

UNITED STATES PATENT OFFICE.

WALTER CANTELO, OF SHARON, PENNSYLVANIA.

EXTENSOMETER.

No. 812,181.

Specification of Letters Patent.

Patented Feb. 13, 1906.

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To all whom it may concern:

Be it known that I, WALTER CANTELO, a citizen of the United States, residing at Sharon, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Extensometers; 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.

My invention relates to improvements in extensometers or instruments for use in extension or compression tests to indicate on a greatly-enlarged scale the deformations occurring in the specimen being tested.

My invention will be understood by reference to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 is a perspective view of the instrument on an enlarged scale, and Fig. 2 shows a horizontal section through the upper part of the frame and shows the indicator-arms as broken away.

The instrument includes two extensible side frames, which are adjustably spaced apart, thus constituting a single frame capable of being extended or contracted both longitudinally and laterally. To this frame are connected jointed levers, which, as well as the side frames, are connected to the specimen and travel in opposite directions, one lever carrying a graduated arc and the other lever carrying a pointer, which travels along that arc as the specimen expands or contracts.

The two side frames each consist of a bar A , secured to a tubular sleeve A^2 , and a bar A' , which carries a rod A^0 , having a sliding fit in said sleeve A^2 and provided with a pin a^0 , projecting through the slot a^2 in said sleeve, at one or both sides of which slot are graduations a^3 . By means of this pin and slot the two side frames may be similarly adjusted. There are two of these pins and slots, one on each side of the instrument; but one only is shown in Fig. 1, the other being on the opposite side and hidden. These two side frames are thus each composed of an upper and lower member, the upper member being connected to one part of the specimen and the lower member being connected to the other part of the specimen, with an extensible connection between the two members to permit the expansion or contraction of the specimen. These two extensible side frames are con-

nected together by a telescopic connection, such as the rod B and the sleeve B' , which rod B is provided with a screw-threaded portion b , passing through said sleeve B' and entering the nut B^2 . There are two of these nuts, as shown in Fig. 1, and by means of these the two side frames may be spaced apart as may be desired.

C (shown in dotted lines) represents the specimen, which may be of any suitable shape. Suitable means for connecting the specimen to the instrument are provided, such as the pointed holder D , on one side of the frame, and the notched holder D' , on the other side of the frame, for connecting the frame to the specimen. These holders are preferably detachably connected to the frame, as by means of the nuts d . Pivoted on these holders are the levers E and F , which are preferably provided with extensions E' and F' , hinged thereto, as at e' and f' , so as to be adjusted to any desired position. The arm E' carries the graduated arc E^2 , and the arm F' carries any suitable pointer, such as the needle F^2 .

The levers E and F are provided with suitable studs e and f , respectively, on opposite sides of their pivots, with which studs the links G and H are detachably connected. These links terminate in suitable holding-points D^2 , similar to those already described, which engage the specimen at a predetermined distance from the holders carried by the frame. By having these studs e and f on opposite sides of the fulcrums of their respective levers any expansion or contraction of this specimen will cause the lever-arms E' and F' to move in reverse directions, so that the pointer will move forward or backward over the scale E^2 , as the case may be, and the actual expansion or contraction of the specimen between the holding-points will be greatly magnified in the motion of the pointer over the scale. The arms E' and F' are jointed to the levers E and F , as at e' and f' , so that either the pointer or the scale, or both, may be moved and the instrument set at, say, the zero position whenever desired.

In order to secure greater magnification, the arms E' and F' may be varied in length or they may be made telescopic, if desired. In order to adjust the instrument to specimens of different length, the links G and H may be removed and others of greater or less length may be substituted, if desired. This may be done, as by removing the pins e^2 and d^2 , slip-

ping the link G off of the holder D² and off of the stud e, and then adjusting the members of the side frame to receive a new link whether longer or shorter than the old one.
 5 The opposite link may be removed and a new one supplied in the same way.

It will be obvious that as the specimen expands or contracts so will the members of the extensible side frames move apart or toward
 10 each other.

Where the instrument is used, as indicated, on a vertical specimen, the weight of the arms E' and F' will tend to prevent any in accuracies through lost motion; but where the instrument is to be used in a horizontal position or on a specimen that is in any other
 15 than the vertical position it may be desirable to have springs I and K attached to the levers E and F, respectively, so as to steady the said levers and take up lost motion.
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It will be obvious that various modifications in the herein-described instrument might be made which could be used without departing from the spirit of my invention.

25 Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an extensometer, the combination of the frame adapted to be connected to the specimen, levers pivoted to said frame, and
 30 links connected to said levers on respectively opposite sides of their respective fulcrum and also connected to the specimen at a point distant from said levers, substantially as described.
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2. In an extensometer, the combination of the frame adapted to be connected to the specimen, levers pivoted to said frame, and links connected to said levers on respectively
 40 opposite sides of their respective fulcrum and also connected to the specimen at a point distant from said levers, a graduated scale being carried by one of said levers and a pointer carried by the other lever, substantially as
 45 described.

3. In an extensometer, the combination of the frame adapted to be connected to the specimen, levers pivoted to said frame, and links connected to said levers on respectively
 50 opposite sides of their respective fulcrum and also connected to the specimen at a point distant from said levers, with steadying-springs connected to said levers and to said frames for taking up the lost motion of said levers,
 55 substantially as described.

4. In an extensometer, the combination of the frame adapted to be connected to the specimen, levers pivoted to said frame, and links connected to said levers on respectively
 60 opposite sides of their respective fulcrum and also connected to the specimen at a point distant from said levers, a graduated scale being carried by one of the levers and a pointer carried by the other lever, with steadying-
 65 springs connected to said levers and to said

frame for taking up the lost motion of said levers, substantially as described.

5. In an extensometer, the combination of the frame adapted to be connected to the specimen, levers pivoted to said frame, and
 70 each provided with an arm or extension hinged thereto, and links connected to said levers on respectively opposite sides of their respective fulcrum and also connected to the specimen at a point distant from said levers,
 75 substantially as described.

6. In an extensometer, the combination of the frame adapted to be connected to the specimen, levers pivoted to said frame, and each provided with an arm or extension
 80 hinged thereto, and links connected to said levers on respectively opposite sides of their respective fulcrum and also connected to the specimen at a point distant from said levers, a graduated scale being carried by one of said
 85 arms and a pointer carried by the other arm, substantially as described.

7. In an extensometer, the combination of the frame adapted to be connected to the specimen, levers pivoted to said frame, and
 90 each provided with an arm or extension hinged thereto, and links connected to said levers on respectively opposite sides of their respective fulcrum and also connected to the specimen at a point distant from said levers,
 95 with steadying-springs connected to said levers and to said frames for taking up the lost motion of said levers, substantially as described.

8. In an extensometer, the combination of
 100 the frame adapted to be connected to the specimen, levers pivoted to said frame, and each provided with an arm or extension hinged thereto, and links connected to said
 105 levers on respectively opposite sides of their respective fulcrum and also connected to the specimen at a point distant from said levers, a graduated scale being carried by one of the arms and a pointer carried by the other arm,
 110 with steadying-springs connected to said levers and to said frame for taking up the lost motion of said levers, substantially as described.

9. In an extensometer, the combination of a laterally and longitudinally adjustable
 115 frame, holders mounted in said frame to engage the specimen, levers pivoted to said frame, links connected to said levers on respectively opposite sides of their respective fulcrum, and holders carried by said links and
 120 connected to the frame and adapted to be connected to the specimen at a point distant from said levers, substantially as described.

10. In an extensometer, the combination of a laterally and longitudinally adjustable
 125 frame, holders mounted in said frame to engage the specimen, levers pivoted to said frame, and links connected to said levers on respectively opposite sides of their respective fulcrum, and holders carried by said links and
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connected to the frame and adapted to be connected to the specimen at a point distant from said levers, a graduated scale being carried by one of said levers and a pointer carried by the other lever, substantially as described.

11. In an extensometer, the combination of a laterally and longitudinally adjustable frame, holders mounted in said frame to engage the specimen, levers pivoted to said frame, and links connected to said levers on respectively opposite sides of their respective fulcra, and holders carried by said links and connected to the frame and adapted to be connected to the specimen at a point distant from said levers, with steadying-springs connected to said levers and to said frames for taking up the lost motion of said levers, substantially as described.

12. In an extensometer, the combination of a laterally and longitudinally adjustable frame, holders mounted in said frame to engage the specimen, levers pivoted to said frame, and links connected to said levers on respectively opposite sides of their respective

fulcra, and holders carried by said links and connected to the frame and adapted to be connected to the specimen at a point distant from said levers, a graduated scale being carried by one of the levers and a pointer carried by the other lever, with steadying-springs connected to said levers and to said frame for taking up the lost motion of said levers, substantially as described.

13. In an extensometer, the combination with levers, of means for pivotally connecting said levers to the specimen, links connected to said levers respectively on opposite sides of their respective fulcra, and means for connecting said links to the specimen at a distance from the points of connection of said levers with the specimen, substantially as described.

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

WALTER CANTELO.

Witnesses:

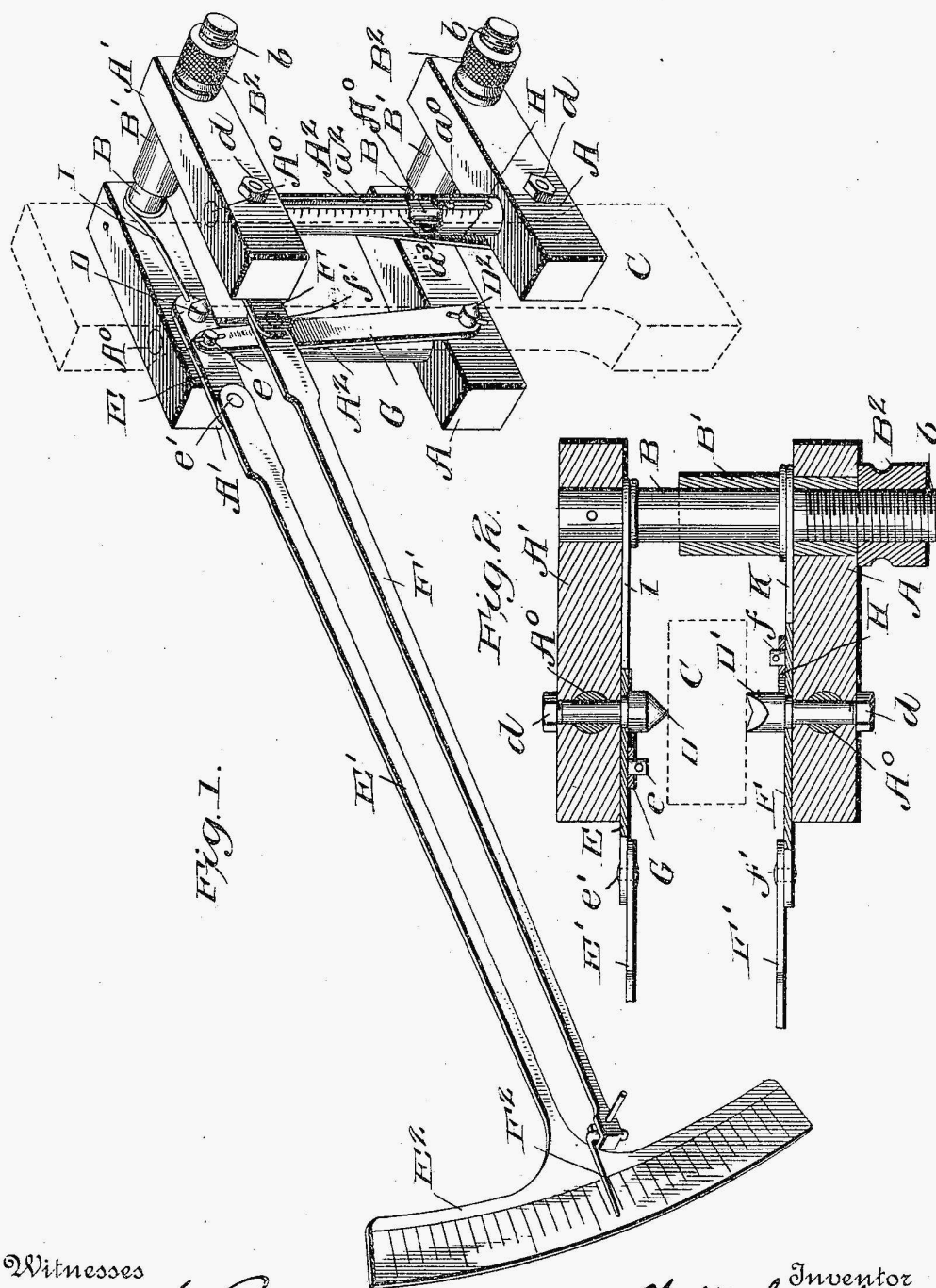
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Witnesses

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