

Feb. 5, 1929.

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H. TAWARA

PROPELLING APPARATUS FOR SHIPS

Filed March 10, 1927

4 Sheets-Sheet 1

Fig. 1.

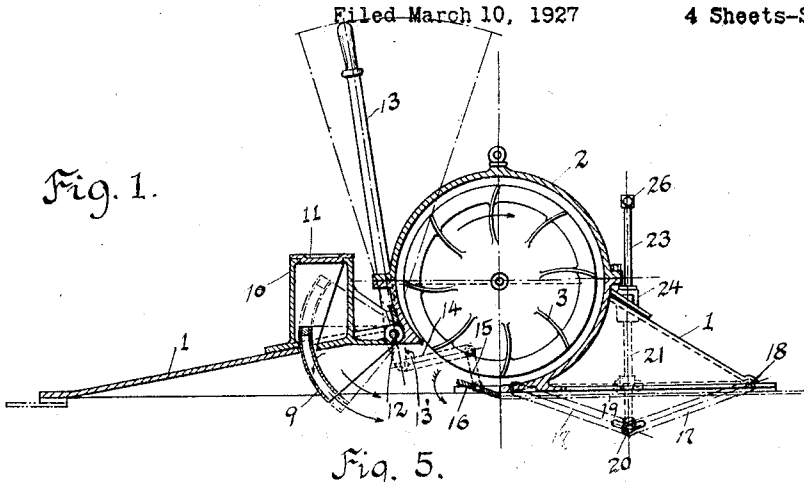


Fig. 5.

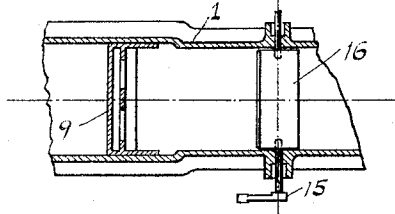
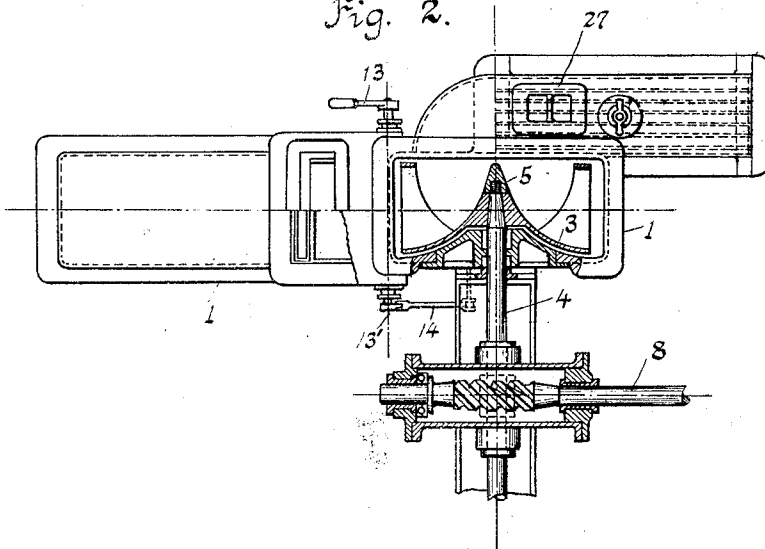


Fig. 2.



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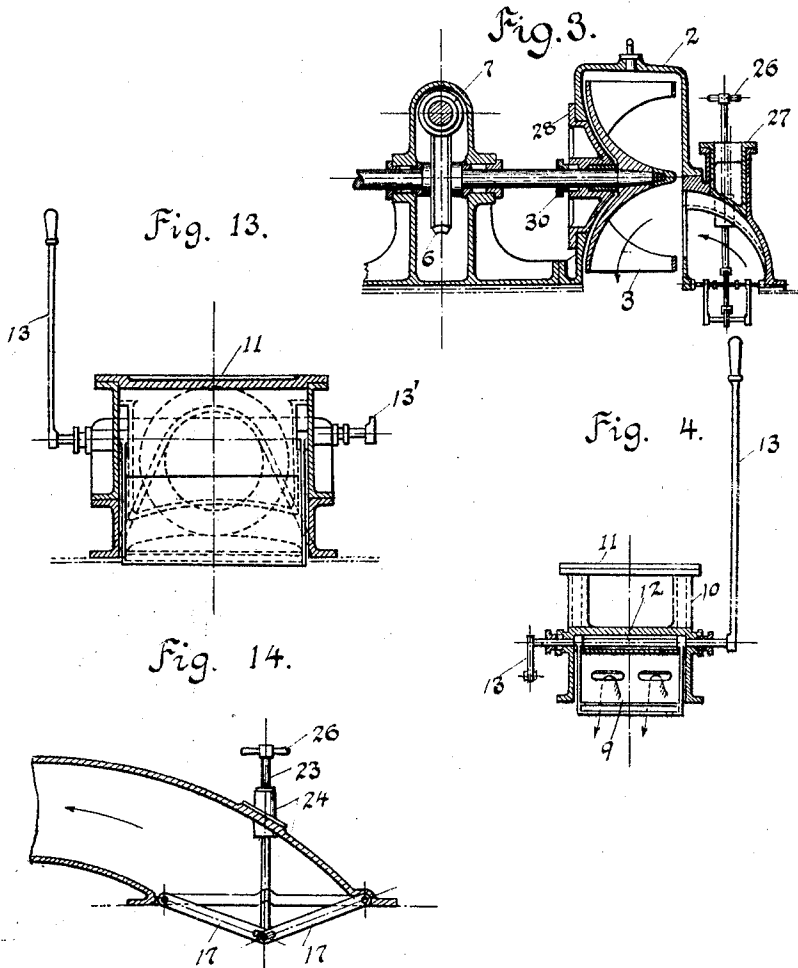
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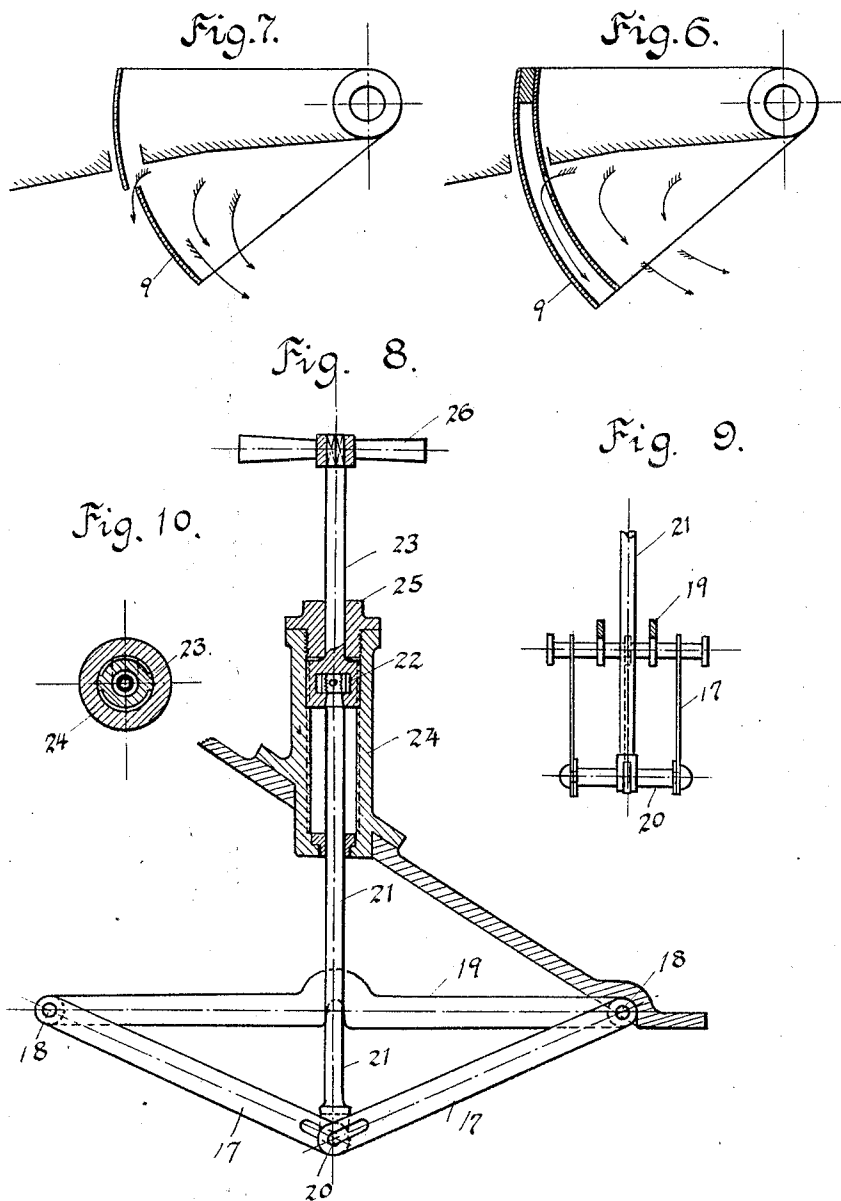
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PROPELLING APPARATUS FOR SHIPS

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4 Sheets-Sheet 3



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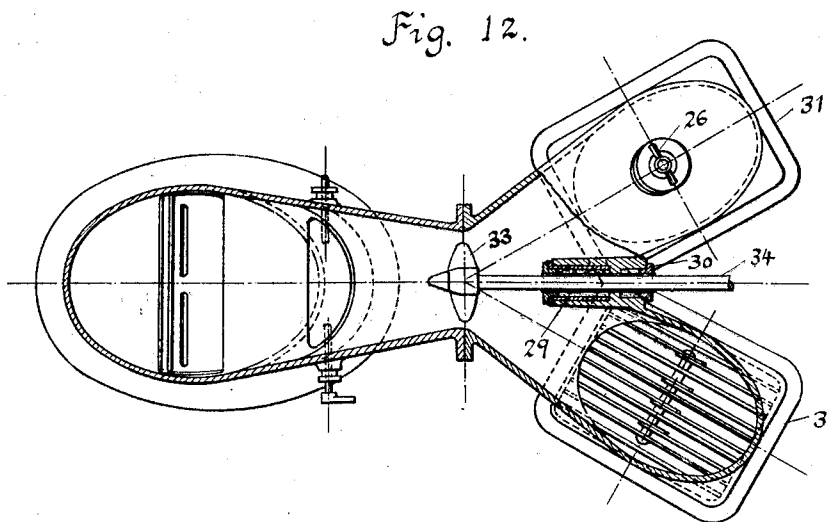
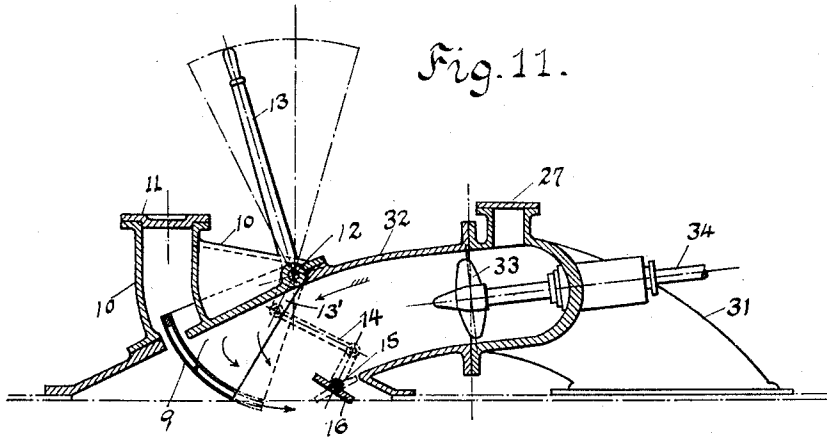
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PROPELLING APPARATUS FOR SHIPS

Filed March 10, 1927

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

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PROPELLING APPARATUS FOR SHIPS.

Application filed March 10, 1927, Serial No. 174,348, and in Japan July 14, 1926:

This invention relates to a propelling apparatus and especially to a class suitable to be arranged inside the hull of ships and has for its object to propose a propelling apparatus in which astern movement is obtained without reversing the rotation of the main driving shaft with utmost efficiency. The invention is mostly applicable for shallow draught ships. For this purpose a device for sweeping off sea weed etc., which will choke the suction pipe for the water, is also provided in this invention. The astern propelling is carried out by operating astern board only and the action of which is completed by aid of a guide plate arranged inside the delivery pipe.

In the accompanying drawings, Figs. 1 to 10 show one example of the apparatus according to this invention and in which:

Fig. 1 is a vertical longitudinal section,

Fig. 2 is a plan view, partly in section,

Fig. 3 is a vertical transverse section,

Fig. 4 is a detailed sectional view showing attachment of a guide plate,

Fig. 5 is a horizontal section of an astern board attachment,

Figs. 6 and 7 are sectional views of respectively single and double type astern boards,

Fig. 8 is enlarged sectional view showing detail of a grate employed in this invention,

Fig. 9 is the front view of the grate, and

Fig. 10 is a section showing detail of grate operating parts,

Figs. 11 and 12 show another example of the apparatus according to the invention, and in which:

Fig. 11 is a longitudinal section,

Fig. 12 is a plan view partly in section thereof.

Figure 13 is a vertical section of Figure 1.

Figure 14 is a view of a grate employed in this invention.

In the first example shown in Figs. 1 to 10, 1 is a casing of the new propelling apparatus and to which a cover 2 for a paddle wheel 3 is fitted. The wheel 3 is fixed to the shaft 4 at each end thereof by means of a nut 5. The shaft 4 is provided with a worm wheel 6 at the center thereof, which is geared with a worm 7 on the main driving shaft 8 driven by a suitable motive power. At the outside of the rear slope of the casing 1 which forms a rear delivery space, a casing 10 is provided to receive an astern board 9 which operates with the water moved by the propulsion means to give an astern movement of the ship and at

the top of this casing 10, a detachable cover 11 is provided for inspection. This astern board 9 may be single type as shown in Figs. 4 and 6, or double type as shown in Fig. 7, and is fixed to the shaft 12 provided with an operating handle 13. At one end of the shaft 12, an arm 13' is fitted and by which a guide board 16 for delivery water is operated through links 14 and 15.

At the fore part of the casing 1 forming suction space, a movable grate 17 and a fixed grate 19 are provided. The each end of this movable grate is pivoted to a shaft 18 fixed to the casing 1, while each end of the fixed grate is rigidly attached to the same shaft 18. The rods forming the movable grate and those forming the fixed grate are alternatively arranged. The fixed grate, however, may be replaced by a movable grate so that the whole grate is constituted by movable one. The each rod of the movable grate is jointed at the center pin 20 connected to an operating rod 21 (see Fig. 8). To the threaded top of the rod 21, a nut 22 is fitted, which is inserted to a slot of corresponding shape provided in the enlarged head of another rod 23 from one side of the slot, the rod 23 having an operating handle 26. 24 is a casing fixed to the casing 1 to receive the joints 21, 22, 23, and is covered by a cover nut 25. When the operating handle 26 is turned by nineteen degrees from the position shown in Fig. 8, the parts come to positions shown in Fig. 10, in which the longitudinal projections 23' provided in the enlarged head of the rod 23 engage to corresponding longitudinal slots 24' provided in the inner wall of the casing 24. Therefore, the rod 23 can be freely pulled in and out in the casing 24 so that the pivoted grate 17 is shaken to drop off sea weed etc., as shown in Fig. 8. For this purpose, the joint of the each rod of the grate 17 is provided with an oblong slot. When sea weed etc. are swept off, the rod 23 is pulled up and turned by nineteen degrees reversely so that the parts are again brought into fixed positions. 27 is an opening for cleaning the suction space. 28 is a side cover of the paddle wheel and serves also to the bearing of the shaft of the wheel. The bearing may be constituted of lignumvitæ provided with a packing gland 30.

In the second example shown in Figs. 11 and 12, a suction pipe 31 is jointed to a delivery pipe 32 by clamping together with their flanges, and a screw propeller 33 is ar-

ranged at the center of the joint. 34 is the shaft of the propeller and is driven by any convenient motive power. The suction pipe is branched into two pipes as shown in Fig. 5
 12. At the rear part of the delivery pipe an astern board 9 is provided. This board 9 is fixed to a shaft 12 which is operated by the handle 13. In ahead propulsion, the board 9 is moved into its casing 10, while in
 10 astern propulsion, it is projected into the position as shown in Fig. 10. At the opposite end of the shaft 12, an arm 13' is fitted which operates a guide plate 16 mounted to a pivoted shaft through links 14 and 15. When
 15 the handle 13 is in astern position, the guide plate 16 will partly shut the exhaust pipe as shown in full line in Fig. 11, so that the direction of water passing through the delivery pipe is directed to the corner of an
 20 angle formed by the board 9 and the casing of delivery pipe 32 and promotes or makes easy the reversing movement of the delivery water. The bearing of the main shaft 34 is provided at the joint of the two branches of
 25 the suction pipe where a lignumvitæ bearing 29 and a gland 30 may be used. 27 is an opening for cleaning the propeller etc. The end of each suction branch is of course provided with the grate apparatus as shown and
 30 described with reference to the first example although it is not shown in the figures.

As will be easily understood from the above going, when the suction pipe is choked by sea weed etc., which is mostly met by shallow draught ships, it is easily swept off by simply pulling up and down the operating rod 23 and thereby projecting the movable grate in and out.

The astern board 9 may be single or double type. In the former, a notch 9'' is provided at the corner of an angle formed by the board and the casing 1, while in the latter, a notch 9' is formed in the fore plate thereof only. Thus, in the single type, a part of the stream
 45 runs out of the notch 9'' while the majority of the stream runs along the inner curve of the board. In the double type, a part of the stream running out of the notch 9' will also

run parallel to the rest of the stream running along inner curve of the board. In any of the types, the water pocket, which is the main ground of deficiency of astern power, is entirely obviated by providing such notches, so that a ship can be efficiently propelled
 50 astern without reversing the rotation of the main shaft and accordingly without reversing the rotation of the main motor or engine. Further, by the provision of a guide plate 16 in the exhaust passage, the direction of delivery stream is changed to be directed
 55 to the corner of the angle formed by the astern board and the delivery casing so that reversing of the stream is made remarkably easy.

I claim:

1. A propelling apparatus for ships, comprising a casing adapted to be secured to the bottom of a ship, said casing having an inlet and an outlet, a water propelling means within the casing whereby water is moved through the casing, an astern board movable across the outlet, a movable guide plate arranged in the outlet to direct the water against the astern board and means to simultaneously operate the astern board and the guide plate substantially as shown and described.
2. The propelling apparatus for ships as claimed in claim 1 and in combination therewith, of a movable grate arranged in the inlet side of the casing.
3. The propelling apparatus for ships as claimed in claim 1 and in combination therewith of a casing secured to the outlet part of the first mentioned casing and into which the astern board can be withdrawn.
4. The propelling apparatus for ships as claimed in claim 1 in which the astern board is provided with transverse slots.
5. The propelling apparatus for ships as claimed in claim 1 in which the astern board comprises a front member and a rear member, the front member being provided with transverse slots.

In testimony whereof I affix my signature.

HIKOSABURO TAWARA.