Dec. 8, 1925. 1,564,805

C. C. WEST

HYDRAULIC CONVEYER ADAPTED FOR UNLOADING SHIPS

Filed May 6, 1921 2 Sheets-Sheet 1

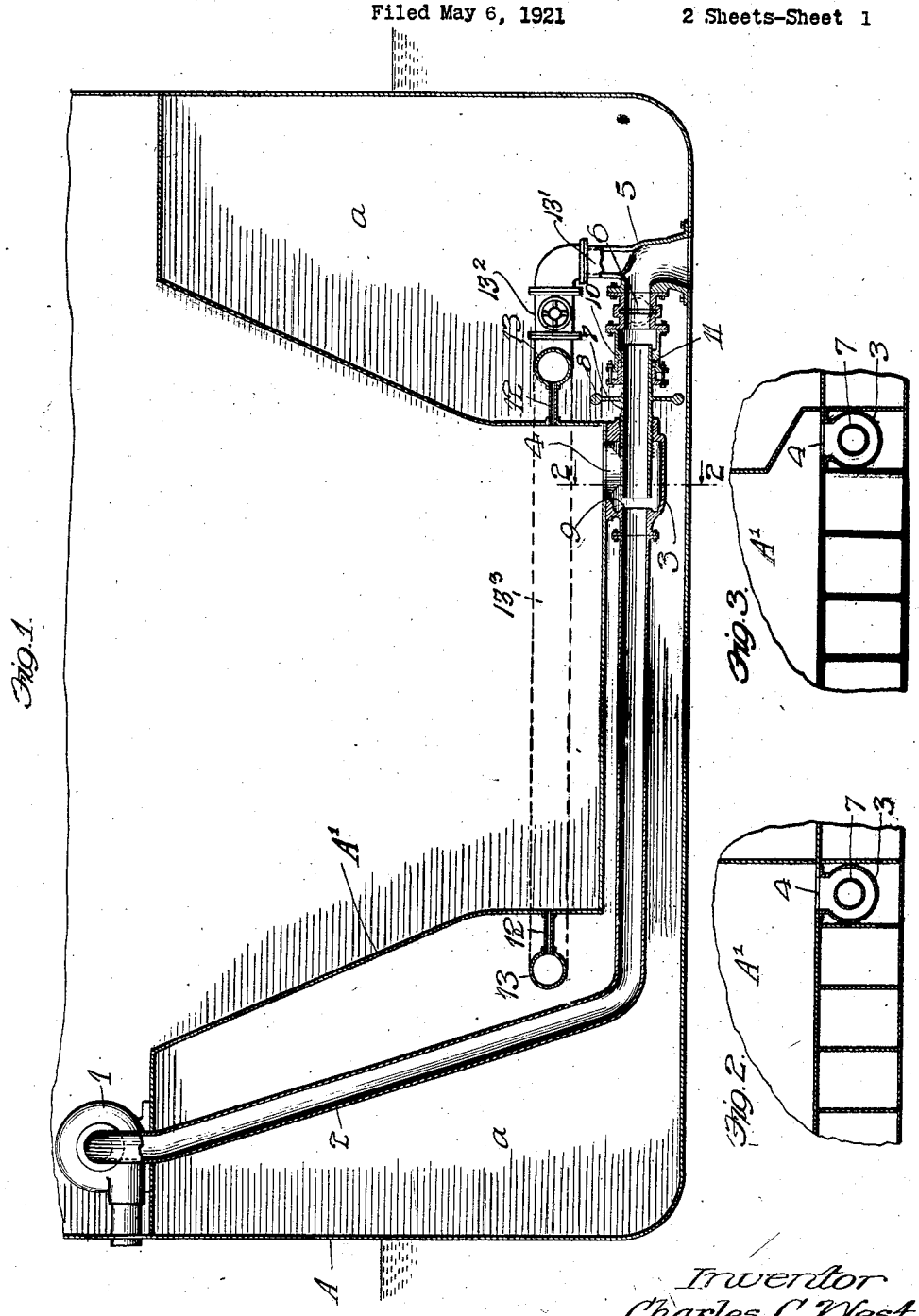



Fig. 1.




Fig. 3.




Fig. 2.

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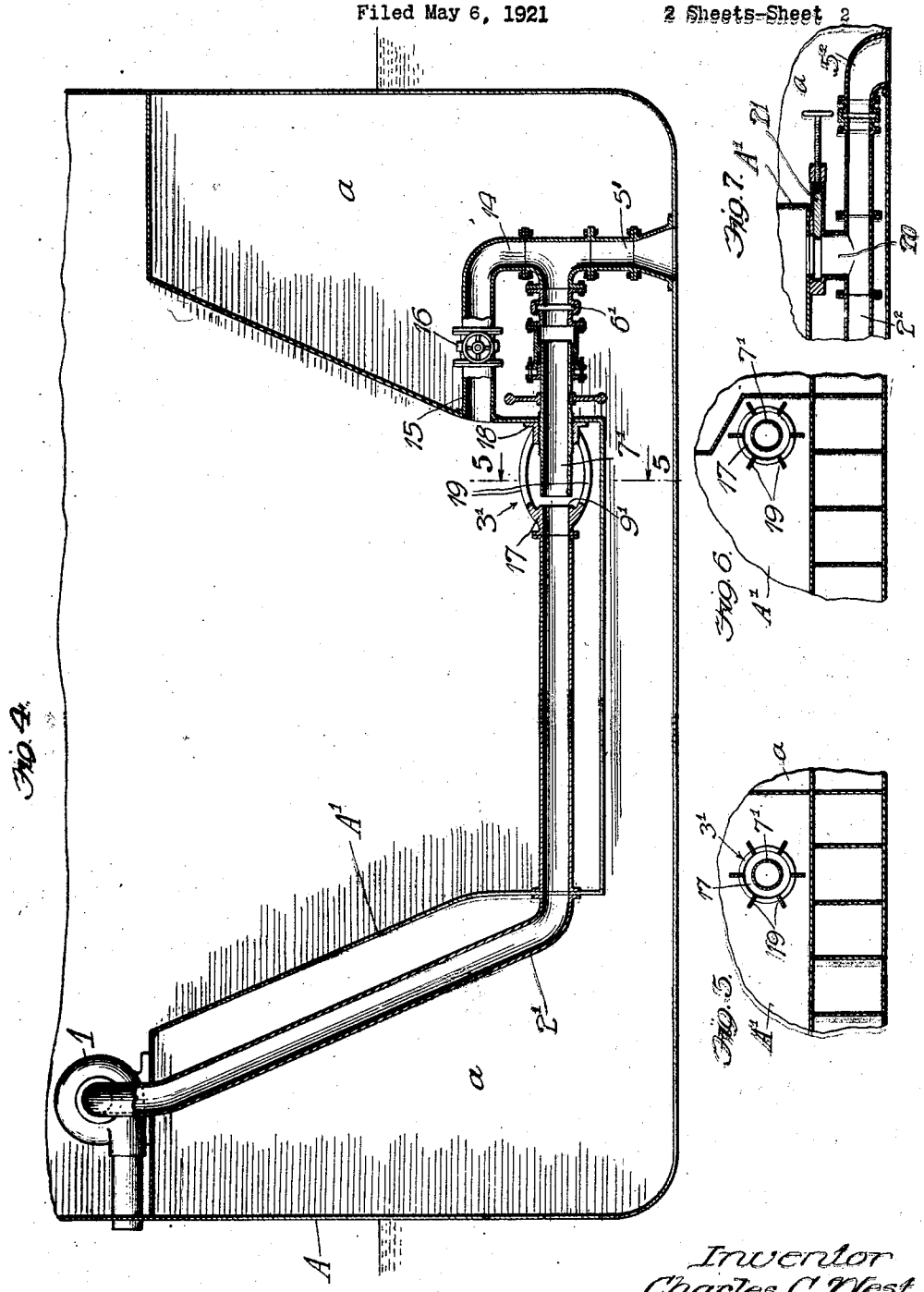



Fig. 4.




Fig. 7.




Fig. 6.




Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## HYDRAULIC CONVEYER ADAPTED FOR UNLOADING SHIPS.

Application filed May 6, 1921. Serial No. 467,371.

*To all whom it may concern:*

Be it known that I, CHARLES C. WEST, a citizen of the United States, and a resident of Manitowoc, county of Manitowoc, and State of Wisconsin, have invented certain new and useful Improvements in Hydraulic Conveyers Adapted for Unloading Ships, of which the following is a specification.

This invention relates to conveyers and relates particularly to hydraulic conveyers, especially designed and adapted for handling sand and other materials which can be handled by means of centrifugal pumps.

The object of the invention is to provide a conveyer adapted for quickly and economically unloading sand from vessels—and for other similar purposes.

To effect the object of the invention, my improved conveyer comprises the various features, combinations of features and details of construction hereinafter described and claimed.

In the accompanying drawings, in which my invention is fully described,

Figure 1 is a diagrammatic sectional view of a vessel equipped with a conveyer of my invention, said conveyer being shown in section.

Figure 2 is a sectional view on the line 2—2 of Fig. 1.

Figure 3 is a view similar to Fig. 2 illustrating a modification.

Figure 4 is a view substantially similar to Fig. 1, illustrating a modified construction.

Figure 5 is a sectional view on the line 5—5 of Fig. 4.

Figure 6 is a view similar to Fig. 5 illustrating another modification; and

Figure 7 is a fragmentary view illustrating modified means for controlling communication between the hopper and the conveyer pipe.

Referring now to the drawings, in which I have for purpose of concrete and definite illustration, shown a conveyer of my invention as applied in use for unloading sand or similar material from a vessel, A indicates the hull of the vessel, built inside of which is a hopper A′ adapted to contain sand or other material which can be handled by a suitable pump. The hopper A′ is supported within the hold of the vessel by bulkheads *a* which extend between and connect said hopper with the hull A, there being a sufficient number of said bulkheads to provide supports of adequate strength for said hopper.

Said hull and hopper merely typify any form of container or receptacle to which a conveyer of my invention may be applied and both thereof may be of any desired or approved construction, and are not, therefore, shown or described in detail.

My improved conveyer comprises a pump, indicated at 1, and which may be mounted in any convenient position on the vessel. Said pump 1, is connected with the hopper A′ by means of a pipe 2, the end of which, remote from said pump, is connected to a hollow fitting or casing 3, said fitting or casing being provided with an opening 4 in one side thereof and being connected to the bottom of the hopper A′ with said opening in communication with a corresponding opening formed in the bottom of said hopper.

My improved conveyer also comprises a sea-cock 5 secured to the bottom of the hull A of the vessel with an open end of the casing thereof in communication with a corresponding opening in the bottom of said hull. Said sea-cock is controlled by a valve 6 therein, in a usual manner.

In the operation of the conveyer, water is adapted to be admitted to the pipe 2 through the sea-cock 5 in the following manner:— Secured in a hole or opening formed in the end of the fitting or casing 3 opposite to that to which the pipe 2 is connected so as to be movable endwise, is a pipe section 7. As shown, said sleeve is secured in screw threaded engagement with the hole or opening in said casing or fitting 3 and is adapted to be turned my means of a hand-wheel 8 formed thereon. Rotation of said pipe section, through its screw threaded engagement with the hole in said casing or fitting, will operate, in an obvious manner, to impart endwise movement thereto in one direction or the other, depending upon the direction in which said pipe section is turned.

The front end of said pipe section is adapted to engage a valve seat 9 formed on the interior of the casing or fitting 3 surrounding the admission opening to the conveyer pipe 2, thereby cutting off communication between said casing or fitting and the

conveyer pipe 2, and the rear end of said pipe section is slidably fitted to a hole or opening formed in a nipple or pipe section 10 secured to the sea-cock 5. Leakage around said pipe section is prevented by means of a suitable packing 11, said packing, as shown, being of the usual gland type.

With the described construction, it is obvious that when the pipe section 7 is turned to bring the front end thereof into engagement with the seat 9 on the casing or fitting 3 and the valve 6 of the sea-cock 5 is open, water will be admitted directly from said sea-cock to the conveyer pipe 2, and that when the pipe section 7 is turned to retract the front end thereof from the seat 9, the conveyer pipe 2 will be in communication with the hopper A'. Thus by closing the valve 6 in said sea-cock, said conveyer pipe 2 will communicate only with hopper A', or by retracting said pipe section 7 from the seat 9 and only partially closing the valve 6 in said sea-cock, said pipe will communicate with both the hopper A' and the sea-cock 5, thereby drawing material to be conveyed from said hopper and clear water from said sea-cock, which will thus operate, as a vehicle, to carry along with it the solid material from the hopper A'.

To facilitate the flow of material from the hopper A' into the casing or fitting 3, means are provided for admitting water to said hopper in sufficient quantities to render the contents of said hopper "fluid"—that is of such consistency that it will flow readily. For this purpose, flushing pipes are provided adapted for connecting said hopper with a source of water supply.

In what I consider to be the preferably embodiment of my invention, water is adapted to be supplied to said hopper by pipes 12, which connect said hopper with manifolds 13 which may communicate with a supply pump, not shown, or, in the case of a vessel, with the sea-cock 5 or directly through the sides of the vessel with the surrounding body of water at a sufficient distance below the water line to afford necessary water pressure under all loading conditions, to insure an adequate water supply. As shown, said manifolds have supply connection with the sea-cock 5 by means of a header 13' on said sea-cock, which connects it directly with one of the manifolds 13. Said header is controlled by a valve $13^2$ and the manifolds 3 at opposite sides of the hopper A' are cross-connected, as by a pipe indicated at $13^3$.

Said water supply pipes are provided with suitable control valves by means of which the quantity of water supplied to the hopper may be regulated as desired or entirely cut off.

As a modification of my invention, instead of the flushing pipes 12, I contemplate the use of a relatively large flushing pipe which communicates directly with the casing of the sea-cock 5 and which discharges into the hopper in close proximity to the point of communication of the conveyer pipe 2 with said hopper.

This modification is shown in Fig. 4 of the drawing, in which 14 designates a header on the sea-cock casing, 15 the pipe which connects said header with the interior of the hopper A', and 16 a valve which controls said pipe 15.

As shown in Figs. 1 to 3, the casing or fitting 3, conveyer pipe 2 and sea-cock 5 and associated parts are positioned at the under side of the hopper A' and outside thereof.

My improved conveyer may be installed in any convenient position with reference to other parts. For example, it may be positioned adjacent to a bulkhead *a*, as shown in Fig. 2, at a distance from said bulkhead, or said bulkhead may be off-set to form a recess to receive said conveyer, as shown in Fig. 3.

Instead of the construction shown in Figs. 1 to 3, in which the casing or fitting 3 and pipe 2 are located entirely outside of the hopper A', I contemplate as a modification of my improved conveyer, locating the casing or fitting 3 and also the section of the conveyer pipe 2 adjacent thereto inside of the hopper. With this construction, the casing or fitting 3, instead of having closed sides, will be made in the form of a cage comprising a front section on which the valve seat 9 is formed and a rear section provided with a screw-threaded opening for the pipe section, said front and rear sections being rigidly connected by spaced tie bars. In other respects said modified construction is similar to the conveyer shown in Figs. 1 to 3 and heretofore described.

Said modified construction is shown in Figs. 4 to 6 of the drawings, in which 2' designates the conveyer pipe, 3' the cage or fitting, as a whole, 5' the sea-cock, 6' the valve, which controls said sea-cock, and 7' the pipe section for connecting said sea-cock with the pipe 2'. Said cage 3' comprises front and back sections 17 and 18 which are rigidly connected by spaced tie bars 19, said front and rear sections 17 and 18 and said tie bars 19 being preferably made of cast iron and forming a single piece. Said front section is provided with a valve seat 9' for the end of the pipe section 7' and said rear section is provided with a hole or opening with which said pipe section has screw-threaded engagement.

As in the construction shown in Figs. 1 to 3, the cage or fitting 3' and the conveyer pipe 2' may be installed in any convenient position within the hopper, either clear of any bulkhead, or in a recess formed by an

off-set portion of the bulkhead, as shown in Figs. 5 and 6, respectively.

As a further modification of my invention, instead of controlling communication between the hopper A′ and the conveyer pipe 2 by means of the endwise movable pipe section 7 in co-operation with the valve seat 9 on the fitting 3, I contemplate the use of a fixed connection between the sea-cock 5 and conveyer pipe 2 and controlling communication between the hopper and conveyer pipe by means of a valve in the connection between said hopper and conveyer.

This modification is shown in Fig. 7 of the drawings, in which A′ designates the hopper, $2^2$ the conveyer pipe, $5^2$ the sea-cock, 20 a T-fitting which connects the hopper with the conveyer pipe $2^2$ and the sea-cock $5^2$ and 21 a valve which controls the branch of said T-fitting connected to the hopper A′.

The hopper A′ containing sand or other granular material which it is desired to discharge, either overboard or at a desired point of deposit, the contemplated operation of my improved conveyer is as follows:—

The pipe section 7 is first turned to seat the front end thereof against the valve seat 9 on the interior of the casing or fitting 3—or, in the construction shown in Fig. 7, the valve closed—and the valve 6 which controls the sea-cock 5 is opened, thereby admitting water directly from said sea-cock to the conveyer pipe 2. The pump 1 is next started, the suction of said pump operating to draw water from the sea-cock 5 through the conveyer pipe to said pump 1. When the pump 1 begins to discharge water—indicating that the conveyer pipe 2 is filled with water—the pipe section 7 is turned to retract the end thereof from contact with the valve seat 9—or the valve 21 opened—whereupon the weight of the sand in the hopper A′, which has been rendered "liquid" by the admission of water to said hopper through the flushing pipes provided for the purpose, together with the suction of the pump 1, will operate to cause the mixed sand and water to flow from said hopper into the casing 3, and thence into and through the conveyer pipe 2 to the pump 1, whence it will be discharged as contemplated.

When the end of the pipe section 7 is retracted from the valve seat 9—or the valve 21 opened—the valve 6 which controls the admission of water from the sea-cock 5 to the conveyer pipe 2 will be closed, whereby the entire suction of the pump will be applied to drawing mixed sand and water from the hopper and raising it through the conveyer pipe 2.

In case, at any time, it is desired to increase the fluidity of the mixed sand and water which enters the conveyer pipe 2 from the casing 3, this may be effected by only partially closing the valve 6, thus admitting any quantity of water desired from the sea-cock 5 to said conveyer pipe, and correspondingly increasing the fluidity of the mixed sand and water being conveyed.

I claim:

1. In a cargo carrying ship, the combination of the hull of the ship, a hopper therein forming the cargo space of the ship, a conveyer adapted for discharging sand and other granular material contained in said hopper, comprising a fitting which communicates with said hopper, a pump, a conveyer pipe which connects said fitting with said pump, a sea-cock installed in the hold of the ship below the water line under all conditions of loading, valve controlled pipe connections from said sea-cock to said fitting, comprising a pipe section supported so as to be movable endwise in position to register with the admission end of the conveyer pipe, said pipe section and conveyer pipe being provided with opposed valve seats adapted for engagement and disengagement by endwise movement of said pipe section to cut off or establish communication between said pipe section and fitting and forming means, when said valve seats are in contact, for connecting the conveyer pipe with the sea-cock, providing priming means for the pump, and pipe connections adapted for flushing the hopper to render the granular contents thereof fluid.

2. A cargo carrying ship as specified in claim 1, in which the pipe connections for flushing the hopper consist of manifolds which extend lengthwise along the sides of the hopper and pipes communicating with said manifolds which discharge into said hopper.

3. A cargo carrying ship as specified in claim 1, in which the pipe connections for flushing the hopper consist of manifolds which extend lengthwise of said hopper and which have valve controlled supply connections with the sea-cock, and pipes which communicate with said manifolds and which discharge into said hopper.

4. A cargo carrying ship as specified in claim 1, in which the fitting to which the conveyer is connected is positioned beneath the hopper and forms a closed casing provided with an opening which communicates with the interior of said hopper.

In witness that I claim the foregoing as my invention, I affix my signature this 16th day of April, A. D. 1921.

CHARLES C. WEST.