

May 16, 1933.

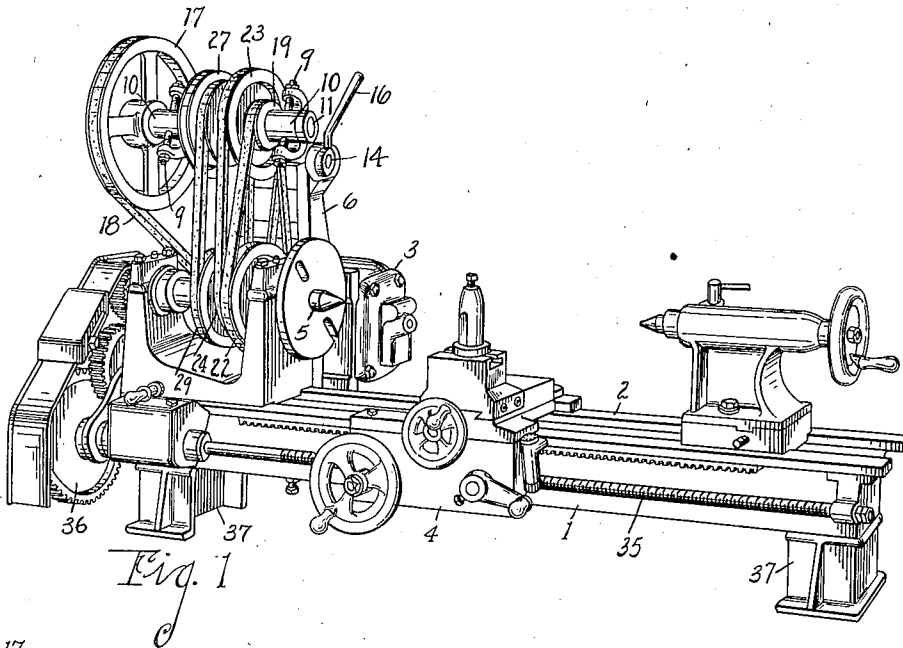
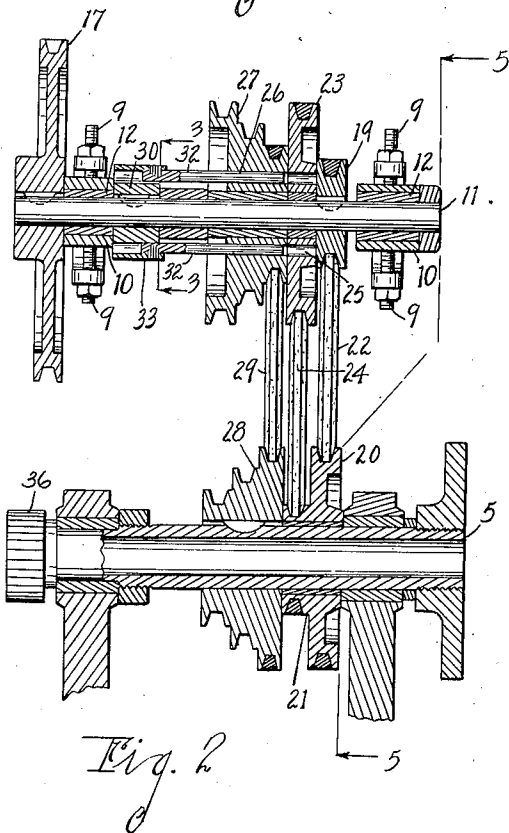
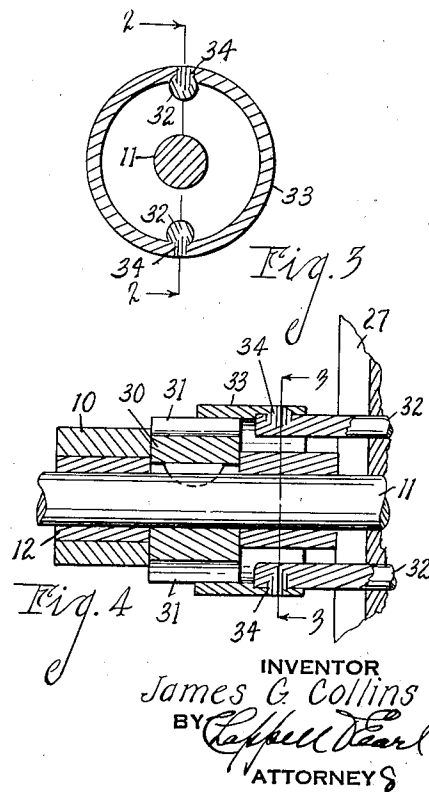
J. G. COLLINS

1,909,522

LATHE

Filed March 8, 1932

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

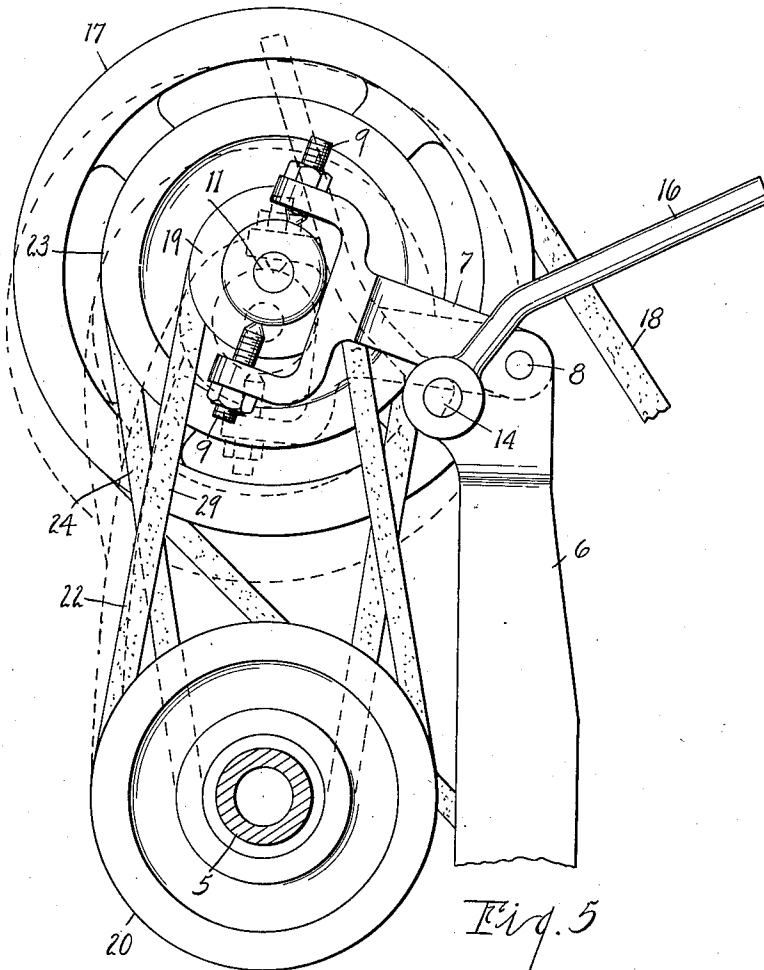


Fig. 5

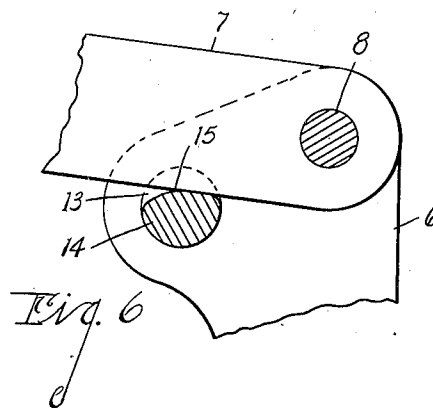


Fig. 6

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LATHE

Application filed March 8, 1932. Serial No. 597,555.

The main objects of this invention are:

First, to provide an inexpensive and practical lathe that is particularly adapted for home use.

5 Second, to provide a lathe of this type with improved speed changing means.

Third, to provide means whereby the speed changing V-belts may be quickly shifted.

Fourth, to provide improved means for 10 carrying and adjusting the position of one pulley shaft relative to another.

Fifth, to provide a lathe having these desirable advantages and characteristics, that is simple and economical in its parts and 15 highly efficient and effective in operation.

Objects relating to details and economies of my invention will appear from the description to follow. A structure which is a preferred embodiment of my invention is 20 illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of a lathe embodying the desirable features of my invention.

25 Fig. 2 is an enlarged fragmentary view in vertical section of the change speed mechanism, taken on a line corresponding to line 2—2 of Fig. 3.

Fig. 3 is a transverse detail section taken 30 on line 3—3 of Fig. 4.

Fig. 4 is an enlarged detail section showing the connection between the collar and sleeve.

Fig. 5 is an enlarged fragmentary view 35 partially in side elevation and partially in section on a line corresponding to line 5—5 of Fig. 2, and

Fig. 6 is an enlarged detail section of the drive shaft supporting and adjusting mechanism.

40 The parts are identified by their numerals of reference which are the same throughout the several views.

Referring to the drawings, 1 in general indicates a lathe embodying the invention, 45 which is provided with a supporting frame 2 on which is mounted an electric motor 3 for driving the tool carriage 4 and the work spindle or shaft 5. Spaced supports 6 extend upwardly from the main frame and 50 have arms 7 pivoted thereto at 8. The free

ends of the arms 7 are forked and are provided with opposed set screws 9 between which are secured collars 10, through which the drive or driving shaft 11 is journaled, 55 frictionless bushings 12 being disposed around the drive shaft 11 on the insides of the collars 10. The position of the drive shaft 11 relative to the free ends of the arms 7 may be very accurately adjusted by means 60 of the set screws 9.

The spaced supports 6 are provided with 65 alined openings 13 in which the cam shaft 14 is journaled, the cam shaft being provided with cam surfaces 15 which support the arms 7 so that the angular position of the arms 65 may be adjusted relative to the supports 6 about the pivot 8 by turning the cam shaft 14. A crank or handle 16 is secured to one end of the cam shaft 14 for facilitating the 70 manual rotation thereof. Fig. 6 shows the relative position of the parts when the drive shaft 11 is lowered for changing the belts from one pulley to another. The belts are 75 tightened by turning the cam shaft 14 through an angle of about 180°.

The drive shaft 11 has a relatively large pulley 17 keyed to one end thereof, said pulley being connected to the motor 3 by the V-belt 18. A relatively small driving pulley 19 is also keyed to the drive shaft 11, and 80 this pulley is connected to the relatively large pulley 20, that is journaled to the work spindle or shaft 5, and is provided with an integral relatively small pulley 21. A V-belt 22 connects the driving pulley 19 to the relatively large one 20 of the speed changing 85 pair of pulleys 20 and 21. The small pulley 21 is connected to a relatively large intermediate pulley 23, journaled to the drive shaft 11 by the belt 24. The intermediate pulley 23 is provided with longitudinal bores 25 which are adapted to register with the longitudinal bores 26 in the multiple driving pulley 27 which is also journaled to the drive shaft 11. The multiple driving pulley 27 is 90 connected to the multiple driven pulley 28 keyed to the driven shaft 5 by the belt 29.

Keyed to the drive shaft 11 is a collar 30 having internal grooves 31 for receiving the 100 internal longitudinally disposed arms or rods

32 which are welded to the sleeve 33 at 34, the inner ends of the rods 32 terminating midway of the sleeve 33, the latter being slidably carried by the collar 30. The outer ends of the rods 32 extend through the bores 26 in the driving multiple pulley 27 so that when the sleeve 33 is moved longitudinally to the left, the inner ends of the rods 32 are received by the grooves 31 in the collar, thereby completing the drive from the drive shaft 11 to the driving multiple pulley 27. In this position of the sleeve and rods, the ends of the latter clear the intermediate pulley 23, as illustrated by Fig. 2. The last named drive is disconnected, and the intermediate pulley 23 is coupled to the driving multiple pulley 27, by sliding the collar 33, carrying the rods 32, to the extreme right, so that the outer ends of the rods are received by the bores 25 in the intermediate pulley and the inner ends of the rods clear the collar 30, as illustrated by Fig. 4. With this arrangement, the drive is as follows: Drive shaft 11, pulley 19, belt 22, pulley 20, pulley 21, belt 24, intermediate pulley 23, rods 32, driving multiple pulley 27, belt 29, driven multiple pulley 28, and finally work spindle 5. With this arrangement, a very low speed is imparted to the work spindle which may be varied by changing the position of the V-belt 29 on the multiple driving and driven pulleys 27 and 28. As pointed out above, this may be quickly accomplished by merely giving the crank 16 a half turn, which lowers the driving shaft 11, permitting the V-belt 29 to be changed, after which the belts are tightened by returning the crank 16 to its original position.

The tool carriage 4 is driven in a conventional manner by the longitudinally disposed screw 35 which is connected to the work spindle 5 through the gear chain 36. The pedestals 37 supporting the frame 2 are purposely made relatively short so that the lathe may be mounted on a conventional work bench.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiments of my invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A lathe provided with a drive shaft, a relatively small driving pulley keyed to said shaft, a relatively large intermediate pulley journaled on said shaft and having longitudinal bores therein, a driving multiple pulley journaled on said shaft and having longitudinal bores for registration with said first named bores, a collar keyed to said shaft and having internal grooves, a sleeve longitudinally splined to said collar and having arms slidably disposed through the bores in said driving multiple pulley, whereby said sleeve may be moved longitudinally one way to engage the grooves in said collar and clear said intermediate pulley and the other way to engage said arms in the bores of said intermediate pulley and clear the grooves in said collar, a work shaft disposed parallel to said drive shaft, a driven multiple pulley keyed to said work shaft, a belt connecting said driving and driven multiple pulleys, a pair of connected speed changing pulleys journaled on said driven shaft, and belts connecting said pair of speed changing pulleys to said intermediate and driving pulleys.

2. A lathe provided with a drive shaft, a driving pulley fixed to said shaft, an intermediate pulley journaled on said shaft and having longitudinal bores therein, a driving multiple pulley journaled on said shaft and having longitudinal bores for registration with said first named bores, a collar fixed to said shaft and having grooves, a sleeve longitudinally splined to said collar and having arms slidably disposed through the bores in said driving multiple pulley, whereby said sleeve may be moved longitudinally one way to engage the grooves in said collar and clear said intermediate pulley and the other way to engage said arms in the bores of said intermediate pulley and clear the grooves in said collar, a work shaft disposed parallel to said drive shaft, a driven multiple pulley keyed to said work shaft, a bolt connecting said driving and driven multiple pulleys, a pair of connected speed changing pulleys journaled on said driven shaft, and belts connecting said pair of speed changing pulleys to said intermediate and driving pulleys.

3. A lathe provided with a drive shaft, a driving pulley keyed to said shaft, an intermediate pulley journaled on said shaft and having longitudinal bores therein, a driving multiple pulley journaled on said shaft and having longitudinal bores for registration with said first named bores, a collar keyed to said shaft and having grooves, a sleeve longitudinally splined to said collar and having arms slidably disposed through the bores in said driving multiple pulley, whereby said sleeve may be moved longitudinally one way to engage the grooves in said collar and clear said intermediate pulley and the other way to engage said arms in the bores of said intermediate pulley and clear the grooves in said collar, a work shaft disposed parallel to said drive shaft, a driven multiple pulley keyed to said work shaft, a belt connecting said driving and driven multiple pulleys, a pair of connected speed changing pulleys journaled on said driven shaft, and belts connecting said pair of speed changing pulleys to said intermediate and driving pulleys.

4. A change-speed mechanism comprising a drive shaft, a driving pulley keyed to said shaft, an intermediate pulley journaled on said shaft and having longitudinal bores therein, a driving multiple pulley journaled on said shaft and having longitudinal bores for registration with said first named bores, a collar keyed to said shaft and having grooves, a sleeve longitudinally splined to said collar and having arms slidably disposed through the bores in said driving multiple pulley, whereby said sleeve may be moved longitudinally one way to engage the grooves in said collar and clear said intermediate pulley and the other way to engage said arms in the bores of said intermediate pulley and clear the grooves in said collar, a work shaft disposed parallel to said drive shaft, a driven multiple pulley keyed to said work shaft, a belt connecting said driving and driven multiple pulleys, a pair of connected speed changing pulleys, and means connecting said pair of speed changing pulleys to said intermediate and driving pulleys.

5. A change-speed mechanism comprising a drive shaft, a driving pulley keyed to said shaft, an intermediate pulley journaled on said shaft and having longitudinal bores therein, a driving multiple pulley journaled on said shaft and having longitudinal bores for registration with said first named bores, a collar keyed to said shaft and having internal grooves, a sleeve longitudinally splined to said collar and having arms slidably disposed through the bores in said driving multiple pulley, whereby said sleeve may be moved longitudinally one way to engage the grooves in said collar and clear said intermediate pulley and the other way to engage said arms in the bores of said intermediate pulley and clear the grooves in said collar, a work shaft disposed parallel to said drive shaft, a driven multiple pulley keyed to said work shaft, a belt connecting said driving and driven multiple pulleys, a pair of connected speed changing pulleys, and means connecting said pair of speed changing pulleys to said intermediate and driving pulleys.

a driving shaft, a driven shaft, a driving pulley fixed to the driving shaft, a pair of connected change-speed pulleys journaled on the driven shaft, a belt connecting one of
 5 said change-speed pulleys to the driving pulley, an intermediate pulley journaled on said driving shaft and having a longitudinal bore, a belt connecting the other of said change-speed pulleys to the intermediate
 10 pulley, a multiple driving pulley journaled on said driving shaft and having a longitudinal bore for registration with the intermediate bore pulley, a collar fixed to said driving shaft and having a longitudinal
 15 groove, a sleeve slidably carried by said collar and having an internal longitudinal rod secured thereto for longitudinal movement with said sleeve one way into said groove and the other into said bore, a multiple driven
 20 pulley journaled on said driven shaft, and a belt connecting said multiple driving pulley to said multiple driven pulley.

5. A change-speed mechanism comprising a driving shaft, a driving pulley fixed to the
 25 driving shaft, a plurality of connected change-speed pulleys, a belt connecting one of said change-speed pulleys to the driving pulley, an intermediate pulley journaled on said driving shaft and having a longitudinal
 30 bore, a belt connecting the other of said change-speed pulleys to the intermediate pulley, a multiple driving pulley journaled on said driving shaft and having a longitudinal bore for registration with the inter-
 35 mediate bore pulleys, a collar fixed to said driving shaft and having a longitudinal groove, and a sleeve slidably carried by said collar and having an internal longitudinal rod secured thereto for longitudinal move-
 40 ment with said sleeve one way into said groove and the other into said bore.

6. A change-speed mechanism comprising a driving shaft, a driving pulley fixed to the
 45 driving shaft, an intermediate pulley journaled on said driving shaft and having a longitudinal bore, a multiple driving pulley journaled on said driving shaft and having a longitudinal bore for registration with the intermediate bore pulley, a collar fixed to said
 50 driving shaft and having a longitudinal groove, and a sleeve slidably carried by said collar and having an internal longitudinal rod secured thereto for longitudinal movement with said sleeve one way into said
 55 groove and the other into said bore.

7. A lathe provided with a drive shaft, a multiple pulley journaled on said shaft and having longitudinal bores therethrough, a
 60 loose driven pulley journaled on said shaft on one side of said multiple pulley and having longitudinal bores for registration with said first named bores, a collar fixed to said shaft on the other side of said multiple pulley
 65 and having external longitudinal grooves, and a sleeve encircling said collar and having

longitudinally disposed rods secured thereto, extending through said multiple pulley bores and terminating within said sleeve and constituting splines for coaction with said
 70 grooves when the sleeve is moved longitudinally one way and connecting rods with the bores in the loose driven pulley when moved the other way.

8. A lathe provided with a shaft, a multiple pulley journaled on said shaft and
 75 having longitudinal bores therethrough, a loose driven pulley journaled on said shaft on one side of said multiple pulley and having longitudinal bores for registration with said first named bores, a collar fixed to said
 80 shaft on the other side of said multiple pulley and having longitudinal grooves, and a sleeve encircling said collar and having longitudinally disposed rods secured thereto, extending through said multiple pulley bores and
 85 terminating within said sleeve and constituting splines for coaction with said grooves when the sleeve is moved longitudinally one way and connecting rods with the bores in the loose driven pulley when moved the other
 90 way.

9. A lathe provided with a shaft, a multiple pulley journaled on said shaft and having
 95 longitudinal bores, a loose driven pulley journaled on said shaft and having longitudinal bores for registration with said first named bores, a collar keyed to said shaft and having longitudinal grooves, and a sleeve encircling said collar and having longitudi-
 100 nally disposed rods secured thereto, terminating within said sleeve and constituting splines for coaction with said grooves when the sleeve is moved longitudinally one way and connected rods with the bores in the loose driven pulley and the multiple pulley
 105 when moved the other way.

10. A change-speed mechanism comprising a shaft, a pulley journaled on said shaft and having a longitudinal bore there-
 110 through, a loose driven pulley journaled on said shaft and having a longitudinal bore for registration with said first named bore, a slidable rod extending through said first named pulley bore mounted for longitudinal
 115 movement along said shaft constituting a connecting rod with the bore in the loose driven pulley when in one position and a spline when in another position to coact with engaging means on the shaft, and engaging
 120 means on said shaft to engage said rod when it is in said second named position.

11. A change-speed mechanism comprising a driving shaft, a driving pulley fixed to the driving shaft, a plurality of connected
 125 change-speed pulleys, a belt connecting one of said change-speed pulleys to the driving pulley, an intermediate pulley journaled on said driving shaft and having a longitudinal bore, a belt connecting the other of said change-speed pulleys to the intermediate
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pulley, a multiple drive pulley journaled on said driving shaft and having a longitudinal bore for registration with the bore of the intermediate pulley, a rod mounted for longitudinal movement along said shaft adapted in one position to engage the bores in said intermediate pulley and in said multiple drive pulley and in a second position to engage the bore in said multiple drive pulley and engaging means on said shaft, and engaging means on said shaft to engage said rod when it is in said second named position.

12. A portable lathe unit comprising a base, a support, a motor, a workshaft, an arm pivoted to said support to support a drive shaft parallel to and in proximity to said workshaft, a drive shaft journaled to said arm, a driving pulley fixed to the drive shaft and having a V-belt receiving groove, a loose driven pulley journaled to said drive shaft having a longitudinal bore therein, a pair of connected speed changing pulleys journaled on said workshaft and having V-belt receiving grooves, V-belts connecting said pair of speed changing pulleys to said intermediate and driving pulleys, a driving multiple pulley journaled on said drive shaft and having a longitudinal bore therethrough for registration with said loose driven pulley bore and having V-belt receiving grooves, a driven multiple pulley fixed to said workshaft and having V-belt receiving grooves, a V-belt connecting said driving and driven multiple pulleys, a cam shaft journaled to said support and having a cam surface engaging and supporting said arm whereby to change the angular position of said arm relative to said support whereby said last mentioned V-belt may be shifted on said multiple pulleys, a slidable rod extending through said driving multiple pulley bore and mounted for longitudinal movement along said shaft and adapted in one position to act as a connecting rod with the bore in the loose driven pulley and in another position as a spline to engage engaging means on said drive shaft, and engaging means on said drive shaft to engage said rod when it is in said second named position.

In witness whereof I have hereunto set my hand.

JAMES G. COLLINS.

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