

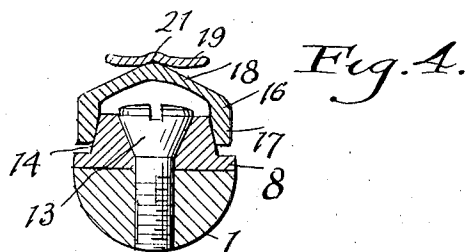
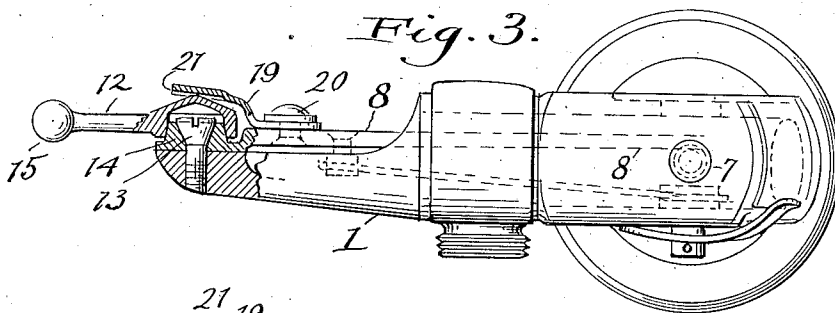
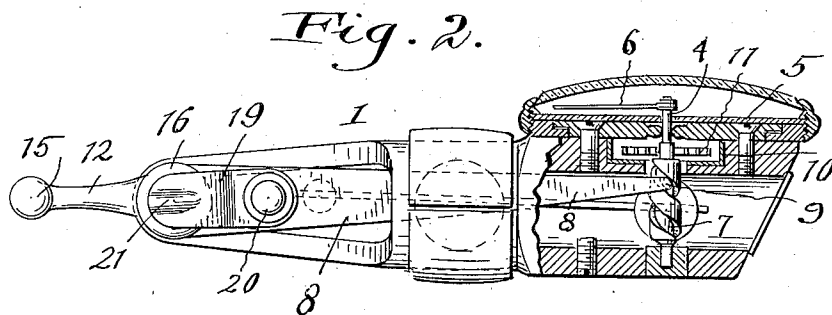
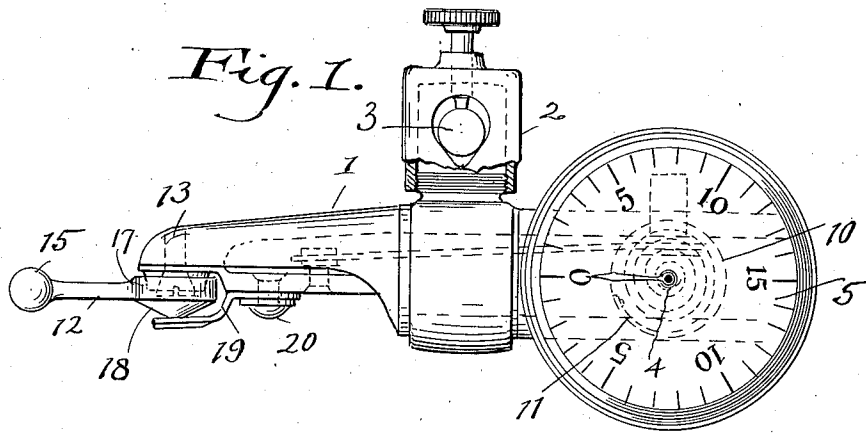
May 25, 1926.

1,585,778

H. A. LOWE

TEST INDICATOR

Filed July 5, 1924



Inventor:
Henry A. Lowe.
Thurston Kiva & Hudson
attys.

Patented May 25, 1926.

1,585,778

UNITED STATES PATENT OFFICE.

HENRY A. LOWE, OF CLEVELAND, OHIO.

TEST INDICATOR.

Application filed July 5, 1924. Serial No. 724,246.

This invention relates to test indicators and is an improvement upon the test indicators which form the subject matter of my prior Patent No. 1,144,367, granted June 29, 1915, and No. 1,466,664, granted September 4, 1923.

The present invention is directed particularly to the means by which the work engaging arm is detachably and adjustably secured to the operating lever arm of the instrument.

It is essential that the operating arm be adjustable angularly with respect to the operating arm to enable the instrument to be used to test different pieces of work, and to obtain extreme accuracy that a close adjustment be possible. It is also essential in order to prevent errors that the work engaging arm be positively held in its adjusted positions. In addition to the above requirements, it is desirable that the work engaging arm be readily detachable from the operating arm since it is often desirable to replace one form of work engaging arm with another.

In my prior Patent No. 1,144,367, a frictional connection is provided between the operating arm and the work engaging arm by which the work engaging arm is held in adjusted position. This connection, however, does not provide a means for detaching and replacing the work engaging arm as is desirable. My prior Patent No. 1,466,664 shows an adjustable connection between the operating arm and work engaging arm which provides a positive lock for the work engaging arm and which is also designed to permit the work engaging arm to be quickly detached. In this device, however, the accuracy of the angular adjustment is limited by the angle between adjacent locking teeth.

It is the object of the present invention to provide a connection between the operating arm and work engaging arm by means of which the work engaging arm may be securely held in any angular position with respect to the operating arm and which permits the work engaging arm to be quickly and easily detached from the operating arm.

A further object of the invention is to provide a construction which is simple and economical to manufacture and which has no parts liable to get out of order.

With the above and other objects in view, the invention may be said to comprise the

device as illustrated in the accompanying drawings hereinafter described, and particularly set forth in the appended claims, together with such modifications and variations thereof as will be apparent to one skilled in the art to which the invention appertains.

Referring to the accompanying drawings forming part of this specification, Fig. 1 is a plan view partly broken away of the instrument; Fig. 2 is a side elevation with the part of the device adjacent the spindle and dial shown in vertical section; Fig. 3 is a bottom view of the device—the connection between the two arms of the operating lever being shown in section; and Fig. 4 is a transverse section through the connection between the work engaging arm and operating arm.

Referring to the accompanying drawings, the instrument includes a body 1 which is identical in construction with the body shown in my prior Patent No. 1,466,664, the body being provided with an adjustable attaching member 2, adapted to be secured to a tool post 3. A spindle 4 is rotatably mounted within the body and projects through a graduated dial 5, the spindle 4 having a pointer 6 fixed to its projecting end outside the dial. The spindle 4 has a spiral groove 7 formed in the surface thereof and the operating lever arm 8 which is pivoted to the body has upon the end thereof a tooth 9 which engages in the above mentioned spiral groove. Between the groove portion of the spindle and the dial 5, the body supports a spring barrel 10 in which there is a spiral spring 11 which is connected with the barrel 10 and with the spindle and acts upon the spindle to turn it counterclockwise to return the pointer to the zero point after it has been shifted by the operating arm acting upon the spindle. The operating arm 8 has an extension or work engaging arm 12 which is adapted to be secured thereto at various angular positions. The movement of the end of the work engaging arm 12 which engages the work is greatly multiplied through the operating arm 8 and spindle 4, and the dial 5 is suitably graduated to indicate the amount of variation in the contour of the work. The operating arm 8 is pivotally connected at its outer end to the body member 1 by means of a pivot screw 13, the arm 8 having a boss 14 formed thereon surrounding the

pivot receiving opening and concentric therewith. This boss has a conical outward tapering surface which is inclined slightly or at a small angle with respect to the axis of the pivot.

The work engaging arm is provided with a suitably formed work engaging portion 15 at its outer end and a hollow inner end portion 16 which has a depending skirt or flange 17, the inner surface of which is conical and adapted to fit tightly upon the tapered outer surface of the boss 14. The end portion 16 of the work engaging arm has an outer closure portion 18 which tapers outwardly to a point at the center thereof. The taper of the conical interfitting projection 14 of the operating arm and of the recess in the operating arm which receives said conical projection is very slight, a taper of about five degrees with respect to the axis of the pivot having been found to give excellent results. With interfitting conical parts tapered at a slight angle with respect to the axis as above described, the arms are securely held against relative turning movement when held together under pressure, the frictional engagement between the two conical surfaces being such as to provide a substantially positive lock between the two arms against relative turning movement.

However, when the clamping means is released it requires relatively little force to disengage the work engaging arm from the operating arm.

For detachably clamping the work engaging arm to the operating arm and for exerting the necessary pressure upon the work engaging arm to securely hold the two arms against relative turning movement, a spring clip 19 is pivotally connected by means of a rivet 20 to the operating arm 8 and has an outwardly offset free end portion which is adapted to engage with the tapered outer portion 18 of the work engaging arm, the free end of the clip 19 being provided on its under surface with a groove 21 engageable with the point of the tapered cover portion 18 to retain the spring clip 19 in retaining position with respect to the work engaging arm. The pressure exerted by the spring clip 19 upon the inner end of the work engaging arm is applied in the direction of the axis of the pivot and is sufficient to hold the inter-engaging parts of the two arms in tight engagement so that the

work engaging arm is very securely held in the angular position to which it is adjusted. Furthermore, the connection between the operating arm 8 and work engaging arm 12 permits the arm 12 to be adjusted exactly to the desired angle with respect to the operating arm.

Having described my invention, I claim:—

1. In a test indicator having a body and an operating arm pivoted thereto, a work engaging arm adjustably and detachably connected to said operating arm, one of said arms having a slightly tapered projection and the other a correspondingly tapered recess in which said projection fits, the tapered walls of the projection and recess being coaxial with the pivot of the operating arm, and means for pressing together the tapered walls of the projection and recess to lock the arms together in adjusted positions.

2. In a test indicator having a body, an operating lever arm and a pivot connecting the operating arm and the body, a work engaging arm adapted to be detachably connected to the operating arm and to be angularly adjusted with respect thereto about the axis of the pivot, said arms having interfitting portions, there being a tapered recess in one arm and a tapered projection on the other arm fitting in said recess, said projection and recess having conical interengaging walls coaxial with the pivot and inclined at a slight angle with respect to their axis, and releasable means independent of the pivot for holding said interfitting parts in locking engagement.

3. In a test indicator having a body, an operating lever arm and a pivot connecting the operating arm to the body, a work engaging arm and means for adjustably and detachably securing said arms together comprising a conical boss formed on said operating arm, said boss surrounding the pivot and having its conical surface inclined at a slight angle with respect to the axis of the pivot, said work engaging arm having a recess with a conical wall adapted to fit tightly upon said boss, and a spring clip pivoted to said operating arm and adapted in one position to engage said work engaging arm and press the same into firm locking engagement with said boss.

In testimony whereof, I hereunto affix my signature.

HENRY A. LOWE.