March 24, 1925. 1,531,043

E. G. STRONG

APPARATUS FOR LAPPING ROLLERS

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Fig. 1.

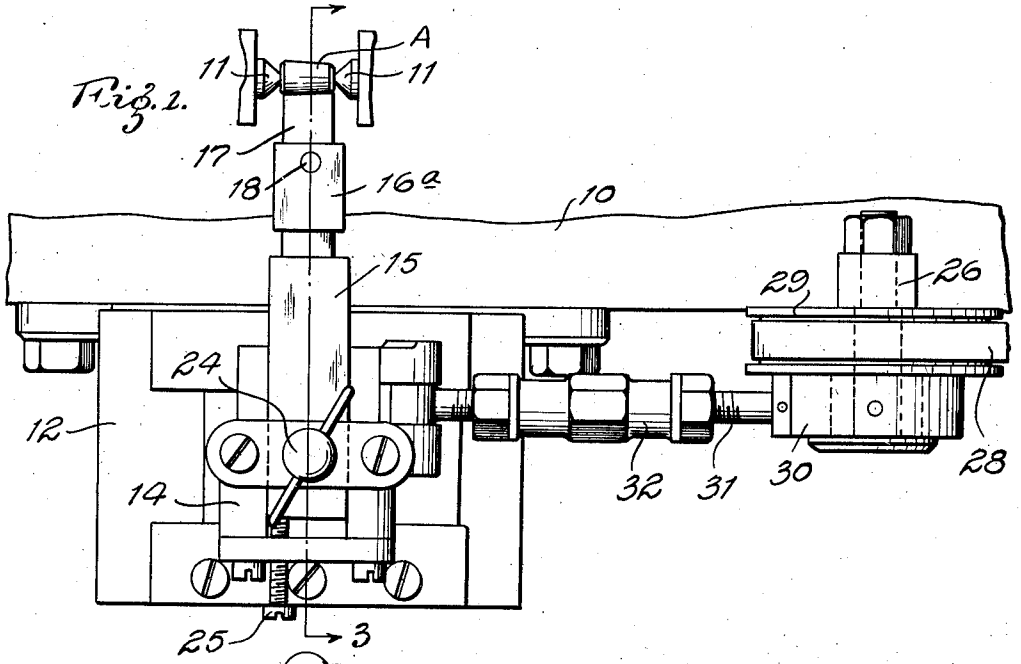
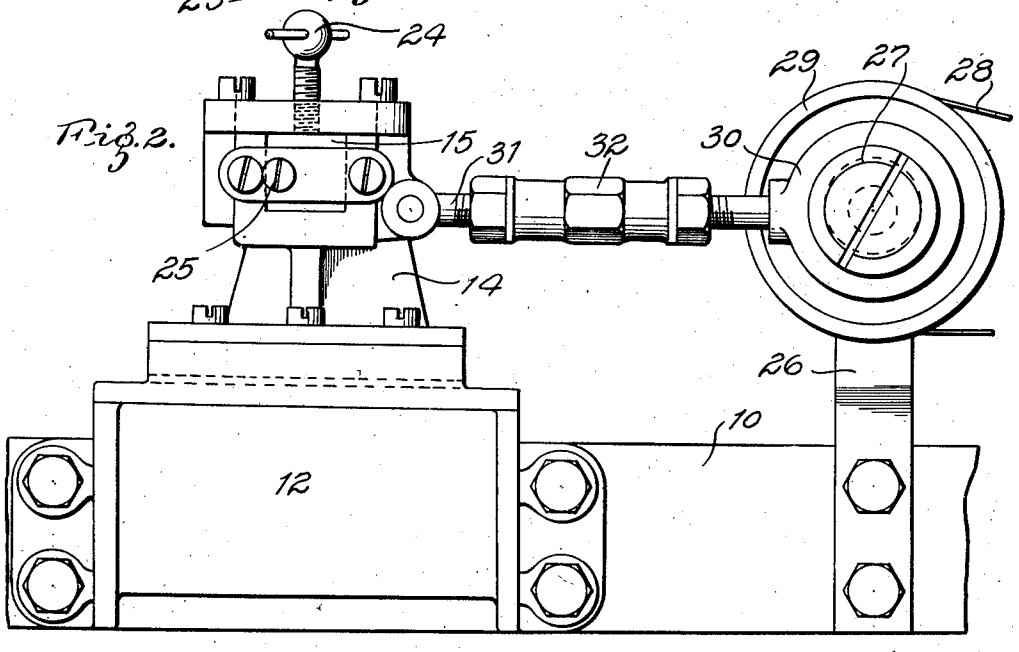


Fig. 2.



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Fig. 3.

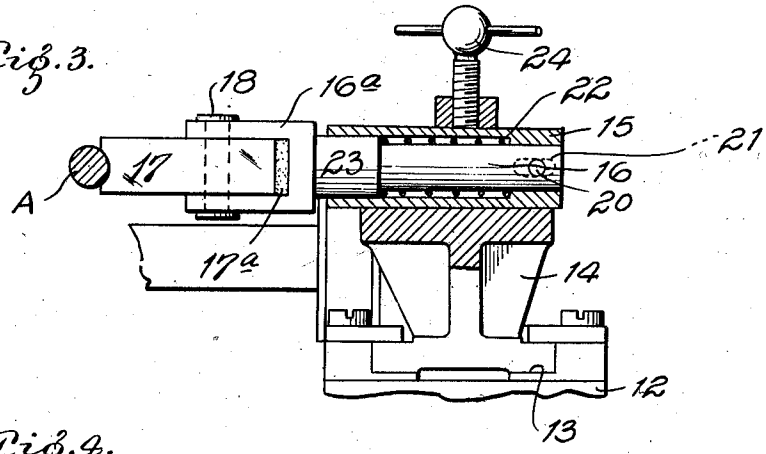


Fig. 4.

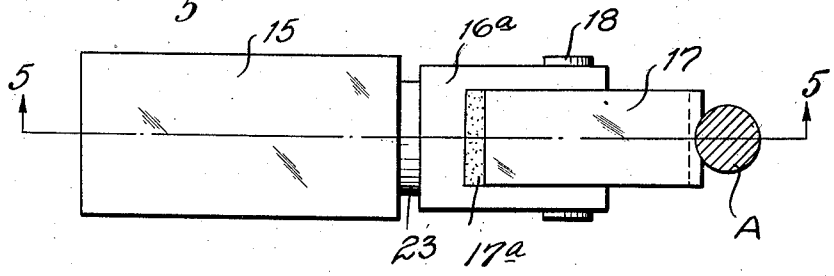


Fig. 5.

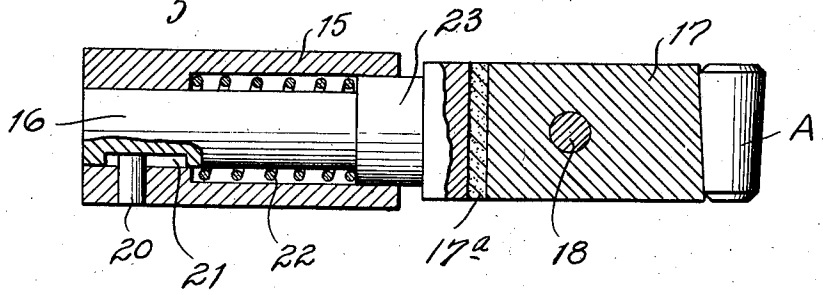
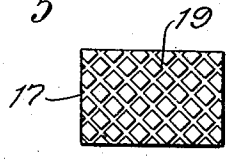


Fig. 6.



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Patented Mar. 24, 1925. 1,531,043

UNITED STATES PATENT OFFICE.

ERNEST G. STRONG, OF CANTON, OHIO, ASSIGNOR TO THE TIMKEN ROLLER BEARING COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

APPARATUS FOR LAPPING ROLLERS.

Application filed May 29, 1922. Serial No. 564,394.

To all whom it may concern:

Be it known that I, ERNEST G. STRONG, a citizen of the United States, and a resident of the city of Canton, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Apparatus for Lapping Rollers, of which the following is a specification.

Heretofore it has been the common practice in the manufacture of high class anti-friction rollers to harden the same and finish by grinding the bearing surface thereof; such rollers, even when ground, are liable to run less quietly than is desirable. The principal object of the present invention is to obtain a highly finished roller that will run more quietly than the ground rollers. The invention consists principally in lapping the rollers after hardening the same and also in the apparatus described hereinafter for lapping the same.

In the accompanying drawing wherein like reference numerals refer to like parts wherever they occur,

Fig. 1, is a plan view of a roll lapping device embodying my invention, the device being shown in connection with a grinding machine;

Fig. 2, is a side elevation thereof;

Fig. 3, is a fragmentary end elevation thereof, the slide bracket being shown partly in section on the line 3—3 in Fig. 1;

Fig. 4, is an enlarged side elevation of the lap and holder therefor,

Fig. 5, is a central horizontal section through the lap and lap-holder on the line 5—5 in Fig. 4; and

Fig. 6, is a face view of the bearing face of the lap.

Referring to the accompanying drawing, my lapping device is shown in connection with a grinding machine, only the table 10 and the axially alined rotary work supporting spindles or centers 11 of which is shown. The lapping device comprises a supporting bracket 12, adapted to be bolted or otherwise rigidly secured to the side of the table 11 of the grinding machine midway of the work supporting spindles 11 thereof.

Mounted in a slideway 13 on the bracket 12, and arranged for a horizontal sliding movement longitudinally of the work supporting centers 11, is a slide-bracket 14. This slide-bracket has a horizontal channel formed in its top which extends transversely of the work supporting spindles 11. Arranged within said channel is a block 15 of rectangular section which extends inwardly towards the work supporting spindles and is provided with a horizontal bore adapted to slidably support the shank or stem portion 16 of a lap-holder.

The lap-holder projects beyond the forward end of the supporting block 15 and is provided with a bifurcated head portion 16^a, within which is mounted a lapping tool 17. The lap 17, is pivotally secured in said head, for horizontally swinging movement, by means of a vertical pivot pin 18. An elastic pad 17^a is located between the rear end of the lap and the inner wall of the bifurcated head portion of the lap-holder and tends to keep the pivotally mounted lap in a straight position. The bearing end of the lap is shaped to conform to the contour of the work that is to be lapped, such work being shown in form of a tapered roller A, for tapered roller bearings. The lap, when made of cast-iron, is preferably formed at its bearing end with a series of grooves 19, which are disposed at right angles to each other and form pockets for receiving an abrasive material. When using a lap made of copper or other soft material, the grooves 19 may be omitted.

Movement of the lap-holder towards and away from the work is limited by means of a pin 20, which has a press fit in the block 15 that projects into a keyway 21 formed in the rear end portion of the shank 16 of the lap-holder. The forward end portion of the bore in the block 15 is enlarged to receive an expansion spring 22, which surrounds the shank portion of the lap-holder. The rear end of this spring bears against an annular shoulder formed by the enlarged bore; and the forward end of said spring bears against an annular shoulder formed by an enlarged collar portion 23 formed integral with the forward end of the shank portion of the lap-holder. Thus, the spring 22 bears against the collar 23 of the lap-holder, thereby pressing the lap transversely against the roller.

The tension of the spring 22 is adjusted, to obtain the required pressure to lap the roller properly, by means of adjusting screws 24 and 25 that are threaded through the top and rear end portions, re-

spectively, of the slide-bracket 14. The screw 25 is adapted to engage the rear end of the block 15 and force said block forwardly against the pressure of the spring 22; and the screw 24 is adapted to bear against top surface of said block, thereby preventing forward movement of the block when the lap is disengaged from the work. With this arrangement, the required pressure of the lap against the work is obtained by adjusting the screw 25, after which the screw 24 is manipulated to clamp the block in its adjusted position.

Journaled in an upright arm 26 on the table 10 of the machine is an eccentric 27 adapted to be driven by a belt 28 and a pulley 29 from the cam-driving shaft (not shown) of the grinding machine. Surrounding the eccentric 27 is a strap 30 which is connected to the slide-bracket 14 by means of a jointed connecting rod 31. The connecting rod is pivotally connected with the slide-bracket 14; and the two sections of said rod are connected by a suitable turn-buckle 32, whereby the length of the rod may be varied.

The operation of the lapping device is as follows:

After being hardened and ground, the rollers that are to be lapped are automatically positioned, one at a time, between the work holding spindles 11 by means of suitable mechanism (not shown) and revolved in the usual manner at high speed. The desired pressure of the lap against the roller is then obtained by adjusting the pressure of the spring 22 by means of the adjusting screw 25, whereby, the roll revolves against the bearing end of the lap and is polished by the moving contact between said roll and said lap. During this operation, a suitable abrading mixture, preferably emery flour and oil, is supplied to the contacting surfaces of the lap and the roller by means of a suitable feeding device (not shown); and the lap is reciprocated longitudinally of the roller, thereby eliminating the danger of grooving the surface of the roller and insuring even polishing throughout its length. The pivotal mounting of the lap permits it to swing on its pivot and accommodate itself to the surface of the roller.

The principal advantage of the arrangement described is that it produces rollers having accurate surfaces that are polished to a smooth finish, whereby said rollers will roll more quietly than the ground rollers.

Obviously, the hereinbefore described arrangement admits of considerable modification without departing from the invention; therefore, I do not wish to be limited to the exact arrangement shown and described.

What I claim is:

1. A roll lapping machine comprising a rotary roll supporting spindle adapted to rotate a roll on its own axis, a slide-bracket, means for imparting a continuous reciprocating movement to said bracket longitudinally of the roll-spindle, a block mounted on said slide-bracket, a lap-holder having a shank portion slidably mounted on said block for movement transversely of the roll axis, a lap mounted on said holder, and a spring bearing against said block and said lap holder for pressing said lap transversely against the surface of the roll.

2. A roll lapping machine comprising a rotary roll supporting spindle adapted to rotate a roll on its axis, a slide-bracket, means for imparting a continuous reciprocating movement to said bracket longitudinally of the roll-spindle, a block mounted on said slide-bracket, a lap-holder having a shank portion slidably mounted on said block for movement transversely of the roll axis, a lap mounted on said holder, a spring sleeved on the shank portion of said holder and bearing against said block and said tool holder for pressing said lap transversely against the surface of the roll, and means for adjusting said spring to regulate the pressure of said lap against said roll.

Signed at Canton, Ohio, this 24th day of May, 1922.

ERNEST G. STRONG.