FUME CONTROL APPARATUS

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3 Claims

ABSTRACT OF THE DISCLOSURE

A fume control apparatus for entraining and disposing of noxious fumes emitted from the mouths of hot metal carrier ladles at a charging station and while the carrier ladles are in transit toward a metal casting station.

The present invention relates to fume control apparatus and is particularly directed to improvements in movable plenum fittings that adapt said apparatus for practical use in foundry fume exhaust systems. It is a purpose of the invention to provide a movable fitting for an exhaust plenum that may be positioned alongside a hot metal ladle, said fitting being self-cleaning and capable of withstanding the proximity to high temperatures surrounding molten metal in the ladle.

Another object of the invention is to provide a movable plenum fitting that is rugged in construction, is economical in manufacture and which will give trouble free service over a relative long period of operation.

Other objects of the invention will be apparent from the following specification taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a fragmental, side elevational view of my fume control apparatus, a part being broken away and shown in section.

FIG. 2 is a section taken on line 2—2 of FIG. 1, parts being broken away and shown in section.

FIG. 3 is a fragmental, enlarged section taken on line 3—3 of FIG. 2.

FIG. 4 is a section taken on line 4—4 of FIG. 3.

FIG. 5 is a top plan view of the apparatus shown in FIG. 3.

My movable fitting for an exhaust plenum is illustrated in connection with a foundry ladle carrier generally indicated by the reference numeral 7. The ladle carrier 7 moves on an overhead rail 8 by means of a front, wheeled rail follower 9 which is swivel mounted upon a horizontal framework 10 to the carrier, said framework having a pair of vertical tracks 11—11 depending from its central portion. A hot metal ladle 12 is guided for vertical movement on the carrier tracks by means of sets of rollers 13, the elevator being raised and lowered by means of a hoist arrangement 14 that may be controlled from a cab 15 on the elevator. A hot metal ladle 16 is mounted on the elevator 12 for tilting movement around the horizontal axis by means of a trunnion 17 rotatable in a bearing 18 on the elevator, the trunnion having a yoke 19 at one end that supports the ladle 16 and is turned around its axis by a power means 20 operated from the cab.

A fume hood 21 is mounted on the carrier framework 10 for vertical movement above the mouth of the ladle 16 and is guided for rectilinear movement by sets of rollers 22—22, each engaging the vertical track 11 and mounted on plates 23—23 projecting from the hood. The hood is gravity actuated and hence is raised and lowered by means of a bracket 24 fixed to the hood and projecting therefrom into the path of the elevator 12.

An upstanding plenum exhaust chamber 25 is positioned alongside the path of movement of the fume en-

training hood 21 and is mounted on and depends from the framework 10 by means of a channel 26 welded to the carriage and to the upper end of the chamber. With particular reference to FIGS. 3—5 of the drawings, the exhaust chamber is formed by a circular outer end wall 27 and a pair of opposed side walls 28 and 29, said walls being closed at their lower ends by a bottom wall 30. The inner end of the chamber confronting the hood and the ladle is closed by a sectionalized wall 31 extending between two opposed upward guide strips 32 and 33 mounted on the confronting end portions of the side end walls 28 and 29, respectively. Each guide strip has a pair of upward parallel grooves 34 and 35 therein for mounting and guiding for vertical movement the individual panels of the wall 31.

As best shown in FIG. 3, a lowermost wall panel 36 is fixedly mounted on the plenum and closes off and extends between the lower portions of the grooves 34—34 and is provided at its upper end with a downturned, centrally positioned hook portion 37. An uppermost wall panel 38 is vertically movable in the guide grooves 35—35 and is provided at its lower end with a centrally positioned, upward hook 39. The upper end of the wall panel 38 has an opening 40 formed therethrough which communicates with a conduit 41 fixed to the panel 38 around said opening, the opposite end of the conduit being fixed to the hood 21 around an opening 210 in said hood. The conduit therefor physically connects the hood 21 to the panel 38 and also provides communication between the interior of the hood and the plenum chamber. The inner end of the conduit is connected to a piston member 42 having the contour of the chamber 27 and extending downwardly in a substantial plane. The piston member 42 is supported by braces 43 welded to the lower face of the piston member 42 and connected as by welding 44 to the conduit 41. A rubber gasket 45 is secured to the piston 42 by means of a plate 46, the edge of the gasket being adapted to snugly engage and on the interior faces of the chamber in an air tight, sealed condition. The sectionalized wall has an intermediate panel 47 freely movable in the guide grooves 34—34, said section 47 having a downturned hook portion 48 formed on its upper end which detachably interlocks with the upward hook portion 39 on panel 38 at its lower end having an upward hook portion 49 which interlocks with the downturned hook portion 37 on the panel 36.

With reference to FIGS. 1 and 2 of the drawings, a slotted exhaust, manifold header 50 is positioned beside the carrier track 8 on hangers 51, said header having an elongated slot 52 in its lower side that is normally closed by a pair of opposed, flexible lips 53 secured to the header on opposite sides of the slot 52. The free end portions of the lips are normally in air-tight engagement with each other and are parted only at those portions that are spread apart by the presence of a plow 54 slide through the header between the lips. The exhaust is exhausted by means of one or more fume exhaust fans 55 connected to the interior of the header by fittings 56, exhaust fumes from the outlet side of the fan being cleaned, and/or exhausted to atmosphere, as desired. The plow 54 has an opening 57 therein which is in communication with the interior of the header 50 and is connected by a conduit 58 to the exhaust opening 59 formed in the bottom portion of the plenum exhaust chamber 25.

In operation the plow 54 will be entered into the leading end 60 of the exhaust header 50 and thus connect the hood 21 with the header through the plenum exhaust chamber 27 at its connection. When the ladle carrier reaches the position shown in FIG. 1 the ladle 16 is usually lowered to a hot metal charging level, the hood 21 following the downward path due to the engagement of the bracket 24 upon the carriage 12. After the ladle is

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An upstanding plenum exhaust chamber 25 is positioned alongside the path of movement of the fumes en-
charged with molten metal there is considerable fuming and the emission of noxious gases from the mouth there-of and these gases and fumes are entrained within the hood 21 and exhausted through the plenum into the header and from thence to atmosphere by the fan 55. The hood follows the vertical path of the ladle and continuously exhausts the fumes therefrom because of the vertically movable connection between the hood and the plenum chamber, the sectionalized wall 31 thereof permitting movement of the intake conduit 41 by the hood in view of the relative sliding movements of the side-by-side panels 36, 38 and 47 mounted in the vertical guides 34—36 and 38—35. As the uppermost panel 38 is moved vertically downwardly in the guides 35—38 because of its connection with the hood 21 the top wall 42 will slide vertically inside the plenum. As the uppermost wall is lowered from the position illustrated in FIG. 3 the interlocking engagement between the hooks 37 and 49 on panels 36 and 47, respectively, will first be detached and panels 47 and 38 will slide downwardly. As panel 47 reaches its lowermost position and panel 38 continues its downward movement the interlocking engagement between the hooks 39 and 48 on panels 38 and 47, respectively, will be detached permitting the panel 38 to move to its lowermost position, the sectionalized wall maintaining the plenum chamber in a closed condition at all times during contraction. Upward movement of the panel 38 will follow a reverse procedure from that just described as will be apparent to those skilled in the art.

These panels are made from sheet metal stampings which resist the temperature created by the molten metal in the ladle and the discharge of molten metal particles from the mouth of the ladle. Also the sectionalized wall is self-cleaning which is an important characteristic in view of the fact that the fumes and noxious gases entrained by the hood carry particles through the system to the exhaust fan which might otherwise clog movable parts that were not self-cleaning.

What is claimed is:

1. Fume exhaust apparatus for a foundry carrier having a vertically moving, hot metal ladle and a hood disposed above and movable with the ladle comprising an upstanding plenum exhaust chamber mounted on the carrier beside the ladle and having an outer end wall, opposed side walls and a bottom wall, a pair of confronting, vertically extending guides each mounted on an inner end of a side wall adjacent the ladle, a sectionalized inner end wall closing the plenum chamber across the guides and consisting of a number of panels, slidable one beside the other in said guides, interlocking means detachably connecting adjacent panels, a conduit connecting the uppermost panel with the hood, a top wall for the plenum connected to the uppermost panel and movable inside the plenum chamber, a gasket on the top wall slidably engaging the inside faces of the outer end wall and the opposed side walls, and exhaust means communicating with the interior of the plenum.

2. Fume exhaust apparatus set forth in claim 1 wherein the lowermost panel is fixedly mounted in the guides, and an intermediate panel is disposed in the guides and extends between the uppermost and lowermost panels.

3. Fume exhaust apparatus set forth in claim 1 wherein in the interlocking means comprises cooperating hooks formed on the horizontal edge portions of adjacent panels.

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