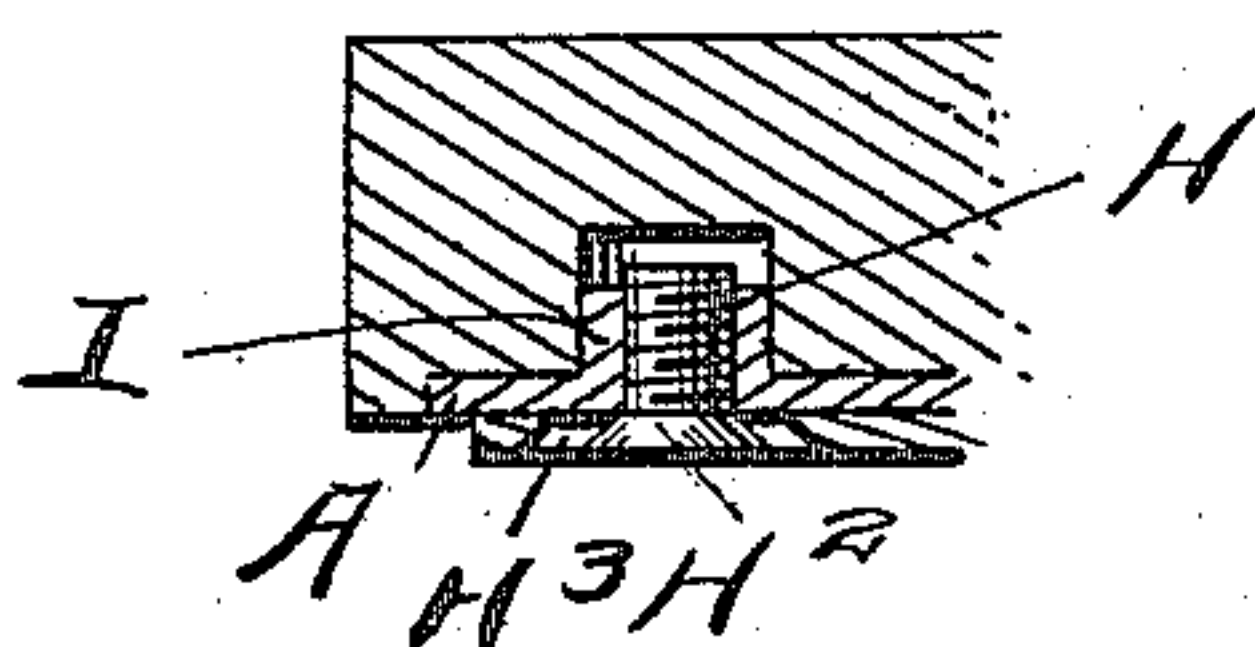
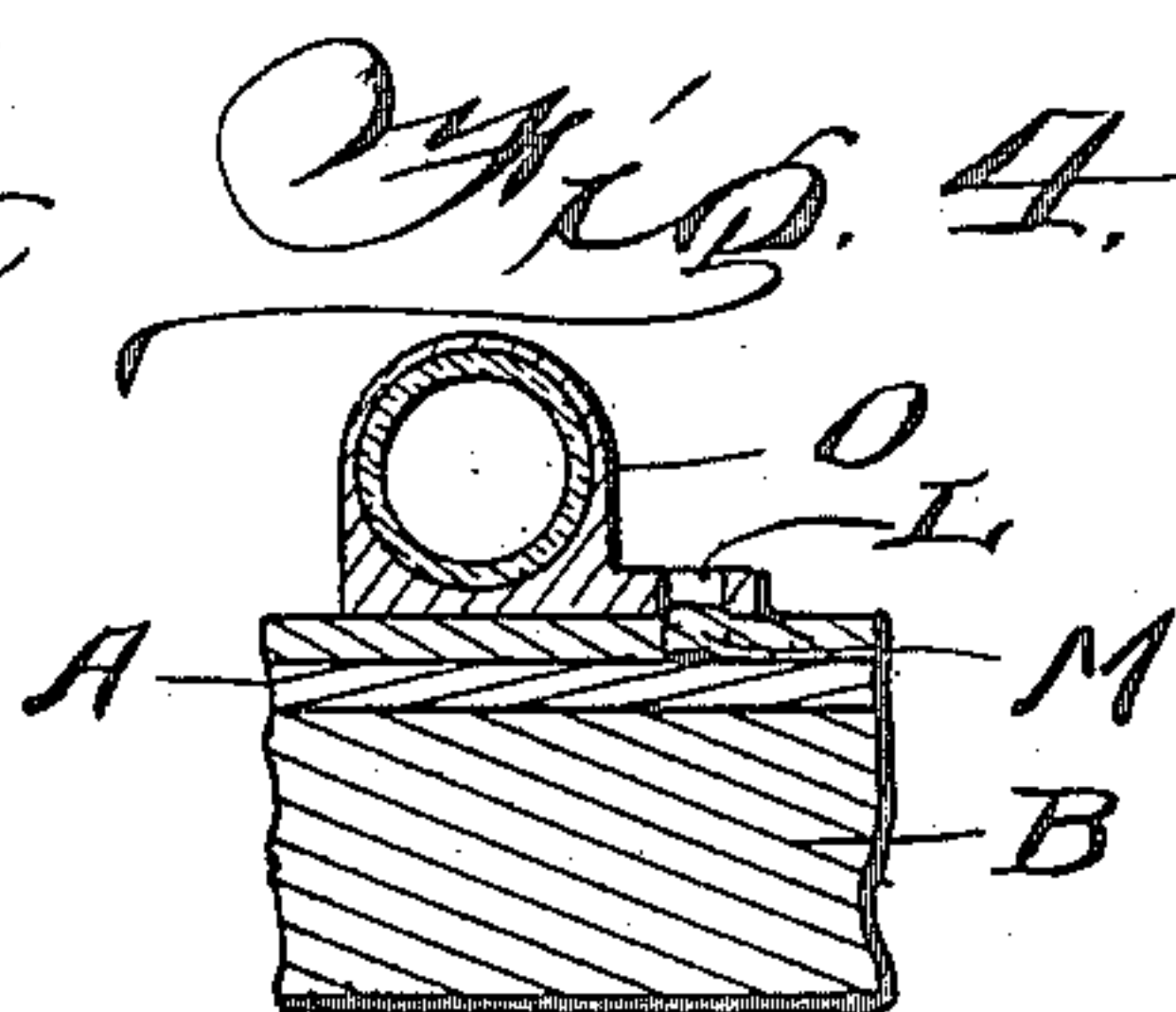
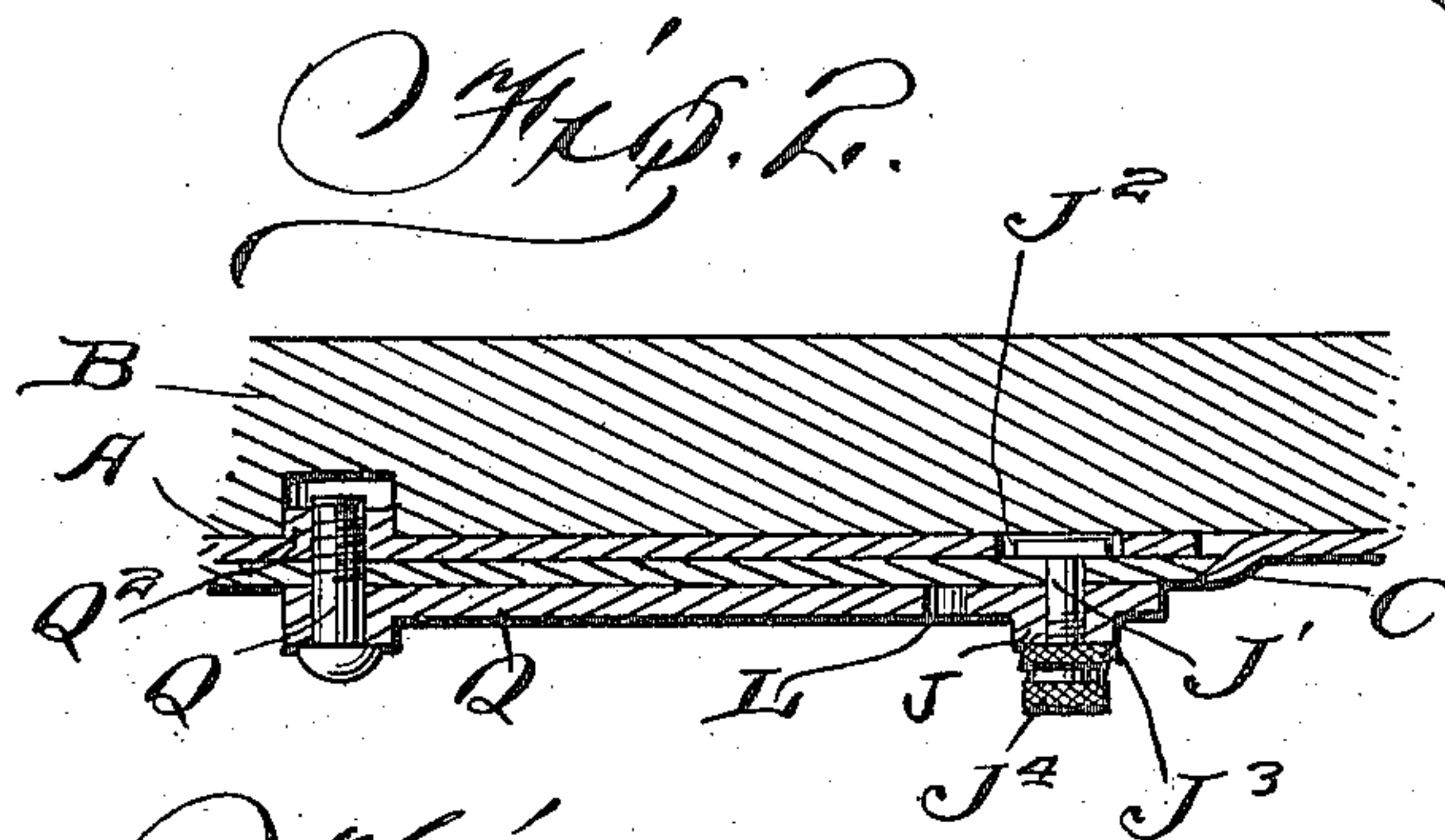
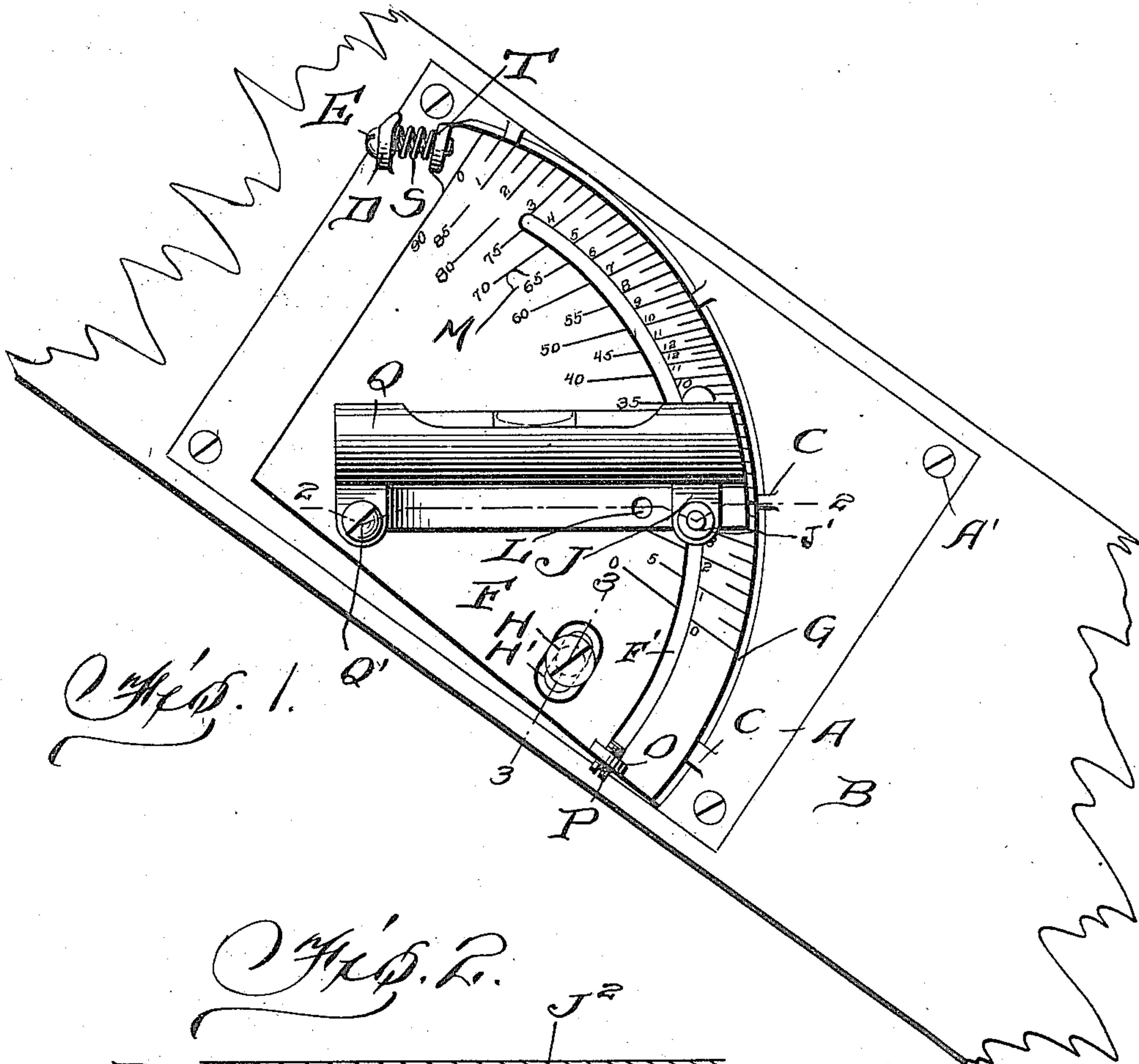


L. BERGH.
SPIRIT LEVEL CLINOMETER.
APPLICATION FILED APR. 14, 1910.

964,199.

Patented July 12, 1910.



Witnesses
Fro. L. Thoms
J. W. Sherwood

Inventor
Louis Bergh.
By *Franklin N. Dwyer*
Attorney

UNITED STATES PATENT OFFICE.

LOUIS BERGH, OF RYE, NEW YORK.

SPIRIT-LEVEL CLINOMETER.

964,199.

Specification of Letters Patent.

Patented July 12, 1910.

Application filed April 14, 1910. Serial No. 555,480.

To all whom it may concern:

Be it known that I, LOUIS BERGH, a citizen of the United States, residing at Rye, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Spirit-Level Clinometers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in clinometers and comprises essentially a movable protractor adjustably held upon a plate adapted to be fastened to a straight edge and provided with graduations to show the pitch of inches to the foot as well as degrees, means being provided to hold a level at any desired pitch and a screw to adjust the device to compensate for wear at the zero graduation.

My invention comprises various details of construction and combinations and arrangements of parts which will be hereinafter fully described and then specifically defined in the appended claims.

I illustrate my invention in the accompanying drawings, in which:—

Figure 1 is an elevation showing the device fastened to a straight edge with the level adjusted horizontally showing a certain pitch of the straight edge to a horizontal. Fig. 2 is a sectional view on line 2—2 of Fig. 1. Fig. 3 is a detail section on line 3—3 of Fig. 1, and Fig. 4 is a detail sectional view showing the manner of holding the level at its farthest limit in one direction.

Reference now being had to the details of the drawings by letter, A designates a plate fastened by screws A' to the straight edge B. Said plate, which is made preferably of metal, has fingers C struck up therefrom at intervals and also has an integral lug D near the upper end of the plate, which lug has a laterally extending recess for the reception of the headed screw E. A protractor F having a curved slot F' adjacent to its curved and beveled edge G, is held upon said plates by the fingers C engaging said beveled edge and also by means of the screw H which passes through a slot H' in the pro-

tractor and whose inner end engages an interiorly threaded boss I integral with the plate A, the beveled head H² of said screw being adapted to engage the beveled edge H³ of the opening H' to hold the protractor in an adjusted position when the screw edge is tightened. A projection O integral with the protractor adjacent to one of its edges is provided with a threaded aperture for the reception of the screw P, one end of which projects in alinement with the slot F'. A level Q is pivotally mounted upon a screw Q' which passes through apertures in the protractor and plate, as shown in Fig. 2 of the drawings, and has its threaded end engaging threads in a boss Q² integral with said plate, whereby it may be held in adjusted positions. The free swinging end of the level has a laterally projecting lug J which is apertured for the reception of a headed screw J', the head of which is seated in the recess J² in the plate A, while the shank of the screw J' passes through registering apertures in the protractor and lug J and a nut J³ with a milled circumference is fitted upon the threaded end of the screw, a jam nut J⁴ also being mounted upon the screw J' for the purpose of holding the nut J³ in an adjusted position.

The screw E is adapted to fit a threaded aperture in a lug T which is integral with the protractor, as shown in Fig. 1 of the drawings. A coiled spring S is interposed between the lugs D and T and bears yieldingly against the same, the tension of the spring being regulated by turning the screw in one direction. Said protractor, it will be noted, has graduations adjacent to its curved marginal edge, indicating rise of inches per foot, and also graduations indicating degrees of angles.

In operation, the clinometer being attached to a straight edge in the manner shown, the straight edge may be set plumb or vertical and the protractor adjusted by loosening the screw H. The adjustment of the protractor is accomplished by means of the screw E held in the lug D, the protractor being held upon the plate as it is adjusted by means of the fingers C and the screw H. If the screw D is turned to the right, the protractor will be pulled up and, if turned to the left, the spring upon the screw D will press the protractor down as much as permitted by said screw. In this manner, the protractor may be moved until

the desired point or true plumb is obtained. Said spring will serve to hold the screw E steady and make the action of the protractor positive when the screw E is loosened. The protractor having been properly adjusted, it may be held in such position by the tightening of the screw H. When the protractor is adjusted as described with the level showing a true horizontal, the straight edge with the instrument may be used as a plumb rule. When it is desired to use it as a level, the thumb screw J may be loosened and the level swung down to zero and adjusted in such position by means of the screw P which is provided to take up any wear incident to the level coming in contact with said screw P. The graduations upon the protractor show from zero to 90° and pitches of inches to foot, both from horizontal and from vertical within the range shown and divided into one-quarter inches.

In the event of it being desired to find out if a piece of timber has a pitch say of eight inches to the foot, which would indicate that for every foot it runs a level distance, the rafter will rise eight inches, the spirit level will be placed at the eight inch graduation upon the protractor and fastened by the screw J, after which the straight edge is laid upon the top of the rafter. If the spirit level shows exactly true level, the pitch of the rafter will be correct.

In the event of the building of a retaining wall if it is desired to have a slope of two inches to every foot in height, which is a difficult problem to solve in common building construction, this slope may be determined by the swinging of the level up to the two inch mark from the top of the instrument and, when held so that the level shows true, the straight edge will give the correct slope of the wall, it mattering not whether the wall is one or twenty-five feet in height. In the same manner any pitch or slope may be found within the range of the scale of the instrument. The same rules apply in getting various degrees, as will be readily understood.

In order to hold the level at its farthest limit in one direction or toward the lug T, a resilient struck up lug or projection M upon the protractor is adapted to contact with the under face of the level and spring into the opening L formed in a lateral projection of the casing of the level and as shown clearly in Fig. 4 of the drawings. A lateral pressure upon the level when it is desired to swing the level after the retaining nuts J⁴ and J³ have been loosened will cause said resilient projection M to retract and allow the level to move freely.

What I claim to be new is:—

1. A clinometer comprising a plate provided with an opening and a threaded aperture and having fingers projecting from the

face thereof, a protractor with graduations thereon and provided with a short slot and with an elongated curved slot, the edge of said protractor being engaged by said fingers, a screw engaging in said threaded aperture and having a beveled head engaging the marginal edges of said short slot, an apertured level pivotally connected to said plate and protractor, a screw having a head seated in said first named opening and extending through said elongated slot and the aperture of said level, a nut fitted to the last named screw, and means for adjusting the protractor.

2. A clinometer comprising a plate provided with an opening and a threaded aperture and having fingers projecting from the face thereof, a protractor with graduations thereon and provided with a short slot and with an elongated curved slot, the edge of said protractor being engaged by said fingers, a screw engaging in said threaded aperture and having a beveled head engaging the marginal edges of said short slot, an apertured level pivotally connected to said plate and protractor, a screw having a head seated in said first named opening and extending through said elongated slot and the aperture of said level, a nut fitted to the last named screw, a lug upon the protractor provided with a threaded aperture, a recessed lug upon the plate, and a screw held in the recess of the lug and engaging in the threaded aperture of the lug upon the protractor.

3. A clinometer comprising a plate provided with an opening and a threaded aperture and having fingers projecting from the face thereof, a protractor with graduations thereon and provided with a short slot and with an elongated curved slot, the edge of said protractor being engaged by said fingers, a screw engaging in said threaded aperture and having a beveled head engaging the marginal edges of said short slot, an apertured level pivotally connected to said plate and protractor, a screw having a head seated in said first named opening and extending through said elongated slot and the aperture of said level, a nut fitted to the last named screw, a lug upon the protractor provided with a threaded aperture, a recessed lug upon the plate, a screw held in the recess of the lug and engaging in the threaded aperture of the lug upon the protractor, and a coiled spring interposed between said lugs upon said plate and protractor.

4. A clinometer comprising a plate provided with an opening and a threaded aperture and having fingers projecting from the face thereof, a protractor with graduations thereon and provided with a short slot and with an elongated curved slot, the edge of said protractor being engaged by said

fingers, a screw engaging in said threaded aperture and having a beveled head engaging the marginal edges of said short slot, an apertured level pivotally connected to
 5 said plate and protractor, a screw having a head seated in said first named opening and extending through said elongated slot and the aperture of said level, a nut fitted to the last named screw, a lug upon the protractor
 10 provided with a threaded aperture, a recessed lug upon the plate, a screw held in the recess of the lug and engaging in the threaded aperture of the lug upon the protractor, a coiled spring interposed between
 15 said lugs upon said plate and protractor, a projection upon the protractor at one end of said elongated slot and provided with a threaded aperture, and an adjusting screw mounted in the aperture of said projection
 20 and in alinement with the elongated slot.

5. A clinometer comprising a plate provided with an opening and a threaded aperture and having fingers projecting from the face thereof, a protractor with graduations
 25 thereon and provided with a short slot and

with an elongated curved slot, the edge of said protractor being beveled and engaged by said fingers, a level pivotally connected to the protractor and having an aperture therein in registration with the elongated
 30 slot, a bushing upon said plate and about the threaded aperture therein, a screw fitting in said threaded aperture and bushing and having a beveled head engaging the bevel about said short slot, a screw having a head seated
 35 in the opening in the plate and extending through the elongated slot and said aperture in the level, a nut upon the screw passing through the slot in the protractor and aperture in said level, and a resilient
 40 lug upon the protractor and adapted to spring into an opening which is provided in said level.

In testimony whereof I hereunto affix my signature in the presence of two witnesses. 45

LOUIS BERGH.

Witnesses:

A. M. HARRIOTT,
 T. E. SNIFFEN.