APPARATUS FOR CONFINING FLOATING MATERIAL

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One previously known floating oil boom comprises a canvas curtain suspended in the water by cork floats. This type of boom was quite heavy and clumsy to handle, and required many men to handle it due to its relative great weight. The canvas had a comparatively short life in water due to its tendency to rot; in addition, due to the relative maintenance cost of the canvas boom, it was not very practical.

Another type of oil boom known in the prior art was manufactured of aluminum. The aluminum floats of this type of boom were easily damaged by collision with a boat or by being driven into pilings, etc., by the waves or the wind. Even if the collision did not puncture the aluminum floats, the floats were quite readily deformed. The aluminum sections were heavy and difficult to handle, many men being required to place them in position. Due to the comparatively expensive aluminum construction, the boom had to be cleaned and reused after contact with oil. Furthermore, this type of boom came in rigid sections which had to be coupled together to form a long barrier, and then had to be uncoupled after use. This necessarily required a good deal of labor and delay.

Accordingly, it is an object of the invention to provide a lightweight floating oil boom which is easy to handle and store.

It is another object of the invention to provide a boom of the above character which is manufactured of non-sparking materials, reducing the possibility of fires.

It is a further object of the invention to provide a boom of the above character which is sturdy, and will be undamaged by collisions.

It is a further object of the invention to provide a boom of the above character which is inexpensive, and which may be disposed of by burning.

It is another object of the invention to provide a boom of the above character which is continuous and flexible, eliminating the necessity of coupling of sections together.

It is still another object of the invention to provide a boom of the above character which is collapsible, whereby the boom may be stored in a relatively small space.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIGURE 1 is a plan view of a portion of a dock showing a first boom in position around a ship, and showing a launch preparing to tow a second boom into position.

FIGURE 2 is a fragmentary front elevation view of one end portion of the boom of the present invention.

FIGURE 3 is a cross-sectional vertical end view taken along line 3--3 of FIGURE 2.

FIGURE 4 is a cross-sectional vertical end view taken along line 4--4 of FIGURE 2.

FIGURE 5 is a cross-sectional horizontal plan view taken along line 5--5 of FIGURE 2.

FIGURE 6 is a fragmentary perspective view of one of the floats, showing the groove which receives the boom.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Referring to FIGURES 1 and 2, the floating oil boom of the present invention generally comprises a continuous elongated flexible plastic curtain or fin which is suspended in the water by a series of floats of expanded plastic polymer secured at intervals to one elongated edge of the fin. Preferably, the other elongated edge of the fin is weighted. FIGURE 1 shows an oil tanker 10 tied to a dock or pier 12, having the novel oil boom 14 positioned around the ship 10 to trap any oil or similar fluid which may be discharged, effectively preventing fouling of the neighboring anchorage and downstream waters. When not in use, boom 14 may be compactly flaked into breakaway containers 16 under dock 12, from which boom 14 may readily be paid out before launch 18 much faster than prior booms.

As shown in FIGURE 2, the boom according to the present invention comprises a continuous sheet or fin 20 of any desired length. The upper edge 22 of sheet 20 is attached to a plurality of spaced floats 24. A painter 25 is secured to the end float 24 for towing by the launch 18. Fin 20 may be made of any desired material which is chemically inert, impervious to water and oil and which has a long life when exposed to these materials, for example, polyethylene or other artificial polymeric sheets.

Floats 24 are made of a suitable expanded polymer, for example, foamed polyethylene. The float 24 is preferably in the form of a right circular cylinder having a small arch or slot cut along its lower surface a slot 26 parallel to the axis of the cylinder, slot 26 having a width equal to the thickness of fin 20. Floats 24 are spaced far enough apart so that fin 20 provides a flexible intermediate portion between adjacent floats so that boom 14 may be compactly flaked for storage as shown in FIGURE 1.

In order to provide a barrier of continuous level, each float 24 other than the pair on the ends of boom 14 has a vertical slot extension 28 (FIGURE 6). Vertical slot extension 28 at the ends of float 24 extend entirely through the float, to accommodate integral fin extensions 30. The end pair of floats 24 preferably have such slots only on the ends adjacent other floats 24. Fin extensions 30 are generally rectangular segments of fin material fitted in and extending between facing slot extensions 28 in adjoining floats, and these fin extensions 30 may be heat sealed to the main portion of fin 20 as at 31.

A plurality of rivets 32 secure fin 20 to floats 24. Rivets 32 extend through apertures 34 (see FIGURES 3 and 4) and through mating apertures 36 in fin 20 and fin extension 30. Rivets 32 are preferably made from polyethylene rods or dowels of suitable length inserted through apertures 34 and 36. Polyethylene rods 38 are then assembled over the ends of the dowels, after which the ends are heated and peened over washers 38 to form flattened head members 40, locking floats 24 to fin 20 and fin extension 30.

In order to ballast fin 20 and maintain it in a vertical position in the water, a plurality of weights 42 are attached to the lower edge 44 of fin 20. As illustrated in FIGURE 5, weights 42 may be in the form of a lead
staple which is inserted through corresponding pairs of apertures 46 in the lower edge 44 of fin 20 and clinched.

While the floats 24 have been disclosed as preferably
in the form of right circular cylinders, other forms of
floats may be utilized. For example, the floats may be in
the form of elongated planks of expanded or foamed poly-
erm suitably attached to a polymer fin. Two planks may
be attached, one on either side of the fin to form a sand-
wich-like construction. Preferably such a pair of planks
would be in the form of halves of a longitudinally divided
right circular cylinder, assembled together flush with the
top edge of the fin. Such a construction would eliminate
the need for fin extensions 30. Thus floats in the form
of cylinders having any desired shape of cross-section or
"generating" area may be employed, whether rectangular,
square, polygonal or irregular. However, the right circu-
lar cylinder form is preferred because of low wind resis-
tance when in the water, effectively reducing heeling of
the boom in high winds. The central positioning of
fin 20 in a generally radial slot 25 likewise enhances bal-
cance and stability of the boom, but the fin may be se-
cured to the side surface of the floats if desired.

Likewise, materials may be utilized other than the pre-
ferred polyethylene. For example, foamed polyurethane
may be used for the floats although presently it is fairly
expensive. Similarly, presently available polystyrene foams are usually too friable to give long service, but are
otherwise suitable. While rivets 32 have been illustrated for the purpose of attaching fin 20 to float 24, other meth-
ods may be used such as heat welding or the use of suit-
able adhesives or solvents.

In the floating oil boom 14 as above disclosed, the
floats 24 may typically be approximately 9 feet long and
from 3 to 6 inches in diameter. Floats 24 may be spaced
approximately 10 inches apart on one elongated edge of
fin 20 which may be of any desired length. The overall
height of fin 20, including vertical extension 30, may be
approximately 12 inches. With these dimensions, the
boom 14 weighs approximately 0.5 ounces per linear foot,
which is many times lighter than previously known float-
ing oil booms. Due to its extremely light weight, two men
in a light launch can break out and tow a 2500 foot boom
made according to the present invention around the larg-
est oil tanker in 10 minutes, as compared to eight or more
men and one hour required with prior constructions. The
boom 14 according to the present invention provides a
continuous barrier without a joint or break, thus elimi-
nating the time and expense required for coupling boom sections together according to the prior art. Furthermore,
the present boom is so inexpensive that when badly fouled,
the cost of burning and replacing this boom is consider-
ably less than the cost of cleaning a cork and canvas boom
of the conventional type. Using the preferred materials,
the entire boom may be destroyed by burning on a burn-
ing barge at sea, since with the exception of the small
lead weights, the entire boom is made of a flammable
material.

As has been made apparent from the above description,
there has been provided a light-weight floating oil boom
wherein the separation between floats provides for a flexi-
bile portion permitting ready storage and ease in handling.
In its preferred embodiment, the entire boom is manu-
factured of non-sparking materials, reducing the possi-
bility of fire. The foamed polymer utilized for floats
eliminates the possibility of sinking a float by collision or
other manhandling, and utilizing the preferred materials,
the boom can withstand a large amount of abuse without
being damaged.

The provision of a continuous polymer fin eliminates
the necessity of coupling several sections together and
makes possible large savings in man power and time re-
quired to install the floating boom in position. Using the
preferred materials, a boom manufactured in accordance
with the instant disclosure is quite inexpensive, and may
de be disposed of by burning when badly fouled. The in-
stant boom is quite compact in its collapsed position and
may be stored in a relatively small space, and yet is con-
venient for rapid installation by a small light launch.

It will thus be seen that the objects set forth above,
among those made apparent from the preceding descrip-
tion, are efficiently attained, and since certain changes
may be made in the above construction without departing
from the scope of the invention, it is intended that all
matter contained in the above description or shown in
the accompanying drawing shall be interpreted as illustra-
tive and not in a limiting sense.

It is also to be understood that the following claims
are intended to cover all of the generic and specific features
of the invention herein described, and all statements of
the scope of the invention, which, as a matter of language,
might be said to fall therebetwixt.

Having described my invention, what I claim as new
and desire to secure by Letters Patent is:

1. A floating oil boom characterized by facile storage
and use comprising, in combination,
(A) a continuous elongated flexible polymer fin hav-
ing an opposed pair of longitudinal edges,
(B) a plurality of elongated expanded polymer floats
positioned along a first edge,
(1) said elongated floats being longitudinally
spaced apart along said fin by at least twice the
maximum float thickness to permit said fin to
bend back on itself and allow said boom to be
folded in an accordion manner,
(2) the upper edge of said floats being substan-
tially aligned with the portions of said first fin
edge intermediate adjacent floats to provide a
continuous barrier of substantially uniform
height, and
(C) means securing said floats to said fin whereby
said fin may be folded in accordion-like fashion at
points intermediate said floats to permit storage of
said boom in a fully assembled condition and the
boom may be positioned by towing one end thereof
to unfold said boom.

2. The floating oil boom defined in claim 1 wherein
there is provided a plurality of ballast weights secured
through said fin adjacent the second of said opposed pair
of elongated fin edges.

3. The floating oil boom defined in claim 1 wherein
(A) said floats are elongated cylinders that present low
wind resistance:
(1) each of said floats having a longitudinal slot
in its lower surface to receive and straddle said
fin, and wherein
(B) said securing means are polymer rivets retaining
said fin in said slot;

4. The floating oil boom defined in claim 3 wherein
(A) a portion of said longitudinal slot extends verti-
cally entirely through said cylinder at the end of said
float, and
(B) said first edge of said fin is provided with vertical
extensions between adjacent floats,
(1) said vertical extensions are received in said
extended vertical slot portions and extend verti-
cally substantially to the tops of said floats.

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