Oct. 13, 1931. C. OTTO 1,827,329

COKE OVEN DOOR

Filed Nov. 26, 1928

Fig. 1.

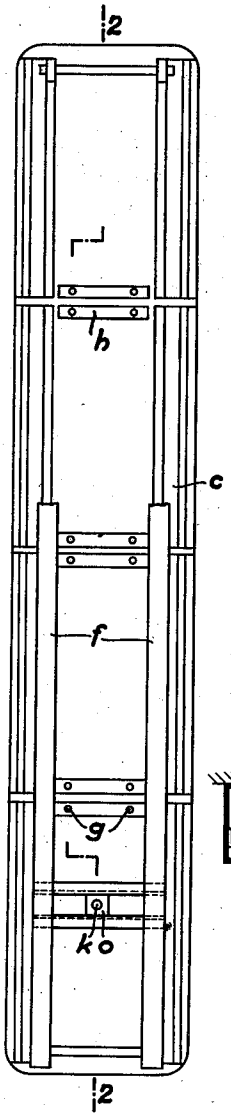


Fig. 3.

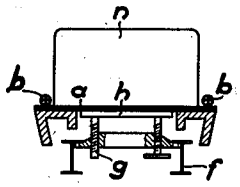


Fig. 4.

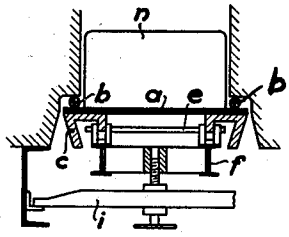
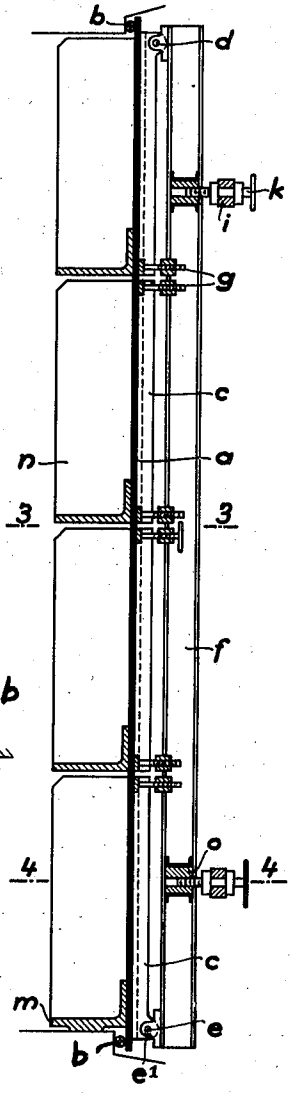


Fig. 2.



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Patented Oct. 13, 1931 1,827,329

UNITED STATES PATENT OFFICE

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COKE OVEN DOOR

Application filed November 26, 1928, Serial No. 321,826, and in Germany December 3, 1927.

The invention relates to self-tightening coke oven doors.

The doors of the modern tall coke ovens suffer from the heavy drawback of becoming warped and bent in particular toward the end of the carbonizing period due to the unequal heating they are exposed to, so that there does no longer exist a gas-tight closure.

The invention has for its object to entirely avoid this bending and the leakage resulting therefrom, of coke oven doors and to secure a permanent absolutely gas-tight closure. This object is obtained according to the invention in a very simple manner by the fact that the coke oven door is formed by a flexible elastic sheet metal plate which covers the entire door opening and carries on its outer side the sealing-means and is able to be pressed against the door frame in several individual sections. The tightening of the door of this design may be effected either by directly putting an asbestos cord on the face of the door frame or by lodging it in a movable cord frame and pressing it into the wedge-shaped groove provided to receive the tightening means; or by providing both these ways simultaneously. The sections of the elastic sheet metal plate are pressed separately and may be reinforced outside by means of separate profile irons or the like of a length corresponding to that of the respective plate sections. These profile irons may be so designed that one of their legs together with the door frame forms a gap of wedge-shaped cross section, so that the possibility is afforded to stop up from outside in case of need eventual leaking places.

To the profile irons is attached a rigid structure made of profile iron or the like which is articulated on the door plate by means of two or more shafts, this structure carrying the pressing means, such as wedges, screws or springs adapted to press the door sections against the door frame. To drive home these wedges, screws or springs, a driving means may be provided that is actuated from a common manipulating device. This profile iron structure that carries the pressing means may be articulated in a very simple manner by a shaft on the uppermost reinforcing profile irons of the elastic door plate, whilst another shaft is provided on the lower portion of the rigid profile iron structure, which shaft is able to slide up and down in slots provided in the lower re-inforcing profile irons of the elastic plate. In this manner any warping due to changes of temperature is absolutely compensated for.

The rigid profile iron structure and therewith the door is pressed on by screw bolts which rotatably engage the rigid structure and are mounted in transverse bolts engaging the buckstays of the oven.

The individual sections of the elastic door plate have mounted on their inner side brackets that carry the refractory heat-insulating liner of the sections, which liner may further be fixed thereon by screw bolts or the like.

In order to allow of the invention to be more easily understood, a preferred embodiment of same is illustrated by way of example in the drawings which accompany and form part of this specification. In the drawings

Figure 1 is a front elevation, partly in section, of the improved coke oven door,

Figure 2 is a vertical section on line 2—2 of Figure 1,

Figure 3 is a horizontal section on line 3—3 of Figure 2, and

Figure 4 is a horizontal section on line 4—4 of Figure 2.

Referring to these figures, *a* denotes the elastic metal plate adapted to be pressed against the door frame in several individual sections. This plate *a* in the form shown carries on its outer side a sealing means, e. g. an asbestos cord *b*, which may be applied either directly thereon or is lodged in a special guide. The several sections to be pressed individually, of the elastic plate *a* are reinforced outside by individual profile irons *c* or the like the length of which corresponds to that of the sections to be pressed separately. The uppermost and lowermost couple of profile irons *c* has hingedly mounted on it each by a shaft *d* and *e*, respectively, a rigid profile iron structure *f*, the lower shaft *e* being arranged on this structure in a manner such as to be able to slide up and down in

slots e^1 provided on the lower couple of re-inforcing irons *c*.

The rigid profile iron structure *f* carries the means for pressing the individual sections of plate *a*, these means consisting for example of screws *g* that act upon special strengthening ribs *h* of plate *a*. The rigid structure *f* and therewith the door is pressed against the door frame by means of screws *k* which are rotatably mounted in transverse bolts *i* and in a corresponding nut *o* fixed on the rigid structure *f*. The bolts *i* engage the buckstays of the oven, as shown.

On their inner side turned toward the oven chamber the sections of the elastic plate *a* carry brackets *m* adapted to support the refractory heat-insulating liner *n* of the individual plate sections, which liner may further be fastened by additional screw bolts or the like.

When the door should be put in place, this is done in a very simple manner by firstly applying the bolts *i* engaging the buckstays, by means of the screws *k* and thereupon pressing against the door frame the individual plate sections from top to bottom by driving home the pressing means, as wedges, screws or springs. To withdraw the door, said latter pressing means are loosened first, and then the main screws *k* are removed.

The advantage afforded by the invention primarily resides in the fact that eventual tensions occurring in the door are immediately compensated for. This advantage is obtained by the application of the described elastic sheet metal plate covering the entire door aperture, and by its articulated connection with the rigid profile iron structure which carries the pressing means, and in particular by the lower hinge shaft being able to slide in slots. Any warping and bending of the elastic door plate is entirely avoided, because the plate is pressed sectionally, the necessary freedom to elastic motion of the individual plate sections being secured by the refractory liner likewise being subdivided into corresponding sections.

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

1. A coke oven door comprising in combination a stationary door frame, an elastic sheet metal plate fitting thereto, sealing means arranged between said door frame and said plate, a plurality of re-inforcing members successively fixed on the outside of said plate in its longitudinal direction, a rigid structure hingedly mounted on several of said re-inforcing members one of the hinges having clearance in the longitudinal direction of said plate, and means arranged on said structure for pressing said plate against said door frame in sections each corresponding in length to the respective re-inforcing member.

2. A coke oven door comprising in combination a stationary door frame, an elastic sheet metal plate fitting thereto, sealing means arranged between said door frame and said plate, a plurality of re-inforcing members successively fixed on the outside of said plate in its longitudinal direction, a rigid structure hingedly mounted on the uppermost and lowermost of said re-inforcing members, one of the hinges having clearance in the longitudinal direction of said plate, and means arranged on said structure for pressing said plate against said door frame in sections each corresponding in length to the respective re-inforcing member.

3. A coke oven door comprising in combination a stationary door frame, an elastic sheet metal plate fitting thereto, sealing means arranged between said door frame and said plate, a plurality of re-inforcing members successively fixed on the outside of said plate in its longitudinal direction, a rigid structure hingedly mounted on the uppermost and lowermost of said re-inforcing members said last-named hinge having clearance in the longitudinal direction of said plate, and means arranged on said structure for pressing said plate against said door frame in sections each corresponding in length to the respective re-inforcing member.

4. A coke oven door comprising in combination a stationary door frame, an elastic sheet metal plate fitting thereto, sealing means arranged between said door frame and said plate, a plurality of re-inforcing members successively fixed on the outside of said plate in its longitudinal direction, a rigid structure hingedly mounted on the uppermost and lowermost of said re-inforcing members, said last-named hinge having clearance in the longitudinal direction of said plate, means arranged on said structure for pressing said plate against said door frame in sections each corresponding in length to the respective re-inforcing member, and brackets mounted on the inner side of said plate and adapted to support heat-insulating liner sections corresponding to said pressing sections.

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

CARL OTTO.