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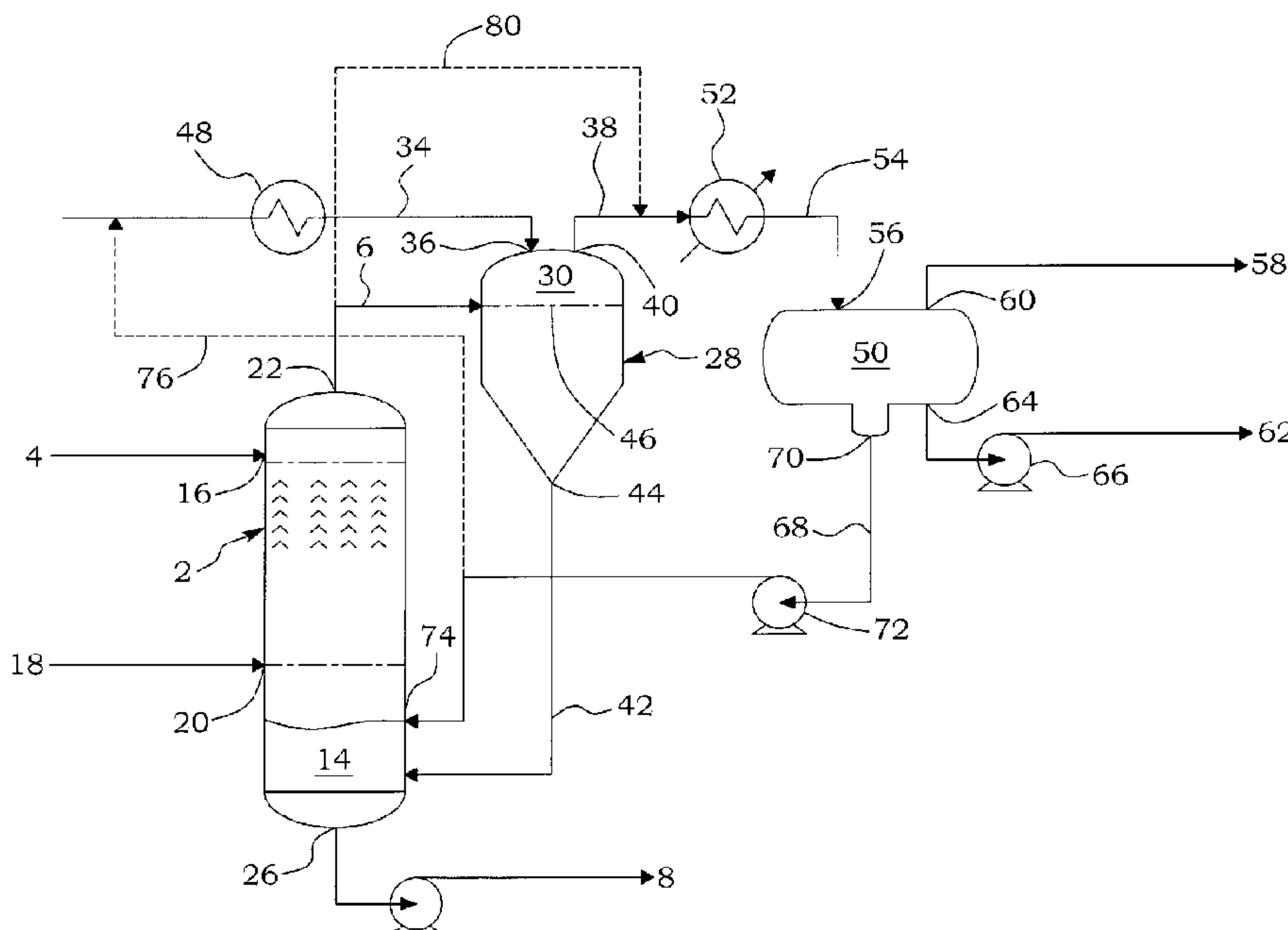
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(54) Titre : UNITE DE RECUPERATION DE NAPHTHA DANS DES RESIDUS ET PROCEDE POUR PURIFIER DES PARTICULES DE RESIDUS ENTRAINEES PAR UN CIRCUIT DE SOLVANT NAPHTENIQUES DE TETE

(54) Title: TNRU AND PROCESS WITH SCRUBBING OF ENTRAINED TAILINGS PARTICLES FROM AN OVERHEAD NAPHTHENIC SOLVENT STREAM



(57) Abrégé/Abstract:

A tailings naphtha recovery unit (TNRU) for recovering naphtha from a diluted tailings includes a stripping vessel for separating the diluted tailings into a solvent component containing naphtha and entrained particles and a solvent recovered tailings component; a scrubbing vessel for scrubbing the solvent component to remove the entrained particles; and a heating device for heating a flushing fluid fed to the scrubbing vessel to or near the flash temperature of the solvent component. Entrained particle removal reduces damage and clogging in overhead systems in particular due to variations in TNRU feed. A tailings naphtha recovery process is also provided with an overhead scrubbing step to remove entrained particles from the flashed solvent.



ABSTRACT

A tailings naphtha recovery unit (TNRU) for recovering naphtha from a diluted tailings includes a stripping vessel for separating the diluted tailings into a solvent component containing naphtha and entrained particles and a solvent recovered tailings component; a scrubbing vessel for scrubbing the solvent component to remove the entrained particles; and a heating device for heating a flushing fluid fed to the scrubbing vessel to or near the flash temperature of the solvent component. Entrained particle removal reduces damage and clogging in overhead systems in particular due to variations in TNRU feed. A tailings naphtha recovery process is also provided with an overhead scrubbing step to remove entrained particles from the flashed solvent.

TNRU AND PROCESS WITH SCRUBBING OF ENTRAINED TAILINGS PARTICLES FROM AN OVERHEAD NAPHTHENIC SOLVENT STREAM

FIELD OF THE INVENTION

- 5 The present invention relates to the treatment of oil sands bitumen froth and more precisely to a process for recovering naphthenic solvent from naphtha diluted tailings.

BACKGROUND OF THE INVENTION

- 10 Oil sands extraction processes primarily use hot water mixed with oil sands ore to produce a slurry from which is removed a froth fraction containing bitumen. The bitumen froth, which contains bitumen, water and fine mineral solids, is further processed by adding a diluent solvent to facilitate separation of the bitumen from the other components.

- 15 In froth treatment operations, the bitumen froth is mixed with diluent and the diluted froth is supplied to separation vessels to separate an overflow diluted bitumen stream from an underflow solvent diluted tailings stream.

- Froth treatment operations thus produce by-products including solvent diluted tailings. The cost and environmental impact preclude directly discharging solvent
20 diluted tailings to tailings ponds. The diluted tailings are thus treated in a tailings solvent recovery unit.

- Various tailings solvent recovery units have been proposed and each has its own set of drawbacks and challenges. Many possible recovery schemes are disclosed in the literature. In one process, froth treatment tailings from the froth treatment
25 plant are introduced into a flash vessel with internal shed decks maintained at sub-atmospheric pressures. Steam is introduced below the internals and the major portion of the diluent vaporizes together with water. The flashed vapours are removed and cooled to condense diluent and water which separate by gravity settling. Non-condensed vent gases are withdrawn from the condenser to maintain

the sub-atmospheric pressure. The flashed solvent depleted tailings are pumped from the flash vessel to tailings disposal.

Some challenges encountered by known tailings solvent recovery processes result in lower solvent recovery levels than would be desirable. For some processes, the
5 lower recovery is attributable to premature flashing at the feed inlet inducing feed to bypass the shed decks and negating any addition of steam below the shed decks. Other processes which operate the flash vessel at near atmospheric pressures which may permit feed distribution over the shed decks and may increase the steam addition to maintain vessel temperature to about 100oC can
10 increase naphtha diluent recovery.

Another diluent recovery process investigation flashes feed to a flash temperature such that the enthalpy of vaporized flash components matches enthalpy released from the flash liquid and the flash temperature governs vapour pressures of vaporizing components. Given the relative volatility of diluent hydrocarbons, there
15 may be an expected direct relationship between feed temperature, flash temperature and diluent recovery. However, the investigation identified increased feed temperatures for the same feed flow did not proportionately translate to increased diluent recovery due to increased vaporization of water. Stable operation for the flash column in terms of flash temperature and pressure was found
20 marginally below the boiling point of water for the operating pressure and with small increases in feed enthalpy resulting in upsets as the water essentially boils.

Process upsets affect the flash column in at least two ways. Firstly, boiling on shed decks results in damage to the extent that frequently the shed decks fail structurally. Secondly, the vapour velocity in the column increases by an order of
25 magnitude exceeding design guidelines, such a set out in "*Design Two-Phase Separators within the Right Limits*" W. Svrcek, et al. Chemical Engineering Progress Oct 1993, to limit entraining solids and bitumen into the overhead system.

In the overhead of the tailings solvent flash column, bitumen acts a binder for the solids to adhere on surfaces in the overhead system. The adherence of solids to
30 components of the overhead system restricts vapour flow to the downstream equipments unit operations such as condensers and separators. The adherence of

solids on condenser heat transfer surfaces reduce cooling and condensing of vapours which increases the non-condensed gases to be vented. Directionally, both effects of solids adhering on surfaces in the overhead system increase column pressure which reduces feed flashing resulting in actual diluent recoveries.

- 5 The contribution of increased steam to improve diluent recoveries due the reduced partial pressure created by the superheated steam can often be largely offset by the increased water vapour reporting an overhead system restricted by the adherence of solids. Over the operating cycle, the deposit of solids causes column performance to deteriorate which can only be regained by shutting down the
10 column and associated systems for repair and cleaning.

Known processes have particular challenges and limitations for achieving high diluent recoveries while avoiding fouling problems in the overhead systems of the tailings flash column. Conventional approaches has either been to either size the flash column to minimize the overhead velocity such that particles below a specific
15 acceptable diameter settle out or provide demisting pads to protect downstream equipment. The operating conditions for these vessels are prone to upsets that entrain particles overhead in quantities higher than typical overhead systems.

There is thus a need for a technology that overcomes at least some of the drawbacks of what is known in the field, such as the above-mentioned drawback
20 that may result from the entrainment of solids and their deposition in overhead apparatuses. The invention identifies a system for scrubbing entrained particles from a flash vessel, to achieve high naphthenic diluent recovery in a tailings solvent recovery process.

25 **SUMMARY OF THE INVENTION**

The present invention responds to the above need by providing a tailings naphtha recovery unit (TNRU) comprising a scrubbing system for entrained particles and a related process for recovering the naphthenic solvent.

In one embodiment, there is provided a TNRU for recovering a naphthenic solvent
30 from a solvent diluted tailings, the TNRU comprising a stripping vessel for

separating the solvent diluted tailings into a solvent component and a solvent recovered tailings component, the solvent component comprising a naphthenic solvent vapour and entrained tailings particles; a scrubbing vessel for scrubbing the solvent component, the scrubbing vessel comprising a scrubbing section for
5 separating the entrained tailings particles from the naphthenic solvent vapour, thereby producing a scrubbed solvent vapour; a solvent inlet for providing the solvent component into the scrubbing section; a fluid inlet for providing a flushing fluid to the scrubbing vessel, the flushing fluid removing the entrained tailings particles contained in the solvent component, thereby producing a flush media; a
10 liquid outlet for releasing the flush media from the scrubbing section; and a solvent outlet for releasing the scrubbed solvent vapour from the scrubbing vessel.

The TNRU may also include a heating device for heating the flushing fluid to or near the flash temperature of the solvent component before entering the scrubbing vessel.

15 The scrubbing vessel may comprise a removal system for promoting the removal of the entrained tailings particles from the solvent component. The removal system may comprise means for changing the flow pattern, such as cyclonic means or a grid.

The TNRU may also have a condenser connected to the solvent outlet for
20 condensing the scrubbed solvent vapour and producing a condensed naphthenic solvent.

There may also be an overhead separator for receiving the condensed naphthenic solvent and producing vent gas, recovered naphthenic solvent and produced water.

25 The TNRU may also have a recycle line for recycling at least a portion of the produced water from the overhead separator to the fluid inlet of the scrubbing vessel.

The TNRU may also have a recycle line for recycling at least a portion of the produced water from the overhead separator to the stripping vessel.

The TNRU may also have a first and a second recycle lines for recycling at least a portion of the produced water from the overhead separator respectively to the fluid inlet of the scrubbing vessel and the stripping vessel.

5 The TNRU may also have a flush recycle line for recycling at least a portion of the flush media to the fluid inlet of the scrubbing vessel.

The TNRU may also have a bypass line connecting the stripping vessel to the condenser for temporally providing the solvent component directly into the condenser without passing through the scrubbing vessel during maintenance operations.

10 The flushing fluid preferably includes water. The flushing fluid may contain chemical aids to promote the removal of the entrained tailings particles.

The fluid inlet may be located above the solvent inlet.

The flash temperature of the solvent component may range from about 25°C to about 100°C.

15 The pressure in the scrubbing vessel may range from about 25 kPaa to about 110 kPaa.

In one embodiment, the scrubbing vessel is a first scrubbing vessel and the TNRU further comprises a second scrubbing vessel arranged in series with the first scrubbing vessel.

20 The invention also provides a tailings naphtha recovery process for recovering a naphthenic solvent from a solvent diluted tailings. The process has the following steps:

25 stripping the solvent diluted tailings, with a stripping fluid within a stripping vessel, into a solvent component and a solvent recovered tailings component, the solvent component comprising a naphthenic solvent vapour and entrained tailings particles;

introducing the solvent component within a scrubbing vessel;

introducing a flushing fluid within the scrubbing vessel to contact the solvent component and remove the entrained tailings particles contained in the solvent component, thereby producing a scrubbed solvent vapour and a flush media comprising flushed tailings particles;

5 withdrawing the scrubbed solvent vapour from an upper section of the scrubbing vessel; and

 withdrawing the flush media from a bottom section of the scrubbing vessel.

10 The process may include the step of promoting the removal of the entrained tailings particles from the solvent component with a separator located within the scrubbing vessel.

The step of promoting of the removal of the entrained tailings particles may be performed by a grid. It may be performed by directional change means. It may be performed by cyclonic means.

15 The process may also include the step of condensing with a condenser the scrubbed solvent vapour to produce a condensed naphthenic solvent.

The process may also include the step of separating with an overhead separator the condensed naphthenic solvent into vent gas, recovered naphthenic solvent and produced water.

20 The process may include the step of recycling at least a portion of the produced water from the overhead separator to the scrubbing vessel.

The process may include the step of recycling at least a portion of the produced water from the overhead separator to the stripping vessel.

The process may include the step of recycling at least a portion of the produced water to the scrubbing vessel and the stripping vessel.

25 The process may include the step of recycling at least a portion of the flush media back to the scrubbing vessel.

The process may include the step of bypassing the scrubbing vessel for maintenance operation of the scrubbing vessel.

The process may include the step of bypassing the solvent component from the stripping vessel directly to the condenser for maintenance operation of the scrubbing vessel.

The flushing fluid may include water.

- 5 The process may include the step of promoting the removal of the entrained tailings particles with chemical aids added to the flushing fluid.

The flush media may contain a weight percentage of flushed tailings particles ranging from about 0.1 wt% to about 2 wt%.

- 10 The process may include heating the flushing fluid to or near the flash temperature of the solvent component.

The process may include the step of heating the flushing fluid to a temperature ranging from about 25°C to about 100°C.

The process may include the step of pressurizing the scrubbing vessel under a pressure ranging from about 25 kPaa to about 110 kPaa.

- 15 The scrubbing vessel may be a first scrubbing vessel and the process also comprises scrubbing the solvent component within a second scrubbing vessel in series operation.

- 20 The flush media may recycle back into the flash vessel below an upper liquid level of accumulated solvent recovered tailings to create a liquid seal therewith. Creating the liquid seal can allow avoiding valves for controlling recycling the flush media back into the flash vessel.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the distribution system and the related tailings solvent recovery process according to the present invention are represented in the following figures.

- 25 Figure 1 is a block flow plan illustrating a stripping apparatus and a scrubbing apparatus according to an embodiment of the present invention.

Figure 2 is a block flow plan illustrating an overall tailings naphtha recovery unit (TNRU) according to an embodiment of the present invention.

While the invention will be described in conjunction with example embodiments, it will be understood that it is not intended to limit the scope of the invention to these embodiments. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included as defined by the appended claims.

5

DETAILED DESCRIPTION

The present invention provides a tailings naphtha recovery unit (TNRU) and a related process for recovering naphtha from a solvent diluted tailings and scrubbing entrained particles from a flash or stripping vessel treating the solvent
10 diluted tailings.

Referring to Figure 1, the TNRU preferably comprises a stripping apparatus (2) for receiving the solvent diluted tailings (4) and separate it into two streams: a solvent component (6) and a solvent recovered tailings component (8). The stripping apparatus (2) comprises a stripping vessel (10) with a stripping section (12) and a
15 bottom section (14). The solvent diluted tailings are fed to a tailings inlet (16) located in the stripping section (12) where the stripping occurs by action of a stripping fluid (18) fed to the stripping vessel through a stripping fluid inlet (20) located above the bottom section (14). The stripping fluid (18) may comprise steam. The produced solvent component (6) is released from the stripping vessel
20 through a solvent outlet (22) located at the top of the stripping vessel. The solvent component (6) comprises a vaporized naphthenic solvent component and entrained tailings particles. The stripping fluid (18) entrains the vaporized naphthenic solvent component (6) and, due to the vapour velocity, tailings particles are also entrained out of the stripping vessel. The produced solvent recovered
25 tailings component (8) is released from the vessel (10) through a tailings outlet (26) located in the bottom section (14).

Still referring to Figure 1, the TNRU also comprise a scrubbing vessel (28) which is fed by the solvent component (6) containing the entrained tailings particles. The scrubbing vessel (28) is used to separate the entrained particles from the solvent
30 component (6). The solvent component (6) enters a scrubbing section (30) of the

scrubbing vessel (28) through a solvent inlet (32) and is scrubbed by a flushing fluid (34) fed to the scrubbing vessel (28) through a fluid inlet (36). The flushing fluid is typically water and is preferably heated to flash temperature then supplied to a grid within the vessel. The grid promotes the separation of particles into the flush fluid by either directional changes in the flow pattern or cyclonic means. In some cases, the flush fluid may also use water from the separator to minimize input of water subject to quality constraints. The fluid inlet (36) is located above the solvent inlet (32). A scrubbed solvent vapour (38) is thereby produced and released from the vessel through a solvent outlet (40). The tailings particles are entrained downwards the vessel (28) by the flushing fluid (34) forming a flush media (42) which is released from the vessel (28) through a tailings outlet (44). The flush media with entrained particles collects in the scrubber and preferably flows by gravity into the stripper column or to the columns bottom pump. A grid (46) located in the scrubbing vessel (28) acts as a separator for promoting the removal of the entrained tailings particles from the solvent component. The separator could also be a cyclone or any apparatus changing the flow pattern. The flushing fluid (34) is heated by a heat exchanger (48) before entering the vessel (28) in order to be at or near the flash temperature of the vaporized solvent component (6) and favour vapour equilibrium. The flash temperature of the solvent component (6) is preferably ranging from about 70°C to about 100°C, and the pressure in the scrubbing vessel is ranging from about 25 kPaa to about 110 kPaa. More preferably, the flushing fluid (34) comprises water.

In another aspect, Figure 2 illustrates a possible configuration for the TNRU. A stripping vessel (10), a scrubbing vessel (28) and an overhead separator (50) operate in series to recover the naphthenic diluent from the solvent diluted tailings. As explained in the above description of Figure 1, the scrubbing vessel (28) separates the entrained tailings particles from the solvent component, thereby producing a scrubbed solvent vapour (38). This scrubbed vapour (38) is then sent to an overhead separator (50) without risking deposition of solids which would have damaged the apparatuses. Before being fed to the overhead separator, the scrubbed vapour (38) is condensed in a condenser (52) thereby producing a naphthenic condensed solvent (54). The scrubbed gas passes to the condenser for

condensing diluent and water by cooling below the dew point. The condenser (52) connects the solvent outlet (40) of the scrubbing vessel (28) to the overhead separator (50). The naphthenic condensed solvent (54) is fed to the overhead separator (50) through a condensed solvent inlet (56) where it is separated into a vent gas (58) released through a gas outlet (60); a recovered naphthenic solvent (62) which is pumped out through a naphthenic solvent outlet (64) by a first pump (66); and a produced water (68) which is pumped out the overhead separator (50) through a water outlet (70) by a second pump (72). The water outlet (70) is connected to the stripping vessel (10) to recycle the produced water back to the vessel (10) through a recycle inlet (74). The recycle inlet (74) may be located at or near the bottom section of the stripping vessel and under the stripping fluid inlet (20). A portion (76) of the produced water (68) is recycled back to the heat exchanger (48) to join the scrubbing fluid (34) and be heated before entering the scrubbing vessel. The flush media (42) is recycled back to the bottom section (14) of the stripping vessel (10). A portion of the flush media (42) is also recycled back to the scrubbing vessel (28) because the solids content of the flush media is sufficiently low to enable a further flushing action. In one optional aspect, the flush media recycle line (42) is in fluid communication with the flash vessel (2), preferably below the upper liquid level of the solvent recovered tailings pool in the bottom of the flash vessel (2). The recycle line (42) may be configured to enable a liquid seal with the tailings pool, allowing the flushing media to flow in a controlled manner without resorting to a typical valve and level-control setup. Preferably, valves can thus be avoided on this recycle line (42), which has benefits related to avoiding wear due to particulate-containing fluid flow through valves. Preferably, the flush media contains a weight percentage of flushed tailings particles ranging from about 0.1 wt% to about 2 wt%. The particle concentration of the flush media may be managed within this range or at a desired or predetermined range or value by purging excess water or adding make-up water as needed. Finally, the TNRU comprises a bypass line (80) to feed the solvent component (6) directly to the condenser (52) without being scrubbed, during maintenance operation of the scrubbing vessel (28) and its grid (46).

In one aspect, the scrubber minimizes entrained particles in overhead systems to allow the flash column to be operated at desired operating conditions to maximize naphtha recovery. Naphtha recovery and efficiency is also improved over longer run times. In another aspect, the preferred configuration of external scrubbers
5 allows temporary bypassing of the scrubbers through a bypass line for short time intervals for online maintenance without seriously affecting operations. In another aspect, the scrubber system and any and all configurations described herein may also be applied to recovering other types of solvents, such as alkanes from alkane diluted tailings derived from a corresponding froth treatment operation. In another
10 aspect, the scrubbing systems may be used in connecting with a single stage flash vessel or a multi-stage arrangement in which two or more flash vessels are arranged in series and a scrubber is provided in the overhead system of one or both of the flash vessels.

Embodiments of the present invention provide a number of advantages. For
15 instance, in one aspect, the system is external and can be serviced by bypassing the unit when required. In addition, the flushing media used in the scrubber may aid in removing build up of material and chemical aids can be added to improve the removal. The scrubbing device provides a flow path that causes entrained droplets to be captured into the flush fluid.

20 In one aspect, heating of the wash fluid to the flash temperature is particularly preferred to maintain the equilibrium with the vapor stream to the unit.

In another aspect, in typical operation the level of particles entrained in the flush fluid is relatively low and in such cases it may be desirable that a significant portion of the flush media be recycled to minimize flush fluid and heat demands.

CLAIMS

1. A tailings naphtha recovery unit (TNRU) for recovering a naphthenic solvent from a solvent diluted tailings, the TNRU comprising :

a stripping vessel for separating the solvent diluted tailings into a solvent component and a solvent recovered tailings component, the solvent component comprising a naphthenic solvent vapour and entrained tailings particles;

a scrubbing vessel for scrubbing the solvent component, the scrubbing vessel comprising:

a scrubbing section for separating the entrained tailings particles from the naphthenic solvent vapour, thereby producing a scrubbed solvent vapour;

a solvent inlet for providing the solvent component into the scrubbing section;

a fluid inlet for providing a flushing fluid to the scrubbing vessel, the flushing fluid removing the entrained tailings particles contained in the solvent component, thereby producing a flush media;

a liquid outlet for releasing the flush media from the scrubbing section; and

a solvent outlet for releasing the scrubbed solvent vapour from the scrubbing vessel.
2. The TNRU of claim 1, wherein the scrubbing vessel further comprises a removal system for promoting the removal of the entrained tailings particles from the solvent component.
3. The TNRU of claim 2, wherein the removal system comprises means for changing the flow pattern.
4. The TNRU of claim 2, wherein the removal system comprises a grid.

5. The TNRU of any one of claims 1 to 4, further comprising a condenser connected to the solvent outlet for condensing the scrubbed solvent vapour and producing a condensed naphthenic solvent.
6. The TNRU of claim 5, further comprising an overhead separator for receiving the condensed naphthenic solvent and producing vent gas, recovered naphthenic solvent and produced water.
7. The TNRU of claim 6, further comprising a recycle line for recycling at least a portion of the produced water from the overhead separator to the fluid inlet of the scrubbing vessel.
8. The TNRU of claim 6, further comprising a recycle line for recycling at least a portion of the produced water from the overhead separator to the stripping vessel.
9. The TNRU of claim 6, further comprising a first and a second recycle lines for recycling at least a portion of the produced water from the overhead separator respectively to the fluid inlet of the scrubbing vessel and the stripping vessel.
10. The TNRU of any one of claims 1 to 9, further comprising a flush recycle line for recycling at least a portion of the flush media to the fluid inlet of the scrubbing vessel.
11. The TNRU of any one of claims 1 to 10, further comprising a bypass line connecting the stripping vessel to the condenser for temporally providing the solvent component directly into the condenser without passing through the scrubbing vessel during maintenance operations.
12. The TNRU of any one of claims 1 to 11, wherein the flushing fluid comprises water.
13. The TNRU of any one of claims 1 to 12, wherein the flushing fluid comprises chemical aids to promote the removal of the entrained tailings particles.

14. The TNRU of any one of claims 1 to 13, wherein the fluid inlet is located above the solvent inlet.
15. The TNRU of any one of claims 1 to 14, wherein the solvent inlet is spaced away from the fluid inlet by a predetermined distance to encourage solvent flashing.
16. The TNRU of any one of claims 1 to 15, wherein the flash temperature of the solvent component is between about 25°C and about 100°C.
17. The TNRU of claim 16, wherein the flash temperature of the solvent component is predetermined and managed.
18. The TNRU of any one of claims 1 to 17, wherein the pressure in the scrubbing vessel is between about 25 kPaa and about 110 kPaa.
19. The TNRU of any one of claims 1 to 18, wherein the scrubbing vessel is a first scrubbing vessel and the TNRU further comprises a second scrubbing vessel arranged in series with the first scrubbing vessel.
20. The TNRU of any one of claims 1 to 19, further comprising a heating device for heating the flushing fluid to or near the flash temperature of the solvent component before entering the scrubbing vessel.
21. A tailings naphtha recovery process for recovering a naphthenic solvent from a solvent diluted tailings, the process comprising:
 - stripping the solvent diluted tailings, with a stripping fluid within a stripping vessel, into a solvent component and a solvent recovered tailings component, the solvent component comprising a naphthenic solvent vapour and entrained tailings particles;
 - introducing the solvent component within a scrubbing vessel;
 - introducing a flushing fluid within the scrubbing vessel to contact the solvent component and remove the entrained tailings particles contained in

the solvent component, thereby producing a scrubbed solvent vapour and a flush media comprising flushed tailings particles;

withdrawing the scrubbed solvent vapour from an upper section of the scrubbing vessel; and

withdrawing the flush media from a bottom section of the scrubbing vessel.

22. The process of claim 21, further comprising promoting the removal of the entrained tailings particles from the solvent component with a separator located within the scrubbing vessel.

23. The process of claim 22, wherein the promoting of the removal of the entrained tailings particles is performed by a grid.

24. The process of claim 22, wherein the promoting of the removal of the entrained tailings particles is performed by directional change means.

25. The process of any one of claims 21 to 24, further comprising condensing with a condenser the scrubbed solvent vapour to produce a condensed naphthenic solvent.

26. The process of claim 25, further comprising separating with an overhead separator the condensed naphthenic solvent into vent gas, recovered naphthenic solvent and produced water.

27. The process of claim 26, further comprising recycling at least a portion of the produced water from the overhead separator to the scrubbing vessel.

28. The process of claim 26, further comprising recycling at least a portion of the produced water from the overhead separator to the stripping vessel.

29. The process of claim 26, further comprising recycling at least a portion of the produced water to the scrubbing vessel and the stripping vessel.

30. The process of any one of claims 21 to 29, further comprising recycling at least a portion of the flush media back to the scrubbing vessel.
31. The process of any one of claims 21 to 30, further comprising bypassing the scrubbing vessel for maintenance operation of the scrubbing vessel.
32. The process of any one of claims 25 to 31, further comprising bypassing the solvent component from the stripping vessel directly to the condenser for maintenance operation of the scrubbing vessel.
33. The process of any one of claims 21 to 32, wherein the flushing fluid comprises water.
34. The process of any one of claims 21 to 33, further comprising promoting the removal of the entrained tailings particles with chemical aids added to the flushing fluid.
35. The process of any one of claims 21 to 34, wherein the flush media contains a weight percentage of flushed tailings particles between about 0.1 wt% and about 2 wt%.
36. The process of claim 35, wherein the flush media contains a weight percentage of flushed tailings particles which is managed by purging excess water and adding make-up water when needed.
37. The process of any one of claims 21 to 36, further comprising heating the flushing fluid to or near the flash temperature of the solvent component
38. The process of claim 37, wherein the heating of the flushing fluid is performed to obtain a flushing fluid temperature between about 25°C and about 100°C.
39. The process of any one of claims 21 to 38, further comprising pressurizing the scrubbing vessel under a pressure between about 25 kPaa and about 110 kPaa.

40. The process of any one of claims 21 to 39, wherein the scrubbing vessel is a first scrubbing vessel and the process also comprises scrubbing the solvent component within a second scrubbing vessel in series operation.
41. The process of any one of claims 21 to 39, wherein the flush media is recycled back into the flash vessel below an upper liquid level of accumulated solvent recovered tailings to create a liquid seal therewith.
42. The process of claim 41, wherein creating the liquid seal allows avoiding valves for controlling recycling the flush media back into the flash vessel.

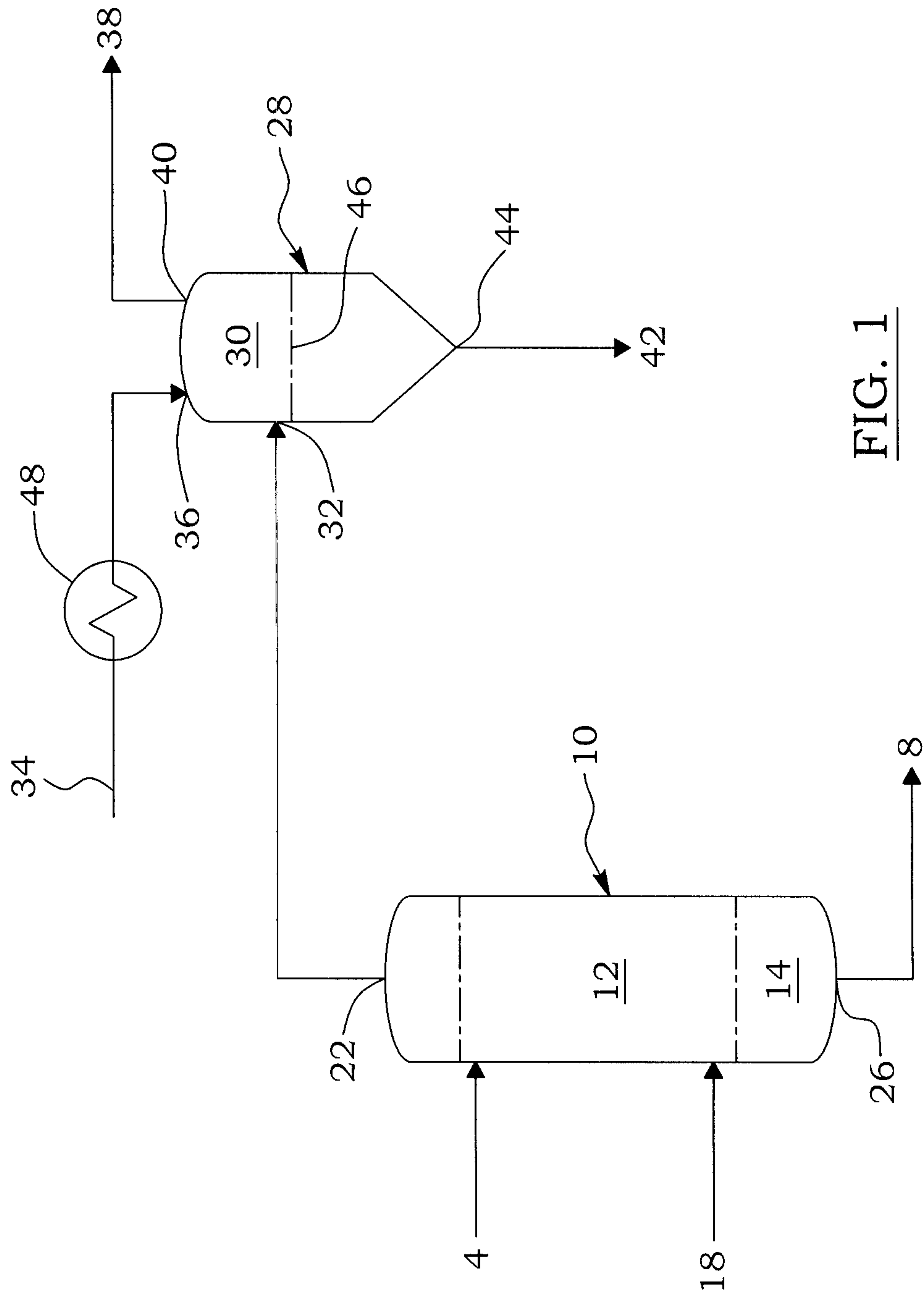


FIG. 1

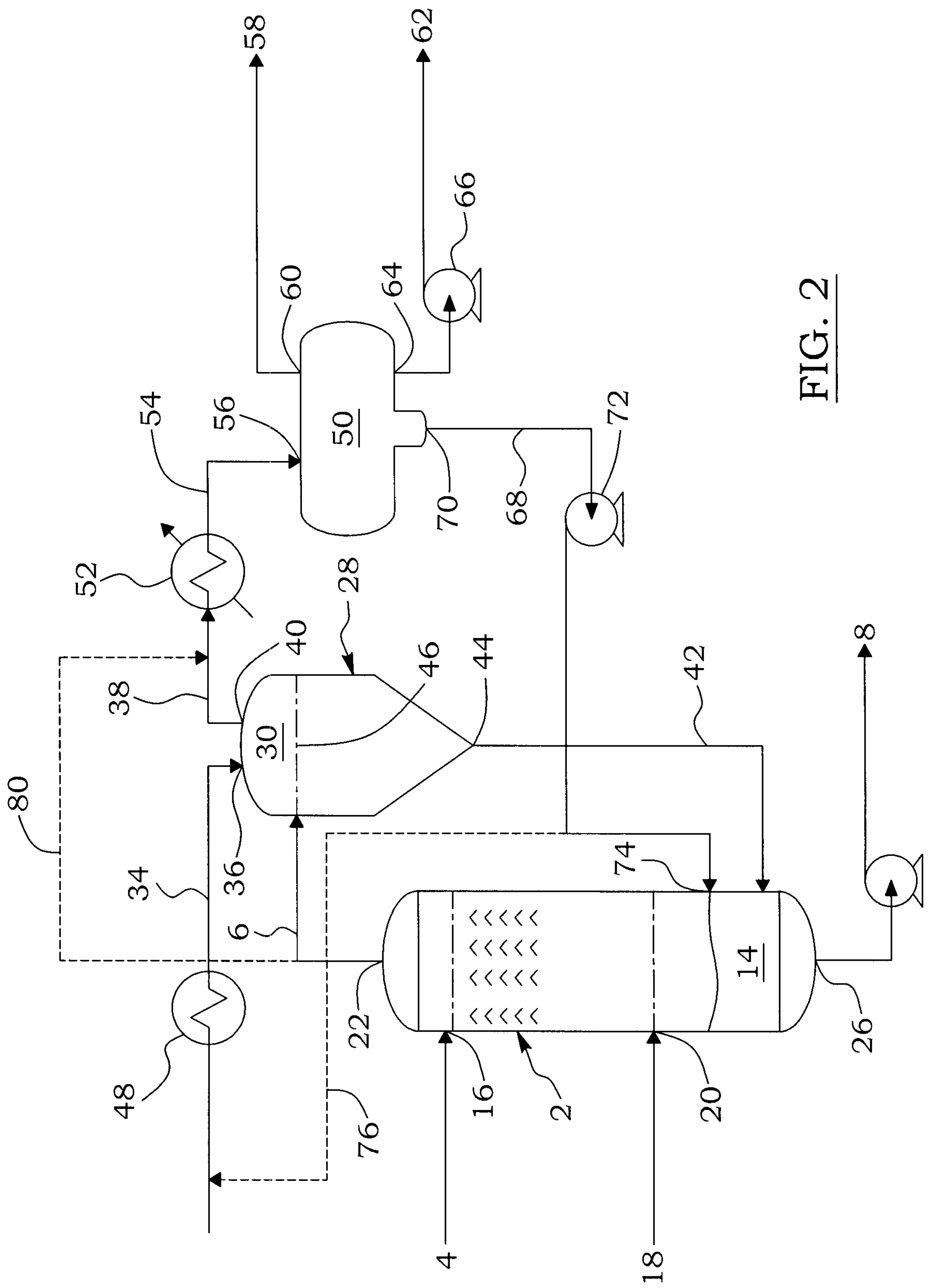


FIG. 2

