

TITLE OF INVENTION

Apparatus To Facilitate The Cleaning Of Internal Surfaces of A Tank Container

FIELD AND BACKGROUND OF INVENTION

Generally, the invention relates to an apparatus to facilitate the cleaning of the interior surfaces, including the interior ceiling surfaces, interior wall surfaces, interior corners of an ISO standard 20-ft tank containers by means of high pressure fluid, including steam, directed at said surfaces, and including the cleaning and removal of oil and oil residue off said surfaces.

The current conventional practice of properly cleaning the interior surfaces of a standard 20-foot ISO tank container, commonly used in the bulk storage and transport of liquids, gases and powders, is to have one or more persons entering the container and manually cleaning said surfaces, whether through means of scrubbing, scraping, washing or the like. As physical entry is required in order to access the inside of the tank, these methods pose obvious potential health risks to those performing the cleaning due to exposure to fumes or potential explosion, especially where the previous cargo stored in

said tank container was oil or gas. Further, physical entry increases the risk of injury due to falls in a slippery environment in low lighting conditions.

Further, commonly, a hose, commonly to which is attached a high-speed nozzle, is also introduced into the tank container in order to spray and manually direct water at high speeds onto the interior surfaces of the tank. Often, the water bears added chemicals to assist in dissolving the unwanted substances residing on the walls, dependent on said substances which were carried within the tank container. This, in turn, adds costs to the cleaning process and potentially, the risk of exposure of said chemicals to the cleaner(s).

Alternatively, tank cleaning lance systems are known to be used so as to avoid the necessity of one or more persons physically entering the tank container. Such systems are known to comprise a single pipe through which water, whether hot or cold, or a combination of water and steam, whether chemically laced or otherwise, is passed through and then ejected through one or more nozzles located at one end of said pipe. In contrast, the present invention involves fluids such as steam which are passed through high speed nozzles providing a fan-like distribution of said fluid as the medium used for cleaning.

The prior art includes tank cleaning lance systems which generally comprise a tank cover, a single straight pipe wherein the length of entry and angle of the pipe are

adjustable in relation to the cover, and one or more nozzles at the end of the pipe. In these systems, the tank cover is fitted into position over the tank and the angle and length of entry is manually changed and adjusted while cleaning fluid is pumped and ejected through the pipe and out of one or more high-speed jet nozzles. A challenge in using these systems is that one is unable to determine, whether visually or otherwise, the various optimal combinations of angles, lengths of entry, time required and ejection speed of fluid for each respective area of internal surface, thus wasting a significant amount of cleaning fluid. In using these systems, dependency on individual skill and experience is high. A further disadvantage is that, as only a single pipe is used, a longer time is required for the cleaning process. In addition, at the end of the cleaning process, manual entry for a visual inspection is required in order to confirm that the surfaces have indeed been cleaned.

In contrast to the prior art, the present invention serves to clean specifically standard 20-foot ISO tank containers, and features a plurality of hollow lances, each comprising a first elbow, pipe, second elbow and nozzle, wherein the length of entry of each pipe in relation to the cover, the angle of each pipe in relation to the cover, the angle of each nozzle in relation to its respective pipe, the angles of spray of fluid from each respective nozzle, are all fixed (but not necessarily all uniform) within specific respective ranges and are each combinatorially configured to clean specific internal areas and surfaces of the standard 20-foot ISO tank containers. As the internal dimensions of a 20-

foot ISO tank container are standardised on an international level, and are consistent from one container to another, the configuration of the present invention is predetermined so that fluid, being primarily steam in the present invention, may be sprayed at predetermined angles or ranges of angles in order to access all internal surfaces and corners of the container.

Further, in contrast to the prior art, steam is pumped through all of the plurality of lances simultaneously, thus significantly reducing the amount of time required for the cleaning process as well as reducing the amount of water used.

Distinguished from the prior art, the present invention further features a primary hollow trunk affixed to said cover with apertures through which connected to each respective end of said plurality of lances, thus ensuring simultaneous uniformity in fluid pressure throughout all lances.

In addition, the present invention features one or more lengthier lances for the purpose of injecting fluid unto the further corners of the tank container, and which may be inserted through at least one hole in said cover and secured to said primary trunk.

A primary object of the present invention is to provide an apparatus to clean the internal surfaces of a standard 20-ft tank container without any involvement of one or more persons physically entering the tank container.

A further object of the present invention is to provide an apparatus featuring a cover configured to fit the top hole of a standard 20-ft tank container with a plurality of lances affixed to and through said cover, each lance comprising a first hollow elbow, a hollow pipe, a second hollow elbow and a nozzle.

A further object of the present invention is to significantly reduce the time required for the cleaning process to complete by injecting fluid, preferably steam, simultaneously through all lances.

A further object of the present invention is to provide an apparatus wherein the length of entry of each lance in relation to the cover, the angle of each pipe in relation to the cover, the angle of curvature of each elbow, the angle of each nozzle in relation to its respective pipe, the angles of spray of fluid from each respective nozzle, are all combinatorily preconfigured in specific optimal ranges so as to facilitate the access of fluid onto the internal surfaces of said tank container.

A further object of the present invention is to provide an apparatus wherein there is general uniformity in fluid pressure through all respective lances.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1 is an perspective view of a cleaning apparatus showing a primary trunk 20 with eye 20 at its top end, stump 82 near its top end and with its base end affixed to a central portion of external cover 100 which shows an aperture 150, covers 153 and 158, and a plurality of prongs 102. Primary trunk 20 further has two outwardly opposing apertures 180, and two outwardly opposing clasps 120. Fig. 1 further shows short lances 30, 40, 50 and 60, which each comprise a first elbow 33, a pipe 35, a second elbow 37, and a nozzle 39. Fig. 1 further shows secondary trunks 31 and 51, each with one end affixed to the corpus of primary trunk 20 and its other end affixed to elbows 33 of short lances 30 and 50 respectively; secondary trunks 41 and 61, each with one end affixed to the corpus of secondary trunks 31 and 51 respectively and its other end affixed to elbows 33 of short lances 40 and 60 respectively. Fig. 1 further shows, hooked to eye 80, chain and hook 300, which is not part of the present invention.

Fig. 2 is a side view of the cleaning apparatus showing primary trunk 20, eye 80, stump 82, two clasps 120, a pair of apertures 180. Fig. 2 further shows secondary trunks

31 and 51, and short lances 30, 40, 50 and 60. Fig. 2 further shows chain and hook 300, which is not part of the present invention.

Fig. 3 is a base view of the cleaning apparatus showing external cover 100 and internal cover 100, prongs 102, two apertures 150, two covers 158, two covers 153, and short lances 30, 40, 50 and 60.

Fig. 4 is a top view of the cleaning apparatus showing external cover 100, prongs 102, two apertures 150, two covers 158, two covers 153, two stoppers 159, two clasps 120, primary trunk 20 and secondary trunks 31, 41, 51 and 61. Fig. 4 further shows guides 157, one at each length of each cover 158.

Fig. 5 is a side view of the cleaning apparatus showing a pair of long lances 220 and in a 'closed' position, and each with one end affixed to primary trunk 20. Each long lance 220 has a hose 222, a second pipe 228, a second elbow 230, a third long pipe 232 and nozzle 234.

Fig. 6 is a side view of the cleaning apparatus with a pair of long lances 220 installed and in an 'open' position.

Fig. 7 is a perspective view of the cleaning apparatus with a pair of long lances 220 in an 'open' position, each long lance 220 comprising a hose 222, a second pipe 228, a second elbow 230, a third long pipe 232 and nozzle 234.

Fig. 8 is a perspective view of a portion of the invention and shows two clasps 120 on opposing sides of primary trunk 20, each clasp 120 comprising a stem 123, fork 126, door 124, arm 128 and handle 125.

Fig. 9 shows the cleaning apparatus assembled onto a standard 20-ft tank container.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The preferred embodiments of an apparatus for the cleaning of the internal surfaces and internal corners of a standard ISO tank container commonly used in the storage and transport of liquids, gases, grains and powders, including oils, malt, and the like, is shown in Figs. 1 to 8, where like numerals illustrate like portions and parts of the invention.

For purposes of clarity, Figs. 1 to 4 show the apparatus without long lances 220. Figs. 5, 6, 7 and 9 show the apparatus with long lances 220; in particular, Fig. 5 shows

the apparatus with long lances 220 in a 'closed' position, while Figs. 6, 7 and 9 show the apparatus with installed long lances 220 in an 'opened' position. The labeling of Figs. 5, 6 and 7 bear an emphasis on the features of long lances 220.

With reference to Figs. 1 and 2, the apparatus comprises a generally flat, circular disc external cover 100 with a plurality of flat prongs 102 protruding laterally from its sides, internal cover 110 being a smaller flat circular disc concentric to and extending from the base surface of external cover 100, and wherein the shape and dimensions of external cover 100, internal cover 110 and prongs 102 are configured to fit and lock by means of rotation into the top opening of a standard 20-ft ISO tank container so as to render the tank container airtight.

Extending upwardly from a top central portion of outer cover 100 is primary trunk 20, which is generally hollow and tubular in shape with a circular cross-section and has an eye 80 at its superior closed end. Figs. 1 and 2 show a chain and hook 300 through which eye 80 is hooked, said chain and hook not being part of the present invention, and wherein said chain is connected to a crane or any other weight bearing mechanism so as to carry the weight and load of the apparatus while in the process of guiding, preferably by holding on to primary trunk 20, the apparatus to the top opening of the standard 20-ft ISO tank container for locking and use.

With reference to Figs. 1 and 2, primary trunk 20 further has a pair of opposing protruded apertures 180 on its primary corpus, said apertures being adapted to firmly receive an end of a long lance 220. In a preferable embodiment, protruded apertures 180 each have threaded corpuses so as to receive and lock one end of long lance 220. Apertures 180 are identical to each other save that one aperture 180 is in a position on primary trunk 20 generally vertically below that of stump 82 and the other aperture 180 is on a side of primary trunk 20 opposing that of stump 82.

In Figs. 1 and 4, primary trunk 20 further has two hinged clasps 120, each on opposing sides of its corpus and opposingly oriented so that each clasp 120 opens in an orientation away from the other. In a preferred embodiment, said pair of clasps 120 are in a plane relatively transverse to those of said apertures 180. With reference to Fig. 8, each clasp 120 comprises a stem 123 the base of which is affixed to a portion of the corpus of primary trunk 20, a two-pronged fork 126 extending from an end of stem 123, a hinged door 124 which pivots from one of its ends around the end of a first prong of fork 126 and a channel 125 at the end of a second prong of fork 126. Each hinged door 124 comprises an arm 128 and a handle 125; one end of arm 128 is affixed and hinged to the end of said first prong of fork 126, and the other end of arm 128 extends to handle 125. Each channel 127 is adapted to firmly receive a portion of arm 128 so that door 124 may firmly rest on said second prong of fork 126 when in a closed position, with reference to the clasp 120 on the leftmost side of Fig. 8.

The cavity formed by the prongs of fork 126 is curved and is adapted to receive laterally the cross-sectional corpus of pipe 228 of long lance 220 when clasp 120 is open, and hold it in place when closed. Preferably, each clasp 120 may be firmly locked when closed so as to firmly keep each long lance 220 in place during operation, as a stable position and orientation of each long lance 220 is necessary for effective cleaning of the internal surfaces and corners relatively further away from the tank container's top opening.

Primary trunk 20 further has hollow stump 82 on its corpus, as shown in Figs. 1 and 2. Stump 82 extends laterally from a portion near to the top of primary trunk 20, protruding in an orientation similar to that of secondary trunk 31 and in a general plane relatively transverse to those of clasps 120. Stump 82 is adapted to firmly receive and lock in place one end of a hose, said reception and locking to be strong enough to withstand high-pressure fluids passing through the connection between said hose and stump 82. Preferably, stump 82 is threaded whether internally or externally, and receives one end of hose by means of screw and/or rotation.

The other end of said hose is firmly connected to a device or machine (usually a high pressure fluid pump) which emits fluids, such as steam, in a controllable and adjustable manner and at high pressures and speeds, preferably at pressures of 30,000

kg/m² or above, but not necessarily limited to this range. For clarity, said hose and high pressure fluid device do not comprise in the present invention. Steam is preferably used as it is an effective medium for removing oil and oil residue on surfaces when sprayed upon said internal surfaces at high speeds and pressure.

In a preferable embodiment, hollow secondary trunks 31 and 51 extend horizontally from one end of each on diagonally opposing sides of primary trunk 20. Hollow secondary trunk 41 extends horizontally from a section of the corpus of secondary trunk 31. Similarly, hollow secondary trunk 61 extends horizontally from a section of the corpus of secondary trunk 51.

In Fig. 1 and 2, short lances 30, 40, 50 and 60 each comprise the following: a first hollow elbow 33 with one downward-facing end affixed to an end of a vertical cylindrical hollow pipe 34, said pipe 34 adjoining at its other end to an end of a second hollow elbow 37 with its other end adjoined to nozzle 39.

In a preferable embodiment, each elbow 33 is a right-angled curved/bending elbow with one end and opening facing a lateral orientation and its other end facing a downward orientation. With reference to Figs. 1 and 2, said lateral ends of elbows 33 of short lances 30, 40, 50 and 60 are connected to an end of secondary trunks 31, 41, 51 and 61 respectively, and the said downward facing end of each elbow 33 is affixed to a

superior end of hollow pipe 35. Each pipe 35 is a through-pipe with an external portion of its corpus affixed, preferably by welding means, to external cover 100 and/or internal cover 110.

Affixed to the base end of each pipe 35 is elbow 37. Preferably, the angle of central axis of the inferior end of each elbow 37 relative to the inferior vertical falls in the range between 35 degrees and 55 degrees, and the angular range of spray of nozzle 39 falls in the range of 120 degrees to 140 degrees when steam is applied through it at an approximate pressure of 30,000 kg/ m². Further, in a preferred embodiment, each nozzle 39 provides a flat spray distribution pattern deflected at an upward angle and wherein the angle of central axis of the range of spray ranges from 35 degrees to 55 degrees to the superior vertical. And all so that all said ranges and angles combinatorially enable high pressure fluid, preferably steam, emitted through said nozzles 39 to reach the internal ceiling surfaces and curved wall surfaces of a standard ISO tank container at a pressure and temperature effective for the purposes of cleaning these surfaces.

In a preferred embodiment of the present invention, with reference to Fig. 1, nozzles 39 of short lances 30 and 50 are oriented in opposing directions relative to each other, likewise, nozzles 39 of short lances 40 and 60 are oriented in opposing directions relative to each other, and all so that laterally, central axis of orientation of each nozzle 39 is generally perpendicular to that of its immediate adjacent nozzles 39.

The connections of each respective end of secondary trunks 31 and 51 to primary trunk 20 are so that the cavity in primary trunk 20 extends to the respective cavities in secondary trunks 31 and 51. Similarly, the connections of each respective end of secondary trunks 41 and 61 to the corpuses of secondary trunks 31 and 51 respectively are so that the respective cavities in trunks 31 and 51 extend to the cavities in secondary trunks 41 and 61 respectively. Likewise, the respective cavities in secondary trunks 31, 41, 51 and 61 extend to each of the respective cavities in elbows 33, pipes 35, elbows 37 and nozzles 39 of short lances 30, 40, 50 and 60 respectively. The connections and cavities described in this section of the description are so that a high-pressure fluid may be passed through said cavities efficiently and effectively, maintaining high pressure throughout, starting from the opening and cavity in hollow stump 82 and ending and ejecting from each nozzle 39.

In a primary embodiment, the cavity in primary trunk 20 terminates at its top and its base.

With reference to Figs. 5 and 6, each long lance 220 comprises a hose 222, being a flexible hollow through-hose preferably made of a flexible material capable of withstanding high pressures and temperatures without excessive loss of heat, with one end affixed to aperture 180 in an airtight manner and with its other end affixed to the

superior end of hollow pipe 228, being a through-pipe, which extends to a hollow elbow 230 with a through cavity. Elbow 230 extends to a hollow pipe 232, being a long through-pipe, which extends to nozzle 234. Preferably, 228 and 232 are straight pipes.

In a preferred embodiment of the present invention, the angle of central axis of the inferior end of each elbow 230 falls in the range between 15 degrees and 35 degrees below horizontal when pipe 228 is generally vertical, and so that the central axis of each pipe 232 is at minimum 105 degrees and at maximum 125 degrees to its respective pipe 228. Similar to that of nozzle 39, the angular range of spray of each nozzle 234 falls in the range of 120 degrees to 140 degrees when steam is applied through it at an approximate pressure of 30,000 kg/m². Further, in a preferred embodiment, each nozzle 234 provides a flat spray distribution pattern deflected upwardly and wherein the angle of central axis of the range of spray ranges from 35 degrees to 55 degrees to the superior vertical. And all so that all said ranges and angles combinatorially enable high pressure fluid, preferably steam, emitted through said nozzles 39 to reach the internal ceiling surfaces, superior curved corners and curved wall surfaces, further from its centre, of a standard ISO tank container at a pressure and temperature effective for the purposes of cleaning these surfaces.

In a preferred embodiment of the present invention, with reference to Figs. 6 and 7, when long lances 220 are in an 'open' position, nozzles 234 of are oriented in directly

opposite directions relative to each other, and the central axis of each pipe 232 is at minimum 105 degrees and at maximum 125 degrees to the superior vertical.

Extending outwardly from two opposing external sides of each elbow 230 is a pair of opposing protrusions, preferably circular in cross-section, which are lodged within, in a freely rotatable manner, the internal sides of external cover 100 and/or internal cover 110 facing aperture 150 and parallel to the length of cover 158, thus forming a swivel whereby each long lance 220 may be freely rotated along a plane and around a respective centre being said respective protrusions. The two long lances 220 may be rotated into a 'closed' position, as shown in Fig. 5, wherein long pipes 232 are in a generally vertical orientation and are generally perpendicular to external cover 100; in this 'closed' position, the inferior portion of the apparatus comprising primarily of pipes 35 and 232, elbows 37, and nozzles 39 and 234, are of a position and orientation suitable for insertion into a standard 20-ft container tank through its top opening. Subsequent to said insertion and to the affixing in an airtight manner of external cover 100 and internal cover 110 to the opening of the container tank, long lances 220 may be rotated into an 'open' position, as shown in Figs. 6, 7 and 9, wherein each respective pipe 228 of long lances 220 is in a vertical orientation and position 'locked' between the prongs of fork 126 of respective clasps 120 with door 124 is a 'closed' position and wherein cover 158 is slid into a position closing aperture 150; in this 'open' position of long lances 220, the apparatus is ready for use in the cleaning process.

With reference to Figs. 1, 3 and 4, each aperture 150 is a rectangular hole through external cover 100 and internal cover 110. In Fig. 3, a first aperture 150 is near to short lance 60, while a second aperture 150 is near to short lance 40. Each aperture 150 further has a fixed, short slat-shaped cover 153 covering a portion of the central end of each aperture 150 and a long slidable slat-shaped cover 158 covering a portion of the radial end of each aperture 150. Short cover 153 and long cover 158 each have a concave curved end opposing the other, said ends being adapted to laterally receive a portion of the corpus of pipe 228 when vertically oriented. The curved end of short cover 153 faces in a direction away from the centre of external cover 100, while the curved end of long cover 158 faces in a direction towards the centre of external cover 100. With reference to Fig. 4, affixed to the superior surface of external cover 100 and alongside each length of each cover 158 is a rail-like guide 157 allowing for the slidable lateral movement of cover 158 limited to movement towards and away from the centre of external cover 100. Stoppers 159, each affixed to the superior surface of external cover 100 and located near to the radial end of each cover 158 serves to prevent cover 158 from sliding beyond the limits of guides 157. For purposes of clarity, the phrase “central end” refers to the end which is nearer to the centre portion of external cover 100 and the phrase “radial end” refers to the end which is further from the centre portion of external cover 100.

In a preferred embodiment, upon the secure locking of cover 100 onto the top opening of a standard ISO 20-foot tank container, apertures 150 are in an orientation wherein their lengths are parallel to the length of said tank container.

The connections of each respective end of hoses 222 to primary trunk 20 are so that the cavity in primary trunk 20 extends to the respective cavities in hoses 222. Similarly, the respective cavities in hoses 222 extend to the corresponding respective cavities in pipes 228, then to the respective cavities in elbows 230 then to the respective cavities in pipes 232 then through to the respective cavities in nozzles 234. Similar to those of short lances 30, 40, 50 and 60, the connections and cavities described in this section of the description are so that a high-pressure fluid may be passed through said cavities efficiently and effectively, maintaining high pressure and temperature throughout, starting from the opening and cavity in hollow stump 82 and ending and ejecting from each nozzle 234.

In a preferred embodiment of the present invention, each of primary trunk 20, secondary trunks 31, 41, 51 and 61, pipes 35, 228 and 232 are cylindrical in shape.

CLAIMS

1. An apparatus comprising an external cover (100), a hollow primary trunk (20) with a hollow stump (82), a first and second hollow secondary trunk (31, 51) extending from said primary trunk (20), a third hollow secondary trunk (41) extending from the corpus of said first secondary trunk (31), a fourth hollow secondary trunk (61) extending from the corpus of said second secondary trunk (51), and extending from each other end of each of said first, second, third and fourth secondary trunks (31, 41, 51, 61) is a first, second, third and fourth short lance (30, 40, 50, 60) respectively wherein each short lance comprises a hollow pipe (35) and a nozzle (39).
2. The apparatus of claim 1 wherein each short lance further comprises a first hollow elbow (33) between and connecting each secondary trunk (31, 41, 51, 61) to each short lance (30, 40, 50, 60).
3. The apparatus of claim 2 wherein each short lance further comprises a second hollow elbow (37) between and connecting each said hollow pipe (35) to each said nozzle (39).
4. The apparatus of claim 1 wherein each short lance (30, 40, 50, 60) penetrates through said external cover (100) and the primary corpuses of each pipe (35) of each

short lance (30, 40, 50, 60) are primarily on a side of external cover (100) opposing that of primary trunk (20) and secondary trunks (31, 41, 51, 61).

5. The apparatus of claim 1 wherein the base of primary trunk (20) is affixed to a central portion of external cover (100).

6. The apparatus of claim 1 wherein the cavity within primary trunk (20) terminates at its base.

7. The apparatus of claim 1 further comprising an internal cover (110) below that of said external cover (100).

8. The apparatus of claim 7 wherein said internal cover (110) is smaller and concentric to external cover (100).

9. The apparatus of claim 4 wherein each short lance (30, 40, 50, 60) penetrates through said internal cover (110) and the primary corpuses of each pipe (35) of each short lance (30, 40, 50, 60) are on a side of said internal cover (110) opposing that of primary trunk (20) and secondary trunks (31, 41, 51, 61).

10. The apparatus of claim 1 wherein said external cover (100) is of a flat, disc-like shape.
11. The apparatus of claim 10 wherein said external cover further comprises a plurality of prongs (102) extending laterally and radially from its sides.
12. The apparatus of claims 1 and 11 wherein said external cover (100) is adapted and configured to fit and lock into the top opening of a standard ISO 20-foot tank container.
13. The apparatus of claim 7 wherein said external cover (100) and internal cover (110) are both adapted and configured to fit and lock into the top opening of a standard ISO 20-foot tank container.
14. The apparatus of claim 1 wherein the cavity in said stump (82) is contiguous with the cavity in said primary trunk (20).
15. The apparatus of claim 1 wherein the cavity in said primary trunk (20) is contiguous with the cavities in said first and second secondary trunks (31, 51).

16. The apparatus of claim 1 wherein the cavities in said first and second secondary trunks (31, 51) are contiguous with the cavities in said third and fourth secondary trunks (41, 61) respectively.

17. The apparatus of claim 1 wherein the cavities in said first, second, third and fourth secondary trunks (31, 41, 51, 61) are contiguous with the cavities in each of said first, second, third and fourth short lances (30, 40, 50, 60) respectively.

18. The apparatus of claim 1 wherein the nozzles (39) of said first and third short lances (30, 50) are facing in opposing directions relative to each other.

19. The apparatus of claim 1 wherein the nozzles (39) of said second and fourth short lances (40, 60) are facing in opposing directions relative to each other.

20. The apparatus of claim 1 wherein primary trunk (20) has an eye (80) at its top.

21. The apparatus of claims 14, 15, 16 and 17 wherein fluid is pumped through said stump (80) and ejected through each nozzle (39) of each short lance (30, 40, 50, 60).

22. The apparatus of claim 3 wherein the angle of central axis of the inferior end of each said second elbow (37) relative to the inferior vertical falls in the range between 35 degrees and 55 degrees.

23. The apparatus of claim 1 wherein the angular range of spray of each said nozzle (39) falls in the range of 120 degrees to 140 degrees when steam is applied through it at an approximate pressure of 30,000 kg/ m².

24. The apparatus of claim 1 wherein each said nozzle (39) provides a flat spray distribution pattern deflected at an upward angle.

25. The apparatus of claim 1 wherein each said nozzle (39) provides for an angle of central axis of the range of spray ranges from 35 degrees to 55 degrees to the superior vertical.

26. An apparatus comprising an external cover (100), a hollow primary trunk (20) with a hollow stump (82), a first hollow long lance (220) extending from said primary trunk (20) wherein said first long lance (220) comprises a first hollow pipe (234) extending to a hollow hose (222) extending to a second hollow pipe (228) extending to a hollow elbow (230) extending to a third hollow pipe (232) extending to a nozzle (234).

27. The apparatus of claim 26 further comprising a second long lance (220) extending from said primary trunk (20), said second long lance (220) comprising a first hollow pipe (234) extending to a hollow hose (222) extending to a second hollow pipe (228) extending to a hollow elbow (230) extending to a third hollow pipe (232) extending to a nozzle (234).

28. The apparatus of claims 26 and 27 wherein said external cover (100) has one or more through apertures (150).

29. The apparatus of claim 26 wherein the base of primary trunk (20) is affixed to a central portion of external cover (100).

30. The apparatus of claim 26 wherein the cavity within primary trunk (20) terminates at its base.

31. The apparatus of claims 26 and 27 further comprising an internal cover (110) below that of said external cover (100).

32. The apparatus of claim 31 wherein said internal cover (110) has one or more through apertures (150).

33. The apparatus of claims 28 and 32 wherein each said elbow (230) of each long lance (220) further has a pair of opposing protrusions extending from opposing external sides of each elbow (230).

34. The apparatus of claim 33 wherein each said protrusion is lodged within, in a freely rotatable manner along a plane, the internal sides of said external cover (100) facing said aperture (150) and/or the internal sides of said internal cover (110) facing said aperture (150).

35. The apparatus of claim 34 wherein one or more long lances (220) are freely rotatable along a plane and around said protrusion as its centre of rotation.

36. The apparatus of claim 35 wherein one or more long lances (220) are rotatable to a position where its said third hollow pipe (232) is in a generally vertical orientation.

37. The apparatus of claim 35 wherein one or more long lances (220) are rotatable to a position where its said second hollow pipe (228) is in a generally vertical orientation.

38. The apparatus of claim 28 further comprising a fixed short cover (153) covering a portion of aperture (150) approximate to its end nearer to the centre of said external cover (100).

39. The apparatus of claim 28 further comprising a slidably movable long cover (158) covering a portion of aperture (150) approximate to its end further from the centre of said external cover (100).

40. The apparatus of claim 39 further comprising one or more guides (157) alongside each length of each long cover (158), wherein said guides are affixed to the superior surface of said external cover (100).

41. The apparatus of claim 40 said guides allow for the slidable lateral movement of said long cover (158) limited to movement towards and away from the centre of said external cover (100).

42. The apparatus of claim 39 further comprising a stopper affixed to the superior surface of external cover 100 and located near to the end of each said long cover (158).

43. The apparatus of claim 39 wherein said short cover (153) and said long cover (158) each has a concave curved end opposing the other.

44. The apparatus of claim 43 wherein said curved ends are adapted to laterally receive a portion of the corpus of said second hollow pipe (228) of each said long lance (220).

45. The apparatus of claim 44 wherein each said long cover may be slidably moved to cover respective aperture (150).

46. The apparatus of claims 26 and 27 wherein the central axis of each third hollow pipe (232) of each long lance (220) is at minimum 105 degrees and at maximum 125 degrees to its respective second hollow pipe (228).

47. The apparatus of claims 26 and 27 wherein the angular range of spray of each nozzle (234) of each long lance (220) falls in the range of 120 degrees to 140 degrees when steam is applied through it at an approximate pressure of 30,000 kg/m².

48. The apparatus of claims 26 and 27 wherein each nozzle (234) of each long lance (220) provides a flat spray distribution.

49. The apparatus of claims 26 and 27 wherein the angle of central axis of the range of spray of each nozzle (234) of each long lance (220) ranges from 35 degrees to 55 degrees to the superior vertical.

50. The apparatus of claim 27 wherein said long lances (220) may be rotated into orientations facing directly away from each other.
51. The apparatus of claims 26 and 27 wherein said third pipe (230) and nozzle (234) of each long lance (220) are inferior to said external cover (100).
52. The apparatus of claims 26 and 27 wherein the primary corpus of said second pipe (228) of each long lance (220) is superior to said external cover (100).
53. The apparatus of claims 26 and 27 wherein the cavity in said stump (82) is contiguous with the cavity in said primary trunk (20).
54. The apparatus of claims 26 and 27 wherein the cavity in said primary trunk (20) is contiguous with the cavity in said hose (222) of each long lance (220).
55. The apparatus of claims 26 and 27 wherein, for each long lance (220), the cavity in its said hose (222) is contiguous with the cavity in its said second hollow pipe (228), which is contiguous with the cavity in its said elbow (230), which is contiguous with the cavity in its said long pipe (232), which is contiguous with the cavity in its said nozzle (234).

56. The apparatus of claim 37 wherein upon each long lance (220) being rotated to a position where its said second hollow pipe (228) is in a generally vertical orientation, each of said nozzles (234) provides for a spray distribution pattern deflected at an upward angle.