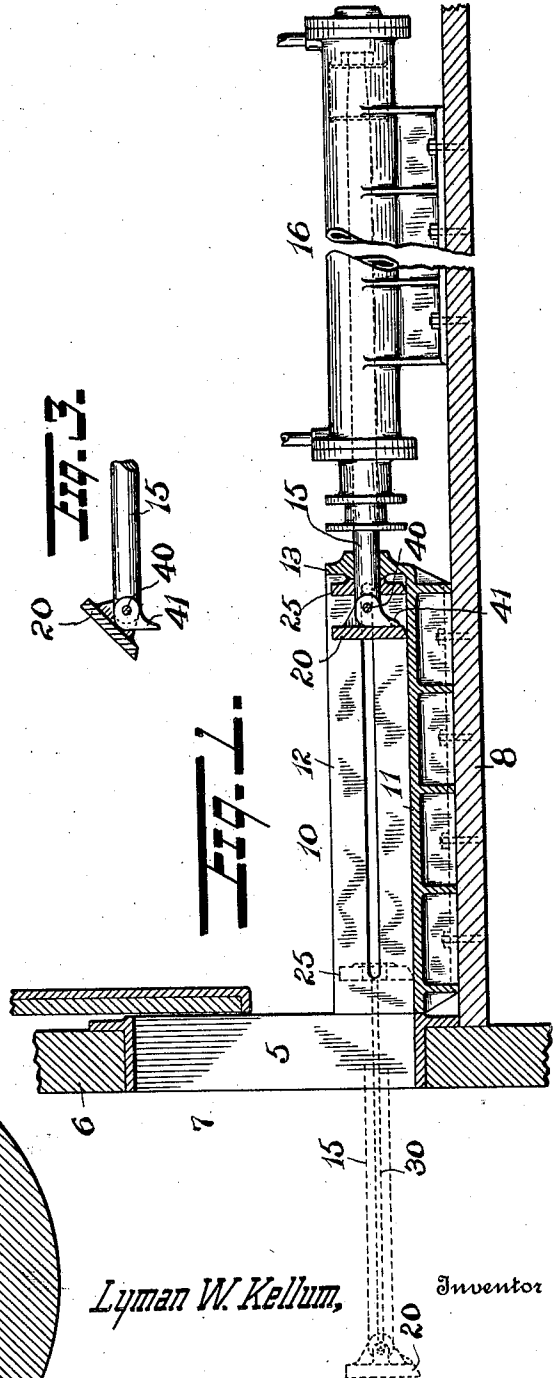
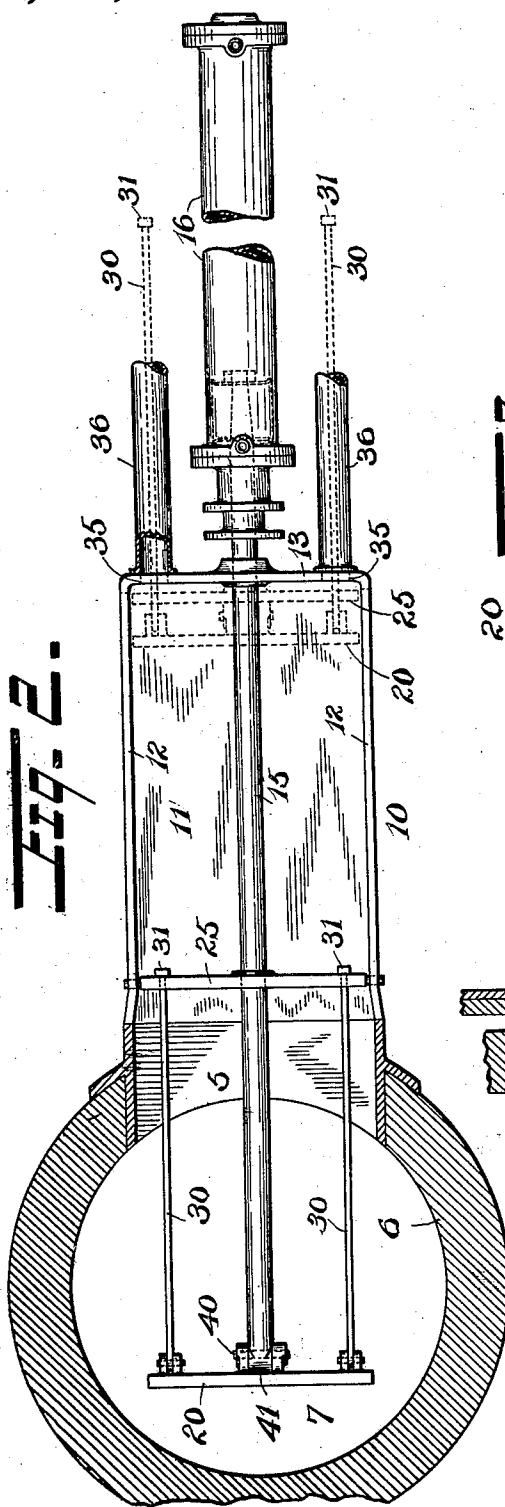


L. W. KELLUM.
CHARGING MECHANISM FOR CUPOLAS.
APPLICATION FILED MAY 5, 1919.

1,335,741.

Patented Apr. 6, 1920.



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CHARGING MECHANISM FOR CUPOLAS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LYMAN W. KELLUM, a citizen of the United States, residing at Birdsboro, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Charging Mechanism for Cupolas, of which the following is a specification.

My invention consists in improved charging mechanism adapted particularly for cupola furnaces having lateral feed-way openings through which the charges of material are periodically delivered to the furnace chamber; and my main objects are to facilitate and expedite the charging operations while at the same time providing for such leveling of the delivered charges as to maintain a substantially uniform bed of material in the furnace chamber. The invention is fully described in connection with the accompanying drawing illustrating a preferred embodiment thereof, and the novel features are specifically pointed out in the claims.

Figure 1 is a vertical longitudinal section showing my improved charging mechanism in connection with the feed-way of a heating furnace; the pusher driving means indicated being incompletely illustrated, with the fully projected position of the latter indicated in dotted lines.

Fig. 2 is a corresponding plan-view showing the pusher head and rod support in fully projected position, with a dotted-line showing of the positions assumed by their operating connections when said parts are in retracted position.

Fig. 3 is a partial detail view showing the pusher head swung upward during withdrawal to ride freely over the charged material.

The drawing indicates in cross-section a top portion of a cupola furnace having a lateral feed-way opening 5 in the furnace wall 6 through which the periodically charged material is delivered to the furnace chamber 7; and also the horizontal floor 8 upon which such material and my improved charging mechanism is supported.

This mechanism comprises a charge container 10, having a floor 11 and parallel side walls 12, 12 forming a feed-way corresponding with the feed-way 5 through the furnace wall; of which latter it forms a closely communicating extension fixed to the charging floor 8. An outer-end wall 13 of this

container serves in connection with the side walls 12 thereof to hold the required material, preferably in sufficient quantity for a single charge; such material being freely admitted to the communicating lateral feed-way 5 of the furnace excepting as the latter may be closed by a suitable door when desired.

The means for discharging this material from the container into the furnace chamber comprises a horizontally reciprocative pusher bar 15, passing through and preferably supported in a central opening in the end wall 13 of the container; said pusher rod being actuated by any suitable drive mechanism, such as a hydraulic apparatus indicated at 16, whereby its projecting and retracting movements may be readily controlled in a well known manner. This pusher rod is provided with a pusher-head 20 loosely fitted to the container and the communicating furnace feed-way 5; and its length and the reciprocating movement imparted to it by said drive mechanism, are adapted to project said pusher head 20 horizontally through the full length of the extended feed-way formed by the furnace feed-way 5 and the communicating charge container, and beyond the same toward the opposite wall of the furnace chamber, so that the material in the container will not only be pushed into the furnace chamber but be spread therein approximately level with the floor of the feed-way.

To provide for properly supporting the pusher rod and maintaining the substantially horizontal movement required during projection of the pusher head beyond the feed-way and across the furnace chamber, to level the charge, I employ a sliding support for said rod; this rod support 25 as shown consisting of a transversely arranged bearing plate mounted in the longitudinally slotted side walls 12, 12 of the charge container so as to be reversely slidable from substantially one end to the other of the latter; such sliding movements being imparted to it during a portion only of each rod movement so as to locate the support respectively at the forward end of the container preliminary to the leveling projecting movement, and at the outer end wall 13 of the container when the retracting movement is completed. Such sliding movements are imparted to the rod support 25, as shown, by connecting means consisting of headed pull-

rods 30 secured to the pusher head and slidably mounted in the apertured rod support 25 so as to be effective in pulling the latter forward with the headed pusher rod until the pull-rod heads 31 are drawn by the pusher head into pulling contact with the support 25.

When the pusher head is fully retracted, as indicated in the full-line positions of Fig. 1, the slidable rod support 25 has been pushed outward thereby against the end wall of the container, as indicated, and the latter is ready to receive a charge for delivery to the furnace. When in this position the pull-rods 30, 30 are projected through openings 35, 35, therefor in said end wall 13, as indicated in dotted lines; fixed sheaths 36, 36, being preferably provided to protect these rods when thus projected.

When the charge has been placed upon the container and the headed pusher rod is moved forward to discharge it, the rod support 25 will be substantially unaffected by such movement until after the pull-rods 30, 30 have been drawn through it so as to bring the heads 31, 31 in contact therewith; but before the pusher-head has been so far projected as to require special support this contact occurs, and the rod support is thereafter moved so as to maintain it at a minimum distance from the pusher head while the latter is passing beyond the feed-way and spreading the delivered charge over the furnace chamber.

The timing of successive determined charges is normally such that the delivered material will be practically leveled up with the floor of the feed-way throughout the furnace chamber by the full projection of the pusher head as described. In practice however I have found it of great advantage to insure the free withdrawal of the pusher head by causing the latter to swing readily clear of any obstructing material in its return path; and to this end I provide a pivotal connection 40 to the pusher rod, and a lower shoulder 41 on the latter against which the pusher head normally falls and is pressed during the charging operation; while the head is free to swing forward and upward during withdrawal so as to ride freely over the charged material. The mechanism as specifically shown and described may be readily modified in detail construction and application within the invention as defined in the claims.

What I claim is:

1. In a charging mechanism comprising a charge container forming a furnace feed-way extension; a headed pusher rod, means for horizontally projecting the same through said feed-way and into the furnace chamber, and supporting means for the projected rod, movable with the latter during the latter portion only of the projecting movement.

2. In a charging mechanism comprising a charge container forming a furnace feed-way extension; a headed pusher rod, means for projecting the same through said feed-way and into the furnace chamber, a support for said projected rod slidably mounted in said charge container, and means for moving said support with the rod during a portion only of each rod movement.

3. In a charging mechanism comprising a charge container forming a furnace feed-way extension; a pusher rod having a pusher head, means for projecting said headed rod through the feed-way and into the furnace chamber, a rod support slidably mounted in said charge container, and connecting means between said pusher head and rod support whereby the latter is moved to opposite ends of the container by reverse movements of the pusher rod.

4. In a charging mechanism comprising a charge container forming a furnace feed-way extension; a pusher rod having a pusher head pivoted thereto so that its lower portion may be swung forward thereon, means for projecting said headed rod through the feed-way and into the furnace chamber, a rod support slidably mounted in said charge container, and connecting means between said pusher head and rod support whereby the latter is moved to opposite ends of the container by reverse movements of the pusher rod.

5. In a charging mechanism comprising a charge container forming a furnace feed-way extension; a pusher rod having a pusher head, means for projecting said headed rod through the feed-way and into the furnace chamber, a pusher rod support slidably mounted in said charge container, and headed pull-rods connected to said pusher head and movable in openings formed respectively in said rod support and in the closed end of the container.

In testimony whereof I affix my signature.

LYMAN W. KELLUM.