

# PATENT SPECIFICATION

(11) 1 571 008

1571 008 (21) Application No. 8901/77 (22) Filed 2 March 1977  
 (31) Convention Application No. 7 603 000  
 (32) Filed 3 March 1976 in  
 (33) Sweden (SE)  
 (44) Complete Specification published 9 July 1980  
 (51) INT CL<sup>3</sup> B63B 21/36  
 (52) Index at acceptance B7V 302 306 HG



## (54) A COLLAPSIBLE ANCHOR

(71) I, ARVID ISAKSSON, of N—  
 Torngatan 17, S—531 00 Lidköping, Sweden,  
 a subject of the King of Sweden, do hereby  
 declare the invention, for which I pray that a  
 5 patent may be granted to me, and the method  
 by which it is to be performed, to be par-  
 ticularly described in and by the following  
 statement:—

10 The present invention relates to a collapsible anchor.

According to the present invention there  
 is provided a collapsible anchor comprising  
 two shanks, each provided with a fluke ex-  
 tending laterally of the shank, the shanks  
 15 being pivotably interconnected by a bolt  
 which passes through holes in end portions  
 of the shanks, one of the end portions engag-  
 ing an abutment on the bolt and the other  
 end portion being engaged by a compressed  
 20 resilient element disposed between that other  
 end portion and a further abutment on the  
 bolt, each end portion being inclined to the  
 main portion of the respective shank, and the  
 end portion of one of the shanks engaging  
 25 the other shank in such a way as to prevent  
 relative pivotal movement of the shanks out  
 of an operative position in which the shanks  
 are inclined to one another, the end portions  
 being tiltable away from each other by com-  
 30 pressing the resilient element to move the  
 end portion of the said one of the shanks out  
 of engagement with the said other shank to  
 allow the shanks to be folded together into  
 an inoperative position.

35 For a better understanding of the present  
 invention and to show how it may be carried  
 into effect, reference will now be made, by  
 way of example only, to the accompanying  
 drawings, in which:

40 Figure 1 shows a collapsible anchor in an  
 operative position on the sea bed;

Figure 2 is a front elevation of the anchor  
 of Figure 1;

45 Figure 3 is a side elevation of the anchor  
 of Figures 1 and 2;

Figure 4 shows the anchor of Figures 1 to  
 3 in a collapsed, inoperative position;

Figures 5 and 6 show, on a larger scale and  
 in partial section, two views of part of the

anchor of Figures 1 to 4 in the operative  
 position; and

Figures 7 and 8 correspond to Figures 5  
 and 6 but show the anchor during collapsing  
 into the inoperative position.

The anchor shown in the drawings com-  
 prises two parts or halves 1 and 1'. Each  
 part comprises an anchor shank 2 and 2',  
 respectively, and a fluke 3, 3', respectively.  
 At the end of each shank away from the  
 fluke, there is an inclined end portion 4 and  
 4', respectively. An eyebolt 6 extends through  
 holes 5 and 5', respectively, in the above-  
 mentioned end portions. The function of these  
 fittings will be described in greater detail  
 below.

Since both of the parts 1 and 1' are sub-  
 stantially identical, only one part will be  
 described in detail.

In the part 1, the shank 2 consists of a  
 rectangular-section steel rod or the like the  
 main portion of which is straight and which,  
 at its upper end 4, is bent and provided with  
 the hole 5. The fluke 3 is fixed at the other,  
 end 8 of the shank. The fluke consists of a  
 slightly arched plate of relatively thick sheet  
 metal and is—apart from a portion 9 which  
 is located on a level with the joint line be-  
 tween shank and fluke—substantially triangu-  
 lar. It should, however, be noted that the  
 apex of the triangle is offset so that it lies  
 adjacent a plane passing through the shank.  
 The point or bill 10 of the fluke 3, which  
 thus corresponds to the apex of the triangle,  
 is very sharp as compared with the bills of  
 conventional anchors. The edge portions 11  
 and 12 of the fluke which are to bury them-  
 selves in the sea bed are designed as cutting  
 edges in that the edges at the side of the fluke  
 3 facing out from the shackle end of the  
 shank are bevelled.

The function of the folded-out anchor is  
 apparent from Figures 1, 2 and 3. In Figure  
 1, the anchor is seen lying on the sea bed B  
 before the anchor line has been tightened. It  
 is apparent from this Figure that one fluke 3  
 rests with its point 10 on the sea bed, whilst  
 the rear edge of the other fluke 3' and the  
 upper ends of the shanks 2, 2' rest against

50

55

60

65

70

75

80

85

90

95

the sea bed. As soon as the anchor line is tightened, the point 10 will bury itself in the sea bed.

5 In Figure 1, the sea bed is indicated by the line B and the direction of the anchor line is shown by the line D. It is clearly apparent from this drawing that if the line is pulled in the direction D that the fluke will bury itself in the direction Y.

10 The reason why the position of the apex of the triangle or the point 10 is offset in towards the plane in which the shank 2 lies is apparent from the drawings. Since the anchor, or in any event the operative fluke 3 lies, in the initial position, inclined in relation to the bed B, the point should be laterally offset in order to realize an even loading of the fluke so that it strives to cut through the bed material when the line is tightened and the shank 2 will be aligned with the line.

15 When engagement with the bed material has been established, that is to say when the fluke 3 has cut down into the bed material, the inoperative part 1' of the anchor (that is to say the shank 2' and the fluke 3') does not participate directly in the retention function, serving merely as a stabilizer.

20 A substantial advantage in the illustrated anchor is that, irrespective of how the anchor is turned when it reaches the bottom, one fluke will always be positioned so that its point can bury itself in the sea bed. If the anchor lies such that the eyebolt faces in the wrong direction, the anchor will tip over or turn about the downwardly facing fluke as soon as the anchor line is tightened.

25 The previously mentioned inclined end portions 4 and 4' at the upper ends of the shanks are equidistant from the fluke on each respective shank. Because, as is shown in the drawings, the portions 4 and 4' abut against each other, one anchor part will be slightly offset relative to the other half. This means that the anchor parts can be totally collapsed in on each other so that, as is apparent from Figure 4, the fluke 3 will lie above the fluke 3' and the shanks will be closely adjacent one another.

30 The locking mechanism for the anchor parts, in which are included the inclined portions 4 and 4', the eye bolt 6 and the holes 5 and 5' therefor, is constructed and functions in the following manner.

35 At the inclined end portion 4 provided on the one shank 2, the hole 5 is located a distance  $a$  from the transition 13 between the shank and the inclined end portion. The hole in the inclined end portion 4' provided on the other shank 2' is located a distance  $b$  from the free end 14 of this portion, the distance  $a$  being equal to or insignificantly greater than the distance  $b$ . The distance  $c$  between the hole 5' and a slightly bevelled corner 15 of the portion 4' is, however,

40 greater than the distance  $a$ . As long as the portion 4' is kept in face-to-face contact with the portion 4, the shanks 2 and 2' cannot be turned relatively to one another about the axis of the eye bolt 6 because of the position of the corners 15 and 16 of the portion 4'. A resilient means in the form of a ring 18 of rubber or the like is mounted between the upper side of the inclined end portion 4 of the shank 2 and a washer 17 fixedly disposed on the bolt shaft adjacent the ring and serving as an abutment. The end of the bolt shaft projecting downwardly through the holes 5 and 5' is provided with an abutment in the form of a stop ring 19 and the fit between the bolt shaft and at least one of the holes (preferably the hole 5' of the portion 4') is such that a certain freedom of movement is allowed for. This freedom of movement is achieved if the hole is made conical or possibly biconical.

45 The biasing action of the resilient ring 18 ensures a determined abutment pressure between the inclined portions 4 and 4' of the shanks 2 and 2', and thereby locking of the shanks in the operative position.

50 When the anchor is to be collapsed, the flukes are pulled apart from each other, and it is then possible to cause the corner 15 of the portion 4' to slide past the inner side 20 of the shank 2 which slopes outwardly away from the hole. When the flukes are pulled apart from each other, the resilient means will, as is apparent from Figures 7 and 8, be compressed. The bolt will thereby be shifted slightly in the axial direction and also incline somewhat with respect to the hole 5'. When the projecting corner portion 15 has slid a distance along the shank surface 20 such that the centre point of the surface has been passed, the resilient means will assist in the continued movement in the collapsing direction. In the event of movement in the opposite direction, a similar compression of the resilient means must take place before the shanks reach their correct operative position and, also in this case, the means 18 assists in the movement towards the end position once the corner 15 has passed the centre point of the shank surface 20.

55 The idea with the locking of the anchor in the operative position is essentially such that turning of the shanks in relation to each other cannot take place without manual movement of the flukes apart from each other. Other forces which may act upon the anchor during the anchoring operation will be in the opposite direction, so that the anchor will thereby be locked even harder.

60 Adaptation of the position of the hole 5' in relation to the region 21 at the transition between the shank 2' and the portion 4' can realize a similar locking function when the shanks 2 and 2' reach their collapsed position shown in Figure 4. Thus, the distance  $b'$  and

70

75

80

85

90

95

100

105

110

115

120

125

130

*c'* in Figure 7 should correspond substantially to the distances *b* and *c*.

5 The device described provides realizes a simple, rapid and effective locking mechanism which, moreover, totally lacks movable parts with a tendency to corrode.

**WHAT WE CLAIM IS:—**

1. A collapsible anchor comprising two shanks, each provided with a fluke extending laterally of the shank, the shanks being pivotably interconnected by a bolt which passes through holes in end portions of the shanks, one of the end portions engaging an abutment on the bolt and the other end portion being engaged by a compressed resilient element disposed between that other end portion and a further abutment on the bolt, each end portion being inclined to the main portion of the respective shank, and the end portion of one of the shanks engaging the other shank in such a way as to prevent relative pivotal movement of the shanks out of an operative position in which the shanks are inclined to one another, the end portions being tiltable 25 away from each other by compressing the resilient element to move the end portion of the said one of the shanks out of engagement with the said other shank to allow the shanks to be folded together into an inoperative position.

2. A collapsible anchor as claimed in claim 1, in which the resilient element is a rubber ring.

3. A collapsible anchor as claimed in claim 1 or 2, in which the end portion of the said one of the shanks has a bevelled edge which engages the surface of the said other shank adjacent the transition between the main portion and the end portion of that other shank.

4. A collapsible anchor as claimed in any one of claims 1 to 3, in which the bolt is a clearance fit in the hole in the end portion of the said one shank.

5. A collapsible anchor substantially as described herein with reference to the accompanying drawings.

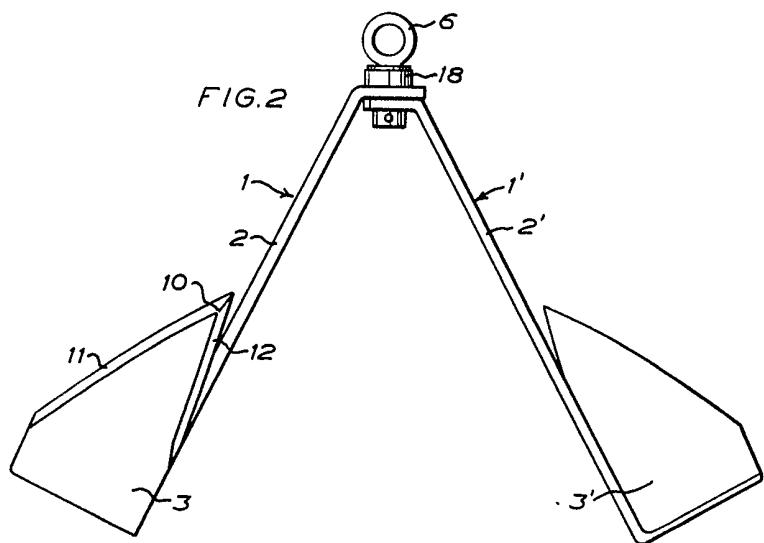
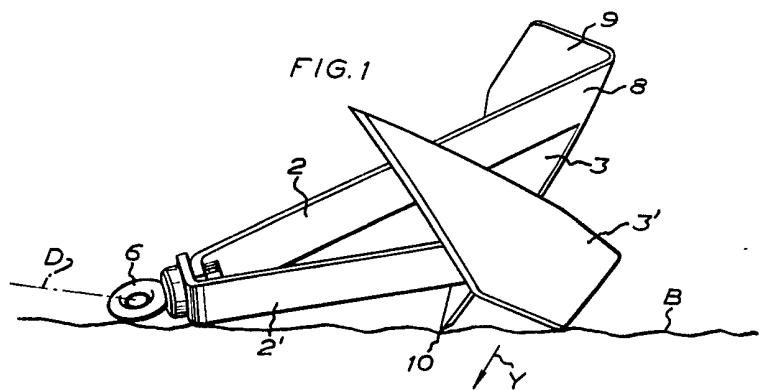
35

40

45

HASELTINE LAKE & CO.,  
Chartered Patent Agents,  
28 Southampton Buildings,  
Chancery Lane,  
London WC2A 1AT  
— and —  
Temple Gate House,  
Temple Gate,  
Bristol BS1 6PT  
—also—  
9 Park Square,  
Leeds LS1 2LH.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1980.  
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from  
which copies may be obtained.



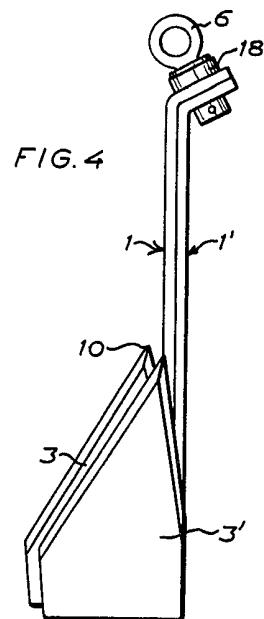
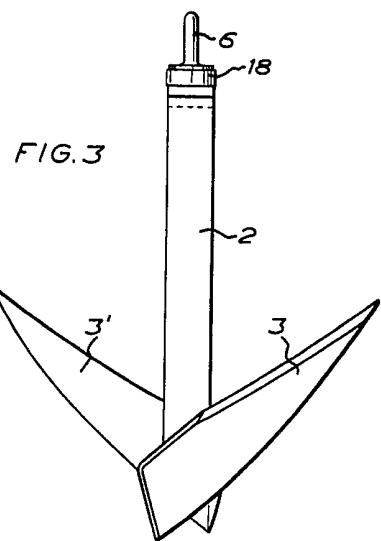


FIG.5

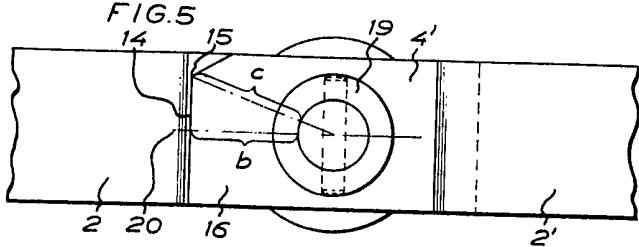


FIG.6

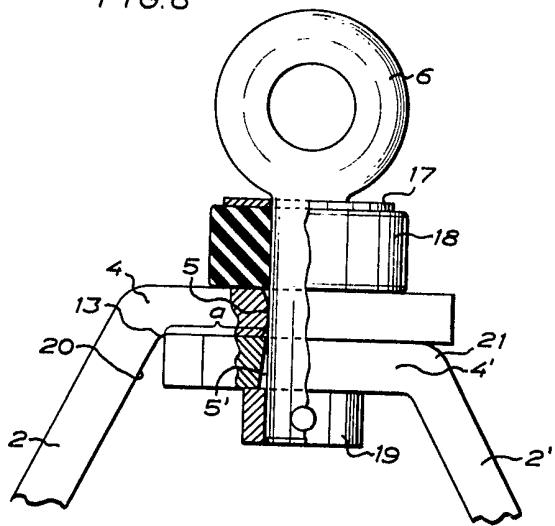


FIG. 7

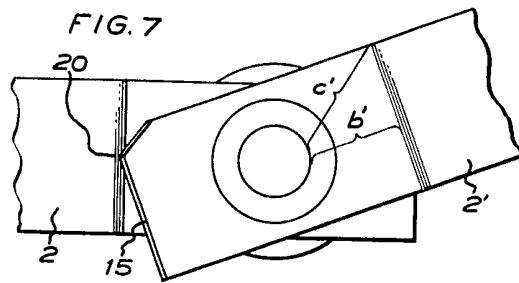


FIG. 8

