No. 792,735. PATENTED JUNE 20, 1905.

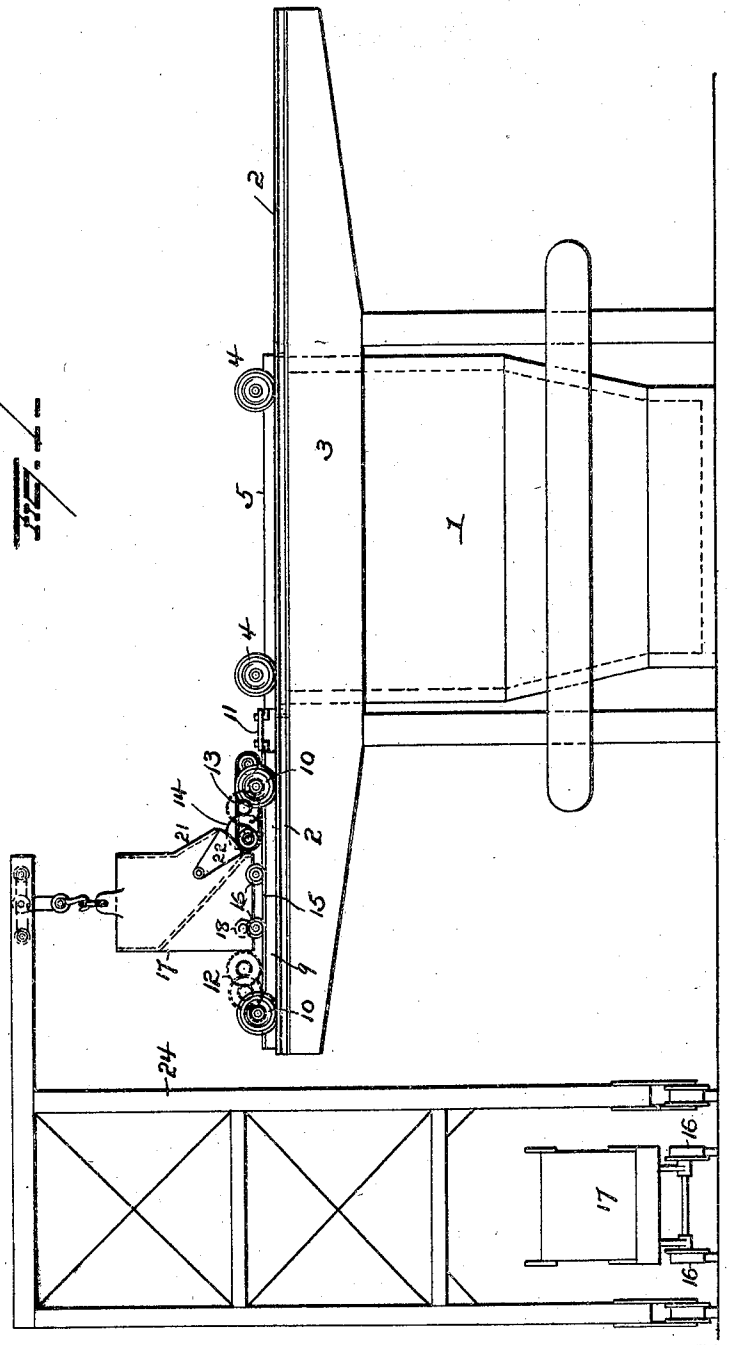
J. W. SEAVER.

FURNACE FILLING APPARATUS.

APPLICATION FILED NOV. 11, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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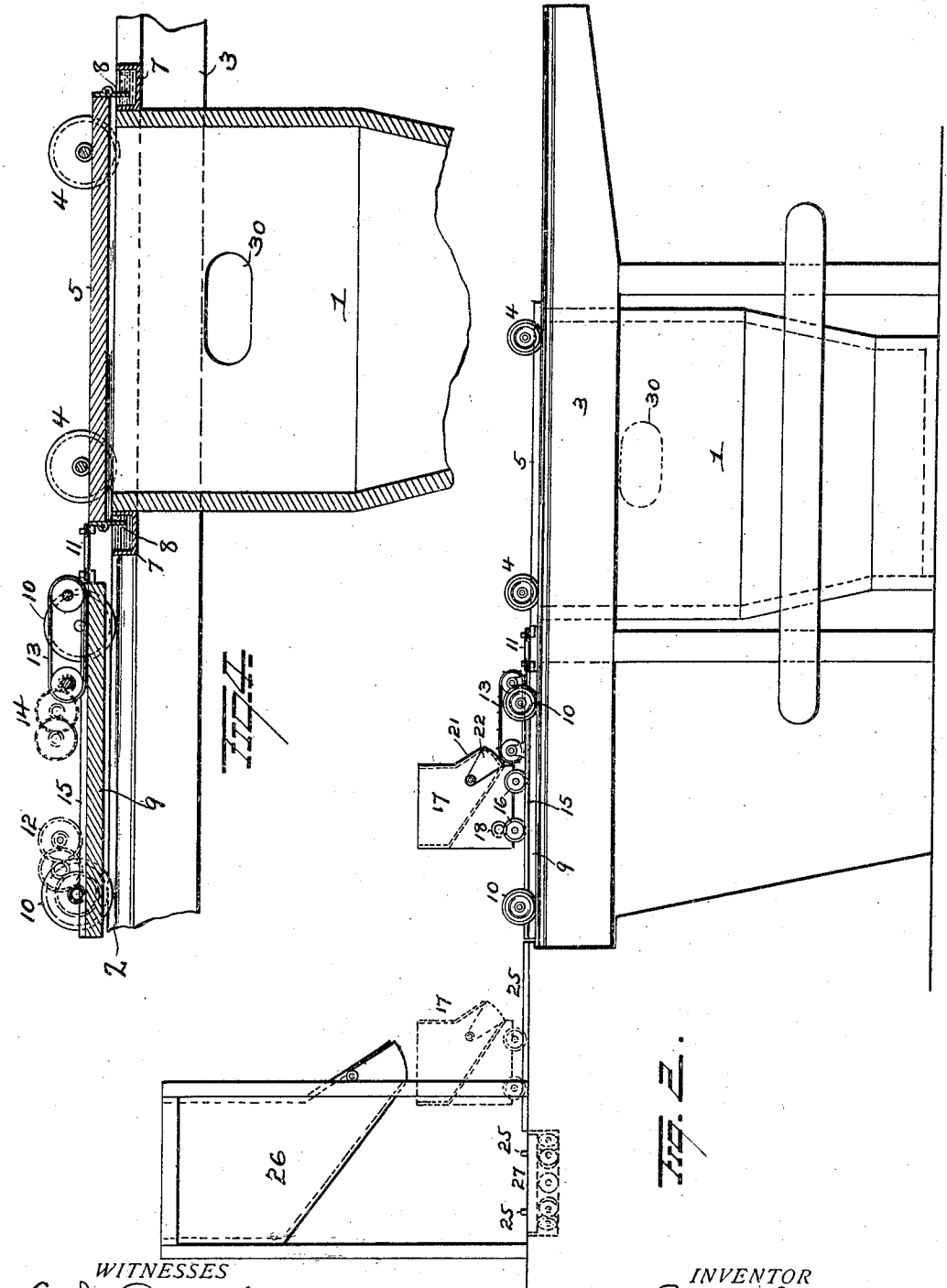


Fig. 1.

Fig. 2.

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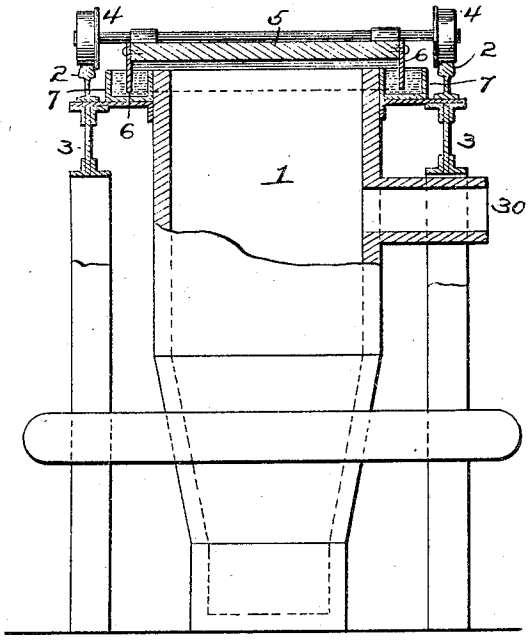


Fig. 3.

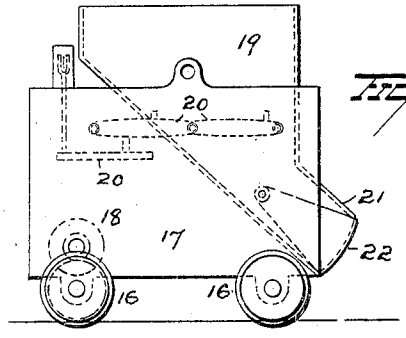


Fig. 5.

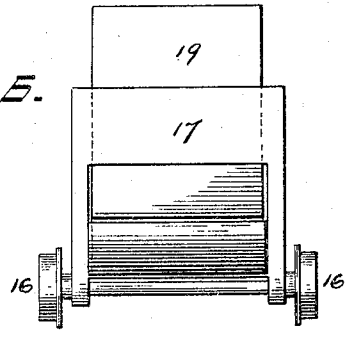
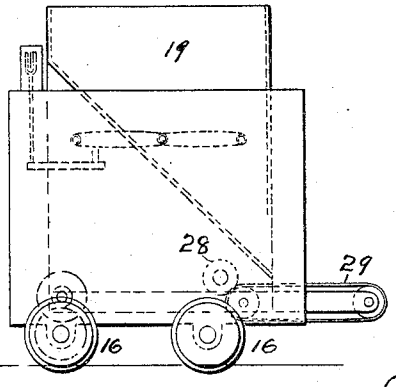


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN WRIGHT SEAVER, OF CLEVELAND, OHIO, ASSIGNOR TO THE WELLMAN-SEAVER-MORGAN COMPANY, OF CLEVELAND, OHIO.

FURNACE-FILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 792,735, dated June 20, 1905.

Application filed November 11, 1904. Serial No. 232,366.

To all whom it may concern:

Be it known that I, JOHN WRIGHT SEAVER, a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Furnace-Filling Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved furnace-filling apparatus, the object of the invention being to provide improved means for feeding and filling rectangular, elliptical, or other elongated furnaces and smelters.

Heretofore the charge for such furnaces has been deposited in this character of furnace in one of three ways. The first method is that of elevating the stock or charge to the platform surrounding the top of the furnace and then shoveling into the furnace by hand, which was very laborious and exhaustive, not only on account of the severe labor, but on account of the fumes arising from the furnace. The second plan, which in general operation, consists in elevating the stock in barrels or cars, arranged to dump sidewise or endwise, and dumping the contents of the cars into the furnace. This method is an improvement on the first, but is still a very laborious process. The third method consists of forming the lid on top of the furnace with conveying-belt or endless apron, on which the stock or charge is deposited. The lid-carrying conveying belt or apron is moved back from the furnace under a bin or bins to receive therefrom the charge on its endless belt or apron. The lid is then moved to the furnace, and as it traverses the same the endless belt or apron is operated to deposit the stock into the furnace. In order to utilize this third method of filling the furnace in an economical manner, it is necessary that the bins from which the charge or filling is drawn be located at a height above the top of the furnace, so that the movable lid carrying the endless belt or apron can be run beneath the bins and filled from them, and it is evident that this third method is only available when the bins can be located on an upper level near the top of the furnace, and even then only a limited amount of charge or stock can be deposited on the conveying-belt at one time.

My improved apparatus is an improvement upon all of the above-described means for filling furnaces; and it consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view of a furnace, illustrating one form of my invention. Fig. 2 is a similar view illustrating an alternative construction. Fig. 3 is a view in cross-section of the furnace. Fig. 4 is a view in longitudinal section of the furnace. Fig. 5 is a side view of one form of lorry or charging-car. Fig. 6 is an end view of the lorry or car shown in Fig. 5, and Fig. 7 is a view of an alternative or modified form of lorry or car.

1 represents a furnace of ordinary construction having greater length than breadth, and 2 represents rails supported on beams 3 beside the upper end of the furnace and forming a track on which the wheels 4 at the sides of a furnace-cover 5 are mounted to run. This cover 5 is made with depending aprons 6 at its side edge, normally submerged in the water of troughs 7, located beside the furnace, and hinged or otherwise movable aprons 8 are provided at the ends of the cover, normally submerged in the water-troughs at the ends of the furnace, thus completing a water seal all around the furnace-top. A platform 9, which also serves as an auxiliary cover, and which will be hereinafter referred to as such, is also provided with wheels 10, mounted to run on rails 2, and is connected at one end with cover 5 by couplings 11, (of any desired form,) which couplings 11 also serve to hold the cover 5 and auxiliary cover 9 apart, providing a narrow opening between them for the passage therethrough of stock or charge into the furnace, as will more fully hereinafter appear.

An electric or other motor 12 is provided on the auxiliary cover 9 to propel the same

along the track 2, and an endless conveyer-apron 13 is located on cover 9 and propelled by a motor 14 to dump stock or charge deposited thereon between the covers.

Parallel rails 15 are located longitudinally on auxiliary cover 9, and on these rails the wheels 16 of a lorry or dumping-car 17 are adapted to run. This car or lorry is shown clearly in Figs. 5 and 6 and comprises in the main a body supported on wheels 16 and containing a motor 18 to propel the same, and a bin or receptacle 19, having an inclined bottom, is located in the body and supported on scale-beams 20, permitting the contents of the bin or receptacle 19 to be weighed before being dumped into the furnace. The construction and operation of the scale-beams need not here be set forth in detail, as any form of scale adapted for the purpose might be used or the weighing feature dispensed with altogether if preferred.

At the lower forward end of bin or receptacle 19 a discharge chute or nozzle 21 is located and provided with a hinged shutter or door 22, normally closing the same.

The car or lorry may be filled in various ways. As shown in Fig. 1, the car may receive its load from bins or receptacles at a level lower than the top of the furnace and be conveyed to the tracks on auxiliary cover 9 by an elevator and crane 24, or, as shown in Fig. 2, when the bins are at a height above the furnace-top the car or lorry may be run on tracks 25 beneath a series of bins 26 and after being filled can be turned on a turn-table 27 and run onto auxiliary cover 9. In fact, the lorry or car can be filled in any desired manner, according to the plant in which it is used.

The operation of the construction above described is as follows: The filled lorry or car is run by its motor 18 along the track 15 to a point with its discharge-nozzle 21 projected over the endless conveyer or apron 13. The motor 12 is then started to move auxiliary cover 9 and push the cover 5 in advance thereof, the depending aprons 8 at the ends of cover 5 being first raised out of their water-seal trough. As the covers move over the top of the furnace motor 14 is started and conveyer or apron 13 will convey the charge dumped thereon by the nozzle 21 of the lorry to the end of auxiliary cover 9 and dump it down between the covers into the furnace below, and the covers are moved back and forth over the furnace until the entire contents of the lorry or car is deposited therein, and by changing the speed of the motor the charge can be dumped at one movement of the covers or require several back and forward movements, and thus be distributed throughout the furnace as desired.

A modified form of lorry or car is shown in Fig. 7, in which an endless conveyer or apron 29 is carried by the car and located below the discharge-outlet of the bin or receptacle therein. This conveyer 29 projects out beyond the car and is driven by a motor 28. With this construction of lorry or car the conveyer 13 on the auxiliary cover 9 can be dispensed with.

By constructing the lorry or car with a bin mounted on scale-beams the charge can be accurately weighed. The receptacle may be partially filled with any kind of ore or other material and that amount weighed, and the lorry may then be moved to bins and filled with a different material, each different kind being weighed on its own scale-beam. The charge for smelting-furnaces generally consists of different kinds of ore with different kinds of coke, flux, &c.

The furnace is provided with an outlet 30 for waste-gas and products of combustion through which the gas escapes while the furnace is being filled.

In case it may be desired to deposit the coke or other ingredients on the edges of the furnace instead of in the center of the same the bin or receptacle of the lorry can be provided with partitions and the coke placed in the outer compartments so formed and the other material in the middle compartment, and this arrangement will allow the charge to be deposited as desired.

It is evident that in place of the movable crane indicated in Fig. 1 a fixed derrick or crane for each furnace could be substituted or another convenient method of lifting the lorry to the proper height could be provided, such as inclined planes, elevators, &c.

In place of an electric motor for moving the lorry a cable or other suitable means of propulsion could be employed, such as a locomotive, mule, or man power.

The tracks on the auxiliary cover might be omitted and a double set of tracks provided beside the furnace-top. In this case the lorry will move over the auxiliary cover 9 and the lorry can be arranged to move the covers by means of power on the lorry, in which event the motor 12 and auxiliary mechanism is dispensed with. A motor for moving the endless conveyer 13 might also be provided on the lorry. So if such form of construction were employed there would be no motor or other power attached to auxiliary cover 9, as the covers would be moved by a motor on the lorry and the conveyer 13 would also be operated by a motor on the lorry.

A great many other changes might be made in the general form and arrangement of the parts described without departing from my invention, and hence I would have it understood that I do not restrict myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention as claimed.

Having fully described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the class described, the combination with a furnace, of two traveling covers therefor connected together and spaced apart, and a lorry to travel over one of said covers to supply a charge between said covers to the furnace.

2. In an apparatus of the character described, the combination with a furnace, of two traveling covers therefor, connected together and spaced apart, a conveyer to feed a charge between the covers to the furnace, and a traveling lorry to run over one of said covers and supply the charge to the conveyer.

3. In an apparatus of the character described, the combination with a furnace, of two traveling covers therefor, connected together and spaced apart, an endless conveyer mounted upon and carried by one of said covers to feed a charge between the covers to the furnace, and a traveling lorry to run on the cover carrying the conveyer and constructed to discharge onto the latter.

4. In an apparatus of the character described, the combination with a furnace, of a movable cover on the furnace, a movable auxiliary cover connected with and spaced from the main cover, and a lorry or dumping-car to run on the auxiliary cover to supply material between the covers to the furnace.

5. In an apparatus of the character described, the combination with a furnace, of a movable cover on the furnace, means for moving the cover, an auxiliary movable cover, tracks thereon and a lorry or dumping-car to run on said tracks and supply a charge to the furnace.

6. In an apparatus of the character described, the combination with a furnace, of a wheeled cover for the furnace, a wheeled auxiliary cover connected with and spaced from the cover, tracks on the auxiliary cover, and a lorry or dumping-car adapted to run on said tracks and dump material between the covers down into the furnace.

7. In an apparatus of the character described, the combination with a furnace, of a cover thereon, an auxiliary cover connected with and spaced from the cover, a motor on the auxiliary cover to move the covers across the top of the furnace, tracks on the auxiliary cover, a lorry or dumping-car adapted to run on said tracks, and a conveyer on the auxiliary cover adapted to receive the material from the lorry and dump it down between the covers as the latter moves across the furnace-top.

8. In an apparatus of the character described, the combination with a furnace, of a cover water-sealed at its edges, an auxiliary cover connected with and spaced from the cover, means for moving the covers across the furnace-top, and a lorry or dumping-car adapted to receive its charge from any source of supply, and means for conveying or guiding the lorry or car onto the auxiliary cover.

9. In a furnace-charging apparatus, the combination with a furnace, of two traveling covers therefor, spaced apart and connected together, a lorry to travel on one of said covers, means for supplying a charge to said lorry, means on the lorry for weighing the charge, and a conveyer mounted on and carried by one of said covers to receive the weighed charge from the lorry and discharge it between the traveling covers, into the furnace.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN WRIGHT SEAVER.

Witnesses:
N. R. FAIRLAND,
W. G. HILDEBRAN.