(No Model.)

J. E. WILLIAMSON.

MICROMETER GAGE.

No. 535,521. Patented Mar. 12, 1895.

FIG. 1.

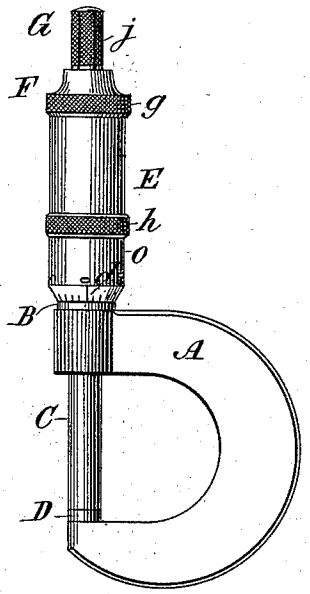


FIG. 3.

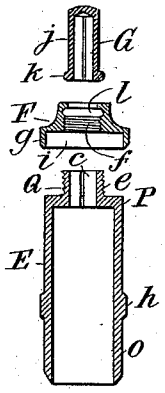


FIG. 2.

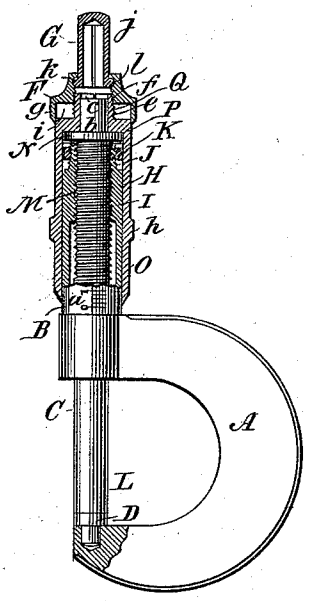
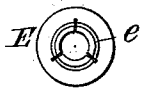


FIG. 4.

FIG. 5.



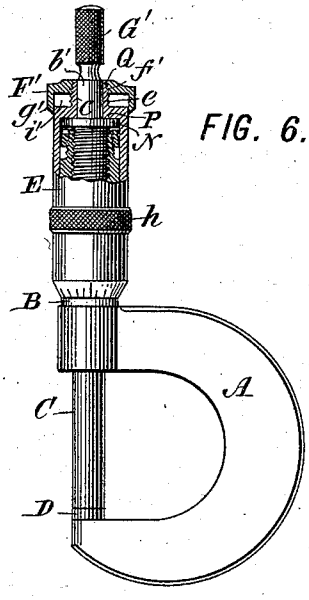


FIG. 6.

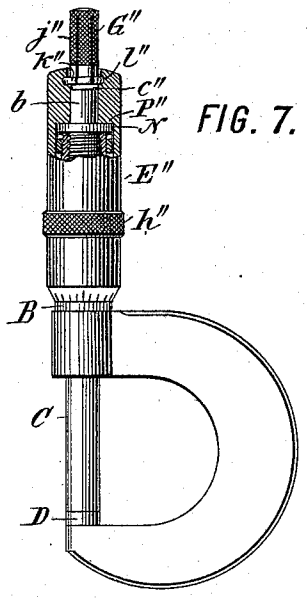


FIG. 7.

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MICROMETER-GAGE.

SPECIFICATION forming part of Letters Patent No. 535,521, dated March 12, 1895.

Application filed November 24, 1894. Serial No. 529,807. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. WILLIAMSON, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Micrometer-Gages, of which the following is a specification.

This invention relates to micrometer gages and analogous devices, and aims to provide certain improvements in devices of this character.

Heretofore in micrometer gages having a screw-threaded spindle working in a threaded split nut or barrel, and carrying a sleeve or shell serving as an indicator in connection with the graduation on the barrel, attempts have been made to provide for the inaccuracies due to wear, by making the sleeve adjustable relatively to the screw; and also to prevent the use of force in screwing the spindle down too tightly, frictional handles upon the sleeve have been made.

My invention provides an improved construction for the connection between the spindle and its sleeve or shell whereby the adjustment of the latter is facilitated, and it provides an improved frictional handle or driver for operating the gage and preventing the application of undue force thereto.

To this end in carrying out my invention, I provide certain improvements in the construction of the micrometer gage which will be hereinafter fully set forth in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a micrometer gage constructed according to the preferred form of my improvements. Fig. 2 is a similar view, the barrel, sleeve and handle being in axial section. Fig. 3 is an axial section of the sleeve, its fastening nut and the frictional handle separated from each other. Fig. 4 is a plan view of the handle alone. Fig. 5 is a plan view of the sleeve alone. Fig. 6 is a side elevation of a micrometer gage of ordinary construction supplied with my improved adjustable sleeve, the latter and the barrel being partly in axial section; and Fig. 7 is a similar view showing an ordinary micrometer with my improved frictional handle.

Referring to the drawings, let A indicate the bow or frame of a micrometer; B, the usual nut or barrel thereof; C, the spindle or male screw; D, the anvil against which this seats at zero; E, the micrometer sleeve; F, the fastening nut therefor, and G the frictional handle.

The bow A and nut B are of usual construction, the latter being a tubular barrel having a split upper end H provided with an internal screwthread I which receives and engages the screw thread of the spindle C. As usual the barrel has at its upper end a tapering external screwthread J, on which screws a tapering nut K, by means of which the end of the barrel is contracted to cause it to embrace the screwthread of the spindle with the desired tightness or friction. On the barrel, as shown in Fig. 2, the usual graduations *a* are formed, consisting of a vertical line intersected by horizontal lines corresponding each to the axial distance traversed by the spindle in making an exact revolution. In the end of the bow opposite the barrel, the anvil D is applied in any suitable manner, that shown being a fixed or non-adjustable anvil or stop.

The spindle C has the usual cylindrical end L opposed to the anvil, and within the barrel it has the usual screwthread M engaging the screw-threaded portion I of the barrel. Above this thread it has a shoulder N serving to determine the position of the sleeve relatively to the spindle, and above this shoulder it is constructed with a cylindrical portion *b* upon which the sleeve is connected to the spindle.

The sleeve is the usual micrometer sleeve in its general construction, having a tubular body O fitting over the barrel *b*, a shoulder P abutting against the shoulder N of the spindle, and a cylindrical aperture *c* fitting over the end *b* of the spindle. On the lower edge of the body O the sleeve has the ordinary or any suitable graduations or subdivisions *d*, comprising a zero mark at one point, and subdivisions indicating twenty-fifths or other suitable divisions of its circumference. The sleeve normally turns with the spindle, but it is capable of rotative adjustment relatively thereto.

As thus far described the parts are of ordinary or usual construction, in which ordinarily the zero mark on the sleeve coincides with the upright line on the barrel and meets the lowermost graduation or zero mark thereon

when the spindle is screwed exactly against the anvil with the proper degree of force. The spindle and sleeve being relatively fixed so long as the instrument is in normal condition, the divisions *d* on the sleeve will serve to correctly indicate the measurements taken with the instrument, but should any wear occur, the spindle will turn beyond the normal, thus bringing the zero mark of the sleeve out of coincidence with the vertical line of the graduations *a*, and thereafter the indications taken from the graduations will be imperfect to the extent of the wear. To correct this the sleeve has been made rotatively adjustable relatively to the spindle, so that when the spindle was screwed home the sleeve could be loosened and turned until its zero mark was disposed properly relatively to the graduations *a*, and then set fast again on the spindle. My present invention has for one of its objects to provide an improved construction for permitting such adjustment of the sleeve. Another element of inaccuracy in gages lies in the danger of screwing the spindle so tightly against the object being measured that there will be some spring in the parts sufficient to give a slight inaccuracy in the indications read from the graduations. My invention also provides an improved construction of friction handle for the spindle designed to prevent the application of too much force to the latter in operating it.

According to the part of my invention which relates to the adjustment of the sleeve relatively to the spindle, I construct the sleeve with a slender tapering slitted neck Q at its upper end, through which a cylindrical socket *c* is formed, and on which neck is cut a tapering screw thread *e*. The neck Q rises from the square upper end of the sleeve preferably to and above the end portion *b* of the spindle, and is divided on lines parallel with its axis by three or more kerfs or slits, which enable the inner walls of the neck to be sprung toward and from the cylindrical portion *b* of the spindle. To cause the walls of the neck to embrace the spindle, I provide the nut F, which has an external knurled or handle portion *g*, a cylindrical socket portion *i* fitting over the upper end of the sleeve and sufficiently deep to permit the necessary movements of the nut toward and from the sleeve, and a central bore carrying a tapering female screw thread *f* corresponding with and engaging the screw thread *e* of the neck. When the nut F is screwed toward the sleeve, the engaging screw threads cause the sides of the neck to tightly embrace the portion *b* of the spindle, and thus rigidly lock the sleeve to the latter. The reverse movement of the nut frees the neck, so that its walls release the spindle sufficiently to permit independent rotation of the parts, or the axial withdrawal of the sleeve from the spindle. To enable the proper holding of the sleeve while the nut is being adjusted, I provide it with a knurled handle *h* near its lower extremity, by which it can be rotated to bring the sleeve into proper coincidence with the graduations *a* of the barrel, and by which it can then be held while the nut F is being set up tight. Thereafter either the handle *g* of the nut, or *h* of the sleeve may be used as desired to rotate the spindle in using the micrometer. With this construction no special tool is required to reset the micrometer, as it may be done by the operator at any time by the simple grasping of the sleeve in one hand and the nut in the other, turning the latter sufficiently to permit movement of the sleeve, then moving the sleeve to the desired position, and then holding it and setting the nut tight. This can be accomplished very quickly and at any time.

The facility with which the sleeve can be disconnected from the spindle is especially advantageous when it is found necessary to clean the instrument. It often happens that some small particle lodges within the sleeve or barrel and interferes with the operation of the gage, or is liable to impair its screw thread. In such case the sleeve should be immediately loosened from the spindle and detached therefrom, and the clamping nut K of the barrel should be loosened to permit the free removal of the spindle. Then the parts can be cleaned, readjusted and put together without having been impaired by their separation while dirty.

My improved friction handle consists of an auxiliary handle G, preferably much smaller in diameter than the micrometer sleeve, which is connected to the sleeve or to the spindle through the medium of the sleeve or otherwise by a frictional connection consisting of a socket *l* preferably formed in the nut F, and an elastic head *k* fitting this socket and formed at the lower end of the handle G. In its preferred form the handle consists of a tubular stud having a solid top and a slitted or divided elastically expansive body, at the lower outer edge of which is formed an annular rib or head *k*. The handle has a knurled exterior substantially cylindrical, which normally projects above the end of the sleeve and can be grasped between the fingers for rapid rotation of the spindle. In the construction shown in Figs. 1 to 5, the socket *l* is formed in the upper part of the nut F above the screw thread *f*, and above the socket is a concentric aperture through the nut, which equals or exceeds the diameter of the handle G above its head *k*, is inserted. Below the socket the bore through the nut F is slightly greater than the diameter of the cylindrical portion of the handle, but slightly smaller than the diameter of the head. The handle G is connected with the nut by contracting its slitted end and then passing its body upwardly through the bore of the nut until its head slips into the socket *l*, whereupon as the lower end of the handle expands when released, it will be firmly seated in the socket, and the frictional engagement between the latter and the head of the handle will be the measure of

force which can be applied to the spindle through the medium of the handle. When this force is exceeded the handle will slip in the socket if further turned.

It will be seen that my invention provides an improved micrometer gage which is simple in construction and convenient of use, and it will be understood that the invention is not limited to the precise details of construction and arrangement set forth as constituting its preferred form, as it may be modified in certain respects without departing from the spirit of the invention.

Fig. 6 shows a modification in which the ordinary construction of spindle is employed with my improved connection between the sleeve and spindle. In this instance the spindle, above its cylindrical portion here lettered b', has an integral knurled handle portion G'. The sleeve E is identical in construction with that before described, and the nut F' is adapted solely for fastening the sleeve to the spindle. The nut for this purpose has its external handle portion g', its internal socket i', and tapering female thread f', the latter engaging the corresponding thread e of the neck Q to fasten the sleeve to the spindle.

Fig. 7 shows a construction in which my improved friction handle alone is used. In this instance the spindle is of ordinary construction, while the sleeve lettered E'' has a lower handle portion h'' only, a shoulder P'' at top, a cylindrical socket c'' embracing and sweated or otherwise permanently fixed to the cylindrical part b of the spindle, and above this the sleeve is constructed with an annular socket l'' into which the head k'' of the slitted handle G'' is snapped. Above the sleeve the handle G'' has the knurled cylindrical handle portion or body j''. In this instance the handle G'' is snapped into the sleeve E'' by passing its head k'' through the enlarged bore at the upper end thereof.

What I claim is—

1. In a micrometer gage, the combination with the screw, a barrel nut therefor having a graduation, and a micrometer sleeve carried by the screw coacting with said barrel nut to indicate the measurements of the gage, and rotatively adjustable relatively to the screw to bring it in proper coincidence with the graduations of the barrel nut, of a nut screwing on and concentric with said sleeve said nut and sleeve having faces engaging when the nut is screwed on the sleeve and clamping the latter in position on said screw, substantially as and for the purpose set forth.

2. In a micrometer gage, a screw having a cylindrical portion near its upper end, a barrel nut for said screw having a graduation, and a micrometer sleeve engaging and coacting with said barrel nut for indicating the measurements of the instrument, and carried by and rotatively adjustable relatively to said screw, said sleeve having a concentric split neck, a cylindrical socket traversing said neck and embracing the cylindrical portion of said screw, and a tapering external screwthread upon said neck, in combination with a nut having a tapering screwthread engaging the screwthread of said sleeve and when screwed thereon compressing said neck against the cylindrical portion of said screw and thereby clamping the screw and sleeve together, substantially as and for the purpose set forth.

3. In a micrometer gage, a screw having a cylindrical portion b, a barrel nut for said screw having a graduation a, and a sleeve carried by said screw rotatively adjustable thereon, and coacting with the graduation of said barrel to indicate measurements taken by the instrument, said sleeve having a split neck Q traversed by a cylindrical socket c receiving said portion b of the screw and having externally a tapering screwthread e, and a nut F having a tapering screwthread f engaging the thread e on the sleeve, an external handle portion g, and a cylindrical socket i receiving the end of the sleeve, whereby when said nut is screwed on said neck, the latter is compressed against the portion b of said screw, and the sleeve and screw are clamped together.

4. In a micrometer gage, a spindle C having a screw thread shoulder N and cylindrical portion b, in combination with a barrel B having a female screwthread engaging the thread on said spindle, and a graduation a, a bow A, an anvil D, a micrometer sleeve E embracing said spindle and barrel having a graduation d, a shoulder P embracing said shoulder N, a split neck Q, a socket c traversing said neck and receiving the portion b of said spindle, a tapering screwthread e on the exterior of said neck, and a handle portion h, and a nut F having a tapering screwthread f engaging the thread e, a handle portion g, and a socket i receiving the end of said sleeve, whereby when said nut F is screwed on said neck said sleeve and spindle are clamped together, when unscrewed said sleeve can be adjusted relatively to said spindle, and in manipulating said nut said sleeve can be held by its handle portion h, and said nut turned by its handle portion g.

5. In a micrometer gage, the combination with the screw, the barrel nut therefor, and a micrometer sleeve carried by the screw, of a yielding handle for said screw consisting of an elastic metallic piece having a handle portion j near its outer end, a compressible head k near its inner end, and a socket l connected to said screw and receiving and frictionally embracing said head k, whereby when the screw is turned by said handle the power transmitted is limited by the frictional engagement between the head of the handle and said socket.

6. In a micrometer gage, the combination with the screw having a cylindrical end, the barrel nut therefor, and a micrometer sleeve carried by the screw having a central bore embracing the end of the screw and a socket beyond such end, of a yielding handle for said

screw consisting of a split piece having a compressible head near its inner end and a handle portion at its outer end, said head seated within and frictionally embracing said socket, and said handle end exposed beyond said sleeve, substantially as and for the purpose set forth.

7. In a micrometer gage, the combination with the screw C having cylindrical part *b*, of the barrel nut, the sleeve E having split neck Q and socket *c* receiving the end of said screw, the nut F having tapering screwthread *f* screwing on said neck, socket *l* beyond said thread, and a bore between said socket and its upper end, and the handle G having head *k* seated in said socket *l*, and exposed body portion *j*, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES E. WILLIAMSON.

Witnesses:
GEORGE H. FRASER,
THOMAS F. WALLACE.