

Oct. 18, 1966

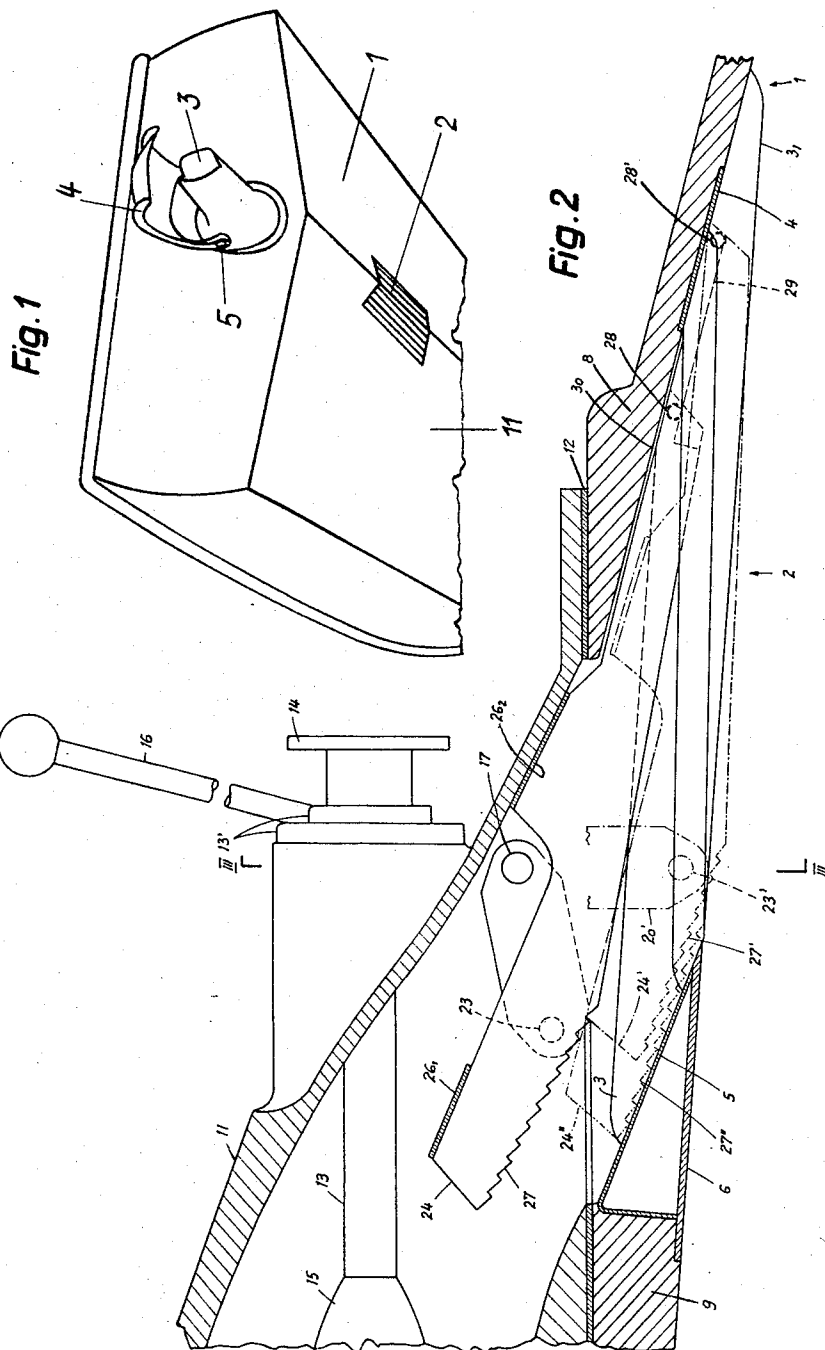
W. RABALD

3,279,414

CLEARING DEVICE FOR THE PROTECTIVE INTAKE GRILLE
ON A WATER-JET PROPELLED WATER CRAFT

Filed May 11, 1965

2 Sheets-Sheet 1



INVENTOR
WILLY RABALD
BY *Robert H. Jurek*
AGT.

Oct. 18, 1966

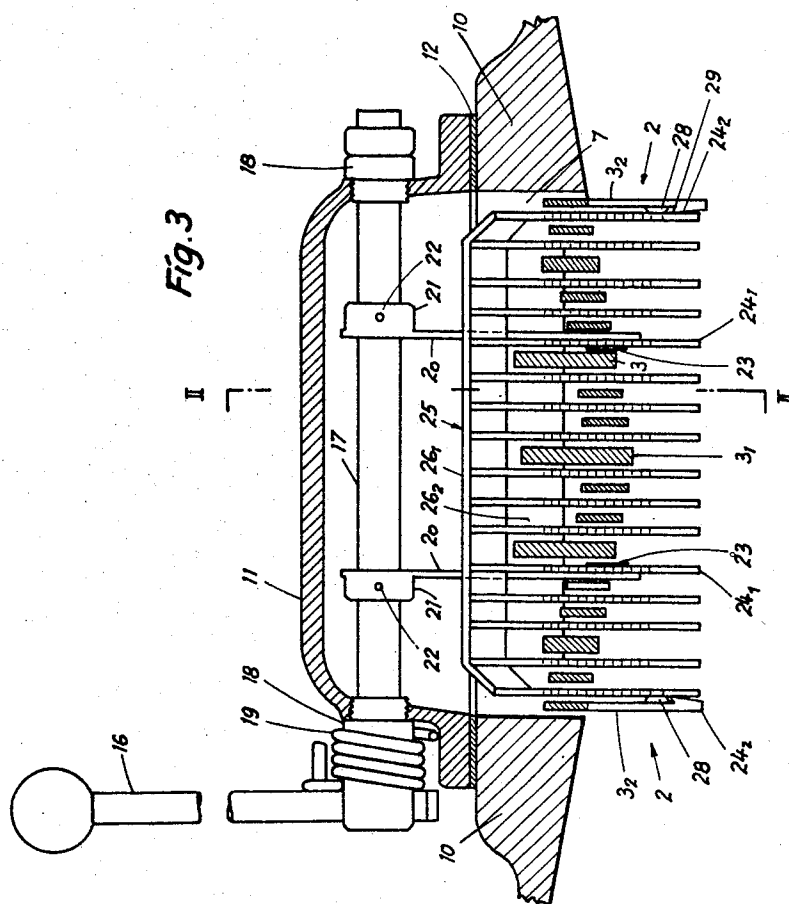
W. RABALD

3,279,414

CLEARING DEVICE FOR THE PROTECTIVE INTAKE GRILLE
ON A WATER-JET PROPELLED WATER CRAFT

Filed May 11, 1965

2 Sheets-Sheet 2



INVENTOR
WILLY RABALD
BY *Robert H. Jacob*
AGT.

1

2

3,279,414

CLEARING DEVICE FOR THE PROTECTIVE INTAKE GRILLE ON A WATER-JET PROPELLED WATER CRAFT

Willy Rabald, 29 Ringlikerstrasse, Uitikon am Albis, Switzerland

Filed May 11, 1965, Ser. No. 454,910

Claims priority, application Germany, May 14, 1964, R 37,904

6 Claims. (Cl. 115—.5)

This invention relates to a device for clearing the grille protecting the intake channel of the power-driven jet propulsion pump of a water-jet propelled water craft. In course of time this grille tends to become fouled by algae, leaves, paper or other flotsam and in this condition it may seriously impair the propulsion efficiency of a motor boat. In exceptional circumstances the grille may become completely choked and prevent the boat from being driven at all. The only remedy then is to dive under the boat and to clean the grille with a scraping tool.

It is accordingly a primary object of the present invention to do away with this awkward necessity by providing a movable clearing grille consisting of bars adapted to descend through the gaps between the bars of the protective grille.

Another object of the invention is to provide a movable clearing grille formed of bars having serrated undersurfaces which ride down a sloping apron associated with the bars of the protective grille, the apron thereby being cleaned of foreign material which accumulates on it.

A further object is the provision of a movable clearing grille which clears the protective grille of foreign matter by the simple back and forth movement of an operating lever.

Yet another object is to provide a movable clearing grille which is urged by spring means into a normal inoperative position where it does not impair operation of the jet propulsion pump.

These and other objects of the invention will become apparent from the following description of a specific clearing device in accordance with the invention, the said device being shown by way of example in the accompanying drawings, in which:

FIGURE 1 is a perspective view of the rear end of a water-jet propelled motor boat viewed from an oblique angle under the stern;

FIGURE 2 is a longitudinal section of the intake with a protective grille and an associated clearing grille taken on the line II—II in FIGURE 3; and,

FIGURE 3 is a cross section taken on the line III—III in FIGURE 2.

FIGURE 1 shows the stern of a motor boat driven by a power unit in the form of an internal combustion engine driving the impeller of a rotary pump. The pump draws in water through a large intake opening covered by a protective grille 2 and located centrally at the rear of the flat bottom of the boat, the water being rearwardly ejected in the form of a powerful jet of between say 16 and 20 cm. diameter through a jet pipe 3 above the water line. The reactive thrust of the jet drives the boat forward, and in a manner already known in such boats the jet pipe 3 can be laterally deflected and the boat thus steered without the need of a rudder. For this purpose a deflector 4 is pivotably mounted on a hinge 5 and is thus adapted to be lowered behind the mouth of the jet pipe to deflect the jet forwards for braking and/or pulling astern. Other details of the stern of the boat, such as the exhaust of the engine and the like, are not shown in FIGURE 1 which merely illustrates the type of water craft to which the invention relates and which has become increasingly popular in recent years.

The protective grille 2 which is illustrated in FIGURE 2 and FIGURE 3 consists of a number of up-ended bars 3 of rectangular section extending in the fore and aft direction of the boat. The forward ends of the bars are welded to an apron 4, while the rear ends are welded to an apron 5 extending at an acute angle to a bottom plate 6 to which it is firmly attached and which is flush with the adjoining parts of the bottom 1 of the boat.

The front and rear ends of the intake opening of a suction channel 7 are bounded by the two aprons 4 and 5. The apron 4 is let into an upwardly-sloping part 8 of the frame of the bottom 1, and another frame member 9 of the bottom 1 is located aft of apron 5 and of member 6 of the bottom. The casing 11 of the pump is mounted with the interposition of a gasket 12 on members 8 and 9 and a member 10 (see FIGURE 3) forming part of the framing of the bottom 1. The horizontal shaft 13 of the pump passes through a stuffing box 13' and carries a flange 14 for coupling it to the drive shaft of an engine not shown in the drawing. The pump shaft carries an impeller, either in the form of a bladed propeller wheel or of a turbine rotor. Part of the hub 15 of the impeller can be just seen in FIGURE 2.

The arrangement so far described is that of a motor boat of existing construction that has very satisfactory operating characteristics provided the protective grille 2 remains clean. However, experience has shown that this grille 2, which incidentally comprises bars that are not all of the same cross section (the central strongest bar is marked 3₁), is quickly fouled in some waterways with the result that the speed of the boat is then considerably reduced. The remedy in the past was to pull the boat out of the water and to lay it up on chocks to permit the grille 2 to be cleaned or to clean out the grille with hook-shaped or other suitable tools by diving under the hull. This however is avoided in the present construction because of the provision of a clearing device which permits the grille to be quickly and satisfactorily cleaned by the simple expedient of working a lever 16 to and fro a number of times.

This lever 16 is mounted in a manner not shown in detail on one end of a shaft 17 the major part of which is contained in casing 11 in which it is mounted in tight bearing bushes 18. The lever 16 is attached to the shaft outside the casing 11 and is held in its normal position, or urged back into its normal position, by a powerful torsion spring 19 interposed between the lever 16 and the outside of the casing. Secured by bushes 21 and pins 22 to the shaft 17 which extends across the longitudinal axis of the boat are two parallel arms 20. The free end of each arm 20 is pivotably connected at 23 to a bar 24₁ of a clearing grille 25 which comprises a number of parallel up-ended steel bars 24 interconnected by two cross members 26₁ and 26₂. Each bar 24 of the clearing grille is provided on its bottom rear end with a number of teeth 27 for scraping off the rear apron 5 of the protective grille upon which a considerable quantity of flotsam and other material is always found to collect. The bars 24 of the clearing grille 25 are also adapted to descend through the gaps between adjacent bars 3 of the protective grille 2.

The movements of the clearing grille 25 are determined on the one hand by the circularly arcuate path of the hinges 23 and on the other hand by the path of two guide pins 28 affixed to the forward ends of the two outer bars 24₂. These two pins 28 ride in two straight guide-ways 29 provided in the two outer bars 3₂ of the protective grille.

When the clearing grille 25 is in its normal position of rest, its bars 24 are in the position indicated in full lines in FIGURE 2. The lower position of the clearing

3

grille 25 into which it can be moved by the deflection of the lever 16 is indicated in dot-dash lines 24'. The corresponding positions of the arms 20, teeth 27, hinges 23 and guide pins 28 are indicated respectively by the references 20', 27', 23' and 28'. One intermediate position of the clearing grille 2' is indicated at 24'', and it will be seen that in this intermediate position 24'' the teeth 27'' make contact with or have just made contact with the rear apron 5. The lower parts of the bars 24 slightly project between the bars of the protective grille 3 even when the clearing grille is in raised normal position. When the clearing grille moves obliquely downwards in the forward direction its bars descend along the full length and width of the gaps between the bars of the protective grille, while the upper edges of the forward ends of its bars ride along the upper face 30 of the suction channel 7 and the pins 28 ride in the ways 29. The clearing grille 25 is raised again by the torque produced by the spring 19.

It will therefore be seen that the protective grille 2 can be substantially completely cleared of all accumulations of fouling material and the normal efficiency of the water-jet propulsion unit restored by working the lever 16 back and forth a number of times.

The difficulties of accommodating the clearing grille 25 in the narrow intake channel 7 which forwardly merges into the bottom of the very acute angle of only a few degrees, and of effectively operating the clearing grille in this restricted space by suitable actuating means are overcome by the provision of the straight guideways for the guide pins 28 and the arcuately circular motion of the hinges at 23.

It will of course be understood that the particular clearing device described above can be modified in a number of respects without departing from the spirit and scope of the invention. I therefore desire that the above description should be considered by way of example only and not have any limiting effect on the appended claims.

I claim:

1. In a water-jet propelled water craft comprising a boat hull, a power-driven jet pump mounted in said hull, in intake to said jet pump in the bottom of said hull, a protective grille formed of a plurality of spaced-apart bars protecting said intake against the entry of foreign material, and an apron having attached thereto the rear ends of said bars, said apron sloping forwardly at an acute angle: a movable clearing device for clearing said protective grille comprising a clearing grille formed of a plurality of spaced-apart bars, supporting means for supporting said clearing grille adjacent said protective grille, said supporting means providing for movement of said clearing grille whereby said bars of said clearing grille descend through the spaces between said bars of said protective grille, and a plurality of serrated under-surfaces on the rear portions of said clearing grille bars adapted to ride down said sloping apron whereby accumulations of foreign material on said apron are removed by said serrated under-surfaces of said clearing grille bars.

2. A clearing device as claimed in claim 1 wherein said supporting means for said clearing grille are arranged to guide the bottom forward end of said clearing grille along a substantially straight path and to guide the rear end of said clearing grille over an arcuate path.

3. A clearing device as claimed in claim 1 wherein

4

said clearing grille is pivotally connected to the ends of two arms mounted on a transverse shaft, said shaft being rotatable to and fro by a manually-operable lever connected thereto.

4. A clearing device as claimed in claim 1 comprising a rotatable transverse shaft extending transversely of said protective grille, two arms mounted on said shaft, pivotal connections on said two arms connecting said arms to said clearing grille, a pump casing arranged adjacent said protective grille, said pump casing having a part wherein said two arms are located, said part of said pump casing forming part of said intake, an operating lever connected to said shaft whereby manual operation of said lever in a back and forth motion causes rotation to and fro of said shaft, and a spring arranged to urge said lever into a position where said clearing grille is clear of said protective grille.

5. A clearing device as claimed in claim 1 wherein the two outermost bars of said clearing grille are provided with guide elements for co-operation with guideways in the two outermost bars of said protective grille in order to guide the forward lower end of said clearing grille along a substantially straight path.

6. A water-jet propelled water craft comprising a boat hull, a power-driven jet pump mounted in said hull, an intake opening in the bottom of said hull, a casing for said jet pump having a portion thereof defining an intake passage leading from said intake opening to an inlet in said pump, an outlet in said pump, an outlet passage leading from said outlet to a jet opening in the stern portion of said boat, a protective grille formed of longitudinally-extending spaced-apart parallel bars covering said intake opening whereby the entry of foreign material into said intake passage and said jet pump is prevented, a rotatable shaft mounted transversely of said protective grille within said portion of said pump casing defining said intake passage, journal means carried by said portion of said pump casing arranged to support the two ends of said shaft, a pair of spaced-apart arms on said shaft, a clearing grille formed of longitudinally-extending spaced-apart parallel bars pivotally supported by said arms above said protective grille and within said portion of said pump casing, said arms being pivotally connected to the rearward end of said clearing grille, a pair of substantially straight guide-ways provided on the two outermost bars of said protective grille, a pair of guide members on the forward ends of the two outermost bars of said clearing grille respectively adapted to engage and slide along said guide-ways, a manually-operable operating lever connected to said shaft, spring means urging said lever into a position wherein said arms on said shaft hold said clearing grille clear of said protective grille, a sloping apron joined to the rearward portion of said protective grille, and a serrated under-surface on said clearing grille adapted to scrape said apron on back and forth movement of said operating lever.

References Cited by the Examiner

UNITED STATES PATENTS

1,700,913 2/1929 Tawara ----- 60—35.54

MILTON BUCHLER, *Primary Examiner*.

65 ANDREW H. FARRELL, *Examiner*.