

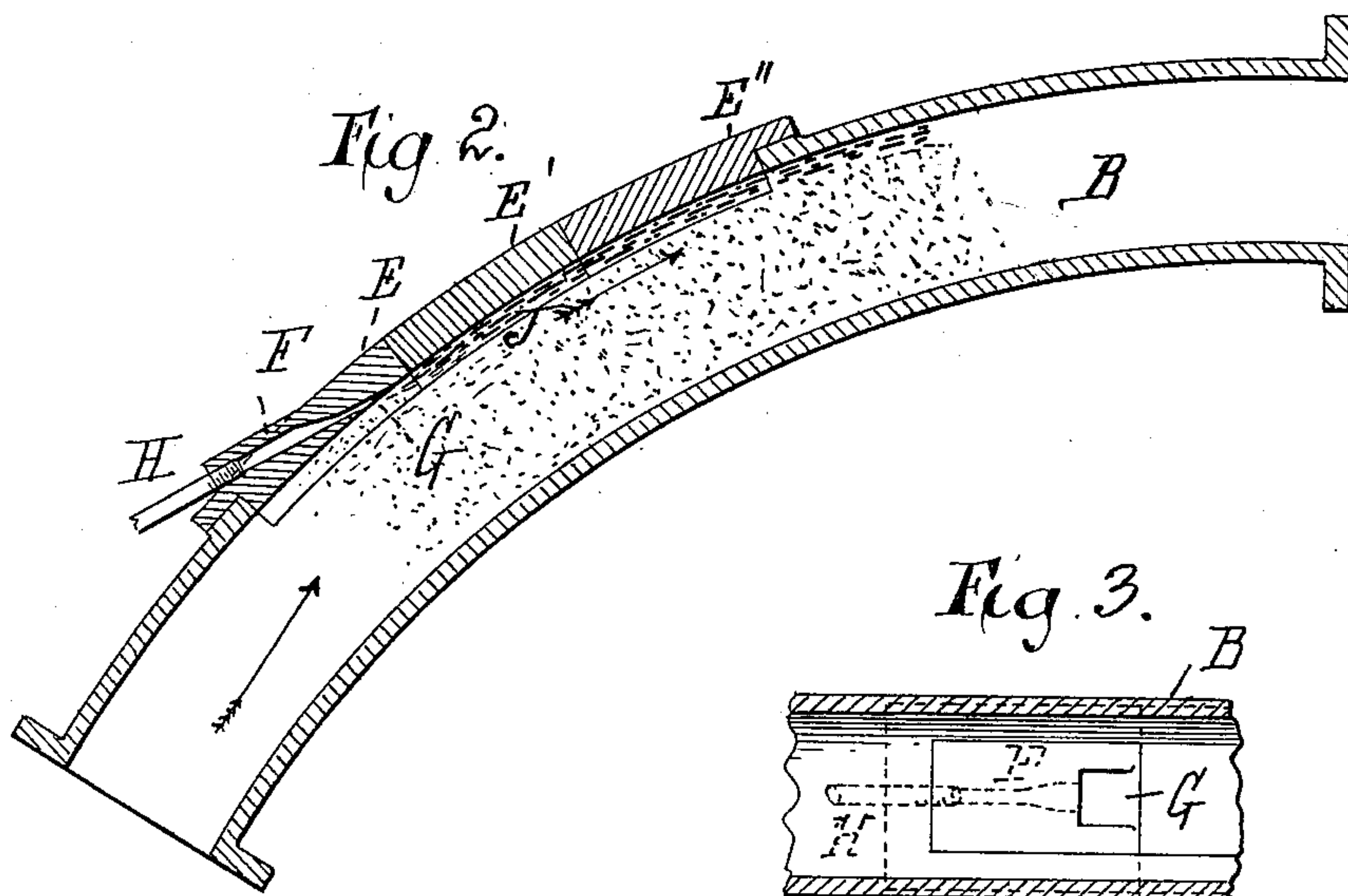
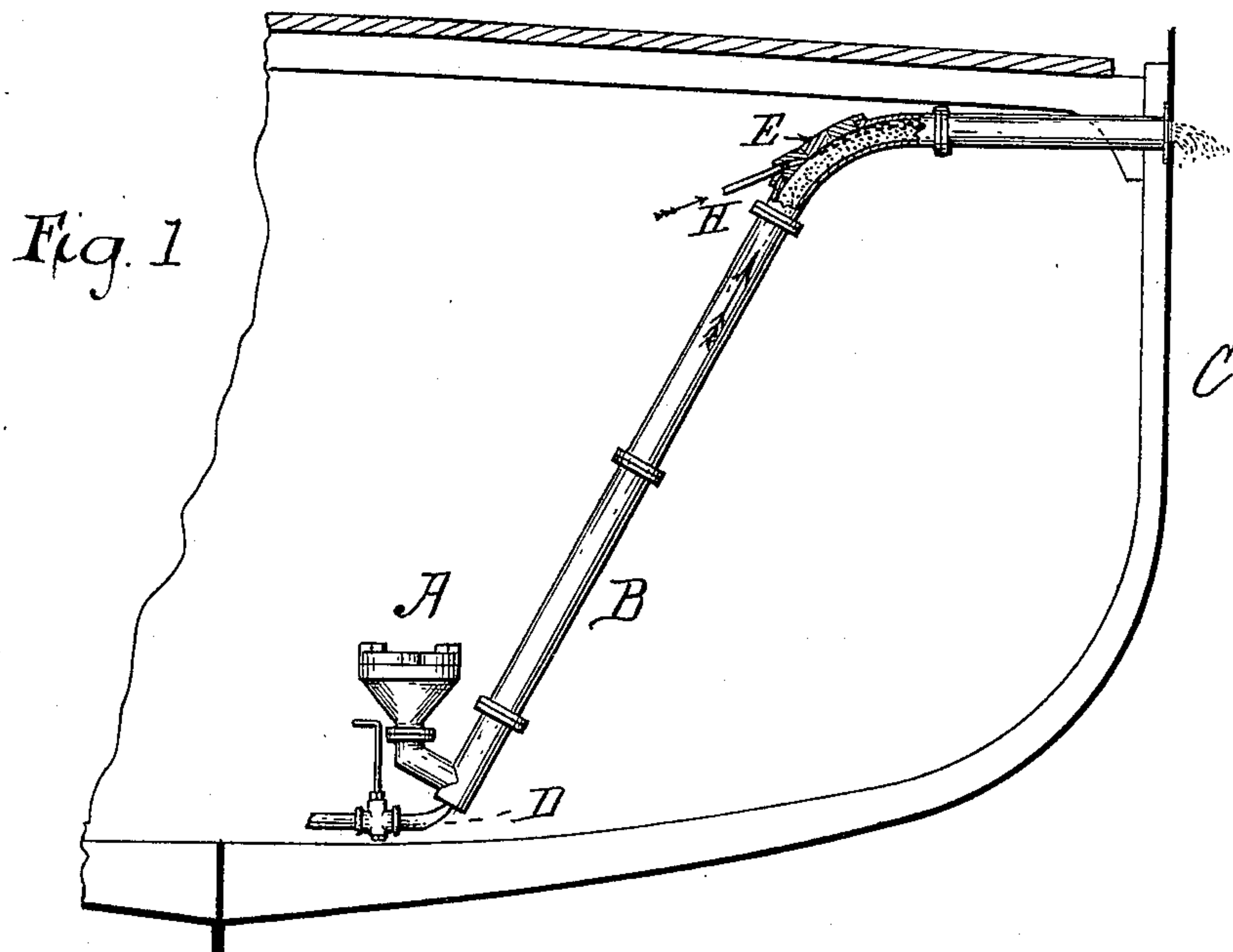
(No Model)

J. M. TAYLOR.

APPARATUS FOR ELEVATING OR CONVEYING ASHES, &c.

No. 584,968.

Patented June 22, 1897.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JOHN M. TAYLOR, OF PORTLAND, MAINE.

## APPARATUS FOR ELEVATING OR CONVEYING ASHES, &c.

SPECIFICATION forming part of Letters Patent No. 584,968, dated June 22, 1897.

Application filed December 23, 1896. Serial No. 616,726. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN M. TAYLOR, of Portland, Cumberland county, Maine, have invented a new and useful Improvement in  
5 Apparatus for Elevating or Conveying Ashes or other Loose Comminuted Material, of which the following is a specification.

My invention relates to that class of apparatus wherein a comminuted material—such  
10 as ashes, gravel, mud, &c.—is forced through a conduit or tube by a jet of water entering the end of said tube and entraining the loose solid material with it.

My invention consists more particularly in  
15 a novel device for preventing the erosion or scouring of the bends or turns in the conduit or tube by reason of the impact of the moving solid material upon the inner wall of the bend while it is undergoing change in direc-  
20 tion of movement.

In the accompanying drawings, Figure 1 shows my invention applied to the discharge-tube or conduit of an apparatus for ejecting  
25 ashes and other refuse from the holds of ships, the vessel being exhibited in transverse section. Fig. 2 is an enlarged longitudinal sectional view of my device; and Fig. 3 is a plan view of the inner wall of the tube, showing the inlet-orifice for the water forced  
30 in at the bend.

Similar letters of reference indicate like parts.

The ash-ejecting apparatus represented in Fig. 1 is substantially the same as that set  
35 forth in United States Letters Patent No. 482,759, granted September 20, 1892, to Horace See, and forms no part of my present invention. Neither is my invention limited to employment with such apparatus, which is  
40 here introduced for the purpose of illustrating one means of usefully applying my said invention. The said apparatus, briefly described, has a hopper A, which communicates with the discharge-pipe B. Said discharge-  
45 pipe leads upward and passes through the side C of the vessel above the water-line.

Communicating with the lower end of pipe B is a jet-pipe D, from which, by any suitable pump, water is ejected into the pipe B. The  
50 ashes thrown into the hopper A are entrained by the water emitted by pipe D and are by the force of the jet carried up the pipe B and

thence discharged through the side of the ship overboard.

It is found in practice that when the loose  
55 solid material meets a bend in the conduit-pipe and is thus compelled to change direction by striking against the inner concave surface of the outer walls of the pipe it abrades that surface after the well-known manner of the  
60 sand-blast, so that this part of the conduit rapidly wears out and needs replacing long before the rest of the conduit. In order to obviate this difficulty, I secure in the bend of the pipe preferably an iron block E, in  
65 which there is a duct F, terminating at one end in an orifice G of enlarged area and at the other end adapted to receive a pipe H, leading from any suitable source of water-supply under pressure. The delivery-orifice G is to  
70 be placed at a point in the inner surface of the bend slightly in advance of the point where the effects of the erosion or abrasion of the ashes or other loose material begin to appear. This is easily determinable for any  
75 special conditions of material of pipe, curvature of bend, or abrasive nature of loose solids conveyed and may be adjusted once for all. The inclination of the duct F is to be such that the jet entering into the pipe therefrom  
80 is at an acute angle to the surface to be protected. When the pipe is full of liquid and comminuted material, as represented by the light dots in Figs. 1 and 2, moving in the di-  
85 rection of the arrows, the admitted jet (indicated by the short dark lines at J) will follow the inner surface of the bend and will operate substantially as a water-cushion. Be-  
90 cause it escapes through the enlarged delivery-orifice G its velocity becomes reduced and, spreading out, it forms a shield following the inner concave surface of the bend and interposing itself between said surface and the main current of abrasive material. Being  
95 free from abrasive substances it does not erode said surface, while it prevents access thereto of the solid substances in the main current.

I desire to call especial attention to the fact that I do not project powerful jets of water  
100 into the pipe B at such angles as will merely enable them to assist the main current in lifting the contents of the pipe. Such jets do not serve the present purpose, but, on the con-



trary, defeat it, because they throw the main current forcibly against the side of the tube which is opposite their points of entrance and even unite with said current to increase its moving force, and the effect of that is to cause still worse abrasion at the places of contact.

It is essential in my device that the admitted current shall be given, first, the proper angle at the proper place in the bend and, second, shall be reduced in velocity to such an extent as that while it will enter the main pipe it will not deflect the main current in the manner above stated, but will simply run between that current and the surface to be protected. This is easily regulated once for all, and the fact that it is operating properly is shown by the absence of abrasion on both sides of the bend.

In the drawings I have shown the duct F, formed in a block E, which is secured in place; but this construction is not essential, since I may form said opening directly in the pipe-wall. I also show two additional blocks E' E'', arranged in the bend.

I claim—

1. The combination with a pipe having a bend, turn or curve, and means for forcing a current of mixed solid and liquid material through said pipe, of means for injecting a current of liquid into said pipe, in the direction of said mixed current and between said mixed current and the inner concave surface of said bend; whereby said concave surface is protected from abrasion or erosion by the solid material in said mixed current, substantially as described.

2. The combination with a pipe having a straight portion and a bend, turn or curve and means for forcing a current of mixed solid and liquid material through said pipe, of means for injecting a current of liquid into said pipe in the direction of said mixed current and at or about the point where said straight portion and bend adjoin, and at an

acute angle to the inner concave surface of said bend; whereby said entering liquid is interposed between said concave surface and said mixed current and said surface thereby protected from erosion or abrasion by the solid material in said mixed current, substantially as described.

3. The combination with a pipe having a bend, turn or curve and means for forcing a current of mixed solid and liquid material through said pipe, of means for injecting into said pipe a thin broad current of liquid of relatively lower velocity than said mixed current in the direction of said mixed current and at or about the point where said curve begins and at an acute angle to the inner concave surface of said curve; whereby said entering liquid current is interposed between said concave surface and said mixed current and said surface protected from erosion or abrasion by the solid material in said mixed current, substantially as described.

4. The combination of a pipe having a bend turn or curve, and in the wall of said pipe adjacent to said bend a thin wide duct communicating with an opening into said pipe of relative large area; the aforesaid parts being constructed and arranged so that a water-current entering said pipe through said opening will be projected in the form of a thin sheet at an acute angle to and along the concave surface of said bend, substantially as described.

5. The combination of the conduit having a bend, turn or curve, a block detachably secured in the wall of said bend, and an opening or duct disposed in said block at an acute angle to the inner concave surface thereof, substantially as described.

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Witnesses:

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