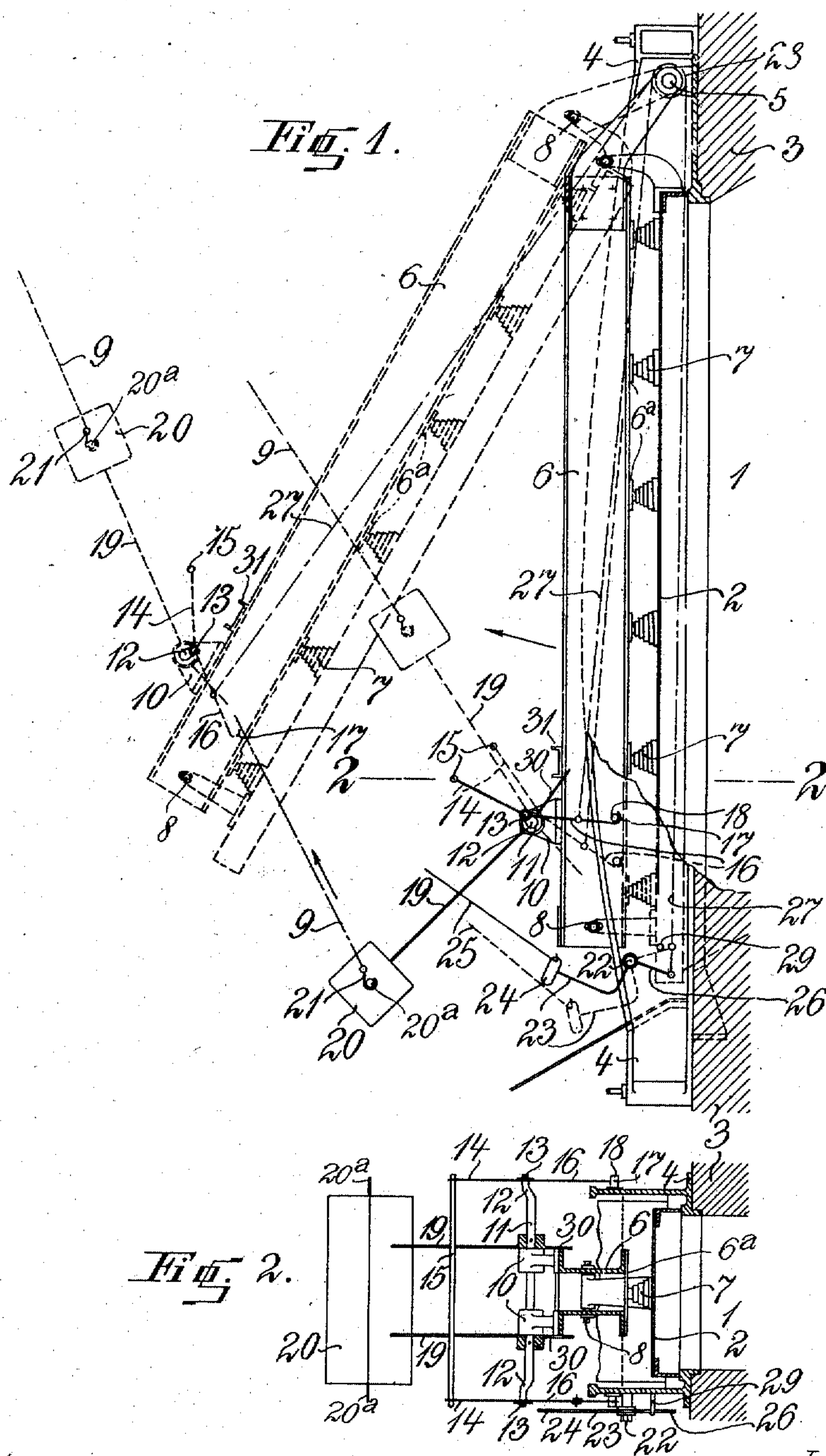


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LATCH MECHANISM.  
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980,337.

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# UNITED STATES PATENT OFFICE.

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## LATCH MECHANISM.

980,337.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, PAUL RIECKE, a subject of the German Emperor, and resident of Dessau, in the Duchy of Anhalt and Empire of Germany, have invented certain new and useful Improvements in Latch Mechanisms, of which the following is a specification.

My invention relates to latch mechanisms, especially for the doors of coke-ovens and the like, and particularly the doors of ovens having inclined chambers in which the material tends to slide down and therefore presses against the door with considerable force. To tightly close the door, various mechanisms have been devised hitherto, consisting of levers mounted on the door and arranged to operate latches adapted for engagement with keepers mounted on the door frame; in connection with such locking or latching devices, pressure devices, such as weights, are employed to hold the door tightly against its frame, and hitherto these two devices have been connected operatively in such a manner that the mechanism for relieving the pressure devices also served for moving the latches into and out of their active position. This complete interdependence of the pressure-relieving mechanism and of the latching device is a drawback in some cases. If for instance repairs are to be made to the latches, to the contact surfaces or to other parts which are not accessible when the door is closed, it becomes necessary to hold the weight or other pressure device in its inactive position (with the latches released) either by operating the relieving means or by jacking up or supporting the weight. To overcome this difficulty, I have so constructed the relieving mechanism that at the time of relieving the pressure it will automatically release the latches, thus allowing the door to open; when it is desired to close the door, an auxiliary actuating device, independent of the relieving mechanism, is employed to bring the latches into a preliminary locking position, and then the latches are brought to their final locking position by the joint action of the lever mechanism cooperating with the relieving mechanism and of said auxiliary actuating device. Thus the door may be closed with the aid of, say, the relieving device mounted

on the quenching car, without bringing the latches into engagement with their keepers. Repairs are thus facilitated.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a vertical section of a coke oven embodying my invention, and Fig. 2 is a cross-section on line 2—2 of Fig. 1.

The inclined chamber 1 is adapted to be closed tightly at its lower end, by means of the plate 2 carried by the swinging door, which plate engages a stationary frame 4 rigidly secured to the brickwork or setting 3 of the oven. The door further comprises beams or yokes 6 fulcrumed horizontally at 5, above the opening of the chamber, and the closing plate 2 is suspended from said beams by means of bolts 8 passing through elongated slots in the beams, so that the closing plate is capable of a limited movement toward and from said beams. In the closing position, the plate 2 is pressed tightly against the frame 4 by means of springs 7 interposed between said plate and cross pieces 6<sup>a</sup> carried by the beams 6. A yielding connection is thus obtained between the closing plate and the door frame consisting of the beams 6.

The beams 6 carry brackets 10 in which is journaled a rock shaft 11 having its ends bent to form cranks 12. The cranks are formed with pins 13 on which are fulcrumed levers having arms 14, on the side farthest away from the oven, connected by a crossbar 15, the other arms 16 forming latches with hook-shaped ends 17 adapted to engage stationary pins or keepers 18, preferably secured to the frame 4. The shaft 11 is further provided with two arms 19, arranged beneath the crossbar 15 and carrying a pressure device, such as the weight 20, for exerting a pull on the latches 16, 17 and thus keeping the closing plate 2 tightly against the stationary frame 4 when the latches are engaged with the keepers 18.

The opening and closing of the door is effected by means of any suitable device for rocking the shaft 11. In the drawings I have shown pins 20<sup>a</sup> projected from the ends of the weight 20 and adapted to be engaged by hooks 21 at the end of a relieving mechanism such as the chain 9, which may be



mounted on the quenching car (not shown) and connected with means for exerting an upward pull on said chain.

When the door moves toward its closed position, the latches 16 17 would automatically engage the keepers 18, if only the parts described above were provided. This would be objectionable in some cases, as explained, and to prevent this automatic action, I have added a preliminary actuating device which in the construction shown is located laterally of the door and comprises a bell-crank lever 23, 26 fulcrumed on the stationary frame 4 at 22 and provided at the end of its forward or outer arm 23 with an eye 24 adapted to be engaged by a suitable tool, such as a hook 25 handled by an attendant on the quenching car. To the other arm 26 of the elbow lever is secured one end of a chain, cord or other flexible connection 27 which leads upward to and over a pulley or other guide 28 mounted on the axis 5 (or at least adjacent thereto), the other end of said connection being secured to one of the latch arms 16. The weight of these arms and of the parts connected therewith should be such that when fully released, the arm 26 of the auxiliary actuating device will be lifted against stationary stop pins 29 by the overbalancing of the arms 16.

If the door is in the open position illustrated by dotted lines in Fig. 1, the arm 26 will be in its upper position and the flexible connection 27 is held taut by the weight of the arms 16. If by discontinuing the pull on the relieving mechanism 9, the door is caused to swing by gravity toward the open end of the oven chamber, the arm 26 will remain in its upper position, the location of the pulley 28 at or near the axis 5 preserving a constant length of the flexible connection between said axis and the arms 16, notwithstanding the swinging of the door. I thus avoid slackness of said connection and any injury to the connection or impeding of the door's movements which might result from such slackness.

When it is desired to lock or latch the door, so that the oven chamber may be refilled, the attendant by means of the hook 25 exerts an upward pull on the arm 23 of the auxiliary actuating device, preferably before the door reaches its closing position. Upon a further paying out of the chain 9 the plate 2 will engage the frame 4 and the levers 19 will swing downward under the influence of the weight 20. The rocking of the shaft 11 resulting from this movement will draw the latches 17 outward, that is, away from the oven; at the same time the latches will move upward owing to the pull exerted on the flexible connection 27 by the downward movement of the arm 26. These

two movements of the latches 17 bring them into operative closing engagement with the keepers 18, as illustrated by full lines in Fig. 1. The door is now latched and moreover pressed against the stationary frame 4 with a force corresponding to the excess of the pressure exerted by the weight 20 over the outward pressure exerted by the material in the oven chamber 1.

In order to prevent the cranks 12 from turning beyond their dead centers (after the latches 17 have become engaged) the lever 19 is provided with an extension 30 which comes against a stop 31 on the beams 6, before the cranks 12 reach their dead center position.

In order to open the door, the relieving mechanism such as the chain 9 is brought into action to raise the weight 20. The rock shaft 11 being turned, the latch ends 17 now move toward the oven, tending to disengage them from the keepers 18. As soon as the weight of the latches can overcome the friction holding them against the keepers, the latches will fall and through the connection 27 will draw the arm 26 of the preliminary actuating device upward against the stop 29. If for any reason the latches should not become disengaged from their keepers automatically as described above, they will be disengaged without fail as soon as the lever 19 in its continued upward movement strikes the cross bar 15.

If it is desired to make repairs without latching the door, the preliminary actuating device is not brought into action, that is to say, the arm 23 is not pulled upward, but the door is closed only by disconnecting or paying out the chain 9. The lever 19 then reaches the position shown in full lines, but the latches 16, 17 do not, since they only move outward in response to the turning of the cranks 12, but do not perform the upward swinging movement about the axis 13 which is necessary to bring them into engagement with the keepers and which can be accomplished only by means of the preliminary actuating device. When the repairs have been completed, the lever 19 and arm 23 are swung upward, and then the lever 19 is moved downward again, causing the latches to engage the keepers 18 as indicated by full lines in Fig. 1.

It will be understood that the construction shown is but an example illustrating the carrying out of my invention and that many modifications may be made without departing from the nature of the invention as set forth in the appended claims. Thus the latches 16, 17 may be operated by eccentrics or by elbow levers instead of using the cranks 12; in any event however, I prefer that the latches should be subjected only to a ten-



sional strain or pull when in their active position. Further, the operating member 23 of the auxiliary actuating device may be constructed as a treadle, and its connection 5 with the latches may be different from that shown in the drawings.

While the description and drawing relate specifically to a device for latching a door to the frame of an oven, it will be understood 10 that my improved latch mechanism is applicable in other relations to secure two members one of which is movable relatively to the other.

I claim as my invention:

5 1. In combination with two members one movable relatively to the other, a keeper mounted on one of said members, a latch mounted movably on the other member and adapted to engage said keeper and to be sub- 20 jected to a pull while in its active position, mechanism mounted on the latch-carrying member and connected with the latch to disconnect it from the keeper when said mechanism is operated to separate the two mem- 25 bers, and a preliminary actuating device for bringing the latch to a position which will throw it into engagement with the keeper when the said mechanism is operated to bring the two members together, while the 30 latch will remain out of engagement with the keeper, notwithstanding the coming together of said members, if the preliminary actuating device is left in its normal position.

35 2. In combination with two members one pivoted to the other, a keeper mounted on one of said members, a latch mounted movably on the other member and adapted to engage the said keeper and to be subjected 40 to a pull while in its active position, mechanism mounted on the latch-carrying member and connected with the latch to disengage it from the keeper when said mechanism is operated to separate the two members, a guide 45 located at the pivot connecting said members, a preliminary actuating device, and a flexible connection leading from said device to the guide and thence to the latch, said device when in its normal position permitting 50 the two members to be brought together without bringing the latch into engagement with the keeper, while by moving said device into its active position the latch will be brought to a position which will throw it 55 into engagement with the keeper when said mechanism is operated to bring the two members together.

60 3. The combination of a stationary member, a movable member adapted to engage said stationary member, a stationary keeper, a latch movably mounted on the movable member and adapted to engage the keeper, mechanism, carried by the movable member,

for releasing the latch from the keeper and separating the movable member from the 65 stationary member, and a preliminary actuating device which in its normal position permits the movable member to be brought against the stationary member without bringing the latch into engagement with the 70 keeper, while by moving said device into its active position the latch will be brought to a position which will throw it into engagement with the keeper when said mechanism is operated to bring the movable member 75 against the stationary member.

4. The combination of a stationary member, a movable member adapted to engage said stationary member, a stationary keeper, a latch movably mounted on the movable 80 member and adapted to engage the keeper, mechanism, carried by the movable member, for releasing the latch from the keeper and separating the movable member from the stationary member, and a preliminary actu- 85 ating device movably mounted on the stationary member and operatively connected with the latch, said device in its normal position permitting the movable member to be brought against the stationary member 90 without bringing the latch into engagement with its keeper, while by moving said device into its active position the latch will be brought to a position which will throw it into engagement with the keeper when said 95 mechanism is operated to bring the movable member against the stationary member.

5. The combination of a stationary member, a pivoted member adapted to engage said stationary member, a stationary keeper, 100 a latch movably mounted on the pivoted member and adapted to engage the keeper, mechanism, carried by the pivoted member, for releasing the latch from the keeper and separating the pivoted member from the sta- 105 tionary member, a guide located at the pivot connecting the two members, a flexible connection secured to the latch and extending in engagement with said guide, and a preliminary actuating device, connected with 100 said connection and movably mounted on the stationary member, said device in its normal position permitting the pivoted member to be brought against the stationary member without bringing the latch into engage- 115 ment with the keeper, while by moving the said device into its active position the latch will be brought to a position which will throw it into engagement with the keeper when said mechanism is operated to bring 120 the pivoted member against the stationary member.

6. The combination of two members one movable relatively to the other, a keeper on one of said members, a rock shaft mounted 125 on the other member and provided with a

crank, a latch pivoted on said crank and adapted to engage the keeper, means for turning the rock shaft, and a support engaging said latch at a distance from the crank.

5 7. The combination of two members one movable relatively to the other, a keeper on one of said members, a rock shaft mounted on the other member and provided with a crank, a latch pivoted on said crank and adapted to engage the keeper, means for turning the rock shaft, and an auxiliary ac-

tuating device movably mounted on the member carrying the keeper, and a connection from said device to a point of the latch at a distance from its pivot. 15

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

PAUL RIECKE.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.