United States Patent [19]

Joseph

[11] **3,740,706**

[45] **June 19, 1973**

[54] **TRANSDUCER MOUNTING APPARATUS**

[75] Inventor: **Sebastian J. Joseph,** Jerseyville, Ill.

[73] Assignee: **Specialized Electronics, Inc.,** Greenville, Miss.

[22] Filed: **Sept. 28, 1971**

[21] Appl. No.: **184,349**

[52] **U.S. Cl.** ..... **340/8 S,** 310/9.1

[51] **Int. Cl.** **H04b 13/00**

[58] **Field of Search** ..... 340/8 S; 310/9.1

[56] **References Cited**

UNITED STATES PATENTS

2,646,950	7/1953	Nelson et al.	340/8 S
3,027,539	3/1962	Stillman, Jr.	340/8 S
2,837,727	6/1958	Mayes	340/8 S

FOREIGN PATENTS OR APPLICATIONS

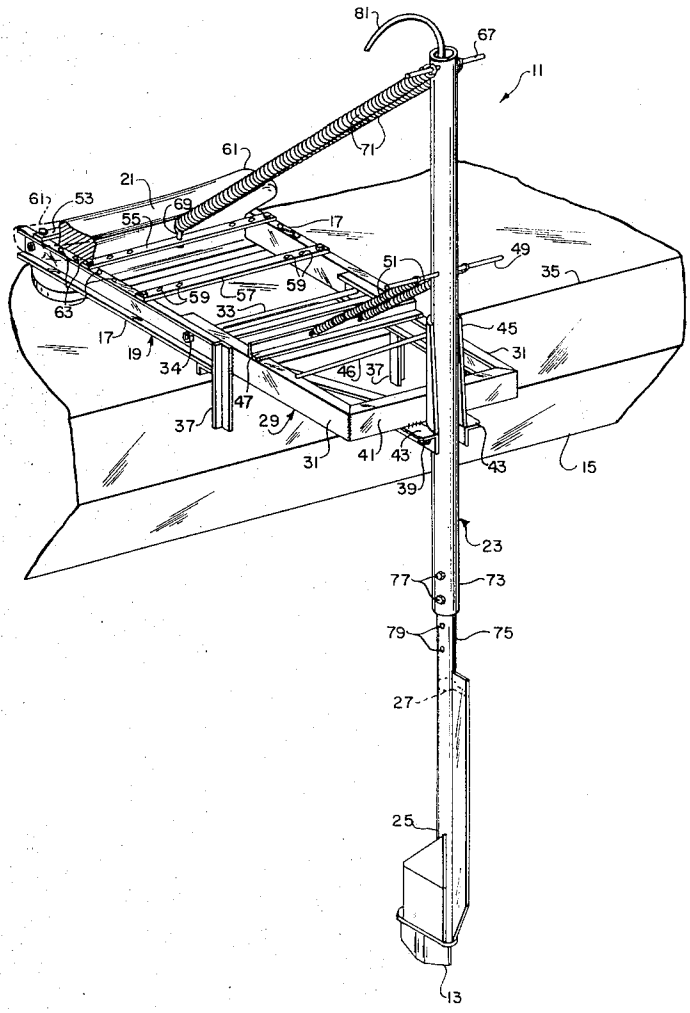
1,075,989	2/1960	Germany	340/8 S

Primary Examiner—Benjamin A. Borchelt
Assistant Examiner—H. J. Tudor
Attorney—Koenig, Senniger, Powers and Leavitt

[57] **ABSTRACT**

Apparatus for mounting a marine hydrophone transducer or the like on a water-borne vessel. An elongate boom has one end adapted for carrying the transducer and for extension into the water. A base is adapted to be secured to the deck of the vessel adjacent one edge of the deck. The boom is pivotally connected to the base for pivoting movement between a retracted position with the boom out of the water and an extended position with the boom positioning the transducer below the surface of the water. When extended the boom can pivot also in response to being struck.

6 Claims, 4 Drawing Figures

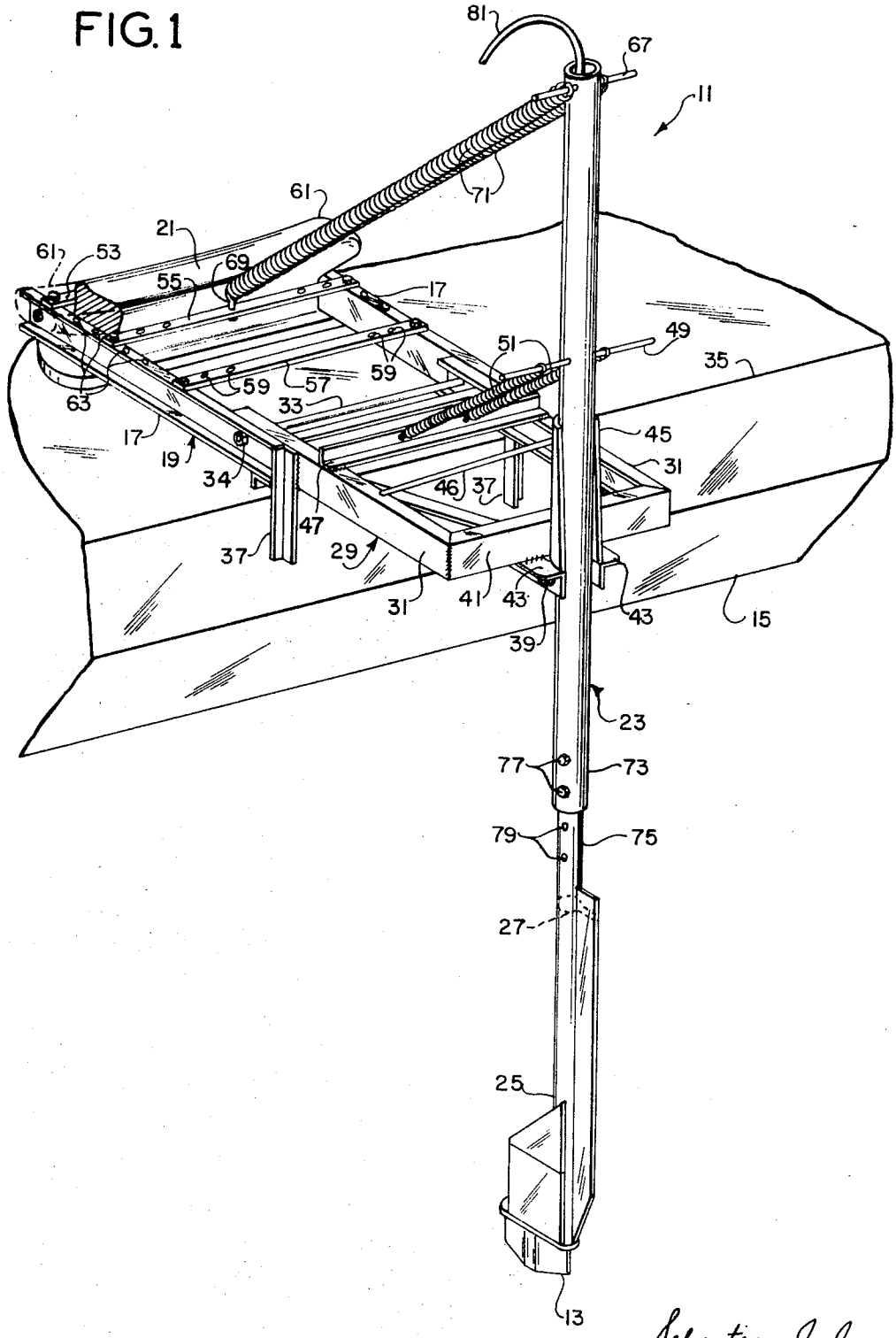


PATENTED JUN 19 1973

3,740,706

SHEET 1 OF 2

FIG. 1



Sebastian J. Joseph,
Inventor.
Koenig, Senniger,
Powers and Leavitt,
Attorneys.

FIG. 2

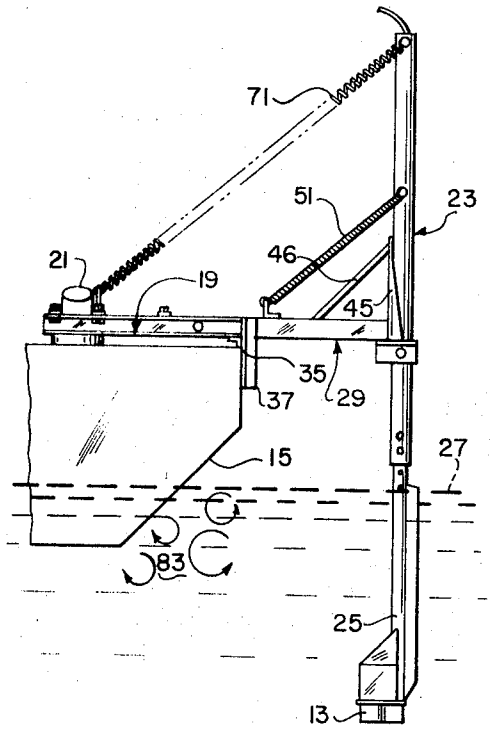


FIG. 3

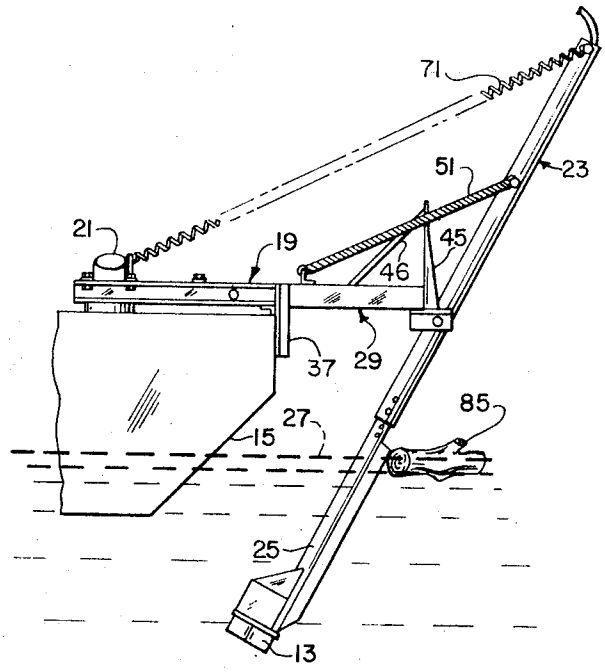
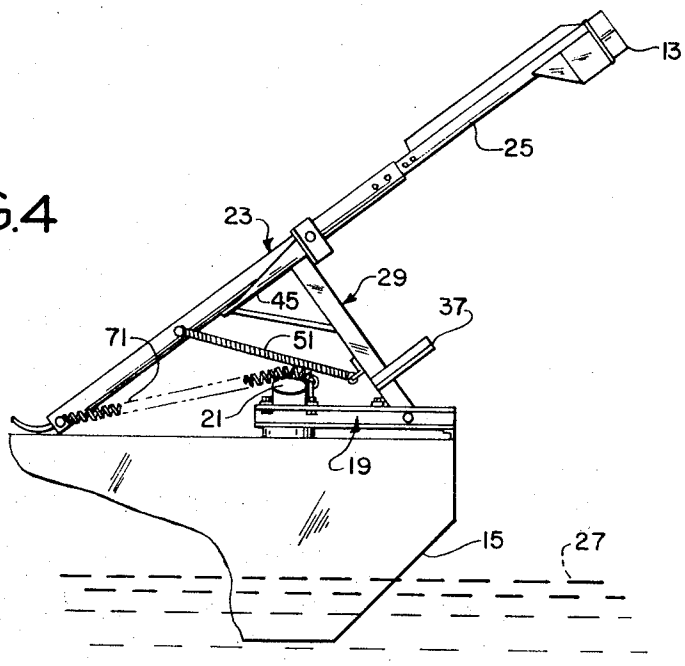


FIG. 4



TRANSDUCER MOUNTING APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to the use of marine hydrophone transducers and more particularly to apparatus for mounting such a transducer or the like on a water-borne vessel such as a river towboat barge.

A fathometer is sometimes employed when barges are pushed by a river towboat. Such a fathometer includes a hydrophone transducer which is positioned below the surface of the water for measuring water depth, preferably at "the head of the tow," i.e., the bow of the head barge of a string of barges so that a depth measurement can be obtained prior to the barges passing over the measurement point. However, it is desirable that water turbulence associated with the bow of a barge as it passes through the water not disturb the transducer so as to cause erroneous indications. Such turbulence disturbance can be avoided if the transducer is spaced well ahead of the barge. At the same time, it is important that provision be made for removing the transducer from the water and stowed or retracted to a safe position in which it does not interfere with other operations involving the barge on which it is mounted. Further, it is desirable not only to be able to adjust the transducer's depth but also to readily transfer the transducer to another barge. Prior art transducer mounting arrangements have not fully satisfied these several objectives and, in addition, have permitted damage to the transducer if struck by drift or other obstructions in the water.

SUMMARY OF THE INVENTION

Among the several objects of the invention may be noted the provision of improved apparatus for mounting a marine hydrophone transducer or the like on a water-borne vessel; the provision of such apparatus particularly useful for mounting a transducer on a towboat barge; the provision of such apparatus which spaces the transducer well away from the vessel to avoid water turbulence effects; the provision of such apparatus which readily and quickly allows the transducer to be lowered into the water and to be withdrawn from the water and retracted to a safe position; the provision of such apparatus readily facilitating a change in the depth to which the transducer is immersed; the provision of such apparatus which is easily installed, removed or transferred to another vessel and which is adjustable to permit use thereof in conjunction with various sizes of fittings such as cavels or timberheads; the provision of such apparatus which is not itself prone to damage nor permissive of damage to the transducer in response to being struck by drift or other obstructions; and the provision of such apparatus which is relatively easily and inexpensively constructed. Other objects and features will be in part apparent and in part pointed out hereinafter.

Briefly, apparatus of the present invention for mounting a transducer on a towboat barge or other vessel comprises an elongate boom having one end adapted for carrying the transducer and for extension into the water. By engaging a cavel or timberhead, a base is adapted to be secured to the deck of the vessel adjacent one edge of the deck. An arm pivotally connects the boom to the base for pivoting movement of the boom between a retracted position in which said one end of the boom is out of the water and an extended position

in which said one end of the boom extends into the water for positioning of the transducer below the surface of the water. The arm is pivotally connected to the base generally at the deck edge thereby to space the boom from the deck edge when in extended position. The boom is pivotally connected to the arm and, when extended, is urged by springs toward a generally vertical position but can pivot in response to obstructions striking the boom or the transducer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of transducer mounting apparatus of the invention, showing a transducer and a portion of a vessel to which the apparatus is secured;

FIG. 2 is a side view of the apparatus showing a certain boom thereof in normal extended vertical position with the transducer positioned below the water surface;

FIG. 3 is a side view similar to FIG. 2 but illustrating pivoting action of the boom in response to being struck by water-borne drift; and

FIG. 4 is another side view of the apparatus illustrating a retracted position of the boom.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and particularly to FIG. 1, transducer mounting apparatus of the invention is illustrated generally at **11**. A conventional marine hydrophone transducer **13** for a fathometer, as used for water depth measurement, is mounted by apparatus **11** to a water-borne vessel **15**. Here, vessel **15** is represented as a barge of the type pushed by a river towboat or the like. Apparatus **11** is secured to the deck of barge **15** at its bow by engagement of a spaced pair of parallel side frame members **17** of a base (generally designated **19**) of apparatus **11** with a cavel or timberhead **21**. Such cavels are conventionally located adjacent the deck edge of barges and the like and are employed for relaying ropes or cables, as for securing such barges together or to a towboat. It will be understood that the dimensions and location on the vessel's deck of such cavels or timberheads may be subject to variation.

Apparatus **11**, whose several elements are preferably of aluminum or steel suitably welded or bolted together, includes an elongate tubular boom designated generally **23**. Boom **23** is shown in an extended position in which one end **25** thereof constituting a transducer foot assembly extends into the water for positioning of transducer **13** below the surface of the water. The water level is represented by a dashed line indicated at **27**. The foot assembly **25** (including transducer **13**) may be of a commercially available construction.

Boom **23** is pivotally connected to base **19** by an arm generally designated **29**. Arm **29** comprises a spaced pair of parallel side frame members **31** which are connected to frame members **17** of base **19** by means of a rod **33** (secured by bolts **34** at its ends) serving as a pivot permitting pivoting movement of boom **23** between the extended position shown and a retracted position thereof (see FIG. 4) in which the end **27** of the boom carrying transducer **13** is out of the water. Dimensions of the apparatus are such that pivot rod **33** is generally at or closely adjacent the edge **35** of the barge

deck and arm 29 spaces boom 23 a distance out in front of deck edge 35 to avoid turbulence associated with passage of the barge through the water.

Welded or otherwise secured to each of arm side members 31 are short extensions 37 which, as shown, may be of L-shaped stock. Extensions 37 extend downward from arm members 31 adjacent deck edge 35 to engage the side of the barge and thus limit downward pivotal movement of arm 29 with respect to base 19 with boom 23 in the extended, generally vertical, position shown.

Boom 23 is also pivotally attached near its midpoint to arm 29 by means of a pivot bolt or rod 39. A cross-brace member 41 of the arm assembly rigidly maintains the side members 31 in spaced relationship. Extending forward from brace 41 are a pair of L-shaped bracket extensions 43. Boom 23 is carried between these two extensions 43 by pivot bolt 39. An upwardly extending collar 45 welded to extensions 43 limits pivotal movement of boom 23 with respect to arm 29 to prevent boom end 25 carrying transducer 13 from moving away from the barge 15 but permits pivotal movement toward the barge. Thus collar 45 serves as a stop member. Stiffeners 46 extend between arm side members 31 and the top of collar 45.

Another cross-brace 47 also extends between arm side members 31. A rod 49 passes through the upper portion of boom 23 above the top edge of collar 45 at a point generally intermediate pivot 39 and the upper end of boom 23. A pair of tension springs 51 are secured between cross-brace 47 and rod 49 at the opposite sides of the boom for the purpose of resiliently urging boom 23 in engagement with collar 45.

Base 19 similarly includes bar-like cross-braces 53, 55 and 57 for maintaining the parallel frame side members 17 in adjustably spaced relationship on opposite sides of cavel 21. Each of cross-braces 53, 55 and 57 includes a plurality of apertures spaced at intervals from the ends, such as those indicated at 59 on cross-brace 57. These cross-braces are bolted to frame members 17 through such apertures selected so that frame members 17 are spaced apart just sufficient to pass on opposite sides of the cavel 21 but under the ears or ends 61 of the cavel.

It is also to be noted that frame members 17 are provided with spaced apertures as indicated at 63 to permit adjustment of the spacing between cross-braces 53 and 55 and between these two cross-braces and deck edge 35. Further, bolts 34 at the ends of pivot rod 33 facilitate disassembly and adjustment of the spacing of side members 17. Thus, as will be seen, the spacing of the various members of base 19 can readily be adjusted to accommodate different sizes and deck locations of cavels or timberheads.

At the upper extremity of boom 23 a rod 67 passes through the boom. Secured between rod 67 at the opposite sides of boom 23 and an eyebolt 69, passing through the midpoint of cross-brace 55, are a pair of tension springs 71. Springs 71 assist springs 51 in resiliently urging boom 23 in engagement with collar 45 and also facilitate lifting of boom 23 by pivoting of arm 29 on pivot 33 for movement of the boom to its retracted position.

The depth of transducer 13 below water level 27 is adjustable by virtue of a telescoping arrangement. It may be seen that the main portion of boom 23 constitutes a first tubular element 73 while foot portion 25 comprises a second tubular element 75 which is fitted within element 73 in telescopic relationship. Bolts 77 adjustably secure elements 73 and 75 together, there being additional apertures as indicated at 79 in element 75 for providing different levels of adjustment. Thus the depth of transducer 13 below water 27 may be readily varied. A cable 81 for connecting transducer 13 to fathometer apparatus extends through the boom.

As an alternative arrangement for depth adjustment, boom 23 can be provided with conventional adjustable ring-type clamps. Such clamps may be used to secure boom 23 to pivot 39 and to secure the sets of springs 51 and 71 to the upper portion of the boom at the same general locations as they are shown attached to rods 49 and 67. Such clamps may then be loosened to permit vertical adjustment of the boom for variation in the depth of transducer 13.

FIG. 2 shows that boom 23 in its extended position is generally vertical with the boom and transducer 13 spaced by arm 29 generally well ahead of deck edge 35 of vessel 15 thereby substantially avoiding any effects of water turbulence or eddies 83 caused by passage of vessel 15 through the water. FIG. 3 illustrates pivoting action of boom 23 in response to being struck by water-borne drift such as a log obstruction 85 shown striking foot assembly 25 of the boom. As the boom pivots in this manner, the drift is shed by the inclined boom without damaging either transducer 13 or the boom and the boom then returns with urging of springs 51 and 71 to its vertical position as shown in FIG. 2.

In FIG. 4, boom 23 is shown in its retracted position to which it is quickly and easily raised with the aid of springs 71. In this position, boom 23 and transducer 13 are safely out of the way (as is desirable where the bow is to engage another vessel or be run against a shore line, river bank, or the like). Also, transducer 13 can be easily inspected or replaced, etc., when boom 23 is in the retracted position shown.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Apparatus for mounting a marine hydrophone transducer or the like on a water-borne vessel, comprising a base to be secured to the deck of said vessel adjacent one edge of said deck, an elongate boom having one end for carrying said transducer and for extension into the water, means pivotally mounting said boom relative to the base for swinging of the boom between a retracted position in which said one end of the boom is clear of the water and an operating position in which said one end of the boom extends into the water thereby to position the transducer below the surface of the water, said mounting means comprising an arm pivotally connected at one end thereof to the base, said boom being pivotally mounted on the other end of said arm, said arm being swingable between a raised position in which said boom is in its retracted position and a lowered position in which with said boom in its operative position said transducer is spaced from said vessel a distance sufficient to avoid the effects of water turbu-

lence on the transducer as the vessel passes through the water, a stop carried by the arm engageable by the boom thereby to prevent said one end of the boom from swinging away from said vessel when said boom is in its operating position, and spring means for resiliently urging said boom toward said stop, said boom, when in its operating position, being swingable from its operating position toward said vessel in response to water-borne drift or the like striking the boom thereby to prevent damage to said boom and transducer carried thereby, said spring means then returning said boom to its operating position.

2. Apparatus as set forth in claim 1 wherein said base comprises a spaced pair of generally parallel side members and means for maintaining said side members in adjustably spaced relationship on opposite sides of a cavel or the like adjacent said deck edge and extending generally to said deck edge.

3. Apparatus as set forth in claim 2 wherein said arm comprises a spaced pair of generally parallel side members and means for maintaining said side members in spaced relationship.

4. Apparatus as set forth in claim 1 wherein said boom is pivotally connected to said arm at a point intermediate the ends of the boom, said boom, when in its operating position and engaging said stop, being generally vertical.

5. Apparatus as set forth in claim 4 wherein said spring means comprises a first tension spring means interconnected between said boom and said arm and a second tension spring means interconnected between said boom and said base, said second tension spring means assisting said first tension spring means in resiliently urging said boom into engagement with said stop and facilitating swinging of said arm from its lowered position to its raised position for moving the boom from its operating position to its retracted position.

6. Apparatus as set forth in claim 4 wherein said boom includes a first tubular element and a second tubular element slidable in telescopic relationship with respect to said first element and means adjustably securing said elements together whereby the depth of said transducer below water surface may be varied.

* * * * *