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LIQUID TROUGH SEAL

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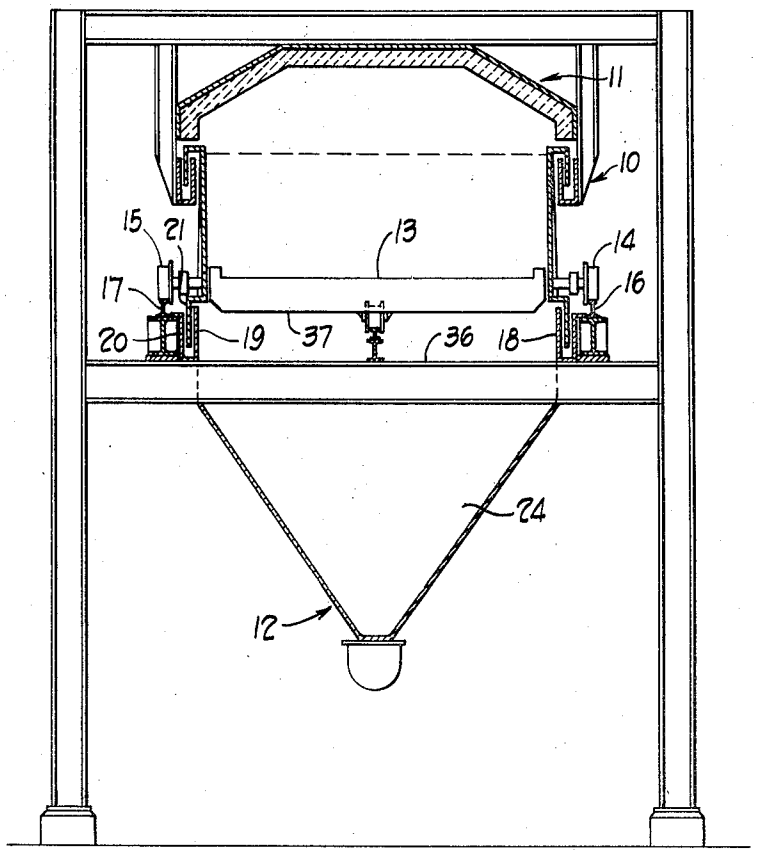


Fig. 1

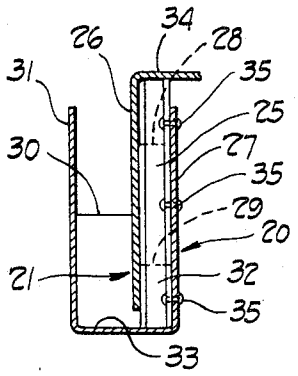


Fig. 2

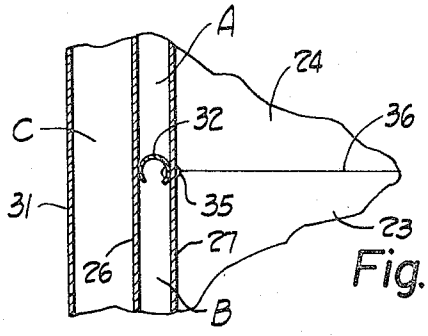


Fig. 3

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LIQUID TROUGH SEAL

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ABSTRACT OF THE DISCLOSURE

A flexible strip used in conjunction with a liquid seal comprising a trough partially filled with liquid and a flange extending from a moving pallet into the trough and liquid intermediate the sides of the trough, for transversely sealing the space between the flange and an adjacent trough side to keep fluid under pressure from passing through said space.

This invention is especially well suited for use in a circular traveling grate machine having adjacent zones in which gas pressure and vacuum or two different gas pressures are maintained. The following description, therefore, will be in relation to such a traveling grate machine.

The circular traveling grate machine essentially comprises, a plurality of pallets movable along a generally circular path and in the same plane which is normally horizontal. The pallets move between a hood which is fixedly surmounted in spaced relation from a windbox. A liquid seal such as described in Patent No. 3,302,936 is utilized to seal the space between the windbox, moving pallets and hood. Such a seal, for example, employs a trough mounted on each marginal edge of the windbox and hood adjacent the moving pallets. Liquid, e.g. water, is circulated in the trough. The pallets carry a flange at each marginal edge. The pallet flanges are configured to extend into the trough for sealing engagement with the circulating liquid. Thus, the space between the windbox, hood, and moving pallets is closed forming an envelope which is sealed from the ambient atmosphere.

A problem exists when, for example, gases under pressure are passed from one section of the windbox upwardly through a burden on the pallets, and then recirculated downwardly through the burden on the pallets into an adjacent section of the windbox, as a channel is formed in the trough between the flange and the trough side adjacent the pallets. The gases will circulate through the channel between the adjacent zones, or windbox sections rather than move through the burden on the moving pallets. In other words, the gases will short circuit through the channels formed in the troughs, the movement of the gases through the channels being the path of least resistance. This short-circuiting of the gases is detrimental to processing the burden on the moving pallets. This invention is directed to providing a seal for blocking this channeling of the gases through the troughs between adjacent hood or windbox sections under differential fluid pressure, or fluid pressure and vacuum.

Briefly stated, the invention is in a flexible or pliable sealing strip mounted in the trough for sealing engagement with the flange extending into the trough, and the trough side adjacent the pallets. The sealing strip is provided between adjacent zones in which gas pressure and vacuum, or two different gas pressures are maintained.

The following description of the invention will be better understood by having reference to the annexed drawing, wherein:

FIG. 1 is a cross-sectional view of a conventionally-designed circular traveling grate machine comprising a windbox, pallets and hood, and employing a trough-type liquid seal for sealing the spaces between the marginal edges of the windbox and hood, and moving pallets;

FIG. 2 is an enlarged sectional view of a typical trough secured to, for example, the marginal edge of the windbox, and a flange carried, for example, by the pallets for sealing coaction with the liquid in the trough, and illustrating an embodiment of the invention for sealing the channel formed in the trough; and

FIG. 3 is a fragmentary top sectional view showing the embodiment of the invention of FIG. 2 in cross section.

Referring more particularly to FIGS. 1–3 of the annexed drawing, there is shown a circular traveling grate machine generally indicated at **10**. The traveling grate machine **10** essentially comprises a hood **11** fixedly surmounted in spaced relation from a windbox **12**. A plurality of pallets, e.g. pallet **13**, are movable between the hood **11** and windbox **12**. Each pallet is mounted on wheels which are movable along a trackway mounted outside the windbox **12** and hood **11**, e.g. the wheels **14** and **15** of pallet **13**, are movable along the trackway rails **16** and **17** outside and adjacent the windbox's marginal edges **18** and **19**.

The following description of the invention will be in relation to a trough **20** and flange **21** mounted on the windbox **12** and pallet **13**, respectively, it being understood that the inventive concept is applicable to other troughs and flanges used.

The particular design of the trough is important. The trough should be of sufficient width and depth such that the volume of liquid in the section of the trough between the flange and the trough side farthest from the pallets, is at least about four to five times the volume of liquid in the section of the trough between the flange and the trough side adjacent the pallets. If the reservoir of liquid in the former mentioned section of the trough is insufficient, it is difficult to maintain a satisfactory vacuum within the windbox. Also, gases passing through the burden on the grates of the pallets, under pressure can escape from the process by bubbling through the insufficient liquid reservoir in the trough.

Inventive concept

A fluid passageway or channel **25** is formed in the trough **20** between the dip portion **26** of the flange **22**, or that portion of the flange extending into the trough **21**, and the trough side **27** adjacent or closest the pallets when gas pressure and vacuum, or differential gas pressures are maintained in adjacent windbox sections, e.g. sections **23** and **24**. In such cases, the gases for carrying out the process, will circulate through the fluid passageway **25** rather than pass through the burden on the pallets. Under such conditions of gas pressure and vacuum, for example, a liquid head **28** (shown in dotted line) may result in that portion or section A of the trough **20** adjacent the windbox section **24** under gas vacuum, and a comparatively smaller liquid head **29** (shown in dotted line) may result in that portion or section B of the trough **20** adjacent the windbox section **23** under gas pressure. The trough should be designed such that a relatively constant head or reservoir of liquid **30** (shown in dotted line) can be maintained in that portion or section C of the trough **20** between the pallet dip flange **26** and the opposing trough side **31**. If, for example, the reservoir of liquid **30** would closely approach the head of liquid **29** under gas pressure, gas under pressure could bubble through the liquid in sections B and C, and escape from the process.

A sealing strip **32** is provided to seal the passageway or channel **25**. The sealing strip **32** is at least coextensive with the dip flange portion **26***a* extending into the trough

20, and, preferably, extends to the trough bottom 33 and the pallet, which in this case is the lateral flange portion 34 extending from the pallet. The sealing strip 32, preferably, covers the area defined by the trough bottom 33, the lateral pallet flange 34, the pallet dip flange 26, and the trough side 27. In this manner, the passageway or channel 25 formed between the trough side 27 and the pallet dip flange 26, is effectively sealed or blocked.

The sealing strip 32 is, preferably, flexible or pliable, and composed of any suitable gas or liquid impervious material, e.g. rubber, plastic or metal. The flexible sealing 32 is designed to compressively engage the dip flange 26 and trough side 27. This can be accomplished by, preferably, detachably mounting the flexible sealing strip 32 on the trough side 27 by any suitable fastening means, e.g. bolts 35. The sealing strip 32 is, preferably, rolled; that is, it is generally U-shaped, which permits the sealing strip 32 to expand or contract in order to compressively engage the dip flange 26, as it moves laterally towards and away from the trough side 27, such movement being caused, for example, by misalignment of the pallets as they move along the trackway.

Conventionally designed "dead plates" are normally mounted on the adjoining edge 36 of the adjacent windbox sections 23 and 24 for engaging the underside of the pallets, e.g. underside 37 or pallet 13, to restrict movement of the gas through the space between the adjoining edge 36 of the adjacent windbox sections 23 and 24, and the underside of the pallets. In some pallet designs, the dead plates traversing the width of the pallets and windbox sections, may extend to the trough sides, in which case the sealing strip 32 would compressively engage the adjacent dead plate to seal or block the fluid passageway formed by the trough, pallet and said adjacent dead plate.

Thus, there has been provided a new and novel means for sealing a channel formed in the trough of a trough-type liquid seal employing a flange extending into a trough partially filled with liquid. Such means are essential for keeping, for example, the gases under pressure, from by-passing into a next adjacent zone under less gas pressure, or gas vacuum, rather than passing through a burden on the pallets.

Other modes of applying the principle of this invention may be employed instead of those specifically set forth above, changes being made as regards the details herein disclosed, provided the elements set forth in any of the following claims, or the equivalent of such be employed.

It is, therefore, particularly pointed out and distinctly claimed as the invention:

1. In combination:
(a) at least two adjacently disposed windbox sections;
(b) a hood in fixed surmounted spaced relation to the windbox sections;
(c) a plurality of pallets movable between the windbox sections and hood;
(d) trough-type liquid seals coacting between the pallets, hood and windbox sections to seal the spaces between the marginal edges of the hood and windbox sections and the moving pallets; and
(e) means for transversely sealing a channel formed in each trough between a flange extending into the liquid in the trough and the side of the trough adjacent the pallets, to prevent gas under pressure from passing between the windbox sections through the channel, rather than through a burden carried by the pallets.

2. The combination of claim 1, wherein the channel sealing means includes a flexible sealing strip mounted for compressively engaging the trough side adjacent the moving pallets and the flange extending into the liquid in the trough.

3. The combination of claim 2, wherein the sealing strip is mounted on the trough side adjacent the moving pallets.

4. The combination of claim 3, wherein the flexible sealing strip is at least coextensive with the depth of the flange extending into the trough.

5. The combination of claim 4, wherein the flexible sealing strip is rubber.

6. In a seal comprising a trough at least partially filled with liquid and a flange extending into the trough and liquid intermediate the sides or the trough, the improvement which comprises a flexible strip disposed in sealing relation with the flange, liquid and an adjacent trough side for transversely sealing the space between the flange, liquid and adjacent trough side to keep fluid under pressure from circulating through said space.

7. In a seal having a plurality filled with liquid, and a flange extending into the trough and liquid intermediate the sides of the trough; the improvement which comprises means for transversely sealing the space between the flange, and an adjacent trough side to keep gas under pressure from circulating through said space, said means including a flexible sealing strip at least coextensive with the depth of the flange in the trough and compressively engaging the flange and adjacent trough side.

8. The improvement of claim 7, wherein the sealing strip is configured to compressively engage the flange and trough side should the flange and trough side move relatively towards and away from each other.

9. The improvement of claim 8, wherein the flange moves and the trough is stationary, and the sealing strip is mounted on the trough side.

10. The improvement of claim 9, wherein the sealing strip is rubber.

11. In a circular traveling grate machine including a plurality of pallets moving sequentially across at least one pair of adjacently disposed windboxes in which differential gas pressures or gas pressure and vacuum are maintained; means for sealing the spaces between the windboxes and moving pallets, including:
(a) a trough mounted on the opposing marginal edges of the windboxes, and partially filled with liquid;
(b) a flange carried by the pallets at each marginal edge, and configured to extend into the trough and liquid to seal the space between the marginal edges of the pallets and windboxes, the flange extending into the trough intermediate the sides of the trough; and
(c) means for sealing a by-passageway formed by the trough, pallets and flange, through which the gas can circulate between the windboxes rather than pass through a burden on the pallets moving across said windboxes.

12. The space sealing means of claim 11, wherein the gas by-passageway sealing means includes:
(d) a flexible sealing strip mounted to compressively engage the flange and trough side adjacent the pallets.

13. The place sealing means of claim 12, wherein the flexible sealing strip is mounted on the trough side adjacent the pallets, and is at least coextensive with the depth of the flange in the trough.

14. The space sealing means of claim 13, wherein the sealing strip is composed of a gas impervious material.

15. The space sealing means of claim 13, wherein the sealing strip is composed of rubber.

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