A. HATCH.

INDICATORS FOR TRUING WORK IN LATHES.

No. 191,586. Patented June 5, 1877.

Fig. 1.

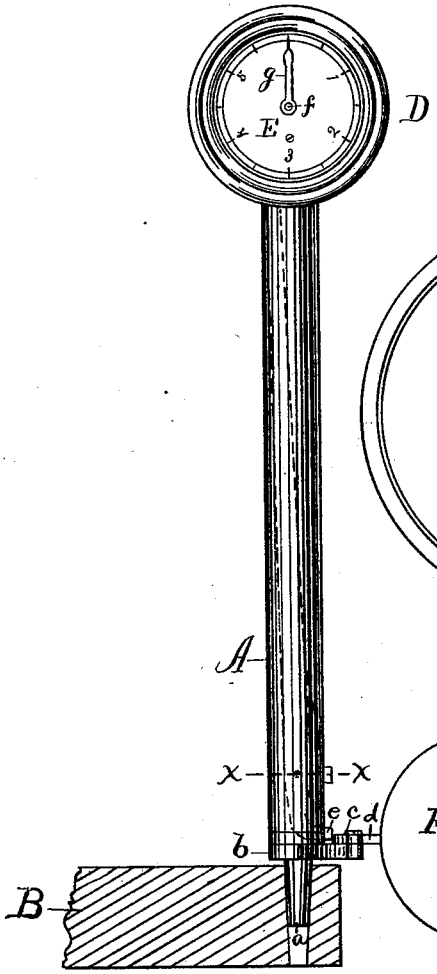


Fig. 2.

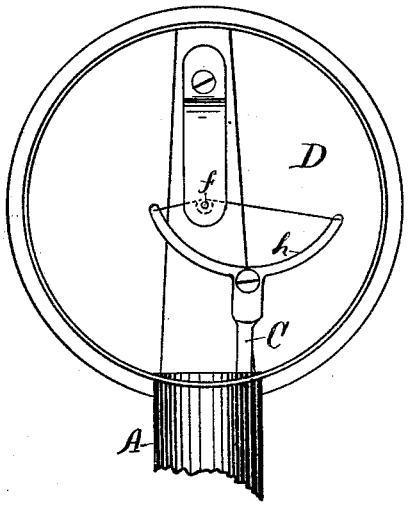


Fig. 3.

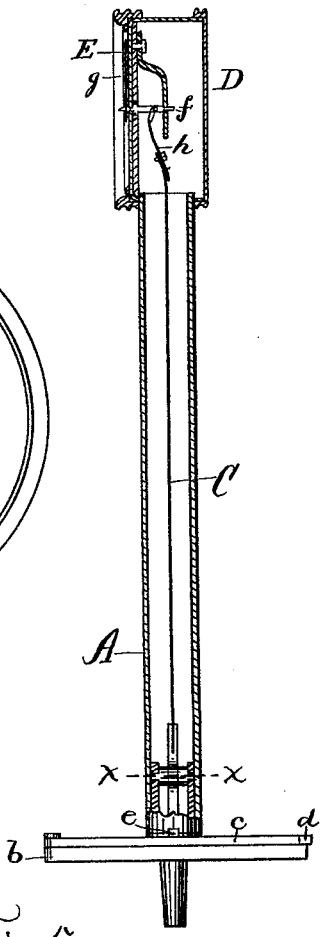


Fig. 4.

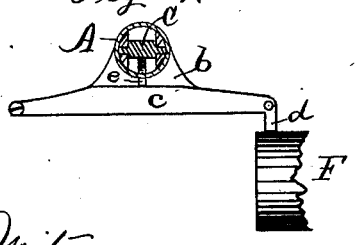
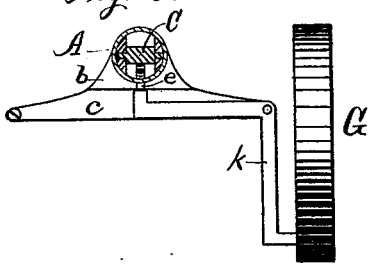


Fig. 5.



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IMPROVEMENT IN INDICATORS FOR TRUING WORK IN LATHES.

Specification forming part of Letters Patent No. **191,586**, dated June 5, 1877; application filed April 27, 1877.

To all whom it may concern:

Be it known that I, ANSON HATCH, of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Indicators for Truing Work in Lathes, Planers, &c., of which the following is a specification:

My invention is designed for use in truing work (either the periphery or face) in lathes, and also in planers and other machines; and it is used by placing a yielding arm against the work to be trued, starting the work, and observing the movement or non-movement of a suitable indicator, which shows whether or not the work is true.

The invention consists of mechanism for this purpose, as hereinafter described.

In the accompanying drawing, Figure 1 is a front elevation of an indicator which embodies my invention. Fig. 2 is a view of the interior of the upper part of the same as viewed from the back side. Fig. 3 is a vertical section, partly in elevation, of the same. Fig. 4 is a transverse section of the same on line *x x* of Figs. 1 and 3, showing the lower part of the same as viewed from above; and Fig. 5 is a like view, with an angle-lever attached thereto for truing the face of work.

A designates a standard, which may be of any desired form. In the present case it is of tubular form, and incloses a part of the mechanism. At the foot of the standard there is a tapering shank, *a*, designed to be received in a correspondingly-tapered hole at any convenient point of the machine where my device is to be used. For use in an engine-lathe said hole may be made in a piece of steel, B, Fig. 1, which will fit in the tool-post of the lathe, so that, by moving the lathe-carriage in the usual manner, the position of the tool may be under the complete control of the operator.

Just above the shank *a* there is a cross-arm, *b*, and pinned or hinged to one end of said cross-arm is a yielding and reciprocating arm, *c*, provided at the end opposite its pivot with a projecting nib, *d*. Extending up through the standard is a lever, C, which lever is pivoted near its lower end and provided with an outward-turned arm, *e*, below said pivot, which arm *e* engages with one side or edge of the yielding and reciprocating arm *c*.

The upper end of the standard A is provided with a case, D, the front of which has a circular face, E, divided into as many divisions as may be desired, and either with or without figures to indicate the number of said divisions or subdivisions thereof. Back of said face is a frame supporting in bearings the ends of a horizontal shaft, *f*, one end of which projects through the center of the face E and carries a pointer or indicator, *g*. The upper end of the lever C is provided with a bow, *h*, to the ends of which the two ends of a fine cord or thread are attached, said thread being coiled once or more around the shaft *f*, so that a reciprocating motion of the bow *h* imparts a rotary motion back and forth to the shaft *f* and its pointer *g*, after the well-known manner of a bow-drill.

A spring (not shown) bears upon the edge of the lever C above its pivot so as to continually press the projecting end of said lever outward, and in contact with the yielding arm *c*.

The projecting end *d* of the yielding arm *c* is brought against the periphery of the work to be trued, said work being designated by F in Figs. 1 and 4, and the same being held and revolved in the lathe in any ordinary manner. If the work thus revolving in contact with the end *d* is true—that is, perfectly concentric—then the arm *c*, and consequently the pointer *g*, will remain at rest. If, however, the work is not exactly true, an out-and-in motion will be imparted to the yielding arm *c*, which will depress the lever C a little at its short end, and impart a much greater motion to the bow at its long end, and consequently to the shaft *f* and its pointer *g*, which motion will continue to carry the pointer in one direction until the point of greatest eccentricity of the work begins to pass the end *d* of the arm *c*, when the parts under the action of the spring move in the opposite direction until the point of the least eccentricity of the work is reached, when the pointer again reverses its motion, as before described.

By stopping the work when the pointer is on its point of reversal, the eccentric point of the work will be located exactly opposite the end *d* of arm *c*, the high or low point resting against said end *d*, according to the direction last traversed by the pointer. The work can

then be shifted in the proper direction, tried again by the indicator, and, if not true, changed until, on the application of the indicator, the non-movement or rest of the pointer indicates that the work is true.

By means of my indicator the least eccentricity of the work is converted into a reciprocating rotary movement of the pointer, greatly multiplied, so that the least deviation can be readily ascertained and positively located. The machine may very easily be so adjusted that a variation of one-thousandth part of an inch at the end *d* will move the end of the pointer one-eighth of an inch.

Oftentimes it is desirable to true the face of a pulley or other work. The end *d* of the arm *c* may be set directly against the face of work for such purpose, but I prefer to pivot or pin an angle-arm, *k*, Fig. 5, to the end of arm *c*, with one end of arm *k* in contact with the projecting end *e* of lever C, and the other arm resting against the face of the work, as shown in Fig. 5, when any deviation in said face will depress the lever C and be indicated by the pointer *g*, in the manner before described. When the angle-lever *k* is used, as above described, the pressure upon the arm *c* is endwise, so that it does not move.

Other devices and appliances can be attached to the yielding arm *c*, to carry the point of engagement into a hole of any depth, and against the circular walls of said hole, to indicate, in the manner already described, whether the same is eccentric or not. The adaptation of these appliances to bring the device to conform to the character of the work to be trued will readily suggest themselves to mechanics.

In order to ascertain when straight work is parallel to its line of motion in planers, &c., it is only necessary to move the work when the end *d* is in contact therewith, and if the work is not parallel with its line of motion the deviation will be indicated by the pointer *g*, and the work can be changed accordingly.

Other styles of indicators might be employed in place of the pointer *g*, and other connecting mechanisms might be substituted to connect the indicator with the yielding and reciprocating arm which engages the work without departing from the generic features of my invention.

I claim as my invention—

1. In an indicator for truing work, a yielding and reciprocating arm for engagement with the work to be trued, in combination with a reciprocating indicator and their connecting mechanism, substantially as described, and for the purpose specified.

2. In an indicator for truing work, the lever C pivoted to the standard A, one end adapted for engagement with the work to be trued and the other end adapted to carry an indicator, substantially as described, and for the purpose specified.

3. In an indicator for truing work, the combination of the standard A, arm *c*, lever C, bow *h*, shaft *f*, and pointer *g*, substantially as described, and for the purpose specified.

4. In an indicator for truing work, the combination of the pointer *g*, shaft *f*, bow *h*, lever C, angle-lever *k*, and standard A, substantially as described, and for the purpose specified.

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