No. 624,198. Patented May 2, 1899.

C. A. EICKE.

COFFER DAM FOR SCREW PROPELLERS.

(Application filed May 21, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

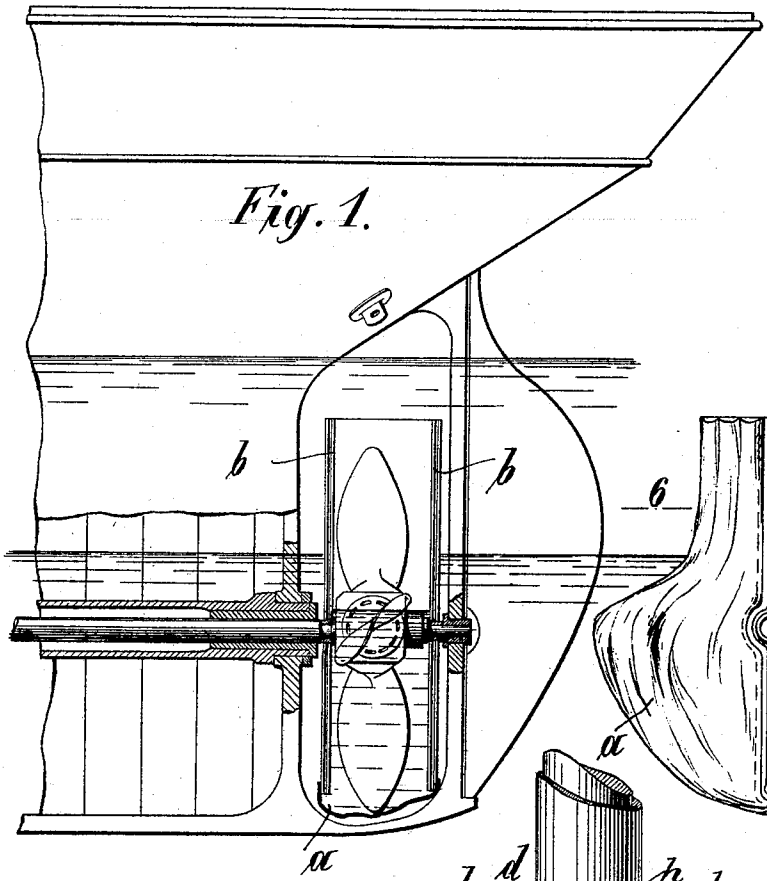


Fig. 3.

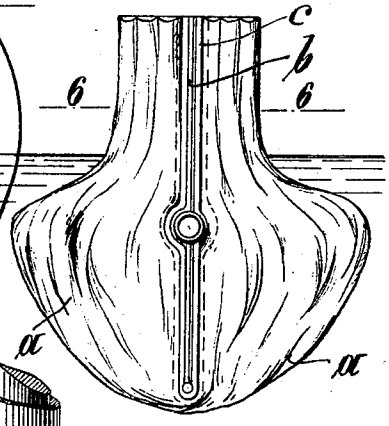
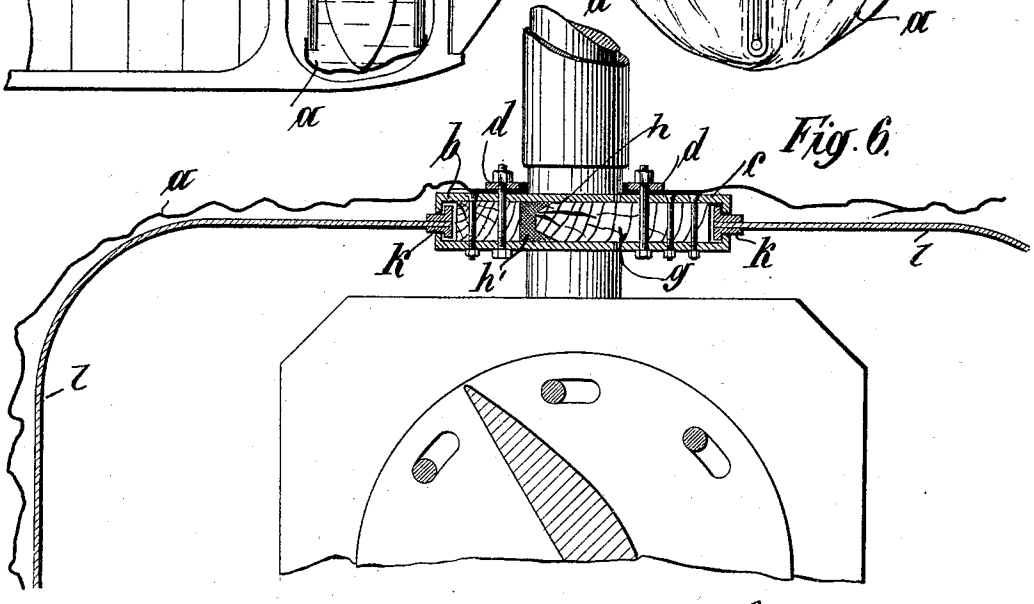


Fig. 6.



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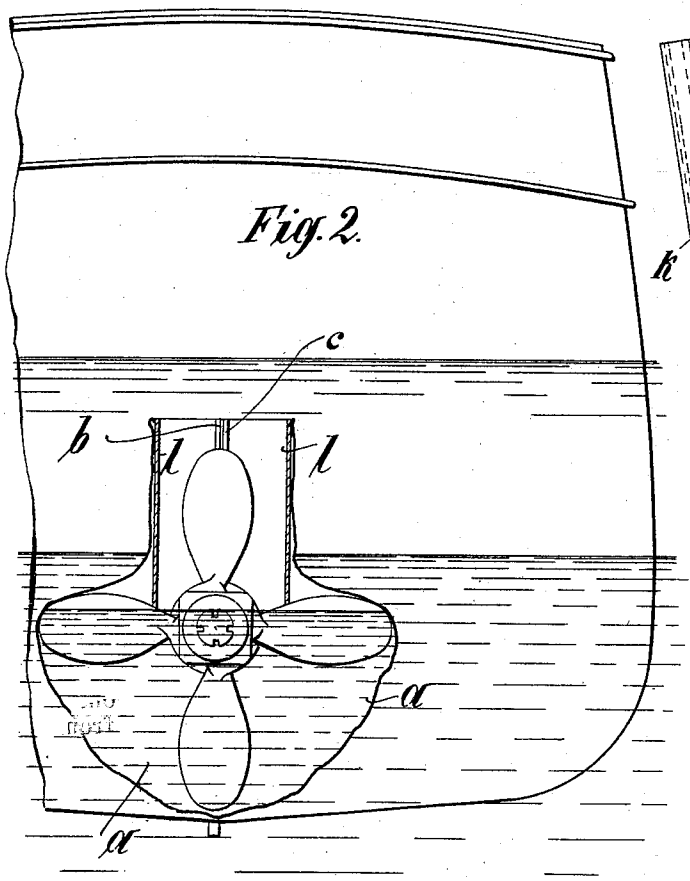


Fig. 2.

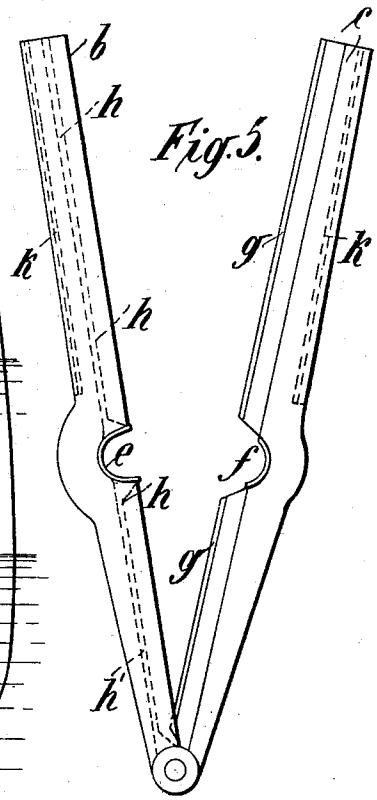


Fig. 5.

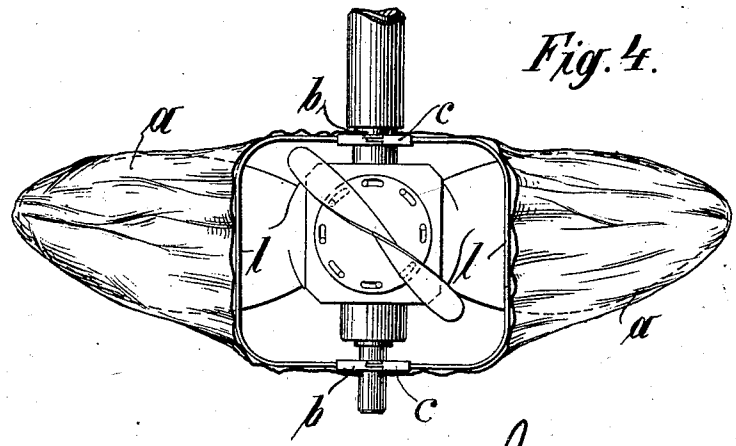


Fig. 4.

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UNITED STATES PATENT OFFICE.

CARL AUGUST EICKE, OF BREMERHAVEN, GERMANY.

COFFER-DAM FOR SCREW-PROPELLERS.

SPECIFICATION forming part of Letters Patent No. 624,198, dated May 2, 1899.

Application filed May 21, 1898. Serial No. 681,304. (No model.)

To all whom it may concern:

Be it known that I, CARL AUGUST EICKE, a citizen of Germany, residing at Bremerhaven, near Bremen, free city, in the German Empire, have invented certain new and useful Improvements in Coffer-Dams for Screw-Propellers, (for which I have applied for patents in England, dated April 1, 1898, No. 7,800; in Belgium, dated April 4, 1898, No. 105,201; in Italy, dated April 4, 1898; in Denmark, dated March 30, 1898, No. 357; in Austria, dated March 29, 1898, and in Hungary, dated April 1, 1898, No. 4,667,) of which the following is a specification.

The coffer-dam forming the subject-matter of this invention has for its object to dam separately, so as to be able to replace them, the vanes or wings of a screw-propeller so constructed that these vanes or wings can be screwed on and off the same. Such a coffer-dam is designed to avoid the inconvenience adherent to similar constructions heretofore devised—such as, for instance, those forming the subject-matter of the German Imperial Patents Nos. 51,426 and 30,581. The first of these patents discloses a construction of coffer-dam which is very awkward and inconvenient and very heavy, being, moreover, cumbersome to handle and in many cases not applicable to twin-screw propellers, while that disclosed in the second patent, which is theoretically a much superior construction, has the defect that it occupies on board a considerable amount of useful space, while the workmen engaged repairing in this coffer-dam have to work in an atmosphere of compressed air, which in all cases must have an injurious effect on the health of these workmen, as experience has fully demonstrated.

The present coffer-dam is comparatively light in weight, it can be stowed away on board in spaces which are not suitable for other storing purposes, and its manipulation is, according to circumstances, free from many difficulties.

The accompanying drawings show the new coffer-dam constructed according to this invention.

Figure 1 shows the rear end of a steamship equipped with a single screw-propeller which is coffer-dammed according to this invention. Fig. 2 shows an aft view of the same steamer. Fig. 3 is a front view of the coffer-dam *in situ*. Fig. 4 is a plan view of this coffer-dam drawn to an enlarged scale for the sake of clearness. Fig. 5 is a side view of a sectional clamp or frame used in connection with the coffer-dam. Fig. 6 shows, to a still further enlarged scale, a partial sectional plan view of the coffer-dam. This figure is really a horizontal section of the coffer-dam on line 6 6 of Fig. 3 and is drawn to particularly illustrate the construction of the clamp or frame shown in Fig. 5 and the manner of fitting the same to the fixed part of the coffer-dam surrounding the vane or wing which is being repaired.

When using the coffer-dam herein described and illustrated, the screw-propeller must be so turned that the vane required to be repaired or replaced by another assumes a vertical and lowermost position. A sack *a* is suspended over the propeller at the top, so as to entirely inclose the whole screw. This sack *a* should consist of water-tight strong material, and in order to be able to place it conveniently over the screw it is composed, like an ordinary pocket, of two parts which are joined at the front as well as at the rear side by a hinged piece or frame *b c*. Fig. 6 shows the mode of fixing the two sack-halves to the hinged frame *b c*. Ordinary headed screws pass through this frame and press, by the aid of rails *d*, the material firmly against *b c* along the length of the hinged frame. The two portions of the frame are provided with notches *e* and *f*, Fig. 5, which allows the said frame to fit tightly around the propeller-shaft. In cases wherein the propeller-shaft *n* is not arranged relatively to the rudder-post so as to turn therein the rear part *b c* may not require the notches *e f*. In fact the whole of that rear part may be entirely dispensed with. The damming-sack in such a case cannot be so conveniently handled for the purpose of removing the horizontal vanes of the propeller. In the construction shown by way of example the frame *b* has a groove *h*, a projecting edge *g* engaging in this groove and bearing tightly against an india-rubber strip *h'* in order to form a tight joint.

f' is the hinge which connects together the two parts b c of the frame. When the sack a is placed over the screw, the front and rear parts of the frame b c, Fig. 1, must be held sufficiently far apart by cords or ropes, while the open side of the sack, which is obviously turned downward, must be sufficiently stretched out.

To be able to use the above coffer-dam, it is obvious that the water should be still, or at least only slightly in motion—that is to say, the ship should either be anchored in a harbor or be in a smooth sea; and it is furthermore necessary that the screw-propeller should project out of the water or remain but very little under the surface of the water, although the coffer-dam may still be utilized when the screw is lying at a greater depth in the water, so long as a prolongation in the height of the sack is provided for by annexing an additional attachment thereto.

It is desirable that the screw-propeller should project out of the water or be only slightly immersed therein in order to allow the work of repair to be commenced. Otherwise the coffer-dam for the propeller would have to be unnecessarily large and heavy. When the sack a has been placed over the screw until the notches or recesses e f of the hinged frame b c are at the same height as the screw-shaft, the two sides of the frame are closed, and the sack is thus fixed over the propeller, when the screw is turned through an angle of one hundred and eighty degrees, so that the damaged vane may come uppermost, the whole sack following this motion and having its open side likewise brought uppermost. The sack is now opened to such an extent as to be able to slip therein along guides k, formed on the outside of the frame b c, to plates or shells l of sheet-iron or other sufficiently stiff material or metal. The vertical edges of the shells should have a suitable shape, as shown in Fig. 6, in order to remain engaged within the grooves k. These shells are, as shown in Figs. 4 and 6, of such a height as to project outwardly over the greatest periphery of the screw, so that they must thus safely project above the level of the water in case the screw was situated or emerged slightly below such water-level.

Fig. 1 shows the whole coffer-dam in longitudinal section, so that the shell l, placed on the right side of the ship, is that which is visible. The left-sided shell, on the contrary, cannot be seen. To facilitate the adjustment of these shells, each shell l may consist of several different parts, which may be connected together by screws or any other suitable means. In the drawings each shell has been shown as formed of one piece only for the sake of simplicity of manufacture. These shells are supported by the lower ends of the guides or grooves k as well as by the two horizontal propeller vanes or wings, although it is obvious that this latter mode of support—*i. e.*, on the vanes or wings—is far from being indispensable. When the coffer-dam has been brought to the position clearly shown in Figs. 2 and 3 in the manner hereinbefore described and the upper edges of the sack have been secured to the upper edges of the coffer-dam shells or side pieces in any suitable manner—such as, for instance, by means of hooks and eyes—the coffer-dam is then emptied by means of a pump to such an extent that the water left therein only reaches as high as the propeller-shaft. After having introduced a wooden grating inside the said coffer-dam to prevent the tools—such as spanners, hammers, and the like—required for use from falling into the sack and perchance piercing the latter the workmen employed for the purpose of repairing or exchanging one of the vanes proceed to get inside the coffer-dam from the top in order to loosen the vane which is to be replaced. When this is done and the form of the aft-part of the ship is such that the vane cannot be removed right away from the coffer-dam, the latter is refilled with water, when one of the shells l is taken out. The corresponding side of the sack a, which adheres tightly around the coffer-dam shell or side, drops, consequently, so far down that the vane can be readily taken out at the side and replaced by another, which is first allowed to hang loosely on the boss or hub, when the released coffer-dam shell or side is put back again in its place and the water is again pumped out of the coffer-dam as far as the said boss or nave, whereupon the new vane is allowed to slide on its fixed pins or screw-bolts or rivets in order to be finally fixed in position. The wooden grating is now removed from the coffer-dam, and the two sides or shells are stored away again on board, whereupon the propeller is turned again through an angle of one hundred and eighty degrees, so that the new vane may come downward when the frame b c is opened and the whole coffer-dam sack is taken off the screw at the bottom and drawn out of the water. In the parts where this sack is laid on the propeller-vanes it can be properly strengthened or stiffened, if required.

It may be remarked that during the loosening and screwing up of the vane or wing the exhaust-pipe of the pump must be left in the coffer-dam in order to be able to constantly remove the water pressing in, owing to the unavoidable leaks occuring in the water-tight-making arrangement.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, what I claim, and desire to secure by Letters Patent of the United States, is—

A coffer-dam for screw-propellers comprising a sack or bag adapted to inclose the whole

screw-propeller, this bag being made of any suitable water-tight material and having frames *b*, *c* whereby it may be firmly closed upon the shaft of the propeller by means of one or two pairs of frames *b*, *c* and shells or sides *l* arranged in said bag and adapted to leave a space open at the top but closed on all sides and means such as grooves *k* for holding the shells *l* against the frames *b*, *c*, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

CARL AUGUST EICKE.

Witnesses:
H. G. IHLDER,
CRL. I. GARRETTI.