No. 747,718. PATENTED DEC. 22, 1903.

H. H. HUFF.

FURNACE.

APPLICATION FILED JUNE 1, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 2.

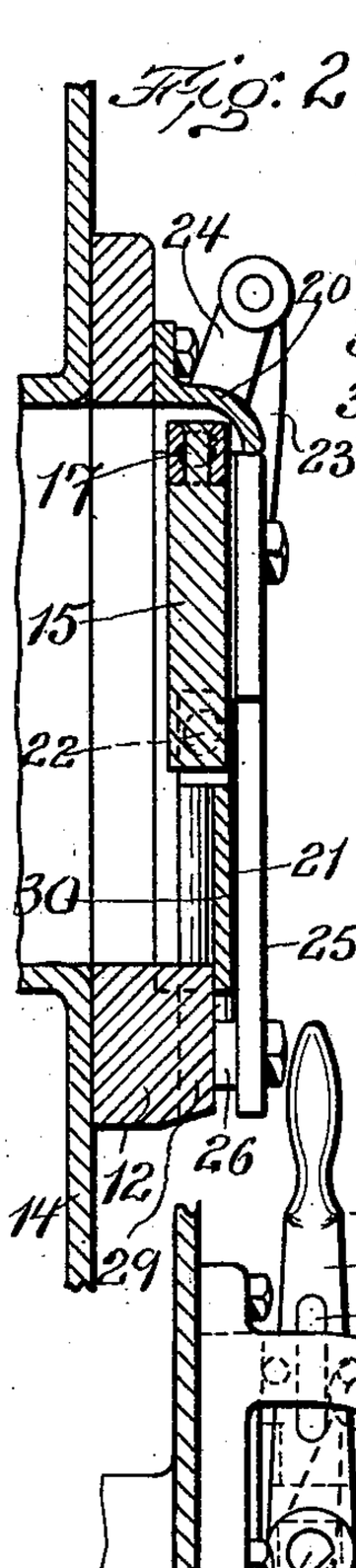


Fig. 1.

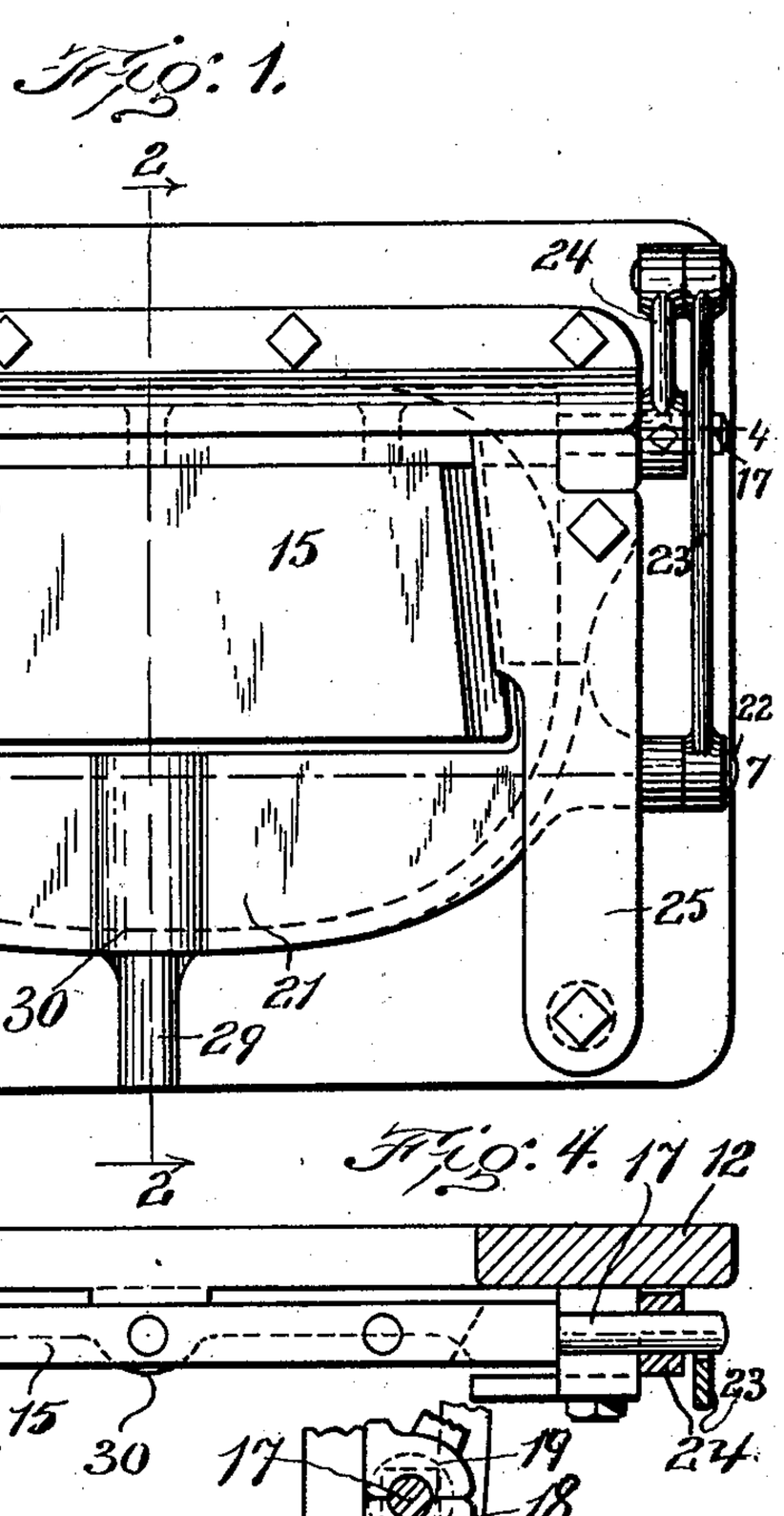
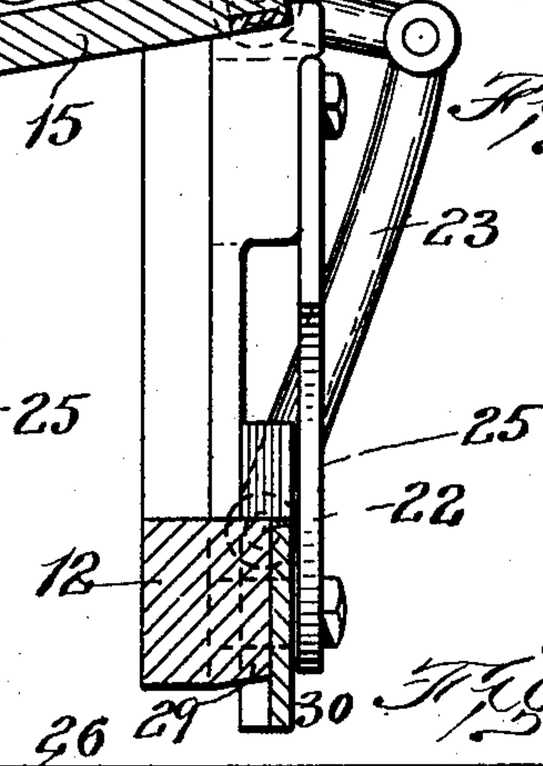


Fig. 3.

Fig. 4.

Fig. 6



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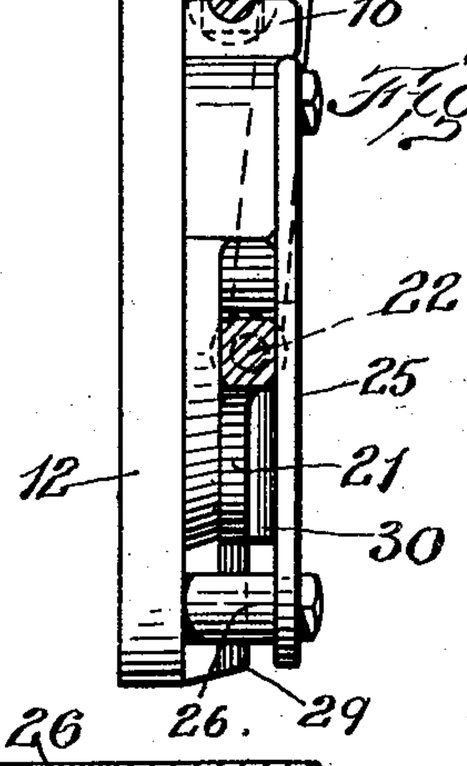

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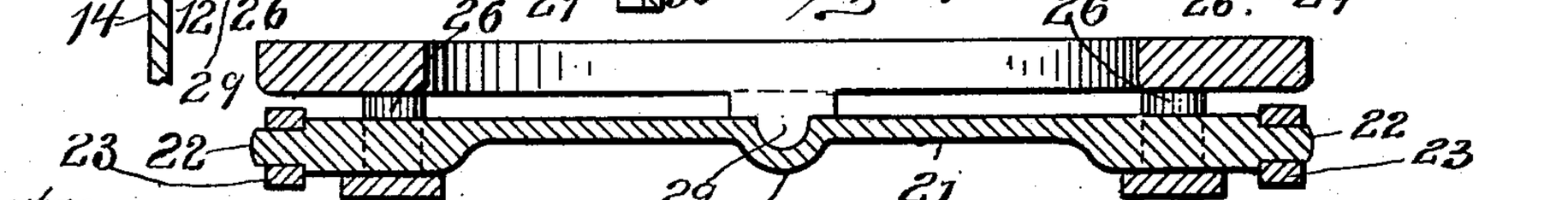

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NO MODEL. 3 SHEETS—SHEET 2.

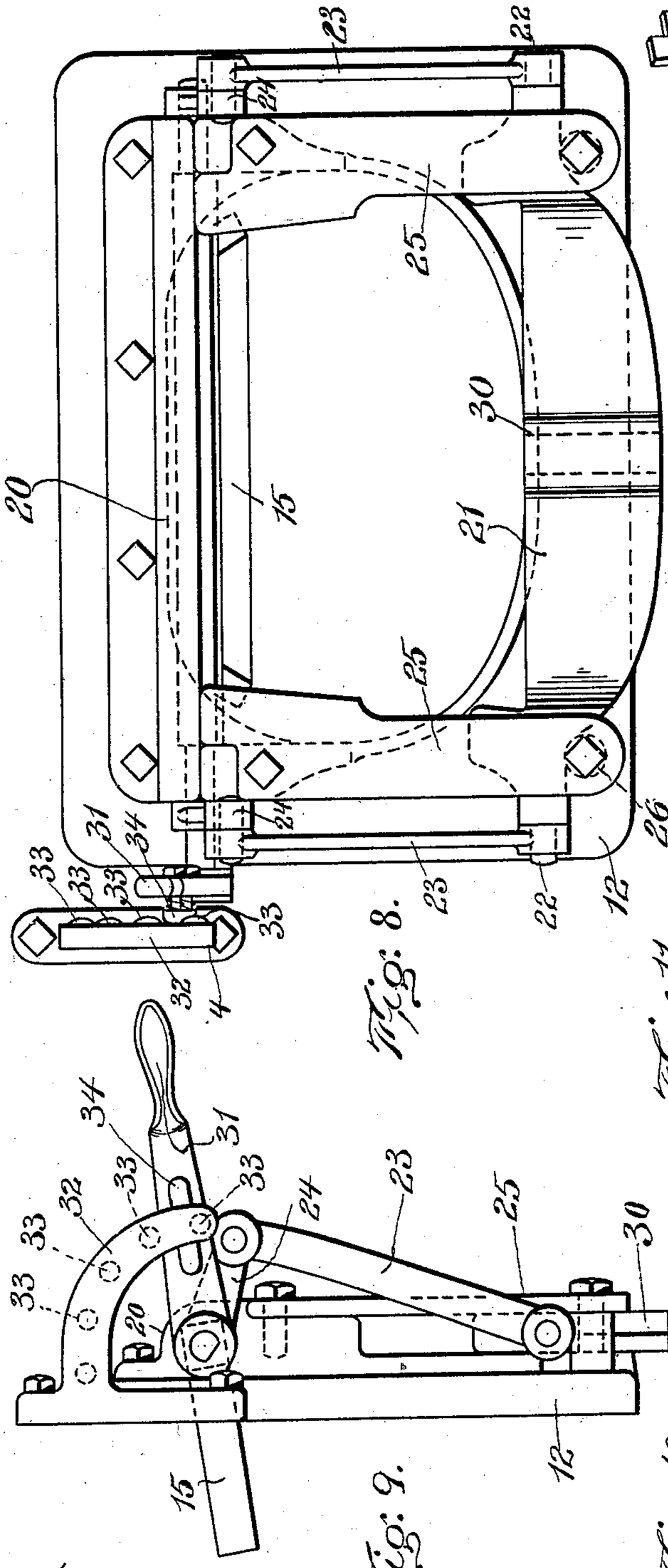

Fig. 8.

Fig. 9.

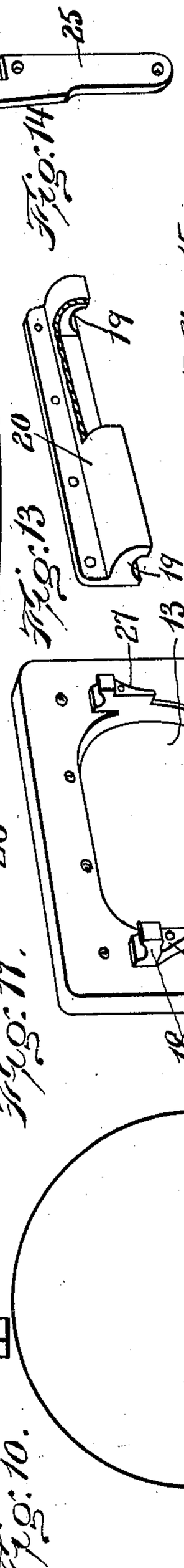

Fig. 11.

Fig. 13.

Fig. 14.

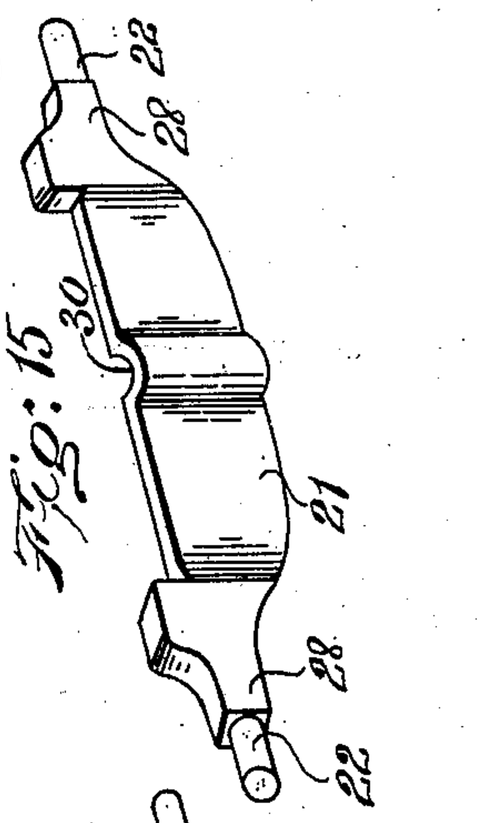

Fig. 15

Fig. 12.

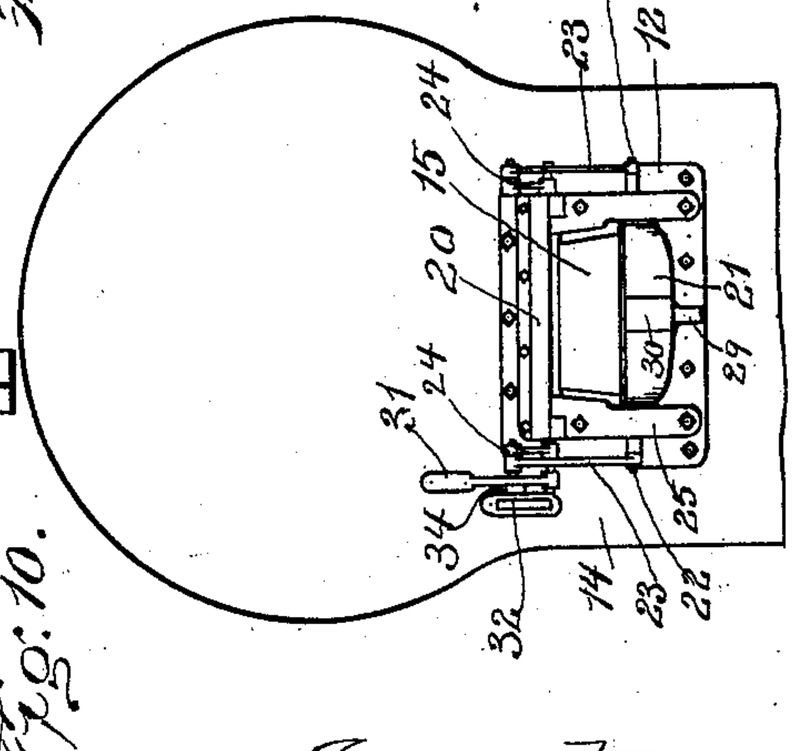

Fig. 10.

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APPLICATION FILED JUNE 1, 1903.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 16

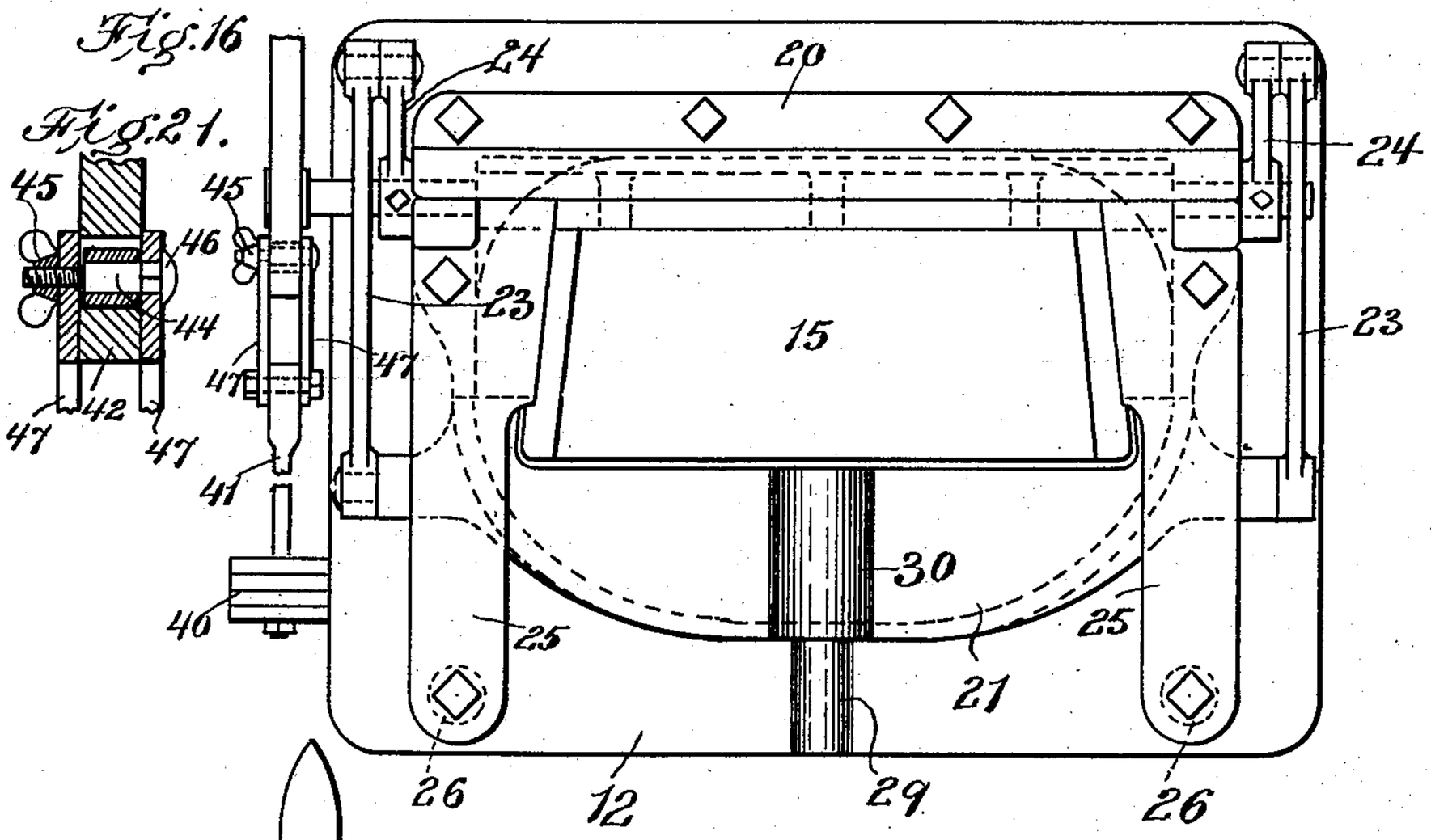


Fig. 21.

Fig. 17.

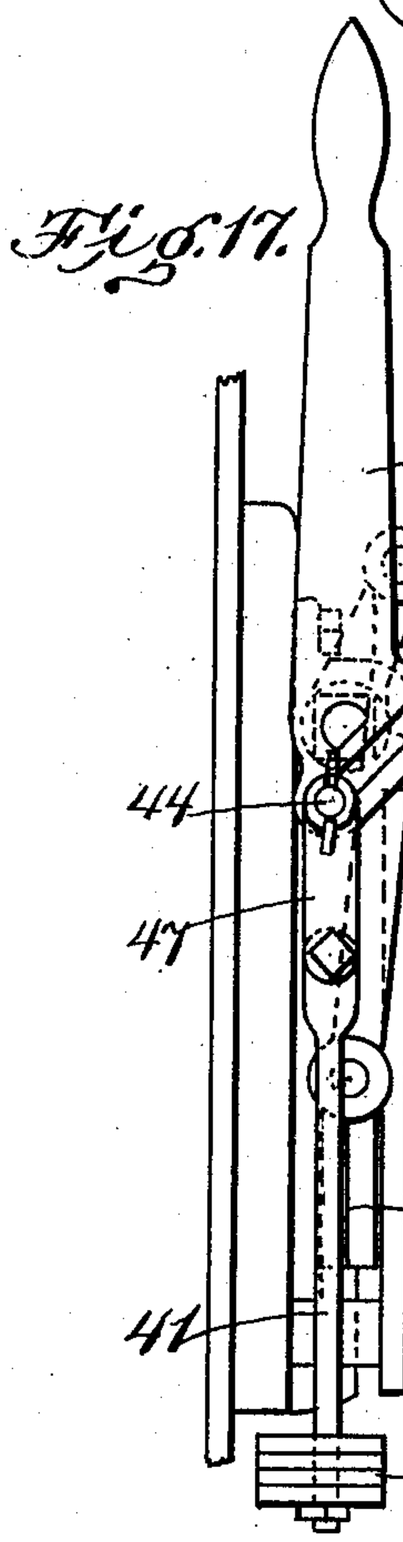


Fig. 18.

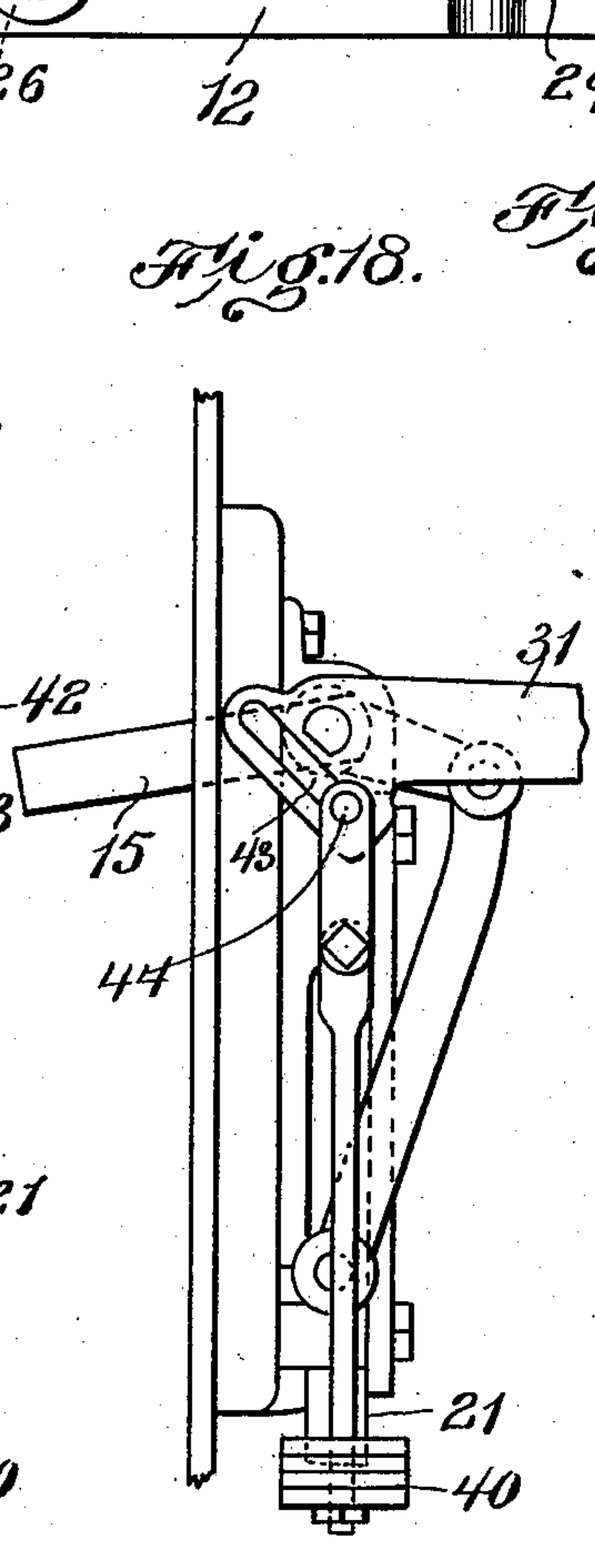


Fig. 19.

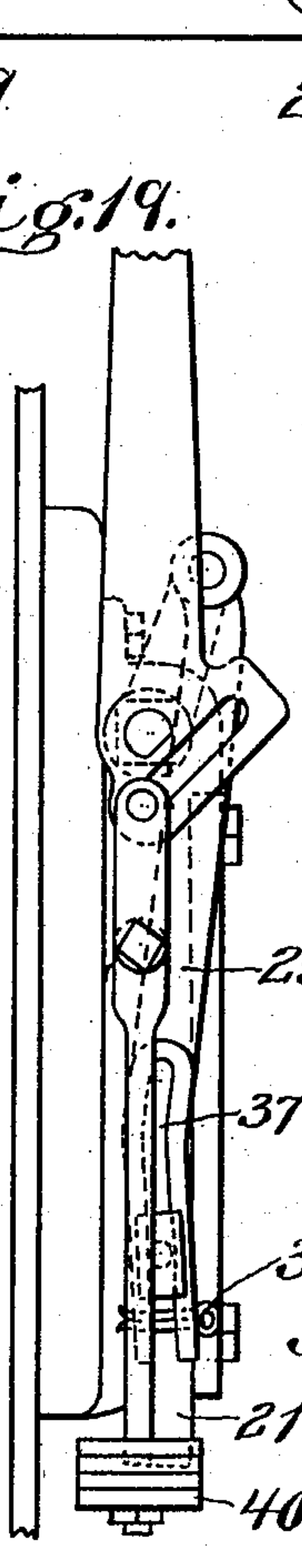
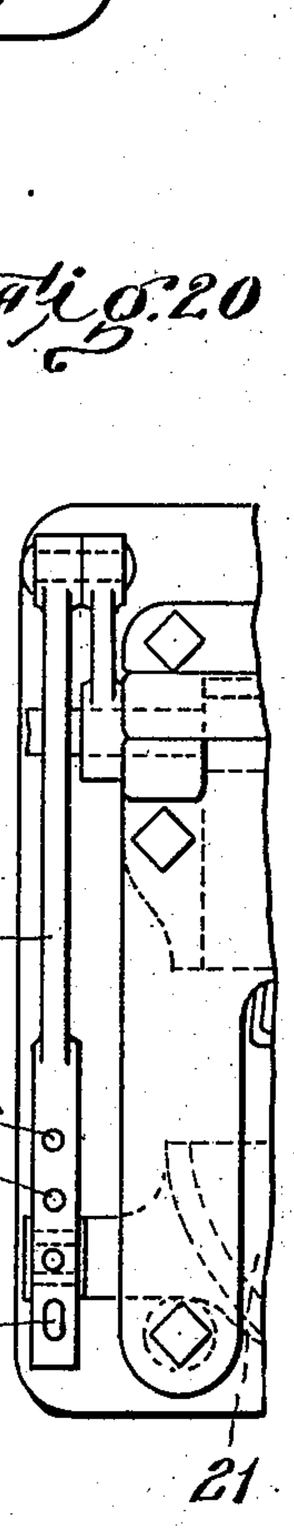


Fig. 20



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No. 747,718. Patented December 22, 1903.

UNITED STATES PATENT OFFICE.

HENRY H. HUFF, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HUFF LOCOMOTIVE APPLIANCE COMPANY, OF KITTERY, MAINE, A CORPORATION OF MAINE.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 747,718, dated December 22, 1903.

Application filed June 1, 1903. Serial No. 159,435. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. HUFF, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to furnace or fire-box doors, and particularly to doors of the furnaces or fire-boxes of locomotive-engines, although my invention is not limited to this use and may be applied to stationary or other engines as well as to locomotives.

The invention has for its chief object to provide a two-part door composed of a hinged upper section adapted to swing on a horizontal axis and a sliding lower section which is connected with the upper section in such manner that the two sections are opened and closed simultaneously, the sliding section constituting a counterbalance to support the swinging section in any desired position and reduce the labor or force required to open and close the sections to the minimum.

The invention also has for its object to provide certain incidental improvements; and it consists in the several improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a front elevation of a furnace-door and its casing embodying my invention. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents an edge or end elevation, a part of the furnace-wall being shown in section. Fig. 4 represents a section on line 4 4 of Fig. 1. Fig. 5 represents a section on line 5 5 of Fig. 1. Fig. 6 represents a view similar to Fig. 2, showing the door-sections opened. Fig. 7 represents a section on line 7 7 of Fig. 1. Fig. 8 represents a front elevation showing the doors open. Fig. 9 represents an end view showing the doors open. Fig. 10 represents an elevation of the back wall of a locomotive fire-box provided with my improved door. Fig. 11 represents a perspective view of the body portion of the door-casing. Figs. 12, 13, 14, and 15 represent perspective views of detached parts hereinafter referred to. Fig. 16 represents a view similar to Fig. 1, showing a counterbalancing-weight. Fig. 17 represents an end view of the construction shown in Fig. 16, the door-sections being closed. Fig. 18 represents a view similar to Fig. 17, the door-sections being open. Fig. 19 represents an end elevation showing means for adjustably connecting the lower door-section with the upper section. Fig. 20 represents a front elevation showing the adjusting means represented in Fig. 19. Fig. 21 represents a fragmentary sectional view hereinafter referred to.

The same reference characters indicate the same parts in all the figures.

In carrying out my invention I provide a door-casing which preferably includes a body or frame portion 12 of the general form shown in Fig. 11, the same having a door-opening 13 and being adapted to be bolted or otherwise secured to the back wall 14 of a furnace or fire-box.

15 represents a swinging door-section which is hinged to the casing 12, the preferred connection between the section 15 and casing 12 being by means of arms or trunnions 17 17, formed on or affixed to the section 15, and bearings on the door-casing composed of lower sections 18 at opposite ends of the door-opening, and upper sections 19, formed on a casting 20, which is bolted to the casing 12 above the door-opening. The door-section 15 is adapted to swing inwardly into the fire-box.

21 represents the lower or sliding section of the door, which is movable vertically on the casing, its movements being controlled by guides with which the casing is provided, as hereinafter described. The sliding section 21 is provided at its ends with oppositely-projecting arms or trunnions 22, which are connected by links or rods 23 with the swinging ends of arms 24, affixed to the trunnions 17 of the swinging section, the arrangement being such that when the swinging section is opened or swung inwardly the arms 24 are depressed and permit the downward movement of the sliding section 21, thus fully uncovering the door-opening, as shown in Figs. 6, 8, and 9. It will be seen that the sliding section 21 is caused by the described connections between it and the swinging section 15 to act as a counterbalance for the latter, the swinging

section being retained by the sliding section in any position to which it may be adjusted. Owing to the fact that the two sections are thus counterbalanced the labor required in opening and closing the sections is reduced to the minimum.

25 25 represent guides composed of vertical strips or bars affixed to projections 26 27, Fig. 11, on the outer face of the casing 12, the portions of the guides between said projections being separated from the casing by vertical spaces which receive squared portions 28, Fig. 15, formed on the sliding section 21. The guides 25 prevent the sliding section 21 from being displaced sidewise or outwardly from the casing 12. Endwise displacement of the sliding section 21 is prevented by a vertical guiding rib or member 29, formed on the casing below the door-opening, and a complemental guiding member formed as a vertical groove 30 in the inner side of the sliding section 21, the said groove engaging the rib 29.

31 represents a lever or handle fast to one of the trunnions 17 to enable the operator to open and close the door-sections. To provide against loose movements of the door-sections, I provide retaining means comprising a fixed segmental arm 32, affixed to the firebox wall and provided with a series of bosses 33, and a yieldingly-supported latch or detent member 34, mounted on studs 35, which are supported by the operating-lever 31 and pressed outwardly by springs 36 into engagement with the bosses 33. When the member 34 is between any two of the bosses, the lever cannot be moved to carry the member 34 across either of said bosses without the application of sufficient force to overcome the springs 36.

It will be seen that the two sections 15 and 21 operated simultaneously enable the door-opening to be quickly opened and closed with a slight effort on the part of the operator and enable an opening of any desired size to be continuously maintained—that is to say, the door-sections may be left at various positions between their extreme open position and their extreme closed position.

In Figs. 19 and 20 I show means for adjusting the sliding section 21, so that when the swinging section is closed and the sliding section is raised to its fullest extent there may be still an opening of any desired width left between the adjacent edges of the two sections for the admission of any fixed amount of oxygen. To this end I provide the lower portion of the links 23 with longitudinal slots 37, in which the arms 22 of the sliding section 21 are vertically adjustable, the said arms being supported in the slots 37 by means of stop-pins 38, inserted in the slotted portions of the links, there being a series of orifices 39 formed in the slotted portions of the links at different heights to permit the pins 38 and the sliding sections 21 to be correspondingly adjusted.

In Figs. 16, 17, 18, and 19 I show an additional counterbalancing-weight 40, suspended by a rod 41 from the operating-lever 31. Said weight, which may be made in sections, so that it can be increased or diminished, is intended as an auxiliary to the sliding section 21. The operating-lever 31 is provided with an arm or extension 42, in which is formed a slot 43. Said slot receives a pin 44, which connects the upper end of the link 41 with the arm 42. The arrangement is such that when the door-section 15 is closed, as shown in Fig. 17, the slot 43 is inclined in such direction as to cause the pin 44 to move to the inner end of the slot. When the pin is in this position, the operative length of the arm 42 is so reduced that the effective force of the weight 40 is reduced to the minimum. When the door is opened, as shown in Fig. 18, the slot 43 assumes an opposite inclination and the pin 44 is caused to move to the outer end of the slot, thus increasing the effective force of the weight 40. The weight 40 and the described connections between it and the swinging door are not claimed herein, the same being shown and claimed in Letters Patent No. 726,298, dated April 28, 1903. In the present case I have added to the devices shown in said patent means for securing the pin 44 rigidly at any desired point in the slot 43, said means comprising a thumb-nut 45, engaged with the threaded end of the pin or bolt 44, said nut coöperating with the head 46 of said bolt in causing the two plates 47 47, which are connected with the upper end of the link 41, to bind firmly upon the opposite sides of the arm 42, and thus immovably secure said plates and the pin 44 to the arm 42. If the pin is thus secured to the arm when the parts are in the position shown in Fig. 18, the weight 40 will tend to hold the door-section 15 open so long as the pin remains engaged with the arm 42.

I claim—

1. A furnace-door comprising a hinged upper section, and a vertically-movable lower section serving also as a counterbalance for the hinged section.

2. A furnace-door comprising a hinged upper section, a vertically-movable lower section, and connections between the two sections for imparting movement from one section to the other.

3. A furnace-door comprising a hinged upper section, a vertically-movable lower section, and means for simultaneously moving said sections to and from their closed and open positions.

4. A furnace-door comprising a hinged upper section, a vertically-movable lower section, swinging arms engaged with the upper section, and rods or links connecting the swinging ends of said arms with the lower section.

5. The combination of a door-casing having bearings at its upper portion and vertical guides below said bearings, a swinging door-section having trunnions journaled in said bearings, a sliding door-section engaged with

said guides, and connections between the two sections.

6. The combination of a door-casing having bearings at its upper portion, vertical end guides below said bearings at opposite ends of the door-opening, and a central vertical guide or rib below the door-opening, a swinging door-section having trunnions journaled in said bearings, a sliding door-section having arms at its ends engaged with said end guides, and a central guiding member engaged with the central guide-swinging arms affixed to the said trunnions, and rods or links connecting said swinging arms with the arms on the sliding section.

7. A furnace-door comprising a hinged upper section, a vertically-movable lower section, connections between the two sections for imparting movement from one section to the other, and means for retaining said sections in different positions.

8. A furnace-door comprising a hinged upper section, a vertically-movable lower section, connections between the two sections for imparting movement from one section to the other, a lever affixed to the hinged section and provided with a spring-pressed detent member, and a fixed arm provided with a series of projections adapted to coöperate with said detent member.

9. A furnace-door comprising a hinged upper section, a vertically-movable lower section, swinging arms engaged with the upper section, and rods or links pivoted to the swinging arms and adjustably connected with the lower section, whereby the latter may be adjusted relatively to the swinging section.

10. The combination of a hinged door, a slotted arm affixed to the door, a counterbalancing-weight, a link connected with the weight, a slidable connection between the link and the slotted arm, and means for securing said connection at any point within the range of its sliding movement.

In testimony whereof I have affixed my signature in presence of two witnesses.

HENRY H. HUFF.

Witnesses:
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E. BATCHELDER.