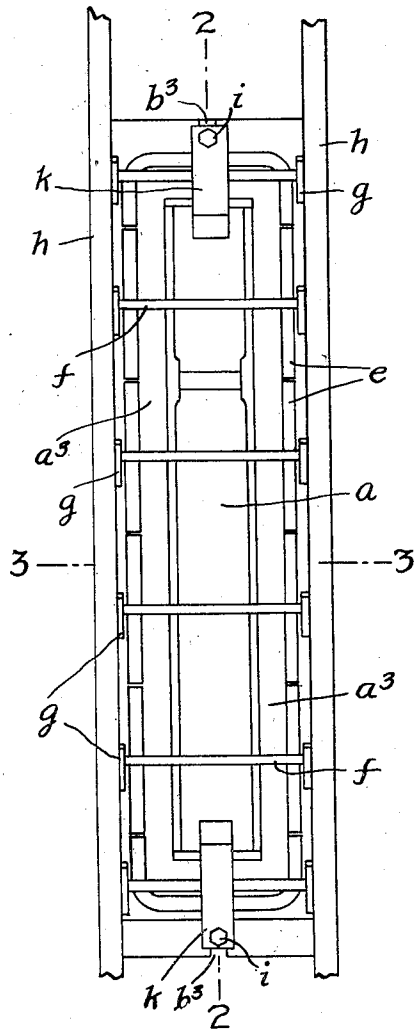
Nov. 24, 1931. C. OTTO 1,833,494

COKE OVEN DOOR

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Fig. 1.



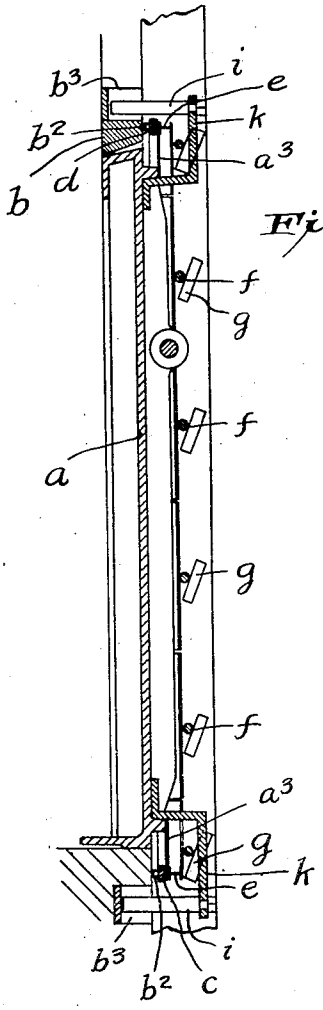


Fig. 2.

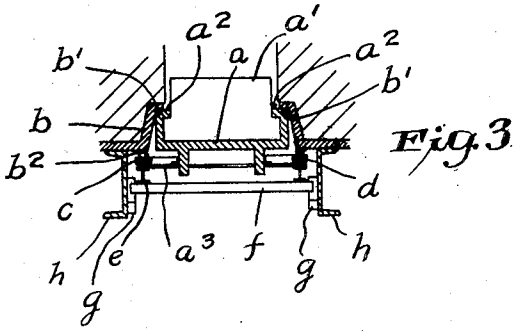


Fig. 3

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Fig. 4.

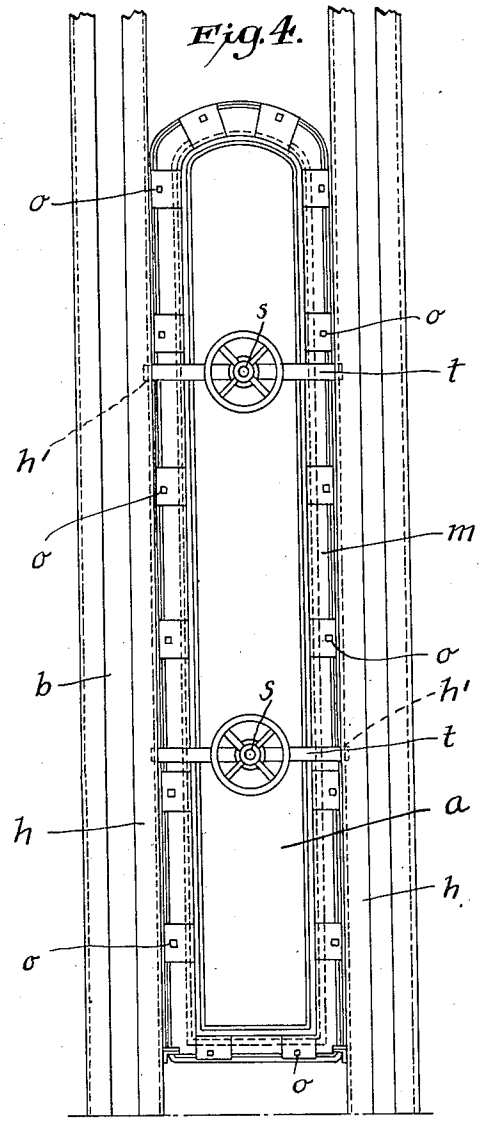


Fig. 5.

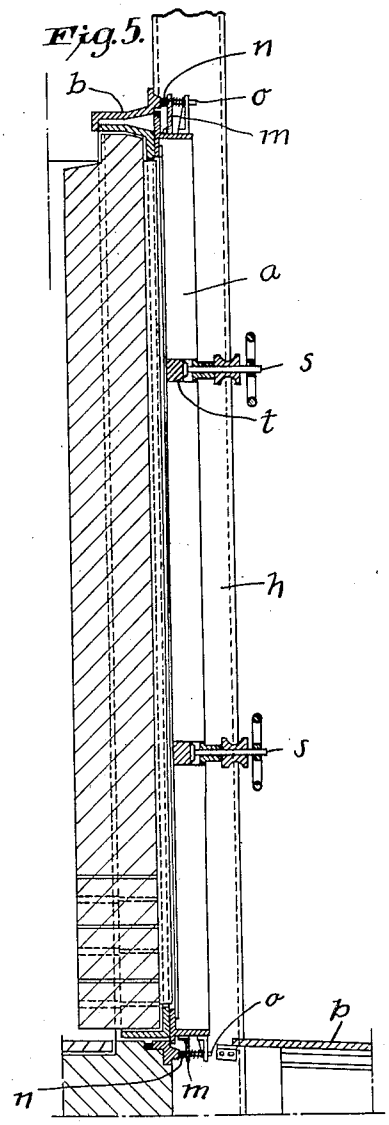
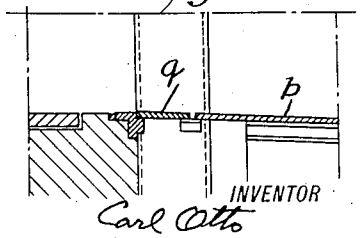


Fig. 7.



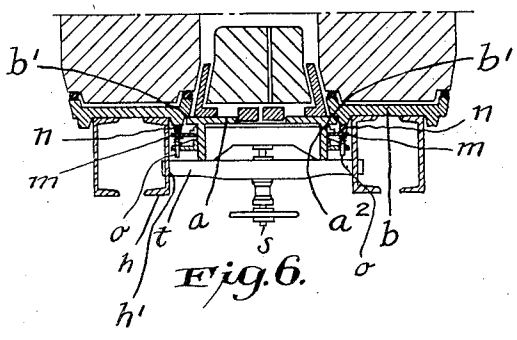


Fig. 6.

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COKE OVEN DOOR

Application filed October 27, 1927, Serial No. 229,097, and in Germany October 27, 1926.

The invention relates to self-tightening coke oven doors.

With the self-tightening coke oven doors hitherto known two lines of construction may be distinguished which led to two designs differing in principle. The first design realizes the problem of self-tightening by means of an adjustable elastic packing means, usually an asbestos cord, that is pressed into the space existing between door and door frame, this elastic packing means being pressed, according to the special construction of the closure, either into the outwardly open gap between door and door frame or outside this gap onto that portion of the door frame that surrounds the oven heads. The second construction dispenses with the use of an elastic packing means and obtains the self-tightening effect by means of a metal packing, that is by pressing iron onto iron, by a metal tightening face arranged on the door and abutting on a corresponding face of the door frame, or by a metallic tightening frame, arranged on the door and having a certain spring action, being pressed onto that portion of the door frame which surrounds the oven heads. The first construction affords the possibility of readjusting in a simple manner the elastic packing means upon local leakages occurring. This affords a great advantage, as it is practically impossible in the rough coking service to place the doors always in exactly the same position relatively to the door frame. A drawback, however, of this construction resides in the elastic packing means wearing in service in an extraordinarily short time and this mostly at the two lower door corners, where it is clamped first between door and frame, when the door is not exactly inserted. With the second construction, having a metal packing, the wear is naturally very small in comparison with the first-mentioned construction, the metal packing, however, is very disadvantageous in so far as it is rigid and cannot be re-adjusted in a satisfying degree, upon local leakages occurring due to the door and frame getting warped. This warping of the door and the door frame is practically inavoidable but, indeed, the more careful the construction is, the less and later will occur this warping. This is proved by the fact, that a great number of coke oven doors operated in a thoroughly satisfying manner through months and that thereupon leakages occurred suddenly, owing to the iron parts of the doors and the frames warping under the action of heat stresses.

The invention has for its object to utilize the advantages of the two described constructions but to avoid with certainty their drawbacks. This object is obtained according to the invention by the means, that besides a metal packing known per se and arranged to close the channel existing between door and door frame, there is arranged a second packing formed by an elastic and adjustable packing means adapted to be pressed in known manner against the portion which is outside and surrounds the oven heads, of the door frame. In this manner the metal abutting edges of the door and door frame serve so to say as a main packing and determines by its mutual abutting faces the correct rigid position of the door within the door frame, whilst, when local leakages occur due to the tightening faces getting warped, the second packing enters into action as an auxiliary packing, which in the new construction no longer determines the correct position of the door, but the elastic packing means serves merely to tighten. The main metal packing thus prevents practically completely the tarry constituents of the gases developed in the oven chambers from exerting any injurious action upon the elastic packing. This is saved with this arrangement to an extent hitherto not obtained, whilst a reliable tightening effect is obtained under all circumstances.

In order to allow of the invention to be more easily understood, two preferred embodiments of the invention are illustrated by way of example in the drawings which accompany and form part of this specification. In these drawings Figs. 1 to 3 illustrate the first, and Figs. 4 to 7 the second embodiment. In particular:

Fig. 1 shows the front view of a self-tightening coke oven door,

Fig. 2 is a vertical central section on line 2—2 of Fig. 1,

Fig. 3 is a horizontal section on line 3—3 of Fig. 1,

Figs. 4 to 6 are views of the second embodiment and correspond to those of Figs. 1 to 3,

Fig. 7 is a portion of Fig. 5 with the door in open position.

The embodiment illustrated in Figs. 1 to 3 will be described first.

The coke oven door which is designed in the usual manner as stopper door for oven chambers, substantially consists of the door body a and the proper stopper a^1 made of refractory brickwork. The body a has an abutting metal face a^2 on each side of the stopper, which face, when the door is inserted, is pressed against a corresponding face b^1 of the portion of the door frame b, which extends inwardly in the direction of the oven chamber, providing a gap between the door and door frame; a metallic closure of the gap is thus obtained. Furthermore, a frame a^3 made of an elastic sheet metal plate, is arranged on the door body a, on the outer edge of which frame is provided a labyrinth packing on the side turned toward the oven. This packing substantially consists of a frame piece c in which an elastic packing means, e. g. an asbestos cord d, is embedded, and of a smaller tightening frame b^2 mounted on the outer portion of the door frame b and adapted to be pressed into the asbestos cord d. Another frame e serves to tighten both the metal packing a^2 b^1 and the elastic packing d b^2, which frame is fastened likewise on the sheet metal frame a^3 but on the side remote from the oven. This frame e is subdivided so as to form several sections which are stretched in the closing position of the door by bolts f the ends of which engage wedge faces g arranged on the buckstays h.

In order to enable the elements of the labyrinth packing to engage each other always on the same place when the door is inserted, a guide is provided on top and bottom of the door. This guide substantially consists each of a guide bolt i fastened on the door body a by means of an angle piece k, and of a recess b^3 provided in the door frame b and serving to guide bolt i.

In the embodiment illustrated in Figs. 4 to 7 the abutting faces b^1, which co-operate with the abutting faces a^2 of the door body a and are provided on the door frame b, are arranged on that portion of the latter which surrounds the oven heads. In this way the ends projecting into the oven chambers, of the door frame may be made much shorter than in the first embodiment. To further tighten the door, an elastic sheet metal frame m is fixed on the door body a, on the outer edge of which frame an elastic packing means, e. g. an asbestos cord, is arranged. Spring-pressed presser bolts o distributed on the door edge serve to adjust the packing cord.

To fix the door in closed position, it is bolted on the buckstays h, as usual. The bolting consists of cross bars t rockingly mounted on and adjustable by means of threaded bolts s, and spiders r, which bars engage recesses h^1 provided on the buckstays h.

As the described tightening device extends all around the door edge, that is, also to the bottom portion of the door, it is impossible to have the coke ramp p extending closely to the oven floor. The gap remaining between oven floor and ramp p has therefore to be bridged by a sheet metal plate q, as illustrated in Fig. 7, after the door has been withdrawn from the door frame, in order to enable a satisfying passage of the coke cake onto the ramp p, when the coke cake is pushed.

What I claim and desire to secure by Letters Patent is:—

1. In a coke oven having a chamber provided with an opening, a closure for said opening comprising a metal door frame surrounding the opening, a door in said door frame arranged to provide a channel between the door and door frame, said door including a metal frame having shoulders, the inner face of said shoulders facing the oven chamber engaging the outer face of said door frame at a part thereof inward of said channel so as to provide a metal on metal sealing surface, a portion of said door frame being outward of said channel and extending transversely to the chamber, at opposite sides of said opening, and an elastic packing carried by the door and adapted to engage the outer face of the said portion of the door frame along the opposite sides of said opening.

2. In a coke oven having a chamber provided with an opening, a closure for said opening comprising a metal door frame surrounding the opening, a door in said frame arranged to provide a channel between the door and door frame, one portion of said door frame being inward of said channel and extending inwardly in the direction of the chamber and being provided with shoulders extending transversely of the chamber, and another portion of said frame being outward of said channel and extending transversely

of the chamber at opposite sides of said opening, said door being provided with a metal frame having shoulders, the inner face of the shoulders of the door facing the chamber engaging the outer face of the shoulders of the door frame so as to provide a metal on metal sealing surface inward of said channel, and an elastic packing carried by said door and adapted to engage the outer face of the portion of the door frame that is outward of said channel at opposite sides of said opening.

In testimony whereof, I have signed my name to this specification.

CARL OTTO.