(No Model.)

H. J. COGSWELL.

WATCHMAKER'S LENGTH GAGE.

No. 531,435. Patented Dec. 25, 1894.

Fig. 1.

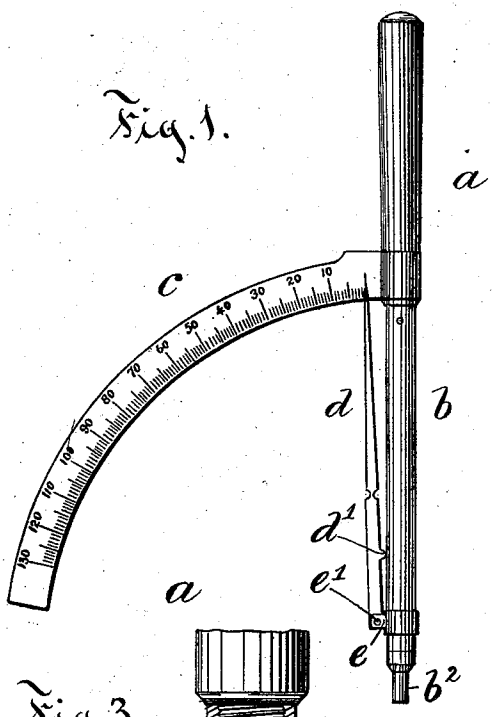


Fig. 2.

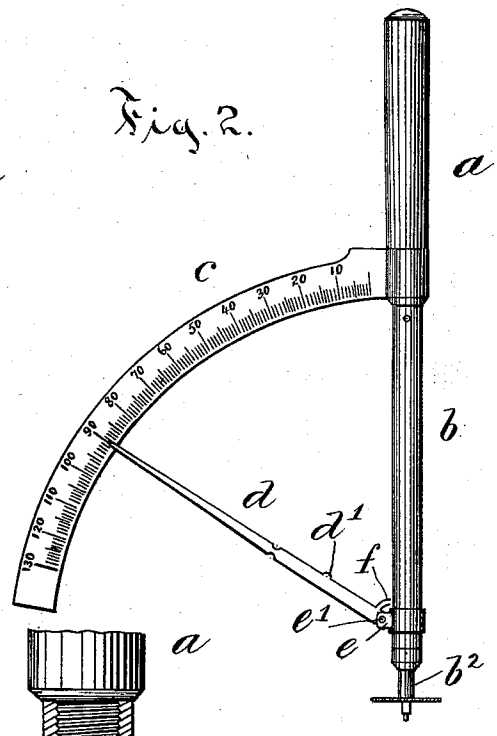


Fig. 3.

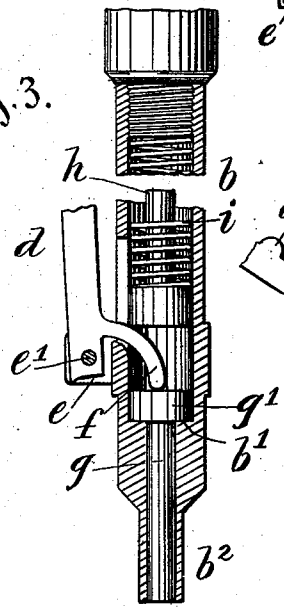
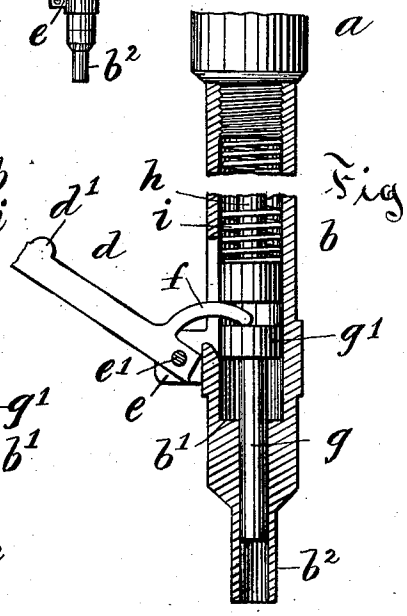


Fig. 4.



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UNITED STATES PATENT OFFICE.

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WATCHMAKER'S LENGTH-GAGE.

SPECIFICATION forming part of Letters Patent No. 531,435, dated December 25, 1894.

Application filed October 1, 1894. Serial No. 524,578. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. COGSWELL, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Watchmakers' Length-Gages, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of my invention is to provide a tool that shall be particularly adapted for use by repairers for the measurement of the length of the staff or pinion or of like small shafts where great accuracy is required, and to this end my invention consists in the details of the several parts making up the gage as a whole and in the combination of the parts as more particularly hereinafter described and pointed out in the claims.

Referring to the drawings: Figure 1 is a view of the implement. Fig. 2 is a detail view of the implement illustrating its manner of use. Fig. 3 is a detail view on enlarged scale in section through parts of the gage showing the position of such parts when the implement is not in use. Fig. 4 is a detail view in section on enlarged scale showing the position of parts when used in measuring.

In the accompanying drawings the letter *a* denotes the handle of the tool having a hollow portion or shank *b* within which part of the mechanism is supported. From a point about midway of the handle and shank a graduated arm *c* extends for about ninety degrees, the end of an index arm *d* being arranged to traverse the graduated arm and by its position indicate the distance traveled from the zero point on the scale.

The index arm *d* is pivoted to a bracket *e* formed on or secured to the tool near the end of the shank, the index arm having a branch *f* which extends through a slot in the shank and encounters the top of a plunger *g*.

The plunger *g* is located within the hollow part of the shank the broadened head *g'* forming a shoulder which rests against the shoulder *b'* within the shank. The lower end of the shank is provided with a nipple b^2 and the end of this nipple and of the plunger *g* are in precise alignment when the plunger is at the lower limit of its play, as shown in Fig 3 of the drawings.

A piston *h* loosely arranged within the tubular shank is forced downward by a spiral spring *i* and exerts a continuous pressure upon the outer edge of the branch *f* and tends to hold the index arm *d* in the position with relation to the handle, as shown in Fig. 1 of the drawings, the index finger being on zero of the scale.

The plunger and several other parts of the mechanism are in the relative position shown in Figs. 1 and 3 when the plunger is at the lower limit of its play, but as soon as a shaft, a wire or like article is thrust into the nipple and forces the plunger back the index arm will travel along the scale a distance proportioned to the extent of movement of the plunger. This proportion of movement of the index finger depends upon the ratio between the distance from the pivot *e'* to the end of the branch as compared with the distance from the pivot *e'* to the outer end of the finger, a slight movement of the plunger being multiplied many times so that the thousandth of an inch of movement of the plunger is magnified so as to become an easily noted quantity on the scale marked on the arm. In the scale as shown in the drawings the movement of the plunger can be read to the nearest thousandth of an inch.

The outer end of the index arm is forked the extreme of one fork forming the finger and the other forming a guide which travels along on the back of the arm on which the scale is marked.

The contact parts, that is, the end of the branch *f* and the surfaces of the plunger and piston, as well as the end of the nipple and outer end of the plunger, are of hardened steel and thus adapted to endure continued use for a long period of time without any appreciable wear of the surfaces such as would affect the accuracy of the implement as a measuring tool. By the use of this tool the lengths of shafts and other small parts where great accuracy is desired can be readily determined and with accuracy.

The lower end of the index arm *d* is provided with a projection or stop *d'* which by

contact with the shank or bracket limits and determines the outward swinging movement of the arm *d*.

I claim as my invention—

1. In combination in a length gage a handle, the tubular shank terminating in a nipple, an index arm pivoted to the shank with a branch extending within the latter and in contact with a plunger, a plunger located within the shank and having a shoulder cooperating with the shoulder within the shank whereby the outer end of the plunger is held in exact alignment with the outer end of the nipple, a spring actuated piston arranged within the plunger and pressing upon the branch, and a graduated arm adapted to be traversed by the end of the index arm, all substantially as described.

2. In combination in a length gage a handle, a tubular shank terminating with a nipple, a spring actuated piston located within the shank, a shouldered plunger loosely supported within the shank and having a shoulder cooperating with a shoulder within the shank whereby the outer end of the plunger is held in exact alignment with the outer end of the nipple, a graduated arm, an index arm having a branch located between the proximate surfaces of the plunger and the piston, and a stop on the lower end of the index arm limiting the swinging play of the arm, all substantially as described.

HENRY J. COGSWELL.

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