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(12) # EUROPEAN PATENT APPLICATION

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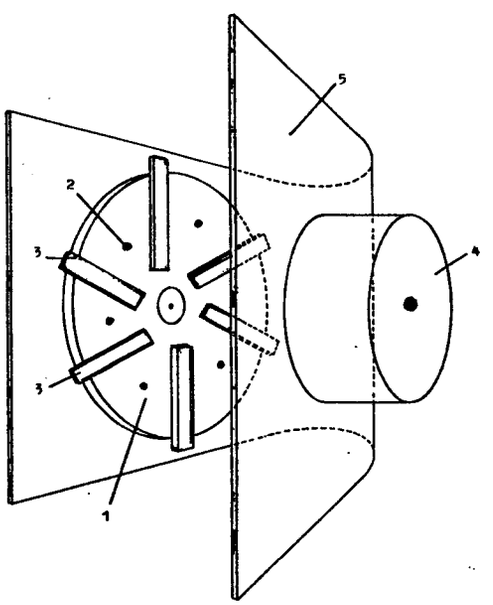
(54) **A working method and a device for the removal of growth from constructions under the sea level.**

(57) A method for removal of growth from underwater constructions using a flexible slab which has rotatory discs with longitudinal elements in secant configuration.



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(Translation).

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Applicant: Gerrit Broersz, at Schoonhoven.

A working method and a device for the removal of growths on constructions under the sea water level.

The invention relates to a device for the removal of growths on constructions of several origins, which are under the sea water level, such as pilars and other supports of artificial islands for oceanographic investigation and for the winning of raw materials, comprising drilling platforms as well as pipe lines etc.

In the British Patent Application 84.25.322 and the Netherlands Patent Application 85.01.089 a device is described for the scrubbing and removal of growths and foulings from structures which are under or above the water level.

The device described therein has appeared to be particularly appropriate for the removal of crustaceans and other growths from constructions used for the support of artificial islands as well as from floating constructions.

It is characterized by a flexible sheet upon which two or more shields are mounted, upon each of which a driving mechanism is attached, which by means of conduit pipes pneumatically or hydraulically can rotate a driving shaft which is perpendicularly mounted upon said flexible sheet and upon which different mutually exchangeable bearing devices with scrubbing means can be fastened.

In this way any profiles, elevations etc. can be scoured off.

The flexible sheet can be moved around bent curved surfaces.

By the scrubbing means the growths are removed effectively while no damage of the construction can take place, such as that which is likely to appear by removal of growths with linearly applied hand tools, such as chisels, mallets etc.

Upon the used bearing devices, which have a circular circumference, knives, bristles, teeth and/or scouring cushions are used as scrubbing means.

Surprisingly it now appeared that a considerably improved result with this work can be obtained if the scouring elements will neither be located as a bristle or as a flat circular scrubbing element around the axis of the bearing device nor be fastened in radial direction with regard to the axis of the bearing device.

The novel pneumatically or hydraulically driven apparatus, as intended in the first paragraph, is characterized according to the present invention in that exchangeable circular discs, to be affixed on the driving shaft, are provided with steel chisels or plain-iron cutters placed in a secant configuration with respect to the circumference, the horizontal axis of said chisels or cutters having an angle of 30^{o} towards the radius of said discs. Preferably six or more of said chisels are fastened in this way upon the circular disc of the scouring device.

The material and the shape of said chisels are selected according to an assortment, which gives the choice dependent on the kind of the surface to be cleaned and in particular on the nature of the growths to be removed, which may vary from coralline, shell valves, mussels, seaweed, algae, corrosion, to tectonic and chemical crusts and filthiness.

According to one embodiment of the tool under the invention, to which it is not restricted however, this consists of a circular disc upon which rectangular elements or means are welded which are square in cross-section, and which are bevelled along one of the oblong edges in the shape of a chisel. By the rotatory motion a powerful impulsion is caused, which results in a fast and efficacious crumbling off of the growth or fouling sediment.

Other shapes of the scouring elements are used with this device as well, in particular with straight parts, and with parts deflected at the extremities, extending at the outer side of the circular contours of the rotatory disc, said deflected parts reaching upwards or downwards respectively.

For the removal of miscellaneous types of growth, which appear in practice, these shapes of elements will be combined with one another.

Furthermore they can also be put upon discs provided with bristles, the threads of which being of metal or of polymers, and standing perpendicularly with respect to each disc, such that an action results, which is simultaneously shattering, scouring and wiping off.

Practical experiments have been carried out by divers, which showed that sweeping with the described types of the device enables a complete cleansing under severe conditions, such as are appearing in tropical estuaries and at continental shelves along tropical shores.

The invention is further elucidated on the basis of the enclosed figures 1-5.

Figure 1 shows a view of one embodiment of the device according to the present invention.

Therein 1 is the circular disc, which is mounted with bolts (2) upon the rotatory means being driven pneumatically or hydraulically at the flexible sheet, and (3) reproduces the rectangular chisel-shaped scouring elements each being placed in a secant configuration, under an angle of 30^{o} with respect to the radius of the disc.

Figure 2 shows a view of the underside and a side view of a scouring tool according to the invention.

Figure 3 shows schematically the placing of two rotatory scouring devices which rotate in directions opposite to one another.

Figure 4 shows a side view of the device according to the invention.

Figure 5 shows views of alternative shapes of discs provided with scouring elements, as intended according to the present invention.

Claims:

1. A device for the removal of growths upon constructions under the sea water level with the aid of a flexible sheet, upon which shields are mounted upon each of which a driving mechanism is attached, which by means of conduit pipes can rotate a driving shaft situated perpendicularly with respect to said flexible sheet, upon said shaft bearing tools for scouring elements being fastened, characterized in that exchangeable round plates or discs (1), to be fastened on said driving shaft, are provided with rectangular steel chisel-shaped scouring elements (3) placed in a secant configuration with respect to the circumference, the horizontal axis of said elements having an angle of 30^{o} towards the radius of the disc.

2. A device according to claim 1, characterized in that six chisels are positioned in a secant direction upon the round discs.

3. A device according to claim 1 or 2, characterized in that the steel chisels are longitudinally shaped and extend outside the circumference of said disc.

4. A device according to any of claims 1-3, characterized in that said steel chisels are bevelled along one of the oblong edges.

5. A device according to claim 1, characterized in that said chisels are bent around the edge of said disc.

6. A device according to claim 1, characterized in that said discs are furthermore provided with bristles.

7. A working method for the removal of growths on constructions under the sea water level, characterized in that for the purpose one or several devices according to one of the claims 1 through 6 are applied.

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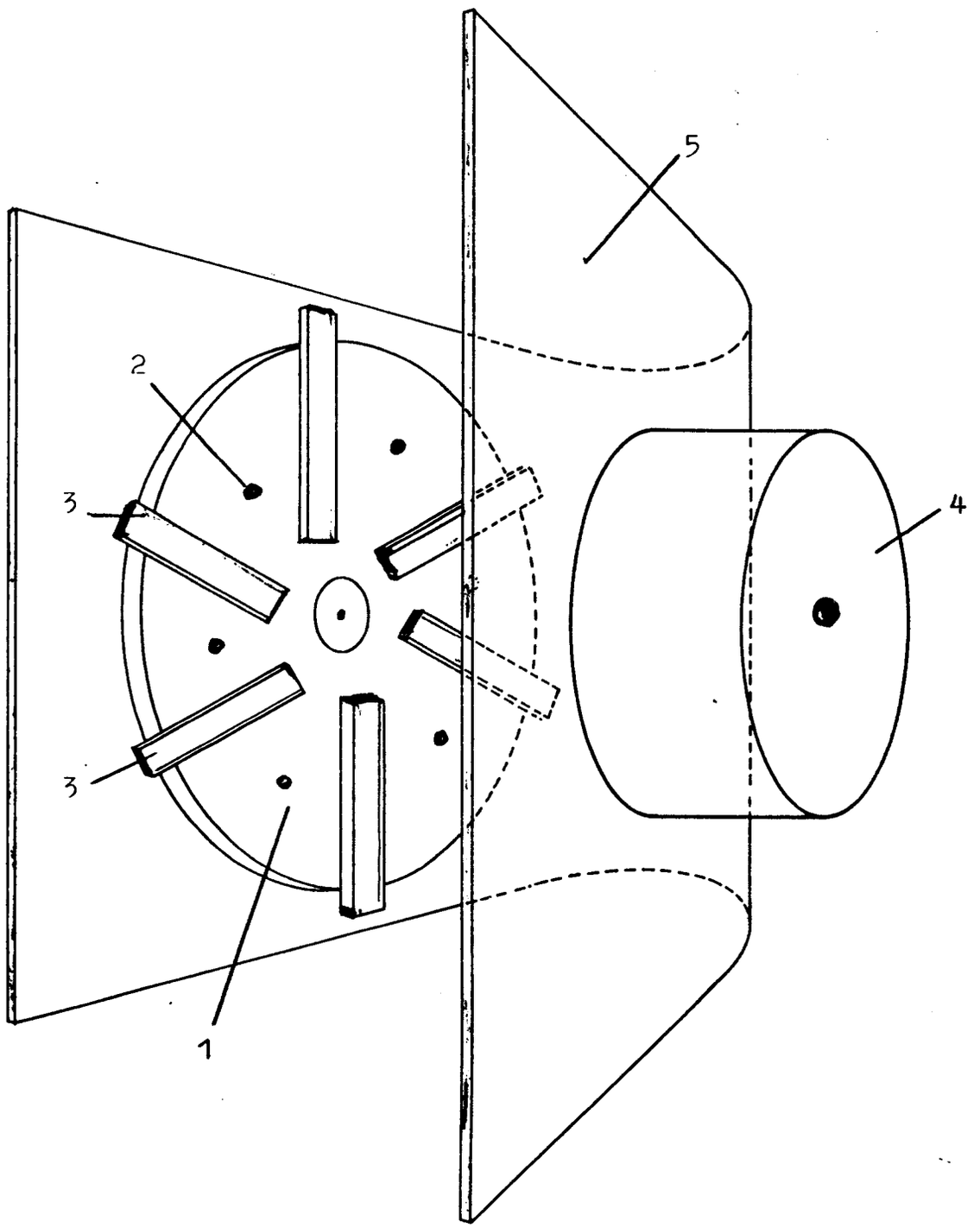

FIG. 1.

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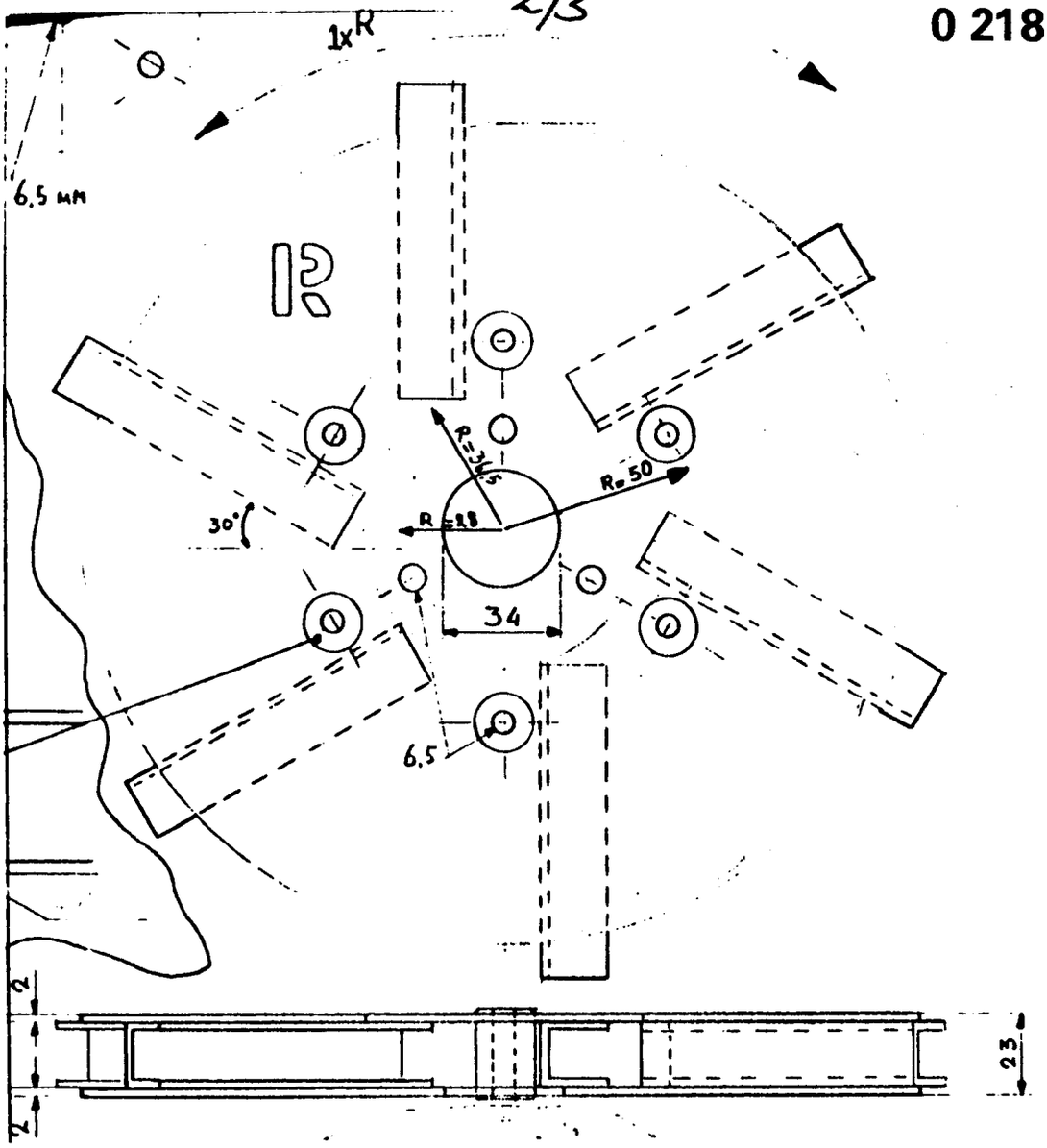

Fig. 2.

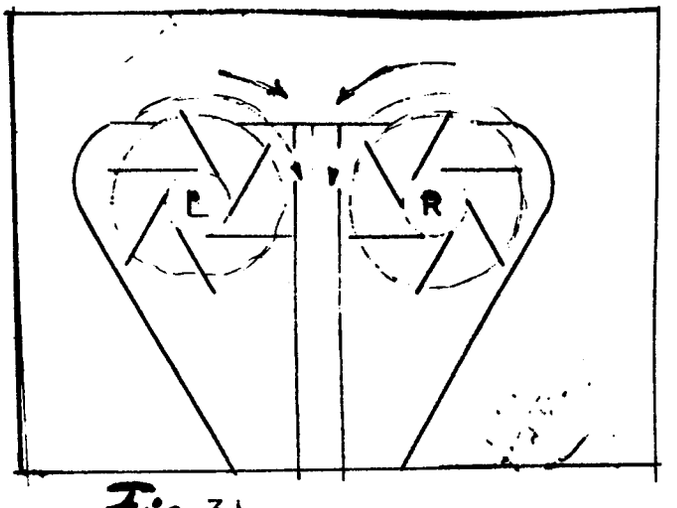

Fig. 3.

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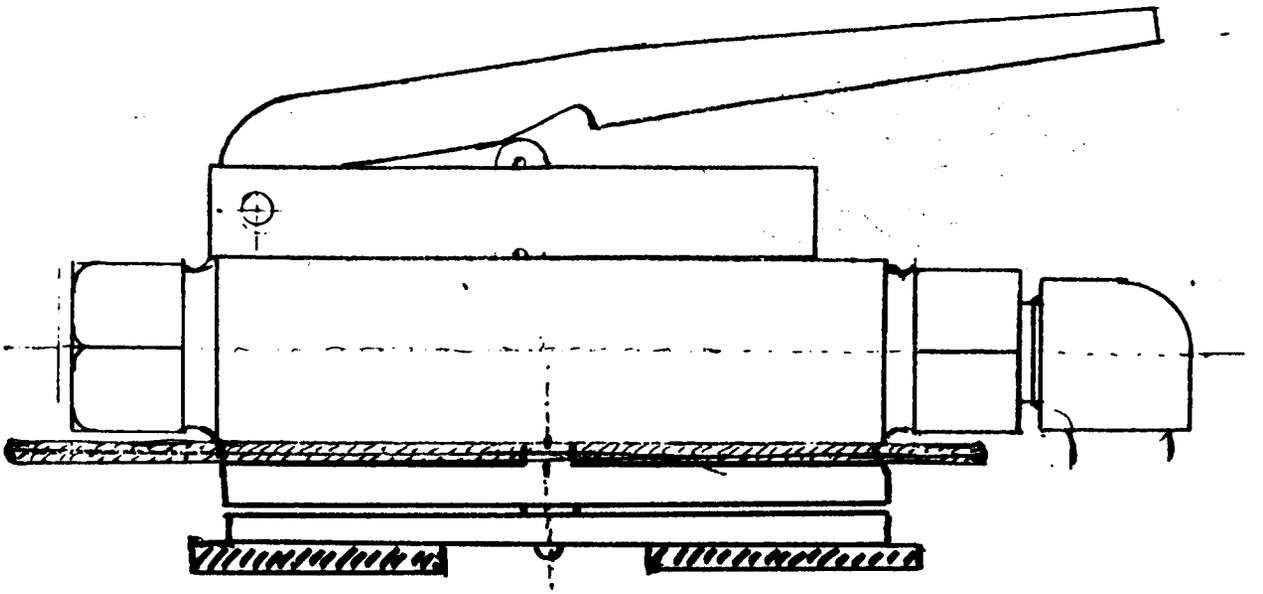

Fig. 4.

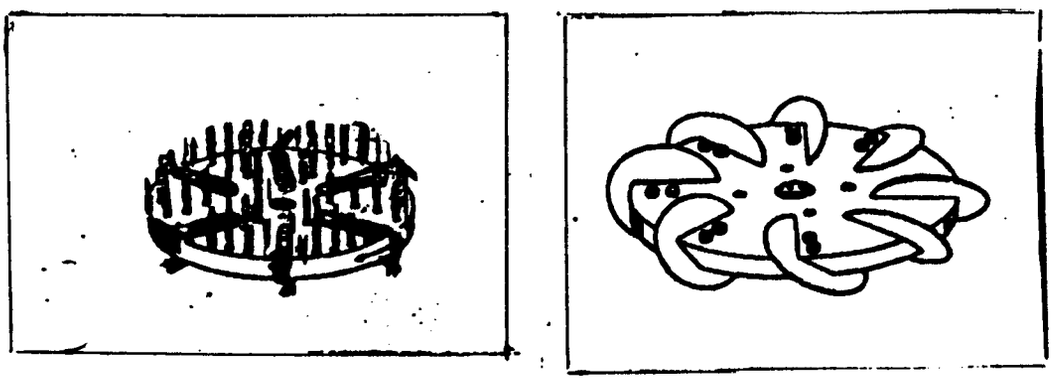

Fig. 5.

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EUROPEAN SEARCH REPORT

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EP 86 20 1578

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.4)
Y,D	DE-A-3 535 213 (BROERSZ) * Whole document * ---	1,7	B 63 B 59/08 B 08 B 1/04
Y	US-A-2 725 907 (HAGEN) * Column 2, lines 1-22; figure 1 * ---	1,7	
A	EP-A-0 131 987 (VAN ROMPAY) * Whole document * ---	1,7	
A,P	EP-A-0 181 310 (VAN ROMPAY) * Figures 1-13 * & BE-A-900 965 (Cat. A) (Published: 15-02-1985) ---	3,5	
A	US-A-3 628 489 (MICHAELSEN) * Abstract; figures 2-7 * ---	6	
A	US-A-4 372 242 (LUNDSBERG) -----		TECHNICAL FIELDS SEARCHED (Int. Cl.4) B 63 B B 08 B B 23 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10-12-1986	DE SCHEPPER H.P.H.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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