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C. W. MERRIAM, JR
MANEUVERING BOARD ATTACHMENT

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FIG. 1

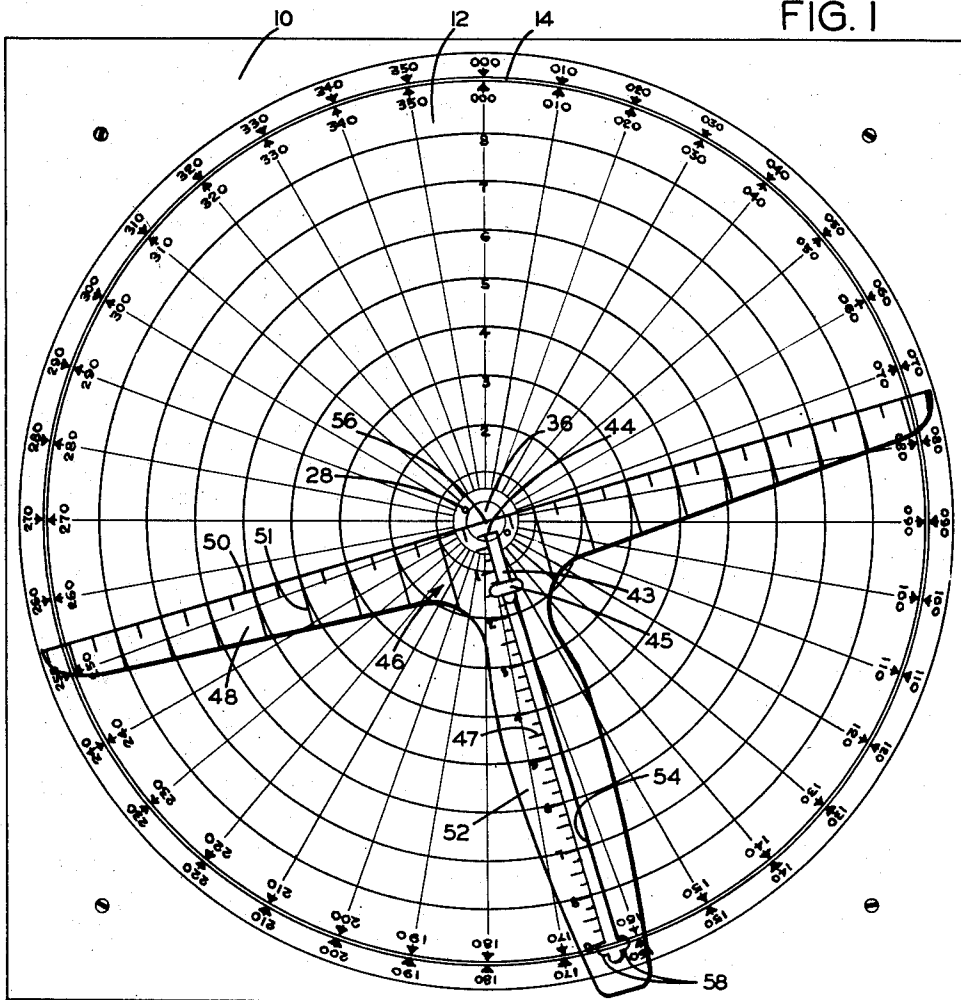


FIG. 2

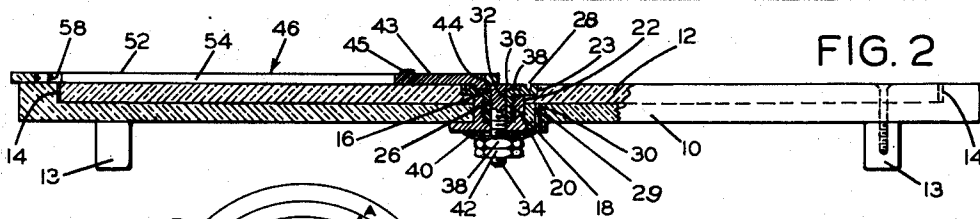
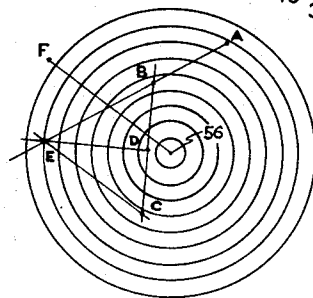


FIG. 3



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MANEUVERING BOARD ATTACHMENT

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3 Claims. (Cl. 33-76)

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This invention relates to maneuvering boards and more particularly to an attachment therefor for facilitating and expediting the plotting and indicating of the most direct course for interception of a moving target.

It is an object of the present invention to provide a conventional type of maneuvering board such as is used aboard a ship with a simple and effective attachment by means of which the user of the board may easily and expeditiously determine the shortest possible course for effecting the interception of a moving target.

It is another object of the invention to provide an attachment of this character which is adapted to be mounted on presently existing maneuvering boards with but a few, simple modifications thereto.

With the above and other objects and features in view, the invention will now be described with reference to the accompanying drawings which illustrate a preferred embodiment of the invention and will be pointed out in the claims.

In the drawings:

Fig. 1 is a top plan view of a maneuvering board with the attachment applied thereto;

Fig. 2 is a sectional elevation thereof; and

Fig. 3 is a diagrammatic view illustrating the operation of the device.

The conventional maneuvering board comprises a frame 10 and a disc 12, the frame being mounted on legs 13. The frame and disc are preferably made of transparent plastic material. The frame is recessed as at 14 to receive the disc 12 with its upper surface lying flush with the upper surface of the frame. The disc is marked with a plurality of concentric circles in spaced relation to indicate range. The disc is also marked with a series of lines extending radially from its center to its periphery and spaced from each other by 10°. At the outer ends of these lines designations of the number of degrees starting from 000 are marked successively around the disc. Corresponding relative bearing designations are marked on the surface of frame 10 around the portion adjacent to the recess 14.

The disc is rotatably mounted centrally in the frame on the periphery of a bushing comprised of upper and lower sections 16 and 18, respectively. The lower section 18 has a flanged head that engages the undersurface of the frame 10 and has an upwardly extending shank 20 that is inserted within a bore 22 provided centrally of the frame. The upper section 16 of the bushing, likewise has a flanged head that enters within a recess 23 provided centrally of the disc 12. A depending shank 26 on the upper section 16 is externally threaded and is screwed into an internally threaded bore of the shank 20. Openings 28 are provided in the upper surface of the head of the upper section 16 for

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receiving a spanner wrench to facilitate the assembling operation. When the parts are assembled, the recessed portion 23 of the disc 12 has just sufficient clearance between the undersurface of the flanged head of the section 16, the outer surface of the shank 20, and the upper surface of the frame 10 to permit of its free rotary movement in the frame. An upstanding pin 29 secured in the flanged head of the section 18 extends into an opening 30 in the frame 10 to hold the sections 16 and 18 stationary.

Centrally of the sections 16 and 18 is a bore 32 for receiving a stud 34. The stud 34 is provided at its upper end with a circular flange 36 that is received within a recess 38 provided in the upper surface of the flanged head of section 16. The depth of the recess 38 accommodates the flange 36, so that its upper surface lies flush with the surface of the disc 12. The lower end of the stud 34 has threaded thereon an adjusting nut 38 bearing against an interposed friction spring 40. By adjusting the nut 38, a proper degree of friction is maintained upon the stud and disc 36 to permit the latter to be freely rotatable and yet held frictionally in any position to which they may be adjusted relative to the disc 12 and frame 10. A lock nut 42 bearing against the adjusting nut 38 serves to hold the adjustment secure.

An upstanding, radially extending, support or arm 43 is formed integral with the flange 36. The inner end 44 of this arm is offset from the center of the stud a slight distance. Adjacent to the outer end of the arm 43 is a transversely disposed retaining member or lug 45 formed so that the under-surface of its outwardly projecting portions lie flush with the upper surface of the arm proper.

A T square 46, also preferably made of transparent plastic material, is arranged for mounting on the arm 43. The crosshead 48 of this T square is formed with an external straightedge 50 having a measuring scale 51 marked thereon. The leg 52 of the T square is provided with a slot 54 centrally thereof that extends substantially throughout its length and partially into the crosshead 48. The width of the slot 54 is substantially the same as the width of the arm 43 so that the T square may be mounted thereover with just sufficient clearance to provide for sliding movement of the T square axially of the arm 43. The arm serves to guide the direction of movement of the T square as it is slid toward or away from the center 56 of the maneuvering board. The distance between the inner end of slot 54 and the straightedge 50 corresponds exactly with the distance between the end 44 of the arm 43 and the center 56. Hence, when the inner end of the slot is brought to a position where it abuts against the

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end 44, the straightedge 50 intersects exactly the center 56 of the board.

Adjacent to the outer end of the slot 54 there are provided a pair of oppositely disposed enlargements 58, the contours of which correspond to the configuration of the outwardly projecting portions of the lug 45. Therefore, to mount the T square upon the maneuvering board, it is only necessary to align the enlarged portions 58 with lug 45 whereupon the T square will drop over the arm 43 and lie with its undersurface in sliding contact with the upper surface of the disc 12. Now, upon sliding the T square to a position where the enlarged portions 58 are out of alignment with the lug 45, the undersurface of the outwardly projecting portions of the latter will lightly engage the upper surfaces of the leg 52 of the T square at the portions thereof lying adjacent to the opposite sides of the slot 54. The upper surface of the leg 52 of the T square has marked thereon, adjacent to the slot 54, a measuring scale 47 from which can be determined the distance between the straightedge 50 and the center 56 for a purpose which will hereinafter appear.

Referring to Fig. 3, wherein is shown a typical illustration of the use of the maneuvering board with the attachment thereon, the spot A represents the initial fix which has been taken on an enemy plane, by radar or other means, and plotted upon the board as to range and bearing. A second fix B, of the enemy plane is similarly plotted upon the board. A third fix C, on a friendly plane, is similarly taken and plotted upon the board. The straightedge 50 of the T square 46 is placed on fixes A and B and the line of sight so established, is projected as a line upon the board. Straightedge 50 is then positioned on points B and C and the mid-point D is established and marked upon the board by the use of the measuring scale 51. The T square 52 is then positioned so that one of the lines of the measuring scale 51 of the straightedge 50 is placed parallel to the line BC and, at the same time, the straightedge passes through point D. This permits the erection of a line perpendicular to BC at mid-point D. This perpendicular will cross line AB extended, at E. Line EC is then the hypotenuse of a triangle CDE and is equal to the hypotenuse EB of the triangle EDB. Then with the straightedge 50 on EC the T square is moved axially of the arm 43 to a position where the straightedge 50 passes through the center 56 of the maneuvering board. The line 56F is parallel to line CE, and is, therefore, the course to be taken by the friendly plane starting from point C.

A basically similar geometric construction can be made for a friendly plane starting from a point over the center point 56, said construction employing the use of the measuring scale 47 and the slot 54.

It will be understood that the foregoing assumes that the friendly plane is capable of traveling at a speed equal to the enemy plane and, moreover, it is manifestly necessary that the angle EBC be sufficiently less than 90° to permit the course to be followed by the friendly plane from point C, to be such as to intersect the "AB extended," within the confines of the maneuvering board.

The invention described herein may be manufactured and used by or for the Government of the United States of America for government

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purposes without the payment of any royalty thereon or therefor.

Having described the invention what is claimed as novel and desired to be protected by Letters Patent of the United States is:

1. An attachment for a maneuvering board comprising, a T square formed of uniformly flat transparent material having an elongated slot lengthwise of its leg and being formed with a straightedge on its crosshead, said slot having a pair of oppositely disposed enlargements therein, a stud adapted to be rotatably mounted centrally of said maneuvering board, an arm extending radially of said board and horizontally disposed on said stud, said arm being of a width that is just sufficient to fit with sliding clearance within said slot, a transversely extending lug on said arm in nonrotatable relation therewith of a size and shape to receive the enlarged portion of said slot, whereby the square may be mounted on said arm by aligning the enlarged portion of said slot with said lug and whereby the square may thereafter be removably retained on said arm by sliding the square so that said lug engages the upper surfaces of those portions of the square lying adjacent to the opposite sides of said slot.

2. A maneuvering board comprising, in combination, a frame, a disc centrally supported within said frame, said frame and disc being marked with correlated range and bearing designations, a hollow bushing centrally secured to said frame and extending through and rotatably securing said disc to said frame, a stud rotatably disposed within said bushing, frictional means for restraining rotation of said stud relative to said frame, an elongated arm on said stud extending radially therefrom in spaced relation from the center of said stud and disposed over and in contacting relation with said disc, a T square formed of uniformly flat transparent material and including a leg and a crosshead, said crosshead being formed with a straight edge, said leg being formed with a lengthwise slot and fitted on said arm in nonrotatable relationship therewith, said arm being in slidable relation with the walls of said slot, said T square being supported on said arm in contacting and slidable relation with said disc and said frame.

3. Apparatus as in claim 2 and including means on said arm for arresting the T square against further movement when said straightedge has been brought to a position where it intersects the center of said disc.

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