Aug. 4, 1942. R. B. LEWIS 2,292,326

PANTOGRAPH EXTENSOMETER

Filed Dec. 7, 1940

Fig. 1.

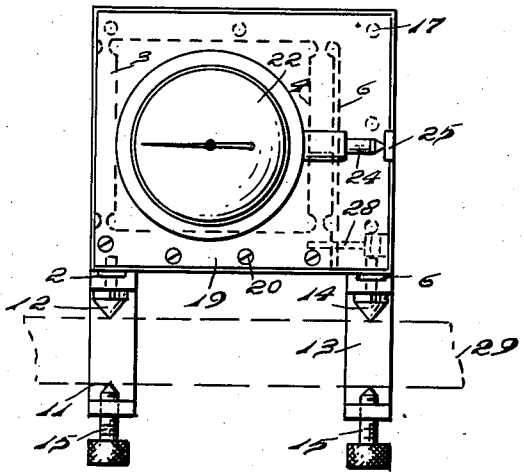


Fig. 2.

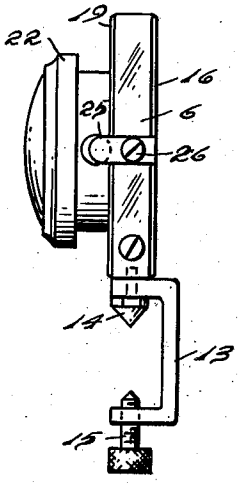


Fig. 3.

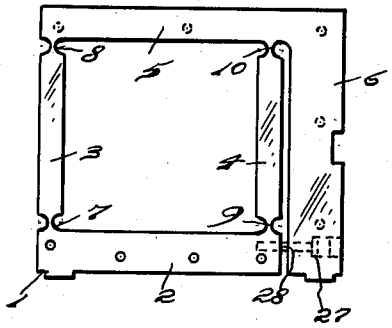


Fig. 4.

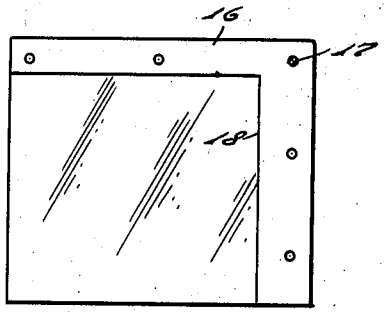


Fig. 5.

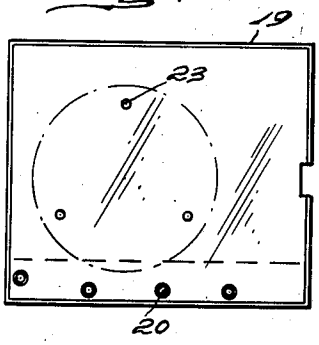


Fig. 6.

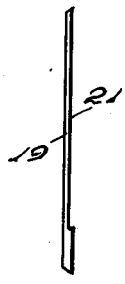
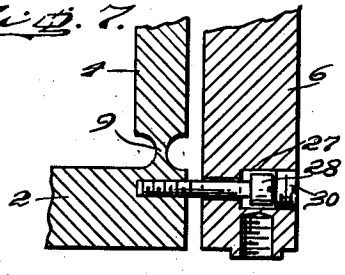


Fig. 7.



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PANTOGRAPH EXTENSOMETER

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Application December 7, 1940, Serial No. 369,064

7 Claims. (Cl. 33—148)

The object of this invention is to devise a novel extensometer in which the number of parts is reduced to a minimum and which will be accurate and reliable in testing stresses to which a specimen is subjected.

The body portion or frame of the extensometer consists of a single member forming relatively movable parts which carry the clamps for the specimen, and in order to prevent abnormal springing of the frame which would be deleterious to its sensitivity and accuracy, a novel front and a novel back plate are connected in a novel manner to the frame. The dial indicator is carried by the front plate and cooperates with an abutment carried by the frame.

With the above and other objects in view as will hereinafter clearly appear, my invention comprehends a novel pantograph extensometer.

Other novel features of construction and advantage will hereinafter clearly appear in the detailed description and the appended claims.

For the purpose of illustrating the invention, I have shown in the accompanying drawing a preferred embodiment of it, which, in practice, will give satisfactory and reliable results. It is, however, to be understood that this embodiment is typical only and the various instrumentalities of which my invention consists can be variously arranged and organized, and the invention is not limited to the exact arrangement and organization of these instrumentalities as herein set forth.

Figure 1 is a front elevation of a pantograph extensometer, embodying my invention.

Figure 2 is an end elevation.

Figure 3 is a plan view of the frame.

Figure 4 is a plan view of the back plate.

Figure 5 is a plan view of the front plate.

Figure 6 is an end view of the front plate.

Figure 7 is a sectional view on an enlarged scale, showing more particularly the manner in which the movement of the frame is regulated.

Similar numerals indicate corresponding parts.

Referring to the drawing:

1 designates the frame which is formed from an integral plate to provide a front number 2, side members 3 and 4, a rear member 5 and a side member 6 connected with the rear member 5 and spaced from the side member 4 and the juxtaposed end of the front member 2.

The side member 3 is weakened or of reduced thickness at 7 and 8 and the side member 4 is weakened or of reduced thickness at 9 and 10. The members 2, 3, 4 and 5 form limbs of a parallelogram with the limbs flexibly connected.

A specimen clamp 11 is secured by the screw of a center point 12 to the front member 2 of the frame 1, and a similar specimen clamp 13 is secured to the front face of the side member 6 by the screw of a center point 14. These center points are preferably spaced the conventional two inches apart. Each clamp has a clamping screw 15 of the same construction and provided with a hardened point in alignment with its cooperating center point.

The frame 1 has a back plate 16 secured to it by screws 17 which are positioned along its rear wall 5 and side member 6. The back plate 16 is recessed at 18 to provide clearance.

A front plate 19 is secured to the frame 1 along its front wall by screws 20. The front plate is recessed at 21 to provide clearance.

A dial indicator 22 is secured to the front plate by fastening devices 23 and its spindle 24 bears against a stop 25 in the form of an arm secured to the side member 6 by a screw 26.

In order to limit the total travel of the member 6, the latter is recessed at 27 to receive the head of a limiting screw 28 which passes through the member 6 and is in threaded engagement with the front member 2 of the frame. The head of the screw 28 has a desired clearance with the inner wall of the recess 27. 30 is a threaded limiting plug.

A conventional specimen 29 is shown in clamped position in Figure 1.

The operation of my novel pantograph extensometer will now be apparent to those skilled in this art and is as follows:

The specimen to be tested is clamped in position as shown in Fig. 1, and the load is applied to the specimen in the well known and conventional manner. The parallel flexure members transmit the movement from the specimen to the indicating mechanism of the dial indicator.

In order to avoid elastic deformation in relative movement between the sides 5 and 6, a recessed cover plate 16 or equivalent bracing member is secured rigidly to these members, eliminating any and all elastic distortion, thus ensuring movement of the center point 14 being definitely and accurately transmitted to the back frame member 5.

The frame is so assembled that movement of one side of the pantograph with relation to the other side of the pantograph is transferred without distortion.

The frame can be considered as a member such as 2, connected with an angle bracket such as 5 and 6, by flexible aligning members in such a

manner that movement of the member and angle bracket are associated to accurately transfer relative movement within the system.

In order to avoid elastic deformation between members **5** and **6**, the recessed cover plate **16** is secured rigidly to these members, eliminating any and all elastic distortion, and thus ensuring the movement of the center point **14** being definitely and accurately transmitted to the rear frame member.

The frame is so assembled that movement of one side of the pantograph with relation to the other side of the pantograph is transmitted without distortion.

One can always start from a base length.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a pantograph extensometer, a rectangular frame comprising a member, an angle bracket, flexible aligning members connecting said member and angle bracket, center points carried by said member and one side of said angle bracket, and a brace member having marginal portions rigidly secured to opposite ends of said angle bracket to eliminate any and all elastic distortion between them, thus ensuring movement of the center point carried by one side of the angle bracket being definitely and accurately transmitted to the otiher side of said angle bracket.

2. In a pantograph extensometer, a rectangular frame having a front wall, an angular rear wall and flexible aligning members connecting said front and rear walls, a brace member having marginal portions rigidly secured to opposite ends of said angular rear wall to eliminate any and all elastic distortion between said sides, and a dial indicating the relative movement between said walls.

3. In a pantograph extensometer, a rectangular frame having front and rear members connected by side spacers having flexing portions, and having a side member fixed to the rear member and extending along and spaced from a juxtaposed side spacer, specimen clamps secured respectively to said front member and the free end of said side member, a brace member rigidly connected at marginal portions to opposite ends of an angle formed by said side and rear members to reinforce said side and rear members to eliminate elastic distortion between them, an abutment on said side member, and a dial indicator operatively supported by said front member and having its spindle contacting said abutment.

4. In a pantograph extensometer, a rectangular frame having front and rear members connected by side spacers having flexing portions, and having a side member extending from the rear member along and spaced from the juxtaposed side spacer, specimen clamps secured respectively to said front member and the free end of said side member, a back plate fixed to said side and rear members, a front plate fixed to said front member, an abutment on said side member, a dial indicator secured to said front plate and having its spindle contacting said abutment, and means to limit relative movements of said front member and side member.

5. In a pantograph extensometer, a frame in the form of a parallelogram having front and rear members spaced and connected by side spacers having flexible portions, and having an arm fixed to one of said members, specimen clamps secured respectively to one of said members and said arm, a brace member having marginal portions rigidly secured to said arm and the member to which it is fixed to reinforce such arm and member and prevent elastic distortion between them, a dial indicator in fixed connection with said front member, and an abutment on said arm with which the spindle of said dial indicator contacts.

6. In a pantograph extensometer, a frame in the form of a parallelogram having front and rear members spaced and connected by side spacers having flexible portions, and having an arm integral with one of said members, specimen clamps secured respectively to one of said members and said arm, a back plate secured to said arm and to one of said members to prevent elastic distortion between them, a front plate secured to the other of said members, said plates being recessed to provide for clearance with juxtaposed movable parts of said frame, a dial indicator fixed to said front plate, and an abutment on said arm with which the spindle of said dail indicator contacts.

7. In a pantograph extensometer, a frame in the form of a parallelogram having front and rear members spaced and connected by side spacers having flexible portions, and having an arm integral with one member and extending along the side of an adjacent member, specimen clamps secured respectively to the frame and the arm, a back plate fixed at marginal portions to said arm and its integral member, and a dial indicator connected with said front member and cooperating with said arm.

ROBERT B. LEWIS.