Feb. 26, 1957 R. C. BRANDT 2,782,513

GEOMETRICAL INSTRUMENTS

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Fig. 1

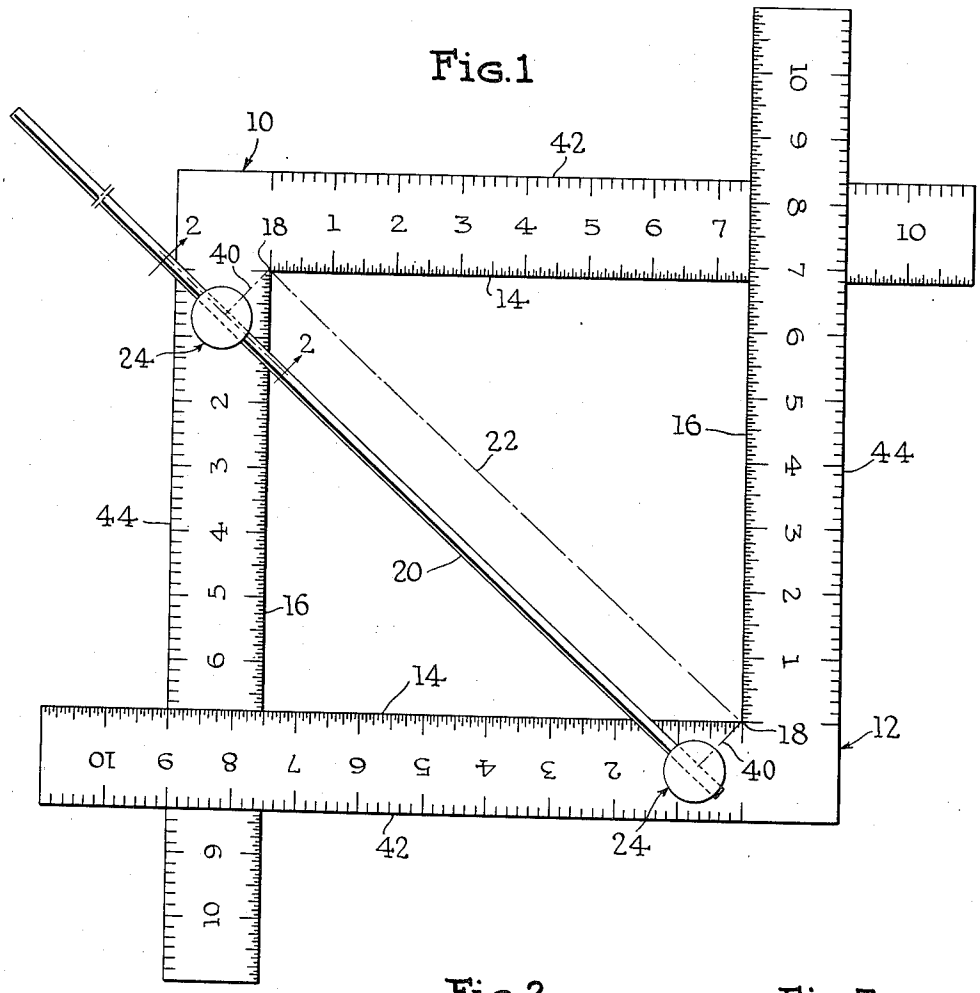


Fig. 2

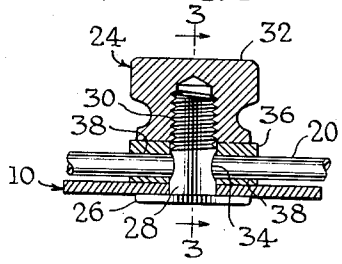
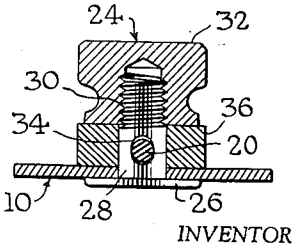


Fig. 3



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GEOMETRICAL INSTRUMENTS

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4 Claims. (Cl. 33—95)

This invention relates to geometrical instruments and, more particularly, to improvements in graphic proportioners or adjustable cropping angle devices as typified, for example, by the disclosures of U. S. Patents No. 2,124,659 to Tyrrell, No. 2,552,460 to Rodman, and No. 2,560,937 to Ens.

All of such instruments comprise a pair of angle members, usually right-angles, arranged in opposed overlapping relationship to define a parallelogram, usually a rectangle. A bar or strut adjustably connects the two members for slidable movement toward or away from each other along the bar, and also for pivotal movement relative to the bar. In all of such prior art devices, the axis of pivotal movement of the angle members relative to the bar are located at the apexes of the angle members, i. e. at the corner formed by the inner straight edges of the member. The pivotal arrangement of the member relative to the bar permits adjustment of the member to vary the proportions of the parallelogram defined thereby, while the slidable mounting of the members on the bar permits adjustment of the size of the parallelogram while maintaining its proportions constant; size adjustment being accomplished, of course, while maintaining the members restrained against pivotal movement relative to the bar.

As mentioned above, in all such prior art instruments, the axes of pivotal attachment of the members to the bar are located at the apexes or inner corners of the members, i. e. at the intersection of the inner straight edges of each member.

This positioning of the pivotal axes gives rise to practical disadvantages because the corner of each member, i. e. the intersection of its straight edges, is obstructed by both the connecting bar and the bracket or other attaching means adjustably mounting the member on the bar. Thus, all prior art devices have two corners which are at least partially obstructed from view and not conveniently accessible with a drawing instrument, e. g. a pen or a pencil.

Accordingly, it is an object of this invention to provide a geometrical instrument of the type described that has no obstructed corners.

It is a further object of this invention to provide an improved geometrical instrument of the type described, in which all the corners thereof are unobstructed from view and readily accessible with a drawing instrument.

Other objects and advantages of the invention will be apparent from the following description and accompanying drawings, in which:

Figure 1 is a plan view of a geometrical instrument embodying this invention;

Figure 2 is an enlarged fragmentary sectional view taken on lines 2—2 of Figure 1;

Figure 3 is a sectional view taken on lines 3—3 of Figure 2.

Referring now to the drawings:

There are shown two preferably thin and flat angle members **10** and **12**, each having a pair of inner straight

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edges **14** and **16** intersecting at a right angle to form a corner or apex **18**. The numbers **10** and **12** are arranged in opposed overlapping relationship, i. e. as shown in the drawing, with the member **12** partially overlying the member **10**, so that the two pairs of edges **14** and **16** define a rectangle. While the edges **14** and **16** of each member are here shown as intersecting at a right angle, it is within the contemplation of this invention that the intersecting angle may be any angle between 0° and 180°, as long as the intersecting angles of both members are identical so that the inner edges of the members will define a parallelogram. In usual practice, however, instruments of this nature define rectangles.

A bar or strut **20** adjustably connects the two members **10** and **12** and is attached to the latter so that it extends parallel to but spaced laterally from an imaginary line, indicated by the dot-dash line **22**, extending through the apexes **18** of the member. Obviously, with this arrangement, the apexes or corners **18** are in full view and also fully accessible with a drawing instrument. Brackets or attaching devices **24** adjustably secure the bar **20** to the members **10** and **12**, and since both devices **24** may be identical, a description of one will suffice for both.

Each device **24**, as shown best in Figures 2 and 3, includes a headed stud **26** freely extending upwardly through an opening in its corresponding member **10** or **12**. Above its member, the stud **26** has a smooth portion **28** followed by a threaded portion **30** on which a nut **32** is engaged. Preferably, the nut **32** is knurled for ease of manual manipulation. The smooth portion **28** of the stud is provided with a vertically elongated diametrically extending aperture **34** (Figure 3) of a size to slidably receive the bar **20**. A washer or collar **36** is mounted for slight axial movement on the smooth portion **28** of the stud, and is engageable by the nut **32** to clamp the collar against its corresponding member.

The collar **36** has a pair of diametric apertures **38** (Figure 2) registering with the aperture **34** in the stud **26** and slidably receiving the bar **20**. Consequently, when the nut **32** is loosened, the stud **26** can pivot freely on its corresponding member and thus permit relative pivotal movement between the latter and the bar **20** about the axis of the stud. When the nut **32** is tightened, however, the stud **26** and collar **36** are held against pivotal movement on their corresponding member.

The attaching devices **24** are oppositely mounted on the member **10** and **12** so that the pivotal axis of each device is spaced an equal distance from the apex **18** of its corresponding member, and is on the same side of the line **22** when the members **10** and **12** are assembled with the rod **20**. This distance is sufficient so that the devices **24** will not overhang the edges **14** and **16**. Preferably, a line **40** connecting the pivotal axis of each device to the apex **18** of its corresponding member is perpendicular to the line **22**, but in all cases both lines **40** should be parallel.

Preferably, the edges **14** and **16** of the members are provided with scale indices which may graduate in inches, as shown in Figure 1. Additionally, the outer edges **42** and **44** of the members may be straight and be provided with a pica scale, as shown in Figure 1. This is of tremendous advantage when the instrument is used in conjunction with printed material.

Since the usage of instruments of this nature is well known, no detailed description thereof need be given here. It is sufficient to point out that with the nuts **32** loosened, the members **10** and **12** may be freely adjusted to define parallelograms or rectangles of various sizes and proportions, and with the nuts tightened, the members may be moved toward or away from each other along the bar **20** to change the size of defined parallelograms or rectangles while maintaining the proportions thereof con-

stant. It will be seen that such constant proportions obtain because the bar **20** always is parallel to the line **22**, but four unobstructed corners are had because of the offset relation between the bar and the line **22**.

It will be realized that the specific embodiment disclosed to illustrate the principles of this invention is susceptible of change without departing from such principles. For example, it is not necessary for the bar **20** to be slidable in both attaching devices **24**, but only in one. Hence, the bar **20** may be fixed to the collar **36** of one of the devices **24**. Therefore, this invention includes all modifications encompassed within the spirit and scope of the following claims.

I claim:

1. In a geometrical instrument of the character described, the combination comprising: two opposed overlapping angle members, each having a pair of straight edges intersecting at an included angle less than 180°, the edge intersecting angles of said members being identical and said members being arranged so that said edge pairs define a parallelogram; a bar adjustably connecting said members, said bar being parallel to but spaced from a line connecting the apexes of said edge pairs; attachment means mounting said members on said bar for sliding movement of at least one of the members toward and away from the other along the length of said bar to adjust the size of the parallelogram and for pivotal movement of both of said members relative to said bar to adjust the proportions of the parallelogram, the pivotal axes of said attachment means being on the same side of and spaced equidistantly from said line and from the apex of the corresponding member, whereby said apexes are unobstructed by said bar and said attachment means; and means included in said attachment means for releasably securing said members against pivotal movement relative to said bar.

2. The structure defined in claim 1, wherein a line connecting each axis with the apex of the corresponding member is perpendicular to the said line connecting the apexes.

3. In a geometrical instrument of the character described, the combination comprising: two opposed overlapping angle members, each having a pair of straight edges intersecting at a 90° included angle, and said members being arranged so that said edge pairs define a rectangle; a bar adjustably connecting said members, said bar being parallel to but spaced from a line connecting the apexes of said edge pairs; and a clamping bracket carried by each of said members, at least one of said brackets slidably receiving said rod and both of said brackets permitting pivotal movement of said rod relative to the corresponding member, the pivotal axes of said brackets being on the same side of and spaced equidistantly from said line and from the apex of the corresponding member, whereby said apexes are unobstructed by said rod and brackets, said brackets being adjustable to clamp said members against pivotal movement relative to said rod.

4. The structure defined in claim 3, wherein a line connecting each axis with the apex of the corresponding member is perpendicular to the said line connecting the apexes.

No references cited.