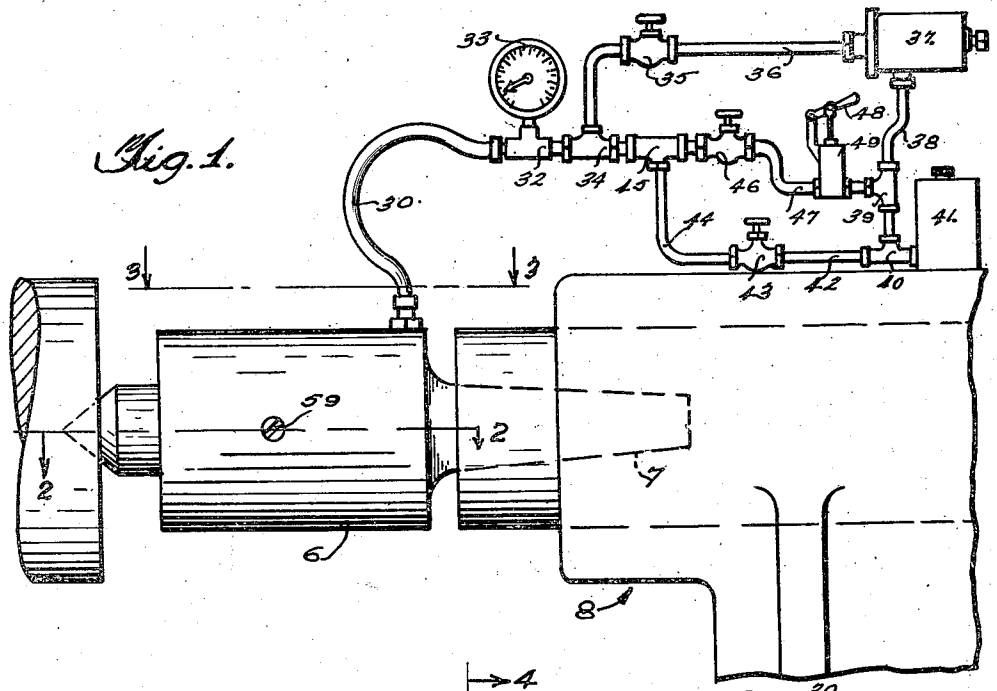
July 2, 1946. L. A. BARTO 2,402,979

HYDRAULIC LATHE CENTER

Filed Dec. 28, 1943 2 Sheets-Sheet 1

Fig. 1.



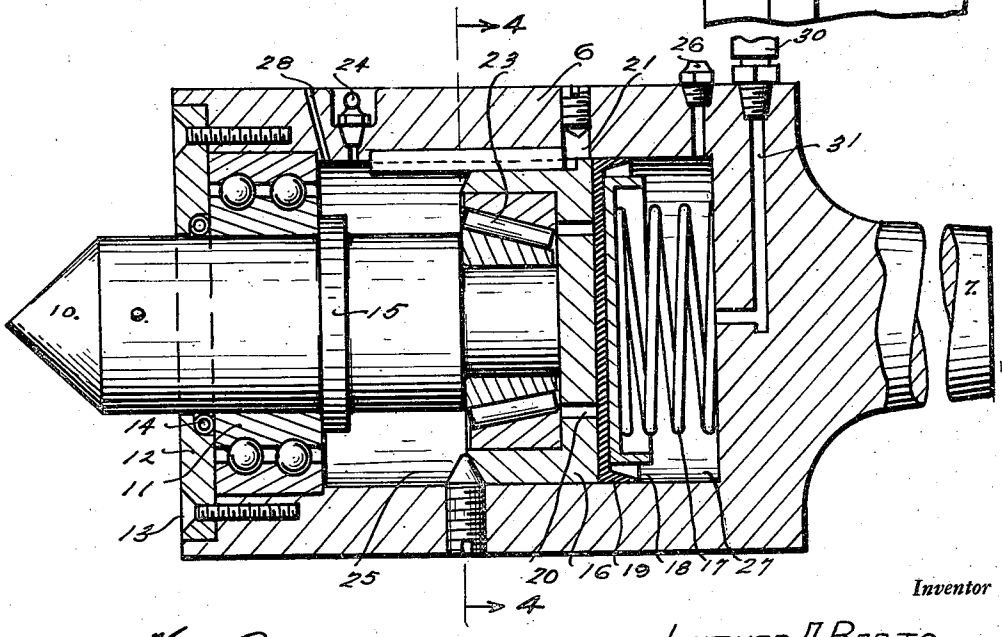


Fig. 2.

Inventor

LUTHER A. BARTO

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

July 2, 1946. L. A. BARTO 2,402,979

HYDRAULIC LATHE CENTER

Filed Dec. 28, 1943 2 Sheets-Sheet 2

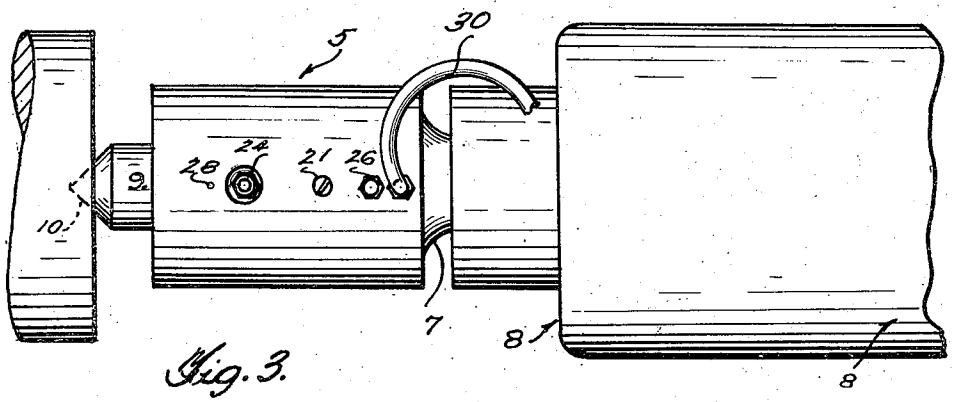


Fig. 3.

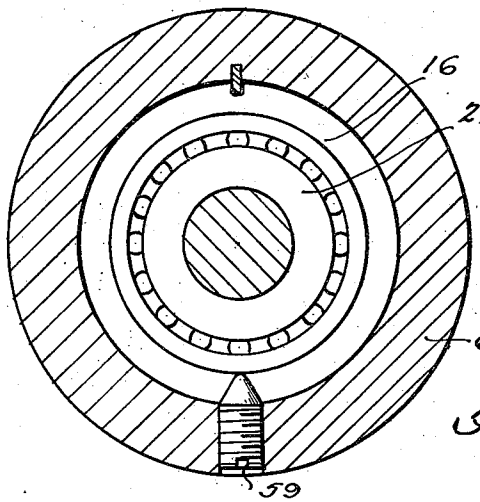


Fig. 4.

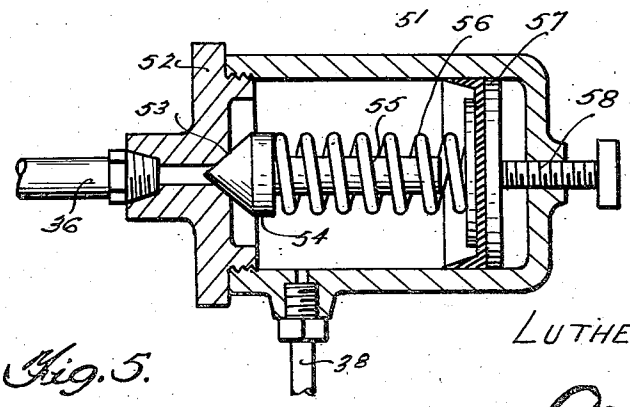


Fig. 5.

Inventor

LUTHER A. BARTO

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

Patented July 2, 1946 2,402,979

UNITED STATES PATENT OFFICE

2,402,979

HYDRAULIC LATHE CENTER

Luther A. Barto, Allentown, Pa.

Application December 28, 1943, Serial No. 515,964

4 Claims. (Cl. 82—33)

1

This invention relates to new and useful improvements in lathe centers, the principal object being to provide a hydraulic control of the pressure created by the heat expansion on the tail stock center of work or job to be turned or machined on small or large engine lathes.

Another important object of the invention is to provide a hydraulic lathe center which is portable and can be easily applied to conventional lathes and which includes means for indicating and controlling work pressures at all times.

Another important object of the invention is to obviate the necessity of changing centers because of burning out and scoring of the same, and correspondingly to preclude the necessity of changing such centers due to the overheating or scoring of the bearings carrying the same.

Other objects and advantages of the invention will become apparent to the reader of the following description.

In the drawings:

Figure 1 is a fragmentary side elevational view showing the improved center.

Figure 2 is a fragmentary longitudinal sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a fragmentary top plan view of the structure shown in Figure 1.

Figure 4 is a cross section on the line 4—4 of Figure 2.

Figure 5 is a fragmentary longitudinal sectional view through the adjustable valve.

Referring to the drawings wherein like numerals designate like parts, it can be seen that numeral 5 generally refers to the improved tailstock unit which consists of a case 6 from which a tapered shank 7 projects for disposition into the tailstock of the lathe which is generally referred to by numeral 8.

Numeral 9 denotes a tailstock center having a tip 10 and this center is disposed through a ball bearing assembly 11 located within the outer end of the case 6, and a closure plate 12 secured in place by screws 13 abuts the outer portion of the bearing assembly 11. The plate 12 contacts a lubricant seal 14.

The center 9 has a circumferential rib or collar 15 which abuts the inside of the bearing assembly 11, this as is clearly shown in Figure 2.

The inner end of the center 9 has a hollow piston structure 16 bearing against the same and urged to this position by a compression spring 17 which is interposed between the inner end of the case 6 and a cup 18 which, in turn, bears against a leather cup or seal 19. Small openings 20 are provided in the piston to facilitate easy removal

2

of the bearing cup. A plugged opening 21 is provided in the case to allow clearance for slotting the keyway. Numeral 22 denotes a key for preventing rotation of the piston 16.

Inclined roller bearings 23 are provided in an assembly located within the piston and associated with the inner end of the center 9 to take care of end thrust and also certain amount of radial pressure in addition to that taken care of by the ball bearing assembly 11.

A grease fitting 24 is provided for the chamber 25 and a bleeder valve 26 is provided for the chamber 27 at the opposite side of the piston 16. A small air vent 28 is provided for the chamber 25.

A tube 30 extends from a duct 31 communicating with the chamber 27 and this connects by a fitting 32 with a pressure gauge 33 and also by way of a fitting 34 with a valve 35. From the valve 35 a pipe 36 extends to an adjustable valve 37 and this, in turn, is connected by way of a pipe 38 to a fitting 39. The fitting 39 is connected to another fitting 40 which, in turn, is connected to a hydraulic fluid reservoir 41 and also by way of a pipe 42 to a valve 43, the latter being, in turn, connected by a pipe 44 to a fitting 45 between fitting 34 and a valve 46, the latter valve being connected by a pipe 47 to a hand pump or the like 48. The hand pump 48 is in turn connected as at 49 to the fitting 39. The tank 41 provides the requisite air-compression chamber therein for a purpose presently apparent.

The adjustable valve 37 consists of a case 51 having a header 52 in which is a valve seat 53 to which the pipe 36 extends. A tapered valve 54 operates against this seat and has a stem 55 projecting inwardly and around which is disposed a coiled spring 56. The spring 56 is interposed between the valve element 54 and a piston 57, the position of which can be adjusted by a feedable screw 58.

From the foregoing the operation of the device should now be readily understandable. As the work operated on by the lathe expands due to heat or the like, the center 9 is forced inwardly against the pressure of the spring 17, and correspondingly the pressure of the fluid in the hydraulic system. Conversely, upon cooling of the work for any reason whatsoever, the spring 17 will bias the lathe center 9 outwardly thereagainst to maintain a desired pressure on the work. This pressure may be regulated in accordance with the pressure indicated by gauge 35, fluid being fed from the fluid reservoir 41 either through the pipe 42, the valve 43, and the pipe 44 to the pressure gauge 33 and the line 30 into the chamber 27, and controlled

manually by means of the valve **43** in accordance with the pressure indicated on the gauge **33**. Hydraulic pressure in the system may be relieved, as required, by means of the valve **35**, line **36**, automatic valve **32**, line **38**, and fittings **39**, **40**, whereby the fluid may be returned to reservoir **41**, the pressure in the automatic valve **37** being governed by the position of the screw **58** as above described.

Thus, it will be seen that automatic or manual constant pressure control against the center **9** may be continuously maintained regardless of the expansion or contraction of the work due to heat.

The gauge **33** indicates in pounds per square inch the hydraulical force or pressure developed in the tailstock. For example, if 800 pounds per square inch is needed for satisfactory operation of the unit and the work being turned it may be controlled either by the automatic valve **32**, or the manually adjustable valve **43**, in such manner as to maintain the pressure constant. The pressure on the gauge should never reach the maximum thrust load on the roller bearing **23**.

Assuming that the piston and seal have compressed the fluid in the hydraulic chamber and the spring **17** to the maximum limit, due to the expansion of the work due to heat or the like and it is desired to return the piston to the normal frontal position, and the pressure exerted through the fluid reservoir in the manner previously described is insufficient to accomplish the same, the pump **48** may be manually actuated, the valves **43** and **35** being closed and the valve **46** open to accomplish this result by building up the fluid pressure to such point that the piston, and correspondingly the associated lathe center **9** is returned to the desired position.

Thus, it will be seen that by means of the instant invention, pressure in the system forcing the lathe center **9** against the work may be maintained substantially constant, regardless of the expansion or contraction of the work, occasioned by heat due to the speed of rotation of the work or the like. It will also be seen that there is herein provided an improved hydraulic lathe center accomplishing all the objects of this invention and others including many advantages of great practical utility and commercial importance.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter.

Having described the invention, what is claimed as new is:

1. In a center for lathes in combination, a hydraulic cylinder, means for supplying fluid under pressure to said cylinder, a piston in said cylinder, a lathe center slidably operable by said piston extending from said cylinder, a compression spring biasing said piston and said center outwardly with respect to said cylinder, said means for supplying fluid under pressure including a conduit, a pressure recording gauge in said conduit, a plurality of conduits connecting said pressure gauge with a fluid pressure reservoir, and a manually operable valve controlling admission of said fluid through one of said conduits.

2. In a center for lathes in combination, a hydraulic cylinder, means for supplying fluid under pressure to said cylinder, a piston in said cylinder, a lathe center slidably operable by said piston extending from said cylinder, a compression spring biasing said piston and said center outwardly with respect to said cylinder, said means for supplying fluid under pressure including a conduit, a pressure recording gauge in said conduit, a plurality of conduits connecting said pressure gauge with a fluid pressure reservoir, and an automatic valve adapted to be adjusted to a predetermined pressure controlling admission of said fluid through one of said conduits to said cylinder.

3. In a center for lathes in combination, a hydraulic cylinder, means for supplying fluid under pressure to said cylinder, a piston in said cylinder, a lathe center slidably operable by said piston extending from said cylinder, a compression spring biasing said piston and said center outwardly with respect to said cylinder, said means for supplying fluid under pressure including a conduit, a pressure recording gauge in said conduit, a plurality of conduits connecting said pressure gauge with a fluid pressure reservoir, a manually operable valve controlling admission of said fluid through one of said conduits and an automatic valve provided with adjusting means to control a supply of fluid admitted to said cylinder in accordance with the adjustment thereof to a predetermined pressure as indicated by said pressure gauge.

4. In a center for lathes in combination, a hydraulic cylinder, means for supplying fluid under pressure to said cylinder, a piston in said cylinder, a lathe center slidably operable by said piston extending from said cylinder, a compression spring biasing said piston and said center outwardly with respect to said cylinder, said means for supplying fluid under pressure including a conduit and a pressure recording gauge in said conduit, a plurality of conduits connecting said pressure gauge with a fluid pressure reservoir, a manually operable valve controlling admission of said fluid through one of said conduits, an automatic valve controlling admission of said fluid to said cylinder positioned in another of said conduits, said automatic valve being adjustable, and a pressure pump positioned in still another of said conduits adapted to supply additional fluid under pressure when the valves in said first-mentioned two of said conduits are closed.

LUTHER A. BARTO.