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(54) Title: FISH CAGE SCREEN AND CLEANING APPARATUS

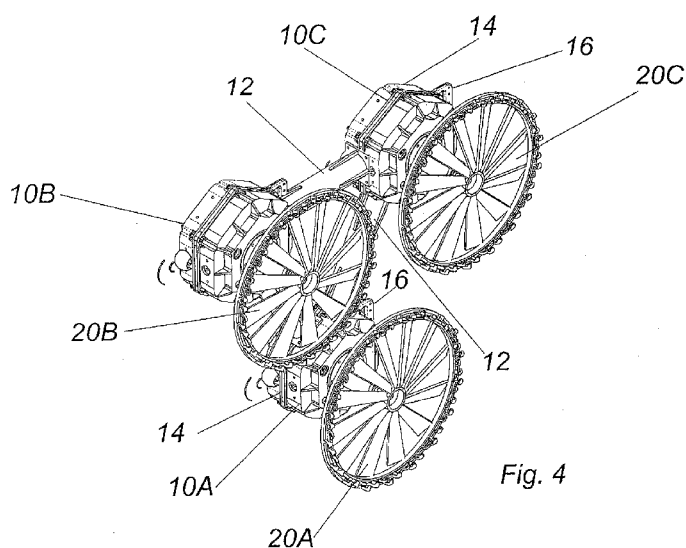


Fig. 4

(57) Abstract: The device (4, 70) includes a screen cleaning brush (10a, 10b, 10c, 72) with multiple fibers or cleaning fingers (32) made from a flexible material with a hook and barb shape. The hook (40,42,44) is designed to trap the screen strand (7) as it passes and rotates on a flexible arm to clean the adjacent and opposite side of the strand and then flexes to release the strand. The instant invention has a unique propulsion system and navigation system that enables automatic navigation of the cleaning apparatus on the screen of the aquaculture cage. Alternative the screen cleaning can be performed with a frame (70) having fins (90) to assist in the directional placement of the cleaning fingers (32) against a submersed screen.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/033447

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01K61/00 A01K75/00 A46B13/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A01K B63B A46B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 56 062188 U (YOSHIJI SUZUKI) 26 May 1981 (1981-05-26)	1,2, 15-17
Y	page 3, paragraph 1 figures 1, 2	3,4
Y	----- JP 8 228641 A (MITSUBISHI HEAVY IND LTD; KOBE MECHATRONICS KK) 10 September 1996 (1996-09-10) abstract paragraphs [0010] - [0012] figures 1-7	3,4
A	----- WO 98/58535 A1 (KVENSETH PER GUNNAR [NO]; JOHNSEN TORE [NO]; TORSVIK HANS [NO]; ANDRES) 30 December 1998 (1998-12-30) page 2, line 3 - line 12 page 2, line 17 - page 3, line 22 figure 1 ----- -/-	1,3,15, 17



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/033447

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-4, 15-19

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2012/033447

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2009/110802 A1 (BERG BRYNJAR [NO]) 11 September 2009 (2009-09-11) page 9, line 28 - page 11, line 12 page 17, line 13 - page 18, line 7 page 18, line 22 - page 19, line 12 page 20, line 7 - page 21, line 19 figures 1-7 -----	1,3,15, 17

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/033447

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 56062188	U	26-05-1981	NONE	

JP 8228641	A	10-09-1996	NONE	

WO 9858535	A1	30-12-1998	NONE	

WO 2009110802	A1	11-09-2009	NO 328058 B1	23-11-2009
			WO 2009110802 A1	11-09-2009

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-4

Aquaculture cage screen cleaning device with brush head having flexible hook shaped fingers.

1.1. claims: 15-19

Aquaculture cage screen cleaning device with frame having flexible hook shaped fingers.

2. claim: 5

Brush head with flexible hook shaped fingers having a first longer leg portion connected to a "U" shaped portion which is connected to a second shorter leg.

3. claims: 6, 7

Aquaculture cage screen cleaning device with brush heads having propeller blades attached to their rim.

4. claims: 8-14

Automatic aquaculture cage screen cleaning device with propulsion device(s), sensor(s) and a central processing unit.
