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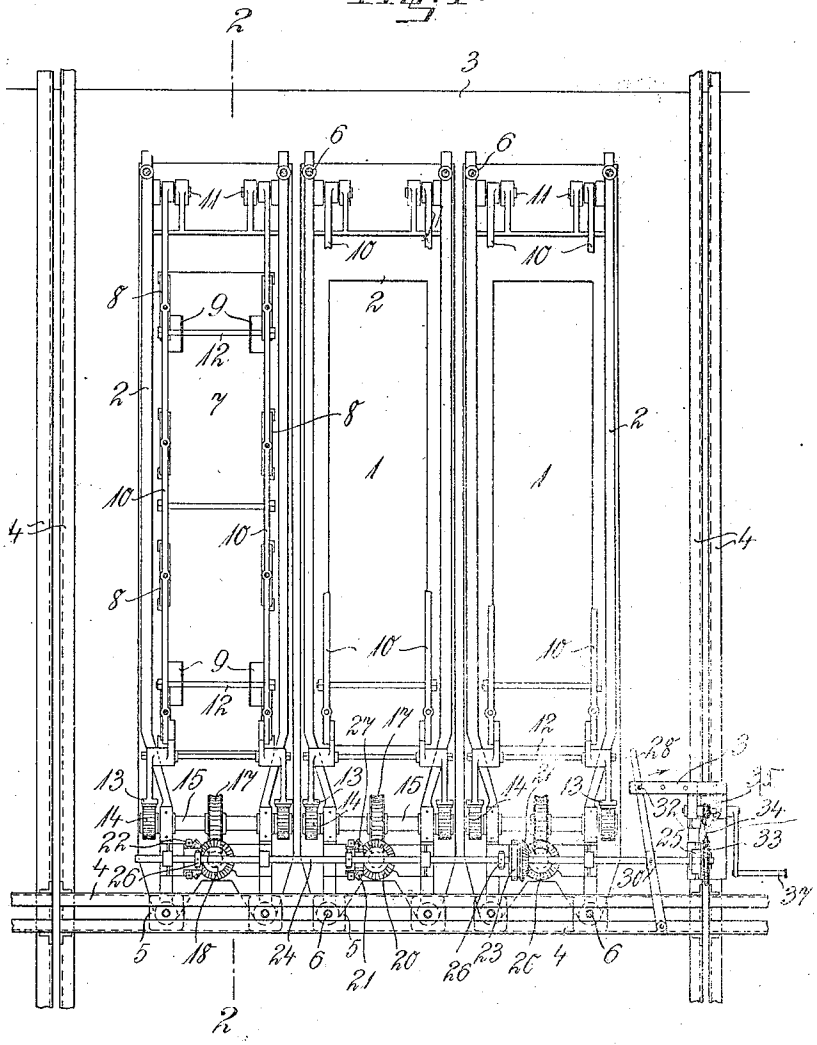
MEANS FOR OPERATING THE DOORS OF RETORT FURNACES, COKE OVENS, AND THE LIKE FROM A DISTANCE.

APPLICATION FILED FEB. 13, 1909.

925,651. **Patented June 22, 1909.**

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

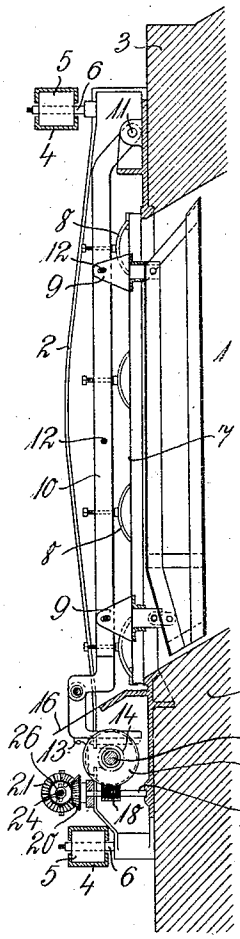


Fig. 3.

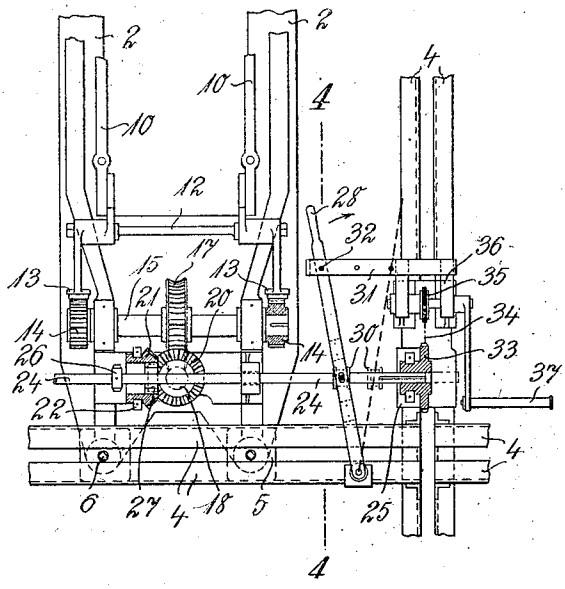


Fig. 4.

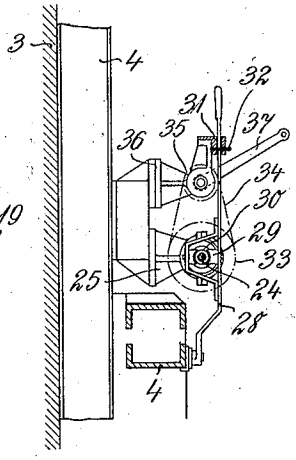
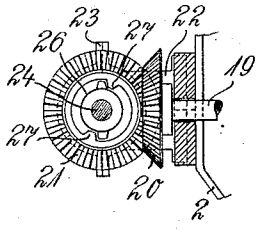


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MEANS FOR OPERATING THE DOORS OF RETORT-FURNACES, COKE-OVENS, AND THE LIKE FROM A DISTANCE.

No. 925,651. Specification of Letters Patent. Patented June 22, 1909.

Application filed February 13, 1909. Serial No. 477,508.

To all whom it may concern:

Be it known that I, PAUL RIECKE, a citizen of the Empire of Germany, residing at Dessau, Germany, have invented certain new and useful Improvements in Means for Operating the Doors of Retort-Furnaces, Coke-Ovens, and the Like from a Distance, of which the following is a full, clear, and exact description.

In retort furnaces or coke ovens for gasifying coal and converting it into coke it is customary to have a number of inclined retorts located side by side, the discharge doors being located at the lower ends of the retorts, so that when such doors have been unlocked and opened the incandescent coke will slide out by gravity; or when the bottom of the retorts is horizontal, a pushing, drawing, or conveying mechanism of any approved character is employed to discharge the coke through the open door.

It is convenient to lock and unlock the doors from a distance, and various devices of this character have been proposed. As a rule the doors are, for this purpose, pivoted at their upper ends above the outlets of the retorts and the lower ends of the doors are provided with racks adapted for engagement with pinions, by the turning of which the doors may be locked or unlocked.

According to my present invention the devices for locking or unlocking the several doors are operated from a common shaft in the particular manner hereinafter described and claimed, whereby the operation of the doors from a distance is greatly facilitated and simplified.

In the accompanying drawings I have illustrated the application of my invention to inclined retorts, but it will be well understood that the invention is not limited to such.

Figure 1 is a front elevation with parts in section showing a portion of a retort furnace provided with my invention; Fig. 2 is a vertical section on line 2—2 of Fig. 1; Fig. 3 is a detail of the mechanism shown in front elevation, but on a larger scale than in Fig. 1; Fig. 4 is a vertical section on line 4—4 of Fig. 3 and Fig. 5 shows upon an enlarged scale a detail of the gearing.

Fig. 1 shows three adjoining chambers or retorts 1 of a furnace, the lower or outlet ends of said chambers being surrounded by frames 2, which are let into the frame or setting 3 of the furnace and are held in position by means of channel bars 4 extending close to the furnace wall and of nuts 5 held by said channel bars and fitted on screw threaded studs 6 projected from said frame 2. The openings or outlets are closed by doors 7 which fit tightly against the frames 2 and are secured movably to stirrups or bars 10 by means of lugs 9, having slots to receive bolts 12 which connect the bars 10 belonging to the same door. Springs 8 are interposed between each door 7 and the corresponding bars 10. The entire door structure may swing about a pivot 11 with which the bars 10 are connected as shown, said pivot being located on the frame 2 above the outlet opening of the retort. The lower ends of the bars 10 are U-shaped as shown best in Fig. 2 and provided with small racks 13 engaging pinions 14 which are arranged in pairs. Each two pinions are secured to the ends of the shaft 15 journaled in the frame 2 below the chute 16 which is located in the continuation of the inclined bottom of the retort 1. Between the pinions 14 the shaft 15 carries a worm wheel 17 permanently in mesh with a worm 18 the shaft 19 of which is also journaled in the frame 2 and carries a bevel gear 20 at its outer end.

The several bevel wheels 20 are in permanent engagement with bevel gears 21 all alining in the direction of the length of the furnace, see Fig. 1, and held against movement in such direction, but capable of rotating; for instance the bevel gears 21 are held in bearings 22, which are secured to the frame 2, by means of covers 23, which fit into grooves provided in the hubs of the respective bevel gears 21 as shown in Figs. 3 and 5. The hubs of these bevel gears 21 have a wide bore through which extends a relatively thin rod 24 so that a space is left between said rod and the hubs of said gears. The rod 24 is capable of sliding lengthwise and also of rotating, being supported for instance on the frame 2 and also at the end on a bracket 25 which may be secured to one of the channel bars 4. The rod 24 carries a series of clutch disks 26, one for each of the bevel gears 21, and the projections of these clutch disks may be brought into or out of engagement (by a longitudinal movement of the rod 24) with corresponding clutch teeth 27 projected inwardly from the hubs of the bevel gears 21. The bevel gears

may thus be connected with or disconnected from the rod 24 to rotate therewith, or to become independent thereof. The relative location of the several clutch disks 26 on the rod 24 is such that when one of the clutch disks is in operative position or registry with the clutch teeth 27 of one of the bevel gears 21, then all the other clutch disks 26 carried by said rod 24 are out of registry with the projections 27 on all the other bevel gears 21. In other words, only one of the doors can at the time be in operative relation to the mechanism controlled by the rod 24 and a separate position of said rod corresponds to the registry of each individual coupling disk 26 with the respective clutch teeth 27. The longitudinal adjustment of the rod 24 may be effected in any suitable manner, as by means of a hand lever 28 pivoted at its lower end to one of the channel bars 4 and provided with jaws 29 having a pin and slot connection to allow them to slide, said jaws engaging a collar 30 capable of turning on the rod 24, but held against moving lengthwise relative thereto. The upper end of the lever 28 moves in a guide 31 on which suitable marks indicate the position of the lever which corresponds to the connection of the mechanisms of the several doors with the rod 24. Pins 32 (see Figs. 3 and 4) may be used to hold the lever in these various positions. The rod 24 also serves as an operating shaft or spindle and may, for this purpose, extend through a sprocket 33 journaled in the bracket 23, said sprocket wheel being held against longitudinal movement, but capable of rotation with the shaft 24; for instance a tongue and groove connection may be employed between the shaft and sprocket wheel together with means for preventing the sprocket wheel from moving lengthwise relatively to the bracket 25 (see Fig. 3). The sprocket wheel 33 is driven by means of a chain 34 from a sprocket wheel 35, which may be journaled in a bracket 36 carried by one of the channel bars 4 at the end of the furnace. A crank 37 is provided for turning the sprocket wheel 35.

If it is desired to empty the retort 1 which is farthest away from the crank 37, then the hand-lever 28 is brought into the extreme position shown in Fig. 1, thus bringing the coupling disk 26 which is at the extreme left into operative relation to the bevel gear 21 which controls the mechanism of the door shown at the extreme left of Fig. 1. If then the crank 37 is turned in the proper direction, the pinions 14 corresponding to said door will be turned in such a manner as to disengage them from the respective racks 13, thus unlocking the door. Any approved device may then be employed to fully open the unlocked door and thus allow the incandescent coke to slide out over the chute 16. When the door has been brought to the closing position, the racks 13 will be close to the pinions 14 and if then the crank 37 is turned in the direction opposite to that first employed, the door will be pressed tightly against the frame 2 as shown in Fig. 2.

If it is desired to operate the door-locking mechanism of the middle retort shown in Fig. 1, the hand lever 28 is moved to the right as indicated by the arrow until it registers with the central hole of the guide 31, and in this position the locking mechanism of the central door is in operative relation to the shaft 24 by the clutch mechanism 26—27 and this mechanism may be actuated to lock or unlock the door by turning the crank 37 in one direction or the other as described above. Similarly, by throwing the hand-lever 28 fully to the right, the mechanism of the retort door shown at the right of Fig. 1 will be brought into operative connection with the shaft 24.

It will be understood that I may employ various other constructions of clutches and devices for operating them, without departing from the nature of my invention.

I claim as my invention:

1. The combination of a furnace having a plurality of retorts, doors for closing the individual retorts, individual mechanisms for locking and unlocking the several doors, a longitudinally movable rod carrying a plurality of devices, each adapted for registry with one of said mechanisms to operate the same, means for shifting said rod lengthwise, and means for rotating the rod to operate one or the other of said mechanisms.

2. The combination of a furnace having a plurality of retorts, doors for closing the individual retorts, individual mechanisms for locking and unlocking the several doors, a longitudinally movable rod carrying a plurality of clutch members, coöperating clutch members on each of said mechanisms, means for shifting said rod lengthwise, and means for rotating the rod.

3. The combination of a furnace having plurality of retorts, doors for closing the individual retorts, individual mechanisms for locking and unlocking the several doors, a plurality of operating clutch members connected to mov in unison, corresponding driven clutch members on each of said mechanisms, the distance between the operating clutch members being different from that between the driven clutch members so that only one pair of clutch members may be brought into operative registry at a time, means for shifting the said connected clutch members to bring them into or out of registry with the driven clutch members, and means for rotating the connected clutch members to actuate the door mechanism which at the time is in registry with an operating clutch member.

4. The combination of a furnace having a plurality of retorts, doors for closing the individual retorts, individual mechanisms for locking and unlocking the several doors, a longitudinally movable rod carrying a plurality of clutch members, corresponding driven clutch members connected to pinions on each of said mechanisms, said driven clutch members having hollow hubs for the passage of the movable rod, means for shifting said rod lengthwise and means for rotating the rod.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses:

PAUL RIECKE.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.