

(No Model.)

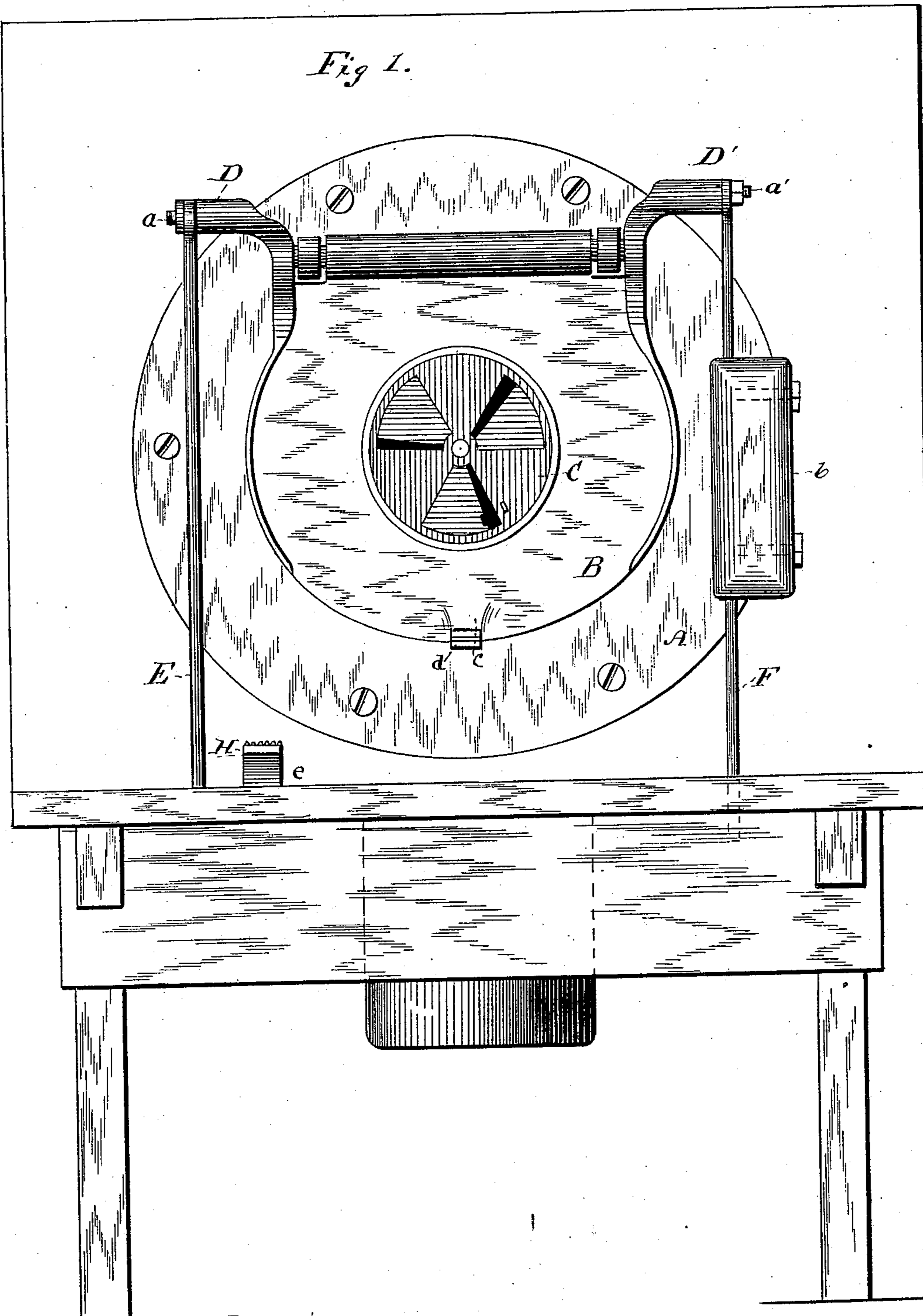
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T. R. BUTMAN.

FURNACE DOOR.

No. 308,551.

Patented Nov. 25, 1884.



WITNESSES

Chas. R. Burr
W. E. Bowen

INVENTOR

Thos. R. Butman
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(No Model.)

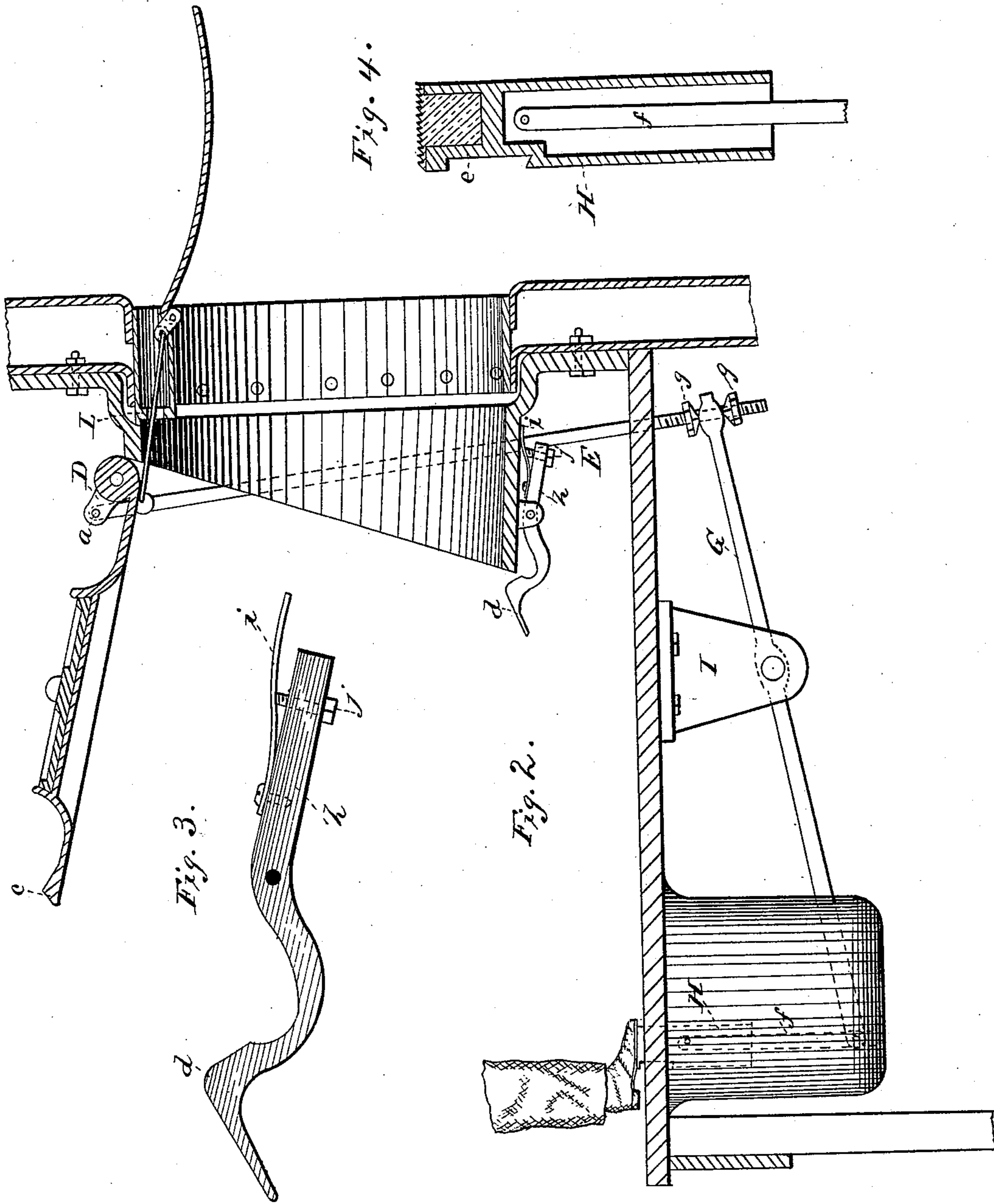
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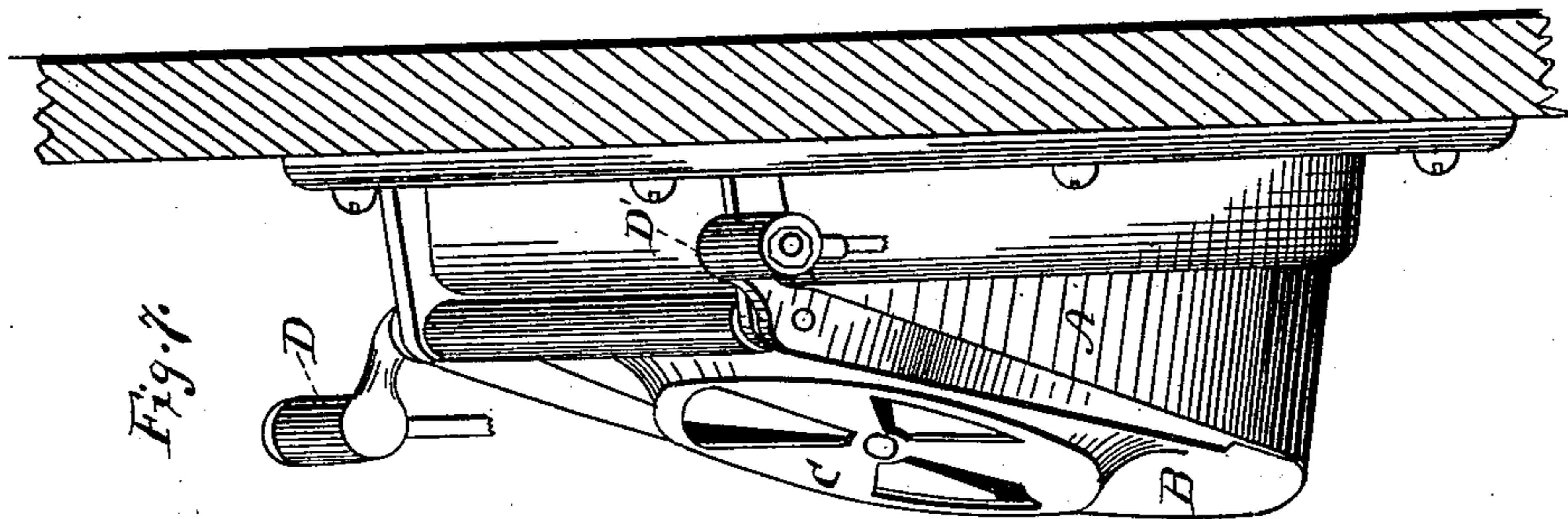


Fig. 7.

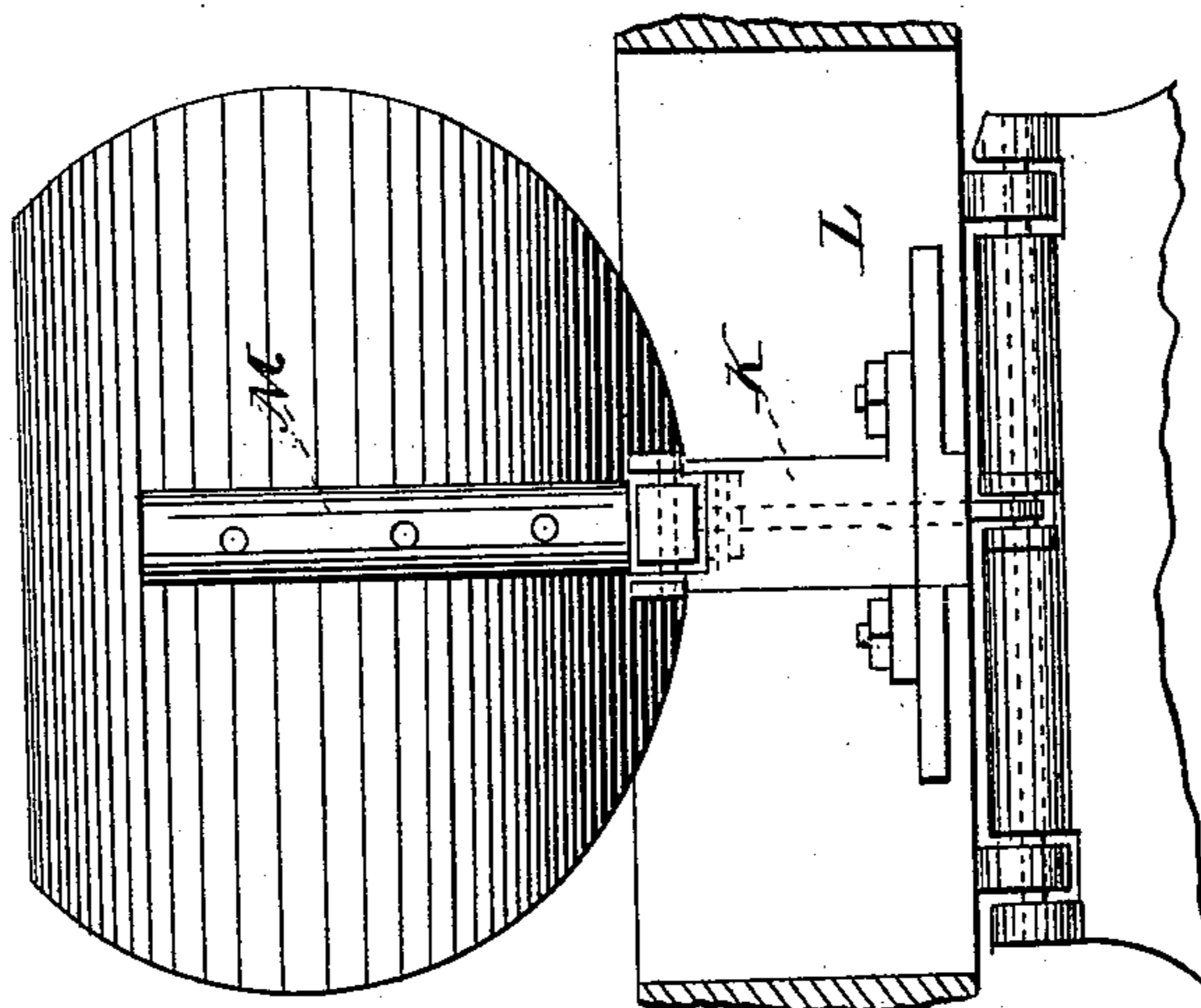


Fig. 6.

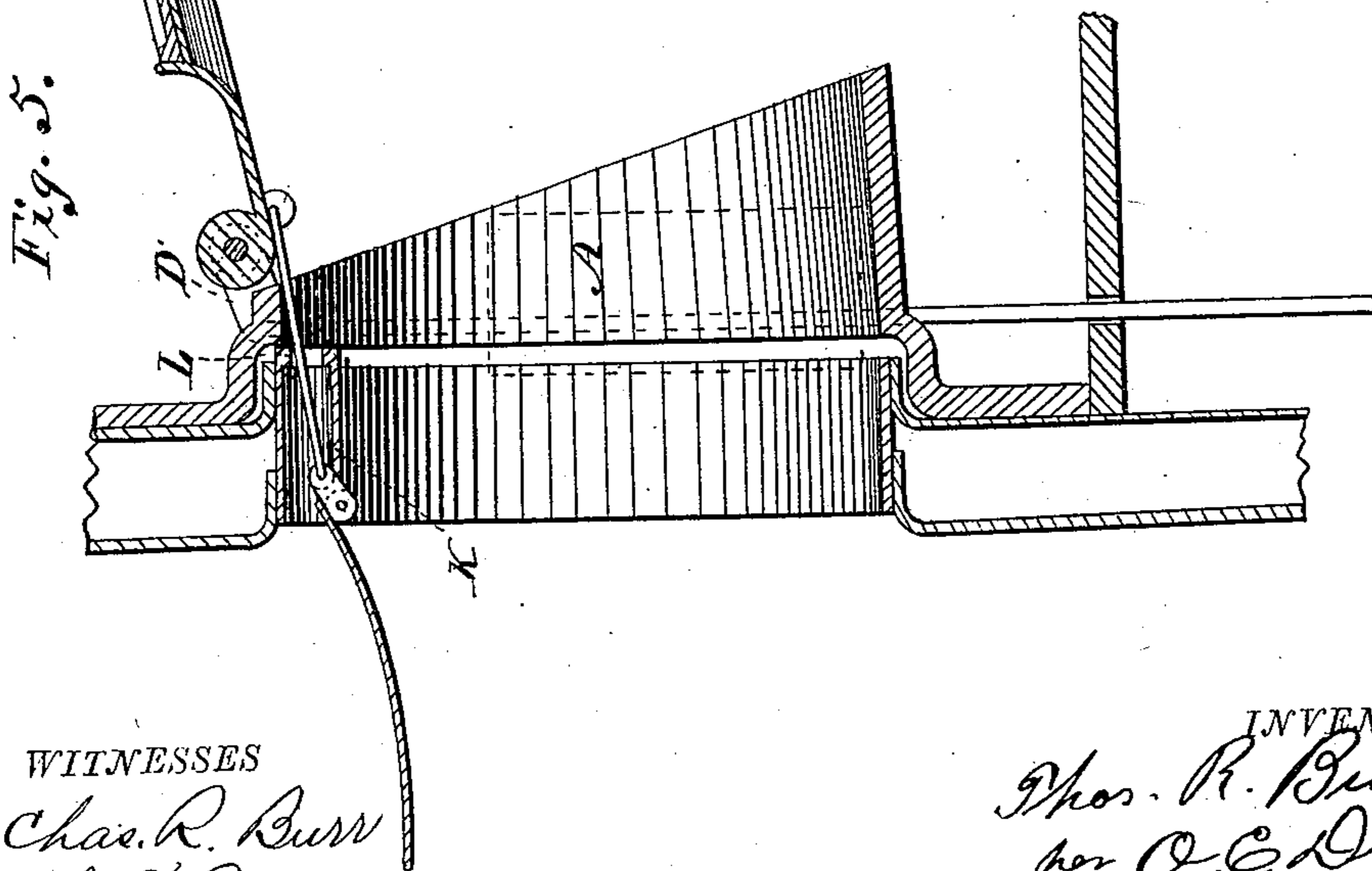


Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

THOMAS REED BUTMAN, OF CLEVELAND, ASSIGNOR TO JAY A. HIGBEE, OF
FREMONT, OHIO.

FURNACE-DOOR.

SPECIFICATION forming part of Letters Patent No. 308,551, dated November 25, 1884.

Application filed March 9, 1883. Renewed April 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, THOMAS REED BUTMAN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Furnace-Doors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to new and useful improvements in furnace-doors, but particularly applicable to the furnaces of locomotives and marine boilers. It has for its object simplicity in construction, cheapness in first cost, facility for rapid firing, easy manipulation, and a partially automatic action.

The present invention is an improvement upon an application for locomotive furnace-doors filed by me August 5, 1882, Serial No. 68,557, in which are used springs and other mechanism not so well adapted to locomotive-furnaces as the present invention.

To improve on this door and to prevent it from rattling and jarring while in operation are further objects of my invention; and to this end it consists, first, in providing the door with two operating-cranks, one of which is designed to open the door and the other to nearly balance the door in such manner as to make it work upon its trunnions with the same ease as if it were centrally pivoted, in combination with the operating mechanism; second, in the particular construction and arrangement of the combined box-bracket and shield relatively to the door-frame and deflecting-plate in such manner that it forms a bracket-hinge, to which the tongue-hinge of the deflecting-plate is secured by means of a pintle at one end and to a lug formed upon the door-frame at the other end, permitting the connecting-link of the door and deflector to pass through it, and to protect it from the heat and rough usage; third, it further consists in the combination of the door-deflector and its connecting-link with the connecting-rod, lever, and foot-operating mechanism; and, finally, in the peculiar arrangement of the door-latch and spring relatively to the inclined edge of the door in such manner that the door is prevented from jarring while the

engine is in motion, all of which will more fully hereinafter appear.

Referring to the drawings, Figure 1 represents a front elevation of my door, showing the operating-rod and the counterpoise-weight mounted upon rod F. Fig. 2 is a vertical longitudinal section of Fig. 1. Fig. 3 is a side view of the compression-latch. Fig. 4 is a sectional view of the foot-post with its flexible block, also in section. Fig. 5 shows a vertical section of the door on the opposite side. Fig. 6 shows an inverted plan view of the deflector, showing the tongue-hinge and stiffening-piece detachably secured to the deflector, and the box-bracket and the top of the door, and also of door-brackets and hinge. Fig. 7 shows an isometrical perspective view of my door-frame and door and brackets, the strengthening or stiffening rim of the edge of the door, and the bulged ring for fitting around the flanged furnace-doorway.

The same letters denote like parts in all the figures, in which A is the door-frame; B, the door. C is the air-register, and D D' the cranks which are cast upon the door, one of them extending upward and outward and the other upward and inward, (see Fig. 7,) and are provided with journal-bearings *a a'*.

E is a vertical rod, attached at one end to crank D and journaled on bearing *a*, and at the other end to the working-lever G. (See Fig. 2.) Rod F is connected to crank D' on bearing *a'*, and simply extends through the foot-board, by which it is maintained in position. This rod is provided with a weight, *b*, and so poised that it nearly counterbalances the door B, but not so much as to prevent the door from automatically closing itself by gravity.

c shows the end of the retaining or compression latch, and *d* the lug on the door, which will be more fully described farther on.

H is the foot-post, provided with recess *e*, which serves the purpose of a retaining device when the door is held in an open position. The foot-post H is cast hollow in its lower portion, in which a rod, *f*, is pivoted, and this rod *f* is connected to lever G at one of its ends, which lever G is fulcrumed in the middle in bracket I, which is suspended from the foot-board of the cab. The bore of foot-post H is much larger than the rod *f*, and thus permits the rod to oscillate as it moves

up or down. The rod E is connected to lever G by two check-nuts, *g g*. These nuts, as they are screwed up or down, give more or less swing to the door in opening it.

5 Ordinarily, when the door is upon a stationary furnace, it will stay closed of its own gravity; but when used upon a locomotive there is a tendency for the door to shake and jar, which is annoying to the attendant and
10 wearing on the parts. To prevent this jarring noise, I provide a retaining or spring compression latch, (see Figs. 2 and 3,) which is so arranged as to constantly bear against a beveled boss on the lower edge of the door,
15 not latching the door, but to hold it by means of the spring against the door, and so retains it in position without jarring. This latch is of special and peculiar construction and of great importance, and I will specially describe
20 its construction and operation as follows: The compression-latch is suspended from the bottom of the door-frame by lugs or other suitable means, and extends back under the door-frame. This back part, *h*, is provided with a
25 spring, *i*, which is fastened to the top of the latch-piece and adapted to bear against the bottom of the door-frame. The tendency of the spring is to depress the latch-bar in the rear and throw it up in the front in such man-
30 ner as to constantly bear against the door when closed. A set-screw, *j*, regulates the tension of the spring as may be desired.

The front end of the latch is provided with a goose-neck and head-like curve and incline
35 (see Fig. 3) in such way as that when the door closes it strikes the incline and depresses the latch, and, when closed, presses back against the door and retains it so by compression of the spring. The goose-head portion is thicker
40 than the rib and neck, and has also a backward bevel, so that when the door is opened it readily slides over this incline and swings open. This compression-latch is applicable to other purposes and other doors, and may
45 be put up in packages for commercial use in the trade.

I will now proceed to describe the box-shield bracket and bracket-tongue, in which K is the bracket, and L the lug cast on the inside
50 of the top of the door-frame, to which the box-bracket is secured.

M is the tongue-bracket and stiffening-piece for the deflector, which is detachably secured thereto, so that when the deflector is burned
55 a new one may readily be substituted.

The door-frame (see Fig. 7) is cast in one piece, and with it the lugs or brackets which form trunnions upon which the door is hung, and, as before stated, the box-bracket lug is
60 also cast to the door-frame.

The contour of the door-frame and door presents a neat and pretty appearance and adds largely to the tasteful appearance of the furnace-front.

65 Referring again to Fig. 4, which shows the foot-post, it will be observed that it is also cast with a hollow top for the reception of a

flexible piece or block, serrated upon its top for the purpose of increasing the traction of the shoe-sole of the fireman, and at the same
70 time preventing too much wear on it, as would be the case if the serrations were made of iron. These flexible blocks, which may preferably be made of vulcanized rubber, are detachable, so that when they become smooth
75 on the surface a new one can be substituted.

I am aware that furnace-doors have been made with horizontally-swinging deflectors, so that the door and deflector will simultaneously swing upwardly, and therefore do not
80 broadly claim such construction in this application; but

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

1. The combination, in furnace-doors, consisting of the swinging door, the deflecting-plate, and the connecting-link with the box-bracket and with the tongue-bracket detachably secured to the deflector, as described. 85

2. The combination, in furnace-doors, consisting of the swinging door, the deflecting-plate, and connecting-link with the box-bracket and with the detachable tongue-bracket, said box-bracket being secured to the frame of the door by means of the lug and to
90 the deflector by means of the tongue-bracket, as set forth. 95

3. The combination, in a furnace-door, consisting of the door, deflecting-plate, and their intermediate mechanism, with the operating
100 connecting-rod, lever, and foot-post, arranged and operating as set forth.

4. The combination, in furnace-doors, of the door and deflecting-plate, hinged horizontally, the box-bracket and the connecting-
105 link, the rod E, lever G, and foot-post mechanism with the counterpoise-weight and rod F, operating together as set forth.

5. The combination, in a furnace-door, of the door and deflector, box-bracket and connecting-link, and tongue-bracket with the rod
110 E, lever G, and foot-operating mechanism, with the door spring-latch for maintaining the door in position by compression, as set forth.

6. The combination, in a furnace-door, of
115 the door having the stiffening-rim, and the cranks D D, in combination with the door-frame provided with brackets or lugs cast thereon, said cranks being provided with journal-bearings and with the pintle-rod, as set
120 forth.

7. The combination, with the furnace-door adapted to hang horizontally, and provided with a crank, of the connecting-rod, the lever, fulcrumed as described, with the foot
125 mechanism, the tread of the foot-post having a flexible serrated bearing, all being arranged and operating as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of
130 two witnesses.

Witnesses: THOMAS REED BUTMAN.

B. F. MORSELL,

EDWARD E. ELLIS.