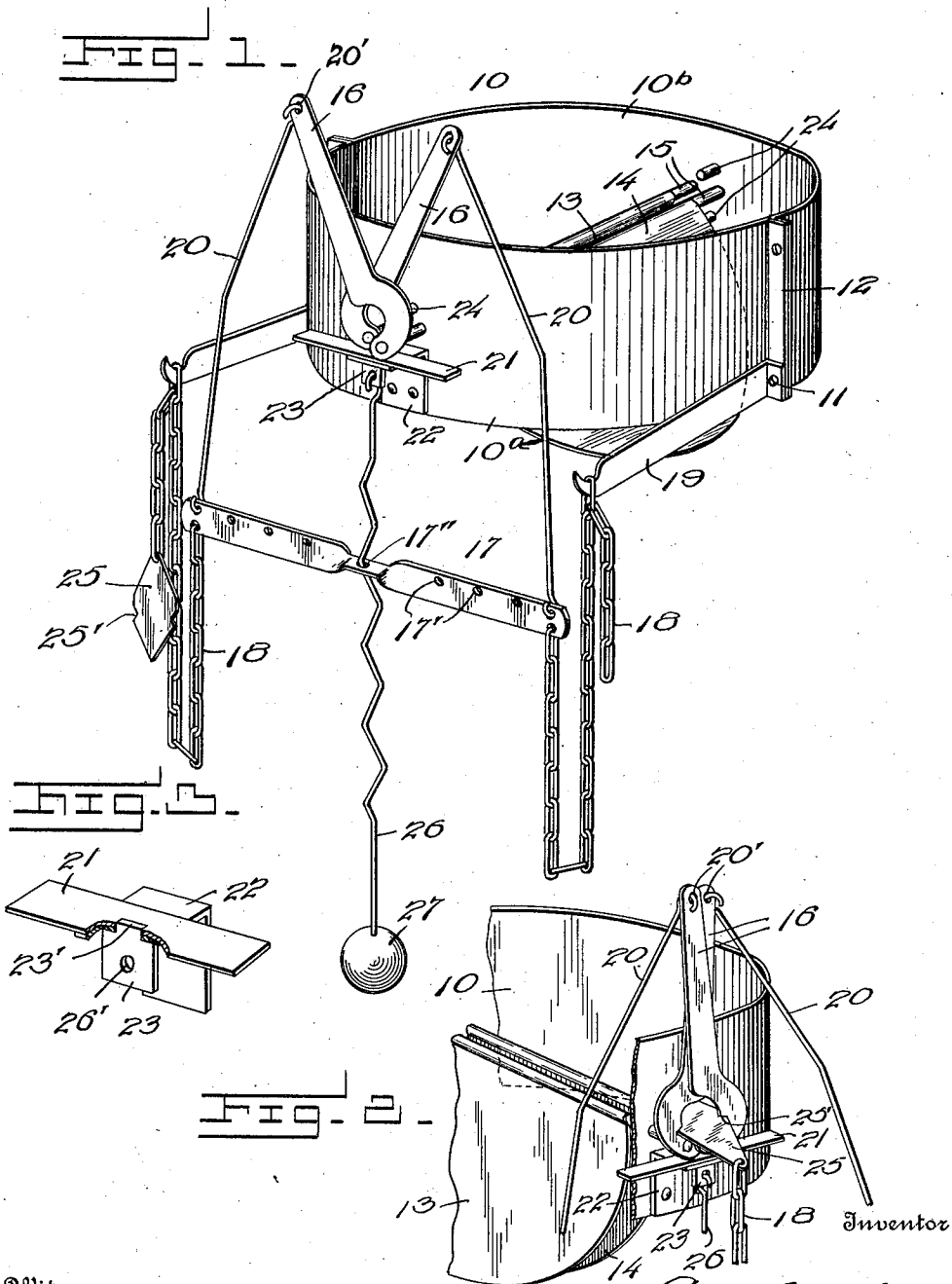


A. W. ARNOLD.
 AUTOMATIC FURNACE DAMPER.
 APPLICATION FILED NOV. 14, 1911.

1,079,824.

Patented Nov. 25, 1913.



Witnesses
A. H. Armstrong
J. E. Arnold

Inventor
A. W. Arnold
 By *Geo. L. Beeler* Attorney

UNITED STATES PATENT OFFICE.

ARTHUR W. ARNOLD, OF NEW YORK, N. Y.

AUTOMATIC FURNACE-DAMPER.

1,079,824.

Specification of Letters Patent.

Patented Nov. 25, 1913.

Application filed November 14, 1911. Serial No. 660,234.

To all whom it may concern:

Be it known that I, ARTHUR W. ARNOLD, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented a new and useful Automatic Furnace-Damper, of which the following is a specification.

This invention relates to that type of dampers or draft governors which are designed to operate automatically under the influence of the draft itself to maintain a substantially uniform combustion of fuel, in accordance with the conditions for which the devices may be adjusted.

Among the objects of this invention are to provide a device of the character set forth possessing novel and efficient counterpoise mechanism, peculiar means to retard or control the speed of the damper wings, and a simple and convenient form of means to temporarily lock the damper open.

The foregoing and other objects are attained in a satisfactory manner through the means hereinbelow fully described and claimed, and illustrated in the accompanying drawings, though it is to be understood that such illustrations are but suggestive of one of the many forms which the invention may be made to assume without departing from the spirit of the appended claims.

In the drawings, Figure 1 is a perspective view of a damper made in accordance with this invention, the several parts being in operative position, set for operation by a light draft; Fig. 2 is a fragmentary perspective view indicating the application of the aforesaid locking means, and Fig. 3 is a detail described below.

Throughout the following description and on the several figures of the drawings similar parts are referred to by like reference characters.

In the embodiment of the invention disclosed 10 indicates a sleeve or collar which may comprise a plurality of sections 10^a and 10^b fastened together by screws or bolts 11 passed through oppositely disposed flanges 12. By means of said fastening means the collar sections may be separated more or less in applying the collar to the pipe or flue (not shown) in which the damper is being fixed and then snugly clamped in place, even though there may be a variation in the di-

ameters of different pipes supposedly of the same size.

The wings 13 and 14 are secured to and rotate with a pair of pivot rods 15 journaled in opposite portions of the collar and are normally pendent from said rods when the damper is open. The levers 16 are secured to the rods 15 opposite the wings and together with the counterbalance mechanism control the position or pivotal movement of the wings. Said counterbalance comprises a cross-bar 17 to which one or more flexible weights, such as chains 18, are attached. Each chain is shown attached at one end to said cross bar, another portion thereof being suitably supported at any convenient point from which the chain or chains may be manipulated. The illustration shows for this purpose a hook or support 19 for each chain, but it is apparent that under certain conditions a single support otherwise located, as for instance at an upper floor, might be employed for either or both chains. Each chain hangs in a loop, that portion thereof between the bottom of the loop and point of attachment on the cross bar determining the effective heft of the chain, and which heft is variable inversely in accordance with the height of adjustment of the hooked or supported end of the chain. As the damper wings swing toward their closed position the cross bar descends, causing some of the counterbalance links to be added successively to the fixed supporting means. The effective heft or influence therefore of the counterbalance gradually becomes less as the damper wings approach the position when the maximum area thereof is brought into the path of the draft. When the chain is supported so as to form a loop of maximum length the effective heft thereof is the greatest, whereby the damper will be operated toward its closed position under the influence of the lightest draft. The shorter the loop, or connection between the cross bar and the support the heavier will be the fire that will cause its draft to close the damper. A pair of links or hangers 20 are pivotally connected at 20' to the levers and are adjustably connected along a series of holes 17' to the cross bar. When the hangers are connected to the cross bar at points distant from its center the pull of the counterweight

upon the levers is applied in a direction approximately tangential thereto, but when the hangers are set in holes 17' nearer the center of the bar the initial pull of the weight is applied in a direction approxi-

5 mating the radius, requiring a heavier fire to start the damper wings toward the closed position, though after such start and the levers swing downward the pull becomes

10 more effective due to its application in a direction approaching the tangential or at right angles to the levers.

The upward swing of the damper wings and hence the proportion of the flue area that will be closed thereby may be deter-

15 mined by a bumper plate 21 against which the levers will impinge. The ends of the bumper plate may be bent upward more or less so as to determine once for all the neces-

20 sary downward swing of the levers in accordance with the draft conditions or other requirements of each damper being installed. The bumper plate is shown as

25 being rigidly secured upon an angle bracket 22 by means of a lug 23, the bracket being connected permanently to the collar 10. As shown in Fig. 3 the lug has an ob-

30 long shank 23' which is passed through the bracket and plate and then upset, the form of the shank preventing the plate from swinging about in a horizontal plane.

Studs 24 secured to the collar and projecting inwardly therefrom above and below the pivot rods prevent any possibility of the

35 flue sections engaging said rods and interfering with free action of the wings.

Should it be desirable to temporarily positively lock the wings open, as for instance in starting a fire, this may be accom-

40 plished in a simple and effective manner by means of the key 25 which may be introduced between the levers transversely of the parallel planes in which they move, as

45 shown in Fig. 2, the notches 25' of the key interlocking with the opposed inner edges of the levers. The form of the key is such that it will stay in the place illustrated, but may readily be thrust in or pulled out with

50 the fingers for the purpose stated. The key may conveniently be connected to one of the chains to prevent its loss when not in use.

The retarding means alluded to above comprises a sinuous or corrugated rod 26 detachably suspended from a fixed point, as

55 for instance the lug 23 at 26' and extending loosely downward through a vertical hole or eye 17'' in the cross bar. While the rod offers no obstruction to the cross bar in its ordinary movements, it is impossible for

60 said bar to pass along the bends in the rod 26 sufficiently rapidly to permit the wings to thump or pound in either direction of their movement. Any means, such as a

65 weight 27, carried by the lower end of the rod 26 which will resist its vibration due to

the movement of the cross bar along the situations, will serve to still further reduce the speed of the wings.

I claim:

1. In an automatic damper, the combination of a pair of normally pendent pivoted wings, oppositely arranged levers connected to said wings, a cross bar connected to said levers, and flexible weight means of variable effective heft connected to and suspended from both ends of said cross bar.

70 75

2. In an automatic damper, the combination of a normally pendent wing and counterweight mechanism therefor comprising a flexible weight whose one end is connected to the wing and a support for the other end thereof whereby the intermediate portion of the weight is formed into a depending loop of variable length and effective heft, substantially as set forth.

80 85

3. In an automatic damper, the combination of a pair of wings adapted to be moved by the force of the draft and means to control the speed of such movement, said controlling means including a member connected to said wings and having a vertical eye, and a sinuous rod extending through said eye, substantially as set forth.

90 95

4. The combination with the movable portion of an automatic damper, of retarding means therefor comprising a vertically movable member connected to said portion and having an eye, and a sinuous rod fixed from vertical movement and extending through said member eye, substantially as set forth.

100

5. The combination with the movable portion of an automatic damper, of retarding means therefor comprising a vertically movable member connected to said portion and having an eye, a sinuous rod extending through said eye and vibratable laterally, and means to resist such vibration, substantially as set forth.

105

6. In an automatic damper, the combination of a pair of movable wings, a cross bar connected to said wings and movable simultaneously therewith, counterweight means connected to said cross bar, and retarding means for the wings and cross bar comprising a bent rod extending through the cross bar.

110 115

7. In an automatic damper, the combination of a collar, a pair of wings pivoted in the collar, a pair of levers connected to said wings, and bumper means to limit the movement of said levers, said bumper means comprising a plate, a bracket connected to the collar, and a lug having an oblong shank securing the plate to the bracket, substantially as shown and described.

120 125

8. In an automatic damper, the combination of a pair of pendent pivoted wings, a pair of levers secured to said wings and movable in parallel planes, and means to temporarily positively lock said levers and

130

wings from movement, said locking means comprising a key introduced between the levers transversely of said planes, substantially as set forth.

5 9. In a draft operated damper, the combination of a damper member mounted to swing, a flexible counterbalance therefor and a support adapted to receive portions of the counterbalance successively as the damper
10 swings from open to closed positions, whereby the effective influence of the counterbal-

ance upon the damper member is varied inversely to the effective force of the draft upon said member throughout the swing thereof.

In witness whereof I have hereunto affixed my signature in the presence of two witnesses.

ARTHUR W. ARNOLD.

Witnesses:

G. L. BEELER,
F. E. ARNOLD.

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