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A. E. NEWTON.

GEARING.

APPLICATION FILED AUG. 19, 1904.

Patented Dec. 14, 1909.

3 SHEETS—SHEET 1.

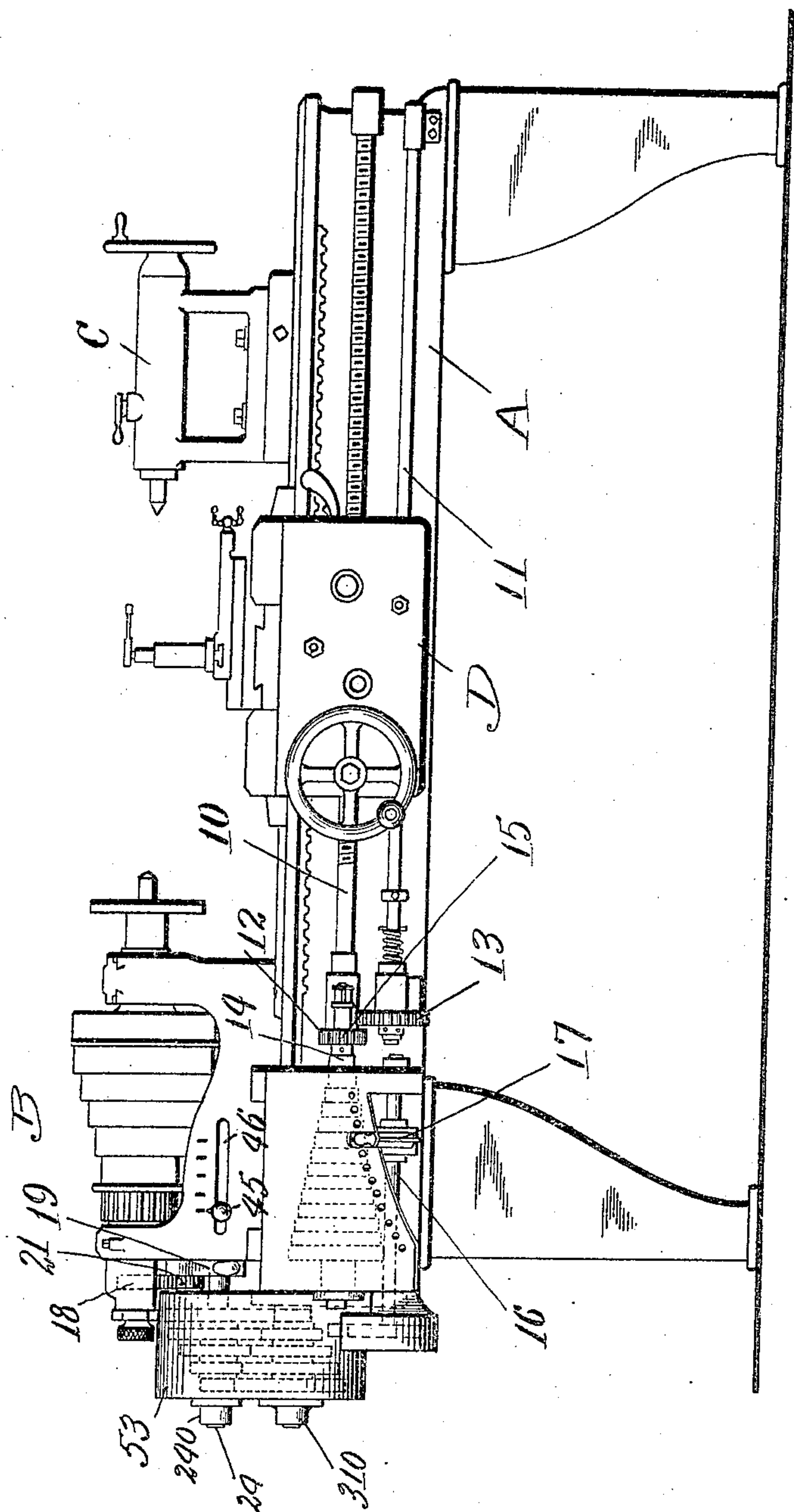


Fig. 1.

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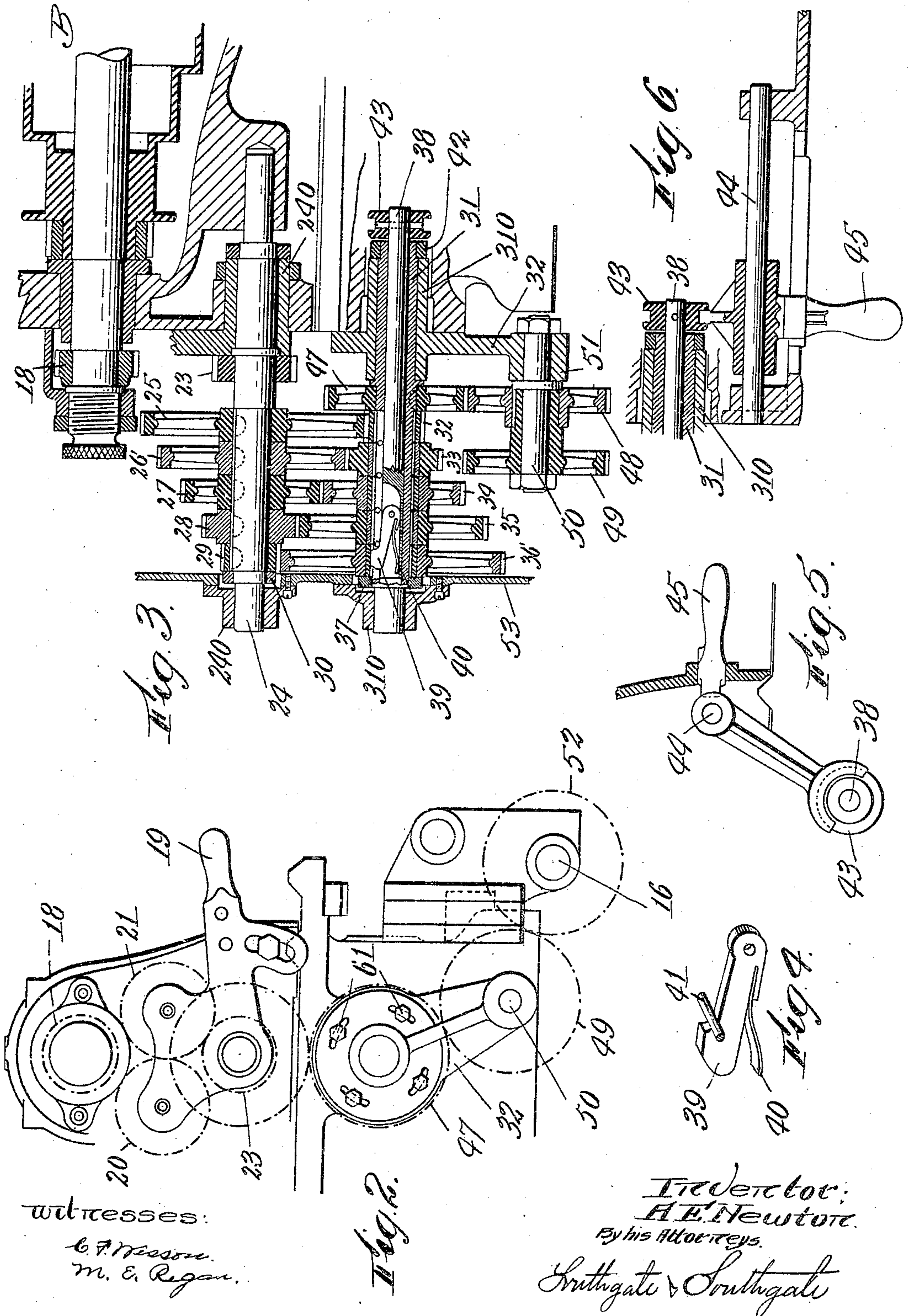
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3 SHEETS—SHEET 2.

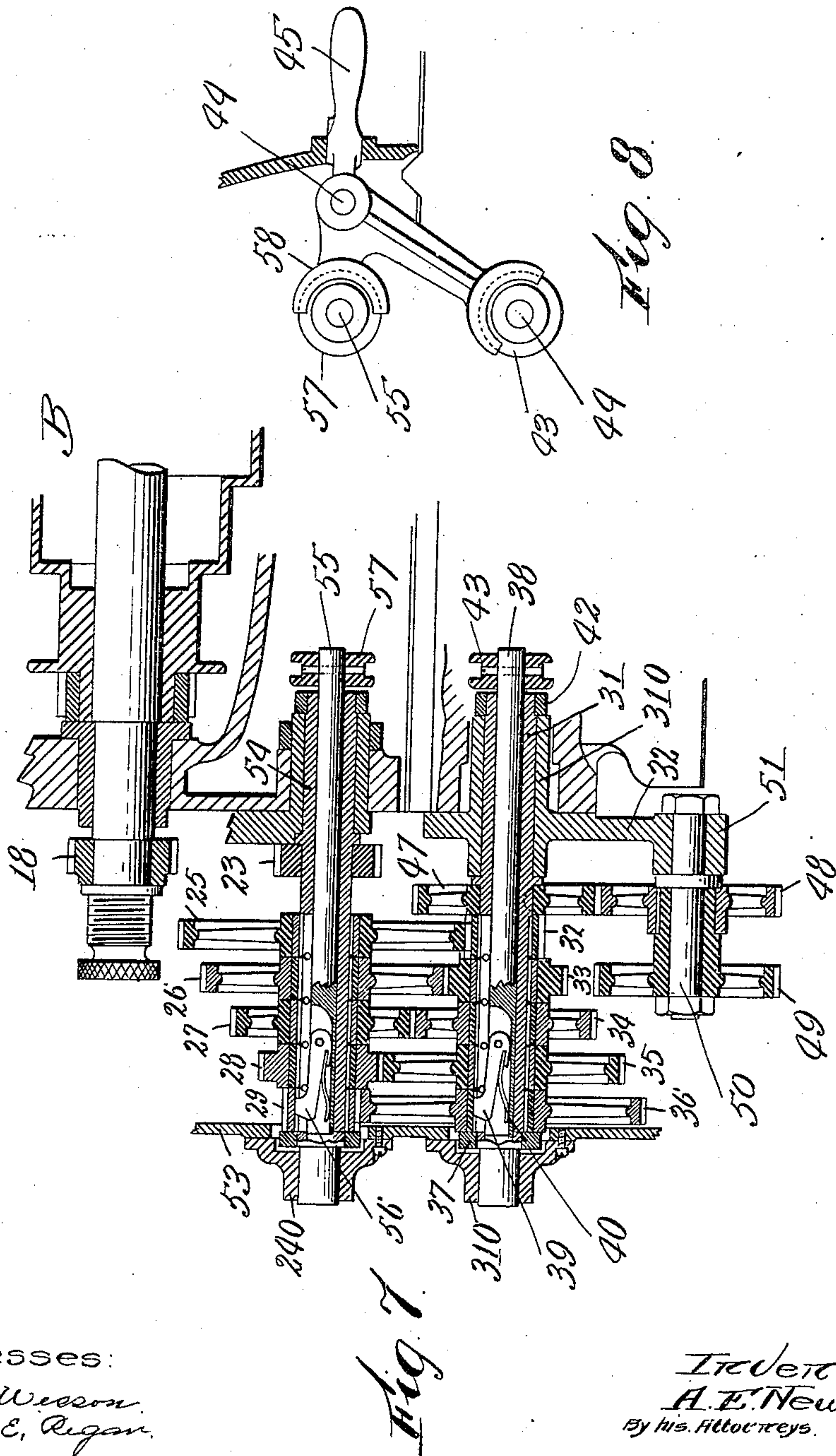




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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

ALBERT E. NEWTON, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO PRENTICE BROS. COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## GEARING.

943,042.

Specification of Letters Patent.

Patented Dec. 14, 1909.

Application filed August 19, 1904. Serial No. 221,330.

*To all whom it may concern:*

Be it known that I, ALBERT E. NEWTON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Gearing, of which the following is a specification.

This invention relates to gearing and while capable of general use is especially adapted to improve engine lathes and especially the variable speed mechanism used between the head-stock and the lead screw and feed-rod actuating the carriage.

A preferred form of the invention is shown and described in the accompanying three sheets of drawings; referring to which,

Figure 1 is a front elevation of an engine lathe with my improvements applied thereto. Fig. 2 is a partial end elevation of the head-stock and end of the bed showing the way the variable speed mechanism is incorporated into the device. Fig. 3 is a cross-sectional view of the parts shown in Fig. 2. Fig. 4 is a perspective view of the sliding key. Fig. 5 is an end view, and Fig. 6 a sectional plan view of the means for operating the sliding key. Fig. 7 is a view similar to Fig. 3, illustrating a preferred modification, and Fig. 8 is a view similar to Fig. 5 illustrating the operating means for the sliding keys.

Referring to the drawing and in detail, A designates the bed, B a support or head-stock, C the tail-stock, and D the movable carriage of an engine lathe.

The carriage may be actuated by driven mechanism, either through a lead-screw 10 or a feed-rod 11. The lead screw 10 has a gear 12 on its end and the feed-rod 11 a gear 13 on its end. A countershaft 14 is arranged parallel with the lead-screw and feed-rod, and has a shifting pinion 15, which may be moved to engage either the gear 13 or the gear 12, so that power may be imparted, either to the lead screw or to the feed-rod. A slotted shaft 16 is journaled in bearings on the front of the bed and fitted to slide thereon is a lever 17 carrying a pinion and intermediate gear which is adapted to engage any one of a series of gears mounted on the countershaft 14. The details of these last named parts are not shown or described at length as they are well understood. By this arrangement power ap-

plied to the shaft 16 can be taken, either to the lead screw or to the feed-rod. The improvement has particular reference to a variable speed mechanism employed between the head-stock and this shaft 16. A series of interchangeable gear wheels and a sweep are commonly employed for this purpose, but the use of the same is objectionable in that the adjustments can only be made when the lathe is stopped and in that replacement and adjustment of gears is necessary.

To avoid the use of a series of interchangeable gear-wheels, I provide the following mechanism: On the end of the live spindle in the head-stock is arranged a pinion 18. Fitted in a bearing in the head-stock is a hub of a lever 19, which carries two intermeshing pinions 20 and 21, the pinion 21 meshing with a gear 23. By rocking the lever 19, either pinion 20 or 21 can be meshed with the pinion 18 and hence gear 23 driven in either direction, as desired. The gear 23 is tightly fitted on a shaft 24 journaled in the hub of the lever 19 and in the bearing 240. Fitted on said shaft 24 is a series of gear wheels 25, 26, 27, 28 and 29, the said gears in this modification being keyed to said shaft 24 and held in place by a collar 30. A bushing 31 is journaled in a bearing 310 and in a bracket 32. Loosely fitted on said bushing 31 are a series of gears 32, 33, 34, 35 and 36 arranged inversely to the series of gears 25 to 29 and meshing therewith. A collar 37 keeps said gears in position on the bushing. A rod 38 is fitted in said bushing and the same carries a pivoted key 39, which is normally forced outward by a spring 40. Pins 41 are arranged in the slotted bushing 31 to correspond with the joints or meeting faces between the gears of the series so that the key will first move out of the particular gear which it engages and then snap into the next gear, each of said gears having a slot or key-way for this purpose. A collar 42 is arranged on the inside end of the bushing 31 to keep the same in place in the bracket 32. Arranged on the inner end of the rod 38 is a grooved collar 43. A pin is driven through said collar to engage the rod 38 so that by moving said collar axially the rod 38 and thereby the pivoted key 39 will be moved. A guiding rod 44 is fitted in hubs or bearings formed in the inside of the head-stock. An adjusting handle 45 has a long hub fitted



on said guiding rod 44 and a yoke engaging said grooved collar 43. A slot 46 is cut in the front of the head-stock and said handle engages the sides of said slot. By this arrangement, a strong, efficient and accurate means for sliding the key 39 is provided. Mounted on said bushing 31 is a gear 47 which engages one member of a double gear 48—49 running on a stud 50 secured in an arm 51 formed as part of the bracket 32. The member 49 of said double gear engages a gear 52 secured on the end of the countershaft 16. A cover or box 53 is secured to the end of the bed and the bearings 240 and 310 are secured thereto.

The foregoing presents an advantageous structure to build in that the head-stock and its parts can be assembled on the bench and the parts that are mounted on the front of the bed secured thereto and then the bracket 32 adjusted in position so that the second series of gears will properly mesh with the first series of gears and then the bracket turn so that the gear 49 will mesh with the gear 52. When this adjustment is made the bracket 32 can be secured in place by bolts 61. By making the holes for these bolts slotted the said bracket 32 can be adjusted angularly on the bushing 31 so that if a peculiar or odd sized screw is desired, which cannot be cut by the mechanism provided, the same can be obtained by using a different gear 52 on the shaft 16. But ordinarily the parts are secured positively in position and the great range of adjustment provided meets all conditions.

By the arrangement shown the various adjustments of the lever can be made without removing any part and the use of interchangeable gear wheels avoided.

By manipulating the adjusting handle 45, five different changes can be obtained and if there are twelve gears arranged on the countershaft 14, as indicated in dotted lines, five times twelve or sixty changes are possible.

By adjusting the lever 17 and the slip pinion 15 any one of these sixty changes can be imparted to either the lead-screw or the feed-rod in either direction.

It will also be noted that various changes can be made without reversing any part. This enables the mechanism to be adjusted to get sixty different right or left hand screws or to obtain that number of feeds from the rod in either direction of the carriage travel.

In some cases, it is desirable to have only the particular gear of the series 25 to 29 in operation, so that only a pair of the two intermeshing series of gears will be in operation. When this is desired, instead of using a shaft 24, a bushing 54 is provided as shown in Fig. 7, and the gears 25 are loosely arranged on said bushing. A rod 55 is fitted

in said bushing and the same carries a pivoted key 56, the rod 55 and the key 56 being constructed like the rod 38, pivoted key 39 and their detail parts previously described. On the end of said rod 55 is secured a grooved collar 57. The handle 45 in this modification has an additional yoke 58 extending therefrom which engages the grooved collar 57, as shown in Fig. 8. Now when the handle 45 is adjusted the keys 39 and 56 will be adjusted together and only one intermeshing pair of the two series of gears will be in operation. This construction is desirable as it prevents the rattle due to the driving of unnecessary parts. It will be noted that in this construction the bushing 54 is journaled in the hub of the lever 17 making a neat and simple construction.

The larger gears of each of the series are preferably bushed with steel bushings, as shown, so that the key-ways cut therein will not wear out and the smallest in each series is preferably made of steel.

The parts herein shown and described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

Having thus fully described my invention what I claim and desire to secure by Letters Patent of the United States is:—

1. The combination with a variable speed mechanism for engine lathes and the like for imparting power to driven mechanism, comprising two series of intermeshing gears having key-ways, two slotted bushings on which said two series of gears are arranged, a rod fitted in each of said bushings, a key mounted on each rod and movable transversely thereon for engaging the said key-ways, and means connecting the rods so that their keys are kept in position for engagement with the cooperating gears of the two series, and for simultaneously moving the keys on their rods, of a casing containing said variable speed mechanism having a slot, and an adjusting handle on the yoke projecting through the slot.

2. In an engine lathe, a variable speed mechanism comprising a support, driven mechanism, a driving pinion, a lever having a hub journaled in the support, two intermeshing gears carried by said lever and arranged so that either can be meshed with the driving pinion, a bushing fitted in the hub of said lever, a gear fixed on said bushing and meshing with one of the gears carried by said lever, a series of gears loosely journaled on the bushing, means for locking any one of said gears to said bushing, a second series of gears intermeshing with the first series and gearing therefrom to the driven mechanism.

3. In an engine lathe, a variable speed mechanism for imparting power to the means which actuates the carriage comprising



ing a support having a slot cut therein, a bushing, a series of gear wheels loosely journaled thereon, means in said bushing for locking any one of the said gears to the bushing, a guide shaft fitting in the support, and an adjusting handle for operating said means and fitted to said slot and said guide shaft.

4. A variable speed mechanism for engine lathes, comprising a support, a driving pinion, a driven mechanism, a variable speed train, a bushing supporting a part of said variable speed train, means for adjusting the variable speed train, a transmitting gear on said bushing, a bracket supported to be turned on an axis concentric with the bushing, and an intermediate gear carried by said bracket for connecting the driving pinion with the transmitting gear.

5. In an engine lathe, a variable speed

mechanism for imparting power to the means which actuates the carriage, comprising a support, a driving pinion, a bushing, a series of gear wheels journaled loosely thereon, means in said bushing for locking any one of said gears to the bushing, an adjusting handle extending out through the support and connected to shift the rod, a transmitting gear fastened on said bushing, a swinging piece turning on said bushing, and an intermediate gear on the swinging piece connecting the transmitting gear and driving pinion.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

ALBERT E. NEWTON.

Witnesses:

JOHN F. CROWELL,

PHILIP W. SOUTHGATE.