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PATENTED OCT. 25, 1904.

G. G. RIGGS & A. E. BABIN.

LATHE TEST INDICATOR.

APPLICATION FILED MAY 12, 1904.

NO MODEL.

FIG. 1.

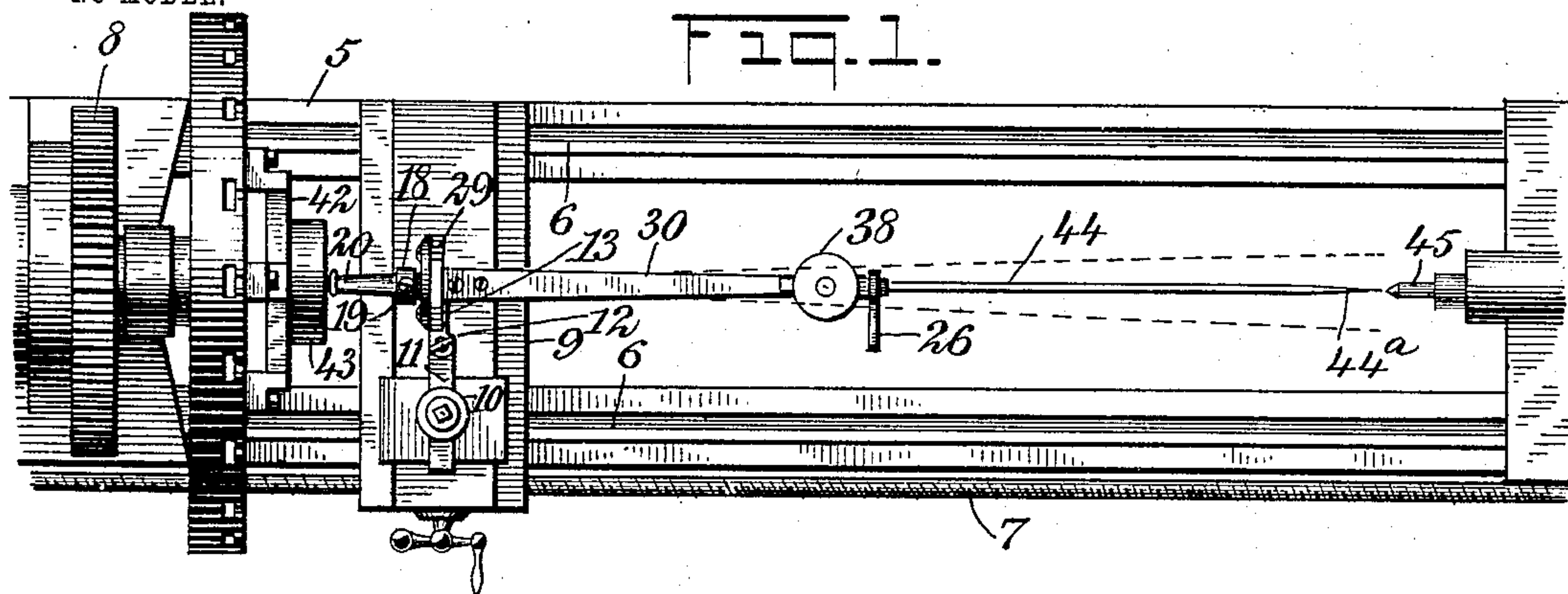


FIG. 2.

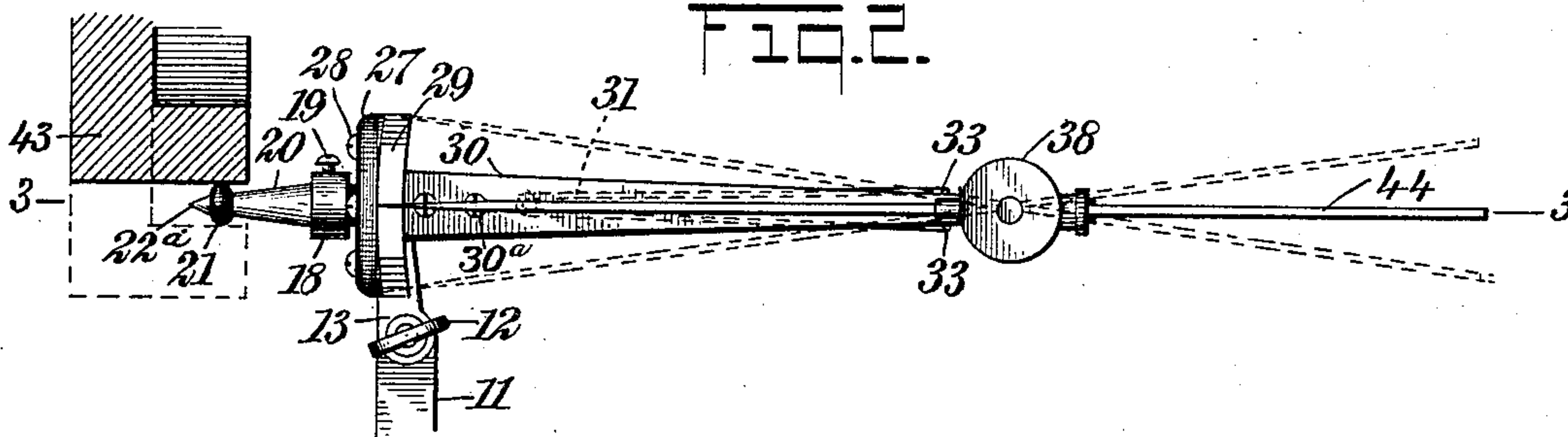


FIG. 3.

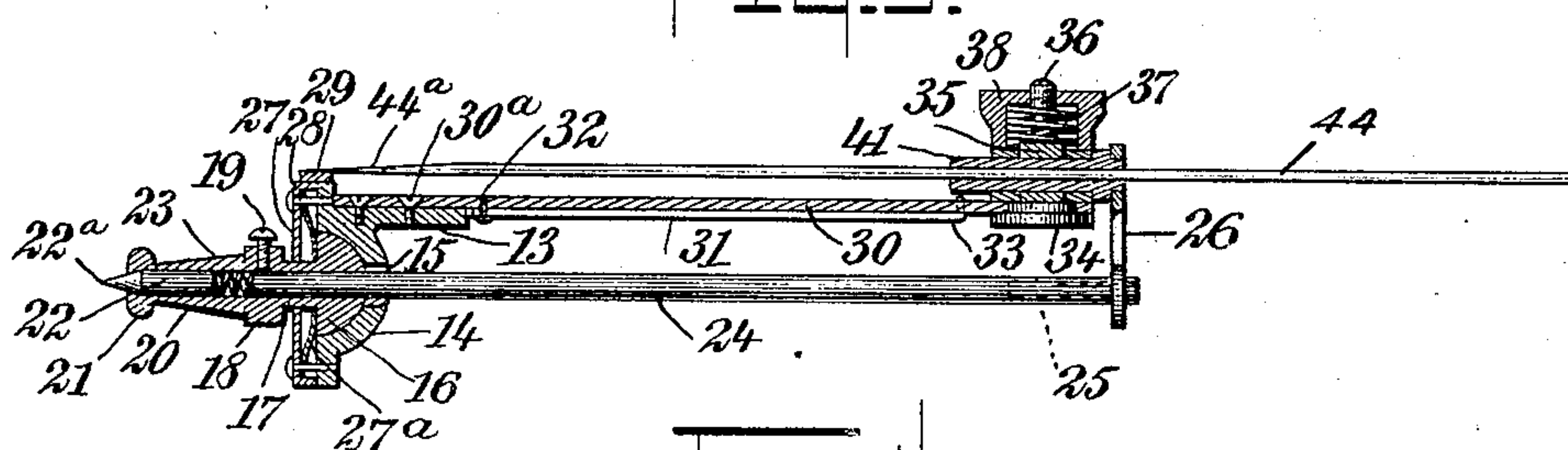
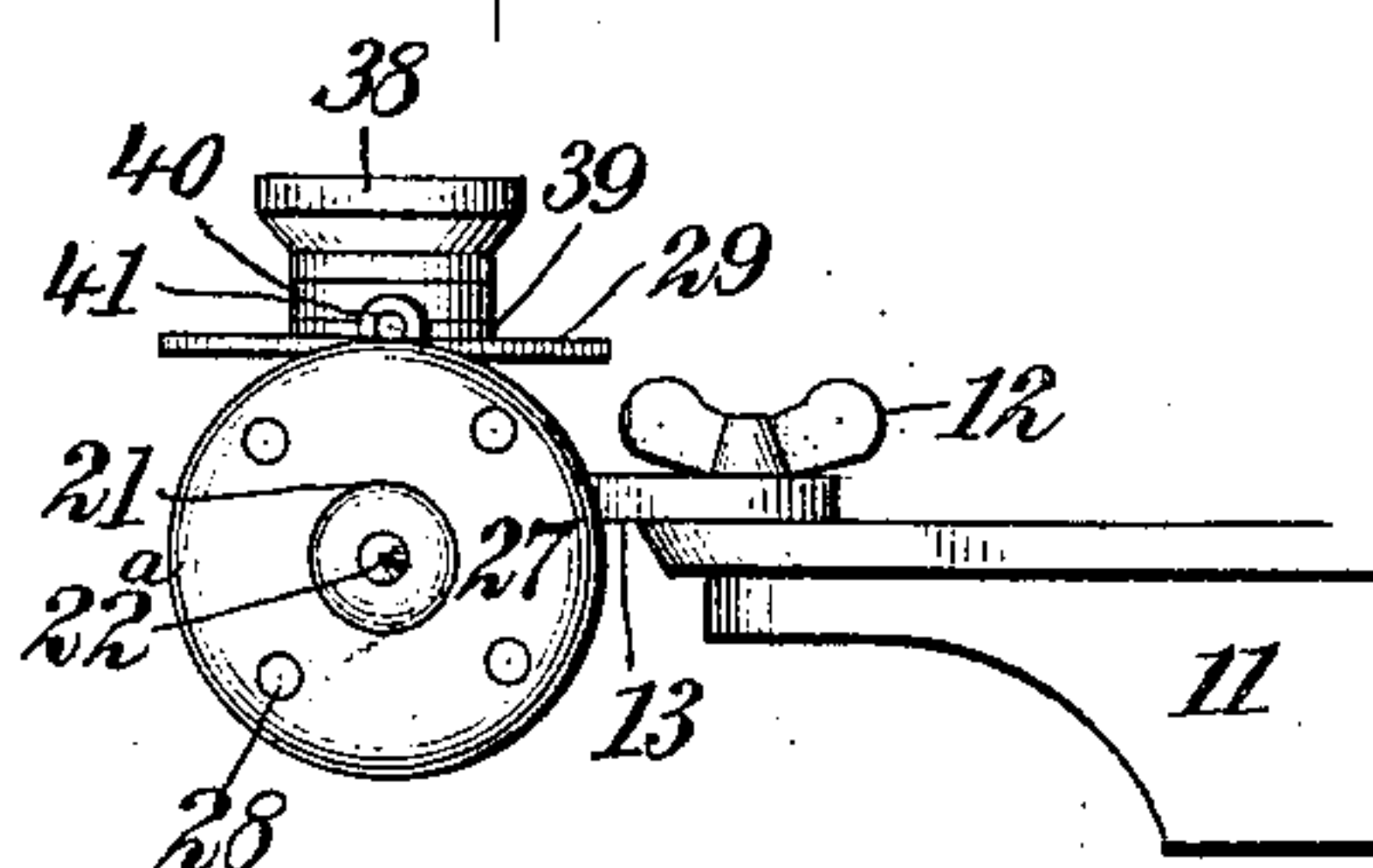


FIG. 4.



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# UNITED STATES PATENT OFFICE.

GARDINER GEORGE RIGGS AND ARSENE EDMOND BABIN, OF WATERBURY, CONNECTICUT.

## LATHE TEST-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 773,425, dated October 25, 1904.

Application filed May 12, 1904. Serial No. 207,563. (No model.)

*To all whom it may concern:*

Be it known that we, GARDINER GEORGE RIGGS and ARSENE EDMOND BABIN, citizens of the United States, and residents of Waterbury, in the county of New Haven and State of Connecticut, have invented a new and Improved Lathe Test-Indicator, of which the following is a full, clear, and exact description.

Our invention relates to lathe test-indicators used for centering and truing up work to be turned upon a lathe.

Our invention presents certain improvements in the construction of such apparatus whereby the same is rendered more efficient, accurate, and sensitive and also whereby it is given a combinational character, as hereinafter described, and pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary view of a lathe equipped with our invention used as a centering device. Fig. 2 is a fragmentary plan view showing our invention used as a truing-up device. Fig. 3 is a vertical section upon the line 3 3 of Fig. 2, and Fig. 4 is a side elevation showing the device as viewed from the left of Fig. 3.

The lathe-frame is shown at 5, the ways at 6, the feed-screw at 7, the gearing at 8, and the carriage at 9, these parts being of the usual construction. Mounted upon the carriage 9 is a tool-holding post 10, provided with a supporting member 11. By means of a thumb-screw 12 an ear 13 is detachably secured upon the supporting member 11, the ear being movable angularly into different positions, as will readily be understood from Figs. 2 and 4. Integral with the ear 13 is a hemispherical shell 14, provided with an aperture 15 and fitted with a hemispherical bearing member 16, the shell 14 and this bearing member constituting a so-called "ball-and-socket" joint. Integral with the hemispherical bearing member 16 is a cylindrical member 17, provided with a collar 18, integral therewith, and inserted laterally into this col-

lar is a set-screw 19. The collar 18 is integral with a sleeve 20, preferably of frusto-conical form and terminating in an annular shoe 21. Disposed within this annular shoe is a boss 22, provided with a sharp point 22<sup>a</sup>. A spiral spring 23 engages the larger end of the boss 22 and also engages one end of the indicator-bar 24. This indicator-bar is provided at one end with a socket 25 and is encircled thereat by a link 26. Engaging the shell 14 and connected thereto by means of screws 28 is a cap 27. Rigidly secured to the shell 14 is a gage 29, preferably of arcuate form, as indicated in Fig. 2. A spring-disk 27<sup>a</sup>, preferably of sheet metal or brass, is disposed intermediate the cap 27 and the hemispherical bearing member 16, so as to normally maintain the hemispherical bearing member 16 and the indicator-bar 24 in a certain predetermined position, but still allow the same to be moved slightly awry, thereby always tending to bring the same back to said normal position. An arm 30 is rigidly connected by means of screws 30<sup>a</sup> to the ear 13, and a spring 31 is secured by a screw 32 upon the under side of the arm 30 and is loosely connected with the arm by means of bosses or upturned ends 33. Mounted loosely upon the outer end of the arm 30 and passing loosely through the same is a stem 35, provided with a head 34 and with a screw portion 36. Encircling the screw portion 36 is a spiral spring 37, and covering this spiral spring and encircling the same is a screw-cap 38. Two annular bearing members 39 40 are fitted upon opposite sides of the split sleeve 41, as will be understood from Figs. 3 and 4. When the cap 38 is screwed down tightly, as indicated in Fig. 3, its pressure grips the two annular bearing members 39 40 upon opposite sides of a sleeve 41, thereby holding the sleeve rigidly in relation to the arm 30 and enabling the sleeve to tightly grip the needle 44, which may be inserted therein, as indicated in Figs. 2 and 3. This needle may, if desired, be removed from the sleeve 41 and inserted directly into the socket 25, as indicated in Fig. 1. The lathe-chuck is shown at 42 and the work to be centered or trued up, as the case may be, at 43.



The permanent centering-point of the lathe is shown at 45 at the right of Fig. 1.

Our invention is used as follows: Suppose it be desired to center the piece 43, representing the work to be operated upon, as indicated in Fig. 1. The piece 43 is indented approximately in the center by means of a centering-punch and secured centrally within the lathe-chuck in a manner well known in the art. The lathe being thrown into action, the piece 43 is caused to rotate, and unless the point 22<sup>a</sup> happens to be exactly in the center of rotation the indicator-bar 24 is caused to gyrate, so that the extreme point 44<sup>a</sup> of the indicating-needle 44 passes around the centering-point 45, the amplitude of the gyration indicating how much of the work 43 is off its center. Adjustment is made accordingly and a second test made, the workman now knowing the angular movements of the indicating-needle 44. When the piece 43 is entirely true, so that its geometrical center corresponds with its center of rotation, the needle 44 will have no motion and will simply rotate in axial alinement with the point 45. Suppose now that it is desired to use the device for the purpose of truing up the piece 43—that is, of indicating whether or not its peripheral surface is coincident with a true circle. For this purpose the needle 44 is withdrawn from the socket 25, is reversed in direction, and then thrust through the sleeve 41, as indicated in Figs. 2 and 3. The link 26 is now swung downward upon the sleeve 41 as a center and slipped over the outer end of the indicator-bar 24, as will be understood from Fig. 3. This is easily accomplished by loosening the screw-cap 38 and moving the sleeve 41 a slight distance longitudinally. The point 44<sup>a</sup> being now brought to the center of the gage 29, the cap 38 is tightened, so as to clamp the needle 44 rigidly between the annular bearing members 39 and 40, these bearing members and the cap 38 being movable as a whole relatively to the fixed arm 30. The sleeve 41 is now free to swing upon an imaginary axis passing vertically through the screw portion 36. The needle 44 is therefore free to swing horizontally, the point 44<sup>a</sup> passing back and forth over the gage 29. By adjusting the supporting member 11 in the tool-holding post 10 and also moving the carriage 9 in a manner well understood in the art the revoluble shoe 21 is brought against the outer or peripheral surface of the piece 43 to be operated upon. The lathe now being started up, the revolution of the piece 43 actuates the shoe 21, thereby causing the same to oscillate back and forth, the indicator-bar 24 moving horizontally back and forth within a definite plane. The sleeve 41 and the link 26 being rigid relatively to each other, the link 26 simply moves back and forth, always maintaining its vertical relation, and as its lower end fits loosely upon the indicator-bar 24 the

sleeve 41 swings horizontally upon the vertical axis of the screw portion 36. This causes the point 44<sup>a</sup> of the indicating-needle to sweep back and forth horizontally over the gage 29. The operator, therefore, by watching the movements of the point 44<sup>a</sup> of the needle relatively to the gage 29 can tell to what extent the piece 43 is out of true, the tendency of the spring 27<sup>a</sup> being to normally maintain the indicator-bar 24 and the indicating-needle 44 in a definite central position, thereby causing the shoe 21 to bear slightly against the peripheral edge of the piece 43 no matter what may be the position of the piece in question. The object of the boss 33 upon the spring 31 is to prevent excessive movement of the indicating-needle 44 by limiting the horizontal sweep of the sleeve 41, as will be understood from Figs. 2 and 3. It will be noted, therefore, that this is a combinational instrument adapted for service as a centering device or as a truing-up device and admits of quite a variety of uses which will readily suggest themselves to persons skilled in the art.

We do not limit ourselves to the exact construction of the indicator above described, for the reason that the structure and action may be changed within certain limits without departing from the spirit of our invention.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination of a ball-and-socket joint comprising two members, an arm rigidly connected with one of said members, an indicator-bar rigidly connected with the other of said members, spring mechanism connected with both of said members and normally tending to maintain the same in a predetermined position relatively to each other, an indicating-needle loosely mounted upon said arm and movable relatively thereto, and mechanism connecting together said indicating-needle and said indicator-bar.

2. The combination of a ball-and-socket joint, comprising two members, means for securing one of said members rigidly in position, an indicator-bar connected with the other of said members and free to gyrate, and an indicating-needle to be connected with said indicator-bar and actuated thereby.

3. The combination of a ball-and-socket joint consisting of two members, one fixed and the other movable, a movable needle, connections extending therefrom to said movable member, and an indicator-bar provided with means for engaging the work to be operated upon, thereby causing said indicator-bar to oscillate.

4. The combination of an indicator-bar adapted to oscillate and provided with means for engaging the work to be operated upon, a needle disposed adjacent to said indicator-bar and likewise adapted to oscillate, mechanism connecting said indicator-bar with said



needle, and means for adjusting said needle in the general direction of its length.

5 5. The combination of an indicator-bar, a support therefor, means for engaging the work and thereby causing said indicator-bar to oscillate, a needle mounted adjacent to said indicator-bar, clamping mechanism for holding said needle in predetermined positions, and a link connecting said indicator-bar with  
10 said clamping mechanism for the purpose of causing said needle to move in accordance with the movements of said indicator-bar.

15 6. The combination of an indicator-bar provided adjacent to one of its ends with means for causing said indicator-bar to oscillate under movements of the piece to be operated upon, a needle mounted at a point adjacent to the other end of said indicator-bar and free to turn upon an axis crossing the  
20 general direction of said indicator-bar, said

needle extending to a point near the work, means for supporting said needle, mechanism connecting together said bar and said needle, and a scale disposed adjacent to said work.

7. The combination of a ball-and-socket 25 joint consisting of two members, one fastened and the other movable, a centering-point connected with said fixed member, and mechanism controllable by movements of said movable member for indicating the motions 30 thereof.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GARDINER GEORGE RIGGS.  
ARSENE EDMOND BABIN.

Witnesses:

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