Oct. 16, 1956 J. H. DWYER 2,766,529

PANTOGRAPH

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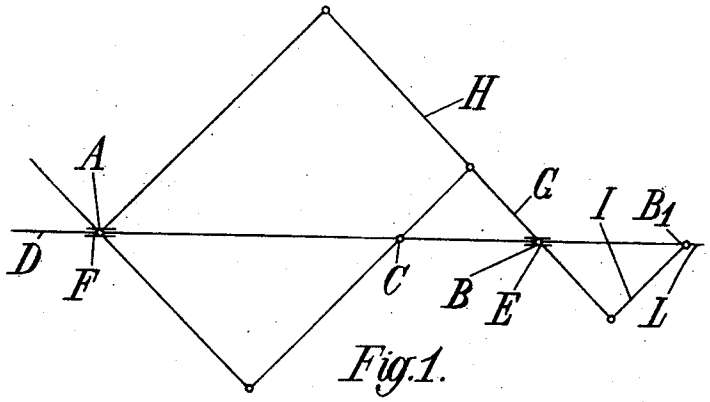


Fig. 1.

Fig. 2.

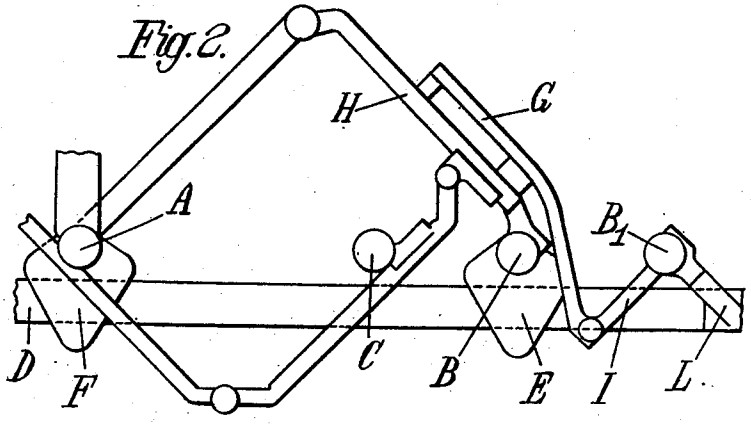
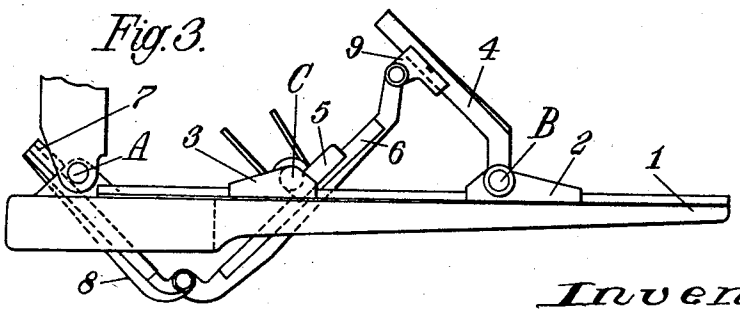


Fig. 3.



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PANTOGRAPH

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4 Claims. (Cl. 33—25)

This invention relates to an improved pantograph, one object of the invention being to increase the working range of existing pantographs, another object being to produce a more rigid type of pantograph than hitherto known for two or three dimensional reproductions, especially where pantographs are used in connection with die-sinking and engraving machines.

The usual pantograph consists of four main arms which are linked together so as to form a parallelogram. This parallelogram can be slidably adjusted for size in order to reduce or increase the ratio of reproduction.

The invention consists in a pantograph provided with an attachment of extension members adapted to increase the distance between the stylus and the cutter or other reproducing member to a required multiple of the original distance and comprising an aligning-bar for keeping the swivelling point of the pantograph, the stylus point and the working point of the cutter or other reproducing member in a straight line.

The invention also consists in the improved constructions of pantographs as hereinafter described with reference to the accompanying drawings.

Referring to the drawings,

Figure 1 is a diagram illustrating the invention;

Figure 2 shows by way of example one mode of carrying the invention into effect as applied to existing pantographs; and

Figure 3 shows the construction of a newly manufactured pantograph.

Referring to the diagram shown in Figure 1, part of it illustrates the working of any known pantograph; the swivelling point A of the pantograph, the stylus point B which copies the shape of the master and the working point or the bearing C carrying the actual cutter are always situated on a straight line, and the adjustment of the parallelogram is carried out in such a way that the distances A—B and A—C are in the ratio of reproduction. In other words, with a pantograph which is reproducing at ⅔ or 1.33:1 the distance A—B will be four times the distance B—C. It is a recognized fact that in the working of the pantograph the actual distance B—C is constantly changing as the pantograph opens and closes during its working, but again the distance A—C varies in a fixed ratio with respect to B—C.

Occasions arise when the master is of such great dimensions that when placed in position it will interfere with the clamping of the work-piece so that the cutting operation is rendered impossible. In order to overcome this difficulty, according to the present invention an attachment comprising a number of extension members is provided in order to increase the distance between the stylus and the cutter to a required multiple of the original distance, still keeping the centre of the stylus in the said straight line.

Referring to the whole of the diagram shown in Figure 1 and the construction shown in Figure 2, the extension members provided by the present invention comprise an aligning bar D the extreme end of which near the stylus

carries a bracket L on which the stylus B′ is mounted. The bar D is also slidably mounted in between two shoes E and F mounted on the original housing of the stylus B and of the swivelling point A respectively.

The aligning bar is shown mounted below the pantograph the bar being suitably offset from the axis of both the stylus B and the swivelling point A and the hinged bracket L being also offset by the same amount.

Of course the bar D may alternatively be mounted on the top of the pantograph, and if so desired, the bar need not be offset. The same result is obtained by fixing the bar D at the point A and allowing the bracket L to slide along the bar. In each case the shoes E and F are so arranged as to swivel during the operation of the pantograph.

The attachment according to the invention also comprises an extension arm G attached to pantograph arm H and hinged to a bar I which in its turn is hinged to the bracket L referred to. The extension G and the bar I form the sides of a triangle, the base of which is the distance B—B′.

The attachment referred to, which may be used for working in two or three dimensions, can be attached to any existing pantographs in order to give the user the possibility of producing larger pieces of work on existing equipment. However, the same invention can be used in connection with the manufacture of new pantographs.

In the construction shown in Figure 3 the swivelling point A, the cutter point C and the stylus point B are again kept in one line and the distance A—B in the proper ratio with the distance B—C. The pantograph mainly consists of an arm **1** which carries two sliders **2** and **3** and is pivoted at A. The slider **2** is hinged to the pantograph member **4** and also carries a stylus in the centre of this hinge. The slider **3** is hinged and connected to a further slider **5**, which in its turn can be fixed in different positions to the pantograph arm **6**. Another slider **9** is hinged to the member **6** and is fixed to the member **4** in a position corresponding to the required ratio. A further slider **7** is hinged at the swivelling point A below the main arm **1** on which the member **8** can be fixed relatively to the point A, the member **8** being hinged to the member **6**. By suitably adjusting the slider **5** on the member **6** and the member **8** on the slider **7** and slider **9** on member **4**, the ratio between A—B and B—C can be suitably varied according to the required reductions.

The advantages of this improved type of pantograph as compared with the conventional parallelogram type of pantograph are: greater strength with the swinging arm mounted above the cutter bearing; increased working area for both two and three dimensional reproductions; the greater mass can be constantly balanced.

In the construction shown the bar **1** is fixed at the point A and the slider **2** is shown displaceable along the bar; the same object is attained by fixing the slider **2** to the bar **1** and allowing the bar to slide through the point A.

The details for carrying the invention into effect may be varied without departing from the essence of the invention.

I claim:

1. In a pantograph having a system of arms pivotally interconnected to form a parallelogram linkage movable in two dimensions about a swivelling point and having one of the arms arranged to carry a stylus, and a reproducing tool carried on an adjacent arm, means for increasing the distance between the stylus position and the reproducing tool to a required multiple of the original distance, said means comprising an extension member attachable to the stylus arm, an intermediate bar pivoted at one end to said extension member, a bracket pivotally connected to the intermediate bar at the other end thereof, said bracket carrying a stylus, an aligning bar, and

means interconnecting said aligning bar with the last mentioned stylus, the reproducing tool and said swivelling point to maintain the swivelling point, the reproducing tool and the stylus in line during movement of the pantograph, the bracket being mounted at the end of the aligning bar that is adjacent the original stylus position.

2. A pantograph as claimed in claim 1 having housings at the original position of the stylus and at the swivelling point respectively and two shoes mounted on said housings and in which the aligning bar is slidably mounted in between said shoes.

3. A pantograph as claimed in claim 1 in which the aligning bar is equally offset from the axis of the stylus and from the axis of the swivelling point.

4. A pantograph as claimed in claim 1 in which the said extension member and the intermediate bar form

the sides of a triangle, the base of which is the distance between the original stylus position and the position of the stylus on the bracket.

References Cited in the file of this patent

UNITED STATES PATENTS

118,902	Bruce et al.	Sept. 12, 1871
538,776	Grier	May 7, 1895
1,235,668	Eaton	Aug. 7, 1917
1,365,868	Tempest	Jan. 18, 1921
2,178,131	Zwick	Oct. 31, 1939
2,626,540	Eserkaln	Jan. 27, 1953

FOREIGN PATENTS

418,135	Great Britain	Oct. 18, 1934
487,634	Great Britain	June 23, 1938