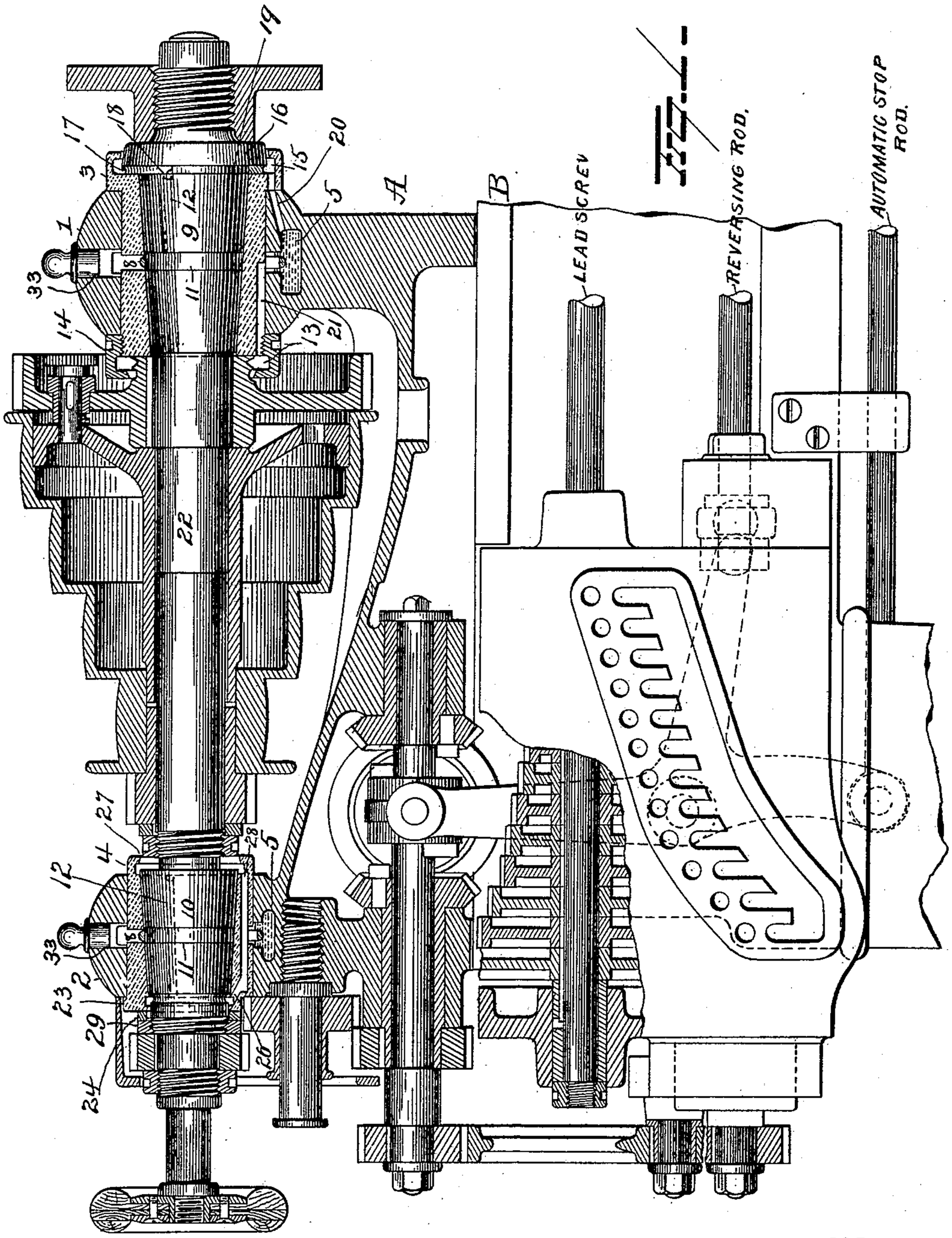
No. 626,715. Patented June 13, 1899.

W. P. NORTON.

ENGINE LATHE HEAD.

(Application filed Dec. 28, 1898.)

(No Model.) 4 Sheets—Sheet 1.



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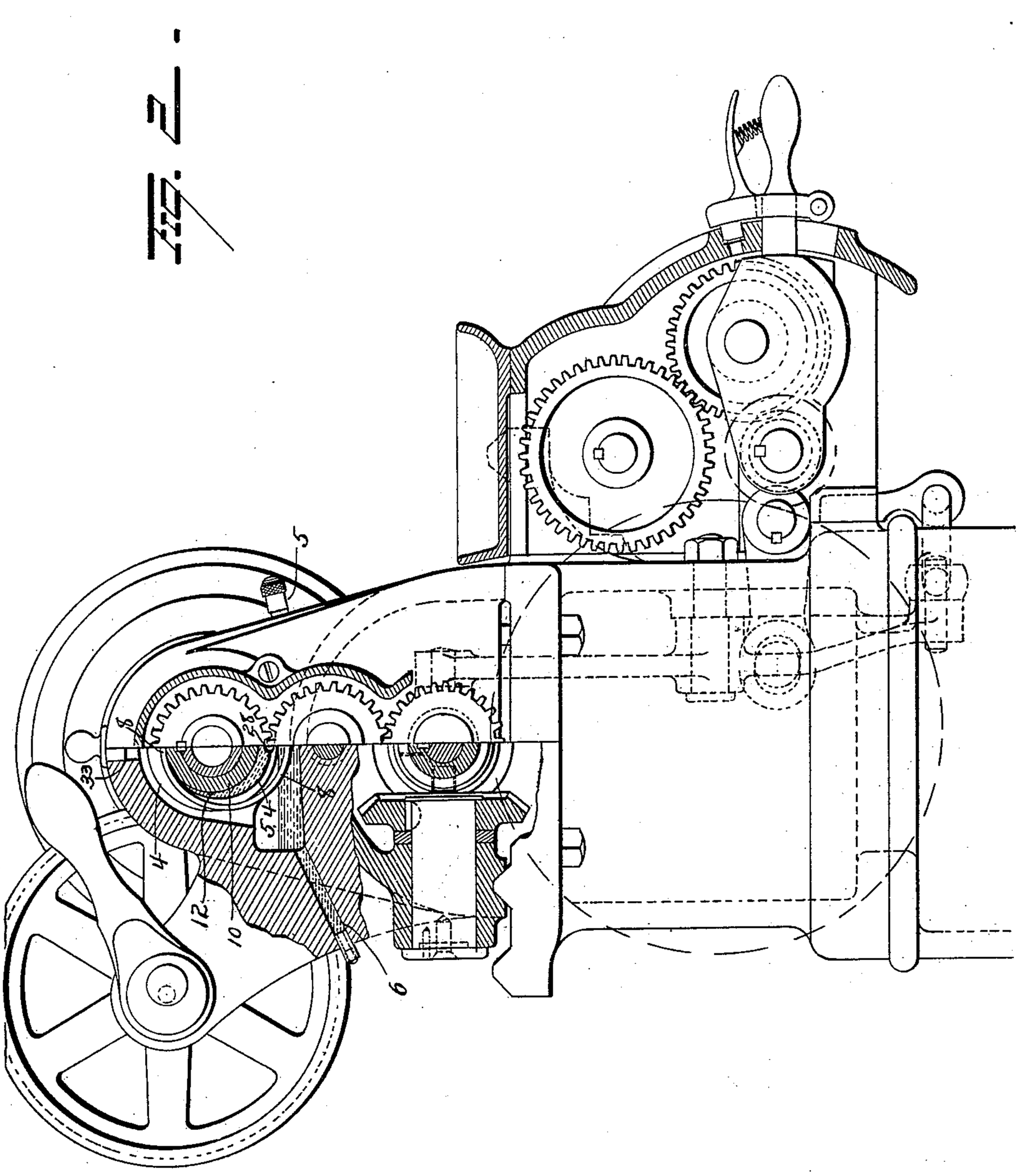
(No Model.) 4 Sheets—Sheet 2.



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(No Model.) 4 Sheets—Sheet 3.

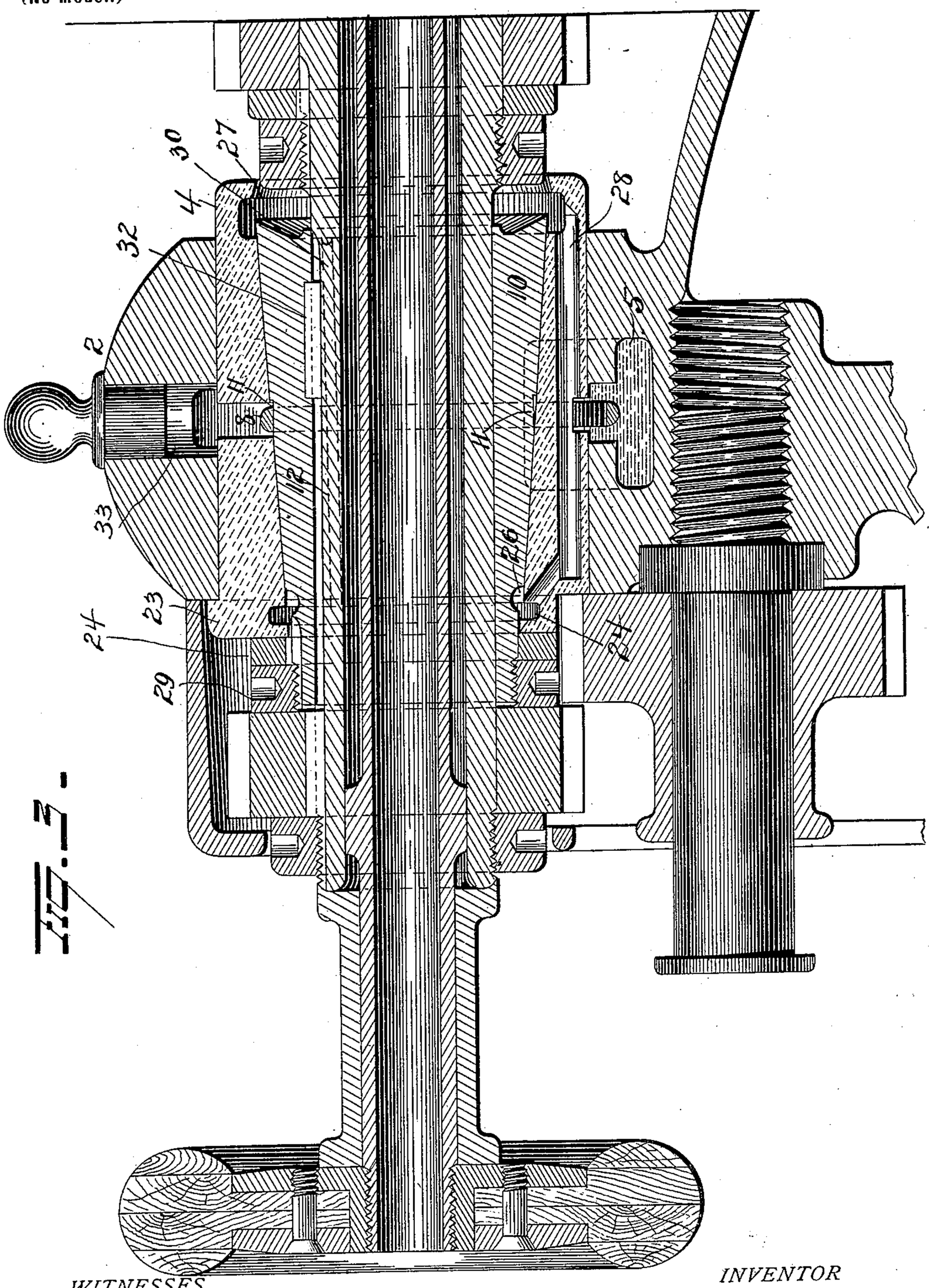

FIG. 3.

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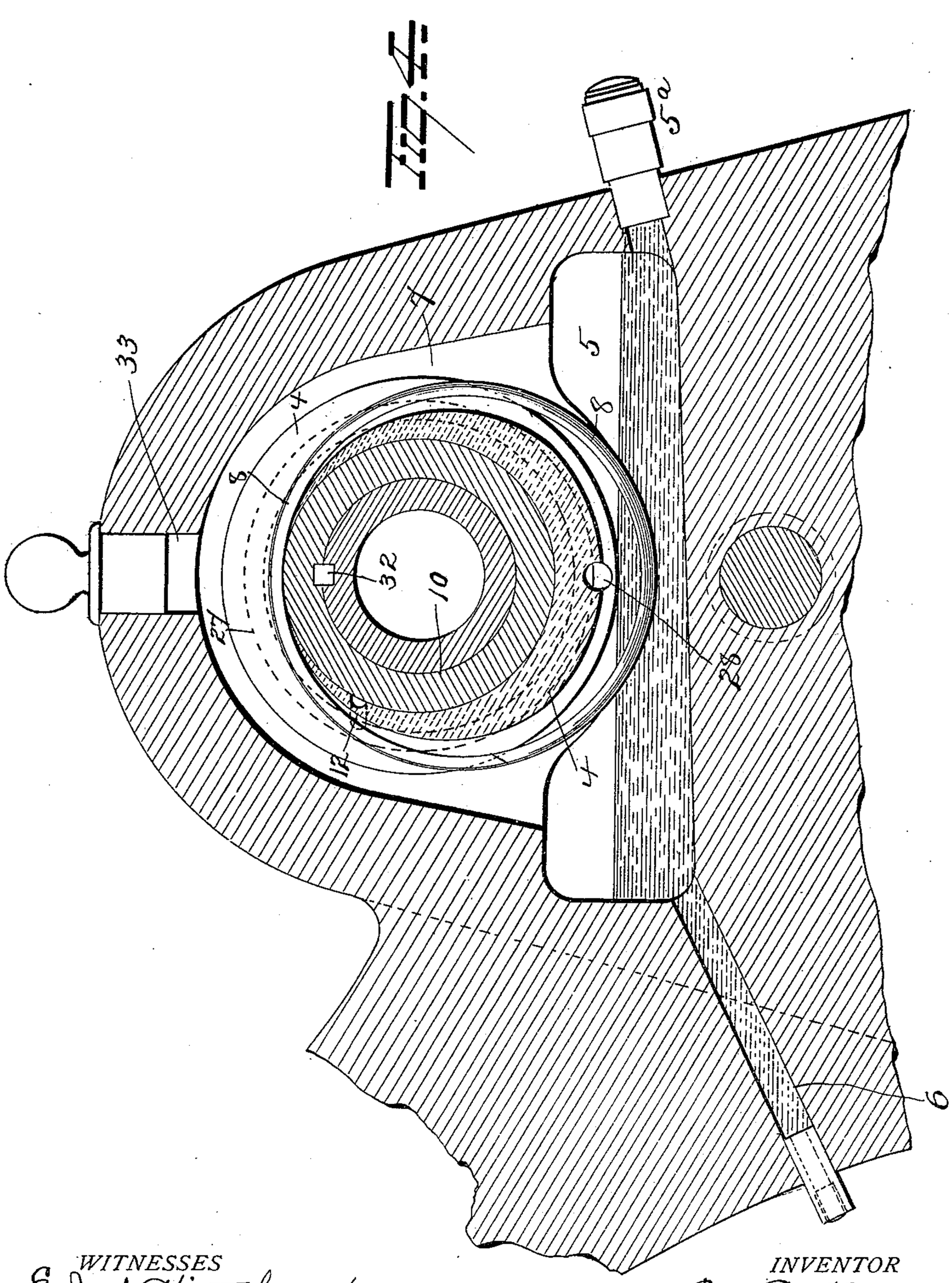

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UNITED STATES PATENT OFFICE.

WENDELL P. NORTON, OF TORRINGTON, CONNECTICUT.

ENGINE-LATHE HEAD.

SPECIFICATION forming part of Letters Patent No. 626,715, dated June 13, 1899.

Application filed December 28, 1898. Serial No. 700,530. (No model.)

To all whom it may concern:

Be it known that I, WENDELL P. NORTON, of Torrington, in the county of Litchfield and State of Connecticut, have invented certain new and useful Improvements in Engine-Lathe Heads; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in engine-lathe heads, and is designed more particularly for use in connection with the machines disclosed in Patents No. 470,591, dated March 8, 1892, and No. 549,006, dated October 29, 1895, granted to me for improvements in screw-cutting lathes.

The object of the present invention is to provide improved means for mounting and securing the live-spindle in place in the head-stock and for effectually lubricating the bearing therefor; and my invention consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in section of my improved engine-lathe head, showing part of the change-speed mechanism in elevation. Fig. 2 is an end view of same, partly in elevation and partly in transverse section. Fig. 3 is an enlarged view in section of part of the live-spindle and one bearing, and Fig. 4 is a view in transverse section.

In Figs. 1, 2, and 3 of the drawings I have shown the speed-changing mechanism of my improved lathe; but this mechanism is fully disclosed and described in my patents above referred to and is simply illustrated herein to show up the connections and relative arrangements of the several parts.

Again, while the invention herein disclosed and claimed was designed for use on my screw-cutting lathes I would have it understood that I do not confine its use to such lathes or machines, but consider myself at liberty to use it on any and all machines comprising a live spindle or shaft mounted at two or more points in bearings.

A represents the head-stock of the machine, mounted on the usual bed B and provided at its ends with journal-bearings 1 and 2. The bearing 1 carries a bushing 3, and the bearing 2 carries the bushing 4, and each bearing is provided centrally below its respective bushing with an oil reservoir or cavity 5, communicating with the interior of the bearing. Each reservoir, as clearly shown in Fig. 4, extends transversely well across the head-stock A, and each is provided, preferably, with a nipple or sight-tube 5^a, through which any excess of oil deposited in the reservoir may flow out or through which the operation of filling may be viewed, so as to regulate the quantity of oil deposited therein, and each is also provided with a drainage-duct 6, through which the oil, together with any deposit therein, may be withdrawn from the reservoir.

A passage-way 7 leads from each reservoir 5 up and around the bushing for the reception of the lubricating-ring 8. This ring is preferably made of metal, semicircular in cross-section, with its flat inner face resting on the crown or top surface of the live spindle or shaft. The sides of the bushings 3 and 4 are cut away or grooved, as shown in Fig. 4, to receive the rings 8, the said grooves at the tops or crowns of the bushings extending through the latter, so as to permit the flat inner faces of the rings 8 to rest in contact with the crown or upper surface of the live-spindle.

The inner faces of the bushings 3 and 4 are conical, with their larger ends toward the work, so as to receive the end thrust of the spindle exerted through the conical sections 9 and 10 of said spindle.

The lubricating-rings 8 rest with their lower portions well down in the oil-reservoirs and, as before stated, are supported by and rest in contact with the crown of the live-spindle. Hence it will be seen that as the live-spindle revolves the rings revolve and carry up a regular and continuous supply of lubricant to the crown of the shaft. In order to prevent slipping of the lubricating-rings, I have provided the cones 9 and 10 with flattened sections 11, and I prefer to roughen the outer surfaces of these sections 11, so as to increase the friction between the cones and the rings, and thus drive the latter with a regular positive action. These flattened and roughened surfaces of the cones receive the oil as it is raised by the rings, and the oil thus deposited

thereon passes into grooves 12, formed in the inner surfaces of the bushings 3 and 4. These grooves, preferably one for each bushing, are arranged at a slight inclination, as shown, and the oil is fed thereto from the central flat surfaces 11 in both directions, thus thoroughly lubricating the cones 9 and 10 of the spindle. The oil is moved along the groove in both directions from the center and passes from the smaller end of bushing 3 into the annular chamber 13, formed in the clamping-nut 14, and passes from the larger end of the bushing into the annular recess or cavity 15, formed in the outer enlarged end of bushing 3. The cone 9 is provided with a shoulder 16, which rests against the ring 19, interposed between the shoulder and the bushing, the ring 19 being grooved on its periphery, as at 17, while the outer surface of the shoulder 16 immediately outside of the groove is inclined. The ring 19 may have a groove 18 for the escape of the oil from the groove 12 in the bushing; but in any event the oil as it issues from between the bushing and ring settles in or on the groove 17 or is thrown off by centrifugal action into the annular recess 15. The oil as it issues from between the cone-surfaces gravitates to the bottom of the recess and runs from there through duct 20 into the reservoir 5. If any oil should drop into the inclined shoulder of the cone, it would gravitate toward the lower end thereof and drop into the recess 15. The oil issuing at the other end of the bushing 3 drops into the recess 13 of the lock-nut 14 and passes from thence through duct 21 into the reservoir 5. From this it will be seen that the oil as it is taken up passes through the bushing and back again to the reservoir, thus keeping the bearing continuously and uniformly oiled while the machine is in operation, with no waste whatever of the lubricant.

The shoulder of bushing 3 rests against bearing 1 and is retained in place by the lock-nut 14, engaging screw-threads on the opposite end of the bushing. This nut not only locks the bushing in place, but is designed also for taking up wear between the live-spindle and bushing. The cone 9 is integral with the hollow live-spindle 22, and hence it will be seen that the cone on the spindle, resting within the conical bushing, prevents endwise movement of the spindle in one direction.

Bearing 2 carries the bushing 4, and the latter is provided at its outer end with a shoulder adapted to bear against the outer face of bearing 2. The cone is provided at its small or outer end with a peripheral recess 26, into which the oil first enters as it leaves the cone, and from which it drops or is thrown into the recess 24 in the shoulder 23, while the oil which passes inwardly toward the opposite end of the cone is deposited in the annular recess 27 in the bushing 4. The recesses 24 and 27 communicate by means of ducts 28 with the oil-reservoir, and hence the oil after it has passed through the bushing gravitates back to its oil-chamber. This bushing 4 carries a feather 32, which latter rests in a groove 30 in the live-spindle. Hence it will be seen that while the cone necessarily revolves with the spindle the latter is free to elongate when heated without binding the cone-bushing in its conical bearing. Bushing 4 is locked against movement and consequent displacement in its bearing and wear between the parts compensated for by the lock-nut 29 screwed onto the smaller end of the cone and bearing against the collar interposed between the nut and the outer end of the bushing.

With the construction above described wherein the live-spindle carries two cones mounted in cone-shaped bushings, one of the cones being integral with the spindle and the other keyed thereto so as to permit the spindle to slide therein, the shaft can elongate without wedging its cones in the bushings, and by providing a lubricating device, such as described, a thorough and continuous lubrication of the contacting cone-surfaces is effected without waste of oil and without attention on the part of the operator.

The lubricant or oil may be introduced into the reservoirs in any suitable manner; but in the present instance I have shown the bearings 1 and 2 provided each with an opening 33 in its top, and from the construction it will be seen that oil poured in through these openings will thoroughly lubricate the ring and gravitate directly into the reservoirs.

It is evident that many slight changes might be resorted to in the construction and arrangement of parts herein shown and described without departing from the spirit and scope of my invention. Hence I would have it understood that I do not wish to limit myself to the exact construction herein shown and described; but,

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

1. The combination with two bearings and bushings therein, the latter having conical bores, the larger ends of the latter being toward the work, of a live-spindle having a cone for each conical bore, one cone being rigidly secured to the spindle and the other keyed thereto.

2. The combination with two bearings and bushings therein the latter having conical bores, the larger ends of the latter pointing toward the work, of a live-spindle having a cone for each bore, one cone being rigidly secured to the spindle and the other keyed thereto and means for locking the loose cone and its bushing against independent endwise movement.

3. The combination with two bearings and bushings therein, the latter having conical bores and slotted upper sides, of a live-spindle having a cone for each bore, lubricating-rings resting within the slots in the bushings and

on the flattened or cylindrical sections formed in the cones and an oil-reservoir below each bushing.

4. The combination with two bearings, bushings therein, the latter having conical bores and slotted upper surfaces, and means for locking the bushings in the bearings, of a live-spindle having two cone-bearings, a lubricating-ring for each bearing, each ring resting within the slot in the bushing and on a flattened or cylindrical section formed in the crown of the cone and an oil-reservoir beneath the bushing.

5. The combination with a bearing having an oil-reservoir therein and a bushing, the said bushing having a slotted upper surface, of a live-spindle having a conical bearing the latter having a flattened section, and a ring resting on the crown of said flattened section with its lower portion in said oil-reservoir below the bushing.

6. The combination with a bearing having an oil-reservoir therein, a slotted bushing in said bearing, and a recessed lock-nut for locking the bushing in its bearing, of a live-spindle having a conical section fitting within the conical bore of the bushing, a ring resting within the slot in the bushing and engaging a flattened section in the crown of the conical surface of the live-spindle, the said bushing having a groove for conveying the oil to the ends of the bushing, an oil-reservoir under the bushing and ducts leading from the ends of the bushing to the reservoir.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WENDELL P. NORTON.

Witnesses:
WILLIAM F. PEETZ,
WILLARD A. RORABACK.