

P. RIECKE.

DEVICE FOR LOCKING AND RELEASING OVEN DOORS.

APPLICATION FILED JULY 28, 1909.

964,055.

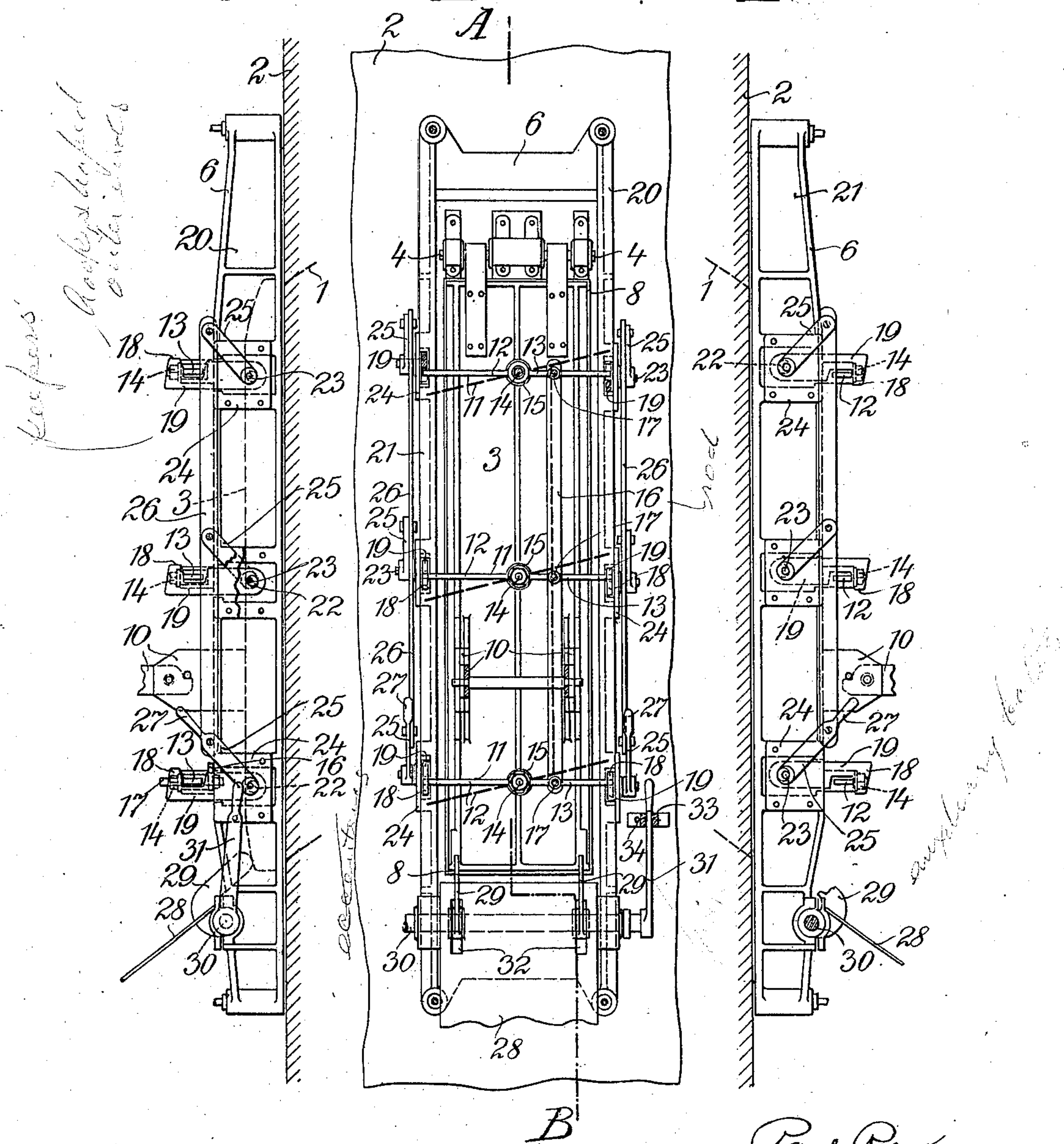
Patented July 12, 1910.

2 SHEETS—SHEET 1.

Fig. 2.

Fig. 1.

Fig. 3.



Witnesses:

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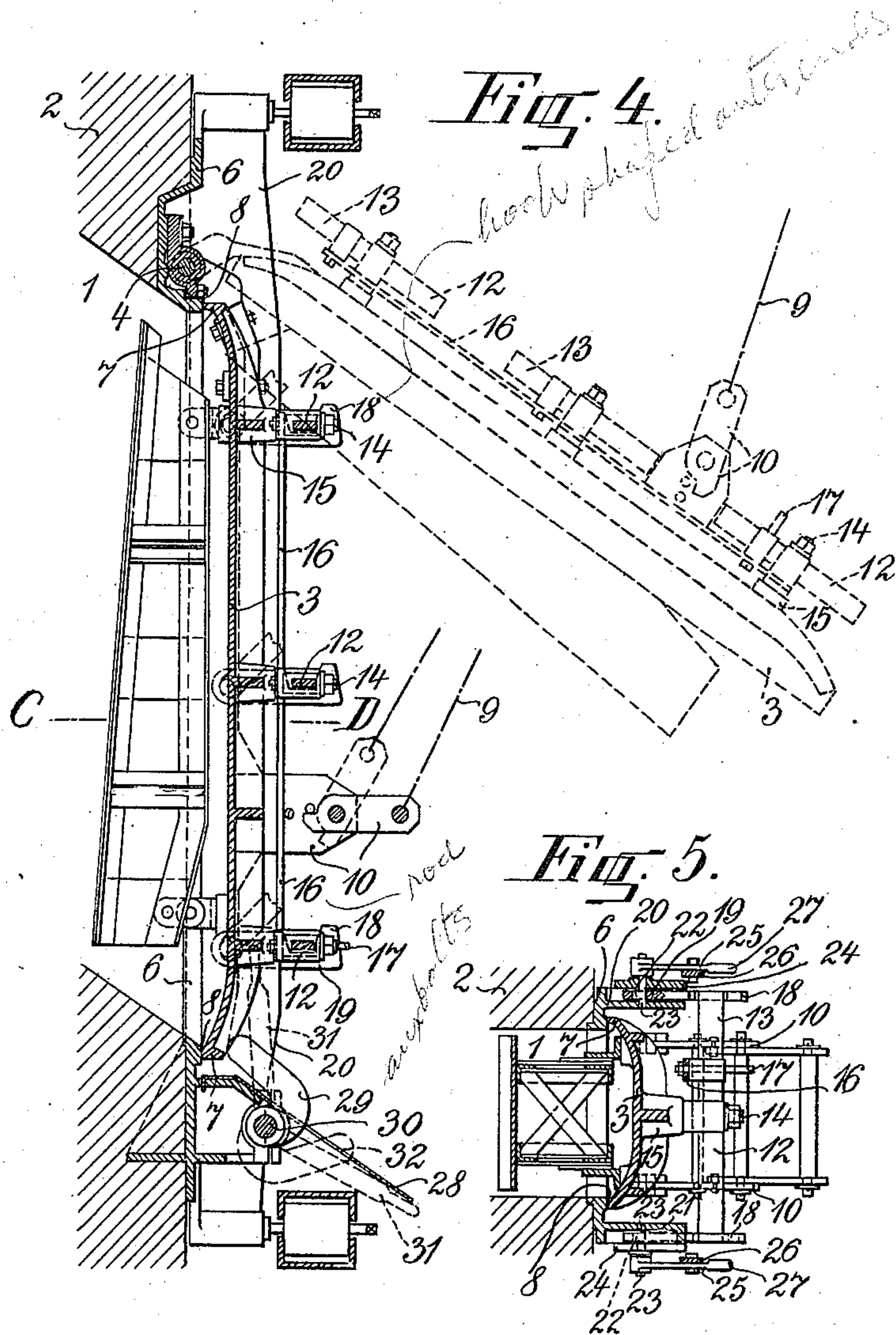
Attorneys

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UNITED STATES PATENT OFFICE.

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DEVICE FOR LOCKING AND RELEASING OVEN-DOORS.

964,055.

Specification of Letters Patent.

Patented July 12, 1910.

Application filed July 26, 1909. Serial No. 509,509.

To all whom it may concern:

Be it known that I, PAUL RIECKE, a subject of the Emperor of Germany, and resident of Dessau, in the Duchy of Anhalt and Empire of Germany, have invented certain new and useful Improvements in Devices for Locking and Releasing Oven-Doors, of which the following is a specification.

My invention relates to mechanism for locking and releasing the doors of ovens, such as coke ovens or gas producing ovens. In some cases, for instance when the bottom of the oven chamber or retort is inclined toward the door, danger exists that upon opening the door the burning material or the fresh material fed to the retort will slide out through the door opening and in order that the workmen attending the oven shall not be injured or incommoded by the material thus issuing from the oven, a proper construction must be provided for the device which serves to lock and release the door and to close it in a gas-tight manner. For this purpose the expedient has been proposed heretofore of locking and releasing the oven door from a distance. According to my present invention the same purpose is accomplished in a different way which allows the door to be operated from a point immediately adjacent thereto while preserving all the conditions requisite for the gas-tight and reliable closing of the oven. This I accomplish by movably mounting on the oven door one or more bolts adapted for engagement with hook-shaped keepers located on the stationary door frame and disposed at right angles to the plane of the door. The keepers are movable lengthwise for the purpose of pressing the door against the door frame and obtaining a gas-tight joint. With this construction the movement required to bring the bolts into and out of engagement with the keepers can be very small and owing to the special arrangement of a device for pressing against the door this movement of the bolts is effected without the application of material strength; therefore, after the gas-tight fit of the door has been relieved it is easy to release the door by turning the bolts from a point at the side of the door by means of a rod or other suitable tool. The danger of the workmen being injured by material dropping from the oven, upon the opening of the door, is thus greatly reduced. When the gas-tight fit of the door

is relieved, the weight of the material contained in the oven or retort naturally has a tendency to press the door away from the frame and thereby press the bolts against the keepers so as to oppose considerable resistance by friction to the disengagement of the bolts. To overcome this difficulty I have provided on the door an auxiliary pressure device which forces the door toward the door frame even after the gas-tight fit has been relieved.

Reference is to be had to the accompanying drawings which illustrate the application of my present invention to a retort oven having inclined chambers, it being understood that this is only an example of the various ways in which my invention may be carried out.

Figure 1 is a fragmentary front elevation showing the door closed; Fig. 2 is a side elevation; Fig. 3 is a similar view looking from the opposite side; Fig. 4 is a section on line A—B of Fig. 1; and Fig. 5 is a horizontal section on line C—D of Fig. 4.

All these views show the door in the closed position except that the open position is indicated by dotted lines in Fig. 4. The oven 2 has an inclined chamber 1 at the lower end of which the upper portion or door 3 is pivoted as at 4 to the stationary door frame 6, which surrounds the opening at the lower end of the chamber 1. To obtain a tight joint the door is provided with a ridge 7 fitted against a ledge 8 of the door frame 6; the opening and closing of the door is controlled by any suitable lifting device, for instance by means of a chain 9 pivotally connected with the door as at 10.

In the particular construction illustrated, three two-armed bolts 11 are secured to the door 3 at uniform distances, said bolts extending parallel to the pivot 4. Each of these bolts is mounted to turn, and is provided with two arms 12—13 connected with a hub capable of swinging upon a pin 14 which, as shown in Fig. 5, extends from a lug 15 of the door 3 at a right angle to the plane of said door. I prefer to connect the arms 12 and the arms 13 of the several bolts 11 as by means of a rod 16 which has a pivotal connection with the arms 13 by means of pins 17. Thus, if one of the bolts is turned all the other bolts will swing in the same manner. The length of the arms 12—13 is so selected that when turned to a position at

right angles to the longitudinal axis of the door (that is, to a horizontal position in Fig. 1) they will come under the hook-shaped outer ends 18 of the keepers 19 which are provided on the two longer sides 20—21 of the door frame 6 in a number and position corresponding to the bolts 11. Of course the hooks on one side 20 of the frame must be directed oppositely to the hooks on the other side 21 of the frame, for instance the ones upward and the others downward as shown clearly in Figs. 1, 2 and 3.

The keepers 19 are mounted on eccentrics 22 carried by the door frame 6 and these eccentrics are provided with trunnions 23 by which they are mounted to turn on the one hand in the longitudinal side members 20—21 of the door frame 6 and on the other hand in cover plates 24 which are rigidly connected with the door frame. One of the trunnions 23 is extended outwardly beyond the plate 24 and rigidly connected with a lever 25 by means of which each of the eccentrics can be turned to produce a corresponding movement of the keeper 19. The keepers are so guided in the door frame or in the cover plates 24 that upon turning the eccentric 22 the corresponding keeper will move only lengthwise in a direction perpendicular to the plane of the door frame 6. (See Figs. 2, 3 and 5). I prefer to connect the levers 25 of the eccentrics 22 on each frame side 20 or 21 by a rod 26, and the lowermost lever 25 is provided with a handle or with a projection 27 on which a gas pipe or the like may be fitted so that by turning this lowermost lever all the eccentrics on one side of the frame may be moved at the same time to produce a corresponding movement of all the keepers 19 on that side.

In the door frame 6, two auxiliary bolts 29 are mounted to turn within convenient reach of the workman; preferably below the chute 28 which serves to carry away the coke discharged from the retort. In the construction shown, these auxiliary bolts 29 are secured to a shaft 30 adapted for operation by a lever 31. Slots or notches 32 are provided in the chute 28 for the passage of the curved auxiliary bolts 29, so that as desired they may be turned under the chute or up to press against the door 3 (see Fig. 4); in the latter position the bolts 29 may be locked in any suitable manner for instance by passing a pin 34 through the lever 31 and through a bracket 33 secured to the oven 2 (see Fig. 1).

Fig. 4 indicates in dotted lines the position taken by the door when open. When it is desired to close the door the chain 9 is paid out until the ridge 7 of the door plate 3 lies against the ledge 8 of the door frame 6. During this closing movement the auxiliary bolts 29 are in the position indicated by dotted lines in Fig. 4, that is, below the chute 28, so that they are without

the path of the door; the bolts 11 are in a position at an angle to the longitudinal axis of the door (as indicated by dotted lines in Fig. 1) so that they will not come in contact with the keeper hooks 18 during this closing movement. The keepers 19 are in the position farthest away from the door frame 6; the inner edges of the hooks 18 being preferably somewhat above the upper longitudinal edges of the bolt-arms 12—13 so that when the bolts are thereupon moved in the keepers there will be no friction between these parts. In order to lock the door the workman now turns the lowermost bolt 11, for instance by means of a rod inserted between the pins 17 and 14 (see Figs. 1 and 5) and owing to the bolts being connected by the rod 16 all the bolts will be brought under their hooks 18 at the same time. In order to produce a gas-tight fit of the door the lowermost levers 25 on both sides 20—21 of the door frame 6, are turned and thus all the eccentrics 22 are operated in such a manner that the keepers 19 are moved lengthwise toward the oven. This movement causes the hooks 18 to press against the arms 12—13 of the bolts 11 thereby forcing the ridge 7 of the door 3 against the ledge 8 of the door frame 6. The eccentrics 22 are constructed in a well-known manner so that they may become self-locking when the levers 25 are in the position which presses the door against its frame.

When the door is opened in order to empty the chamber 1, the workmen may without any danger of injury first relieve the gas-tight fit of the door by turning the lowermost levers 25 in the direction opposite to that first referred to, since the door is still locked by the hooks 18 of the keepers 19. There is however some danger that the door might be forced away from the door frame 6 for instance by the weight of the coke contained in the chamber 1, in which case the door would press against the keepers 19 creating a friction which would render it difficult to operate the bolts 11. In order to overcome this difficulty, the auxiliary bolts 29 are turned against the door by means of the lever 31 after the door has been closed and after the gas-tight fit has been obtained, and the auxiliary bolts are locked in this position as by means of the pin 34. With this arrangement the workman can, without exerting any particular strength, and without exposing himself to any danger, unlock the door from a position at the side thereof by turning the lowermost bolt 11 by means of a rod or the like in such a manner that the arms 12—13 will be moved out of engagement with the keepers 19. Then the lever 31 is unlocked and the auxiliary bolts 29 are swung down as indicated by dotted lines in Fig. 4 and then if the door is opened by a pull on the chain 9 the glow-

ing mass of coke will slide from the chamber 1 over the chute 28 to the quenching device into which such chute is generally arranged to discharge the coke. The workman is not exposed to danger of being burned by the hot incandescent coke.

The number and arrangement of bolts on the oven door and of the corresponding keepers on the door frame depends on the size of the door. While I have shown and described bolts mounted to turn I do not desire to limit myself to this specific construction, but I might employ other kinds of bolts such as sliding bolts. Similarly the movement of the keepers perpendicularly to the plane of the door may be obtained by means of other devices than eccentrics, such as elbow levers. The auxiliary devices for pressing the door against its frame may also be utilized in locking the door for the purpose of insuring an easy movement of the bolts 11 to the locking position, the auxiliary bolts 29 being pressed against the door 3 before the door is locked by the bolts 11.

I claim as my invention:

1. The combination, with an oven having an opening and a movable door for closing the same, of a locking bolt pivoted to the door, a keeper on the oven frame adapted for engagement with an end of said bolt, said keeper being movable toward and from the plane of said opening, and an eccentric for moving said keeper.

2. The combination, with an oven having an opening and a movable door for closing the same, of a plurality of locking bolts pivoted to the door, a plurality of keepers on the oven frame adapted for engagement each to a bolt end and movable toward and from the plane of said opening, means for simultaneously positioning all the locking bolts and means for simultaneously moving all the keepers on a given side of said door.

3. The combination, with an oven having an opening and a movable door for closing the same, of a plurality of double-armed locking bolts pivoted to the door, a plurality of keepers arranged on opposite sides of the oven frame and adapted for engagement with the respective ends of the bolts, said keepers being movable toward and from the plane of said opening, means for simultaneously positioning all the locking bolts and means coacting with all the keepers on each side of the oven frame to move them simultaneously.

4. The combination, with an oven having an opening and a movable door for closing the same, of a plurality of double armed

locking bolts pivoted to the door, a plurality of oppositely directed keepers arranged on opposite sides of the oven frame and adapted for engagement with the respective ends of said bolts, said keepers being movable toward and from the plane of said opening, means for simultaneously positioning all the locking bolts, an eccentric provided with a lever for each keeper, and a connecting bar adjacent to and connected with all the said levers on either side the door by means of which all the corresponding eccentrics may be actuated simultaneously thereby moving the keepers.

5. The combination with an oven having an opening and a movable door for closing the same, of a double-armed locking bolt pivoted to the door, and oppositely directed keepers arranged on opposite sides of the oven frame and adapted for engagement with the respective ends of the bolt, said keepers being movable toward and from the plane of the said opening, and eccentrics for moving the keepers.

6. The combination, with an oven having an opening and a movable door for closing the same, of a plurality of locking bolts pivoted to the door, a plurality of keepers on the oven frame adapted for engagement each to a bolt end and movable toward and from the plane of said opening to press the door against the oven or relieve such pressure, and an auxiliary device independent of and separated from said bolts and keepers for pressing the door against the oven independently of the effect of the keepers.

7. The combination, with an oven having an opening and a movable door for closing the same, of a locking device comprising two members carried by the door and by the oven frame respectively, one of said members being movable toward and from the plane of said opening, in the closed position of the door, to press the door against the oven or relieve such pressure, and an auxiliary device independent of and separated from said locking device comprising a bolt pivoted to the oven frame and adapted to be swung over and against the door to press said door and oven frame together independently of the action of the locking device.

In witness whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

PAUL RIECKE.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.