J. V. ROBINSON.

FIRE GOVERNOR.

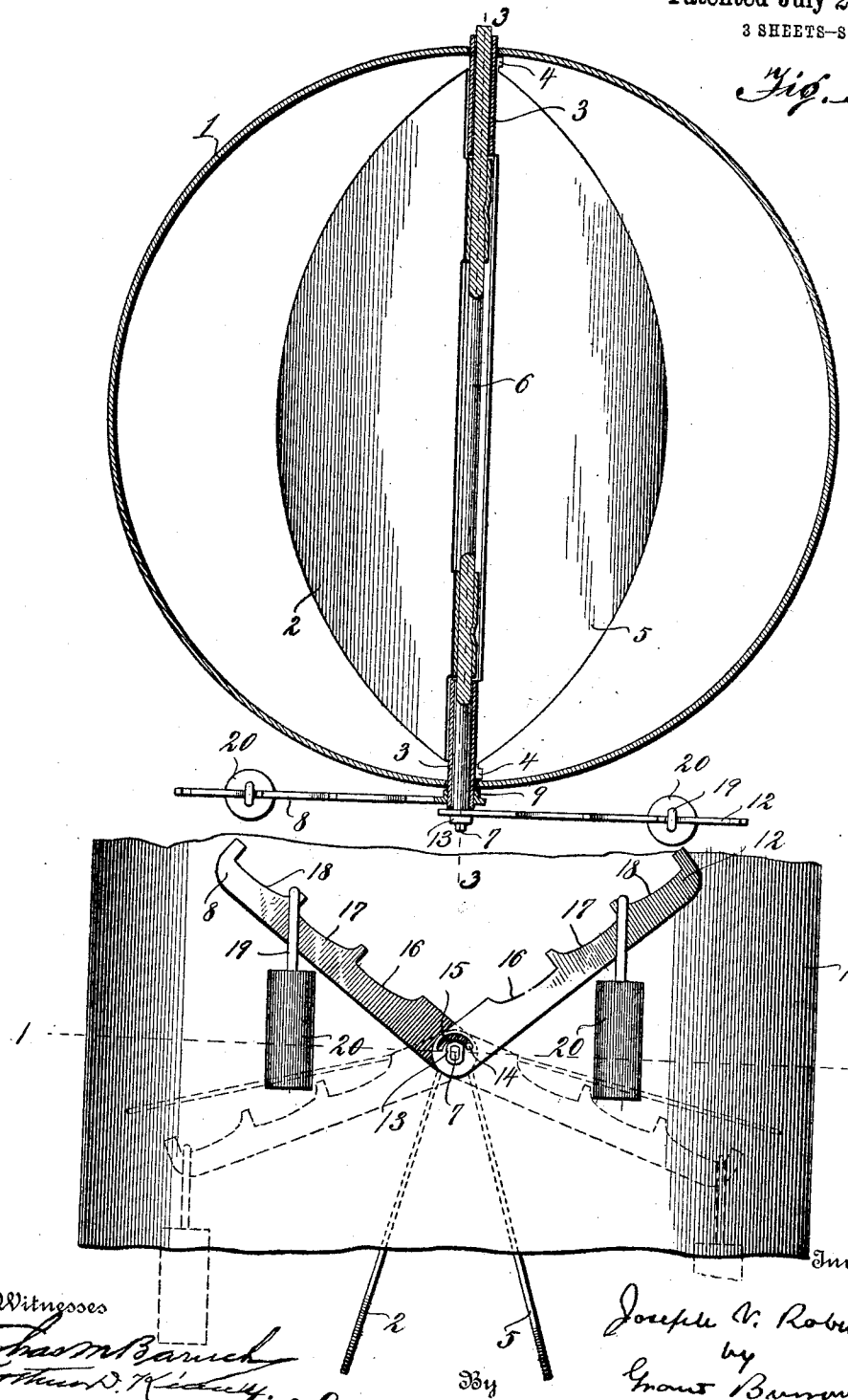
APPLICATION FILED FEB. 8, 1911. RENEWED DEC. 6, 1911.

1,105,208.

Patented July 28, 1914.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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Fig. 2

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3 SHEETS—SHEET 2.

Fig. 3.

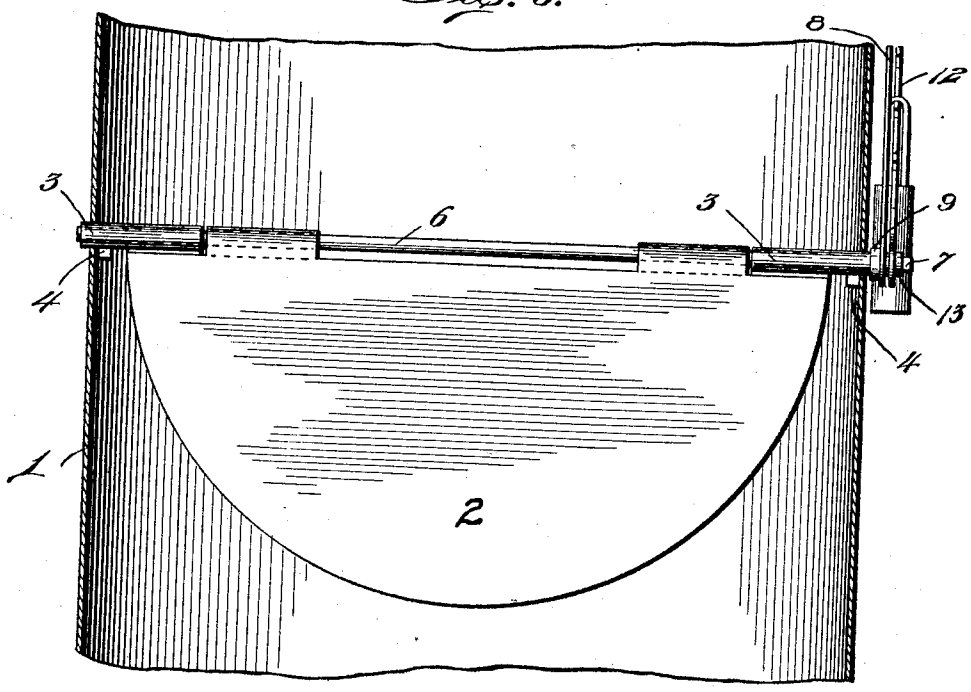


Fig. 8.

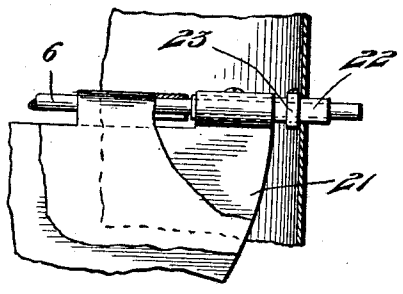


Fig. 4.

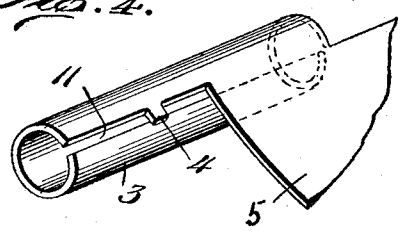


Fig. 5.

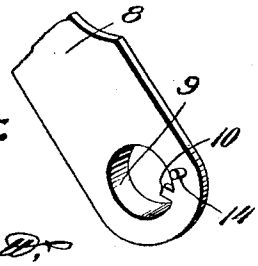
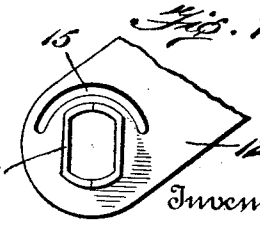


Fig. 6.

Fig. 7.



Witnesses

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3 SHEETS—SHEET 3.

Fig. 9

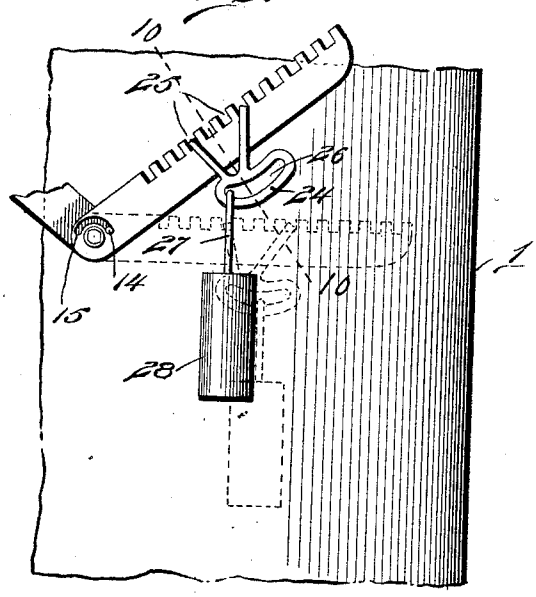


Fig. 10.

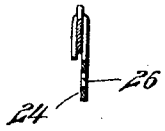


Fig. 11

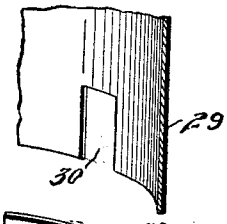


Fig. 12.

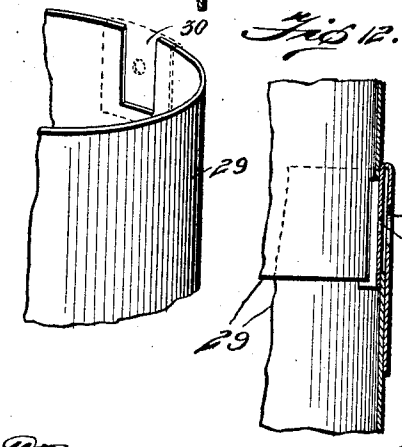
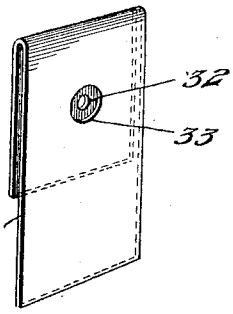


Fig. 13.



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UNITED STATES PATENT OFFICE.

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FIRE-GOVERNOR.

1,105,208. Specification of Letters Patent. Patented July 28, 1914.

Application filed February 8, 1911, Serial No. 607,409. Renewed December 6, 1911. Serial No. 664,279.

To all whom it may concern:

Be it known that I, JOSEPH V. ROBINSON, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Fire-Governors, of which the following is a specification.

My invention relates to an improved fire governor, and it consists in the constructions, combinations and arrangements herein described and claimed.

An object of my invention is to provide an improved fire governor constructed to maintain a condition of stable equilibrium throughout its entire range of movement, thereby minimizing the defective action caused by rapid oscillation, or fluttering, in previous devices of this character.

A further object of my invention is to provide a compact and durable fire governor adapted for efficient operation under all practical conditions, and capable of ready installation without the service of a mechanic.

In the accompanying drawings, forming a part of this application and in which similar reference numerals indicate corresponding parts in the several views; Figure 1 is a section on the line 1—1 of Fig. 2, showing the flue, pivot-bearings, and part of one arm in section; Fig. 2 is a fragmentary elevation of a furnace flue with my invention applied thereto; Fig. 3 is a section of the flue on the line 3—3 of Fig. 1; Fig. 4 is an enlarged detail perspective view, clearly showing the construction of the bearing sleeves; Fig. 5 is a detail perspective view of the spring ferrule for engaging said sleeve; Fig 6 is an end view of the pivot rod; Fig. 7 is a similar view of the arm and spring ferrule for engaging said rod; Fig. 8 is a fragmentary view, illustrating a slight modification; Fig. 9 is a fragmentary side elevation, illustrating a further modified construction; Fig. 10 is a section on the line 10—10 of Fig. 9; Fig. 11 is a fragmentary perspective view of two separated flue sections provided with slots for receiving a bearing plate; Fig. 12 is a section of two assembled flue sections with a bearing plate in position, and Fig. 13 is an enlarged perspective view of a bearing plate.

Referring to the drawings, 1 indicates any usual flue, or draft conduit, for conveying the hot products of combustion from a furnace or stove. A damper wing 5 is formed integral with, or secured to, a pair of sleeves 3, rotatably supported in bearing openings in said flue; said sleeves being advantageously constructed, in one form, to project through the openings commonly formed in the flue of a heating furnace for the usual damper pivot. I have shown said sleeves 3 formed integral with the blank of the damper wing 5, and provided with spacing ears 4 for preventing contact of said wing with the interior of the flue. A second damper wing 2 is rigidly secured to a pivot rod 6 which is rotatably mounted in the sleeves 3 and projects at 7 beyond one of said sleeves. An arm 8 is provided with a spring ferrule 9 adapted to be tightly forced over the projecting portion of the sleeve 3, and with a lug 10 for entering a slot 11 in said sleeve to insure proper positioning of said arm thereon. A corresponding arm 12 is provided with a similar spring ferrule 13 for engaging the projecting end of the pivot rod; said ferrule and rod being flattened, as shown in Figs. 6 and 7. The arms 8 and 12 are provided with an interengaging pin 14 and arc-shaped slot 15, for limiting the relative swing of said arms in both directions. The swing arms 8 and 12 are provided with any desired series of ways 16, 17 and 18 for receiving the bails, or other supports, 19 of weights 20 for counterbalancing the damper wings 2 and 5. As shown in the drawings, the bottom of each way gradually curves into the arm from the inner end of the way toward its outer end.

Referring especially to Figs. 1 and 2, it will be noted that the effective leverage of the centers of gravity of the damper wings 2 and 5 about their pivot points gradually increases throughout the entire upward swing of said wings from their lowermost position. During the early portion of such upward swing of the damper wings, the arms 8 and 12 swing downward to their horizontal positions with a corresponding increase in the effective leverage of the weight supports 19 thereon. Upon continued swing of the arms 8 and 12 below their horizontal position, the weight supports 19 gradually shift outward on the curved ways of said arms, radially relative to the pivotal points of the damper wings, thereby progressively increasing the effective leverage of the weights 20 to compen-

sate for the corresponding increase in the effective leverage of the weights of the damper wings; thereby tending to maintain a uniform counterbalancing of said damper wings throughout their entire swing. It is to be noted that the wings, within the limits of their relative movements, can operate independently of each other; consequently, should one of the wings become loaded with a greater deposit of soot on its upper surface than the other wing (for various reasons soot is apt to fall to one side of the pipe rather than to the other), the wing with the lighter load having a freer movement would compensate for the sluggish movement of the more heavily loaded wing. Owing to the gradual curvature of the bottom of the ways the weights will gradually and smoothly shift their sliding engagements with the arms so that there will be no sudden increase or decrease of the leverage of the weights on their respective damper wings. This movement of the weights in their ways comprehends an automatic shifting of the point of connection of each weight along its arm as the damper wing moves up or down.

Fig. 8 illustrates a slight modification, in which one of the damper wings 21 is rigidly secured to sleeves 22 provided with spacing collars 23, which are substituted for the integrally formed sleeves 3 previously described.

Figs. 9 and 10 illustrate a modified construction in which supports, or saddles, 24 are adjustably mounted in a series of notches 25 on the counterbalancing arms, and provided with properly curved ways 26 for receiving the bails 27 of the counter weights 28.

Figs. 11, 12 and 13 illustrate an advantageous means for attaching my improved damper in position. In this construction, the coöperating ends of flue sections 29 are provided with slots 30. Bearing plates 31 are bent to overlap one of the flue sections, and are provided with coaxial bearing openings 32 and 33 for receiving the bearing sleeves of the damper wing and the spring ferrule of the adjacent counterbalancing arm, and are constructed of light material so as to effectively conform to the curvature of the flue at the points where they rest.

I have illustrated preferred and satisfactory constructions, but changes could be made within the spirit and scope of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters-Patent is:

1. In a fire governor, the combination of a pivoted damper wing, and a counterbalance connected with said wing having its point of connection with the wing automatically shiftable radially relative to the pivotal point of the wing as the wing moves in either direction, substantially as described.

2. In a fire governor, the combination of a flue, a pivot rod, sleeves loosely mounted on said rod for engaging bearing openings in said flue, a pair of swinging damper wings secured, respectively, to said rod and sleeves, and automatically shifting means for uniformly counterbalancing said wings throughout their swing, substantially as described.

3. In a fire governor, the combination of a flue having bearing openings, a pivot rod, sleeves loosely mounted on said rod for projecting through bearings in a flue, a pair of swinging damper wings secured, respectively, to said rod and sleeves, a pair of arms provided with spring ferrules for engaging a projecting end of said rod and of the adjacent sleeves, and counterbalance weights carried by said arms, substantially as described.

4. In a fire governor, the combination of a flue having bearing openings, a pivot rod, sleeves loosely mounted on said rod for projecting through bearings in a flue, a pair of swinging damper wings secured, respectively, to said rod and sleeve, a pair of arms provided with spring ferrules for engaging a projecting end of said rod and of the adjacent sleeve, counterbalance weights carried by said arms, and means on said spring ferrules for properly positioning said arms relative to said rod and sleeve, substantially as described.

5. In a fire governor, the combination of a pivoted damper wing, an arm projecting from said wing beyond the pivotal point of the wing and provided with an elongated way, and a counterbalance having a sliding engagement with said elongated way operating to shift automatically its position along the way as the arm moves through its horizontal position, substantially as described.

6. In a fire governor, the combination of a pivoted damper wing, an arm projecting from said wing beyond the pivotal point of the wing and provided with a series of elongated ways, and a counterbalance adapted to have a sliding engagement with any one of said elongated ways and operating when engaged in a way to shift automatically its position along the engaged way as the arm moves through its horizontal position, substantially as described.

7. In a fire governor, the combination of a swinging damper wing, an arm secured thereto provided with an arched shaped slot for interengagement with a stop for positively limiting its swing in either direction, a series of ways in said arm, and an automatically shifting weight mounted in one of said ways for maintaining a condition of

stable equilibrium throughout the entire swing of said wing, substantially as described.

8. In a fire governor, the combination of a flue, a pair of swinging damper wings mounted therein, arms associated with said wings, and counterbalance means connected with said arms with the connections between the counterbalance means and the arms shiftable automatically along the arms during the operation of the damper wings to vary the effective leverage of the counterbalance means, substantially as described.

9. In a fire governor, the combination of a flue, swinging damper wings mounted therein, counterbalance arms connected to the respective wings for movement therewith and provided with elongated ways, and counterbalance members connected with said arms and shiftable automatically along the elongated ways whereby a uniform counterbalance of the damper wings is maintained, substantially as described.

10. In a fire governor, the combination of a flue, a swinging damper wing mounted therein, an arm carried by said wing having an elongated way provided with a curved bottom, and a counterbalance automatically shiftable along the curved bottom of the elongated way to give a gradual change in the leverage of the counterbalance, substantially as described.

11. In a fire governor, the combination of engaging flue sections having coincident slots in their engaging edges, a plate bent over the edge of one of the flue sections provided with a bearing opening registering with the coincident slots in the engaging edges of the flue sections, and a damper wing pivoted in the bearing opening of the plate.

12. In a fire governor, the combination of engaging flue sections having coincident slots in their engaging edges, a plate folded over the edge of one of the flue sections with its folds extending over opposite sides of the slot in such section and with the folds provided with coaxial bearing openings registering with the coincident slots in the flue sections, and a damper wing pivoted in the coaxial bearing openings of the plate.

13. In a fire governor, the combination of a flue section having a slot in its edge, a plate folded over the edge of the flue section with its folds flat against the inner and outer surfaces of the flue section and said plate provided with a bearing opening registering with the slot in said flue section, and a damper wing pivoted in the bearing opening in said plate.

14. In a fire governor, the combination of two flue sections engaging and overlapping at their ends with coincident slots in their overlapping walls, a plate removably mounted on the engaging ends of the flue sections extending over the coincident slots therein and provided with a bearing opening registering with the coincident slots, and a damper wing pivoted in the bearing opening of said plate.

15. In a fire governor, the combination of a flue section provided with a slot in its wall, a plate placed on the flue section over the slot therein having a bearing opening registering with said slot, means for holding said plate in place on the flue section, and a damper wing pivoted in the bearing opening of said plate.

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

JOSEPH V. ROBINSON.

Witnesses:
G. AYERS,
B. M. OFFUTT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."