

900,472.

Patented Oct. 6, 1908.

3 SHEETS—SHEET 1.

Fig. 1.

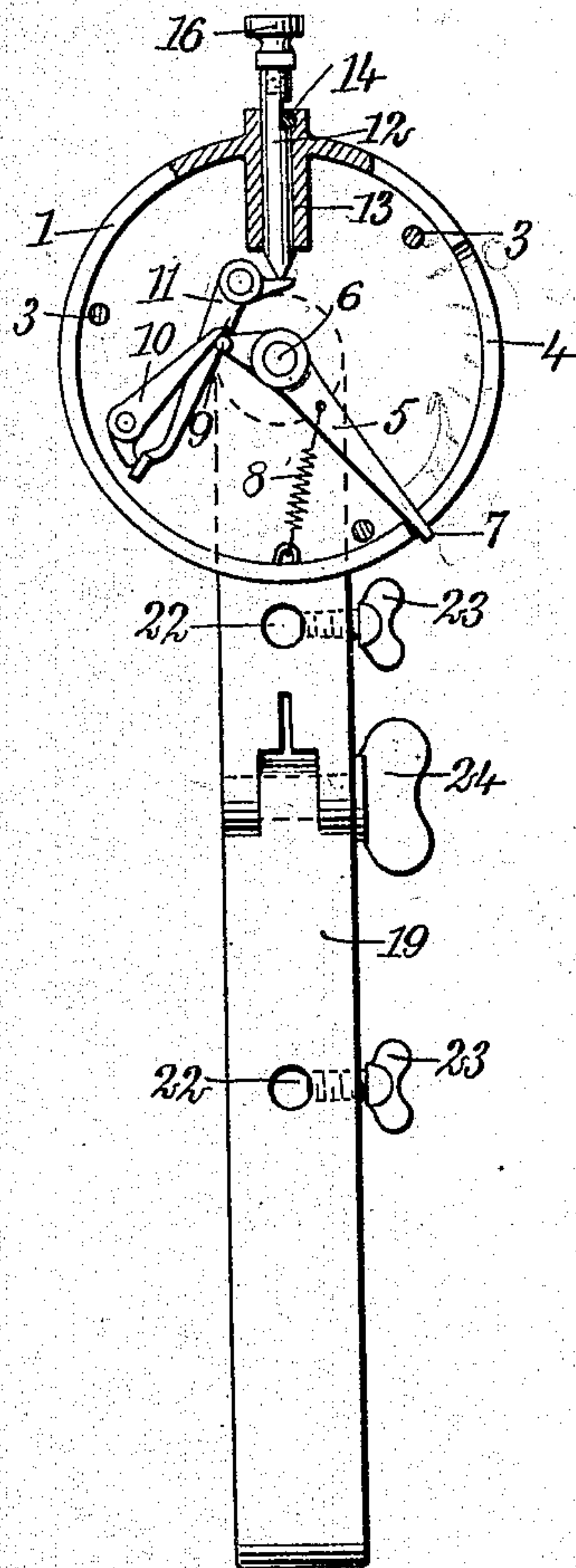
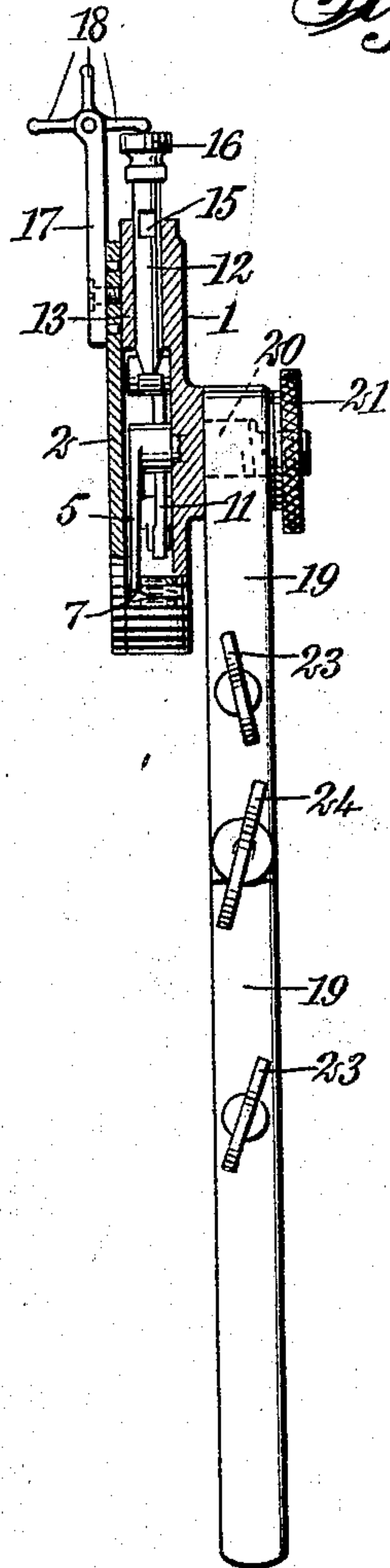


Fig. 2.



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3 SHEETS—SHEET 2.

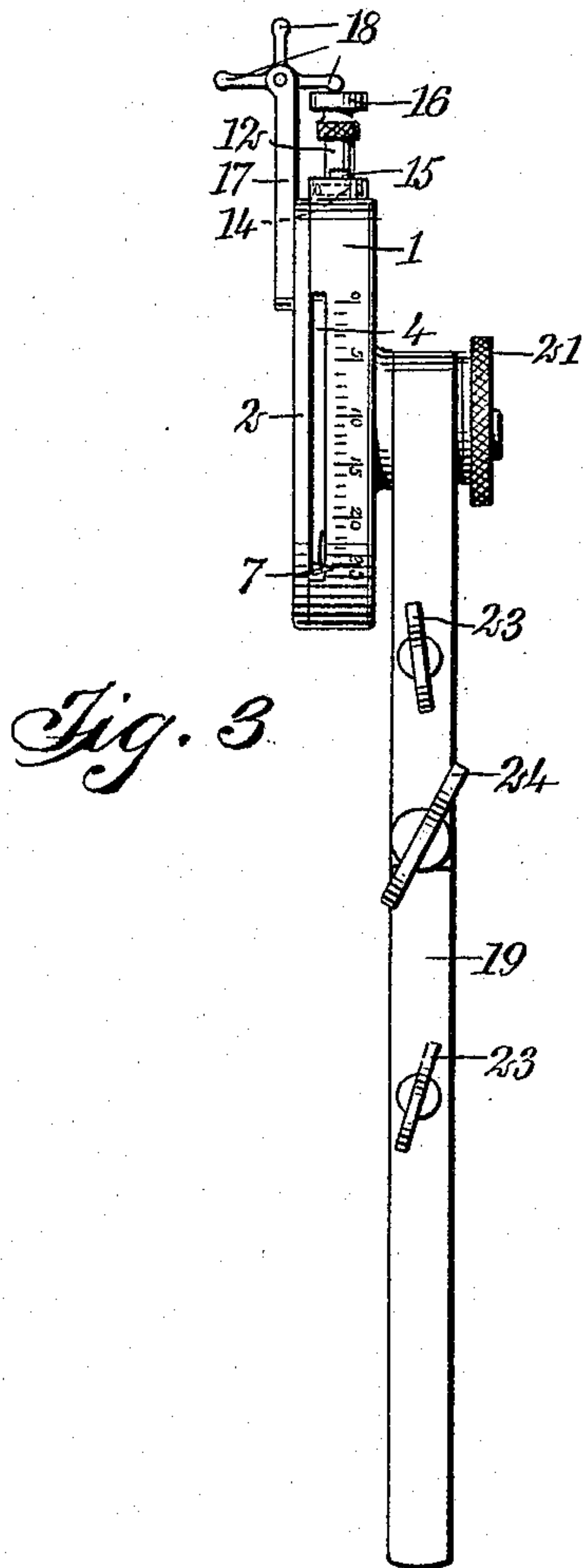


Fig. 3.

Fig. 4.

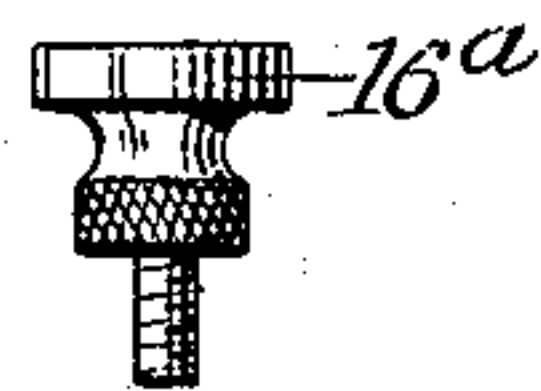


Fig. 5.

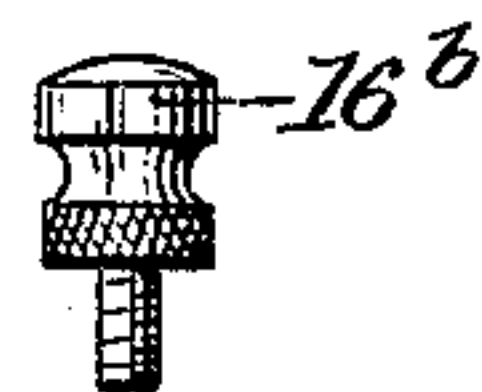


Fig. 6.

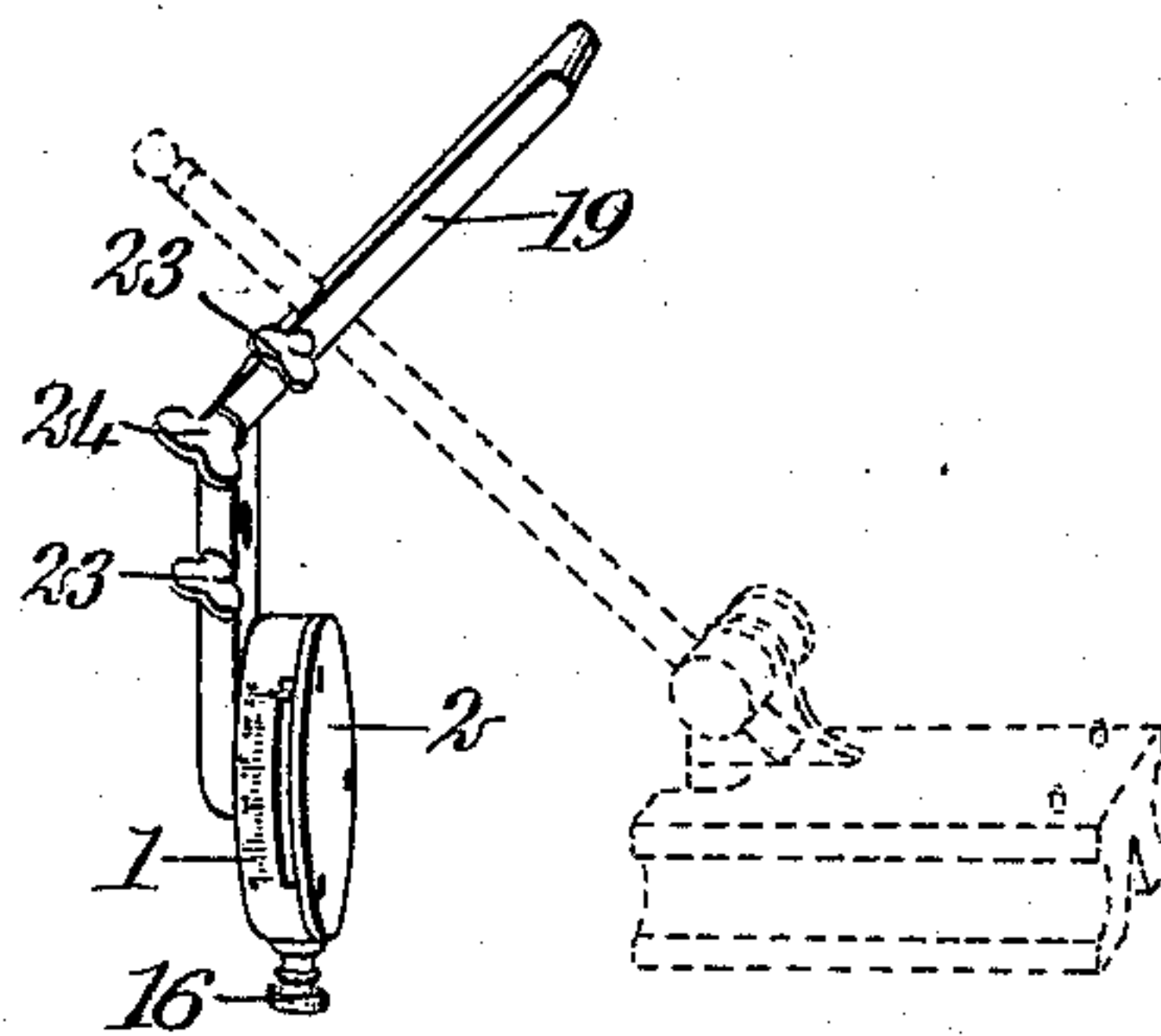
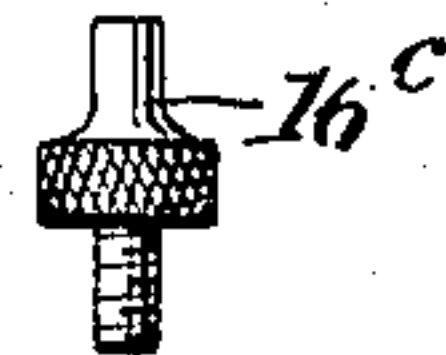


Fig. 7.

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3 SHEETS—SHEET 3.

Fig. 8.

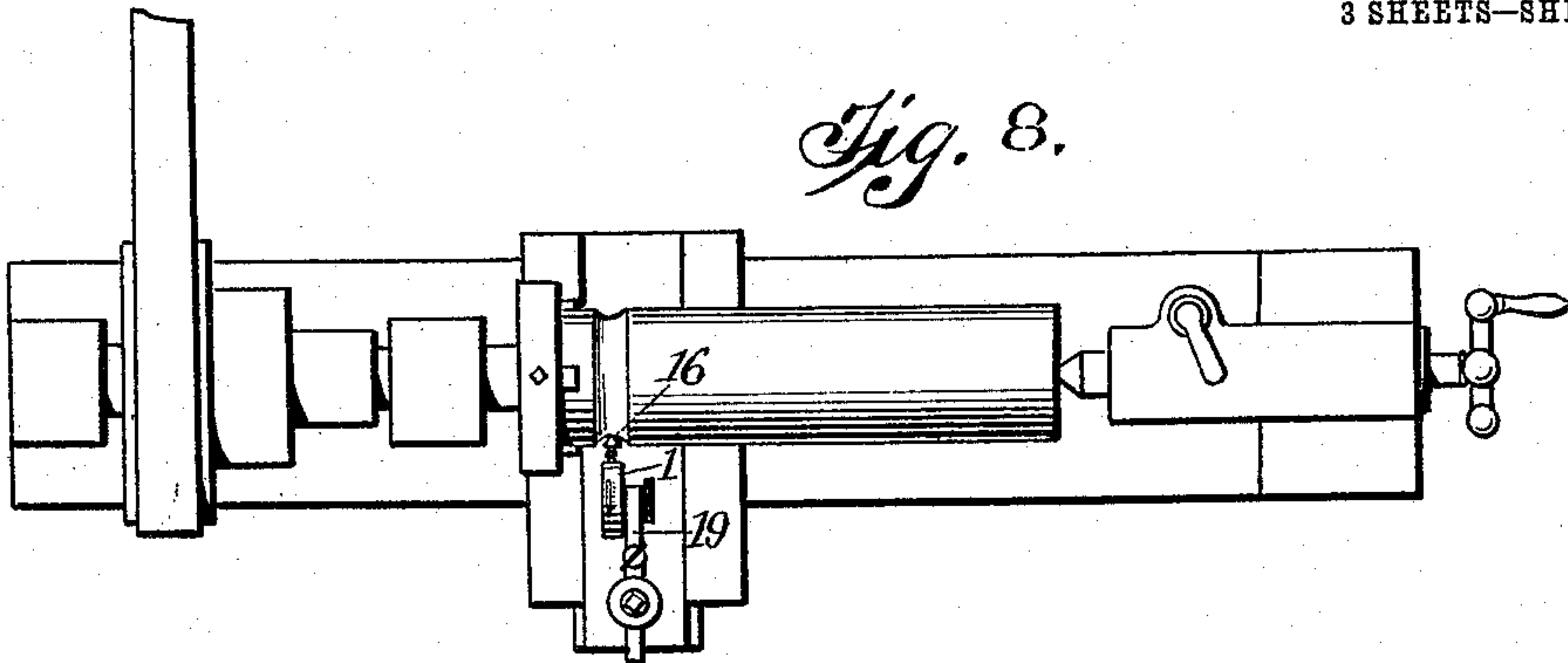


Fig. 9.

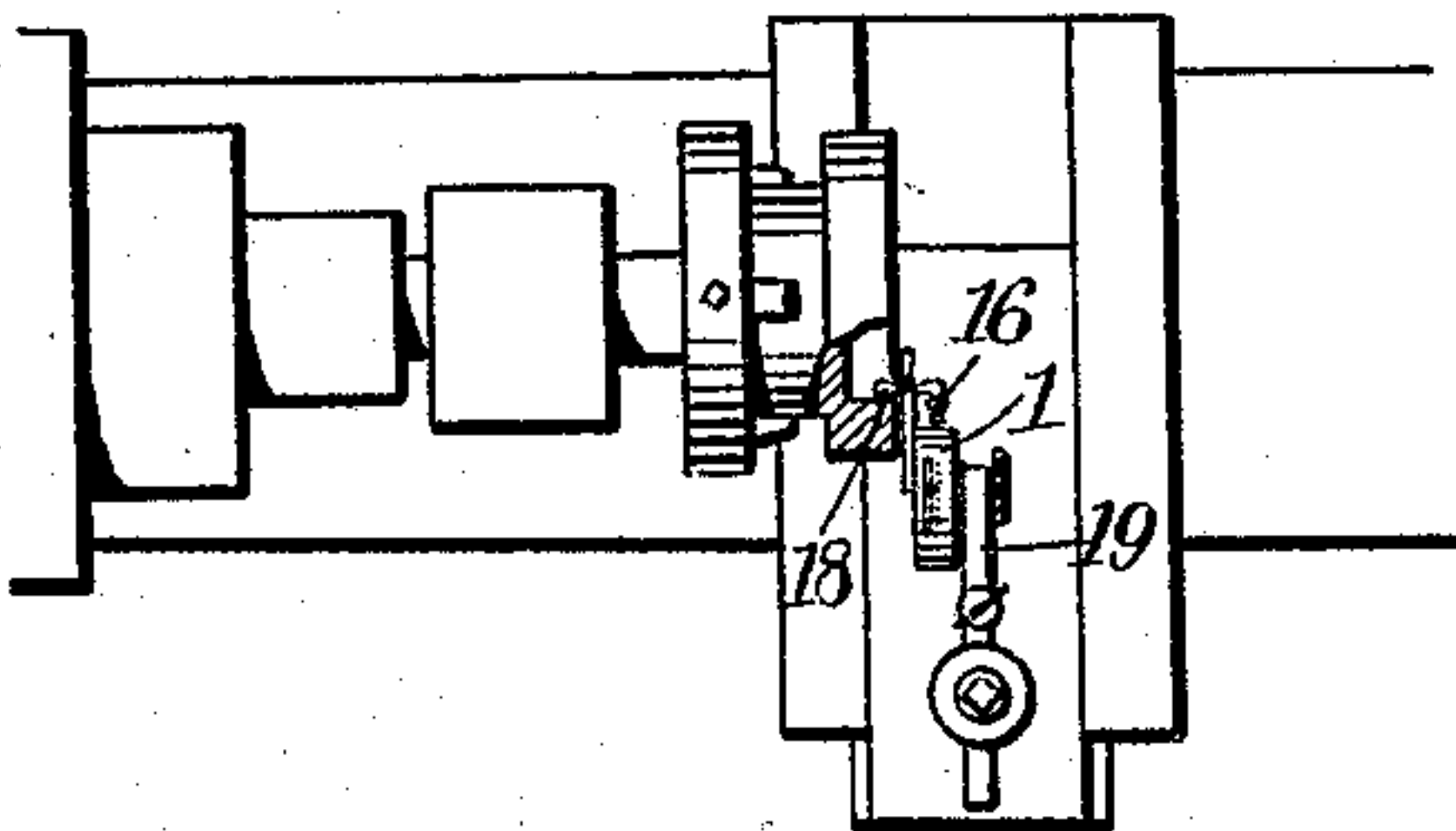
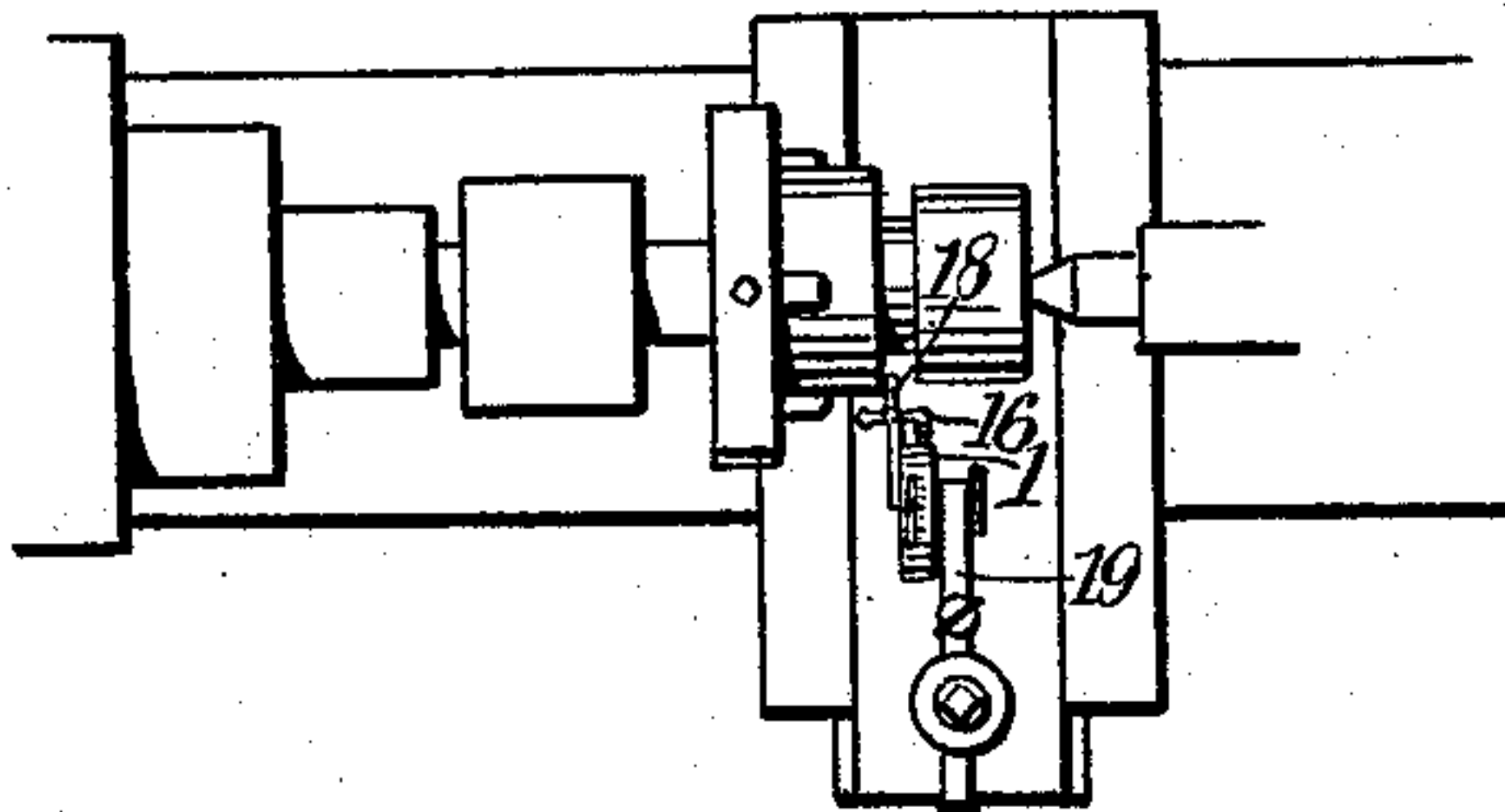


Fig. 10.



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UNITED STATES PATENT OFFICE.

HENRY P. BOETTCHER, OF JERSEY CITY, NEW JERSEY, ASSIGNOR OF ONE-THIRD TO FRANK C. BRAUN, OF JERSEY CITY, NEW JERSEY.

UNIVERSAL INDICATOR.

No. 900,472.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed June 4, 1907. Serial No. 377,196.

To all whom it may concern:

Be it known that I, HENRY P. BOETTCHER, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and Improved Universal Indicator, of which the following is a full, clear, and exact description.

This invention is an improved indicator more especially designed for tool-makers' and machinists' use, and operating when applied to the work to accurately and automatically show to what extent, if any, the work is out of true.

The object of the invention, primarily, is to provide a device of this character of universal application which may be applied to surfaces and points ordinarily inaccessible to the common indicator.

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 side elevation, partly in section, of the preferred form of my invention; Fig. 2 is an edge view of the same, partly in section; Fig. 3 is an edge view of the indicator complete; Figs. 4, 5 and 6 are views of contact points which may be substituted for that shown in Figs. 1, 2 and 3; Fig. 7 is a perspective view of the indicator as applied to a surface gage; and Figs. 8, 9 and 10 illustrate the application of the indicator to the work within a lathe.

More specifically described the indicator comprises a casing 1, in the form of a cylindrical box having a removable side 2, secured in place by cross-screws or pins 3. The body portion of the casing 1 is cut out to provide a slot 4 adjacent to the side 2, at one side of which graduations are provided preferably in one-thousandths of an inch, the zero mark starting at one end of the slot. An indicating or scale lever 5 is revolvably mounted at the center of the casing on an axis 6, and is provided with a pointer 7 traversing the graduations at the side of the slot 4, this pointer being normally retained at the extreme end of the slot 4 from the zero mark, by a tension spring 8 arranged within the casing and connected thereto and to the scale lever 5. The short arm of the lever 5 carries a projection 9 with which

is engaged the long arm of a converting lever 10, the latter being of slightly bell crank form with the short arm thereof in contact with the long arm of an actuating lever 11 which is also of bell crank form, with its short arm arranged in the path of a piston 12, slidably mounted within an extended bearing 13 passing through the circumference of the casing, the piston being preferably constructed with a conical inner end where it engages the lever 11, and is held against rotation within the bearing 13 and limited in its reciprocation therein by a cross-pin 14, which engages a flattened portion 15 formed on the piston. The outer extremity of the piston 12 is constructed with a threaded bore for receiving a contact point or tip 16, this tip being interchangeable with tips 16^a, 16^b or 16^c respectively shown in Figs. 4, 5 and 6.

Detachably connected to the removable side of the indicator is an arm 17 which pivotally supports at its outer end a number of radiating fingers 18, preferably constructed with slightly enlarged heads as shown. These fingers in the preferred construction are three in number, with the central finger arranged at right angles to the other two, one of the latter being adapted to contact with the interchangeable tip carried by the piston 12.

The casing 1 is centrally attached at one side to the outer end of a bar 19, a pin 20 being formed on or otherwise affixed to the casing and engaged by a thumb-nut 21 for this purpose. By this construction it is possible to revolve the casing to carry the piston 12 at any required angle to the bar 19 and secure the casing in adjusted position by tightening the nut 21. The bar 19 is constructed with apertures 22 which pass through the side thereof and are each provided with a thumb-bolt 23. Intermediate the apertures 22 the bar 19 is hingedly connected together, adapting the inner and outer sections thereof to be swung at an angle to each other and clamped together by a thumb screw 24.

By this construction and arrangement of the system of levers between the piston 12 and the pointer 7, it is apparent that very little sliding movement of the piston will cause the pointer to traverse a considerable distance on the scale, thus making the pointer

extremely sensitive when the tip 16 or one of the fingers 18 are applied to a surface. In using the indicator in connection with a lathe, the bar 19 is clamped in the tool post, as illustrated in Figs. 8, 9 and 10. If the work to be gaged is an outside surface as shown in Fig. 8, the arm 17 is removed and one of the tips 16, 16^a, 16^b or 16^c is applied directly to the surface, and in this manner by turning the work slowly as by pulling the belt of the machine around by hand, the extent to which the work is out of true may be readily observed. When the indicator is used to gage an inside or an end surface, as shown in Figs. 9 and 10, the attachment composed of the arm 17 and the fingers 18 is employed, the finger projecting at one side of the indicator being brought in contact with the inside surface as shown in Fig. 9, whereas the outwardly-projecting finger is engaged with the work in the case of an end surface, as shown in Fig. 10. The apertures 22 in the bar 19 serve as a convenient means for attaching the indicator to the post of a surface gage or other device, as shown in Fig. 7. By reason of the several adjustments of the indicator when so applied it may be caused to assume any desired position.

This indicator can be used in milling machines, planers, shapers, lathes, drill presses or any kind of machine for measuring inaccuracies or resetting work, also for inspection purposes. It is invaluable to inspectors of machine parts or tools, as it is a universal indicator, taking the place of the various kinds of indicators which inspectors now are obliged to use for inspection purposes.

Only a few applications of my improved indicator are shown and described, in order that the utility of the instrument may be understood; it is, however, apparent that numerous other uses of the device will, in practice, be found which are not herein suggested, also various changes within the scope of the invention as defined in the annexed claims may be made.

Having thus described my invention I

claim as new and desire to secure by Letters Patent:

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1. In an indicator, a casing, an indicating lever fulcrumed on the casing and having a pointer, a piston slidably mounted through the circumference of the casing in a plane with the fulcrum or axis of rotation of the indicating lever, and actuating and converting levers having arms extending from opposite sides of their fulcrum and respectively engaged with the piston and with the indicating lever at the opposite side of its fulcrum from the pointer, and engaged with each other, for transmitting the movement of the piston to the indicating lever.

2. In an indicator, a bar composed of two members hingedly connected together, a circular casing revolubly attached to one of said members, a piston slidably mounted in the casing, an indicating lever pivoted at the center of the casing and having a pointer passing through a slot in the circumference of the casing adapted to traverse a scale thereon, an actuating lever in engagement with the piston, a converting lever in engagement with the actuating and indicating levers, a detachable tip carried by the piston, an arm attached to the opposite side of the casing from said bar, and alining fingers and an intermediate finger pivoted to the outer end of said arm, one of which is adapted to contact with said tip.

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3. In an indicator, a circular casing, an indicating lever fulcrumed concentrically in said casing and having a pointer, a radially-arranged piston slidably mounted in the circumference of the casing, and means for transmitting the movement of the piston to the indicating lever at the opposite side of its fulcrum from the pointer.

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

HENRY P. BOETTCHER.

Witnesses:

W. W. HOLT,
JOHN P. DAVIS.

Liggett 54304 3-07
Bath 526960 -94
Peterson 811244 -06
Bonlet 659048 -00
Plummer 448586 -91
Reimer 773983-04
Bath 320201 -94
Brown 454516 -91
Bunker 49073 -65
Storrell 826971 -06

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