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(54) Title: CORPSE CREMATION PLANT (57) Abstract Crematory furnace with crematory chamber (7), characterised in that: said crematory chamber (7), has an underlying chamber for the smoke recirculation (8), said underlying chamber having the function of further heating the crematory bottom which makes up the resting plane of the corpse being cremated; at least a post-combustion chamber with separated post-burners (8''-8/9''-9'') is provided.		

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DESCRIPTION

CORPSE CREMATION PLANT

Technical Field

The present invention regards a corpse cremation plant.

The crematory furnace and respective loader are also an object of this invention as parts of said plant.

Background Art

In prior art different types of crematory furnaces with different structures and functions whose yield is anyway always limited are known.

A purpose of this invention is that of improving their performances.

The use of loading the coffins in crematory furnace either manually or by lifting trucks or by very complicate equipment, generally unsuitable for handling the box containing the coffin is known.

Another problem is the furnace cleaning, that is the ash recovery, which is presently carried out manually.

The manual operation involves the need of turning off the furnace and make it even partially cool, the extraction from the still working or anyway still burning furnace being impossible and anyway dangerous.

Furthermore, in the conventional furnaces having a rear ash discharge and a cleaning door placed outside of the furnace axis for the simultaneous presence of the primary burner aligned with the post-combustion upper one and with the bottom lower one, some typical triangle shaped areas are formed in the crematory chamber corners, avoiding the ash total removal and collection for each corpse.

A purpose of the present invention is that of also obviating the above mentioned drawbacks and increase performance.

Essence of the invention

1 As claimed, the problem is solved by means of a corpse crematory plant,
2 including:

- 3 - a double chamber crematory furnace, being provided:
- 4 - a first crematory chamber and
- 5 - a second post-combustion and smoke oxidation chamber,
- 6 - and in which it is further provided that the crematory chamber always
- 7 has a combustion bottom in said crematory chamber, having beneath it a
- 8 smoke recirculation underlying chamber.

9 Thus a combustion bottom with the specific function of increasing the
10 crematory potential and of avoiding the organic liquid spilling is
11 obtained, and not only the functionality but also the combustion yield
12 are increased.

13 In a preferred solution the smoke recirculation underlying chamber is
14 equipped with a secondary burner, thus forming said post-combustion
15 chamber, underlying said crematory chamber and thus determining a
16 high temperature increase of said combustion bottom. In such solution
17 the smokes from the crematory chamber reach the lower post-
18 combustion area through suitable side openings in order to obtain a
19 perfect and total combustion of the crematory gases.

20 In an alternative variation the post-combustion chamber is placed
21 behind the crematory chamber, thus obtaining the advantage of having
22 both the crematory bottom warm and the downstream post-combustion
23 of the smokes before they are conveyed to the chimney.

24 In fact the post-combustion area has the function of ensuring the total
25 oxidation of the crematory smokes thanks to a high temperature (850-
26 950°C), a suitable stay time (1 or 2 sec.) and a high turbulence condition
27 ($O_2 > 6\%$).

28 The furnace is functionally equipped with an oleodynamical lifter

1 which by means of a longitudinal telescopic developed support provided
2 for the automatic introduction of the coffin into the crematory chamber,
3 said support involving at the end a scraper able to recover the ashes
4 from the previous cremation.

5 Thus, the working cycle is sped up and also the total yield is increased.

6 The coffin loader for crematory furnaces, hereinafter called loader, also
7 avoids the use of industrial equipment such as the lifting trucks for the
8 box handling.

9 These and other advantages will appear from the following detailed
10 description of preferred embodiment solutions with the aid of the
11 enclosed drawings whose execution details are not to be considered as
12 limitative but are only given as examples.

13 Figure 1,2,3 show three side elevation views of the loader according to
14 the respective functioning.

15 Figure 4 shows a front view of the loader.

16 Figure 5 and 6 show two top views of the loader bearing structure, in
17 which the moving system and the structure beneath the conveying
18 plane and above it are shown.

19 Figures 7 and 8 show a first version of crematory furnace;

20 Figures 9 and 10 show a second version of crematory furnace;

21 Figures 11 and 12 show a third version of crematory furnace;

22 Referring to figures 7 to 12 concerning the furnace structure, it may be
23 noticed that:

24 - the furnace includes a crematory upper chamber 7 and a chamber
25 placed beneath the crematory hot bottom, which further heats it
26 (crematory hot bottom).

27 The crematory hot bottom has the function of increasing the plant's
28 capacity and of avoiding the organic liquid 8 spilling.

1 The burners are substantially provided in the crematory chamber (main
2 combustion chamber 7"). Additional burners are provided in the post-
3 combustion chamber (8").

4 The post-combustion chamber is made either beneath said bottom or at
5 the end of both.

6 When the post-combustion chamber is provided at the bottom it is
7 aligned after the crematory chamber integrated into a bottom single-
8 block structure 9-9" with a smoke return wall 9' and post-burner 9").

9 Referring to figures 1 to 6 concerning the loader, it may be noticed that
10 with 1 is indicated the loader base structure and with 2 and 4 are
11 indicated two quadrangularly 41,42-21,22 engaged oscillating parallel
12 uprights, operated for the lowering and lifting by tilting by a
13 fluidynamical cylinder 3 with station 31 and support plane 5 and
14 movable plane 6.

15 - Before resting the coffin on the upper reference plane 6, the wood
16 shims, which make up the feet for keeping the box lifted from the
17 furnace plane and for allowing the loader withdrawal, are arranged on
18 the loader. The wood shims are burnt together with the coffin.

19 The coffin discharge is completely automatic by means of a control
20 electric board, endowed with the interlocks necessary for the crematory
21 process, for avoiding inconsistent actions. The electric board, endowed
22 with emergency control, may work both automatically and manually.

23 Pushing the loading button, the loader rests the coffin in the
24 combustion chamber in 20" and goes back to its starting position in
25 other 20".

26 The times are set by means of flow adjustment valves installed on the
27 oleodynamical station.

28 The loader is steadily anchored to the transit plane by some expansion

1 bolts passing through the section bars resting on the base structure 1.
2 - The lifting is obtained by advancement, by oleodynamical piston (3).
3 The box resting plane lifts by a pantograph movement which involves a
4 slight axial advancement of the coffin.
5 Coffin insertion into the combustion chamber:
6 When the loader is in the highest elevation position, the loader's upper
7 plane is made slide forwards controlled by a chain moved by an
8 hydraulic motor 31 which also controls the piston 3.
9 When the upper plane 6 is completely advanced, the coffins is positioned
10 in the combustion chamber. The lifting piston further pushes the plane
11 forwards, lowering it. Thus, the box is laid on the combustion chamber
12 base plane.
13 The base plane is withdrawn by the motor driven chain and goes back to
14 its starting position.
15 The loader is endowed with respective mechanical limit switches for
16 detecting the described positions:
17 FC1 Loader's limit switch at rest.
18 This is the loader's cycle starting and end position.
19 FC2 Maximum elevation limit switch.
20 Is the position which precedes the coffin insertion into the combustion
21 chamber.
22 FC3 Forward base plane limit switch.
23 After the loader has reached the maximum elevation point, the base
24 plane (6) insertion into the combustion chamber starts. FC3 signals the
25 base plane stroke completion.
26 FC4 coffin resting laying switch.
27 When the base plane has ended its stroke, the loader starts its
28 pantograph movement again and lays the coffin on the plane of the

1 combustion chamber; at this point the base plane may be withdrawn.
2 FC5 Backed base plane limit switch.
3 This is the base plane (6) rest position, at this point the pantograph
4 movement may be carried out in the reverse direction for returning to
5 the loader resting conditions.
6 Oleodynamical plant
7 The pantograph movement is realised by the oleodynamical piston 3.
8 The base plane advancement is realised by a hydraulic motor driven
9 chain movement 31. The advancement speed of the base plane 6 is
10 adjusted by flow adjustment valves.
11 The loader is endowed with an oleodynamical station with a 10 litres tank
12 and a pump having $P_i = 2,2$ KW and $P_a = 1,7$ KW.
13 Buffering
14 A buffering carter having a double aesthetical and safety function for
15 avoiding the operators to contact the mechanical parts which activate
16 the loader, which result completely closed inside of the same carter is
17 provided.
18 As claimed the end of the loader's (6) telescopic development platform
19 has a lower point scraper, which lowered on the crematory furnace (7)
20 plane, once the cremation has occurred, allows the ash recovery.
21 For such a purpose an ash falling and extraction opening may be
22 provided 7".
23 The crematory chamber shape of the furnace allows a complete cleaning
24 of the ashes on the whole bottom surface without creating preferential
25 areas and paths thanks to the cleaning from the front load door.
26 The characteristics which the furnace solution have in common are:
27 - the presence of the hot bottom placed beneath the crematory chamber;
28 - the particular arrangement of the comburent air distribution nozzles

1 in the crematory chamber such to ensure an air homogeneous
2 distribution along the coffin and a suitable turbulence inside of the
3 same chamber;

4 - the single-block structure containing the crematory chamber and the
5 post-combustion chamber with rear metal structure for containing the
6 fan and the secondary burner. Such structure has an acoustic-
7 insulating function;

8 - the crematory ash discharge always occurs on the loading side when
9 the loading door opens, the ashes are then made fall into the underlying
10 cinerary drawer which will be manually extracted.

11 Further characteristics concern:

12 - the internal coating with insulating and refractory bricks having an
13 alumina high content (min. 42%) such to ensure a high thermal inertia;

14 - the opening system with the loading door both oleodynamically and
15 manually operated in case of electric power lack.

16 Summarising:

17 Said crematory furnace always involves a carbon steel structure for
18 containing the secondary burner and the fan having an acoustic
19 insulating function opposed to the loading area (9).

20 Advantageously said containing bottom structure (9) is placed after an
21 intermediate chamber (9'') with smoke deviation wall (9') and post-
22 combustion (9''), thus realising a post-combustion area placed on the
23 bottom. Said crematory furnace thus involves a burner (9) containing
24 structure, an intermediate post-combustion chamber (9''') endowed with
25 opposite smoke deviation walls (9') and post-combustion burner (9'')
26 substantially placed before the smoke discharge towards the chimney
27 and directed towards a post-combustion pre-chamber limited by a
28 partition wall hanging from the top (9').

1 Thus the forced path followed by the smokes towards the chimney eases
2 the falling and oxidation of the not yet burnt rough particles. In such
3 solution the smoke outlet occurs from the top;

4 In such a case the crematory chamber burner (7'') is placed upstream of
5 the loading door (7'), and it is directed downstream where the coffin is
6 positioned.

7 The post-combustion area is also realised in the chamber beneath the
8 hot bottom (8), where a downstream burner (8'') is provided; in such
9 case the crematory chamber burner (7'') is placed at the top upstream of
10 the same and directed towards the loading door and downwards, a side
11 hollow space (i) which allows the smoke passage from the crematory
12 upper chamber (7) to the lower chamber (8), where the post-combustion
13 will occur, is provided.

14 Practically, by adopting the solution with the hollow space, an internal
15 crematory chamber and a second combustion chamber are obtained, this
16 latter made up of the hollow space. An equipment with no hollow space
17 is also provided.

18 In such solution the smoke outlet towards the chimney occurs laterally
19 from the bottom (figs. 10, 12).

20

1 Claims

2 1. Crematory furnace with crematory chamber (7), characterised in that:
3 - said crematory chamber (7), has an underlying chamber for the smoke
4 recirculation (8), said underlying chamber having the function of
5 further heating the crematory bottom which makes up the resting plane
6 of the corpse being cremated;

7 - at least a post-combustion chamber with separated post-burners (8" -
8 8/9" - 9") is provided.

9 2. Furnace, according to the previous claim, characterised in that a
10 bottom chamber (9) which covers functional apparatuses and access
11 areas to the crematory chamber and/or to the post-combustion chamber
12 is provided.

13 3. Furnace, according to the previous claim, characterised in that said
14 crematory furnace involves a bottom chamber (9) with an intermediate
15 post-combustion chamber (9'') endowed with opposite smoke deviation
16 walls (9') and post-combustion burner (9'') substantially placed before
17 the smoke discharge towards the chimney and directed towards a post-
18 combustion pre-chamber limited by a partition wall hanging from the
19 top (9'), this latter being preceded by a partition wall which rises from
20 the bottom and divides it from said crematory chamber (7).

21 4. Furnace, according to the previous claim, characterised in that said
22 underlying chamber (8), involves a respective burner (8'') which is
23 placed downstream of the underlying chamber and directed upstream
24 (9).

25 5. Furnace, according to any of the previous claims, characterised in
26 that the crematory chamber burner (7'') is placed upstream beneath the
27 access main door (7') and next to an opening communicating with the
28 underlying chamber (8).

1 6. Furnace, according to the previous claim, characterised in that the
2 crematory chamber burner (7") is placed downstream at the top and
3 substantially directed upstream, being the combustion communication
4 passage to the underlying chamber (8) also downstream beneath it.

5 7. Furnace, according to the previous claim, characterised in that in said
6 underlying chamber (8) a respective post-combustion burner (8") is
7 provided.

8 8. Furnace, according to the previous claim, characterised in that in said
9 underlying chamber (8) a respective post-combustion burner (8")
10 placed downstream and directed upwards substantially in the same
11 stream is provided.

12 9. Furnace, according to the previous claim, characterised in that said
13 crematory chamber (7) communicates with said underlying chamber (8)
14 by side double wall intercommunication with hollow space (i).

15 10. Corpse cremation plant with crematory chamber (7) and coffin
16 loader for crematory furnace according to any of the previous claims,
17 characterised in that it includes a liftable base structure 1 and a frame
18 or upper plane (5) and a longitudinally "p" developing support plane (6)
19 and involving at the end a scraper (6') for the respective ash collection,
20 in the respective crematory chamber of said furnace at least an ash
21 collection opening for the scraped extraction (7'") being provided.

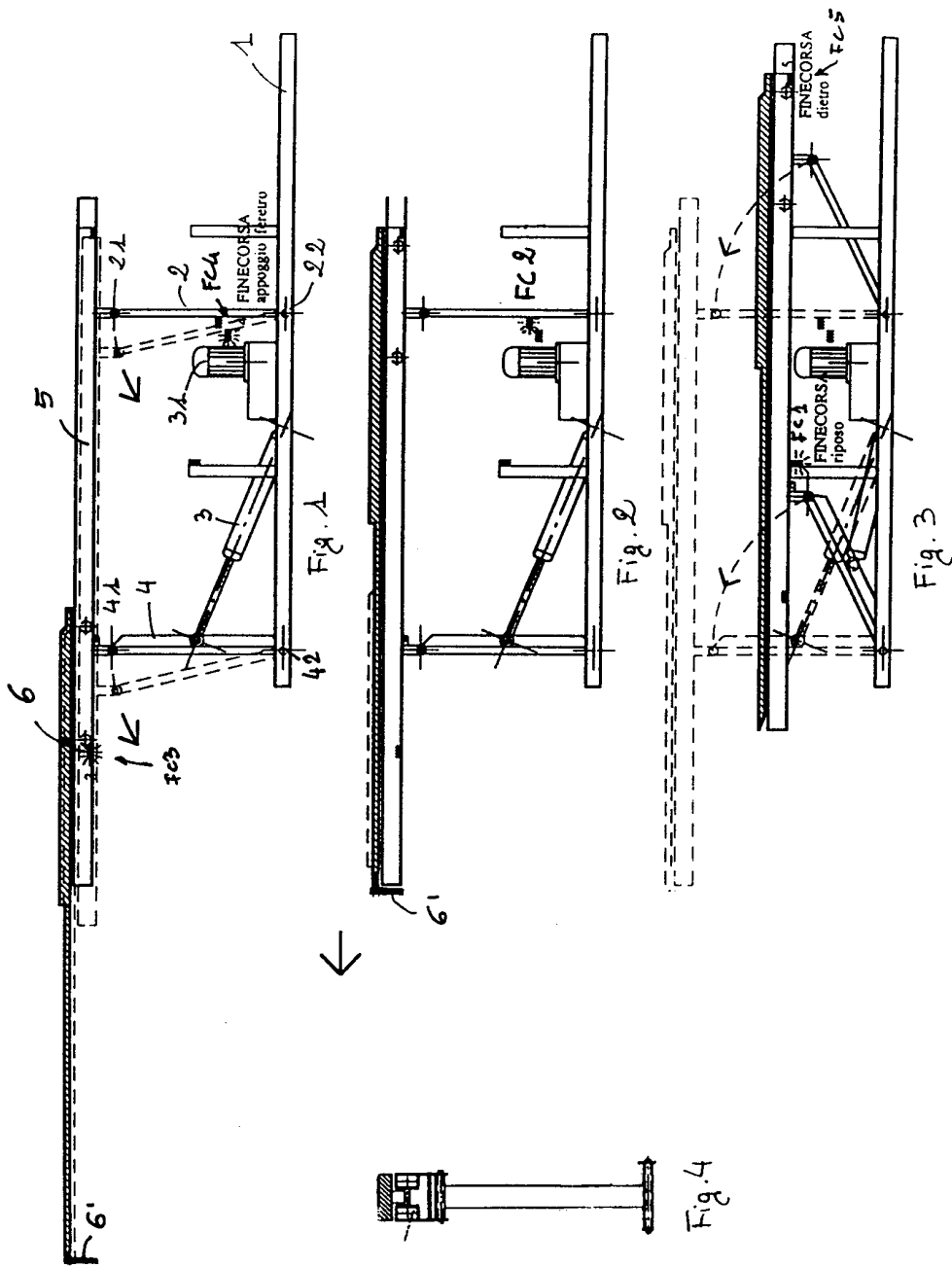
22 11. Plant according to the previous claim, characterised in that said
23 loader is connected to said base structure by a couple of upperly and
24 lowly engaged uprights (2,4) for forming a parallelogram shaped
25 quadrangle (41,42-21,22) inclinable for lifting or lowering the upper
26 structure (5), by a fluidynamical piston (3) which engages on said base
27 structure on one side and on one of said uprights (4) on the other by
28 fluidynamical motor driving (31).

1 12. Plant according to the previous claim, characterised in that above
2 said plane or upper structure (5) of said loader, slides a further movable
3 plane, which develops projecting on guides (6).

4 13. Plant according to the previous claim, characterised in that said
5 movable plane (6) of said loader, is moved to and fro by a transmission
6 chain, the whole controlled by a control single fluidynamical station
7 (31) with a servo-control system.

8 14. Plant according to the previous claim, characterised in that said
9 loader includes five limit switches:

- 10 - a plane lowering limit switch as a resting limit switch (FC1);
- 11 - a maximum lifting limit switch (FC2);
- 12 - a limit switch for the movable plane maximum advancement (6, FC3);
- 13 - a limit switch for the maximum backing of said movable plane (6, FC4).



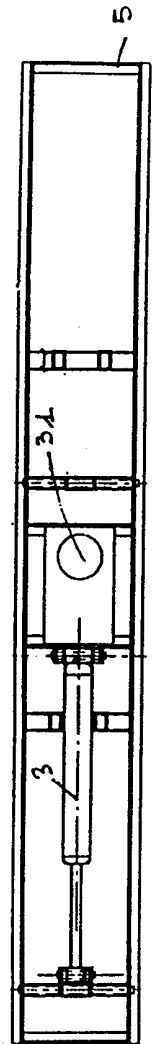


Fig. 5

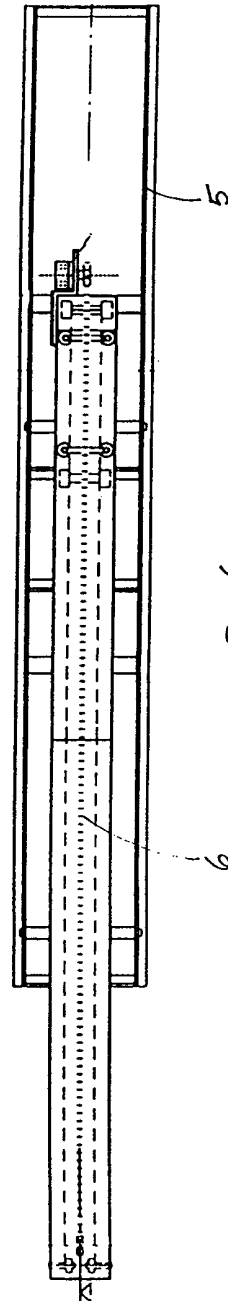


Fig. 6

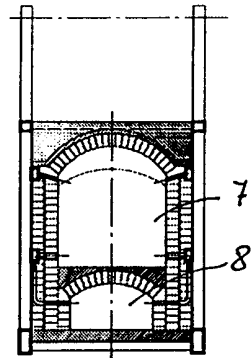


FIG. 7

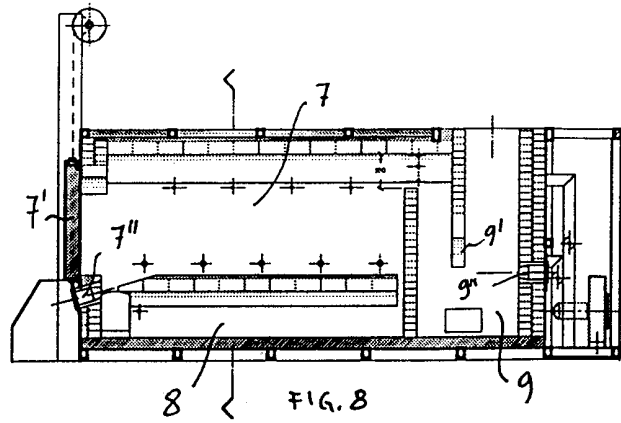


FIG. 8

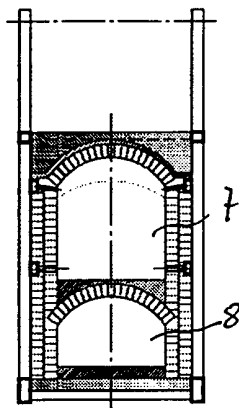


FIG. 9

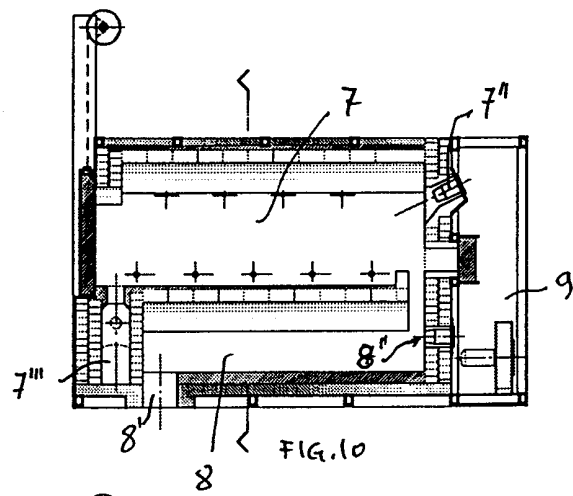


FIG. 10

