

Double mooring bollard

The present invention is concerned with a mooring bollard, preferably a
5 double mooring bollard of the contra rotating, mechanically driven type, preferably
intended for ship and offshore installations for mooring or coiling of a rope.

Rotating bollards are known. Reference is made in this connection to
"skipslære 3" ¹ where Pusnes Rotobollards are shown. This is not, however,
motorised as it is placed in connection with a winch. In the same textbook it is
10 claimed to that a further development would be to put power on the bollard and the
hawser directly to the storing reel. Motorising a bollard is thus not in itself a new
idea.

In Norwegian patent application no. 78.0223 a pulling unit including two
sets of yardarms is proposed. This is quite a comprehensive piece of equipment
15 that cannot easily be combined to normal standard mooring bollards.

The same may be said in connection with German patent publications DE
2.102.728 C2 and DE 2.416.415.

The novel part of with this invention is how a standard-like fixed mooring
bollard is provided to also function as if it were motorised and contra rotating.

20 This is achieved according to the invention with a double mooring bollard
(1) of the contra rotating, mechanically driven type, preferably intended for ship
and offshore installations, characterised by consisting of:

fixed first and second mooring bollards,

a motor arranged internally in at least one of the mooring bollards and with
25 a drive shaft centrally provided in at least one of the bollards,

outer cylinders rotateably arranged on the outside of the first and second
mooring bollards and with an upper end adapted for coupling to the drive shaft.

Other embodiments of this invention are outlined further in the claims 2-9.

The present invention will be explained further by means of embodiments
30 of of the invention and with reference to the enclosed drawings.

Fig. 1 shows a first embodiment with a motor in both bollards.

Fig. 2 shows a second embodiment with a motor in one bollard and preferably chain transmission through cogwheels or hawser transmission to the other bollard dimensioned for equal, but contra rotation.

Fig. 3 shows the mooring bollard in fig. 1 and 2, seen from above.

5 Fig. 4 shows an embodiment with a driving unit with bearings built into the gear, and flexible material around the bolts through the top lid.

Fig. 5 shows an embodiment with separate bearings for the driving unit.

Fig. 6 shows an embodiment with directly coupled motor and stopper in connection with the outer cylinder/inner side foundation.

10 Fig. 7 shows a stopper based on a spring-held bolt.

Fig. 8 shows a stopper device based on hydraulic pins that move in/out of a cog crown provided on the outer cylinder.

With reference to the drawings and firstly to fig. 1, the details in the invention will be explained further. The figure shows a double mooring bollard 1
15 without the top lid where two outer cylinders 2 with lids are arranged on the outside of fixed bollards 3, so that the fixed bollards form axle columns with original strength for the now rotating cylinders.

Inside in preferably both the fixed bollards 3 is a motor 4 (electric, hydraulic, etc.) with flexible bearings sideways and with a vertical drive shaft 5
20 pointing upwards and in the centre of the bollard's inside diameter. The rotation speed is adjusted with gears 6 during operation when run electrically, alternatively oil current/volume during operation when run hydraulically.

A flange is provided at the axle's top end and is coupled together with a lid 9 through a flexible coupling 7, 8 consisting of a lower coupling section 7 and an
25 upper coupling section 8. When the cylinders are treaded down over the fixed bollards, the coupling will work.

Bolt(s) 10 through the top lids 9 and preferably threaded together with the coupling's lower section 7 prevents gliding up.

A stopper 11 for one-way rotation is provided inside preferably in
30 connection with the cylinder lid's under and inner side of the fixed bollards 3.

Inside between fixed bollards 3 and the outer cylinders 2 is provided preferably a sliding bearing 12. Further a sufficient number of grease nipples 13 with pipes is provided.

In another embodiment of the invention, see fig. 2, the motor 4 is provided in only one of the bollards. The motor 4 has in addition a vertical drive shaft 14 pointing downwards with horizontally fixed cogwheels 15 at the end. By use of preferably chain transmission/hawser 16 through cogwheels 17, 18 horizontally provided in the bollard basis, will force from the bollard with the internal motor be transferred to an axle 19 held in the centre 20 inside the second bollard 3, such that both cylinders 2 rotate with equal speed, but in opposite directions.

In "skipslære 3" it is suggested to run the bollard and hawser directly to a storing drum. The present invention differs significantly from this solution by that it is the cylinders 2 that rotate, and not the bollards 3. It is furthermore not previously known that motor(s) can be used for running cylinders inside the mooring bollards. The mooring bollard according to the present invention offers maximum compactness, such that the requirements for space on deck and further the bollard construction itself remain nearly identical with ordinary fixed bollards. The bollard according to this invention provides new functions such as tightening or hauling in of a hawser, without the use of a winch. This is also significant since one can avoid using more large mooring winches and purchasing and maintenance costs these would incur. In light of the above the invention offers a simplified and cost-beneficial construction that can be applied on existing ships, platforms, etc. and also in future constructions. This will in turn lead to the following:

- Mooring by use of "yardarm" and "stopper" will become history.
- This results in increased safety.
- Reduced personnel requirements during mooring, hauling and departure.
- Reduced time in port.
- Several larger, fixed mooring winches and associated problems of jamming of the hawser on the reel can be avoided.

The double mooring bollard in accordance with the present invention can be produced, for example, in a workshop, transported to the ship, platform etc. and fixed in place.

The invention also permits existing mooring bollards to be modified, so that they can be run mechanically. Such a modification will include the following: The top lid will be removed and two cylinders with a top lid lowered down over

the fixed bollards, in such a way that the fixed bollards form axle columns with their original strength for the now also rotating cylinders. Inside in preferably both the fixed bollards an electric, hydraulic, air etc. motor is provided with a vertical axle pointing upwards from these and in the centre of the bollards' inside diameter.

5 The speed of rotation is adjusted by gears etc., and the direction is set to be opposite for the two cylinders. One part of a preferably flexible coupling is provided on the axle's top end. The associated part is fixed centrally on the cylinder lids' under side. The coupling will take place when the cylinders, which have a greater inside diameter than the fixed bollard's outer diameter, are lowered

10 down. A bolt going through the top lids and preferably threaded together with the coupling's lower half, will keep the parts together and prevent sliding up. When starting the internal motors, the cylinders will rotate around the fixed bollards in such a way that when a hawser is put over the cylinders in a figure-eight, it may be tightened or hauled up. It is the two cylinders that are motorised and contra

15 rotating, not the bollards. A stopper preferably for one-way rotation is provided in connection with the rotating cylinder lids' under side and inside of the fixed bollards.

The bollards in accordance with the present invention may be angular in relation to their base, and grooves for the hawser may also be provided in the outer

20 cylinders of the bollards.

A further development of the bollards in accordance with this invention may be, for example, that the hydraulics are built in such a way that the bollards have a tension function, that is keeping the hawser's tension constant, independent of, for example, the ship's movements.

**PATENT CLAIMS**

1. Double mooring bollard (1) of the contra rotating, mechanically driven type, preferably adapted for ship and offshore installations,
5 characterised by that it consists of:
fixed first and second mooring bollards (3, 3),
a motor (4) arranged inside at least one of the mooring bollards (3, 3) and with a driving axle (5) centrally provided inside at least one of the mooring bollards (3, 3),
outer cylinders (2) rotateably provided on the outside of the first and second
10 mooring bollards (3) and with an upper end arranged for coupling to the driving axle (5).
2. Double mooring bollard (1) according to claim 1,
characterised by that the outer cylinders (2) are provided with a lid (9) in their upper end, and the lid (9) is further provided with bolt holes for the receiving of a driving
15 axle coupling (7, 8).
3. Double mooring bollard (1) according to claims 1 or 2,
characterised by that the motor (4) is fixed in the first mooring bollard (3) and is equipped with a through going driving axle (14), the driving axle's upper end is arranged
20 for running of the outer cylinder (2) and the driving axle's lower part is coupled to preferably a cogwheel and chain arrangement (15, 16, 17, 18) for running of the second mooring bollard's driving axle (19).
4. Double mooring bollard (1) according to claims 1, 2 or 3,
25 characterised by that the driving axle's (5) upper end is provided with a first half of a preferably flexible coupling (7) and the mentioned coupling's (7) second half (8), are via bolts (10) through the cylinder lid, centrally arranged to the cylinder lid's under side (9) and to the first coupling half.
- 30 5. Double mooring bollard (1) according to claims 1, 2 or 3,
characterised by that the motor (4) is flexibly stored on a base ring that is provided to the bollard's (3) inner side, in that the motor fastening's bolt holes are provided with preferably rubber washers.



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6. Double mooring bollard (1) in accordance with anyone of the aforementioned claims,
characterised by that between the cylinders' upper ends and the fixed bollards' (3)
5 inner side there is provided a stopper (11) preferably for one-way and contra rotating of
the mooring bollard (1).
7. Double mooring bollard (1) according to anyone of the aforementioned claims,
characterised by that between the fixed bollards' (3) top rim and the cylinders'
10 upper end there is provided a suitable number of sliding bearings (12) including grease
nipples with pipes (13).
8. Double mooring bollard (1) according to anyone of the aforementioned claims,
characterised by that between the fixed bollards' (3) and the outer cylinders (2)
15 there is provided a suitable number of sliding bearings with grease nipples and pipes (13).
9. Double mooring bollard (1) according to claims 1-5 and 7, 8,
characterised by that between the cylinder's lower outer wall and the foundation's
underside there is provided a stopper (11) preferable for one-way and contra rotating of
20 the mooring bollard (1).



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