

C. E. HOWE.
ATTACHMENT FOR GRINDING MACHINES.
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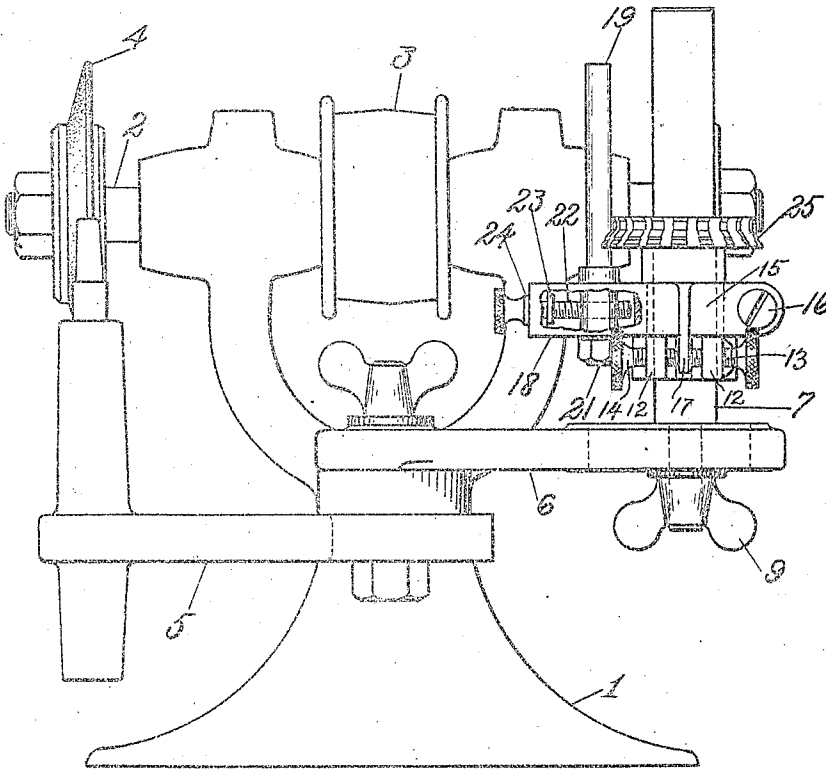


Fig. 1.

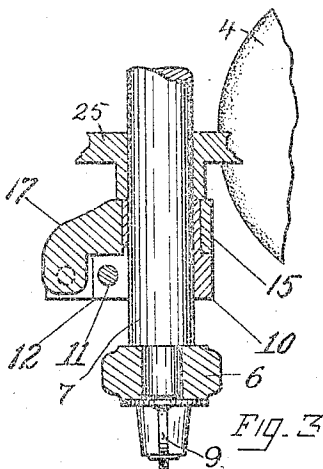


Fig. 3.

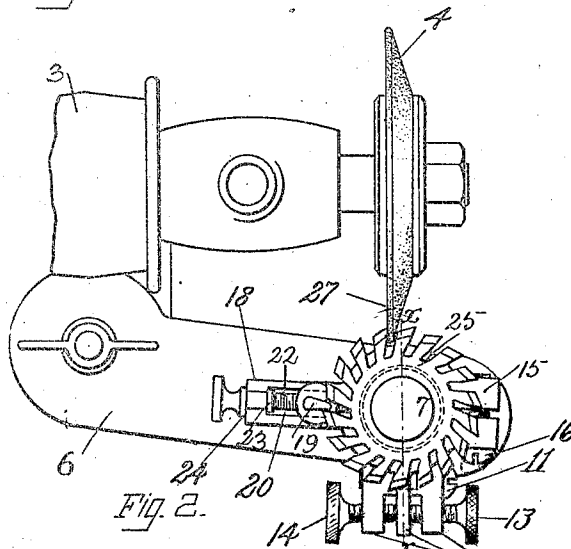


Fig. 2.

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ATTACHMENT FOR GRINDING-MACHINES.

1,056,419.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES E. HOWE, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain Improvements in Attachments for Grinding-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to an attachment for grinding machines and its object is to provide means for sustaining a tool to be ground by which the position of said tool relatively to the grinding surface may be accurately adjusted, the operation of bringing the tool into contact with the grinding surface conveniently accomplished, and successive faces quickly brought into position to be ground.

For accomplishing this object I employ a spindle upon which the tool may be moved longitudinally into and out of contact with the grinding surface. I insure the proper relative positions of the grinding surface and the portion of the tool to be acted upon by providing means cooperating with the spindle for engaging the tool. This means may be carried by a supporting member which is movable relatively to the grinding surface, so that the position or path of the tool relative to the grinding surface can be properly controlled, and manually operable devices may be provided to adjust this supporting member and to clamp it in position.

Other features of the invention, including details of construction and combinations of parts, will be herein described and defined in the claims.

In the embodiment of the invention herein disclosed a rotary cutter is shown as the tool to be ground, but the invention is not limited to use as a support for this particular form of tool.

Figure 1 of the drawings is a side elevation of a preferred form of mechanism embodying my invention; Fig. 2 is a plan view of the right-hand portion of the same; and

Fig. 3 is a vertical section on the line $x-x$ 50 of Fig. 2.

The drawings show the attachment applied to a grinding apparatus of ordinary type, including a casting 1, upon which is mounted a shaft 2 having a pulley 3 and grinding tools 4. Pivotaly supported on the casting are the usual tool rest arms 5 and 6. My attachment is shown as adjustably mounted on the arm 6, being clamped in position by any suitable clamping device, such as a thumb nut 9.

The present embodiment of the invention includes a spindle 7 for receiving and centering a tool. A split sleeve 10 may be adjustably clamped on the spindle 7, by means of a screw 11, to support in proper vertical position parts hereinafter described.

Supported on the spindle 7 is a member 15, shown as a split collar mounted on the sleeve 10 and preferably frictionally held thereon by a clamping screw 16. The member 15 is arranged to be adjusted in either direction by means supported from any suitable fixed portion of the attachment. A convenient arrangement for effecting this adjustment comprises thumb screws 13, 14 mounted in lugs 12, said lugs projecting laterally from the sleeve 10. The ends of said screws engage opposite sides of a laterally and downwardly projecting finger 17 of the member 15, said finger extending loosely between the lugs 12. It is evident that by the cooperation of these thumb screws the member 15 may be clamped in the desired position by turning said screws while the screw 16 is loose. The screw 16 may also be employed to clamp the member 15, if desired.

The member 15 is provided with tool-engaging means consisting of a rod 19 which is adapted to engage the periphery of the tool, as by entering the space between adjacent teeth. The rod 19 is mounted on a slotted arm 18 projecting laterally from the member 15 and bears on the upper face of said arm 18 with its lower portion extending through a slot 20 in said arm and provided with a nut 21 to clamp it firmly in any de-

sired position. The lower end of the rod 19 is flattened and fits in the slot 20 so that the rod is held from rotation. The rod 19 in the particular construction shown is supported on the top face of the arm 18. The lower part of the rod 19 is provided with a screw-threaded perforation in which the end of a thumb screw 22 may enter. This thumb screw 22 is provided with two shoulders 23, 24 bearing on opposite sides of the cross-piece of the slotted arm 18. The cross-piece is provided with a depression forming a bearing for the thumb screw 22, as indicated in Fig. 2. It is apparent that the thumb screw 22 may be removed by lifting it from its bearing in the arm 18. Upon loosening the nut 21 the rod 19 may be readily adjusted by the thumb screw 22 to fit the particular tool to be ground, and by removing said nut both the rod 19 and the thumb screw 22 may be withdrawn from the arm 18.

A rotary cutter 25, which is shown as an example of the tool to be ground, may rest on the collar 15 and the sleeve 10, as illustrated in Fig. 3, and is free to slide vertically on the spindle 7 to bring the face to be ground into contact with the surface 27 of the grinding tool. The cutter is held from rotation and guided in its vertical movement by the rod 19.

It will be observed that the spindle extends beyond the rod 19 so that the tool may be moved vertically on said spindle to disengage it from said rod. It is also to be noted that by adjusting the sleeve 10 on the spindle, or the spindle itself, the rod 19 may be moved angularly and its position relative to the grinding surface changed, the position shown on the drawings being substantially at right angles with the grinding surface 27. If desired, this change may be made so that the rod 19 will occupy the space between the teeth which is next to the space occupied by the grinder.

In the use of the attachment, after the spindle 7 is placed in proper position, the arm 6 is adjusted to bring the cutter into proper position with respect to the grinding tool and the rod 19 is adjusted to engage the cutter by turning the screw 22. By manipulation of the thumb screws 13, 14 the face to be ground is then accurately positioned relative to the grinding tool. The face to be ground may then be brought in contact with the grinding tool by sliding the cutter up and down on the spindle. It is to be noted that the rod 19 and standard 7 serve as fixed guides for accurately controlling the path of the cutter in its vertical movement.

When the grinding operation for one face has been completed, the cutter is moved vertically to disengage it from the rod 19 and partially rotated to bring the next face

into position and then allowed to descend into engagement with the rod 19 and the grinding operation repeated.

While in the above description, a complete attachment has been described in detail in order to fully set forth one manner of applying the invention, it will be understood that various changes may be made in arrangement and in details without departing from the spirit of the invention. For instance it will be seen readily that it is immaterial whether the device is arranged so that the cutter is moved vertically or whether in some other direction.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an attachment for grinding machines, a spindle to receive a tool arranged to permit movement of the tool longitudinally thereof, in combination with means independent of but cooperating with said spindle to guide the tool in its longitudinal movement.

2. In an attachment for grinding machines, a spindle to receive a tool arranged to permit movement of the tool longitudinally thereof, in combination with means to engage the periphery of the tool and cooperating with said spindle to guide the tool in its longitudinal movement.

3. In an attachment for grinding machines, a spindle to receive a tool arranged to permit movement of the tool longitudinally thereof, in combination with a rod extending parallel to said spindle in position to engage the periphery of the tool.

4. In an attachment for grinding machines, a spindle to receive a tool arranged to permit movement of the tool longitudinally thereof, in combination with a rod extending parallel to said spindle in position to engage the periphery of the tool, the said rod being adjustable toward and from said spindle.

5. In a grinding machine attachment; means to present a tool for treatment, said means including a spindle along the axis of which said tool is movable longitudinally, in combination with a guide extending beside said spindle, and cooperating therewith to determine the position of said tool for treatment, said guide and spindle differing in length to permit adjustment of said tool relatively to one prior to its adjustment relatively to the other.

6. In an attachment for grinding machines, the combination with a spindle to receive a tool, of a sleeve mounted on said spindle, means for guiding the tool comprising a member for engaging the peripheral portions of the tool arranged to be moved angularly by turning said sleeve, and means for clamping said sleeve in desired position.

7. In an attachment for grinding machines, the combination with a spindle to receive a tool, of a sleeve mounted on said spindle, a collar mounted on said sleeve, means connected to said collar for guiding the tool, and means for adjusting said collar with respect to said sleeve whereby said guiding means may be accurately positioned.
8. In an attachment for grinding machines, the combination with a spindle to receive a tool, of a sleeve mounted on said spindle, a collar mounted on said sleeve, means connected to said collar for guiding the tool, lugs on said sleeve, a finger on said collar extending loosely between said lugs, and screws extending through said lugs and bearing upon said finger whereby said grinding means may be accurately positioned.
9. In an attachment for grinding machines, a spindle to support a tool, a tool engaging member movably mounted with relation to said spindle and manually operable devices engaging said member and arranged in opposition to actuate the member in either direction and clamp it in position.
10. The combination with a grinding wheel of means for guiding and positioning the tool and with relation to which the tool is movable along the face of the wheel, said means comprising means for centering the tool and cooperating means engaging the peripheral portions of the tool to determine its angular position, the said cooperating means being constructed to have engagement with the periphery of the tool during the movement of the latter across the face of the wheel.
11. The combination, with a grinder, of means for guiding and positioning a tool and with relation to which the tool is movable toward and from the grinder, said means comprising means for centering the tool and cooperating means engaging the tool to determine its angular position.
12. The combination, with a grinder, of means for guiding and positioning a cutter constructed to permit independent movement of the cutter toward and from the grinder, said means comprising means for centering the cutter and cooperating means for engaging the cutter between its teeth to determine its angular position.
13. In a machine of the class described, the combination with a grinding device, of tool positioning mechanism comprising means for centering the tool constructed to permit independent movement of the tool along the acting surface of the grinding device, and a locking member for engaging the peripheral portions of the tool to determine its angular position, arranged to permit angular movement of the tool when the latter is moved clear of the grinding device.
14. The combination with a grinding device, of tool positioning mechanism comprising means for centering the tool constructed to permit independent movement of the tool toward and from said device, and a locking member for engaging the peripheral portions of the tool to determine its angular position.
15. In a grinding machine, a grinding member, and means to present a tool in position to be ground thereby, said means including a spindle to direct the movement of said tool transversely of said grinding member, and a rod extended alongside of said spindle and serving to limit the rotation of said tool.
16. Grinding mechanism, comprising a frame, a grinding member thereon, an arm mounted on said frame, a spindle mounted on said arm and provided with a work-support to receive the work, and a guide extended near said spindle and cooperating therewith to direct said work transversely of said grinding member.
17. A work-support for grinding machines of the class described, said work-support comprising a spindle, an extended guide, and means to support said spindle and guide extended alongside each other near the grinding member of said machine, said spindle and guide cooperating to guide said tool in a predetermined path transversely of said grinding member.
18. Grinding apparatus, comprising a work-support, means to secure the same relatively to a grinding member, and a plurality of parallel rods for maintaining a tool and guiding an edge thereof in its path across the acting surface of said grinding member.
19. Grinding mechanism, comprising a grinding wheel, a work-support adjustable relatively to said wheel and in a line parallel with the axis thereof, and a plurality of parallel rods for maintaining a tool and guiding an edge thereof in its path across the acting surface of said grinding member.
20. Grinding mechanism, comprising a grinding wheel, and a work-support including a plurality of parallel rods parallel to a grinding surface of said wheel for maintaining and guiding a tool edge in its path across said grinding surface.
21. Grinding mechanism, comprising a grinding wheel, a work-support having a plurality of parallel rods cooperating to direct the work transversely of said grinding wheel, means for adjustment of said rods relatively to said grinding wheel in a line parallel to the axis of the latter, and means for moving said support and rods together out of operative position.
22. Grinding mechanism, comprising a grinding member, and means to present a tool in position to be ground thereby, said

means including a spindle and a guide co-operating to direct the movement of said tool transversely of said grinding member, a work-supporting member concentric with, and movable about the axis of, said spindle, and means to regulate the position of said work-supporting member to insure a predetermined path for said tool in its traversal of said grinding member.

23. Grinding mechanism, comprising a grinding member, and means to present a tool in position to be ground thereby, said means including a spindle and a guide extended side by side and coöperating to direct the movement of said tool transversely of said grinding member, and a work-supporting sleeve concentric with and adjustable upon said spindle, said sleeve having a projection and a screw engaged with said sleeve projection and guide respectively to regulate the position of the sleeve to determine the path of said tool transversely of said grinding member.

24. In a machine for grinding a tool, the combination of a grinding wheel, a spindle adjustable bodily in a plane substantially parallel with the axis of said grinding wheel to vary the angle at which a cutting portion of said tool is to be ground, and along the axis of which spindle said tool may be moved transversely to said grinding

wheel, and means to maintain said tool portion throughout said transverse movement in said adjusted angular relation to said grinding wheel.

25. A grinding machine, having in combination, a grinding wheel, a work support, work holding means supported thereon consisting of a spindle extended in parallel relation to the plane of said wheel, a guide extending alongside of said spindle, said spindle being capable of holding the work so that it may be moved longitudinally of said spindle in traverse of said grinding wheel and rotated about said spindle toward and from said grinding wheel, said spindle being of such length with relation to the diameter of said grinding wheel and said guide that the work may be moved longitudinally of said spindle to a position on said spindle wherein it may be rotated freely about said spindle without coming into contact with said guide or grinding wheel.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHAS. E. HOWE.

Witnesses:

S. A. CROSTON,
FRED. C. GOODWIN.