

UNITED STATES PATENT OFFICE.

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MICROMETER-GAGE.

SPECIFICATION forming part of Letters Patent No. 541,916, dated July 2, 1895.

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To all whom it may concern:

Be it known that I, CHARLES F. BOWMAN, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Measuring-Instruments; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to certain novel and useful improvements in measuring instruments of the micrometer class, and has special reference to that construction having two uprights mounted upon a beam, one of which is fixed thereon, and the other movable and arranged to be secured in certain positions on the beam; which positions are determined by means of removable blocking of any suitable length.

The object of my invention is to dispense with the use and annoyance of the removable blocking or distance pieces, and to arrange upon the beam fixed positions or stops, against which, the movable upright is brought and firmly secured; also to improve and simplify the construction of the mechanism of the micrometer measuring screw.

With these ends just recited in view, my invention consists of stops attached to the beam and arranged preferably at an angle thereto, which stops are also preferably made adjustable, so that in making the instrument that may be regulated as to height, or in case of wear, such wear may be compensated for by means of this adjustable feature. These stops are so arranged on the beam as not to interfere with the travel of the movable upright when such upright is not located against any one of said stops; which latter action or result is effected by means of a hardened piece attached to said upright, which piece is so arranged that it is capable of being engaged with any one of the said stops, and thus locate the upright, or when disengaged therefrom, to allow the said upright to be moved along the beam.

The improvements in the micrometer screw

mechanism consists in combining with the screw, a nut having cone shaped ends, longitudinal opening or split in one side, a cone shaped seat provided in the micrometer thimble or shell, for one end of said nut, combined with a threaded sleeve having a cone shaped seat to engage the other end of said nut, whereby the nut is closed upon the traveling screw so as to eliminate lost motion therein, all of which improvements, will be more fully described in the following specification, and such features as are believed to be new and novel, particularly pointed out in the claims to follow.

To enable others to understand my said invention reference is had to the accompanying drawings which, together with the specification explain the device.

Figure 1 represents a side elevation of the micrometer gage, central sectional view of the screw mechanism; a portion of the movable upright and beam broken away to show the stops of the beam and the engaging piece of the said upright; also the movable upright in dotted position, with its contact piece thrown out of engagement with the stops on the beam. Fig. 2 is an end elevation of the gage and broken section of the movable upright, looking in the direction of the arrow seen in Fig. 1. Fig. 3 is a broken view of a round beam with broken view of the movable upright mounted thereon. In this view as well as in Fig. 1, the contact piece or arm is brought into engagement with one of the stops of the beam. Fig. 4 is an end elevation of Fig. 3, looking in the direction of the arrow, showing the manner of maintaining a perpendicular position of the upright on a round or circular beam. Fig. 5 is an end view of the circular beam, showing a longitudinal slot therein to assist in connection with a key shown in Fig. 4, to steady the movable upright. Fig. 6 is both a side and an end elevation of the micrometer nut. Fig. 7 is a perspective view of the split taper pin arranged to pass transversely through the movable upright and holes of the beam. Fig. 8 is a broken sectional view of the micrometer screw and shell projection of the movable upright, cone-shaped seat therein, for the cone shaped end of the micrometer nut. Fig. 9 is a detail view of the block inserted in the lower end of the movable upright.

Its construction and operation are as follows:

1 (see Fig. 1) represents the beam, 2 the movable upright, and 3 the fixed or stationary upright.

4 are what may properly be termed distance points or stops and are screw threaded a part of their length, to engage threaded holes angularly arranged through the beam 1. The angle shown being thirty degrees which enables the faces 4^a of the stops 4 to abut squarely against the outer face of the eccentrically arranged contact arm 5, which is attached to the rod 6, and this rod is rotatably mounted in a hole obliquely arranged through the upright 2 and surmounted by the nut 7 on its outer projecting end.

8 is the threaded portion of the micrometer screw and 8^a its measuring point, said screw being rigidly fixed—as is usual in such cases—to the traveling sleeve 9.

10 is the tubular projection of the upright 2 which supports the micrometer screw mechanism. See also Fig. 8. The outer end of this projection has an enlarged mouth, at the bottom of which is the cone shape seat 11, the taper of which seat conforms to the cone shape ends 12 of the micrometer nut 13. See also Fig. 6. This nut 13 has the longitudinal opening 14 cut through one side thereof. The enlarged mouth of the projection 10 is threaded a portion of its depth to admit the threaded sleeve 15, whose taper or cone-shape mouth engages with the outer cone shape end of the nut 13, so that, by reason of the cone shape ends of this split nut, and the cone shape seat of the projection 10, combined with the adjustable feature of the cone sleeve 15, the nut is compressed or closed down upon the screw, whenever it becomes necessary to take up wear therein. The outer surface of the nut 13, is smooth, and is prevented from rotating with the screw 8 by means of the pin 16,—see Fig. 8—engaging partly—see also Fig. 6—with the longitudinal groove 17 of the said nut, and a corresponding groove—not shown—in the walls of the shell projection 10. The short threaded shell 18 in the front face of the upright,—Fig. 1—operates as a bearing or support for the smooth cylindrical portion of the end 8 of the micrometer screw. The split taper pin 19—see also Figs. 7 and 2—is arranged to pass through the hole 20,—see dotted position of said upright in Fig. 1—and the straight sides 21 of the upright 2 and also through the holes 22 of the beam 1.

Referring to Fig. 2, the frame of the upright which is mounted upon the beam, whose sides as before mentioned are indicated by the reference figures 21, is preferably forked or in other words constructed with its lower portion open, into which open end is riveted the block 23. Interposed between the upper surface—see Fig. 1—of this blocking and the under surface of the beam 1 is the key 24, whose downward projecting ends 25 overhang the ends of the block before mentioned, and, by so

doing, said key is maintained in place. The threaded end of the tightening screw 26, which screw passes through a threaded hole in the block 23, engages with said key 24, and by so doing, the upright 2 is firmly clamped to the beam. The beam shown in Figs. 1 and 2 being square, and the base of the upright constructed to conform therewith, will insure the upright 2 maintaining a perpendicular position. In the construction shown in Figs. 3, 4 and 5, the beam is round, and it will therefore require a special arrangement for that purpose, which consists of the longitudinal slot 27 in the lower side of said beam to receive the key 24. The arrangement of this key with the block 23 is the same as shown in Figs. 1 and 2, with this exception, that in the upper end of the block 23,—see also Fig. 9—is the slot 28, which registers with the slot in the beam, and into both of which slots the key operatively fits. When, therefore, the grip or pressure of the screw 26 is released from the key 24, said key will drop,—see Fig. 4—sufficiently to release the upright, and allow it to be moved along the beam, and yet always maintain its influence over the same in keeping it plumb.

The operation of the device is as follows: When the upright 2 is brought into any one of the five positions shown, the arm or contact piece is turned, and its outer face brought to bear against the end 4 of the required stop of the beam. The pin 19 is passed through the hole 20 in the upright and through one of the holes 22 of the beam with which said hole will approximately register. As there is more or less vertical play in the upright when the screw 26 is loosened, there is a tendency, owing to the inclined faces of the stop, and contact piece 5, Fig. 3, for the said contact piece to be located too high, so that the tightening screw 26 would not pull it down. To counteract this, I employ the split screw 19 which, by reason of its springy nature and the fact that the holes in the beam and upright are slightly mismatched, will have a tendency to draw the upright slightly to the left, so that, when the screw 26 is tightened, the stop of the beam and the contact piece of the upright will be brought into proper engagement with each other by reason of the controlling influence of the two screws 19 and 26. If a pin having a solid body were used instead of the split pin above mentioned, the tendency would be rather to maintain the upright in its slightly elevated position, an error which the split pin effectually corrects. It may be advisable as the contact arm 5 and the stops 4 are hardened, to counteract any tendency to wear, or for the arm 5 to make any impression on the face of the boss or projection 29 of the upright 2, to insert in such projection the hardened pin 30. When the micrometer screw is at zero, and the upright 2 in the first position, viz., against the first stop to the right of the fixed upright 3, the end of the measuring point 8 will abut the anvil 31 of the latter and each of the said stops 22 may

be arranged at such a distance from each other that will represent the full travel of the micrometer screw, so that work of different lengths, proportionate to the distance any one of these stops is placed from the anvil plus the travel of the micrometer screw, can be measured.

From the foregoing description of my improved beam, it will readily be seen that there is a decided advantage to be derived in the use of permanent fixed stops or distance points, both to the maker and user, that when detachable pieces are inserted between the uprights to establish the different distances required. To the maker of the instrument a slight variation between the holes formed in the beam for the several stops, can be rectified by means of the adjustable feature of such stops, which may also be employed to advantage by the user to compensate for wear.

I do not wish to be confined to the exact arrangement shown on the movable upright for bringing it in contact with the stops of the beam, as a vertically operating sliding piece on such upright would answer equally as well. The most important feature of my device consists in locating certain well defined stops or points of distance, established from the anvil of the fixed upright upon the beam, so that the movable upright can be brought into engagement with any one of said points, and when disengaged therefrom, said upright may be moved along said beam unobstructed by said points or stops and thereby dispense with the use of the insertible distance pieces heretofore employed. Therefore I do not wish to be confined strictly to the arrangement or construction of these stops but hold myself at liberty to place them at right angles to the beam or inclined thereto, as shown, or to make them of any shape best calculated to produce the best results.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a micrometer gage with the beam carrying the gaging heads or uprights, one of which is fixed and the other movable thereon, of a series of adjustable locating stops on said beam for the location of the movable upright at certain predetermined distances from the fixed upright, means on said movable upright to engage with said stops.

2. The combination in a micrometer gage with the beam carrying the fixed and movable gaging heads or uprights having the gaging points, of a series of angularly arranged threaded holes through said beam, a series of threaded pins adjustably engaging therewith, one end of each of said pins hardened and arranged to be located near the surface of the beam, means provided on the movable upright to readily engage with said stops or be disengaged therefrom, so that, by means of the adjustable feature of the said stops the movable upright can be accurately located with respect to its position on the beam and the stationary upright.

3. A micrometer gage comprising in combination, a beam having mounted thereon a fixed and a movable upright each carrying gaging points, adjustable stops for locating the movable upright in different positions on said beam and angularly arranged therein, means on such upright for engaging such stops, transverse holes through said beam, a hole through the said movable upright coinciding with the holes of the beam, a split pin arranged to pass through the same and locate said movable upright firmly against one of the before mentioned adjustable stops and the beam, combined with a tightening screw as shown.

4. A micrometer gage comprising in combination, a fixed standard a measuring screw supported therein, a threaded nut mounted on said screw and having a longitudinal opening in one side thereof, and beveled ends, a stationary beveled supporting seat in the said standard for one of such ends, an exteriorly threaded thimble surrounding said measuring screw and adjustably engaging with a threaded portion of the said standard, said thimble having also a beveled mouth to engage the outer beveled end of the before mentioned nut, so that, by this combined arrangement of the beveled ends of the nut, longitudinal opening; fixed beveled seat; and adjustable thimble the nut is closed upon the screw or released therefrom by the slightest movement of the said thimble, as set forth.

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

CHARLES F. BOWMAN.

Witnesses:

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