(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 667 486 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **95100289.8**

(51) Int. Cl.[6]: **F22B 1/28**

(22) Date of filing: **11.01.95**

(30) Priority: **10.02.94 IT TO940074**

(43) Date of publication of application:
16.08.95 Bulletin 95/33

(84) Designated Contracting States:
BE CH DE DK ES FR GB LI

(71) Applicant: **R.E.A. s.n.c. di Sassi e Baudin & C.**
Via Molino della Splua, 6
I-10028 Trofarello (Turin) (IT)

(72) Inventor: **Sassi, Stefano**
Strada Genova, 131/Ter
I-10024 Moncalieri,
Turin (IT)
Inventor: **Sassi, Virginio**
Strada Genova, 131/Ter
I-10024 Moncalieri,
Turin (IT)

(74) Representative: **Robba, Eugenio et al**
Studio "INTERPATENT"
via Caboto 35
I-10129 Turin (IT)

(54) Instantaneous accumulating steam generator.

(57) In a steam generator there are provided: a funnelled conveyor (11) from inside the chamber (13), with winding shape to soften confluence of said steam when drawn from said chamber; and outside, downstream of the conveyor (11) and centrally therewith, a "plenum chamber" (17), operating as flywheel, from which chamber said steam is gently drawn and sent outside. The probe (23) inside the boiler (1) is equipped with a protection chamber (25) for protecting the stem (27) thereof from condensate deposit formation thereon and false level signals caused by depression; the resistances (29) are provided at a very long distance between end portion (31) and flange (5).

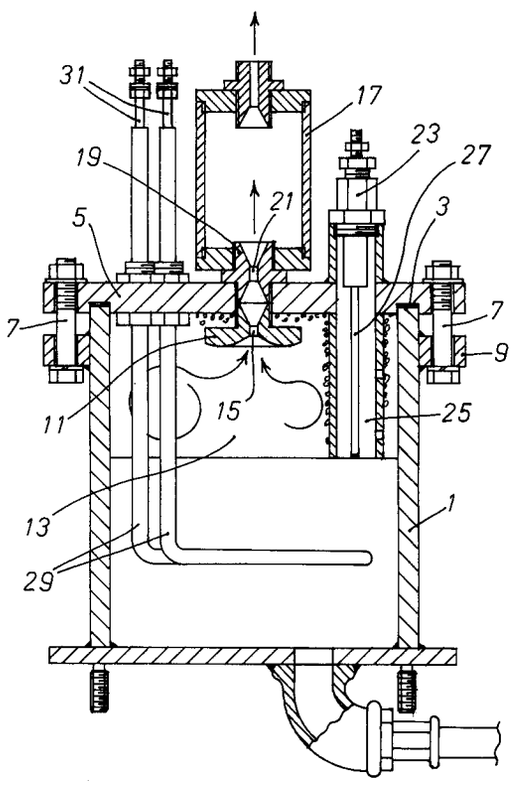


FIG. 1

EP 0 667 486 A1

The present invention refers to an instantaneous accumulating steam generator.

It is known that, in prior art instantaneous steam generators, unbalance conditions occur between steam consumption and steam generation inside the steaming chamber.

This is due to the chamber internal volume and to the internal depression range that brings about an increase in water level, thus decreasing the steam chamber.

Moreover, the flange surface allows a humidity entrainment due to the depression occurring during the steam flow from steam chamber to solenoid valve.

Resistances usually have poor wear resistance due both to the high temperature and to the reduced water volume created by the depression range.

Object of the present invention is to overcome said drawbacks by providing a steam generator of the above-mentioned type in which the amount of produced steam and the amount of required steam are balanced, without creating a strong condensate entrainment and without excessively stressing the resistances.

A further object of the steam generator according to the invention is to avoid false level signals on the internal probe, due to condensate deposit formation on the probe after the entrainment occurring on the flange.

These and further objects together with other features and advantages, are attained by the instantaneous steam generator of the invention, wherein:

- a central, funnelled steam conveyor is provided from the inside to the outside of the steam chamber, designed in such a way as to gently draw steam from inside said steam chamber, said conveyor being of a winding shape adapted to soften the confluence of said steam when drawn from said steam chamber;
- a "plenum chamber", that is a steam vessel operating as flywheel is provided outside the generator boiler and located downstream and centrally with respect to the above conveyor, from which vessel the steam is drawn and sent outside without sudden variations of the balance between water and steam inside the boiler;
- the probe inside the boiler is equipped with a protection chamber for protecting the probe stem from the condensate deposit caused by the depression occurring on the flange lower surface as well as from false water level signals, caused by the displacement of said water volume by depression;
- the resistances are provided at a very long distance between end portion thereof and flange, in order to avoid those strong, sudden changes of temperature to which usual resistances are subject.

Further features and advantages of the invention will appear from the following detailed description of an embodiment thereof, given as a non-limiting example, with reference to the accompanying drawings, in which:

Fig. 1 is a side elevation view of a longitudinal section of the steam generator of the invention;

Fig. 2 is a top plan view of the boiler of said generator;

Fig. 3 is a side elevation view of a longitudinal section of the outlet conveyor applied to an outlet opening of said boiler;

Fig. 4 is a side elevation view of a longitudinal section of the inlet conveyor or mouth applied to the inlet opening of the steam vessel or "plenum chamber" applied to the boiler.

As clearly shown in the Figures, the steam generator of the invention comprises substantially a small boiler 1 to which a cover 5 is sealingly fixed in 3; this cover 5 is usually plane and is secured in place by a plurality of through bolts 7 extending through said cover 5 and a suitable circular projection 9 provided on the outside cylindrical wall of the boiler 1.

Centrally to the cover 5, a central, funnelled steam conveyor 11 is provided, from the inside to the outside of the steam chamber 13, designed in such a way as to gently draw steam from inside said steam chamber 13.

For that purpose, said conveyor 11 is of a winding shape, with neck 15 in the Venturi-like tube (see Fig. 3), said neck being adapted so as to facilitate and speed up the steam flow from the boiler 1 to a vessel 17 located downstream.

Said vessel 17 is provided outside the generator boiler 1, and it is centrally located with respect to the conveyor 11, and operates as steam "plenum chamber".

The steam enters said vessel 17 through an inlet conveyor 19, also equipped with neck 21 in the Venturi-like tube, said inlet conveyor 19 being aligned with the outlet conveyor 11 from the boiler 1 and completing the function of softening for the steam flow from said boiler 1 to said vessel 17.

The steam will be sent to users through an outlet hole 21, provided in the Figure on top of the vessel 17, and also equipped with funnelled mouth.

The probe 23 inside the boiler 1 is equipped with a protection chamber 25 for protecting the stem 27 of said probe 23 from condensate deposit formation caused by the depression occurring on the flange lower surface as well as from false water level signals, caused by the displacement of said

water volume by depression.

The resistances 29, with which the boiler 1 is equipped, are provided at a very long distance between end portion 31 thereof and flange 5, in order to avoid those strong, sudden changes of temperature to which usual resistances are subject.

As for the rest, the resistances 29 are of the same type so far used in these steam generators.

Claims

1. Instantaneous accumulating steam generator, composed of a boiler (1) to which a cover (5), usually plane, is sealingly fixed (in 3), secured in place by a plurality of through bolts (7), extending through said cover (5) and a suitable circular projection (9) provided on the outside cylindrical wall of the boiler (1), characterized in that:

- a central, funnelled steam conveyor (11) is provided from the inside to the outside of the steam chamber (13), designed in such a way as to gently draw steam from inside said steam chamber (13), said conveyor (11) being of a winding shape adapted to soften the confluence of said steam when drawn from said steam chamber;
- a "plenum chamber" (17), that is a steam vessel operating as flywheel, is provided outside the generator boiler (1) and located downstream and centrally with respect to the above conveyor (11), from which vessel (17) the steam is drawn and sent outside without sudden variations of the balance between water and steam inside the boiler (1);
- the probe (23) inside the boiler (1) is equipped with a protection chamber (25) for protecting said probe stem (27), from the condensate deposit caused by the depression occurring on the lower surface of the flange (5) as well as from false water level signals caused by the displacement of said water volume by depression;
- the resistances (29) are provided at a very long distance between end portion (31) thereof and flange (5), in order to avoid those strong, sudden changes of temperature to which usual resistances are subject.

2. Steam generator according to Claim 1, characterized in that the outlet conveyor (11) from the boiler (1) is of a winding shape, with neck (15) in the Venturi-like tube, said neck being adapted so as to facilitate and speed up the steam flow from said boiler (1) to said vessel (17), and in that also the inlet conveyor (19) in the vessel (17) has a neck (21) in the Venturi-like tube, said inlet conveyor (19) being aligned with the outlet conveyor (11) from the boiler (1) and completing the function of softening the steam flow from said boiler (1) to said vessel (17).

3. Steam generator according to Claim 1 or 2, characterized in that the steam is sent to users through an outlet hole (21), provided generally on top of the vessel (17), and also equipped with funnelled mouth.

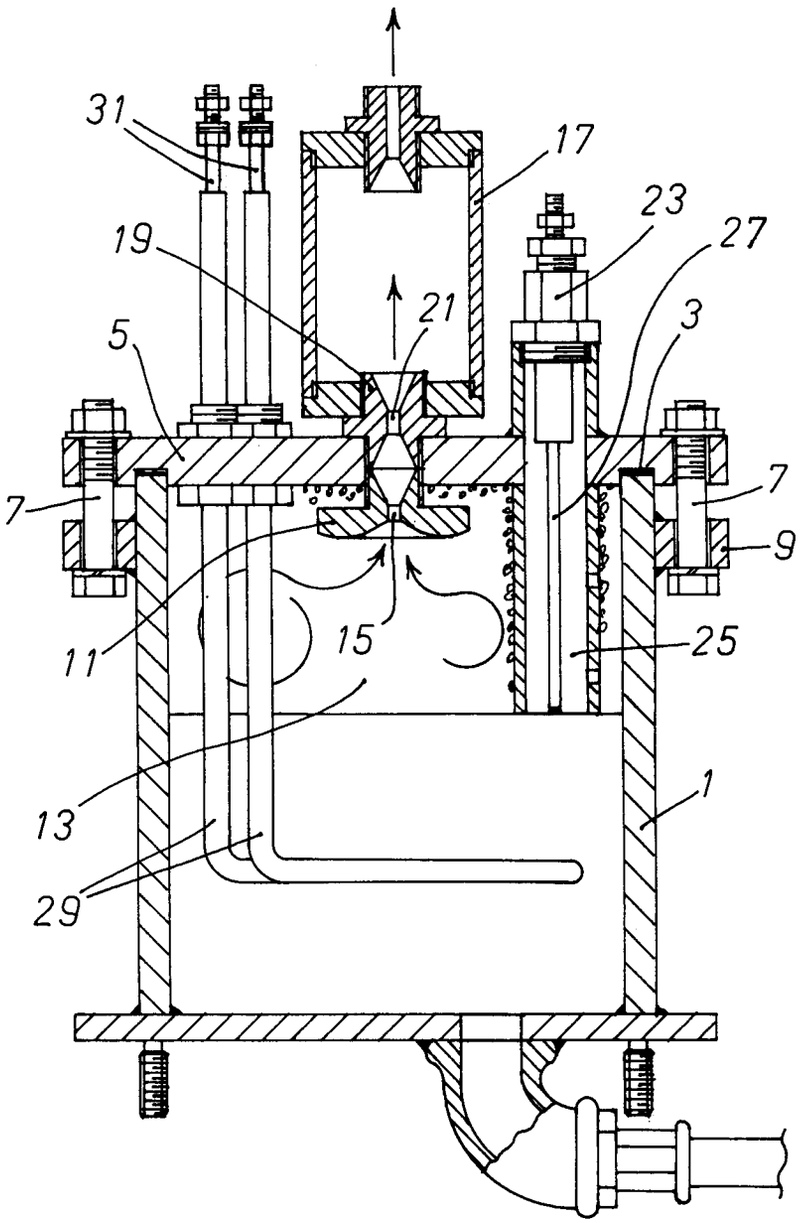


FIG. 1

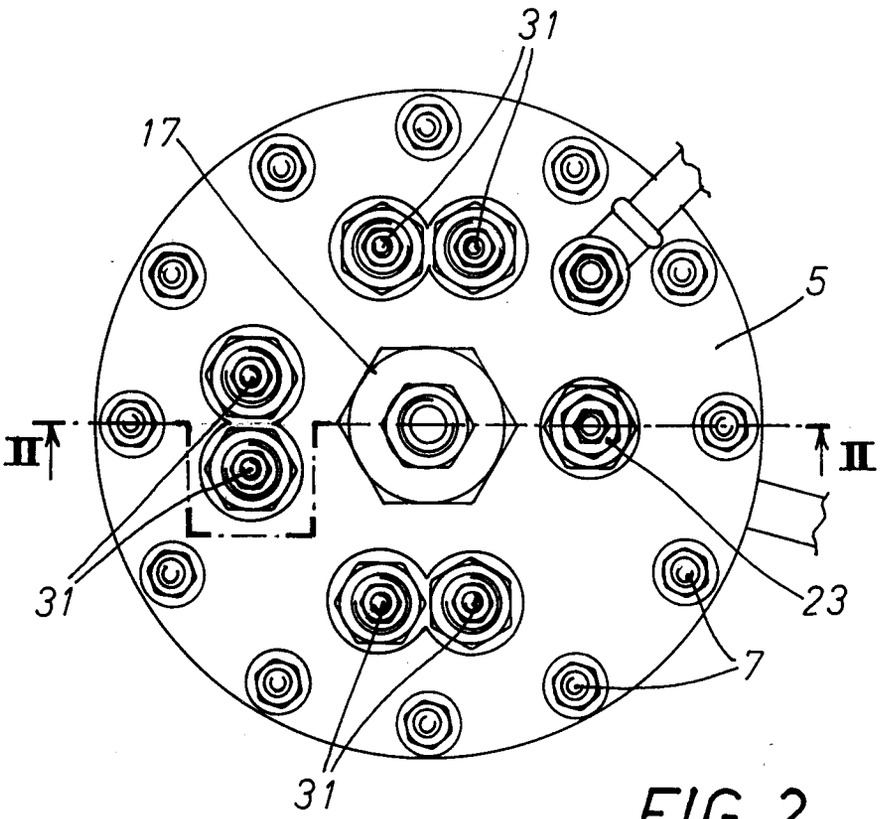
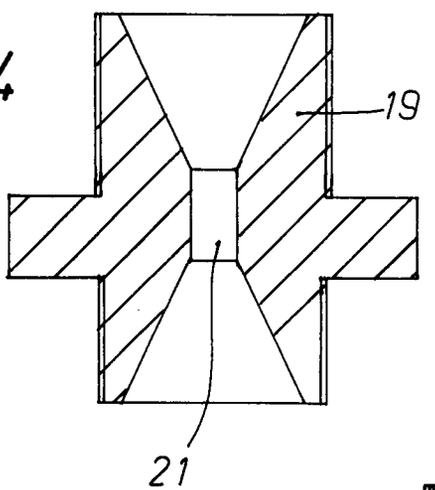


FIG. 2

FIG. 4



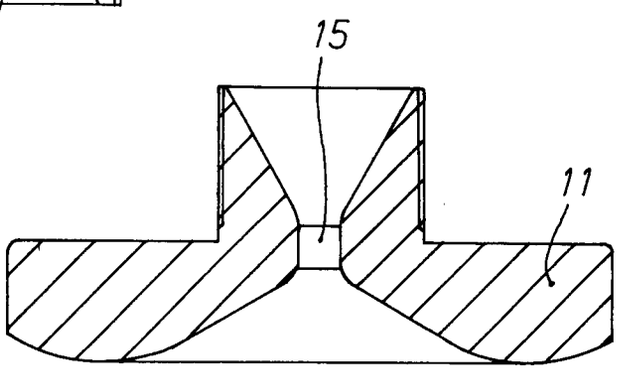


FIG. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 10 0289

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.6)
A	WO-A-87 05681 (RIBA) * page 3, paragraph 1; figures *	1	F22B1/28
A	US-A-1 430 927 (SMALLEY) * figure 1 *	1	
A	WO-A-88 00316 (TECATOR) * page 3, line 36 - line 39; figure 4 *	1	
A	US-A-1 504 251 (LANSING) * the whole document *	1	
A	US-A-2 220 353 (SEBO) * page 1, right column, line 17 - line 24; figures *	1	
A	US-A-2 478 569 (COOPER) * column 3, line 15 - column 4, line 61; figures *	1	
A	WO-A-83 01101 (LOVIK) * page 2, line 26 - line 35; figures *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	DE-A-35 32 261 (RIBA) * column 6, line 6 - line 22; figure 3 *	1	F22B F24F
A	GB-A-623 154 (GENERAL ELECTRIC) * page 2, line 75 - page 3, line 8; figures *	1	
A	EP-A-0 323 939 (BOURGEOIS) * column 4, line 61 - column 6, line 28; figures 1,5 *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 May 1995	Van Gheel, J

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

EPO FORM 1503 03.82 (P04C01)