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C. A. CROOKER

2,252,425

DRAFT CONTROL DEVICE

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Fig. 1.

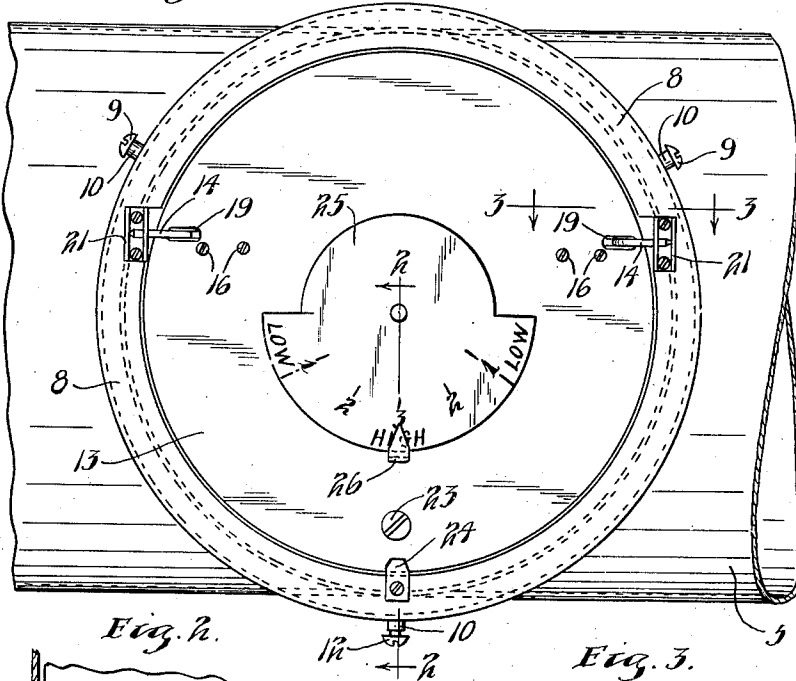


Fig. 2.

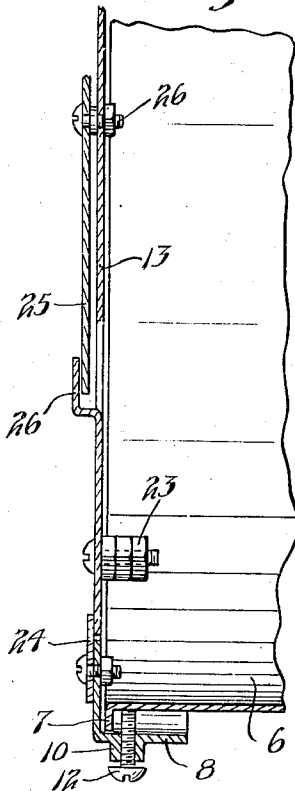


Fig. 3.

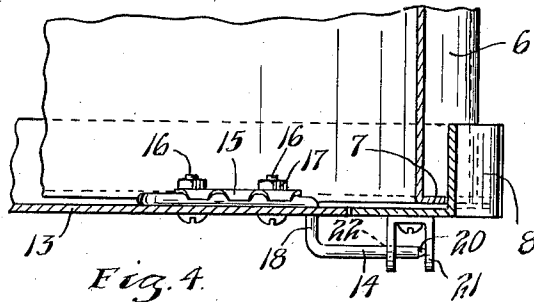
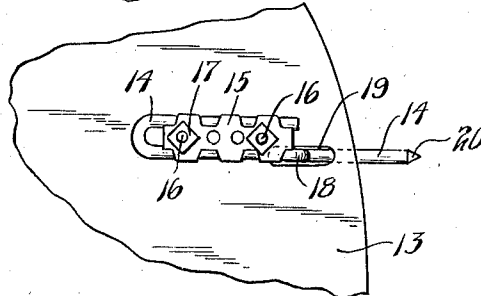


Fig. 4.



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## UNITED STATES PATENT OFFICE

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## DRAFT CONTROL DEVICE

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4 Claims. (Cl. 236—45)

This invention relates to devices for controlling drafts in connection with stoves and furnaces of various types.

One of the objects of the invention is to provide a draft control device which may be quickly and easily attached to a flue or similar pipe in connection with a furnace and the like to automatically regulate the amount of draft and, thereby, control the burning of the fire.

Another object is to provide a draft control device capable of highly efficient functioning and at the same time being extremely easy to adjust to various control positions.

Still another object of the invention is to provide an improved bearing construction for the pivotally mounted air regulating valve.

A further object of the invention is to provide a readily readable, simply constructed and easily operatable indicating mechanism for determining various positions to which the device may be set.

These and other objects of my invention will more fully appear from the following description, made in connection with the accompanying drawing, wherein like reference characters refer to the same or similar parts throughout the various views, and, in which:

Fig. 1 is a front elevation of my improved device attached to a stove pipe;

Fig. 2 is a sectional view taken approximately on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged section taken on the line 3—3 of Fig. 1; and

Fig. 4 is an enlarged fragmentary section of the rear side of the valve element with one of its pivot pins.

In the particular embodiment of my invention illustrated in the drawing there is shown a portion of a smoke pipe 5. Extending outwardly from the pipe and connected thereto is a short pipe section 6, which may be provided with an outwardly flared end 7. The short pipe section 6 may be secured to the smoke pipe 5 in any desirable manner, and this short pipe section may or may not be provided as a part of the draft control unit when sold. Fitting around the flared end of the short pipe section 6 is a collar-like element 8. This collar has provided preferably at two spaced points a pair of bolts 9, which are threadedly mounted in the circumferential face of the collar and which are provided with washer elements 10 so that when the bolts 9 are threaded inwardly, they will be stopped before they contact the surface of the short pipe section 6, but will lie behind the flange

7 at the end of said pipe section. A lower bolt 12 is also threadedly mounted in a circumferential wall of the collar 8, but it is preferably of such length that it can be screwed up until it contacts the short pipe section 6, thus locking the collar against rotation relative to the pipe.

As shown in the drawing, the collar element 8 is open throughout its central portion and within the open central portion is mounted a disk-like valve element 13 which is of such size that it will not contact the forward flange of the collar when the valve is fitted therein. The valve is provided with a pair of pivot pins 14 on a line above the center of the valve as best shown in Fig. 1. Each of the pivot pins comprises a substantially U-shaped inner end which is adapted to be clamped beneath a clip 15, the latter being secured by bolts 16 extending rearwardly through the valve element and having nuts 17 on their inner ends. The pivot pins are bent outwardly at 18 and extend through slots 19 in the face of the valve 13 and are then bent laterally of the valve to extend beyond the edges thereof. The extreme outer ends of the pivot pins are provided with relatively sharp ends 20.

Mounted on the forward flange of the collar 8 adjacent the position of the pivot pins 14 are bearing elements comprising relatively U-shaped pieces of metal having smooth flat outer walls 21 and inner walls provided with substantially tapered openings 22. The pivot pins 14 are adapted to be positioned in the openings 22 with the pointed ends of the pins either contacting the flat outer bearing faces 21 or in very close proximity thereto. The above described arrangement of valve pivot pins and bearings provides a pivotal mounting for said valve, and because the pins are off-center with respect to the true center of the valve, the latter will always have a tendency to swing to its closed position with respect to the opening defined by the collar 8. A counterweight 23 of any desired style may be provided to supplement the weight of the lower part of the valve 13 below the line of the pivot pins. Parts of the front flange of the collar 8 are cut out adjacent the bearings which support the pivot pins as shown in Figure 1 so that the lower part of the valve can swing inwardly and outwardly without bearing against said flange.

A stop element 24 is suitably secured at the lower part of the collar and, as shown, extends inwardly radially to intercept the valve as it swings downwardly to prevent the lower portion

of said valve from swinging past the flange of the collar 8 in an outward direction. The stop 24 is preferably made of a type of metal which is normally strong enough to prevent the above mentioned swinging of said valve, but which, on the other hand, is weak enough to bend and permit said outward swinging under unusual conditions such as in the event of an explosion within the stove and smoke pipe. Explosions within a heating unit are, of course, not of very frequent occurrence, but in the event of any such accident the outward swinging of the valve results in a quick lessening of pressure within the stove and smoke pipe, and thus prevents more serious damage to the heating plant. Mounted centrally of the valve 13 is an indicator plate 25 which may be swung pivotally from a bolt 26 secured in the center of the valve. As shown in the drawing the indicator plate has a greater radius in its lower half than in its upper half. Therefore, said indicator will always remain in the same position relative to the floor regardless of the angle to which the collar 8 and valve 13 are turned relative to the short pipe section 6. The lower half of the indicator plate 25 preferably bears notations similar to those indicated in the drawing so that the operator of the draft control device can determine various positions to which the control device may be turned. A pointed 26 is preferably struck from the material forming the valve 13 and co-operates with the indicator plate 25.

When the device is in a position shown in Fig. 1 of the drawing, the pivot pins 14 lie on a horizontal line. In this position the valve is arranged to exert a maximum resistance against any air tending to flow inwardly past the valve. However, if the collar 8 and the valve which is carried thereby are rotated, for example a distance of 45 degrees either to the right or to the left, said rotation will tend to offset the unbalanced weight of the valve and make it easier for higher pressured air exteriorly of the valve to push said valve open and create a flow of air through the short pipe section 6 and into the flue or smoke pipe 5, thus reducing the pull of the draft through the fire pot of the stove or furnace. Of course, the collar can be set at any number of different angles to provide a fine adjustment of the draft control device, and, if desired, the lower bolt 12 mounted in the collar 8 may be turned inwardly so that the collar can be locked in position relative to the short pipe section 6.

It should be borne in mind that with the pivot pin and bearing arrangement shown and described, I have provided a bearing which works outside of the pipe section 6 and is, therefore, unaffected by smoke and gases within said pipe which would either cause a carbon deposit upon the bearing or produce oxidation and improper pivotal action. When the device is set at an angular position the pointed end of the lower pivot pin will bear most of the weight of the valve during swinging movement thereof, and the tapered openings 22 permit only slight contact between the shank of the pivot pin and the apertured portion of the U-shaped bearing. Furthermore, since the tapered opening 22 and the flat bearing face 21 are spaced a slight distance from each other, there is no opportunity for dust and dirt to collect around the point of the pin since there is no sort of pocket into which dirt or soot can settle. The U-shaped inner ends of the pivot pins are anchored on the inner side of the valve so that the outer face of said valve will

present a neat and uncluttered appearance, and in the event of wear of the points of the pivot pins, they can be easily adjusted to compensate for the wear by moving said U-shaped ends relative to their clamping plates 15.

In view of the foregoing, it will be seen that I have provided a highly efficient type of draft control device which is unaffected by the carbon and gases within the smoke pipe and which can be adjusted to a relatively unlimited number of positions and still retain its features of accurate operation and comparatively frictionless pivotal movement.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportion of the various parts without departing from the scope of the present invention.

What is claimed is:

1. In a draft regulator for furnace flues and the like, a section of stove pipe having an outwardly flared end, a ring adapted to fit around said flared end, ring retaining elements secured to said ring and extending behind said flared end in spaced relation to said pipe to permit rotation of said ring relative to the pipe, a disk like valve element within said ring and spaced therefrom, oppositely disposed pivot pins extending through said valve element from the rear face thereof and laterally from the front face thereof in off-center relation thereto, means mounted on the rear face of said valve for adjustably retaining said pivot pins, and bearings on the outer face of said ring for pivotally supporting said pivot pins and valve.

2. In a draft regulator for furnace flues and the like, a section of stove pipe having an outwardly flared end, a ring adapted to fit around said flared end, ring retaining elements secured to said ring and extending behind said flared end in spaced relation to said pipe to permit rotation of said ring relative to the pipe, a disk like valve element within said ring and spaced therefrom, oppositely disposed pivot pins extending through said valve element from the rear face thereof and laterally from the front face thereof in off-center relation thereto, means mounted on the rear face of said valve for adjustably retaining said pivot pins, and bearings on the outer face of said ring for pivotally supporting said pivot pins and valve, a gravity responsive indicator dial pivotally mounted centrally of said valve, and a dial position indicator movable with said valve upon rotation of the valve and said ring.

3. In a draft regulator for furnace flues and the like, a pivotally mounted and axially rotatable valve element, the pivotal mounting for said valve including substantially horizontal longitudinally adjustable pins extending from the edges of the valve flat substantially vertically positioned and relatively flat bearing elements against which the pins are adapted to bear, in free pivotal relationship, co-operating bearing elements surrounding said pins and in open spaced relationship to said flat bearing elements, said co-operating bearing elements having pin receiving openings to receive said pivot pins, said openings being tapered to reduce the friction producing contact surfaces between the material defining said openings and said pins, and said pins having reduced end portions to lessen the friction between said ends and said flat bearing surfaces.

4. In a draft regulator for furnace flues and the like, a pivotally mounted and axially rotatable valve element, the pivotal mounting for said

valve including pins extending substantially horizontally from the edges of the valve, substantially vertical flat bearing elements against which the said pins are adapted to bear in free pivotal relationship, cooperating bearing elements having pin receiving openings and sur-

rounding said pins and in open spaced relationship to said flat bearing elements, and said openings being tapered to reduce the friction producing contact surfaces between the material defining said openings and said pins.

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