July 8, 1958 C. D. BARNES 2,841,927

CONTACT-WHEEL-BELT-GRINDER

Filed Jan. 12, 1956 3 Sheets-Sheet 1

Fig. 1.

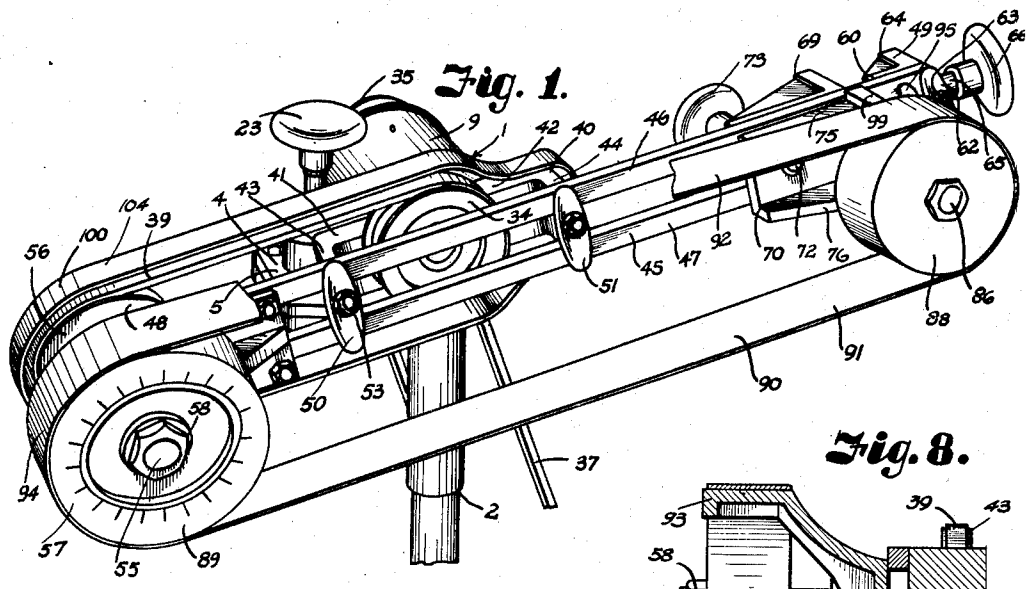


Fig. 8.

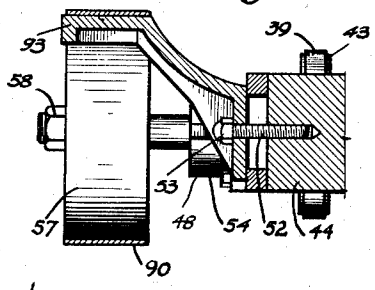
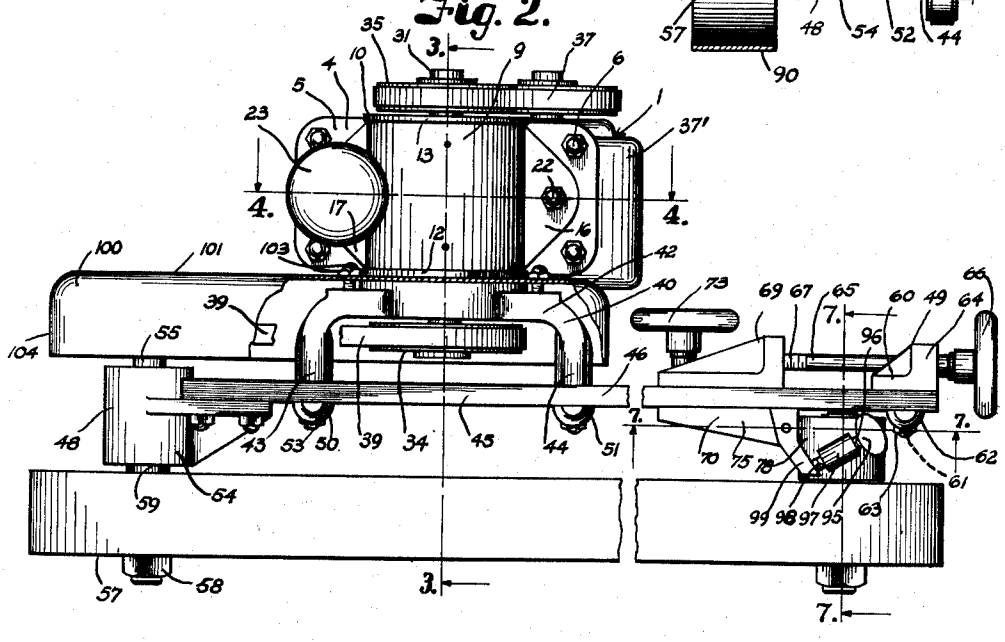


Fig. 2.



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Filed Jan. 12, 1956 3 Sheets-Sheet 2

Fig. 3.

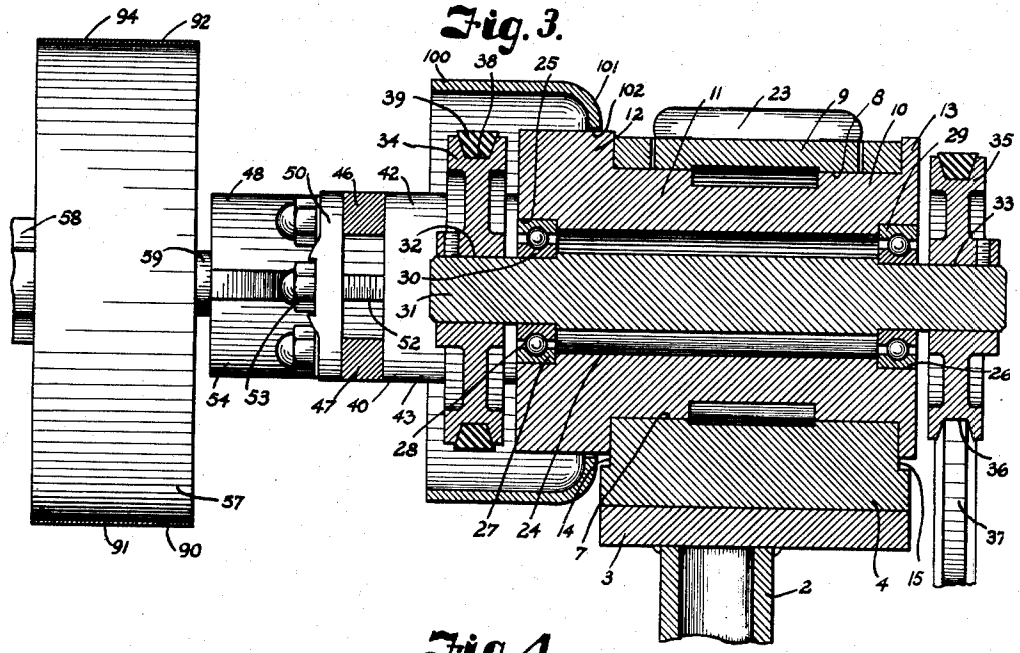
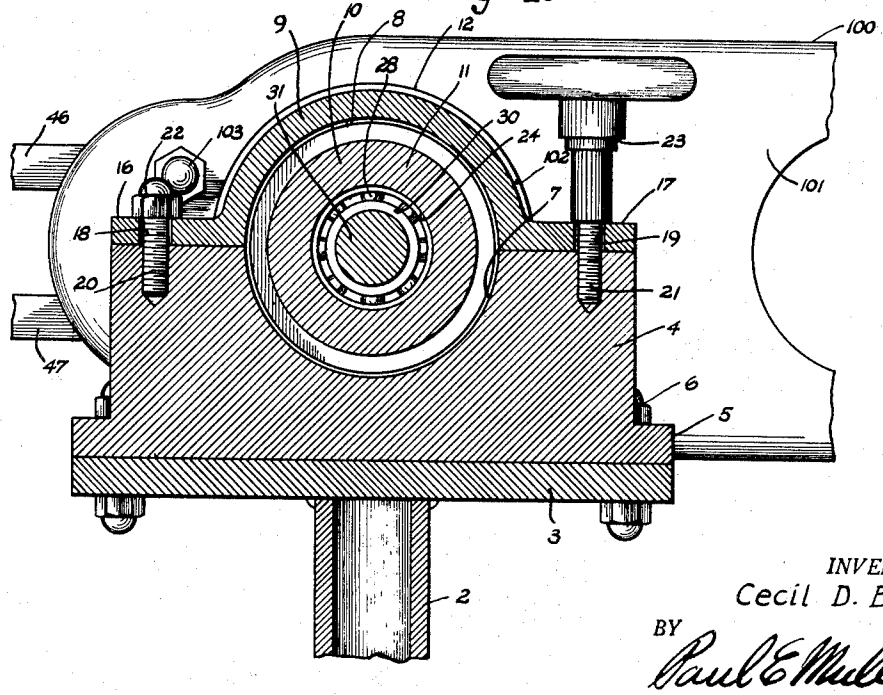


Fig. 4.



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Filed Jan. 12, 1956 3 Sheets-Sheet 3

Fig. 5.

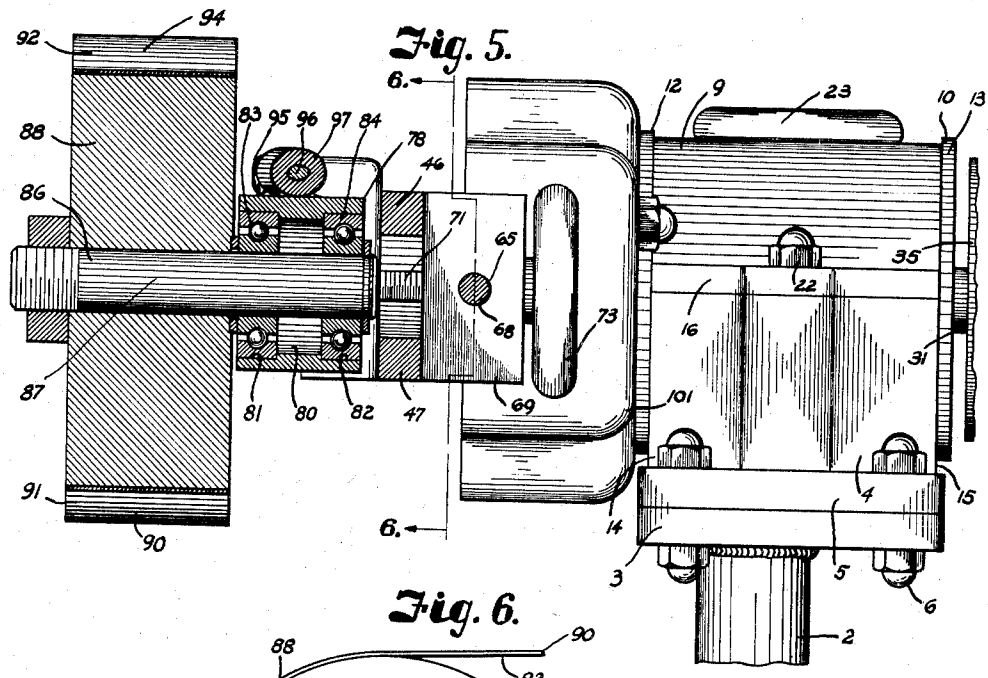


Fig. 6.

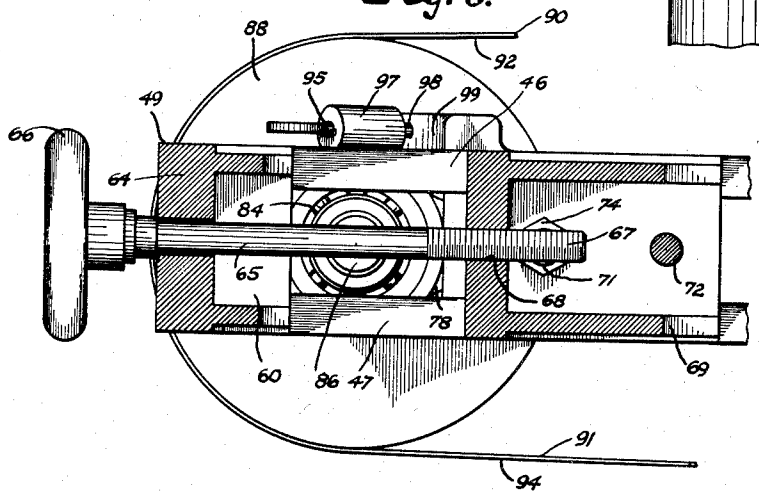
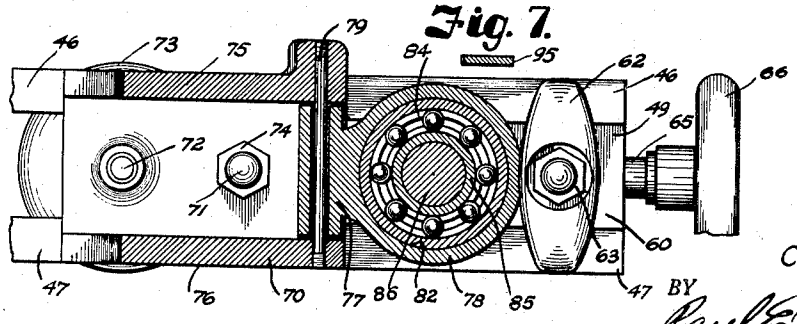


Fig. 7.



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CONTACT-WHEEL-BELT-GRINDER

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Application January 12, 1956, Serial No. 558,773

4 Claims. (Cl. 51—141)

This invention relates to a contact-wheel-belt-grinder for removing flash and mold marks from castings, finishing metals, and like grinding and polishing operations. The object of the invention is to provide a device of this character which is extremely flexible in its maneuverability to suit the particular work in hand and the convenience of the operator.

Other objects of the invention are to provide a simple, light-weight device; to provide a resilient faced contact wheel in association with a grinding belt, operating thereover and over an idler pulley that is easily adjustable to maintain alignment of the grinding belt with the resilient face of the contact wheel; to provide a structure which permits of a full 360° adjustment of the grinding belt about a fixed support therefor; to provide the device with a platen table in association with a grinding belt so that it may be used both horizontally and vertically; and to provide a belt grinder adapted for multiple set-ups in fast production line operations.

In accomplishing these and other objects of the invention, as hereinafter pointed out, I have provided improved structure, the preferred form of which is illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective view of a contact-wheel-belt-grinder constructed in accordance with the present invention.

Fig. 2 is a plan view of the contact-wheel-belt-grinder.

Fig. 3 is a section through the pivot head on the line 3—3 of Fig. 2.

Fig. 4 is a cross section through the pivot head on the line 4—4 of Fig. 2.

Fig. 5 is a cross section through the belt guide pulley and the pivotal mounting therefor, to adjust the axis thereof angularly with respect to the axis of the contact wheel.

Fig. 6 is a cross section on the line 6—6 of Fig. 5.

Fig. 7 is a fragmentary section on the line 7—7 of Fig. 2.

Fig. 8 is a fragmentary cross section showing support of the platen.

Referring more in detail to the drawings:

1 designates a contact-wheel-belt-grinder constructed in accordance with the present invention that is adapted to be mounted upon a bench, pillar, portable table or in most convenient places in a shop. However, in the present drawings, the support constitutes a pillar or standard 2 having a plate 3 for mounting a block 4. The base of the block 4 preferably conforms with the shape of the plate 3 and has flange portions 5 for accommodating fastening devices, such as bolts 6, that attach the bearing block to the plate 3, as best shown in Figs. 4 and 5.

The bearing block 4 has a semi-cylindrical recess 7 extending transversely thereof to cooperate with a similar recess 8 in a bearing cap 9 for securing a turning head 10. The turning head 10 includes a cylindrical body portion 11 that is adapted to be turned to different positions within the block 4 and cap 9 for positioning the belt and contact wheel, as later described. The ends of the cylindrical body portion 11 project through opposite sides of the bearing block 4 and have annular flanges 12 and 13 for contacting with the opposite end faces 14 and 15 of the block 4 so as to restrict axial movement of the turning head 10 on the pillar 2, when the head 10 is turned therein. The cap 9 has ears 16 and 17 provided with apertures 18 and 19 whereby the cap member is passed over studs 20 and 21 that are fixed in the block 4 and extend upwardly therefrom and through the apertures of the ears. One of the studs carries a nut 22 and the other an internally threaded hub of a hand wheel 23 so that when the hand wheel is tightened, the cap 9 clamps the trunnion from turning movement in the block 4.

The turning head 10 has an axial bore 24 extending therethrough and the ends have counter bores 25 and 26 to seat therein the outer races 27 of antifriction bearings 28 and 29. The inner races 30 of the bearings carry a counter shaft 31 that extends axially through the counter bore and has reduced ends 32 and 33 carrying pulleys 34 and 35 which are fixed to the reduced ends of the drive shaft. The pulley 35 has a circumferential groove 36 for a driving belt 37 that may be driven from any suitable prime mover, such as a motor 37'. The pulley 34 also has a circumferential groove 38 for a belt 39.

The turning head, on the same side as the pulley 34, has a yoke 40 which includes the flange 12 and diametrically arranged arms 41 and 42. The arms 41 and 42 extend radially from the flange 12, the points spaced from the periphery of the pulley 34 and terminate in lugs 43 and 44, as best shown in Fig. 2. Carried by the lugs 43 and 44 is an arm or beam 45 composed of spaced apart substantially parallel bars 46 and 47 of substantially longer length than that required to span the yoke 40 whereby the projecting ends mount fixed brackets 48 and 49. The bars are secured to the faces of the yoke by clamps 50 and 51 having ends lapping the outer faces of the bars, as shown in Fig. 1. The clamps are retained by studs 52 that extend from the lugs 43 and 44 of the yoke and through the clamping plates to carry nuts 53 by which the clamps 50 and 51 are drawn into contact with the bars and the bars against the end faces of the lugs 43 and 44. It is thus obvious that the arm or beam formed by the bars turns with the head 10 and that the beam may be positioned at different angles through a range of 360°.

The bracket 48 includes a barrel portion 54 for rotatably mounting a transverse or stub shaft 55. The shaft 55 has ends projecting from opposite sides of the bearing member to carry a driven pulley 56 in registry with the pulley 34 to drive the pulley 56 through the belt 39. The opposite or outer end of the shaft 55 carries a contact wheel 57 that is removably fixed thereto by a nut 58. The nut 58 is threaded on the shaft 55 and engages the outer side face of the contact wheel to hold the opposite side face of the wheel in contact with a suitable stop 59.

The fixed bracket 49 is of angle shape to provide a base portion 60 which is secured against the outer faces of the bars by a stud 61, a clamp plate 62, and a nut 63 in the same manner that the bars are attached to the yoke of the turning head. The bracket 49 also has a lateral portion 64 to form a support for a shaft 65. The shaft 65 being suitably mounted for rotation without axial movement so that when a hand wheel 66 on the end of the shaft is rotated, an opposite threaded end 67 of the shaft turns within an internally threaded opening 68 of slidable bracket part 69. The bracket part 69 rides along the outer faces of the bars in cooperation with an inner

bracket part 70 that slides therewith along the outer or opposite faces of the bars 46 and 47. Carried by one of the bracket parts are clamping devices, such as studs 71 and 72, that extend through suitable openings in the other bracket part to mount a hand wheel 73 and a nut 74, respectively. The nut 74 being adjusted so that the brackets are slidable along the bars and held in any adjusted position on tightening of the hand wheel 73 to draw the brackets into clamping contact with the bars. The bracket part 70 has spaced apart ears 75 and 76 on respective outer sides thereof to mount therebetween a barrel portion 77 on a bearing bracket 78. Extending through the ears 75 and 76 and through the barrel portion 77 is a pivot pin 79 for forming a hinge on which the bearing bracket 78 is adapted to be moved pivotally about an axis transversely of the bars 46 and 47. The bearing bracket 78 has an axial bore 80 and counter bored ends 81 and 82 mounting anti-friction bearings 83 and 84. Carried in inner races 85 of the respective bearings is a stub shaft 86 having an end 87 projecting from the outer face of the bearing bracket corresponding with the projecting end of the driven stub shaft 55. The end 87 of the shaft carries a pulley 88 corresponding with the contact wheel 57, previously described. However, the peripheral face of the pulley 88 is preferably rigid whereas the contact wheel 57 has a resilient rim 89. Operating over the peripheries of the contact wheel and pulley 88 is an endless belt 90 to form parallel runs 91 and 92, one of which may be backed on the inner side thereof by a platen 93 which is carried by the stud 52. The outer face of the belt is treated to form a grinding, or polishing surface 94, according to the particular work to be performed thereby.

The belt is maintained in tracking relation with the resilient rim of the contact wheel 57 by adjusting the bearing bracket 78 on its pivotal axis. This is effected by a thumb screw 95 having a threaded shank 96 engaging internal threads of a lug 97 that projects from the side of the bearing member to support the end 98 in contact with a laterally projecting lug 99 on the bracket member 70, as best shown in Figs. 2 and 6. The belt 39, pulley 34 and pulley 35 are preferably covered by a guard 100. The guard 100 has a closed side 101 having an opening 102 to pass over the flange 12. The guard is secured to the arms of the yoke 40 by screws 103. The side 101 covers the open side of the belt 39 while the bars 46—47 and associated parts provide protection from that side. The guard also includes a lateral flange 104 surrounding the side 101 to complete the protective enclosure around the pulley and belt.

In using the apparatus constructed and assembled as described, the belt 37 is connected with a suitable source of power, such as an electric motor 37' (see Fig. 2). The grinding belt is tensioned over the resilient face of the contact wheel. This is effected by loosening the hand wheel 73 to loosen the bracket parts 69 and 70 on the faces of the bars 45 and 46. The hand wheel 66 may then be turned to move the bracket parts back and forth along the bars so as to shift the spacing of the pulley 88 from the contact wheel. When the tension of the belt is properly adjusted, the hand wheel 73 is turned to retighten and clamp the bracket parts 69 and 70 in fixed position. The runs of the grinding belt are centered with respect to the peripheral face of the contact wheel by adjusting the angle of the shaft 86 relatively to the shaft 55. This is effected by turning the wing screw 95 to effect the desired pivotal movement between the bearing bracket 78 and the bracket part 70, the bearing bracket 78 turning upon the axis of the pin 79. With the belt suitably adjusted, the hand wheel 23 is loosened to where the turning head moves within the bearing block so as to adjust the angle of the runs of the belt relatively to the support. For example, the belts may be set at any angle through a complete circle of 360° so as to adjust the machine to the work or to more conveniently bring the work into contact with the grinding belt. When the proper angle is determined, the hand wheel 23 is retightened to draw the bearing cap into clamping contact with the trunnion portion of the turning head. The contact wheel and belt pulley may be adjusted relatively to the axis of the turning head by loosening the nuts 53 and sliding the bars between the lugs 43—44 and the clamps 50 and 51. Thus, the contact wheel may be adjusted to a position nearer the standard or moved further therefrom to best suit the particular work in hand.

If it becomes necessary to use the platen, the clamp 51 and nut which retains it are removed and the platen bracket, as shown in Fig. 8, is applied to replace the clamp 51. The nut is then replaced and tightened to hold the platen portion thereof in contact with the under side of the upper run of the belt. If desired, a contact wheel with a resilient periphery may be substituted for the pulley 88 so that both ends of the belt may be used for grinding purposes. If desired, supplementary wheels may be applied by threading adaptors (not shown) on the shafts 55 or 56 in place of the nuts 58.

From the foregoing, it is obvious that I have provided a contact-wheel-belt-grinder which is well adapted for removing flash and mold marks from castings or for performing other grinding and polishing operations.

It is also obvious that the grinding belt is readily adjustable to accommodate the work in hand and that the grinding belt is adjustable through a full 360°.

It is also obvious that this adjustment may be effected while the belt is in operation, merely by loosening the hand wheel 23, adjusting the angle, and re-tightening the hand wheel.

What I claim and desire to secure by Letters Patent is:

1. A grinder, including a standard, a bearing block on the standard and having a transverse semi-cylindrical recess providing a bearing face of relatively large area, a turning head having a cylindrical trunnion in said recess, a cap extending over the trunnion and having a semicylindrical bearing face cooperating with the bearing face of the recess in forming a journal for the trunnion, adjustable means for anchoring the cap to the block for gripping the trunnion to prevent movement thereof and to release the trunnion for turning movement through 360 degrees, said turning head having a bore extending through the trunnion axially, a countershaft journaled in the bore, a yoke projecting from the turning head oppositely of the trunnion and having spaced apart arms, a counterpulley on the end of the countershaft intermediate said arms, a driving pulley on the other end of the countershaft, a beam carried by said arms of the yoke and having ends extending outwardly of opposite sides of the yoke, a bearing fixed to one end of the beam, a stub shaft journaled in the bearing, a bracket, means adjustably supporting the bracket on the other end of the beam, a stub shaft carried by the bracket, contact wheels on the stub shafts, a grinding belt extending around the contact pulleys to provide a continuous moving grinding face for the contact wheels, a driven pulley on the stub shaft carried by said bearing and in aligning registry with the counterpulley, an endless belt operating over the driven and counter pulleys, and a drive belt extending over the driving pulley on the countershaft for operating the grinding belt.

2. A grinder, including a standard, a bearing block on the standard and having a transverse semicylindrical recess providing a bearing face of relatively large area, a turning head having a cylindrical trunnion in said recess, a cap extending over the trunnion and having a semicylindrical bearing face cooperating with the bearing face of the recess in forming a journal for the trunnion, adjustable means for anchoring the cap to the block for gripping the trunnion to prevent movement thereof and to release the trunnion for turning movement through 360 degrees, said turning head having a bore extending axially through the trunnion, a counter-

shaft journaled in the bore, a yoke projecting from the turning head oppositely of the trunnion and having spaced apart arms, a counterpulley on one end of the countershaft intermediate said arms of the yoke, a driving pulley on the other end of the countershaft, spaced apart bars extending transversely of the arms of the yoke and having outwardly extending ends, clamps on outer sides of the bars, fastening devices extending through the clamps and into the arms of the yoke, a bearing fixed to one end of the bars, a stub shaft journaled in the bearing, a bracket, means adjustably supporting the bracket on the other end of the bars, a stub shaft carried by the bracket, contact wheels on the stub shafts, a grinding belt extending around the contact pulleys to provide a continuous moving grinding face for the contact wheels, a driven pulley on the stub shaft carried by said bearing and in aligning registry with the counterpulley, an endless belt operating over the driven and counter pulleys, and a drive belt extending over the driving pulley on the countershaft for operating the grinding belt.

3. A grinder as described in claim 1, wherein the trunnion has circumferential flanges engaging side faces of the block to restrict endwise movement of the trunnion and maintain stability of the beam under grinding pressures applied to one and the other of the contact wheels.

4. A grinder as described in claim 1 wherein the beam comprises spaced apart bars.

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