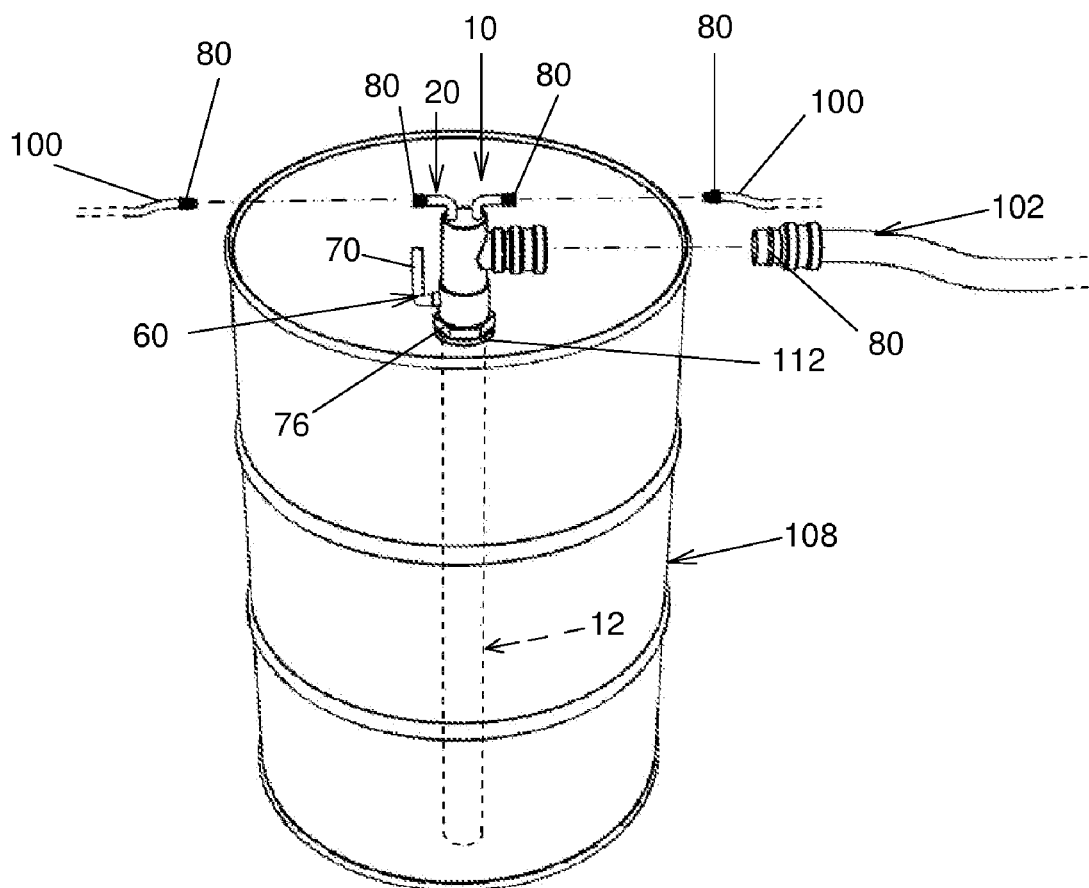


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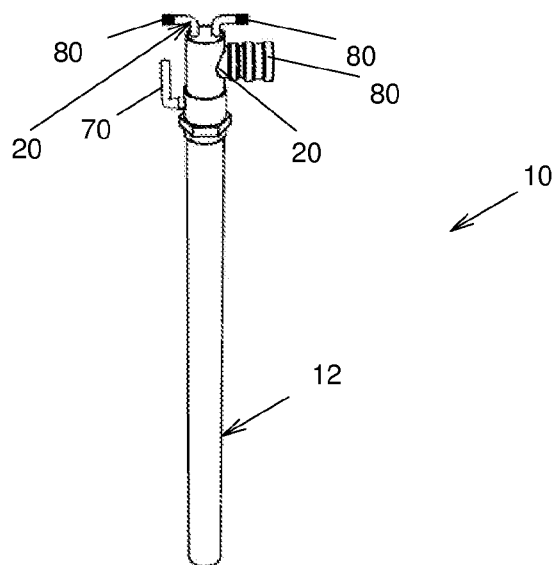


FIG. 1

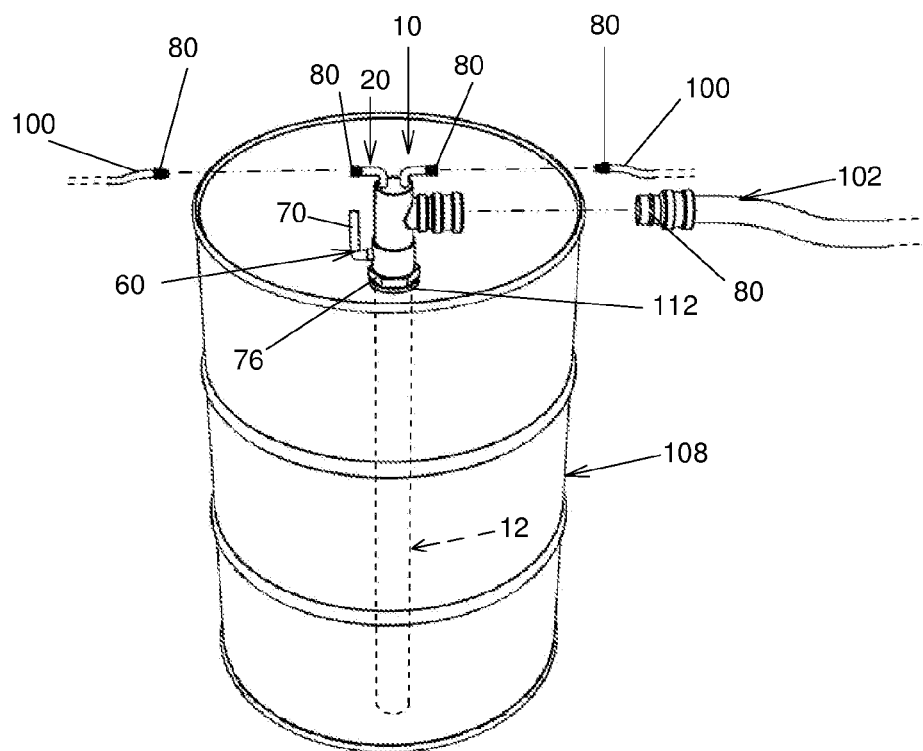


FIG. 2

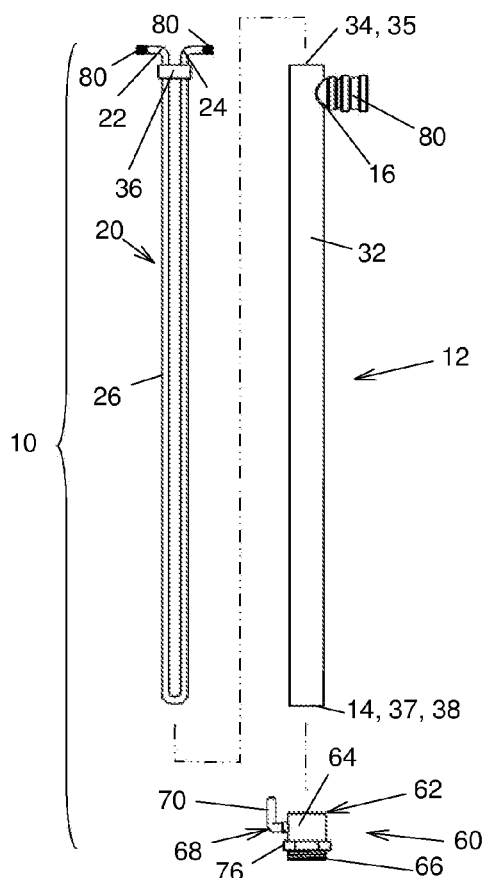


FIG. 3

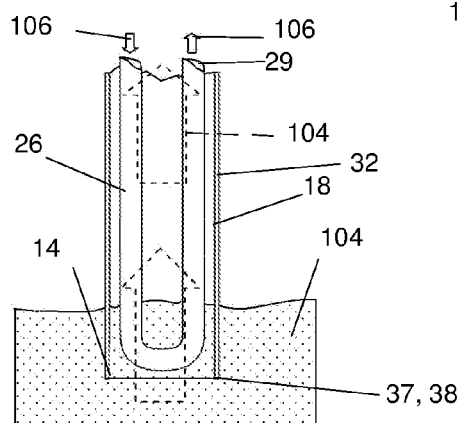


FIG. 6

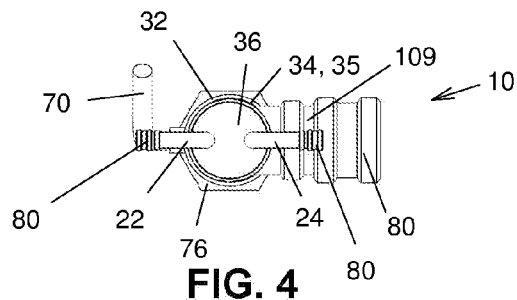


FIG. 4

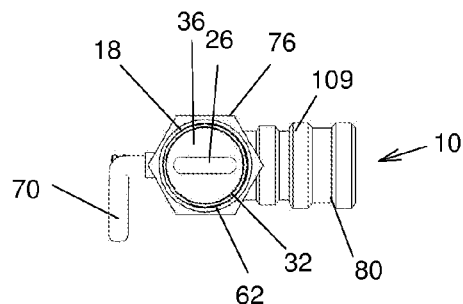


FIG. 5

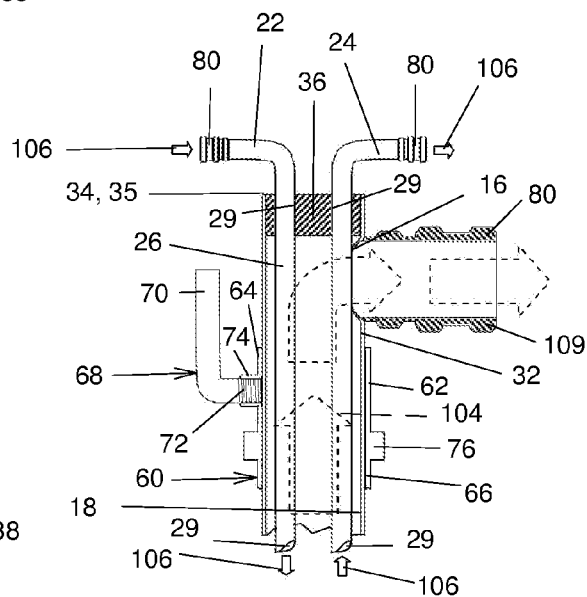


FIG. 7

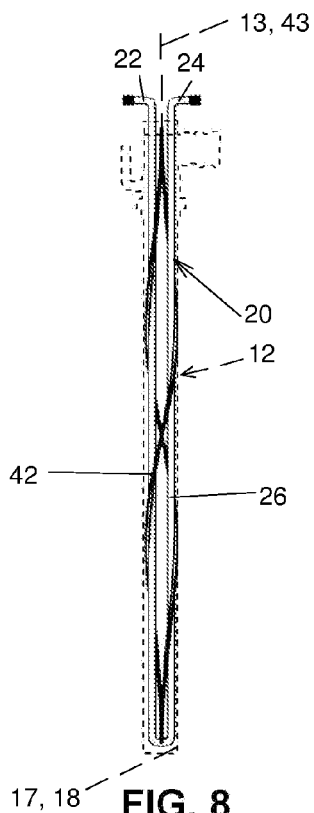


FIG. 8

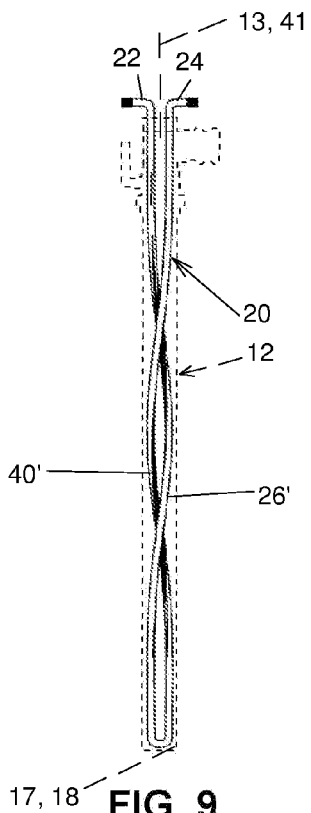


FIG. 9

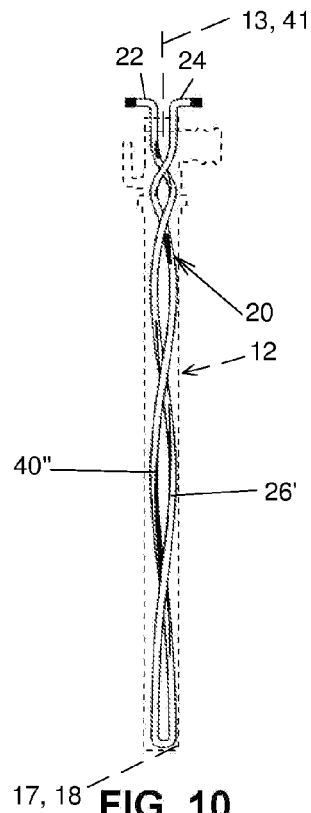


FIG. 10

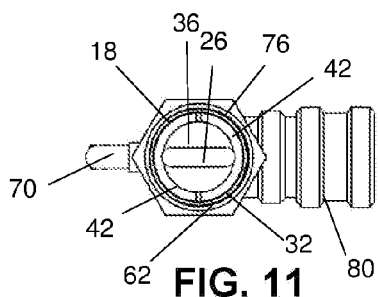


FIG. 11

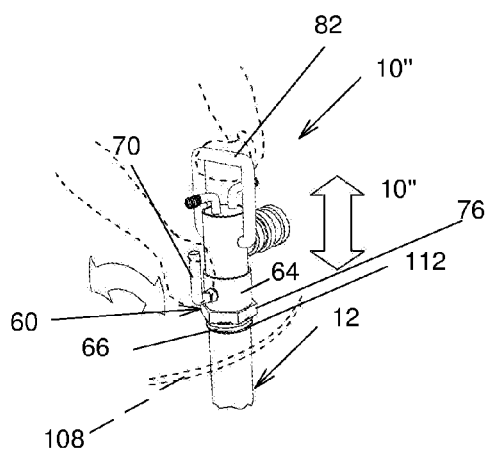


FIG. 12

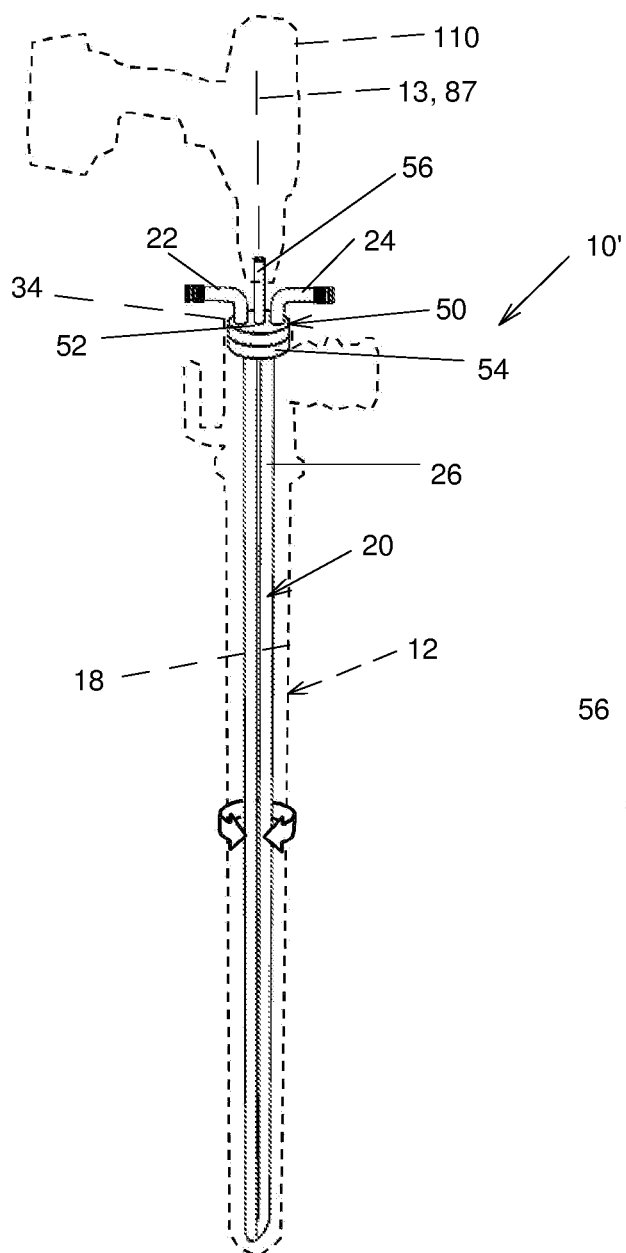


FIG. 13

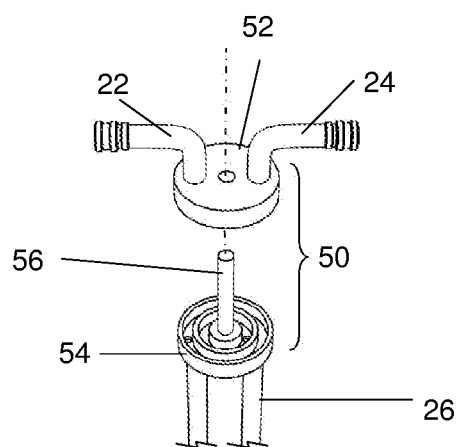


FIG. 14

SUCTION NOZZLE AND METHOD

FIELD OF THE INVENTION

[0001] The present invention relates generally to material handling and, more particularly, to a suction nozzles and methods usable to draw fluids from containers.

BACKGROUND

[0002] Heated suction devices and apparatuses, which typically include a suction nozzle or head operatively coupled to suction pumps and configured to heat a material to pump are known. These devices and apparatus are typically used for transferring relatively cold fluids or viscous materials between containers or for cleaning and decontamination purposes. The suction nozzle, or an equivalent suction head, provides a means for simultaneously softening, or otherwise melting, the relatively cold fluid or viscous material such that the latter may reach a sufficient fluidity to be suctioned through a suction inlet of the device or apparatus.

[0003] Existing suction nozzles are however typically relatively large, cumbersome, complex and expensive to manufacture.

[0004] Against this background, there exists a need to provide an improved suction nozzle and improved suction methods. An object of the present invention is therefore to provide such suction nozzles and methods.

SUMMARY OF THE INVENTION

[0005] In a broad aspect, the present invention provides a suction nozzle for drawing a viscous material from a container, the suction nozzle comprising a housing, the housing defining substantially opposed suction inlet and suction outlet; and a suction passageway extending in the housing between the suction inlet and outlet; and a conduit extending through the housing, the conduit defining conduit first and second end portions and a conduit intermediate portion extending therebetween, the conduit intermediate portion being provided at least in part in the suction passageway and the conduit first and second end portions each extending outwardly from the housing, the conduit first end, second end and intermediate portions together defining an uninterrupted conduit passageway separated from the suction passageway. When the viscous material has a viscosity that is lowered when the viscous material is heated, circulating a hot fluid through the conduit passageway when the suction nozzle is positioned in the container with the suction inlet submerged in the viscous material lowers the viscosity so as to facilitate drawing the viscous material from the container by exerting a suction at the suction outlet.

[0006] The invention may also provide a suction nozzle wherein the conduit intermediate portion is entirely contained in the suction passageway.

[0007] The invention may also provide a suction nozzle wherein the conduit intermediate portion extends along a major portion of the suction passageway.

[0008] The invention may also provide a suction nozzle wherein the conduit intermediate portion is substantially U-shaped.

[0009] The invention may also provide a suction nozzle wherein the conduit first and second end portions are substantially L-shaped.

[0010] The invention may also provide a suction nozzle wherein the housing is substantially cylindrical and defines

substantially axially opposed housing first and second ends, the suction inlet and outlet being provided respectively substantially adjacent the housing first and second ends.

[0011] The invention may also provide a suction nozzle wherein the suction inlet extends substantially axially through the housing and the suction outlet extends substantially radially through the housing.

[0012] The invention may also provide a suction nozzle wherein the conduit first and second end portions extend from the housing axially opposed to the suction inlet.

[0013] The invention may also provide a suction nozzle wherein the housing includes a body and a cap, the body being substantially cylindrical and defining substantially axially opposed body first and second ends, the body being opened at the body second end to define the suction inlet and the body being closed by the cap at the body first end, the conduit first and second end portions extending from the cap.

[0014] The invention may also provide a suction nozzle wherein the conduit intermediate portion extends in the suction passageway from the cap and reaches a portion of the suction passageway that is substantially adjacent to the suction inlet.

[0015] The invention may also provide a suction nozzle wherein the conduit intermediate portion includes a substantially helical section.

[0016] The invention may also provide a suction nozzle wherein the substantially helical section has a pitch that varies therealong.

[0017] The invention may also provide a suction nozzle wherein the substantially helical section has a pitch that is substantially constant therealong.

[0018] The invention may also provide a suction nozzle wherein the substantially helical section has an helix axis that is co-linear with a longitudinal axis of the body.

[0019] The invention may also provide a suction nozzle wherein the cap includes a fluid rotary union allowing rotation of the conduit intermediate portion relative to the conduit first and second end portions while maintaining fluid communication individually between the conduit intermediate portion and each of the conduit first and second end portions, the cap also including a rotary drive member protruding outwardly therefrom and rotatable jointly with the conduit intermediate portion about a rotation axis co-linear with the longitudinal axis of the body.

[0020] The invention may also provide a suction nozzle wherein the suction passageway is delimited by a passageway peripheral surface, the suction nozzle further comprising a vane extending in the suction passageway from the passageway peripheral surface.

[0021] The invention may also provide a suction nozzle wherein the vane is helical with an helix axis co-linear with a longitudinal axis of the body.

[0022] The invention may also provide a suction nozzle further comprising an attachment configured and sized for attaching the housing to the container.

[0023] The invention may also provide a suction nozzle wherein the attachment is threaded for engaging a threaded portion of a container aperture part of the container.

[0024] The invention may also provide a suction nozzle wherein the attachment is height adjustable to adjust a height of the suction inlet in the container by selectively allowing the housing to move relative to the attachment.

[0025] The invention may also provide a suction nozzle further comprising a suction hose attachment extending from the suction outlet.

[0026] The invention may also provide a suction nozzle wherein the housing defines a pair of conduit apertures extending between the housing external surface and the suction passageway, the conduit extending through the conduit apertures.

[0027] The invention may also provide a suction nozzle further comprising a handle mounted to the housing.

[0028] Advantageously, the present invention provides an improved suction nozzle represented by an economic assembly of a relatively small number of commonly available components, that is relatively light to handle, economic to manufacture and, in some embodiments, may be used in inflammable environments.

[0029] In another broad aspect, the invention provides a container, comprising: a container body provided with a container aperture; and a suction nozzle for drawing a viscous material from the container. The suction nozzle includes a housing mounted to the container and extending through the container aperture, the housing defining substantially opposed suction inlet and suction outlet, the suction inlet being inside the container and the suction outlet being outside the container; and a suction passageway extending in the housing between the suction inlet and outlet. A conduit extends through the housing, the conduit defining conduit first and second end portions and a conduit intermediate portion extending therebetween, the conduit intermediate portion being provided at least in part in the suction passageway and the conduit first and second end portions each extending outwardly from the housing, the conduit first end, second end and intermediate portions together defining an uninterrupted conduit passageway separated from the suction passageway. When the viscous material has a viscosity that is lowered when the viscous material is heated, circulating a hot fluid through the conduit passageway when the suction nozzle is positioned in the container with the suction inlet submerged in the viscous material lowers the viscosity so as to facilitate drawing the viscous material from the container by exerting a suction at the suction outlet.

[0030] In yet another broad aspect, the invention provides a method for drawing a viscous material from a container using a suction nozzle having a suction inlet, a suction outlet and a suction passageway extending therebetween, the viscous material having a viscosity that is reduced when heated, the method comprising: inserting part of the suction nozzle in the viscous material so that the suction inlet is submerged in the viscous material and the suction outlet is provided outside of the viscous material; circulating a hot fluid in a conduit provided in the suction passageway so that the hot fluid and the viscous material remain separated from each other in the suction passageway while heat is transferred from the hot fluid to the viscous material; and exerting a suction at the suction outlet.

[0031] The invention may also provide a method wherein the hot fluid includes a glycol based antifreeze liquid.

[0032] The invention may also provide a method further comprising rotating the viscous material along a passageway longitudinal axis as the viscous material moves from the suction inlet to the suction outlet.

[0033] The invention may also provide a method wherein rotating the viscous material includes rotating the conduit about the passageway longitudinal axis.

[0034] The invention may also provide a method wherein rotating the viscous material includes circulating the viscous material along vanes extending helically inside the suction passageway.

[0035] The invention may also provide a method wherein the conduit includes an helical portion and rotating the viscous material includes circulating the viscous material along the helical portion.

[0036] The present application claims benefit from UK request application Number 1517072.3 filed Sep. 26, 2015, the contents of which is hereby incorporated by reference in its entirety.

[0037] Other objects, advantages and features of the present invention will become more apparent upon reading of the following non-restrictive description of some embodiments thereof, given by way of example only with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] FIG. 1, in a perspective view, illustrates an embodiment of a suction nozzle, according to the present invention;

[0039] FIG. 2, in a perspective view, illustrates the suction nozzle in FIG. 1 engaged in a top opening of a container in the form of a typical drum containing a viscous material;

[0040] FIG. 3, in a side exploded view, illustrates the suction nozzle shown in FIG. 1;

[0041] FIG. 4, in a top plan view, illustrates the suction nozzle shown in FIG. 1,

[0042] FIG. 5, in a bottom plan view, illustrates the suction nozzle shown in FIG. 1;

[0043] FIG. 6, in a partial side cross-section view, illustrates a bottom end portion of the suction nozzle shown in FIG. 1;

[0044] FIG. 7, in a partial side cross-section view, illustrates a top end portion of the suction nozzle shown in FIG. 1;

[0045] FIG. 8, in a side elevational view, illustrates an alternate embodiment of a suction nozzle according to the invention, here shown with its hollow cylinder in transparent view and including a vane having an helical configuration;

[0046] FIG. 9, in a side elevational view, illustrates another alternate embodiment of a suction nozzle according to the invention, here shown with its hollow cylinder in transparent view and including a conduit having an helical configuration;

[0047] FIG. 10, in a side elevational view, illustrates yet another alternate embodiment of a suction nozzle according to the invention, here shown with its hollow cylinder in transparent view and including a conduit having a differently shaped helical configuration than the one shown in FIG. 9;

[0048] FIG. 11, in a bottom plan view, illustrates the alternate embodiment of a suction nozzle shown in FIG. 8;

[0049] FIG. 12, in a partial perspective, environmental view, illustrates yet another alternate embodiment of a suction nozzle according to the invention, here shown engaged in the top opening of a drum barrel and provided with a top handle;

[0050] FIG. 13, in a partial perspective view, illustrates yet another alternate embodiment of a suction nozzle according to the invention; and

[0051] FIG. 14, in a perspective exploded view, illustrates a typical two passage fluid rotary union part of the suction nozzle of FIG. 13.

DETAILED DESCRIPTION

[0052] The term “substantially” is used throughout this document to indicate variations in the thus qualified terms. These variations are variations that do not materially affect the manner in which the invention works and can be due, for example, to uncertainty in manufacturing processes or to small deviations from a nominal value or ideal shape that do not cause significant changes to the invention. These variations are to be interpreted from the point of view of the person skilled in the art.

[0053] FIGS. 1 to 7 inclusively illustrate various aspects of an embodiment, according to the present invention, of a suction nozzle 10.

[0054] Referring to FIG. 2, the suction nozzle 10 is typically usable with a source of hot fluid 100 and a suction hose 102 for simultaneously softening and suctioning a viscous material 104 (as illustrated for example in FIG. 6). In some embodiments, the source of hot fluid 100 may circulate a fluid in a closed circuit while heating it to a predetermined temperature, which may be selectively adjustable. In other embodiments, the fluid is not circulated in a closed circuit and only passes through the suction nozzle 10 once. The suction hose 102 is typically flexible, but rigid or semi-rigid hoses, among others, are also within the scope of the invention. The hot fluid 106 provided by the source of hot fluid 100 is warmer than the viscous material 104 contained in the container 108, and typically hotter than ambient temperature. In some embodiments, the hot fluid 106 is at ambient temperature and the viscous material is colder than ambient temperature, such as would be the case if the container was stored in a cold storage unit or outside in cold weather.

[0055] The suction nozzle 10 comprises a housing 12. The housing 12 may be tubular, and in a specific example of implementation, of a substantially cylindrical configuration. However, in alternative embodiment, the housing 12 has any other suitable shape. The housing 12 has a substantially elongated configuration and defines a suction inlet 14, typically at one end thereof, and a suction outlet 16 typically at an opposed end thereof. A suction passageway 18 extends between the suction inlet 14 and the suction outlet 16.

[0056] Now referring more particularly to FIG. 3, the suction nozzle 10 further comprises a conduit 20 extending through the housing 12. For the purpose of this document, the terminology “extending through the housing 12” means that the conduit has two portions thereof that are located outside of the housing 12, and a portion thereof that is inside the housing 12. This can be achieved by having an uninterrupted tube that passes through suitable shaped apertures in the housing 12 or by having individual tubes that connect to ports formed in the housing 12 and leading into the suction passageway 18, among other possibilities. Thus, the conduit 20 may be made of a single uninterrupted element, or of many elements connected to each other. The conduit 20 has a conduit first end portion 22, a conduit second end portion 24 and a conduit intermediate portion 26 extending between the conduit first end portion 22 and the conduit second end portion 24. The conduit intermediate portion 26 is provided at least in part in the suction passageway 18 and the conduit first and second end portions 22 and 24 each extend out-

wardly from the housing 12. The conduit first end, second end and intermediate portions 22, 24 and 26 together define an uninterrupted conduit passageway 29 (seen for example in FIG. 6) separated from the suction passageway 18. In other words, any fluid circulating in the conduit passageway 29 does not enter in contact with the viscous material 104 flowing in the suction passageway 18. In some embodiments, the conduit first and second end portions 22 and 24 are substantially L-shaped to facilitate connection to the source of hot fluid 100.

[0057] Thus, when the viscous material 104 has a viscosity that is lowered when the viscous material 104 is heated, circulating a hot fluid 106 through the conduit passageway 29 when the suction nozzle 10 is positioned in the container 108 with the suction inlet 14 submerged in the material lowers the viscosity so as to facilitate drawing the viscous material 104 from the container 108 by exerting a suction at the suction outlet 16. In some embodiments, the hot fluid 106 is a heated glycol based anti-freeze liquid, but any other suitable fluid is also within the scope of the invention, such as hot water, among others.

[0058] In the specific embodiment shown in the drawings, the conduit first end portion 22 and the conduit second end portion 24 each extend sealably outwardly through a wall portion of the housing 12 that is substantially adjacent the suction outlet 16.

[0059] The conduit intermediate portion 26 extends within the suction passageway 18 from the conduit first end portion 22 and the conduit second end portion 24. For example, the conduit intermediate portion 26 is substantially U-shaped. Typically, the conduit intermediate portion 26 extends along a major portion of the suction passageway 18 towards the suction inlet 14. Also, typically, the conduit intermediate portion 26 is entirely contained in the suction passageway 18, but conduit intermediate portions 26 that protrude from the suction passageway 18 are also within the scope of the invention.

[0060] Thus, with the source of hot fluid 100 fluidly coupled to the conduit first end portion 22, the suction hose 102 fluidly coupled to the suction outlet 16, and the suction inlet 14 submerged in the viscous material 104, the viscous material 104 can be simultaneously softened by the hot fluid 106 circulating through the conduit 20 and suctioned out through the suction outlet 16 by the suction hose 102. The viscous material 104 is consequently progressively heated and softened, as it travels within the suction passageway 18, between the suction inlet 14 and the suction outlet 16, thus significantly enhancing the flow of suctioned viscous material 104 through the suction hose 102.

[0061] In some embodiments of the invention, as illustrated in the figures, the housing 12 is represented by a rectilinear hollow cylinder 32 defining substantially axially opposed housing first and second ends 35 and 37, seen for example in FIG. 3. The suction inlet and outlet are provided respectively substantially adjacent the housing first and second ends 35 and 37. The hollow cylinder 32 forms a body for the housing 12 and is sealably closed at a body first end 34 thereof with a cap 36. The conduit first end portion 22 and the conduit second end portion 24 each extend sealably outwardly through the cap 36. More specifically, the cap 36 defines a pair of conduit apertures 29 (better seen in FIG. 7) extending between a housing external surface 13 and the suction passageway 18 and the conduit 20 extends through the conduit apertures 29.

[0062] Furthermore, in this specific embodiment, the suction outlet 16 extends radially through a lateral wall portion of the hollow cylinder 32 that is substantially adjacent the body first end 34. The hollow cylinder 32 is open ended at a body second end 38 thereof opposite the body first end 34, thus forming the suction inlet 14, which thus extends substantially axially through the housing 12. Thus, the conduit first and second end portions 22 and 24 extend from the housing axially opposed to the suction inlet 14.

[0063] As best illustrated in FIGS. 6 and 7 jointly, the hollow cylinder 32 and the conduit 20 are each typically suitably dimensioned and shaped so as to have the conduit intermediate portion 26 extend substantially adjacently longitudinally from the cap 36 along inner surface portions of the suction passageway 18.

[0064] In some embodiments, the conduit intermediate portion 26 preferably extends substantially rectilinearly within the suction passageway 18 from the conduit first end portion 22 and the conduit second end portion 24 to a position substantially adjacent the suction inlet 14.

[0065] In some embodiments, as exemplified respectively in FIGS. 9 and 10, the conduit intermediate portion 26' and 26'' has at least a longitudinal portion thereof that is twisted axially relative to an imaginary centered longitudinal axis of the suction passageway 18 to form a substantially helical section 40' and 40''. Thus, the substantially helical section 40' and 40'' has an helix axis 41 that is co-linear with a longitudinal axis 13 of the body. In these embodiments, the substantially helical section 40' and 40'' applies a stirring effect on the viscous material 104 for distributing the heat cumulated within the viscous material 104 as the latter is suctioned along the suction passageway 18 towards the suction outlet 16.

[0066] In some embodiments, as best exemplified in FIG. 10, the substantially helical section 40'' has a pitch that varies therealong, for example that increases progressively from a portion thereof that is adjacent the suction inlet 14 towards the suction outlet 16 so as to progressively increase the stirring effect on the viscous material 104 as the latter is also progressively softened by heat cumulated along the suction passageway 18. This is different from the embodiment shown in FIG. 9 where the pitch is constant.

[0067] In some embodiments, as illustrated in FIGS. 8 and 11, the suction nozzle 10 may further comprise at least one vane 42 formed in, or otherwise attached to, inner surface portions of the suction passageway 18. More specifically, the suction passageway is delimited by a passageway peripheral surface 17 and the vane 42 extends in the suction passageway from the passageway peripheral surface 17. In some embodiments, the vane 42 is helical with an helix 43 axis co-linear with a longitudinal axis 13 of the body. The vane 42 in these embodiments can be continuous with other vanes that are not helical (not shown in the drawings).

[0068] Thus, the vane 42 applies a stirring effect on the viscous material 104 for distributing the heat cumulated within the viscous material 104 as the latter is suctioned along the suction passageway 18 toward the suction outlet 16.

[0069] Furthermore, likewise the substantially helical section 40' and 40'', the vane 42 may have a pitch that increases progressively from a portion thereof that is adjacent the suction inlet 14 towards the suction outlet 16 so as to progressively increase the stirring effect on the viscous

material 104 as the latter is also progressively softened by heat cumulated along the suction passageway 18.

[0070] In some embodiments, as illustrated in FIGS. 13 and 14, the suction nozzle 10' may further comprise a fluid rotary union 50 fluidly coupled to the conduit 20 for axially rotating the conduit intermediate portion 26 within the suction passageway 18, relative to the conduit first and second end portions 22 and 24.

[0071] As would be obvious to someone familiar with hydraulic devices and equipment's having rotating portions, fluid rotary unions 50 are known in the art and are typically usable for allowing one or more fluid conduits to be rotated along a given axis while maintaining fluid communication between the static and movable fluid conduits. For example, the fluid rotary union 50 is a two passage fluid rotary union having a static outer portion 52 rigidly mounted substantially adjacently the body first end 34, and a rotatable inner portion 54 that is rotatably mounted to the static outer portion 52 at end thereof that is within the suction passageway 18.

[0072] The fluid rotary union 50 may be of the type having a rotary drive member 56 operatively coupled to the rotatable inner portion 54 and extending axially through the static outer portion 52 and, thus, outwardly distally from the body first end 34. Thus, the conduit intermediate portion 26 and the rotary drive member 56 are rotatable jointly, typically about a rotation axis 57 co-linear with the longitudinal axis 13 of the body.

[0073] The fluid rotary union 50 is fluidably coupled at a position along the conduit intermediate portion 26 that is substantially adjacent the conduit first end portion 22 and the conduit second end portion 24.

[0074] Thus, with a rotary drive 110 operatively coupled to the rotary drive member 56, the conduit intermediate portion 26 is selectively axially rotated within the suction passageway 18, thus stirring the heat radiated by the conduit 20 within the viscous material 104.

[0075] FIG. 14 illustrates in an exploded view an example of an inner configuration of a two passage fluid rotary union 50. Other equivalent inner configurations are also possible. Furthermore, as exemplified in the drawings, the cap 36 may be conveniently replaced by the fluid rotary union 50.

[0076] The rotary drive 110 may any suitable rotary drive such as, for example, a battery powered hand drill (as illustrated in dotted lines in FIG. 13), an explosion-proof electric drive motor (not shown in the drawings) attached to the body first end 34, or the likes.

[0077] Thus, when the suction nozzle 10 of the present invention has its rotary drive member 56 operatively coupled to an explosion-proof electric drive motor, the present invention may be used to transfer viscous materials 104 between selected containers 108 in highly hostile environments having high safety regulations such as the oil and gas industry, in the woodwork industry where there are wood dust laden environments in which are managed highly inflammable glues, varnishes and solvents, and the likes.

[0078] As illustrated in FIG. 12 for example, in some embodiments, the suction nozzle 10 also includes an attachment 60 configured and sized for attaching the housing 12 to the container 108. For example, the attachment 60 is threaded for engaging a threaded portion of a container aperture 112 part of the container 108. In some embodiments, the attachment 60 is for threadedly mounting the suction nozzle 10 to a container aperture 112 of the container

108 and selectively adjusting the immersed position of the suction inlet **14** into the viscous material **104**. In these embodiments, the attachment **60** may be height adjustable to adjust a height of the suction inlet **14** in the container **108** by selectively allowing the housing **12** to move relative to the attachment **60**.

[0079] In a specific embodiment of the invention, referring to FIG. 7, the attachment **60** includes a relatively short sleeve member **62** coaxially and substantially freely slidably engaged in a snug fit relation on the hollow cylinder **32**.

[0080] The sleeve member **62** defines a sleeve top portion **64** and a sleeve bottom portion **66**. The sleeve bottom portion **66** is threaded along an outer end surface portion thereof for threadedly engaging the compatibly container aperture **112** of a container **108** containing the viscous material **104**.

[0081] The attachment **60** further typically includes a locking element **68** along the sleeve top portion **64** for selectively locking the attachment **60** at a user selected position along the hollow cylinder **32**.

[0082] As exemplified in FIG. 7 for example, the locking element **68** may include a locking element handle portion **70** and a locking element threaded portion **72**. The locking element threaded portion **72** is engaged in a sleeve threaded bore **74** extending laterally through a lateral wall portion of the sleeve top portion **64**, for abuttingly engaging a side surface portion of the hollow cylinder **32**.

[0083] The sleeve member **62** may further define a hexagon shaped peripheral portion **76** along the sleeve top portion **64** for allowing a user to tighten the threaded portion of the sleeve bottom portion **66** into the container aperture **112** of the container **108** using an open wrench hand tool or the like.

[0084] In some specific embodiments of the invention, the suction nozzle **10** is suitably sized and configured so as to allow the threaded portion of the sleeve bottom portion **66** to threadedly engage the container aperture **112** of a container **108** in the form of a typical 55 US gallon barrel or equivalent as illustrated in FIG. 2.

[0085] The suction nozzle **10** may further comprise a quick connect coupler **80** for fluid conduits at each one of the conduit first and second end portions **22** and **24** respectively, and at the suction outlet **16**. Also, typically, a suction hose attachment **109** extends from the suction outlet **16** to attach the suction hose **102** thereto.

[0086] As illustrated in FIG. 12, in some embodiments, the suction nozzle **10** may also include at least one handle **82** for handling the suction nozzle **10**. Each one of the handles **82** may be represented by a loop shaped handle member extending from an outer surface portion of the housing **12** that is substantially adjacent the suction outlet **16**.

[0087] The housing **12** and the conduit **20** are made of substantially rigid and heat resistant materials.

[0088] Thus, the proposed suction nozzle **10**, and other similar devices or systems, are usable to implement a method for drawing the viscous material **104** from the container **108** when the viscous material **104** has a viscosity that is reduced when heated. The method includes inserting part of the suction nozzle **10** in the viscous material **104** so that the suction inlet **14** is submerged in the viscous material **104** and the suction outlet **16** is provided outside of the viscous material **104**; circulating the hot fluid **106** in the conduit **20**, which is provided in the suction passageway **18**,

so that the hot fluid **106** and the viscous material **104** remain separated from each other in the suction passageway **18** while heat is transferred from the hot fluid **106** to the viscous material **104**; and exerting a suction at the suction outlet **16**. [0089] In some embodiments, this method also includes rotating the viscous material **104** along a passageway longitudinal axis of the suction passageway **18** as the material moves from the suction inlet **14** to the suction outlet **16**. For example, rotating the material includes rotating the conduit **20** about the passageway longitudinal axis. In another example, rotating the material includes circulating the material along vanes **42** extending helically inside the suction passageway **18** or along an helically extending conduit **20**. [0090] Although the present invention has been described hereinabove by way of exemplary embodiments thereof, it will be readily appreciated that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, the scope of the claims should not be limited by the exemplary embodiments, but should be given the broadest interpretation consistent with the description as a whole. The present invention can thus be modified without departing from the spirit and nature of the subject invention as defined in the appended claims.

What is claimed is:

1. A suction nozzle for drawing a viscous material from a container, the suction nozzle comprising:

- a housing, the housing defining
 - substantially opposed suction inlet and suction outlet; and
 - a suction passageway extending in the housing between the suction inlet and outlet; and
- a conduit extending through the housing, the conduit defining conduit first and second end portions and a conduit intermediate portion extending therebetween, the conduit intermediate portion being provided at least in part in the suction passageway and the conduit first and second end portions each extending outwardly from the housing, the conduit first end, second end and intermediate portions together defining an uninterrupted conduit passageway separated from the suction passageway;

wherein, when the viscous material has a viscosity that is lowered when the viscous material is heated, circulating a hot fluid through the conduit passageway when the suction nozzle is positioned in the container with the suction inlet submerged in the viscous material lowers the viscosity so as to facilitate drawing the viscous material from the container by exerting a suction at the suction outlet.

2. The suction nozzle as defined in claim 1, wherein the conduit intermediate portion is entirely contained in the suction passageway.

3. The suction nozzle as defined in claim 1, wherein the conduit intermediate portion extends along a major portion of the suction passageway.

4. The suction nozzle as defined in claim 1, wherein the conduit intermediate portion is substantially U-shaped.

5. The suction nozzle as defined in claim 1, wherein the conduit first and second end portions are substantially L-shaped.

6. The suction nozzle as defined in claim 1, wherein the housing is substantially cylindrical and defines substantially axially opposed housing first and second ends, the suction

inlet and outlet being provided respectively substantially adjacent the housing first and second ends.

7. The suction nozzle as defined in claim 6, wherein the suction inlet extends substantially axially through the housing and the suction outlet extends substantially radially through the housing.

8. The suction nozzle as defined in claim 7, wherein the conduit first and second end portions extend from the housing axially opposed to the suction inlet.

9. The suction nozzle as defined in claim 8, wherein the housing includes a body and a cap, the body being substantially cylindrical and defining substantially axially opposed body first and second ends, the body being opened at the body second end to define the suction inlet and the body being closed by the cap at the body first end, the conduit first and second end portions extending from the cap.

10. The suction nozzle as defined in claim 9, wherein the conduit intermediate portion extends in the suction passageway from the cap and reaches a portion of the suction passageway that is substantially adjacent to the suction inlet.

11. The suction nozzle as defined in claim 9, wherein the conduit intermediate portion includes a substantially helical section.

12. The suction nozzle as defined in claim 11, wherein the substantially helical section has an helix axis that is co-linear with a longitudinal axis of the body.

13. The suction nozzle as defined in claim 11, wherein the substantially helical section has a pitch that varies therealong.

14. The suction nozzle as defined in claim 11, wherein the substantially helical section has a pitch that is substantially constant therealong.

15. The suction nozzle as defined in claim 9, wherein the cap includes a fluid rotary union allowing rotation of the conduit intermediate portion relative to the conduit first and second end portions while maintaining fluid communication individually between the conduit intermediate portion and each of the conduit first and second end portions, the cap also including a rotary drive member protruding outwardly therefrom and rotatable jointly with the conduit intermediate portion about a rotation axis co-linear with the longitudinal axis of the body.

16. The suction nozzle as defined in claim 6, wherein the suction passageway is delimited by a passageway peripheral surface, the suction nozzle further comprising a vane extending in the suction passageway from the passageway peripheral surface.

17. The suction nozzle as defined in claim 16, wherein the vane is helical with an helix axis co-linear with a longitudinal axis of the body.

18. The suction nozzle as defined in claim 1, further comprising an attachment configured and sized for attaching the housing to the container.

19. The suction nozzle as defined in claim 18, wherein the attachment is height adjustable to adjust a height of the suction inlet in the container by selectively allowing the housing to move relative to the attachment.

20. The suction nozzle as defined in claim 1, further comprising a suction hose attachment extending from the suction outlet.

21. The suction nozzle as defined in claim 1, wherein the housing defines a pair of conduit apertures extending

between the housing external surface and the suction passageway, the conduit extending through the conduit apertures.

22. The suction nozzle as defined in claim 1, further comprising a handle mounted to the housing.

23. A container, comprising:

a container body provided with a container aperture; and a suction nozzle for drawing a viscous material from the container, the suction nozzle including

a housing mounted to the container and extending through the container aperture, the housing defining substantially opposed suction inlet and suction outlet, the suction inlet being inside the container and the suction outlet being outside the container; and a suction passageway extending in the housing between the suction inlet and outlet; and

a conduit extending through the housing, the conduit defining conduit first and second end portions and a conduit intermediate portion extending therebetween, the conduit intermediate portion being provided at least in part in the suction passageway and the conduit first and second end portions each extending outwardly from the housing, the conduit first end, second end and intermediate portions together defining an uninterrupted conduit passageway separated from the suction passageway;

wherein, when the viscous material has a viscosity that is lowered when the viscous material is heated, circulating a hot fluid through the conduit passageway when the suction nozzle is positioned in the container with the suction inlet submerged in the viscous material lowers the viscosity so as to facilitate drawing the viscous material from the container by exerting a suction at the suction outlet.

24. A method for drawing a viscous material from a container using a suction nozzle having a suction inlet, a suction outlet and a suction passageway extending therebetween, the viscous material having a viscosity that is reduced when heated, the method comprising:

inserting part of the suction nozzle in the viscous material so that the suction inlet is submerged in the viscous material and the suction outlet is provided outside of the viscous material;

circulating a hot fluid in a conduit provided in the suction passageway so that the hot fluid and the viscous material remain separated from each other in the suction passageway while heat is transferred from the hot fluid to the viscous material; and

exerting a suction at the suction outlet.

25. The method as defined in claim 24, wherein the hot fluid includes a glycol based antifreeze liquid.

26. The method as defined in claim 24, further comprising rotating the viscous material along a passageway longitudinal axis as the viscous material moves from the suction inlet to the suction outlet.

27. The method as defined in claim 26, wherein rotating the viscous material includes rotating the conduit about the passageway longitudinal axis.

28. The method as defined in claim 26, wherein rotating the viscous material includes circulating the viscous material along vanes extending helically inside the suction passageway.

29. The method as defined in claim **26**, wherein the conduit includes an helical portion and rotating the viscous material includes circulating the viscous material along the helical portion.

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