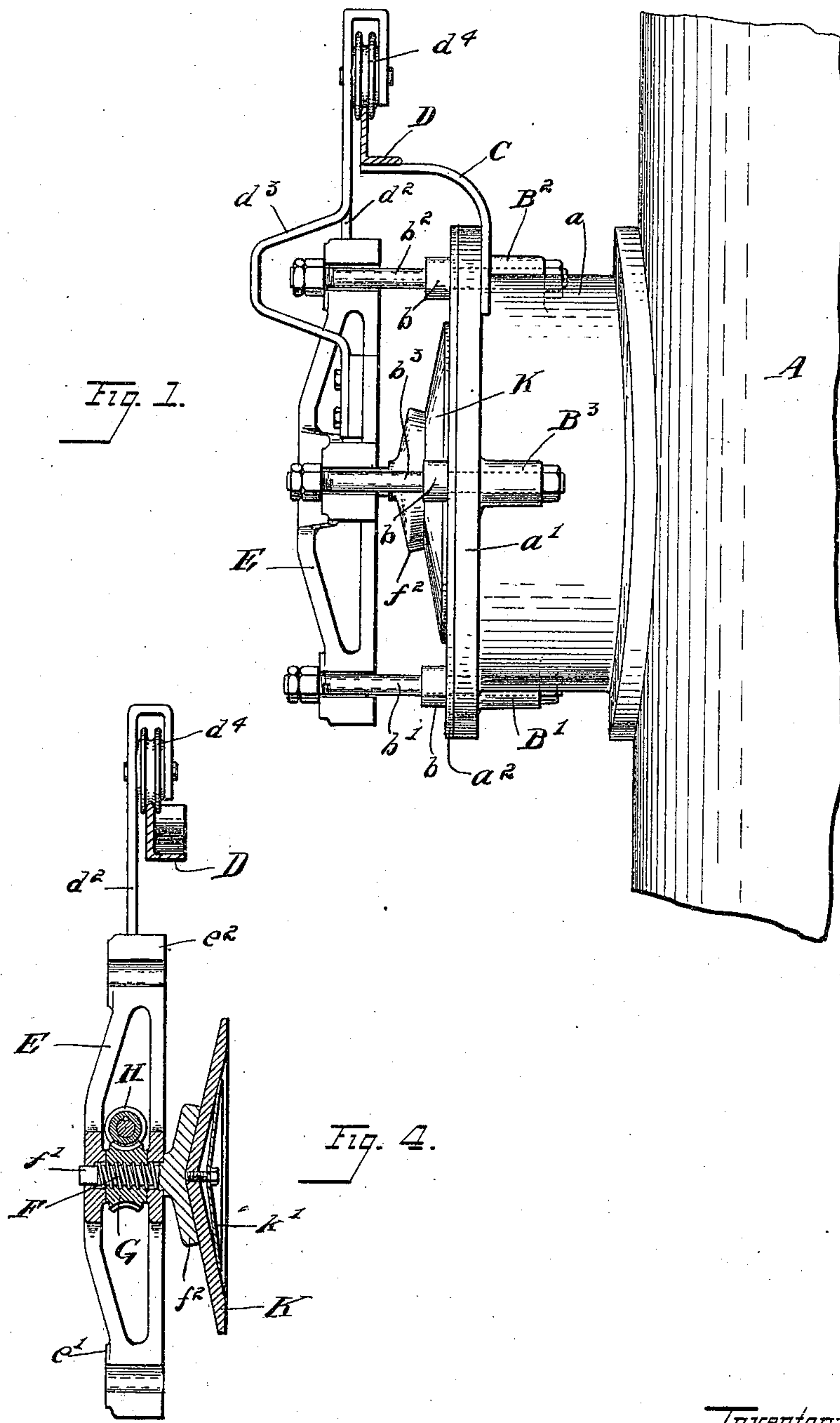


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APPLICATION FILED DEC. 11, 1909.

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2 SHEETS—SHEET 1.



Witnesses  
Herman Esche  
Gust B. Mueller.

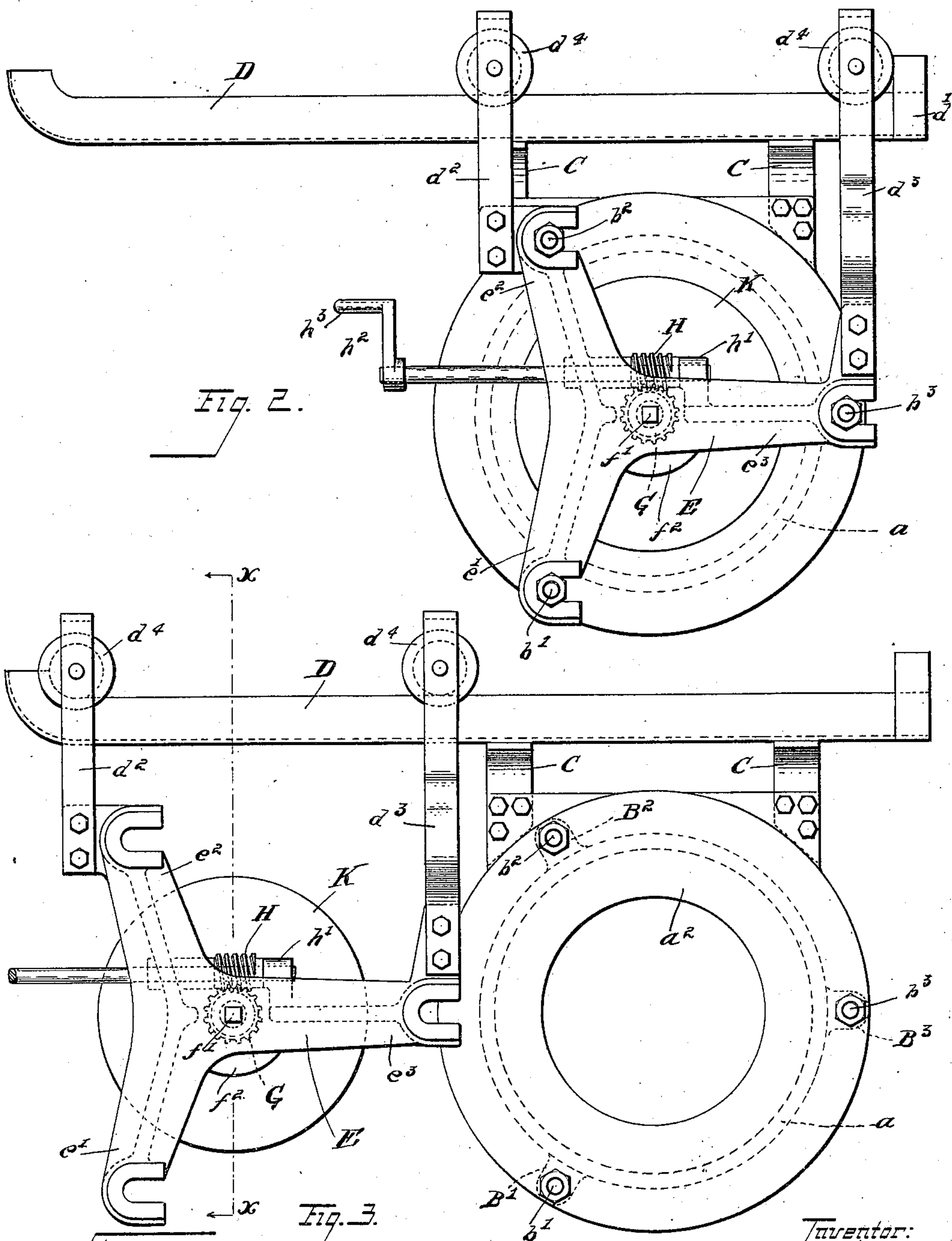
Inventor:  
Arthur G. McKee  
by *A. E. Merkel*,  
his Attorney

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his Attorney



# UNITED STATES PATENT OFFICE.

ARTHUR G. McKEE, OF CLEVELAND, OHIO.

CLOSURE FOR BLAST-FURNACE STOVES.

983,632.

Specification of Letters Patent.

Patented Feb. 7, 1911.

Application filed December 11, 1909. Serial No. 532,514.

*To all whom it may concern:*

Be it known that I, ARTHUR G. McKEE, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Closures for Blast-Furnace Stoves, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to a closure for blast furnace stoves, and more especially to an improved means for operating it.

The object of the invention is to provide a closure and its coördinate closing mechanism which shall fulfil all the requirements, and yet be decidedly less cumbersome of manipulation.

The said invention consists of means which are hereinafter more fully described, and particularly set forth in the claim.

The annexed drawings and the following description set forth in detail certain means for carrying out my invention, such means, however, constituting but one of various forms in which my invention may be applied.

In said annexed drawings:—Figure 1 is a side elevation of my closure as applied to a flanged opening. Fig. 2 is a front elevation of the device as it appears when closed. Fig. 3 is a like view when open and out of place. Fig. 4 is a section of the closing mechanism proper on line  $x-x$  of Fig. 3, and looking in the direction of the arrows.

Like letters and numerals of reference refer to similar parts in the several views.

The blast furnace chimney A is provided with a flanged opening  $a$  having on its end a flange proper  $a'$ . Spaced at equal distances around the exterior surface of this flange, I provide three bosses  $B^1$ ,  $B^2$ ,  $B^3$ , the latter one,  $B^3$ , being situated on one end of the horizontal diameter of the flange. Each one of these bosses is provided with openings in line with the flange opening, and extending through them are bolts  $b^1$ ,  $b^2$ ,  $b^3$ . These are of a length such that they will project some distance in front of the flange, and are provided with shoulders  $b$  which hold in place upon the front of the flange  $a'$  the flat annular ring  $a^2$  adapted to serve as a face plate. This plate may accordingly be made removable and is also

reversible, so that when it becomes worn on one side, the other may be used, after which it may be either discarded at small loss, or refinished and again used. Upon their ends these bolts are further provided with any approved form of lock nuts. The specific purpose of these bolts will be hereinafter sufficiently explained.

Located upon the upper face of the flange  $a'$  are two overhanging brackets C, and mounted upon these is an angle iron D having one end  $d'$  terminating substantially over the boss  $B^3$ , and the other laterally extending for some distance beyond the opposite side of the flange. As used in conjunction with my closure, this angle iron D is adapted to serve as a track for a trolley, and for obvious reasons, is bent upwardly at either end.

The trolley comprises two rollers  $d^4$ ,  $d^4$ , and the supporting arms  $d^2$ ,  $d^3$ , the latter being somewhat longer, for reasons presently appearing. From these arms I suspend a three-spoked and webbed spider E, two of the spokes  $e^2$  and  $e^3$  having projecting ears, to which the arms are secured. Specifically, the longer arm  $d^3$  is of such a length that the spoke  $e^3$ , to which it is secured, may rest horizontally, that is, in line with the boss  $B^3$ . The ends of each of the spokes are equidistant from a central point, and this distance corresponds to the radii of the bolts  $b^1$ ,  $b^2$ ,  $b^3$ . The ends of the spokes are shaped to form jaws having their open sides pointed in the direction of the spoke  $e^3$ , namely, toward the boss  $B^3$ . It will now be evident that the trolley and spider may be moved either to one side or in place in front of the flanged opening. Further, that the jaws on the spokes  $e^1$ ,  $e^2$ ,  $e^3$  will respectively engage the bolts  $b^1$ ,  $b^2$ ,  $b^3$  inside the lock nuts upon their outer ends.

The spider E, as previously suggested, and as clearly shown in the drawings, is, save at the jaw-forming ends, webbed throughout, except at the center point, where it is hollowed out, and has mounted across the spoke  $e^2$ , so as to be capable of coöperation, a screw F fixed in the direction of rotation, but movable in the direction of its axis, and nut G, having a worm gear cut in its periphery. The screw has a squared end  $f'$  and an enlarged head  $f^2$ . The screw opening on the inner face of the spoke  $e^3$  is unthreaded and slightly larger in bore than the thread on the screw, which may consequently be



readily inserted therein, to be then screwed into the worm gear G. Upon passing through this gear, which has a thickness the substantial equivalent of the hollowness of the spider, the squared end  $f'$  fits into a squared opening  $a$  of corresponding size on the outer face of the spoke  $e^3$ . This particular spoke has further mounted upon it intermediately of its ends an upwardly extending boss  $h'$ , adapted to serve as a thrust bearing for one end of a worm shaft H. This extends horizontally through the upright spoke  $e^2$ , it meshes with the gear G, and is provided on its free end with the usual arm  $h^2$  and handle  $h^3$ . Indirectly mounted upon the enlarged head  $f^2$  of the screw F in any desired manner, is a circular door K, corresponding in size to the flanged opening. The drawings show the door provided at the central portion of its exposed face with an ancillary steel plate  $k$ , to protect the door from direct contact with the high temperature in the stove. It will now be readily understood how the handle  $h^3$  may turn the worm shaft H to rotate the worm wheel G, and so move the screw F in or out, and hence the door K, toward or away from the flanged opening. Assuming the door to be drawn toward the spider, and the latter moved to one side with the trolley, in order to close the opening, it is only necessary to move the trolley back along the track to its one end  $d'$ ,

in which position the spider E will be centered directly in front of the opening. The jaw  $e^3$  will, in the meantime, have engaged the bolt  $b^3$ , and simultaneously the jaws  $e'$  and  $e^2$  will have engaged in the same way the bolts  $b'$  and  $b^2$ . The lock nuts will accordingly constitute a backing for the spider, and hence permit the door to be forced against the flanged opening as tightly as might be desirable.

Having fully described my invention, what I claim therefore, and desire to secure by Letters Patent is:—

In a device of the character described, the combination of a member provided with a flanged opening; a laterally extending trolley rail mounted adjacent to said opening; a spider suspended from said trolley; means for securing said spider in front of the opening; a rotatably fixed screw extending inwardly from said spider; a door mounted upon said screw; and means comprising a worm and worm gear connected with said screw, and adapted to move said door toward and away from said opening.

Signed by me, this 3d day of December, 1909.

ARTHUR G. McKEE.

Attested by—

CURT B. MUELLER,  
WINIFRED WALTZ.