

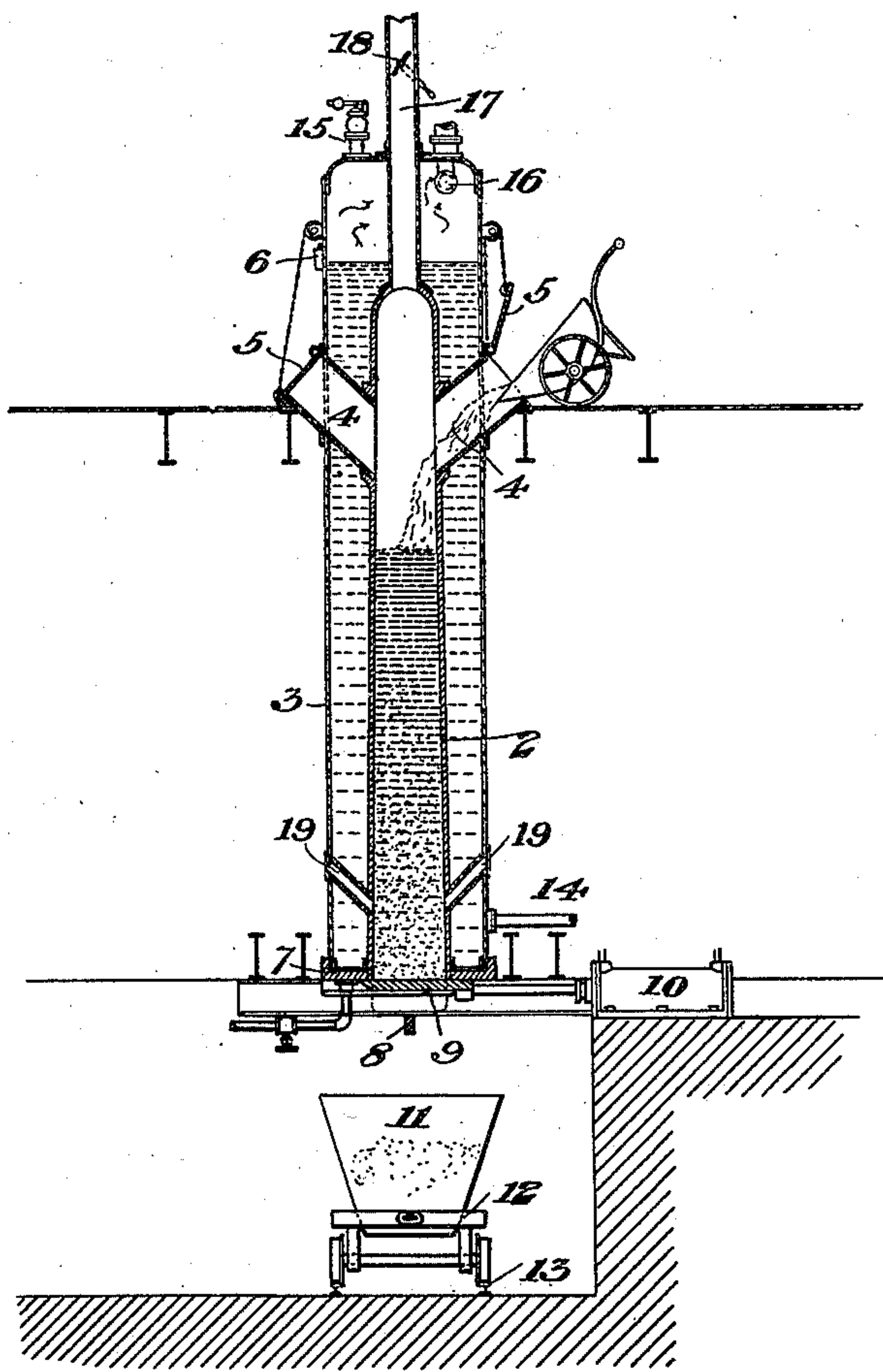
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J. A. POTTER.
SLAG HEATING APPARATUS.

(Application filed July 8, 1901.)

(No Model.)



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN A. POTTER, OF PHILADELPHIA, PENNSYLVANIA.

SLAG-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 709,112, dated September 16, 1902.

Application filed July 8, 1901. Serial No. 67,397. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. POTTER, of Philadelphia, Philadelphia county, Pennsylvania, have invented a new and useful Slag-Heating Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, in which the figure is a sectional side elevation showing one form of apparatus constructed in accordance with my invention.

My invention relates to the utilizing of the heat contained in molten slag for the heating of other fluids—such as, water, air, &c.; and its object is to provide a simple and effective apparatus in which the operation may be carried on continuously and economically.

In the drawing, in which I show my invention as applied to a steam-boiler, I show the boiler as composed of inner and outer shells 2 and 3, which are preferably circular in cross-section, the outer shell being cylindrical, while the inner one tapers upwardly, being of considerably larger diameter at the bottom than at the top, so that its cross-sectional area increases downwardly. Inlet-chutes 4 are provided near the upper end of the inner shell and which are preferably inclined downwardly and inwardly from two or more sides, as shown, and open into the inner shell, so that molten slag may be dumped therethrough into the inner shell. These chutes may be provided with suitable closing-doors 5, which may be hinged and lifted by counterweighted chains 6, leading over pulleys, as shown, or by any other suitable means. The annular space between the inner and outer shells is closed at the bottom, where the boiler is supported upon a suitable base 7, this base-framework being open and free below the inner shell, except for a lower cross-bar 8, arranged to support the column of slag when the inner chamber is opened at the bottom. The bottom of the inner shell is closed by a reciprocatory shear-blade 9, which moves in suitable guides and is provided with a shearing front edge. This shear-blade is reciprocated by connection with the piston or plunger of a hydraulic cylinder 10 or by other suitable connections. Beneath the boiler is a pit arranged to con-

tain a slag-car 11, which may be carried on a wheeled truck 12, traveling on the track 13.

14 is the water-inlet pipe for the boiler, and 15 the blow-off pipe. The steam is taken out through the usual dry-pipe 16, and to allow the escape of any gases which may be thrown off by the slag I preferably provide a valved pipe 17, which leads upwardly from the inner shell through the top of the boiler and is provided above with a hand-controlled valve 18, as shown. As the slag may stick in the lower part of the slag-chamber, I provide poke-holes 19, which are preferably inclined downwardly.

In the operation of the boiler a column of slag is maintained within the inner shell, successive additions of liquid slag being made whenever desirable through the upper inlets and at desirable intervals, the shear-blade is retracted, the column of slag dropped down upon the cross-bar, and the shear-blade is then forced forward, thus cutting off the protruding cooled portion of the slag column and closing the lower end of the slag-chamber. The cut-off portion is broken up and dropped into the slag-car to be taken away to the dump. The inner shell therefore contains at all times a column of slag, the upper part of which may be liquid, and grading from this condition down through a semi-liquid or pasty condition to the bottom part of hardened and solidified slag.

The boiler is used in the ordinary manner, the water-level being preferably kept somewhat above the upper end of the inner shell, as shown in the drawing.

The advantages of my invention result from the using of the vertically-extending column of slag, to which liquid additions are made at the top and successive portions of which are sheared off at the bottom. Each addition of slag thus remains within the boiler a sufficient length of time for the utilization of the major portion of its contained heat, and economy is thus given, while the operation is simple and easily carried out. The downwardly-enlarging form of the slag-chamber prevents sticking and jamming of the column and the shear-blade acts as a closure and also as shearing mechanism for cutting off the successive portions of the column.

Many changes may be made in the form and shape of the heater, air may be forced through the annular space between the inner and outer shells instead of using water, and many other changes may be made in the form and arrangement of the parts without departing from my invention as claimed.

I claim—

1. A slag-heater containing an inner vertically-extending slag-chamber, a shear-blade closing the lower end of said chamber, mechanism for reciprocating said shear-blade, and a stop or support below the blade and arranged to support the slag column with a portion thereof protruding below the slag-chamber; substantially as described.
2. In a slag-heater, a hollow shell arranged to contain a fluid to be heated, and having an inner vertically-extending slag-chamber, feed-openings leading through the hollow shell to the slag-chamber, shearing mechanism arranged to cut off successive lower portions of the slag column and means for supporting the slag column with its lower portion protruding downwardly below the slag-chamber; substantially as described.
3. In a slag-heater, a hollow shell containing a vertically-extending slag-chamber, a shear-knife arranged to close the lower end of the chamber, mechanism for reciprocating the

knife, a stop or support arranged to stop the column of slag with its lower portion projecting below the chamber, and a slag-receptacle below the said knife; substantially as described.

4. A slag-heater containing a slag-chamber, the cross-sectional area of which increases downwardly, means for supporting a slag column with its lower end portion projecting below the chamber, and a movable shear-blade arranged to close the lower end of the chamber; substantially as described.

5. In a steam-boiler, a hollow double shell containing an inner vertically-extending slag-chamber, slag-chutes leading through the outer shell to the upper part of the inner shell, a shear-blade arranged to close the lower end of the slag-chamber, a support arranged to hold a slag column with its lower portion below the lower end of the chamber, and mechanism for reciprocating the shear-blade, said boiler having steam and water connections; substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN A. POTTER.

Witnesses:

GEO. B. BLEMING,
JOHN MILLER.