No. 734,182. PATENTED JULY 21, 1903.

E. W. KELLEY.

INDICATOR FOR TRUING UP-WORK.

APPLICATION FILED AUG. 13, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

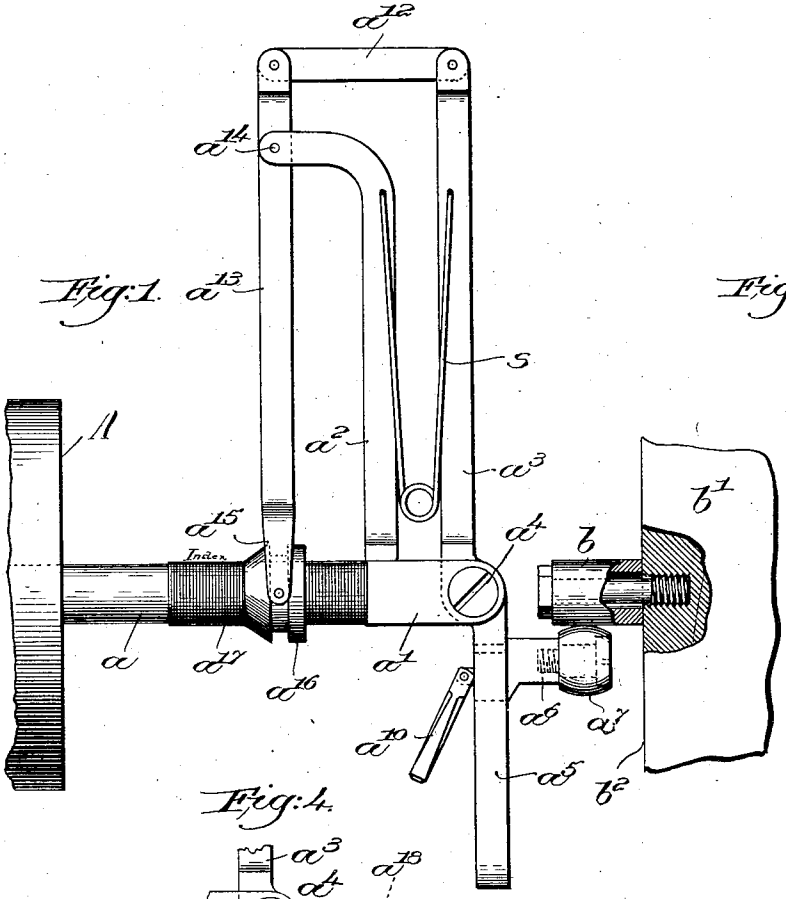


Fig. 2.

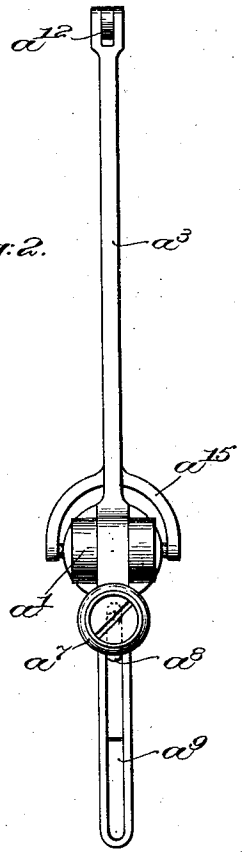


Fig. 4.

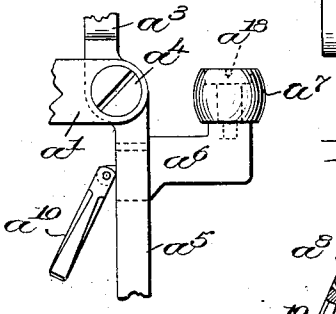
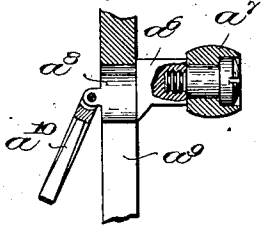


Fig. 3.



Witnesses,
Edward H. Allen.
Thomas J. Drummond.

Inventor
Edward W. Kelley
by Livesley Gregory
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 734,182. PATENTED JULY 21, 1903.

E. W. KELLEY.

INDICATOR FOR TRUING UP WORK.

APPLICATION FILED AUG. 13, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig: 5.

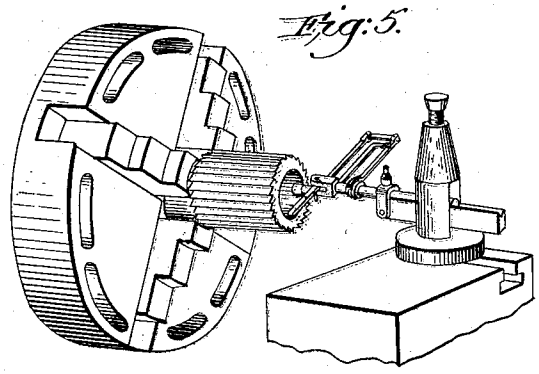


Fig: 7.

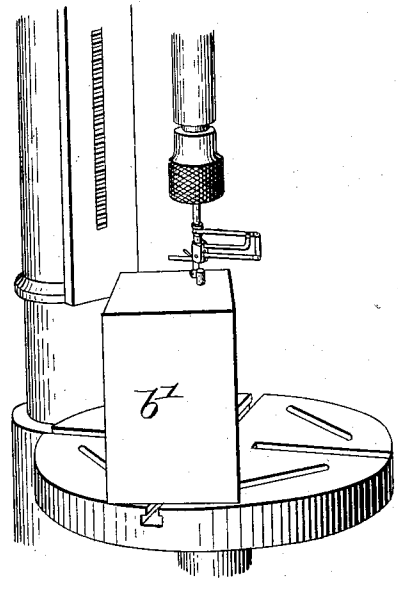
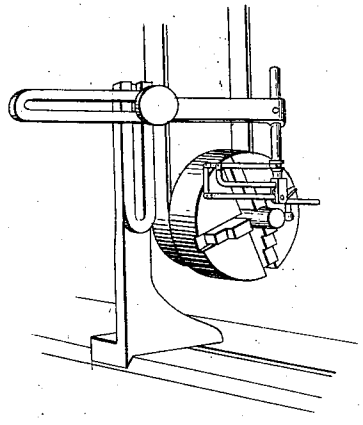


Fig: 6.



Witnesses,
Edward G. Allen.
Thomas J. Drummond.

Inventor;
Edward W. Kelley,
by Lansby Gregory.
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 734,182. Patented July 21, 1903.

UNITED STATES PATENT OFFICE.

EDWARD W. KELLEY, OF LOWELL, MASSACHUSETTS.

INDICATOR FOR TRUING UP WORK.

SPECIFICATION forming part of Letters Patent No. 734,182, dated July 21, 1903.

Application filed August 13, 1902. Serial No. 119,521. (No model.)

To all whom it may concern:

Be it known that I, EDWARD W. KELLEY, a citizen of the United States, residing at Lowell, county of Middlesex, and State of Massachusetts, have invented an Improvement in Indicators for Truing Up Work, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In machine-shop practice one of the most difficult things to effect is the truing up or holding of the work accurately with relation to the tools to be used both for drilling, boring, &c.

Various expedients have been resorted to for effecting the truing up of the work, but no device, to my knowledge, has been devised having all the necessary requisites. Accordingly I have devised an indicator, such as hereinafter described, for determining with the utmost nicety and accuracy the relative positions of the work and tool of the machine used.

The indicator devised by me is applied temporarily to the chuck of the machine in which the work is to be done, and after the proper position for the work has been properly ascertained or the work has been trued up the indicator is withdrawn and in its place is inserted the usual working tool.

The indicator to be herein described is provided with a roll or feeler, which in the rotation of the chuck bears, preferably, against a button attached to the work and through suitable transmitting means, to be described, moves a sleeve over graduated lines of the shaft of the indicator. Any lack of truth in the position of the work is indicated by a movement of the sleeve over the index-lines of the shaft, but when the work is perfectly trued up all longitudinal movement of the sleeve is stopped.

The constructional details, operation, and further advantages of my invention will be more fully set forth in the course of the following description, reference being had to the accompanying drawings, in which I have shown one embodiment of my invention, and the latter will be more accurately defined in the appended claims.

In the drawings, Figure 1 shows my invention in side elevation as applied to a horizontal shaft, parts being broken away for purposes of illustration. Fig. 2 shows the same in end elevation. Fig. 3 is a fragmentary detail, mainly in longitudinal section. Fig. 4 is a similar detail showing a modified construction. Figs. 5 to 7 are perspective views illustrating the application of my invention to different kinds and situations of work.

The indicator in the form illustrated in Figs. 1 to 4 comprises a shaft a, sustaining a bracket a', having a fixed arm a^2, an indicating-lever a^{13}, and a movable lever $a^3\ a^5$, pivoted at a^4 on said bracket. The arm a^2 extends laterally with relation to the longitudinal center of the shaft a, and to its outturned end is jointed a lever a^{13}, forked at a^{15} to engage the opposite sides of a sleeve a^{16}, mounted to be moved back and forth on the shaft a over delicately-marked index or scale lines a^{17}. The upper short arm of the lever a^{13} has pivoted to it a link a^{12}, jointed in turn to the longer arm a^3 of the lever $a^3\ a^5$, pivoted at a^4, the shorter arm a^5 of the lever $a^3\ a^5$ being slotted, (see Fig. 2,) and it receives the foot a^8 of a stand a^6, on which is mounted a friction roller or feeler a^7. This stand may be clamped in any desired position on the arm a^5 by means of a lever a^{10}.

To use the indicator shown in Fig. 1, insert the shaft a in a chuck A of any usual shape and adapted to be rotated in any usual manner, said shaft taking the place of the tool or drill customarily held in said chuck. To maintain the feeler a^7 in contact with the work or a suitable button or stud b, connected therewith temporarily in usual manner, I employ a spring s, secured to the arm a^2 and to the arm a^3 of the lever $a^3\ a^5$ in such manner as to tend to pull the arm a^3 toward the arm a^2 or so as to hold the feeler against the button.

When the indicator is used as illustrated in Figs. 6 and 7, the spring is unnecessary, as the feeler will rest against the work by gravity.

With the device applied as shown in Fig. 1 the stand will be adjusted in the slot a^9 of arm a^5 until the feeler strikes the button b, when the stand will be clamped in position and the feeler will as the shaft a is rotated roll or travel around the button in direct contact therewith.

If the button b and the shaft a are not absolutely coaxial with each other, it will be evident that the feeler a^7 will not travel in a true circle, and consequently the lever a^3 a^5 will be swung slightly about the pivot a^4 and will, acting through the transmitting means, move the sleeve longitudinally over the index, and inasmuch as the sleeve is carried by the longer arm of the lever a^{13} the lack of truth in the position of the work will be magnified on the scale, so that any slight lack of truth in the position of the work may be noted by observing the movement of the sleeve relatively to the scale a^{17}. The lines constituting scale a^{17} are extended entirely about the shaft a, so that the operator can observe every minute movement of the sleeve on the shaft, and thus determine any inaccuracy in position of the work on which the button is mounted.

If instead of adjusting the work to be drilled or bored it should be desired to ascertain whether the surface b^2 of the work, for example, is absolutely plumb, I arrange the feeler as shown in Fig. 4, where it will be seen that it is mounted on an axis a^{18}, parallel to the arm a^5, so that upon rotation of the indicator-shaft the feeler a^7 will be in a position to bear upon the surface b^2 instead of against the button b.

In Fig. 1 the work is shown as stationary and the indicator as rotated, and the same is true in Fig. 7, the indicator, however, being vertically arranged as for use in a vertical drill instead of in a horizontal drill, as in Fig. 1.

In Figs. 5 and 6 the indicator is stationary and the work moves. Fig. 5 shows the facility with which my invention is applied to internal work and Fig. 6 how it may be applied to external work.

My invention is exceedingly simple and is delicate and exact in operation.

It will be understood that my invention may be embodied in many different forms, and I do not intend to restrict myself to the actual arrangements and combinations of parts herein shown, nor, in fact, do I intend to limit my invention otherwise than as expressed in the claims, taken in connection with the specification.

By the term "transmitting means" I intend to include suitable levers employed to move the sleeve over the index, the levers deriving their movement from imperfect positioning of the part or metallic body to be treated.

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

1. An indicator for truing up work, comprising means for engaging the work, an index, a sleeve, and transmitting means intermediate the means for engaging the work and said sleeve for moving the sleeve in an exaggerated manner over the index to thereby detect any inaccuracy in the position of the work to be acted upon.

2. An indicator for truing up work, comprising a shaft, a lever movably mounted on said shaft and carrying a feeler, an index, an indicator-lever, and a sleeve engaged thereby and adapted to be moved relatively to said index, connection between said feeler-carrying lever and said indicator-lever, the former lever moving the latter lever and sliding the sleeve on the shaft to indicate any inaccuracy in the position of the work.

3. An indicator for truing up work, comprising a shaft having an index, a lever movably mounted on said shaft and carrying a feeler to engage the work, an indicator-lever having a sleeve and mounted to be moved relatively to said index, and means for normally maintaining said feeler in engagement with the work, said feeler-carrying lever being connected with said indicator-lever and moving the latter responsively to any inaccuracy in position of the work.

4. An indicator for truing up work, comprising means for engaging the work, a shaft having an index, a sleeve, and transmitting means including a plurality of levers to move said sleeve relatively to said index in an exaggerated manner.

5. An indicator for truing up work, comprising a shaft having an index, a feeler-carrying lever pivoted on the end of said shaft, an indicator-lever having a fixed pivot close to its outer end, said feeler-lever being connected at the end of its longer arm farther from said shaft to the short arm of said indicator-lever, and a sleeve movable longitudinally over said index and showing in an exaggerated degree inaccuracies in position of the work.

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

EDWARD W. KELLEY.

Witnesses:
NATHAN D. PRATT,
JOHN J. DEVINS.