July 27, 1926. 1,593,753

P. J. DARLINGTON

MICROMETER CALIPER

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Fig. 1

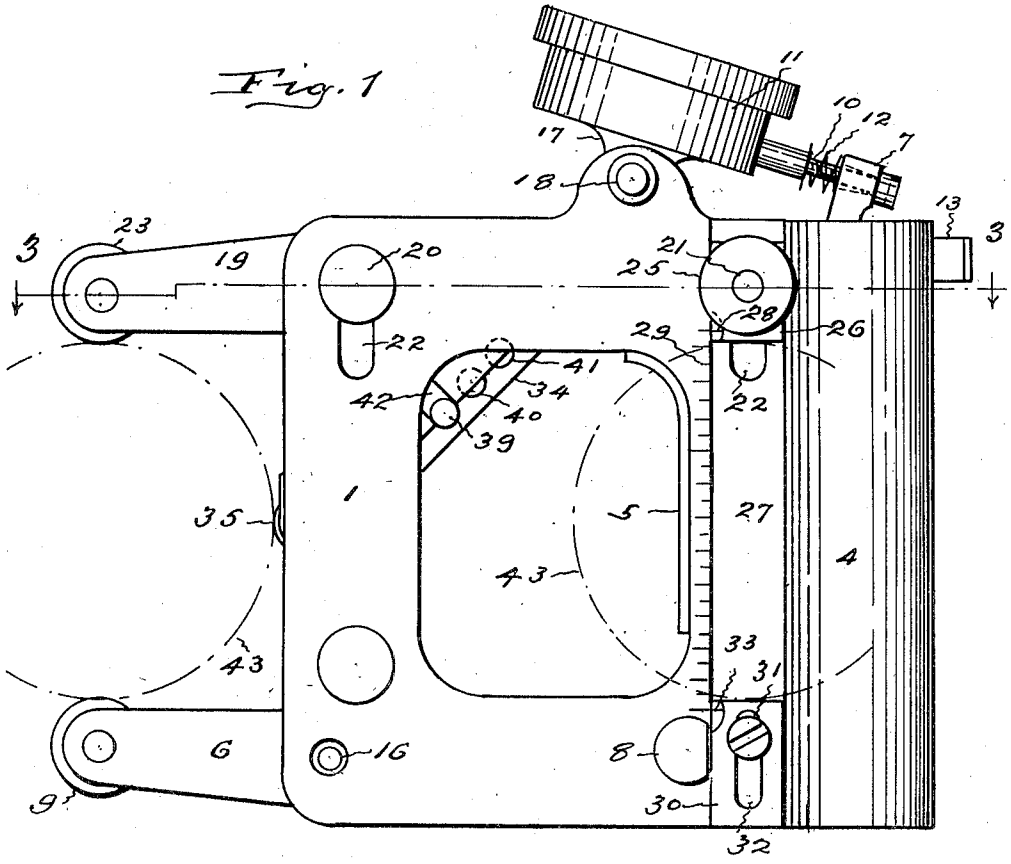
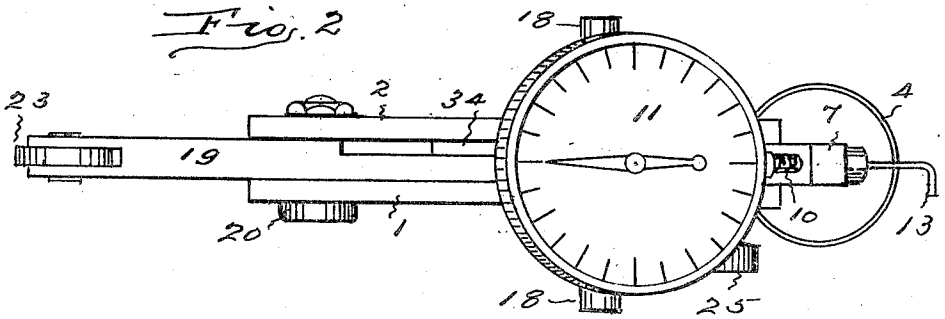


Fig. 2



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Fig. 3

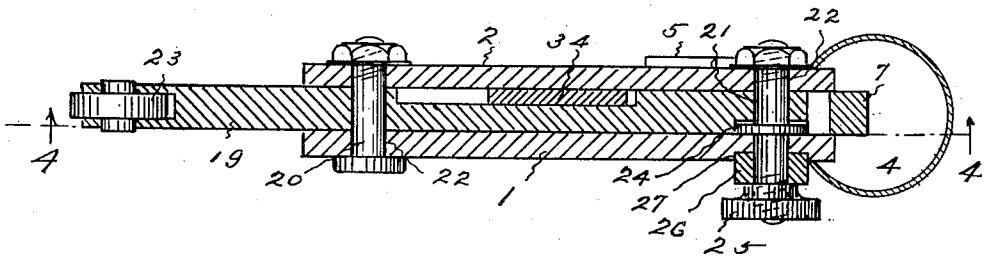
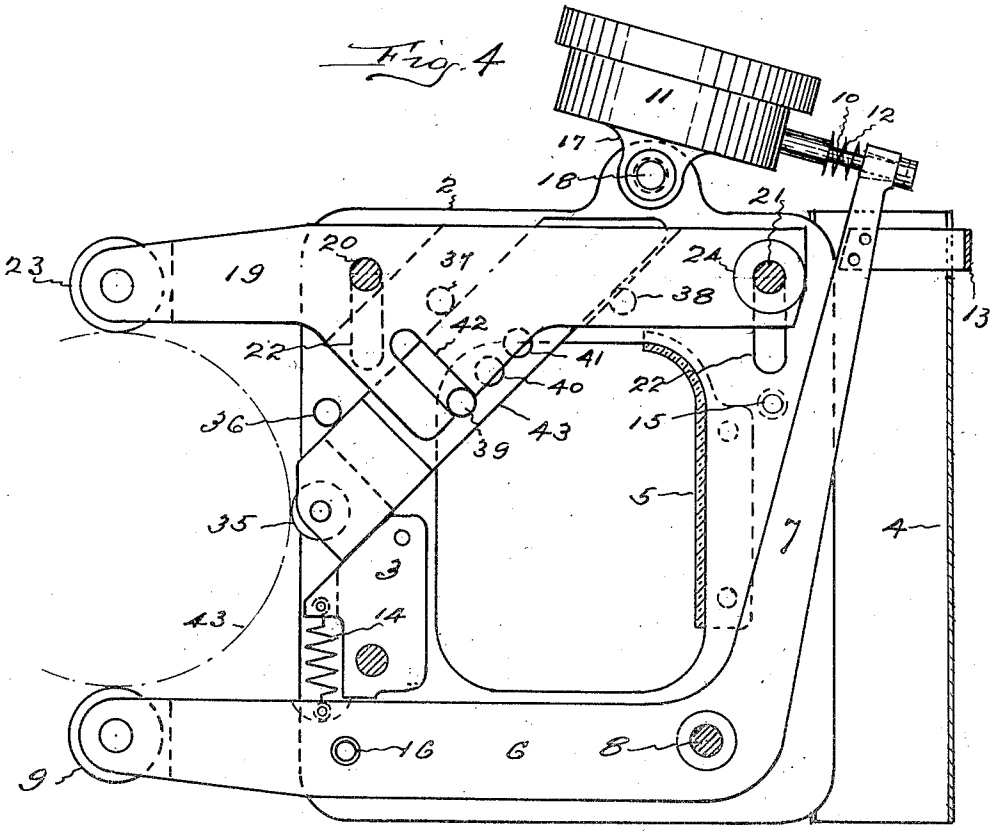


Fig. 4



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UNITED STATES PATENT OFFICE.

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MICROMETER CALIPER.

Application filed March 26, 1925. Serial No. 18,398.

This invention relates to micrometer calipers, and especially to those of the comparator type used in measuring small differences in diameter between reference standards to which the micrometers are set at zero, and objects in process of reduction to the sizes of the standards.

The object of the present invention is to provide an instrument of this character which is relatively cheap to manufacture and has increased accuracy and adaptability over those of similar character which are in common use.

In the accompanying drawings Fig. 1 shows a side elevation of an instrument that embodies the invention. Fig. 2 shows a plan of the same. Fig. 3 is a horizontal section on the dotted line 3—3 on Fig. 1. Fig. 4 is an elevation with a part of the frame removed, the plane of separation being that indicated by the dotted line 4—4 on Fig. 3.

The frame of the device illustrated is composed of two rectangular plates 1 and 2 having central openings, which are clamped together face to face with an intermediate space block 3 near the front. At the back the frame plates are connected by a hand grip 4, preferably of tubular form, that is removably attached to the frame plates and encloses the opening between them. The frame plates are also connected in front of the hand grip by a finger grip 5, desirably made of heat insulating material.

The movable calipering member, which is in the shape of an angle lever that has a horizontal arm 6 and a substantially vertical arm 7, is pivoted on a stud 8 so as to swing between the frame plates. The outer or front end of the horizontal arm of this lever has an anvil 9, which is shown in the form of a roll, but may be made in any other desired shape. This anvil is designed to contact with the bottom of the object to be calipered,—the reference standard when the instrument is being set, or the piece in process of reduction which is to be compared with the standard. The upper end of the lever is adjustably connected by means of a screw 10 with the stem of a multiplying indicator or dial gage 11. A spring 12 is located on the screw between the upper end of the lever and the stem of the gage for the purpose of taking up any lost motion due to the looseness of the screw thread. A thumb piece 13 is attached to the lever near the upper end and extends backward through the hand grip in position to be engaged by the thumb of the hand holding the instrument. A spring 14 is connected between the horizontal arm of the lever and the space block for the purpose of normally lifting this end of the lever. A pin 15 is removably inserted into the frame in position to act as a stop which will limit the inward movement of the upper arm of the lever. A hole 16 is drilled through the frame plates and the horizontal arm of the lever. In order to lock the lever in its neutral or zero position during the adjustment of the instrument the pin 15 is withdrawn from its normal stop position and thrust through this hole. The gage is held with its lug 17 extending between the frame plates, by a pin 18 which projects on both sides beyond the gage so as to act as a guard or protection therefor when the device is laid down.

The normally stationary calipering member is in the form of a horizontally extending arm 19 adjustably secured between the frame plates near the top. This arm is clamped in position by bolts 20 and 21 that pass through the arm and through slots 22 in the frame plates. The outer or front end of this arm has an anvil 23 which is illustrated as in the form of a roll but may be any other suitable shape. When the nuts on the bolts 20 and 21 are loosened the arm is free to be adjusted up and down within the limits of the slots, so as to carry the anvil on this calipering member more or less toward or from the anvil on the other calipering member. The bolt 21 acts as a pivot member for the arm 19 during the process of finally adjusting the arm. The bolt 21 by means of its collar and thumb nut is first located and held in position. Then the arm is adjusted around it, as on a pivot, after which the nut on the other end of the bolt is tightened to affect an additional clamping of the parts. After adjustment to the desired position the nuts are tightened so as to clamp this member in place. The rear clamping bolt 21 has a collar 24 and a thumb nut 25 and it carries a block 26 that is fitted to slide in the vertical groove 27 in the frame plate when the arm is adjusted. This block extends out from the frame plate and has an index mark 28 that is adapted

to register with graduations 29 on the frame plate along the edge of the groove. In the lower end of the groove is a block 30 held by a screw 31 that passes through a slot 32 in the block. This block extends out from the frame plate and has an index mark 33 adapted to register with the graduations on the frame plate.

An adjustable locating member or center stop 34 provided with a roller 35 is arranged obliquely between the frame plates. This stop is guided by the upper edge of the space block and the pins 36, 37 and 38 so that it will move, when adjusted, at substantially an angle of 45 degrees with relation to the horizontal axis of the stationary calipering member. This center stop has a pin 39 that may be set in the location shown, or in either of the perforations 40 or 41, and it projects into a slot 42 in the stationary calipering arm, which slot extends at an angle of 45 degrees to the horizontal axis of the arm or at right angles to the direction of movement of the center stop. As a result of this connection between the center stop and the normally stationary calipering member the center stop is caused to move downward and forward or up and back, as the calipering member is adjusted down or up, one-half of the distance of the vertical movement of the calipering member. In other words, the center stop is moved by the adjustable calipering member, so that its end is always substantially opposite the center of a body placed between the calipering members, and the same distance from the object center as the anvils on the calipering members.

When the device is to be used the stop pin 15 is inserted in the hole 16 so as to hold the swinging calipering member with the gage pointer in zero position. The pin 39 in the center stop and the lower block 30 on the frame are secured in their respective adjustments for the anvils with which the calipering members are equipped. The upper block 26 is set from the lower block approximately by the graduations, for the diameter to be produced. The reference standard, represented as cylindrical by the dotted circle 43, is placed upon the lower block and the upper block is moved down against the standard and clamped in place, as shown at the right on Fig. 1. The reference standard is then removed from this position and placed between the anvils, as indicated at the left of Fig. 1, and the outer end of the stationary calipering member is brought down, swinging around bolt 21 as a pivot, until its anvil rest upon the standard diametrically opposite the anvil of the movable calipering member. The stationary calipering member is then clamped in that position, after which the pin 15, that has been employed to hold the lever 6 with the gage indication at zero during the adjustment of the stationary calipering member, is withdrawn and the swinging calipering member released, the pin being replaced in its normal position where it acts as a limit stop for the swinging member. With the instrument in this condition the gage will indicate very slight variations from the standard used, of any piece of work placed between the anvils.

The invention claimed is:—

1. A caliper comprising a frame, a normally movable calipering member and a normally stationary calipering arm mounted on said frame, a pivot member journalled in said arm, means adjustably securing said pivot member to said frame, a clamping member adapted to secure said arm to said frame in adjusted angular position on said pivot member, and a gage adapted to indicate the relation of the movable calipering member to the stationary arm.

2. A caliper comprising a frame, a normally stationary calipering member, means adjustably securing said stationary member on said frame, a normally movable calipering member mounted on said frame, a gage actuated from and indicating the position of said movable calipering member with relation to said stationary calipering member, and means for locking said movable member and holding said gage with its indication in zero position while said stationary member is being adjusted.

3. A caliper comprising a frame formed with two parallel slots, a normally movable calipering member mounted on said frame, a pivot member adjustably secured in one of said slots, a normally stationary calipering arm journalled on said pivot member, a clamping member in the other slot adapted to secure said arm in angular adjustment around said pivot member, and a gage adapted to indicate the relation of the movable calipering member to the stationary calipering member.

4. A caliper comprising a frame, a normally movable calipering member mounted on the frame, a normally stationary calipering member mounted on the frame, means whereby said stationary member may be adjusted toward and from said movable member, a stop member movably mounted on the frame, means connecting said stop member with said stationary member whereby the stop member is automatically adjusted with relation to said other members by the adjustment of the stationary member, and a gage mounted on the frame and connected with and adapted to indicate the relation of the movable calipering member to the stationary calipering member.

5. A caliper comprising a frame, a normally movable calipering member mounted on the frame, a normally stationary caliper-

ing member mounted on the frame, means whereby said stationary member may be adjusted toward and from said movable member, an index block movable with said stationary member, a complementary index block attached to the frame, and a gage mounted on the frame and connected with and adapted to indicate the relation of the movable calipering member to the stationary calipering member.

6. A caliper comprising a frame, a normally movable calipering member mounted on said frame, a pivot member adjustably secured on said frame, a normally stationary calipering arm journalled on said pivot member, means for clamping said arm to said frame in adjusted angular position around said pivot member, and means projecting from said pivot member and co-operating with a part of said frame whereby the distance between said projection and frame part indicates the dimension to be measured by the calipering member and calipering arm.

7. A caliper comprising a frame, a normally movable calipering member mounted on the frame, a normally stationary calipering member mounted on the frame, means whereby said stationary member may be adjusted toward and from said movable member, a stop member adjustable on the frame at an angle of 45 degrees to the adjusting movements of said stationary member, means connecting the stop member with the stationary member whereby the adjustment of the latter member adjusts the former member, and a gage mounted on the frame and connected with and adapted to indicate the relation of the movable calipering member to the stationary calipering member.

8. A caliper comprising a frame, an oscillatory calipering member pivotally mounted on the frame, a normally stationary calipering member clamped near each end to the frame and adjustable parallel to its axis toward and from said movable member, a stop member movable obliquely on the frame, means movably connecting said stop member with the stationary member, and a gage mounted on the frame and connected with and adapted to indicate the relation of the movable calipering member to the stationary calipering member.

9. A caliper comprising a frame consisting of two plates secured face to face with a spacing block between, a normally movable calipering member pivoted between said plates, a normally stationary calipering member adjustably mounted between said plates, means whereby said stationary member may be adjusted toward and from said movable member, and a gage mounted on the frame and connected with and adapted to indicate the relation of the movable calipering member to the stationary calipering member.

10. A caliper comprising a frame, a tubular hand grip detachably applied to the frame, a normally movable calipering member mounted on the frame, a normally stationary calipering member mounted on the frame, means whereby said stationary member may be adjusted toward and from said movable member, and a gage mounted on the frame and connected with and adapted to indicate the relation of the movable calipering member to the stationary calipering member.

11. A caliper comprising a frame, a normally movable calipering member mounted on the frame, a normally stationary calipering member mounted on the frame, means whereby said stationary member may be adjusted toward and from said movable member, a stop member, and means connecting the stop member and said adjustable stationary member for displacing the end of said stop member at right angles to the movement of the stationary member one-half of the distance of adjustment of said stationary member.

12. A caliper comprising a frame, a normally movable calipering member mounted on the frame, a normally stationary calipering member mounted on the frame, means whereby said stationary member may be adjusted toward and from said movable member, and a stop member automatically adjusted by the adjusting movements of the stationary member.

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