanism at both ends of such shaft for securing the work, a worm gear and pinion for rotating such shaft and the work, and a feed shaft and gearing for connecting with and rotating the worm-pinion, substantially 50 as set forth.

7. The combination, with the base and the work-spindle supported by the same and projecting at both ends and adapted to receive two articles to be acted upon, of a wheel and worm-pinion for rotating the shaft and the work, a shaft and gearing for driving such worm-pinion, and mechanism for connecting and disconnecting the driving-shaft, substantially as set forth. 60

Signed by me this 13th day of February, 1891.

ALBERT D. PENTZ.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.