

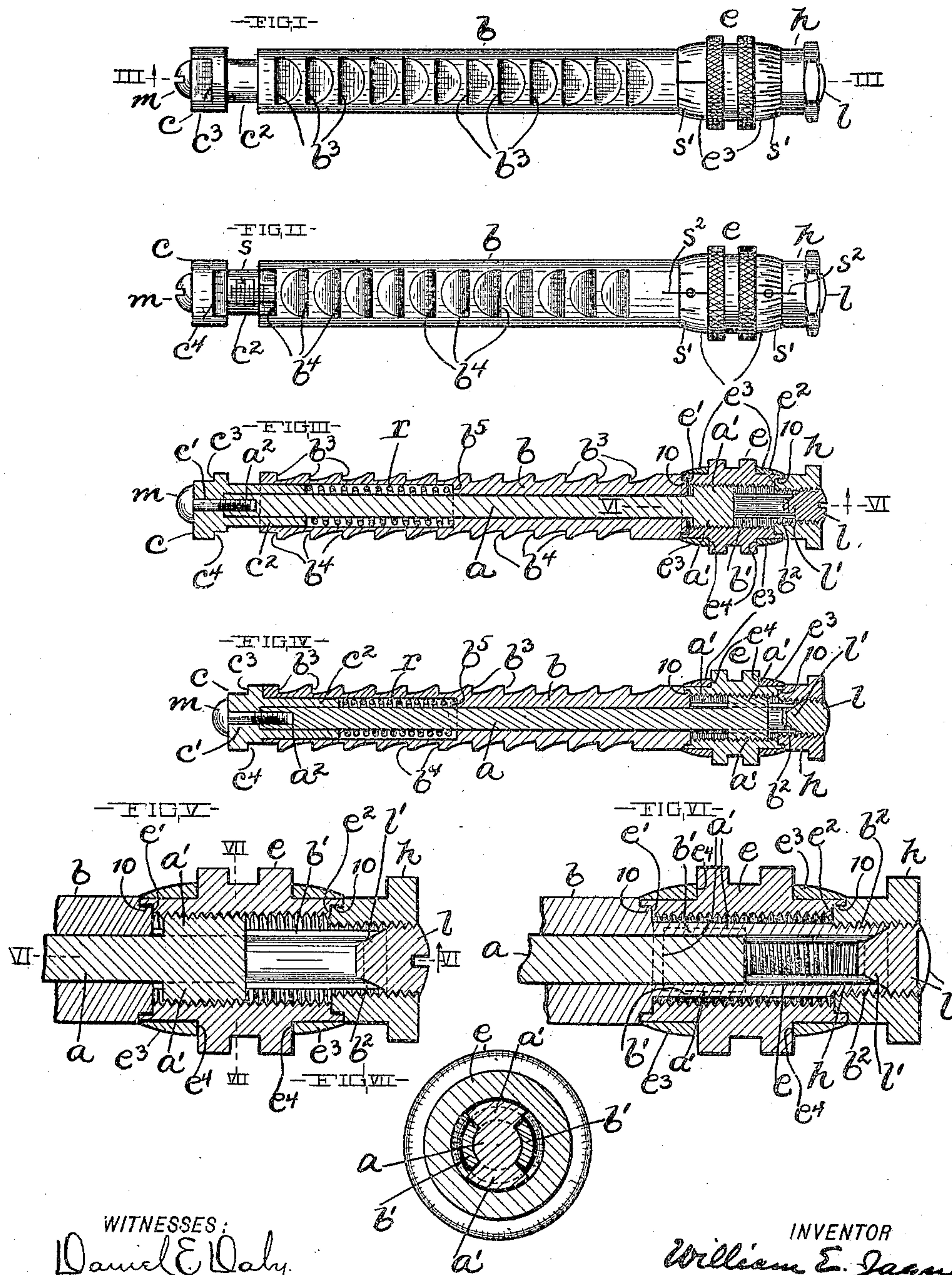
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W. E. JAKUES.
MICROMETER GAGE.

(Application filed Mar. 23, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

WILLIAM E. JAKES, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR OF TWO-THIRDS TO DONALD E. WEBSTER, OF SAME PLACE.

MICROMETER-GAGE.

SPECIFICATION forming part of Letters Patent No. 684,691, dated October 15, 1901.

Application filed March 23, 1901. Serial No. 52,538. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. JAKES, a resident of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Micrometer-Gages; 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 pertains to make and use the same.

My invention relates to improvements in micrometer-gages, and pertains more especially to a tool suitable for use in making micrometric measurements and as a scale to set calipers by.

The object of this invention is to provide an exceedingly convenient tool of the character indicated and to render the construction simple and durable and reliable in its operation.

With this object in view the invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figures I and II are opposite side elevations, respectively, of my improved gage or tool. Fig. III is a central longitudinal section on line III III, Fig. I, looking in the direction indicated by the arrow. Fig. IV is a central longitudinal section corresponding with Fig. III, except that in Fig. IV the shoulder-forming head of the endwise-shiftable rod of the tool is shown closed against the relatively stationary cooperating bar of the tool. Figs. I, II, III, and IV show a full-sized tool. Fig. V is an enlarged central longitudinal section of a portion of the tool, showing, among other things, the rod-operating sleeve, the sleeve-engaging segments of the rod, and the bearings for the sleeve. Fig. VI is a central longitudinal section on line VI VI, Figs. III and V. Fig. VII is a transverse section on line VII VII, Fig. V, looking in the direction indicated by the arrow.

Referring to the drawings, *a* designates an endwise-shiftable rod which extends centrally and longitudinally through and has bearing in a relatively stationary bar *b*. The bar *b* is consequently tubular for accommo-

dating the reception and operation of the rod *a*. The rod *a* at one end of the bar *b* is provided with a head *c* and at its opposite end has two externally and peripherically screw-threaded segments *a'* and *a'*, arranged at opposite sides, respectively, of the rod and engaged and embraced by a correspondingly internally screw-threaded sleeve *e*, which is rendered stationary so far as endwise movement thereof is concerned in any approved manner, so that the rod *a* is shifted in the one direction or the other, according as the sleeve *e* is rotated in the one or the other direction. Preferably the sleeve *e* is confined endwise between the adjacent end of the bar *b* and a nut *h*, which is mounted upon and engages two correspondingly-screw-threaded and oppositely-arranged segments *b²* and *b²*, formed by the outer or free ends of two arms *b'* and *b'*, which are rigid with the bar *b* and project from the said bar *b* between the segments *a'* and *a'* at opposite sides, respectively, of the rod *a* and extend through the sleeve *e*. The arms *b'* are wide enough to occupy the spaces between the segments *a'*, and the side edges of the said arms slope to conform to the sloping sides of the said segments. The arms *b'* and *b'* form, therefore, slideways for the slide-forming threaded segments *a'* and *a'* and prevent circumferential displacement of the said segments and the connected rod *a*. The arms *b'* and *b'* and the sleeve *e* are of course long enough to accommodate the required range of movement of the rod *a*. Preferably the inner end of the nut *h* and the opposing end of the bar *b* are reduced diametrically to form an annular shoulder 10, and the sleeve *e* is mounted upon the said shoulders 10 and 10 of the bar *b* and the nut *h* and has, preferably, two annular internal shoulders *e'* and *e²* next adjacent the opposing surfaces of the bar *b* and nut *h*, respectively.

A screw *l* engages with threads of the nut *h* and has its inner end terminating in a wedge *l'*, extending between and engaging the segments *b²*, formed, as already indicated, by the outer ends of the arms *b'* and *b'* of the bar *b*. The wedge *l'* is instrumental when the parts are assembled in suitably spreading the segments *b²* and *b²* apart and establishing a close

engagement between the threads of the said segments and the threads of the nut *h*, so that the nut will not be liable to become loose.

By the construction hereinbefore described it is obvious that the head *c* of the rod *a* is shifted toward or from the adjacent end of the bar *b*, according as the slide-forming threaded segments *a'* and *a'* and the connected rod *a* are shifted endwise in the one direction or the other by turning the sleeve *e* in the one or the other direction.

The head *c* of the rod *a* is perforated centrally and longitudinally, as at *c'*, to accommodate the reception of a screw *m*, which engages a correspondingly threaded hole *a''*, formed in and centrally and longitudinally of the adjacent end of the rod *a*. The screw *m* therefore removably secures the head *c* to the rod *a*. The detachable head *c* is important to accommodate a separation and assemblage of the parts when rendered necessary for any reason, because the rod *a*, as the segment-forming and sleeve-engaging end thereof is diametrically larger than the bore of the bar *b*, can only be removed from and introduced into the said bar at the sleeve-engaging end of the bar, and the spring *r*, hereinafter referred to, can only be introduced or removed from the bar at the bar's opposite end.

The rod *a* on the inner end of the head *c* is externally provided in any approved manner with a scale *s*, which extends from the head *c* along the said rod *a* a suitable distance. Preferably the head *c* is formed upon the outer end of a sleeve or collar *c''*, which snugly embraces the rod *a* and extends into the bore of the bar *b* a suitable distance. The surrounding wall of the said bore affords bearing for the sleeve or collar *c''*, and the spiral spring *r* is mounted and confined upon the rod *a* between the free end of the sleeve or collar *c''* and an annular shoulder *b''*, formed upon the said wall a suitable distance from the collar *c''*. The spring *r* is under tension and acts to push the head *c* outwardly, and consequently is effective in taking up any lost motion between the mutually-engaging threads of the sleeve *e* and the slide-forming segments *a'*.

The bar *b* upon one side is provided with a row of shoulders *b''*, arranged at equal intervals longitudinally of the bar and at right angles to the plane of movement of the rod *a*, and the said bar is provided also, but upon its opposite side, with another row of shoulders *b'''*, arranged at equal intervals longitudinally of the bar and at right angles to the line of movement of the rod *a*, and preferably each shoulder of each row of shoulders is arranged directly opposite a shoulder of the other row of shoulders. The shoulders *b'''* face in the direction of the head *c* of the rod *a*, and the shoulders *b''* face in the opposite direction—viz., toward the sleeve *e*. The head *c* is provided with two external shoulders *c''* and *c'''*, that are arranged in line with the different aforesaid rows of shoulders, respectively. The

shoulder *c''* upon one side of the head *c* and in line with the row of shoulders *b''* of the bar *b* faces in a direction opposite to the direction in which the said shoulders *b''* face, and consequently faces away from the bar *b*, so that the said shoulder *c''* of the head *c* and any shoulder of the said row of shoulders *b''* of the bar *b* form two cooperating surfaces or points by which to set internal calipers. The other shoulder *c'''* of the head *c* faces the shoulders of the row of shoulders *b'''* of the bar *b*, and consequently the said shoulder *c'''* of the head *c* and any shoulder of the said row of shoulders *b'''* of the bar *b* form two cooperating surfaces or points suitable for setting external calipers by.

The shoulders of each row of shoulders of the bar *b* are in the tool illustrated arranged a quarter of an inch apart, and the arrangement of the shoulders of the head *c* relative to the rows of shoulders of the bar *b* is such that each shoulder of the head *c*, when the said head has been actuated by a proper manipulation of the sleeve *e* against the bar *b*, as shown in Fig. IV, shall be one-quarter of an inch from the first or nearest shoulder of the cooperating row of shoulders of the said bar *b*.

The shoulders *c''* and *c'''* of the head *c* are formed, preferably, by suitably recessing the said head externally. The shoulders *b''* and *b'''* of the bar *b* are similarly formed by recesses in the exterior of the bar.

The range of movement of the rod *a* is in the tool illustrated equal to the distance apart of two adjacent caliper-setting shoulders of the rows of shoulders of the said bar, and consequently the scale upon the collar *c''* of the rod *a* is used for indicating large fractions of the distance between two adjacent caliper-setting shoulders or points of the bar *b*.

The sleeve *e* is provided at each end and externally with a graduated scale *s'*, extending circumferentially of the said sleeve, and the bar *b* and the nut *h* are each provided externally, next to the adjacent end of the sleeve, with a line or mark *s''* for use in the reading of the scales upon the sleeve. Obviously, the scales *s'* upon the sleeve are for the purpose of indicating the fractions of the divisions of the graduated scale *s* of the head *c* of rod *a*. As graduated scales of the character indicated are well understood, a more extended description or illustration thereof is not considered necessary in this application.

Obviously my improved construction of gage or tool not only renders possible the use of two systems of measurement upon the tool, if desired, but is exceedingly meritorious on account of its simplicity, compactness, and durability. It will be observed also that my improved device is suitable for use in measuring thicknesses of paper and other objects between the opposing surfaces of the bar *b* and the head *c* of the rod *a*. I would remark also that the sleeve *e* is circular externally in end elevation and that the scale-forming portions of the said sleeve are formed, prefer-

ably, by metal collars or rings e^3 , having the dimensions required to render them capable of being forced onto the ends of the sleeve against shoulders e^4 , formed upon the body portion of the sleeve. It is of course important that when the head c is closed against the adjacent end of the bar b the zero graduations of the scales s' should be in line with the index marks or lines s^2 of the said bar b and the nut h , and obviously by the construction hereinbefore described the said rings or collars are capable of adjustment circumferentially upon applying the requisite force or capable of being forced off the sleeve and again forced thereon into the required position, so as to bring the zero graduations of the sleeve e into line with the marks or lines s^2 of the nut h and the bar b when the head c , as shown in Fig. IV, is closed against the adjacent end of the bar b .

What I claim is—

1. A gage or tool of the character indicated, comprising a tubular bar; an endwise-shiftable rod extending through and having bearing in the said bar; which rod is provided, at one end and externally of the aforesaid bar, with a head and a scale extending from the inner end of the head longitudinally of the rod, and has an externally-screw-threaded segment at its opposite end; means for preventing circumferential displacement of the said segment and rod; a rotary correspondingly internally screw-threaded sleeve engaging the said segment, and means for preventing endwise displacement of the sleeve, substantially as and for the purpose set forth.

2. A gage or tool of the character indicated, comprising a tubular bar b provided, at one end, with two projecting slideway-forming arms b' and b'' ; an endwise-shiftable rod extending through and having bearing in the said bar and between the said arms and provided with an externally-screw-threaded segment snugly but slidably interposed between the said arms; which rod is provided, at its opposite end and externally of the aforesaid bar, with a head; a rotary correspondingly internally screw-threaded sleeve engaging the said segment; and means for preventing endwise displacement of the sleeve, substantially as and for the purpose set forth.

3. A gage or tool of the character indicated, comprising a tubular bar; an endwise-shiftable rod extending through and having bearing in the said bar, which rod is provided, at one end and externally of the aforesaid bar, with a head and a scale extending from the inner end of the head longitudinally of the rod, and has two oppositely-arranged externally-screw-threaded segments at its opposite end; means for preventing circumferential displacement of the segments; a rotary correspondingly internally screw-threaded sleeve engaging both segments, and means for preventing endwise displacement of the sleeve, substantially as and for the purpose set forth.

4. A gage or tool of the character indicated, comprising a tubular bar b provided, at one end, with two projecting slideway-forming arms b' and b'' ; an endwise-shiftable rod extending through the said bar and between the said arms and provided with two oppositely-arranged externally-screw-threaded segments snugly but slidably interposed between the said arms, which rod is provided, at its opposite end and externally of the aforesaid bar, with a head and a scale extending from the inner end of the head longitudinally of the rod; a rotary correspondingly internally screw-threaded sleeve engaging the said segment, and means for preventing endwise displacement of the sleeve, substantially as and for the purpose set forth.

5. A gage or tool of the character indicated, comprising a tubular bar b provided, at one end, with two projecting slideway-forming arms b' and b'' terminating at their outer ends in externally-screw-threaded segments b^2 and b^3 ; an endwise-shiftable rod extending through the said bar and between the said arms and provided with an externally-screw-threaded segment snugly but slidably interposed between the said arms, which rod is provided, at its opposite end and externally of the aforesaid bar, with a head and a scale extending from the inner end of the head longitudinally of the rod; a rotary correspondingly internally screw-threaded sleeve engaging the said segment, and a nut engaging with the threads of the aforesaid arm-segments b^2 , substantially as and for the purpose set forth.

6. A gage or tool of the character indicated, comprising a tubular bar b provided, at one end, with projecting slideway-forming arms b' terminating at their ends in externally-screw-threaded segments b^2 ; an endwise-shiftable rod extending through the said bar and between the said arms and provided, at one end, with an externally-screw-threaded segment snugly but slidably interposed between the said arms, which rod is provided, at its opposite end and externally of the aforesaid bar, with a head and a scale extending from the inner end of the head longitudinally of the rod; a rotary correspondingly internally screw-threaded sleeve engaging the said segment; a nut engaging with the threads of the aforesaid arm-segments b^2 , and a screw engaging with threads of the outer portion of the nut and terminating at its inner end in a wedge extending between and arranged to spread apart the aforesaid arm-segments b^2 , substantially as and for the purpose set forth.

7. A gage or tool of the character indicated, comprising a tubular bar reduced diametrically at one end to form an annular shoulder and having the said end provided with the two projecting slideway-forming arms b' and b'' terminating, at their outer ends, in two oppositely-arranged and externally-screw-threaded segments b^2 and b^3 ; an endwise-shiftable

able rod extending through the said bar between the said arms and provided, at one end, with the two oppositely-arranged externally-screw-threaded segments a' and a' snugly but
 5 slidably arranged between the aforesaid arms b' , which rod is provided, at its opposite end and externally of the aforesaid bar, with a head and a scale extending from the inner end of the head longitudinally of the rod; a
 10 nut engaging with threads of the aforesaid arm-segments b^2 and reduced diametrically at its inner end to form an annular shoulder 10, and a rotary internally-screw-threaded sleeve engaging with threads of the rod's seg-
 15 ments a' and mounted upon the aforesaid shoulders 10 and confined endwise between the nut and the bar, substantially as and for the purpose set forth.

8. A gage or tool of the character indicated,
 20 comprising a tubular bar having a row of external shoulders spaced equidistantly longitudinally of the bar and facing toward one end of the bar; an endwise-shiftable rod extending through and having bearing in the
 25 said bar and provided, at one end and externally of the bar, with a head having a shoulder arranged in line with the aforesaid shoulders of the bar but facing in the opposite direction, which rod is provided with a scale
 30 extending from the inner end of the head longitudinally of the rod, and means for shifting the rod endwise, substantially as and for the purpose set forth.

9. A gage or tool of the character indicated,
 35 comprising a tubular bar having a row of external shoulders spaced equidistantly longitudinally of the bar and facing toward one end of the bar and having another row of shoulders spaced equidistantly longitudinally
 40 of the bar and facing in the opposite direction; an endwise-shiftable rod extending through and having bearing in the said bar, and provided, at one end and externally of the bar, with a head having two shoulders ar-
 45 ranged in line with the different aforesaid rows of shoulders, respectively, but facing in the opposite direction, which rod is provided with a scale extending from the inner end of the head longitudinally of the rod, and means
 50 for shifting the rod endwise, substantially as and for the purpose set forth.

10. A gage or tool of the character indicated, comprising a tubular bar recessed externally upon opposite sides to form a row of shoulders
 55 b^8 spaced equidistantly longitudinally of the bar and facing toward one end of the bar, and another row of shoulders b^4 spaced equidistantly longitudinally of the bar and facing in the opposite direction; an endwise-shiftable
 60 rod extending through and having bearing in the said bar, and provided, at one end and ex-

ternally of the bar, with a head c having the two external shoulders c^3 and c^4 arranged in line with the different aforesaid rows of shoulders b^3 and b^4 , respectively, but facing in the
 65 opposite direction, which rod is provided with a scale extending from the inner end of the head longitudinally of the rod, and means for shifting the rod endwise, substantially as and for the purpose set forth. 70

11. A gage or tool of the character indicated, comprising a tubular bar provided internally with the shoulder b^5 ; an endwise-shiftable rod extending through and having bearing in the
 said bar; the sleeve or collar c^2 mounted upon
 75 one end of the said rod and provided externally of the bar with a head c detachably secured to the rod; a spiral spring mounted and confined upon the rod between the aforesaid sleeve or collar and the aforesaid shoulder,
 80 and means for shifting the rod endwise, substantially as and for the purpose set forth.

12. A gage or tool of the character indicated, comprising a tubular bar b reduced at one end to form an annular shoulder 10 and provided
 85 externally and at the said end with an index mark or line s^2 , and having the said end provided with two projecting slideway-forming arms b' and b' terminating, at their outer ends, in externally-screw-threaded segments b^2
 90 and b^2 ; an endwise-shiftable rod extending through the said bar between the said arms and provided at one end with an externally-screw-threaded segment a' snugly but slidably arranged between the aforesaid arms,
 95 which rod is provided, at its opposite end and externally of the bar, with a head c , and a scale extending from the inner end of the head longitudinally of the rod; a nut h engaging with threads of the aforesaid arm-segments
 100 b^2 and reduced diametrically at its inner end to form an annular shoulder 10 and provided externally with an index mark or line s^2 , and a rotary internally-screw-threaded sleeve e engaging with threads of the aforesaid rod's
 105 segment a' and mounted upon the aforesaid shoulder 10 and confined endwise between the nut and the bar, and provided at each end and externally with a graduated scale s' extending circumferentially of the sleeve, which
 110 sleeve is circular externally in end elevation and has each scale s' formed by a ring or collar e^3 forced onto the body portion of the sleeve, substantially as and for the purpose set forth. 115

Signed by me at Grand Rapids, Michigan,
 this 18th day of March, 1901.

WILLIAM E. JAKUES.

Witnesses:

F. H. CLARKE,
 D. E. WEBSTER.