(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 143 484**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **84201537.2**

(22) Date of filing: **23.10.84**

(51) Int. Cl.⁴: **B 63 B 35/30**

(30) Priority: **28.10.83 NL 8303723**

(43) Date of publication of application: **05.06.85 Bulletin 85/23**

(84) Designated Contracting States: **BE DE FR GB NL**

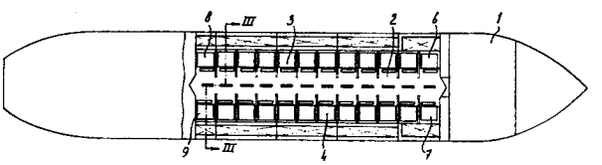
(71) Applicant: **IHC HOLLAND N.V., Rietgorsweg 6 P.O. Box 208, NL-3350 AE Papendrecht (NL)**

(72) Inventor: **Langejan, Hendrik, Oosterstraat 12, NL-2931 AT Krimpen a/d Lek (NL)**

(74) Representative: **van der Beek, George Frans et al, Nederlandsch Octrooibureau Johan de Wittlaan 15 P.O. Box 29720, NL-2502 LS 's-Gravenhage (NL)**

(54) **Hopper having bottom discharge valves.**

(57) Hopper for storing bulk goods, like dredge goods, which hopper comprises one or more holds which are provided with discharge means in the form of valves (3, 4) in the bottom. Further discharge means consist of sliders (6, 7, 8, 9). In very shallow water the sliders are opened first. By discharging the hopper will rise in the water. This provides enough room under the bottom for discharging by means of the valves.



EP 0 143 484 A1

Hopper having bottom discharge valves.

The invention relates to a hopper for storing bulk goods, like dredge goods, which hopper comprises one or more holds, which are provided with discharge means in the form of valves or flaps in the bottom.

Such a hopper is generally known, for example from the Netherlands patent application 6404349 laid out to public inspection, which patent application relates to a hopper having valves hinging around longitudinal axes at the height of the bottom surface of the vessel, which valves, when in open position, are swung down and protrude from the bottom of the vessel.

From the British patent specification 3666/1911 also a hopper is known having conical bottom valves which can be moved up and down in vertical direction, which valves, when in closed position, lie above the bottom surface of the vessel and, when in open position, protrude under the bottom. These known hoppers are disadvantageous herein that they cannot be used in shallow water or only with high restrictions because when opening these valves, the latter find themselves against the bottom. Opening mostly takes place when the hopper is fully loaded, so during the heaviest draught of the vessel.

The aim of the invention is to provide a hopper, which can also be used in shallow water, but keeps the advantages which are inherent to unloading by means of valves. For valves have the property to make quick unloading possible and require relatively little maintenance. They are reliable and the operating mechanism is cheap and rugged.

This aim is reached according to the invention because the discharge means, apart from the valves, consist of sliders.

By also applying sliders together with the valves according to the invention it is achieved that in shallow water, in which the hopper has hardly any room left with respect to the

bottom, it is possible to start discharging by opening the sliders. Then part of the charge disappears through the discharge openings, opened by said sliders, through which the vessel will come to lie higher in the water. The further discharging can be done then with the help of the valves for, as the vessel has come to lie higher in the water, enough room has come about under the bottom for discharging by means of the valves.

Sliders used in hoppers are known per se, for example from the US patent specification 1,063,284. Sliders, however, have the disadvantage that the construction is more expensive and that when opening, it is required to displace the sliders in guidings and along sealings, while these sliders are pressed against the guidings by the charge resting on it. This results in hard wearing and frequent maintenance. A hopper, which has been provided with sliders at the location of all the discharge openings, is therefore seldom applied because it has little sense to construct a hopper which is only suitable for shallow water and which, during most of the time that it is applied in deeper water, has to deal with the problems which are inherent to the sliders loaded by the charge. Valves do not have these disadvantages for they open up downwards and so are forced open by the charge when unlocking, and move together with the charge in the same direction.

Within the scope of the invention it is sufficient when the number of sliders is less than the number of valves, for mostly a small rising of the vessel in the water is already sufficient to enable the valves to open.

In addition, it is preferable to put the sliders at one or both ends of the hopper hold and of the vessel respectively. When the sliders at both ends of the vessel are opened, then this results in an even rising of the vessel in the water and this is sufficient to continue unloading after this via the discharge valves located between the ends. Besides, by opening the sliders at one end a slanting float-on position can be created through which the possibility comes about to get very close to the coast line. In addition, the trim of the loaded vessel can be influenced.

The invention will be further explained with the help

of the drawings, in which:

Fig. 1 schematically shows a longitudinal section of a hopper according to the invention;

Fig. 2 is a horizontal section under the middle deck with a view of the discharge means; and

Fig. 3 is a cross-section according to the line III-III of fig. 2.

The hopper showed in fig. 1 has a hold 2, which is provided in the bottom with two parallel rows of sets of discharge valves 3 and 4 respectively, which are hinged around longitudinal axes and which are kept in the closed position showed in fig. 3 with the help of drawing means 5. In the open state they take the position showed by the interrupted lines in fig. 3.

The hold of the hopper is provided at the front with sliders 6 and 7 respectively and at the back with sliders 8 and 9 respectively.

When these sliders 6 through 9 are opened, for example by moving them horizontally to the space between the bottom 10 and the keelson 11, then at the location of the opened sliders the charge flows away, so is discharged. The vessel then will lie higher in the water through which the valves 3 and 4 respectively can be opened and the whole charge can be discharged.

The hopper vessel which is showed has four sliders 6, 7, 8 and 9, ten sets of valves 3 on port-side and ten sets of valves 4 on starboard-side.

When only the front sliders 6 and 7 are opened then only the front of the ship will rise. The same applies to the back sliders which, when they alone are opened, will see to it that the back of the ship rises.

With the latter, adaptations to the bottom profile are possible, but also adaptations of the loading state and with that the trim of the vessel. This is important in particular when the hopper hold is divided into sections by cross bulkheads.

A hopper vessel which is provided in one half with sliders in the bottom and in the other half with valves could be thought of. Such a vessel can approach the coastline closer than a

vessel which is exclusively provided with valves and yet is able to discharge the load adequately. A vessel which is exclusively provided with sliders, as known, is able to do this naturally, but, as a matter of fact, then has only sliders with the difficulties attached to it during use in deeper water,

In itself it is of course possible to use valves which are built in higher, like for example known from the already mentioned US patent specification 1,063,284, fig. 2. Putting the discharge valves in a higher location, which valves when open do not protrude under the bottom, has the disadvantage, however, that as a result the total loading volume will be less.

It is also assumable to position the sliders and valves alternately. Such a hopper has the advantage then that the sliders during use in deep water need not be opened at all for the discharge, for it is sufficient to only open the valves for the discharge. Only in shallow water the sliders will operate. This means that during use in deep and shallow water the sliders, which are loaded heavier and require much maintenance, are used less often and consequently have a longer operational life.

CLAIMS.

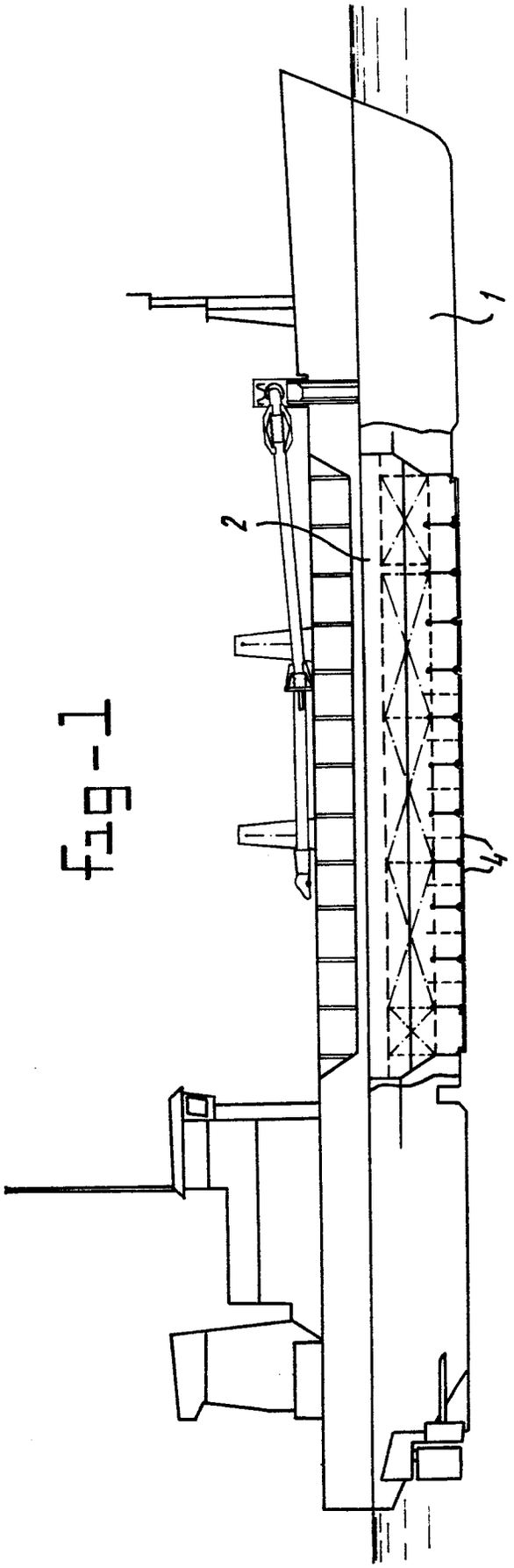
1. Hopper for storing bulk goods, like dredge goods, which hopper comprises one or more holds, which are provided with discharge means in the form of valves in the bottom, characterized in that the discharge means, apart from the valves, consist of sliders.

2. Hopper according to claim 1, characterized in that the number of sliders is less than the number of valves.

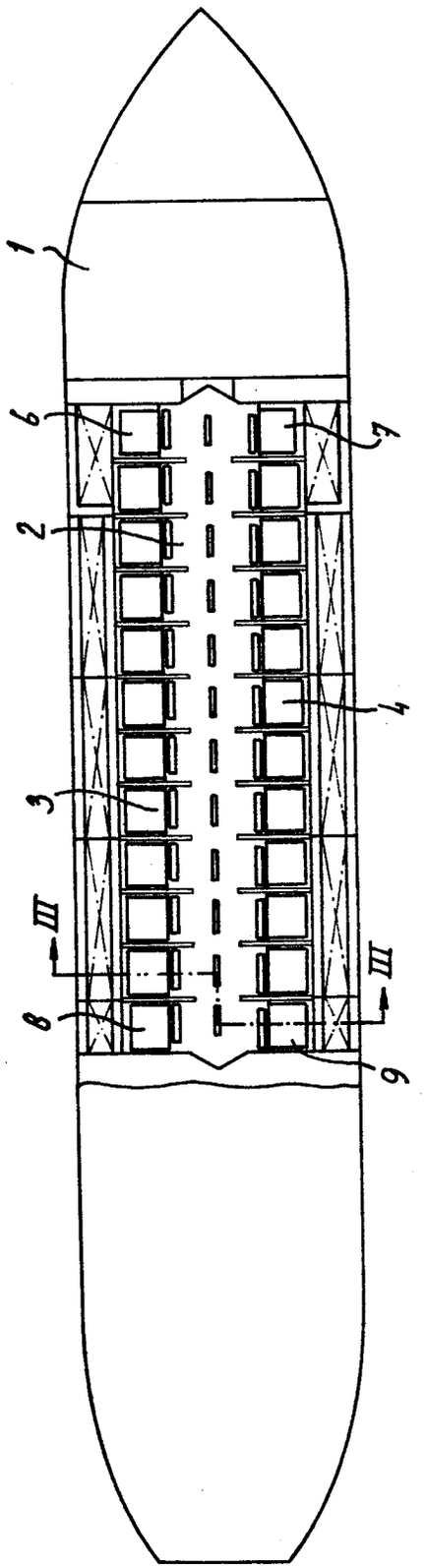
3. Hopper according to claim 1 or 2, characterized in that the sliders are located on one or both ends of the hopper hold.

****

0143484



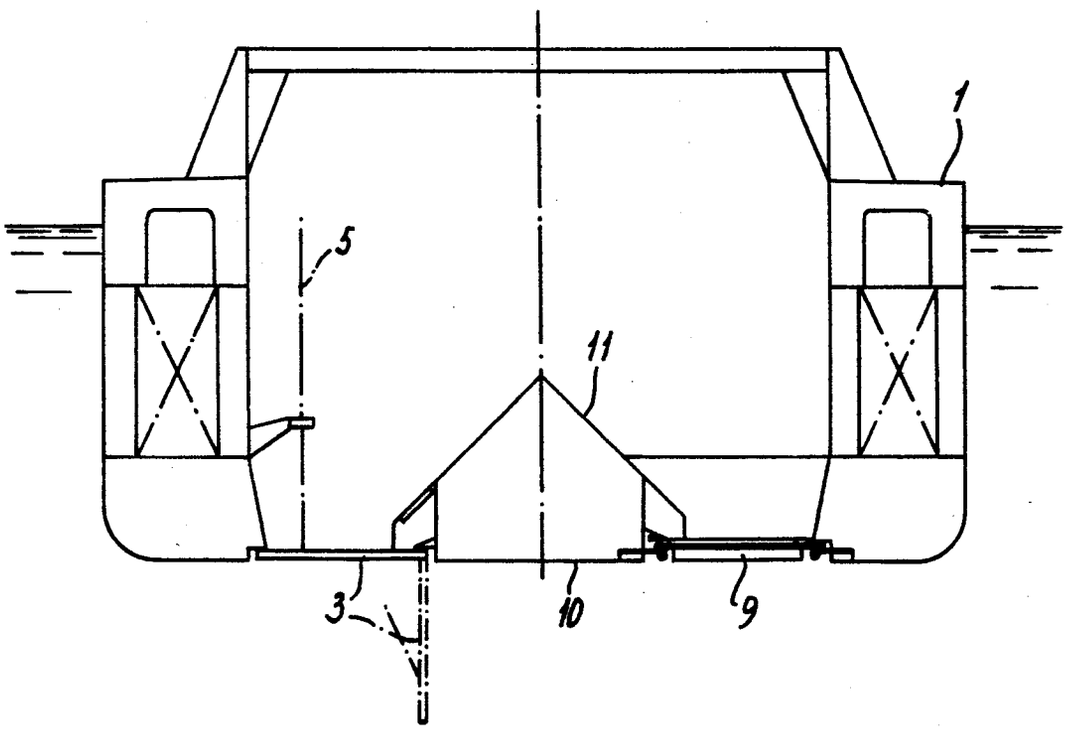
Фиг-1



Фиг-2

0143484

Fig-3



0143484

European Patent Office

Application number

EP 84 20 1537

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	NL-C- 112 379 (VERSCHURE & CO.) * column 2 - column 3, line 7; figures 1,2 *	1	B 63 B 35/30
X	DE-C- 154 022 (GOEDKOOP) * page 1, line 31 - page 2, line 60, figures 1-6 *	1,2,3	
A	EP-A-0 080 733 (AMERICAN STEAMPSHIP CO.) * page 3, line 26 - page 15, line 2; figures 1-3 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 63 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27-11-1984	VOLLERING J.P.G.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503 03.82