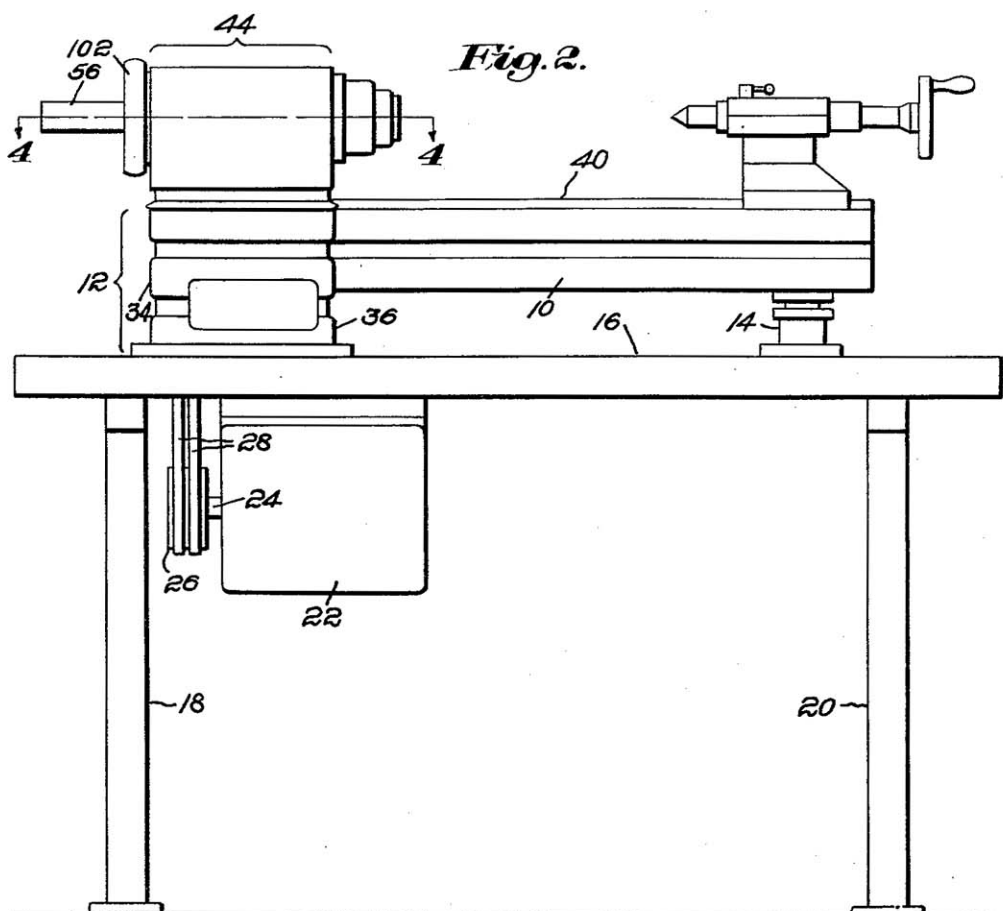
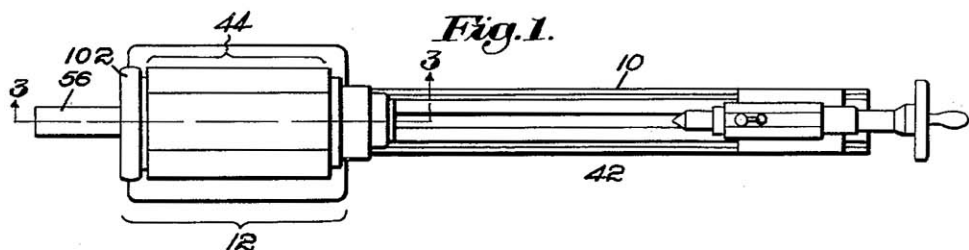


## LATHE

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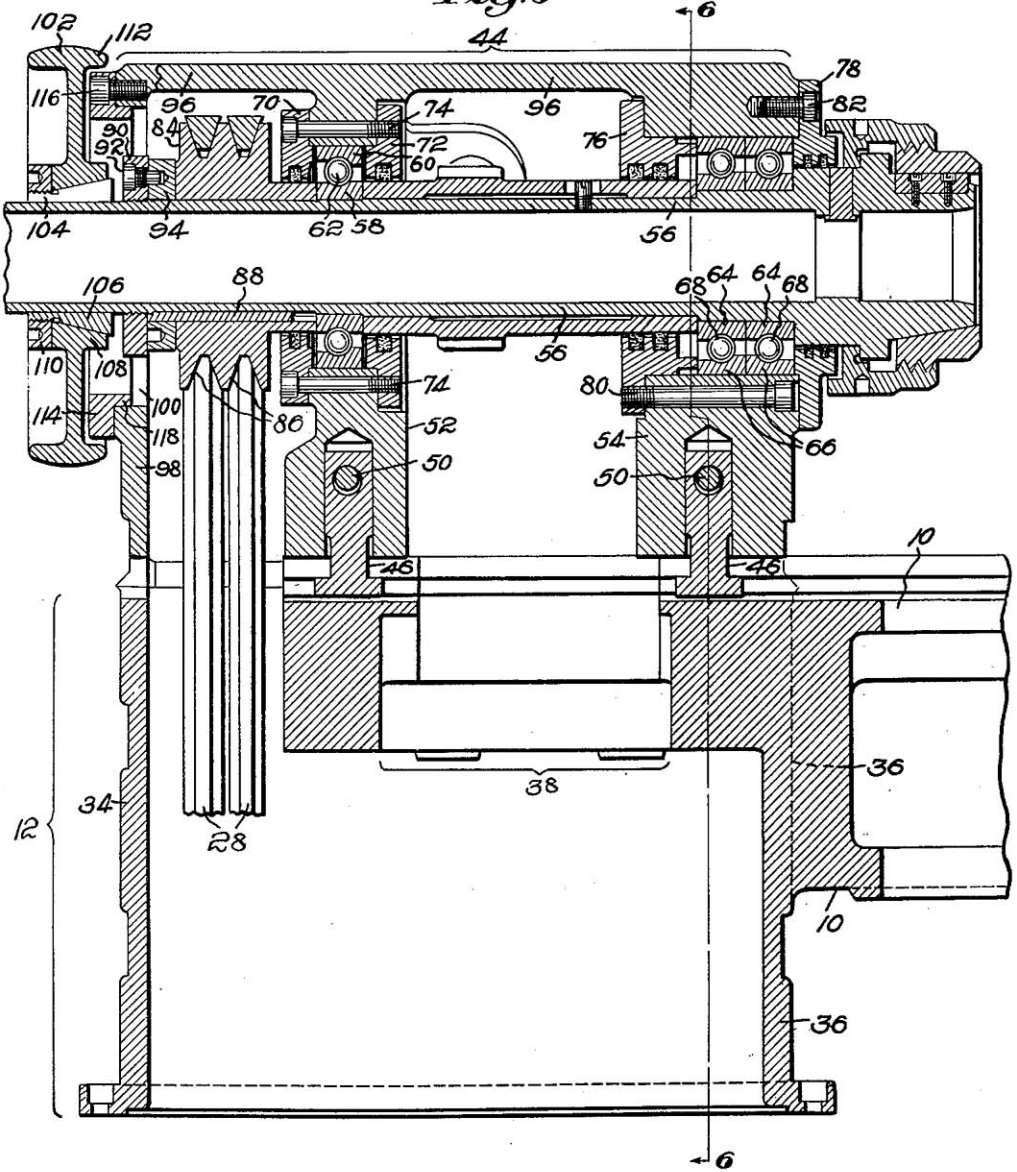
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Fig. 3



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Fig. 4.

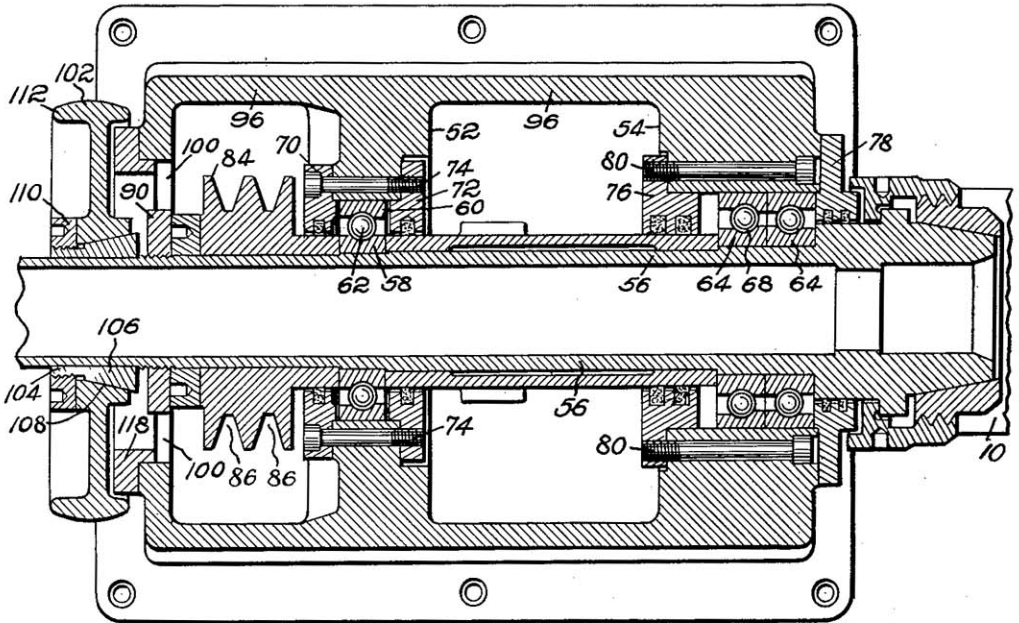
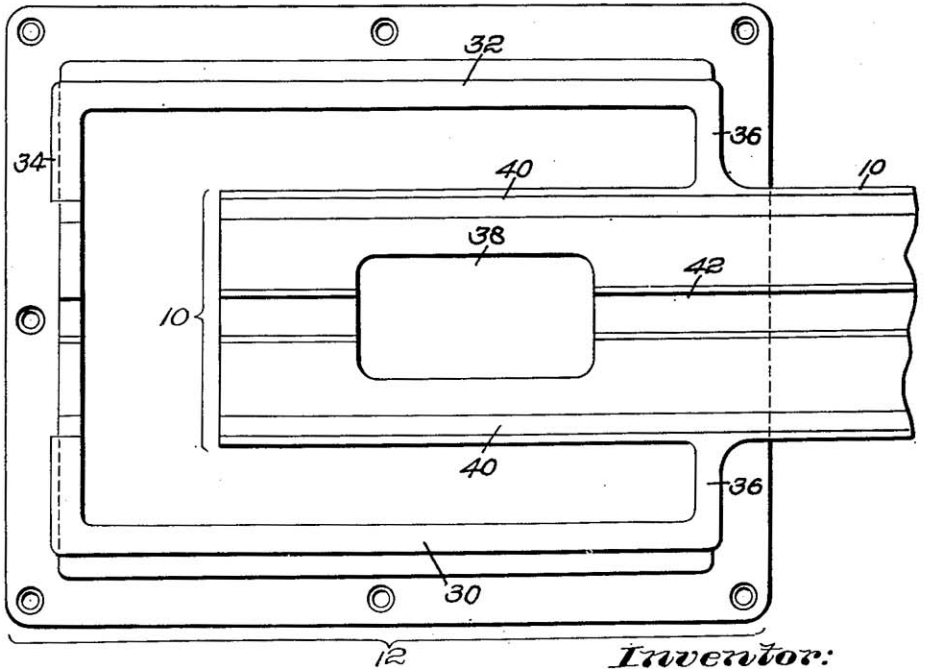


Fig. 5.



12

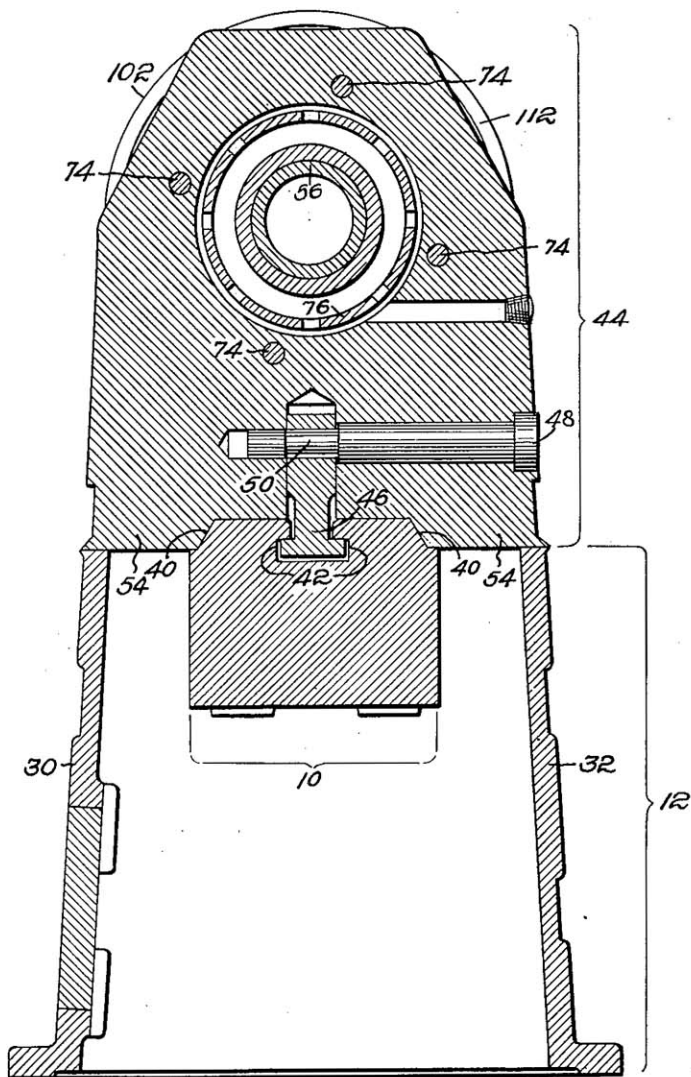
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Fig. 6.



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## UNITED STATES PATENT OFFICE

2,225,950

## LATHE

Frederick C. Blanchard, Brookline, Mass., assignor  
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Application June 17, 1939, Serial No. 279,719

11 Claims. (Cl. 82—2)

This invention relates to lathes and is concerned with a construction which provides for the housing of the spindle driving pulley and its belt, and yet permits removal and replacement of a jointless belt without disturbing the headstock, the spindle, or the spindle bearings. And yet, the arrangement is such that, in the use of the lathe, the operator's hands or clothing are in no danger of being injured by the pulley or the belt.

These desirable results are attained by a novel arrangement in which the pulley, instead of being in the usual location between the headstock bearings, is disposed between the outer bearing (the left-hand bearing, as viewed from the front of the lathe) and the outer end of the spindle, and by the provision of a chamber for the pulley and its belt endwise of that part of the lathe bed which supports the spindle bearings. There are several other features which contribute to these desirable results and which will appear during the course of the following description of one desirable embodiment of the invention when taken in connection with the accompanying drawings thereof, while its scope will be pointed out more particularly in the appended claims.

In the drawings:

Fig. 1 is a plan of a lathe embodying the invention;

Fig. 2 is a front elevation of the same on a bench;

Fig. 3 is a vertical, longitudinal section on an enlarged scale on line 3—3 of Fig. 1;

Fig. 4 is a horizontal section on an enlarged scale on line 4—4 of Fig. 2;

Fig. 5 is a plan of a portion of the bed and the left-hand pedestal; and

Fig. 6 is a vertical, transverse section on an enlarged scale on line 6—6 of Fig. 3.

Referring to the drawings and to the embodiment of the invention illustrated therein by way of example, there is shown a lathe (see Figs. 1 and 2) comprising a bed 10 supported by two pedestals 12 and 14 which may rest upon any appropriate underlying support such as a bench 16 supported as by legs 18 and 20, although the invention is by no means limited to a bench-type lathe. For example, the pedestal 12 might be of sufficient height to constitute a leg resting directly upon the floor, in which event the pedestal 14 might give place to a leg resting directly upon the floor. On the other hand, the pedestal 12 might be quite shallow, in which event it might be supported indirectly as by a hollow leg. In the case of a deep pedestal, it is common to house a driving mechanism and even a motor

within the pedestal itself, and in the case of a shallow pedestal resting upon a hollow leg it is common to house the driving mechanism and even the motor within the leg. These considerations are mentioned merely to convey some idea of the possible variations of the invention in respect to the proportions of the pedestal 12.

Sometimes, also, the left-hand pedestal is separate from the bed for convenience of manufacture and possibly for other reasons, but in the present example, for convenience of manufacture and for other reasons the pedestal is an integral part of the bed, though the bed proper retains its characteristics as such to a very large extent, as will later appear. So also, the pedestal, as herein employed, retains to a large extent the characteristics of other pedestals, but in the present example it is hollow so that it may serve to house certain controls as well as a part of a driving belt disposed endwise of what may be considered the bed proper, as will presently appear.

In the present example, a speed-box, or change-speed mechanism, conventionally represented at 22 has a driven shaft 24, to which is secured an appropriate pulley 26, the one shown by way of example being the well-known double V-groove type, driving V belts 28 which extend upwardly through the bench 16 and into the pedestal 12.

The pedestal, the bed, and the headstock now to be described in detail are of novel construction. By reference to Fig. 5, it will be observed that the pedestal 12 is a hollow, box-like affair and that it has front and rear walls 30 and 32, a left-hand end wall 34 and a right-hand end wall 36. The lower part of the wall 36 (see Fig. 3) extends completely across and beneath the bed 10, while the upper part of said wall (see Fig. 5) is interrupted by the bed.

For convenience of manufacture, the wall 36 is integrally joined with the sides and bottom of the bed 10, but this is the sole connection between the pedestal 12 and the bed 10. In fact, it would be perfectly possible to make the pedestal distinct from the bed and to affix it thereto, but I prefer to make them in one casting. However, the fact that the wall 36 is the sole connection between the pedestal and the bed is clear from an examination of Fig. 5 in which the bed has the appearance of jutting into the pedestal.

In the present example, the bed juts into the pedestal a very considerable distance, but there are other circumstances under which the bed might jut into the pedestal to a much less extent. For example, in a screw-cutting lathe when gear-

ing is to be enclosed within the pedestal and in fact is to run in a bath of oil, it will be desirable to arrange this gearing between the end of the bed and a transverse wall extending from front to rear of the pedestal and connecting its front and rear walls. In such case, this wall will support the left-hand spindle bearing, while the right-hand spindle bearing will be supported by the bed. However, in the present example, both spindle bearings are above and supported by the bed, as will presently appear.

There is no particular need of maintaining the full depth of the bed 10 after it enters the pedestal 12, and in fact, by comparing Figs. 3 and 6, it will be observed that the depth of the bed is quite substantially reduced. Moreover, there is no particular reason why this interior portion of the bed should not be further lightened, as by the provision of a chamber 38 therein (see Fig. 3) especially as this chamber may serve as a convenient location for certain control elements which are omitted from the drawings because they form no part of the present invention.

The bed 10 is provided (see Fig. 6) with usual elevated ways 40 and with a usual T-slot 42. The ways serve to support a headstock 44 (see Fig. 6) now to be described, which is conveniently secured in place as by T-members 46 drawn upwardly to clamp the headstock as by rotatable members 48 having eccentric portions 50 passing through the T members.

Referring now to Fig. 3, it will be observed that the headstock comprises two transverse walls 52 and 54 which support appropriate bearings, presently to be described, for a spindle 56. In the present example, there are two such bearings, and one of them is a one-row ball-bearing, while the other is a two-row ball-bearing. The one-row bearing comprises inner and outer races 58 and 60 and an intermediate set of balls 62, while the two-row bearing comprises two inner races 64, two outer races 66 and two intermediate sets of balls 68. The outer race of the one-row bearing is conveniently held in place as by oppositely disposed rings 70 and 72 drawn together by screws 74 passing loosely through the ring 70 and through the wall 52 and threaded into the ring 72. The outer races of the two-row bearing are somewhat similarly held in place as by rings 76 and 78, but in this case the ring 76 is secured by screws 80 passing loosely through the wall 54 and threaded into the ring 76, while the ring 78 is secured in place by separate screws 82 extending loosely through such ring and threaded into the wall 54 of the headstock. While these rings carry felt washers, it is not considered necessary to describe them, or to describe the spindle in detail as such details have no particular bearing on my present invention.

In the early part of this description, it was stated that the spindle pulley, instead of being in the usual location between the headstock bearings, is disposed between the outer bearing (the one at the left in Fig. 3) and the outer end of the spindle. This construction and arrangement will now be described, still referring to Fig. 3. In this example, there is a pulley 84 having V grooves 86 for the belts 28. The pulley is conveniently secured against rotation on the spindle as by a key 88, supplemented by a clamping arrangement which also clamps the inner ball races to the spindle, the same including a collar 90 threaded onto the spindle and coupled by studs 92 to a ring 94 which exerts an axial thrust against the pulley. It is deemed unnecessary further to de-

scribe the clamping arrangement because the same has no particular bearing on my present invention.

To house the pulley, the upper portions of the belts and the greater part of the spindle, the headstock is provided with a wall 96 which extends about the top and the front and back of the headstock, as well as a wall 98 which is disposed at the left-hand end of the headstock, i. e., outwardly beyond the pulley. The wall 98 is provided with a circular opening 100 of sufficient size to afford access to the pulley 84 and to the belts 28 to effect removal of the latter without disturbing the spindle, its bearings, or in fact any part of the headstock.

In the present embodiment, a hand-wheel 102 is provided to turn the spindle or to hold it against rotation when desired, and to render this hand-wheel conveniently removable to afford access to the pulley 84 and belts 28, the wheel is clamped to and about the spindle as by a split bushing 104 having a tapered portion 106 which is drawn into a tapered portion 108 in the wheel 102 as by a collar 110 threaded onto the bushing, thus contracting the bushing about the spindle. To prevent the user's fingers from being caught between the hand-wheel and the headstock, the hand-wheel is provided with a flange 112 which overlaps and closely encompasses a ring 114 suitably secured as by screws 116 to the headstock and having a flange 118 received in the opening 100. Removal of the hand-wheel and preferably also the ring 114 affords access through the opening 100 to the pulley 84 and belts 28. The latter can then be taken off the lower pulley 26, and the upper pulley 84, after which the belts may be drawn through the opening 100 and passed over the outer end of the spindle. The belts can then be drawn downwardly past the left-hand end of the bed 10 and through the pedestal 12. This is the preferred mode of removal. If desired, however, removal can be effected by withdrawing the belts completely through the opening 100.

Thus it will be seen that, although the upper pulley and the upper portions of the belts are housed so that injury to the user's hands is impossible, nevertheless the belts can easily be removed and replaced by new ones without disturbing the spindle and its bearings.

Having thus described one embodiment of the invention but without limiting myself thereto, what I claim and desire by Letters Patent to secure is:

1. In a lathe, the combination of a housing, a bed jutting into said housing from one side thereof and terminating short of the opposite side thereof, leaving a space between the latter side and the adjacent end of said bed, bearing means supported by said bed, a spindle supported by said bearing means and having a portion overhanging said space, a pulley on said overhanging portion, and an enclosure for said pulley, said enclosure having an opening affording access to said pulley.

2. In a lathe, the combination of a hollow pedestal, a bed supported by and jutting into said pedestal from one side thereof and terminating short of the opposite side thereof, leaving a space between the latter side and the adjacent end of said bed, bearing means supported by said bed, a spindle supported by said bearing means and having a portion overhanging said space, a pulley on said overhanging portion, and an enclosure for said pulley.



3. In a lathe, the combination of a bed, a pedestal having a wall disposed endwise of and separated from one end of said bed by a space, bearing means supported by said bed between said end and the remote end of said bed, a spindle supported by said bearing means and having a portion overhanging said space, and a pulley on said overhanging portion.

4. In a lathe, the combination of a bed, a pedestal having two walls, one supporting said bed and the other disposed endwise of and separated from one end of said bed by a space, bearing means supported by said bed between said end and the remote end of said bed, a spindle supported by said bearing means and having a portion overhanging said space, and a pulley on said overhanging portion.

5. In a lathe, the combination of a housing comprising complementary upper and lower parts, a bed jutting into said lower part and terminating short of the opposite side thereof, leaving a space between the lathe side and the adjacent end of said bed, bearing means within said upper part, a spindle supported by said bearing means and having a part overhanging said space, and a pulley on said overhanging portion, said upper part of said housing having an opening endwise of said pulley affording access to the same.

6. In a lathe, the combination of a housing comprising complementary upper and lower parts, a bed jutting into said lower part and terminating short of the opposite side thereof, leaving a space between the lathe side and the adjacent end of said bed, bearing means within said upper part, a spindle supported by said bearing means and having a part overhanging said space, a pulley on said overhanging portion, said upper part of said housing having an opening endwise of said pulley and affording access to the same, and a handwheel on said spindle and normally substantially closing said opening.

7. In a lathe, the combination of a housing comprising complementary upper and lower parts, a bed jutting into said lower part and terminating short of the opposite side thereof, leaving a space between the lathe side and the adjacent end of said bed, bearing means within said upper part, a spindle supported by said bearing means and having a part overhanging said space, a pulley on said overhanging portion, said upper part of said housing having an open-

ing endwise of said pulley and affording access to the same, and handwheel on said spindle and normally substantially closing said opening, said handwheel and said upper part of said housing having overlapping portions, one closely encompassing the other.

8. In a lathe, the combination of a bed having ways and having an opening endwise of and beyond one end of said ways, bearing means between said opening and the opposite end of said ways, a spindle supported by said bearing means, a pulley on said spindle above said opening, a belt passing over said pulley and extending downwardly past said end of said ways and into said opening, and a housing for said pulley and said bearing means.

9. In a lathe, the combination of a bed having ways and having an opening endwise of and beyond one end of said ways, bearing means supported by said ways between said opening and the opposite end of said ways, a spindle supported by said bearing means, a pulley on said spindle above said opening, a belt passing over said pulley and extending downwardly past said end of said ways and into said opening, and a housing for said pulley and said bearing means.

10. In a lathe, the combination of a bed and a supporting pedestal therefor having a common opening extending vertically within both, said bed having a head-stock-supporting portion between said opening and the remote end of said bed, a headstock supported by said headstock-supporting portion and having bearing means between said opening and the remote end of said bed, said headstock having a chamber complementary to said opening, a spindle supported by said bearing means, and a pulley on said spindle within said chamber and above said opening.

11. In a lathe, the combination of a bed having a spindle-bearing supporting portion, two spindle bearings supported thereby, a spindle supported by said bearings, a pulley on said spindle between the outer end of the latter and the outermost bearing, a pulley driving belt, and a housing which houses said bearings, said pulley, and said belt, said housing having an opening adjacent to the outer end of said spindle to afford access to said belt for removal of the latter from said pulley.