May 25, 1954 J. A. MORRIS ET AL 2,679,163

PLUG-IN PITOT-STATIC TUBE

Filed March 3, 1953

Fig. 1.

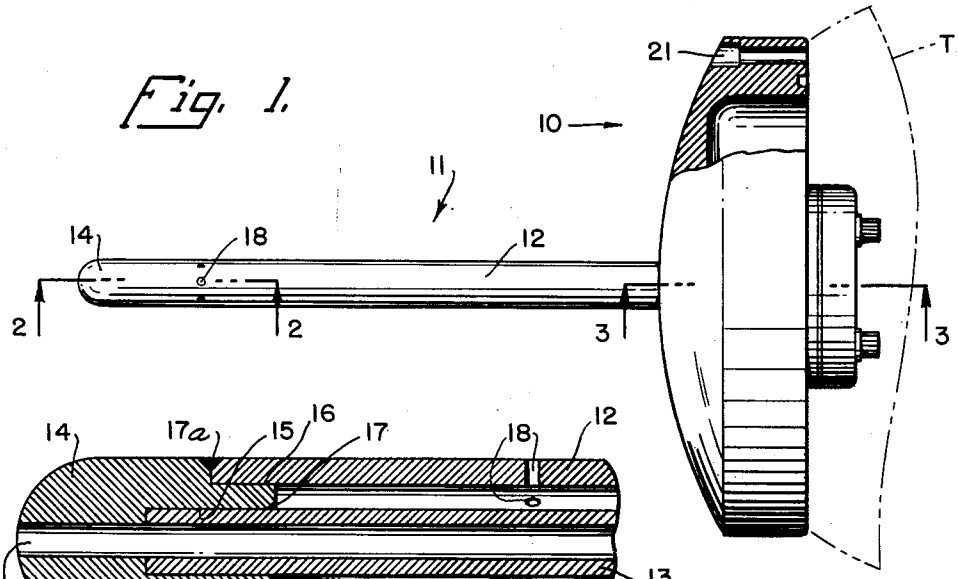


Fig. 2.

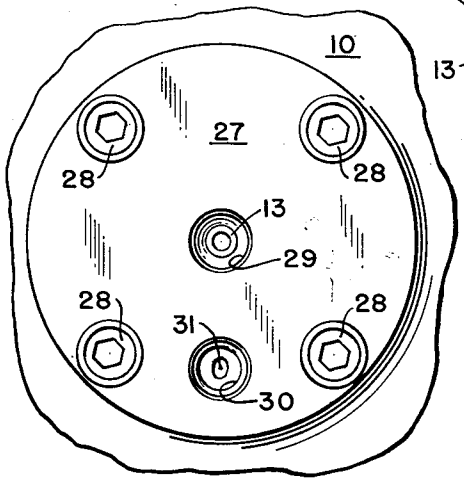


Fig. 4.

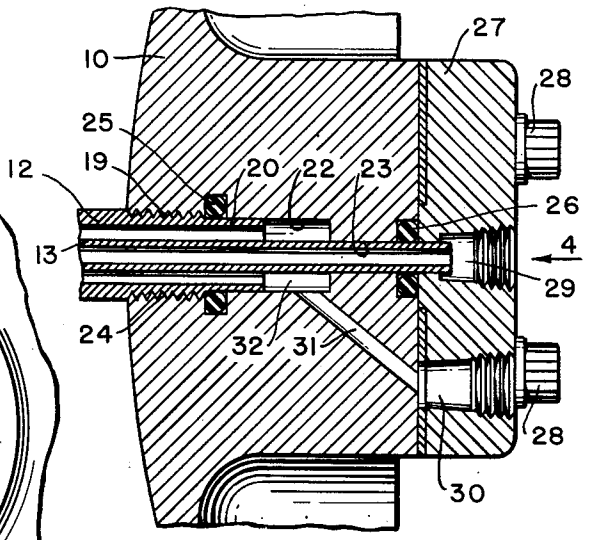


Fig. 3.

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PLUG-IN PITOT-STATIC TUBE

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1 Claim. (Cl. 73—212)

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This invention relates to improvements in Pitot tubes.

When a water test run of a torpedo is to be made it is common practice to provide it with a Pitot tube for obtaining the static and dynamic water pressures along its run, these pressures being communicated to suitable instruments which record data from which velocity and/or depth of submergence of the torpedo may be determined. When the torpedo is retrieved, considerable care must be exercised in handling the torpedo to prevent breakage of the Pitot tube, which is quite fragile. This careful handling and possible breakage of the Pitot tube could be obviated if the Pitot tube could be readily removed from the torpedo prior to retrieving. This has not been practical, however, since the Pitot tubes formerly employed required opening of the torpedo to disconnect them or otherwise required the disconnection of cumbersome pipe fittings. It will now become apparent that the provision of a Pitot tube which could be readily attached to a torpedo prior to a test run, and readily detached from the torpedo at the end of its run and prior to retrieving it, would advantageously facilitate the retrieving operation.

One of the objects of the invention is to provide a Pitot tube assembly which may be readily attached and detached from its carrying support.

Another object is to provide a novel carrying support for the Pitot tube assembly.

Another object is to provide a novel Pitot tube and carrying support for use on torpedoes.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 is a side elevation of the subject of the invention, a portion being broken away, the forward end of a torpedo being shown by dotted lines;

Fig. 2 is an enlarged section taken on line 2—2, Fig. 1;

Fig. 3 is an enlarged fragmentary section taken on line 3—3, Fig. 1; and

Fig. 4 is a rear elevation of Fig. 3 as viewed in the direction of arrow 4.

Referring in detail to the drawing, the invention comprises, in general, a support member 10 and a Pitot tube assembly 11. The Pitot tube assembly comprises a pair of circular tubes 12, 13 which are secured in concentric relationship by a head member 14, the latter having a bore 15

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for receiving the forward end of tube 13, a velocity pressure communicating bore 15a communicating with the bore of tube 13, and a concentric surface 16 thereon over which the forward end of tube 12 telescopes. Braze or solder joints 17, 17a permanently retain this assembly together. Tube 12 is provided with external threads 19 near its rear end, the tube also being machined circular to the root diameter of the threads to provide a tubular unthreaded portion 20 between the threaded portion and the rearmost end of the tube. A plurality of angularly spaced apertures 18 are provided in tube 12 intermediate its ends which communicate ambient static pressure to the space between tubes 12, 13.

Pitot tube support member 10, which also forms a closure for the forward end of torpedo T, is secured to the latter by a plurality of angularly spaced cap screws (not shown) which extend through angularly spaced apertures 21 and threadedly engage the torpedo. A central portion of this member is provided with concentric bores 22, 23, the former telescopically receiving unthreaded portion 20 of the tube 12 and the latter similarly receiving a portion of tube 13. Bore 22 is also provided with a threaded portion 24 which threadedly receives threads 19 on tube 12. An O seal ring 25, disposed in a suitable annular channel in member 10 surrounds unthreaded portion 20 and a similar seal ring 26 surrounds tube 13 near its rear end.

A plate 27 is secured to the rear face of member 10 by a plurality of cap screws 28, this plate being provided with a threaded opening 29 which communicates with tube 13, and another threaded opening 30 which communicates with the annular space between the tubes through a drilled port 31 and annular space 32. The threaded openings just referred to are provided with suitable pipe couplings (not shown) to communicate the tubes with conduits extending to the recording instrumentation.

In the use of the device, the rear end of the Pitot tube assembly is applied to the concentric bores in the Pitot tube support member and rotated until disposed in the position shown. At the end of the run, and prior to retrieving the torpedo, the Pitot tube assembly is rotated in the opposite direction and removed from the support member. As will be apparent, both of the procedures may be quickly performed without disturbing any of the more permanent connections between the Pitot tube assembly and the instrumentation.

Obviously many modifications and variations

of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claim the invention may be practiced otherwise than as specifically described.

What I claim is:

In torpedo apparatus for measuring fluid pressures, comprising; a support member forming a closure for the front end of a torpedo, a Pitot tube assembly projecting forwardly from a front face of said member including a cylindrical velocity pressure tube and a cylindrical static pressure tube surrounding same in concentric spaced relationship, the rear end of the static pressure tube having a portion of reduced diameter and a threaded portion between said portion of reduced diameter and the remainder thereof, the velocity pressure tube having a portion extending rearwardly beyond the rear end of the static pressure tube, said member having a first threaded bore for detachably receiving said threaded portion and a second unthreaded bore for receiving said portion of reduced diameter, said second bore also providing an annular space adjacent the rear end of the

static pressure tube, a third bore in said member disposed axially of the first and second named bores adapted to telescopically receive a portion of the velocity pressure tube extending beyond the rear end of the static pressure tube, a pipe connection disposed at a rear face of said member in axial alignment with said velocity pressure tube, a pipe connection disposed at a rear face of said member in non-axial alignment with said static pressure tube and to one side of the first named connection, and a conduit in said member communicating the last named pipe connection with said annular space.

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