

CONVENTION

AUSTRALIA

Patents Act

APPLICATION FOR A STANDARD PATENT

Norsk Hydro A.S
Bygdoy alle 2,, 0257 Oslo 2,, NORWAY

60 9 6 0 6

hereby applies for the grant of a standard patent for an invention entitled:

ARRANGEMENT FOR THE COMPENSATION OF DAMAGING MAGNETIC FIELDS ON
TRANSVERSALLY DISPOSED ELECTROLYSIS CELLS

which is described in the accompanying complete specification.

Details of basic application(s):-
882083 NORWAY

11 May 1988

Address for Service:

PHILLIPS ORMONDE & FITZPATRICK
Patent and Trade Mark Attorneys
367 Collins Street
Melbourne 3000 AUSTRALIA

DATED this TENTH day of MAY 1989

PHILLIPS ORMONDE & FITZPATRICK
Attorneys for:
Norsk Hydro A.S

By:

Our Ref : 131500
POF Code: 1346/1346

APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED 5-2-91

M 008903 1005819

P8829 AU

AUSTRALIA

Patents Act

DECLARATION FOR A PATENT APPLICATION

▼ INSTRUCTIONS

(a) Insert "Convention" if applicable

(b) Insert FULL name(s) of applicant(s)

(c) Insert "of addition" if applicable

(d) Insert TITLE of invention

(e) Insert FULL name(s) AND address(es) of declarant(s) (See headnote*)

(f) Insert FULL name(s) AND address(es) of actual inventor(s)

(g) Recite how applicant(s) derive(s) title from actual inventor(s) (See headnote**)

(h) Insert country, filing date, and basic applicant(s) for the/or EACH basic application

(k) Insert PLACE of signing

(l) Insert DATE of signing

(m) Signature(s) of declarant(s)

Note: No legalization or other witness required

In support of the (a) convention application made by

(b) Norsk Hydro a.s

(hereinafter called "applicant(s) for a patent (c) for an invention entitled (d) "Arrangement for the compensation of damaging magnetic fields on transversally disposed electrolysis cells"

I/We (e) Arne Sundnes,
Norsk Hydro a.s
Bygdøy Allé 2, 0257 Oslo 2, Norway

do solemnly and sincerely declare as follows:

1. ~~I am/We are the applicant(s).~~

(or, in the case of an application by a body corporate)

1. I am/We are authorized to make this declaration on behalf of the applicant(s).

2. ~~I am/We are the actual inventor(s) of the invention.~~

(or, where the applicant(s) is/are not the actual inventor(s))

2. (f)

Hans Georg Tidemann Nebell
Arnulf Øverlands veg 159
0764 Oslo 7, Norway

is/are the actual inventor(s) of the invention and the facts upon which the applicant(s) is/are entitled to make the application are as follows:

(g)

The applicant is the assignee fo the actual inventor.

(Note: Paragraphs 3 and 4 apply only to Convention applications)

3. The basic application(s) for patent or similar protection on which the application is based is/are identified by country, filing date, and basic applicant(s) as follows:

(h)

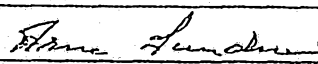
Norwegian patent application No. 882083 of May 11, 1988
Norsk Hydro a.s.

4. The basic application(s) referred to in paragraph 3 hereof was/~~were~~ the first application(s) made in a Convention country in respect of the invention the subject of the application.

Declared at (k) Oslo, Norway

Dated (l) April 13, 1989
for Norsk Hydro a.s

(m)


Arne Sundnes

To: The Commissioner of Patents

(12) PATENT ABRIDGMENT (11) Document No. AU-B-34607/89
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 609606

(54) Title
ARRANGEMENT FOR THE COMPENSATION OF DAMAGING MAGNETIC FIELDS ON
TRANSVERSALLY DISPOSED ELECTROLYSIS CELLS

International Patent Classification(s)
(51)⁴ **C25C 003/16**

(21) Application No. : **34607/89** (22) Application Date : **10.05.89**

(30) Priority Data

(31) Number	(32) Date	(33) Country
882083	11.05.88	NO NORWAY

(43) Publication Date : 16.11.89

(44) Publication Date of Accepted Application : 02.05.91

(71) Applicant(s)
NORSK HYDRO A.S.

(72) inventor(s)
HANS GEORG TIDEMANN NEBELL

(74) Attorney or Agent
PHILLIPS ORMONDE & FITZPATRICK, 367 Collins Street, MELBOURNE VIC 3000

(56) Prior Art Documents
AU 574036 51653/85 C25C 3/16
US 37756938
US 3775280

(57) Claim

1. Arrangement for compensation of unwanted electromagnetic influence from the rectifier field and end cell field on end cells in an aluminium potline comprising at least two rows of reduction cells with the cells arranged transversally in each row, wherein electric current is conducted to and from the end cells in three or more asymmetric arranged supply bars via a distribution bar on each end cell, a net current is formed in the distribution bar, providing compensation for the electromagnetic influence from the rectifier field and end cell field.

AUSTRALIA

Patents Act

60 9 6 0 6

COMPLETE SPECIFICATION

(ORIGINAL)

Class

Int. Class

Application Number:

Lodged:

Complete Specification Lodged:

Accepted:

Published:

Priority

Related Art:

This document contains the
amendments made under
Section 49 and is correct for
printing.

APPLICANT'S REF.: P 8829

Name(s) of Applicant(s):

NORSK HYDRO a.s.

Address(es) of Applicant(s):

Bygdoy Alle 2
0257 Oslo 2
Norway

Actual Inventor(s):

Hans Georg Tidemann Nebell

Address for Service is:

PHILLIPS, ORMONDE AND FITZPATRICK

Patent and Trade Mark Attorneys

367 Ccllins Street

Melbourne, Australia, 3000

Complete Specification for the invention entitled:

Arrangement for the compensation of damaging magnetic
fields on transversally disposed electrolysis cells

The following statement is a full description of this invention, including the best method of performing it known to
applicant(s):

Arrangement for the compensation of unwanted electromagnetic influence from the rectifier field and end cell field on the end cells in an aluminium potline comprising at least two rows of reduction cells with the cells arranged transversally in each row.

It is of great importance for the production economy in an aluminium electrolysis process that the electric energy is used in the most efficient way. It is also very important that the various parts of the busbar arrangement, which conducts the current from the rectifier to the first electrolytic cell in the row, from the last cell in said row to the first cell in the neighbouring row and then from the last cell to the rectifier, are positioned so as to minimize the magnetic field induced in the cells.

A typical arrangement of the aluminium electrolytic cells is to position the cells transversally in rows with the electric current being conducted from one cell to the next and from one row to the next row. The direction of the current in one row will be opposite of the current direction in the neighbouring row.

The present electrolytic process utilizes a current of 200 to 300 kA. This current induces large magnetic field affecting the neighbour row and cell causing great problems because the magnetic field influences the molten metal forming the

cathode in the bottom of every cell. The molten metal is exposed to electromagnetic forces due to the current passing.

The distance between two rows of cells in a potline is however normally long such that the only effect on the neighbouring row will be the vertical component of the magnetic field. To compensate for the unwanted or bias field component caused by the neighbouring row, a higher current is normally passed around or under the short end facing the neighbouring row of the transversally arranged electrolysis cell than to other parts of the cell.

The first and last cell (end cells) of every row are the cells which are most exposed to the electromagnetic field, because they are influenced by the magnetic field both from the neighbouring row and from the busbar conducting the current from one end of the potline area back to the rectifier, and at the other end conducts the current from one row to the next (between the end cells). This influence can be reduced by increasing the distance between the rectifier and the potline, and by increasing the distance from the last cell in a row to the transverse busbar leading the current to the neighbouring row. This is however an expensive method, giving unnecessary long busbars and requiring a large area.

~~The object of the present invention is to achieve a full compensation for the magnetic influence from the rectifier field and end field at the end cells in a potline comprising rows of aluminium electrolysis cells, and it has also been an object to reduce the installation costs by reducing the busbar length and to save space by reducing the distance between the rectifier and the potline at one end and between the transverse busbar and the potline at the other end of the potline.~~

In accordance with the present invention there is provided an arrangement for compensation of unwanted electromagnetic influence from the rectifier field and end cell field on end cells in an aluminium potline comprising at least two rows of reduction cells with the cells arranged transversally in each row, wherein electric current is conducted to and from the end cells in three or more asymmetric arranged supply bars via a distribution bar on each end cell, a net current is formed in the
10 distribution bar, providing compensation for the electromagnetic influence from the rectifier field and end cell field.

Installation costs may be reduced by reducing the busbar length. Space may be saved by reducing the distance between the rectifier and the potline at one end and between the transverse busbar and the potline at the other end of the potline.

20 27031



~~This is achieved by conducting the current asymmetricly in three or more supply bars to or from the end cells of a potline, in such way that a net electric current is induced in the distribution bars giving compensation for the magnetic influence from the rectifier and end field.~~

The invention will be explained in detail by the way of examples only, with reference to drawings illustrating a potline comprising the arrangement according to the invention. The invention only includes the end cells on the row of cells and not the whole row of cells. It is also understood that by using well-known technology the rows per se are stabilized with respect to influence from the neighbouring row.

Electric current from the rectifier L is carried in three or more supply bars to the first end cell in row 1, and is connected asymmetrically to a distribution bar A comprising four or more risers S being symmetrically positioned with respect to the cell. This arrangement will give a net electric current in the supply bar conducted from right to left and provides a compensation for the first end cell in row 1. The electric current is thereafter conducted from the cathode of an upstream cell to the anode of the next downstream cell, as normal, and to the other end cell in row 1.

The electric current is from this other end cell conducted to a distribution bar B. The current is then from said cell conducted via three or more busbars T asymmetrically positioned with respect to the midpoint of the supply bar, to the first cell in the neighbouring row 2 seen in the current direction. This arrangement gives a net current in the distribution bar B from left to right and provides the necessary extra compensation for this other end cell in row 1.



The electric current is further asymmetrically conducted to a distribution bar C on the first cell in the row 2. Thereafter the current is conducted from the cathode of an upstream cell to the anode of the next downstream cell, as normal, to the other end cell in the row 2. From this other end cell in row 2 the current is conducted to a distribution bar D. And from this busbar D the current is conducted via three or more busbars T, being asymmetric arranged with respect to the midpoint of the distribution bar, back to the rectifier, as illustrated in the figure.

It is obvious that the dimensioning and positioning of the distribution bars, the risers and the supply bars in the rectifier field and end field will determine the current intensity in the distribution bar, and the level of compensation for the end cells.

The practical arrangement of the invention will be solved by normally construction procedures, with respect to the numerous factors and conditions which are important to consider when building and planning an aluminium potline with a high current intensity and reduced magnetic field. Normally, it is only the end cells in a potline with a current intensity above 200 kA needing extra compensation.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. Arrangement for compensation of unwanted electromagnetic influence from the rectifier field and end cell field on end cells in an aluminium potline comprising at least two rows of reduction cells with the cells arranged transversally in each row, wherein electric current is conducted to and from the end cells in three or more asymmetric arranged supply bars via a distribution bar on each end cell, a net current is formed in the distribution bar, providing compensation for the electromagnetic influence from the rectifier field and end cell field.

2. An arrangement according to claim 1 substantially as herein described with reference to the accompanying drawings.

Dated: 29 January 1991

PHILLIPS ORMONDE & FITZPATRICK

Attorneys for:

NORSK HYDRO A.S.

27021

David B Fitzpatrick



