

No. 701,525.

Patented June 3, 1902.

W. S. WASHBURN.  
SAFETY VALVE.

(Application filed Jan. 12, 1901.)

(No Model.)

Fig. 1.

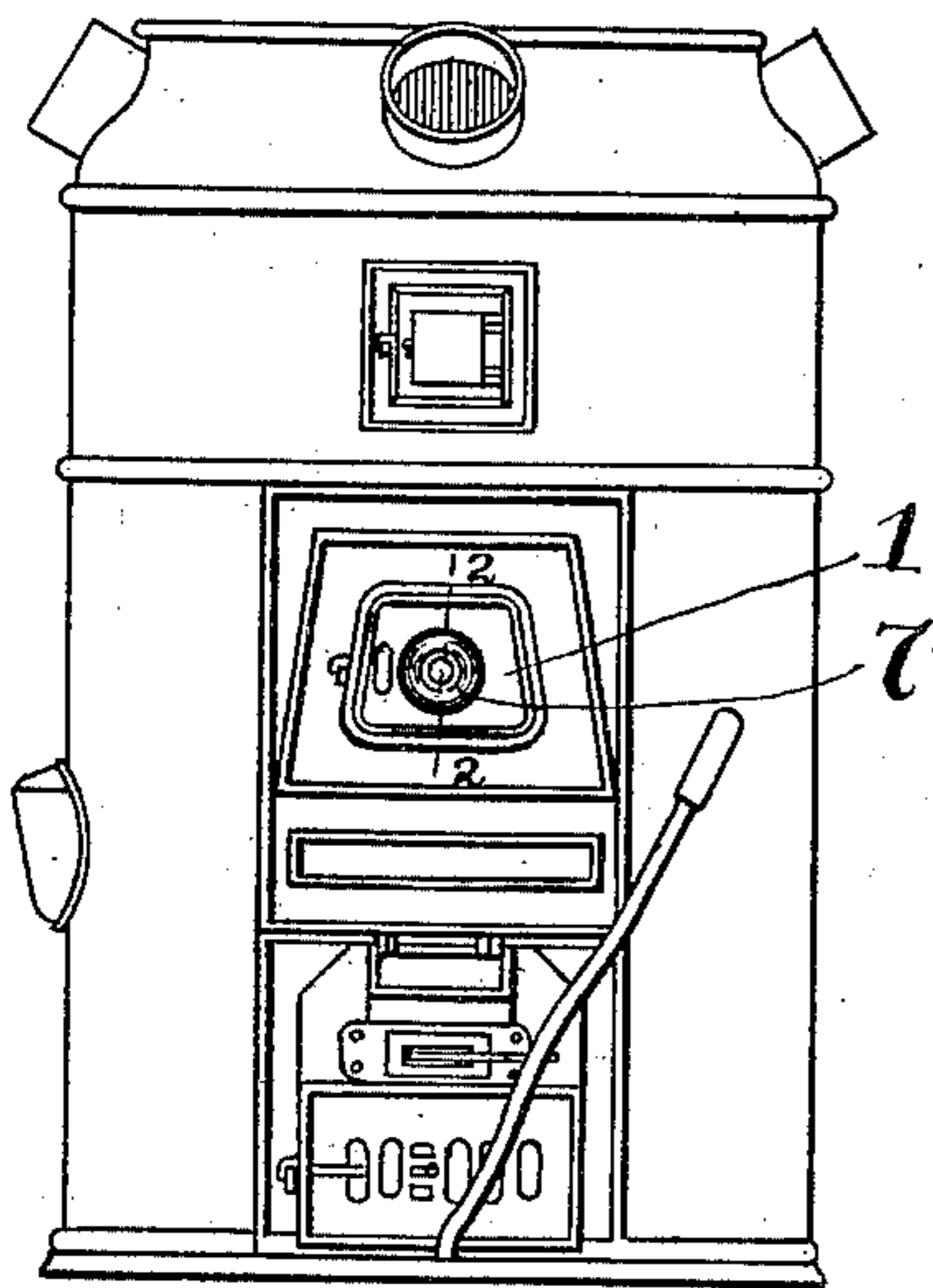


Fig. 3.

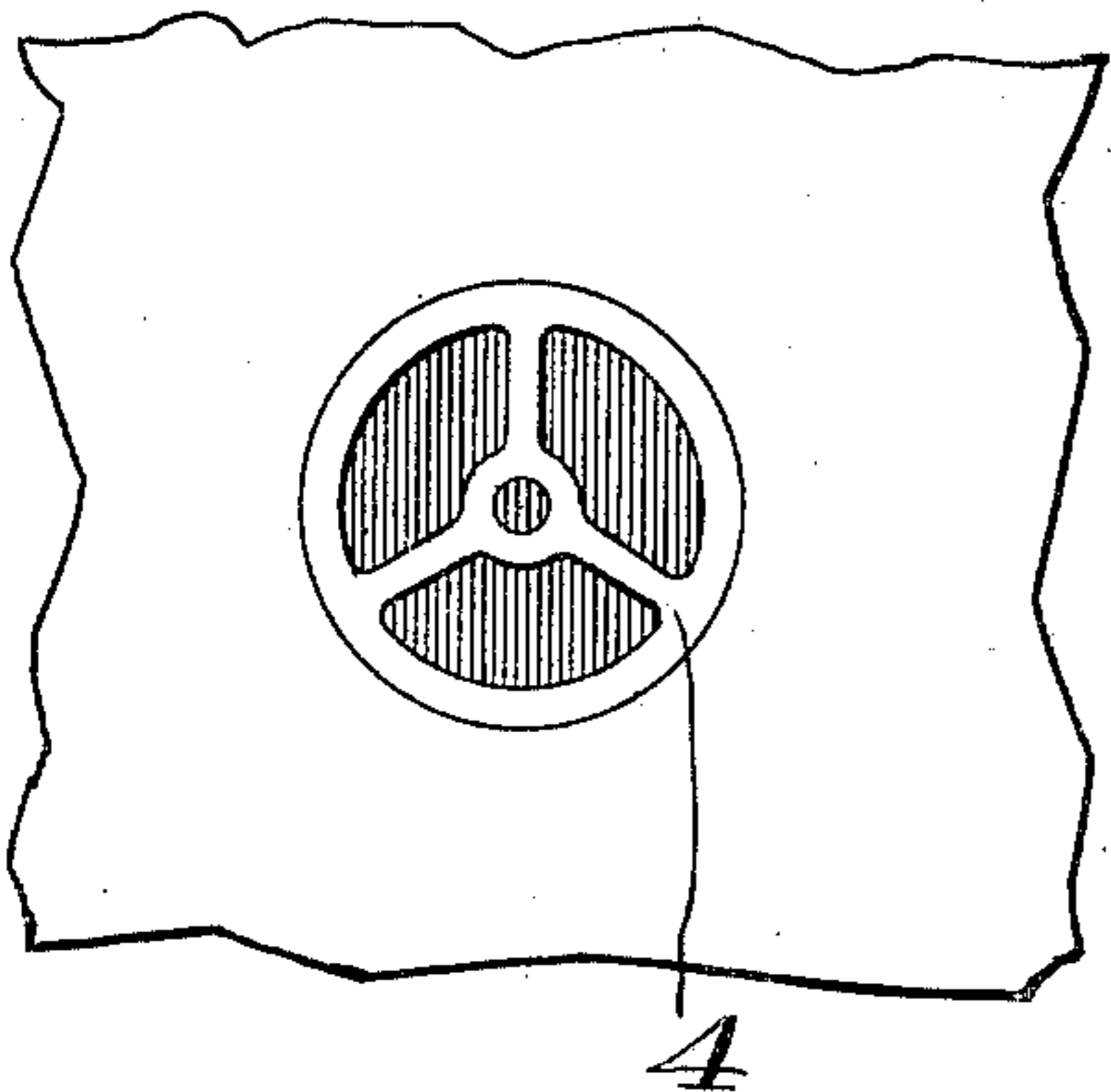
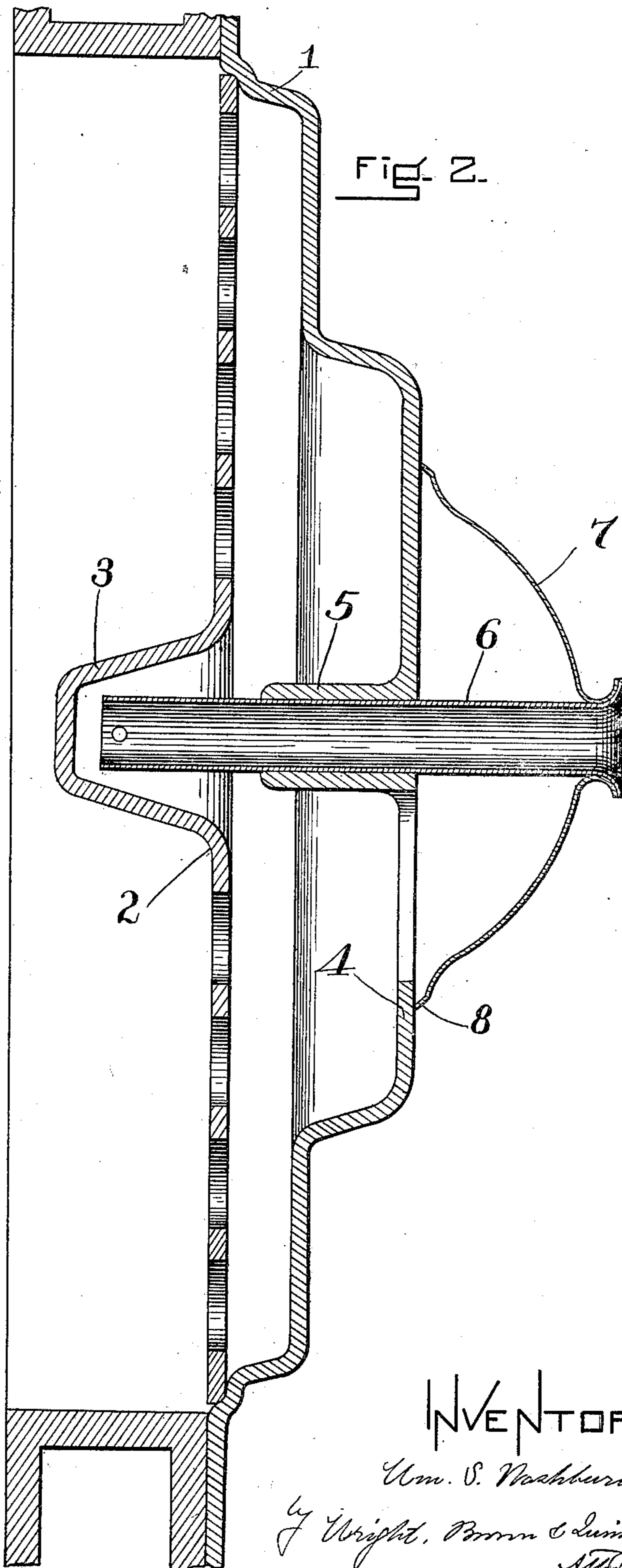


Fig. 2.



WITNESSES.  
*P. W. Pezzetti.*  
*E. B. Batcher.*

INVENTOR  
*Wm. S. Washburn*  
*by Wright, Brown & Lundy*  
*Attys.*

# UNITED STATES PATENT OFFICE.

WILLIAM S. WASHBURN, OF WOLLASTON, MASSACHUSETTS.

## SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 701,525, dated June 3, 1902.

Application filed January 12, 1901. Serial No. 42,983. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM S. WASHBURN, of Wollaston, in the county of Norfolk and State of Massachusetts, have invented certain  
5 new and useful Improvements in Safety-Valves, of which the following is a specification.

This invention relates to a new and improved safety-valve for heaters; and it consists in the novel features of construction and relative arrangement of parts hereinafter fully described in the specification, clearly illustrated in the drawings, and particularly pointed out in the claims.

15 Reference is to be had to the accompanying drawings, forming a part of this application, in which like characters indicate like parts wherever they occur.

Figure 1 shows in front elevation a furnace  
20 or heater the door of which is equipped with my improved safety-valve. Fig. 2 is an enlarged sectional view of the door and safety-valve on the line 2 2 of Fig. 1. Fig. 3 is a front elevation of the spider that supports  
25 the safety-valve.

1 represents a door for the fire-box of a heater. This is provided with a perforated stationary plate 2, having a depression 3. In front of the plate 2 the door is bulged outward and formed with an open spider 4, arranged, as stated, in front of the plate 2 and at a slight distance therefrom. The central part of the spider 4 is formed with an apertured substantially horizontal hub or guide  
35 5. A spindle or slide 6 is mounted to move horizontally in the guide 5. A cover 7 is secured to the outer end of the spindle and formed with a flange 8, arranged to engage the front of the door outside of the spider 4.  
40 The spindle 6, as shown, is formed as a tube, and the cover 7 may be struck up from thin sheet metal.

My improved safety-valve serves not only to admit air to the top of the coal or wood or  
45 other material for combustion in the fire-box, but also to relieve pressure in the fire-box, due to explosion of gas or other causes.

In the use of the safety-valve as a damper to admit air to the fire-box the cover 7 and  
50 the spindle 6 may be drawn outward to any desired extent, the air passing to the fire through the spider 4 and the perforations in

the plate 2. In the event of any explosion of gas or any undue pressure occurring for any reason in the fire-box the cover 7 with  
55 the spindle 6 are forced outward, permitting the escape of the gas through the perforated plate 2 and the spider 4 and the relief of the pressure at a predetermined point and in a predetermined way, so that these results can  
60 be guarded against and controlled instead of, as heretofore, having explosions and undue pressure relieved at some weak spot in the house-piping or the furnace or heater, with all the attendant dangers, among which are  
65 escape of gas into the living-rooms, causing suffocation, and the setting fire to the wood-work by the burning gas. By having the undue pressure relieved at a predetermined point all these dangers are obviated. 70

It is evident that the spindle 6 might be stationary and the cover 7 slide thereon instead of, as shown, having the cover 7 rigidly fixed to the spindle. In case the spindle 6 is stationary the hub 3 of the plate 2 might be  
75 omitted if desired. From inspection of the drawings it will be further evident that the cover 7 is sensitive to and will respond at once to undue changes and degrees of pressure in the fire-box, being forced outward by  
80 the latter whether the cover occupies the position shown in Fig. 2 or its closed position or whether it be pulled out part way for the admission of air. In other words, whether in use for the exclusion or admission of air to  
85 the fire-box the valve is always in condition to respond to the action of undue pressure by being forced outward, as described. When pressure is relieved by my safety-valve, the normal operations of the heater continue, the  
90 unconsumed gases passing up the chimney until another explosion occurs or the gases accumulate in the fire-box to such an extent as to create pressure sufficient to operate the valve. 95

In heaters as constructed prior to my invention, there being no safety-valve or relief-valve, so to speak, besides the disadvantages heretofore discussed the increased pressure in this old form of heaters tended to cause a leak in  
100 the pipes, and this leak once started would continue even after the climax of the increased pressure or the explosion had occurred, so that in the old type of heater the liability of

leakage in the pipes was a continuing one, both before and after explosions, that in many cases are not of sufficient severity to attract attention, but which, nevertheless, are of more or less frequent occurrence.

The perforated plate shown in the drawings is by way of illustration only and may be omitted, if desired. When employed as shown, it serves to diffuse the air entering the fire-box by means of the tube 6 and prevents such air from entering the fire-box in the form of a jet having force. It also forms one wall of a chamber, of which the bulged front of the door forms the other wall, resulting in the air which enters through the tube 6 being partially heated before entering the fire-box. Other changes may be made without departing from the spirit and scope of my invention, which comprises a passage-way to the fire-box guarded by a safety-valve arranged to automatically open to relieve pressure in the fire-box at a predetermined point.

It will be seen that the openings in the plate 4 constitute a vent or outlet for the escape of gas from the fire-box and that the hub 5 constitutes a substantially horizontal guide which coöperates with the spindle or slide 6 in directing the movements of the valve 7 to its closed and its open positions. It will also be seen that the horizontal arrangement of the said guide enables it to coöperate with the slide 6 in holding the valve in either its closed position or its open position, so that the spindle and valve have no tendency to move in either direction by gravitation, but are caused by the bearing of the slide on the horizontal guide to remain in any position in which the valve may be left. It follows, therefore, that the valve when closed is free to be opened by gas-pressure within the fire-box and when so opened remains open until pushed inwardly by hand, so that after a valve-opening explosion air is permitted to enter through the said vent to facilitate the combustion of the gases generated in the fire-box and prevents a recurrence of the valve-opening pressure.

Having thus explained the nature of my invention and described a way of using and constructing the same, though without attempting to set forth all of the forms in which it may be made or all the modes of its use, what I claim, and desire to secure by Letters Patent, is—

1. A safety-valve for a heater, comprising a member having a plurality of openings or passages from the fire-box to the external atmosphere, and a cover for part of said openings, said cover being provided with an opening to normally admit air directly to the fire-box and being also free to be moved outward by excessive pressure within the fire-box.

2. A safety-valve for a heater, comprising a member having a plurality of openings or passages from the fire-box to the external atmosphere, a cover for part of said openings a support for said cover having a passage to normally admit air directly to the fire-box, said cover being permanently free to be moved outward by excessive pressure within the fire-box.

3. A safety-valve for a heater, comprising a fire-box door having a perforated portion, a permanently-open tube free to slide relatively to said perforated portion, and a cover attached to said tube and movable therewith and having a diameter to cover the perforations around the tube, said cover being permanently free to be moved outward to relieve excessive internal pressure in the fire-box.

4. A heater provided with a vent or outlet communicating with the fire-box, a substantially horizontal guide adjacent to said outlet, and a valve adapted to close said outlet and having a slide movable on said guide from the closed position to the open position of the valve, the guide supporting the valve in either of said positions.

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

WILLIAM S. WASHBURN.

Witnesses:

A. D. HARRISON,  
P. W. PEZZETTI.