

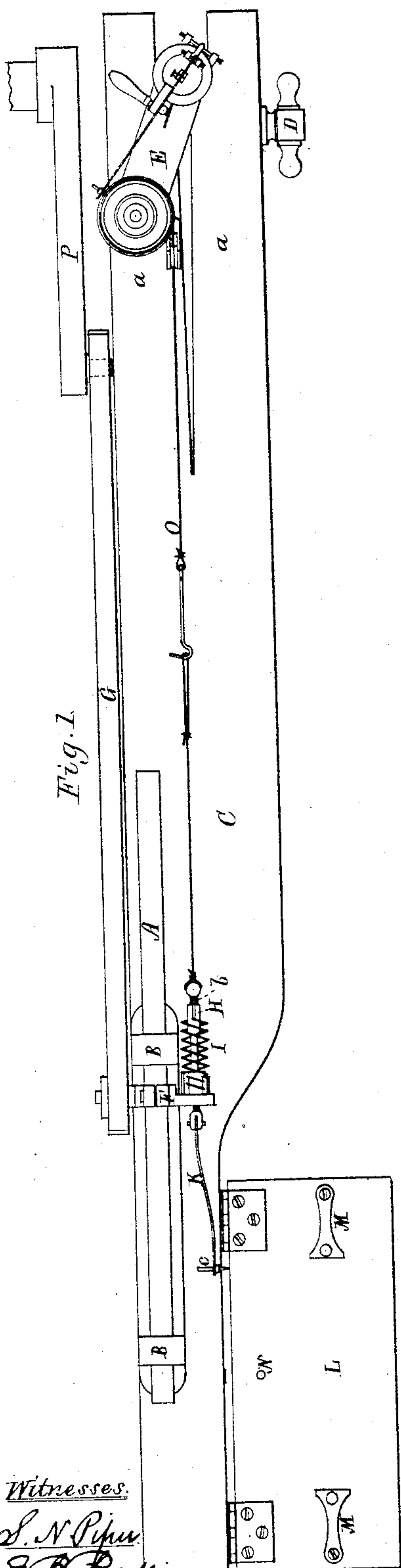
(No Model.)

G. W. BROWN.

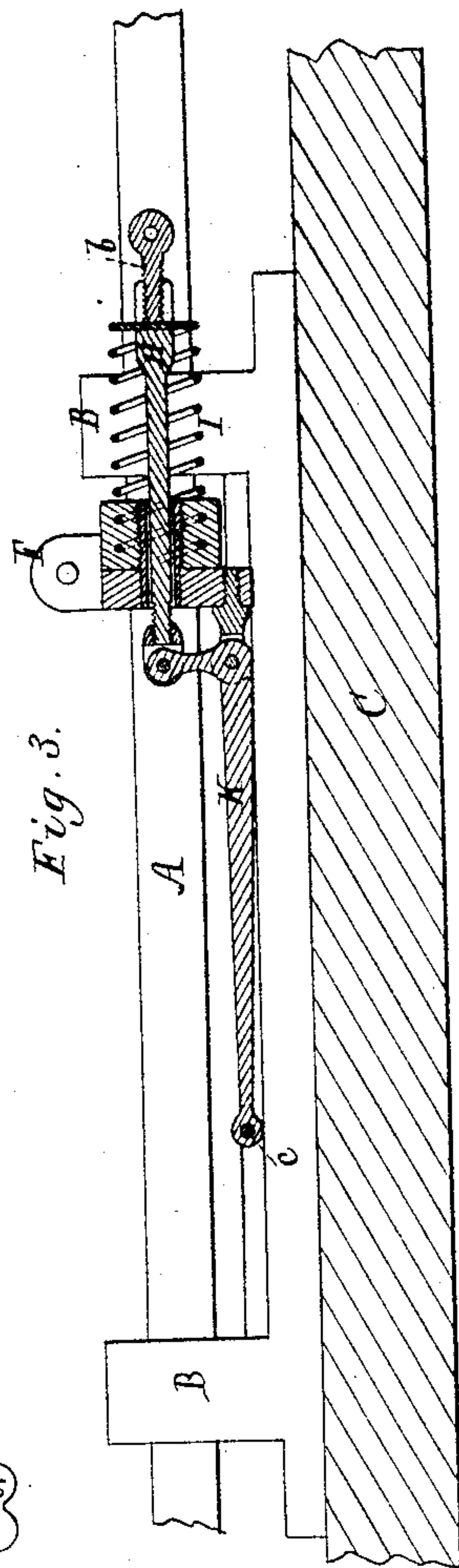
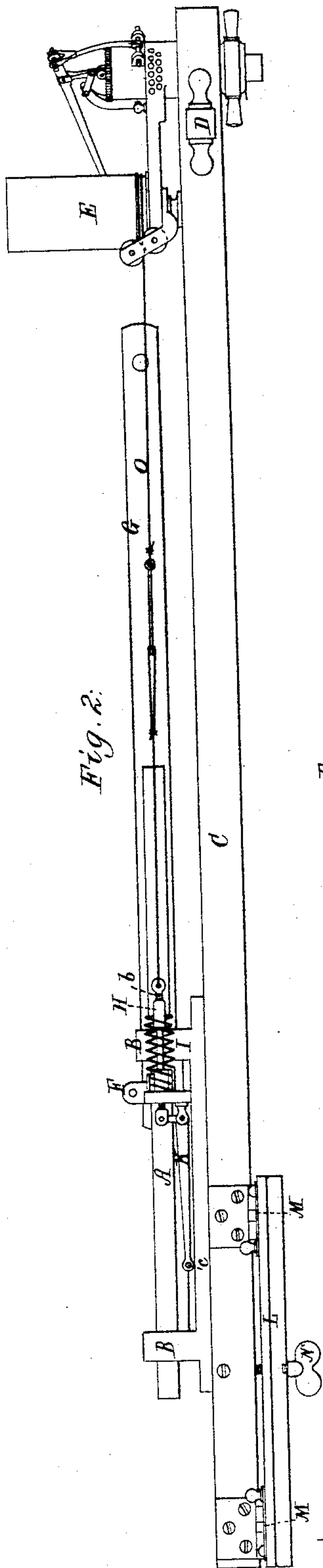
MECHANISM FOR INDICATING THE LONGITUDINAL EXPANSION OF
THE OPERATIVE CORD OF A STEAM ENGINE INDICATOR.

No. 284,176.

Patented Sept. 4, 1883.



Witnesses.
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UNITED STATES PATENT OFFICE.

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MECHANISM FOR INDICATING THE LONGITUDINAL EXPANSION OF THE OPERATIVE CORD OF A STEAM-ENGINE INDICATOR.

SPECIFICATION forming part of Letters Patent No. 284,176, dated September 4, 1883.

Application filed July 25, 1883. (No model.)

To all whom it may concern:

Be it known that I, GILMAN WELD BROWN, of West Newbury, in the county of Essex, of the Commonwealth of Massachusetts, have invented a new and useful Improvement in Mechanism for Indicating the Longitudinal Expansion of the Operative Cord of a Steam-Engine Indicator; and I do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, and Fig. 2 a side elevation, of the mechanism as applied to a steam-engine indicator and its actuating-cord. Fig. 3 is a vertical and longitudinal section of the shoe, rod, and its spring and marking-lever, to be described.

Steam-engine indicators usually have their paper-carrying cylinder or drum operated or revolved one way by a cord wound around a pulley fixed to the said cylinder or drum, such cord being pulled by the piston or some other proper part of the engine, and a spring being employed to produce a counter movement of the drum. The inertia and momentum of the drum cause the cord generally to expand or stretch lengthwise unequally during each stroke of the piston of the engine. Such induces inequalities in the stretch or expansion of the cord, and effects more or less error in the action of the indicator or imperfect registry by it.

My invention is to determine and register the variations in the stretch or expansion of the indicator-cord while it may be in operation, in order that due measures may be taken for correction of the error or errors in the indicator that may result from such inequalities of expansion.

In the drawings, A represents a straight rod or tube supported in a guide or puppet, B, so as to be capable of sliding therein rectilinearly forward and backward in a direction lengthwise of such bar or rod. The puppet is fixed upon the upper surface of a flat bar, C, which at its rear part is furcated, and has to the prongs *a a* of the furcation a screw, D, for clamping them to a steam-engine indicator, E. To the rod A, at its middle, there is screwed a cross-head, F, to which is pivoted a connection-rod, G. Arranged in the said

cross-head is a slide-rod, H, which at its rear is provided with a screw, *b*, having a globular and diametrically-perforated head, the screw being screwed into the rod H lengthwise thereof, and against the middle part of a double-coiled spring, I, inserted within the rod, which is slotted from its rear end a suitable distance to receive the spring. The said spring extends rearwardly from and is affixed to the cross-head F, or to suitable projections therefrom. At its front end the slide-rod H is jointed to the shorter arm of a lever, K, which has the said arm arranged at a right angle, or thereabout, to the longer arm, and in the latter a pencil or marker, *c*. To the bar C, at one edge thereof, a tablet, L, is hinged, so as to be capable of being either turned down for having a sheet of paper fixed to it by means of two spring-clamps, M M, adapted to its inner face, or turned up to carry the said sheet in contact with the point of the pencil. A screw, N, screwed through the tablet, answers as a stop to arrest it in its upright position by bringing up against the edge of the bar C, or a piece of metal, or the head of a screw inserted in such bar. By means of the screw N the upright position of the tablet can be regulated to keep its sheet of paper in proper contact with the pencil, as its point may become worn down.

The operative cord O of the steam-engine indicator E is extended from the drum-pulley of the latter to and fastened to the head of the slide-rod H.

The connection-rod G, at its rear end or part, is to be pivoted on the wrist of a crank, P, which is to be revolved by suitable means synchronously with that of the steam-engine, or so as to cause the slide-rod A to have a reciprocating movement synchronously with that of the piston of the steam-engine cylinder, from which it will be seen that during each advance movement of the slide-rod the actuating-cord O will be pulled, so as to cause the drum of the indicator to revolve. Should the tension or draft on the cord be equal during such revolution of the indicator-drum, the pencil *c* will travel in a straight line across the sheet of paper; but should the draft increase, the slide-rod H will draw backward, and by its action on the marker-lever will cause the longer arm

thereof to rise, whereby the pencil will move in a curved path across the paper, and describe thereon a line which will indicate the variation in the tension, expansion, or lengthwise stretch of the cord O during a stroke of the piston.

With the flat bar C forked and provided with the clamping-screw D, the apparatus may be used for regulating the stretch of the cord of a steam-engine indicator disconnected from such bar, or with a steam-engine provided with a registering pressure-indicator, consists in the slide bar or rod A, its supporting and actuating mechanism, the cross-head F, slide-rod H, spring I, marking-lever K and its pencil, and the paper-supporting tablet L, all arranged and adapted substantially as set forth.

I therefore claim—

1. The indicator or apparatus, substantially as described, for registering the stretch or expansion of the actuating-cord of a steam-engine indicator while operating the drum of such indicator, such apparatus consisting of the slide

A, supported and provided with mechanism for reciprocating it, as explained, cross-head F, slide-rod H, spring I, marking-lever K and its pencil or marker, and the paper-supporting tablet L, all arranged to operate essentially as set forth.

2. The combination of the bar C, provided at or near one end of it with means of fixing it to a steam-engine indicator, as explained, with apparatus, substantially as described, for registering the stretch or lengthwise expansion of the cord of such indicator which operates the drum thereof, such apparatus consisting of the slide A, supported and provided with mechanism for reciprocating it, as described, cross-head F, slide-rod H, spring I, marking-lever K and its pencil or marker, and the paper-supporting tablet L, all being arranged and to operate essentially as set forth.

GILMAN WELD BROWN.

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