(No Model.)

F. HOLLAND.

MICROMETER GAGE.

No. 410,163. Patented Sept. 3, 1889.

Fig. 1.

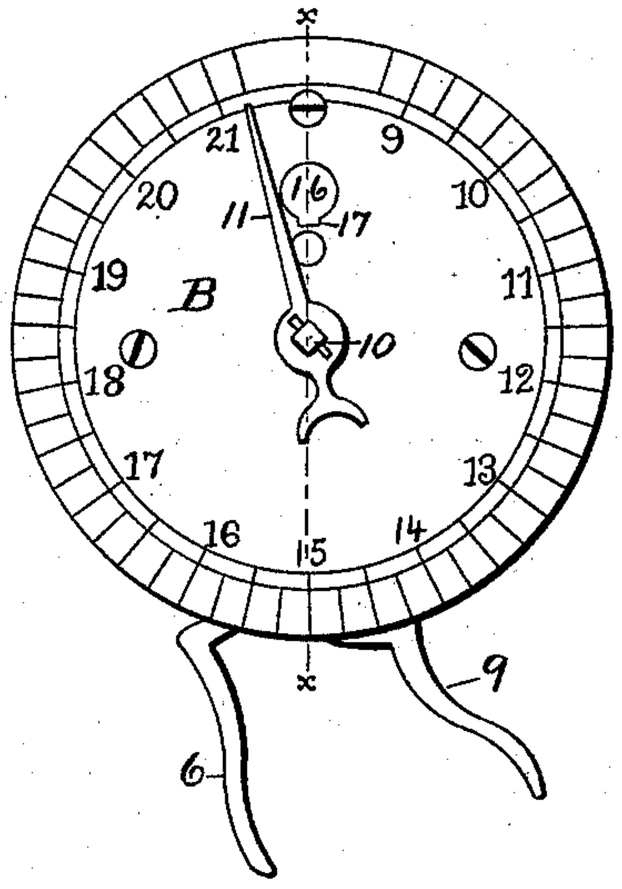


Fig. 2.

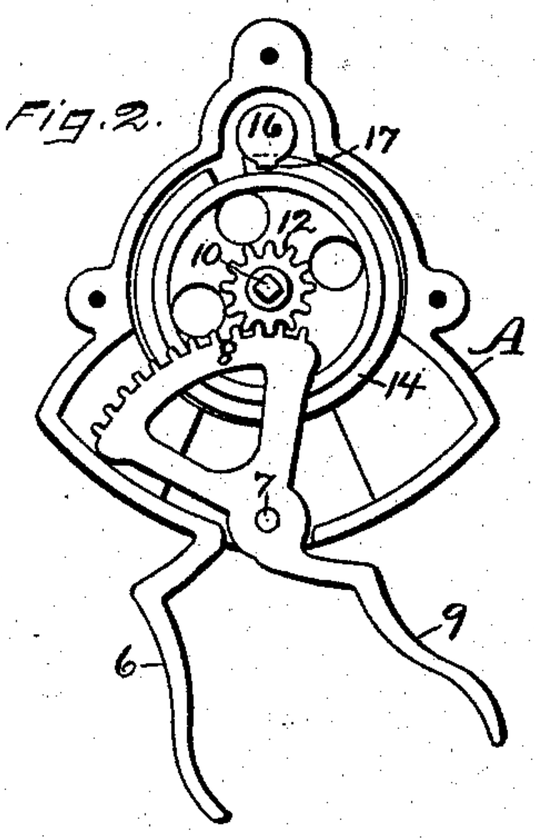


Fig. 3.

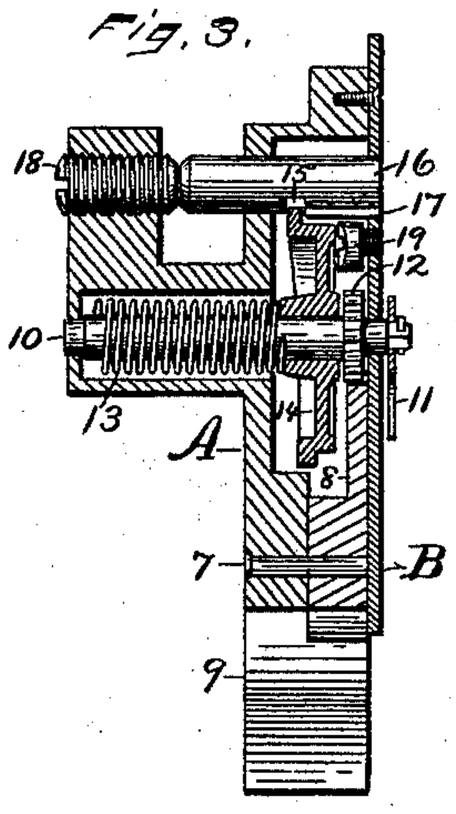


Fig. 4.

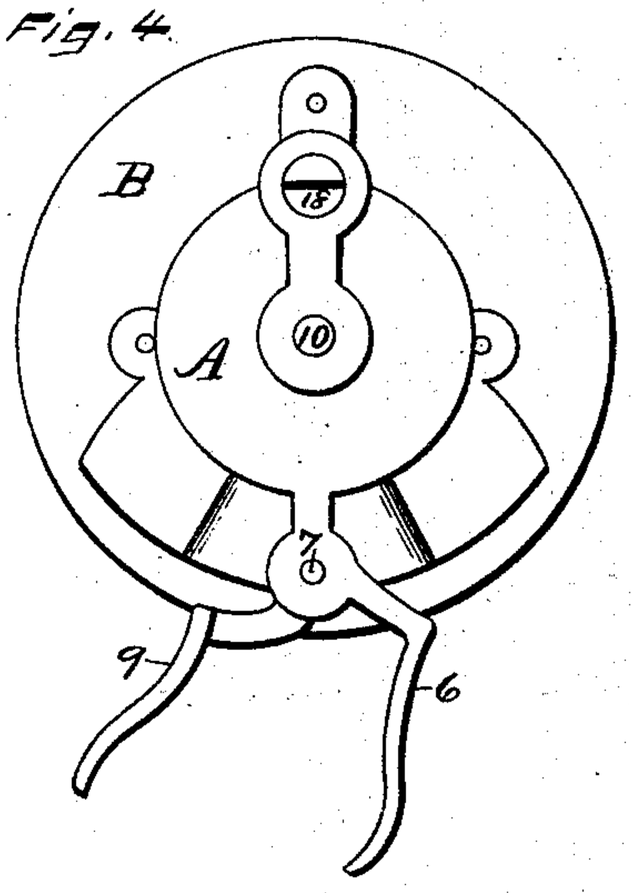
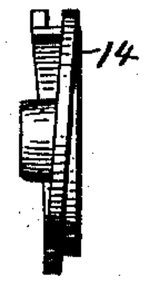


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANKLIN HOLLAND, OF NEW BRITAIN, CONNECTICUT.

MICROMETER-GAGE.

SPECIFICATION forming part of Letters Patent No. 410,163, dated September 3, 1889.

Application filed May 18, 1889. Serial No. 311,282. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN HOLLAND, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Metal-Gages, of which the following is a specification.

My invention relates to improvements in metal-gages; and the main objects of my improvement are to produce a gage which is conveniently handled, and in which the thickness measured may be indicated even if it comes between the standard numbers of the gage.

In the accompanying drawings, Figure 1 is a front elevation of my gage. Fig. 2 is a like view of the same with the dial-plate and pointer removed. Fig. 3 is a sectional view, partly in elevation, the plane of section being indicated by the line *x x* of Fig. 1. Fig. 4 is a rear elevation of the same, and Fig. 5 is a side elevation of a detached part.

A designates the main portion of the case, which is provided with a projecting rigid handle 6, and B designates the dial-plate. Pivoted to one edge of the case, as at 7, near the rigid handle 6, I place the rack 8, from which there projects an integral handle 9. This rack is limited in its motion in either direction by contact with the edge of the case or other suitable stops.

10 designates a shaft carrying at its outer end the pointer 11 on the outside of the dial, and upon the inside of the dial a pinion 12, whose teeth engage the teeth of the rack 8. This shaft 10 is also provided with a spring 13 coiled about it, with one end of the spring secured to said shaft and the other end to the case in a well-known manner of arranging spring-actuated shafts, so that said spring exerts a constant tendency to revolve the shaft in a given direction and throw the rack and its handle, when left free, into the position illustrated in the drawings. Upon this shaft 10 there is a cam-wheel 14, whose periphery engages a notch 15, Fig. 3, in the sliding arm 16. This sliding arm is supported by bearings in the case and dial-plate, one of which may be recessed a little at one side to receive the spline 17, which prevents the sliding arm from rotating; or, in lieu of said spline, other known substitute to prevent rotation may be employed. In direct opposition to the sliding arm 16, I arrange the screw-adjustable anvil 18, which is substantially like the adjustable anvil of calipers and other measuring-instruments, said anvil and sliding arm constituting the gaging-points of my instrument.

In order to insure accuracy in the position of the cam-wheel 14, I provide a stop or bearing stud 19 on the inside of the dial-plate to bear against the side of said cam-wheel for holding it against lateral movement. As shown, this stud is in the form of a screw; but when once set it does not require adjustment. The parts subject to wear may be hardened to insure durability. The dial, as illustrated, is graduated into marks, four of which represent a number of a standard sheet-metal gage, the numbers running from 9 to 21. It may be graduated or arranged for other numbers, according to the use desired; or, instead of gage-numbers, the dial might be graduated in fractions of an inch.

In using my gage the operator takes hold of the handles 6 and 9 and forces them together, thereby imparting motion to the rack 8, which through the pinion 12 will rotate the shaft 10, together with the cam-wheel and pointer, while the periphery of the cam engaging the sliding arm 16 will move said arm outwardly away from the anvil 18. The metal to be gaged is then placed between the confronting ends of the anvil and sliding arm, preferably by slipping the gage upon the metal, and then the handles are released. The spring 13 throws the parts in the opposite direction and brings the sliding arm against the metal until the opposite sides of the metal are in firm contact with the anvil and sliding arm. The pointer on the dial will then indicate the thickness in gage-numbers and fractions thereof, or in fractions of an inch, accordingly as the gage may have been made. Whatever measurement is given on the dial the cam-wheel will be formed with the necessary incline to make the measurements read correctly. If the scale does not run to zero, the instrument may be adjusted to bring the anvil into proper position by the insertion of a piece of metal of a known thick-

ness between the anvil and sliding arm, and then adjusting the anvil until the pointer indicates said thickness.

I am aware that prior patents show gages having a sliding arm, opposing gaging-point, a dial and pointer, and operating devices, and I hereby disclaim the same.

By placing the pointer directly on the cam-shaft, or shaft that operates the sliding arm, I avoid lost motion incident to connecting gearing, or devices for communicating motion to a second shaft, and thereby indicate the measurement with the greatest accuracy.

I claim as my invention—

1. The combination of a case, an anvil, the sliding arm 16, the cam-wheel for moving said arm, the operating-shaft 10, carrying said cam-wheel, devices for moving said shaft, and the pointer or index secured directly upon said operating-shaft and moving therewith, substantially as described, and for the purpose specified.

2. The combination of a case, the spring-actuated shaft, a pointer, cam-wheel, and pinion secured thereto, the sliding arm 16, moved by said cam-wheel, an anvil, the rack 8, and operating-handle for moving said shaft through said pinion, substantially as described, and for the purpose specified.

FRANKLIN HOLLAND.

Witnesses:
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