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Ns. Rif.: 23296EP/MB/FZ/em

Modena, 20 ottobre 2014

Oggetto: Domanda di Brevetto Europeo No. 12759178.2

Data di deposito: 22 giugno 2012

Priorità: MO2011A000167 del 7 luglio 2011

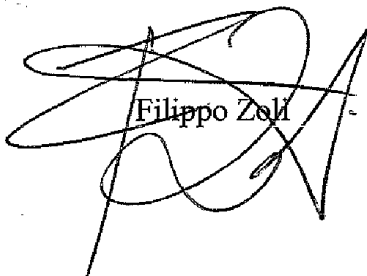
A nome: AMG S.r.l.

Titolo: "Dispositivo per il dosaggio di reagenti chimici in impianti termici"

Facciamo seguito alla nostra del 13 marzo 2014 per confermarvi che, come da vostre istruzioni, abbiamo provveduto a replicare alle obiezioni avanzate nel parere di brevettabilità emesso, unitamente al rapporto di ricerca, dall'International Searching Authority nei confronti della vostra domanda di brevetto identificata in oggetto.

Alleghiamo copia della documentazione così come depositata per vostra opportuna conoscenza ed archiviazione.

Con i nostri migliori saluti.


Filippo Zoli


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(51) International Patent Classification:
C02F 1/68 (2006.01)

(21) International Application Number:
PCT/IB2012/001248

(22) International Filing Date:
22 June 2012 (22.06.2012)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
MO2011A000167 7 July 2011 (07.07.2011) IT

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD,
SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished
upon receipt of that report (Rule 48.2(g))

(54) Title: DEVICE FOR DOSING CHEMICAL REAGENTS IN HEATING SYSTEMS

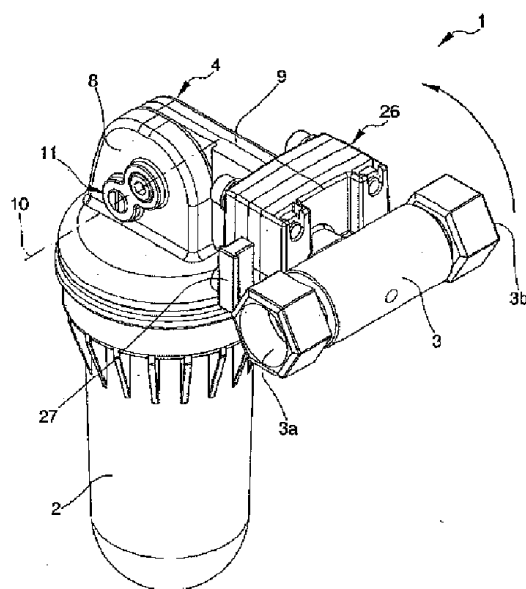


Fig. 1

(57) Abstract: The device for dosing chemical reagents in heating systems comprises at least a tank (2) for containing at least a chemical reagent, at least a tubular element (3) connectable to a water flow line, mechanical and hydraulic connection means (4) of the tubular element (3) with the tank (2) and comprising at least an outward pipe, suitable for introducing water which crosses the tubular element (3) in the tank (2), and at least a return pipe (6), suitable for bringing water mixed with the reagent from the tank (2) into the tubular element (3), wherein the connection means (4) comprise at least a first and a second portion (8, 9) associated with the tank (2) and with the tubular element (3) respectively, and wherein the second portion (9) is coupled in rotation to the first portion (8) around a substantially horizontal axis (10), removable locking means (11) of the second portion (9) being provided with respect to the first portion (8).

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BY FAX

Our Ref.: 23296EP/FZ/EL

Modena (IT), August 26, 2014

Re: European Patent Application No. 12759178.2 – 1352
Corresponding to: PCT/IB2012/001248
Publication: EP 2 729 418 A0
Applicant: AMG S.r.l.
Filing on: 22 June 2012
Priority: Italy – MO2011A000167 of 7 July 2011
Title: "DEVICE FOR DOSING CHEMICALS IN HEATING SYSTEMS"

Dear Sirs,

Reference is made to your **Communication pursuant to Rules 161(1) and 162 EPC** dated 19.02.14 (hereinafter simply the "Communication"), deemed to be notified on 29.02.2014 under R. 126(2) EPC (ten days rule) and inviting to correct any deficiencies noted in the **Written Opinion (WO)** drawn up during the PCT phase by the EPO as International Search Authority (ISA), or at least to comment on this invitation, within a time limit of **six months** after notification of the above Communication, i.e. up to **August 29, 2014**.

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Therefore, in order to correct the deficiencies noted in the WO, please find attached hereto **a set of amendments** containing:

- **a new set of claims 1-11** for replacing the originally filed claims 1-16;
- **support pages** (3 sheets) showing in highlighted form the amendments made for drafting the new of claims 1-11 with respect to the set of claims 1-16 at present on file.

1. Amendments (Art. 123(2) EPC)

1.1 In the claims

New independent claim 1, directed to a "*Device (1) for dosing chemical reagents in heating systems*", has been drafted by merging and reciting in an improved and more clear way the essential of the **subject matter of original claims 1 to 6** (it is noted that it has been maintained the original numbering of the claims, though being affected by a clerical error, as pointed out at Item VIII of the WO), with the integration of further limitations in order to clearly and patentably distinguish the claimed device for dosing chemical reagents of the invention over the relevant prior art.

All the clarification, amendments and limitations introduced in actual new claim 1 have a proper support in the content of the originally filed application.

In particular, in reply to the observations at Item VIII of the WO, the unclear expression "*a substantially horizontal axis*" has been avoided in the new version of claim 1 by replacing it with the more precise expression "*an axis (10) substantially parallel to the axis of said tubular element (3)*", so as to avoid to define the claimed device in term of its position.

It is noted that this amendment is supported by the original disclosure including drawings which clearly show that the two portions 8 and 9, for connecting the tank 2 containing the chemical reagent with the tubular element 3 of the water flow line, are coupled in rotation around an axis 10 which, in all the possible reciprocal configurations that can be assumed by these two portions 8 and 9, is always parallel to the axis of the tubular element 3.

Moreover, also the expression "*removable locking means of said second portion (9) with respect to said first portion (8)*", objected to at Item VIII of the WO, has been made more clear by replacing it, with the support of the passage at page 4 lines 28-30 of the original description, with "*removable locking means (11) of the rotation of said second portion (9) with respect to said first portion (8)*", so as to give a more specific and less generic meaning to the feature "*locking means*".

Moreover the following passage, now part of new claim 1 :

"...said first and second portions (8, 9) being reciprocally coupled in rotation, in the zone of respective coupling areas defined in the extremity sections of said first and second portions (8, 9) substantially opposite those associated with the tank (2) and with the tubular element (3),... "

is supported by the corresponding passage in original claim 5 and by the passage at page 4, line 31 – page 5, line 2 of the original description.

Moreover the following passage, now included in new claim 1:

"...said second portion (9), associated with said tubular element (3), is suitable to be moved between two extreme configurations which are angularly staggered to one another substantially by 90° passing through a plurality of intermediate working configurations, and said first (8) and second (8) portions (8), associated respectively with said tank (2) and said tubular element (3), are suitable to be rotated relatively the one to the other,",

is supported, other than by the original claim 6, by the passages at page 5, lines 19-21, and at page 8, lines 10-18, of the original description.

Still the following portion of new claim 1:

" whereby in one of said extreme configurations the first and the second portions (8, 9) are arranged the one to the other to define an overturned L for the wall mounting of the device, and in the other extreme configuration the first and the second portions (8, 9) are substantially vertically aligned the one with the other for the under-the-boiler installation of the device. "

is supported by the passages at page 5, lines 22-27.

It is noted that new claim 1 adopts, similarly to original claim 1, the two-part form, by putting in the preamble those features which appear to be already known in combination from the more relevant single piece of prior art constituted in the present case by document D1, and in the characterising portion those technical features which appear to distinguish the claimed device for dosing chemical reagents of the invention from the prior art in the whole.

By summarising, the features of the here submitted new set of claims 1-11 are disclosed and supported as follows:

- independent claim 1: the subject matter of original claims 1 to 6, integrated with additional limitations supported by the original description;
- dependent claims 2 to 11: respective original claims 7 to 16.

1.2 Therefore all the amendments made in the claims appear to fulfil the requirements of **Art. 123(2) EPC**.

2. Novelty (Art. 54 EPC)

New claim 1 (independent)

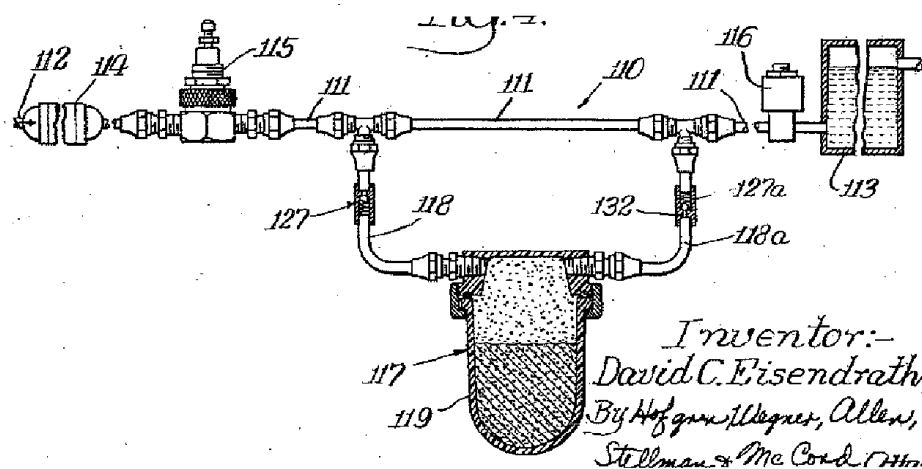
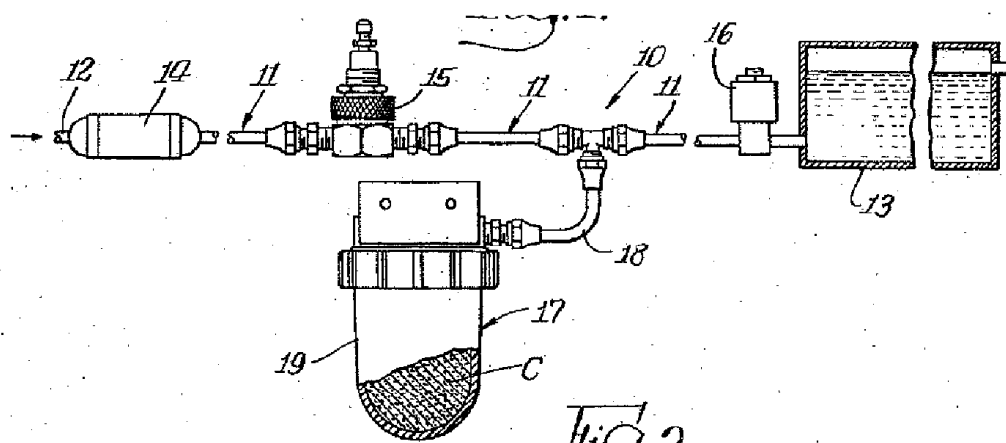
The Written Opinion of the International Searching Authority raises at respective Item V the objection that original claim 1 is not new in view of the disclosure of prior art document D1.

In reply to this objection, new claim 1 has been amended, according to the lines outlined at previous point 1 (Amendments), in order to be clearly considered novel over the relevant prior art, in the present case represented by document D1, as discussed in detail the following.

2.1 Prior art document **D1 (US 3 476 137 A)** discloses, as shown by the following figures, a controlled chemical feeder apparatus (10) having a main conduit (11) defining a fluid flow passage of a fluid, in particular water, from a supply line (12) to a tank (13); a valve (16) for closing the feeding of the fluid to the tank (13); and a resiliently extensible feeder device (17), in the form of an expansible bowl portion (19), for holding a quantity of

a chemical (C) soluble in the fluid to be fed to the tank (13), wherein, in a first embodiment of the apparatus, the feeder device (17) is connected the main conduit (11) through a unique side conduit (18), and the flow of the fluid from the flow passage to the feeder device (17) and from the feeder device (17) to the flow passage through the unique side conduit (18) is controlled by closing or opening the valve (16) so as to vary the difference of pressure between the flow passage and the feeder device (17).

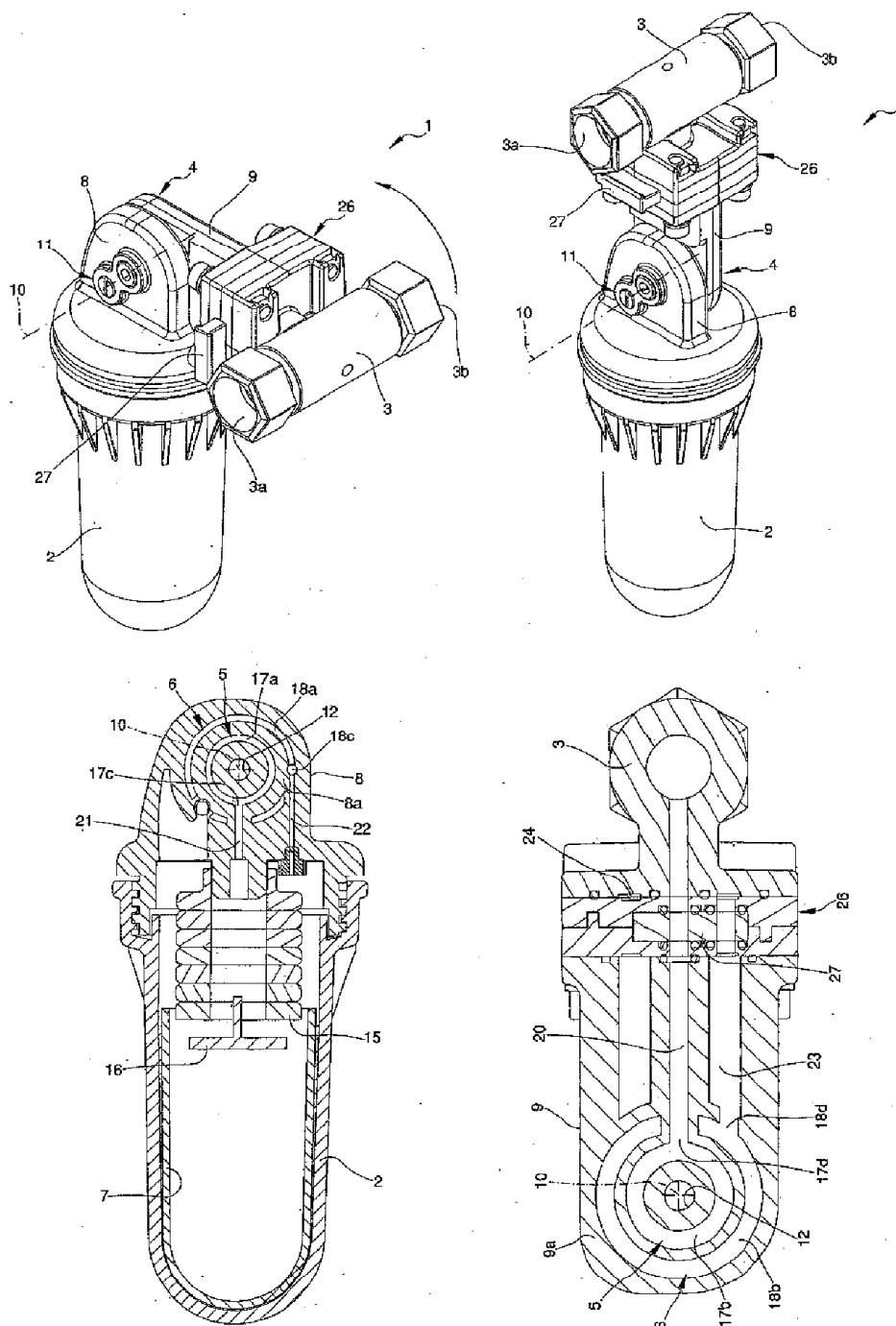
In a further embodiment (110) of the apparatus, as shown by Fig. 4 of D1, the expansible bowl or feeder device is connected to the main conduit (111) through a pair of conduits (118, 118a) which are suitable respectively for introducing into the feeder device (117) water which flow in the main conduit and for conveying a solution formed by the water mixed with the chemical (C) from the feeder device (117) into the main conduit (111).



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D1 (US 3 476 137 A)

However the controlled chemical feeder apparatus that is known from D1 exhibits relevant differences in the structure and in the performances with respect to the device for dosing chemical reagents in heating systems, as shown by the following figures, that is provided by the present invention.



The device for dosing chemical reagents of the present invention

In particular, the controlled chemical feeder apparatus (110) disclosed by D1, even when exhibiting, as shown by the respective Fig. 4, similarly to the dosing device of the invention, a pair of conduits (118, 118a) which are connected to the main conduit (111) respectively for introducing into the feeder device (117) the water which flow in the main conduit (111) and for conveying a solution of water and chemical substance (C) from the feeder device (117) into the main conduit (111), is not suitable to assume with its parts the configurations and the special assets that instead can be assumed by the portions (8, 9), of the dosing device (1) of the invention as recited by new claim 1, which connect the tank (2) with the chemical reagent to the tubular element (3) of the water flow line.

More in detail, in the controlled chemical feeder apparatus (110) disclosed by D1, the means for connecting mechanically and hydraulically the extensible feeder device (117), containing the chemical (C) soluble in the water, to the fluid flow passage defined by the main conduit (111) are constituted by two side conduits (118, 118a) which are separate and are not coupled in any way each with other.

Instead, very differently, in the dosing device (1) of the present invention as recited by new claim 1, the mechanical and hydraulic connection means (4) that are provided for connecting the tank (2), containing the chemical reagent, to the tubular element (3) in which the water flows, exhibit a more complex and articulated configuration and in particular comprise:

“...at least a first and a second portion (8, 9) associated at an extremity with said tank (2) and with said tubular element (3) respectively, with said first portion (8) and said second portion (9) being reciprocally coupled in rotation, in the zone of coupling areas defined in the extremity sections of said first and second portions (8, 9) substantially opposite those associated with the tank (2) and with the tubular element (3), around an axis (10) substantially parallel to the axis of said tubular element (3)...”,

wherein

“.....said second portion (9), associated with said tubular element (3), is suitable to be moved between two extreme configurations which are angularly staggered to one another substantially by 90° passing through a plurality of intermediate working configurations, and said first (8) and second (9) portions associated respectively with said tank (2) and said tubular element (3) are suitable to be rotated relatively the one to the other,

whereby in one of said extreme configurations the first and the second portions (8, 9) are arranged the one to the other to define an overturned L for the wall mounting of the device, and in the other extreme configuration the first and the second portions (8, 9) are substantially vertically aligned the one with the other for the under-the-boiler installation of the device. ”.

Moreover, as further difference with respect to the disclosure of D1, it is noted that the controlled chemical feeder apparatus disclosed by this document does not exhibit any features which correspond to the following ones *“....removable locking means (11) of the rotation of said second portion (9) with respect to said first portion (8), ”*, included in the dosing device of the present invention as recited by new claim 1.

By summarizing, the configuration of the device for dosing chemical reagents and of the respective parts, as well as the way by which these parts are connected, cooperate and are move to each other for making the dosing device to assume a plurality of configurations according the circumstances, as recited by present new claim 1, are very different and cannot be equated to the configuration of the apparatus disclosed by D1 and of the parts constituting it.

2.2 It follows that new claim 1 has to be considered **novel** over prior art document D1.

3. Inventive step (Art. 56 EPC)

3.1 New claim 1 (independent)

New independent claim 1 other than being novel appears also to be inventive over the disclosure of document D1 for the following reasons.

On account of the amendments made, the subject matter of new claim 1 differs from the disclosure of D1, as already pointed out at previous section 2 (Novelty), at least by the following **distinguishing features**, in combination:

".....said connection means (4) comprise at least a first and a second portion (8, 9) associated at an extremity with said tank (2) and with said tubular element (3) respectively, with said first portion (8) and said second portion (9) being reciprocally coupled in rotation in the zone of coupling areas defined in the extremity sections of said first and second portions (8, 9) substantially opposite those associated with the tank (2) and with the tubular element (3), around an axis (10) substantially parallel to the axis of said tubular element (3),

.....the device further comprises removable locking means (11) of the rotation of said second portion (9) with respect to said first portion (8),

....said second portion (9), associated with said tubular element (3), is suitable to be moved between two extreme configurations which are angularly staggered to one another substantially by 90° passing through a plurality of intermediate working configurations, and said first (8) and second (9) portions, associated respectively with said tank (2) and said tubular element (3), are suitable to be rotated relatively the one to the other,

whereby in one of said extreme configurations the first and the second portions (8, 9) are arranged the one to the other to define an overturned L for the wall mounting of the device, and in the other extreme configuration the first and the second portions (8, 9) are substantially vertically aligned the one with the other for the under-the-boiler installation of the device. "

Therefore, in view of the effects and advantages associated with the above distinguishing features, the **objective technical problem** solved by new claim 1, in comparison with the prior art D1, can be regarded as that of providing a device for dosing chemical reagents which can be fitted and arranged in an easy and quick way in a plurality of configurations and assets depending on the circumstances in which the dosing device has to be mounted.

Now, at first as already pointed out while discussing the novelty issue, in the disclosure of D1 the two side conduits which connect the feeder device (117) containing the chemical substance (C) to the main conduit through which the water flows are separate and not linked in any way each to other.

Instead, very differently, in the dosing device of the invention the parts including the pipes which put in fluid communication the tank containing the chemical reagent with the tubular element in which the water flows exhibit a very more complex and articulated configuration which has no point in common with that exhibited by the controlled chemical feeder apparatus disclosed by D1.

Moreover, as further consideration, no suggestion is given by the disclosure of D1 about the possibility of arranging the respective controlled chemical feeder apparatus into a plurality of configuration according the circumstances, whereby a relevant part of the above posed problem is not faced by the disclosure of D1.

Indeed, the configuration of the controlled chemical feeder apparatus is disclosed by D1 as static, and in any case this configuration excludes the possibility of rotating the two side conduits (118, 118a), which put in communication the feeder device with the main conduit, each other, so as to vary the asset of the feeder apparatus.

By contrast with the disclosure of D1, the present invention faces and start from the problem of providing a chemical dosing device, associated with a water flow line, that is suitable to be arranged in a plurality of configurations according to the circumstances and by taking into account the existing encumbrances in which the dosing device has to be mounted.

It follows that the skilled person, when starting from the disclosure of D1 in order to solve the above posed problem, **would not** be capable of finding in this document sufficient help and the necessary information for filling the distance which separates the controlled chemical feeder apparatus, as disclosed by D1, from the dosing device that is recited by new claim 1.

3.2 Therefore it must be concluded that the **subject matter** of **new independent claim 1** appears as **implying an inventive step** over the cited prior art, so as to satisfy Article 56 EPC.

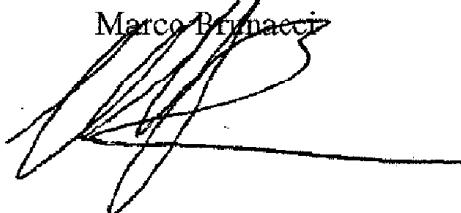
4. Novelty and inventive step of dependent new claims 2 to 11

New claims 2 to 11, since corresponding to more restricted and limited embodiments with respect to new claim 1, on which they respectively depend, directly or indirectly, have to be accordingly considered both novel and inventive.

5 Therefore in view of the amendments and comments here submitted for the present application, reconsideration of it is respectfully requested.

In any case, as a mere precautionary measure and in the event the Examiner following the present reply intends to refuse the application without issuing a further communication pursuant to Art. 94(3) EPC or establishing any informal contact with the applicant's representative, **Oral Proceedings** under Art. 116 EPC are requested.

Yours faithfully
BRUNACCI & PARTNERS
Marco Brunacci



CLAIMS

- 1) Device (1) for dosing chemical reagents in heating systems, comprising:
- at least a tank (2) for containing at least a chemical reagent;
 - at least a tubular element (3) connectable to a water flow line; and
- 5 - mechanical and hydraulic connection means (4) for connecting said tank to said tubular element (3);

wherein said tank (2) comprises at least an outward pipe (5), suitable for introducing water which crosses said tubular element (3) in said tank (2), and at least a return pipe (6), suitable for bringing water mixed with said reagent from
10 said tank (2) into said tubular element (3);

characterised by the fact that said connection means (4) comprise at least a first and a second portion (8, 9) associated at an extremity with said tank (2) and with said tubular element (3) respectively, with said first portion (8) and said second portion (9) being reciprocally coupled in rotation, in the zone of
15 coupling areas defined in the extremity sections of said first and second portions (8, 9) substantially opposite those associated with the tank (2) and with the tubular element (3), around an axis (10) substantially parallel to the axis of said tubular element (3),

by the fact that the device further comprises removable locking means (11)
20 of the rotation of said second portion (9) with respect to said first portion (8),
and

by the fact that said second portion (9), associated with said tubular element (3), is suitable to be moved between two extreme configurations which are angularly staggered to one another substantially by 90° passing through a
25 plurality of intermediate working configurations, and said first (8) and second (9) portions associated respectively with said tank (2) and said tubular element (3) are suitable to be rotated relatively the one to the other,

whereby in one of said extreme configurations the first and the second portions (8, 9) are arranged the one to the other to define an overturned L for the
30 wall mounting of the device, and in the other extreme configuration the first and the second portions (8, 9) are substantially vertically aligned the one with the other for the under-the-boiler installation of the device.

- 2) Device (1) according to claim 1, characterised by the fact that said first and said second portion (8, 9) have respective reciprocal coupling surfaces (8a, 9a) substantially vertical.
- 3) Device (1) according to claim 1 or 2, characterised by the fact that each of
5 said outward and return pipes (5, 6) comprises at least a substantially annular section (17, 18) defined on at least one between said first and said second portion (8, 9) in correspondence to the reciprocal coupling areas, said annular sections (8, 9) being substantially coaxial to the rotation axis of said second portion (9) with respect to said first portion (8) so as to allow the hydraulic
10 connection between said tank (2) and said tubular element (3) during the rotation of the second portion itself around its rotation axis (10).
- 4) Device (1) according to claim 3, characterised by the fact that the annular section (18) of said return pipe (6) is arranged outside the annular section (17) of said outward pipe (5).
- 15 5) Device (1) according to claim 3 or 4, characterised by the fact that each of said annular sections (17, 18) comprises a first part (17a, 18a) and a second part (17b, 18b), these too substantially annular and defined on said first and on said second portion (8, 9) respectively, in correspondence to the respective coupling surfaces (8a, 9a), each of said first parts (17a, 18a) being constantly in
20 communication with the respective second part (17b, 18b) during the rotation of said second portion (9) around its axis (10).
- 6) Device (1) according to claim 5, characterised by the fact that each of said first parts (17a, 18a) has a first port (17c, 18c) communicating with said tank (2) and that each of said second parts (17b, 18b) has a second port (17d, 18d)
25 communicating with said tubular element (3).
- 7) Device (1) according to one or more of the preceding claims, characterised by the fact that said locking means (11) are associated with said connection means (4) in correspondence to the reciprocal coupling areas of said portions (8, 9).
- 30 8) Device (1) according to one or more of the preceding claims, characterised by the fact that said locking means (11) comprise at least a hole (12) which crosses at least partially said portions (8, 9) in correspondence to said coupling

surfaces (8a, 9a) and comprise threaded means (13, 14) suitable for cooperating with said hole (12) to lock in rotation said second portion (9) with respect to said first portion (8).

9) Device (1) according to one or more of the preceding claims, characterised
5 by the fact that said tubular element (3) is associated in rotation with said second portion (9) around an axis substantially at right angles to the axis of the tubular element itself.

10) Device (1) according to one or more of the preceding claims, characterised by the fact that said connection means (4) comprise at least a valve device (26)
10 that can be operated to open/close said outward and return pipes (5, 6) so as to place in communication/insulate said tubular element (3) and said tank (2).

11) Device (1) according to claim 10, characterised by the fact that said valve device (26) is associated with said second portion (9).

CLAIMS

1) Device (1) for dosing chemical reagents in heating systems, comprising:

2) - at least a tank (2) for containing at least a chemical reagent;

3) - at least a tubular element (3) connectable to a water flow line; and

5 4) - mechanical and hydraulic connection means (4) ~~of~~ for connecting said tank
to said tubular element (3);

with wherein said tank (2) ~~which comprise~~ comprises at least an outward
pipe (5), suitable for introducing water which crosses said tubular element (3) in
said tank (2), and at least a return pipe (6), suitable for bringing water mixed
10 with said reagent from said tank (2) into said tubular element (3);

~~5) characterised by the fact that~~

said connection means (4) comprise at least a first and a second portion (8,
9) associated at an extremity with said tank (2) and with said tubular element (3)
respectively, ~~wherein~~ with said first portion (8) and said second portion (9) is
15 being reciprocally coupled in rotation to said first portion (8), in the zone of
coupling areas defined in the extremity sections of said first and second portions
(8, 9) substantially opposite those associated with the tank (2) and with the
tubular element (3), around a substantially horizontal an axis (10) substantially
parallel to the axis of said tubular element (3), and

20 **by the fact that** ~~it~~ the device further comprises removable locking means
(11) of the rotation of said second portion (9) with respect to said first portion
(8), and

~~6) Device (1) according to claim 1, characterised~~

by the fact that said second portion (9), associated with said tubular
25 element (3), moves is suitable to be moved between two extreme configurations
which are angularly staggered to one another substantially by 90° passing
through a plurality of intermediate working configurations, and said first (8) and
second (9) portions associated respectively with said tank (2) and said tubular
element (3) are suitable to be rotated relatively the one to the other,

30 whereby in one of said extreme configurations the first and the second
portions (8, 9) are arranged the one to the other to define an overturned L for the
wall mounting of the device, and in the other extreme configuration the first and

the second portions (8, 9) are substantially vertically aligned the one with the other for the under-the-boiler installation of the device.

7) 2) Device (1) according to claim 1 or 2, characterised by the fact that said first and said second portion (8, 9) have respective reciprocal coupling surfaces
5 (8a, 9a) substantially vertical.

8) 3) Device (1) according to ~~one or more of the preceding claims~~ claim 1 or 2, characterised by the fact that each of said outward and return pipes (5, 6) comprises at least a substantially annular section (17, 18) defined on at least one between said first and said second portion (8, 9) in correspondence to the
10 reciprocal coupling areas, said annular sections (8, 9) being substantially coaxial to the rotation axis of said second portion (9) with respect to said first portion (8) so as to allow the hydraulic connection between said tank (2) and said tubular element (3) during the rotation of the second portion itself around its rotation axis (10).

15 9) 4) Device (1) according to claim 4 3, characterised by the fact that the annular section (18) of said return pipe (6) is arranged outside the annular section (17) of said outward pipe (5).

~~40)~~ 5) Device (1) according to claim ~~4 or 5~~ 3 or 4, characterised by the fact that each of said annular sections (17, 18) comprises a first part (17a, 18a) and a
20 second part (17b, 18b), these too substantially annular and defined on said first and on said second portion (8, 9) respectively, in correspondence to the respective coupling surfaces (8a, 9a), each of said first parts (17a, 18a) being constantly in communication with the respective second part (17b, 18b) during the rotation of said second portion (9) around its axis (10).

25 ~~44)~~ 6) Device (1) according to claim 6 5, characterised by the fact that each of said first parts (17a, 18a) has a first port (17c, 18c) communicating with said tank (2) and that each of said second parts (17b, 18b) has a second port (17d, 18d) communicating with said tubular element (3).

~~42)~~ 7) Device (1) according to one or more of the preceding claims,
30 characterised by the fact that said locking means (11) are associated with said connection means (4) in correspondence to the reciprocal coupling areas of said portions (8, 9).

13) 8) Device (1) according to one or more of the preceding claims,
characterised by the fact that said locking means (11) comprise at least a hole
(12) which crosses at least partially said portions (8, 9) in correspondence to
said coupling surfaces (8a, 9a) and comprise threaded means (13, 14) suitable
5 for cooperating with said hole (12) to lock in rotation said second portion (9)
with respect to said first portion (8).

14) 9) Device (1) according to one or more of the preceding claims,
characterised by the fact that said tubular element (3) is associated in rotation
with said second portion (9) around an axis substantially at right angles to the
10 axis of the tubular element itself.

15) 10) Device (1) according to one or more of the preceding claims,
characterised by the fact that said connection means (4) comprise at least a
valve device (26) that can be operated to open/close said outward and return
pipes (5, 6) so as to place in communication/insulate said tubular element (3)
15 and said tank (2).

~~16)~~ 11) Device (1) according to claim ~~11~~ 10, characterised by the fact that
said valve device (26) is associated with said second portion (9).