Nov. 12, 1929. L. A. AUDRIETH 1,734,958

DRAFTING COMPASS

Filed Oct. 5, 1927

Fig. 1.

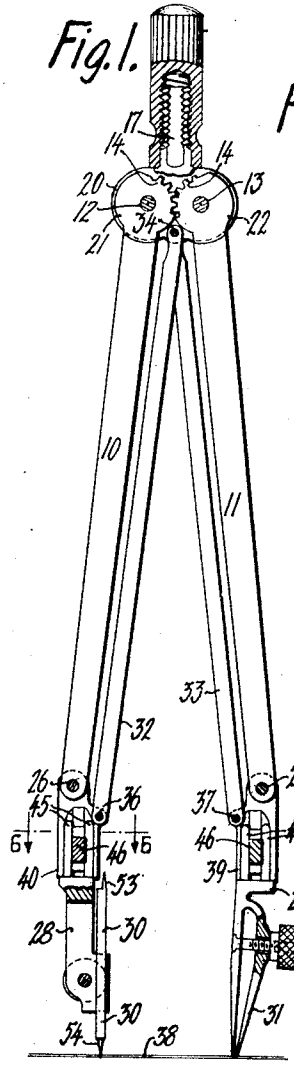


Fig. 2.

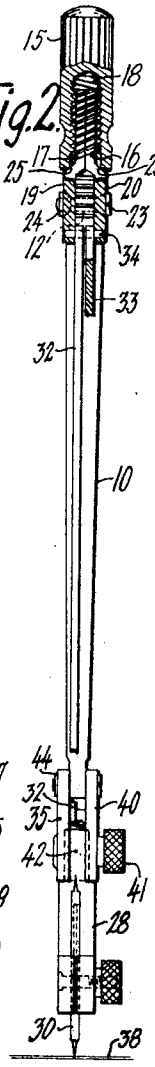


Fig. 3.

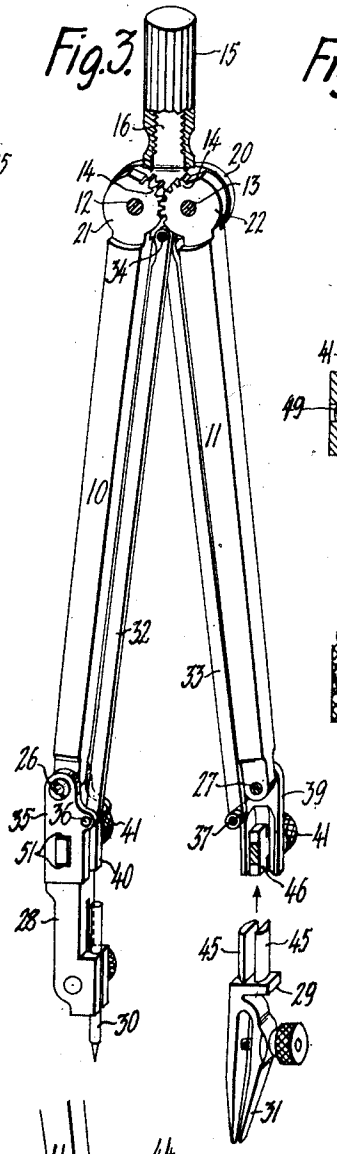


Fig. 4.

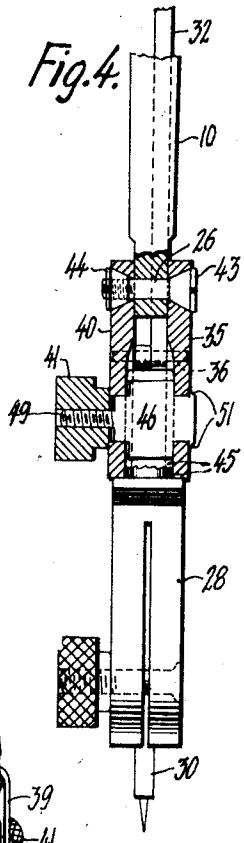


Fig. 5.

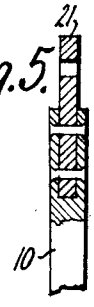


Fig. 6.

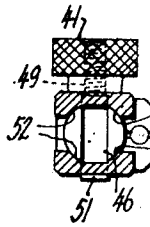
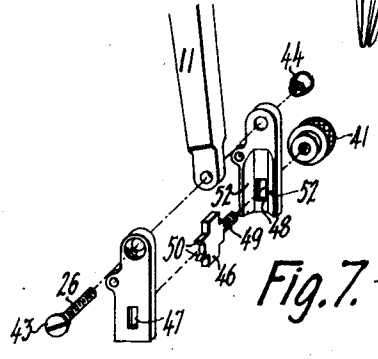


Fig. 7.



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UNITED STATES PATENT OFFICE

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DRAFTING COMPASS

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This invention relates to parallel-motion compasses, in which the needle-point as well as the pen is kept vertical to the paper at all openings of the compass, for fine general execution and also for successful drawing and inking of very small circles.

One of the objects of the invention is to construct a compact, light, stiff instrument, folding into about the same space as an ordinary compass, and having rugged construction so as to withstand ordinary usage without liability of loosening of points or getting out of order.

Links are used in the parallel linkages, and are confined between the legs of the compass; the legs being heavily built, and the links being thin and folding closely between the legs for compactness. Parallel motion is secured without entailing the use of heavy and bulky parts exterior to the legs.

The legs are pivoted eccentrically upon the handle of the compasses, and their hubs are connected to each other by pinion-teeth, and said links are pivoted to the head of the compasses at a point close to said hubs, and they extend down between the legs to points where they are jointed or pivoted to the tops of knuckles which are pendent from the legs, thus forming flexible compass-legs. The head of the compass includes cheek-pieces between which are confined the hubs of the compass-legs, and these cheek-pieces may be clamped upon said hubs to impart the requisite friction and stiffness. The clamping may be done by means of a tubular cap forming a handle, and screwing down upon a stem which rises from the head. Said stem or shank may be formed in halves, one half upon each of the cheek-pieces. This split shank is threaded, and the handle screws down thereon and clamps the cheek-pieces against said hubs.

The knuckles, besides forming members of the parallel linkages, have improved means for detachably holding the pen-carrier and the needle-carrier. Each knuckle is provided with an internal key, and each carrier has a split shank to clasp the key, and the knuckle is formed of clamping plates which bind the split shank upon the key and make a strong connection between the knuckle and the pen or needle point.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a part sectional front elevation of the compasses in one form.

Figure 2 is a sectional side elevation of the same.

Figure 3 is a perspective sectional view of the compasses, showing the pen-point detached.

Figure 4 shows on a larger scale a needle-point, and means for detachably securing it upon a leg of the compasses.

Figure 5 is a detail of the upper end of a compass-leg, showing the steel hub riveted in the bronze leg.

Figure 6 is an enlarged section on line 6—6 of Figure 1, and illustrates the clamping of the keyed knuckle-plates upon the split shank of the pen-point or needle-point.

Figure 7 is a perspective showing the details of the parts in Figure 4.

The compass-legs 10, 11 are eccentrically and independently pivoted at 12, 13 at their upper ends, and formed with pinion-teeth 14, intermeshing to equalize the leg-movements, and to keep the handle 15 vertical at all openings of the compass-legs.

This handle or stem 15 is made hollow or in the form of an internally-threaded cap, which screws down over and upon an interior split shank, composed of threaded halves 16, 17, which are held together by said cap screwed down thereon, the threads of the cap being indicated at 18. This split threaded shank 16, 17 has also a head, which is built up of opposite cheek-pieces 19, 20, between which are confined the pinions or toothed hubs 21, 22 which surmount the compass-legs.

Each of the compass-leg-pivots 12, 13 has a nicked cone-head 23; and a screw extends through both cheek-pieces 19, 20, seen projecting from 19 at Figure 2. A nut 24 is threaded thereon to hold the compass-legs steady, that is, to cause enough friction between the cheeks 19, 20 to prevent accidental swinging.

Between the screw-portions and the cheek-

portions of this head 19, 20 and cam or shoulder portions 25, which join said cheek-portions. The open end of the cap 15 presses down upon cams 25, thus making a strong stiff joint which is not liable to loosen, and increasing the friction between the cheeks 19, 20 and the confined hubs 21, 22.

The lower ends of the legs are pivoted at 26, 27 to knuckles 28, 29, the former shown carrying a needle-point 30 and the latter carrying a pen 31. These knuckles form members of the linkage, being at their upper ends connected by links 32, 33 to the cheek-pieces 19, 20 of the head. A common pivot 34 is used for such connection. Said links turn upon said common pivot 34 as the compass is closed and opened.

The parts form parallel motions; that is, the leg 10 and the link 32 co-operate with the head 19, 20 and the knuckle 35 to form a parallelogram linkage; the leg and link forming the long members and the knuckle 35 and head 19, 20 forming short members of the linkage. The same relation exists between the leg 11 and the link 33. These linkages are opposed to each other and have the same pivot at 34, and a line drawn from 34 to 12 or 13 being parallel with a line from the lower link-pivot 36 or 37 to the lower pivot 26, 27; and the links being parallel to the legs, respectively. It will be seen that, by this means, the needle-point and the pen are kept always in vertical relation to the work-sheet or table 38, and that the device is compact and reliable and of substantially the form and dimensions of an ordinary simple compass, and that it is manipulable as readily as an ordinary compass. The cost of the parallel linkages and the needle and pen points is very small, and the device is reliable, and the parts not liable to get loose or out of order.

The knuckles are designated generally as 35 and 39, being articulated at 26, 27, 36, 37 to the legs and links, and also forming socket-pieces in which are detachably inserted the needle-point and the pen. The left-hand knuckle at Figures 3 and 4 is formed of a pair of clamping plates or jaws 35, 40, which are drawn together by a thumb-screw 41, thereby clamping upon the shank 42 of needle-point-holder 28. These clamps 35, 40 are held partly by screw 26 having cone-head 43 and cone-nut 44, said screw forming the articulation of the knuckle to the leg 10. These clamps 35, 40 are also partly held by riveted pivot-pin 36.

Each of the shanks of the point-carriers 28, 29 is indicated at 45, Figure 3, and is mortised, thus splitting the shank into two parts, which pass up one on each side of a key-member 46, one oblong shoulder of which passes out through an oblong eye 47 in one clamp-plate, and an opposite oblong shoulder passes out through an oblong eye 48 in the other clamp-plate or member, thus preventing the key from rotating. A projecting shank of the key is threaded at 49, and the nut 41 is screwed thereon to draw the clamps together upon the beveled edges of the split shanks 45. Said key-member 46 has projections 50, which, when the parts are assembled, are upset or headed over at 51 to form a head or anchorage which enables the nut 41 to tighten the clamps 35, 40 together upon the edges of the split shanks 45. The clamps have internal bevels 52, which at Figure 6 are shown to have a camming action upon the beveled edges of the split shank, and tend to press said edges together upon the flat key 46, so that the whole structure becomes very rigid and not liable to loosen when the compass is being handled.

The pencil-point and pen-point may be of any desired construction. One of the needle-points 53 may be eccentric to the other 54, so that the device is adapted to draw very small pencil or ink circles, since the eccentric point 53 may be set very close to the point of the pen or pencil. For use with a pencil, a point similar to 28 may be employed; or two caliper points 30 may be used when the instrument is to serve as a pair of dividers. The instrument permits fine measuring, drawing and inking. The handle 15 always bisects the angle between the legs 10, 11.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. An instrument of the class described having, in combination, a pair of legs, a handle upon which the legs are pivoted eccentrically to each other, said legs having toothed intermeshing hub-portions, point-carrying knuckles to which the legs are pivoted at their lower ends, and links folding between said legs, said links at their upper ends pivoted to said handle and at their lower ends pivoted to said knuckles, said handle including cheek-pieces between which the hubs of the compass-legs are confined, said handle forming means for clamping said cheek-pieces upon said hubs to impart friction and stiffness.

2. An instrument of the class described having, in combination, a pair of legs, a handle, said legs having toothed intermeshing hub-portions, point-carrying knuckles to which the legs are pivoted at their lower ends, and links folding between said legs, said links at their upper ends pivoted to said handle and at their lower ends pivoted to said knuckles respectively, said handle having cheek-pieces between which the hubs of the compass-legs are confined and to which the hubs are pivoted eccentrically to each other, each of said cheek-pieces having shank-portions extending upwardly, said shank-portions together forming a threaded stem for the instrument, and a cap threaded to screw down upon said stem, said cheek-pieces having bev-

eled portions engaged by said cap to enable the cap to coact with the threaded shank to crowd said cheek-pieces against the confined hubs.

3. An instrument of the class described having, in combination, a pair of legs, a handle, said legs having toothed intermeshing hub-portions, point-carrying knuckles to which the legs are pivoted at their lower ends, links folding between said legs, said links at their upper ends pivoted to said handle and at their lower ends pivoted to said knuckles respectively, said handle having cheek-pieces between which the hubs of the compass-legs are confined, each cheek-piece having a stem-portion including a cap threaded upon said stem-portion, the hubs being pivoted eccentrically to each other to said cheek-pieces, said cap having means for clamping said cheek-pieces upon said hubs to impart friction and stiffness, each of said hubs being pivoted upon a screw which extends through the cheek-pieces and projects at one end, and a nut upon the projecting end to secure the screw.

4. In a parallel compass having a head and a parallel-linkage leg, a knuckle forming part of the linkage and having opposite plates pivoted to the compass-leg, a key-plate extending edgewise from one of said opposite plates to the other and secured to one of the plates and having a stem extending through the opposite plate and provided with a threaded shank, a nut upon said shank to draw said plates together, and a point-holder having a split shank inserted in said knuckle and confining said key, said nut serving to draw said plates upon said split shank to hold the same firmly.

5. In a parallel compass having a head and a parallel-linkage leg, a knuckle forming part of the linkage and having opposite plates pivoted to the compass-leg, a key-plate extending edgewise from one of said opposite plates to the other and secured to one of the plates and having a stem extending through the opposite plate and provided with a threaded shank, a nut upon said shank to draw said plates together, and a point-holder having a split shank inserted in said knuckle and confining said key, said nut serving to draw said plates upon said split shank to hold the same firmly, and said split shank having external bevels and said plates having corresponding internal bevels, and said nut serving to secure coaction of said bevels to clamp said split shank tightly upon said key.

6. In a parallel compass having a head and a parallel-linkage leg, a knuckle forming part of the linkage and having opposite plates pivoted to the compass-leg, a key-plate extending edgewise from one of said opposite plates to the other and secured to one of the plates by passing through an oblong hole therein and having a stem extending through an oblong hole in the opposite plate and provided with a threaded shank, a nut upon said shank to draw said plates together, and a point-holder having a split shank inserted in said knuckle and confining said key, said nut serving to draw said plates upon said split shank to hold the same firmly, and said split shank having external bevels and said plates having corresponding internal bevels, and said nut serving to secure coaction of said bevels to clamp said split shank tightly upon said key.

7. In a parallel compass having a head and a parallel-linkage leg, a knuckle forming part of the linkage and having opposite plates pivoted to the compass-leg, a key-plate extending edgewise from one of said opposite plates to the other and secured to one of the plates and having a stem extending through the opposite plate and provided with a threaded shank, a nut upon said shank to draw said plates together, and a point-holder having a split shank inserted in said knuckle and confining said key, said nut serving to draw said plates upon said split shank to hold the same firmly, the lower end of said leg being confined between said clamping plates and being secured thereto by a cone-headed screw passing through the clamping plates and the leg, and having a projecting end and a cone-nut threaded upon said projecting end.

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