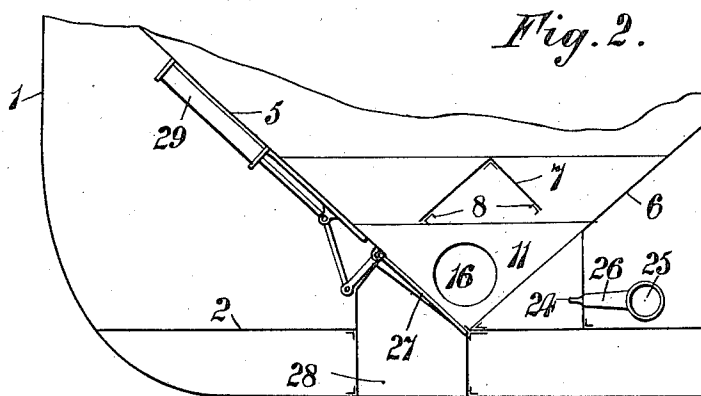
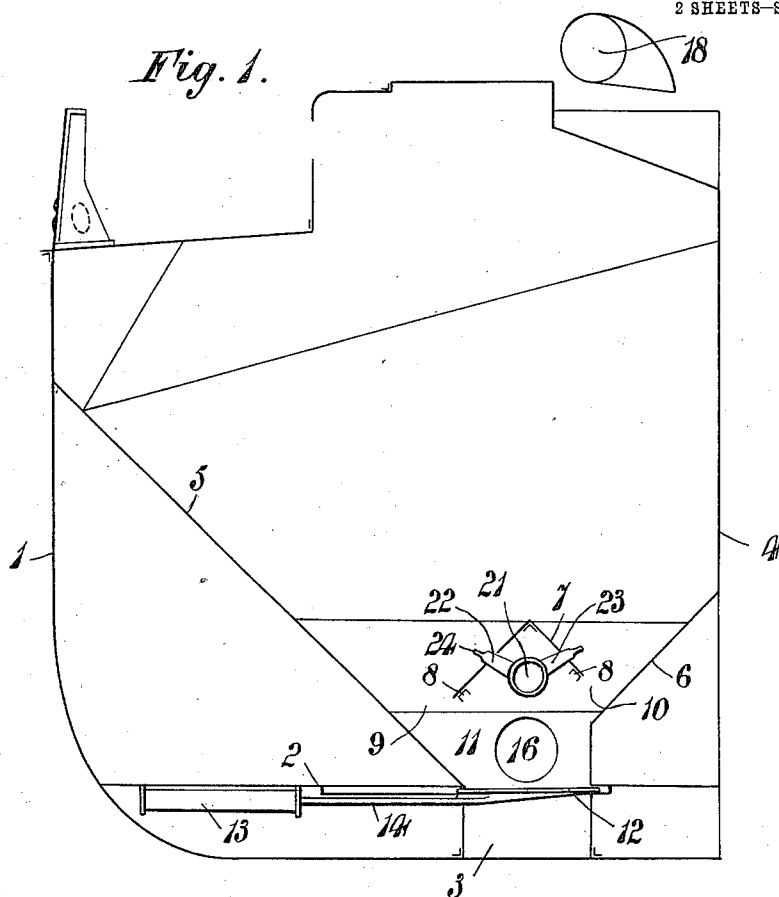


1,063,284.

J. REID.
DREDGE HOPPER.
APPLICATION FILED NOV. 21, 1911.

Patented June 3, 1913.

2 SHEETS—SHEET 1.



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Fig. 4.

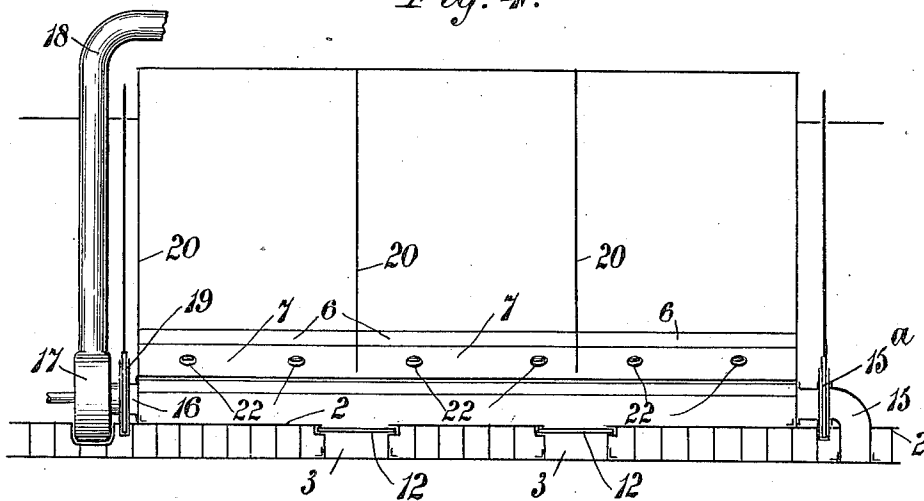


Fig. 3.

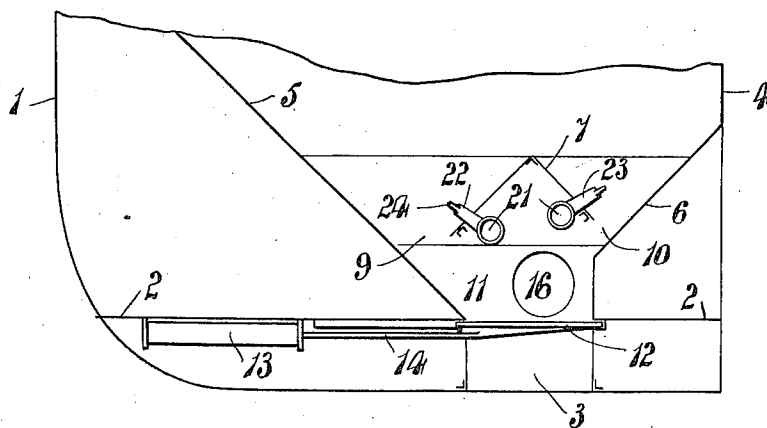
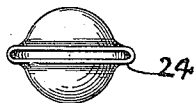


Fig. 5.



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DREDGE-HOPPER.

1,063,284.

Specification of Letters Patent.

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Application filed November 21, 1911. Serial No. 661,457.

To all whom it may concern:

Be it known that I, JOHN REID, resident of Whitehall Building, 17 Battery Place, New York city, in the United States of America, a subject of the King of Great Britain, have invented certain new and useful Improvements in Dredge-Hoppers; and I do hereby declare that the following is a full, clear, and exact description of the same.

The invention relates to improvements in dredge hoppers, as described in the present specification and illustrated in the accompanying drawings that form part of the same.

The invention consists essentially in the novel arrangement and construction, whereby in dumping operations, a steady flow of the sand or some such substance is maintained within the hopper and along the flushing trough and out through the sluice doors and pump hopper suction, and the operation of the various parts made simple and effective.

The objects of the invention are to perform at every discharge a complete operation so that there shall be no collection of the sand or other material left within the hopper or flushing trough, to make it possible to construct a much roomier hopper, and generally in such devices to simplify the operation and construction, without affecting the durability.

In the drawings, Figure 1 is a cross sectional view of that portion of the vessel in which a hopper is contained, showing the interior arrangement of said hopper. Fig. 2 is a similar view to that of Fig. 1, with the top portion of the vessel broken away and showing a simple modified form of the invention. Fig. 3 is another form of the invention, shown in a similar view. Fig. 4 is a longitudinal sectional view, showing hoppers on one side of the vessel and interior arrangements of said hoppers, and flushing trough. Fig. 5 is a detail of the nozzle.

Like numerals of reference indicate corresponding parts in each figure.

In the usual construction of hopper suction dredge, about a third of the vessel's length is devoted to the hoppers which are usually of an open box form with steep sloping sides. At the bottom, there are arranged troughs, or perhaps a single trough from the bottom of which are passages

forming dump openings through which a great part of the sand or other material is deposited.

The discharge openings are usually closed by doors hinged to the flooring of the hopper, generally on the sloping sides, which doors are customarily operated by chains and gearing. The present arrangement makes the parts very cumbersome and cuts out a considerable portion of what should be hopper space, and besides the doors can never be made or maintained even approximately water-tight, owing to the difficulty in seating them evenly on their sills, thereby rendering the dredge to some extent inefficient by reason of the escaping material which must flow out through the cracks incident to badly closed doors.

In the present invention, the doors are arranged in such a way that a water blast becomes very effective, maintaining a steady flow of the sand or other material, besides keeping said sand or other material from collecting on any of the beams or other strengthening structure and in addition the arrangement of the passages and openings is much more suitable for a continuous and quick discharge.

Referring to the drawings, 1 is the hull of the vessel.

2 is the inner framing.

3 are passages suitably walled in between said inner framing 2 and hull 1 and forming discharge openings from the hoppers.

4 is a central bulk head, dividing the hoppers longitudinally, as customary, though it must be understood that there may be just a single longitudinal row of hoppers.

5 is the sloping outer side wall of the hoppers on one side of the vessel extending from a side wall of the hull 1 to a longitudinal line on the inner framing 2 in alignment with the edges of the opening 3, said side wall 5 being at a slant considerably less steep than is usual in hopper side walls.

6 is the inner side wall of the hopper, sloping from the central bulk head 4 to the inner framing 2 of the other side of the passages or openings 3.

7 is a protecting roof shelter, preferably of the peak type, though it may be curved or any suitable shape, which will not collect the substance too readily, said protecting roof 7 extending the full length of the hopper, that is to say, from end to end, and

rigidly secured and supported by longitudinal girders 8 and other means necessary, said roof 7 terminating at each side within a reasonable distance of the sloping side walls 5 and 6, thus allowing free passages 9 and 10 between said roof and side walls and covering in the trough 11.

12 are sliding doors preferably closing in the passages or openings 3 and operated by means of the hydraulic cylinders 13 connected to the doors by the rods 14, said cylinders 13 being suitably connected to the deck so that the operator may readily open and close the doors.

15 is the inlet pipe to the trough 11, extending from one of the ends of said trough through the outer structure of the vessel.

15^a is a sluice gate in the inlet pipe 15.

16 is the outlet pipe from the trough 11, leading to the centrifugal pump 17, said pump having the discharge pipe 18 which may readily be converted into a feed pipe to the hoppers, as usual, in such vessels, the outlet pipe 16 being cut out during the excavation work by the sluice-gate 19.

20 are cross bulk heads, within the hopper, preferably arranged centrally above the passages 3 and extending downwardly to the protecting roof 7.

21 is a water pipe, which is adapted to receive water under pressure and which is suitably supported under the protecting roof 7, preferably central, though there may be pipes on each side, as shown in Fig. 3. In Fig. 1, this pipe is shown centrally and as having the nozzles 22 and 23, said nozzles preferably terminating in open flat spreading lips 24, adapted to give the jet of water from said nozzles a very good range, said jet of water being really in the form of a water blast completely clearing the sides 5 and 6 and all the beams and other structure within each division of the hopper, said nozzles, of course, extending from the water pipe 21 in pairs within each division and forming a main feature to this invention for by means of these water blasts and the arrangement of the doors, the particular construction of hopper is made possible. In Fig. 2, the water pipe 25 is shown in a different position, that is to say, between the inner side wall 6 and the central bulk head and having a nozzle 26 extending laterally so as to direct the blast of water across the trough 11 and up the opposite side wall. This arrangement may not be as efficient as the arrangement described above and it is just shown to give some idea of the many variations that may be made in the position of the nozzles.

In Fig. 2, hinged doors 27 are shown at the lower end of the outer side wall 5 leading to the dump openings 28. This is only a slight modification, said doors 27 being operated similarly from a hydraulic cylinder

29 by means of suitable rods and levers. This, of course, may be a slide door in the side wall, if it is desired.

In the operation of the invention, it will be seen that it is arranged to get control of the material in the hopper and bring force to bear at the will of the dredge operator, so as to compel the material to break up from its consolidated condition and bring it down into the hopper bottom trough where it is distributed along said trough and pours out evenly through the sluices or discharge openings, thus providing a rapid and continuous discharge of the dredged material, entirely under the control of the operator, as by shutting off one or more of the sluice gates or by partially closing same, or by interrupting the jet action on the dredge pump suction, any desired rate of discharge may be arranged for, not only for the whole lot, but for any section of the same in the hopper with divided pockets. The trough in each case is continuous and is covered in by said protecting roof under the bulk heads.

It is desirable, but not essential to my invention, to place the hopper sluices centrally under the transverse bulk heads where they are cut for the passage of the trough, as such arrangement will protect the sluices from the pressure of the dredged material which might otherwise bear very hardly on the closed doors and to some extent retard their operation.

What I claim as my invention is:

1. A dredge hopper, comprising sloping and perpendicular walls leading to a trough portion at the bottom thereof, a protecting roof for said trough portion and discharge openings through the skin of the vessel at intervals from said trough, and a water pipe arranged under said protecting roof and having spraying nozzles extending into the hopper proper and adapted to keep the dredged material moving.

2. A dredge hopper, comprising sloping and perpendicular walls leading to a longitudinal trough at the bottom end thereof, a protecting roof over said trough extending the full length of the hopper and discharge passages from said trough and extending through the skin of the vessel, doors closing said openings and a water pipe having nozzles extending laterally therefrom and adapted to send jets of water directed to those parts of the hopper construction, on which the dredged material ordinarily collects.

3. A dredge hopper, comprising sloping side walls to a trough formation at the bottom and perpendicular end walls and intermediate cross bulkheads, said intermediate cross bulkheads terminating above the trough at the bottom of the hopper, a protecting roof extending the full length of the hopper and passages from said trough

through the skin of the vessel, sliding doors closing the ways to said passages, means for driving the dredged material in a comminuted condition to said trough, and means

5 for operating said doors.

4. A dredge hopper, comprising sloping side walls and perpendicular end walls, a trough portion and intermediate walls, said intermediate walls terminating at their
10 lower ends above the trough, a protecting roof extending the full length of the hopper beneath said intermediate cross bulkheads and partially closing in the trough, said
15 trough having dump openings extending through the skin of the vessel at a position below said intermediate cross bulkheads, doors closing said opening and a longitudinal pipe under said protecting roof and adapted to contain water under pressure
20 and having spraying nozzles extending laterally therefrom within each of the hopper compartments, said nozzles being adapted to project jets of water into the dredged material and maintain said material during
25 discharge in a comminuted condition.

5. A dredge hopper comprising longitudinal walls converging to a trough-shaped formation, a bottom and end walls, one of said end walls having at one end of the trough the pump suction pipe therethrough 30 and the other end wall having an inlet from the seawater, and a shelter extending the full length of said hopper slightly above the bottom and partially covering in the trough and shaped to bring the sand there- 35 under substantially on a level with its lower edge and leave a space between said sand level and the underside of said shelter for the accumulation of still water adapted to initiate the flow of sand and water in said 40 trough between the sea inlet and pump suction pipe during discharging operations.

Signed at Montreal Canada this 15th day of November 1911.

JOHN REID.

Witnesses:

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G. H. TRESIDDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."