

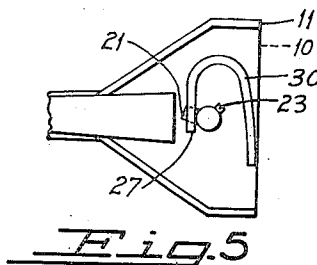
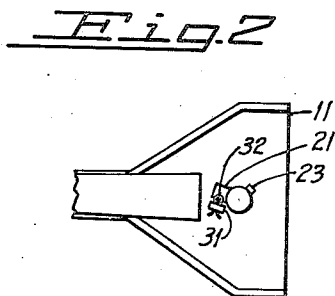
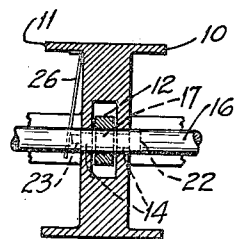
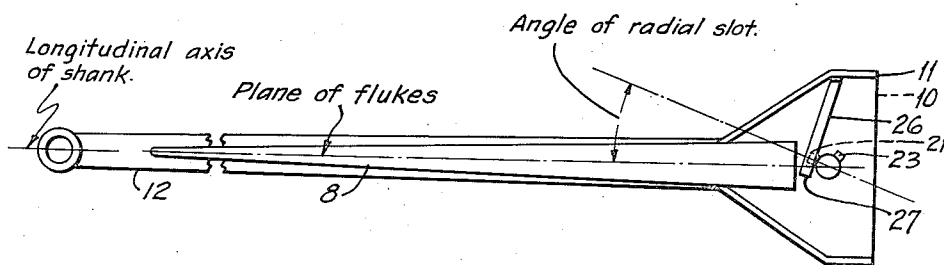
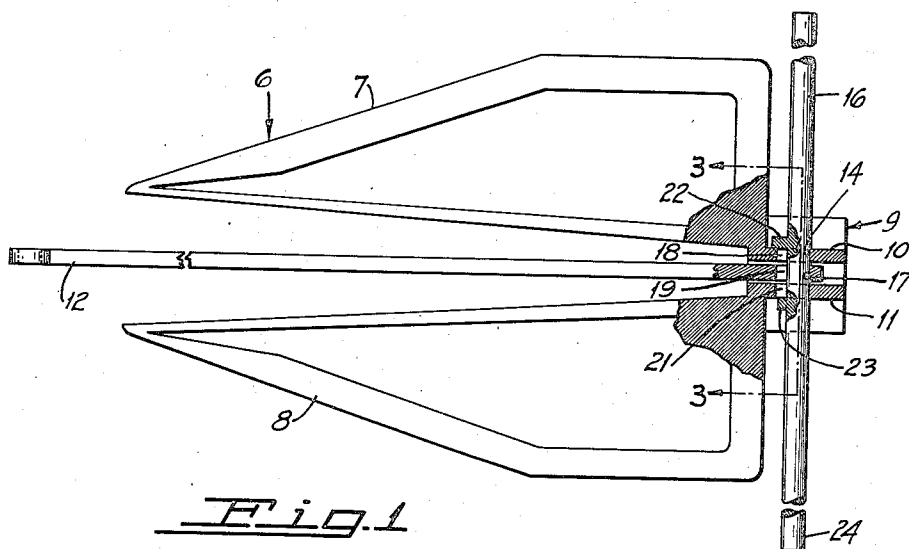
Oct. 19, 1948.

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2,451,719

ANCHOR

Filed Jan. 13, 1945



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2,451,719

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Application January 13, 1945, Serial No. 572,635

11 Claims. (Cl. 114—208)

1

This invention relates to improvements in anchors, and more particularly to improvements in "navy" type anchors. Such an anchor generally includes several essential parts, e. g. 1 a shank, 2 a pair of flukes usually joined together by 3 a crown, the flukes being pivotally supported at one end of the shank, and 4 a stock extended through the crown and generally providing a pivotal support for the shank and flukes. Anchors of this general type are well known and one may refer to my Patents 2,249,546; 2,320,966 and 2,354,666 for disclosures of typical structures to which the present invention is applicable.

In an anchor of this type, the shank and flukes swing relative to each other, the permissible angular swing in either direction being fixed beforehand. The term "fluke angle" is usually applied to this angular swing as measured between the longitudinal axis of the shank and the plane of the flukes when the latter are in either extreme position. This angle varies with different anchor designs and values between 21° and 65°, for example, will be found in known anchors. The total angular swing from one extreme position to the other is twice the fluke angle. It is essential that the swing be the same in either direction.

The several parts of the anchor are usually manufactured separately and are then assembled, a portion of the crown being cut away to provide the desired fluke angles between the fluke and shank on each side of the flukes. The several parts are provided by methods such as casting or forging and while reasonable care is commonly employed to ensure that the individual parts are identical it frequently happens that some dimensional variation is present. The usual practice is to adjust the several parts comprising each anchor, grinding a portion off each side of the crown to permit the shank to swing through the desired fluke angle on each side of the shank.

If an assembled anchor is taken apart and later reassembled it is possible for the shank to be returned in a position reversed with respect to its original position. In this case, the fluke angle may be varied unintentionally. Since this angle is relatively critical and since it should be identical in both directions of swing, it is very desirable that this happening be obviated. In accordance with this invention I provide an anchor construction in which the shank can only be inserted and the anchor assembled in one position,

2

thus ensuring assembly with all parts in the same relationship.

To ensure that the shank, flukes and stock remain in the proper relation, it is, of course, necessary to secure the parts together in some manner and various expedients have been adopted for this. These have included welding or brazing of stops on the stock after the anchor was assembled. In another instance, the stock was provided with two lugs spaced apart the width of the crown which is apertured to pass the stock and one of the lugs. When the stock was inserted and turned, both lugs engaged the crown and the stock was in position. To prevent rotation of the stock, a cotter pin was passed through a hole in the stock and was extended between two other lugs on the side of the crown.

To each of the means heretofore provided for securing stock, shank and flukes together, some objection has arisen. For example, an anchor having stops welded on the stock cannot be taken apart without severe treatment, it being necessary to either cut or grind the welded stops away. The use of the cotter pin passed through a matching hole in the stock requires machine drilling or coring. Further, after the anchor has been in use for some time, the cotter pin is relatively difficult to remove.

In accordance with this invention, I provide the fluke structure and shank in any desired manner and one may refer to my aforesaid patents for typical and detailed constructions of these. However, in accordance with the present invention, the crown is slightly modified to include, in addition to the aperture or main bore through which the stock is passed, a smaller aperture or radial slot formed in each side of the crown along the aforesaid aperture. Two projections are formed integral with the stock, one of these being larger than the other and of such a size that it will not pass through the auxiliary apertures or slots provided in the crown, while the smaller one will pass readily. When it is desired to assemble the anchor, it is merely necessary to put the shank in position and to then insert the stock through the aperture in the crown, aligning the smaller projection with the auxiliary apertures and pushing the stock through the crown. The stock passes through the crown until the larger projection comes up against the side of the crown. In this position, the stock is rotated. As soon as the smaller projection passes out of alignment with the auxiliary aperture, the stock is in its final position. The aperture through which the smaller

projection has just passed is then covered to prevent the smaller projection from registering with the aperture. This is accomplished by providing a spring or other closure for the aperture, which closure is readily moved out of position if it be desired to remove the stock.

The radial slot can be placed in any angular relation to the plane of the flukes and to the shank so far as mere assembly of the anchor is concerned. However, to ensure that the anchor can only be assembled with the shank in one position it is essential that the radial slot be provided in the crown and in the shank in such a position that the sum of the acute angle between (1) the radial slot in the crown and the plane of the flukes and the acute angle between (2) the radial slot in the shank and its longitudinal axis be greater than the fluke angle. If the angles defined in (1) and (2) are each greater than half the fluke angle, shank misalignment is impossible; if the angles are each equal to one another and their sum is greater than the fluke angle, the radial apertures will be symmetrically positioned in both elements and shank misalignment is also impossible. If either angle is less than half the fluke angle, even though the total angle approximates but is less than the fluke angle, misalignment is still impossible so long as the shank and flukes are in a normal relationship during assembly, i. e., in a common plane; for, in this case, if the flukes and shank are moved relative to one another, it is possible to assemble the anchor in either of the two possible relationships instead of in only one relationship. However, to do this, it is necessary to move the flukes and shank out of their normal relationship.

The invention includes other objects and features of advantage some of which, together with the foregoing, will appear hereinafter wherein I have disclosed an anchor embodying the present invention.

The invention will become further apparent upon consideration of the following detailed description and of the drawing wherein Figure 1 is a plan view of an anchor embodying the present invention with a portion thereof cut away to illustrate construction.

Figure 2 is a side elevation with the stock in final position.

Figure 3 is a section along line 3—3 in Figure 1.

Figure 4 is a side elevation of a modified construction illustrating the present invention.

Figure 5 is a fragmentary side elevation illustrating another construction.

Referring to the drawing, I provide a fluke structure generally indicated at 6 and including opposite flukes 7 and 8 joined together by a crown structure generally indicated at 9. The crown includes opposite portions 10 and 11 on each side of shank 12. Portions 10 and 11 slope upwardly and rearwardly, as explained in my Patent No. 2,354,666, to raise the crown and so effect rotation of the flukes as the anchor is drawn over bottom.

In accordance with the present invention, crown 9 is formed with an aperture 14 through which a stock 16 can be extended. Shank 12 includes a like aperture 17 so that with the stock in position a pivotal mounting for the fluke and shank is provided by the stock.

In accordance with this invention, I provide an auxiliary aperture or radial slot 18 in crown portion 10, a like aperture or radial slot 19 in the shank 12, and another aperture or radial slot 21 in crown portion 11. The radial slots 18 and 21

in the crown are at an angle to the plane of the flukes which is approximately more than half the fluke angle, the same angle being used for slot 19 in shank 12. As I have indicated, the sum of these angles should be approximately greater than the fluke angle.

In the manufacture of the several anchor parts by casting, provision of the radial slots may require preparation of special cores and special foundry practice to ensure that the sum of the defined acute radial slot angles is greater than the fluke angle, while usual cores and methods can be utilized to provide the slots at slightly smaller angles. In the event the added cost is not deemed warranted, it still is of advantage to provide the radial slots angularly in the crown and in the shank. The normal position of the flukes and shank for assembly is as is illustrated in Figure 2, with the plane of the flukes passing through the longitudinal axis of the shank. With the angular radial slots, this position can only be achieved when the respective acute angles are equal even though their sum is less than the fluke angle. When the shank is reversed, it must be moved and positioned at an angle to the plane of the flukes to permit assembly. This is an unusual procedure, generally sufficient to indicate to any one that the shank has been reversed.

On the side of the stock I provide a first projection 22 and a second projection 23, the latter being smaller than the former and of a size just sufficient to pass through each radial slot 18, 19, and 21 while projection 22 is retained against side 10.

With the shank in its proper and sole assembly position between the flukes, the stock is inserted, its end 24 being first moved through aperture 14, aperture 17 in the end of the shank, and aperture 14 in crown portion 11. Movement of the shank is continued until projection 22 comes up against the side of crown portion 10, projection 23 then being on the opposite side and against crown portion 11. If the stock is now rotated, projection 23 will be taken out of alignment with aperture 21 and the stock will be locked in position. Means are provided for preventing the lug 23 from accidentally entering aperture 21. By mounting a flat spring 26 (Figures 2 and 3) on the side of crown portion 11 or curved spring 30 (Figure 5) so that the projecting end 27 thereof extends over aperture 21 this is ensured. Thus, when the projection 23 passes through aperture 21, it moves the spring out of the way. However, as soon as the stock is rotated the spring moves back into position and cannot be displaced unless the spring is held above the aperture 21 to permit projection 23 to enter.

In Figure 4 I have shown a modified form of device in which a lug 31 is mounted cooperatively on the side of the crown to provide an aperture to receive cotter pin 32. The pin extends over and acts as a closure for the aperture 21, thus preventing extension 23 from again entering aperture 21 unless this is desired and effective steps taken to permit it by removal of the cotter pin 32.

With the anchor assembled the fluke is adjusted as by grinding away those portions of the crown which the shank engages when the flukes move into their extreme angular position with respect to the shank. With the anchor capable of only one assembly position, the fluke angle cannot be varied by inadvertent mis-assembly.

The feature of locking the stock in position is broadly applicable to other devices. For example

5

it can be employed to lock the stock on a kedge type anchor or to lock a pin in a shackle. In either case the spring or cotter pin lock can be provided on the shank of the kedge anchor or on a side of the shackle.

I claim:

1. An anchor of the twin fluke type comprising a shank having a forward and an after end, a pair of flukes, a crown at the after end of the flukes, a stock, said crown and said shank each having an aperture therein to pass said stock whereby the stock provides a pivotal support for the shank and flukes, said stock having a first projection and a second projection thereon spaced apart substantially the width of the crown, said first projection being of a larger size than said second projection, a radial slot formed along a side of said aperture in said crown and in said shank and of a size sufficient to pass only said second projection upon insertion of the stock into the crown and movement of the stock in the crown until said first projection engages a side of said crown and said second projection is substantially in engagement with the opposite side of said crown, said radial slot being at an angle in said crown to the plane of the flukes and at an angle to the longitudinal axis of said shank, each of said angles being substantially equal to one another and the sum of said angles being greater approximately than said fluke angle, as herein defined.

2. An anchor of the twin fluke type comprising a shank having a forward and an after end, a pair of flukes, a crown at the after end of the flukes, a stock, said crown and said shank each having an aperture therein to pass said stock whereby the stock provides a pivotal support for the shank and flukes, said stock having a first projection and a second projection thereon spaced apart substantially the width of the crown, said first projection being of a larger size than said second projection, a slot formed along a side of said aperture in said crown and in said shank and of a size sufficient to pass only said second projection upon insertion of the stock into the crown and movement of the stock in the crown until said first projection engages a side of said crown and said second projection is substantially in engagement with the opposite side of said crown, a lug on the side of said crown cooperatively adjacent the slot and said second projection, and means removably carried by said lug and normally in a position thereon to prevent said second projection from re-entering the slot except when said last mentioned means is removed from said lug to expose said slot.

3. An anchor of the twin fluke type comprising a shank having a forward and an after end, a pair of flukes, a crown at the after end of the flukes, a stock, said crown and said shank each having an aperture therein to pass said stock whereby the stock provides a pivotal support for the shank and flukes, said stock having a first projection and a second projection thereon spaced apart substantially the width of the crown, said first projection being of a larger size than said second projection, a radial slot formed along a side of said aperture in said crown and in said shank and of a size sufficient to pass only said second projection upon insertion of the stock into the crown and movement of the stock in the crown until said first projection engages a side of said crown and said second projection is substantially in engagement with the opposite side of said crown, said radial slot extending radially

6

in said crown and shank in the same direction from the longitudinal axis of said crown and shank aperture and at an angle to the common longitudinal axis of the shank and the plane of said pair of flukes which angle is approximately greater than half the fluke angle.

4. An anchor of the twin fluke type comprising a shank having a forward and an after end, a pair of flukes, a crown at the after end of the flukes, a stock, said crown and said shank each having an aperture therein to pass said stock whereby the stock provides a pivotal support for the shank and flukes, said stock having a first projection and a second projection thereon spaced apart substantially the width of the crown, said first projection being of a larger size than said second projection, a radial slot formed along a side of said aperture in said crown and in said shank and of a size sufficient to pass only said second projection upon insertion of the stock into the crown and movement of the stock in the crown until said first projection engages a side of said crown and said second projection is substantially in engagement with the opposite side of said crown, said radial slot being at an angle in said crown to the plane of the flukes and at an angle to the longitudinal axis of said shank, each of said angles being at least substantially equal to one-half said fluke angle as herein defined, and means adapted to be positioned over that crown slot immediately adjacent said second projection to prevent said second projection from re-entering said crown slot.

5. An anchor of the twin fluke type comprising a shank having a forward and an after end, a pair of flukes, a crown at the after end of the flukes, a stock, said crown and said shank each having an aperture therein to pass said stock whereby the stock provides a pivotal support for the shank and flukes, said stock having a first projection and a second projection thereon spaced apart substantially the width of the crown, said first projection being of a larger size than said second projection, a slot formed along a side of said aperture in said crown and in said shank and of a size sufficient to pass only said second projection upon insertion of the stock into the crown and movement of the stock in the crown until said first projection engages a side of said crown and said second projection is substantially in engagement with the opposite side of said crown, said radial slot being at an angle in said crown to the plane of the flukes and at an angle to the longitudinal axis of said shank, each of said angles being at least substantially equal to one-half said fluke angle, as herein defined, and a spring member secured on a side of said crown and normally extending over said slot to prevent re-entrance of said second projection.

6. An anchor of the twin fluke type comprising a shank having a forward and an after end, a pair of flukes, a crown at the after end of the flukes, a stock, said crown and said shank each having an aperture therein to pass said stock whereby the stock provides a pivotal support for the shank and flukes, said stock having a first projection and a second projection thereon spaced apart substantially the width of the crown, said first projection being of a larger size than said second projection, a radial slot formed along a side of said aperture in said crown and in said shank and of a size sufficient to pass only said second projection upon insertion of the stock into the crown and movement of the stock in the crown until said first projection engages a side of said crown and

said second projection is substantially in engagement with the opposite side of said crown, said radial slot being at an acute angle in said crown to the plane of said flukes and at substantially the same angle to the longitudinal axis of the shank, the sum of said angles being at least equal to the fluke angle, as herein defined.

7. An anchor of the twin fluke type comprising a shank having a forward and an after end, a pair of flukes, a crown at the after end of the flukes, a stock, said crown and said shank each having an aperture therein to pass said stock whereby the stock provides a pivotal support for the shank and flukes, said stock having a first projection and a second projection thereon spaced apart substantially the width of the crown, said first projection being of a larger size than said second projection, a radial slot formed along a side of said aperture in said crown and in said shank and of a size sufficient to pass only said second projection upon insertion of the stock into the crown and movement of the stock in the crown until said first projection engages a side of said crown and said second projection is substantially in engagement with the opposite side of said crown, said radial slot being at an acute angle in said crown to the plane of said flukes and at substantially the same angle to the longitudinal axis of the shank.

8. An anchor of the twin fluke type comprising a shank having a forward and an after end, a pair of flukes, a crown at the after end of the flukes, a stock, said crown and said shank each having an aperture therein to pass said stock whereby the stock provides a pivotal support for the shank and flukes, said stock having a first projection and a second projection thereon spaced apart substantially the width of the crown, said first projection being of a larger size than said second projection, a radial slot formed along a side of said aperture in said crown and in said shank and of a size sufficient to pass only said second projection upon insertion of the stock into the crown and movement of the stock in the crown until said first projection engages a side of said crown and said second projection is substantially in engagement with the opposite side of said crown, said radial slot being at an acute angle in said crown to the plane of said flukes and at substantially the same angle to the longitudinal axis of the shank, the sum of said angles being less than the fluke angle, as herein defined.

9. In combination, a first member having an aperture therein and a radial slot formed along a side of said aperture, a second member adapted to be inserted into and passed through said aperture with a projection thereon matching said slot, and a lug on a side of said first member and

having an aperture therein adapted to receive and to position a cotter pin in slot covering position, and a cotter pin in said lug aperture covering said slot to prevent said projection from re-entering said slot while said projection is in engagement with said side.

10. In combination, a first and a second member spaced apart and positioned in a side by side relationship, said members each having a passageway therein aligned along a common axis, said passageway including a slot formed along a side thereof in each of said pair of members, a rod member having a first and a second lug thereon, said rod member and said second lug being of a size sufficient to permit said rod member to be inserted in said passageway with said second lug passing along said slot until said first lug abuts the outer face of said first member and said second lug rests against the outer face of said second member, a third lug on said outer face of said second member adjacent said slot, and a cotter pin positioned in said third lug and covering said slot to prevent said second lug from registering with said slot.

11. An anchor of the twin fluke type comprising a shank having a forward and an after end, a pair of flukes, a crown at the after end of the flukes, a stock, said crown and said shank each having an aperture therein to pass said stock whereby the stock provides a pivotal support for the shank and flukes, said stock having a first projection and a second projection thereon spaced apart substantially the width of the crown, said first projection being of a larger size than said second projection, a first radial slot formed along a side of said aperture in said crown and at an acute angle to the projected plane of said flukes, a second radial slot in said shank formed along a side of said aperture in said shank at an acute angle to the longitudinal axis of said shank, said first and second slots being of a size sufficient to pass only said second projection upon insertion of the stock into the crown and movement of the stock in the crown until said first projection engages a side of said crown and said projection is substantially in engagement with the opposite side of said crown, the sum of said angles being greater than said fluke angle, as herein defined.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,036,275	Langford	Aug. 20, 1912
2,249,546	Danforth	July 15, 1941