Nov. 7, 1939. J. Y. BLAZEK 2,179,465

GRINDING TOOL

Filed Dec. 9, 1938 2 Sheets-Sheet 1

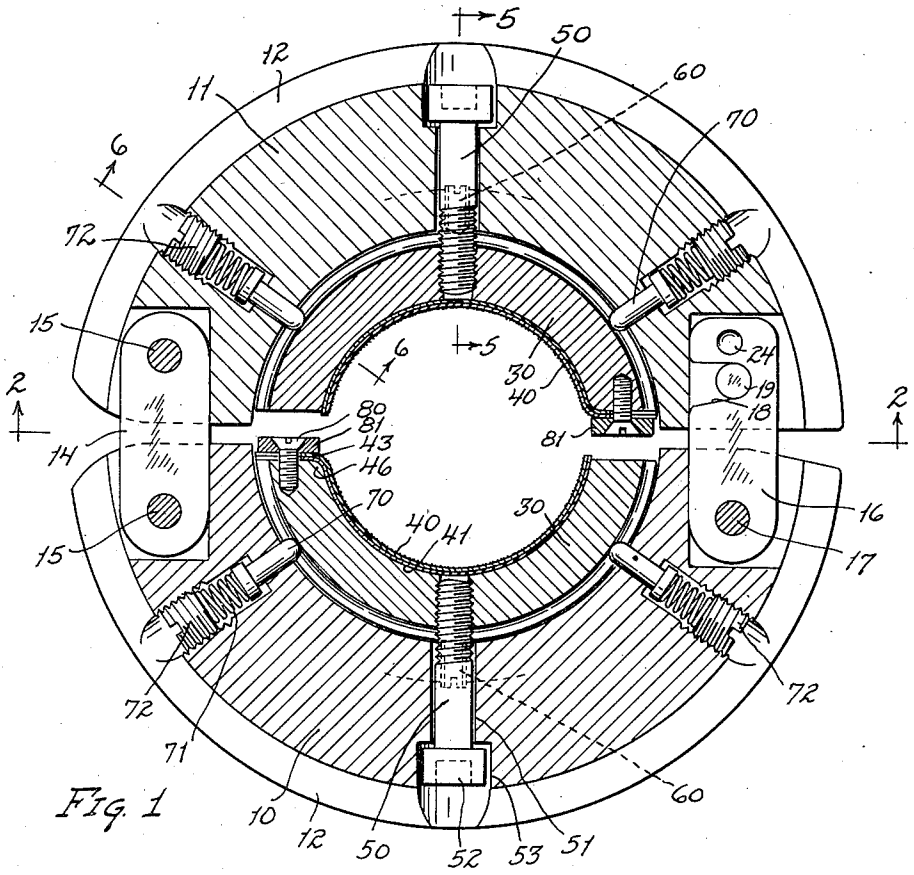


FIG. 1

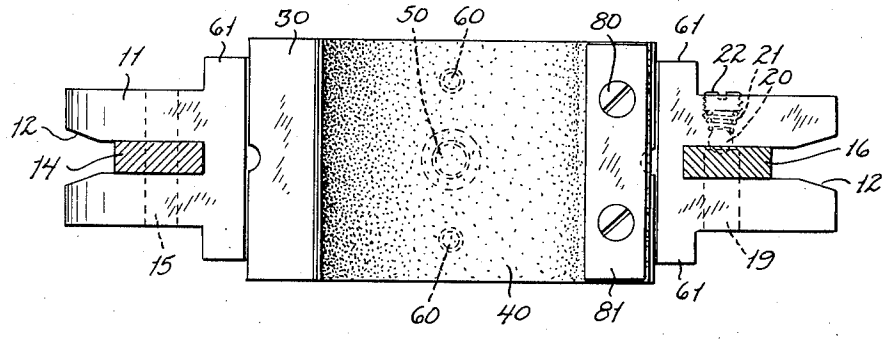


FIG. 2

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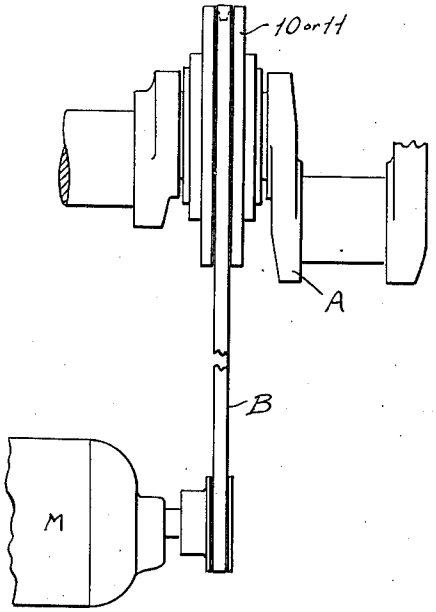


FIG. 3

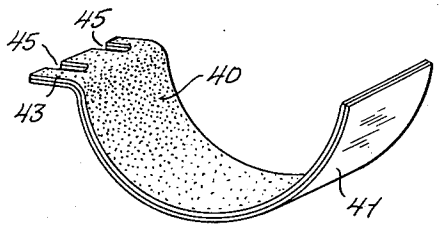


FIG. 4

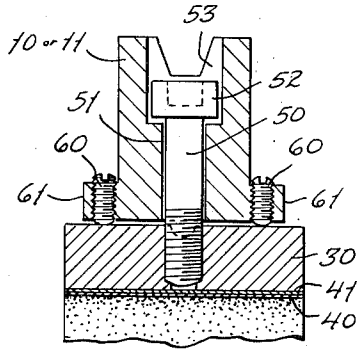


FIG. 5

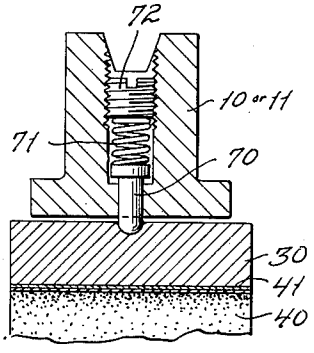


FIG. 6

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GRINDING TOOL

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Application December 9, 1938, Serial No. 244,791

8 Claims. (Cl. 51—73)

This invention relates to a grinding tool suitable for grinding shafts and other round objects to render them truly cylindrical. My grinding tool, for instance, is well adapted for grinding crankshafts of automobile engines.

In grinding crankshafts it is desirable to have a separable ring-like frame carrying on its inner periphery spring pressed shoes supporting abrading material. The separation of the frame allows the device to be passed around the crankshaft and then closed, making a complete ring about it with the abrading material passing against the shaft. In operating such a device, I have found that there has been difficulty with the spring pressed shoes dropping out of place during the act of mounting them. It is one of the objects of the present invention to support the shoes in such manner that they cannot drop out during the separation of the frame, but are still free to be pressed inwardly about the shaft in use.

Another object of the invention is to provide for tipping the shoes which support the abrading material, so that they may act rapidly on a shaft which has been worn to a decided taper, and thereafter may assume true position for cylindrical grinding. Still another object of the invention is to support the abrading material effectively, so that it will not be torn by the stress applied to it.

The invention will become more apparent from the following description, reference being had to the drawings hereof which illustrate a preferred embodiment of the invention, the essential features of the invention being summarized in the claims.

In the drawings, Fig. 1 is a cross-section of my grinding tool in a plane at right angles to the axis of the shaft to be ground; Fig. 2 is an axial cross-secion of the tool in a plane indicated by the line 2—2 on Fig. 1; Fig. 3 is a view illustrating the tool mounted on a crankshaft and driven by a belt from a motor; Fig. 4 is a perspective of the flexible grinding element; Figs. 5 and 6 are details of the grinding tool, being radial sections on the correspondingly numbered lines on Fig. 1.

The frame of the grinding tool comprises a split pulley consisting of two half-ring members 10 and 11, each of which has formed in outer periphery a groove 12 adapted to receive a driving belt. The two members are hinged together by a link 14 seated in a recess in the members, and pinned thereto by pins 15. This allows the two members to swing apart so that they can be placed about a shaft. When in place, the members are secured together by a latch bar 16 mounted in a recess diametrically opposite the link 14. The latch bar is pinned at 17 to one of the members and has a notch 18 adapted to engage a pin 19 carried by the other member.

The latch bar 16, which holds the two half-rings together, as a rigid unit, is prevented from displacement on its pivot by a spring detent. As shown in Fig. 2, this detent comprises a ball 20, pressed by a spring 21, backed by a screw block 22, all mounted in a cavity in the member 11. This enables the latch bar to be readily swung into place, whereupon the ball seats in a depression 24 in the latch bar, and retains it in closed position, but allows it to be swung out whenever desired, by pressure of a suitable tool inserted in the space between the frame halves.

The frame described carries two identical arcuate shoes 30, which, as hereinafter described, support the flexible grinding strips 40 in position to act on the shaft to be ground. Each member 30 is freely supported by the corresponding frame member 10 or 11 by a screw 50 pressing loosely through a radial opening 51 in the member and threaded at its inner end into the shoe 30. The screw has a head 52, which loosely occupies an enlarged opening 53 in the frame member.

The mounting of the shoes in the loose manner described enables their adjustment and spring pressure inwardly, as about to be explained, but it is effective to attach the shoes of a frame so that they will not drop out of place. The looseness of the mounting of the shoes allows considerable wobble to the shoe. Thus, it may not only be readily spring pressed inwardly, but may be tipped to cause the face of the abrading material to lie in a slightly conical position, which is very effective in rapidly truing down a shaft which has been worn to a considerable taper. This tipping of the shoes is effected by two set screws 60 which are mounted in flanged portions 61 of the frame in longitudinal alignment with the screw 50.

By turning in one or the other of the set screws, the shoe may be tipped slightly when it is in its outermost position. Thus, the shoe may start the grinding with the abrasive material in a slightly conical form, then as the grinding continues, and the taper is worn off of the object being ground, the spring pressure on the shoes moves them inwardly away from the set screws, so that they assume a truly cylindrical position.

As shown in Figs. 1 and 6, the inward spring pressure of the shoes is effected by a pair of plungers 70, located preferably about 60° each side of the screw 50, and pressed radially in-

wardly by springs 71 backed by screw plugs 72, the plunger, spring and plug occupying a cavity in the frame ring.

To hold the emery cloth which forms the abrading member in position to be always effective and at the same time not tear by the stresses put on it, I back the cloth strip 40 by a thin strip of steel 41, the cloth and strip making approximately a semi-cylinder. At the edge of such semi-cylinder the strip and cloth are bent outwardly radially, as shown at 43 (Figs. 1 and 4). These latter portions have formed therein notches 45, which are adapted to be occupied by screws 80 passing through a clamping bar 81.

The shoe 30 is rounded at the junction of its inner periphery with the outward face, which forms the seat for the abrading band, as shown at 46. This rounded support for the band when it changes from the straight anchored portion to the curved abraded portion prevents breaking of the abrading fabric at this region. The abrading band, as will be seen, is anchored only at one end and is free at the other end, as shown in Fig. 1. The device, when in use, rotates in what would be a clockwise direction in Fig. 1, so that the grinding stresses on the band are away from the anchorage 81, and keep the abrading band smooth throughout its length.

In Fig. 3 I have indicated, at A, a crankshaft to be ground. My tool is opened by swinging back the latch bar 16 and then, as thus spread, the tool is passed about the crankshaft and locked by the return of the latch bar 16 into the position shown in Fig. 1. The shoes are adjusted, if necessary, by manipulation of the screws 60 to cause the abrading bands to make the proper engagement with the crankshaft; then a belt B may be passed over the frame and over the driving pulley of a motor M and the tool is ready to operate.

This tool is well adapted for grinding the crank shafts of motor vehicles, without removing the shaft from its bearings, it being merely necessary to remove the pan of the crankshaft housing and detach the connecting rods. Preferably the tool does not fill the entire space between the cranks and may be manually shifted back and forth axially as it rotates, by a rod or fork pressed first against one side and then against the other.

I claim:

1. A grinding tool for shafts and similar members comprising a ring-like frame, arcuate shoes within the frame adapted to support abrasive material and engage the shaft to be ground, radial extending pins centrally connected to said shoes and loosely mounted in said frame for supporting said shoes so that they may have only a limited movement with reference to said frame, and springs independent of said pins for pressing said shoes inwardly.

2. A shaft grinding tool comprising a separable frame adapted to embrace a shaft, a pair of substantially half-ring shoes mounted on the inner periphery of the frame, each shoe being loosely mounted at its center by means of a headed screw extending loosely through the frame, spring-pressed plungers on opposite sides of the screw pressing the shoe inwardly, an abrasive band mounted on each shoe.

3. A grinding tool for shafts and similar members comprising a ring-like frame, arcuate shoes within the frame adapted to support abrasive material, means centrally connected to the shoes for loosely supporting them, springs for pressing the said shoes inwardly, and means for tipping the shoes so that the abrasive material will lie in a slightly conical position.

4. A grinding tool for shafts and similar members comprising a ring-like frame, arcuate shoes within the frame, abrasive strips supported by the shoes, said shoes being supported in such manner that they may be pressed inwardly into position to define a true cylinder, springs for so pressing the shoes, screws loosely mounted in the frame and centrally engaging the shoes to support them, and set screws on longitudinally opposite sides of each supporting screw to enable the tipping of the shoes.

5. A shaft grinding tool comprising a ring-like frame adapted to lie around the shaft, arcuate shoes within the inner periphery of the frame spring pressed inwardly, abrading bands carried by the shoes respectively, and each band comprising a flexible metal member with an emery cloth facing adhered thereto.

6. In a shaft grinding tool, the combination of a ring-like frame, a shoe movably mounted within the frame having an arcuate inner face, an abrading member comprising fibrous sheet material coated with abrasive and mounted on a thin metallic band, said abrading member extending around the inner periphery of the shoe, but in a certain region bent outwardly to provide a shoulder engaging the shoe and through which the abrading member is driven.

7. In a shaft grinding tool, the combination of a ring-like frame adapted to surround the shaft, arcuate shoes on the inner periphery of the frame, abrading members lying against the inner periphery of the shoes, the shoes having outwardly extending portions connected with the inner periphery by curves, each abrading member being formed similarly to such inner face of the shoe and secured to the shoe on the outwardly extending portion thereof whereby said member curves gradually from its anchorage to its active position.

8. A shaft grinding tool comprising a separable frame adapted to embrace a shaft, a pair of substantially half-ring shoes mounted on the inner periphery of the frame, each shoe being mounted at its center and being rockable at such mounting in a plane in which the shaft axis lies, spring pressed plungers on opposite sides of the mounting tending to hold the shoe equalized, an abrasive band mounted on each shoe consisting of emery cloth adhering to a flexible strip, the cloth and strip extending outwardly from the inner periphery of the shoe and being secured to the shoe at such outward extension.

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