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R. F. ASHBROOK
MECHANICAL DRAWING DEMONSTRATOR

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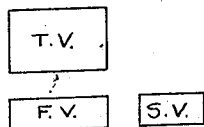
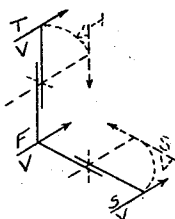
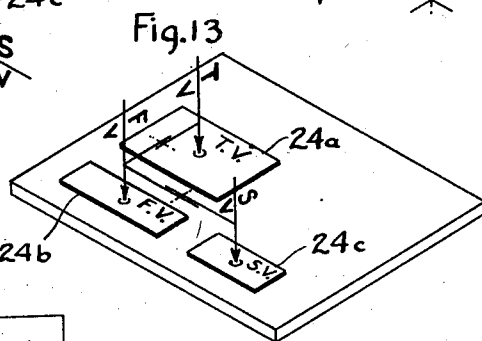
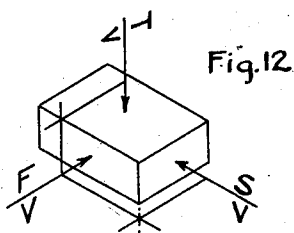
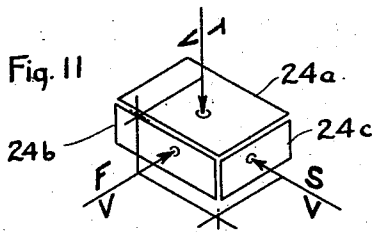
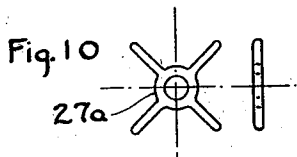
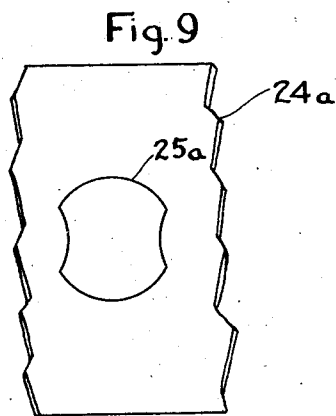
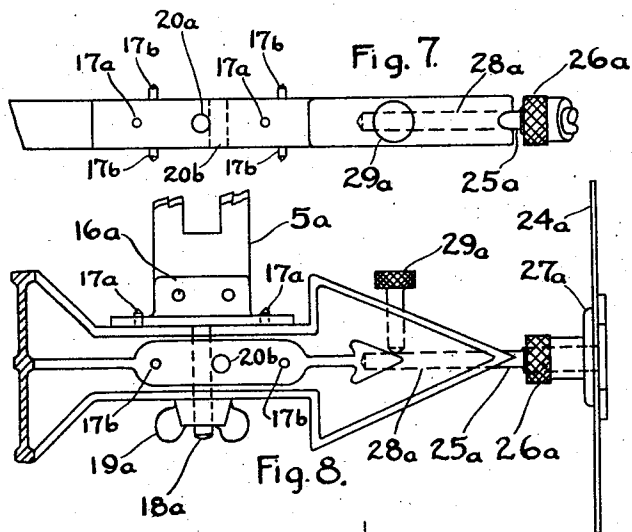


Fig. 15

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MECHANICAL-DRAWING DEMONSTRATOR.

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This invention relates to educational appliances, and more particularly to a device for teaching mechanical drawing.

One object of this invention is to provide a device of the above nature which may be used for demonstrating the relationship of the several views of a mechanical drawing, and which may also be used as a view finder and visualizer.

A further object is to provide a device of this nature which will be simple in construction, inexpensive to manufacture, easy to manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view there has been illustrated on the accompanying drawings, one form in which the invention may be conveniently embodied in practice.

Fig. 1 represents an isometric view of the educational appliance, as it appears when in use in association with an object to be viewed, the stand upon which the appliance is mounted being shown separated therefrom, for clearness.

Fig. 2 is an isometric view of the auxiliary view finding member, shown detached from the remainder of the apparatus.

Fig. 3 is a top view of the adjustable mechanism for slidably and pivotally holding two of the view finder member connecting arms.

Fig. 4 is a side view of the same.

Fig. 5 is an isometric view of one of the cross-shaped guides illustrated in Figs. 3 and 4.

Fig. 6 is an isometric view of the leaf spring adapted to be carried by the guide shown in Fig. 5.

Fig. 7 is a top view of one of the finder members showing the means for attaching it to its corresponding connecting arm and also showing a view sheet and its holder attached thereto.

Fig. 8 is a front view of the same.

Fig. 9 is a side view of the view sheet holder.

Fig. 10 shows front and end views, respectively, of one of the spider washers of the view sheet holder shown in Figs. 7 to 9.

Fig. 11 is a diagrammatic isometric view showing three view finders and three view sheets in their correct relationship with respect to an object.

Fig. 12 is an isometric view of an object

with three view finders shown diagrammatically in their correct positions.

Fig. 13 is an isometric view of a drawing board having the three view sheets of Fig. 11 swung down into the plane of the board.

Fig. 14 is a diagrammatic isometric view of the most common arrangement of the three view finders, and showing how said view finder members may be swung into a common plane.

Fig. 15 is a drawing of the views of an object as obtained by the view finders arranged as in Fig. 14.

Figs. 16 and 17 are views similar to Figs. 14 and 15, showing a modified arrangement of the view finder member, the side view in this instance being at the right of the top view.

It has been previously found quite difficult to teach students of mechanical drawing the principles and practice of orthographic projection and view visualization. By means of the present invention this difficulty has been overcome. This has been accomplished by providing a device having three arrow-like view finder members, each arranged at right angles to the other two, whereby the student will easily visualize the relationship of the proper views to be made of an object. The view finding members are made relatively adjustable longitudinally so that the device can be used upon objects of varying sizes, so that isometric projections, oblique projections, cabinet projections, etc. may be readily produced and demonstrated.

Briefly stated the invention comprises a plurality of interchangeable view finder members, arrow-like in form, said members being detachably connected together by a central supporting frame work, having a plurality of arms. The arms are adapted to be arranged in various ways and are made adjustable, slidably and rotatably, and may be locked in any desired adjusted position.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, A indicates generally the object to be viewed, B the supporting frame-work, and C the stand or base. The numerals 1, 2, 3, and 4 indicate, respectively, the front, side, top, and auxiliary view finder members. Theoretically, these view finder members are to

be considered as located at infinite distances from the object to avoid the effect of perspective. In other words, each view finder member may be considered as an infinite number of parallel arrow-like members.

In order to connect the view finder members 1, 2, 3, and 4 into a unitary structure, provision is made of five supporting arms 5^a, 5^b, 5^c, 5^d, and 5^e. These supporting arms extend at right angles to the direction of their respective view finder members, and are arranged in pairs, the arms of each pair being slidable in cross-shaped guiding members 6^a, 6^b, and 6^c as the case may be. Each guiding member serves to prevent rotation of its supporting arms and maintains the arms of each pair constantly at right angles to each other.

By means of this construction, it will be seen that the view finder members may be readily adjusted for viewing objects of varying sizes. The cross-shaped guiding members 6^a, 6^b, and 6^c are open on their top sides, as shown by the numeral 11^a in Fig. 5, in order to permit one arm of each pair to be removed and rotated into alinement with the other arm of said pair, whenever it is desired to have the two view finders point in the same direction, as diagrammatically shown in Fig. 13.

Each of the cross-shaped guiding members 6^a, 6^b, and 6^c has a curved leaf spring 7^a, 7^b, and 7^c adapted to be held in place by a non-rotatable pivot bolt 8^a, 8^b, and 8^c, said guiding members, leaf springs, and bolts being secured together by wing nuts 9^a, 9^b, and 9^c passing through holes 12^a and 13^a in the guiding members and slots 14^a and 14^b in the view finder arms.

The guiding members are provided with closed guideways 10^a, 10^b and 10^c on their undersides, as shown in Fig. 5.

In operation, whenever it is desired to shift the position of the view finder members, the wing nut 9^a, 9^b, and 9^c will first be unscrewed. This will permit the leaf spring 7^a, 7^b, or 7^c to eject the upper arm out of its open guide-way 11^a, whereupon said upper arm may be manually rotated on the pivot bolt into alinement with the lower arm in the closed guide-way 10^a. The arms may then be readily reclamped by again tightening the wing nut.

In order to secure the arms 5^a, 5^b, 5^c, and 5^e to their respective view finder members, plates 15^a, 15^b, 15^c, 15^d, and 15^e are provided, each of said plates having a pair of holes 16^a, 16^b, 16^c, 16^d, and 16^e adapted to register with pins 17^a, 17^b, 17^c, 17^d, 17^e, and 17^f projecting from said view finder members. Each plate also has projecting therefrom a threaded pin 18^a, 18^b, 18^c, 18^d, and 18^e said pins being adapted to interchangeably pass through suitable holes 20^a, 20^b, 20^c, 20^d, and 20^e in any of the view finder members. Wing

nuts 19^a, 19^b, 19^c, 19^d, 19^e, and 19^f are provided for detachably holding said plates in position.

In Fig. 2 an auxiliary view finder member is illustrated having a two-part arm 21 comprising sections 21^a and 21^b which are capable of relative rotation. The arms 21^a and 21^b are pivotally secured together by a pivot bolt 22 and a clamping wing nut 23.

For the purpose of demonstrating how the views of an object may be swung into a single plane and vise versa into three coordinate planes, each view finder member is provided with means for holding a view sheet 24^a, 24^b, 24^c, or 24^d. One such holding means is shown in Figs. 7 and 8, and consists of a flanged rod 25^a which is adapted to pass through a suitable hole in the view sheet and fits within an elongated socket 28^a in the point end of the view finder member. The view sheet is held in place upon the flanged rod 25^a by a nut 26^a and a spider washer 27^a. Clamping screws 29^a, 29^b, 29^c, and 29^d are provided in each view finder member for releasably locking the view sheet units in position.

The preferred form of stand illustrated in Fig. 1 consists of a base 32, but it is within the spirit of the invention to substitute for said base suitable clamping means for attachment to the chalk rail of a blackboard or upon the edge of a shelf, table, etc. Projecting up from the base 32 is a vertical pivot rod 33 upon which a collar 34 is adjustably secured as by a thumb screw 35. Mounted to rotate on the collar 34 is a pivot block 36 having two pairs of oppositely extending hollow lugs 36^a and 36^b, said lugs having bolts 39^a and 39^b extending therethrough to form pivot bearings for a pair of forked frames 37^a and 37^b. The threaded ends of the bolts 39^a and 39^b are provided with clamping wing nuts 40^a and 40^b respectively.

In order to permit the stand to be readily transported from place to place, the top end of the rod 33 has a handle ring 38. The outer ends of the forked frames 37^a and 37^b are pivoted upon a pair of pins 39 and 40 respectively, said pins being carried in a suitable yoke 42.

By means of this construction, it will be evident that the yoke 42 may be rotated and also moved up and down while remaining at all times parallel to the pivot rod 33. The top of the yoke 42 has a threaded pin 42^a, which forms a pivot for the inner end of a slotted member 43 which is releasably secured upon said pin by a wing nut 44. The lower end of the yoke 42 has an unthreaded depending pin 45 which serves as a pivot for an angular member 46, the latter having the top of its vertical arm 46^a attached to the slotted member 43 by a squared bolt 52 and wing member 52^a.

In order to releasably hold anyone of the view finder members described above, a clamping member 47 is provided, said clamping member being adapted to rotate
 5 on a horizontal axis by means of a bolt 48, said member being held in adjusted position by a clamping wing nut 48^a. The clamping member 47 has a fixed lower jaw 48^b and a swinging upper jaw 49 hinged
 10 on a pin 49^a. The jaws are normally held apart by the pressure of a coiled spring 50 held on a rod 50^a, and said jaws are adapted to be forced toward each other to clamp a view finder member by a clamping wing
 15 nut 51.

It will be understood that the clamping jaws 48^b and 49 may hold any one of the view finder members in a vertical, horizontal, or inclined position.

20 The several view relationships employed in common practice may be obtained by various arrangements of the connecting arms and view finder members. For instance, Figs. 15 and 17 show two of these relationships. The arm arrangements corresponding to Figs. 15 and 17 are shown in Figs. 14 and 16 respectively.

In operation, assuming the parts are in the position shown in Fig. 1, to obtain the view relationship shown in Fig. 17, it is only necessary to disconnect the arm 5^c
 30 from the front view finder member 1 and attach it to the top view finder member 3. At the same time the arm 5^d is disconnected from the side of the side view finder member 2, and reconnected to the top thereof. The view position which will then be assumed by the arms 5^c and 5^d is shown by dotted lines 30 and 31 in Fig. 1. Now when
 35 the side view finder member is rotated about the pivot bolt 8^b to bring the side view into the plane of the top view, this side view will take the position relative to the top view shown in Fig. 17.

40 One advantage of this invention is that the device may either be held by hand, allowed to rest on the object, drawing board, or table, or be supported by a stand.

A further advantage of the present invention is that it may be arranged in the following ways: first, over the object for finding views thereof; second, over the drawing or picture of an object for finding views; third, over or against a plane surface such as a drawing board in either
 45 vertical, horizontal, or inclined position.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure but may be modified and embodied in various other forms without departing from its spirit. In short, the in-
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vention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new and for which it is desired to secure Letters Patent is:

1. In a mechanical drawing demonstrator, a pair of direction finder members, each of said finder members having an arm connected thereto, a common support for said arms, and means for rotatably connecting said arms to said support for permitting said arms to be rotated into a common plane.

2. In a mechanical drawing demonstrator, a pair of direction finder members, each of said finder members having an arm connected thereto, a common support for said arms, means for rotatably connecting said arms to said support for permitting said arms to be rotated into a common plane, and a stand for holding said finder members adjacent an object.

3. In a mechanical drawing demonstrator, a plurality of direction finder members, a plurality of arms connected to said finder members respectively, a support for said arms to hold said finder members in orthographic projection relationship, and means for rotatably connecting said arms to said support to permit said finder members to be rotated into parallelism.

4. In a mechanical drawing demonstrator, a plurality of direction finder members, means for holding said members in orthographic projection relationship, said finder members being pivoted to a corresponding number of arms and being rotatable into parallelism, all of said finder members being held as a unit on a suitable support.

5. In a mechanical drawing demonstrator, a plurality of direction finder members, means for holding said members in orthographic projection relationship, said finder members being pivoted to a corresponding number of arms and being rotatable into a position perpendicular to the plane of any view, all of said finder members being held as a unit on a suitable support, and means on said support for holding said unit in vertical and horizontal adjustment.

6. In a mechanical drawing demonstrator, a plurality of direction finder members, means for holding said members in orthographic projection relationship, said finder members being pivoted to a corresponding number of arms and being rotatable into a position perpendicular to the plane of any view, all of said finder members being held as a unit on a suitable support, and means on said support for holding said unit in vertical and horizontal adjustment, said means comprising the combination of a vertical rod, a block mounted to pivot on said rod, a pair of arms pivoted to said block,
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a yoke connected to said arms, and a clamping member secured to said yoke for engaging said unit.

7. In a mechanical drawing demonstrator, a plurality of direction view finder members, means connected to said view finder members for holding them perpendicular to the planes of the respective planes of projections, and means for adjustably connecting said view finder members together.

8. In a mechanical drawing demonstrator, a plurality of directional view finder members, said view finder members having arms connected therewith for holding them perpendicular to the respective planes of orthographic projection, a support, said arms being adjustably mounted in sliding guides carried by said support.

9. In a mechanical drawing demonstrator, a plurality of direction view finder members, means for holding said view finder members in space relationship so that each view finder member will be perpendicular to its respective plane of orthographic projection, said means being slidably and rotatably adjustable.

10. In a mechanical drawing demonstrator, a plurality of view finder members, a common support for said members, and means on each of said view finder members for holding a sheet representing the corresponding view.

11. In a mechanical drawing demonstrator, a plurality of direction and view finder members, each of said members having detachable view-sheet holder units, and means for holding each of said members at an angle of ninety degrees from its adjacent members.

12. In a mechanical drawing demonstrator, a plurality of view finder members, each of said members carrying an interchangeable view-sheet holding unit, supporting arms on each of said members, and a stand for interchangeably holding any one of said view finder members, said stand comprising a vertical rod, a block rotatably mounted on said rod, a pair of parallel supporting arms pivoted to said block, and means carried by said parallel arms for clamping upon any of said finder members.

13. In a mechanical drawing demonstrator, a plurality of view finder members, each of said members having a rod carried thereby for interchangeably holding a sheet representing a projection view.

14. In a mechanical drawing demonstrator, a plurality of view finder members, each of said members having a rod connected therewith, a nut for locking said rod whereby a sheet representing a projection view may be carried by said view finder member, means for holding said finder members in perpendicular planes having one vertical edge in common.

15. In a mechanical drawing demonstrator, a plurality of direction view finder members, each of said members having means secured thereto for holding a sheet representing a projection view, said members being connected by arms, said arms being pivotally and slidably connected together, whereby said finder members may be swung into a position perpendicular to a common plane.

16. In a mechanical drawing demonstrator, a plurality of direction view finder members, each of said members having a slotted arm connected therewith, said slotted arms being pivotally mounted in a guiding member, whereby said finder members may be rotated into a position perpendicular to a common plane.

17. In a mechanical drawing demonstrator, a plurality of directional view finder members, each of said members having clamping means for detachably and interchangeably holding a sheet representing a projection view, and means for holding said view-sheets in orthographic relationship to each other.

18. In a mechanical drawing demonstrator, a plurality of view finder members, slotted arms connected to said members for holding said members at right angles to each other, said arms being pivotally mounted on a common support, whereby said view finder members may be rotatably and slidably adjusted.

In testimony whereof, I have affixed my signature to this specification.

ROBERT F. ASHBROOK.