(No Model.)

J. J. McINTYRE.

MICROMETER BEAM GAGE.

No. 571,094. Patented Nov. 10, 1896.

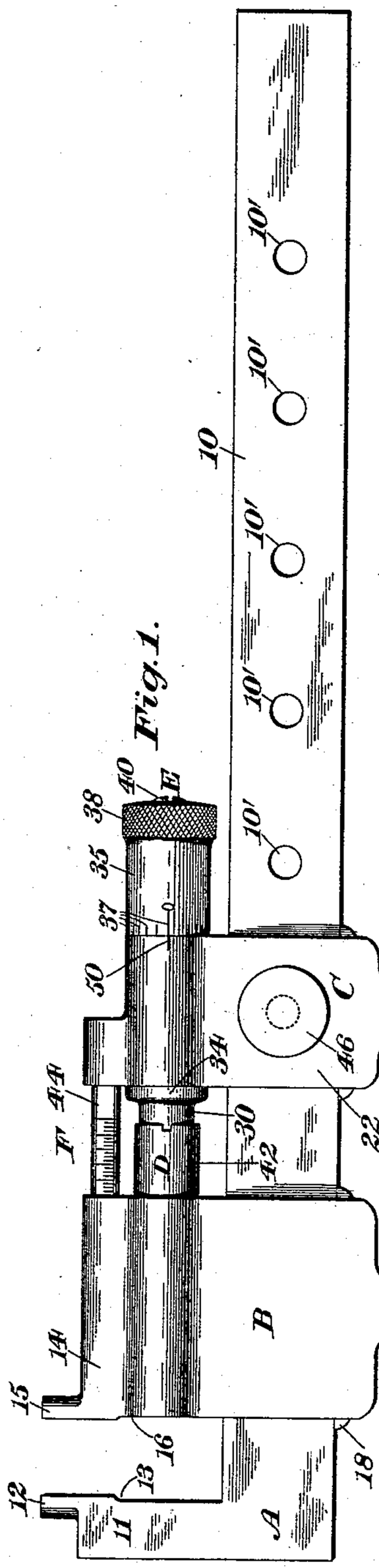

Fig. 1.

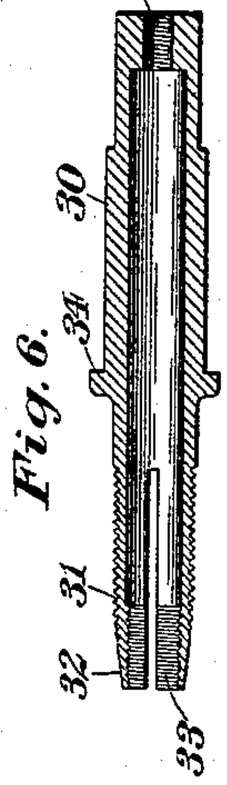

Fig. 6.

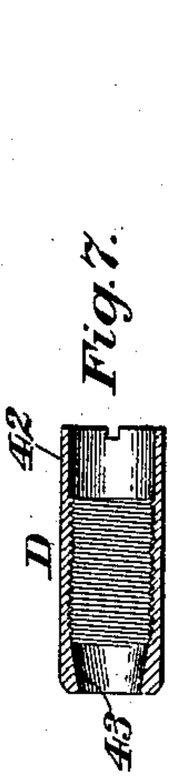

Fig. 7.

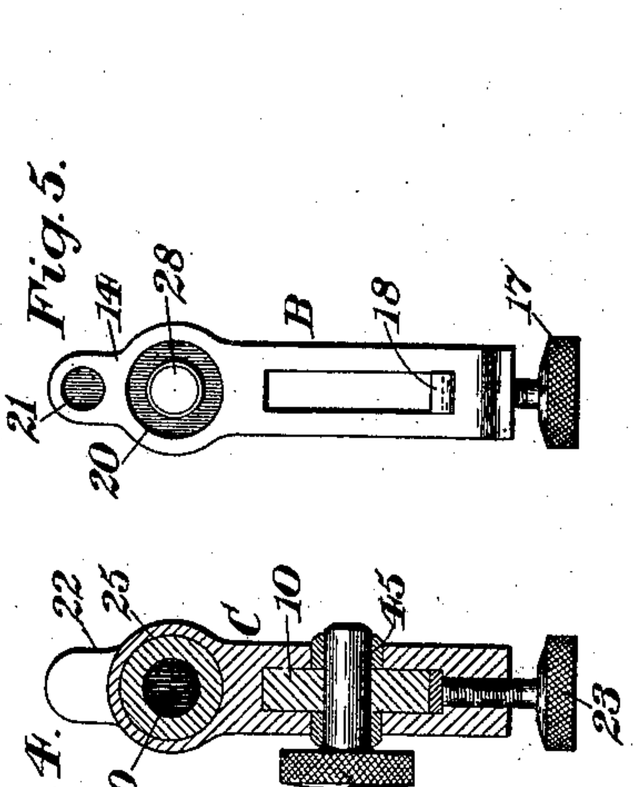

Fig. 5.

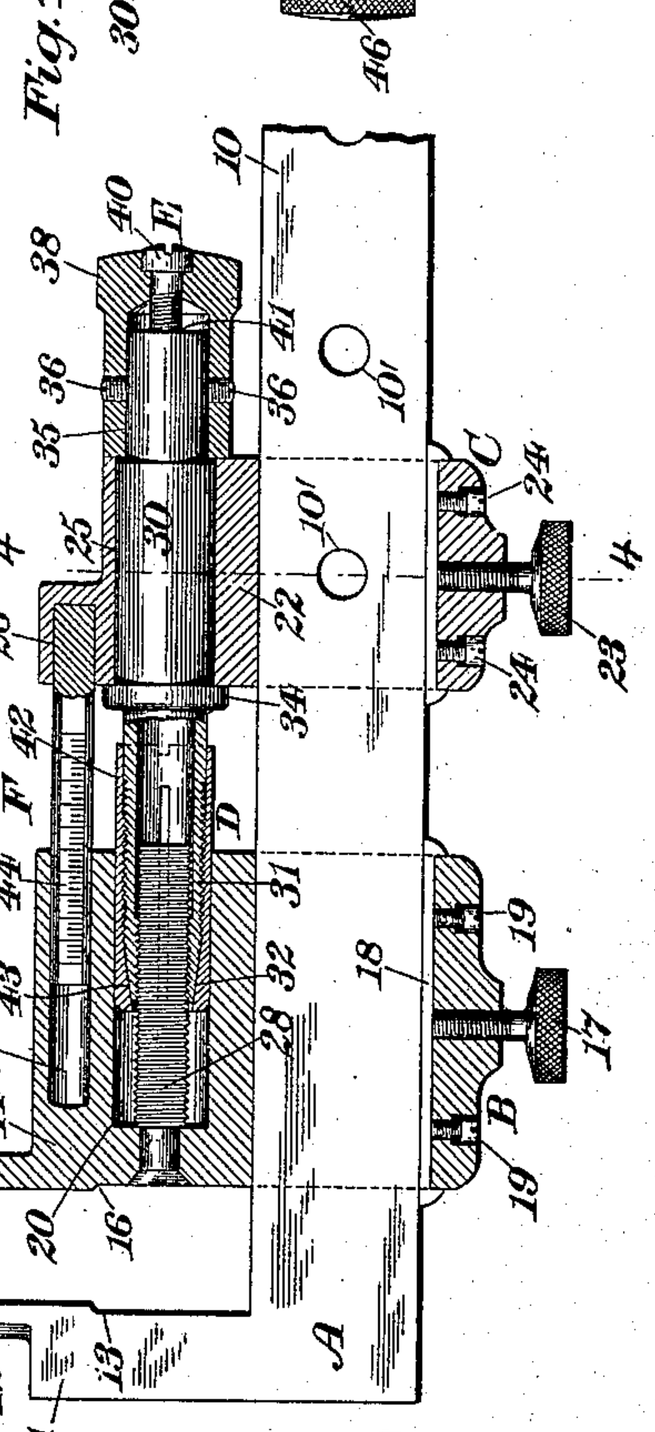

Fig. 4.

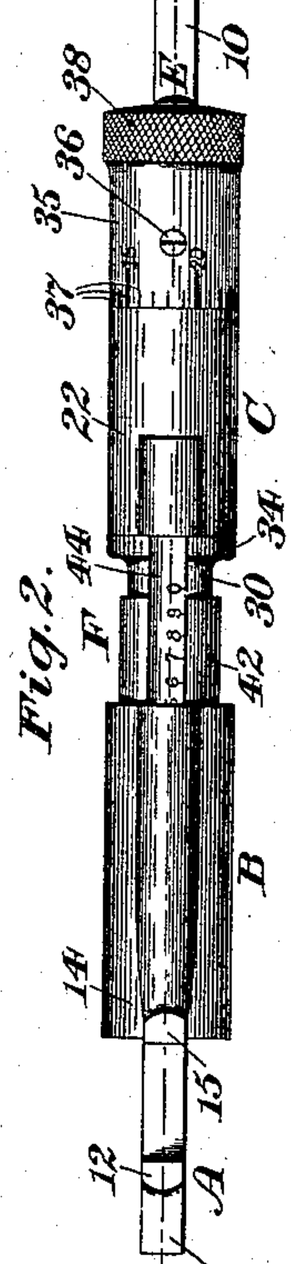

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

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MICROMETER-BEAM GAGE.

SPECIFICATION forming part of Letters Patent No. 571,094, dated November 10, 1896.

Application filed June 19, 1896. Serial No. 596,147. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. McINTYRE, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Micrometer-Beam Gages, of which the following is a specification.

This invention relates to micrometer-beam gages or calipers; and the object of the invention is to provide an improved device adjustable for measuring relatively large work, and which instrument can be quickly and readily adjusted and will be accurate in its measurements.

A further object of the invention is to provide a measuring instrument in which the wear of the various parts can be taken up and the micrometer-screw thoroughly protected from dust and dirt.

In the drawings accompanying and forming part of this specification, Figure 1 is a view of the improved measuring instrument assembled for use and showing a full size of one construction thereof. Fig. 2 is a top view thereof with the beam or bar broken off. Fig. 3 is a vertical longitudinal sectional view of the same, taken in line 3 3, Fig. 2, parts thereof being shown in elevation. Fig. 4 is a transverse sectional view taken in line 4 4, Fig. 3. Fig. 5 is a right-hand end view of the sliding jaw detached. Fig. 6 is a longitudinal sectional view of the rotary member detached. Fig. 7 is a longitudinal sectional view of the inclosing cap or casing for taking up the wear of the micrometer-screw and rotary member and for protecting the same from dust and dirt.

Similar characters designate like parts in all the figures of the drawings.

This improved measuring device comprises in a general way a jaw beam or bar, (designated generally by A,) a sliding jaw or member (designated in a general way by B) carrying a micrometer-screw, a supplemental sliding member (designated in a general way by C) and constituting means for supporting and carrying a graduated bar, and graduated means for actuating the sliding jaw to thereby move the same relatively to the graduated bar, said sliding jaw and supplemental sliding member, combined with the graduated bar and actuating means, constituting an adjustable member (designated in a general way by F) and having an adjustment as a whole longitudinally of the jaw bar or beam A, means (designated in a general way by D) for taking up the wear of said micrometer-screw and one part of the actuating means and protecting the same from dust and dirt, and means (designated in a general way by E) for taking up the wear of another part of said actuating means.

In the preferred form thereof herein shown and described this improved measuring instrument comprises a beam or bar 10, having a jaw 11, extending transversely therefrom and herein shown projecting at right angles thereto, and having a reduced end or extension 12, which reduced end has its outer face formed to a circle and is adapted for taking interior measurements—such as the diameters of bores, recesses, &c. The inner face of the jaw, if desired, may be recessed or relieved, as at 13, so as to confine the measuring-surface thereof to dimensions sufficiently small to insure accurate measurement, while large enough to provide a bearing area not subject to rapid wear. This bar 10 and jaw 11 will be hereinafter termed, for the purposes of this specification, a "jaw-bar" or "beam," and the beam thereof is provided with a series of transversely-extending apertures 10′, equidistantly disposed apart relatively to each other, for the purpose hereinafter set forth.

Fitted for adjustment upon the beam or bar 10 of the jaw is a sliding member or jaw 14, also having a reduced extension or projection 15, similar to the extension or projection 12 of the jaw-bar, and in connection with which it is used for the purpose heretofore specified, and the working-face of which sliding jaw may, if desired, be relieved, as at 16, in a similar manner to the recessed or relieved portion 13 of the jaw 11. In the construction shown this sliding jaw is provided with a clamping device, such as a thumb-screw 17, extending through the under side thereof and adapted to engage a gib or liner 18 inserted intermediate the edge of the bar or beam 10 and the inner face of the sliding jaw, whereby on the actuation of said clamping device the movable

jaw can be secured in the position to which it may be adjusted.

As a means for taking up the wear on the edge of the jaw or on the gib or liner 18 the movable jaw is provided with a pair of adjusting devices, such as screws 19, one of which is disposed at each side of the clamping means 17, whereby the wear on the parts can be compensated for. The sliding jaw or member is provided with a pair of longitudinal openings or bores 20 and 21, preferably tubular and extending in parallelism with each other, and herein shown of different diameters and preferably disposed above the upper edge of the beam or bar 10, although it is understood that they could be disposed at the side thereof and accomplish the same result, the larger bore 20 being herein shown below the smaller bore 21 and adapted to receive the micrometer-screw 28, which is secured therein in any suitable manner, and herein shown headed at the inner end of the jaw-wall.

Fitted for sliding movement on the bar or beam 10 is a supplemental sliding member 22, which forms the supporting and carrying means for the actuating means hereinafter set forth, and which is provided with a clamping device 23 and wear-take-up or compensating means 24, substantially similar to that described in connection with the sliding jaw 14. This supplemental member 22 is likewise provided with a pair of longitudinal openings or bores in parallelism with each other and of different diameters, the larger bore 25 thereof being below the smaller bore 26, and said openings being in alinement with the bores 20 and 21 of the sliding-jaw member and the bore 25, extending longitudinally through said supplemental member, whereby said bored member constitutes a support for the reception of the rotary actuating means hereinafter set forth.

The sliding jaw-actuating means, in the preferred form shown, comprises a rotary member or spindle 30, provided with a tubular slotted end 31, having a smooth beveled exterior face 32, and is exteriorly and interiorly threaded, the interior threads 33 thereof being adapted to engage the micrometer-screw 28 of the sliding-jaw member 14. This rotary member 30 is preferably constructed of different diameters and extends through the bore 25 of the member 22 and is provided with a collar or flange 34, adapted to engage the inner face of said supplemental sliding member 22 to prevent longitudinal movement of said actuating means in one direction, and is adapted to receive a tubular sleeve or thimble 35, provided with suitable clamping means 36, whereby the same can be fixedly secured to the rotary member and whereby movement of said rotary member is prevented in the opposite longitudinal direction by the engagement of the inner end of said thimble 35 with the outer face of the supporting member 22. This sleeve 35 is provided with graduations 37 and is in the nature of a "vernier," and in the form shown is provided with a knurled head 38 for the proper manipulation thereof, and whereby on the turning of the vernier the rotary member will turn therewith to move the sliding jaw. As a means for taking up the wear of this vernier resulting from the constant operation thereof an adjusting device (herein shown as a screw 40) extends through the end of said sleeve and projects into a threaded aperture 41 in the end of the rotary member 30, whereby on releasing the clamping devices the adjusting-screw can be actuated to move the sleeve toward the face of the supplemental member 22 and thus take up the wear of the parts.

As a means for taking up the wear of the micrometer-screw, and also for protecting the same from dust and dirt, a tubular interiorly-threaded member or cap 42 is adapted to engage the exterior threads 31 of said rotary member. This interiorly-threaded cap is provided with an interiorly-beveled end 43 for engaging the beveled and slotted end 33 of the rotary actuating member, whereby on the rotation of said tubular cap the slotted end of the rotary member will be caused to engage the micrometer-screw to take up any wear of the parts in a manner that will be obvious without further description. This cap also prevents dust and dirt from penetrating to the micrometer-screw.

Fixedly secured in the bore 26 of the supplemental member 22, and which bore is preferably of shallow depth and is preferably in the nature of a recess, is a graduated bar 44, the free end of which extends into and slides freely in the bore 21 of the sliding jaw 14 and not only constitutes means for indicating the measurement of the work, but also, to a certain extent, a support for said sliding jaw to prevent lateral movement thereof.

The transverse apertures 10′ in the bar or beam 10 in the construction shown are disposed an inch apart, and the supplemental movable member 22 is provided with a transverse opening 45 in alinement with the openings 10′ of the bar or beam and through which a fastening device in the nature of a thumb-pin 46 is adapted to extend, whereby the adjustable member F can be moved within the limits of the instrument to measure various sizes of work.

It will be understood that the graduated bar 44 or the rotary vernier 35 may be graduated in any desired and usual way to indicate various measurements, even below the thousandths of an inch, if desired; but for ordinary and practical use the bar is herein shown having one inch thereof graduated and divided into tenths and numbered from "0" to "10" or "0," and each tenth divided into fourths, whereby forty graduations are obtained, and the vernier is herein shown provided with twenty-five equal divisions and

numbered from "0" to "25," whereby on the adjustment of the vernier through its entire circle the sliding jaw will be moved twenty-five one-thousandths or one-fortieth of an inch, and on the adjustment of said vernier four times through its circle the sliding jaw will be moved one hundred one-thousandths or one-tenth of an inch, so that in this construction the device is operable to measure as low as a thousandth of an inch and as many inches and thousandths thereof in proportion to the length of the bar or beam 10.

In the operation of this improved measuring instrument in order to measure one-thousandth of an inch the sliding jaw 14 is disposed in position with the working-face of its projection 15 engaging the working-face of the projection 12 of the jaw 11 and the supplemental sliding member 22, adjusted and clamped in position to have the graduated bar with its first or zero mark at the outer end of the sliding jaw 14 and the vernier turned to have its first or zero mark in line with the indicating-mark 50 on the side of the supplemental member 22, whereby on turning the vernier a distance equal to one twenty-fifth of its entire surface, or from "0" to "1," the sliding jaw 14 will be moved by its micrometer-screw one-thousandth of an inch, and by turning the vernier through its twenty-five graduated marks said sliding jaw will be moved twenty-five thousandths of an inch, or a distance equal to one-fortieth of the graduated bar or one division thereof, and by turning said vernier four rotations said sliding jaw will be moved one-hundred thousandths or one-tenth of an inch, or from "0" to "1" of the graduated bar.

In the adjustment shown in Figs. 1, 2, and 3 the sliding jaw is set to measure five-hundred thousandths or five-tenths of an inch, so that the jaw has been moved on the graduated bar 44 five-tenths or one-half of its graduated length, and by continuously operating the vernier while the supplemental slide 22 is clamped in its first position the sliding jaw can be moved to measure exactly one inch.

In order to measure one inch and a fraction thereof, or two, three, or more inches and fractions thereof, the clamping device 23 of the supplemental slide 22 is released and the adjustable member F moved to bring the transverse aperture 45 of the supplemental slide member 22 in alinement with one of the transverse apertures 10′ of the beam or bar 10 and then clamped in position, whereby the working-faces of the jaws 11 and 14 will be one or more inches apart, so that on the adjustment of the vernier the sliding jaw can be moved the desired distance to increase the measurement a fractional part of the main measurement and then clamped in such position, if desired, by the clamping means 17.

By this improved measuring instrument, which is not only simple in its construction and operation, but is also readily and quickly adjustable to accomplish the desired measurement, the wear of the parts can be taken up and the micrometer-screw protected from dust and dirt, while at the same time a measuring instrument is provided which is adapted for use in measuring comparatively large work.

In the use of this device for taking interior measurements the diameters of the projections 12 and 15 are of course allowed for or deducted from the result obtained.

Having described my invention, I claim—

1. The combination with a fixed jaw having a laterally-projecting stem; of a movable jaw provided with an enlarged bore mounted on said stem; a micrometer-screw fixedly secured in said movable jaw; a supplemental member having a smooth bore; a rotary sleeve having a smooth periphery mounted in the bore of said supplemental member, said sleeve having a flange bearing against a side of said supplemental member and being also slitted, externally beveled, and exteriorly and internally threaded at its inner end; an internally-threaded cap having a smooth internally-beveled end mounted on said sleeve; and means for rotating said sleeve and thereby adjusting the movable jaw.

2. The combination with a fixed jaw having a long, lateral extension; of a movable jaw provided with bores of different diameters; a screw fixedly secured within the larger bore; a supplemental member having a socket and a bore, the latter extending entirely through said member; a graduated bar secured in said socket; a rotary sleeve having a smooth periphery mounted in the bore of said member, said sleeve being provided with a flange fitting against a wall of the supplemental member and being externally and internally threaded and exteriorly beveled at its forward end; a threaded, interiorly-beveled cap secured on said sleeve; a thimble attached to the sleeve; and a screw carried by the thimble and entering a threaded bore in the rear end of the sleeve.

3. A measuring instrument comprising a jaw bar or beam having a series of transverse, equidistantly-disposed apertures; an adjustable member mounted thereon and having removable means for engaging one of said transverse apertures and also having means for clamping the same in position relatively thereto and comprising a sliding jaw having a pair of longitudinal bores of different diameters, said sliding jaw having a micrometer-screw disposed in that bore thereof having the largest diameter, and a supplemental member also having a longitudinal bore in alinement with the micrometer-screw bore of the sliding jaw; a rotary member carried by said supplemental sliding member and having an interiorly and exteriorly threaded, slotted, tubular end provided with a plane exteriorly-beveled face and adapted to en-

gage the micrometer-screw for actuating said sliding jaw; an interiorly-threaded cap having a plane interiorly-beveled end adapted to engage the exteriorly threaded and beveled end of the rotary member to compress the same; a graduated sleeve or thimble fixedly secured to said rotary member for actuating the same; and a graduated bar fixedly secured to the supplemental member and sliding in the smaller bore of the sliding jaw.

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