July 29, 1941. T. E. HUGHES 2,250,913

FUME EXHAUSTING APPARATUS FOR USE WITH INGOT MOLDS

Filed July 27, 1939 2 Sheets-Sheet 1

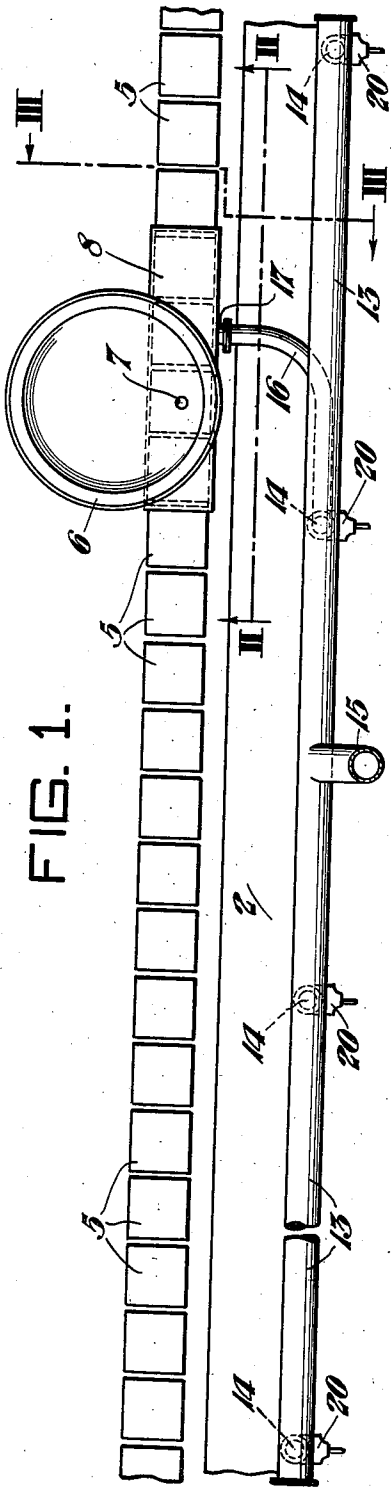

FIG. 1.

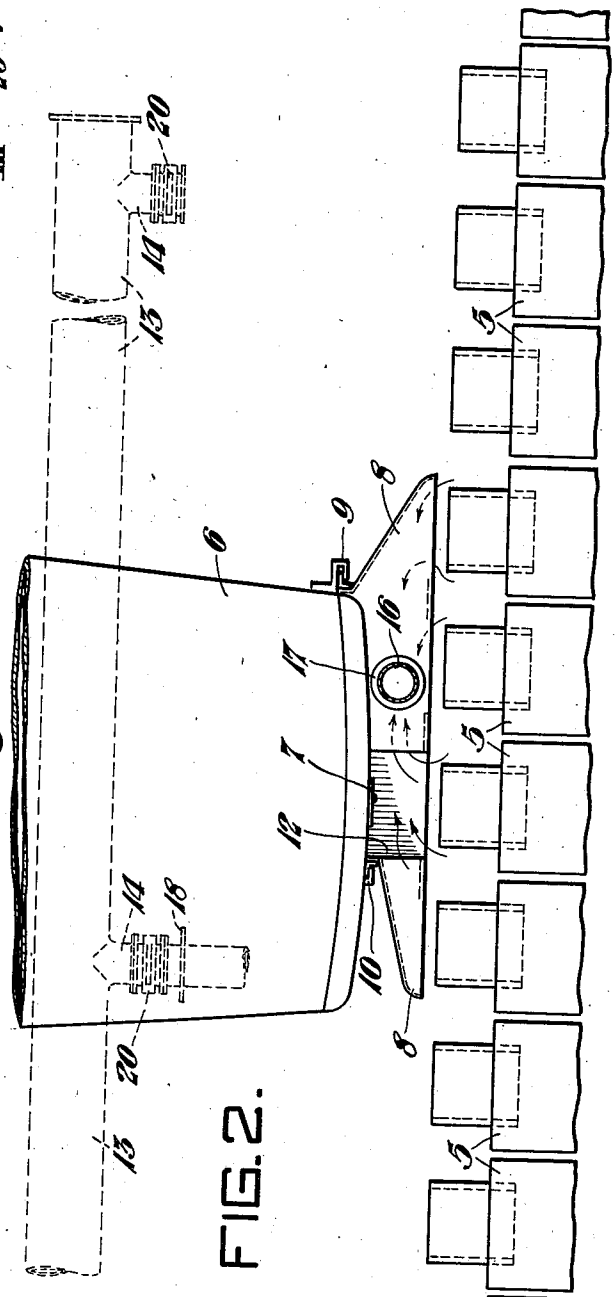

FIG. 2.

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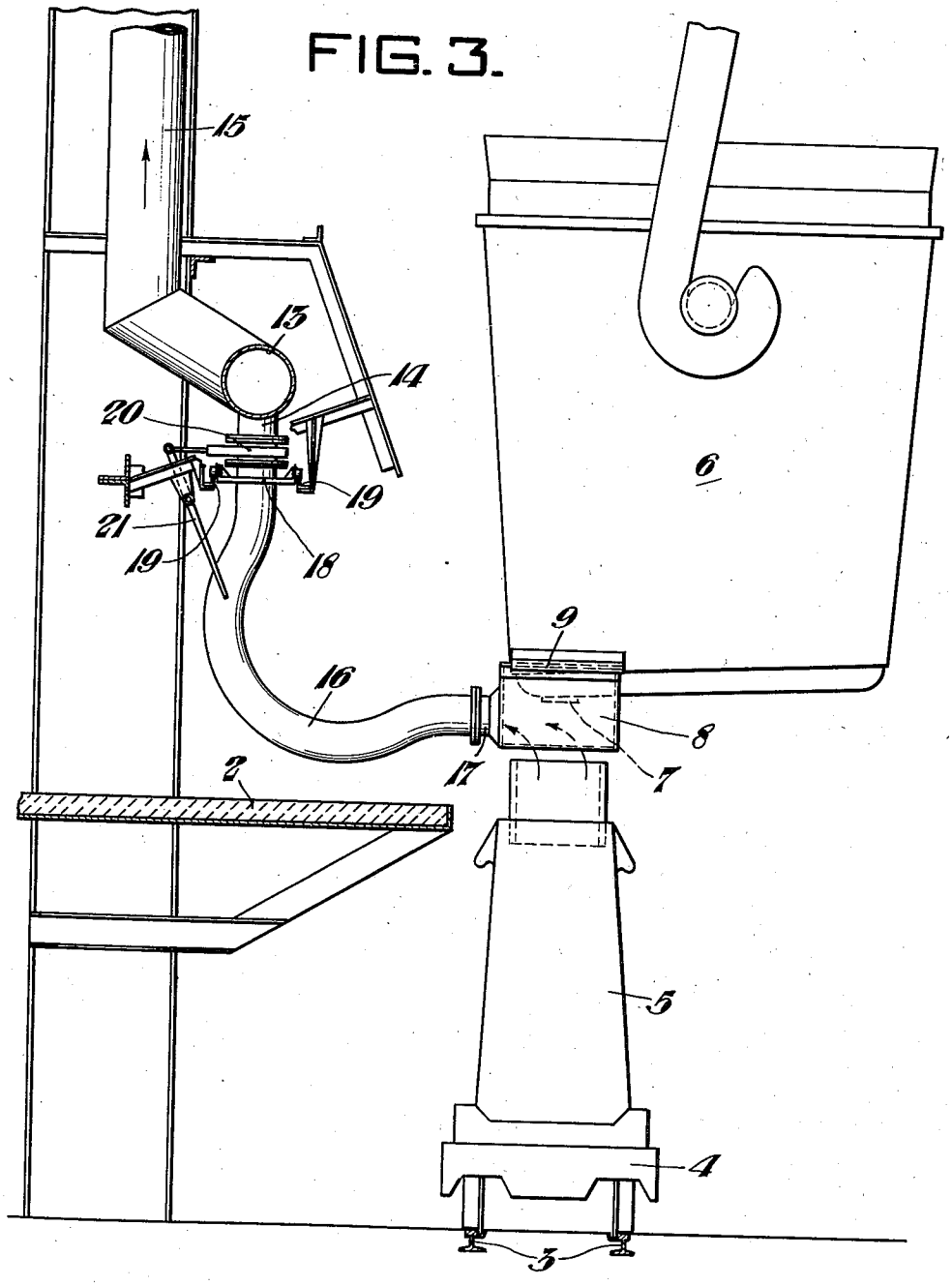
FIG. 3.



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UNITED STATES PATENT OFFICE

2,250,913

FUME EXHAUSTING APPARATUS FOR USE WITH INGOT MOLDS

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2 Claims. (Cl. 22—73)

This invention relates to apparatus for collecting and exhausting the fumes and gases issuing from the top of ingot molds during the pouring thereof.

In the manufacture of steel ingots, it is the usual practice to provide a plurality of successively aligned ingot molds and pour the same through the top thereof from a large ladle of molten steel which is suspended and moved along the row of ingot molds usually by means of an overhead travelling crane. It is sometimes desirable to manufacture leaded-steel ingots; that is, steel ingots containing a certain amount of lead, primarily for improving the machineability of the finished steel. The lead is usually added to the steel at the time of pouring the same into the molds in the form of small lead shot and when these fine particles of lead come into contact with the hot metal, a large amount of lead fumes and gases issue forth from the top of the mold which, of course, are poisonous and dangerous, and, oftentimes, fatal to human life. In order to collect and carry away these poisonous lead fumes so as to protect the workmen in the vicinity of the pouring operations, it is proposed to employ the apparatus of the present invention.

Accordingly, it is one of the objects of the present invention to provide an improved apparatus for collecting and exhausting the fumes and gases issuing from the top of ingot molds during the pouring thereof which will efficiently and effectively carry the same therefrom, thereby eliminating the escape of such gases and fumes into the surrounding atmosphere.

It is another object of the invention to provide an improved apparatus for collecting and exhausting the fumes and gases issuing from the top of the ingot molds during the pouring thereof which can be conveniently and safely used and, at the same time, apparatus which is simple and inexpensive in its construction and use.

Various other objects and advantages of this invention will be more apparent in the course of the following specification and will be particularly pointed out in the appended claims.

In the accompanying drawings there is shown, for the purpose of illustration, one embodiment which my invention may assume in practice.

In these drawings:

Figure 1 is a plan view of the improved fume exhausting apparatus of my invention;

Fig. 2 is a section taken on line II—II of Fig. 1; and

Fig. 3 is a section taken on line III—III of Fig. 1.

Referring more particularly to the drawings, there is shown a pouring platform 2 suitably arranged along the side of the tracks 3 on which mold cars 4 are adapted to run for carrying the ingot molds 5. As is the conventional practice, the ingot molds 5 are successively aligned in front of the pouring platform and there is provided a sufficient number of ingot molds to accommodate the heat of the steel to be poured and there is also provided a conventional ladle 6 for carrying the molten steel which is adapted to be conveyed from the furnace to the pouring station or the line of ingot molds by means of an overhead crane.

According to the present invention, there is adapted to be arranged on the bottom side of the ladle 6 around the pouring nozzle 7 thereof an elongated sheet metal hood member 8 being of such length as to be disposed over a plurality of ingot molds at one time, preferably four in number, and having a width at least equal to the width of the top of the molds and preferably slighter greater than such width. The hood 8 is removably attached to the bottom of the ladle 6 by means of angle irons 9 and 10 which are adapted to act as a track for slidably receiving the upper flanged edges of the hood. The hood preferably has an opening 12 in the side thereof next to the pouring platform, opposite the nozzle 7, which is substantially equal in width to the width of an ingot mold and adapted for a purpose hereinafter to be described.

There is suitably arranged on the platform 2, parallel to the line of ingot molds, a longitudinally extending suction header pipe or manifold 13 having a plurality of spaced apart connections 14 arranged therealong. The suction header is connected preferably centrally thereof to a connection 15 which is, in turn, connected to a fan, filter or stack, or other suitable exhausting means, and to such other filtering or fume collecting equipment as is considered necessary. There is provided a flexible hose connection 16, one end of which is adapted to be preferably permanently attached to the hood 8 at 17. On the other end of the hose 16 there is provided a coupling or connecting member which is mounted on a carriage 18 and which is adapted to be removably connected to any one of the connections 14 arranged in and along the suction header 13. The carriage 18 is movably disposed on tracks 19 suitably arranged below the suction header 13 and parallel thereto so as to support and aid in conveying and facilitate the handling of same 18 so as to aid in positioning it opposite

the desired connection 14. There is associated with each of the connections 14 preferably a valve 20 to be closed preferably by means of a manually controlled handle 21 when the hose connection 18 is detached therefrom and opened thereby when the same is attached thereto.

The improved gas or fume exhausting apparatus of the present invention functions in the following manner:

The ladle 6 of molton steel is moved to position opposite the pouring platform by means of the overhead crane as described. The hood 8 is then positioned on the bottom of the ladle around the pouring nozzle 7 thereof by sliding the upper flanged edges of the hood into the tracks formed by the angle irons 9 and 10 so that the hood is disposed over the aligned row of ingot molds and spaced a short distance thereabove or above the hot tops thereon; that is, if such are used. The hose connection 18 is then moved to position opposite the nearest end connection 14 and attached thereto. The improved fume exhausting apparatus of the present invention is then in readiness and pouring of the ingot molds can then be started. The ladle is adapted to move from right to left as shown in Figure 2 of the drawings and it will be seen that the hood 8 extends back over the two ingot molds that have previously been poured so as to collect any fumes or gases escaping while the ingots are freezing therein. The hood 8 has the opening 12 in the side thereof so as to permit the operator to watch the pouring of the metal into the ingot mold being poured and to permit the placing of the lead shot into the mold as it is being poured in the manufacture of leaded steel ingots. As the ladle is moved along the row of ingot molds, and it reaches a position in which the flexible hose 16 will not satisfactorily reach to the end connection 14 to which it is attached, the valve or gate 20 thereof is closed and the connection 18 disengaged therefrom and moved to a position opposite the next succeeding or nearest connection 14 along the suction header 13 and attached thereto. This hose connection is transferred and moved along the suction header 13, as described, as the progress of the pouring continues.

It will thus be seen that as the gases escape from the ingot molds, they collect in under the hood 8 and are conveyed safely therefrom through the hose 16 into the header pipe 13 and out into the stack or other safe place of disposal by means of a fan or other suitable exhaust equipment.

After the heat has been poured or when the ladle has been emptied of the molten steel, the hood 8 is then removed from the bottom of the ladle and placed upon the platform until the next pouring operation. The ladle then it returned to the furnace to be refilled with molten steel or to its place of storage until the next heat is to be poured.

When ingot molds are poured having hot tops thereon, it is customary to fill the mold up to the bottom of the hot top positioned therein and then proceed to the next mold and pour it likewise to the bottom of the hot top in order to permit the steel in the first mold to freeze and seal the clearance space between the wall of the hot top and the wall of the mold. The ladle is then moved back and the hot top filled with the molten metal. Such pouring is repeated, as described, throughout the line of molds. In order that the present apparatus may be used with ingot molds having hot tops thereon as well as with molds not using hot tops, and to secure all of the advantages thereof, the front of a hood 8 is extended sufficiently so as to cover the mold in front thereof that has been poured up to the bottom of the hot top and collect the gases and the fumes issuing therefrom while the hot top of the previous mold poured is being filled.

While I have shown and described one embodiment of my invention, it will be understood that this embodiment is merely for the purpose of illustration and description and that various other forms may be devised within the scope of my invention, as defined in the appended claims.

I claim:

1. Apparatus of the class described including, in combination, an elongated hood member for collecting gases and fumes from a series of successively aligned ingot molds as they are being poured, means for removably attaching said hood to the bottom of the pouring ladle so as to be disposed around the pouring nozzle therein and extending downwardly therefrom directly over the molds, said hood member supported solely by said ladle and adapted to be spaced from the molds and being of such length as to be disposed over a plurality of ingot molds at one time, a flexible hose connection having one end thereof securely attached to said hood and communicating with the interior thereof, and movable means arranged along the series of successively aligned ingot molds which is adapted to support the opposite end of said flexible hose connection with said end adapted to be removably attached to any one of a series of connections arranged along said movable means for conveying the gases and fumes from in under said hood.

2. Apparatus of the class described including, in combination, an elongated hood member for collecting gases and fumes from a series of successively aligned ingot molds as they are being poured, means for removably attaching said hood to the bottom of the pouring ladle so as to be disposed around the pouring nozzle therein and extending downwardly therefrom directly over the molds, said hood member supported solely by said ladle and adapted to be spaced from the molds and being of such length as to be disposed over a plurality of ingot molds at one time, a flexible hose connection having one end thereof securely attached to said hood and communicating with the interior thereof, a trackway arranged along and substantially parallel to the series of successively aligned ingot molds, and a movable carriage arranged on said trackway which is adapted to support the opposite end of said flexible hose connection with said end adapted to be removably attached to any one of a series of connections arranged along the trackway for conveying the gases and fumes from in under said hood.

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