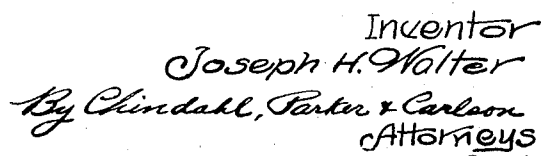


2,056,239

Original Filed Nov. 25, 1932



UNITED STATES PATENT OFFICE

2,056,239

HOPPER

Joseph H. Walter, Springfield, Ohio, assignor, by mesne assignments, to The Steel Products Engineering Company, Springfield, Ohio, a corporation of Ohio

Original application November 25, 1932, Serial No. 644,247. Divided and this application January 5, 1933, Serial No. 650,208

7 Claims. (Cl. 221-118)

The present invention relates to improvements in fuel hoppers, and has particular reference to a new and improved hopper adapted for underfeed fuel stokers as shown in my co-pending application Serial No. 644,247, filing date November 25, 1932, of which this application is a division.

The primary object of the present invention resides in the provision of a novel upright fuel hopper which comprises an inlet opening at the top with one edge at a relatively low elevation for the convenient introduction of fuel, and which is adjustable selectively into any one of a plurality of different positions best adapted to the environment of the stoker.

Further objects and advantages will become apparent as the description proceeds.

In the accompanying drawing, Figure 1 is a fragmentary side elevational view of a hopper embodying the features of my invention.

Fig. 2 is a plan view of the hopper.

Fig. 3 is a vertical sectional view taken along line 3-3 of Fig. 2.

Fig. 4 is a perspective view of the hopper showing the sides in separated relation.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawing and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring more particularly to the drawing, the hopper comprises a base 5, and an upright superstructure 6 mounted on the base. While the base 5 may be provided in various forms, it is herein shown as particularly adapted for an underfeed fuel stoker, and hence as comprising a vertical rear wall 7, an inclined forward wall 8 and oppositely inclined side walls 9 and 10 defining an upwardly opening generally V-shaped trough 11. Preferably, two spaced depending brackets 12 and 13, on opposite ends of the base 5, rest on a foundation 14 to support the hopper and its attachments. The front bracket 12 is integral with and extends forwardly of the front wall 8, and is formed with an elongated cylindrical bearing sleeve 15 in alignment with the apex of the trough 11. An external horizontal sleeve 16 formed on the rear wall 7 and to which a fuel duct 17 is connected defines an outlet opening also in alignment with the trough 11. A fuel conveyor 18, preferably of

the screw type, extends along the trough 11 through the outlet sleeve 16 into the duct 17, and the apex of the trough conforms generally to the cylindrical contour of the conveyor vane. The forward end of the conveyor 18 extends through the sleeve 15 for attachment to a suitable driving transmission indicated generally at 19.

To afford convenient and ready access to the interior of the hopper base 5 where the conveyor 18 enters the sleeve 16, an opening 20 is formed partly in the top of the sleeve and partly in the wall 7 at the juncture. That part of the opening 20 in the wall 7 may be viewed as an enlargement of the outlet opening to the sleeve 16. An angular plate 21 is removably secured against the wall 7 and the top of the sleeve 16 to close the opening 20, and preferably has an inward projection 22 to preserve the cylindrical contour of the outlet opening and to define an upper shearing edge coacting with the vane of the conveyor 18. It will be evident that any obstructions coming between the shearing edge and the conveyor vane and tending to stall the conveyor can quickly be removed through the opening 20 without emptying the hopper.

The superstructure 6 which constitutes the hopper proper comprises an outwardly inclined front wall 23 with a horizontal upper flanged edge 24, a vertical rear wall 25 having a horizontal flanged edge 26 located substantially above the edge 24, and vertical side walls 27 and 28 with upper inclined flanged edges 29 and 30. While the hopper walls may be joined in any suitable manner, preferably, the front and rear walls 23 and 25 have vertical side flanges 31 and 32 overlying the side walls 27 and 28 and riveted thereto. It will be evident that the edges 24, 26, 29 and 30 at the top of the hopper constitute an inlet opening which is inclined with the edge 24 depressed for the convenience of the attendant in throwing in fuel.

Stokers are installed under widely varying conditions. In some instances, it might be extremely inconvenient to charge fuel into the hopper from the front end of the stoker. One of the features of the invention therefore resides in so constructing the hopper that in assembling the superstructure 6 with the base 7, the inlet opening, and particularly the lower edge 24 thereof, may be orientated to best adapt it to the installation for which the stoker is intended.

Thus, in the preferred form, the top of the hopper base 5 is square in shape so that the upper portion 5 of the hopper may be orientated there-

on as desired in any one of four different positions. The walls 7 to 10 of the base 5 are formed along their upper edges respectively with external marginal flanges 33 to 36 joined at the corners to define a square seat for the structure 6. Likewise, the lower edges of the walls 23, 25, 27 and 28 of the structure 6 are provided respectively with inwardly facing channel structures in the form of grooves 37, 38, 39 and 40 adapted to interfit with the flanges 33 to 36. Preferably, each of the grooves 37 to 40 is defined by striking the lower marginal portion of the wall first outwardly, then downwardly and then inwardly.

In assembling the hopper, three of the upper walls, for example the walls 25, 27 and 28, may be joined together into a unitary structure, and may then be positioned on the base 5 by sliding the grooves 39 and 40 of the two extreme walls 27 and 28 longitudinally onto any two opposite flanges, for example the flanges 35 and 36, until the groove 38 of the intermediate wall 25 interfits with one of the remaining flanges, for example the flange 33. Then, the remaining wall, namely the wall 23, may be secured to the walls 27 and 28, with its groove 37 receiving the remaining flange 34, thereby completely coupling the superstructure 6 to the hopper base 5. In the position shown, the lowest wall 23 constitutes a straight continuation of the inclined base wall 8, and hence fuel may be introduced conveniently from the front end of the stoker. However, the hopper structure 6 may be located selectively in any one of four different positions on the base 5, so that if, in a particular stoker installation, introduction of fuel, for example from the side is desirable, the edge 24 can be orientated to that side.

Also by removing the rivets, one wall, for example the wall 23, can be separated from the rest of the hopper, and the latter can thereupon be removed as a unitary three-wall structure from the base 5 merely by a transverse sliding movement to disengage the channels 38, 39 and 40 from the flanges 33, 35 and 36.

I claim as my invention:

1. In a stoker, in combination, a hopper base having an inlet opening and an external marginal flange about said opening, the outer perimeter of said flange being square, and a hopper seated on said base, and having a discharge opening adapted to be located in registration with said inlet opening, said hopper having grooves receiving the four sides of said flange, said hopper being adapted to be secured to said flange in any one of four different positions.

2. In a stoker, in combination, a vertical hopper base having two side walls and two end walls and formed in the bottom with a horizontal V-shaped trough, a horizontal discharge duct opening from said base through one of said end walls and in alignment with said trough, the upper edges of said walls defining a rectangular inlet opening and each being formed with an external marginal flange, a vertical hopper superimposed on said base, said hopper having four upright walls defining a square outlet at the lower edges adapted to be located in registration with said first mentioned inlet interchangeably in four different relative positions, the upper margins of said hopper walls defining an inlet, with the edge of one wall at a relatively low elevation for the convenient introduction of fuel, each hopper wall being formed along its lower margin with an inwardly facing groove slidably embracing

the flange on the contiguous wall of said base, one of said hopper walls being removably secured in place.

3. In a stoker, in combination, a hopper base having an inlet and a rectangular mounting flange about said inlet, and a sectional hopper having four separately formed side walls defining an outlet, each wall terminating in an inwardly facing channel structure in contiguous relation to the channels of adjacent walls and defining a rectangular retaining means about said outlet adapted to slidably interfit with said flange in any one of a plurality of different angular positions with said outlet in registration with said inlet, three of said walls being adapted to be assembled into a unitary structure slidable onto said base into any one of said positions with the respective channels engaging said flange, and the fourth wall being adapted to be secured to said structure with its channel also engaging the flange to complete the assembly of the hopper.

4. In a stoker, in combination, a vertical hopper base having two side walls and two end walls and formed in the bottom with a horizontally V-shaped trough, a horizontal discharge duct opening from said base through one of said end walls, the upper edges of said walls defining a rectangular inlet opening and each being formed with an external marginal flange, a vertical hopper superimposed on said base and having two upright side walls and two upright end walls defining a rectangular outlet at their lower edges adapted to be located in registration with said first mentioned inlet interchangeably in any one of four different relative positions, the upper margins of said hopper walls defining an inlet, with one edge at a relatively low elevation for the convenient introduction of fuel, said end walls of said hopper being formed along their side margins with lateral and inwardly extending flanges, said side walls of said hopper fitting inside of and secured to the flanges on one of said hopper end walls, the flanges of the other of said hopper end walls being removably secured to said hopper side walls, the lower margin of each hopper wall being struck outwardly, then downwardly and then inwardly to define an inwardly opening groove slidably embracing the flange on the contiguous base wall.

5. In a stoker, in combination, a vertical hopper base having two side walls and two end walls, a horizontal discharge duct opening from said base through one of said walls, the upper edges of said walls defining a rectangular inlet opening and each being formed with an external marginal flange, a vertical sectional hopper superimposed on said base and having two upright side walls and two upright end walls defining a rectangular outlet at their lower edges adapted to be located in registration with said first mentioned inlet interchangeably in any one of a plurality of different angular positions, the upper end of said hopper having an inlet with one edge at a relatively low elevation for the convenient introduction of fuel, one of said hopper walls of each two adjacent walls being formed along one side margin with a lateral and inwardly extending flange overlapping with and secured to the other of said walls, the lower margin of each hopper wall being struck outwardly, then downwardly and then inwardly to define an inwardly opening groove slidably embracing the flange on the contiguous base wall.

6. In a stoker, in combination, a vertical hopper base having two side walls and two end walls, a

horizontal discharge duct opening from said base through one of said walls, the upper edges of said walls defining a rectangular inlet opening and each being formed with an external marginal flange, a vertical sectional hopper superimposed on said base and having two upright side walls and two upright end walls defining a rectangular outlet at their lower edges adapted to be located in registration with said inlet, one of said hopper walls being separately formed and independently secured to the remainder of the hopper, the lower margins of the hopper walls being struck outwardly, then downwardly and then inwardly to define inwardly opening grooves slidably embracing the flange on the contiguous base walls.

fining an inlet at the top, an upright hopper mounted on said base and having an outlet at its lower end in registration with said inlet, said hopper having four connected walls rising respectively from the four sides of said wall structure, and interfitting slidable substantially horizontal spline connections between said hopper walls and the sides of said base wall structure for securing the hopper to said base, one of said hopper walls being removable to permit said hopper to be removed from said base by a transverse sliding movement to separate said connection and when secured in position being effective to lock said hopper on said base through the medium of said connections.

JOSEPH H. WALTER.