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54 **Device for scouring the walls from underwater-lying structures.**

57 There is described an apparatus for treating, for example scouring the walls from under-water-lying structures, notably the curved walls thereof or the walls lying at an angle to one another, which is formed by two brushes or scrapers (4) rotating in opposite direction, which are mounted on a common frame, which is comprised of two components (1,2) which have an hinged connection (3) which coincides with that symmetry plane which extends between said brushes or scrapers (4).

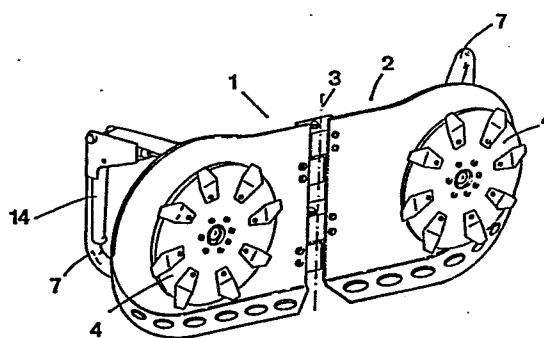


FIG. 3

"Device for scouring the walls from underwater-lying structures".

5 This invention relates to an apparatus for treating, for example scouring the walls from underwater -lying structures, notably the curved walls thereof or walls which lie at an angle to one another.

10 An apparatus which is designed for the same purpose has been described in French Patent Application 77 05.124. The apparatus according to said Application is fitted with two brushes which are hinged relative to a fixed frame. The diver which operates the apparatus can because said brushes are fitted with a handle, adjust each brush independently from the other one at any angle relative to the frame and to one another.

20 The described apparatus has for disadvantage that the diver has to adjust the brushes independently from one another, which is of advantage but in a very limited number of conditions. The drawback of the apparatus is however to be seen in both brushes not adjusting automatically to irregularities of those surfaces to be cleaned. Underwater-lying ship walls, the legs or components from drilling platforms, etc., have locally substantial irregularities or projections as well as accumulations of shell-fishes and/or sea-

weeds. It is frequent to encounter such accumulations in the shape of compact calcareous deposits. When during the use of such an apparatus, a single-sided resistance is encountered, this causes a change in those forces which act on said brushes. Due to the revolving motion of the brushes, a sidewise pressure is exerted on the apparatus. There results therefrom an uncontrolled rotation of the apparatus which has to be taken up by the diver and actually by adapting the adjustment angle of the other brush which is for the time being not in engagement with such an obstacle. The apparatus has then always to be brought in the suitable direction by swimming movements of the diver.

The invention has for object to obviate these and other drawbacks of the known apparatus, and to provide an apparatus which is operatable by the swimmer with a minimum of effort.

Another object of the invention is to provide an apparatus which due to synchronizing of the brushes and to the design of the apparatus, insures an uniform propulsion thereof even when treating irregular surfaces, particularly when the one brush encounters an obstacle which offers a higher resistance.

A further object of the invention is to provide an apparatus which makes possible a larger positive and negative angular displacement.

To obtain these objects according to the invention, the apparatus is formed by two brushes or scrapers rotating in opposite direction, which are mounted on a common frame, which is comprised of two

components which have an hinged connection which coincides with that symmetry plane which extends between said brushes or scrapers.

5 Other details and features of the invention will stand out from the following description, given by way of non limitative example and with reference to the accompanying drawings, in which :

10 Figure 1 is a diagrammatic showing of the apparatus when treating a cylinder- shaped structure.

Figure 2 is a diagrammatic front view of the apparatus as shown in figure 1.

Figure 3 is a bottom view in perspective, of the apparatus according to the invention.

15 Figure 4 is a top view in perspective, of the apparatus as shown in figure 3.

Figure 5 is a perspective showing on another scale, of the apparatus as shown in figures 3 and 4, as it is used by a diver.

20 The apparatus as shown in the figures, is comprised of two frame components 1 and 2, which are connected together by a hinge connection 3, which has been shown in figures 3 and 4 by a dot-and-dash line 3. A brush or knife disc 4 is rotatably mounted
25 on each frame component. Each brush or disc is driven by a hydraulic motor 5, even if it might be considered to drive said brushes or discs with electric or pneumatic motors.

30 As the hinge 3 lies in that symmetry plane which runs through the apparatus between said frame components 1 and 2, the apparatus fits narrowly against

the rounding of any curved structure 6 to be scoured or cleaned (figures 1 and 5).

5 To each frame component is secured a handle 7 which extends preferably slightly slanting outwards relative to frame components 1 and 2.

10 The hinge connection generally shown in 3 between said frame components 1 and 2, is comprised in a preferred embodiment, of elements 8 and 9, whereby the elements 9 are secured to frame component 1 and elements 8 to frame component 2. In each two-element set, one element 9 is hingedly water-tight connected to an element 8. Lines 10, 11 and 10', 11' respectively, connect the hydraulic or pneumatic motors 5 to the inlet line 12 and outlet line 13, 15 respectively, and actually above each element set 8,9. When the brushes are driven by electric motors, the lines 10, 11, 10', 11' are used as tubes for electric cables.

20 On the one handle 7 is mounted an operating member 14 which can control as well the starting as the stopping of the motors, by opening or closing a valve.

25 As the rotating brushes or discs cause underwater a suction force, whereby the apparatus presses strongly against the surface to be cleaned so that both frame components connect tightly to the surface to be cleaned, and as the brushes or discs rotating towards one another cause a forward-directed force to be generated, it is very simple for the diver 30 who operates the apparatus, to follow all of the irregularities of the surfaces to be treated. This

is also due to that hinge axis about which said components 1 and 2 with the brushes mounted thereon, swing, lying very near to the surface to be cleaned. When the brush hinge axis is located too far away from the surface to be cleaned, as this is the case according to said French Patent Application, it is essentially impossible to make use simultaneously of the brush suction force and the automatic adaptation of that angle under which the brushes work on the irregularities of the walls or surfaces to be scoured.

Due to the described structure, a positive as well as a negative angular arrangement of the frame components 1 and 2 is possible, and this in spite of the motors 5 and hinge elements 8 and 9 being covered with housings 20 (figure 5) in a preferred embodiment.

Referring again to figures 1 and 5, there will be noted the curved surface 6 as well as the angle whereunder the apparatus is adjusted, which angle corresponds to the rounding of the surface to be cleaned. Reference 15 shows underwater growth which is to be removed with the apparatus. The removed impurities are projected together with a water stream due to the turbine-action of the revolving brushes or discs, backwards relative to the apparatus. Said water stream with the removed impurities is generally shown in 16. Said lines 12, 13 and possibly an electric line 17 are arranged together in an interlaced sleeve 18, for example. Said sleeve or line 18 leads to a diagrammatically-shown drive unit 19.

To further increase the manoeuvrability under water of the apparatus, a material having a high buoyancy is fastened to components 1 and 2, Said material is not shown in the figures, but may
5 take any shape and extension depending on the specific weight thereof.

It must be understood that the invention is in no way limited to the above embodiments and that many changes may be brought thereto without
10 departing from the scope of the invention as defined by the appended claims.

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CLAIMS.

1. Apparatus for treating, for example scouring the walls from underwater-lying structures, notably the curved walls thereof or the walls lying at an angle to one another, which is formed by two brushes or scrapers (4) rotating in opposite direction, which are mounted on a common frame, which is comprised of two components (1,2) which have an hinged connection (3) which coincides with that symmetry plane which extends between said brushes or scrapers (4).

2. Apparatus as defined in claim 1, in which said brushes are disc-shaped brushes.

3. Apparatus as defined in either one of claims 1 and 2, in which a handle (7) is secured to each said components (1,2).

4. Apparatus as defined in any one of claims 1 to 3, in which on at least the one said handles (7) is provided an operating member (14) for controlling either the fluid, or the electric current for the driving of those hydraulic motors (5) or electric motors, respectively, which drive the brushes or disc-shaped tools (4).

5. Apparatus as defined in any one of claims 1 to 4, in which said hinge connection is formed by at least two sets of mutually-connected hinging elements (8,9), whereby in each set, the one element is secured to the one component, and the other element on the other component of said frame, and to each element is connected a line (10,11; 10', 11') which connects said element to a motor, which line is

used either as line for a fluid, or as a tube for
an electric cable.

6. Apparatus as defined in any one of
claims 1 to 5, in which to said components (1,2) said
5 frame is made of, is fastened a material which has
buoyancy.

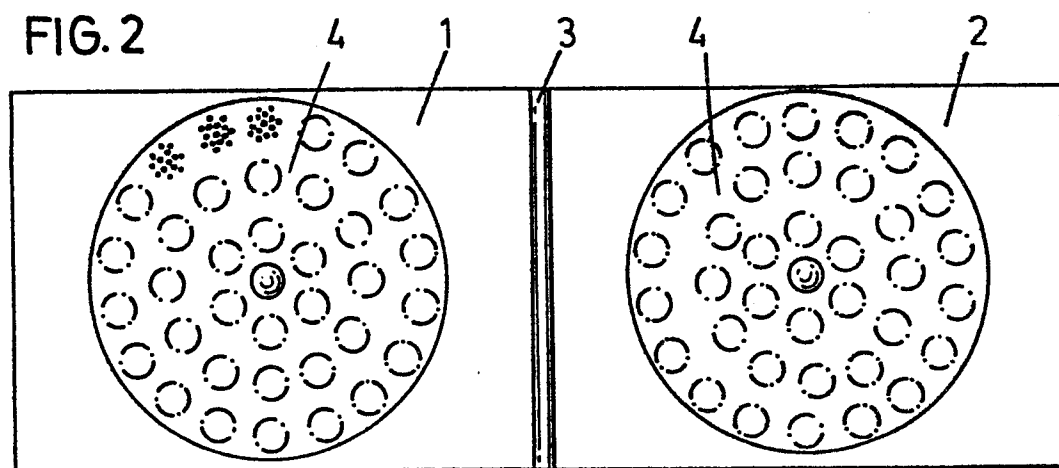
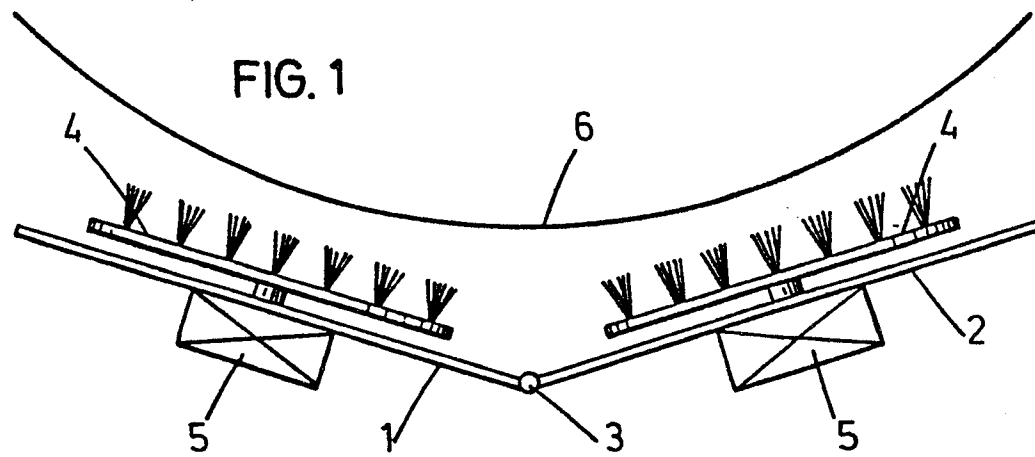
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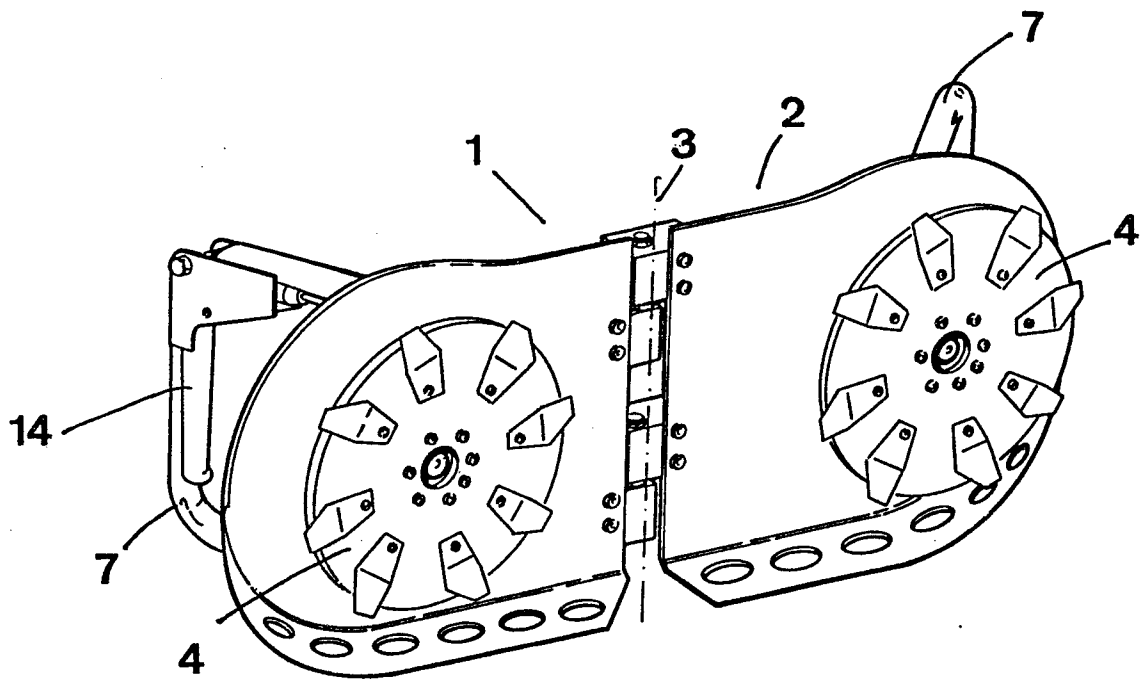


FIG. 3

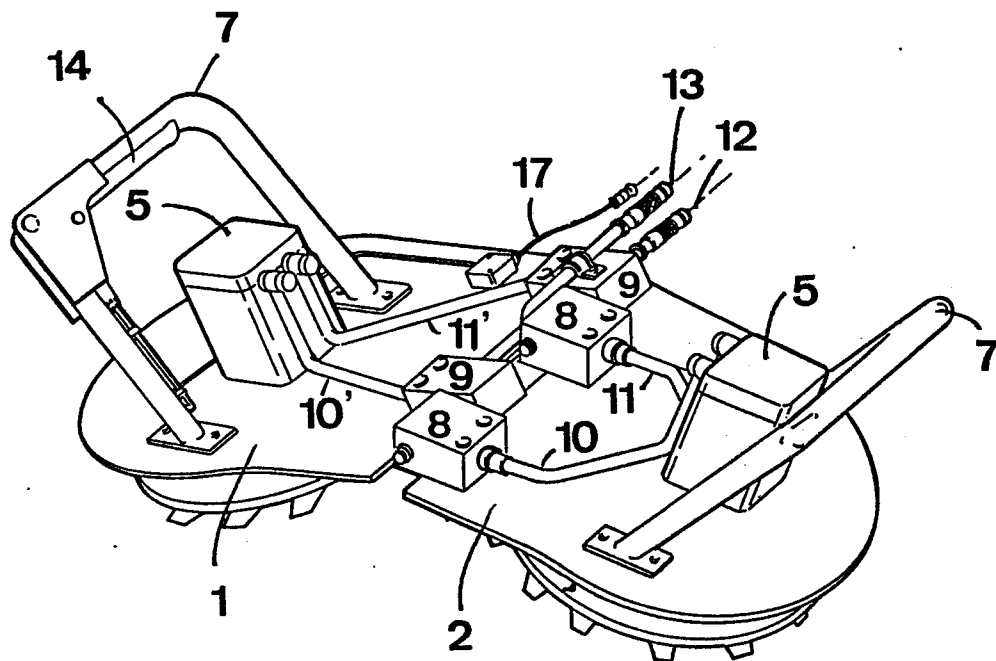
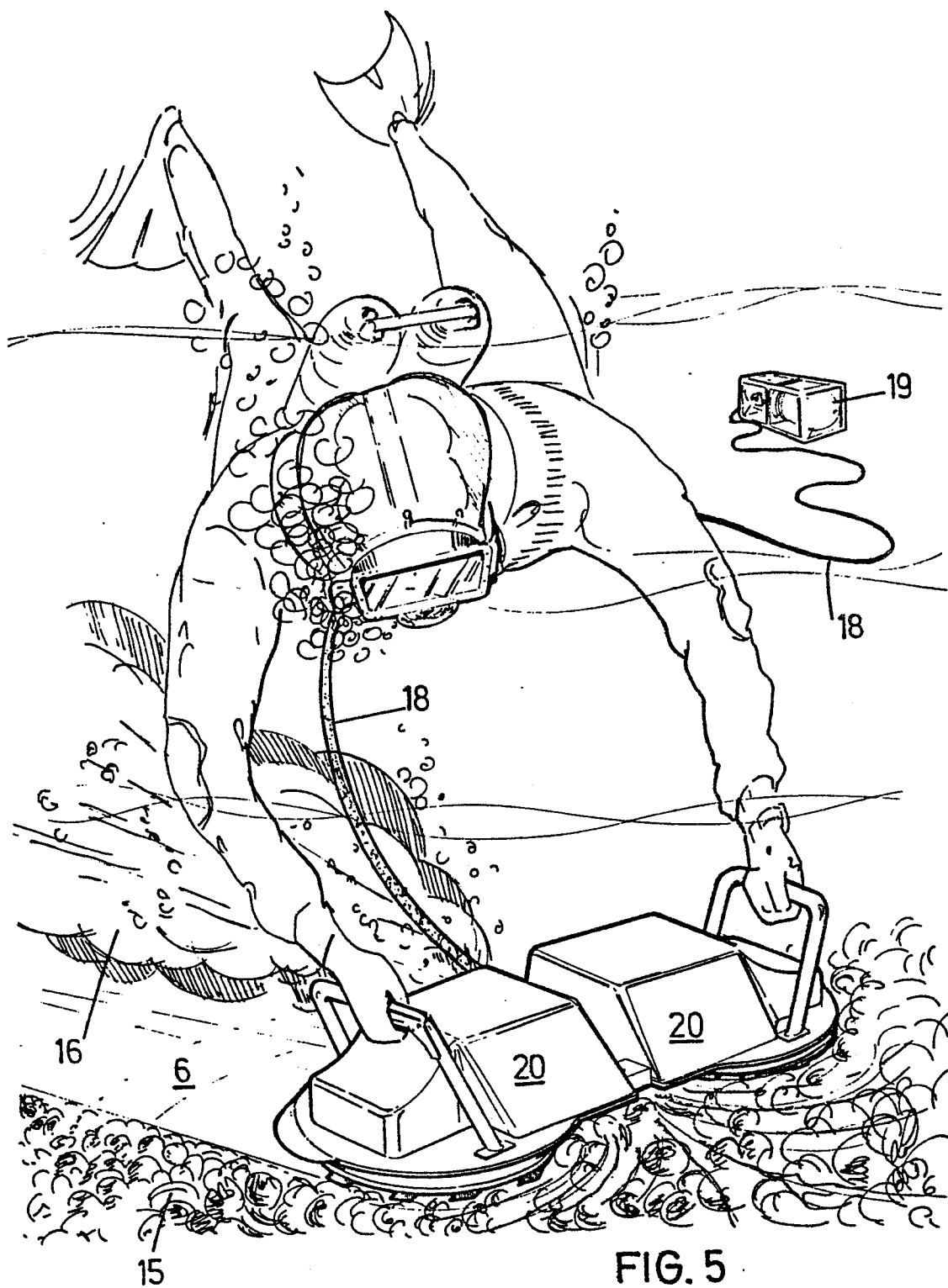


FIG. 4





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Y	FR-A-2 342 875 (INDUSTRIAL RESEARCH AND STANDARDS) * Whole document *	1-5	B 08 B 1/04 B 63 B 59/00
Y	US-A-3 360 816 (FONTECCHIO) * Whole document *	1-5	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			B 08 B B 63 B E 04 H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 02-10-1984	Examiner VAN BOGAERT J.A.M.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			