

1,394,704.

INVENTOR

Walter C. Barnhart.

BY
Pierre Barnes
ATTORNEY

UNITED STATES PATENT OFFICE.

WALTER C. BARNHART, OF SEATTLE, WASHINGTON.

PULLEY-GRINDING MACHINE.

1,394,704.

Specification of Letters Patent.

Patented Oct. 25, 1921.

Application filed December 10, 1918. Serial No. 266,031.

To all whom it may concern:

Be it known that I, WALTER C. BARNHART, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Pulley-Grinding Machines, of which the following is a specification.

This invention relates to grinding machines and, more especially, to improvements in the construction of a machine of the character shown and described in U. S. Patent No. 1,169,377, issued to me January 25, 1916.

The object of the present invention is the perfecting of grinding machines of the referred-to type for the purpose of rendering them more efficient in operation, more conveniently adjusted and capable of performing functions unattainable by devices hitherto in use.

With these ends in view, the invention consists in the novel construction, adaptation and combination of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of my improved grinding machine shown applied to grinding a pulley. Fig. 2 is an end elevational view of the same. Fig. 3 is a detail vertical section showing the abrasive wheel and devices for adjustably supporting the same, the wheel, arbor and holder therefor being shown in different relative positions with respect to the supporting means therefor from which they are represented in the preceding views. Fig. 4 is a view, shown somewhat diagrammatically, of a portion of a pulley face and an abrasive wheel to illustrate the effect of the wheel when in various angular positions with respect to the work.

Referring to the drawings, the numeral 6 designates a shaft upon which is secured a pulley 7 which is to be ground and is rotated, as indicated by arrow *x*, as by means of a power-driven belt 8 passing about a pulley 9 upon the shaft 6.

According to the present invention, I provide a grinding wheel 10, made of a suitable abrasive material, preferably of the type conventionally known as a cup wheel. This wheel is rigidly secured to the screw-threaded end 11 of a shaft 12, as by means of a nut 13. Said shaft is journaled in bearing boxes 14, 14' of a holder 15 and is secured against axial movement toward the

work by means of an extensible set collar 16. The shaft, however, is held against axial movement away from the work by means of anti-friction thrust bearings 19 interposed between the box 14 and a set collar 17 which is rigidly secured to the shaft.

Said holder is formed or provided adjacent its forward end with trunnions 15¹ which are journaled in spaced lugs 18 provided on a base plate 20. 21 represents screws extending through slots 22¹ provided in standards 22 extending upwardly from said base plate and engaging in threaded holes provided in the holder 15 for securing the same at selected tilted positions. The base plate 20 is provided at its underside with a circular recess 20¹ to receive a correspondingly shaped boss 23¹ provided upon a carriage 23, and to which said base plate is secured in adjusted rotary positions by means of bolts 24 extending through arcuate slots 20² of the plate to engage the carriage. Said carriage is provided in its under side with a dove-tail way 25 to receive a rib 26 provided on a bed plate 27, the latter being arranged to be rigidly secured to a supporting framework, such as 28, as by means of bolts 32.

30 represents an adjusting screw for regulating the plate 20 to carry the abrasive wheel 10 toward or from the work, 31 is a feed screw actuated, as by a crank-handle 31¹, to impart movements to the carriage and associated parts during the operation of the machine.

As illustrated, the abrasive wheel 10 is preferably of a substantially cylindrical shape with a truncated conical extremity to provide an annular surface 10¹ by which the grinding or abrading operation is directly accomplished.

In operation, the base plate 20 carrying the holder 15 is first advanced by means of the screw 30 to within a short distance of the pulley 7, which is to have its periphery ground. The holder 15 and plate 20 are then adjusted to present the axis of the abrasive wheel 10 in suitable angular relations to the work in both vertical and horizontal planes. After being thus regulated, the plate 20 is further advanced to engage the wheel with the work, whereupon the plate with the carriage is fed laterally, or in a direction parallel to the shaft 6, through the medium of the screw 31.

When the wheel encounters the face of

the pulley and with the latter rotating in the direction denoted by arrows x in Figs. 1 and 2, the wheel 10 which is engaged at one side of its abrading face 10^1 , will be
 5 caused to rotate in a direction indicated by arrows y in the views, but with the face 10^1 thereof at a different speed than that of the periphery of the pulley by which it is driven.

10 The relative speeds of the engaging surfaces of the pulley and wheel may be controlled by regulating the angularity of the axis of the abrasive wheel with respect to a plane tangential of the pulley where con-
 15 tacted by the abrasive wheel. This will be understood from an inspection of Fig. 4, wherein 7^1 represents a pulley surface and $a-b$ the axis of the abrasive wheel 10 which is caused to have its tapering surface 10^1
 20 brought against the pulley surface.

The arrows x and y , respectively, indicate the directions in which the wheel and pulley travel. When the wheel is adjusted to have its contact with the pulley in a line $c-d$ and
 25 in a plane rectangular to the pulley axis, it is evident that no rotary motion will be imparted to the wheel. When the contact is at $e-f$ or in a plane parallel to the pulley axis, the peripheral speeds of the pulley and
 30 wheel will be the same, with practically no grinding action. When, however, the wheel is adjusted to engage the pulley in the angle between the referred-to contacts, as at $g-h$, for example, then the engaging wheel sur-
 35 face will be driven at a slower speed than the pulley periphery with a consequent grinding action.

From the foregoing explanation, it is ap-
 40 parent that by regulating the angularity of the wheel axis to the pulley-face to engage the latter at a selected plane upon the wheel and within the angle inclosed by $c-d$ and

$e-f$, the rotation of the wheel with respect to the pulley may be regulated. Such regu-
 45 lation of the wheel to afford different rela-
 tive speeds of the same with respect to the pulley speed is an important function of the present invention and should be taken
 50 advantage of to furnish speeds most effective for the so-called "roughing" and "fin-
 ishing cuts" as well as in adapting the speed of the wheel to be suitable for grinding
 metals of different degrees of hardness or density.

While I have illustrated and described my
 55 invention as applied to grinding a pulley, it may advantageously be employed in analogous work such, for example, as grinding the surfaces of beveled wheels or disks such as the face-plates of lathes.
 60

What I claim, is—

In a machine for grinding the face of a pulley, an abrasive wheel, a shaft for said wheel, a holder provided with journal bearings for said shaft, a base plate provided
 65 with upwardly extending lugs and standard elements, having arcuate slots therein centering on said lugs, means provided adjacent the forward end of said holder for tiltably connecting the same to said lugs, means
 70 carried by the holder extending through said standard slots for securing the holder in adjusted angular positions, a carriage movable parallel to the axis of the pulley, and
 75 means for connecting the base plate to the carriage for both rotary and rectilineal movements.

Signed at Seattle, Washington, this 5th day of Dec., 1918.

WALTER C. BARNHART.

Witnesses:

PIERRE BARNES,
 E. PETERSON.