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APPARATUS FOR BLASTING

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Fig. 1.

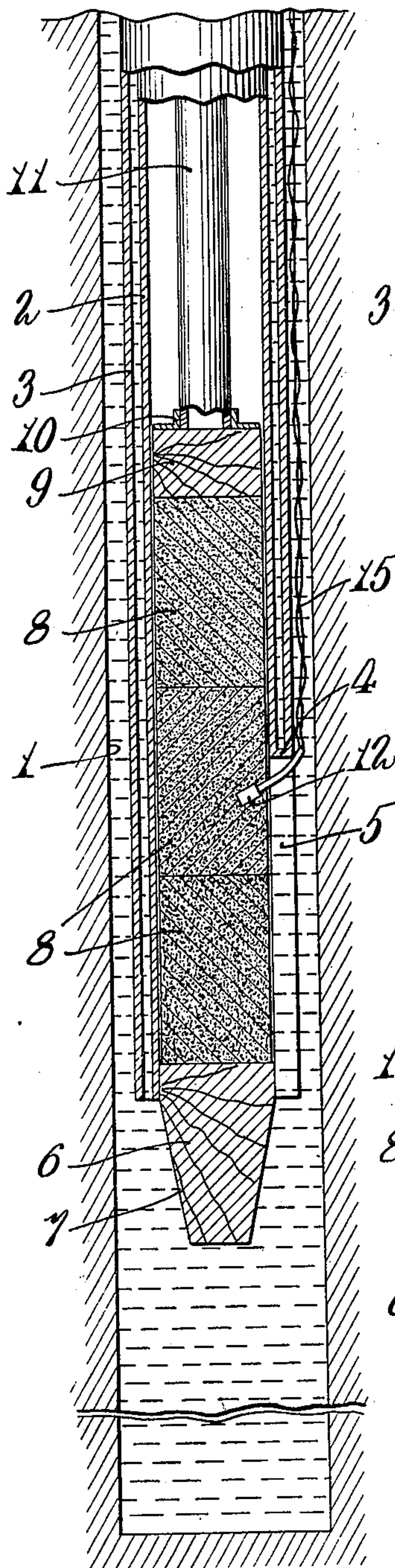


Fig. 2.

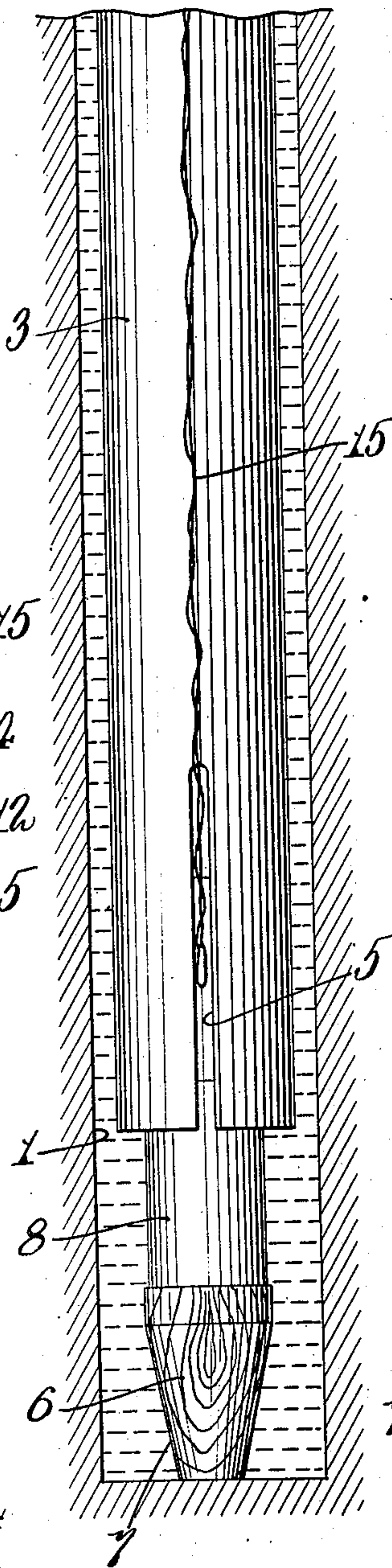
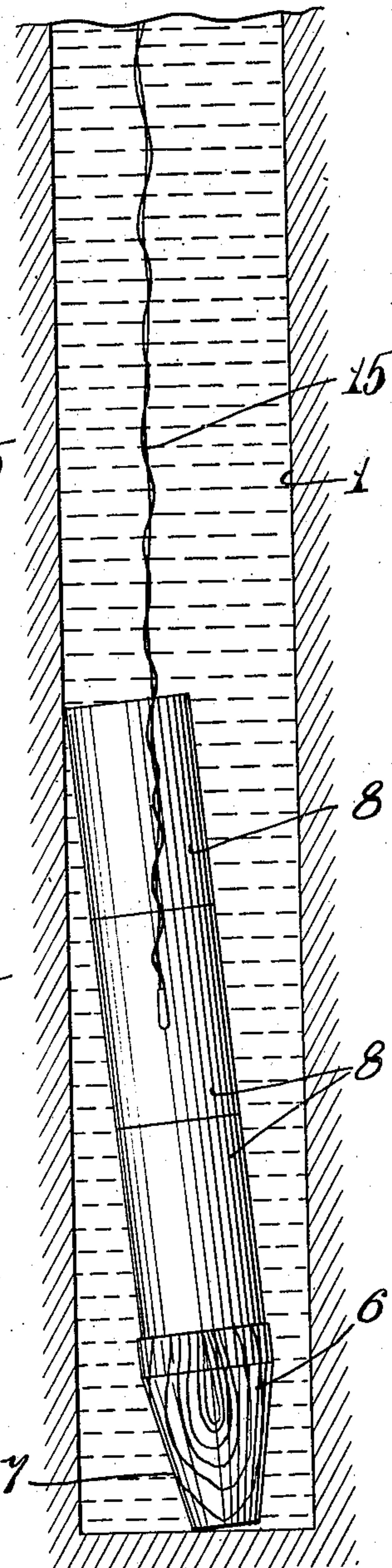


Fig. 3.



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APPARATUS FOR BLASTING

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13 Claims. (Cl. 102—4)

This invention relates to apparatus for blasting, and more particularly to improvements in apparatus for blasting in submarine drilling operations.

5 In submarine drilling operations it is desirable, after completion of a submarine drill hole, to wash out the muddy material at the bottom of the hole prior to the insertion of the blasting charge within the hole. This is usually accomplished by
10 the insertion of a wash pipe within the hole for conducting water under high pressure to the bottom of the hole to clean out the material at the bottom of the hole so that the loading tube can be inserted.

15 An object of this invention is to provide an improved apparatus combining the washing tube with the loading tube so that when the loading tube is lowered into the drill hole, the latter is simultaneously washed clean to permit insertion
20 of the blasting charge within the bottom of the hole. A further object is to provide combined washing and loading tubes of an improved construction. These and other objects and advantages of the invention will, however, hereinafter
25 more fully appear.

In the accompanying drawing there is shown for purposes of illustration one form which the invention may assume in practice.

In this drawing,—

30 Fig. 1 is a longitudinal section through a submarine drill hole showing the washing and loading tubes in position therein during lowering of a blasting charge.

35 Fig. 2 is a view similar to Fig. 1 showing the blasting charge partially removed from the loading tube, the loading tube being shown in elevation.

40 Fig. 3 is a longitudinal section through the drill hole showing the blasting charge in position therein.

45 In this illustrative embodiment of the invention the submarine drill hole is indicated at 1, the loading tube at 2, and another tube at 3. The tubes 2 and 3 are concentrically arranged with the tube 3 surrounding the inner loading tube 2, and the tubes are welded together at 4 to fix the same against relative rotation and to provide a longitudinal slot 5 extending through the lower ends of the tubes. The space between the
50 tubes serves to conduct wash water, and since this arcuate passage is open at the bottom, the wash water may be discharged downwardly therefrom. A wooden plug 6 having a conical lower end 7 is pressed within the lower end of the loading tube
55 2 where a load or charge is to be placed. Within

the loading tube 2 above the bottom plug 6 are placed a number of large sticks of dynamite 8, while engaging the upper end of the dynamite sticks is a wooden piston or plunger 9. This piston 9 is slidable within the bore of the loading tube 2 and is suitable attached at 10 to the lower end of an actuating rod 11 extending centrally through the loading tube to a point above the water level. An igniter 12 for the dynamite sticks has connected thereto blasting wires 15 extending through the longitudinal slot 5 formed in the lower ends of the concentric wash water and loading tubes, and these wires extend upwardly along the wash water tube to a point above the water level.

15 In Fig. 1 of the drawing, the blasting apparatus is shown in position in the drill hole, and as the apparatus is lowered within the hole, the tapered end 7 of the bottom plug 6 tends to guide and centralize the tubes. As the apparatus is
20 lowered within the drill hole, water under pressure is pumped down through the space between the loading tube 2 and the outer wash water tube 3, and the muddy material filling the bottom of the drill hole is washed upwardly around the
25 outer tube and from the hole. When the water and loading tube structure reaches the bottom of the hole, the wash water may be turned off and then, with the plunger 9 held stationary by the rod 11, the wash water and loading tube
30 structure may be moved upwardly relative to the plunger to release the dynamite from the loading tube. The longitudinal slot 5 in the lower ends of the tubes permits freeing of the igniter wires from the loading tube as the latter is with-
35 drawn upwardly. After the water and loading tube structure has been withdrawn, a tamping operation may be resorted to if the nature of the charge permits and it is found desirable, although tamping is, under most conditions, unnecessary.

40 It will be evident that, if desired, instead of conducting the wash water down through the space between the inner and outer tubes, the wash water may be pumped down through the drill hole between the walls of the hole and the
45 outer wash water tube 3 to the bottom of the drill hole, and the muddy material at the bottom of the hole may flow from the hole upwardly through the space between the inner and outer tubes. Under certain conditions, it is possible to
50 lower the tubes and the blasting charge to a position somewhat above the bottom of the hole, and thereafter force the plunger 9 downwardly relative to the tube structure to press the blasting charge down through soft mud in the hole to
55

the bottom of the latter. It will still further be noted that the wooden plug 6 and the dynamite sticks 8 may be enclosed in a separate metal cover or otherwise connected together to form a unitary structure.

As a result of this invention it will be noted that an improved apparatus for blasting in submarine drilling operations is provided wherein the means for washing the drill hole and for lowering the blasting charge into the drill hole are combined into a single unitary structure, thereby permitting washing of the hole and lowering of the loading tube in a single operation. It will further be noted that by arranging the loading and the wash water tubes in the concentric manner shown, it is possible to simultaneously wash and load the drill hole, while at the same time permitting the use of a standard form of blasting charge. These and other uses and advantages of the invention will be clearly apparent to those skilled in the art.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a blasting apparatus, a loading tube, a concentric wash water tube, said loading tube extending through said wash water tube, and a blasting charge carried within the lower end of the loading tube.

2. In a blasting apparatus, a loading tube, a concentric wash water tube, said loading tube arranged centrally within said wash water tube, a blasting charge carried within the lower end of the loading tube, and a plunger extending down through the loading tube for forcing the blasting charge from the loading tube.

3. An apparatus for blasting comprising concentric inner and outer loading and wash water tubes, a blasting charge arranged within said inner tube, and means extending downwardly through said inner tube for forcing the blasting charge through the bottom of the inner tube.

4. An apparatus for blasting comprising concentric respectively inner and outer loading and wash water tubes, spaced plugs arranged within the loading tube and surrounded by the wash water tube, and dynamite sticks arranged within the loading tube between said plugs, and means arranged within said loading tube for forcing said dynamite sticks from the loading tube.

5. An apparatus for blasting comprising concentric respectively inner and outer loading and wash water tubes, spaced top and bottom plugs arranged within the loading tube and surrounded by the wash water tube, and dynamite sticks arranged within the loading tube between said plugs, and means extending through said loading tube and engaging the upper plug for forcing the dynamite sticks and bottom plug through the bottom of the loading tube.

6. In a blasting apparatus, an outer wash water tube, an inner loading tube arranged centrally within said wash water tube, said tubes being united at their lower ends and cooperating to form a longitudinal slot extending through the bottom of the tubes, a dynamite charge ar-

ranged within said inner loading tube and having an igniter, and blasting wires extending through said slot.

7. In a blasting apparatus, an outer wash water tube, an inner loading tube arranged centrally within said wash water tube, said tubes being united at their lower ends and cooperating to form a longitudinal slot extending through the bottom of the tubes, a dynamite charge arranged within said inner loading tube and having an igniter and blasting wires extending through said slot, and means arranged within said loading tube for forcing said blasting charge through the bottom of the loading tube, said slot permitting said blasting wires to move freely with the blasting charge from the tubes.

8. In a blasting apparatus, an inner loading tube carrying a blasting charge, means surrounding said loading tube for conducting wash water to the drill hole during lowering of the loading tube within the drill hole and removable from said hole prior to blasting, and means for removing the blasting charge from the loading tube after the latter has been lowered into the hole.

9. In a blasting apparatus, a loading tube carrying a blasting charge, and means surrounding said loading tube for conducting wash water from the drill hole during lowering of the blasting charge therein and removable from said hole prior to blasting.

10. In a blasting apparatus, an inner loading tube carrying a blasting charge, and means surrounding said loading tube for conducting wash water to the drill hole during lowering of the blasting charge therein, said loading tube and wash water conducting means being simultaneously removable from the drill hole subsequent to the removal of the blasting charge from the loading tube.

11. In a blasting apparatus, concentric wash water conducting and loading tubes cooperating with a drilled hole to form a series of substantially concentric wash water and loading tube passages including a plurality of wash water conducting passages encircling a loading tube passage, an explosive charge in the inner, loading tube passage, said outer passages providing for oppositely moving columns of fresh and burdened wash water, and means for effecting release of the explosive charge from the inner, loading tube passage when at the bottom of a drilled hole.

12. In a blasting apparatus, a combined wash water and loading tube arrangement comprising concentric tubes forming between their walls a wash water passage and providing within the inner wall a chamber for a blasting charge.

13. In a blasting apparatus, a loading tube for receiving an explosive charge and having a slotted wall, means reciprocable in said loading tube for dislodging an explosive charge therefrom, said slotted wall receiving in the slot therein an igniting device leading to the explosive charge in said tube, and means removable from the blast hole prior to blasting and cooperating with said slotted wall, while leaving the slot therein unobstructed, to provide an arcuate external wash water passage extending longitudinally of said loading tube and through which wash water is conducted between the top and bottom of the blast hole.

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