United States Patent

Osmundson

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[54] BOAT HOIST

[72] Inventor: **Bradley M. Osmundson,** 400 Broadway, Webster City, Iowa 50595

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[52] **U.S. Cl.** .....**9/34,** 61/48, 214/1 A

[51] **Int. Cl.** **B63b 23/02**

[58] **Field of Search** .....9/30, 31, 34, 35, 36, 38, 39, 9/41; 214/1 A; 74/521

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Primary Examiner—Trygve M. Blix

Attorney—Morton S. Adler

[57] **ABSTRACT**

A boat hoist for launching a boat and for removing it from the water. This hoist includes a scissor-type extensible and retractable arm assembly connected at one end to a support platform for a boat. The entire supporting structure for the hoist is mounted upon the shore and the other end of the scissor assembly is operatively secured to the shore mounted support. The extension of the scissor assembly projects the boat platform over the water and to a prescribed depth therein and the retraction of the arms elevates the boat platform from the water towards the shore support where the boat can be maintained in a docked position free of the water.

8 Claims, 11 Drawing Figures

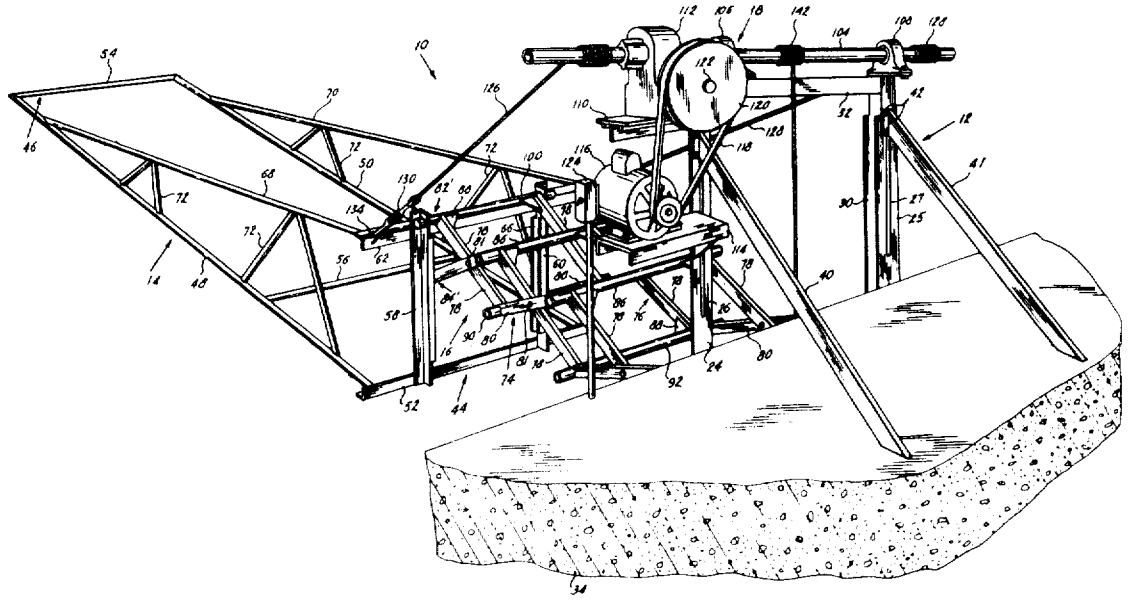


FIG. 1

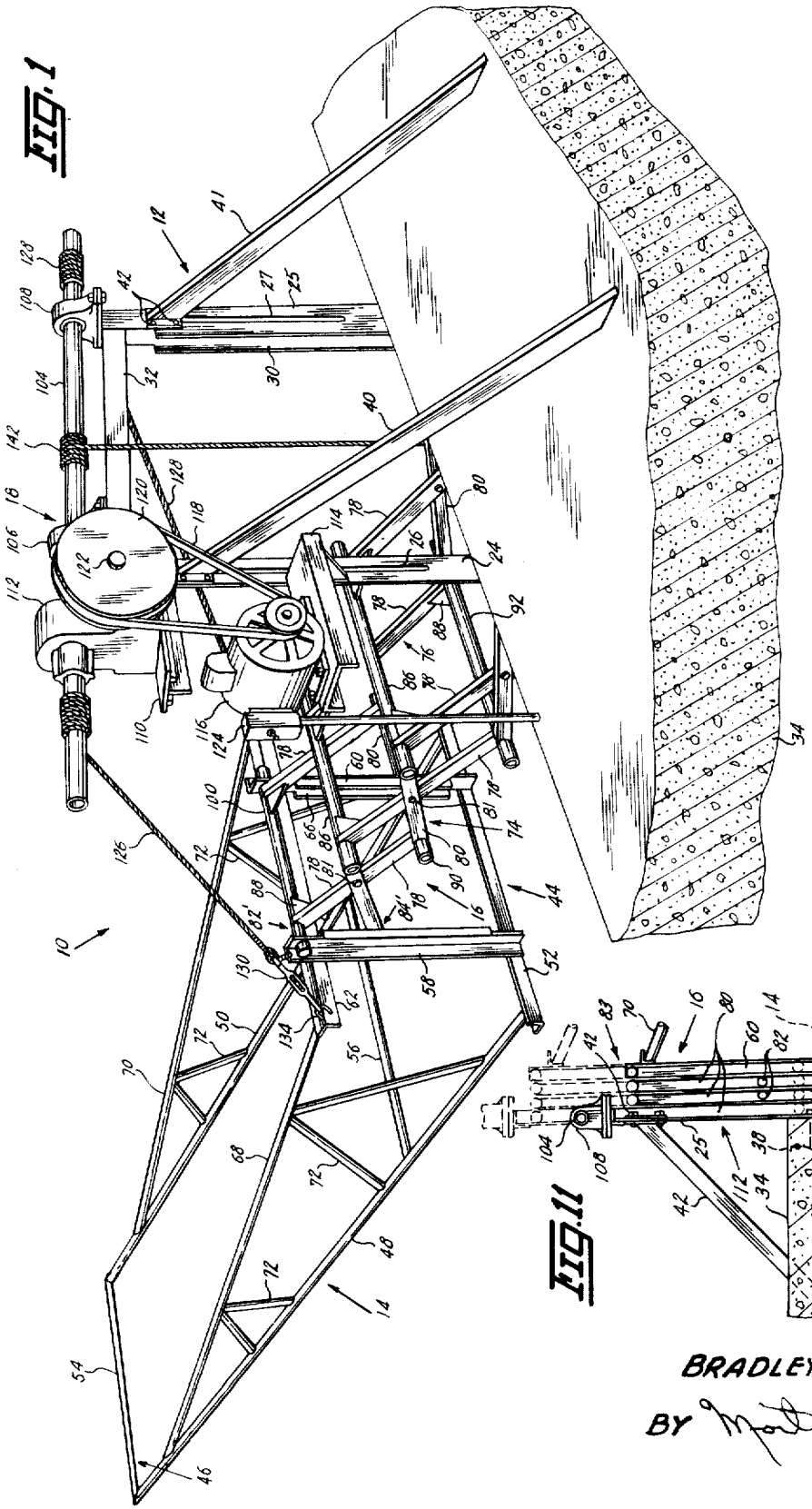


FIG. 11

INVENTOR.
BRADLEY M. OSMUNDSON

BY Morton S. Adler

ATTORNEY.

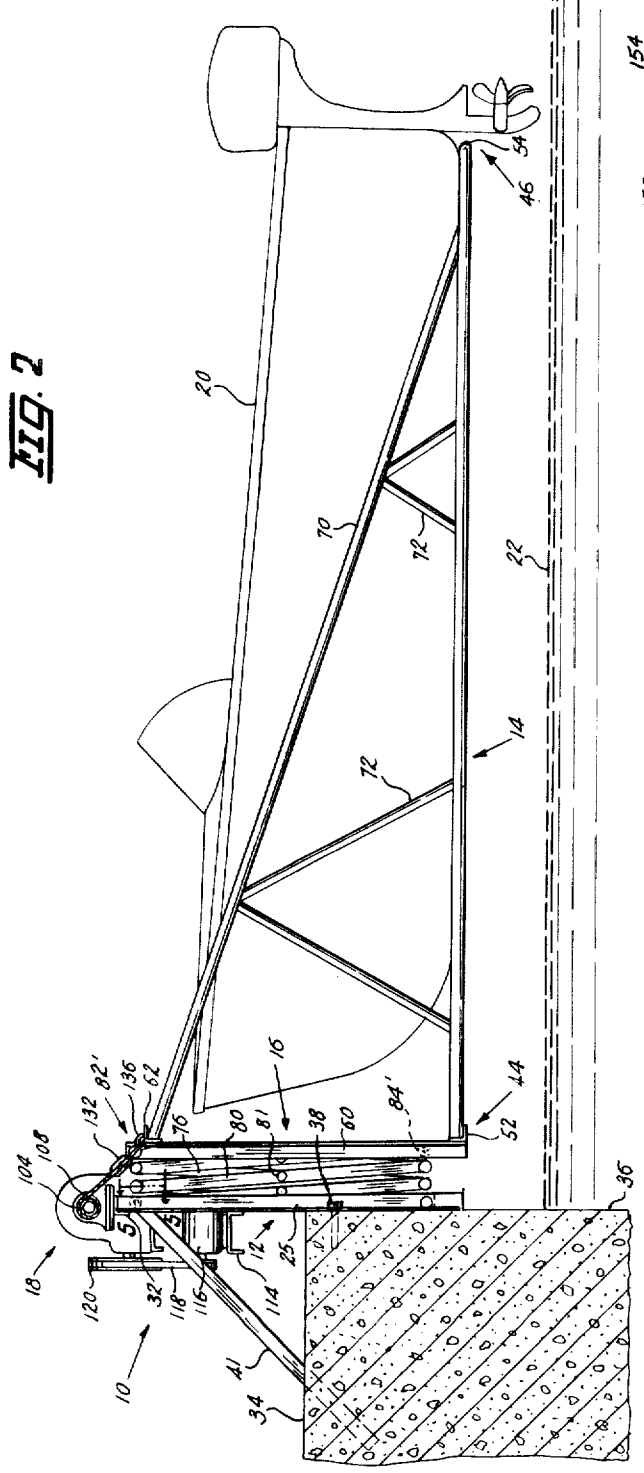


FIG. 2

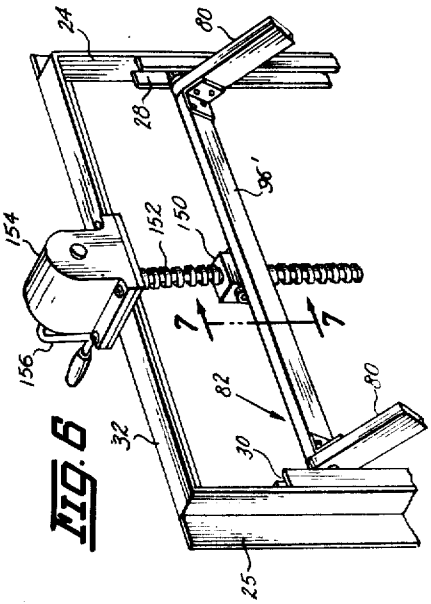


FIG. 6

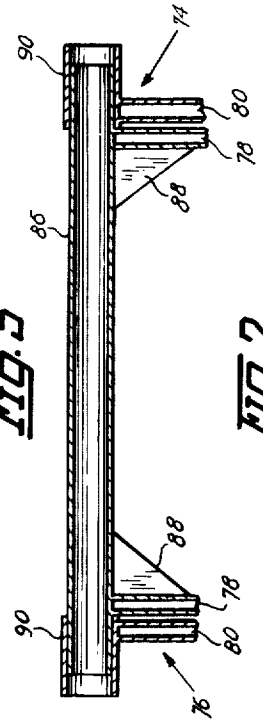


FIG. 5

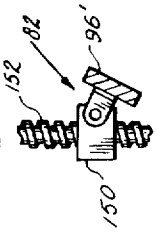


FIG. 7

INVENTOR.
BRADLEY M. OSMUNDSON

BY

ATTORNEY.

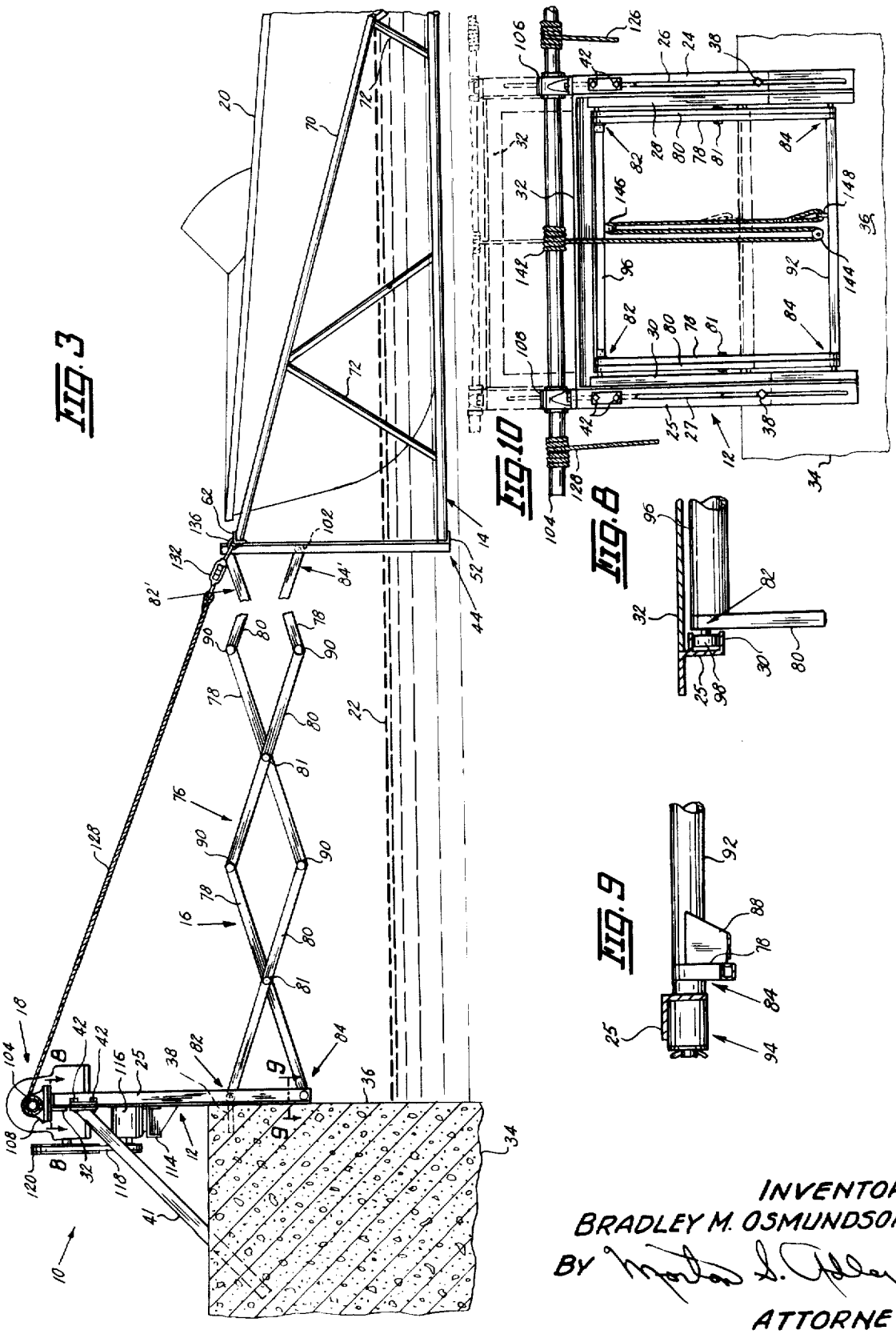


FIG. 3

FIG. 10

FIG. 8

FIG. 9

INVENTOR.
BRADLEY M. OSMUNDSON
BY
ATTORNEY.

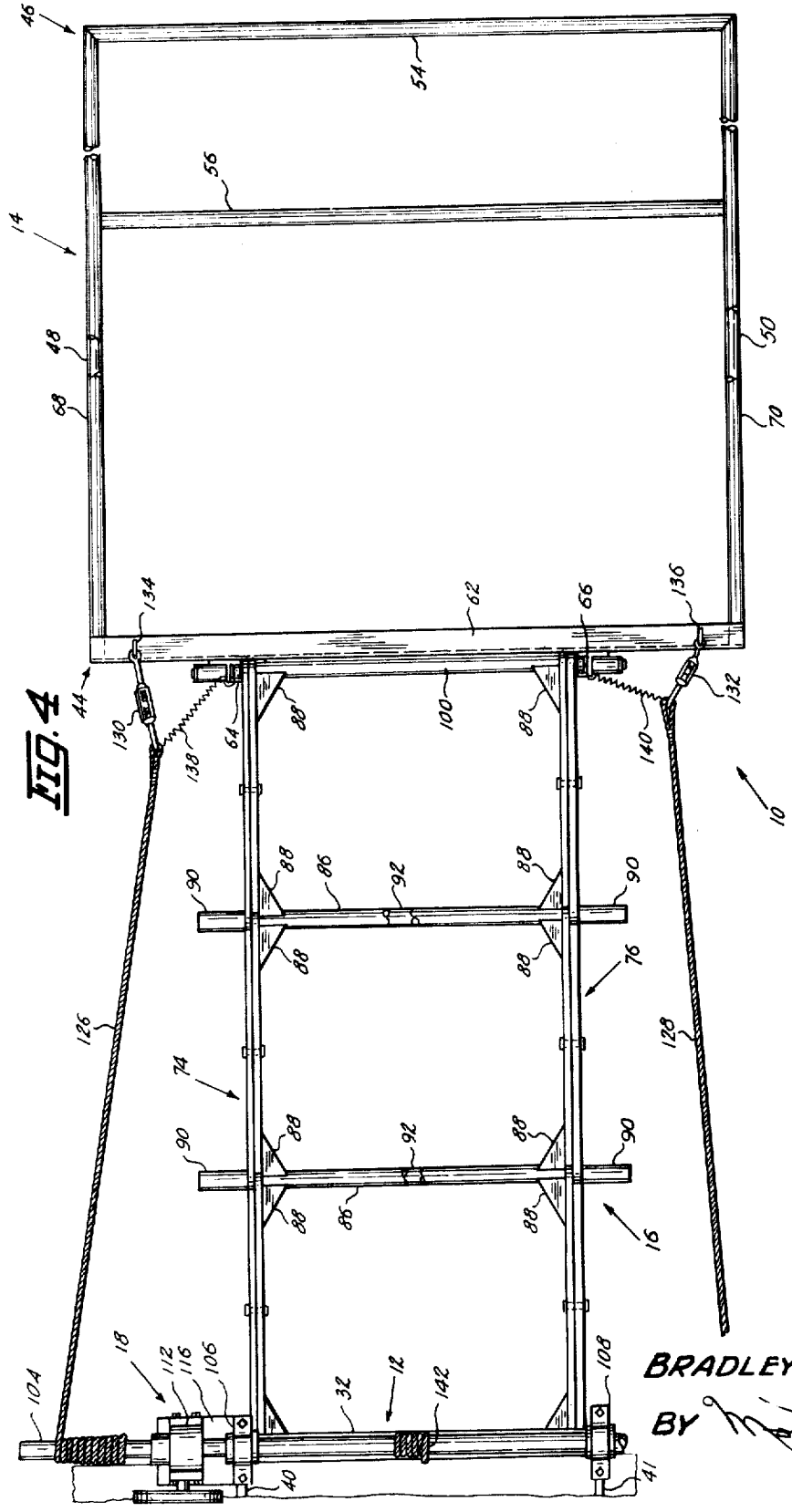


FIG. 4

INVENTOR.
BRADLEY M. OSMUNDSON
BY
ATTORNEY.

BOAT HOIST

BACKGROUND OF THE INVENTION

This invention relates to improvements in boat hoists of the type commonly found along the banks of rivers and lakes to facilitate the launching of boats and particularly to store them in a position completely out of the water when not in use.

Boat hoists of the general type indicated above are found in many varieties and are in common use particularly by those who have temporary or permanent residences on a river or lake. For such persons, their boat is usually kept at the water site for extended periods and when the boat is not in use, it is highly desirable that it can be docked in such a way that it will not be subject to damage from wind or water as would be the case if it were tied to a fixed dock. For this purpose many forms of hoists are available which provide boat supporting platforms that can be lowered into the water and elevated therefrom. So far as can be determined, practically all such hoists have supporting structures that rest upon the bottom of the river or lake at suitable points relative to the bank and while such types of hoists will suitably support a boat and permit its launching into and removal from the water at times, it is necessary in areas where freezing temperatures occur to completely remove such hoists from the water during such cold season in order to prevent substantial damage thereto when the water freezes and subsequently thaws. The destructive effect of such freezing and thawing is well known and in climates where this occurs, not only must all boat hoists be removed from the water but likewise the annual removal and replacement of ordinary docks is a regular practice.

The disadvantages of present type boat hoists as referred to above and the expenses associated therewith have been completely eliminated by the present invention in which the principal object is to provide an improved boat hoist having its sole support on a shore mounted base and which is operable to support a boat whereby the boat can be extended into the water for launching and can be withdrawn out of the water for storage in a position completely free of any water contact.

A further object of the present invention is to provide a boat hoist of the above class which can be maintained in its operable position on a year round basis and is capable of supporting a boat at all times completely free of the water so that neither the hoist nor the boat if it is left thereon year round is subject to any damage from the freezing and thawing of the water and the movement of debris therein during such periods.

Still another object of the present invention is to provide a boat hoist as characterized which is relatively simple in construction and which may be suitably operated either manually or by power.

SUMMARY

The present invention utilizes a support base or structure suitably mounted entirely upon the shore of a river or lake. Such structure includes a pair of vertically disposed and horizontally spaced tracks that may be anchored in concrete or in any other suitable manner. A pair of extensible and retractable scissor arms are disposed so that their respective end members move in a vertical plane and are mounted at one end to the respective tracks in such a manner that the lower ends of the scissor arms are pivotally secured thereto and the upper ends of such arms carry rollers disposed to move vertically therein. The other ends of the scissor arms are in a reverse arrangement to that at the shore support relative to a pair of spaced vertical tracks carrying a horizontal boat support platform so that on the tracks associated with the boat platform, the upper part of the scissor arms are pivotally secured thereto and the lower ends carry rollers.

Means for extending and retracting the scissor arms are provided at the shore support and this can be accomplished in a variety of ways by either manual or mechanical devices. For illustration, I have shown both cable and gear devices although it will be appreciated that other forms may be used for the purposes involved.

The docking or out of the water position of the hoist normally maintains the boat approximately two feet out of the water which is satisfactory for general use during the boating season and likewise the boat platform is submerged approximately 2 feet for launching. Such dimensions, however, are not critical and can be varied as desired by the size of the scissor arms and number of scissor sections used. Preferably, the shore mounted support is vertically adjustable so it can be elevated an additional foot or more relative to the water level during a period of general non-use such as winter time as an added precaution for complete safety from shore line ice accumulations.

The objects of this invention together with details of the operation outlined and the advantages of the same will be more fully described and developed in relation to the more detailed description of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of this new boat hoist showing the shore mounted base support and with the scissor arm assembly in partially extended position,

FIG. 2 is a side elevational view showing the hoist in retracted or elevated position with a boat on the boat supporting platform,

FIG. 3 is a side elevational view similar to FIG. 2 but showing the hoist in extended and lowered position with the boat in the water ready for launching,

FIG. 4 is a top plan view showing this hoist in extended position,

FIG. 5 is a cross sectional view taken on the line 5—5 of FIG. 2,

FIG. 6 is a fragmentary perspective view of the upper portion of the shore mounted support to illustrate a modified form for extending and retracting the scissor arms in relation to the shore mounted support,

FIG. 7 is a cross sectional view taken on the line 7—7 of FIG. 6,

FIG. 8 is a cross sectional view taken on the line 8—8 of FIG. 3 to show the movable attachment of the upper end of the scissor arms to the shore mounted support,

FIG. 9 is a sectional view taken on the line 9—9 of FIG. 8 to show the fixed pivotal connection of the lower scissor arm to the shore mounted support,

FIG. 10 is a front elevational view of the shore based track assembly to better illustrate its vertical adjustment relative to the shore oriented support base, and

FIG. 11 is a side view of the assembly in FIG. 10 showing the normal position in solid lines relative to water level and a selective elevated position in broken lines.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, this new boat hoist is designated generally by the numeral 10 as best seen in FIG. 1 where it is shown in partially extended position and includes generally a shore mounted base or support 12, a boat supporting platform 14, an extensible and retractable scissor type arm apparatus 16 connecting the platform 14 to the base 12, and an operating mechanism 18 carried by the base 12 for effecting the extension and retraction of the boat platform 14 by means of the scissor apparatus 16. Such structure as briefly described and as will be referred to in detail as this description proceeds, is illustrated in its retracted position in FIG. 2 showing a boat 20 supported on platform 14 completely out of and above the surface of a body of water 22 and in FIG. 3, this hoist 10 is illustrated in its extended position where platform 14 is submerged in the water 22 so that the boat 20 may be easily floated or launched.

The base or supporting structure 12 includes the vertically disposed and horizontally spaced channel members 24 and 25 having the respective longitudinal slots 26 and 27 intermediate their ends. Such channel members are disposed so that the channel areas 28 and 30 as best seen in FIG. 6 are op-

positely disposed to each other and define respective tracks or trackways as will later appear. The upper ends of channels **24** and **25** are connected by a beam **32**. Support **12** as thus described is designed to be mounted securely by any suitable means upon the shore so that when it is so mounted, no part of the support will be in the water or resting on the lake or river bottom. It will be appreciated and understood that base **12** can be suitably and securely mounted at a shore location in a variety of ways and for purposes of the present disclosure, I have shown it mounted relative to a concrete seawall **34** although the use of a seawall is not a requirement for the present invention.

As best seen FIGS. **2** and **3**, the seawall **34** presents a vertical face **36** at the shore line and, accordingly, I have anchored the channel members **24** and **25** to surface **36** of the seawall **34** by suitable anchor bolts **38** through slots **26** and **27**. In addition I have provided diagonal braces **40** and **41** as best seen in FIG. **1** which are secured respectively at one end to the channels **24** and **25** through slots **26** and **27** by bolts **42** and are anchored at the other end into the seawall **34** as shown in FIG. **3**. It will be noted that the lower end of channels **24** and **25** are spaced above the normal level of water **22** and when mounted as described, base **12** is securely anchored on a shore oriented support and, as indicated above, any other suitable means for anchoring base **12** in a similar location may be appropriately employed. In the normal use of this hoist **10**, the platform **14** will be approximately two feet out of the water when retracted as seen in FIG. **2** and this has been found to be generally adequate during the general boating season. However, during the off-season when the boat is preferably in winter storage and shore line ice accumulations are possible, support **12** as best seen in FIGS. **10** and **11** can be elevated an additional 18 to 24 inches by loosening the bolts **38** and **42** and using any suitable jack device for which an auto bumper jack is adequate and generally readily available. By tightening the volts with support **12** elevated it will be safe from damage over the winter and no dismantling or removal of the support relative to its shore mounting is required.

The boat platform **14** for purposes of reference includes an inner end **44** and an outer end **46**. Platform **14** is substantially an elongated rectangular rigid frame structure including spaced parallel side pieces **48** and **50** connected at the inner end **44** by the cross member **52** and at the outer end **46** by the cross member **54** as best seen in FIG. **1**. An intermediate cross member or support **56** connects rails **48** and **50** intermediate cross member **52** and approximately the longitudinal center of side pieces **48** and **50**. Thus, cross pieces **54** and **56** serve to support the boat **20** as will be obvious.

Secured to cross piece **52** in spaced relationship are the vertical channel members **58** and **60** which are connected at their upper ends by a cross member **62** corresponding in length and being parallel to member **52**. Thus arranged, members **52** and **62** each project outwardly from the respective vertical planes of channels **58** and **60**. The channel portions on members **58** and **60** are oppositely disposed to each other so as to provide the respective tracks or trackways **64** and **66** (FIG. **4**) whereby the general construction and relationship of channels **58**, **60** and member **62** provide a track containing frame assembly similar to that previously described for channels **24** and **25** having the trackways **28** and **30**.

As seen in FIG. **1**, platform **14** includes the additional rails **68** and **70** which are secured respectively at one end to the respective end portions or rail **62** so as to extend on an incline toward the outer end **46** of platform **14** where they are secured in any suitable manner near the outer ends of rails **48** and **50**. Intermediate their length, rails **68** and **70** are supported by appropriate braces **72** as shown. Thus arranged, rails **68** and **70** provide adequate support for end **54** of platform **14** and also serve as lateral guides for the boat **20** and as seen in FIGS. **2** and **3** where the bow section of the boat will be protected from lateral movement relative to the supporting members of platform **14**.

The scissor arm assembly **16** which, as indicated previously, connects the boat platform **14** to the base support **12**, comprises a pair of parallel and connected scissor arms **74** and **76** as best seen in FIG. **4** which are of like construction so that only a description of arm **76** as seen in FIG **3** will be made and like parts on arm **74** will be given like numerals. The number of scissor type units in arm **76** is a matter of choice depending upon the distance of extension desired for platform **14** and the depth into the water in which it will move and for purposes of this application, as seen in FIG. **3**, I have illustrated arm **76** by having three scissor sections, each of which includes an inner elongated rigid link **78** and an outer elongated rigid link **80** of like lengths which are pivotally connected at their center by pin **81**. Each pair of links **78** and **80** constitute what I have referred to as a scissor unit and are disposed so that in the opening and closing of the scissor arms, the respective ends of such arms will move in a vertical plane. Thus at one extremity of arm **76** relative to the shore support **12** there is the respective upper end **82** and lower end **84** and at the opposite extremity, the corresponding ends are identified by the numerals **82'** and **84'**. The number of scissor units, as indicated above, will be a matter of choice and intermediate the end members **82** and **84** and **82'** and **84'**, the respective ends of such intermediate scissor units on arms **74** and **76** are connected for pivotal movement in any suitable manner such as by the tubular members **86**. In this regard and with reference to FIG. **5**, the inner scissor arms **78** are secured to the outer surface of tube **86** and made rigid by means of a gusset **88**. The outer arms **80** are secured to respective sleeves **90** which are rotatably journalled on the respective ends of tube **86**. This has proved to be a satisfactory arrangement for the scissor arm action but it will be understood that any other suitable means for producing the scissor arm effect may be used.

The lower ends **84** of scissor arms **74** and **76** are connected by a tubular member **92** as best seen in FIG. **9** and such ends **84** are pivotally attached by any suitable bearing means such as **94** to the lower portions of the shore mounted channel members **24** and **25** so that while such ends **84** will pivot relative to such channels, they will not move vertically relative thereto. The upper ends **82** of scissor arms **74** and **76** are also connected by a tubular member **96** as best seen in FIG. **8** and the extremities of such tube are provided with appropriate roller members **98** which are vertically movably disposed within the trackways **28** and **30** in the respective channels **24** and **25**. At the opposite ends of scissor arms **74** and **76**, the reverse arrangement to that described is provided whereby the upper ends **82'** are connected by the tube **100** as best seen in FIG. **1** and are pivotally arranged relative to the upper portion of rails **58** but not vertically movable relative thereto in the same relationship as for ends **84** on channels **24** and **25**. The lower ends **84'** of scissor arms **74** and **76** are suitably connected by an appropriate tube (not shown but similar to the tube **96** in FIG. **8**) on which there are provided the rollers **102** (FIG. **3**) which are rollably journalled in the tracks **64** and **66** of channels **58** and **60** in the same manner as the arrangement of end **82** in tracks **28** and **30**.

Thus far described, it will be seen in FIG. **2** when the scissor arms **16** are retracted that the vertical movable arm ends **82** are at their upper extremity of travel relative to the upper end of the shore support **12** and that the pivotally attached but not vertically movable arm ends **82'** will be planar with ends **82**. Also, in this position the roller arm ends **84'** are disposed at the lowermost point of channels **64** and **66** at the inner end **44** of boat platform **14** and such arm ends **84'** are planar with arm ends **84**. As the scissor arms **16** are permitted to extend by means as will later be described, it will be seen in FIG. **3** that roller arm ends **82** move downwardly relative to the shore support **12** so that as the platform **14** is projected outwardly frame assembly **58**, **60** and **62** with arm ends **82'** attached thereto move downwardly correspondingly and with ends **82'** remaining planar with arm ends **82**. As this occurs, channels **64** and **66** ride downwardly over the roller ends **84'** which remain planar with ends **84**. It will thus be seen that while the scissor

arm assembly remains on a horizontal plane during its extension, the top plane of such assembly is progressively lowered and by the reverse arrangement of roller ends 82 and 84', platform 14 is projected away from the shore line toward deeper water and lowered below the water level. When the scissor arms are retracted from the extended or launching position shown in FIG. 3 to that of FIG. 2 the reverse movements from those described take place. It will be appreciated that scissor arm ends 82 and 84' can be pivotally secured the same as ends 84 and 82' and while this could permit the extension and retraction of platform 14, hoist 10 would of necessity have to be rather steeply tilted toward the relatively shallow water near the shore and would not have the advantage of my preferred embodiment described in projecting platform 14 during launching into deeper water more distant from the shore line.

It will be appreciated that various means and devices can be employed to effect the extension and retraction of this hoist arrangement and for purposes of illustration, I have shown the use of cable means together with an alternate gearing form illustrated in FIG. 6.

While it may appear from the description thus far that because of the normal weight of platform 14 and the scissor arm assemblies 16 and particularly if a boat 20 is on the platform, the arm assemblies would normally project to their extended position, experience has shown that with a sturdily constructed scissor arm assembly, a suitable manual or power means should be employed to facilitate the operation of such assembly. Accordingly, with reference now more particularly to FIGS. 1, 4 and 10, I provide an elongated shaft 104 disposed in parallel relationship above beam 32 and rotatably journalled in bearing members 106 and 108 so that such shaft projects outwardly relative to each bearing member. At one side of support 24, is secured a platform 110 to support a gear box 112 through which one end of shaft 104 is operatively arranged. Below shelf 110 is a second shelf 114 on which is mounted a suitable electric motor 116 connected by a belt 118 to a large pulley wheel 120 mounted on a shaft 122 connected to the gear box 112 in a well known manner. A switch means 124 is suitably located and operatively connected to motor 116 in any well known manner. Wound in the same direction each projecting end portion of shaft 104 are the respective cables 126 and 128 that connect with the respective opposed end portions of the upper cross member 62 as best seen in FIG. 4. For this purpose, I preferably secure the ends of the respective cables 126 and 128 to the respective turnbuckles 130 and 132 which in turn are attached to the respective eyes 134 and 136 on rail 62. To keep such cables generally from lateral deflection, I provide the small compression springs 138 and 140 which connect the respective cables at their point of attachment to the turnbuckles to members 64 and 66. A third cable 142 is wound on shaft 104 intermediate cables 126 and 128 and in a reverse direction thereto and as best seen in FIG. 10 extends downwardly where it is reeved around a pulley 144 secured to tube 92 connecting ends 84 of the scissor arm assembly 16 and then extends upwardly where it is reeved around pulley 146 secured to tube 96 which connects ends 82 of assembly 16. From pulley 146, cable 142 extends downwardly where it is secured to an eye 148 on tube 92. By the above arrangement, it will be appreciated that with hoist 10 in retracted position as shown in FIG. 2, actuation of motor 116 to permit the proper directional rotation of shaft 104 for the unwinding of cables 126 and 128 and the winding of cable 142 results in tube 96 being pulled downwardly to correspondingly lower scissor arm ends 82 and 82' and permit the launching of boat 20 from the position shown in FIG. 3 as previously described. In this way, the extension of platform 14 and the retraction thereof is done under a controlled power arrangement so that there will be no damage to the boat. By reverse rotation of shaft 104, hoist 10 is returned to the position in FIG. 2.

In FIGS. 6 and 7, I have illustrated a modified form for controlling the extension and retraction of the scissor arm assembly 16 and this includes pivotally attaching to the cross beam 96' at end 82 a suitably threaded block 150 to receive an acme threaded shaft 152 operatively connected to a gear housing 154 mounted on cross beam 32. The gearing in housing 154 is shown arranged for manual operation by means of a handle 156 although it will be appreciated that this could be power operated, if desired. With this arrangement, it will be understood that operation of handle 156 will rotate shaft 152 and cause block 150 to move either upwardly or downwardly depending upon the direction of rotation. The effect of this will be the same as the operation of cables 126, 128 and 142. Accordingly, from all of the foregoing it is thought a full and complete understanding of this invention will be had and that the advantages of the same will be appreciated.

I claim:

1. A boat hoist, comprising:
a support frame,
means mounting said frame directly on the shore closely adjacent a body of water,
an elongated boat support member disposed longitudinally over and above the body of water,
said boat support member having respective inner and outer ends with said inner end being oriented in relatively close relationship to said support frame,
an extensible and retractable arm assembly operatively secured at respective opposite ends to said support frame and to said inner end of said boat support member,
means on said support frame operatively connected to said arm assembly to selectively effect the extension thereof away from the shore over and downwardly towards the water and the retraction thereof upwardly relative to the water and towards the shore and said support frame,
the directional movements of said arm assembly relative to the water and shore effecting corresponding movements of said boat support member so that the extension of said arm assembly acts to project said boat support member in a direction away from the shore and into the water to a predetermined depth, and
the retraction of said arm assembly acts to elevate said boat support member and move it in a direction toward the shore to a predetermined plane above the level of the water adjacent the shore.

2. A boat hoist as defined in claim 1 including:
said support frame being vertically disposed, and
means attaching said support frame on the shore to permit of its vertical adjustment relative to the level of an adjacent body of water.

3. A boat hoist as defined in claim 1 including:
said arm assembly comprising:
a scissor arm unit including a pair of elongated rigid arms pivotally connected at their longitudinal center and having their opposite ends operatively connected respectively to said support frame and said boat support member.

4. A boat hoist as defined in claim 1 including:
said arm assembly comprising:
a scissor arm unit including a pair of elongated rigid arms pivotally connected at their longitudinal center and having at each opposite extremity a pair of end members defining an upper end and a lower end which move in a substantially vertical plane during the extension and retraction of said scissor arm unit,
said lower end at one extremity of said arm unit being pivotally secured to said support frame at a point above water level and said upper end at the corresponding extremity being slidably arranged relative to said support frame above said lower end, and
said upper end at the other extremity of said arm unit being pivotally secured to said boat support member at a point above water level and said lower end at the corresponding extremity being slidably arranged relative to said boat support member below said upper end.

5. A boat hoist as defined in claim 4 including:

said means on said support frame to effect the extension and retraction of said arm assembly comprising:

a shaft mounted on said support frame for rotation about its longitudinal axis,

a source of power for rotating said shaft in two respective opposite directions,

a first cable means wound in one direction on said shaft and connected to said arm assembly adjacent said boat support member, and

a second cable means wound in the opposite direction on said shaft and operatively connected to said upper end of said arm assembly adjacent said support frame whereby in one direction of rotation of said shaft, said second cable pulls said upper end of said scissor arm unit downwardly relative to said support frame to effect the extension of said scissor arm during which time said first cable means unwinds and in the reverse rotation of said shaft, said first cable means winds up to effect the retraction of said scissor arm unit with said second cable means unwinding to permit said upper end to move upwardly relative to said support frame.

6. A boat hoist as defined in claim 4 including:

said means on said support frame to effect the extension and retraction of said arm assembly comprising:

a block with a threaded bore having a vertical axis operatively connected to said upper end of said scissor arm unit relative to said support frame,

a vertically disposed shaft on said support frame mounted for rotation about its longitudinal axis and threadably journalled in said block, and

means on said support frame associated with said shaft to selectively rotate the same in two respective opposite directions whereby in one direction of rotation said upper end of said scissor unit is moved downwardly to effect the extension of said arm assembly and rotation of said shaft in the opposite direction moves said upper end upwardly to effect the retraction of said arm assembly.

7. A boat hoist as defined in claim 1 including:

a vertically disposed first trackway on said support frame, the lower end of said trackway being fixed at a point above the level of the water,

a second vertically disposed trackway carried by said boat support member,

said arm assembly comprising:

a scissor arm unit including a pair of elongated rigid arms pivotally connected at their longitudinal center and having at each opposite extremity a pair of end members defining an upper end and a lower end which move in a substantially vertical plane during the extension and retraction of said scissor arm unit,

said lower end at one extremity of said scissor arm unit being pivotally secured to the lower end of said first trackway and said upper end at the corresponding extremity being slidably arranged relative to said trackway,

said upper end at the other extremity of said scissor arm unit being pivotally secured to the upper end of said second trackway and said lower end at the corresponding extremity being slidably arranged relative to said trackway,

the corresponding upper and lower ends of said scissor arm unit at respective opposite extremities being at all times planar with each other whereby with said arm assembly retracted, said upper end in said first trackway is at the upper end thereof and said lower end in said second trackway is at the lower end thereof and in the extension of said arm assembly, said upper end in said first trackway slides downwardly therein to effect a corresponding lowering of said second trackway and boat support member at which time said second trackway slidably moves downwardly relative to said lower end of said scissor arm unit therein so that said boat support member is progressively projected away from the shore line and into the water.

8. A boat hoist as defined in claim 7 including:

means adjustably attaching said first trackway to said support frame to permit of its vertical adjustment thereon relative to the level of an adjacent body of water.

* * * * *