

(No Model.)

A. H. EMERY.
MICROMETER GAGE.

No. 362,149.

Patented May 3, 1887.

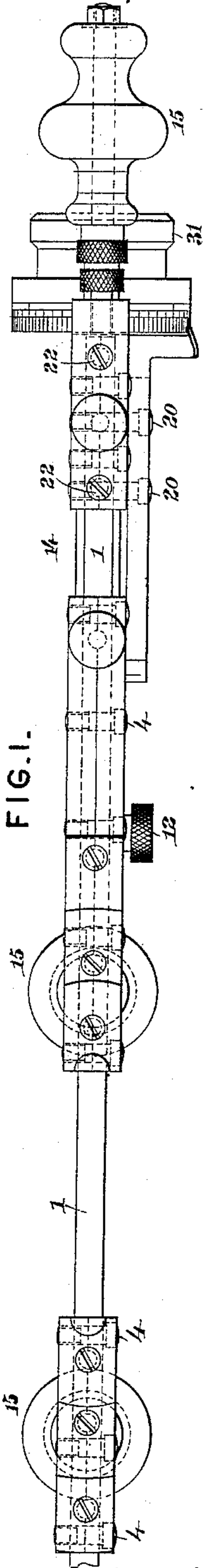


FIG. I.

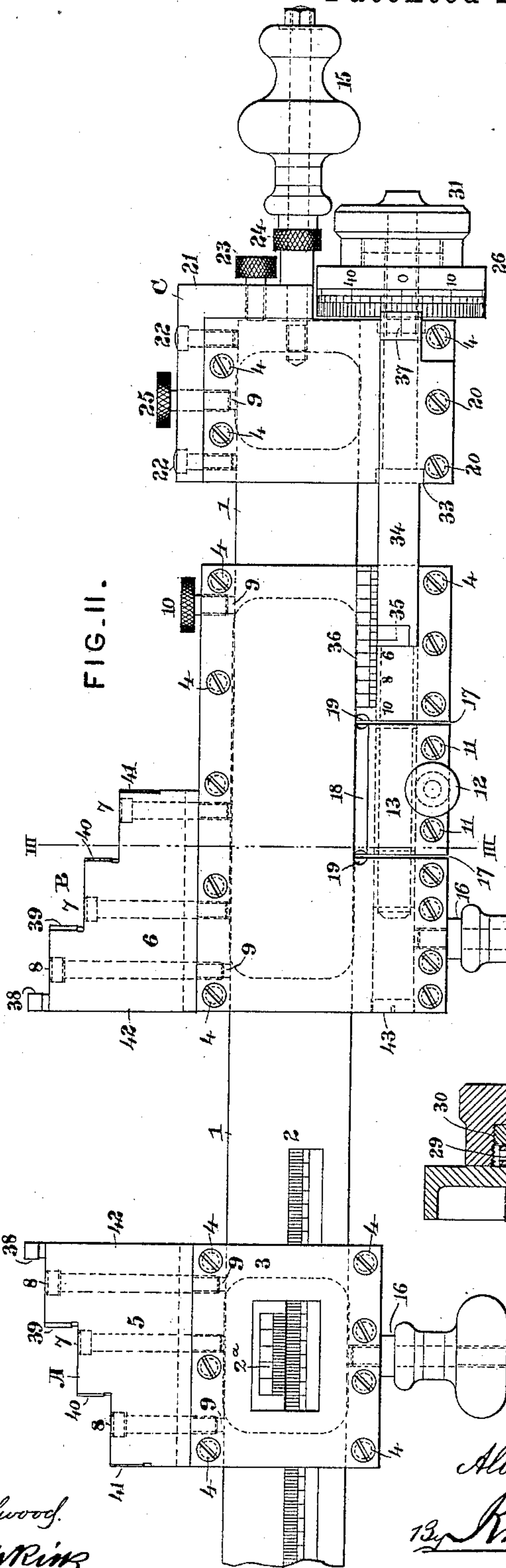


FIG. II.

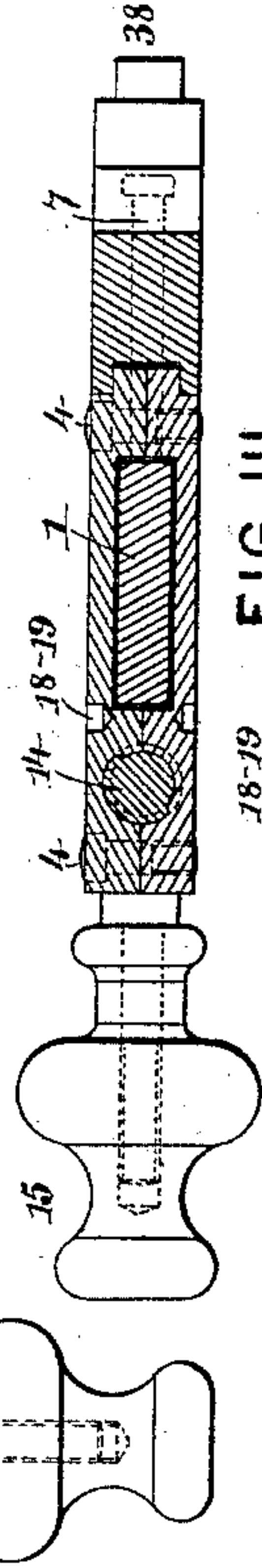


FIG. III.

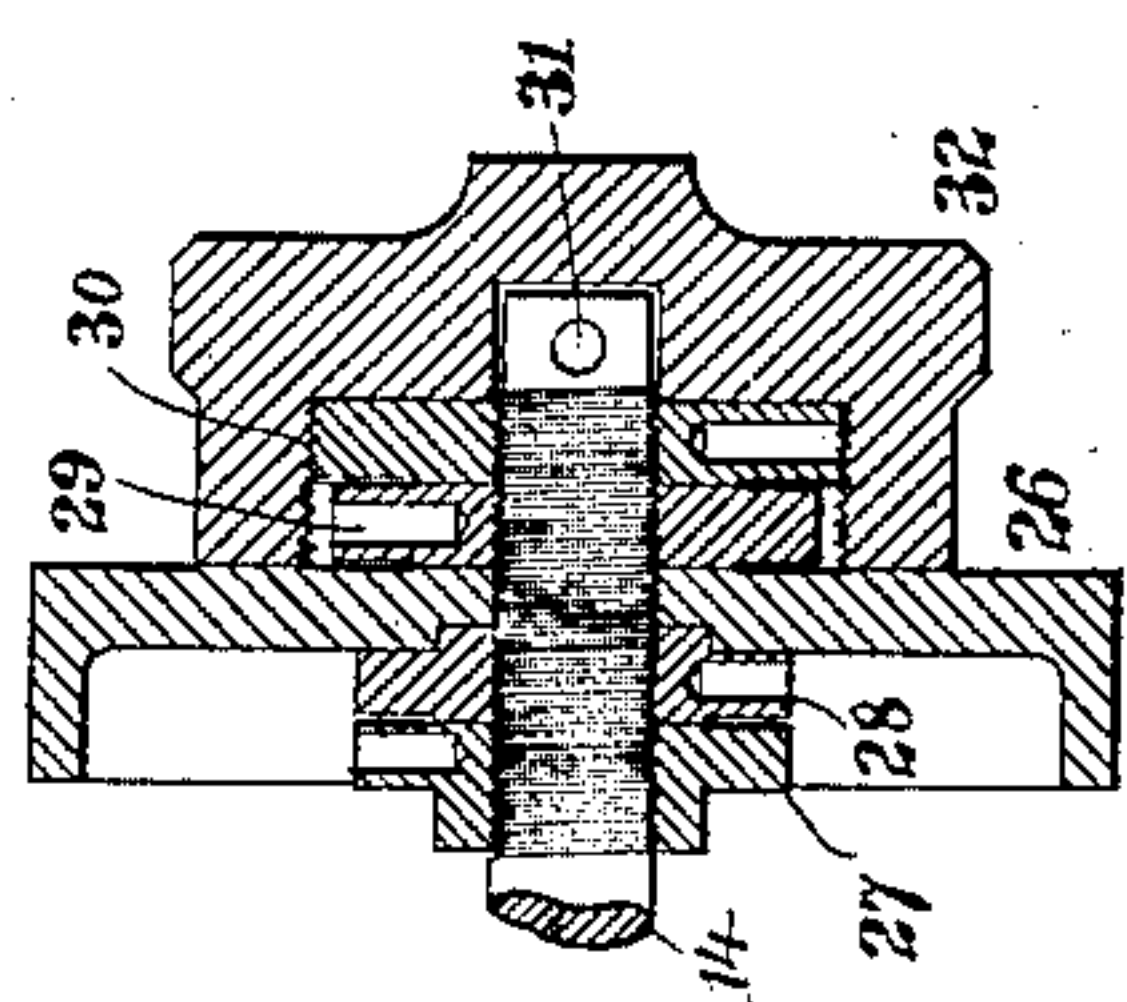


FIG. IV.

Attest: { Geo. T. Smallwood.
F. A. Stopping

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UNITED STATES PATENT OFFICE.

ALBERT H. EMERY, OF STAMFORD, CONNECTICUT.

MICROMETER-GAGE.

SPECIFICATION forming part of Letters Patent No. 362,149, dated May 3, 1887.

Application filed April 20, 1886. Serial No. 199,547. (No model.)

To all whom it may concern:

Be it known that I, ALBERT H. EMERY, a citizen of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Micrometer-Gages, of which the following is a specification.

The subject of this invention is a micrometer-gage constructed with two movable heads, one of which may be first set and the other accurately adjusted by the micrometer-screw; and the invention further relates to certain details of construction employed in carrying the invention into effect.

In the accompanying drawings, Figure I is a front view of a gage illustrating my invention. Fig. II is a side view of the same. Fig. III is a transverse sectional view on the line III III, Fig. II. Fig. IV is a longitudinal sectional view of the head of the micrometer-screw on a larger scale.

The bar 1 has graduations 2, and carries the setting or vernier head A, the moving or gaging head B, and the fixed micrometer-head C, each made of two parts, recessed to receive the bar 1, and firmly secured together by dowel-screws 4.

The heads A and B are constructed with gaging-blocks 5 and 6, respectively, secured to the body of the head by screws 7 and 8. The rear face of the recess in the head A is planed accurately to fit the back of the bar 1, and is drawn home against it by the screws 8 bearing on washers 9, and serving also as set-screws.

The head A is provided with a vernier, 2^a, to determine its adjustment, and is fixed in any position to which it is adjusted by the set-screws 8.

The body of the head B is also made of two recessed pieces secured together by screws 4 and accurately fitted to the back of the bar. It carries a gaging-block, 6, firmly secured to it by screws 7 and 8, the latter being a dowel-screw, and, with the adjusting-screw 10, serving to draw the head home against the rear face of the bar 1.

The two parts of which the respective heads A B are formed are counter-recessed, as indicated by dotted lines in Figs. 1 and 2 and represented in full lines in the sectional view, Fig. 3, so as to bear on the sides of the bar

only at and near the extremities of the head. This is of great practical importance to facilitate accuracy of fitting and freedom of movement, and to avoid the liability of obstruction by entrance of particles of dust or grit between the surfaces.

The inner faces of the blocks 5 and 6 are made accurately at right angles to the back of the recesses in the heads A B, and are kept parallel to each other and at right angles to the bar by means of the adjusting-screws 8 and 10.

The head B is provided with a split nut, 13, for the micrometer-screw 14, the thread of which is wholly within the head B at all times. The nut 13 may be made separately from the head and be secured to it, but is preferably made in one piece therewith, as shown. In order to adjust the nut with the proper pressure on the micrometer-screw 14, the head is provided with two slots, 17, separating in a measure the nut 13 from the rest of the head; and to give it greater flexibility the parts of the nut are, either or both, partially separated from the body of the head by grooves 18, terminating in holes 19. The parts of the nut may now be easily brought together by the adjusting-screws 11.

12 is a locking-screw, by which the head is easily and quickly set in any position desired without disturbing the adjusting-screws 11.

The head C is also made in two parts secured together by screws 4 and 20. An arm, 21, is secured to the head C by screws 22 and forms a part thereof. Screws 23, 24, and 25, passing through the arm 21, secure the head to the bar 1 in the exact position desired. The screw 25 is employed to draw the head firmly home against the guiding rear face of the bar, while the screws 23 24 adjust and set it longitudinally.

The micrometer-screw 14 has a graduated collar, 26, which is fixed accurately in the required position by means of two pairs of lock-nuts, 27 28 and 29 30, the screw 14 having a pin-hole, 31, for holding it, and the nuts similar pin-holes for turning them. One of the nuts 29 30 is threaded on the exterior to secure a cap, 32, of wood or other material which will not freely conduct heat, serving as a handle to operate the screw.

The micrometer-screw 14 is made with a col-

lar, 33, fitting closely in a recess in the head C, and is fixed against longitudinal movement by the nut 27, which is formed with a corresponding collar to fit in a recess in the opposite face of the head, so that by means of these collars the micrometer-screw is fixed against longitudinal movement in the head, while it is permitted to turn freely. In practice the nut 27 is set in the proper position and firmly locked by the nut 28. Then the graduated collar 26 is pressed home against the nut 28, and while its indicator is accurately at zero is fixed in this position in rigid connection with screw 14 by clamp-nut 29 and jam-nut 30, after which the cap 32 is applied, as already described.

The position of the micrometer-screw is shown by an index-line at each end on a piece, 34, secured by screws 20 to the head C. The index-line 35 indicates on the scale 36 the movements of the head by each revolution of the micrometer-screw. The index-line 37 indicates by the scale on the micrometer-collar 26 the fractional rotations of the screw. Each revolution of the screw moves the gaging-head B five one-hundredths of an inch, and as the scale on the screw-head has one hundred graduations each of these graduations represents five ten-thousandths of an inch, and as a good observer can readily read to one-tenth of these graduations the instrument can be conveniently used to gage to one twenty-thousandths of an inch.

Instead of the gaging-blocks 5 6 having together a single pair of gaging-points, 38, each block has two or more exterior gaging faces for internal measurements. The present illustration shows four such gaging-faces on each block, (numbered 38 39 40 41.)

The gaging-faces 42 of the blocks 5 and 6 project slightly beyond the corresponding faces of the heads, to facilitate accurate dressing and prevent their separation by any foreign matter interposed between the heads. The method of preparing these blocks is to make them of steel, very hard, grind the faces 42 to true planes at right angles to the back face of the recesses in the heads A B, and, putting these faces together, grind the faces 38, 39, 40, and 41 to cylindrical arcs of different radii—as, for example, one-eighth, five-eighths, nine-eighths, and thirteen-eighths, respectively—making these gaging-faces portions of cylinders, respectively, of one-fourth, one and one-fourth, two and one-fourth, and three and one-fourth inches diameter, which enables us, by means of the micrometer-screw, which is here shown to measure one inch, to measure by one setting of the head A all interior diameters from one fourth of an inch to four and one-fourth inches. In other words, it affords a range of four inches from any diameter by one setting of the head A by fine micrometer movements, or four times the capacity of the micrometer-screw. Diverse gaging-faces form in part the subject of the claim in another application of mine of even date herewith.

In use the head B is set first, the indicators 35 and 37 being at zero. Then for dimensions up to four and one-fourth inches the head A is brought against it. For large measurements it is set at fixed distances away from B by standard gages or a vernier-gage.

Among the advantages of the invention are the following: The four wearing-faces afford a very large amount of wearing-surface as compared with the small points 38, which are all that are provided in other gages; also, by the reduced length of the micrometer-screw, it is easier to make it accurate, and having to move the micrometer-screw but one-fourth as much, wear of this is saved and its accuracy preserved.

To prevent heat from the hand being communicated to the gage, and for convenience in handling, handles 15 are provided, of wood or other non-conducting material.

The projecting form of the gaging-faces 42 permits the more accurate dressing of their whole length.

In order to keep dust out, a cap, 43, is provided for closing the end of the nut-aperture, and the kerfs between the body of the gage-head and the adjustable screw-sockets are filled with chamois.

The washers 9 in the head B are made partly or wholly of elastic material, or else a spring is provided for the screws 8 and 10 to bear against in order to compensate for any slight irregularities in the width of the bar, and thus permit the head to move with uniform ease.

The separable gage-block 5 or 6 is advantageous, in that it admits of making it very hard, and also affords opportunity for renewing the said block at moderate cost when worn or injured.

Although a vernier-scale may be used, as shown, for setting the gage head A, it is much more accurate than the ordinary vernier-gage, in that it admits of setting the first head, A, by a standard gage interposed between the faces 42, and then taking measurements therefrom within the range of the screw with rapidity and great delicacy by the micrometer movement. These gages are usually made with two or more bars of different lengths, to adapt them for different places and uses.

The principle of constructing a micrometer-gage for delicate measurements with a handle or holding-piece of wood or like material, to prevent injurious conduction of heat to the body of the gage from the hand of the user, also the use of set-screws to adjust the screw socket or nut accurately to the micrometer-screw, and a locking-screw to fix the micrometer-screw at any point and release it again without interfering with such adjustment of its nut or screw-socket, I have described and claimed in another application of even date herewith, designated "Case A," and numbered 199,545.

A gage-head with two or more gaging-faces in the same direction, and the same in combination with a guide-bar and micrometer-screw,

I have described and claimed in another application of even date herewith, designated "Case D," and numbered 199,548.

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

1. A micrometer-gage having a bar, 1, for measurements of much greater range than the run of the micrometer-screw, and two movable gaging-heads, A B, sliding on said bar, the head B being slid by the micrometer-screw and the head A adapted to slide into contact with the head B, or to be accurately set and fixed at any standard distance therefrom while the micrometer-screw, which moves the head B, is at zero.

2. A micrometer-gage constructed with a bar, 1, an adjustable micrometer-head, C, a micrometer-screw, 14, turning therein, a gage-head, A, sliding on the bar 1 and adapted to be set accurately at any determined point by means of a vernier-scale, and a gaging-head, B, also sliding on the bar 1 and moved by the rotation of the micrometer-screw 14, as explained.

3. A movable head for gages, made in two parts to embrace the bar on which it is fitted to slide, and having its interior surfaces counter-recessed, so that they may bear on the face of the bar only at the ends of the head, as explained.

4. A movable gage-head constructed with two separable parts embracing the bar on which it is fitted to slide and counter-recessed, as described, and a third separable part carrying the gaging face or faces, substantially as herein shown and described.

5. A micrometer-gage having a moving gage-head made in two parts to embrace the bar on which it is fitted to slide, a divided non-rotating nut for the micrometer-screw, formed one-half in each part of the head, and a third part, on which the gaging face or faces are formed, secured to the parts which embrace

and slide on the bar, substantially as herein shown and described.

6. A micrometer-gage constructed with a movable gaging-head, B, carrying the micrometer-nut 13 and protecting-sockets on each side of said nut, an adjustable head, C, and a micrometer-screw, 14, turning in the head C without longitudinal movement, and moving the head B, substantially as described.

7. The combination of the movable gaging-head B, the adjustable micrometer-head C, the micrometer-screw 14, turning in the head C, the graduated micrometer-collar 26, adjustable relatively to the micrometer-screw, and the indicator 34, substantially as and for the purposes set forth.

8. The combination of the micrometer-screw 14, the graduated collar 26, adjustable thereon, and the nuts 28 29, between which the said collar is clamped in any required position on said screw, as herein shown and described.

9. The combination of the micrometer-screw 14, the graduated micrometer-collar 26, adjustable thereon, the nuts 28 29, between which the collar is clamped in any required position, and the cap 32, applied to the end of the micrometer-screw for the purpose of manipulating it, as explained.

10. The combination, with the bar 1, of the adjustable setting-head A and vernier-scales 2 2^a, for accurately determining the adjustment of the said head A on the bar 1, the gaging-head B, sliding on the bar 1, and the micrometer-screw 14, for adjusting the latter, substantially as and for the purpose set forth.

11. The combination, with the bar 1, of the adjustable setting-head A and vernier-scales 2 and 2^a, the gaging-head B, micrometer-screw 14, and the adjustable micrometer-head C, substantially as and for the purposes set forth.

ALBERT H. EMERY.

Witnesses:

OCTAVIUS KNIGHT,
F. A. HOPKINS.