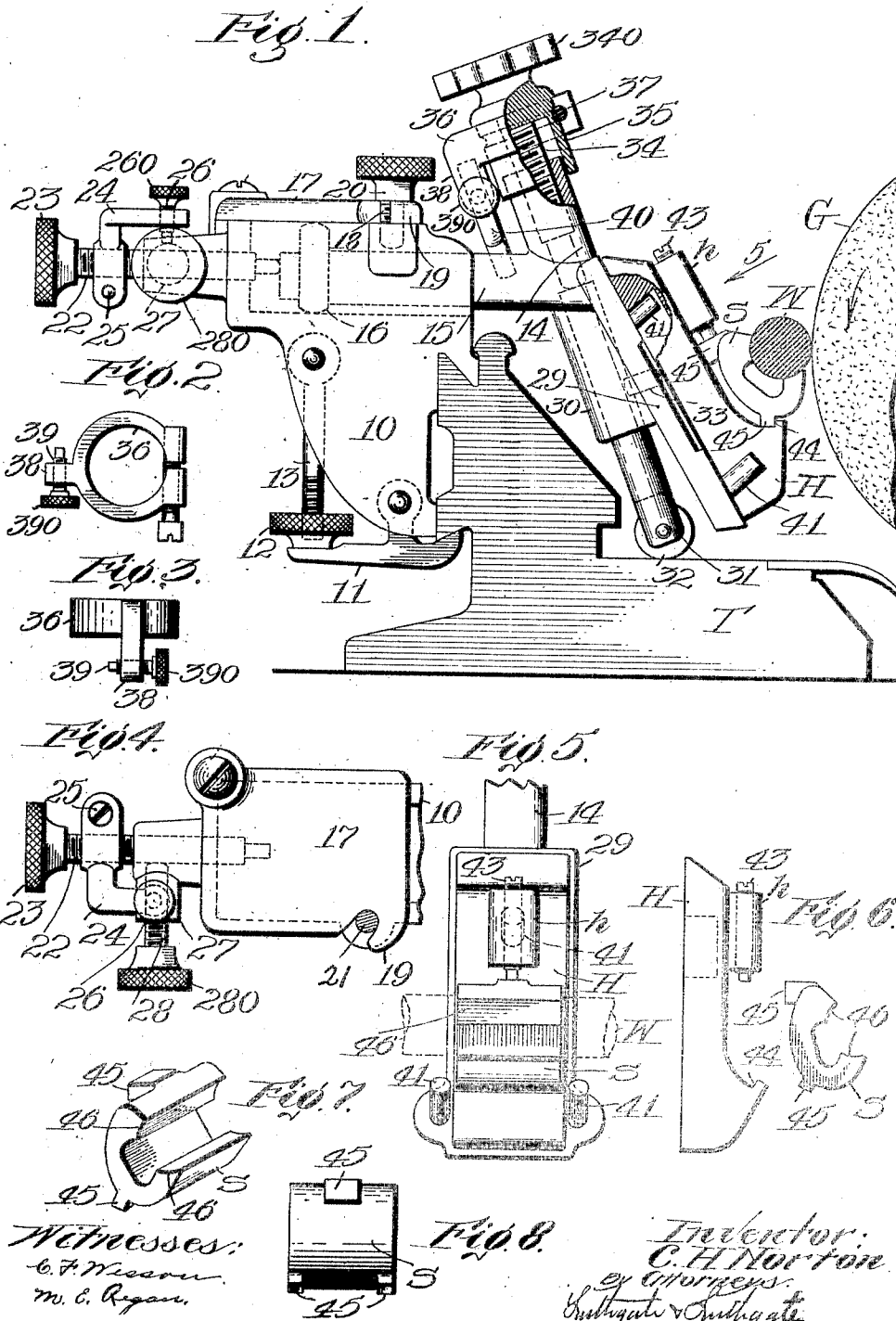


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STEADY REST FOR GRINDING MACHINES.
APPLICATION FILED NOV. 5, 1908.

1,009,989.

Patented Nov. 28, 1911.



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UNITED STATES PATENT OFFICE.

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STEADY-REST FOR GRINDING-MACHINES.

1,009,989.

Specification of Letters Patent.

Patented Nov. 28, 1911.

Application filed November 5, 1908. Serial No. 461,246.

To all whom it may concern:

Be it known that I, CHARLES H. NORTON, a citizen of the United States, residing at Worcester, county of Worcester, and State of Massachusetts, have invented a new and useful Steady-Rest for Grinding-Machines, of which the following is a specification.

The object of this invention is to provide a new and improved adjustable steady-rest construction for grinding machines the work engaging part of which is hardened so as to be adapted for continued use and which construction is provided with stopping means in the adjusting mechanism to utilize the hardened work engaging part for duplicate work.

Machines for grinding cylindrical work are constructed as follows: The work is held on dead centers arranged on a table which is fitted to slide on ways so as to present the work longitudinally or axially to the periphery of a grinding wheel. In other machines the table is stationary, and the wheel moves longitudinally, relatively to the work. It is necessary in machines of these types to provide steady-rests or supports for holding the work in a straight line, so that it will not spring in its length, and so that the grinding wheel will not bend the same. These steady-rests as previously constructed have comprised means for adjustably and yieldingly holding shoes or yokes to bear on the work. These shoes have been made of wood or soft metal, and hence a continual adjustment is required to compensate for wear. I have improved this construction by employing unyieldingly supported shoes so arranged that they can be removed and substituted by others for different diameters of shafts. By making the shoes or bearing blocks as separable or detachable parts, and by providing sets of shoes or bearing blocks for each size to be ground, I can harden the same and thus provide a non-yielding and non-wearing supporting face or work engaging part. This also enables me to provide stopping means in the adjusting mechanism by which each shoe is adjusted to the work, so that by setting the steady-rest or steady rests once for a given piece of work, duplicate work can be obtained with no further, or very little further adjustment. This combination of a detachable non-yieldingly supported hardened bearing shoe or

block with stopping means for preserving a once accurately obtained adjustment, enables the operator to produce a much larger quantity of duplicate work as compared with the old methods where adjustment of the steady-rest or steady-rests had to be made continually.

The invention consists of further important points of construction which will be understood by reference to the accompanying drawing, in which,

Figure 1 is a side elevation partly in section of a steady-rest arranged to embody my invention; Fig. 2 is a plan view, and Fig. 3 a rear elevation of the stopping means employed in connection with the adjusting device which raises and lowers the work engaging part; Fig. 4 is a plan view of the stopping means employed in connection with the device which adjusts the said part in and out from the work; Fig. 5 is a face or plan view on the line 5 of Fig. 1 of the detachable shoe-holder; Fig. 6 is an end elevation of the parts shown in Fig. 5; Fig. 7 is a perspective view of the shoe or work engaging part; and Fig. 8 is a rear view thereof.

Referring to the drawing and in detail, T designates the table, G the grinding wheel, and W the work. The table is provided with the usual gib construction, and one or more steady-rests are fitted thereto. These steady-rests are duplicates, and only one need be shown and described for an understanding of my invention.

The steady-rest frame or block 10 is fitted to the gib on said table, and is provided with a pivoted clamp 11 which engages the gib on the table, and which can be moved to lock the steady-rest block in adjusted position by a nut 12 threaded on the end of an eye-bolt 13. The upper part of the steady-rest block 10 is made hollow, and fitting in the same is a universally adjustable steady-post 14, the shank 15 of which extends into the hollow or cavity in the steady-rest block 10.

The shank 15 is provided with a bearing rib 16 which is turned so as to have a spherical contour, so that the shank can move about the center of the sphere. A cover 17 is pivoted by screw 18 to the top of the steady-rest so as to engage the rib 16, and is provided with a hook 19 which fits under a

knob 20 formed on the end of a screw 21 threaded into the steady-rest block. By unscrewing the knob 20, the cover 17 can be pulled to one side, so that the post 14 and its attachments can be lifted or taken out of the steady-rest block. The post 14 is adjusted in and out of the steady-rest block by a screw 22 which has a knob 23. Fitted on the screw is a slotted ring-shaped stop-arm 24. The screw 22 is threaded into the stop-arm, and the stop-arm can be rigidly held on the screw 22 by a screw 25 threaded in the stop-arm across the slot. A screw 26 is threaded into the end of the stop-arm 24 in position to engage a projection or ear 27 extending from the steady-rest block. By adjusting the screws 25 and 26 the position of the screw 22 and hence the in and out position of the post 14 can be determined. A screw 28 may also be threaded into the steady-rest to engage the screw 22 to lock the same in any position. The screws 26 and 28 are provided with knobs 260 and 280, so that they can be readily manipulated.

On the front or inner end of the post 14 is formed a support 29. Fitting into a boss 30 on the underside of said support is a plunger 31, the lower end of which is yoked, and turning on a pin passing through the yoke is a roll 32 which engages the movable table T. The plunger 31 is held from turning in the boss 30 by a screw 33 threaded through the support 29 and engaging a slot in the plunger. The plunger is adjusted in the boss 30 by a screw 34 which is threaded into the boss 30, and the end of which engages the plunger 31. The screw 34 is provided with a knob 340, and with a cylindrical extension 35 fitted on which is a slotted ring shaped stop-arm 36 which is adjustably held thereon by a screw 37 which is threaded across the slot of the stop-arm as shown in Fig. 2, and which screw 37 engages a groove cut in the cylindrical extension 35 to hold the stop-arm 36 in place. The stop-arm 36 is provided with an extending arm 38 in which is threaded a screw 39 having a knob 390, the end of which screw 39 engages a projection 40 extending up from the post 14. By this construction after the proper adjustment is obtained of the screw 34, the stopping means comprising the arm 36 and the screw 39 can be set so that the adjustment of the screw 34 will always be retained by bringing the screw 39 up against the projection 40.

The surface of the support 29 is provided with three pins 41, as shown, and hung on the upper pin 41 is a shoe-holder H which has a slot in its rear surface to engage therewith. The shoe just fits between the lower pins 41 and hence the shoe can be dropped into place on the pins 41 very quickly. The shoe-holder H is provided with a boss or hub 42 in which is fitted a screw 43. The

holder is also provided with a ledge or ridge 44 at its foot.

S designates one of the shoes. The same is provided with three legs or supporting feet 45, the lower two of which engage behind the ridge 44, and the upper of which rests on the face of the shoe-holder H, thus providing a three point support for the shoe. When the shoe is in place on the holder, the same can be clamped in position by the screw 43. The shoe is also provided with two bearing faces 46—46 which are finished or ground to a certain size of work. The shoe is made out of steel and is hardened, or else it is made out of iron and chilled in the casting thereof, as by placing an iron bar or core in contact with the bearing faces 46—46. By this arrangement a hardened shoe can be unyieldingly held in engagement with the work.

By the arrangement described the shoe holder is universally adjustable, that is, it can rock in any direction, so that the shoe will engage the work properly.

After the shoe is in engagement with the work, by adjusting the same in and out, and by adjusting the same up and down, the shoe can be positioned so that very accurate grinding can be done. After the proper adjustment has been made of the shoe, the horizontal adjustment can be accurately retained by setting the stop-arm 24 and screws 25 and 26 so that the screw 26 will engage the ear 27, and the vertical adjustment of the shoe and shoe holder can be retained by setting the stop-arm 36, screw 37, and screw 39, so that the screw 39 will engage the projection 40 when the parts are accurately adjusted.

As the shoes are made out of hardened material very little wear will occur as the same are used for duplicate grinding work, and when the adjustments are once made they practically can be retained for a long time without further manipulation by the operator, even if the shoe is backed off horizontally or lowered relatively to the work, as these movements can be made without disturbing the position of the stopping means, and which movements are necessary if the work has to be gone over a number of times by the wheel which is the usual practice.

The arrangements herein shown and described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

Having thus fully described my invention, what I claim is:—

1. In a steady-rest for grinding machines, the combination of a shoe holder having a rigid flange thereon, a steady-rest having a pair of feet on the forward edge thereof adapted to engage said flange and a rear foot, and means on the shoe holder for en-

gaging the rear foot and forcing it firmly forward to fix the steady-rest firmly between said means and said flange.

2. In a steady-rest for grinding machines, the combination of a steady-rest block, a steady-post movably carried thereby and having a supporting surface, a detachable shoe holder carried by said surface, and a hardened steel or iron shoe carried by the shoe holder.

3. In a steady-rest construction, the combination of the block, a post extending therein, means for adjusting the post horizontally, a stopping means determining the position of the adjusting mechanism, and a shoe detachably carried by the post.

4. In a steady-rest for grinding machines, the combination of the block, a post extending therein, means for adjusting the post, a shoe of hardened iron or steel supported

from the post, and stopping means arranged in connection with the adjusting mechanism.

5. In a steady-rest for grinding machines, the combination of a post, means for adjusting the post horizontally and vertically, a shoe supported from the post, and stopping means arranged in connection with the adjusting mechanisms.

6. In a steady rest construction, the combination of a post, means for adjusting the post, a stopping means for determining the position of the adjusting mechanism, and a shoe detachably carried by the post.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES H. NORTON.

Witnesses:

FREDK. C. BUTTERFIELD,
J. HERBERT JOHNSON.