

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
3 November 2016

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB16/50718

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B03D 1/14 (2016.01)

CPC - B03D 1/14

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)

IPC(8) Classifications: B01F 3/04; B03D 1/14; C02F 1/24 (2016.01)

CPC Classifications: B01F 3/04; B03D 1/14; C02F 1/24; Y10S 261/26

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)

PatSeer (US, EP, WO, JP, DE, GB, CN, FR, KR, ES, AU, IN, CA, INPADOC Data); Google; Google Scholar; EBSCO; IP.com; keywords: forth, foam, flotation, float, height, level, position, change, adjust, vary, move, lift, lower, outlet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2002/0079270 A1 (BORODYANSKI G et al.) June 27, 2002; figures 2, 3; paragraphs [0050], [0051], [0056], [0057], [0060]	1, 2, 3/1, 3/2, 4/3/1, 4/3/2 --- 5/4/3/1, 5/4/3/2
Y	US 6,481,927 B2 (RHODES LK) November 19, 2002; figure 2; column 3, lines 50-55	5/4/3/1, 5/4/3/2
A	US 2,433,592 A (BOOTH LE) December 30, 1947; entire document	1, 2, 3/1, 3/2, 4/3/1, 4/3/2, 5/4/3/1, 5/4/3/2
A	US 2,423,456 A (LOGUE LH) July 08, 1947; entire document	1, 2, 3/1, 3/2, 4/3/1, 4/3/2, 5/4/3/1, 5/4/3/2
A	US 1,737,624 A (THOMSON GM) December 03, 1929; entire document	1, 2, 3/1, 3/2, 4/3/1, 4/3/2, 5/4/3/1, 5/4/3/2

 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

26 August 2016 (26.08.2016)

Date of mailing of the international search report

07 SEP 2016

Name and mailing address of the ISA/

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB16/50718

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.: 16
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:
Claim 16 is an improper Omnibus-type claim, and as such, constitutes an unsearchable claim.

3. Claims Nos.: 6-15
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:

-Continued Within the Next Supplemental Box-

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 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.:

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
Information on patent family members

International application No.

PCT/IB16/50718

-***-Continued from Box No. III Observations where unity of invention is lacking -***-

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-5 are directed toward: a froth flotation cell including a central dispersing chamber.

Group II: Claims 17 and 18 are directed toward: a method of operating a froth flotation cell that includes a displaceable closure.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical features of Group I include: a froth flotation cell including: a central dispersing chamber disposed in the intermediate zone of the tank; a slurry inlet located in the operatively lower zone of the tank; being in flow communication with a slurry outlet, in order for slurry located in the operatively upper zone of the tank in use to be displaceable from the tank via the slurry outlet conduit, which are not present in Group II.

The special technical features of Group II include: a method of operating a froth flotation cell that includes a displaceable closure for selectively allowing and preventing flow from the operatively lower zone of the tank to the slurry outlet conduit, the method including the step of opening or closing the closure in response to a level control signal received from a level detection means in order to maintain the slurry in the tank at a desired level, which are not present in Group I.

The common technical features of Groups I and II are: a tank having an operatively lower zone, an intermediate zone and an operatively upper zone; and a slurry outlet conduit extending from the operatively upper zone of the tank; characterised in that the operatively lower zone of the tank is also selectively in flow communication with the slurry outlet of the tank, in order for slurry located in the operatively lower zone of the tank selectively to be displaceable towards the slurry outlet.

These common technical features are disclosed by US 2002/0079270 A1 (BORODYANSKI). Borodyanski discloses: a tank (40, figure 3) having an operatively lower zone (adjacent 53; figure 3), an intermediate zone (adjacent 52; figure 3) and an operatively upper zone (adjacent 51; figure 3); and a slurry outlet conduit (20) extending from the operatively upper zone of the tank (as shown; figure 3); characterised in that the operatively lower zone of the tank is also selectively (via height adjustment of outlet 20; paragraph [0056]) in flow communication with the slurry outlet of the tank (as shown; figure 3; paragraph [0057]), in order for slurry located in the operatively lower zone of the tank selectively to be displaceable towards the slurry outlet (via height adjustment of outlet 20; paragraph [0056]).

Since the common technical features are previously disclosed by the Borodyanski reference, the common features are not special and so Groups I and II lack unity.