June 12, 1934. J. B. GAFFNEY ET AL 1,962,343

SLAG TAPPING SPOUT AND CUT-OFF

Filed Feb. 12, 1930 2 Sheets-Sheet 1

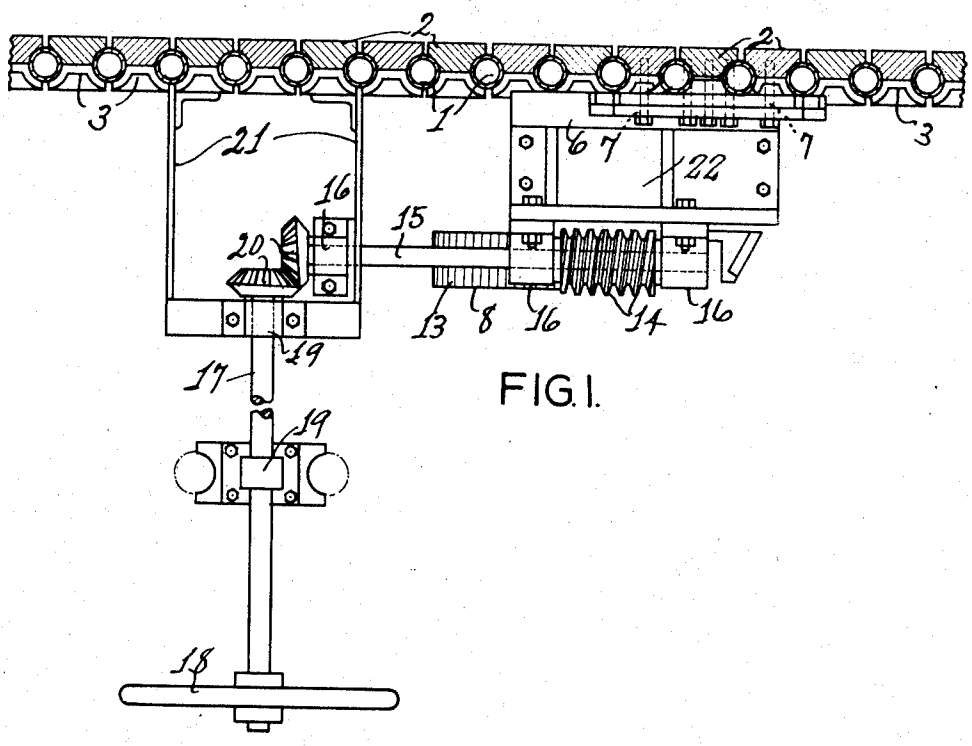


FIG. 1.

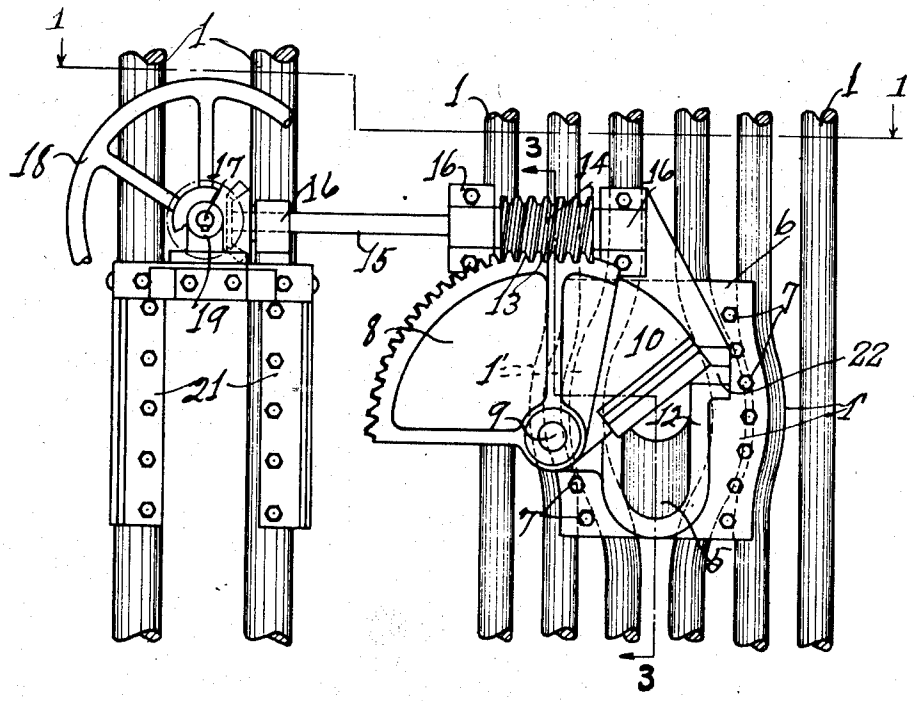


FIG. 2.

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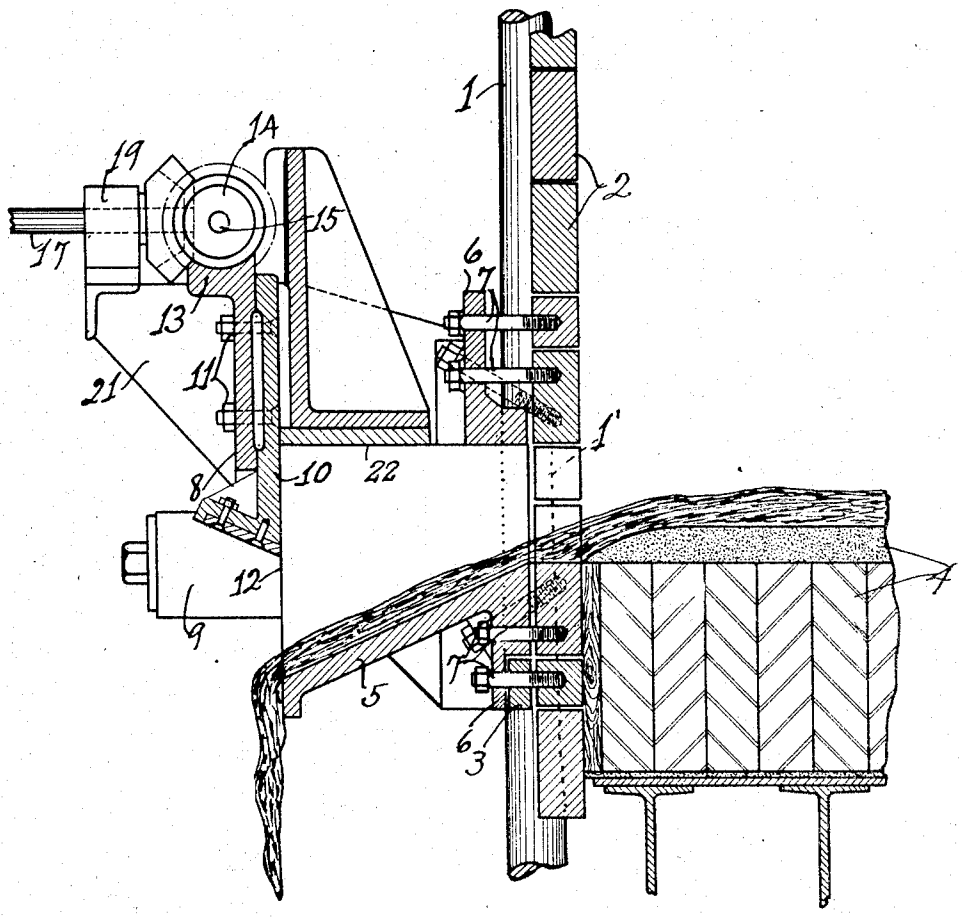


FIG. 3.

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UNITED STATES PATENT OFFICE

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SLAG-TAPPING SPOUT AND CUT-OFF

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Application February 12, 1930, Serial No. 427,877

5 Claims. (Cl. 110—165)

This invention relates to a slag-tapping spout and cut-off or closure that is to be used in a furnace where molten slag from the fuel is permitted to collect and is tapped out periodically.

The invention will be understood from the description in connection with the accompanying drawings, in which Fig. 1 is a horizontal section on the line 1—1 of Fig. 2 through a furnace wall showing the device in place; Fig. 2 is a front view of the same, partly broken away; and Fig. 3 is a section along the line 3—3 of Fig. 2.

In the drawings, reference character 1 indicates a row of vertically disposed furnace wall tubes through which water may be passed for keeping the walls of the furnace cool and also for having steam generated from the water in the tubes. The tubes are lined on the side toward the furnace with blocks 2 of heat-resisting material, such as the well-known Bailey blocks, for example, to provide a substantially continuous smooth wall along the inside of the furnace. The blocks 2 may be clamped against the tubes by means of bolts which pass into the blocks through the clamping members 3 on the other side of the tubes in the well-known way.

The bottom of the furnace is shown at 4 upon which the slag may accumulate in a molten condition until a sufficient amount of the slag accumulates to be drawn out through a spout or opening in a side wall of the furnace. In order to provide such an opening, some of the tubes 1 may be bent sidewise, as indicated at 1'.

A spout 5 having a flange 6 is bolted to the outside of the furnace wall at the opening by means of bolts 7 that may extend into the blocks 2. A sector-shaped plate 8 is journaled on the stud shaft 9 and a relatively thin plate 10 is bolted by means of bolts 11 to the plate 8. The lower edge of the plate 10 may be sharpened and its side next to the furnace is made smooth and flat so as to move in close contact with the straight end 12 of the spout 5. A plate 22 extends across the upper side of the spout 5.

Teeth 13 are provided along the edge of the plate 8 and a worm gear 14 on the shaft 15 is provided for turning this plate. The shaft 15 is journaled in bearings 16.

A shaft 17 provided with a hand wheel 18 is journaled in bearings 19 and the shafts 17 and 15 are provided with miter gears 20.

A support 21 is provided for one of the bearings 19 and one of the bearings 16, this support being fastened to the wall of the furnace in any convenient manner.

By operating the hand wheel 18, the plate 10 can be turned so that its edge may extend into the stream of slag flowing out of the furnace, thus regulating the rate of escape of the molten slag so that it can be taken care of in the sluiceway that may be provided for carrying off the slag, or, if the sluiceway stops up, the spout can be closed entirely. The gate or plate 10 can be used not only for throttling the flow of the slag, but, in view of the fact that it closes the space in the spout 5 above the upper surface of the slag that is flowing out, it prevents air from entering the furnace through the end of the spout 5.

We claim:—

1. In a furnace for burning slag-forming fuel, a wall provided with water cooling tubes, the bottom of said furnace being adapted to hold molten slag, a slag tapping spout mounted on said wall adjacent said cooling tubes to withdraw molten slag from said furnace, a shearing gate supported by said wall for closing said spout to prevent escape of molten slag, said gate being movable to open position to permit molten slag to flow out through said spout and arranged to shear the stream of molten slag when moving to its closing position.

2. In a slag tapped furnace, walls provided with spaced water cooling tubes, the bottom of said furnace being adapted to hold molten slag, a slag tapping spout mounted on said wall and passing through the space between two of said tubes to withdraw molten slag from said furnace, a shearing gate supported by said wall closing said spout to prevent escape of molten slag, said gate being movable to open position to permit molten slag to flow out through said spout and shearing the stream of molten slag when moving to its closing position.

3. In a furnace for burning slag-forming fuel having water tubes therein and a bottom adapted to maintain molten slag thereon, a slag tapping spout extending through a vertical wall of said furnace and beyond the outer surface of said wall, the end of said spout terminating in a substantially vertical plane, and a segment shaped member pivoted near the end of said spout, said member having a flat surface terminating in a knife edge and movable transversely across the end of said spout in contact with the end thereof.

4. In a furnace for burning slag forming fuel in which molten noncombustible residues collect, a slag holding floor for said furnace, furnace walls contacting with said floor to retain said molten residues thereupon, said walls comprising vertically disposed water cooling tubes with

spaces between said tubes, one of said walls being provided with an opening therethrough with the space between tubes on opposite sides of said opening greater than said first named spaces between tubes, a spout in said opening for the withdrawal of molten residue from said slag holding floor, said spout being supported by some of said tubes, and means supported externally of said spout for closing it.

5. In a furnace for burning slag-forming fuel, a floor adapted to receive molten slag in operation, vertical walls coacting with said floor to maintain a slag pool in the bottom of the furnace and including a row of spaced wall cooling tubes, a slag tap opening in the lower end of one of said vertical walls between two of said tubes, a slag discharge spout communicating with said opening and having its discharge end terminating externally of said wall, said spout being mounted on said wall, a gate providing a slag-tight closure for the discharge end of said spout and movable in a plane transversely thereof, and means for positively moving said gate downwardly to a spout closing position and upwardly to a spout opening position.

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