June 12, 1928. 1,673,163

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WAYS FOR LATHES AND LIKE MACHINES

Filed April 25, 1927 2 Sheets-Sheet 1

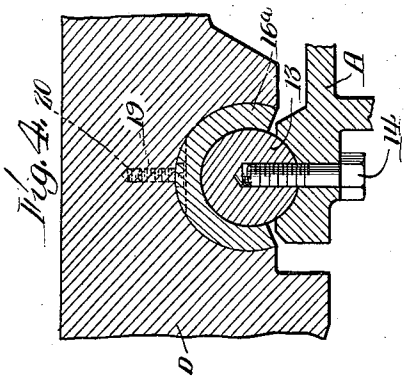


Fig. 4.

Fig. 1

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Fig. 3.

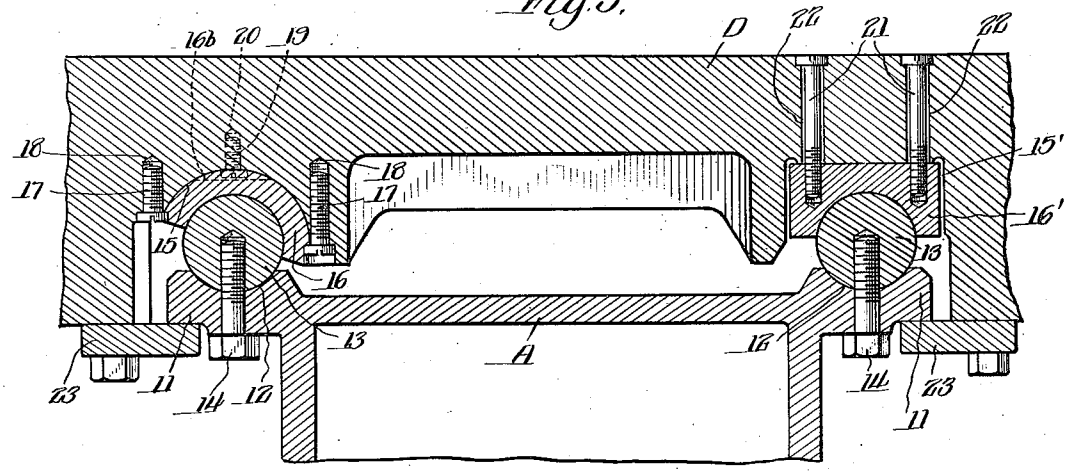
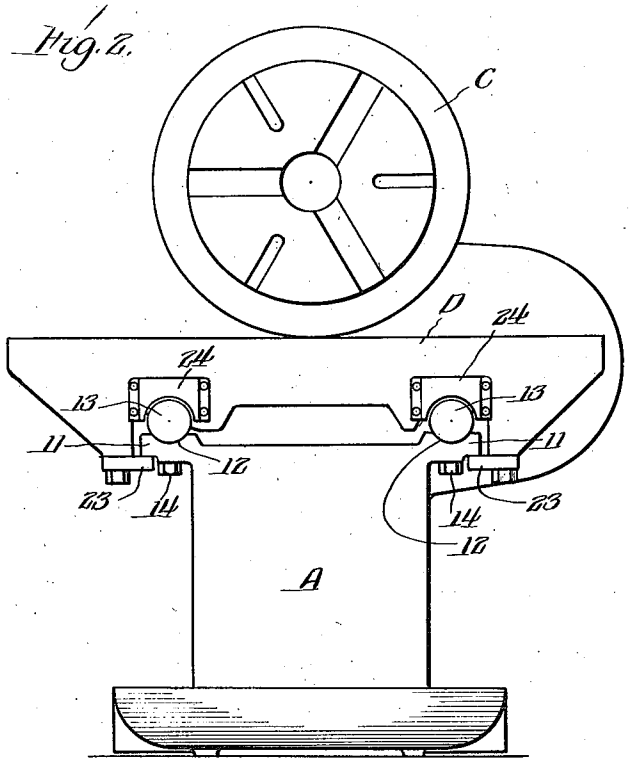


Fig. 2.



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Patented June 12, 1928. 1,673,163

UNITED STATES PATENT OFFICE.

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WAYS FOR LATHES AND LIKE MACHINES.

Application filed April 25, 1927. Serial No. 186,225.

This invention relates to lathes and similar machines having a slide which travels on ways of a bed casting, and has reference more particularly to a new and improved design and construction of the ways of the bed and the bearings of the slide which travel on the ways.

In machines of this character the bed and slide are usually made of best quality of cast-iron, and in order to reduce wear between the sliding surfaces of the bed and slide special attention is given to lubricating the relatively sliding surfaces, and wipers are provided on the ends of the slide to keep the chips and dirt from getting under the slide and onto the ways.

Heretofore flat and V-shaped ways have usually been provided on the bed casting, and attempts have been made to provide the top of the bed ways and the under surface of the slide with hardened and ground flat plates to prevent wear on the sliding surfaces, but the necessity of making the plates very thin and in several sections involves difficult and expensive operations, and in order to adapt the same to present designs without radical changes the plates have to be secured to the cast-iron surfaces by a large number of small screws. Considerable difficulty is also encountered in getting the ends of the sections to fit accurately to prevent dirt and chips getting into the joints and around the screw heads.

The use of round bars as ways has heretofore been proposed, but such round ways are of little, if any, greater efficiency than the commonly used V-shaped and flat ways unless made of hardened steel, and in cooperation with saddles on the under side of the slide that are formed with hardened surfaces directly bearing upon the hardened steel rods.

The main object of the present invention is to provide a construction which will afford all the advantages of perfectly fitting hardened ground relatively sliding surfaces and at the same time avoid the difficulties and expense heretofore encountered in providing such surfaces. In accordance with the present invention the ways are preferably formed as round hardened bars which can be easily ground straight and true for any required length, and the same are secured to the bed by means involving no perforation of the bearing surface; and to the under side of the slide are preferably secured cooperating hardened bearings or saddles having bearing surfaces accurately ground to fit the bearing surfaces of the bars, these bearings or saddles being also secured to the slide by means involving no perforation of the bearing surface.

The invention in several practical forms in which the same may be embodied is illustrated in the accompanying drawings wherein—

Fig. 1 is a side elevation of a conventional form of lathe with head-stock and chuck and a slide which is movable toward and from the chuck on the ways of the bed, a portion of the slide and one of the slide bearings being shown in section;

Fig. 2 is an end elevation, viewed from the right of Fig. 1;

Fig. 3 is an enlarged cross-section through the slide, the ways, and the upper portion of the bed;

Fig. 4 is a sectional view illustrating a modified form of slide bearing which may be employed.

Referring to the drawings, A designates the bed, B the head-stock, C the chuck, and D the slide of a well-known type of lathe.

As shown in Fig. 3, the top of the bed A is formed with laterally overhanging ledges 11, quite customary in lathes of this type, and in the upper surfaces of the ledges 11 are formed concave seats 12 to receive the ways of the bed consisting, in this instance, of round hardened bars 13, which latter are preferably secured in their seats by means of screws 14 passed through holes in the ledges 11 into tapped holes in the under sides of the bars 13. This method of attaching the ways to the bed leaves the bearing surfaces of the ways entirely integral and imperforate and also very strongly and securely maintains the ways in perfect parallel relation.

In the under side of the front of the slide D are formed a pair of longitudinally spaced substantially semi-circular recesses 15 into which are fitted substantially semi-circular saddles 16, these latter being hardened metal members accurately ground on their inner surfaces to an exact fit on the bar 13. A convenient means for fastening the saddles 16 in their seats consists of screws 17 that screw into tapped holes 18 in the slide, with the heads of the screws engaged with notches in the edge portion of the saddles

16, all as clearly shown in Fig. 3. To lock the saddles 16 against endwise movement I may employ screws 19 screwed into tapped holes 20 in the bottoms of the seats 15, the heads of the screws 19 lying in a transverse kerf 16[b] in the saddle 16. It will be observed that the described means for fastening the saddles in their seats and locking them against endwise movement leaves the bearing surface of the saddle integral and imperforate.

The bearing or saddle for the rear side of the slide preferably takes the form of a rectangular block 16′ occupying a correspondingly shaped and slightly wider recess or seat 15′ in the under side of the slide, and held in the recess by long screws 21 entered through holes 22 from the top of the slide, the said holes being slightly wider than the diameter of the screws. This construction provides a floating bearing or saddle that is self adjusting widthwise to the gage of the ways 13, and facilitates lining up of the slide on the ways when the machine is assembled, and avoids the necessity of extreme accuracy in the gage of the saddle seats such as would be required were curved saddles like 16 employed on both the front and rear of the slide.

For the manufacture of semi-circular saddles such as those shown at 16 in Fig. 3, a pair of bearings can be economically made as a circular bearing until just before the hardening operation, when they are cut into halves; and after hardening they are subjected to external and internal grinding operations to secure perfect fit. As shown in Fig. 3, the bearings 16 are preferably set at a slight inclination inwardly of the bed and slide so as to equalize the direct thrust from the center of the spindle to the center of the bar 13.

A form of round bearing or saddle 16[a] is shown in Fig. 5 consisting of a circular bushing having a width more than one hundred and eighty degrees. The use of such a saddle would eliminate the necessity for employing the usual gibs 23 shown in Fig. 3 for preventing lifting of the slide, but is more expensive since but one saddle, instead of two, could be made from a single circular bushing, and it would be necessary to enter the slide on the bars 13 from the rear end of the bed.

To the ends of the slide D are attached offset plates 24 that serve as containers for wiper strips 25 that are thus held on the ways 13 against the outer ends of the saddles. Transverse oil grooves 26 (Fig. 1) are also preferably formed in the bearing face of the saddle near each end to catch any dust and grit that gets past the wipers; and these oil grooves are formed with central ducts 27 communicating with ducts 28 in the slide, through which ducts the grooves can be flushed with oil occasionally to remove the dust and grit.

One of the advantages of the round bar over the regular flat way lies in the fact that the chips will not accumulate thereon to such an extent as on a flat way, but will fall off more readily, thus leaving less to be pushed off by the wipers. Still another advantage of the described construction resides in the fact that the bearing surface of the saddle carried by the slide can be easily ground on an internal grinder or finished by a single point radius tool, to exact fit on the ground bar.

I claim—

1. The combination with a machine bed, of ways consisting of round hardened bars secured on said bed, a slide recessed on its under side, substantially semicircular hardened saddles fitted into said recesses, and fastening means for said saddles consisting of screws entering said slide with the heads thereof supportingly engaged with the edges of said saddles.

2. The combination with a machine bed, of ways consisting of round hardened bars secured on said bed, a slide recessed on its under side, substantially semicircular hardened saddles fitted into said recesses, means for fastening said saddles in place consisting of screws entering said slide with the heads thereof supportingly engaged with the edges of said saddles, and means for locking said saddles against endwise movement.

3. The combination with a machine bed, of ways consisting of round hardened bars secured on said bed, a slide recessed on its under side, saddles in said recesses riding on said bars, and means for locking said saddles in their respective recesses; the recesses and saddles on one side of said slide being so formed as to permit a floating and self-adjusting movement of said last-named saddles on the bar engaged therewith.

4. The combination with a machine bed, of ways consisting of front and rear round hardened bars secured on said bed, a slide formed on the under side of its front edge with transversely rounded recesses and on the underside of its rear edge with transversely rectangular recesses, substantially semi-circular saddles fitting and secured in said rounded recesses and riding on said front bar, rectangular saddles loosely fitting said rectangular recesses and formed with rounded bearing surfaces riding on said rear bars, and means for locking said rectangular saddles in their recesses permitting lateral self-adjustment of said last-named saddles to the bar engaged therewith.

5. The combination with a machine bed and a slide formed with oil ducts, of ways consisting of hardened bars secured to said bed and formed with transversely rounded upper surfaces, and saddles secured to the

under side of said slide and formed with transversely rounded hardened bearing surfaces fitting the rounded upper surfaces of said bars and with transverse oil grooves in said bearing surfaces registering with said oil ducts.

6. The combination with a machine bed and a slide formed with oil ducts, of ways consisting of hardened bars secured to said bed and formed with transversely rounded upper surfaces, saddles secured to the under side of said slide and formed with transversely rounded hardened bearing surfaces fitting the rounded upper surfaces of said bars and with transverse oil grooves in said bearing surfaces registering with said oil ducts, and wipers secured to the ends of said slide opposite the outer ends of said saddles and resting upon said bars.

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