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(54) **METHOD AND APPARATUS FOR REMOVING SPILL**

(57) **Abstract:**

*This First Page has been artificially created and is not part of the CIPO Official Publication*

1 This invention relates to a method and apparatus for removing flammable liquid spilled on the surface of a body of water.

There are many circumstances under which it happens that flammable liquids such as lubricating oil, diesel oil and bunker fuel are spilled on a body of water. On being spilled these liquids, which are normally immiscible, spread over the surface of the water thus creating a rather serious fire hazard. For this and other reasons it is often necessary to remove these liquids from the water surface.

10 It is known to utilize a floating boom arrangement whereby the spill can be collected and maintained within a relatively confined area, but, having confined the spill, it then becomes necessary to remove it from the surface of the water. Several systems have been suggested. Among these is the scattering of dry sand on the spill. The spill wets the sand which sinks to the bottom of the body of water carrying the spill with it.

Also suggested has been the use of a watercraft such as a barge provided with a skimming device mounted on the bow. The skimmer is adjusted as closely to the spill/water interface as possible in order to obtain as high an oil/water ratio as possible in the recovered liquid.

20 Also suggested has been the use of emulsifiers to obtain an oil in water emulsion which would disperse and thereby become harmless.

Various disadvantages are associated with these known systems. The transportation and distribution of large quantities of sand would normally present a problem. The use of a skimming device would in practice be very difficult particularly if it was necessary to use it on rough water as it would not be possible to properly position the skimmer, so the liquid recovered would probably have a very high water/oil ratio which would present storage and separation problems.

The use of emulsifiers might prove satisfactory in a restricted sense, but of course emulsifying agents are normally relatively expensive



1 and as some of the resultant emulsions might not be permanently stable there being a possibility of the liquid constituting the spill coming to the water's surface over an extended period of time.

Of the above-noted systems it will be appreciated that only one of them, the skimming apparatus, physically removes the spilled liquid from the water surface.

The present invention is concerned with the physical removal of a spilled liquid from a body of water by means which, on being brought into contact with the spilled liquid and the body of water, absorbs the spilled  
10 liquid in preference to the water. It has been discovered that an absorbent material satisfactory for this purpose consists of one which contains a high percentage of cotton, it having been found dry cotton will absorb about 29 times its weight in bunker oil and cotton soaked in water and subsequently wrung out will soak up to approximately 12 times its weight in oil on being dipped into the oil only once.

It will be appreciated that with a knowledge of the above discovery various mechanical arrangements can be utilized for the purpose of passing the selectively absorbent material into the spill, drawing the material soaked with the spilled liquid out of the spill, and recovering the spill by subjecting  
20 the material to pressure. The absorbent material can then be passed back into the spill.

In the accompanying Figure there is shown schematically one such form of apparatus.

Referring to this drawing a powered barge 1 has a roller support 2 pivotally secured to its forward end with a rotatable roller 3 horizontally mounted on the support 2. The barge 1 is floating in water 4 on top of which is located an oil spill 5.

Located above the barge 1 and the roller support 2 is a super-structure (not shown) on which are mounted a number of horizontally extend-  
30 ing idler rollers 7, 8, 9 and 10 and a pair of powered, squeeze rollers, an upper one 12 and a lower one 13.

An oil collecting trough 14 extends horizontally below idler roller 8 and a further oil collecting trough 15 extends horizontally below powered roller 13. These troughs 14 and 15 are arranged so that oil collecting in them flows to a container, (not shown), located on the barge.

An endless oil collecting belt 16 formed of a suitable material such as a loosely woven absorbent cotton is threaded about idler rollers 3 and 7, under idler roller 8 so as to pass between it and the trough 14, between powered rollers 12 and 13 and around idler rollers 10 and 9.

10 In operating the device the powered rollers 12 and 13 are rotated so as to cause movement of the belt 16 in the direction of the arrows 20 and the roller support 2 is lowered so as to bring the belt 16 into contact with the oil spill 5. As the belt 16 rotates it selectively absorbs oil from the water surface, carries it over roller 7 and around roller 8 where a certain amount of the oil contained on the belt 16 runs off into the trough 14 and the belt then travels through the powered squeeze rollers 12 and 13 where most of the remainder of the oil is removed from the belt 16 and runs off via the trough 15. The belt then passes around rollers 10 and 9 and back into the oil spill 5. In this manner continuous, positive mechanical collection of the  
20 through it by means of the powered barge 1.

It will be appreciated that there are various alternative structures which could be employed for the purpose of picking up spills by means of selectively absorbent material and that these alternative structures could be of various sizes depending upon the quantity of the spill normally to be expected in the area in which the apparatus is to be utilized.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An apparatus for removing liquid spill from a liquid comprising an endless belt formed from a material capable of selectively absorbing the spill from the liquid, a support, a roller rotatably mounted on said support, said belt running over said roller, said support being movable to bring said belt into contact with the spill where said belt runs over said roller, means for driving said belt over said roller, a pair of opposed parallel rollers, one being rotatably mounted on each side of said belt and together being capable of squeezing said belt between them to remove the spill from said belt as it passes between said rollers and means to collect the spill squeezed from said belt.

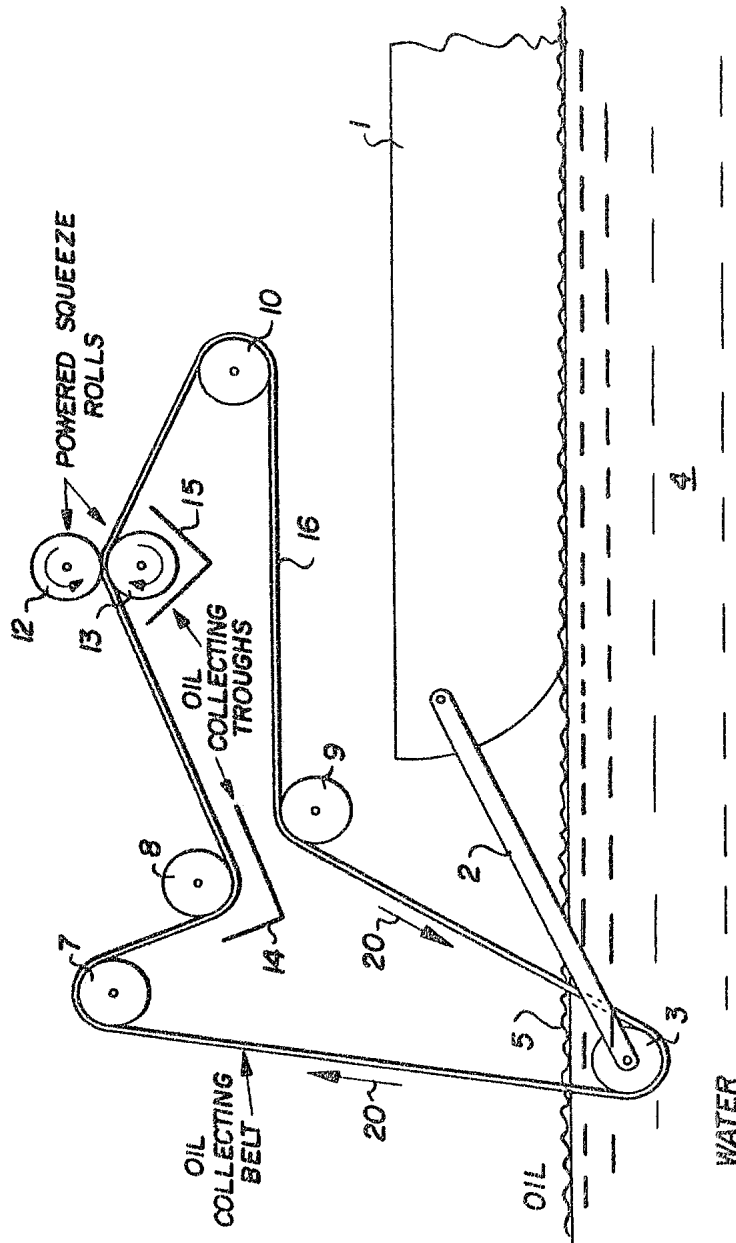
2. An apparatus for removing liquid spill from a liquid comprising a barge, a strut-like support extending from said barge, a first roller at the end of said support distant from said barge, a second and a third idler roller mounted on said barge, said second roller being positioned at a higher elevation than said first and third rollers, a fourth and fifth roller mounted on said barge at a higher elevation than said third roller, and resiliently biased to touch each other along a line contact, a sixth and a seventh idler roller mounted on said barge, a first spill collecting trough under said third idler roller and a second spill collecting trough under said fourth and fifth rollers, an endless belt positioned to run round said first, second and third rollers, between said fourth and fifth rollers, and round said sixth and seventh rollers, said belt being made from material which has the property of being able to selectively absorb the spill from the liquid, and means for rotating said fourth and fifth rollers to drive said belt.

3. The method of removing liquid spill from a liquid comprising introducing into the spill a material which will selectively absorb the spill in preference to the liquid, removing said spill-soaked material from the liquid and spill, applying pressure to said material to remove the spill, collecting the spill removed from said material and reintroducing said material, after removal of the spill, into the spill for further absorption.

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4. A method according to claim 3 wherein the absorbing, pressing and collecting are performed as a continuous operation.





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