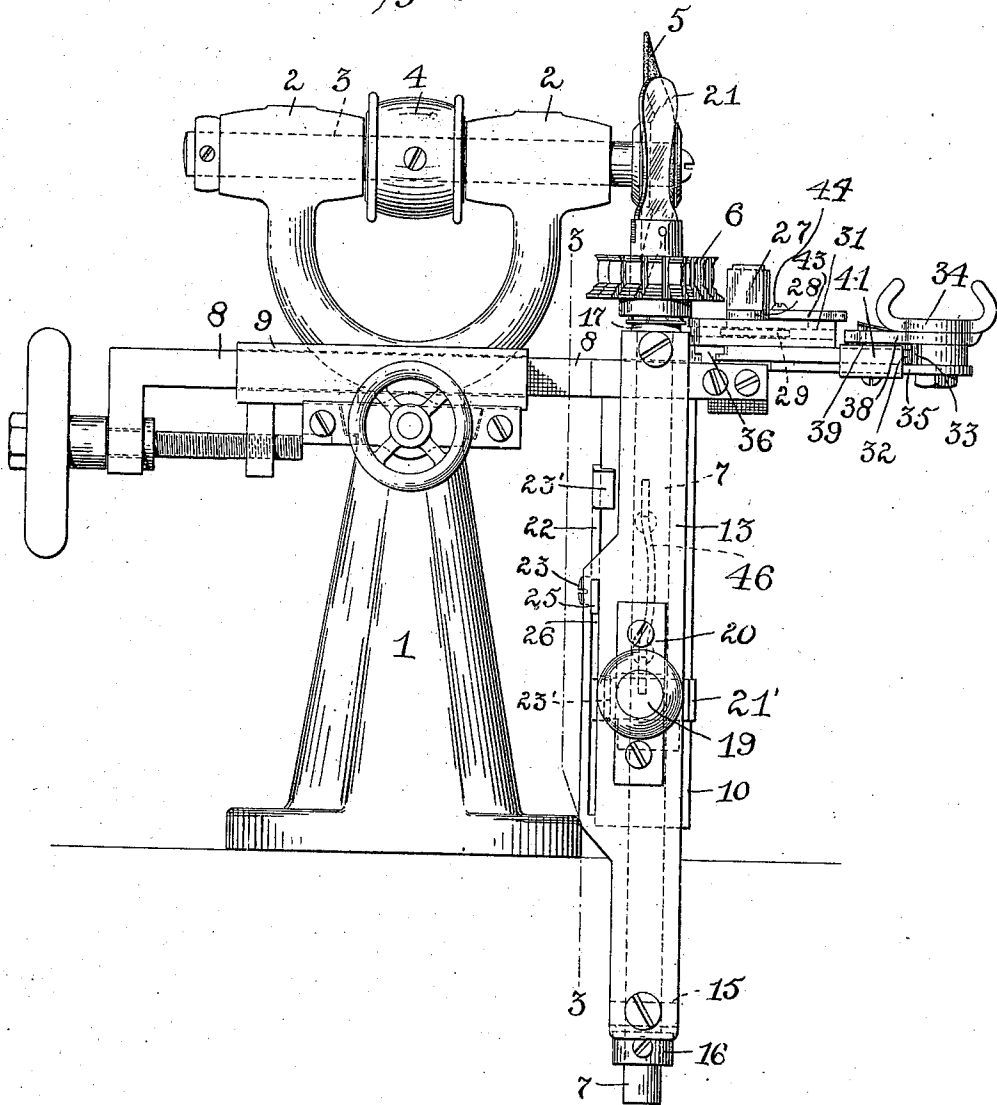


963,059.

C. J. McCALLUM.
CUTTER GRINDER.
APPLICATION FILED OCT. 28, 1909.

Patented July 5, 1910.
3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

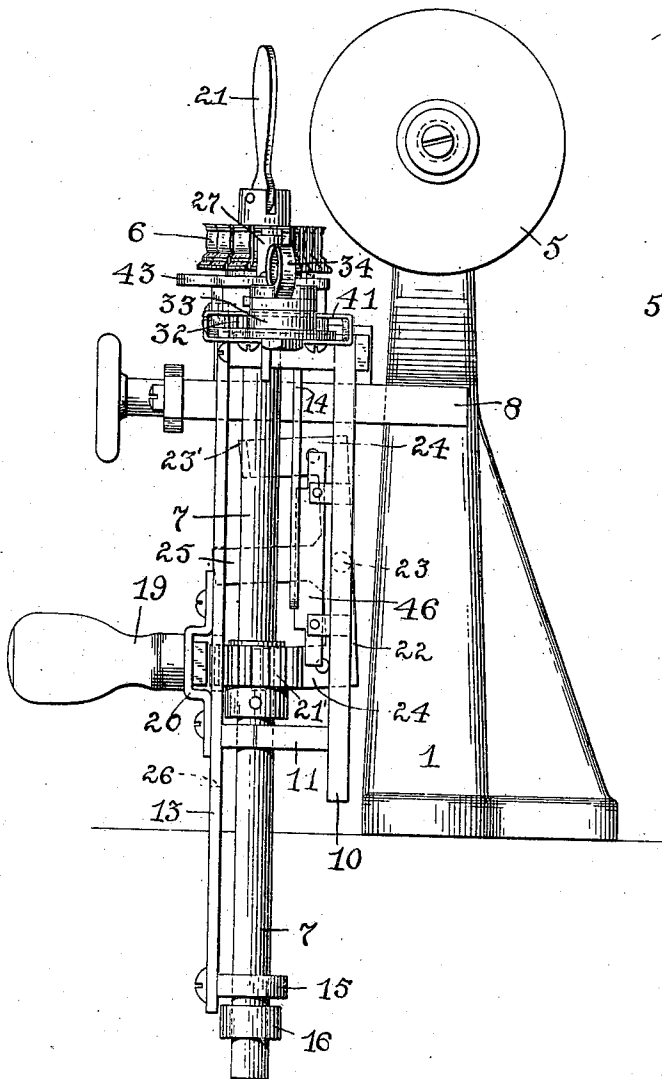
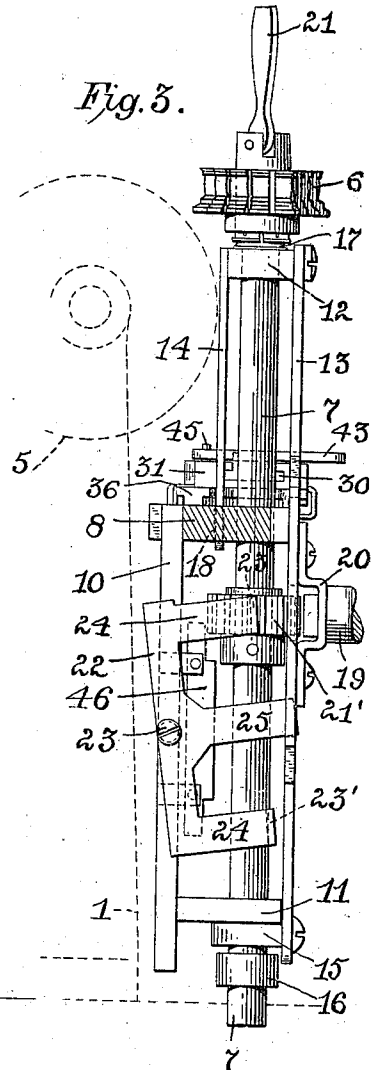


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

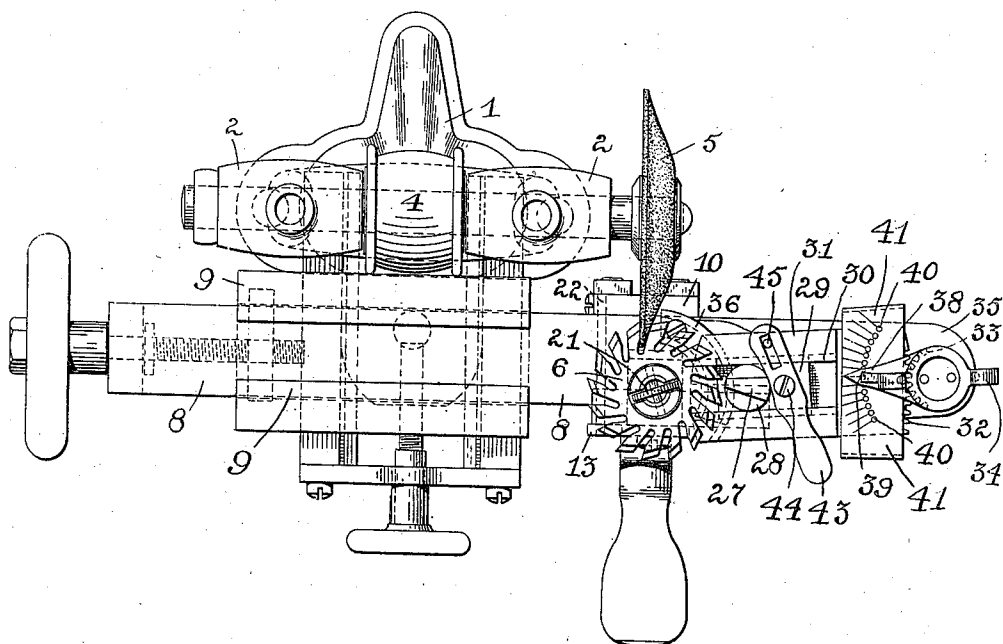
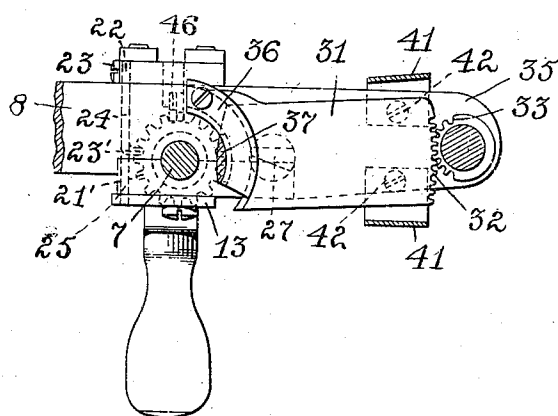


Fig. 5



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UNITED STATES PATENT OFFICE.

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CUTTER-GRINDER.

963,059.

Specification of Letters Patent.

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Application filed October 28, 1909. Serial No. 525,171.

To all whom it may concern:

Be it known that I, CHARLES J. McCALLUM, citizen of the United States, residing at Warren, Maine, have invented certain new and useful Improvements in Cutter-Grinders, of which the following is a specification.

The invention relates to machines for grinding edged tools, and it includes means whereby the work piece may be axially adjusted in relation to the grinding member to secure the proper angle of cut, and also it includes means for changing the position of the work-piece after one grinding action so as to receive the next grinding action of the tool.

The invention consists in the features and combinations and arrangement of parts hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is an end elevation. Fig. 3 is a view along the line 3—3 of Fig. 1, looking from the left of said line with the tool shown in dotted lines. Fig. 4 is a plan view of the apparatus, and Fig. 5 a plan view of a detailed portion of the apparatus with parts removed and parts in section.

In these drawings 1 is the main standard of the machine having bearings 2 in which is mounted a shaft 3 carrying the driving pulley 4, and a grinding disk or tool 5.

The work-piece or the blank to be ground is indicated at 6, and is mounted on a vertical shaft 7, which is adapted to turn in suitable bearings in the frame and also to have longitudinal or vertical reciprocatory movement in said frame.

The frame comprises generally, a table or main portion 8 movable in guideways 9, supported by the standard, said main portion 8 having attached thereto a pendent bracket portion 10, with a laterally extending arm 11 in which the lower end of the shaft 7 is adapted to turn and slide. The shaft passes through an opening in the main plate 8, and at its upper end passes through a cross piece 12 of a vertically slidable frame composed of vertical side plates 13 and 14, the former of which extends down and has an inwardly extending lug or arm 15 embracing the shaft 7, a collar 16 being fixed to the shaft below the lug or arm 15, and a collar or shoulder 17 of the blank holding

member or clamp being arranged to bear on the upper side of the said cross-piece 12. The other vertical plate 14 is guided through an opening 18 in the main plate 8. A handle 19 is attached to a yoke piece 20 secured to the side plate 13, and by this handle the vertically movable frame may be reciprocated so as to carry with it the shaft 7 and the work-piece or blank.

21 indicates a lever by which the clamping device for the work-piece may be controlled to either clamp or release the work-piece or blank, but as this clamping mechanism forms no part of the invention it is not necessary to describe it particularly herein.

By the vertical movement of the shaft 7 derived from the handle 19 and the vertical movement of the frame 12, 13 and 14, the work-piece is carried into contact with the periphery of the grinding tool 5, and continued movement vertically will cause the grinding tool to act upon the tooth of the work-piece. The vertical movement is sufficient to carry the blank past the grinding tool both above and below the same, and after the work-piece leaves the tool and as it is completing its movement up or down, it will be rotated by the turning of the shaft 7 so as to bring another portion of the work-piece in line with the edge of the grinding tool for the grinding of the next tooth. In order to give this intermittent rotary movement to the shaft 7 and the work-piece clamped thereto, a gear wheel 21' is pinned on the shaft 7, and an oscillating member 22 is pivoted at 23 to the fixed bracket 10. This oscillating member has inwardly projecting arms 24 at the top and bottom thereof, and these arms are provided with laterally projecting fingers 23'. The oscillating or shifting member 22 is given its shifting or oscillating movement by its arm 25 projecting into a slot 26 of the frame plate 13 so that as the frame together with the shaft 7 and the work-piece completes its movement in either direction it will have brought the end of the slot 26 against the arm 25 and will have shifted the said arm so as to shift or turn the member 22, and as in the mean time the vertical movement of the frame and shaft 7, has brought the gear 21' into engagement with one of the fingers 23' the shifting movement of the oscillating member will turn the gear and consequently the shaft 7, so as to bring an unground portion of the work-piece opposite

the edge of the grinding tool for the next operation. The amount of movement of the oscillating or shifting member is controlled by the extent of movement of the frame 12, 13 and 14, and the shaft 7, and the reciprocation of these parts is limited by the cross-pieces 12 and 15 engaging respectively the upper side of the main plate 8 and the lower side of the finger or arm 11.

In order to secure initial adjustment of the work-piece so that the tool will act thereon, at the desired angle, I provide an adjusting stop or indicator 27, having flattened sides converging toward the blank or work-piece and carried by stud 28, which in turn is carried by a plate 29 movable in ways 30, of a plate 31 which at its front end has a segmental rack 32 meshing with the segment 33, adapted to be turned by a handle 34, the said segment being mounted in a bracket member 35 extending from the main plate 8. The inner end of the adjusting plate 31 is of segmental form and moves upon a segmental track 36 secured to the main frame plate, the joint between the parts 36 and 31 being of a tongue and groove character, and the said plate 31 having a portion 37 which embraces the edge of the segmental track plate 36 so that the plate 31 will be moved circumferentially in relation to the center of the shaft 7, and consequently of the piece being operated on. The segment 33 is combined with a pointer 38 to move therewith, said pointer having a pin 39 to engage any one of a series of holes 40 in a fixed plate or dial 41 suitably mounted on the bracket 35, as by screws as shown at 42. It will now be understood that by adjusting the pointer to the proper indentation on the scale the segment 33 will turn the plate 31 so as to bring the index or finder point 27 to proper angular position about the center of the piece being operated on, and then by moving the handle 43, pivoted at 44, to the block 29, and having a pin and slot connection 45 with the plate 31, the setting or finder point 27 may be moved to engage the tooth of the piece being operated on so that this tooth will be adjusted to the proper angle, and after this adjustment is effected the work-piece may be set on the shaft 7 in fixed relation thereto by operating the lever 21 to operate the clamping device.

It will be understood of course, that the adjustment just described, in which the setting or finder point 27 is employed, precedes the operations first described, and after the work-piece has been set properly on the shaft 7 it will be simply necessary to move the frame carrying the work-piece vertically in order to make the tool operate thereon and to secure the rotary adjustment of the work-piece between the operations of the tool.

At 46 I show a spline bar of slightly

curved form rigidly secured to the bracket 10 to engage the gear wheel 21 after the said gear has passed from connection with the fingers 23 on the up and down movement. The spline bar is curved in such a manner that the toothed gear, in sliding up or down thereon, will allow the emery wheel or stone 5 to enter the work piece or cutter between the teeth without coming in contact with the cutter until the emery wheel has passed nearly through the cutting face of the cutter tooth, the curve of the spline bar gradually swinging the work piece toward the emery wheel 5 and holding the work piece firmly thereagainst until the work piece has passed the center of the emery wheel on its up or down movement. After the work piece has passed the center of the stone, it is gradually released from contact therewith. By this action the outer or thin edge of the emery wheel will not be worn away, or its face rounded, the contact of the tooth to be ground being on the whole face of the emery wheel while in contact, and in this way keeping its face straight.

I claim as my invention:—

1. In combination with a work-piece holder and a tool, and means for fixing the work-piece on the holder, a plate adjustable substantially circumferentially about the center of the holder, a setting point or device movably mounted on the plate to be engaged by the teeth of the work-piece when adjusted inwardly, and means for adjusting the plate to different angular positions in relation to the center of the work-piece, substantially as described.

2. In combination with a tool and a work-piece holder, with means for clamping the work-piece thereon, a plate adjustable circumferentially in respect to the center of the work-piece and having guideways, a setting point for the work-piece movable in said guideways, a segment at the forward edge of the plate, a second segment engaging the first segment, and an index and pointer, substantially as described.

3. In combination, a tool, a holder for a work-piece having reciprocatory and rotary movement a carrier for the work piece having reciprocatory movement, and means for giving the work holder a step by step rotary movement said step by step means having connection with the reciprocatory carrier to be impelled thereby after the work-piece leaves the tool, substantially as described.

4. In combination with a tool, a work-piece holder having reciprocatory and rotary movement a reciprocatory carrier for the work piece, a gear connected with the work-piece holder, and an oscillating member to engage the gear and turn the same step by step as the said gear completes its movement with the reciprocation of the work-piece holder in either direction, said

oscillating member being connected with the work piece carrier to be operated by the movement thereof, substantially as described.

5 5. In combination with a tool, a shaft carrying the work-piece clamped thereto, a reciprocatory frame carrying the shaft, a gear on the shaft, a shifting member to engage and turn the gear with the shaft as the
10 frame with the shaft completes its movement in either direction, and means for operating the shifting member from the reciprocatory movements of the frame substantially as described.

15 6. In combination with the tool, a shaft having means to clamp the work-piece thereto, bearings in which the said shaft may turn and slide, a device on the shaft for turning the same step by step, and an
20 oscillating member supported independently of the shaft with means for operating the same moving with the shaft and as the shaft completes its longitudinal movement in either direction to cause the oscillating member to turn the said device on the shaft to
25 thus turn the said shaft and the workpiece, substantially as described.

30 7. In combination with the tool, a reciprocatory shaft adapted to rotate intermittently, a tooth member on the shaft, a shift-

ing member having upper and lower arms provided with fingers to engage the tooth member, and means moving with the shaft to operate the shifting member.

8. In combination with the tool, a reciprocatory shaft adapted to rotate intermittently, a tooth member on the shaft, a shifting member having upper and lower arms provided with fingers to engage the tooth member, and means moving with the shaft
40 to operate the shifting member, said means consisting of a frame having portions to strike an arm on the shifting member for shifting the same, substantially as described.

9. In combination with the grinding tool,
45 a work piece holder having movement toward and from the grinding tool, means for giving the work piece a step by step rotary movement, and a curved spline bar adapted to turn the work piece in relation
50 to the grinding face after the work piece has been set or turned to its approximate position, substantially as described.

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

CHARLES J. McCALLUM.

Witnesses:

GEO. W. WALKER,

W. F. THOMAS.