G. H. ALLINGTON.

MICROMETER GAGE.

APPLICATION FILED NOV. 20, 1915.

1,186,364.

Patented June 6, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

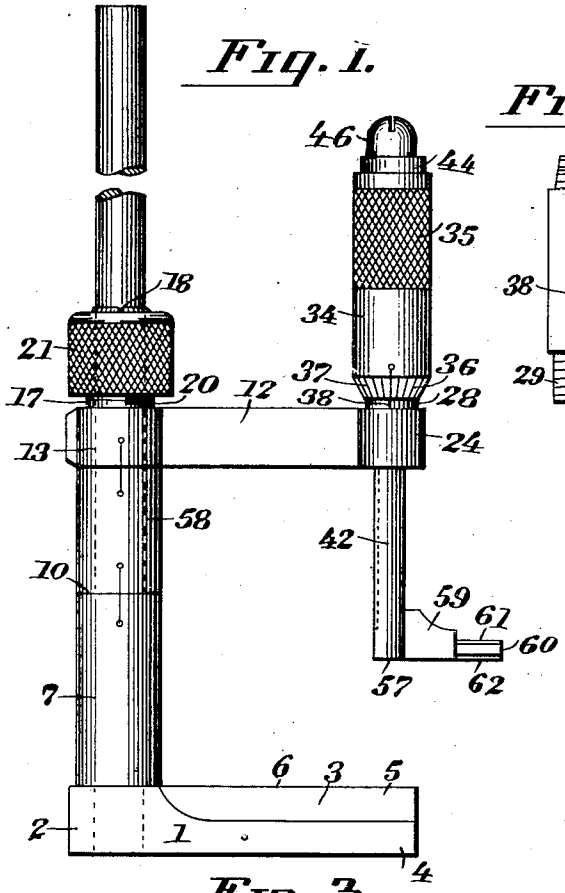
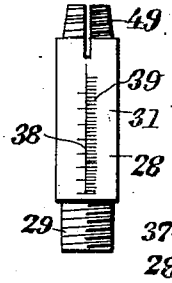


Fig. 13.



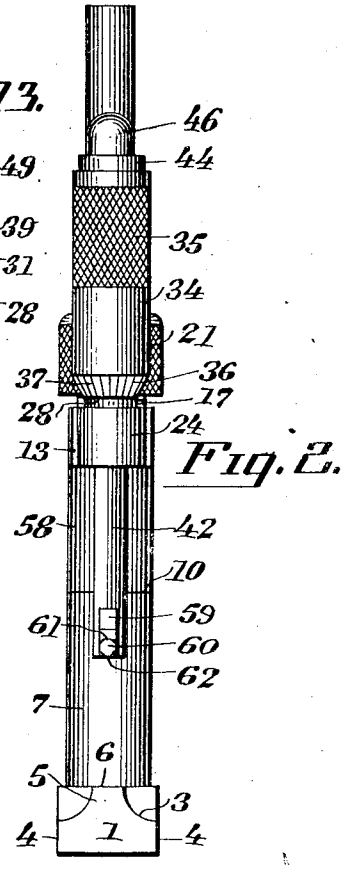


Fig. 2.

Fig. 3.



Fig. 8.

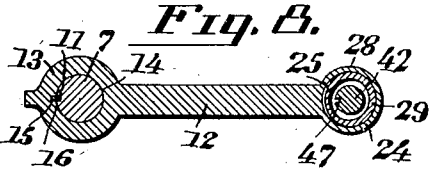


Fig. 7.

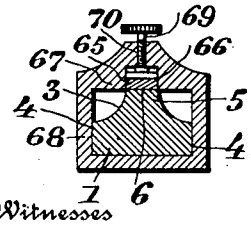


Fig. 10.

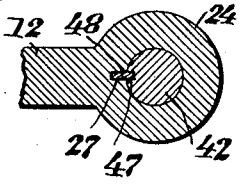


Fig. 11.

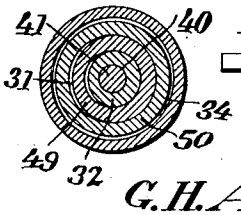
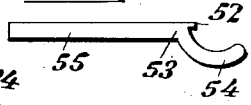


Fig. 12.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 9.

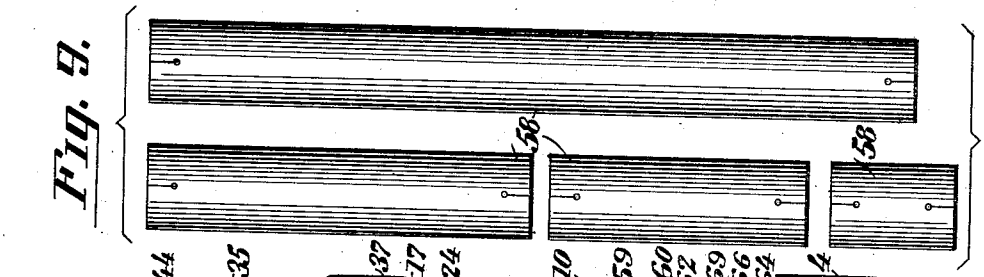


Fig. 6.

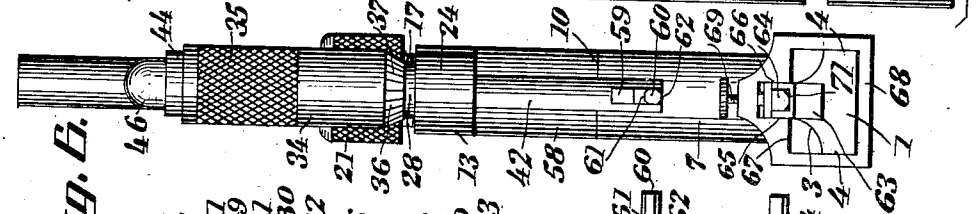


Fig. 5.

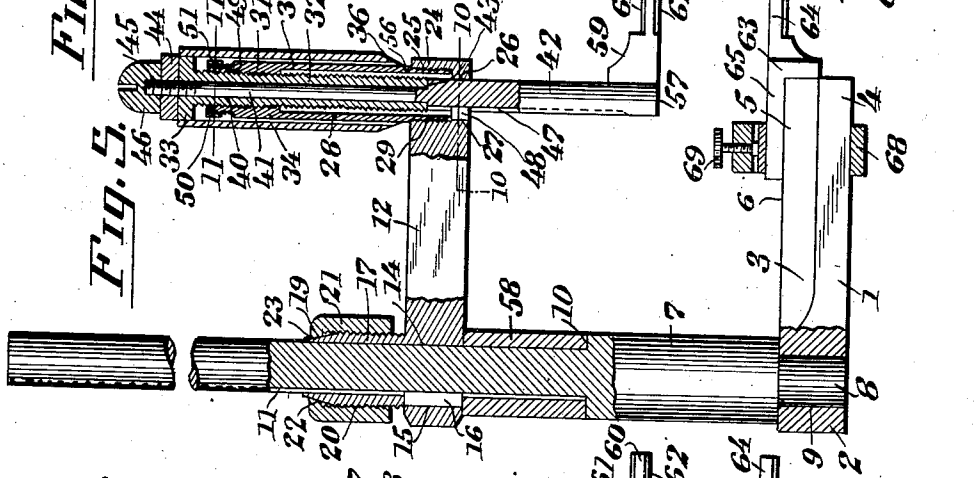
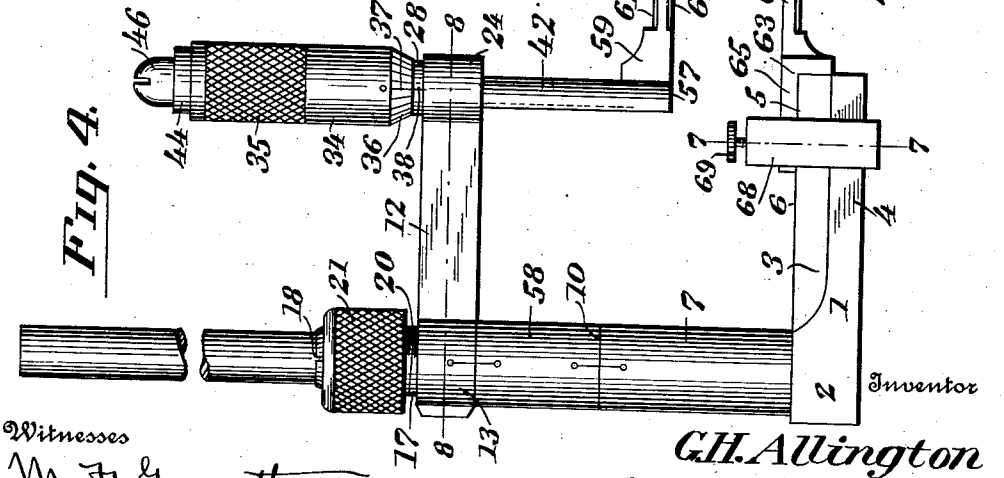


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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MICROMETER-GAGE.

1,186,364. Specification of Letters Patent. Patented June 6, 1916.

Application filed November 20, 1915. Serial No. 62,609.

To all whom it may concern:

Be it known that I, GEORGE H. ALLINGTON, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented new and useful Improvements in Micrometer-Gages, of which the following is a specification.

This invention relates to a micrometer gage, the primary object being to provide a device of this character which is adapted to be used as an inside and outside caliper, and which may be used conveniently and accurately in measuring heights and other distances of considerable length.

A further object is to provide a gage of this class which includes what may be termed a fixed jaw having a shaft or pillar connected therewith, upon which a lateral arm forming the movable jaw is mounted for longitudinal adjustment thereon. Spacing bushings are provided in order that one or more of these may be positioned upon the pillar between the fixed jaw and the said arm in order to adjust the arm quickly to approximate the distance to be measured, means being provided by which the arm may be secured effectively in its initially adjusted position. Then the minute adjustment required in determining the desired distance or caliper may be effected by operation of the micrometer shaft of the movable jaw, the range of this shaft being limited.

A still further object of the invention is the provision of a micrometer shaft for the movable jaw of the device which operates longitudinally without rotation, whereby an extension may be applied to this shaft for use in locating a hole or bushing, in jig or tool work.

Another object is to provide a gage which is constructed so that lost motion and wear of its movable parts may be remedied conveniently and efficiently whenever this is found necessary, thereby insuring accuracy of operation at all times.

The invention consists in the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:

Figure 1 is a side elevation of the device when arranged for use in outside caliper work; Fig. 2 is a front elevation of the same; Fig. 3 is a top plan view; Fig. 4 is a side elevation of the device arranged for use in inside caliper work; Fig. 5 is a longitudinal sectional view taken through the same; Fig. 6 is a front elevation of the same; Fig. 7 is a vertical sectional view on line 7—7 of Fig. 4; Fig. 8 is a horizontal sectional view on line 8—8 of Fig. 4; Fig. 9 is a side elevation of a group of spacing members; Fig. 10 is a sectional view on line 10—10 of Fig. 5; Fig. 11 is a sectional view on line 11—11 of Fig. 5; Fig. 12 is a side elevation of the turning implement used in adjusting the device to account for wear of its movable parts, and Fig. 13 is a detail front elevation of the micrometer barrel.

In the drawings, the numeral 1 designates the elongated fixed jaw of the gage, one end portion 2 of which is rectangular in cross section, whereas the remainder of the jaw is constructed so as to be substantially T-shaped in section as at 3, whereby the lateral base flanges 4 and an uppermost rib 5 having an active upper face 6, are provided. A cylindrical shaft or pillar 7 has the reduced extension 8 provided upon its lower end engaged within the vertical opening 9 provided in the rectangular end portion 2 of the fixed jaw, a pressed joint being formed. The major portion of the pillar 7 is reduced in diameter from the shoulder 10 to its upper end and is provided with a longitudinal key slot 11 for a purpose which will be described presently.

A movable jaw 12 having one of its ends enlarged as at 13 is adapted to extend laterally from the pillar 7 with the vertical opening 14 of its enlarged portion 13 receiving the reduced upper portion of the pillar, whereby the jaw is mounted for longitudinal sliding movement thereon. The enlarged portion 13 of this jaw is provided with a longitudinal groove 15 in the side wall of the opening 14 for the reception of a key 16, a portion of which is engaged within the pillar slot 11 for sliding movement therein so as to secure the jaw 12 against swinging movement upon the pillar at all times. A longitudinally slotted clamping sleeve 17 Fig. 5 is formed upon the upper face of the enlarged portion 13 of the jaw 12 eccentric with its opening 14 for the reception of the pillar. This sleeve is provided with a plurality of longitudinal slots 18 Fig. 1 and has the upper end portions of its outer face tapered as at 19, the body portion of the sleeve being exteriorly screw-threaded as at 20. A knurled locking nut 21 is adapted to be threaded

onto the sleeve 17 and is provided at its upper end with an internal flange 22 having a frusto-conical inner face 23, which is of upwardly decreasing diameter. This flange is adapted to engage the beveled face 19 of the clamping sleeve when the nut is screwed downward upon the same, so as to force the yieldable portions of the sleeve inwardly into tight engagement with the pillar, whereby the jaw 12 may be locked in any desired position upon the latter.

The opposite end of the jaw 12 is also enlarged as at 24 and is provided with a vertical opening which includes an uppermost, threaded portion 25 of large diameter and a reduced lower portion 26 in which a longitudinal key slot or groove 27 is formed. A micrometer barrel 28 of hollow cylindrical formation has its externally threaded lower end 29 engaged within the opening 25 of the jaw enlargement. The upper portion of the bore 30 of this barrel is reduced and is internally threaded as at 31 for the reception of the longitudinally adjustable micrometer screw 32, whose upper end is provided with an external annular flange 33 having a depending sleeve 34 connected therewith by means of a pressed joint. This sleeve embraces the barrel 28 and has a portion of its upper surface knurled as at 35 in order that the sleeve may be rotated readily for the purpose of operating the same and the screw 32 longitudinally with respect to the barrel 28. The lower end of the sleeve has its outer face tapered in the usual manner as at 36 and is provided with a circumferential micrometer scale 37, for use in conjunction with the longitudinal line 38 provided upon the outer face of the barrel, the said line being provided also with a longitudinally graduated scale 39 Fig. 13. The micrometer screw 32 is provided with a smooth internal bore 40 for the reception of the reduced upper end portion 41 of the micrometer shaft 42, whose shoulder 43 is adapted to engage the lower end of the screw frictionally, the reduced portion of the shaft rotatably receiving the screw and being supported by means of an adjustable nut 44 which is threaded onto the protruding upper end 45 of the shaft. A lock nut 46 is also adapted to be threaded onto the extreme end of the shaft for locking engagement with the nut 44, after the latter has been adjusted so as to permit free rotation of the screw upon the shaft and yet prevent any longitudinal lost motion. The lower portion of the shaft 42 is provided with a longitudinal key slot 47 in which the inner portion of a key 48, which is mounted within the slot 27, is engaged, so as to prevent rotation of the shaft during longitudinal operation of the micrometer screw.

In order that lost motion of the micrometer screw within the barrel bore may be remedied, as the coacting threads of the same become worn, a split sleeve 49 is formed upon the upper end of the barrel. This sleeve is tapered upwardly and is threaded externally for the reception of a tapered adjusting nut 50 which latter is movable within the upper end of the sleeve 34 and is provided with a radial opening 51 for engagement by the tooth 52 of a turning implement 53, which is shown in Fig. 12 of the drawings. The tooth 52 of this implement is formed upon the inner face of the arcuate jaw 54 at the inner end of the same where it is joined with the straight handle 55. The barrel 28 is also provided adjacent to its lower threaded end with a radial opening 56 for the reception of the turning implement tooth, in order that the said implement may be used in adjusting the barrel upon the movable jaw to account for wear upon the lower active end face 57 of the micrometer shaft or the upper active face 6 of the fixed jaw. This adjustment is effected by setting the gage at zero, that is within the active faces 57 and 6 of the micrometer shaft and fixed jaws respectively, in close contact with each other, and then in turning the micrometer barrel by means of the turning implement, until the line on the barrel coincides with the zero line on the micrometer sleeve 34.

In order that the device may be used readily and accurately in obtaining linear measurements of considerable length, a plurality of hollow cylindrical spacing members 58 of predetermined lengths are provided for use upon the reduced portion of the pillar 7 in setting the movable jaw initially at approximately the required distance from the fixed jaw. In performing this operation, one or more of the spacing members, as may be necessary, are positioned upon the reduced portion of the pillar, after the movable jaw has been removed, and are adapted to rest upon the shoulder 10 and to support the movable jaw when the latter has been replaced. After this initial operation has been performed, the minute adjustments required may be obtained by operation of the micrometer by manipulating the sleeve 34, in order to bring the active faces 57 and 6 of the micrometer shaft and the fixed jaw respectively into proper engagement with the faces whose distance of separation is to be determined, the device when arranged for this use and in outside caliper work being shown particularly in Figs. 1 to 3 inclusive. A group of the spacing members for use in connection with the device is shown also in Fig. 9.

In Figs. 4 to 6 inclusive, the gage is shown as arranged for use in inside caliper work. In order that the device may be

used for this purpose, a radial head 59 is formed upon the micrometer shaft 42 at the lower end of the same so as to project outwardly therefrom in the plane of the axes of the pillar 7 and the said micrometer shaft. A reduced engaging projection 60 is formed upon the outer end of the head 59 and has its upper active face 61 and its lower face 62 transversely convex for purposes which will appear presently. A removable head 63 is adapted to be secured against the outer end face of the fixed jaw with its engaging projection 64 parallel to and coextensive with the engaging projection 60 of the head 59. This head is supported in its applied position by means of its rectangular shank 65 which extends inwardly so as to overlie the rib 5 of the fixed jaw. This shank is adapted to be received within the medial recess 66 which is provided in the top wall 67 of the rectangular sleeve 68, which latter is adapted to be slid onto the outer end portion of the fixed jaw for use in clamping the removable head thereto. A clamping screw 69 is adjustably mounted within the vertical threaded opening 70 provided in the top wall 67 of the said sleeve in communication with its recess 66, whereby the screw may be engaged with the shank 65 of the movable head in order to bind the latter in its applied position. The under face 71 of the engaging projection 64 of the head carried by the fixed jaw is transversely convex for coöperation with the upper active face 61 of the engaging projection 60 of the micrometer shaft-carried head in obtaining the inside caliper of bores or openings, in a manner which should be readily understood.

In order that the device may be used in determining the location of a hole or bushing, an extension (not shown) may be applied to the engaging projection 60 of the head 59 for use in this capacity. This use is rendered practicable by the fact that the micrometer shaft 42 is non-rotatable.

What is claimed is:

1. A gage of the class described comprising a pair of coacting jaws, one of the said jaws having an engaging inner face, the other jaw being provided with an opening alining with the engaging face of the first jaw, a micrometer barrel engaged within the said opening, a hollow screw mounted within the barrel for longitudinal adjustment therein, a micrometer shaft mounted within the said screw, the screw being rotatable upon the shaft, means for preventing longitudinal movement of the shaft with respect to the screw, means for securing the shaft against rotation during its longitudinal movement, and means by which the screw may be rotated to a predetermined degree.

2. A gage of the class described comprising a pair of coacting jaws, one of the said jaws having an engaging inner face, the other jaw being provided with an opening alining with the engaging face of the first jaw, a micrometer barrel engaged within the said opening, a hollow screw mounted within the barrel for longitudinal adjustment therein, a micrometer shaft mounted within the said screw, the screw being rotatable upon the shaft, means for preventing longitudinal movement of the shaft with respect to the screw, means for securing the shaft against rotation during its longitudinal movement, and an operating sleeve connected with one end of the said screw and adapted to embrace the barrel, the barrel being provided at its inner edge with a circumferentially graduated scale and the barrel being provided with a longitudinally graduated line on its outer periphery for cooperation with the sleeve scale.

3. A gage of the class described comprising a pair of coacting jaws, one of the said jaws having an engaging inner face, the other jaw being provided with an opening alining with the engaging face of the first jaw, a micrometer barrel engaged within the said opening, a hollow screw mounted within the barrel for longitudinal adjustment therein, a micrometer shaft mounted within the jaw opening and having its upper end portion reduced to form a shoulder and adapted to extend through the said screw to permit rotation of the latter thereon, the shoulder of the shaft being frictionally engaged with the lower end of the screw, and a limiting nut threaded onto the protruding upper end of the shaft for frictional engagement with the upper end of the screw, means for preventing rotation of the shaft within the jaw opening, and means by which the screw may be operated.

4. A gage of the class described comprising a pair of coacting jaws, one of the said jaws being provided with an opening, a micrometer shaft slidably mounted within the said opening for coöperation with the other jaw, means by which measured longitudinal movement of the said shaft may be obtained, means for preventing rotation of the shaft during its longitudinal movement, a radial head mounted fixedly upon the inner end of the said shaft and having a reduced engaging projection, a removable head mounted upon the opposite jaw, to the one bearing the micrometer shaft, the said removable head having a reduced engaging projection adapted to be disposed parallel to and coextensive with the engaging projection of the first head, and means for securing the removable head in its applied position.

5. A gage of the class described comprising a pair of coacting jaws, one of the said jaws having an engaging inner face, the

other jaw being provided with an opening alining with the engaging face of the first jaw, a micrometer barrel engaged within the said opening, a hollow screw mounted within the barrel for longitudinal adjustment therein, a micrometer shaft mounted within the said screw, the screw being rotatable upon the shaft, means for preventing longitudinal movement of the shaft with respect to the screw, means for securing the shaft against rotation during its longitudinal movement, means by which the screw may be rotated to a predetermined degree, the micrometer barrel being threaded into the said jaw opening, said barrel being exteriorly threaded adjacent its upper end, and a nut associated with said threaded extremity and having spaced apertures to accommodate an instrument to rotate said barrel.

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

GEORGE H. ALLINGTON.

Witnesses:

MITCHEL C. VANCE,

HARRY L. SWADNER.