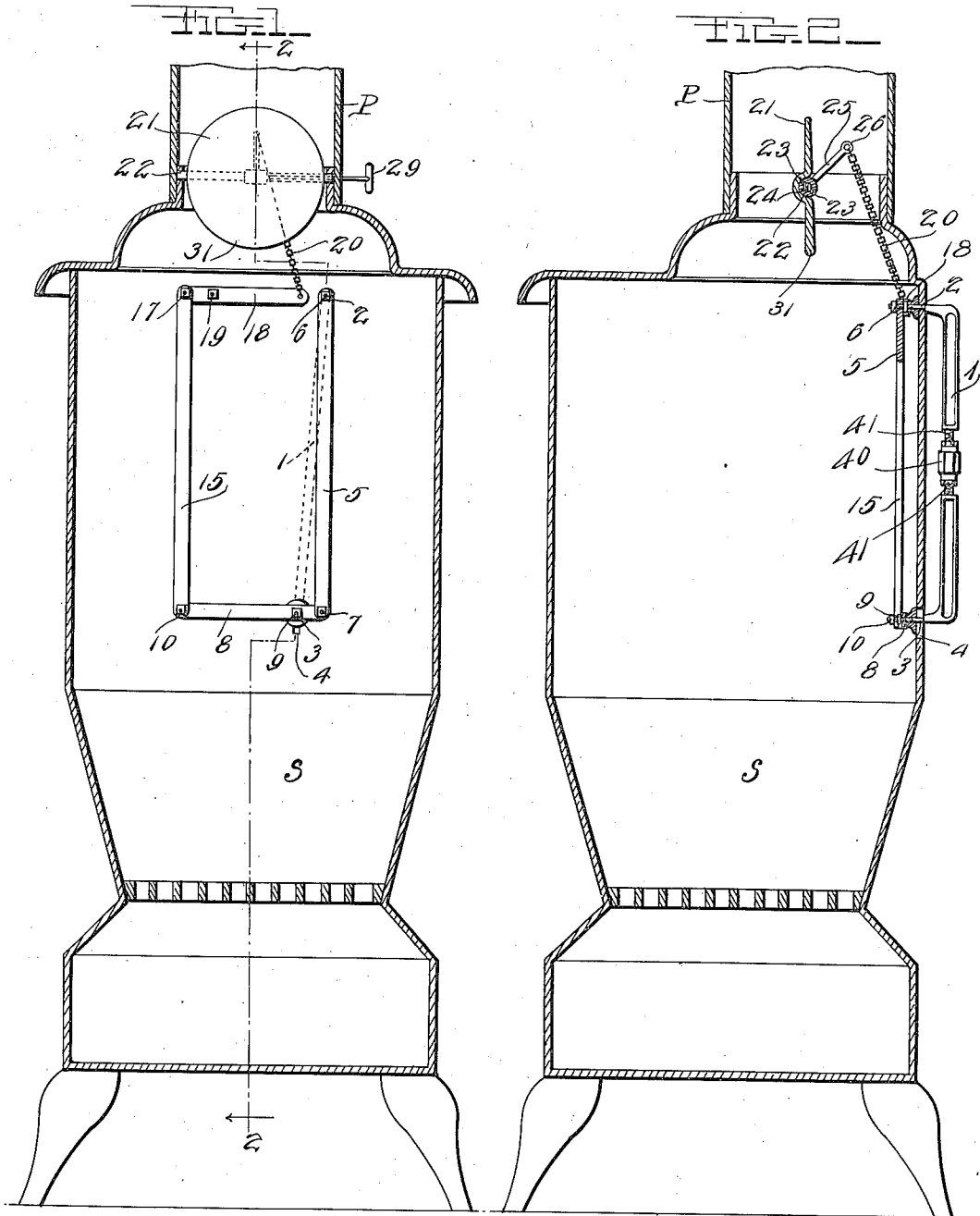


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 AUTOMATIC DAMPER REGULATOR.
 APPLICATION FILED JULY 3, 1911.

1,014,845.

Patented Jan. 16, 1912.

2 SHEETS—SHEET 1.



Witnesses
 P. P. Pierce

N. L. Collamer

Inventor
 E. A. Orr.

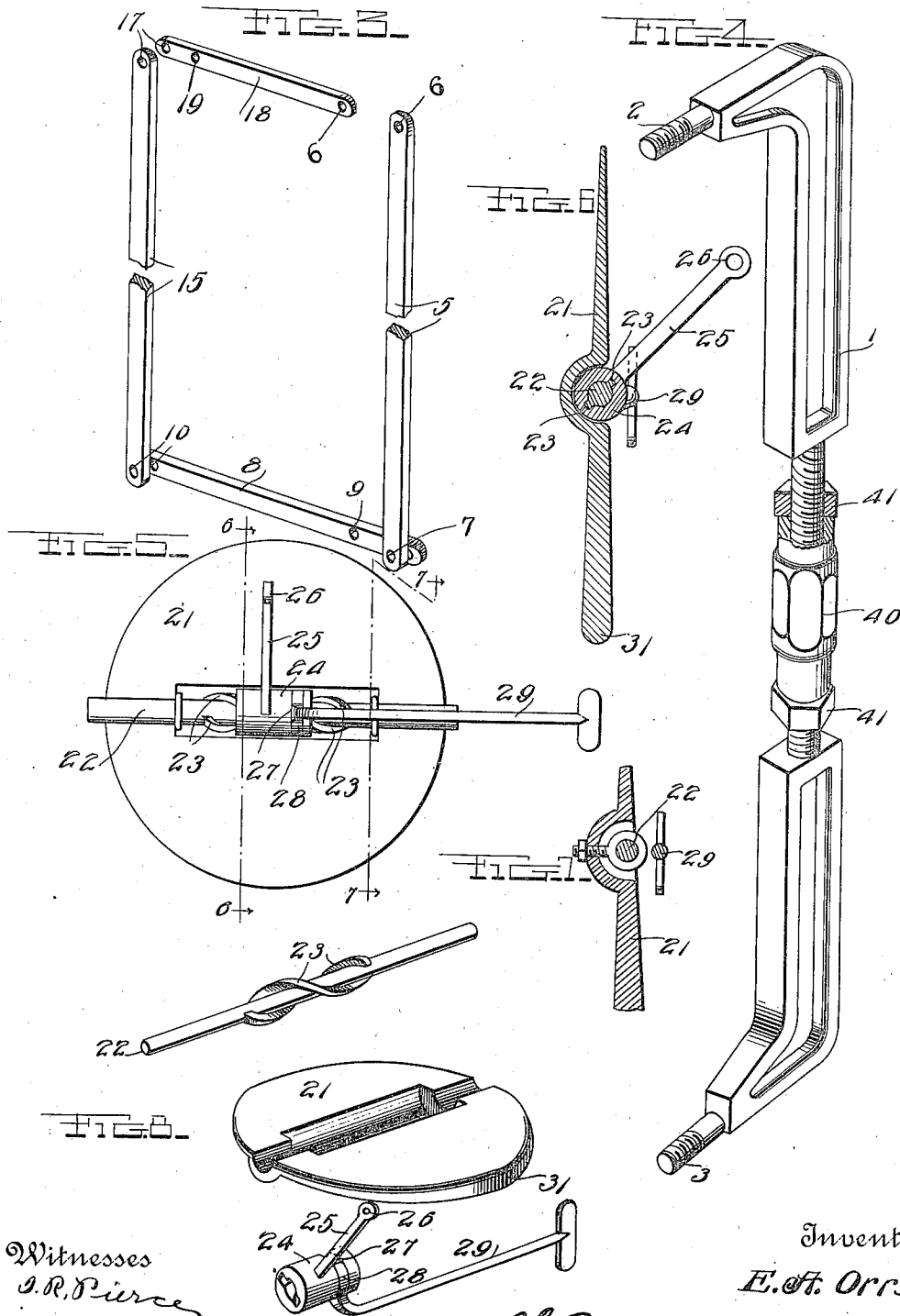
by *A. B. Wilson & Co.*
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UNITED STATES PATENT OFFICE.

ELBERT A. ORR, OF PUEBLO, COLORADO.

AUTOMATIC DAMPER-REGULATOR.

1,014,845.

Specification of Letters Patent.

Patented Jan. 16, 1912.

Application filed July 3, 1911. Serial No. 636,587.

To all whom it may concern:

Be it known that I, ELBERT A. ORR, a citizen of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Automatic Damper-Regulators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to automatic dampers, and more especially to those of that type which are operated by the expansion and contraction of metal under varying conditions of heat; and the objects of the same are to improve the construction and location of the inexpandible support, to provide means for adjusting its length and hence adjusting the action of the thermostatic elements upon the damper itself, and to provide means for adjusting the connection between the thermostatic elements and the damper shaft. These and other objects are carried out by the construction hereinafter more fully described and claimed, and as shown in the drawings wherein—

Figure 1 is a vertical transverse section of an ordinary stove and the movable portions of this device; Fig. 2 is a vertical section on the line 2—2 of Fig. 1; Fig. 3 is a perspective detail of the thermal bars and levers; Fig. 4 is an enlarged perspective detail of the inexpandible part and the turn buckle for adjusting its length from the exterior of the stove; Fig. 5 is an elevation of the damper and its shaft, and the adjusting mechanism therefor; Figs. 6 and 7 are sectional views on the lines 6—6 and 7—7 respectively of Fig. 5; Fig. 8 is a perspective detail of the several parts of the damper and its adjusting mechanism slightly separated from each other.

While this device is applicable to any form of heater, I have illustrated it in the present instance as applied to a stove S having a pipe P by means of which the products of combustion are led to the chimney, and it is to be understood that this may be a heating or cooking stove of any suitable type, the illustration in the present instance being only theoretical.

The numeral 1 designates a support herein called "inexpandible" because it is not intended that it shall expand and contract under heat, to which end it is preferably a

metal casting and it is disposed outside the stove body S with its upper end 2 bent and projecting inward through and secured within the stove body as shown, its own body 1 extending from this upper end 2 thence downward outside of and at some distance remote from the stove body, and preferably in the rear thereof, and its lower end 3 bent inward and passed through a slot 4 in the stove body to the interior thereof. This construction permits the body of the stove itself to expand or contract under varying conditions of heat, whereas the expansion and contraction of the support will be so trivial as to be almost nonexistent, it being my object to secure two practically fixed points which are at the extremities of this support, and on which the thermostatic members are supported.

Inside the stove, and disposed preferably near and below the outlet opening therefrom into the pipe P, a thermostatic or expandible bar 5 (preferably of copper or of some metal which has a high coefficient of expansion) is connected at its upper end at the point 6 to the upper arm 2 of the support 1. Its lower end is pivotally connected at the point 7 to a cross lever 8 whose fulcrum point 9 is pivotally connected with the lower arm 3 of the support 1, so that preferably the short arm of this lever is about one fifth the length of the long arm thereof. Thus it will be seen that the upper end of the thermal bar 5 is connected to one end of the fixed support, and the fulcrum of the cross lever 8 is connected to the other end thereof; and as the support is on the exterior of the stove and the thermal bar is on the interior thereof, the heat will expand the thermal bar and will have no effect upon the support. The remote end of the cross lever 8 is pivoted at 10 to a second upright thermal bar 15 also standing inside the stove; and the upper end of this bar is pivoted at the point 17 to a second cross lever 18 whose fulcrum 19 is in the wall of the stove and preferably again so located that the short arm of this lever will be about one fifth the length of its long arm. It follows that the motion imparted to the long arm of the lower cross lever 8 by the expansion of the thermal bar 5 is communicated to the second thermal bar 15 and added to the expansion of the latter, and the aggregate is communicated to the short arm of the upper cross lever 18, so that the

long arm of the latter will have a considerable degree of play. I might say that with the parts proportioned about as they would be on an ordinary stove, the long arm of this upper cross lever will move through an arc of about four inches length. It will be observed that the fulcrum 19 of the upper cross lever 18 is in the wall of the stove, whereas the fulcrum 9 of the lower cross lever is in the lower end of the support 1. I find this construction can be followed without impairing the usefulness of the device, because the upper end 2 of the support is secured to the stove on a line about level with the fulcrum point 19, whereas the lower end 3 of the support 1 passes through a slot in the wall of the stove as above described, and it might be said that the stove wall therefore expands downward from the point 6 where this device is initially attached thereto.

The long arm of the upper cross lever is connected by any suitable means, as by a chain 20, with a damper located within the pipe P. By preference this damper comprises a blade 21 mounted on a damper shaft 22 which is journaled within the pipe P in the ordinary manner, and said shaft has upon it at some suitable point a few threads 23 engaged by a nut 24 at one end of an arm 25 whose other or outer end has an eye 26 connected with said chain 20. The threads are so steep that tension on the chain will not turn the arm with reference to the shaft 22, but the nut by preference has an annular groove 27 loosely engaged by a fork 28 at the inner end of a handle 29 which extends outward through the pipe P and may be grasped by the operator. By moving this handle in one direction or the other the nut is caused to travel longitudinally upon the threads 23 and to turn slightly thereon, so that the arm 25 may be set at varying positions with respect to the shaft 22 to adjust the throw of the damper as controlled by the thermostat. Moreover I preferably make the lower edge of the blade 21 rather heavy as at 31, so that when the fire burns low and the thermostat slacks up on the chain 20, the gravity of the heavy lower edge 31 of the blade 21 will cause the damper to assume a substantially upright position within the pipe P, and the increased draft up the latter will permit the fire to burn up again.

Another form of adjustment which I may employ independently of the one just described or in connection therewith, consists in providing a turn buckle 40 inserted within the support 1 between the upper and lower arms thereof as best seen in Fig. 4, and this turn buckle may be of such construction that it requires the use of a wrench, after which it may be locked into position by jam nuts or by any other suitable means forming no

part of the present invention. However, as the support 1 will be on the exterior of the stove and therefore probably ornamented in conformity with the design of the stove itself, it may be well to ornament the turn buckle in accord with the general scheme adopted, and possibly make it of such size and shape that it can be manipulated by hand without the necessity for applying a tool. The same might be said of the exposed end of the handle 29 which leads through the stove pipe collar within which the shaft of the damper is pivoted. These details may, however, be left to the manufacturer who may also depart from the strict specification of parts so long as he retains the principle of my invention as set forth in the following claims.

What I therefore claim as new is:

1. In a damper regulator, the combination with the stove having an upright slot in its wall, the damper, the thermal elements, a lever between two of the latter, and connections between said elements and damper; of an inexpansive support whose body is located outside the stove, its upper end passing through and connected with the wall of the stove, and with one extremity of one of said thermal elements, and its lower extremity passing through said slot and connected with the fulcrum of said lever.

2. The combination with a stove having an upright slot in its rear wall, a stove pipe opening out of the stove, and a damper therein; of an inexpansive support whose body stands outside the stove wall with its upper end bent inward and secured thereto and its lower end bent inward and passing loosely through said slot, a thermal bar within the stove body connected at its upper end with the upper end of said support, a lever fulcrumed between its extremities to the lower end of said support with its short arm connected with the lower end of said thermal bar, and connections between its long arm and said damper.

3. The combination with a stove having an outlet, and a damper therein; of an inexpansive support secured at one end to the stove wall, a turn buckle within the length of said support exterior of the stove body, a lever fulcrumed to the other end of the support, connections between one arm of the lever and said damper, and a thermal bar connected at one end to the upper end of said support and pivoted at its lower end to the other arm of said lever, for the purpose set forth.

4. The combination with a stove having an outlet, and a damper therein; of the thermal elements, connections between one of them and said damper, an inexpansive member composed of two upright arms having their outer extremities intumed and a turn buckle connecting their inner extrem-

ities, the stove having through its wall a
hole and an upright slot and one of said
extremities projecting through the hole and
the other through the slot, and connections
5 between said extremities and the thermal
elements, as and for the purpose set forth.
In testimony whereof I have hereunto

set my hand in presence of two subscribing
witnesses.

ELBERT A. ORR.

Witnesses:

JAMES L. BUCHANAN,
EDW. F. RIZER.