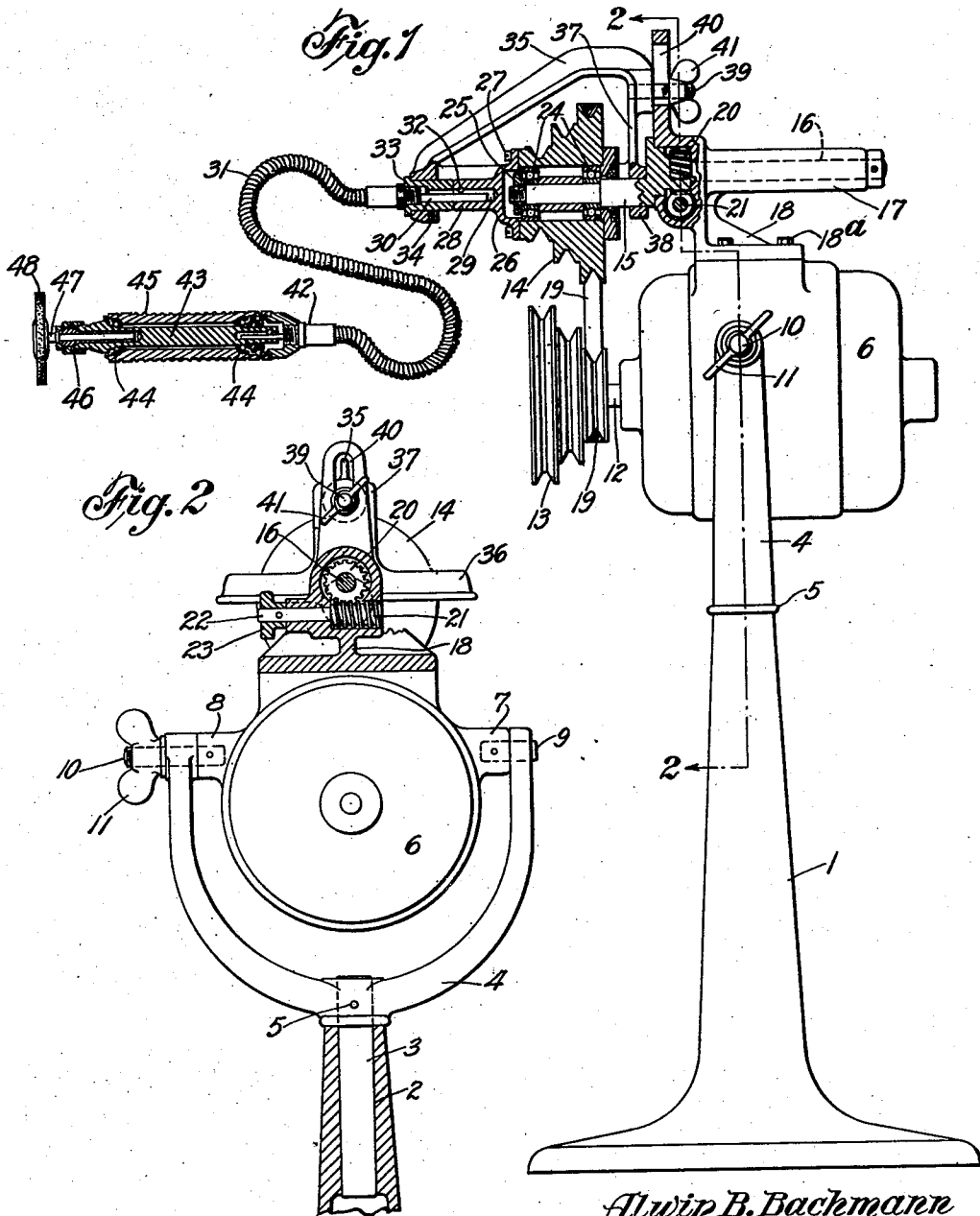


March 2, 1926.

1,575,307

A. B. BACHMANN
FLEXIBLE SHAFT BENCH GRINDER

Filed Dec. 28, 1922



Alwin B. Bachmann
INVENTOR.

BY
W. H. Lockwood
ATTORNEY.

UNITED STATES PATENT OFFICE.

ALWIN B. BACHMANN, OF BROOKLYN, NEW YORK, ASSIGNOR TO KELLER MECHANICAL ENGINEERING CORPORATION, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

FLEXIBLE-SHAFT BENCH GRINDER.

Application filed December 28, 1922. Serial No. 609,370.

To all whom it may concern:

Be it known that I, ALWIN B. BACHMANN, a citizen of the United States, and resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Flexible-Shaft Bench Grinders, of which the following is a specification.

My invention relates more particularly to a portable bench grinder, in which a jack shaft and pulley is utilized in connection with a high speed motor, and means is provided for adjusting the jack pulley, relative to the motor pulley, for tightening the belt.

In bench grinders of this character, a flexible shaft is preferably adapted to be operated by the jack pulley, the flexible shaft operating a grinding wheel which may be supported and applied to the work by means of a suitable handle. The motor is preferably an electric motor of the usual enclosed type and may be supported in a yoke or Y-fork to permit adjustment thereof in a vertical plane and the fork is preferably rotatably supported in a pedestal forming the base of the machine, thereby providing for horizontal adjustment.

It will be understood that in grinding machines of this character, small grinding wheels are usually used and they are required to be operated at high speed. The motor used may be of the high speed type, nevertheless, it is frequently desirable to run the grinding wheel at even higher speed than the motor, and for this purpose, an intermediate or jack pulley is preferably employed, the latter and the motor pulley being stepped or cone pulleys.

When a jack pulley of this character is employed and required to operate at high speed, it is particularly desirable that means be provided for accurately adjusting the tension on the belt between the motor pulley and the jack pulley. Hence, one object of my improved invention is to provide means which may be employed for accurately and effectively tightening the belt and maintaining the necessary tension.

In view of the fact that the jack pulley is operating at very high speed, it is desirable to provide a belt guard and another object of my improvement is to utilize the belt guard, cooperating with the jack pulley, on the one hand, for supporting the end of

the flexible shaft and on the other for holding the jack shaft and pulley in adjusted position, or rather preventing accidental displacement or movement of the jack shaft after an adjustment has been made.

Mechanisms for carrying out these and other object of my improvement are more particularly shown in the accompanying drawings, which represent one form of my improved flexible shaft bench grinder. In the drawings, Fig. 1 shows the bench grinder in side elevation, with the jack shaft and parts associated therewith partially in section; Fig. 2 represents a partial vertical transverse section substantially on the line 2-2 of Fig. 1, showing a section through the swivel support and the worm and gear adjusting means for tensioning the belt.

Referring to the drawings, 1 is the base or pedestal and column for supporting the motor and attached parts, and is preferably provided with a tubular bore at 2, in which a shaft or rod 3 is rotatably mounted; the rod 3 being secured to a yoke or fork 4 by means of the pin 5, thereby providing means for horizontal rotation of the fork on the supporting column 1. Within the yoke or fork 4, the electric motor 6 is adapted to be supported for movement in a vertical plane. For this purpose, the motor casing is provided with ears or bosses 7 and 8, from which project studs 9 and 10, which pass through holes in the upper ends of the arms of the fork or yoke 4, substantially as shown in Fig. 2 of the drawings. Suitable means may be provided for preventing the rotation of the motor on its pivotal supports 9-10 or for clamping the same in any adjusted position and for this purpose, the stud 10 is here shown as provided with a wing nut 11 which, it will be seen, may be utilized for clamping the motor to the fork 4 in any adjusted position.

The electric motor 6 is provided with the usual shaft 12 to which the stepped or cone pulleys 13 are secured in the usual manner. The pulley 13 cooperates, in the present instance, with corresponding stepped or cone pulleys 14, mounted on a jack shaft 15, as more particularly shown in Fig. 1 of the drawings. The jack shaft 15 is preferably off-set eccentrically of and forms a crank pin extending from one end of a crank or pivotal shaft 16, supported and rotatably

mounted in a tubular boss 17, formed integrally with or as part of a bracket 18, secured to the top of the motor casing by suitable bolts 18^a, as indicated in Fig. 1. The bearing boss 17 is preferably formed so that it readily provides a handle for carrying or moving the portable grinder equipment.

Obviously, with a belt 19 between the motor pulleys 13 and the corresponding jack pulley 14, it becomes desirable to accurately adjust the tension on the belt. This may be accomplished in various ways, but preferably the eccentrically mounted stud shaft 15 is adapted to be revolved about the axis of that part 16, of the combined shafts, which serves as the pivotal support for the stud shaft. For this purpose a worm gear 20 is preferably secured to the pivotal shaft 16 and a worm 21 is rotatably supported in the bracket 18, transversely of the crank shaft 16 and cooperates with the worm gear 20, so that by rotation of the worm, the position of the crank pin or stud shaft 15, relative to the axis of the motor 6 and the shaft 12 thereof, may be varied. The worm 21 is provided with an arbor extension 22, to which a knurled head 23 is secured, as indicated in Fig. 2 of the drawings, whereby the worm may be readily turned by hand for adjusting the tension of the belt.

The jack pulley 14 is preferably mounted upon the crank pin or stud shaft 15 by ball bearings, indicated at 24, the pulley being held in place on the stud shaft by a nut 25 or other suitable means. The outer end of the stud shaft 15 and the ball bearings of the pulley are preferably covered by a cap 26 which may be secured to the outer flange of the pulley 14 by suitable screws 27, as indicated in Fig. 1 of the drawings. The cap 26 is preferably provided with a boss 28, which is bored out at 29, to receive the shank end 30 of a flexible shaft, the latter being provided with the ordinary flexible tube or enclosing armour 31. The shank 30 is preferably flattened and cooperates with a transverse pin 32, so that the flexible shaft may be caused to rotate with the jack pulleys 14. The shank 30 of the flexible shaft preferably extends through a thimble or collar 33, to which the tube or armour 31 of the flexible shaft is secured by suitable thread and lock nut 34, as indicated in Fig. 1 of the drawings. A suitable bracket may be provided for supporting the thimble 33, and the end 30 of the flexible shaft in operative connection within the socket 29 of the jack pulley 14, and preferably, this bracket comprises a belt guard 35 provided with two horizontal ribs 36 and a medial rib connected with a plate 37, which is bored out at 38 and loosely mounted upon the inner, supported end of the stud shaft 15, as will be seen in Fig. 1 of the drawings. The upper end of the guard plate 37 is

provided with a bolt 39 extending through a slot 40 in an upwardly extending arm of the bracket 18, as more particularly shown in Figs. 1 and 2 of the drawings. The bolt 39 is preferably provided with a wing nut 41, whereby the belt guard may be clamped to the bracket 18. In view of the fact that the belt guard plate 37 surrounds the stud shaft 15, it will be understood that clamping of the belt guard to the bracket 18 clamps the stud shaft against rotative movement for adjustment purposes in either direction. Therefore, when the wing nut 41 is tightened to clamp the belt guard plate to the bracket 18, the worm 21 cannot be turned effectively to cause a displacement or adjustment of the position of the stud shaft 15.

Obviously, the jack pulleys 14 may be connected to operate a grinding wheel or tool in any suitable manner, but preferably it is connected with a suitable flexible shaft, passing through the tubing or armour 31, the outer end of which is connected at 42, with a shaft 43 rotating on ball bearings 44, in a handle 45, and a suitable chuck 46 is attached to or formed upon the shaft 43, in which the arbor 47 of a suitable grinding wheel 48 may be secured, substantially as indicated in Fig. 1 of the drawings.

The operation of my improved flexible shaft bench grinder is simple, for it will be understood that the pivot support at 3 permits the motor to be readily rotated in a horizontal plane and the pivotal mounting of the motor in the fork 4 allows vertical adjustment of the position of the motor and the latter may be clamped in any desired position by the wing nut 11.

When it is desired to adjust the tension of the belt 19 the crank pin or jack shaft 15 may be revolved about the axis of the crank shaft 16, to which it is secured eccentrically. This rotation of the stud shaft is accomplished by means of the knurled head 23, which when rotated, rotates the worm 21 and hence the worm gear 20, the latter being secured to the pivotal shaft 16. As previously explained, however, the belt guard plate 37 is mounted upon the stud shaft 15 and clamped to the bracket 18, by the wing nut 41 and, therefore, before attempting to shift the position of the stud shaft 15, the wing nut 41 should be loosened. After adjustment of the shaft 15 and jack pulley 14 to tighten the belt 19 the belt guard plate 37 may again be clamped to the bracket 18 by tightening the wing nut 41, thus securing the jack shaft and pulley against any accidental displacement or from any further adjustment, by means of the knurled head 23.

In carrying out my improvement, it will be understood that the form shown and described represents the preferred form and obviously, various modifications in the specific details of construction and in the adap-

lation thereof to motors of different types may be made without departing from the spirit and scope of the invention.

I claim:—

5 1. In a portable grinding machine, provided with a short belt drive adapted for swiveling movement with the motor, the combination with a motor provided with a shaft and pulley, of a bracket mounted upon
10 the motor, a crank shaft rotatably mounted in said bracket and provided with a crank pin forming a jack shaft, a jack pulley rotatably mounted upon said crank pin and means for rotating said crank shaft in said
15 bracket for varying the distance between the jack pulley and the pulley of said motor.

2. In a portable grinding machine provided with a short belt drive adapted for swiveling movement with the motor, the
20 combination with a motor provided with a shaft and pulley, of a bracket secured to said motor, a tubular bearing boss integral with said bracket and extending parallel to the axis of said motor, a crank shaft rotatably mounted in said tubular bearing and
25 provided at one end with a crank pin carrying a jack pulley, and means for adjustably rotating said crank shaft and pin to vary the distance of said jack pulley from the pulley of said motor.
30

3. In a portable grinding machine, provided with a short belt drive adapted for swiveling movement with the motor, the combination with a motor provided with a shaft
35 and pulley, of a bracket secured to said motor, a crank shaft extending parallel to the axis of said motor, and rotatably mounted in said bracket, a crank pin projecting from the end of said crank shaft, a jack pulley rotatably mounted on said crank pin for cooperation with the motor pulley, a
40 worm gear carried by said crank shaft and a worm cooperating with said gear for rotating said crank shaft and pin to vary the distance between said pulleys.
45

4. In a portable grinding machine, provided with a short belt drive adapted for swiveling movement with the motor, the combination with a motor provided with a

shaft and pulley, of a bracket mounted on
50 said motor, a crank shaft rotatably mounted in said bracket and provided with a crank pin, a jack pulley rotatably mounted on said crank pin, means for rotating said crank shaft and pin for moving said jack pulley
55 to vary its distance from the motor pulley, a belt guard cooperating with said jack pulley and adapted to be supported by said bracket, and means for clamping said guard to the bracket and simultaneously clamping
60 said crank shaft so as to hold said jack pulley in adjusted position.

5. In a portable grinding machine, provided with a short belt drive adapted for swiveling movement with the motor, the
65 combination with a motor provided with a shaft and pulley, of a jack pulley rotatably supported on a crank pin, a crank shaft supporting said crank pin for rotative movement toward and from the shaft of said
70 motor to vary the distance between said pulleys, a belt guard cooperating with said jack pulley, a flexible shaft having one end supported by said belt guard, and means for operatively connecting said flexible shaft
75 with said jack pulley to be driven thereby.

6. In a portable grinding machine, provided with a short belt drive adapted for swiveling movement with the motor, the combination with a supporting column, of
80 a yoke mounted to swivel horizontally on said column, a motor mounted in said yoke, for swinging movement in a vertical plane, means for clamping the motor to said yoke in its adjusted position, a flexible shaft
85 adapted to be driven by a pulley on the motor, a jack pulley to which said flexible shaft is connected, a bracket on the motor for supporting said jack pulley, a rotatable member carrying a crank pin on which said
90 jack pulley is mounted, means mounted on said bracket for rotating said member and the crank pin for adjusting said jack pulley toward and from the pulley of the motor, and means for holding said member in ad-
95 justed position.

ALWIN B. BACHMANN.