L. KAPLAN.

CALIPERS.

APPLICATION FILED SEPT. 14, 1917.

1,317,708.

Patented Oct. 7, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

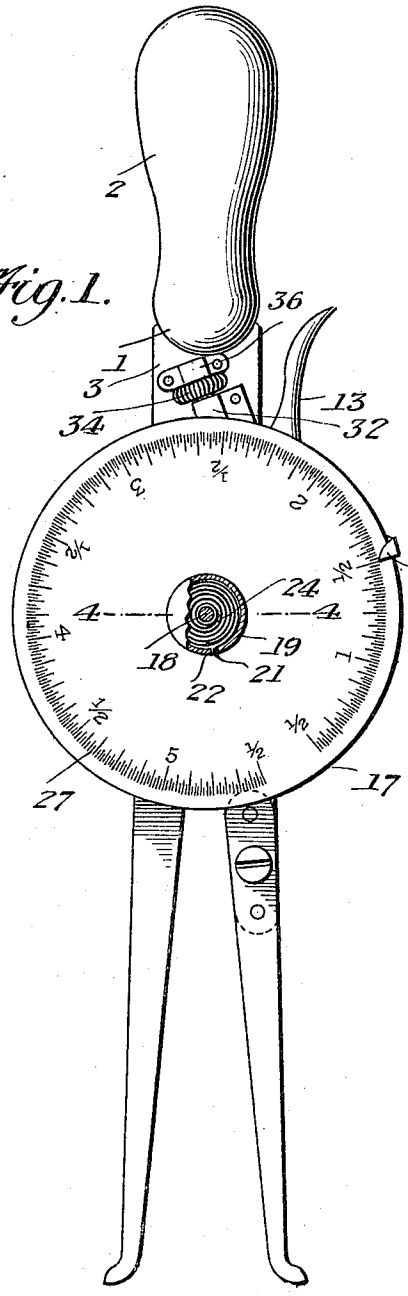
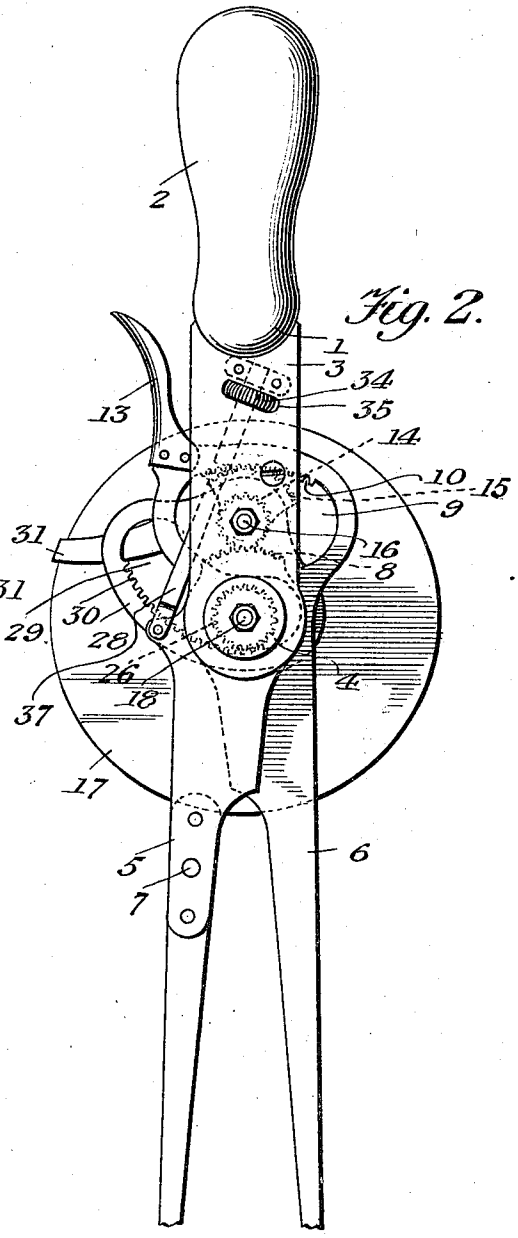


Fig. 2.



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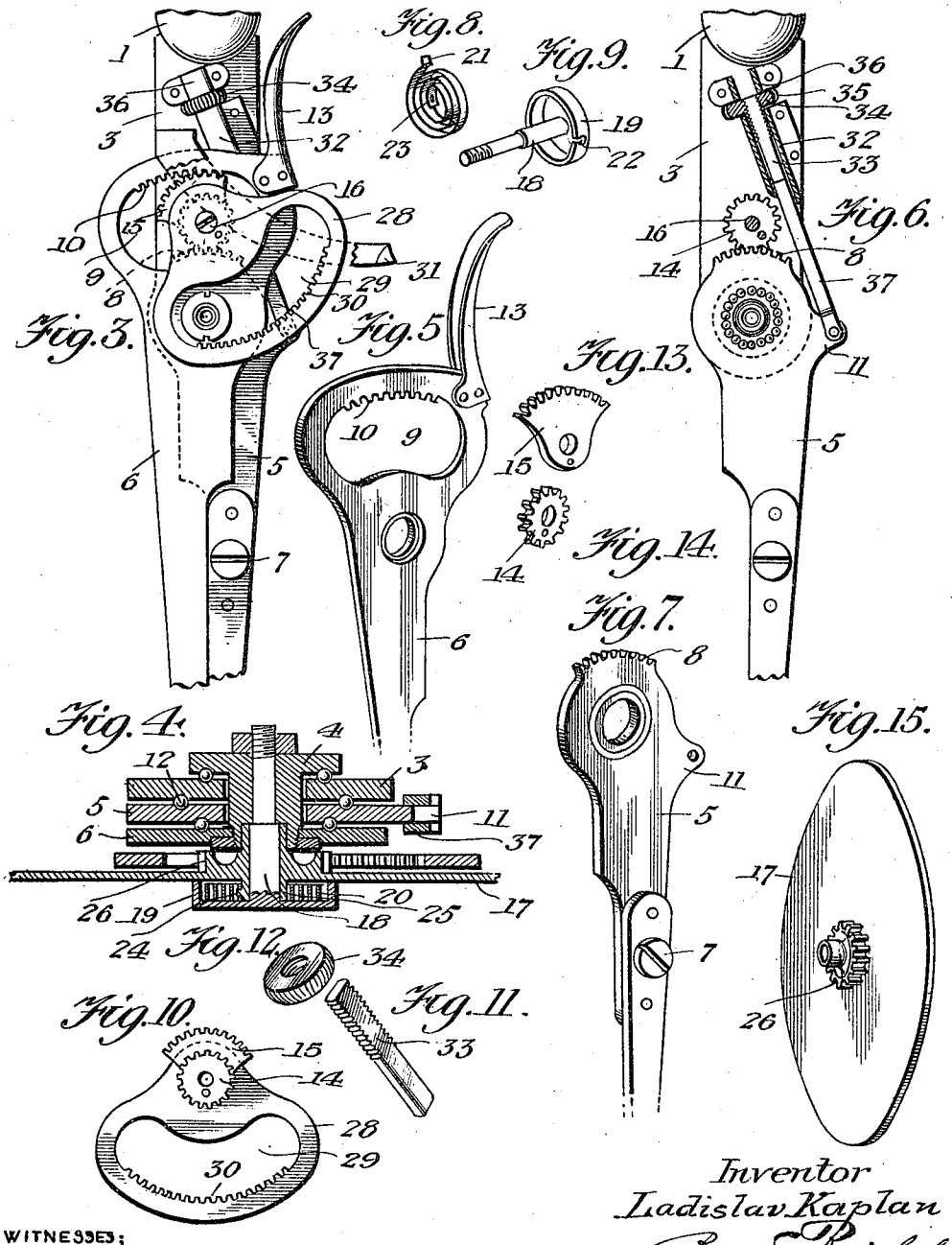
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CALIPERS.

1,317,708. Specification of Letters Patent. Patented Oct. 7, 1919.

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To all whom it may concern:

Be it known that I, LADISLAV KAPLAN, a citizen of the United States, residing at Clinton, in the county of Middlesex and State of Connecticut, have invented a new and useful Calipers, of which the following is a specification.

This invention relates to certain new and useful improvements in calipers and particularly to that type which is known in the art as inside calipers.

The main object of this invention is to provide a calipering device which consists of two arms pivotally mounted upon a handle and a means associated with the arms so that a movement of one correspondingly moves the other arm in an opposite direction to the same degree.

Another object of the invention is to provide a rotating indicator which acts in unison with the opening and closing movements of the arm members and readily shows at a glance the distance between the arm members.

A further object of the invention is to provide an inside calipering device which may be manually operated to bring the arms together in a closely related position so that the device may be readily applied to the interior of the article to be measured and a spring tension means for spreading or opening the arms to ascertain the measurement.

A still further object is to provide an inside calipering device with a stop means whereby the degree of outward movement of the arms may be regulated or set.

Other objects and aims of the invention, more or less broad than those stated, together with the advantage inherent, will be in part obvious and in part specifically referred to in the course of the following description of the elements, combinations, arrangement of parts, and applications of principals constituting the invention; and the scope of protection contemplated will appear from the claims.

In the accompanying drawings, which are to be taken as a part of this specification, and in which I have shown a merely preferred form of embodiment of the invention, Figure 1 is a front elevation partly broken away to give a clearer view of a detailed part; Fig. 2 is a rear elevation showing the manner in which the various parts intermesh with each other; Fig. 3 is a partial front elevation with the indicating dial removed to more clearly illustrate the parts thereunder; Fig. 4 is a section on line 4—4 Fig. 1; Fig. 5 shows the movable arm to which is attached the trigger by which the instrument is manually manipulated in one direction; Fig. 6 is a view of the movable arm and the stop mechanism associated therewith; Fig. 7 is a perspective view of the arm shown in Fig. 6 illustrating more fully the interchangeability of a section thereof; Figs. 8 and 9 respectively the coil spring and the cap member into which it is seated; Fig. 10 is a detail view of the intermeshing gear element and its associated part; Figs. 11 and 12 respectively are views of the adjustable stop member and its operative nut; Fig. 13 represents the gear segment that meshes with the trigger arm; Fig. 14 is the gear wheel that meshes with the opposite arm and Fig. 15 is a perspective view of the rear face of the dial. In the several views like reference numerals indicate similar parts.

Referring to the drawings more in detail 1 indicates a handle which is composed of a gripping portion 2 constructed of any suitable material and into this gripping portion is securely seated a metal extension 3. This metal extension and the gripping portion constitute what I term the handle of the caliper. Pivotally mounted adjacent the end of the metal extension 3 on a hub 4 is a pair of caliper arms 5 and 6 one of which may be made detachable as at 7 for the purpose of substituting another arm of slightly different formation so that the instrument may be used to accomplish its purpose on articles of various shapes. The arm 5 is provided with a gear segment 8 while the opposed arm 6 is cut out as at 9 and provided with a gear segment 10 facing inward or toward the segment 8 on the arm 5.

Integral with the arm 5 is a lateral extension 11 the purpose of which will be hereinafter referred to. To enable the arms to move rather freely ball bearings 12 are arranged between the various movable parts around the pivoted centers. One of the arms, preferably 6, is provided with an operating trigger 13 by which it is manipulated in one direction.

A corresponding degree of movement, but in the opposite direction, is transmitted to the arm 5 by the operation of arm 6, through the employment of a gearing element which meshes with the gear segments 8 and 10 on the arms 5 and 6 respectively. This gear element is composed of a pinion 14 and a segmental gear 15, secured together in any suitable manner and rotatably mounted upon stud 16 secured to the handle.

In order that the space between the arms may readily be ascertained, when the arms are separated, without the use of a rule, or similar article, I employ a dial member 17 which is rotatably supported on a shaft 18. On one end of the shaft 18 there is a cap member 19 in which a coiled spring 20 is housed. The outer convolution of the spring is provided with an offset portion 21 which is adapted to interlock into the slot 22 in the cap member and the inner convolution is perforated as at 23 so as to interlock with a bur 24 formed on a sleeve 25 securely fastened to the dial member 17. This coil spring constitutes a tension means which causes the arms to always travel outward when the manual pressure is released. To the rear face of the dial member 17 and mounted securely upon the sleeve 25 is a spur gear 26. The face of the dial adjacent its periphery is provided with calibrations 27.

Connected with the gear element that causes the arms to move together is a segmental plate 28 which has a cut out portion 29 and an inwardly directed gear segment 30 which meshes with the spur gear 26 on the dial 17 and therefore causes the dial to rotate correspondingly according to the degree of movement of the arms. A pointer 31 secured in any suitable manner to handle coacts with the calibrations on the dial to indicate the amount of movement.

In order that the degree of movement of the caliper arms may be limited in their outward movements, I provide a novel stop mechanism which is constructed as follows. Secured to the handle is a U shaped housing 32 within which is slidably mounted a screw member 33 the adjustments of the same being controlled by a milled nut 34. A slot 35 is made in the handle to accommodate the nut 35. An auxiliary housing 36 is provided to protect the rear end of the screw member 33. Pivotally mounted on the lateral extension 11 of the arm 5 is a plunger 37, the free end of which extends within the housing 32 and coacts with the screw 33 when the device is set for any limit of outward movement.

The operation of the device is as follows: When an inside measurement of any article is desired, manual pressure is brought to bear upon the trigger 13 which causes, through the intergearing means, both arms to move toward each other and in this condition the caliper arms may be inserted within the article. The pressure is then released and the spring tension causes the arms to move in a reversed direction, or in other words outwardly, until the ends of the arms contact with the interior walls of the article being measured. The amount of space between the separated arms will be designated on the dial by the hand 31. Now if it is desired that the device should be set for any reason, as for future measurements, all that is necessary to do is to manipulate the milled nut 34 until the screw member 33 abuts against the end of the plunger 37. This will prevent the arms from spreading under the tension of the spring beyond this set position when the caliper is removed from the article.

I claim:

1. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a trigger secured to one of said arms, and gear means carried by the arms and operatively connected with the trigger whereby movement of the trigger relative to said handle is correspondingly transferred in the opposite direction to the other arm.

2. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a gearing carried by the arms and means carried by one of said arms and having operative connection with the gearing whereby a movement of one of said arms relative to said handle is correspondingly transferred in the opposite direction to the other arm.

3. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, gear means carried by the arms, means carried by one of said arms and having operative connection with said gear means whereby a movement of one of said arms relative to said handle is correspondingly transferred in the opposite direction to the other arm, and a spring tension means carried by said pivot for returning said arms.

4. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a trigger secured to one of said arms, gear means carried by the arms and operatively connected with the trigger whereby a movement of the trigger relative to said handle is correspondingly transferred in the opposite direction to the other arm and a means for indicating the degree of movement of said arms.

5. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a trigger secured to one of said arms, gearing carried by the arms and operatively connected with the trigger whereby a movement of the trigger relative to said handle is correspondingly transferred in the

opposite direction to the other arm and a dial for indicating the degree of movement of said arms.

6. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a trigger secured to one of said arms, gear means carried by the arms and operatively connected with the trigger whereby a movement of the trigger relative to said handle is correspondingly transferred in the opposite direction to the other arm, and a rotatable dial geared to said gear means for indicating the degree of movement of said arms.

7. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a trigger secured to one of said arms, gear means carried by the arms and operatively connected with the trigger whereby a movement of the trigger relative to said handle is correspondingly transferred in the opposite direction to the other arm, and a stop for limiting the degree of movement of said arms in one direction.

8. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a trigger secured to one of said arms, gear means carried by the arms and operatively connected with the trigger whereby a movement of the trigger relative to said handle is correspondingly transferred in the opposite direction to the other arm, and an adjustable stop for limiting the degree of movement of said arms in one direction.

9. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a positive means on one of said arms and gear means carried by the arms and having operative connection with said positive means whereby a movement of one of said arms relative to said handle is correspondingly transferred in the opposite direction to the other arm, a spring tension means carried by said pivot for moving the arms in the return direction and a stop for limiting the degree of movement of said arms caused by the spring tension means.

10. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a gear segment arranged on each arm, gearing carried by one of said arms intermeshing with said gear segments whereby the arms are moved simultaneously in opposite directions, and a trigger secured to one of said arms and operatively connected with the gearing and adapted to cooperate with said handle for causing said movement.

11. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a gear segment arranged on each arm, gearing intermeshing therewith whereby the arms are moved together relatively to said handle in opposite directions, a rotatable dial mounted on said handle and means on the dial having operative connection with the gearing for rotating the dial in accordance with the movements of the arms.

12. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a gear segment arranged on each arm, gearing intermeshing therewith whereby the arms are moved together relatively to said handle in opposite directions, a rotatable dial mounted on said handle and a multiplying gear having operative connection with the intermeshing gear for increasingly rotating the dial in accordance with the movements of the arms.

13. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, a gear segment arranged on each arm, a gearing intermeshing therewith whereby the arms are moved together relatively to said handle in opposite directions, a rotatable dial, a spur gear attached thereto, and a gear segment having connection with the gearing and adapted to mesh with the spur gear to rotate the dial in accordance with the movements of the arms.

14. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, means connected with the arms whereby a movement of one of said arms relatively to said handle is correspondingly transferred in the opposite direction to the other arm and a stop located on the handle adapted to coact with one of the movable arms for limiting the degree of movement of said arms.

15. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, means carried by the arms whereby a movement of one of said arms is correspondingly transferred in the opposite direction to the other arm and an adjustable stop located on the handle adapted to coact with one of the movable arms for limiting the degree of movement of said arms.

16. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, means carried by the arms whereby a movement of one of said arms relatively to said handle is correspondingly transferred in the opposite direction to the other arm and a stop mechanism consisting of an adjustable member arranged on the handle and adapted to coact with one of the movable arms for limiting the degree of movement of said arms.

17. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, gear means carried by the arms whereby a movement of one of said arms relatively to said handle is correspondingly transferred in the opposite direction to the other arm and a stop mechanism consisting of an adjustable screw member arranged on

the handle and adapted to coact with one of the movable arms for limiting the degree of movement of said arms.

18. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, means carried by the arms whereby a movement of one of said arms relatively to said handle is correspondingly transferred in the opposite direction to the other arm and a stop mechanism consisting of a housing located on the handle, an adjustable member within the housing, and means on one of the movable arms coacting with the adjustable member for limiting the degree of movement of said arms.

19. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, means carried by the arms whereby a movement of one of said arms relatively to said handle is correspondingly transferred in the opposite direction to the other arm and a stop mechanism consisting of a housing located on the handle, an adjustable screw member within the housing, and means on one of the movable arms coacting with the adjustable screw member for limiting the degree of movement of said arms.

20. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, means carried by the arms whereby a movement of one of said arms relatively to said handle is correspondingly transferred in the opposite direction to the other arm and a stop mechanism consisting of a housing located on the handle, an adjustable member within one end of the housing, and means carried by one of the movable arms and adapted to abut against the end of the adjustable member within the housing for limiting the degree of movement of said arms.

21. In a calipering device consisting of a handle, a pair of arms pivotally mounted thereon, means carried by the arms whereby a movement of one of said arms relatively to said handle is correspondingly transferred in the opposite direction to the other arm and a stop mechanism consisting of a housing located on the handle, an adjustable member within the housing, a plunger secured to one of the movable arms and adapted to coact with the adjustable member within the housing for limiting the degree of movement of said arms.

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

LADISLAV KAPLAN.

Witnesses:
CHAS. H. B. STEFAULK,
E. L. KNUPFER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."