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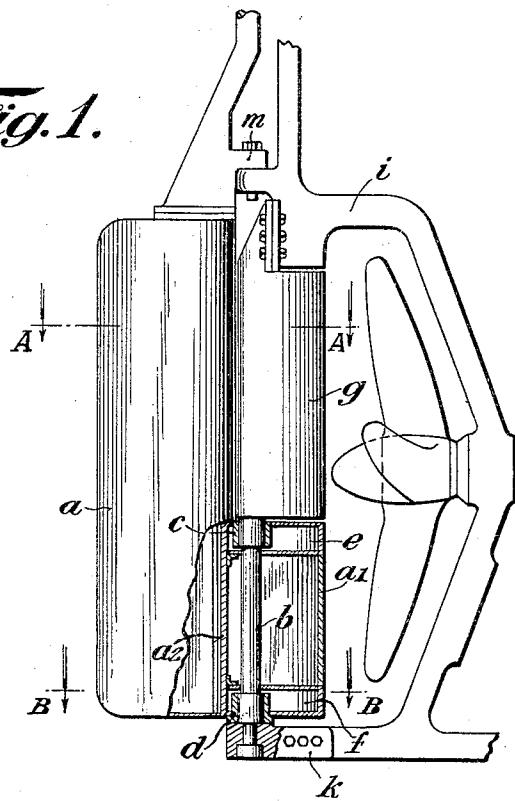
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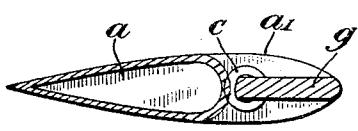
RUDDER FOR SHIPS

Filed Jan. 8, 1932

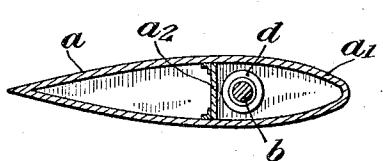
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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## UNITED STATES PATENT OFFICE

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## RUDDER FOR SHIPS

Application filed January 8, 1932, Serial No. 585,529, and in Germany August 17, 1931.

By means of stream line balanced rudders, for instance as disclosed in the U. S. Patent No. 1,745,916, granted to me on February 4, 1930, a very good steering effect on the ship is attained with very little power on the part of the steering engine. It was even observed that with ships with particularly sharp after body or stern lines the steering effect of these rudders might be called too good, since these vessels will deviate from their course with even the smallest deflections of the rudder; owing to this sensitivity to the rudder they become unstable on their course.

Further, for cases where the application of only very small forces for the shifting of the rudder is not required, drop-shaped unbalanced rudder bodies are known, which are located aft of a fixed rudder post and where, owing to the proper ratio of rudder post thickness to the rudder body thickness, the effect of the rudder post upon the course of the flow past the rudder body is diminished to a great extent, so that similar conditions of flow are attained to a stream line balanced rudder.

The present invention relates to a stream line rudder, in particular for vessels with sharp after body or stern lines. According to the invention a rudder system is evolved from a stream line balanced rudder, a drop-shaped profile rudder located aft of a fixed stern post, and a stabilizing area, by means of which rudder system the aforementioned instability of such vessels on their course is eliminated, while the well known advantages of stream line profile rudders are retained.

In the drawing which illustrates a form in which my invention may be reduced to practice,

Fig. 1 represents the side view of the rudder, partly in section,

Fig. 2 represents a horizontal section through the rudder on the line A, A, and

Fig. 3 represents a horizontal section through the rudder on the line B, B, both sections taken in Fig. 1.

The rudder body *a* in its upper part shows a drop-shaped cross-section and in its lower

part a stream line cross-section. It is pivoted on the rudder post *b* by means of the guide bearings *c* and *d*, and its lower portion extends forwardly of the pivot to form the balancing area *a'*. The guide bearings *c* and *d* are accessible by way of the removable covers *e* and *f* respectively, provided in the rudder balancing body *a'*. The rudder post *b* in its upper part is forwardly extended to form the stabilizing area *g*. It is bolted to the stern frame *i* at the flanges *h* and connected with the heel by means of the bearing shoe *k*. The rudder weight is taken up by the pintle *m*.

This system of two combined rudder bodies and a stabilizing area offers on an ahead course of the vessel only a very slightly greater profile resistance than a rudder with total stream line profile. The requisite forces for the operation of the rudder may to a very great extent be brought down to the small values of the rudder operating forces required for a partly stream line balanced rudder, by suitably selecting the ratio between the size of the lower part of the rudder and of the entire rudder. The stabilizing area serves to diminish the course deviations of the vessel.

It is apparent that in carrying out my invention some changes from the construction herein shown and described may be made. I would, therefore, have it understood, that my invention is not limited to the particular details shown and described, but its scope includes their equivalents and such structural departures therefrom as may be required by the different forms of vessels and uses to which it may be applied.

## I claim:

1. A ship's rudder system comprising a movable rudder body, consisting in vertical direction of a balanced portion of stream line shape and of a drop-profile unbalanced portion, and a rudder post fixed at its two ends to the ship's stern frame and heel, and serving as the pivotal axle for the balanced rudder portion, said post having a forwardly extending, plane stabilizing portion thinner than the leading end of the unbalanced rudder portion and being disposed in

line with and forward of the unbalanced rudder portion.

2. A ship's rudder system comprising a movable rudder body which consists of a lower balanced portion of stream line shape, and of an upper unbalanced portion of a drop-shape profile, and a rudder post fixed at its two ends to the ship's stern frame and heel, and serving as the pivotal axle for the balanced rudder portion, said post having a forwardly extending, plane stabilizing portion disposed in line with and forward of the unbalanced rudder portion.

3. A ship's rudder system comprising a movable rudder body which consists of a lower balanced portion of stream line shape, and of an upper unbalanced portion of a drop-shape profile, and a rudder post fixed at its two ends to the ship's stern frame and heel, and serving as the pivotal axle for the balanced rudder portion, said post having a forwardly extending, plane stabilizing portion disposed in line with and forward of the unbalanced rudder portion, and being thinner than the leading end of said unbalanced rudder portion, and of approximately the same horizontal length as the forwardly extending balancing rudder portion.

**WILLIAM SCHOLZ.**

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