

MARKING EQUIPMENT FOR
TRACING COLLIDED SHIPS

The invention relates to a marking equipment
5 for tracing collided ships and, more particularly, to
an equipment which is installed on marine structures
such as buoys or the like and is capable of putting
identification marks on such ships that struck the
marine structures and of sending signals to a watching
10 station on the land.

Coupled with the navigation of large-sized
ships, the congestion of marine traffic causes a number
of accidents that ships strike marine structures
such as buoys or the like. The accidents bring about
15 a problem that it is difficult to identify such ships
that struck the marine structures. For solving this
problem, there is known a marking equipment provided
with a paint bag which is sealed after filling it
with paint and is pushed under pressure by an elastic
20 member so that the paint can jet out of the equipment
by the breaking-off of a sensor capable of being
broken by the impact force when a ship strikes or
touch the sensor.

Such a marking equipment is shown in Fig. 2,
25 wherein numeral 7 is a cylinder which is of hermetically
sealed construction and is provided with a cap 9 for
preventing sea water from entering in the interior

and a metallic fitting 8 for fixing the equipment on a prescribed position of a buoy or the like. Numeral 2 is a paint bag which is formed with a material having desired strength and weather resistance and is sealed after filling it with special paint for marking.

The paint bag 2 is pushed under pressure by a spring 1 through a piston 6, so that the pressure is always applied to the interior of paint bag 2 at constant pressure value. Numeral 4 is a sensor which is a rod-like member of a prescribed length and is made of a suitable material such as synthetic resin or the like. At the center portion of the root of the sensor 4 there is arranged a jet passage 10 communicating with the interior of the paint bag 2. On the outside periphery at the root of the sensor 4, notches 5 are formed so as to break off the sensor 4 and to open the jet passage 10 when a ship strikes the sensor 4 to apply external force thereto. Concretely speaking, when a ship strikes a marine structure such as a buoy or the like and collides with or touch the sensor 4, the impact force leads the sensor 4 to break at the portion of notches 5, whereby the special paint 3, which was pressed by the spring 1 and piston 6, jets from the jet passage 10 and puts a mark on the ship.

However, the conventional marking equipment described above, which is so constructed as to push directly the paint bag 2 under pressure by the spring

1 and piston 6, has the following shortcomings:

(A) There may be caused the so-called missing phenomenon with respect to the special paint in the paint bag. Namely, as the special paint is made of organic matter, if pressure is always given to the paint bag, the evaporation of solvent is accelerated, whereby the special paint will be inevitably hardened to hamper the marking function.

(B) The paint bag, to which pressure is given at all times, may be broken sometimes. Even if not broken, the bag will rapidly deteriorate in quality.

(C) Careful attention is required for the work for assembling the equipment at factory or for replacing the special paint on the spot; such work is very troublesome and complicated, because the paint bag has to be pushed under pressure directly by spring and piston.

Accordingly, the invention provides a marking equipment for tracing collided ships comprising a cylinder, a paint bag accommodated at one end of said cylinder and filled with paint, a spring and a piston located in said cylinder and pushing under pressure at all times said paint bag towards said one end of said cylinder, a bar-like sensor installed outside the said one end of said cylinder, and a retainer having a paint conduit from the interior of said paint bag to the interior of said sensor so as to support the pressure of said spring on said paint bag.

The sensor needs no notch which would make it

susceptible to breaking off. There were precedents for malfunction caused by birds such as sea gulls, kites or the like; that is to say, the sensor broke at the portion of notches when such birds perched on the sensor or began flight therefrom. In the sensor according to the invention there is a retainer head which has advantages as more fully described hereinafter.

The invention will now be illustrated by reference to the accompanying drawings, in which:

10 Fig. 1 is a sketch showing the state in which six sets of the marking equipment of the invention are fixed on a lighted buoy;

Fig. 2 is a sectional view of the conventional marking equipment;

15 Fig. 3 is a sectional view of an embodiment of the invention;

Fig. 4 is an exploded perspective view of the retainer of the invention to illustrate the working thereof; and

20 Fig. 5 is a view illustrating the state of operation of the marking equipment of the invention.

Referring to Fig. 1, there is shown, as an example, the state in which six sets of the marking equipment A according to the invention are installed at equal spaces on the guard frame of a lighted buoy about 4.5 meters above sea level. Of course, the marking equipment can be installed in any desired

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number on any desired position according to the shape and construction of marine structures. As to Fig. 2, description has already been made hereinbefore with reference to the shortcomings of the conventional marking equipment.

Now, description is made on the construction and aspects of an embodiment of the invention by referring to Fig. 3 - Fig. 5, in which the portions identical with those of the conventional marking equipment are denoted by the same numbers and duplicate descriptions are omitted.

A retainer 11 is installed in the interior of a paint bag 2, extending to the interior of a sensor 4, and supports the pushing force under pressure given by a spring 1 and a piston 6. As shown in Fig. 4, the retainer 11 consists of a short-pole shape retainer head 11a, a retainer rod 11b, and a disc shape retainer base 11c which is fixed at one end on the side of the paint bag 2 of the retainer rod 11b. Being located at the bottom of a retainer receptacle which is formed in the sensor 4, the retainer head 11a is a member choking a nozzle 11d formed on a top end face of the retainer rod 11b and having a function of preventing any direct interference with the retainer rod 11b without causing any deformation to the rod having the nozzle 11d when the sensor 4 is broken off, while the retainer rod 11b is a rod member somewhat longer

as compared with the depth of the paint bag 2, with the nozzle 11d for jetting special paint 3 being formed on the top end face coming in contact with the retainer head 11a and an introduction opening 11e being formed in the neighborhood of root, i.e. near the position at which the retainer rod 11b is connected with the retainer base 11c. The nozzle 11d communicates in the retainer rod 11b with the introduction opening 11e to form a paint conduit 13 so as to enable the nozzle 11d to jet the special paint 3 to which pressure is given in the paint bag 2. And further, coming in contact with the bottom of the paint bag 2, the retainer base 11c is a member supporting the pushing force under pressure given by the spring 1 and piston 6 through the bottom of the paint bag 2 and is of a disc shape having a diameter somewhat smaller than the inside diameter of the tubular type paint bag 2.

The retainer 11 constructed as described above comes in contact at the retainer base 11c with the bottom of the paint bag 2, while the end portion having the nozzle 11d of the retainer rod 11b is fitted into the retainer receptacle in the sensor 4 through the retainer head 11a. The retainer receptacle is a deep hole drilled approximately at the center of the end portion of the sensor 4 on the side of a cylinder 7 and is formed with the inside diameter somewhat larger than the outside diameter of the

retainer rod 11b.

A center rod 12 of the piston 6 is provided with a microswitch 14 which is constructed integrally with a back cover 9, gland packing 15 and Y-connector 16, and is automatically set when a back cover 9 is fixed in the cylinder 7.

According to the constructional aspects of the invention, the retainer 11 is installed in the interior of the paint bag 2 and supports the pressure given at all times to the paint bag 2 by the spring 1 and piston 6. Therefore, when a ship strikes or touches the sensor 4, as shown in Fig. 5, the sensor 4 breaks at the portion on which impact stress is concentrated and in which the retainer head 11a comes in contact with the nozzle 11d, with the retainer head 11a springing out from the retainer receptacle in the released state of removing a stopper of the retainer 11, whereby the special paint 3 under pressure, preferably a fluorescent paint, jets to the ship because the nozzle 11d is exposed in the state where the paint bag 2 is subjected directly to the pushing pressure of the spring 1 and piston 6. At the same time, the microswitch 14 works and sends warning signals to a watching station on the land.

Accordingly, the invention can obtain the following advantages:

(a) A normal marking function can be

maintained for a long time with the prevention of hardened special paint achieved by the reduction in the so-called missing phenomenon resulting from the evaporation of solvent in the paint, because no pressure
5 is given to the paint bag containing the special paint with the exception of the case where the sensor is broken off by the impact stress.

(b) The special paint can readily be replaced at the time of assembling or on the spot of installation,
10 because the marking equipment is so constructed as to give pressure to the paint bag exclusively at the time of working; i.e. only at the time when the sensor is broken off.

(c) Both the deterioration in quality of
15 paint bag and the malfunction caused by the damage to the paint bag can be prevented, because pressure is not given to the paint bag at normal time referred to in item (a).

(d) The invention can gain a general
20 advantage of reduction in the production cost of the equipment brought about by the simplified works for assembling and replacing the special paint or reduction in the running cost by the prevention of deterioration in quality of the special paint and
25 paint bag.

CLAIMS:

1. A marking equipment for tracing collided ships comprising a cylinder, a paint bag accommodated at one end of said cylinder and filled with paint, a spring and a piston located in said cylinder and pushing under pressure at all times said paint bag towards said one end of said cylinder, a bar-like sensor installed outside the said one end of said cylinder, and a retainer having a paint conduit from the interior of said paint bag to the interior of said sensor so as to support the pressure of said spring on said paint bag.
2. The marking equipment as claimed in claim 1, in which said paint is a fluorescent paint.
3. The marking equipment as claimed in claim 1 or claim 2, in which said sensor is breakable at a portion at which impact stress is concentrated, and contains a retainer head which blocks a nozzle end of the paint conduit, so that the impact stress breaks off said sensor and releases a paint jet.
4. The marking equipment as claimed in any preceding claim, in which said piston has a centre rod provided with a microswitch which is constructed integrally with a back cover, gland packing and Y-connector, and is automatically set when the back cover is fixed in the cylinder.
5. The marking equipment as claimed in any preceding claim, in which said retainer consists of a short cylindrical retainer head, a retainer rod, and a disc shaped retainer base.
6. The marking equipment as herein described with reference to Figures 3 to 5 of the drawings.

