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## (54) IMPROVEMENTS IN AND RELATING TO ANCHORS

(71) I, JOHN ABBOTT CARRUTHERS, a British subject and New Zealand citizen, of 30 Coates Avenue, Orakei, Auckland, New Zealand, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to anchors and more particularly to anchors which are adapted to resist and as far as possible prevent snagging on the sea bed, lake bottom and the like, when in use.

Up until this time, numerous anchors, such as for example anchors and especially smaller anchors for pleasure craft, when used in some areas upon the sea bed or lake bed, tend to snag and are unable to be lifted. Alternatively, they take substantial time to free from a snagged condition, this making anchors potentially dangerous in use, in a number of circumstances. When permanently snagged and therefore unable to be lifted, such snagging may require a user to cut or destroy an anchor warp, thereby not only losing a majority or large part of an anchor warp, but also an anchor chain and the anchor.

It is an object of this invention to overcome as far as possible these problems and to at least provide the public with a reasonable choice.

Other objects of this invention will become apparent from the following description.

According to one aspect of this invention there is provided an anchor including a head (as herein defined) and a shaft, said shaft including a primary shaft pivotally connected relative to the head and a secondary shaft also being pivotally connected relative to the head, and a release mechanism mounted on the primary shaft and engageable by the secondary shaft to enable the secondary shaft to be releasably locked against movement relative to the primary shaft, characterised in that said release mechanism is adjustable and resettable so that an operator may vary a predetermined strain at which said release mechanism releases said secondary shaft relative to said primary shaft, to permit said shaft increased pivotal movement relative to said secondary shaft and head.

According to a further aspect of the invention I provide an anchor having a head as herein defined including two spaced apart flukes mounted on a pivot shaft, a pair of parallelly aligned cheek plates provided on inner sides of said flukes and providing a recess therebetween, primary and secondary shafts engaged pivotally towards one end thereof with said pivot shaft within the recess, said cheek plates mounting a stop plate thereon for limiting the pivotal movement of a member carried by said one end of the secondary shaft, the opposite end of the primary shaft mounting a release mechanism which releasably engages the opposite end of the secondary shaft with said primary shaft, said primary shaft and secondary shaft being able to pivot relative to the head until the said member carried by the secondary shaft contacts said stop plate and upon a predetermined strain being placed thereon the opposite end of the secondary shaft is forced to disengage from the release mechanism to enable the primary shaft pivotal movement relative to the secondary shaft.

Other preferred features of the invention will become apparent from the following description which is given by way of example with reference to the preferred embodiment and one alternative embodiment and with reference to the accompanying drawings, in which:

Figure 1 is a side view of an anchor according to one form of the invention;

Figure 2 is a plan view of an anchor according to the form of the invention shown in Figure 1 of the drawings;

Figure 3 is a side view of a further form of an anchor;

Figure 4 is a plan view of the anchor shown in Figure 3 of the drawings.

In the present invention, reference to the "head" of an anchor is to be defined as the end of the anchor incorporating flukes and the like, but not including a shaft or shafts to which the warp is attachable.

Referring firstly to Figures 1 and 2 of the accompanying drawings, the preferred embodiment of the anchor will now be described.

The anchor 1 as shown in Figures 1 and 2 of the accompanying drawings includes a shaft 2

formed as a primary shaft 3 and a secondary shaft 4. The primary shaft 3 is provided with a hollow recess 5 along the length thereof, and is substantially bifurcated in formation. An outer end 2a thereof is provided with a suitable bore or hole 8 passing therethrough, for the attachment of a chain, or warp (not shown).

Within the recess 5 of the first or primary shaft 3 is provided the secondary shaft 4, an elongate pivot shaft 10 being provided towards one end of the primary and secondary shafts 3 and 4 and through a head 20 of the anchor 1, to permit pivotal movement of the primary and secondary shafts 3 and 4 relative to the head 20 of the anchor 1.

In this preferred embodiment of the invention the head 20 of the anchor 1 is provided with two spaced apart flukes 25 and 26, said flukes 25 and 26 defining a recess 27 therebetween and substantially parallelly aligned check plates 30 being provided on inner sides thereof, and defining a recess 31 therebetween. The secondary shaft 4 and primary shaft 3 extend into the recess with the secondary shaft 4 extending past the pivotal location on the pivot shaft 10 of the primary shaft 3 and the inner end of the secondary shaft 4 is provided with an elongate bar or "T" section 4a at an extension end thereof.

The check plates 30 are provided between stop plates 35 and extend substantially parallelly with said primary and secondary shafts 3 and 4 and are provided with stop plates 35 on opposing outer edges thereof extending across said check plates in such a position that the inner or extension end, cross bar or "T" section 4a of the secondary shaft 4 may pivot between said stop plates and then be limited from further movement. In the preferred form of the invention check plates and stop plates are mounted from adjacent surfaces of the flukes 25 and 26 and are preferably integrally formed therewith.

In the preferred form of the invention as shown in figures 1 and 2 of the accompanying drawings fluke extensions 45 such as for example angled "Y" extensions extend outwardly from a face of the flukes 25 and 26 so as to increase the fluke area for the purposes of control and effectiveness. Such a fluke increase, can be used in conjunction with the present invention or as an effective means of increasing fluke area, in comparison with other anchors. The increase in fluke area also serves to spread any load and pressure upon the flukes, to behind the pivot point or line of the flukes 25 or 26.

A release mechanism 50 is provided, mounted to the primary shaft adjacent an outer end thereof and within the recess 5. The release mechanism 50 in the preferred embodiment of the invention is provided in the form of an adjustable resettable cam friction surface 51 which is provided as an outer annular casing 52 of a substantially hard material such as for

example tubular metal and within said outer annular casing 52 is provided a resilient inner member 53 providing a slotted aperture 54 therethrough, through which a fixing means 55 engages said release mechanism 50 with the primary shaft 3. Thus, it will be appreciated that the release mechanism 50 is mounted within the recess 5 of the primary shaft 3 and the slotted hole 54 may be orientated to enable the cam or friction surface 51 to be moved longitudinally relative to the primary shaft 3. An outer end 46 of the secondary shaft 4 is adapted to come into contact with the release mechanism 50 such that it may frictionally engage with the cam surface 51 such that in normal conditions the release mechanism will maintain the secondary shaft 4 in position relative to the primary shaft 3 substantially within the recess 5 yet upon a more than predetermined strain being placed upon the release mechanism 50 such as for example by snagging of the anchor the resilient inner member 53 compresses enabling the outer annular casing 52 to move away from said outer end 46 sufficiently for the release mechanism to disengage from the outer end 46. It will be appreciated that longitudinal adjustment of the release mechanism 50 relative to the primary shaft 3 and outer end 46 will vary the degree of compression required to be imparted to the inner member 53 before the release mechanism disengages the outer end 46.

In an alternative embodiment of the invention the release mechanism is provided in the form of a shear pin (not shown) engaged within normally aligning apertures provided in adjacent outer ends of the primary and secondary shafts 3 and 4. The shear pin is provided of a material of sufficient strength such that it may shear upon the more than predetermined strain being applied between the primary and secondary shafts 3 and 4 and it is preferred that a soft metal or a suitable plastics material is utilized for the shear pin.

Bores or holes 56 are provided along the mid-portion of the primary shaft 3 and through the secondary shaft 4, such that when said primary shaft 3 and secondary shaft 4 are engaged with the secondary shaft 4 within the recess 5 a locking means, in the preferred form a toggle pin 57 or nut and bolt can be passed therethrough. In use, when the anchor is to be used with the quick release mechanism, the toggle pin or locking means 57 will be located in an upper housing bore 58 where it will be out of the way, however if it is desired to leave the anchor in a locked position and it is not desired that the anchor have the release facility or capability, the locking means 57 will be removed from the upper bore 58 and passed through the bores 56 in the primary and secondary shafts 3 and 4 to lock the primary and secondary shafts 3 and 4 in position relative to one another and neutralize any quick release mechanism.

In normal use however, it is desired that the anchor be used and have the quick release capability provided by the invention so as to overcome any snagging tendencies. In use, and for example when the anchor is snagged and is unable to be weighed normally, the vessel to which it is attached moves over the anchor in the substantially normal manner so as to tighten an anchor warp and to raise the primary and secondary shafts relative to the head by pivoting said shafts about the pivot shaft of the head. Strain is then applied to the anchor warp either by a ground swell raising the vessel or by further pulling on the anchor warp which brings the inner end of the secondary shaft into contact with one stop plate such as indicated in figure 1 of the accompanying drawings. Upon further strain being applied to the anchor warp, the frictional contact between the upper end of the secondary shaft and the release mechanism will pass a predetermined point should the anchor not normally dislodge, at which time the primary shaft will free itself from the outer end of the secondary shaft and will be able to pivot freely relative to the secondary shaft and the head of the anchor. In this way it will be seen that the primary shaft can pivot relative to the anchor up to about 180 degrees. This pivoting enables the primary shaft to move over the head of the anchor and to pull the anchor out by the head and to release the flukes from a snagged position.

An alternative method of raising the anchor is provided by moving the vessel hard astern whilst the anchor is engaged with the sea bed, whereupon increased strain upon the anchor warp as a result of the vessel moving astern causes the release mechanism to release and enable the flukes to trip over and pull out backwards and whereafter once the flukes are disengaged from the sea bed continued astern movement of the vessel will cause the anchor to hydroplane to the surface whereupon it may be weighed without substantial effort.

Once the anchor has been withdrawn from the water, it can be reassembled and the release mechanism may be readily reset or alternatively the locking means may be inserted through the primary and secondary shafts to hold the primary and secondary shafts in the predetermined or fixed positions relative to one another.

Now referring to figure 3 and 4 of the accompanying drawings, in this form of the invention an anchor head 60 is provided having flukes 61 in a substantially known plough formation, the head 60 having a primary shaft 3 extending upwardly therefrom, the primary shaft 3 having a quick release mechanism such as hereinbefore described, such as in the form of a friction block or cam block 50 which engages an upper end of a secondary shaft 4.

However, in the form of the invention shown in Figures 3 and 4 of the accompanying drawings, the anchor head 60 is provided with a

recessed or concave underside, which can house a turntable 65 which engages with a nut and a stud affixed to the head 60 and through an end of the shaft so that the head 60 of the anchor and flukes are rotatable relative to the shaft 4, the rotatable turntable 65 being on top of the head 60 and fixed thereto.

In this way, added advantages are gained, and it makes it easier for freeing snagged anchors and the like, as in addition to the quick release mechanism which will free the first and second shafts, and thus enable the first shaft 3 to pivot or rotate freely by up to about 180 degrees, it will also enable the shaft combination to rotate relative to the head of the anchor.

In the form of the invention shown in figures 3 and 4 of the accompanying drawings, the primary shaft 3 is rotatably pivoted about the head such as shown in figure 3 of the accompanying drawings by means of a pivot pin, stud and the like 66 the secondary shaft 4 running up the slot of the first shaft 3 and frictionally engaging with the release mechanism 50 such as described in earlier forms of the invention. On a boat moving over the anchor, arms of the shaft will come into contact with stop surfaces, to thus apply friction to the engagement between the end of the secondary shaft and the friction block, to thus release the first shaft from the second shaft, to enable free movement therebetween and relative to the head of the anchor.

In the form of the invention shown by way of example in figure 1 of the accompanying drawings, it is envisaged that the ends of the flukes 61 can be extended or bulbous, being integrally formed with the main fluke portion or alternatively can be provided with adjustable bulbous extensions, flaps, or body extensions 62, to extend the area covered by the ends of the flukes, this facilitating an extension of the end portions of the anchor, so that the heads 63 of the flukes 61 will rest further above the ground, thus allowing the points to enter into the sea bottom or lake bottom. It is envisaged that the bulbous extension formations 62 may be provided with slotted holes and holes may also pass through the edges of the anchor flukes, such that on bolts, adjustable securing means and the like passing there-through, the amount of extension can be varied depending upon the desires of a user.

It will be appreciated therefore that the present invention provides means whereby the shaft and head of an anchor are able to be moved freely relative to one another, such as for example up to about 180 degrees. Up until this time anchors have been provided with some release mechanism, which provide for restricted movement of the shafts and heads relative to one another.

For example, it has been known to provide anchors which have shafts which are able to move up to 90 degrees relative to the head of

anchors. However, this is restrictive in operation, in that the further the head and shaft can pivot relative to one another the better the release possibilities there are and the more effective the release from snagged conditions. This is obtained from the present invention.

It will be appreciated that the anchors have been described by way of example only with reference to the preferred embodiments and alternative embodiments and may be constructed of any desired material for example metal. Modifications and improvements may be made to the invention without departing from the scope of the invention as defined in the appended claims.

#### WHAT I CLAIM IS:—

1. An anchor including a head (as hereinbefore defined) and a shaft, said shaft including a primary shaft pivotally connected relative to the head and a secondary shaft also being pivotally connected relative to the head, and a release mechanism mounted on the primary shaft and engageable by the secondary shaft to enable the secondary shaft to be releasably locked against movement relative to the primary shaft, characterised in that said release mechanism is adjustable and resettable so that an operator may vary a predetermined strain at which said release mechanism releases said secondary shaft relative to said primary shaft, to permit said primary shaft increased pivotal movement relative to the secondary shaft and head.

2. An anchor as claimed in Claim 1, wherein the release mechanism includes a resilient member, a fixing means provided to mount said release mechanism on said primary shaft, and end of said secondary shaft being correspondingly shaped to engage said release mechanism and to engage therewith until a predetermined strain compresses said resilient member sufficiently to enable said end of said secondary shaft to disengage therefrom, to permit shaft increased pivotal movement relative to said secondary shaft and head.

3. An anchor as claimed in claim 2 wherein the primary shaft is provided with a hollow recess therein, within which said secondary shaft and said release mechanism are situated, said release mechanism outer surface providing a cam friction surface located within the recess of the primary shaft, against which the end of the secondary shaft comes into contact, to frictionally engage therewith, so that in normal conditions the adjustable and resettable release

mechanism will retain the secondary shaft in a fixed position relative to the primary shaft.

4. An anchor as claimed in claim 3 wherein said resilient member is provided with a slotted aperture therein, through which said fixing means is engaged, said slotted aperture facilitating moving of said release mechanism longitudinally relative to said primary shaft and said secondary shaft end, to facilitate adjustment of said predetermined strain at which said release mechanism releases.

5. An anchor as claimed in claim 1 wherein, when desired, said primary and said secondary shafts are capable of being locked relative to one another by a locking means, engageable with said primary and said secondary shafts.

6. An anchor as claimed in any one of the preceding claims, wherein the head of the anchor is in the form of a plough.

7. An anchor having a head as herein defined including two spaced apart flukes mounted on a pivot shaft, a pair of parallelly aligned cheek plates provided on inner side of said flukes and providing a recess therebetween, primary and secondary shafts engaged pivotally towards one end thereof with said pivot shaft within the recess, said cheek plates mounting a stop plate thereon for limiting the pivotal movement of a member carried by said one end of the secondary shaft, the opposite end of the primary shaft mounting a release mechanism which releasably engages the opposite end of the secondary shaft with said primary shaft, said primary shaft and secondary shaft being able to pivot relative to the head until the said member carried by the secondary shaft contacts said stop plate and upon a predetermined strain being placed thereon the opposite end of the secondary shaft is forced to disengage from the release mechanism to enable the primary shaft pivotal movement relative to the secondary shaft.

8. An anchor as hereinbefore described with reference to figures 1 and 2 of the accompanying drawings.

9. An anchor as hereinbefore described with reference to figures 3 and 4 of the accompanying drawings.

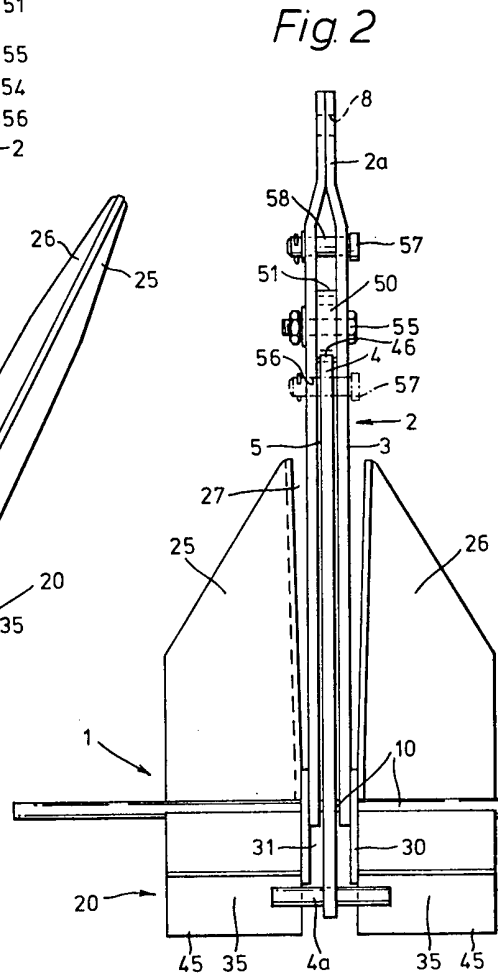
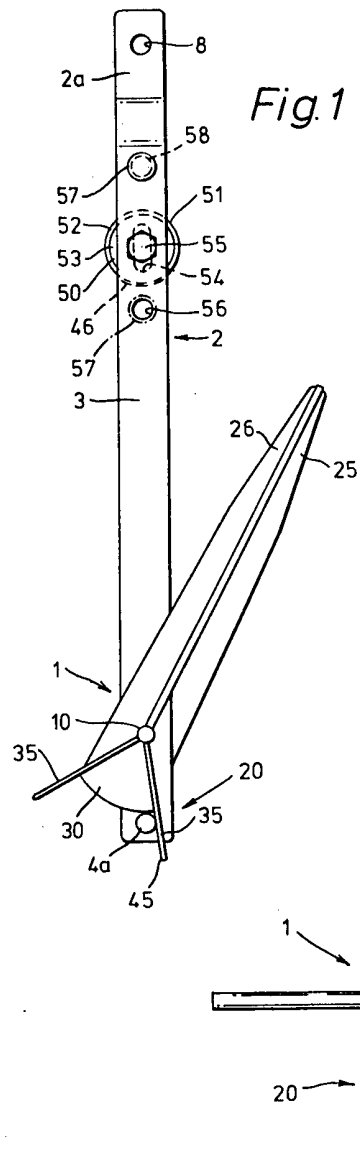
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