March 11, 1930. W. B. WARD 1,749,898

ABRADING MACHINE

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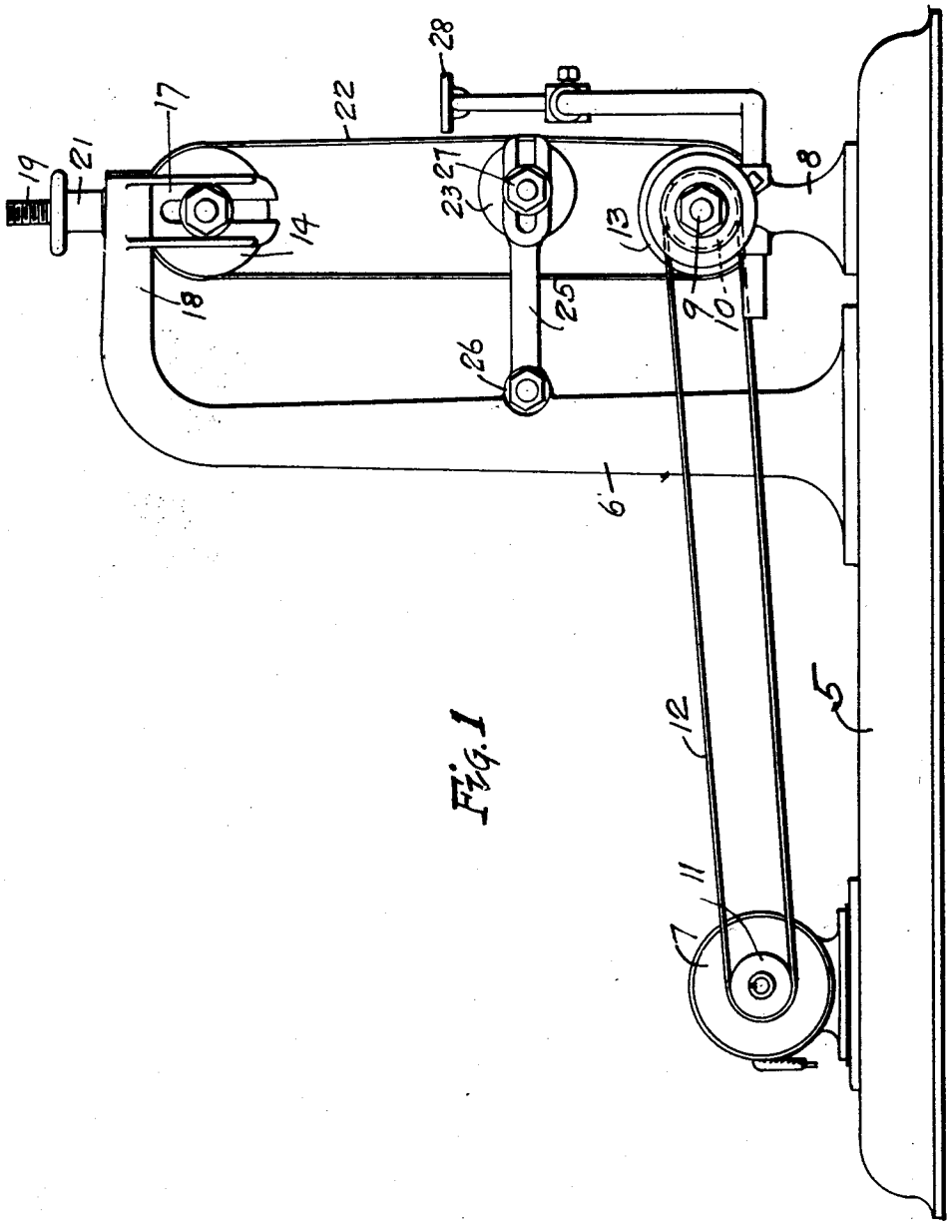


FIG. 1

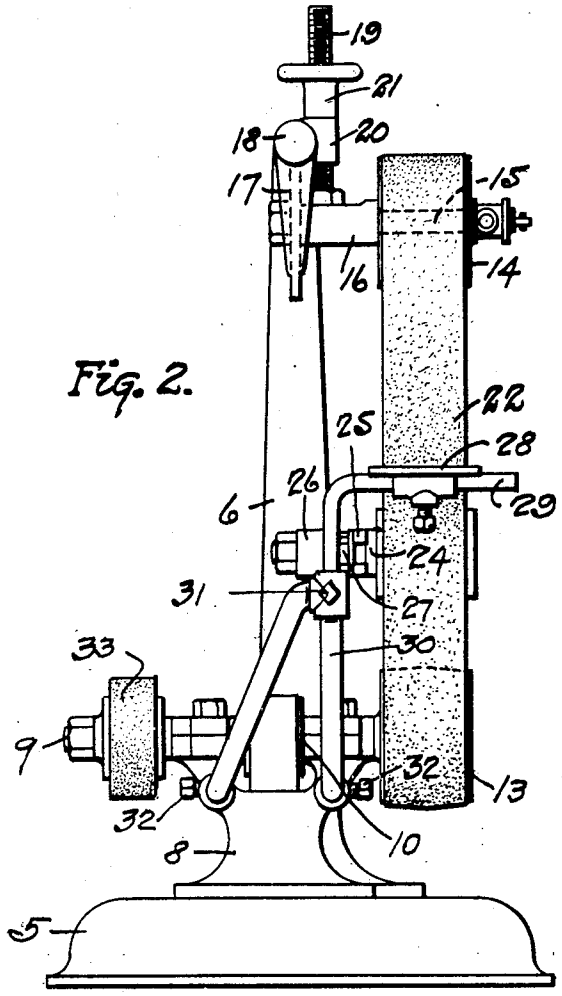
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Fig. 2.



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UNITED STATES PATENT OFFICE

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ABRADING MACHINE

Application filed April 17, 1926. Serial No. 102,604.

This invention relates to abrading machines in general, but has more specific reference to such machines which are of the endless-band type, and particularly to those which are especially adapted for grinding metal pistons and other work pieces having curved or irregular surfaces, or which requires the accurate removal of very small amounts of material.

The principal object of the present invention is to provide an abrading machine in which an endless band of light fabric, having an outer abrasive surface, is mounted between two pulleys, one of which is plane-faced while the other is crowned, and means being provided whereby the working surface of said band is substantially plane. A further object is to provide a mechanism of the character described, by which cylindrical work pieces, or those of circular or irregular configuration, may be ground with uniformity and accuracy. And a still further object is to combine in a unitary machine a band-abrader and a wheel-abrader, both so mounted as to be readily interchangeable, as regards the degree of coarseness of the abrading surfaces.

The means by which the foregoing and other objects are accomplished by my invention, and the manner of their accomplishment, readily will be understood from the following description on reference to the accompanying drawings, in which—

Fig. 1 is a side elevation of a machine embodying my invention.

Fig. 2 is a front elevation of the same.

Referring now to the drawings in detail, the base 5 of the machine has a standard 6 secured thereto near one end thereof, and has mounted at its other end a motor 7. Between the standard 6 and the end of the base 5 on which said standard is mounted, is a bracket 8, having bearings in which is journalled a shaft 9, near the middle of which is secured a pulley 10, which is driven from the pulley 11 of the motor 7 through the medium of a belt 12. At one end of shaft 9 is secured a crowned pulley 13, and directly thereabove, in line therewith, a plane-faced pulley 14 is loosely mounted upon a shaft 15, which is integral with an arm 16, said arm being vertically adjustable in a slotted bracket 17, extending downward from the lateral extension 18 of the standard 6.

Adjustment of the position of arm 16 is accomplished through the medium of a threaded stud 19, which is secured to said arm and extends upward therefrom. A boss 20 projects laterally from the extension 18 through which the stud 19 passes, and said stud is provided with a hand wheel and nut 21, which may be turned to raise or lower the stud 19, as may be desired.

Between pulleys 13 and 14 is mounted an endless band 22, having abrasive material, such as carborundum or emery, applied to its outer surface. Said belt preferably is of very thin and light fabric, so that the tendency to centrifugal distortion is minimized, as is also whipping or slapping, but I have found in practice that a band of so-called "emery cloth" will serve the purpose, especially if the provision to be described hereinafter is made for guiding it and keeping its abrading surface plane.

An idler 23 is rotatably supported by a shaft 24, which extends laterally from a slotted arm 25 that preferably is hingedly attached to a bracket 26 forming part of the standard 6, so that the idler 23 may be swung downward or upward, or may be moved toward or away from the band 22. For adjustment of said idler to increase or lessen its pressure against the band 22, or to move it entirely out of contact therewith, the nut 27 is loosened, to permit shaft 24 to be moved in the slot in arm 25, and, after the desired adjustment has been made, said nut is tightened.

A steady-rest 28 is laterally adjustable on an arm 29, which arm is vertically adjustable in a support 30 mounted upon bracket 8. A set-screw 31 is provided, for clamping the arm 29 in the desired position as regards elevation. The position of the support 30 may be regulated by loosening the set screws 32, and moving said support toward or away from the bracket 8.

A grinding wheel 33, of carborundum, emery, or other abrasive, and of any desired

degree of fineness and hardness, is mounted, in the usual manner, upon the end of shaft 9 opposite that at which the crowned pulley 13 is secured, thereby providing in a single machine both a band-abrader and a disc-abrader.

While the machine is shown as being driven by the motor 7 through the medium of the belt 12, it is obvious that the motor may be geared, or otherwise directly connected, to the shaft 9, in any usual or preferred manner. However, it should be noted that the portion of the belt 22 which is adjacent the steady-rest 28 preferably runs downward, thereby minimizing any tendency of particles from the work piece, or from the abrading surface of the belt, to be thrown upward toward the face of the operator of the machine.

In the use of my improved abrading machine, I prefer to drive the belt 22 at approximately the full speed provided for by a standard high-speed motor (say 1,800 R. P. M.), and, due to the extreme lightness of the belt, I find that it runs practically straight between the pulleys 13 and 14, and not only permits an extremely light cut to be taken, but also makes it possible to grind either a limited portion of the surface of a cylindrical or irregular object, or to surface uniformly the entire circumference of a piston or other like cylindrical object. The purpose in providing the pulley 13 with a crowned face is of course to insure a straight drive of the belt 22, and the principal purpose of the idler pulley 23 is to keep the grinding surface of the belt flat or plane. Also, the nearness of the idler pulley 23 to the steady-rest 28 tends to further steadiness of the abrading belt at the grinding point, and promotes accurate grinding. For ordinary work, however, the idler pulley may be entirely dispensed with.

In addition to the foregoing advantages presented by my improved grinding machine, it will be noted that the use of a very light and flexible abrasive band, driven at high speed, gives an effect entirely different from that produced by the ordinary abrading belts, such as the "sanded belts" used in connection with wood-working machinery. Furthermore, the use of belts such as I employ makes it possible to grind rounded or irregular surfaces without forming flat or "dished" spots such as result from the use of either grinding wheels or semi-rigid belts.

Various modifications of minor details of my improved grinding machine doubtless readily will suggest themselves to those skilled in the art to which it appertains, and I therefore do not desire to have my invention limited to any details of construction or of arrangement of parts not specifically claimed.

Having now fully disclosed the invention, what is claimed is:

1. An abrading machine, comprising a shaft bearing bracket belt abrading mechanism disposed above said bracket, arms mounted in said base and adjustably extending laterally therefrom at right angles to the line of said shaft bearings, each of said arms being bent upward substantially at right angles to said lateral portion thereof, one of said upward extensions being hollow and vertically disposed, and the other thereof inclined toward said vertical one and secured to the same near the upper end thereof as a brace, a rod disposed in said vertical extension and longitudinally adjustable with reference thereto, means for locking said rod with reference to said extension, a lateral extension from said rod, and a steady rest mounted on said extension.

2. In an abrading machine, a base, a bracket mounted on said base and having bearings therein, a shaft mounted in said bearings, a standard extending upward from said base, adjacent said bracket, an arm extending laterally from said standard, a shaft supported by said arm in alignment with said first shaft, pulleys disposed on said shafts, an abrading belt carried by said pulleys, an arm pivotally attached to said standard and extending laterally therefrom, a shaft extending at right angles to said arm and adjustable longitudinally there along and an idler pulley carried by said shaft adjacent said belt, whereby said idler may be adjusted laterally toward said belt and vertically along said belt.

In testimony of the foregoing, I affix my signature.

WALTER B. WARD.