F. J. TREWENT & W. E. PROCTOR.

APPARATUS FOR EJECTING ASHES AND OTHER REFUSE FROM SHIPS.

APPLICATION FILED MAR. 2, 1910.

1,014,921.

Patented Jan. 16, 1912.

5 SHEETS—SHEET 1.

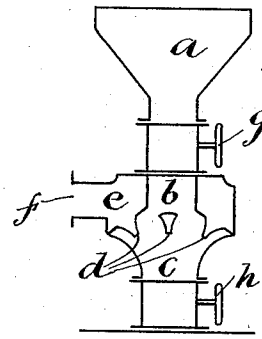

Fig. 1.

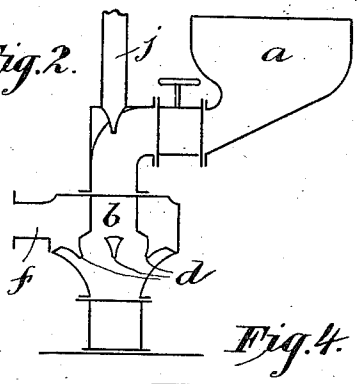

Fig. 2.

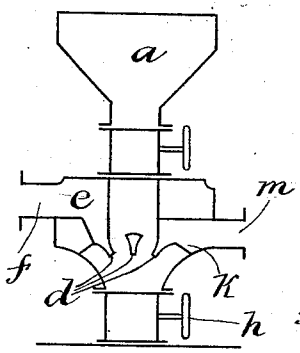

Fig. 3.

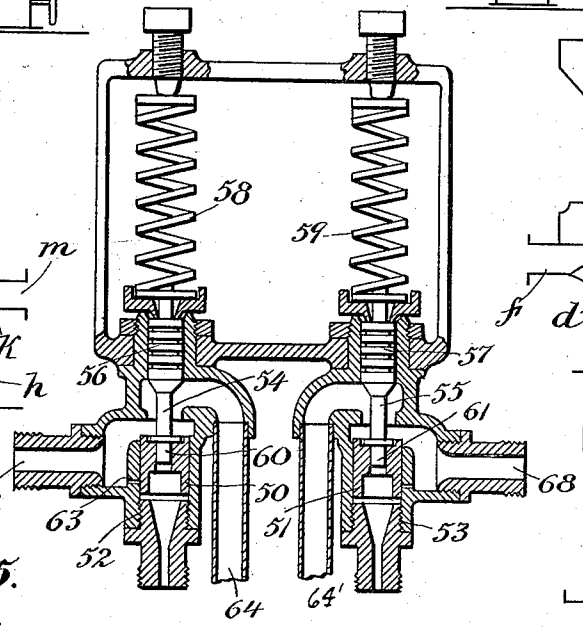

Fig. 8.

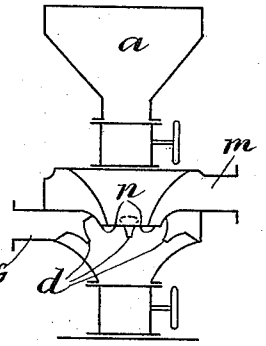

Fig. 4.

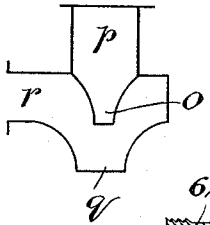

Fig. 5.

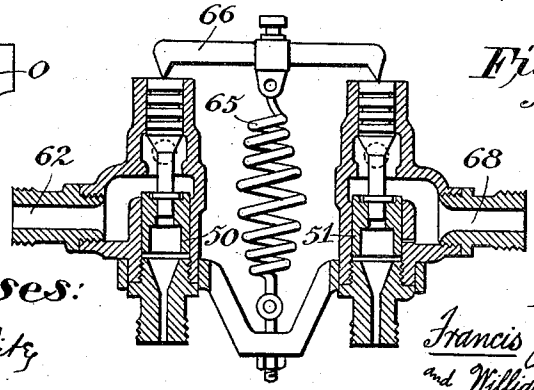

Fig. 9.

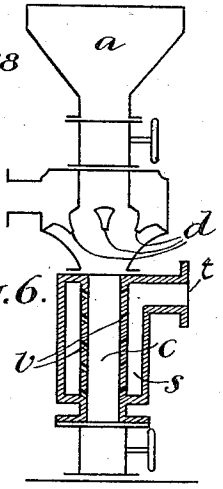

Fig. 6.

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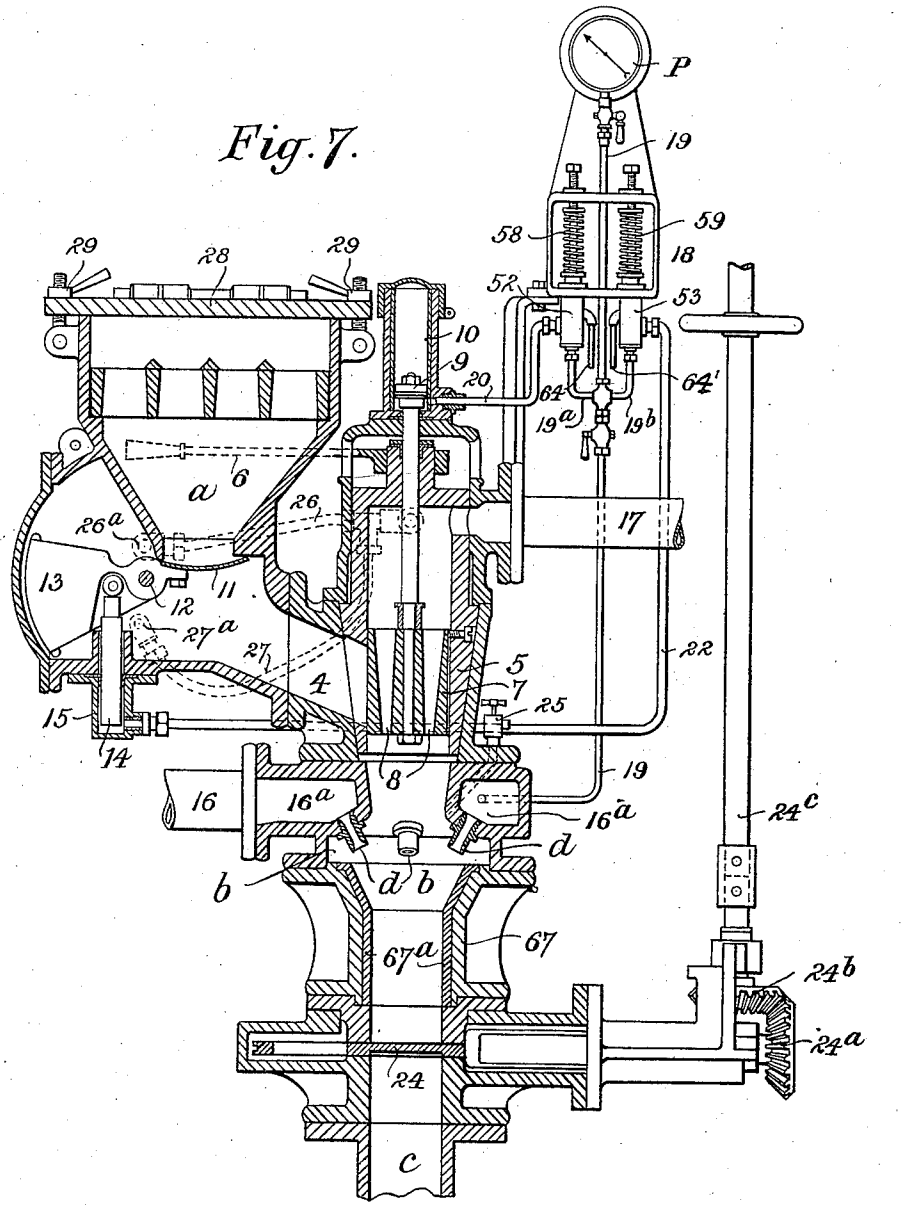
5 SHEETS—SHEET 2.

Fig. 7.



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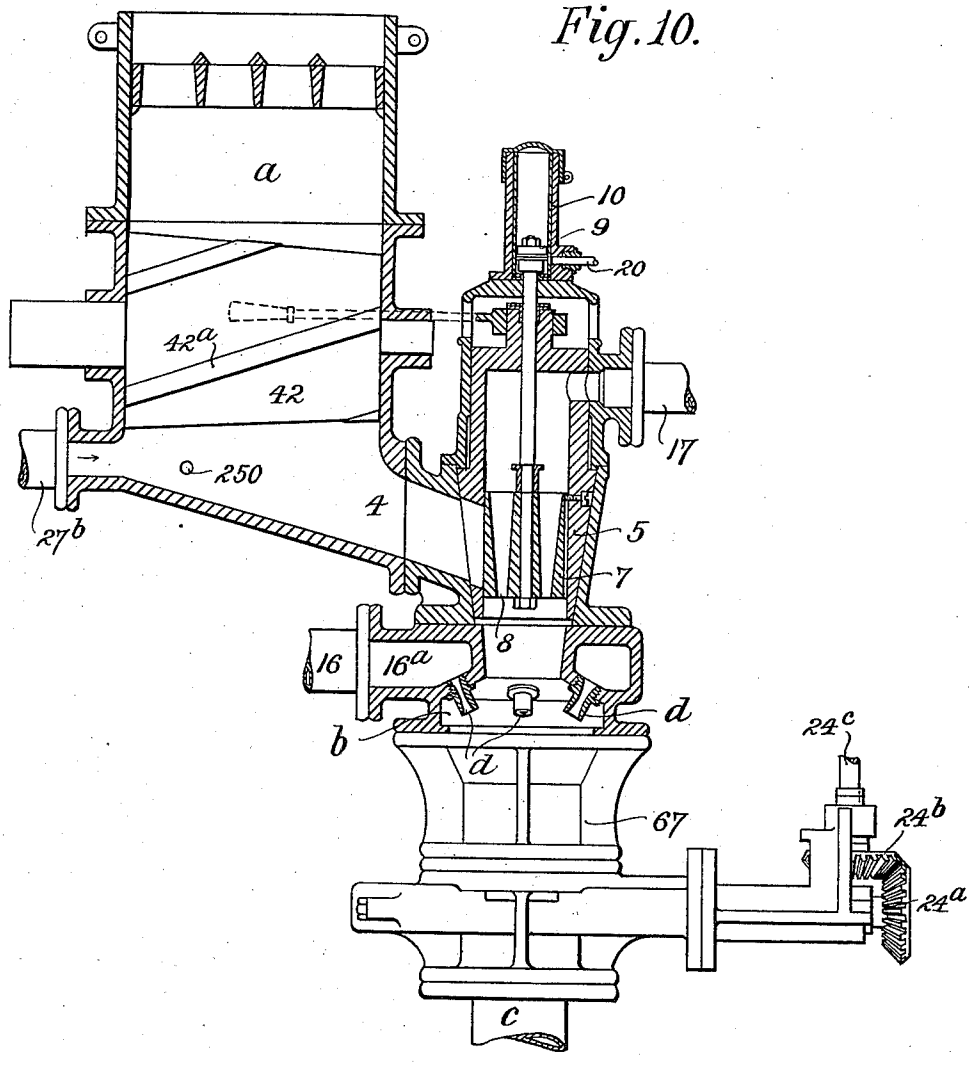
5 SHEETS—SHEET 3.

Fig. 10.



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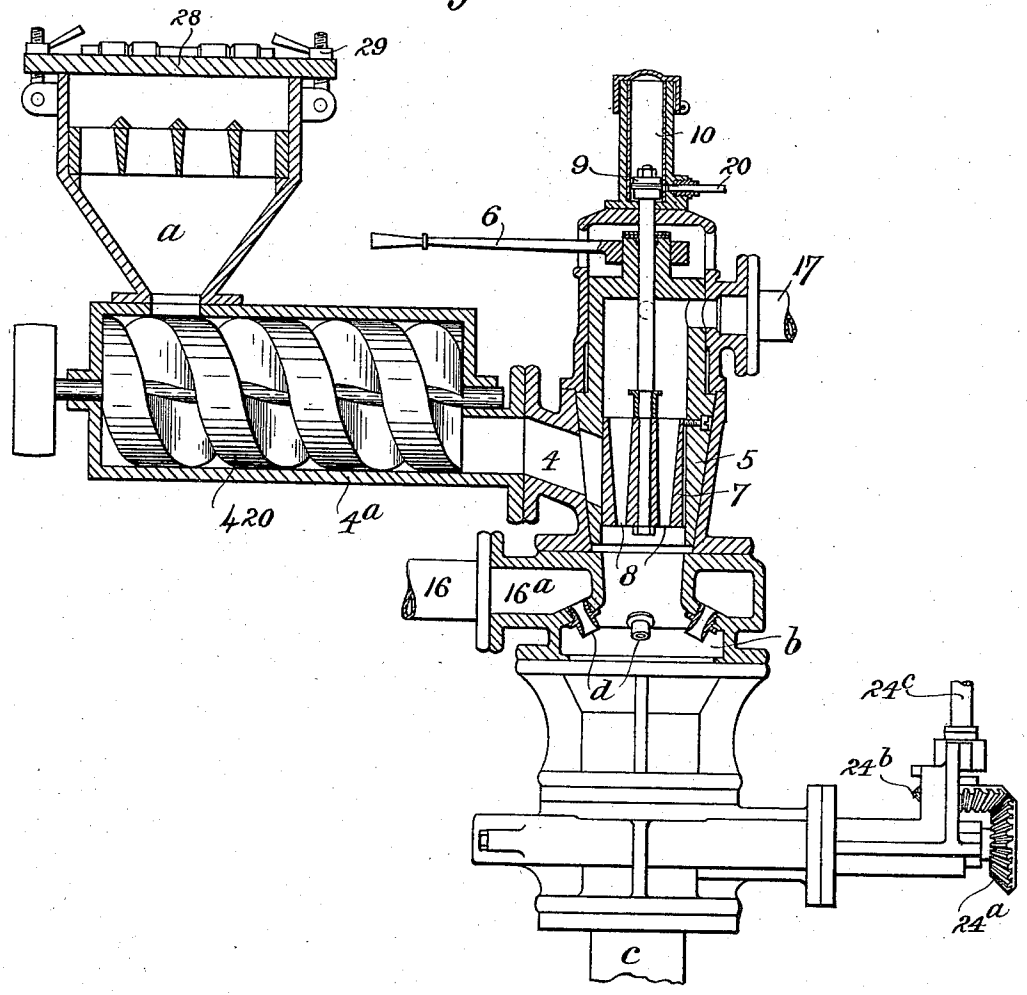
5 SHEETS—SHEET 4.

Fig. 11.



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5 SHEETS—SHEET 5.

Fig. 12.

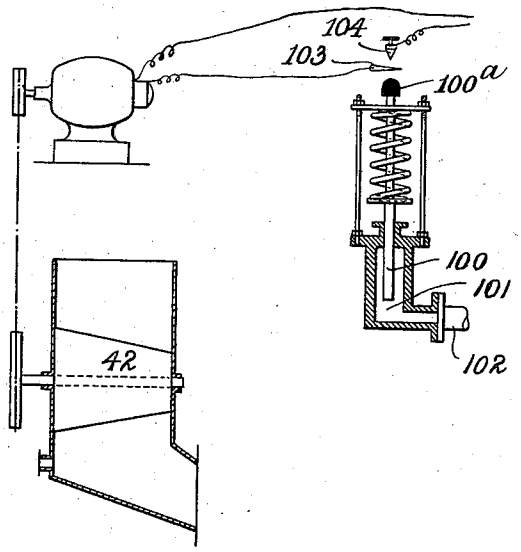
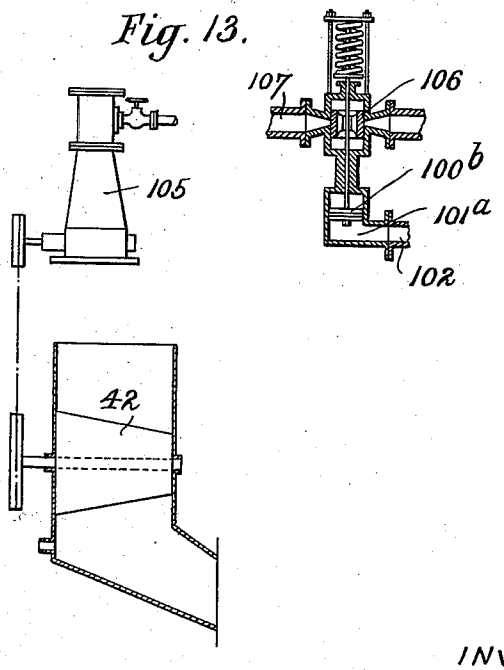


Fig. 13.



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APPARATUS FOR EJECTING ASHES AND OTHER REFUSE FROM SHIPS.

1,014,921. Specification of Letters Patent. Patented Jan. 16, 1912.

Application filed March 2, 1910. Serial No. 546,897.

To all whom it may concern:

Be it known that we, FRANCIS JAMES TREWENT and WILLIAM EDWARD PROCTOR, both of 43 Billiter Buildings, Billiter street, London, England, naval architects and consulting engineers, have invented certain new and useful Improvements in and Relating to Apparatus for Ejecting Ashes and other Refuse from Ships, of which the following is a specification.

This invention relates to apparatus for ejecting ashes and other refuse from ships, wherein the ashes are sent into an ejector chamber that is flooded or partly flooded with water entering from the sea, which water is expelled from this chamber by a current of pressure water serving to eject the ashes or refuse admitted to the said ejector chamber.

According to the invention we dispose water nozzles in the ejector chamber at points around a ring or rings so that the path of the refuse to be ejected passes through the space between the nozzles in such manner that the refuse ejected from the chamber is embraced or inclosed by a flow of water, whereby the ashes are kept toward the center and away from the sides of the discharge pipe. By this means the great disadvantage hitherto caused by the scouring and heavy wear produced by the grinding of the ashes against the sides of the discharge pipe and against corners or angles thereof under the action of the water under high pressure is prevented. The said nozzles will usually be disposed convergently so as to direct their jets of water convergently toward the axis of the discharge pipe in the direction of the discharge, and they are preferably supplied with high pressure water and serve to deliver the main ejecting water current. Some of the said nozzles may be supplied with high pressure water and others with water admitted from the sea, or with low pressure water, the nozzles being disposed symmetrically about the path of the refuse between them. If desired, each nozzle of the ring may be a compound nozzle having concentric passages supplied respectively with high pressure water and with sea of low pressure water so as to discharge a jet of high and low pressure water. Two nozzles disposed at opposite points of a ring may be employed, but it is preferable to employ three or more of them.

Above or behind the nozzles disposed at points of a ring we may dispose a nozzle or nozzles arranged so as to discharge through the ejector chamber; the same may be an axial nozzle or a concentric annular nozzle or a plurality of nozzles. Said nozzle or nozzles will usually be supplied with sea water or low pressure water. Such combined arrangement, like those in which some nozzles of a ring are supplied with high pressure water and others with sea or low pressure water, or those in which compound high or low pressure nozzles are used, has the advantage of increasing the efficiency of the apparatus by supplementing the ejecting action of the pressure nozzles and serving to increase the volume and therefore the velocity of the current of water and ashes passing through the bottom or side of the ship. In some cases the nozzles disposed at points of a ring may be supplied with sea or low pressure water and the nozzle or nozzles disposed above or behind them as described may be supplied with high pressure water.

The invention also consists in arranging the inlet to the ejector chamber and the outlet from the refuse receptacle to be cut off by valves adapted to open and close automatically, according to the pressure of the pressure water, in such manner that the ejector chamber valve opens at a lower pressure than the refuse receptacle valve, so that the cut off of the ejector chamber is opened before that of the refuse receptacle, and conversely that when the pressure falls the refuse receptacle is closed before the ejector chamber. By this means the sea is prevented from passing inward beyond the ejector chamber and the opening and closing of the refuse receptacle and the ejector in their proper sequence are automatically insured. In conjunction with such an arrangement we may provide a jet or jets of water arranged so as to act automatically to wash the connection between the ash or refuse receptacle and the ejector chamber, and the seat of the ejector chamber valve in the period between the closing of the refuse receptacle and the ejector chamber.

The invention also consists in the provision between the refuse receptacle and the

ejector chamber of a revoluble valve adapted throughout its rotation to pass the ashes to the ejector chamber from the receptacle, but nevertheless to be closed in every position to the passage of sea water. Said revoluble valve may be rotated by hand or mechanically, and the rotation of the valve may be controlled by automatic means, so as to stop the rotation when the force of the pressure water driving out the sea water falls to a predetermined degree.

In the accompanying drawings:—Figures 1 to 6 are diagrammatic sections showing various arrangements of nozzles in conjunction with an ejector chamber in accordance with the invention. Fig. 7 is a sectional elevation illustrating a form of apparatus wherein the inlet to the ejector chamber and the outlet from the refuse receptacle are arranged to be cut off by valves adapted to open and close automatically according to the pressure water, in a manner as above mentioned. Fig. 8 is a detail section of a form of valve gear adapted to control the opening and closing of the valves of Fig. 7 in their proper sequence. Fig. 9 is a detail of modified arrangement of valve gear. Fig. 10 is a sectional elevation of apparatus provided with one form of revoluble valve of the described character between the refuse receptacle and the ejector chamber; Fig. 11 is a sectional elevation of apparatus provided with another form of revoluble valve of the described character between the refuse receptacle and the ejector chamber. Figs. 12 and 13 are diagrammatic views of the apparatus illustrating means for automatically actuating the valve 42 shown in Fig. 10, the automatic means being shown in enlarged section.

Referring to the construction shown in Fig. 1, *a* represents the hopper for the ashes or refuse, *b* is the ejector chamber, having a discharge *c* through the bottom or side of the vessel, *d d* represent a ring of nozzles in the ejector chamber and through which the ashes from the hopper *a* pass, so as to be embraced by the water jets in the manner explained, *e* is an annular passage through which pressure water is supplied to the ring of nozzles from the supply pipe *f*. *g* represents a valve between the hopper and the ejector chamber, and *h* represents a valve in the discharge pipe near the ship's bottom.

In the modified construction shown in Fig. 2, the hopper *a* is disposed to one side of the apparatus and an additional nozzle *j* is disposed over the ejector chamber and axially of the ring of nozzles *d*, through which the ashes pass when discharged from the hopper. In this construction the nozzle *j* may be supplied with pressure water and the nozzles *d* with sea water, or if desired the nozzle *j* may be supplied with sea water and the nozzles *d* with pressure water, or any of the nozzles may be of the compound type as shown in Fig. 5.

In the construction shown in Fig. 3 there are two annular passages arranged within the ejector chamber, one passage *e* adapted to be supplied with pressure water through the pipe *f* and the other passage *k* adapted to be supplied with sea water through the passage *m*. In this construction some of the nozzles in the ring *d* through which the ashes discharge as before, are supplied with pressure water and some with sea water; these nozzles may be concentric or be placed one above the other, or the nozzles may be of the compound type as shown in Fig. 5.

In the construction shown in Fig. 4 there is a ring of nozzles *d* adapted to be supplied with pressure water from the supply pipe *f*, in conjunction with an annular nozzle *n* adapted to be supplied with sea water from the supply pipe *m;* or the annular nozzle may be supplied with pressure water and the ring of nozzles with sea water, or the ring of nozzles may be compound nozzles. The ashes from the hopper *a* discharge through the ring of nozzles *d* as before, so as to be embraced by the jets thereof.

Other combinations of nozzles embodying the principle of rings of jets through which the ashes passing through the ejector chamber discharge, may of course be arranged.

Two or more nozzles disposed opposite to one another and discharging down a common discharge pipe so that the refuse passes between them and is embraced by their jets may be used if desired, and may be considered as a ring for the purpose of this invention, but we prefer to use more than two. One or more of such nozzles may be supplied with pressure water and one or more with sea water, or a pressure nozzle and a compound nozzle disposed in the manner described may be employed.

Fig. 5 shows a compound nozzle adapted for use in apparatus made in accordance with this invention. This comprises a nozzle *o* adapted to be supplied with pressure water through the pipe *p* and a nozzle *q* adapted to be supplied with sea water through the pipe *r* or vice versa. No novelty is claimed for this type of nozzle *per se*.

Fig. 6 shows a similar arrangement to Fig. 1 but with the discharge pipe *c* provided with an annular chamber *s* adapted to be supplied with sea water or pressure water through the pipe *t*.

v v are openings or nozzles in the discharge pipe, the flow of water through these nozzles further assists the discharge and protects the sides of the pipes from scouring when ashes are passing down same.

Referring to the apparatus shown in Fig. 7, the ashes may be crushed or ground by

any well-known device if desired before being deposited in the hopper *a*.

b is the ejector chamber as before, provided with a ring of nozzles *d d* the jets whereof embrace the ashes discharged through the chamber *b*.

c is the discharge pipe which passes through the bottom of the vessel. The ejector chamber *b* is connected to the hopper *a* by means of an admission pipe 4. The nozzles *d* in the chamber *b* are supplied with pressure water from a donkey pump or other convenient source. The valve or cock 5 is adapted to be turned manually by the lever 6 or otherwise, to open and close the passage between the admission pipe 4 and the ejector chamber *b*. Within the cock 5 is disposed a safety valve 7 of the plunger type, provided with nozzles 8. The valve 7 is adapted to open and close the passage between the admission pipe 4 and the ejector chamber *b*. The valve 7 is raised by means of the piston 9 working in the hydraulic cylinder 10. An automatic ash control valve 11 is disposed at the base of the hopper *a*. This valve is pivoted at 12 and weighted at 13 so as to keep the hopper closed; the valve 11 is opened by the plunger 14 working in the hydraulic cylinder 15.

The nozzles *d* for discharging the jets that inclose or embrace the ashes passing through the chamber *b* are supplied with pressure water through the pipe 16 and the nozzles 8 are adapted to be supplied with sea water through the pipe 17. Strainers not shown may be disposed in the pressure and sea water pipes to prevent the nozzles from becoming choked.

18 is the automatic valve gear, which is illustrated in detail in Fig. 8.

19 is a pressure water pipe leading from the supply chamber 16^a of the nozzles *d* to the automatic valve gear to which it is connected by branches 19^a, 19^b, connected respectively to small valve cylinders 52, 53, in which work plunger valves 50 and 51, kept normally closed by adjustable springs 58, 59, through the medium of loose stems 54, 55, working in guides 56, 57, and the extensions 60, 61 of which pass through holes in the plungers 50 and 51.

20 is a pressure pipe leading from the connection 62 of valve cylinder 52 to the hydraulic cylinder 10 under the piston 9 that operates the safety valve 7.

22 is a pressure water pipe leading from the connection 68 of valve cylinder 53 to the hydraulic cylinder 15 of the ash valve operating piston 14. A pressure gage P is connected to the pipe 19. The valve 50 is adjusted to be lifted with less pressure than the valve 51. This insures that the safety valve 7 will be opened before the ash valve 11, and closed after the ash valve 11 has closed. When the valve 50 has been raised, pressure water passes by the port 63 to below the operating plunger 9 of the safety valve 7. Should the pressure fall, the plunger 50 drops and opens communication between 62 and the exhaust 64, thus allowing the valve 7 to close. Should the spring 58 break, the stem 54 will be blown out, plunger 50 will fall, closing the port 63 and opening the exhaust 64 and allowing the valve 7 to close. The plunger 51 works in a similar manner to plunger 50, allowing the ash controlling valve 11 to close when the pressure falls or the spring 59 breaks. 64′ is the corresponding exhaust. Adjustable weights or any other well known device may be used instead of springs for controlling the valves 50 and 51, or the valves may be of different areas if desired.

26, 27 represent pipes connected to the interior of the valve 5 and serving to lead sea water therefrom (when supplied by the pipe 17) and deliver the same at 26^a and 27^a into the connection between the hopper *a* and ejector chamber *b* for the purpose of assisting the passage of the ashes. The flush pipes 26, 27 might be supplied with pressure water if desired.

24 is a stop valve disposed in discharge pipe so as to shut off communication with the sea if desired, either automatically or by hand. The bevel gears 24^a, 24^b and shaft 24^c serve for operating the valve.

In operation, when starting the apparatus, the ash valve 11, the cock 5 and the safety valve 7 are shut, and the stop valve 24 is opened, thus permitting sea water to pass into the ejector chamber *b*. The pump is then started and pressure water supplied to the nozzle *d* at a sufficient pressure to drive the sea water out of the chamber *b*. Intimation that this has occurred is given by the sound of air being drawn through the snift valve 25. The pressure is then raised to open the valve 50 and thereby operate piston 9 and raise the safety valve 7 at the discharge end of the admission pipe 4. The pressure is then further raised, whereupon the valve 51 is lifted, the plunger 14 operated and the ash valve 11 at the base of the hopper opened. The cock 5 may now be opened by the lever 6. The ashes in the hopper *a* are now permitted to pass down the admission pipe 4 to the ejector chamber *b*, the passage thereof being assisted by the jets from the pipes 26 and 27. The supply of water to the pipes 26 and 27 may be controlled automatically, 26 to close when the valve 11 closes, and 27 to close when the plunger 7 closes. As soon as the ashes emerge from the admission pipe 4 they are discharged through the bottom of the vessel by the jets issuing from the nozzles 8 and *d*. The discharge may be effected vertically, horizontally, or at any angle. The pressure is preferably maintained suffi-

ciently high to insure the valves 11 and 7 being kept open after the operation has started. Should the pressure fall below the pressure at which the ash valve 11 at the base of the hopper *a* was opened, the plunger 14 is the first to fall, thus closing the valve 11 and preventing the ashes from descending into the admission pipe. The jets from the pipe 27 will continue to flow until the pressure falls sufficiently low to allow the valve 7 at the discharge end of the admission pipe to fall and close. The flow of water from the pipe 27 after the admission of ashes has been stopped, effectually clears the admission pipe of ashes before the valve 7 is closed. Once this valve is closed there is no fear of any back flooding due to a further fall in the pressure of the water. The hopper is provided with a hinged rubber jointed cover 28 which can be secured by bolts 29.

Fig. 9 illustrates a similar arrangement to that shown in Fig. 8, except that only one spring is provided, the valve operating the safety valve being adjusted to open before the valve controlling the ashes, by regulating the position of the spring 65 on the cross lever 66. The spring can be arranged in compression instead of tension. If required a single automatically operated valve may be used to close the passage through which the ashes travel from the hopper to the ejector chamber.

Figs. 10 and 11 illustrate forms of the apparatus in which a mechanically revoluble valve adapted throughout its rotation to pass the ashes to the ejector chamber, but nevertheless constantly closed to the passage of sea water, is fitted between the hopper and the ejector chamber.

In the form shown in Fig. 10, a conical plug 42 provided with vanes 42^a is revolubly mounted below the hopper *a*. The valve 42 thus in all positions prevents the passage of sea water past it, but at the same time it can pass the ashes continuously during its rotation. The vanes of the valve 42 are shown as arranged spirally for the purpose of crushing ashes which may get caught. The inlet of the ashes to the ejector chamber is controlled by a rotary valve 5 and a plunger 7 operated by the pressure water by means of a piston 9 and cylinder 10 as before. The valve 42 may be rotated by any suitable means. The rotation of the valve 42 may be controlled by automatic means so as to stop rotating when the pressure of the pressure water falls to a predetermined head, so as to cut off the supply of ashes before the plunger 7 falls. Suitable means for the purpose are shown diagrammatically in Fig. 12, in which the cock 42 is driven electrically by a motor through suitable gear, and the electric current to the motor is interrupted by an ordinary electric make and break contrivance operated by a spring-pressed plunger 100 having an insulating cap 100^a and subject to the action of the pressure water in a chamber 101 connected to a pipe 102 in connection with the delivery pipe from the pump to the ejector nozzles *d*. The pressure of the pressure water keeps the plunger 100 raised and holds the contact 103 against the contact 104, but when the pressure falls below the determined limit as adjusted by the spring of the valve, this releases the contact 103 and the circuit is broken. Fig. 13 shows diagrammatically another form of controlling arrangement suitable in cases where the valve 42 is driven by a steam engine. In this case in addition to the ordinary steam stop valve on the engine, a contrivance as shown would regulate the supply of steam to the engine 105. The pipe 102 connected to the delivery pipe from the pump to the ejector nozzles would again lead to a chamber 101^a in which works a spring-pressed piston 100^b the rod of which carries a piston valve 106 adapted to open and close the passage of the steam to the engine through the supply pipe 107. By adjusting the spring, the piston valve 106 can be made to lift at any required water pressure and permit steam to pass to the engine, and to close at a predetermined fall of pressure. The passage of the ashes down the admission pipe 4 is assisted by a jet or jets of water from the pipe 27^b which is supplied with pressure or sea water; the supply of water to this pipe may be controlled automatically to stop when the plunger 7 closes. A snift valve 250 is provided beneath the cock 42. The other reference characters on the figure indicate parts corresponding to those in Fig. 7.

The apparatus shown in Fig. 11 is similar to that of Fig. 10, except that the rotary valve for passing the ashes to the ejector chamber is in the form of a double or multiple threaded screw conveyer 420 mounted in a cylindrical casing 4^a closely embracing the same. Such a conveyer while passing the ashes while it rotates will nevertheless always be closed against the passage of sea water. The conveyer may be rotated by any suitable means. The conveyer may be incased in a cylinder and rotate therewith in a cylindrical chamber if desired, or it may simply rotate in a cylindrical chamber as shown. The conveyer may be tapered if desired, for adjustment, or it may be disposed horizontally, vertically, or at any desired angle. The conveyer 420 or the valve 42 (Fig. 10) may be operated by mechanism worked by sea water or otherwise.

In Fig. 7 there is shown between the ejector chamber *b* and the stop valve 24 a length of pipe 67 which may be fitted with a renewable liner 67^a.

The apparatus may be employed for dis-

charging the contents of water closets below water level.

What we claim and desire to secure by Letters Patent is:—

1. In apparatus for ejecting ashes or other refuse from ships, the combination with an ejector chamber through which the refuse passes and adapted to be flooded with water, of a plurality of water nozzles disposed in said chamber about the path of the refuse therethrough, whereby the refuse is embraced by the water jets from said nozzles, substantially as and for the purpose described.

2. In apparatus for ejecting ashes or other refuse from ships, the combination with an ejector chamber through which the refuse passes, and adapted to be flooded with water, of a plurality of ejecting nozzles disposed in said chamber about the path of the refuse therethrough whereby to embrace the refuse by the jets from said nozzles, and means for supplying pressure water to said ejecting nozzles, substantially as and for the purpose described.

3. In apparatus for ejecting ashes or other refuse from ships, the combination with an ejector chamber through which the refuse passes, and adapted to be flooded with water, of a ring of water nozzles disposed in said chamber about the path of the refuse through said chamber, whereby to embrace the refuse by the jets from said nozzles, substantially as and for the purpose described.

4. In apparatus for ejecting ashes and other refuse from ships, the combination with an ejector chamber through which the refuse passes, and adapted to be flooded with water, of a ring of ejecting nozzles disposed in said chamber about the path of the refuse therethrough, whereby to embrace the refuse by the jets from said nozzles, and means for supplying pressure water to said ejecting nozzles, substantially as and for the purpose described.

5. In apparatus for ejecting ashes or other refuse from ships, the combination with an ejector chamber through which the refuse passes and adapted to be flooded with water of a plurality of water nozzles disposed in said chamber about the path of the refuse therethrough, whereby the refuse is embraced by the water jets from said nozzles, and a water nozzle located to discharge through the ejector chamber from behind the said plurality of nozzles, substantially as described.

6. In apparatus for ejecting ashes or other refuse from ships, the combination with an ejector chamber through which the refuse passes, and adapted to be flooded with water, of a plurality of water nozzles disposed in said chamber about the path of the refuse therethrough, whereby to embrace the discharging refuse by the water jets from said nozzles, and an annular water nozzle also disposed in said chamber about the path of the refuse therethrough, whereby to embrace the discharging refuse by the water jet therefrom, substantially as described.

7. In apparatus for ejecting ashes or other refuse from ships, the combination with an ejector chamber through which the refuse passes, and adapted to be flooded with water, of a plurality of ejecting nozzles disposed in said chamber about the path of the refuse therethrough, an auxiliary nozzle located behind said ejecting nozzles, means for supplying pressure water to said ejecting nozzles, and means for supplying sea water to said auxiliary nozzle, substantially as described.

8. In apparatus for ejecting ashes or other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, and a plurality of water nozzles located in said ejector chamber about the path of the refuse therethrough whereby to embrace the discharging refuse by the jets from said nozzles, substantially as described.

9. In apparatus for ejecting ashes or other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, means for supplying pressure water to said ejector chamber, a refuse discharge connection between said container and said ejector chamber, a valve for controlling the outlet of the refuse from the container and a valve controlling the inlet of the refuse to the ejector chamber, means operated by the pressure of the pressure water for opening and closing said valves, said means being adapted in the rise of pressure of the water, first to open the said inlet valve to the ejector chamber and afterward said outlet valve from the container, and to close said valves in converse order in the fall of pressure of the water.

10. In apparatus for ejecting ashes or other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, means for supplying pressure water to said ejector chamber, a refuse discharge connection between said container and said ejector chamber, a valve for controlling the outlet of the refuse from the container and a valve controlling the inlet of the refuse to the ejector chamber, means operated by the pressure of the pressure water for opening and closing said valves, said means being adapted in the rise of pressure of the water, first to open the said inlet valve to the ejector chamber and afterward said outlet valve from the container, and to close said valves in con-

verse order in the fall of pressure of the water, and an automatic flushing jet adapted to flush the said connection and the seat of the refuse inlet valve to the ejector chamber, in the period between the closing of said valves.

11. In apparatus for ejecting ashes or other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, means for supplying pressure water to said ejector chamber, a refuse discharge connection between said container and ejector chamber and a revoluble valve adapted throughout its rotation to pass the refuse from the container to the ejector chamber while remaining closed to the passage of sea water.

12. In apparatus for ejecting ashes or other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, means for supplying pressure water to said ejector chamber, a refuse discharge connection between said container and ejector chamber and a revoluble valve adapted throughout its rotation to pass the refuse from the container to the ejector chamber while remaining closed to the passage of sea water, mechanical means for rotating said revoluble valve, and means controlled by the pressure of the pressure water, for stopping the rotation of said revoluble valve at a predetermined pressure, substantially as described.

13. In apparatus for ejecting ashes or other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, a plurality of ejecting nozzles disposed in said chamber about the path of the refuse therethrough whereby to embrace the discharging refuse by the jets from said nozzles, a refuse discharge connection between said container and ejecting chamber, a revoluble valve adapted throughout its rotation to pass the refuse from the container to the ejector chamber while remaining closed to the passage of sea water, a safety valve for closing communication between the said connection and the ejector chamber, means for supplying pressure water to said nozzles and means for closing said safety valve automatically at a predetermined pressure of the pressure water, substantially as described.

14. In apparatus for ejecting ashes or other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, means for supplying pressure water to said ejector chamber, a refuse discharge connection between said container and ejector chamber, a revoluble valve furnished with peripheral ribs, adapted throughout its rotation to pass the refuse from the container to the ejector chamber while remaining closed to the passage of sea water, and means for rotating said plug, substantially as described.

15. In apparatus for ejecting ashes and other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, a plurality of nozzles disposed in said chamber about the path of the refuse therethrough, a refuse discharge connection between said container and ejector chamber, a revoluble valve adapted throughout its rotation to pass the refuse from the container to the ejector chamber, a safety valve for closing communication between said connection and the ejector chamber, means for supplying pressure water to said nozzles, means for closing said safety valve automatically at a predetermined pressure of the pressure water, means for rotaing said revoluble valve mechanically, and means for stopping its rotation automatically at a predetermined pressure of the pressure water, substantially as described.

16. In apparatus for ejecting ashes or other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, a plurality of nozzles disposed in said chamber about the path of the refuse therethrough, a refuse discharge connection between said container and ejector chamber, a safety valve for opening and closing communication between said connection and the ejector chamber, passages in said safety valve and communicating with the ejector chamber, means for supplying pressure water to said nozzles, means for supplying sea water to said ejector chamber through the passages in said safety valve, and means for closing said safety valve automatically to shut off the ash connection from the ejector chamber at a predetermined pressure of the pressure water substantially as described.

17. In apparatus for ejecting ashes or other refuse from ships, the combination of a container for the refuse, a discharge outlet from the ship, an ejector chamber located between said container and outlet, a plurality of nozzles disposed in said chamber about the path of the refuse therethrough, a refuse discharge connection between said container and ejector chamber, a safety valve for opening and closing communication between said connection and the ejector chamber, passages in said safety valve and communicating with the ejector

chamber, means for supplying pressure water to said nozzles, means for supplying sea water to said ejector chamber through the passages in said safety valve, a revoluble valve adapted throughout its rotation to pass the refuse from the container to the ejector chamber, means for shutting said safety valve automatically at a predetermined pressure of the pressure water, means for rotating said revoluble valve mechanically, and means for stopping its rotation automatically at a predetermined pressure of the pressure water, substantially as described.

In witness whereof, we have hereunto signed our names in the presence of two subscribing witnesses.

FRANCIS JAMES TREWENT.
WILLIAM EDWARD PROCTOR.

Witnesses:
JOHN COURTNEY VAUGHAN NORTON,
ROBERT WILLARD SPEARPOINT.