J. A. MURPHY.

RETORT CHARGING APPARATUS.

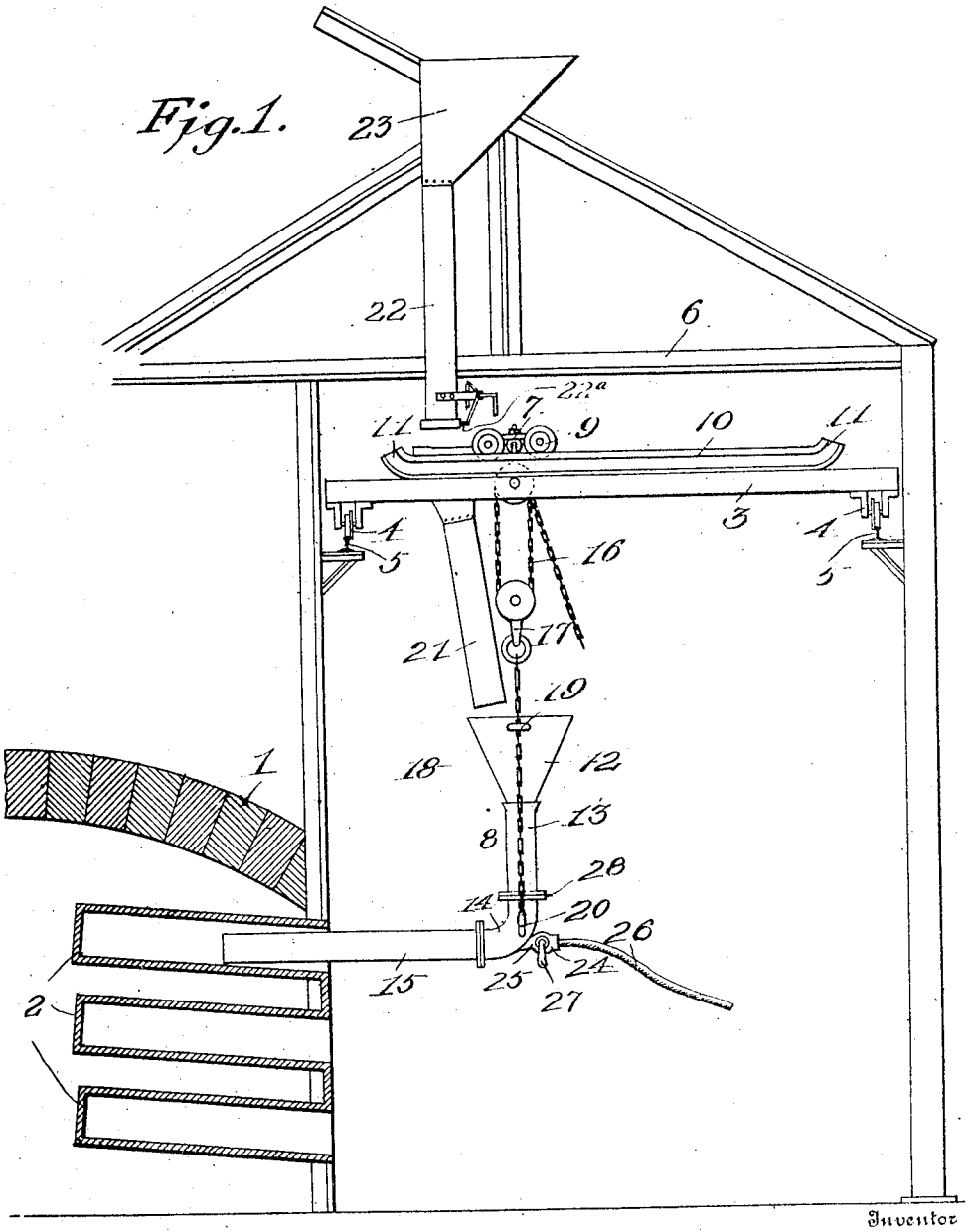
APPLICATION FILED MAR. 14, 1908.

916,578.

Patented Mar. 30, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



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Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

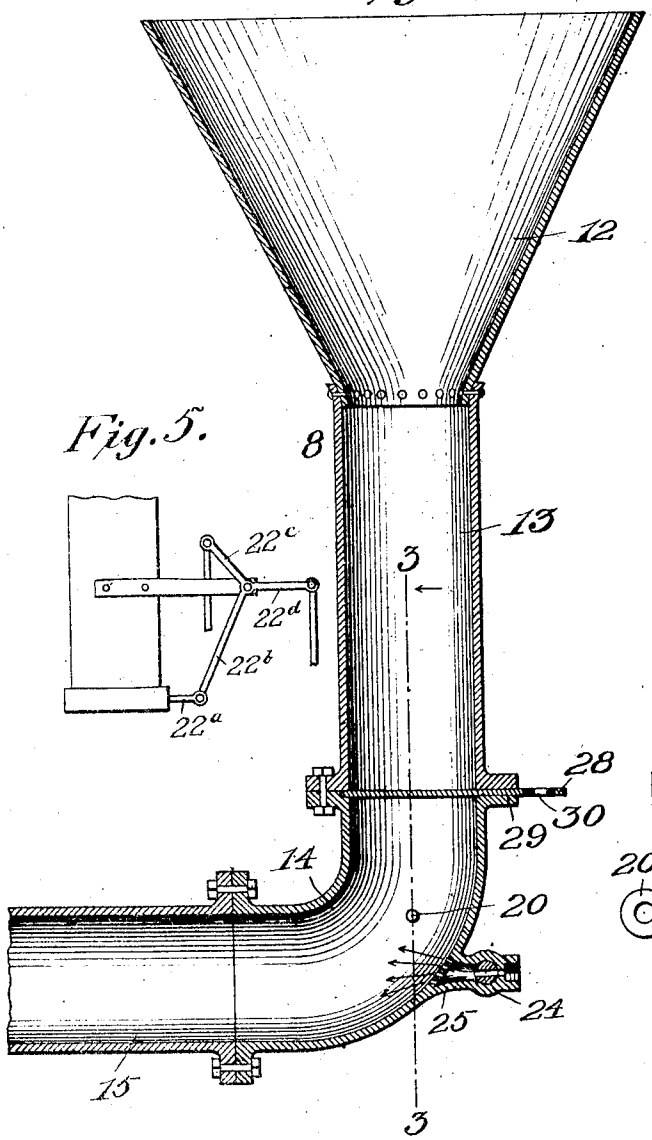


Fig. 4.

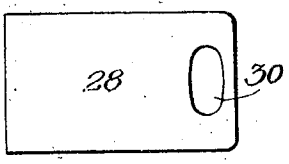
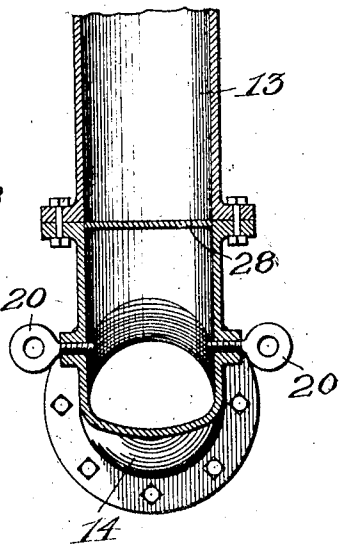


Fig. 5.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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RETORT-CHARGING APPARATUS.

No. 916,878. Specification of Letters Patent. Patented March 30, 1909.

Application filed March 14, 1908. Serial No. 421,072.

To all whom it may concern:

Be it known that I, JOSEPH A. MURPHY, a citizen of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Retort-Charging Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in apparatus for charging the retorts of zinc furnaces, gas retorts, and the like, and it consists of the features of novelty hereinafter fully described and claimed.

The object of the invention is to provide a simple, practical and comparatively inexpensive retort charging apparatus which will enable the retorts of the furnace to be quickly charged by mechanical means so as to effect a marked saving of time and labor, thereby lessening the cost of operating and increasing the production of the furnace.

The above and other objects of the invention, as will hereinafter appear, are attained in its preferred embodiment illustrated in the accompanying drawings, in which—

Figure 1 is a detail vertical section through a portion of a zinc furnace illustrating the application of my invention thereto; Fig. 2 is a vertical section, on an enlarged scale, through the charging chamber or gun; Fig. 3 is a detail section taken on the plane indicated by the line 3—3 in Fig. 2; Fig. 4 is a detail view of the cut off plate or slide in the charging chamber; and Fig. 5 is a detail view of the lower end of one of the chutes showing its controlling valve or damper.

In the drawings 1 denotes a portion of a furnace having retorts 2 arranged in a vertical series and adapted to be charged with ore by my improved charging device or apparatus. The latter comprises a main traveling carriage or crane 3 having supporting wheels 4 which travel upon track rails 5 arranged horizontally in parallel relation upon a suitable elevated supporting structure 6 so that the main carriage can move parallel with the front face of the furnace.

Mounted upon the carriage 3 is a supplemental carriage 7 which is movable toward and from the front face of the furnace and is adapted to carry a vertically adjustable retort charging chamber or gun 8. The supplemental carriage 7 is mounted upon supporting wheels 9 which travel on track rails 10 arranged upon the main carriage 3 and having upturned ends 11 to serve as stops to limit the movement of the carriage 7.

The charging chamber or gun 8 comprises a hopper 12 arranged at the upper end of a vertical section or pipe 13 which is connected by an elbow 14 to a horizontal section or pipe 15 adapted to serve as a discharge nozzle and to enter the retorts 2. The charging chamber 8 is suspended and adjusted by a suitable chain hoist 16 carried by the supplemental carriage 7 and having, connected to its lower pulley block 17, two suspending chains 18 which pass through guide eyes 19 upon the upper edge of the hopper and are attached to screw eyes 20 arranged in bosses upon the opposite sides of the elbow 14.

The ore is fed to the charging chamber through a chute 21 which has its enlarged upper end suitably secured to the main carriage 3 and its depending lower end so disposed that when the nozzle 15 is inserted in one of the retorts 2, the hopper 12 will be beneath the chute 21. The latter receives the ore from a stationary chute 22 depending from a supply hopper 23 arranged in the upper part of the structure 6. It will be understood that any number of the hoppers may be provided for each furnace and the chutes 22 for said hoppers may be movable so as to adapt them to supply ore to two or three of the vertical series of retorts.

In order to control the discharge of the ore through the chute 22 I provide a damper plate or valve 22^a, as clearly shown in Fig. 5. This damper or valve is in the form of a plate mounted for sliding movement in suitable guides and adapted to be operated by a Y-shaped lever or bell crank having a depending arm 22^b loosely connected to the valve plate and two upwardly projecting arms 22^c, 22^d to which operating rods or cords may be connected. The lever is suitably pivoted in bearing brackets upon the chute 22, as clearly illustrated in the drawings.

For the purpose of effectively discharging the ore from the charging chamber or gun into the retort, I provide an injector or blast distributor which is preferably arranged in the elbow 14 at the inner end of the nozzle 15. This injector comprises a rotary plug valve 24 disposed horizontally in a casing 25 in the form of a rearwardly projecting nipple cast integral with the elbow 14, which latter is preferably cast and suitably secured to the two sections or pipes 13, 15. The casing or

projection 25 has one end of a flexible compressed air or steam supply hose 26 connected to its outer end. Upon the outer end or stem of the valve 24 is a depending hand lever 27 by means of which the supply of air or other fluid under pressure may be controlled to enable the blast to be regulated according to the character and condition of the ore. At the inner end of the casing or projection 25 is a perforated plate 25ª which serves to spread and distribute the air blast. This perforated plate is preferably cast integral with the elbow 14, as clearly shown in Fig. 2.

The charging chamber or gun 8 is adapted to contain a little more ore than is necessary to fill one of the retorts 2 and for the purpose of controlling the passage of ore through said chamber I preferably provide a cut off valve plate 28 in the form of a slide arranged in guide recesses 29 in the upper end of the elbow 14. The outer end of the valve plate or slide 28 projects outside of the elbow and is formed with a hand opening 30 so that it may be readily moved into or out of the chamber to close or open the lower end of the vertical section or pipe 13.

In operation, the main carriage 3 is first adjusted in front of one of the vertical series of retorts in the furnace and the supplemental carriage 7 is moved inwardly to dispose the nozzle 15 of the charging chamber or gun within one of the retorts. The valve plate 28 is then pulled outwardly to release the ore in the hopper and the lever 27 of the injector or blast valve is then operated to open the latter so that the blast of air will force the ore through the nozzle 15 and into the retort. After one retort is filled, the charging chamber is adjusted vertically to fill another and this operation is again repeated to fill the third. When the nozzle 15 projects into one of the retorts it is necessary to shift the carriage 7 to move the nozzle out of the retort each time the charging chamber is adjusted. After the retorts of one vertical series have been filled, the main carriage 3 is shifted to the next series to be filled.

From the foregoing it will be seen that the use of my invention will effect a great saving in labor, since two men may effectively operate it and fill the retorts in a much shorter time than is required for filling them manually by a larger number of men. This saving in time effects an increase in the output or production of the furnace and the saving of labor lessens the cost of operating the same. Furthermore, the use of my improved apparatus enables the ore to be conveyed to the hoppers from the roasters or beds by means of pan conveyers, thereby reducing the expense of operating the furnace. It will be noted also that my improved apparatus is simple in construction so that it may be produced and installed at a comparatively small expense and that it will be, at the same time, strong and durable.

The charging chamber or gun has its chains 18 connected to a ring which engages a hook upon the pulley block 17 so that the charging chamber or gun may be removed from the supplemental carriage 7 and a pair of tongs or other grappling device may be substituted for it so that broken or damaged retorts may be easily removed from the furnace and replaced by new ones.

Having thus described my invention what I claim is:

1. The combination of an elevated track, a main carriage upon the same, a supplemental carriage upon the main carriage and movable in a plane at right angles to said elevated track, a charging chamber of right angular form having an elbow united by vertical and horizontal sections, the horizontal section forming a discharge nozzle and the vertical section having a hopper at its upper end, an injector arranged in the elbow, a valve for said injector, a flexible blast supply pipe connected to the injector, a controlling valve in the charging chamber above its elbow, a chute upon the main carriage to discharge into said hopper and means for suspending the charging chamber from the supplemental carriage and adjusting it vertically.

2. The combination of an elevated track, a main carriage upon the same, a supplemental carriage upon the main carriage and movable in a plane at right angles to said elevated track, a charging chamber of right angular form having an elbow united by vertical and horizontal sections, the horizontal section forming a discharge nozzle and the vertical section having a hopper at its upper end, an injector arranged in the elbow, a valve for said injector, a flexible blast supply pipe connected to the injector, a controlling valve in the charging chamber above its elbow, a chute upon the main carriage to discharge into said hopper, a chain hoist depending from the supplemental carriage and flexible connections between the chain hoist and the charging chamber.

3. The combination of an elevated track, a main carriage upon the same, a supplemental carriage upon the main carriage and movable in a plane at right angles to said elevated track, a charging chamber of right angular form having a horizontal section forming a discharge nozzle and a vertical section provided with a hopper, a chute upon the main carriage to discharge into said hopper and means for suspending the charging chamber from the supplemental carriage and adjusting it vertically.

4. The combination of an elevated track, a main carriage upon the same, a supplemental carriage upon the main carriage and movable in a plane at right angles to said elevated track, a charging chamber of right angular

form having a horizontal section forming a discharge nozzle and a vertical section provided with a hopper, a controlling valve in the vertical section of said chamber, an injector in the angular portion of said chamber, and means for suspending said charging chamber from the supplemental carriage and adjusting it vertically.

5. The combination of a main structure, a main supply chute in the upper portion thereof, a controlling valve for said chute, a horizontally disposed elevated track in said structure, a main carriage to travel on said track and beneath said chute, a supplemental carriage to travel on the main carriage in a plane at right angles to said elevated track, a charging chamber suspended from the supplemental carriage and a chute upon the main carriage and adapted to direct the discharge from said supply chute into said charging chamber.

6. The combination of a charging chamber having vertical and horizontal sections united by an elbow, the horizontal section forming a discharge nozzle and the vertical section having a hopper at its upper end and a controlling valve in the vertical section of said charging chamber.

7. The combination of a charging chamber having vertical and horizontal sections united by an elbow, the horizontal section forming a discharge nozzle and the vertical section having a hopper at its upper end, a controlling valve in the vertical section of said charging chamber and an injector arranged in said elbow.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JOSEPH A. MURPHY.

Witnesses:

WILLIAM J. KERR,

H. S. CURRIE.