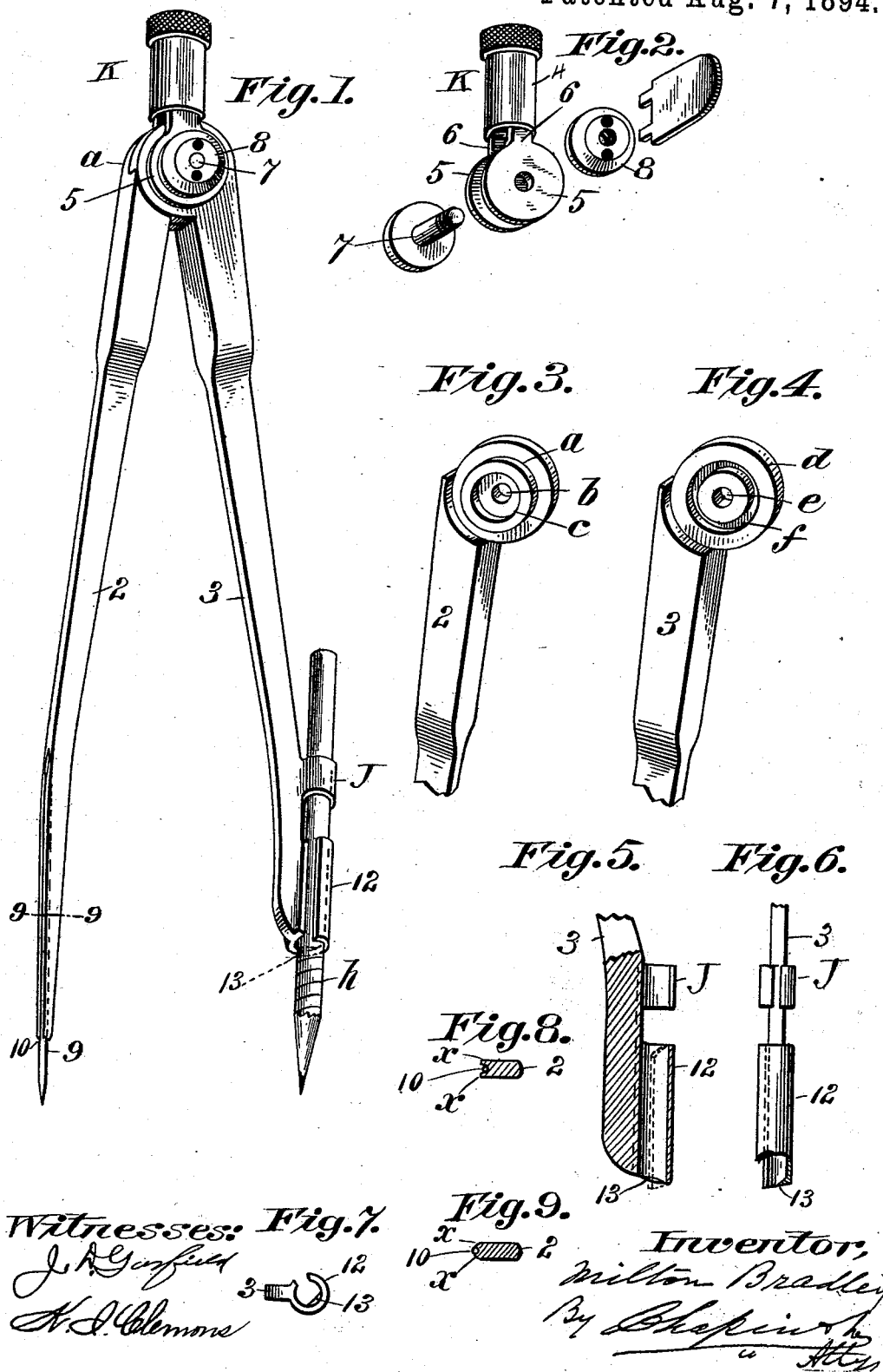


(No Model.)

M. BRADLEY.  
COMPASSES.

No. 524,160.

Patented Aug. 7, 1894.



# UNITED STATES PATENT OFFICE.

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## COMPASSES.

SPECIFICATION forming part of Letters Patent No. 524,160, dated August 7, 1894.

Application filed April 11, 1894. Serial No. 507,087. (No model.)

*To all whom it may concern:*

Be it known that I, MILTON BRADLEY, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Compasses, of which the following is a specification.

This invention relates to compasses for the use of draftsmen and students, the object being to improve the construction of such instruments in respect to the leg-joint thereof, to means on one of the legs for holding and operating a pencil and to means for uniting a steel point to the other leg, all as hereinafter fully set forth.

In the drawings forming part of this specification, Figure 1 is a perspective view of a pair of compasses embodying my improvements, a pencil being there shown connected to one of the legs thereof. Fig. 2 illustrates, in perspective views, the handle and the joint-pin and nut of the instrument, and the spanner for turning said nut. Figs. 3 and 4 are perspective views of the upper ends of the two legs of the compasses, illustrating the joint formation of each leg. Fig. 5 is a longitudinal section of the lower end of the pencil-carrying leg. Fig. 6 is a side view of the lower end of said last named leg, showing the front side of the pencil tube broken away at its lower extremity. Fig. 7 is an end view of the pencil-tube and a cross sectional view of the leg thereto connected. Figs. 8 and 9 are sectional views about on line 9—9, Fig. 1, of the point-bearing leg, illustrating the manner of securing the point rigidly in the leg.

In the drawings, 2 indicates the point-bearing leg, and 3 the pencil-bearing leg of the instrument. The joint-parts of said legs are constructed as follows: On the upper end of one leg, 2, for instance, is a circular, plate-like formation, *a*, having the central bolt-hole, *b*, and the concentric upstanding ring, *c*, on the inner side of said plate, located about midway between the border and the center of the latter. On the upper end of the opposite leg of the instrument, 3, is a similar circular plate, *d*, having also a central bolt-hole, *e*, corresponding to said hole, *b*, of the leg, 2, and having a concentric circular groove, *f*, in its inner face of such width, diameter, and depth, as adapts it to receive

therein the said projecting ring, *c*, of the leg, 2. The height of said ring, *c*, and the depth of said groove, *f*, are such that when the said plates, *a* and *d*, are pressed one upon the other, the surfaces thereof adjoining said ring and said groove are brought into juxtaposition. The said ring, *c*, and groove, *f*, are formed with most carefully adjusted tools, to the end that the rings shall fit perfectly into the groove, thus bringing the said inner surfaces of the plates, *a* and *d*, so that they bear one against the other, and, together with the said interengagement of the ring, *c* and the groove, *f*, constitute such a wide bearing for the joint parts of the compass legs that great durability of the joint is secured, and there is no tendency to looseness and consequent inadvertent displacement of the legs when adjusted to certain relative positions of spread, and while being used.

The handle, *K*, of the instrument consists of a metallic tube, 4, to which are secured two metal disks, 5, each having a laterally extending arm, 6, on its border which enters and is secured to the inner surface of the tube, *K*, by soldering or other suitable means. The said disks are perforated to correspond with said bolt-holes, *b* and *e*, of the joint parts of the compasses.

As shown in Fig. 1, the head (or united joint parts) of the instrument is clasped between said disks, 5, and a joint-bolt, 7, whose diameter is less than that of said bolt-holes, *b* and *e*, is passed through the head and the said disks, and is secured therein by a nut, 8. Said bolt, 7, is made to fit loosely in said bolt-holes so that it may act together with said nut, simply to prevent any separation of the surfaces of said joint-parts on which are the said interlocking ring, *c*, and groove, *f*; and so that said bolt shall not exercise any function of an ordinary joint-pivot, and thereby prove an obstacle to the proper free coaction of said grooves and ring-bearing parts of the joint.

The legs, 2 and 3, of the compasses are preferably made of brass, or similar easy-working metal, and to provide a suitable hard and durable point on the free end of one of the legs, which shall serve the usual and well known purpose, a pointed steel rod, 9, is rigidly fixed in said leg in the following man-

ner: Said leg, from its lower end upwardly, has a groove, 10, formed therein of suitable length, and in said groove said rod, 9, is placed, and the borders,  $x, x$ , of said groove are then pressed, or swaged, over, and rigidly upon said rod, thereby permanently fixing it to said leg, as shown in Fig. 1.

To provide means for holding a pencil,  $h$ , on one leg of the compasses, and means for accurately advancing said pencil in the direction of its length, as its point is worn, or cut away by sharpening it, a split metallic tube, 12, is soldered, or otherwise suitably fixed, to said leg, as shown, which slightly expands when the pencil is put into it, and on said tube, preferably at the lower end thereof, is fixed, or bent therefrom, a dog, 13, having an edge thereon suitable for engaging with the surface of the pencil. Said dog is produced, preferably, by bending a portion of the edge of the tube, 12, inwardly, as shown in Fig. 7, and so arranging the same that it stands at an incline to the axial line of the tube, 12. When so arranged, and when the pencil,  $h$ , is pushed into said tube and turned at the same time, the surface of the pencil is forced into engagement with said dog and is caused to move forward, gradually, according to the spirality of the incline of the dog. A short split tube,  $J$ , is fixed on said leg, 3, a little above said tube, 12, to aid in holding the pencil which passes through it more steady while it is turned to feed it forward and back. The said dog, 13, holds the pencil positively against slipping in the tube, 12, and the angularly arranged dog on the latter provides for very finely graduating the movement of the pencil. In practice it is found that said screw-feed movement of the pencil through the tube results in marking the latter with spiral convolutions, as shown in Fig. 1.

What I claim as my invention is—

1. A uniting joint for compass legs, consisting of a circular plate on one leg having therein a circular groove concentric with a central bolt-hole through said plate, combined with a like plate on the opposite leg of the compass having thereon an upstanding ring concentric with the central bolt-hole through

said plate and fitting closely within said groove, a handle having two perforated disks thereon between which said joint-plates are received, and a joint-bolt passing through said joint-plates and disks and holding the parts through which it passes in juxtaposition, substantially as set forth.

2. A uniting joint for compass legs consisting of a circular plate,  $d$ , having the central bolt-hole,  $e$ , and the concentric groove,  $f$ , therein, combined with the circular plate,  $a$ , of the opposite leg having the central bolt-hole,  $b$ , and the upstanding concentric ring,  $c$ , thereon for engagement within said groove, a handle, and a bolt holding said joint-parts in juxtaposition, and said handle thereon, substantially as set forth.

3. Means for holding and operating a pencil on a compass-leg consisting of a split tube rigidly fixed thereto to receive a pencil, having a pencil-engaging dog thereon projecting inwardly and standing at an incline relative to the axial line of said tube, substantially as set forth.

4. Means for holding and operating a pencil on a compass-leg consisting of a split tube rigidly fixed thereto to receive a pencil, having a pencil-engaging dog thereon projecting inwardly and standing at an incline relative to the axial line of said tube, combined with a second split pencil-guiding tube fixed on said leg opposite one end of said dog-bearing tube, substantially as set forth.

5. A uniting joint for compass legs consisting of a circular plate,  $d$ , having the central bolt-hole,  $e$ , and the concentric groove,  $f$ , therein, combined with the circular plate,  $a$ , of the opposite leg having the central bolt-hole,  $b$ , and the upstanding concentric ring,  $c$ , thereon for engagement within said groove, a handle, and a bolt having a diameter less than that of said bolt-hole through which it passes, holding said joint-parts in juxtaposition, and said handle thereon, substantially as set forth.

MILTON BRADLEY.

Witnesses:

H. A. CHAPIN,  
K. I. CLEMONS.