

B. LUDWIG.
LATCH MECHANISM.
APPLICATION FILED DEC. 11, 1909.

1,025,756.

Patented May 7, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

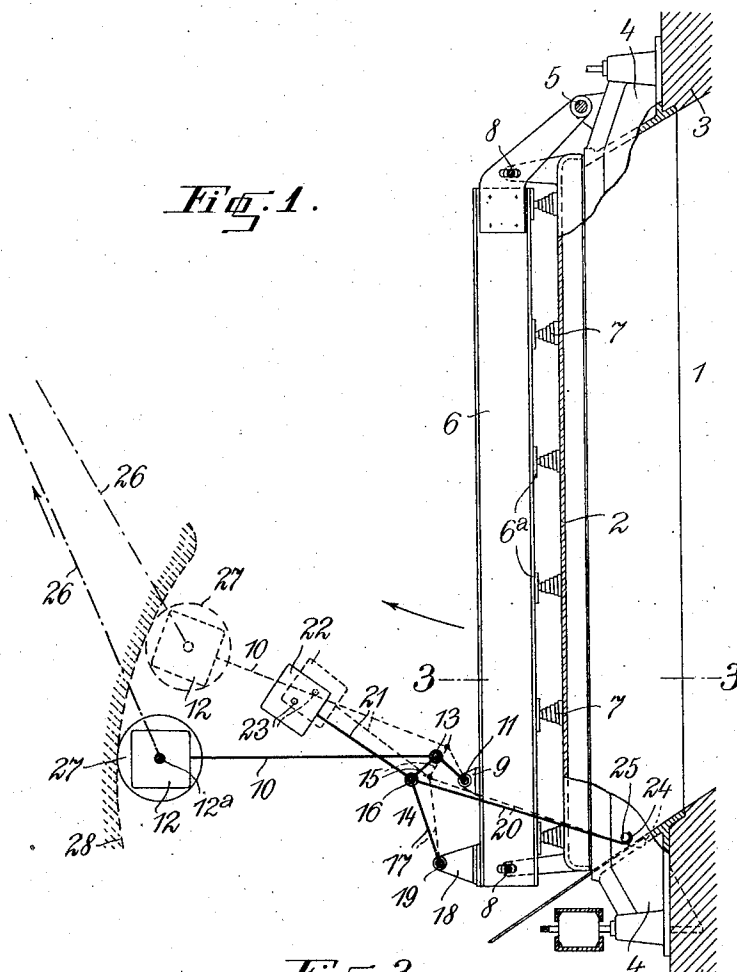
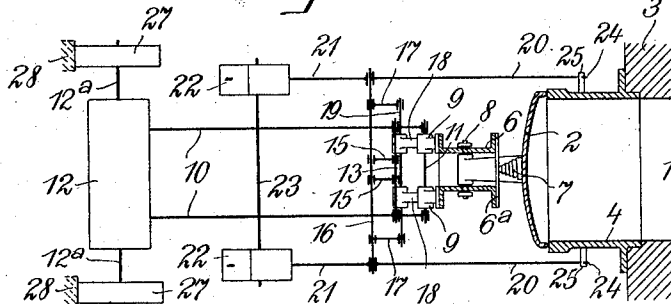


Fig. 3.



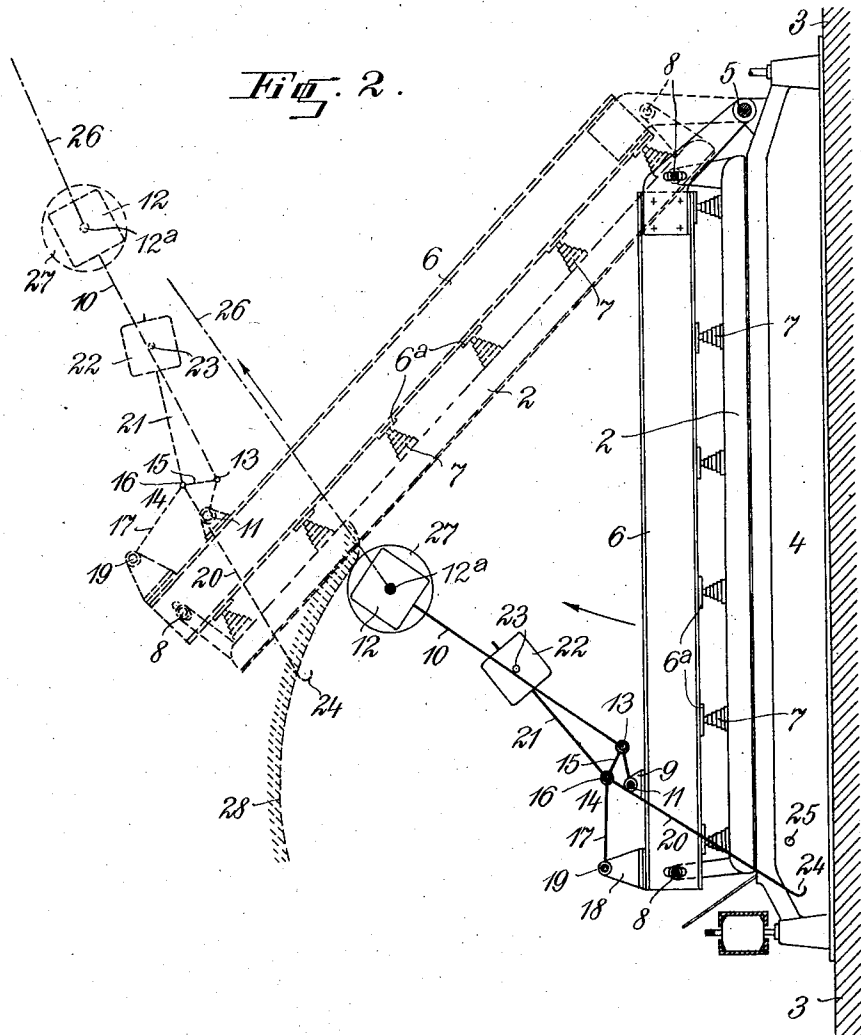
Witnesses:
N. L. Mason
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3 SHEETS-SHEET 2.



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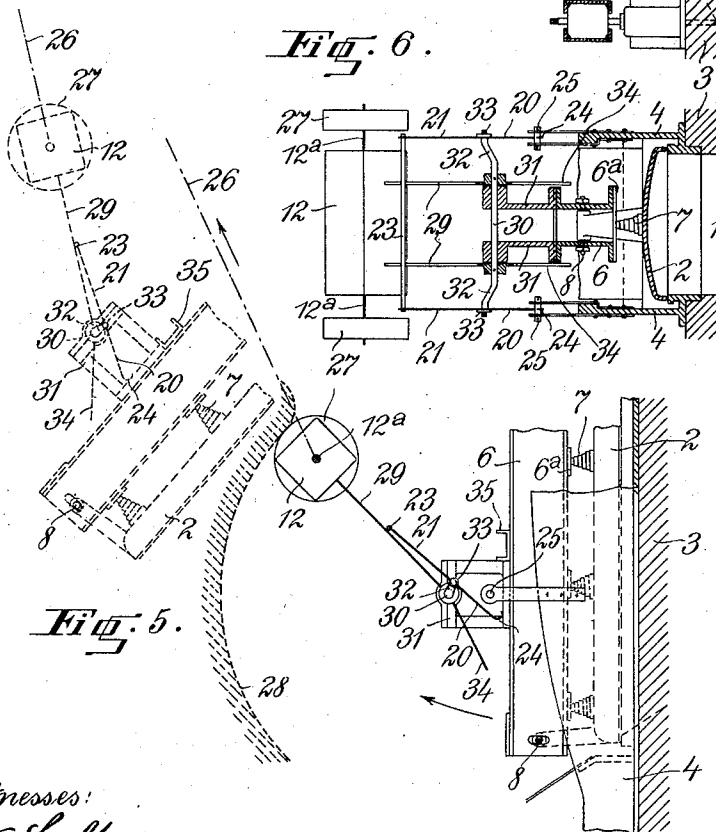
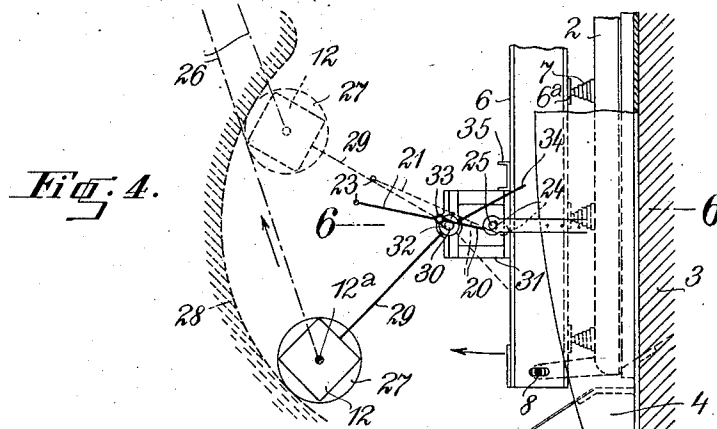
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3 SHEETS—SHEET 3.



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Inventor:
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UNITED STATES PATENT OFFICE.

BERNHARD LUDWIG, OF MUNICH, GERMANY, ASSIGNOR TO THE FIRM OF OFENBAU-GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, OF MUNICH, GERMANY.

LATCH MECHANISM.

1,025,756.

Specification of Letters Patent.

Patented May 7, 1912.

Application filed December 11, 1909. Serial No. 532,552.

To all whom it may concern:

Be it known that I, BERNHARD LUDWIG, engineer, a subject of the German Emperor, and a resident of Munich, in the Kingdom of Bavaria and Empire of Germany, have invented certain new and useful Improvements in Latch Mechanism, of which the following is a specification.

My invention relates to latch mechanism intended especially for closing doors, particularly those of coke ovens having inclined chambers when the door is mounted to swing about a horizontal axis at the upper portion of the door, while the lower portion of the door is provided with a device for pressing it against the stationary frame and with suitable latches.

According to my invention the latches are so arranged as to be subjected to a pull when in engagement with keepers mounted on one of two relatively movable members, and these latches are operated by means of a weighted lever mounted on the other member. By simply turning this lever in one direction or the other, the said other member is pressed tightly against the first-named member or released, and with the arrangement adopted by me, the pressure exerted on the said other member outwardly as by the material tending to slide down the inclined chamber, will subject the engaged latches only to a tensional strain or pull, which they are able to stand better than a compression strain.

In the accompanying drawings, which illustrate two embodiments of my invention diagrammatically, Figure 1 is a side elevation, with parts in section, showing one form of my invention; Fig. 2 is a similar view with the parts in a different position; Fig. 3 is a horizontal section on line 3—3 of Fig. 1; Fig. 4 is partly a side elevation and partly a vertical section illustrating another form of my invention; Fig. 5 is a similar view with the parts in a different position; and Fig. 6 is a cross section on line 6—6 of Fig. 4.

The oven has an inclined chamber 1 and a door provided with a plate 2 which in the closed position fits tightly against the door frame 4 secured to the brickwork or oven structure 3. The door is hung on a horizontal axis 5 located at the upper ends of beams 6 with which the closing plate 2 is connected loosely and yieldingly by

means of bolts 8 passing through elongated horizontal slots in the beams, springs 7 being interposed between the plate 2 and crossbars 6^a connecting the beams 6.

The door 2 and frame 4 constitute the two members movable one relatively to the other, one of said members carrying latches and the other keepers as explained hereinafter.

According to the form of my invention shown in Figs. 1 to 3, a bent lever 10 (consisting of two parallel arms) is mounted to swing about a horizontal axis 11 in brackets 9 secured to the beams 6. At their free outer ends the two arms forming this lever carry a weight 12, and at their bends the two arms are connected by a crossbar 13 to which are pivoted the ends of the upper arms 15 of a toggle lever 14, the lower arms 17 of which are fulcrumed at 19 upon brackets 18 secured to the beams 6. At their joint the arms of the lever 14 are connected by a crossbar 16, on which are fulcrumed levers the outer portions of which, 21, carry weights 22 connected by a crossbar 23, while the inner arms 20 are provided with upwardly directed hook shaped latches 24 adapted for engagement with keepers 25 mounted on the stationary frame 4.

When the door is closed, the parts occupy the position indicated by full lines in Fig. 1, the weight 12, through the medium of the levers 10 and 14, exerting an outward pull on the lever arms or latch arms 20 and pressing the latches 24 against the keepers 25. At the same time the weight exerts an inward pressure against the beams 6 and springs 7, thus forcing the closing plate 2 against the frame 4 with a pressure corresponding to the difference between the inward pressure of the weight and the outward pressure of the material tending to slide down the inclined chamber 1.

When it is desired to open the door, the lever 10 is raised in any suitable manner, for instance by means of a chain or other lifting means 26 which may be connected with pins 12^a projected laterally from the weight 12. This upward movement straightens the toggle lever 14 and pushes the arms 20 toward the oven, thereby disengaging the latches 24 from the keepers 25, as indicated by dotted lines in Fig. 1. During their further upward movement, the two arms of the lever 10 come against the crossbar 23

and thus lift it and the parts to the left of the crossbar 16, against the action of the weights 22, causing the parts to the right of the crossbar, and particularly the latches 24, to drop to the position indicated by full lines in Fig. 2. Therefore, as soon as the lever 10 reaches a certain position, the latches 24 are out of engagement with the keepers 25, so that the door is free to be opened. If the lever is operated by a pull on the chain 26, as shown, the door will open automatically as soon as the lever reaches said position, and will be lifted to the position indicated by dotted lines in Fig. 2.

In closing the door, the steps recited above succeed each other in the reverse order, the door first reaching the position shown in Fig. 2 by full lines. Then, as the lever 10 begins to swing downward to the position indicated by dotted lines in Fig. 1, the weights 22 swing the latches 24 upward until the arms 20 engage the keepers 25. The further dropping of the lever 10 to the position indicated by full lines in Fig. 1 presses the joint 16 of the toggle lever 14 outward and pulls the latches 24 outward against the keepers 25.

As soon as the latches 24 are disengaged from the keepers 25 (dotted position, Fig. 1) there is some danger of a partial opening of the door, owing to the shifting of the combined center of gravity of the door and the device for pressing it against the frame. This would be objectionable on account of its causing great friction between the arms 20 and the keepers. In order to prevent this, it is advisable to provide a guide which will hold the door inward until the lever 10 has engaged the crossbar 23 of the arms 21. This may be carried out by mounting rollers 27 on the pins 12^a, said rollers being adapted to travel on curved guides 28 until the lever 10 has passed upward to a position beyond that indicated by dotted lines in Fig. 1. These guides may be provided on the oven structure or upon the quenching car adapted to receive the coke discharged from the chamber 1.

According to Figs. 4, 5 and 6 the weight 12 is secured to a lever or operating arm 29 journaled at 30 on brackets 31 carried by the beams 6. The ends of the pivot or rock shaft 30 are bent to form cranks 32 on the ends 33 of which the levers 20, 21 are supported pivotally. The arms 21, connected by the crossbar 23, are heavier than the latch arms 20, so that the levers 20, 21 will turn on their pivots 33 when the lever 29 swings downward from the position shown in dotted lines in Fig. 4. The movement of the latches 24 into and out of engagement with the keepers 25 mounted on the stationary frame 4 takes place in the same manner as explained with reference to Figs. 1, 2 and 3.

To prevent the cranks 32 from turning beyond their dead center positions after the latches 24 have become engaged with the keepers 25, the lever 29 is provided with an extension 34 arranged to engage a stop 35 on the beams 6, before the cranks reach the dead center position.

It will be understood that these two embodiments of my invention are illustrated only as examples, and that various modifications may be made without departing from the nature of my invention as set forth in the claims.

I claim as my invention:

1. A structure comprising two members pivotally connected at their upper ends and one movable relatively to the other, a keeper on one of said members, a latch arm carried by the other member to swing relatively thereto into and out of engagement with said keeper, the latch arm being also movable lengthwise on the member carrying it, to move the end of the arm toward or from the keeper while both members are stationary, and mechanism mounted on the latch-carrying member, for first moving the latch arm lengthwise and then swinging it transversely while both members are stationary, and then separating said members, or, in the reverse operation, first bringing said members together, then swinging the latch arm transversely into engagement with the keeper, and finally moving the latch arm lengthwise into the locking position.

2. The combination of two members one movable relatively to the other, a keeper on one of said members, a latch carried by the other member, a weighted lever connected with the latch to move it toward and from the member carrying the keeper, and a crossbar connected with the latch and adapted to be engaged by the lever to swing the latch transversely away from the keeper.

3. A structure comprising two members one movable relatively to the other, a keeper on one of said members, a latch carried by the other member and adapted to engage the keeper, mechanism for operating the latch and for separating said members, and a guide engaging a portion of said mechanism and arranged to prevent separation of said members until the mechanism reaches a predetermined position.

4. The combination of two members one movable relatively to the other, a keeper on one of said members, a latch carried by the other member and adapted to engage the keeper, a lever connected with the latch to move it toward and from the member carrying the keeper and arranged, at a certain point of its throw, to swing the latch transversely away from the keeper, and a guide for preventing the members from separating before the lever has reached said point.

5. The combination of two members one

movable relatively to the other, a keeper mounted on one of said members, a rock shaft mounted on the other member and provided with a crank, a latch pivoted on
5 said crank and adapted to engage the keeper, and a stop on said other member to prevent the crank from passing beyond its dead center position.

6. A structure comprising two members
10 one movable relatively to the other, a keeper on the stationary member, a latch arm carried by the movable member to swing relatively thereto into and out of engagement with said keeper, the latch arm being also
15 movable lengthwise on the member carrying it, to move the end of the arm toward or from the keeper while both members are stationary, mechanism mounted on the latch-carrying member and connected with said
20 latch arm, to first move the latch arm

lengthwise and then swing it transversely while both members are stationary, and then separate said members, or, in the reverse operation, to first bring said members together, then swing the latch arm transversely into
25 engagement with the keeper, and finally move the latch arm lengthwise into the locking position, and means, engaging a portion of said mechanism, for holding said members against separation until the latch arm
30 has been swung out of engagement with the keeper.

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

BERNHARD LUDWIG.

Witnesses:

JOSEF SINGER,
ROWL KOLACZEK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
