Oct. 23, 1928. 1,688,376

M. A. L. BIDOIRE

SYSTEM OF PROPULSION FOR SHIPS

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Fig.1

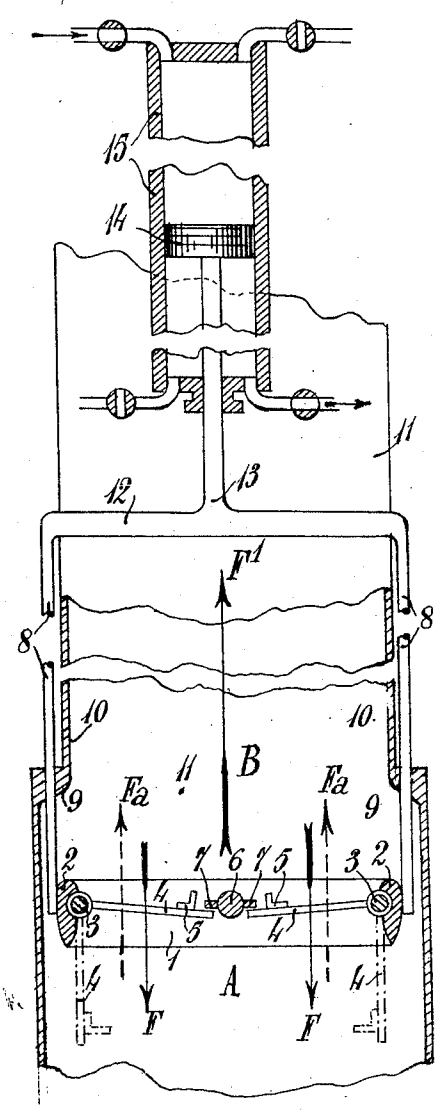


Fig.2

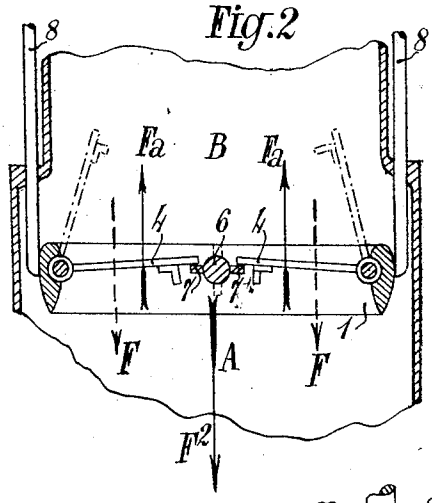


Fig.7

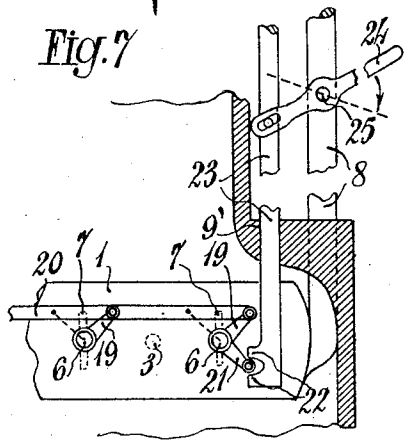
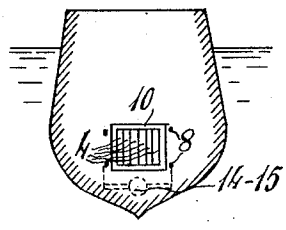


Fig.4



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Fig. 3

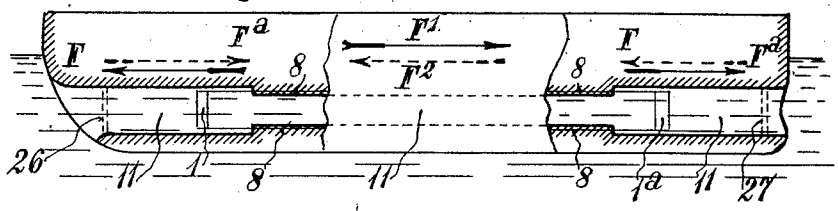


Fig. 5

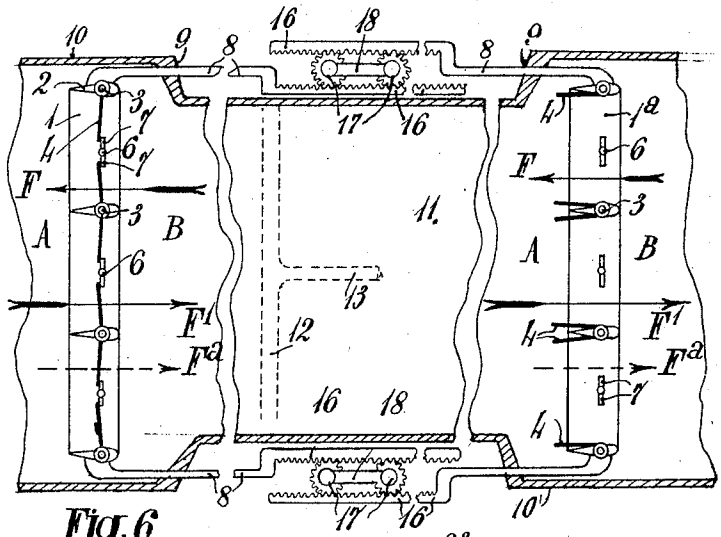
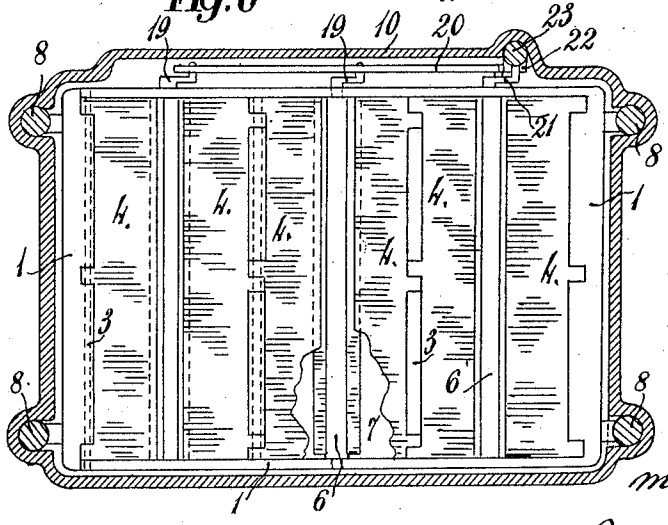


Fig. 6



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UNITED STATES PATENT OFFICE.

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SYSTEM OF PROPULSION FOR SHIPS.

Application filed July 16, 1926, Serial No. 122,848, and in Germany August 17, 1925.

The use on liners of screw propellers designed to impart comparatively high speeds to them has, among other disadvantages, that of low efficiency. It seems at present impossible to think of obtaining, by means of screws, speeds of the order of 100 km. per hour, for example, every screw having, by its nature, a maximum peripheral speed which cannot be exceeded without creating eddies which reduces its already feeble efficiency.

The system of propulsion to be described permits of both a considerably high degree of efficiency and a much higher speed of the ship being obtained than it is possible to obtain by means of screws.

In the accompanying drawings, furnished by way of example, the system is represented very diagrammatically, but sufficiently clearly to enable it to be seen that use is made of shutters pivoted on a support to which an alternating and rectilinear movement is imparted in the interior of and along a conduit arranged longitudinally along the axis of the boat, below the line of flotation and at the same time below the centre of gravity of the boat, the water entering and filling this conduit completely.

During one of the strokes of the shutter support, the shutters are located at right angles to the direction of their rectilinear movement. The shutters then act as frames the action of which on the water causes a reaction to take place on them and their support and, consequently, on the ship which moves in the direction opposite to that in which the shutters are actuated at the same instant.

During the return stroke of the support, the shutters, turning on the pivot on which they are mounted, set themselves parallel to the direction of their rectilinear movement and consequently do not offer any resistance of a deleterious nature to the forward movement of the ship.

By giving to the conduit for the passage of the water a large section, a certain number of shutters can be utilized offering an equally large total useful surface, the useful effect, that is to say, the speed of progress of the ship depending, over and above this surface of the shutters, on the length of the rectilinear stroke of these latter and on the speed at which they are moved.

Finally, by combining in the same conduit two shutter supports moved synchronously but in opposite directions, one of the supports can be caused to accomplish a working or operative stroke while the other support returns to the original position.

In the accompanying drawings by way of example:

Fig. 1 is a diagrammatic and fragmentary plan view, partly in section, of a propulsion system embodying the present invention;

Fig. 2 is a similar view showing the parts in position to drive the vessel astern;

Fig. 3 is a side view, partly in section, of a vessel showing a longitudinal water conduit extending therethrough, in which conduit my propulsion system is adapted to operate;

Fig. 4 is a cross section of the vessel showing the position of the conduit;

Fig. 5 is a fragmentary plan view showing a modification of the shutter operating mechanism;

Figure 6 is a cross sectional view of the water conduit showing a shutter support and operating mechanism therefor; and

Fig. 7 is a fragmentary plan view, showing particularly mechanism for controlling the operation of the shutters.

As shown in Figure 1, the support is constituted by a frame 1, as slender as possible as shown in Figure 2 and carrying rods 3 to each of which is pivoted a shutter 4, reinforced, so as to give it the necessary rigidity, by one or more angle pieces 5 arranged vertically and horizontally.

On the frame 1 may also oscillate, under the action of a mechanism which will be hereinafter described, a rod 6 with vanes 7, (or a number of rods 6 if the frame has several sets of shutters). Each vane 7 acts as a support to the vertical edge of each of the shutters 4.

By means of coupling rods 8, passing through fluidtight joints 9 formed in the wall 10 of the passage 11, the frame 1 is connected to a strong connecting piece 12 fixed to the end of a rod 13 of a piston 14 which works in a cylinder 15 under the action of steam or a compressed combustile or an explosive fluid.

The double acting motor device 14, 15 placed outside the conduit 11, therefore allows the frame 1 to be moved alternately in the direction indicated by the arrows F and then in the direction indicated by the arrows F*a*.

During the stroke F, the shutters 4, ap-

plied against the vanes 7, act on the mass of water situated at A, and this mass, reacting on the whole system, causes the ship to move in the direction indicated by the arrow F^1.

When the motor 14, 15 drives the frame 1 in the direction Fa, the shutters 4 take up, under the thrust of the mass of water situated at B, the position shown in dot and dash lines, but return to bear upon the vanes 7 as soon as the following stroke F begins.

If the direction in which the ship is travelling indicated by the arrow F^1, corresponds to the forward movement of the vessel, it suffices, in order to make the vessel go astern or to check the forward movement thereof, to turn the rod 6 through an angle of 90 degrees either by operating it directly or through sevomotors in such a way that by moving out of the way the vanes 7 allow the shutters 4 to pass from the zone A into the zone B, see Figure 2, which takes place during the movement of the frame 1 in the direction F. The shutters then occupy the position indicated by dot and dash lines in Figure 2.

The rod 6 being brought back to the original position before the termination of this movement of the frame, it follows that, when this latter is moved in the direction indicated by the arrow Fa, the shutters 4 will act on the mass of water situated at B with the result that there will be reaction in the direction F^2 opposed to F^1.

By arranging two frames 1 and 1^a in the conduit both of the same kind, sufficiently far apart from each other (see Figures 3 and 5) and connected through the medium of racks 16 prolonging each rod 8, and gearing at diametrically opposite points into one or more toothed wheels 17 revolving on axles carried by a suitable fixed support 18, it is possible by means of the motor 15 to cause the frames 1 and 1^a to move simultaneously and synchronously but in inverse or opposite directions, one being always in the working or operative position of its shutters while the other is making its return stroke.

In Figures 5 and 6, each frame is supposed to comprise six shutters 4, but this number may be any other.

In Figures 6 and 7 it will be seen that each rod 6 with its vanes 7 is connected at one of its ends, to a lever 19. All these levers are coupled or connected by a rod 20 and on one of the rods is fixed a lever 21 the free end of which is engaged between two projections 22 integral with an operating rod 23 passing like the rods 8 into a joint 9^1 in the wall 10 of the conduit 11.

The rod 23 is normally moved with the rods 8, but by means for example, of a lever 24 oscillating at 25 on one of the rods 8, the rod 23 can be moved relatively to the rod 8, so as to cause the levers 21 and 19 to oscillate through an angle of 90 degrees and consequently the vanes 7 which thus take up the position shown in dot and dash lines in Figure 7, which position allows the shutters to pass from the zone A to the zone B or vice versa.

By giving to the cylinder or cylinders 15 of the motor, to the rods 8 and the racks 16 a suitable length, taking into account the length of the conduit 11 (which depends on the length of the ship) it is possible by means of suitable motors, to cause each frame 1 to traverse in a given time, a useful rectilinear path greater than the forward movement which the gyratory movement of the screw worked by an engine of corresponding power would give.

In consequence of the fact that in the system which has just been described, the motive force is opposed to the lines of resistance in a parallel direction and not obliquely as in the case of a screw, the power obtained is considerably augmented.

The general arrangements which have been described and diagrammatically shown may comprise numerous modifications both in the mounting of the shutters on their supports and in the means employed for operating or working these supports. In particular, the rods 8 may have motors at each end thus causing a considerable lengthening of the ship.

Any suitable type of motor may be used, thus electric motors with automatic reversing gear applied to the gearings 17 may be used (i. e. motors similar to those used for driving the rolls of rolling mills as for example with an Ilgner converting group).

The inventor likewise may arrange parallel with the ship, two conduits similar to the one shown in the drawings. By putting the shutter frames of one of these conduits half a stroke out of phase relatively to the frame of the second conduit, continuity of the propulsive effect is ensured, during the passage of the frames of one conduit over the dead point, one of the frames of the other conduit always working at full power.

For the purpose of allowing of inspection, cleaning and any repairs in the conduit 11, this latter may be closed at both ends by fluid-tight doors 26, 27 which are normally open.

After having pumped out the water, the conduit may be entered through man holes situated at convenient points.

Finally the inventor may use a system of shutters of exactly the same kind for the propulsion of terrestrial or aerial apparatus such as aeroplanes and free wheel vehicles.

What I claim is:

1. In a system of propulsion for ships, in combination, a frame mounted for reciprocation in a water conduit formed in the ship, a pair of shutters pivotally mounted at opposite sides of the frame extending towards each other and having their free ends spaced,

a stop for the shutters comprising a rod extending parallel to the axes of the shutters and having lateral projections adapted to engage the free ends of the shutters, and means for rotating the rod on its axis whereby said projections can be brought opposite either side of the free ends of said shutters.

2. In a system of propulsion for ships, in combination, a frame mounted for reciprocation in a water conduit formed in the ship, a plurality of pairs of shutters pivotally mounted in transverse alinement in said frame and having their free ends spaced, stops for the shutters comprising rods extending parallel to the axes of the shutters and having lateral projections adapted to engage the free ends of the shutters, an arm on each of said rods, a link connecting said arms, and manually operable means for rotating one of said rods whereby said projections can be brought opposite either side of the free ends of said shutters.

In testimony whereof I affix my signature.

MAXIME AUGUSTE LÉON BIDOIRE.