June 11, 1963 D. I. REBIKOFF 3,093,105

CONTROL ARRANGEMENT FOR A SUBMARINE VESSEL

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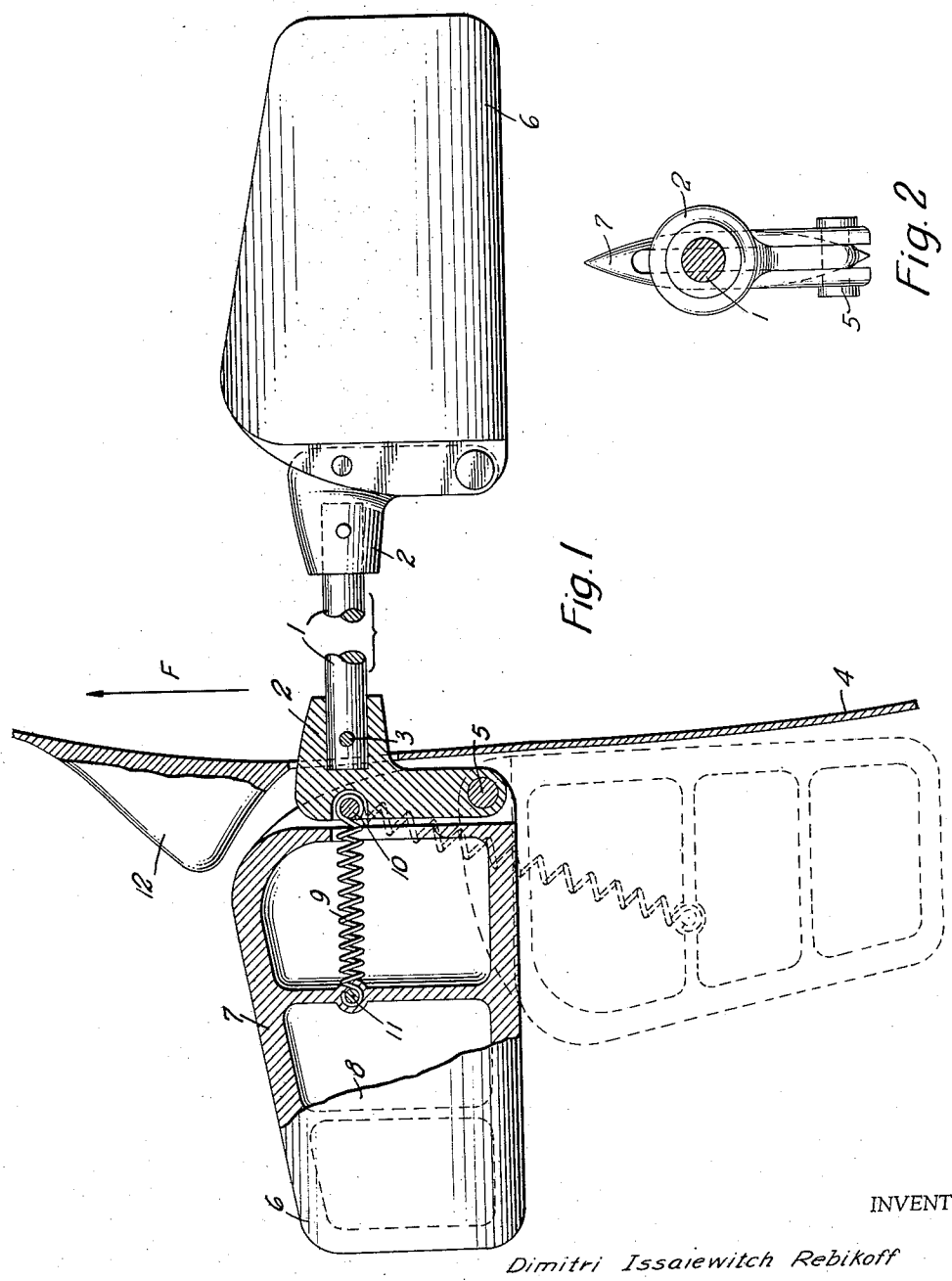


Fig. 1

Fig. 2

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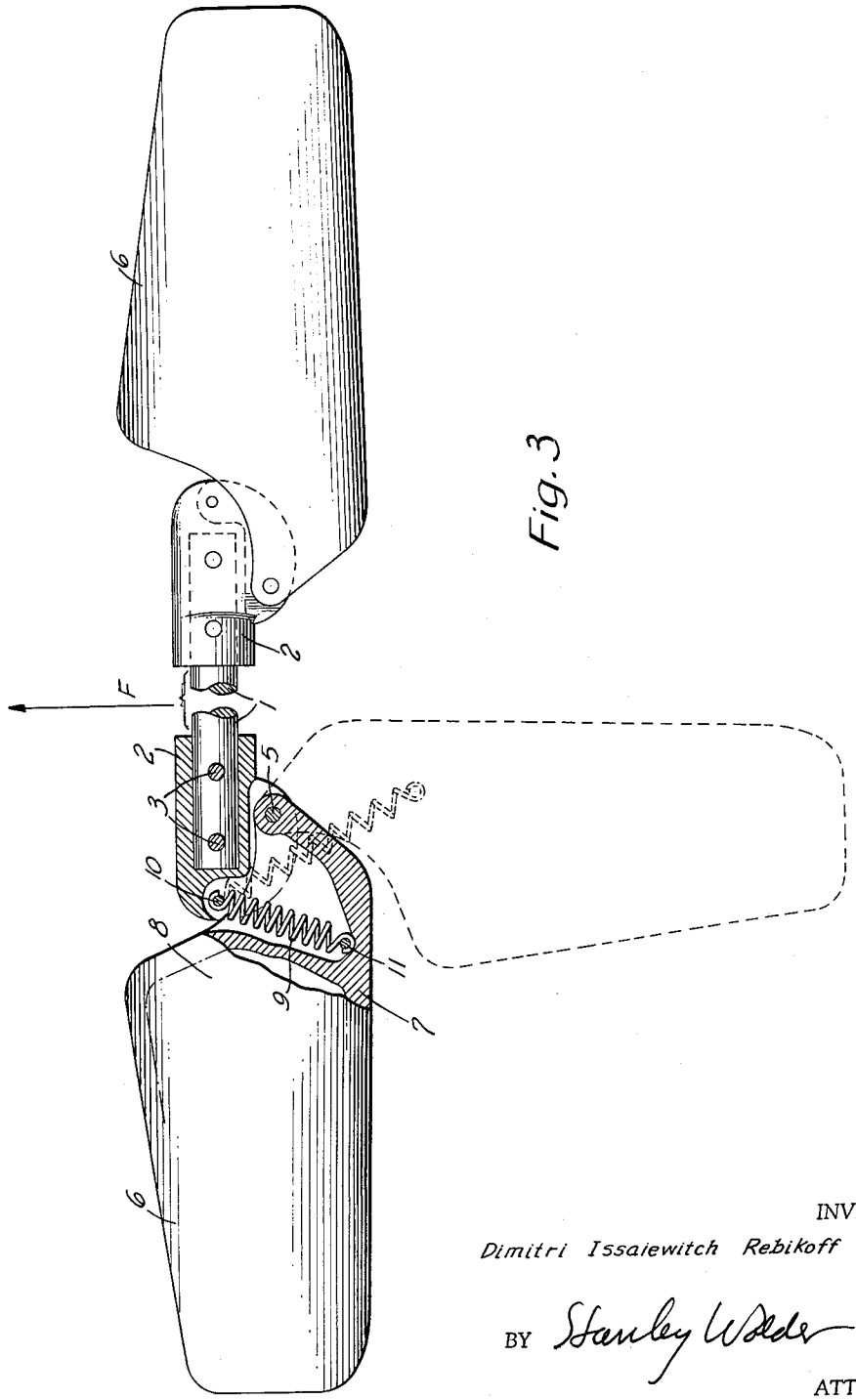


Fig. 3

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CONTROL ARRANGEMENT FOR A SUBMARINE VESSEL

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2 Claims. (Cl. 114—16)

The present invention relates to an arrangement applicable to submarine vessels ranging from ridden torpedoes to the recently developed fast submarines. The path of such submarine vessels and their stability in the path may be controlled by an arrangement of controls described, in particular, in the specification of French Patent No. 1,136,673. These controls give to such a submarine vessel the capability for extended manoeuvres comparable to those of an aeroplane in the air, and permit similar acrobatics (rolling, looping, etc.) which can be valuable in certain applications of submarine vehicles.

There exists, nevertheless, a difference from the aeroplane: the latter is not impeded in flight by its size since it always has sufficient room; on the contrary, the submarine vessel is called upon to move through narrow passages where its spread is liable to constitute a serious impediment and lead to an appreciable diminution of the possibilities of use. It may equally encounter artificial obstructions such as buoy-ropes of mines, etc.

According to the present invention there is provided a submarine vessel having a pair of fins (or hydroplanes) for controlling the descent and ascent and stability of the vessel, wherein each fin is articulated about an axis substantially perpendicular to the plane of the fin, whereby the fin can fold back partially or wholly against the vessel on striking an obstacle against the action of resilient means which normally hold the fin in its proper position.

The fins fold back when they strike an obstacle and once the obstacle has been cleared, regain their original position under the action of a restoring spring or equivalent means. When the fins are retracted totally or even partially, their action is evidently different from that in their normal position. Unlike an aeroplane a submarine vessel is almost in static equilibrium with its surroundings; the throwing out of equilibrium caused by the retraction of a fin is not very serious since the surface of the fin remains operative. Correction may be applied readily by action on the controls.

It should be noted that, in controlling movements of rolling or pitching of a submarine vessel, the fins are always parallel to the direction of movement; the shock causing retraction is therefore always perpendicular to the shaft at which the fin is articulated and there is therefore no risk of deformation of this shaft.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 shows in plan view, partially sectioned, an arrangement according to the invention suitable for a stream-lined submarine vessel;

FIG. 2 is a side view of a detail of the same arrangement; and

FIG. 3 is a partially-sectioned plan view of an arrangement according to the invention suitable for a stream-lined submarine vehicle.

The differences between the two embodiments being slight the description applies in general to both.

The arrow F shows the direction of movement of the submarine vessel. A shaft 1, connected to the controls of the vessel by a convenient linkage such as that described in the abovementioned specification, is fixed in a

fin-carrying bracket 2 by means of one or more pins 3. The bracket passes through the shell 4 serving as the fairing of the submarine vessel (in the case of FIGURES 1 and 2 only). This bracket carries a shaft 5 about which pivots the fin indicated, in general by the reference 6, and represented in full lines in its normal position and in broken lines in its retracted position. The shaft 5 is perpendicular to the plane of the fin. The fin 6 is constituted by a bracing framework 7 covered on both its faces by a sheet of suitable thin material 8. A helical spring 9 is stretched between a pin 10 in the bracket 2 and another pin 11 fixed to the framework of the fin. A protective cowling 12 is fixed to the fairing and deflects obstacles from the bracket 2 against the fin, in case of contact with an obstacle very near to the path of the vessel. The returning spring may be replaced by an extensible rubber spring.

The functioning of the arrangement is easy to understand: on contact with an obstacle, the fin 6 turns about the shaft 5, tensioning the spring or the rubber spring 9 and, under the action of the latter, the fin regains its normal position once the obstacle has been cleared. The fins on both sides of the vessel are arranged as described though only one has been shown for simplicity.

I claim:

1. A submarine vessel comprising a body member, a pair of shafts projecting laterally from opposite sides of said body member, a bracket mounted on the free end of each of said shafts and rotatable therewith and each of said brackets having a rearwardly directed arm provided with a free end, a pair of elevator fins having leading edges and trailing edges, said trailing edges having corners adjacent to said arm free ends, means pivotally connecting each of said fin trailing edge corners to an adjacent free end of a corresponding arm for rotation about an axis perpendicular to said fin between an extended laterally projecting position and a rearwardly directed retracted position, said shafts being forward of said fin trailing edges when said fins are in their extended positions, and spring means connected between each of said brackets and a corresponding of said fins to normally resiliently urge said fins to their extended positions.

2. A submarine vessel comprising a body member, a pair of shafts projecting laterally from opposite sides of said body member, a bracket mounted on the free end of each of said shafts and rotatable therewith, a pair of fins having leading and trailing edges, an arm projecting inwardly and forwardly from the inner trailing edge of each of said fins and having its free end pivoted to a corresponding of said brackets for rotation about an axis perpendicular to said fin between an extended laterally projecting position and a rearwardly directed retracted position, said shafts being forward of said fin trailing edges when said fins are in their extended positions, and spring means connected between each of said brackets and a corresponding of said fins to normally resiliently urge said fins to their extended positions.

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