Nov. 17, 1953 G. LOTTER 2,659,155

DRAWING INSTRUMENT

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Fig. 1

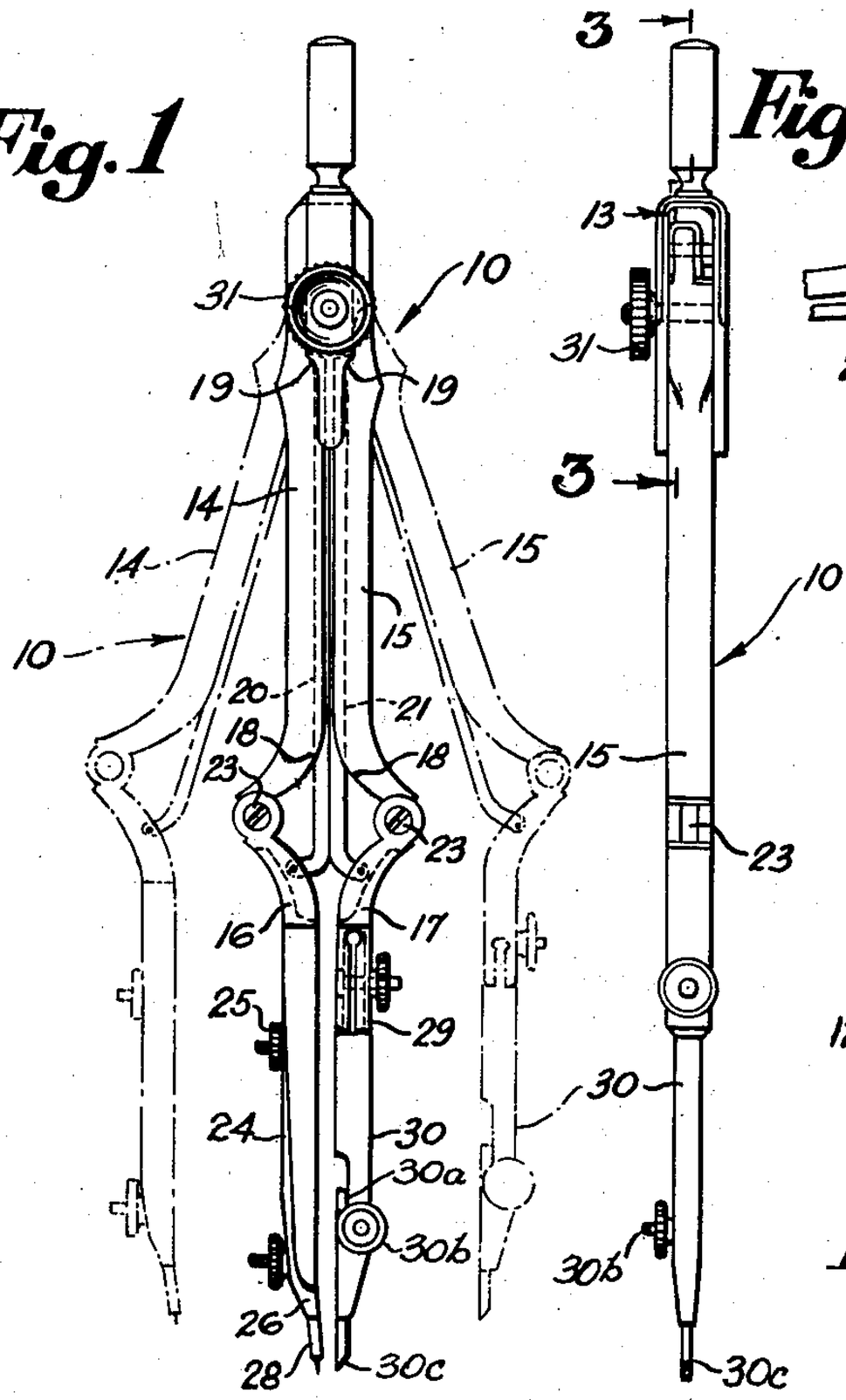


Fig. 2

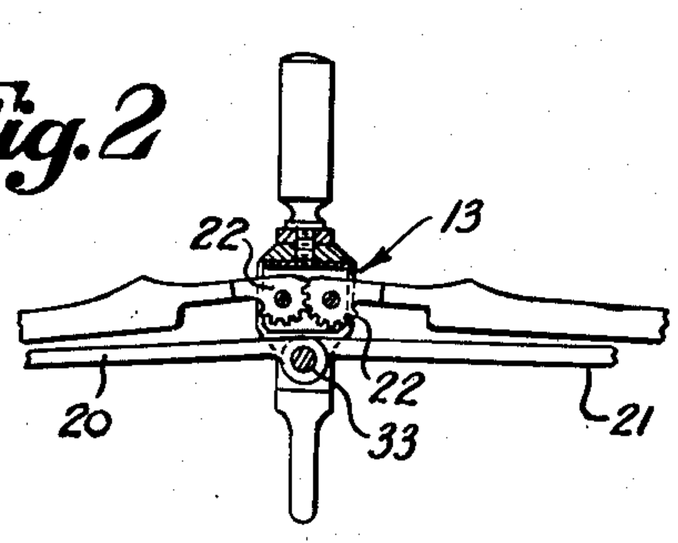


Fig. 3

Fig. 4

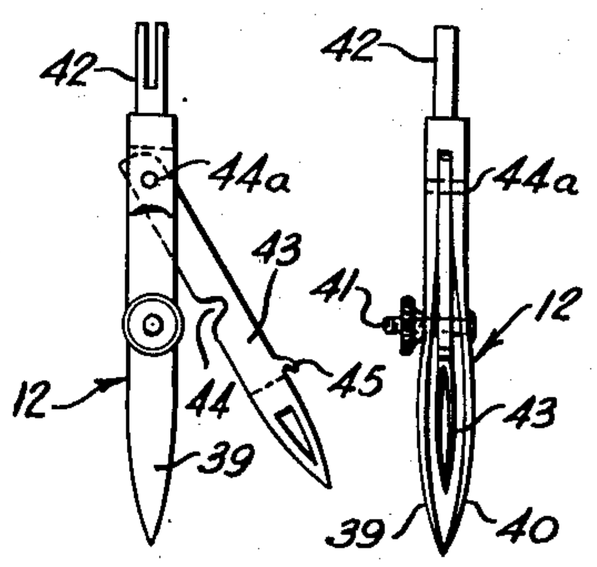
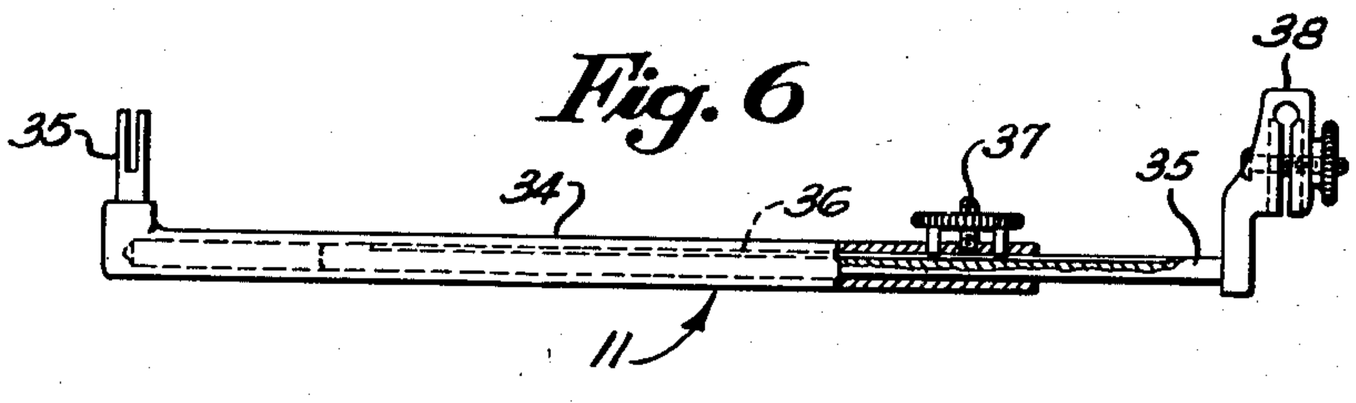


Fig. 5

Fig. 6



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DRAWING INSTRUMENT

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2 Claims. (Cl. 33—151)

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This invention relates to improvements in drawing instruments and more particularly to improvements in a pair of compasses.

One of the objects of the present invention is the provision of a pair of compasses which can be operated with greater security and saving of time, through the use of suitable locking screws and micrometric adjustment.

It is an object of the instant invention to provide a pair of compasses in which both the needle and inscribing points are perpendicular to the inscribed surface.

Another object is the provision of a pair of compasses having a telescopic extension the inscribing point of which is always perpendicular to the plane of the inscribed surface.

A further object is the creation of a filling element for the pen point of the compasses.

It is also an object of the instant invention to provide a needle point of micrometric adjustment for one leg of a pair of compasses.

Other objects of the instant invention will become apparent in the course of the following specification.

In the accomplishment of these objectives, the compasses are made with two upper legs of equal length. The tops of the upper legs are interconnected by gear teeth pivotally mounted on a support carrying a locking screw. Hingedly mounted at the bottom of each upper leg is a lower leg which is maintained vertical in any spread of the upper legs by two links of equal length, the bottom of each link being pivotally connected to one of the lower vertical legs and at the top pivotally connected to the support by a common pivot. One of the lower vertical legs is permanently attached to the upper leg for a needle point having a micrometric adjustment while the opposite lower vertical leg has a broken joint for the replaceable attachment of a pen or pencil point or an extension bar. The pen point is provided with an inking element and the extension bar is designed to maintain an inscribing point also perpendicular to the plane of inscription.

The invention will appear more clearly when taken in conjunction with the accompanying drawings showing by way of example a preferred embodiment of the inventive concept.

In the drawings:

Figure 1 is a front elevational view of the compasses constructed in accordance with the principles of this invention;

Figure 2 is a side view of the compasses shown in Figure 1;

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Figure 3 is a sectional view along 3—3 of Figure 2;

Figure 4 is a front view of the pen point exchangeable with the pencil holder shown in Figure 1;

Figure 5 is a side view of the pen point shown in Figure 4; and

Figure 6 is a front view of the telescopic extension bar exchangeable with the pencil holder shown in Figure 1 and partially in section to better show the internal construction.

Referring now in greater detail to the drawings where like reference numerals indicate like parts, reference numeral 10 indicates the compasses, 11 the telescopic extension, and 12 the pen point.

The compasses 10 are constituted of a support 13, the upper legs 14 and 15, and the lower vertical legs 16 and 17.

The support 13 may be an inverted "L-shaped" member (Figs. 2 and 3) having one vertical member as illustrated.

The longitudinal edges of the upper legs 14 and 15 are turned inwardly between the points 18 and 19 to form opposed sleeves for the later described links 20 and 21. At the top of each upper leg are gear teeth 22 of equal number on equal radii which may be attached to the legs in any known manner or integrally formed therewith and held in operable engagement on the vertical portion of the inverted "L-shaped" support by any suitable pivot pins as shown in Figure 3. At the bottom, each upper leg flares outwardly as illustrated.

The lower vertical leg 16 is the needle point side of the compasses and may be a one piece member with an outwardly flaring top hingedly attached to the outwardly flaring bottom of the upper leg 14 by any suitable means 23 and designed to rotate the lower vertical leg 16 from the straight angle position of Figure 1 inwardly in the plane of rotation of the upper legs as shown by the dot dash lines of Figure 1. The vertical leg 16 has a resilient member 24, which is connected to the leg by a screw 25. The needle point 28 is capable of micrometric adjustment by means of a micrometric screw 26. The free end of the needle point leg is longitudinally slit adjacent the free end into inner and outer portions. The plane of the slit is substantially perpendicular to the plane of rotation of the legs and the inner portion is under inwardly directed tension. At the end extremity of the inner portion, which may extend below the outer portion, the needle point is releasably secured

in juxtaposition with the opposite lower or scribing leg.

The outwardly flaring top of the lower vertical leg 17 is hingedly attached to the outwardly flaring bottom of the upper leg 15 and is rotatable in the same manner as the previously described lower vertical leg 16, but is provided with the known broken joint 29 in which the top of the pencil holder 30 is removably inserted. The pencil holder 30 includes a sleeve 30*a* provided with a screw 30*b*. The sleeve 30*a* is so located that the pencil 30*c* extends very closely to the needle point 28, namely, the sleeve or groove 30*a* is contiguous to the needle point 28 when the compasses are closed.

Of course, the subsequently described penpoint 12 can be interchanged with the pencil holder or another needle point (not shown) could be used to provide a pair of dividers of high accuracy.

To maintain the lower vertical legs 16 and 17 perpendicular to the plane of the inscribed surface, the two links 20 and 21 are pivotally connected together at the top by any suitable common pivot pin 33 (Fig. 3) secured to the vertical portion of the inverted "L-shaped" support 13, a vertical line through the pivot pin being perpendicular to and bisecting a line through the pivotal supports or axes of the gear teeth 22. A lock nut 31 is mounted upon the pin 33 and it may be used to firmly lock the arms in any desired position. At the bottom, each link is turned outwardly (Fig. 1) for pivotal attachment between the inwardly turned edges or sleeves at the top of the lower vertical legs 16 and 17 as shown in Figure 1.

The extension arm 11 is constituted of a casing 34 for attachment in the broken joint 29 of the lower vertical leg 17 in the same manner as the pencil holder 30 shown in Figure 1. Retractile in the casing 34 is a rod 35 having a longitudinal slideway 36 in which the end of a screw 37 is inserted after being threaded through the casing 34. On the free end of the rod 35 is the broken joint 38 of known design for the replaceable attachment of the pencil holder 30 shown in Figure 1, or the later described pen point 12 shown in Figures 4 and 5. The longitudinal center line of the rod 35 is perpendicular to the center line of the lower vertical leg 17 when inserted in the broken joint 29 and the vertical center line of the broken joint 38 is parallel to the center line of the lower vertical leg 17 while the height of the broken joint 38 above the plane of inscription is the same as the height of the broken joint 29 thereabove.

The pen point 12 has the usual spaced members 39 and 40 which are pointed at the free end, the width between the spaced members being adjustable by the screw 41. At the top of the spaced members is the shank 42 the free end of which is removably inserted in the broken joint 29 of the lower vertical leg 17 in place of the pencil holder 30 or in the free end 38 of the previously described telescopic extension 11. Pivotally inserted between the spaced members 39 and 40 is an ink filling element 43 formed of a bar pivotally attached at one end between the spaced members by the pin 44*a* adjacent the shank. By forming a notch 44 in the edge of the element 43 on the side of the screw 41 and tapering the edges of the bar to conform with the edges of the pen, the element can be made to rotate in and out of the pen as shown in Figure 4. To aid in rotating the element 43 outwardly, a finger piece 45 is integrally formed along the edge of the element opposite the notch 44 or otherwise attached.

In operation:

To draw a circle with the improved compasses 10, the needle point 28 is set at the center of the circle in the usual manner. With the legs of the compasses spread apart for the required diameter, the lower legs 16 and 17 will remain perpendicular giving a circle of unusual accuracy either with the use of the pen point 12 or the pencil 30. When the diameter of the circle becomes greater than the spread of the upper legs 14 and 15 will permit, the pencil holder 30 is removed from the end of the lower leg 17 and the end 35 of the telescopic extension 11 inserted in place thereof. In pencil work, the pencil holder 30 is reinserted in the end 38 of the extension 11 and the retractile bar 35 pulled out for the required distance and fastened by the screw 37. In ink work, the pen point 12 is inserted in place of the pencil holder 30 or in the end 38 of the extension bar 11. The ink filling element 43 is then pulled out of the pen 12 as shown in Figure 4 or even further in which position it can be dipped into the ink of the ink bottle (not shown). A longitudinal opening in the free end of the bar with a coacting opening through the sides as shown in Figures 4 and 5 are designed to provide a receptacle for the ink. The filling element 12 is then reverse rotated between the spaced members 39 and 40 to transfer the ink from the receptacle to the point of the spaced members for operation in the usual manner.

Of course, the filling element can be used in a ruling pen as well as in the pen point of the compasses, and the usual handle members and spacers for the protection of the gears may be included as shown in Figures 1 and 2.

It will be understood that the invention is not limited to the exact disclosure herein described but may lend itself to a variety of expressions within the scope of the appended claims.

What is claimed is:

1. A pair of compasses comprising two upper legs, each of said legs being of substantially equal length and turned outwardly at the bottom along similar arcuate lines and terminating at the top in coacting gear teeth, said legs further having sleeves formed in the opposed longitudinal edges thereof intermediate the bottom turned portions and the gear teeth, a vertically directed plate for said gear teeth, means for pivotally securing the gear teeth in operable engagement to said plate with the opposed sleeves substantially in juxtaposition along a perpendicular line bisecting a line through the pivotal means in the closed position of said arms, clamping means perpendicular to the plane of the gear teeth for securing said arms in any desired position of separation, a lower leg for each upper leg, each lower leg being turned outwardly along similar arcuate lines at the top and coacting with the outwardly turned bottom of an upper leg, means for pivotally securing together the outwardly turned portions of each upper and lower leg, each lower leg further having a sleeve formed in the inner surface of the outwardly directed top thereof, the sleeve being substantially aligned with the sleeve of the pivotally secured upper leg, a link pivotally disposed intermediate a common point on said vertical plate below the gear teeth and the inner end of the sleeve of each lower leg, each link coacting with the sleeves of one pair of upper and lower legs, and both links being in juxtaposition along

a perpendicular line substantially bisecting the line through the pivotal mounting means of the gear teeth in the closed position of said upper arms.

2. A pair of compasses comprising two upper legs, each of said legs being turned outwardly at the bottom along similar arcuate lines and terminating at the top in coacting gear teeth, said legs further having sleeves formed in the opposed longitudinal edges thereof intermediate the bottom turned portions and the gear teeth, a vertically directed plate for the gear teeth, means for pivotally securing said gear teeth in operable engagement to said plate with the opposed sleeves substantially in juxtaposition along a perpendicular line bisecting a line through the pivotal means of said gear teeth in the closed position of siad legs, clamping means perpendicular to the plane of the gear teeth for securing said legs in any desired position of separation, a lower leg for each upper leg, each lower leg being turned outwardly at the top along similar arcuate lines and coacting with the outwardly turned bottom of an upper leg, means for pivotally securing together the outwardly turned portions of each upper and lower leg, each lower leg further having a sleeve formed in the inner surface of the outwardly directed top thereof, at least a portion of the sleeve being substantially aligned with the sleeve of the pivotally secured upper leg in the straight angle position of said legs, a link pivotally disposed intermediate a common point on the plate below said gear teeth and the outwardly turned top of each lower leg, the pivotal connection of each link at the bottom being equally spaced from the pivotal connection of the lower leg with the upper leg, each link further being adapted for substantial insertion in the sleeves of the pivotally secured legs in the closed position thereof, the lower legs being in substantially spaced parallel arrangement in the closed position of the legs, and means in at least one of said lower legs for varying the bottom thereof relative to the bottom of the second lower leg.

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