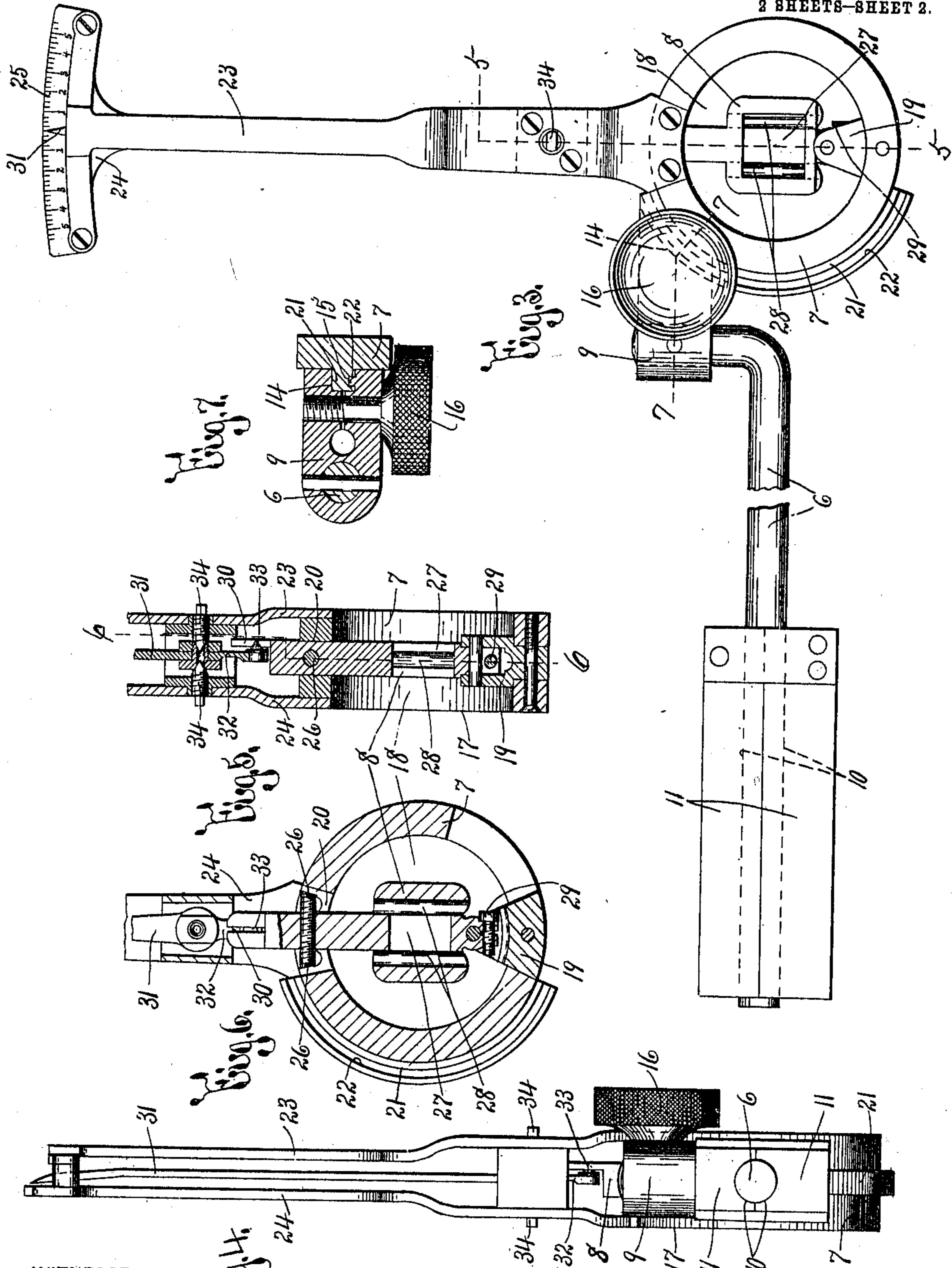


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INSTRUMENT FOR COMPARING THE RELATIVE POSITIONS OF CENTERS.
978,177. APPLICATION FILED NOV. 21, 1904. Patented Dec. 13, 1910.

2 SHEETS-SHEET 2.



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UNITED STATES PATENT OFFICE.

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INSTRUMENT FOR COMPARING THE RELATIVE POSITIONS OF CENTERS.

978,177.

Specification of Letters Patent.

Patented Dec. 13, 1910.

Application filed November 21, 1904. Serial No. 233,693.

To all whom it may concern:

Be it known that I, NATHEN ALBERT LOCKE, of Fulton, in the county of Oswego and State of New York, have invented a certain new and useful Instrument for Comparing the Relative Positions of Centers, of which the following is a specification.

My invention has for its object the production of an instrument for comparing the relative positions of centers, which is particularly simple in construction and highly efficient in operation, and to this end, it consists in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawing in which like characters designate corresponding parts in all the views.

Figure 1 is an elevation of a portion of a lathe equipped with a preferred construction of my invention. Fig. 2 is a sectional view on line 2—2, Fig. 1, all of the parts of the lathe seen in Fig. 1 except the tool-post and the greater portion of the face-plate, being omitted. Fig. 3 is an elevation of my detached instrument. Fig. 4 is an edge view thereof. Fig. 5 is a sectional view on line 5—5, Fig. 3. Figs. 6 and 7 are sectional views, respectively, on lines 6—6, Fig. 5, and 7—7, Fig. 3.

My instrument for comparing the relative positions of centers is here shown as operatively connected to a portion of a lathe, but it will be understood that it may be used in connection with other machines, and for any desired purpose. The portion of the lathe here illustrated comprises opposite centers 1, 2, a face-plate 3, a tool-post 4, and a carriage 5.

The preferable construction of my instrument comprises a support or frame 6, a body 7, a detecting member 8, and indicating means. Said support 6 is provided at one end with a head 9, and its other end is formed rounding in cross-section, and is arranged in grooves 10, Fig. 4 formed in the opposing faces of clamping members 11, which are suitably hinged together at corresponding ends, and may be secured to any desirable means, as the tool-post 4, being here shown as interposed between the usual rocking block 12, and the adjusting screw 13. When the screw 13 is loosened, the support 6 may be moved lengthwise relatively to the tool-post, or its head 9 may be raised or lowered, and when the screw is tightened,

said support is firmly clamped in position. The head 9 is provided with an arc-shaped guide or groove 14, opening through its outer edge and upper and lower surfaces thereof, one of the opposing walls of the guide or groove being preferably provided with a rib 15 Fig. 7. A suitable adjusting screw 16 serves to clamp the walls of the guide or groove 14 toward each other, and the spring of the metal returns said walls when the screw is loosened.

The body 7 is formed with a substantially flat face 17, an opening 18 extending through the face 17 and the opposite side of the body, a part 19 projecting into said opening from the inclosing wall thereof, and a branch-opening 20 Fig. 6 leading from the opening 18 through the outer surface of the body. Said inclosing wall is usually circular in form, and is provided with an arc-shaped guide-rib 21 which is arranged in the guide or groove 14 of the head 9, and is provided with a groove 22 in one face thereof for receiving the rib 15. When the screw 16 is in operative position, the walls of the guide or groove 14 are clamped upon the opposite sides of the rib 21 and firmly secure the body 7 to the head 9, but when said screw is loosened, the body 7 may be adjusted relatively to the head 9 about an axis substantially coincident with the center of the opening 18 and the arc occupied by the rib 21. The body 7 is preferably provided with opposing substantially radial arms 23 24 projecting from the periphery thereof at opposite sides of the branch-opening 20. One of these arms 24 is formed with an indicating surface 25 having characters progressing in opposite directions from a substantially central point, as zero.

As best seen in Figs. 2, 3, 5 and 6, the detecting member 8 is movable in the opening 18, substantially midway between the ends thereof, in a plane substantially parallel with that of the face 17, is pivoted to the part 19, projects into the branch-opening 20, and is provided with stops 26, which cooperate with walls of the branch-opening 20 for limiting the rocking movement of the member 8. Said member 8 is also provided with a passage 27 extending through opposite sides thereof in the direction of the opening 18, and with substantially parallel contact-surfaces 28 arranged at opposite sides of the passage 27, substantially midway between the ends thereof, and substan-

tially equidistant from the axis of the body 7, and formed of rounding cross-section, these contact-surfaces being usually provided on the opposing sides of pins fixed
 5 relatively to each other. The end of the detecting member pivoted to the part 19 may be split and provided with an adjusting screw 29 for clamping this member upon its pivot, and the opposite end of said member
 10 may be formed with a lengthwise slot 30.

The indicating means consists usually of a pointer or lever 31 pivoted intermediate of its ends to a cross-bar connecting the arms 23, 24, and having one extremity movable
 15 along the indicating surface 25, and its other extremity provided with a spring arm 32 which constantly presses a conical point or projection 33 carried thereby, into the slot 30 in the detecting member 8, said point or
 20 projection and slot forming a pivotal connection between the detecting member and the indicating pointer or lever. The pivot for the intermediate portion of the pointer or lever 31 preferably consists of opposing
 25 screws 34 which may be adjusted as desired for taking up any lost motion.

When in use for comparing the vertical alinement of centers, my instrument is arranged as shown in Figs. 1 and 2, with its
 30 indicating means at zero, its detecting member 8 in line with the live center 1, and its face 17 parallel with the opposing surface of the face-plate 3, and the support 6 is firmly clamped in the tool-post 4. The carriage 5 is then moved toward the opposite
 35 center 2 until the same engages one or both of the contact-surfaces 28, whereupon the indicating pointer 31 will register the extent to which the center 2 is out of vertical alinement with the center 1. Any suitable
 40 means may then be used for adjusting the center 2 horizontally relatively to the center 1, as adjusting screws for moving said center laterally. If it is desired to determine
 45 whether or not the centers 1 2 are out of horizontal alinement, the screw 16 is loosened, and the body 7 swung into the position indicated in dotted lines in Fig. 2, whereupon the instrument is adjusted and used as
 50 previously described, and the center 2 moved vertically as desired, either by adjusting means, or by planing off or scraping the surface of the tail-stock carrying the same, or inserting metal between said tail-stock
 55 and the ways in which the same is guided.

To those skilled in the art, it will be understood that my measuring instrument is capable of other uses and that the construction and arrangement of the same may be
 30 more or less varied without departing from the spirit of my invention.

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

1. An instrument for comparing the rela-

tive positions of centers of spindles having tapered ends, the same comprising a detecting member movable in opposite directions and having opposite contact surfaces for engaging the tapered end of each spindle,
 70 the detecting member being movable in either direction by the tapered end of the spindle until both contact surfaces are engaged with said tapered end, substantially as and for the purpose specified. 75

2. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a detecting member movable in opposite directions and having opposite substantially parallel
 80 contact surfaces for engaging the tapered end of each spindle, the detecting member being movable in either direction by the tapered end of the spindle until both contact surfaces are engaged with said tapered end,
 85 substantially as and for the purpose described.

3. An instrument for comparing the relative positions of centers of spindles having tapered ends comprising a movable detecting member provided with opposite substantially parallel pins for engaging the tapered ends of the spindle, the pins being
 90 fixed relatively to each other and formed of rounding cross-section, substantially as and for the purpose set forth. 95

4. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a detecting member movable in opposite directions
 100 and having a passage extending from side to side thereof for receiving the spindles from either side of the detecting member, and also having contact surfaces at opposite sides of the passage for engaging the tapered
 105 end of each spindle, the detecting member being movable in either direction by the tapered end of the spindle until both contact surfaces are engaged with said tapered end, substantially as and for the purpose specified. 110

5. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a detecting member movable in opposite directions
 115 and having a passage and contact surfaces at opposite sides of the passage arranged substantially equidistant from the ends thereof, the contact faces engaging the tapered end of each spindle, and the detecting member
 120 being movable in either direction by the tapered end of the spindle until both contact surfaces are engaged with said tapered end, substantially as and for the purpose described. 125

6. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a detecting member movable in opposite directions
 130 having a passage extending from side to

side thereof and substantially parallel contact surfaces at opposite sides of the passage substantially midway between the ends of the passage, the contact surfaces engaging the tapered end of each spindle, and the detecting member being movable in either direction by the tapered end of the spindle until both contact surfaces are engaged with said tapered end of the spindle, substantially as and for the purpose set forth.

7. An instrument for comparing the relative positions of centers comprising, a movable detecting member having a passage extending from side to side thereof and provided with substantially parallel pins fixed relatively to each other at opposite sides of the passage, and having their opposing surfaces formed of rounding cross-section, substantially as and for the purpose specified.

8. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a detecting member movable in opposite directions and having opposite contact surfaces for engaging the tapered end of each spindle, the detecting member being movable in either direction by the tapered end of the spindle until both contact surfaces are engaged with said tapered end, and indicating means operated by the detecting member during its movement in either direction, substantially as and for the purpose described.

9. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a body, and a detecting member pivoted to the body and having opposite contact surfaces for engaging the tapered end of each spindle, the detecting member being movable on its pivot in either direction by the tapered end of the spindle until both contact surfaces are engaged with said tapered end, substantially as and for the purpose set forth.

10. An instrument for comparing the relative positions of centers comprising a body, and a detecting member pivoted to the body and having a passage extending from side to side thereof, and provided with substantially parallel pins fixed relatively to each other at opposite sides of the passage, the pins having their opposing surfaces formed of rounding cross-section, substantially as and for the purpose specified.

11. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a body having a substantially flat engaging face, and a detecting member supported by the body and movable in opposite directions, the detecting member having opposite contact surfaces for engaging the tapered end of each spindle and being movable in either direction in a plane substantially parallel to the plane of the engaging face by the tapered end of the spindle until both con-

tact surfaces are engaged with said tapered end, substantially as and for the purpose described.

12. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a body having a substantially flat engaging face, and a detecting member pivoted to the body and having opposite contact surfaces for engaging the tapered end of each spindle, the detecting member being movable by the tapered end of the spindle in a plane substantially parallel to the plane of the engaging face until both contact surfaces are engaged with said tapered end, substantially as and for the purpose set forth.

13. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a body having an opening extending from side to side thereof for receiving the tapered ends of the spindles from either side of the body, and a detecting member movable in the opening for cooperating with the tapered end of each spindle, substantially as and for the purpose specified.

14. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a body having an opening extending from side to side thereof for receiving the tapered ends of the spindles from either side of the body, the body having a part projecting into the opening, and a detecting member movable in the opening and pivoted to the projecting part of the body, the detecting member being movable in either direction by the tapered end of either spindle, substantially as and for the purpose described.

15. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a body having an opening extending from side to side thereof for receiving the tapered ends of the spindles from either side of the body, and a detecting member arranged substantially midway between the ends of the opening, the detecting member being movable in either direction by the tapered end of each spindle, substantially as and for the purpose set forth.

16. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a body having an opening extending from side to side thereof for receiving the tapered ends of the spindles from either side of the body, and a detecting member movable in the opening and having opposite contact surfaces for engaging the tapered end of either spindle, the detecting member being movable in either direction by the tapered end of the spindle until both contact surfaces are engaged with said tapered end, substantially as and for the purpose specified.

17. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a body having an opening extending from side to side thereof, and a detecting member movable in the opening and having a passage extending in the same direction as said opening, the opening and passage receiving the tapered end of a spindle from either side of the body, and the detecting member being movable in either direction by said tapered end, substantially as and for the purpose described.

18. An instrument for comparing the relative positions of centers comprising, a body having an opening extending from side to side thereof, and a detecting member movable in the opening and having a passage extending from side to side thereof in the direction of said opening, and contact-surfaces at opposite sides of the passage and non-movable toward and from each other, substantially as and for the purpose described.

19. An instrument for comparing the relative positions of centers comprising, a body having a substantially flat engaging face and an opening extending through the engaging face and the opposite face of the body, and a detecting member supported by the body and movable in a plane substantially parallel to that of said engaging face, and having a passage extending from side to side thereof in the direction of said opening, and contact-surfaces at opposite sides of the passage, substantially as and for the purpose specified.

20. An instrument for comparing the relative positions of centers comprising, a support, a body having an arc-shaped guide and movable on an axis substantially coincident with the center of said arc-shaped guide, means for securing the body to the support, and a detecting member supported by the body and having opposite contact-surfaces arranged substantially equidistant from said axis, substantially as and for the purpose set forth.

21. An instrument for comparing the relative positions of centers comprising, a support provided with a groove, a body having an arc-shaped guide-rib movable in the groove, said body being movable on an axis substantially coincident with the center of the arc-shaped guide-rib, a screw for clamping the walls of the groove against the guide-rib and holding the support in its adjusted position, and a detecting member supported by the body and having opposite contact-surfaces arranged substantially equidistant from said axis, substantially as and for the purpose described.

22. An instrument for comparing the relative positions of centers of spindles having tapered ends, the same comprising a body, a detecting member supported by the body and movable in opposite directions and having opposite contact surfaces for engaging the tapered end of each spindle, the detecting member being movable in either direction by said tapered end, and indicating means pivoted to the body and connected to the detecting member and movable by said member during its movement in either direction, substantially as and for the purpose specified.

23. An instrument for comparing the relative positions of centers comprising, a body, a movable detecting member supported by the body and provided with a slot, an indicating surface having characters progressing in opposite directions, and a pointer pivoted to the body and having one end movable along the indicating surface and its other end provided with a spring arm carrying a projection movable in said slot, substantially as and for the purpose set forth.

In testimony whereof, I have hereunto signed my name in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 27th day of April, 1904.

NATHEN ALBERT LOCKE.

Witnesses:

D. LAVINE,
S. DAVIS.