United States Patent [19]

Padowicz

[11] **3,858,324**

[45] **Jan. 7, 1975**

[54] **PANTOGRAPH**

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[22] Filed: **July 23, 1973**

[21] Appl. No.: **381,437**

[52] **U.S. Cl.** ..... **33/25 R**

[51] **Int. Cl.** **B43l 13/10**

[58] **Field of Search** ..... 33/25, 23 R, 115, 106

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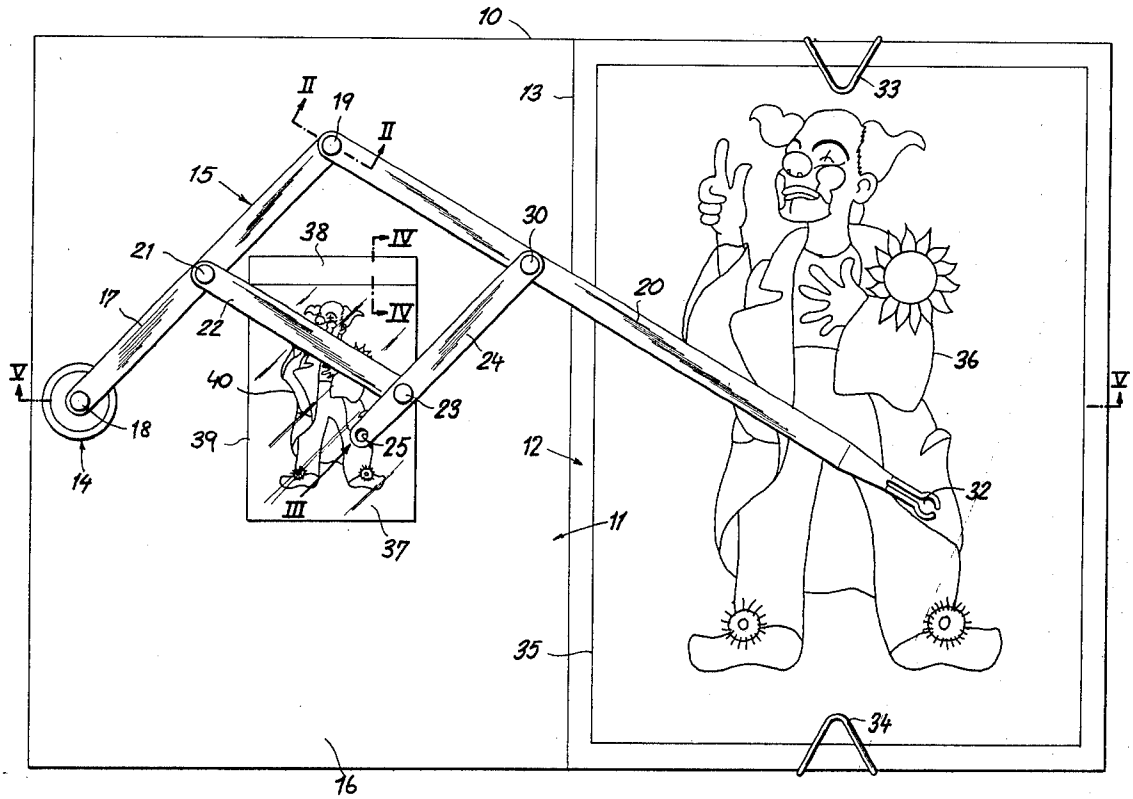
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Assistant Examiner—John W. Shepperd
Attorney, Agent, or Firm—Karl F. Ross; Herbert Dubno

[57] **ABSTRACT**

A folding pantograph comprises a pair of flat sheet supports hingedly interconnected along confronting edges, a pantograph linkage pivotally mounted on one of these supports and having a stylus adapted to trace the outline of an image thereon, and a writing instrument reaching over the hingedly connected edges to inscribe an enlarged version of the pattern upon a sheet of paper carried by the other support. A transparent overleaf disposed over at least a portion of the first support can be lifted to insert the master thereunder so that the scribing operation does not damage the original.

4 Claims, 5 Drawing Figures



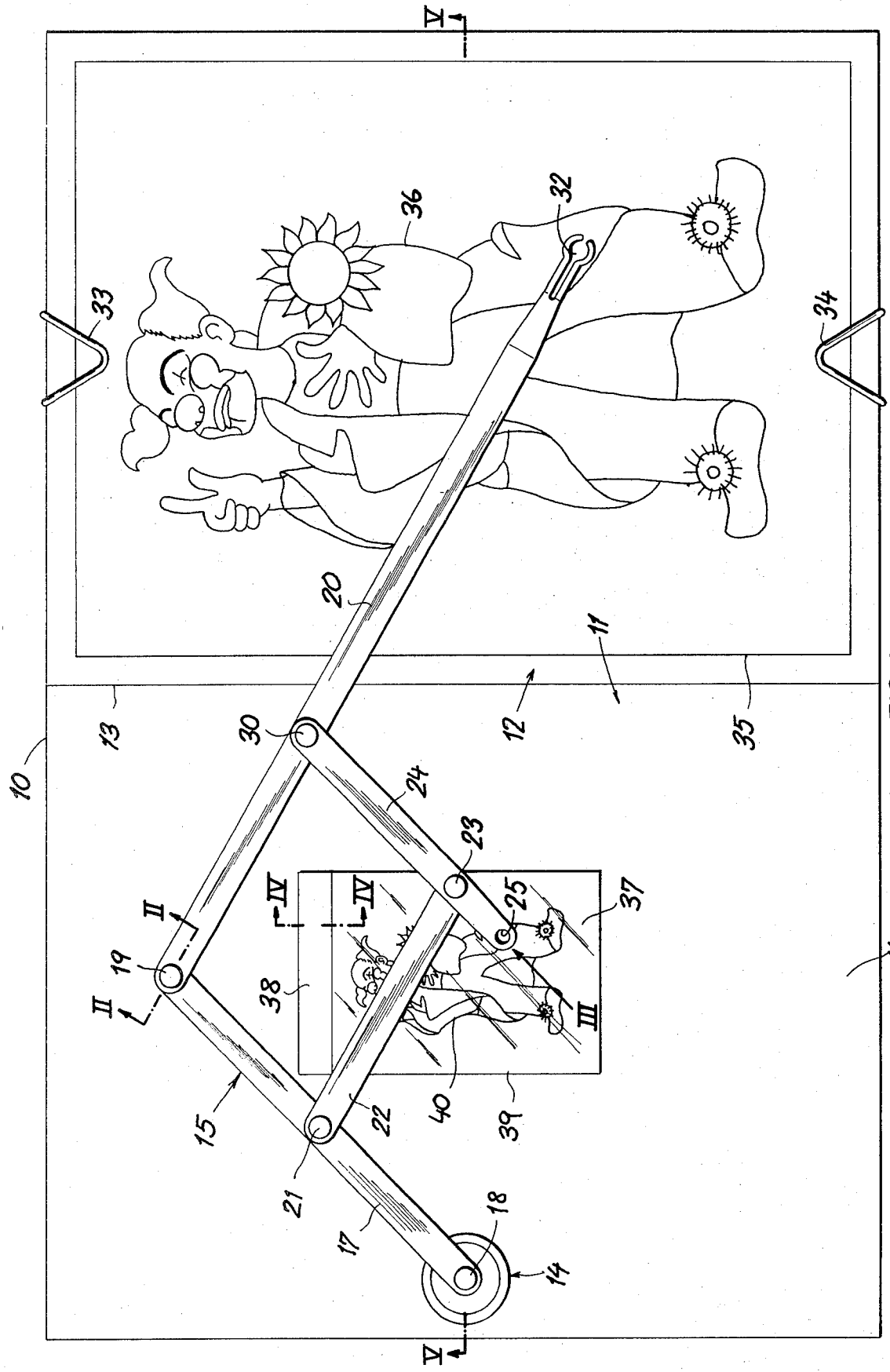

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FIG. 1

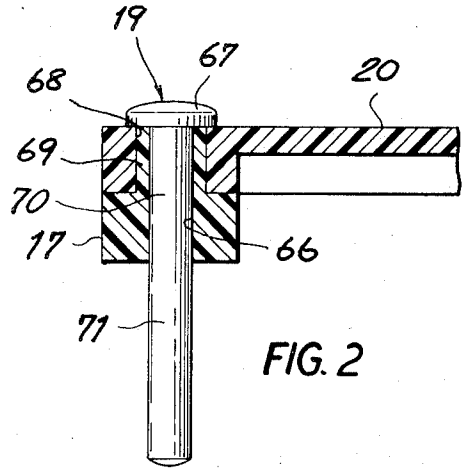


FIG. 2

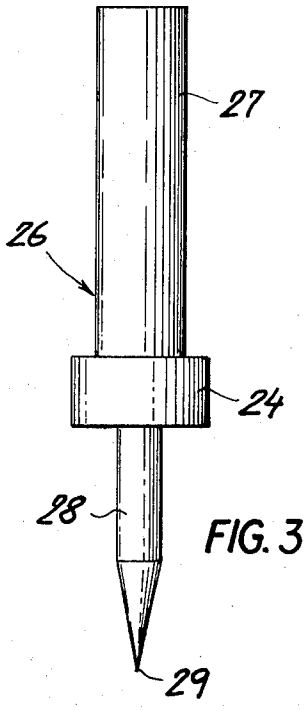


FIG. 3

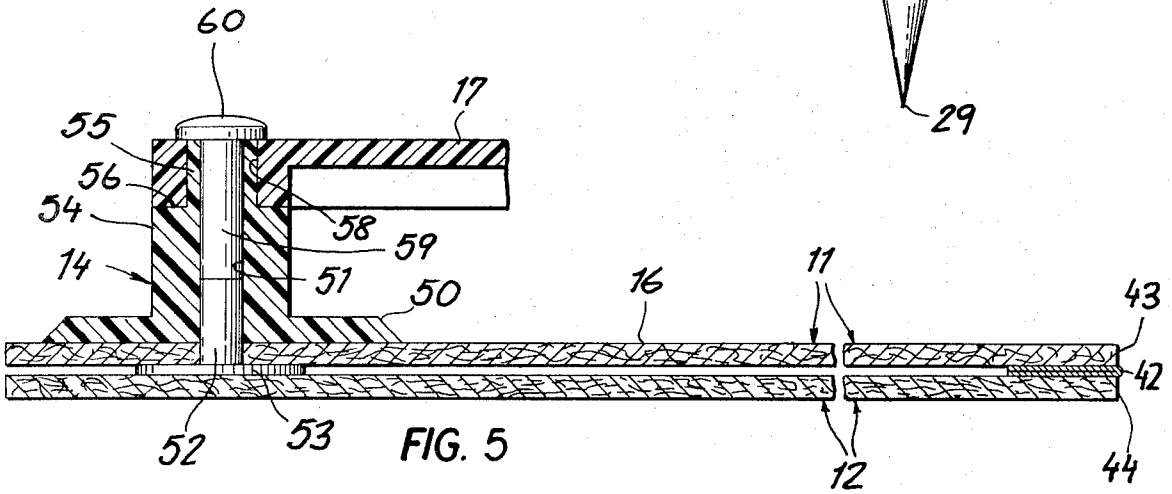


FIG. 5

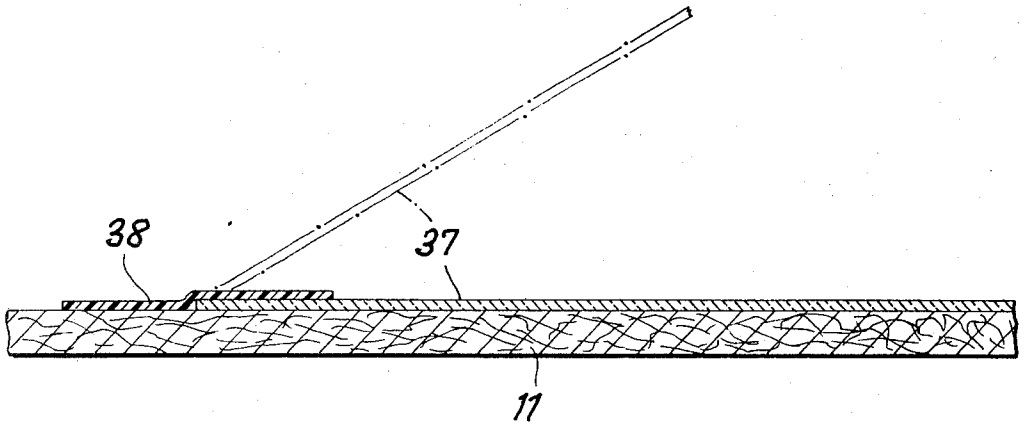


FIG. 4

PANTOGRAPH

FIELD OF THE INVENTION

My present invention relates to a pantograph and, more particularly, to a device for enlarging or reducing images using the pantograph principle and especially for children.

BACKGROUND OF THE INVENTION

Numerous pantograph systems have been provided heretofore for the enlargement or reduction of an image, the systems being provided in high precision arrangements for accurate drafting, as toys or the like with low accuracy, and in a variety of intermediate forms. In general, each such pantograph comprises a support and an arrangement of articulated bars pivotally mounted to the support at an axis perpendicular thereto. The arrangement of articulated bars includes a stylus which is intended to trace the small images and a scribing, writing or drawing instrument, e.g. a pen or pencil, adapted to trace the large image, or vice versa. The support is provided at two laterally spaced locations with means for retaining a master image to be reproduced in larger size or smaller size, and a sheet of paper or some other substrate adapted to receive the reproduced image. One location lies beneath the stylus while the other lies beneath the drawing instrument.

One of the principal difficulties of conventional pantographs is that they are inordinately large if any substantial size enlargement or reduction is contemplated. While the articulated bar arrangement may be contracted in space, it has not been possible heretofore to transport or store a system of the character described with ease or convenience, because of the large size of the support which, as noted, had two locations respectively receiving the master and the copy sheet.

Furthermore, conventional pantograph systems require the use of a sharp-pointed stylus if image enlargements are to be made since, in this case, each line of the master must be traced with great care to avoid the inaccurate reproduction that results by multiplication of errors. Such sharp stylii may damage the master and even tear it to a point that the master is unusable for other purposes.

Furthermore, conventional pantograph systems are of complex and expensive construction which it has not been possible to avoid heretofore without considerable loss of precision.

OBJECT OF THE INVENTION

It is the principal object of the present invention to provide an improved pantograph, especially for use as a toy, whereby the aforedescribed disadvantages can be obviated.

Still another object of the invention is to provide a low cost but relatively accurate pantograph which is compact and is capable of preventing damage to the master or original copy when making enlargements therewith.

SUMMARY OF THE INVENTION

These objects and others which will become apparent hereinafter are attained, in accordance with the present invention, wherein a pantograph for use as a child's toy or other enlargement and reduction purposes, comprises a two-part support having juxtaposed edges

hingedly interconnected so as to enable the support to be folded at the hinged edges with respective surfaces of the two parts lying outwardly. At the opposite edge of one of these surfaces of one of these supports, a pantograph bar arrangement is pivoted for swinging movement about an axis perpendicular to this surface. The pantograph bar arrangement comprises at least one long arm formed at an end with a socket for a scribing instrument, e.g. a pen, pencil, felt-tip or other marker, this arm reaching over the other support part when the support is opened or spread. On the first part, proximal to the pivot, I provide means for retaining a master image in place while the other part of the pantograph is provided with means for retaining a reproduction sheet in place so that, when a stylus scribes the outline of the master on the first support part, an enlarged but geometrically similar outline is reproduced on the other support part.

According to an essential feature of the invention, the first support part is provided with a transparent overleaf of a celluloid or synthetic resin material, preferably by hingedly securing this overleaf to the said surface of the first part whereby the master can be introduced below this overleaf and is covered thereby over a region corresponding to the practical drawing window of the second support part. Thus the scriber engages only the transparent overlay and cannot tear the overlying master.

According to another feature of the invention, the field of the first support part corresponding to the drawing window, is outlined directly upon the first support part and is coextensive with the transparent overlay so that the user may readily ascertain the region of the master which can be reproduced upon the paper sheet fixed to the second support part. I have found it to be desirable within this field to provide a multi-color image and a correspondingly enlarged multi-color image in the window of the second support part so that the user, generally a child of young age, can readily ascertain the correlation between parts of the framed original or master and parts of the copy.

According to still another feature of the invention the scriber holder is a bifurcated portion of the long pantograph arm, having legs which straddle and hug the drawing instrument. It has been found to be advantageous to provide at least one of the articulations of the pantograph bar assembly, a pin or post which rides upon the surface of the first support part and constitutes, with the drawing instrument and the stylus, a three-point support. The pin may have a head and preferably is received within a space or sleeve formed or one of the bars and accommodating an eye of the other bar so that the pin simultaneously holds the two bars in articulating relationship. The or each articulation may be a similar pin which may have a length equal to the thickness of the two bars at their junction or may project therebeyond to provide additional support. A similar pin may mount the bar upon a pedestal as will be apparent hereinafter.

DESCRIPTION OF THE DRAWING

The above and other objects, features and advantages of the present invention will become more readily apparent from the following description, reference being made to the accompanying drawing in which:

FIG. 1 is a plan view drawn to a considerably reduced scale of a pantograph embodying the present invention;

FIG. 2 is a cross-sectional view taken generally along the line II — II of FIG. 1;

FIG. 3 is an end view in the direction of arrow III of FIG. 1 showing the stylus in place;

FIG. 4 is a cross-sectional view taken along the line IV — IV of FIG. 1; and

FIG. 5 is a cross-sectional view taken along the line V — V of FIG. 1.

SPECIFIC DESCRIPTION

The pantograph, according to the present invention comprises a support consisting of a pair of flat hardboard or cardboard support parts **11** and **12** hingedly interconnected at **13** so as to be spreadable into the position shown in FIG. **1**. The support **10** is provided with a pedestal **14** upon which an articulated pantograph bar arrangement **15** is pivotally mounted for swinging movement about an axis perpendicular to a face **16** of the support **11**.

The articulated bar arrangement **15** comprises a first bar **17** of a length intermediate that of bars **20** and **24** which is pivotally mounted at **18** to the pedestal **14** and at **19** to the long bar **20**. At an intermediate location **21**, the bar **17** is pivotally connected to a bar **22** which lies parallel to the bar **20** and is also articulated at **23** to a bar **24** parallel to the bar **17**.

The bar **24** is formed at one end with a socket **25** adapted to receive a stylus **26** which, as shown in FIG. **3**, has a large diameter upstanding portion **27** and a slender shank **28** prolonged in a sharp point **29**.

At its other end, the bar **24** is articulated at **30** to the bar **20** which, as noted, is articulated at its end to the bar **17**.

The distances between articulations **19** and **21** and between articulations **23** and **30** are equal as are the distances between the articulations **21** and **23** and the articulations **19** and **30**. The result is paralellogrammatic linkage having a prolonged bar **20** at the end **32** of which, a bifurcated arrangement is provided to removably receive a writing or drawing instrument such as a pen, pencil felt-tip or nylon tip marker, brush or the like.

The support **12** is provided with means, e.g. clips **33** and **34** for retaining paper sheets in place within a drawing window outline at **35**. For convenience in illustrating the operation of the device, a figure, here a clown, is represented at **36** within the window.

On the first support I provide a transparent overleaf **38** of tape so that it can be swing unpwardly to receive the master image therebelow. This overleaf has an outline corresponding to the rectangular field outline marked at **39** on the surface **16** and enclosing the reduced-image counterpart **40** of the image within the window on the second sheet. Thus, when the stylus is placed upon any portion of the image beneath the overleaf **37**, the scribing instrument at the free end **32** of arm **20** will be disposed directly upon the corresponding image at the right side of the device.

To enable the support part **12** to be folded under the support part **11** as shown in FIG. **5**, a tape hinge **42** is provided along the juxtaposed edges **43** and **44** of the support parts.

It has been found to be advantageous to provide the pantograph assembly as a multiplicity of replaceable and relatively interconnectable parts so that in case any part is damaged it may be removed without tools and replaced by a corresponding part.

To this end, the pedestal **14** (FIG. **5**) comprises a frustum-shaped base **50** which lies upon the surface **16** of support board **11** and is formed with a central bore **51**. A plug **52** of an anchor **53** traversing the board **11**, is tightly fitted into the bore **51** and is hugged by the wall thereof.

The pedestal also comprises a cylindrical portion **54** terminating in a cylindrical boss **55** so that a step or shoulder **56** is formed at the top of the pedestal. The boss **55** forms a pivot for the arm or bar **17** which, like all the bars described is generally molded in synthetic-resin material with a channel profile and is formed with a cylindrical bore **58** receiving the boss **55**. The bar **17** rests upon the shoulder or step **56** and the assembly is held in place by a pin **59** whose head **60** overlies the upper surface of the bar **17** and is of a larger diameter than that of boss **55**. The pin **59**, also molded from synthetic-resin material, is tightly held in the bore **15**. The axial length of boss **55** may be slightly greater than the thickness of the bar **17** to permit free pivotal motion.

At least at one of the articulations of the bars **17**, **22**, **24** and **20** with one another, there is provided a pin **70** which is analogous to pin **59** but is prolonged at **71** to reach the surface **16** of the support. The articulation **19** between the bars **17** and **20** is here shown to have the prolonged pin **70**, **71**. To this end, the bar **17** underlies the bar **20**, both of which are of channel configuration, but is formed with a cylindrical boss **69** over which the bore **68** of bar **20** is fitted. Here again the axial length of the sleeve **69** is slightly greater than the thickness of the bar **20** to permit free rotation. The head **67** of the pin is of a greater diameter than the sleeve **69** so that the two bars cannot be separated unless the pin is first removed. The pin **70**, **71** is force-fitted into the bore **66** of the bar **17**.

In operation, the removable stylus **26** is snugly inserted into the socket **25**, a drawing instrument such as a pencil is fitted into the bifurcated end **32**, a master image is placed beneath the transparent overleaf **37** and a sheet of paper is anchored within the region defined by the outline **35**, to the other support part **12** via the clips **33** and **34**. By following the outlines of the image beneath the overleaf **37**, a reproduction of this image is obtained at the sheet held to the board **12**.

I claim:

1. A pantograph comprising:

a support having a pair of substantially coextensive support boards of rectangular outline, and means hingedly interconnecting said support boards along confronting edges thereof whereby said support boards may be spread into coplanar relationship to define a pair of support surfaces on the same side of said support.

a plurality of articulated bars forming a pantograph assembly pivotally mounted on one of said support boards along said support surfaces and having a stylus adapted to course along an outline on said one of said support boards, and a drawing instrument adapted to course along a geometrically similar outline on the other of said support boards; and

a transparent overleaf hingedly mounted on said surface of said one of said support boards and defining an image field thereon whereby a master image is receivable beneath said overleaf for tracing by movement of said stylus upon said overleaf, said assembly comprising a pedestal member anchored to said one of said support boards, a first bar mem-

ber swingably mounted on said pedestal member at a first pivot, a relatively long bar member articulated to said first bar member at one extremity of said long bar member at a second pivot, a second bar member articulated to said long bar member by a third pivot at an intermediate location along said long bar member, and a third bar member articulated by a fourth pivot to an intermediate location of said first bar member and by a fifth pivot to an intermediate location of said second bar member, said second bar member being provided at a free end with said stylus and said long bar member being provided at a free end with said instrument, each of said pivots comprising a generally cylindrical boss on one of the members thereof, a bore formed in the other member of the respective pivot and rotatably receiving the respective boss, and a pin snugly fitted into the respective boss and having a head of a diameter greater than that of said cylindrical boss, said free end of said long bar member being bifurcated to snugly retain said instrument and said free end of said second bar member being provided with a socket snugly retaining said stylus, said pin at one of said second, third, fourth and fifth pivots being elongated beyond the members constituting same for engagement with said surface of said one of said support members.

2. The pantograph defined in claim **1** wherein said support boards are hinged together along said confronting edges by a tape applied to the opposite surfaces of said support boards whereby said edges abut upon spreading of said boards.

3. The pantograph defined in claim **1** wherein said surfaces of said support boards are provided with rectangular outlines representing the reproduceable field of the master and of the reproduced image.

4. The pantograph defined in claim **3,** further comprising an image permanently formed on said surface of said one of said support boards within its outline and a corresponding figure permanently formed on said surface of said other support within its outline.

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