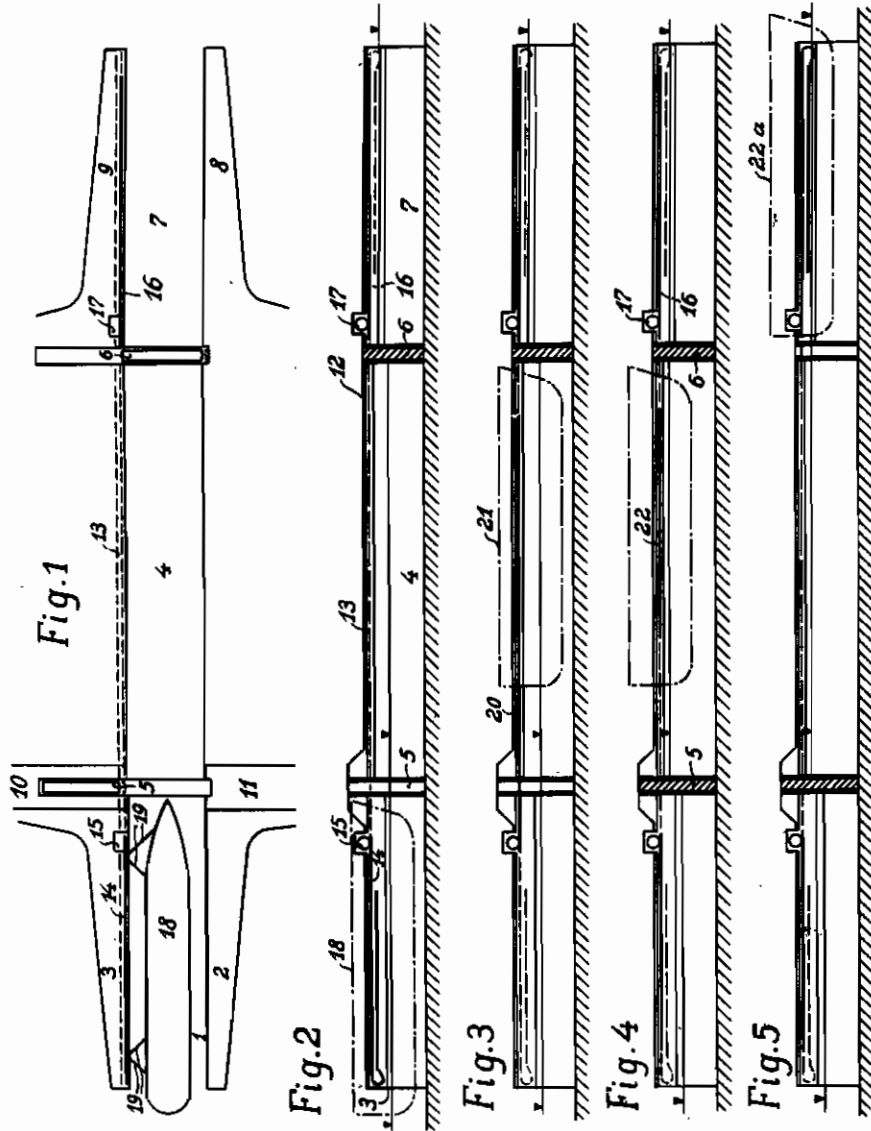


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2 Sheets—Sheet 1



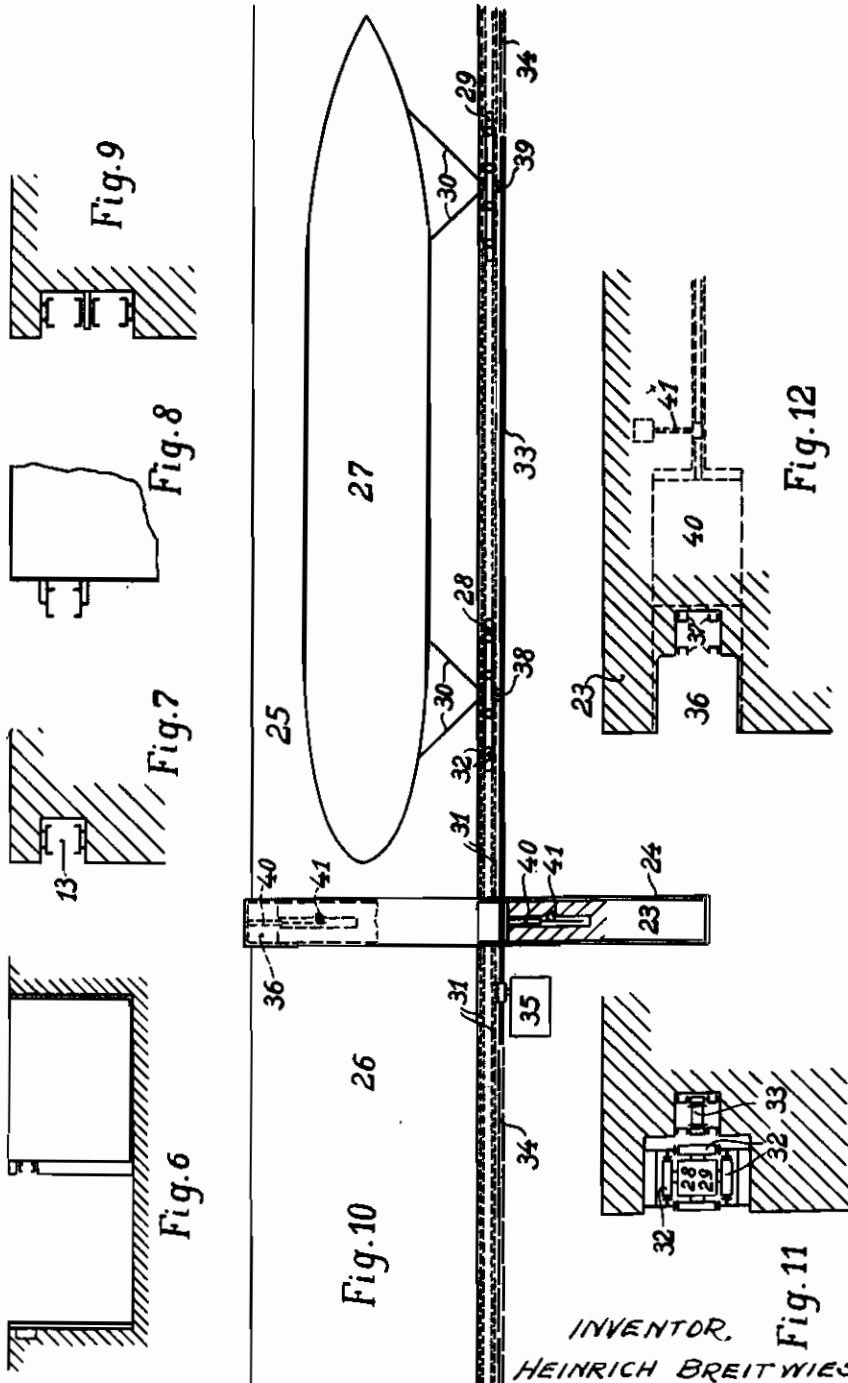
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# ALIEN PROPERTY CUSTODIAN

## DEVICE FOR NAVIGATING SHIPS IN LOCKS, DOCKS AND SO ON

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Application filed August 23, 1939

In navigating ships through lock installations according to the patent (Ser. N. 245290) there is an advantage if the towing means conducted in stationary guides with these guides are located below the level, i. e. below the surface of the plant of the surroundings of the lock (dock or the like) for the purpose not to hinder the traffic. This problem is not easy to solve, if sliding gates are used as it is usual at present in large sea locks. These sliding gates as well as the lock head project the surface of the plant, or the upper edge of these gates lie flush with said surface of the plant, whereby the chambers effect a complete interruption. By the present invention a solution is obtained in using articulated racks on which the ships are fastened. Said racks are so constructed to be capable of withstanding tension and compression and safe against bending.

First the one part of the articulated rack engaging the fastening means of the ship is made disconnectable from the other rack and connectable with a second rack. Each rack together with the disconnectable and connectable part conducts the ship through its cooperating lock-gate, for which this rack is used one for all. This latter is necessary, because at least one of the gates must be closed and because a single long continuous rack extending throughout would hinder the movement of the gate, if it is situated below the level. In this case the rack guides are arranged within a recess-like slot of the lockwall and the adjoining embankment near the upper edge of said wall. These guides are interrupted at the gate chamber and the connection is obtained by additional guides which are adapted on the front side of the gates. In this case the articulated rack can be moved throughout if the gate is in corresponding position within its chamber i. e. the gate is open.

Each of the articulated racks has its own stationary driving device.

The method of operating of this installation is explained in accordance with the drawings, in which

Fig. 1 is a diagrammatical plan view of a lock installation according to the invention,

Figs. 2-5 are sections of the articulated racks in various positions and the ship to be navigated.

Fig. 6 is a cross section through the gate chamber with opened gate.

1 indicates the entrance to the lock 4 and is situated between the directing arrangements 2 and 3. Said lock can be closed by the outer gate 5 and the inner gate 6. 7 indicates the exit which is located between the directing arrangements 8

and 9. On both sides of the outer gate 5 dikes 10 and 11 are adjoining, the upper edge of the gate 5 is placed so high with regard to the high water as the crest of the dike (see Fig. 2). The inner gate 6 lies flush with the level of the plant.

Close below the upper edge of the lock wall or the wall of the directing arrangements respectively a slot 13 for the rack guides is provided within the concrete. In said slot the articulated rack can be moved by the winch work 15 and the rack 16 by the winch work 17. The Fig. 7 illustrates a section on enlarged scale across the slot within the concrete of the lock with the rack guide and Fig. 8 shows a section across the front end of a gate with the rack guide arranged thereon. Fig. 9 is a section across the slot within the directing arrangements. Here two guides one above the other are arranged, the lower of which serves for reversing the rack, as is shown in Fig. 2 and so on. The outer gate ought to be open and the inner gate closed. A ship 18 navigated by her own power into the entrance is engaged with the half of the articulated rack 14 being at the top by aid of connecting means 18 (as shown in Figs. 1 and 2).

By actuating the winch work the ship is navigated into the lock 4. In Fig. 3 the position of the rack is indicated by 20 and that of the ship by 21.

Then the rack is divided. The part 22 to which the ship is fastened remains inside the lock while the other part is moved back upon the directing arrangement 3. The gate 5 can now be closed and the water level is equalled with the water height within the exit 7. This position is illustrated in Fig. 4.

The gate 6 can now be opened and the rack is moved towards the left and coupled with the part of the rack 22. Then the articulated rack is moved towards the right by the driving device 17 and the ship reaches the exit (position 22a) as shown in Fig. 5. After loosening the fastening means 19 the ship can now continue her passage by own power. If a second ship is to be navigated from the exit 7 into the entrance 1 in pursuance of the manoeuvring above mentioned, the operation is executed in reversed succession. In order to navigate a second ship from the entrance 1 into the exit 7, the disconnectable part of the rack 22 must be moved back first and coupled with the articulated rack upon the directing arrangements 3.

In order to secure the ship on both sides it is preferable for practical execution to arrange on both sides of the lock articulated racks and guides as well as driving devices.

It is an advantage to provide a particular guide for that part of the articulated rack engaging the fastening means of the ship which is disposed beside the proper guide of the articulated rack. In this manner the forces and strains respectively being exerted by the ship towards the bank are separated from those which are related exclusively to the movement of the articulated rack. Therefore the guides as well as the members of the rack being connected with the ship are constructed particularly strong for the purpose to absorb the lateral forces, while the articulated rack itself with its guide needs only be so strong as to absorb the pull and push forces in the longitudinal direction.

In Figs. 10-12 the feature of the present invention, as well as a series of construction details corresponding therewith are clearly explained.

Fig. 10 shows diagrammatically in a plan view a lock gate 23 with the gate chamber and the adjoining parts of the lock 25 and the entrance 26. The ship 27 is held on two members 28 and 29 by aid of fastening means 30. Said members 28 and 29 which correspond to one part of the articulated rack according to the construction described above and shown in Figs. 1-5 are conducted upon a guide 31 within the concrete of the bank, whereby the lateral strains are especially considered, for which purpose large guide rollers 32 are provided (see section in Fig. 11).

The movement of the members 28 and 29 is obtained by the articulated rack 33 which is conducted in guides 34 and driven by the winch work 35.

The gate 33 is provided on its front side with a recess 36 corresponding to the slot within the concrete if the gate is open. Within the recess a guide 37 for the articulated rack is provided, so that the latter can be guided over the gate chamber 24.

The movement of the members 28 and 29 over the gate chambers is made possible thereby, that these members are rigid and multiple so long as the breadth of the gate chamber. A guide of these members within the recess 36 of the gate is therefore not necessary.

The operation of this installation is executed principally in such a manner, as described above with the difference that each of both the articulated racks employed in a plant remains unchanged, i e that it is not divided and that the two members 28 and 29 are coupled with both the articulated racks one after the other as required. The coupling is obtained by the members 38 and 39 as indicated diagrammatically.

If the gate 23 is closed it must be avoided at high water, that water enters through the recess 36 from one side of the gate to the other. This is obtained by a sluice 40 (Fig. 12) which is moved within the gate by a driving device 41 in such a manner that the recess 36 can be closed. The position of the gate is illustrated in Fig. 10 by dotted lines.

Also in this case it is possible for a practical execution to provide on both sides of the sluice articulated racks with their guides as well as members especially guided for fastening the ship.

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