April 21, 1936. O. O. HOLLS 2,037,858

MICROMETER GAUGE

Filed Nov. 24, 1933

FIG. 1.

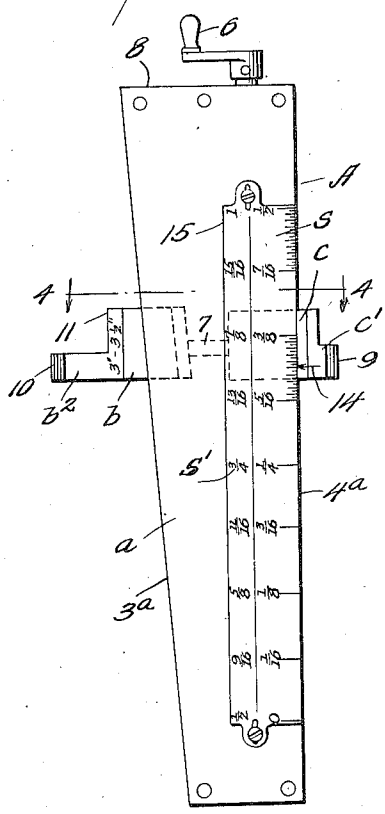


FIG. 2.

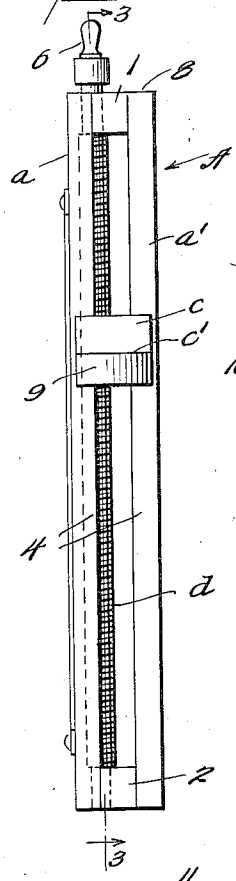


FIG. 3.

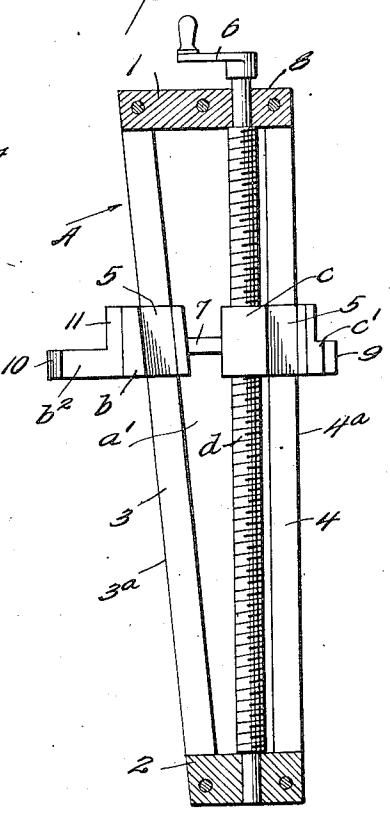
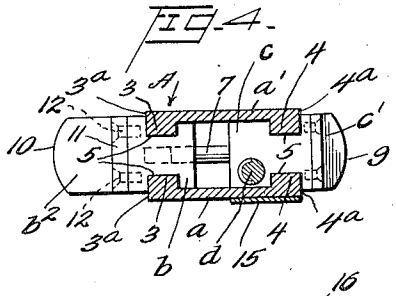


FIG. 4.



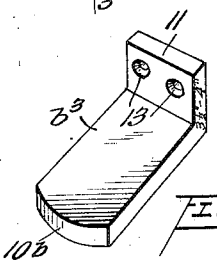


FIG. 5.

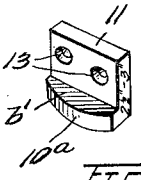


FIG. 6.

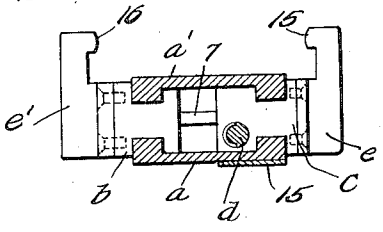


FIG. 7.

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MICROMETER GAUGE

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11 Claims. (Cl. 33—162)

This invention relates to a micrometer gauge of sturdy construction, adapted particularly for use in garages and repair shops for gauging the cylinders of automotive engines, but, of course, useful for other purposes.

In carrying out the invention, I provide a flat elongated metal body having its opposite longitudinal edges straight and inclined with respect to one another, the wider end of the body being preferably at right angles to one of said edges. Metal blocks, interlocked with the body and connected so as to be movable in unison, are adjustable along the longitudinal edges of the body by an adjusting screw journaled in the body. The blocks are provided with contact pieces for engaging the opposite sides of the cylinder or other part which is to be gauged, and the contact pieces on one or both of the blocks are removable so as to be interchangeable with like contact pieces of different lengths for gauging cylinders or other parts of different diameters. The surfaces of the contact pieces which engage the objects to be measured are of substantial thickness, so as to resist wear, and rounded in order that they may not stick in crevices in the walls of the cylinders or parts which they may engage.

The diameter of a part is measured by adjusting the guide blocks until the contact pieces thereon engage the part at its opposite sides. A scale extends longitudinally of the body, and a suitable index mark on one of the blocks indicates on the scale the distance between the contacting surfaces of the contact pieces and, therefore, the diameter of the part which has been gauged.

In the accompanying drawing,

Fig. 1 is a side elevation of the micrometer gauge;

Fig. 2 is an edge view of the same, looking from right to left in Fig. 1;

Fig. 3 is a longitudinal section on the line 3—3 of Fig. 2;

Fig. 4 is a transverse section on the line 4—4 of Fig. 1;

Figs. 5 and 6 are perspective views of interchangeable contact members, and,

Fig. 7 is a section similar to that shown in Fig. 4, but showing contact members for gauging outside diameters.

As shown in the drawing, the body A of the instrument is wedge-shaped and comprises two similar metal plates *a* and *a'*, of the same size and shape, secured together at their ends and spaced apart by metal blocks 1 and 2, forming a rigid supporting structure. Each plate is formed with inwardly projecting ribs 3 and 4 extending longitudinally thereof, parallel with its side edges, the ribs 3 being opposite one another and the ribs 4 being opposite one another. These ribs form guides for metal blocks *b* and *c* arranged between the plates. The block *b* has notches 5 in its opposite sides which fit the ribs 3 closely and the block *c* has similar notches which fit the ribs 4 closely. One of the blocks, as the block *c*, has a threaded opening through which an adjusting screw *d* extends, and this screw is journaled in the blocks 1 and 2 and is provided with a hand crank 6, as shown in Fig. 3. A pin 7, secured to one block, as the block *c*, extends through and is slidable in a bore in the opposing block *b*, and by means of this sliding or telescopic connection between the blocks, when the screw is turned to adjust the block *c* longitudinally of the body portion, the block *b* will be moved by the pin to the same extent and the blocks will move toward or away from one another as they move along the relatively inclined guide ribs, according to the direction in which the adjusting screw is turned.

In the instrument shown in the drawing, the side edges 4^a of the plates are at right angles to the top edges 8, while the side edges 3^a slope gradually downward from the top edges toward the side edges 4^a, and the adjusting screw is arranged parallel with the latter edges.

The block *c* has a short lateral extension *c'* which constitutes a contact piece for engaging the wall of the cylindrical opening whose diameter is to be measured. The outer face 9 of the part is curved in the arc of a circle whose radius is less than that of the smallest opening in which the instrument is to be used. On the opposing block *b*, in Figs. 1–4, is shown a contact piece b^2 having a similarly formed outer face 10. The contact piece b^2 has a flat right-angled extension 11 which fits against the outer face of the block *b*, and screws 12 passing through this extension and into the block removably secure the contact piece to the block. The contact piece b^2 is interchangeable with a longer contact piece b^3, Fig. 5, and a shorter contact piece *b'*, Fig. 6, each of these pieces having a curved outer face 10 and a right-angled extension 11, the latter having openings 13 to receive the screws 12. The block *c* has an index line 14 extending to the adjacent edge 4^a of the plate *a*, and upon the plate, adjacent said edge, is a suitably graduated scale which extends longitudinally of the plate. As shown in the drawing, a metal strip 15 is attached to the plate and this strip carries two parallel scales S and S'.

For use in gauging the cylinders of automotive

engines, the inclination of the edges 3a of the instrument with respect to the edges 4a is such that the blocks *b* and *c*, and the contact pieces thereon, will spread apart ½" in passing from the lowest index mark on the scale to the highest index mark, and each scale is graduated so as to represent a half inch divided into fractions of an inch. Thus, scale S reads upwardly from zero to ½", while the scale S' reads upwardly from ½" to 1".

The interchangeable contact pieces are marked, for convenience of identification in the shop, with numerals indicating the diameters, in inches, of the cylinders or openings in which they are used. Thus, as shown in the drawing, the contact piece *b'* is marked 2½–3; the contact piece b^2 is marked 3–3½, and the contact piece b^3 is marked 3½–4.

The operation is as follows: For engine cylinders of from 2½" to 3" in diameter, the short contact piece *b'*, Fig. 6, will be secured to the block *b*. When this piece is applied, the distance between the center of its contact surface 10a and the center of the contact surface 9 on the contact piece *c'* will be exactly 2½" when the index mark 14 on the latter piece is opposite the ½" line on the scale S', and when the index mark 14 is at the 1" mark, at the top of this scale, the distance between the centers of the contact surfaces 10a and 9 will be exactly 3". Hence the operator, knowing the approximate diameter of the cylinder, will turn the adjusting screw and adjust the contact pieces so that they will go freely into a cylinder of between 2½" and 3" in diameter and then adjust the contact pieces until they engage the wall of the cylinder at diametrically opposite points. When the instrument is removed, the index line 14 will be at a point on the scale S' which will indicate the internal diameter of the cylinder. Thus, since the known distance between the centers of the contact pieces is 2½" when the index line 14 is at the ½" line on the scale, if the index line is at the ¾" mark when the measurement is taken, the diameter will be indicated at 2¾".

If the cylinder to be measured is between 3" and 3½", the contact piece b^2 will be applied to the block *b*, as shown in Figs. 1–4. This contact piece is ½" longer than the contact piece *b'* and hence when the index line 14 is at the lowest mark on the scale, the distance between the centers of the surfaces 9 and 10 will be exactly 3", and when the index line is at the uppermost line on the scale, the distance between these centers will be exactly 3½". To take a reading, the operator adjusts the contact pieces into engagement with the cylinder walls and the indication is then read on the scale S. For example, if the indicating mark 14 is opposite the ¼" mark on scale S, the diameter will be indicated as 3¼".

If the cylinder to be measured is between 3½" and 4" in diameter, the contact piece b^3 will be applied to the block *b* and the reading will be taken on the scale S'. When the contact piece b^3 is applied to the block *b*, the distance between the center of the contact surface 10b, on the contact piece b^3, and the center of the surface 9 of the contact piece *c'* will be exactly 3½" when the index mark 14 is at the bottom of the scale and the distance between these surfaces will be exactly 4" when the index mark it at the top of the scale. When a measurement is taken by adjusting the contact pieces into engagement with the cylinder wall, if the diameter is, say, 3⅝", the index mark 14 will be opposite the ⅝" mark on the scale S'.

For gauging engine cylinders, the operator can determine by observation whether the edge 4a of the instrument is parallel with the cylinder wall but if desired, a square or other straight-edged instrument can be placed across the top of the cylinder and against the upper edge 8 of the gauge which is at right angles to the edge 4a.

Where outside diameters are to be measured, the movable blocks may be equipped with laterally projecting contact members *e*, *e'*, as indicated in Fig. 7. These members have opposed contact surfaces 15 and 16, respectively, adapted to engage points at opposite sides of the object which is to be gauged. The contact member *e'* is detachably connected to the block *b* so as to be interchangeable with other similar members having their contact surfaces spaced different distances from the contact surface of the contact member *e*.

What I claim is:

1. A micrometer gauge comprising an elongated rigid supporting body having its opposite side edges straight and inclined with respect to one another, guide-blocks movable along said edges and supported solely by said body, each block having a contact part projecting therefrom, and means for moving said blocks in unison along said edges.

2. A micrometer gauge comprising an elongated rigid supporting body having its opposite side edges straight and inclined with respect to one another, guide-blocks movable along said edges and supported solely by said body, each block having a contact part projecting therefrom, means for moving said blocks in unison along said edges, and a scale extending longitudinally of the body, adjacent one of said edges.

3. A micrometer gauge comprising an elongated rigid supporting body having its opposite side edges straight and inclined with respect to one another, guide-blocks movable along said edges and supported solely by said body, each block having a contact part projecting therefrom, one of said parts being removable from its block so as to be interchangeable with other contact parts of like structure, means for moving said blocks in unison along said edges, and a scale extending longitudinally of the body, adjacent one of said edges.

4. A micrometer gauge comprising an elongated rigid supporting body having its opposite side edges straight and inclined with respect to one another, an adjusting screw journaled in the ends of the body, guide-blocks movable along said edges and telescopically connected together, one of said blocks having a threaded engagement with said screw, said blocks having contact parts projecting therefrom, and a scale extending longitudinally of the body.

5. A micrometer gauge comprising an elongated rigid supporting body having its opposite side edges straight and inclined with respect to one another, an adjusting screw journaled in the ends of the body, guide-blocks movable along said edges and telescopically connected together, one of said blocks having a threaded engagement with said screw, said blocks having contact parts projecting therefrom, one of said parts being removable from its block so as to be interchangeable with other contact parts of like structure, and a scale extending longitudinally of the body.

6. A micrometer gauge comprising an elongated

rigid supporting body having its opposite side edges straight and inclined with respect to one another, the wider end of the body being at a right-angle to one of said edges, an adjusting screw journaled in the ends of the body and extending parallel with the latter edge, guide-blocks movable along said edges and telescopically connected together, one of said blocks having a threaded engagement with said screw, said blocks having contact parts projecting therefrom, and a scale extending longitudinally of the body.

7. A micrometer gauge comprising an elongated rigid supporting body having its opposite side edges straight and inclined with respect to one another, guide-blocks movable along said edges and supported solely by said body, each block having a contact part projecting therefrom and each contact part having an arcuate contact surface, one of said parts being removable from its block so as to be interchangeable with other contact parts of like structure, means for moving said blocks in unison along said edges, and a scale extending longitudinally of the body, adjacent one of said edges.

8. A micrometer gauge comprising a supporting body composed of two similar elongated plates secured rigidly together at their ends parallel with one another and spaced apart, the side edges of the plates being straight and said edges at one side of the body being inclined with respect to the side edges at the opposite side of the body, said plates having guide ribs parallel with said edges, guide-blocks having interlocking engagement with said ribs and connected so as to be movable together along the ribs, each block having a contact part projecting therefrom, an adjusting screw journaled in the ends of the body and having a threaded engagement with one of the blocks, and a scale extending longitudinally of the body.

9. A micrometer gauge comprising an elongated rigid supported body having its opposite side edges straight and inclined with respect to one another, guide-blocks movable along said edges and supported solely by said body, said blocks being connected so as to move in unison, each block having a contact piece at its outer end, one of said contact pieces being removable and interchangeable with larger and smaller contact pieces, and a scale extending longitudinally of the body adapted for use with different contact pieces.

10. A micrometer gauge comprising an elongated rigid supporting body having its opposite side edges straight and inclined with respect to one another, guide-blocks movable along said edges and supported solely by said body, each block having a contact part projecting therefrom, one of said parts being removable from its block so as to be interchangeable with other contact parts of like structure, and means for moving said blocks in unison along said edges.

11. A micrometer gauge comprising an elongated supporting body having its opposite side edges straight and inclined with respect to one another, the wider end of said body being at a right angle to one of said side edges, a scale on the body parallel with the latter edge, guide blocks movable along said side edges and supported solely by said body, and means for moving said blocks in unison along said side edges.

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