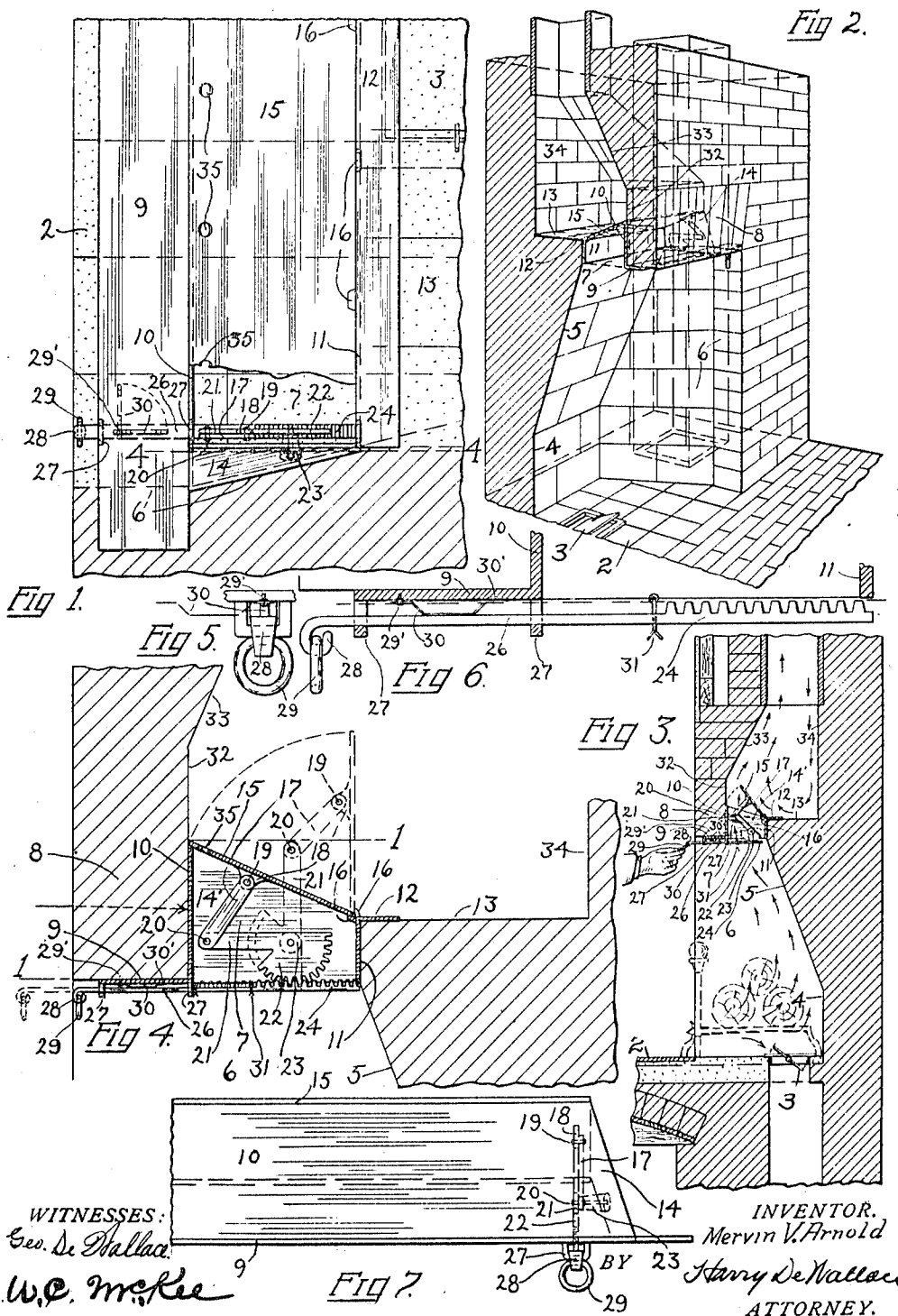


M. V. ARNOLD.
FIREPLACE.
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UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MERVIN V. ARNOLD, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Fireplaces, of which the following is a specification.

This invention relates to improvements in fire-places, and has for its object to provide a novel and simple construction and arrangement of the throat of a fire-place, to the end that a greater amount of heat may be produced and supplied to a room, by the burning of less fuel, than by any other fire-place known to me.

A further object is to provide effective means for preventing the smoking of the fire-place, particularly when a fire is started in a damp chimney.

A further and particular object is to provide a novel and simple damper for controlling and regulating the draft in the throat of the chimney and for conserving the heat. And a further object is to provide novel and simple mechanism for operating the damper and other movable parts.

The various features and parts of the invention will be understood from the detail description which follows, and by reference to the accompanying drawing, which forms a part of the specification, and in which—

Figure 1 is a horizontal section taken on line 1—1 of Fig. 4; showing the damper closed; also showing the operating mechanism located at one end of the throat. Fig. 2 is a perspective view of a fire-place having my improvement applied. Fig. 3 is a central vertical section; showing the damper in operation; also showing the course of the hot and cold air currents. Fig. 4 is an enlarged vertical section taken on line 4—4 of Fig. 1. Figs. 5 and 6 are respectively a front and side view of the rack-bar employed for rocking the damper. Fig. 7 is a front view of the angle-iron which supports the arch.

Similar characters of reference are assigned to corresponding parts throughout the several views.

In the drawing, 2 represents the floor or bottom of the fire-place which is preferably provided with an ash-damper 3.

4 represents the back wall of the fire-place, the upper portion 5 of which preferably inclines upwardly from a point near the bottom 2, to a point near its upper end for

the purpose of deflecting, or compelling the heat from the fire to pass out into the room, and 6 represents the opposite sides or reveals which are splayed or sloped correspondingly, for the same purpose as the back.

7 is the throat of the fire-place, which is formed in the first place by the masonry comprising the upper edges of the back 5 and the reveals 6, and also by the lower rear side of the arch 8. The throat 7 when finished is faced or lined on all sides by series of angular irons and other parts which comprise the throat frame. The front angle-iron consists of a horizontal leaf or portion 9, the opposite ends of which are embedded in the jams or reveals 6, and this part supports the arch bricks or the masonry 8. The vertical leaf or portion 10 of the said iron lies against and protects the rear side of the arch 8. The rear angle-iron comprises a vertical portion 11 which lies against the front face of the inclined back 5, while the horizontal leaf 12 of the said iron lies upon a comparatively broad shelf or ledge 13 which extends rearwardly from the throat into the chimney. The opposite ends of the throat are lined with end plates 14 and 14'. These end plates may be separate parts, or they may be formed with either the front or back angle-irons.

The damper employed for closing the throat, as well as, for regulating and controlling the draft from the fire-place to the chimney, consists of a substantially flat iron or steel plate 15, which is preferably rectangular in form, and has a greater breadth than the opening of the throat 7. When closed the damper 15 is disposed on an incline, as best seen in Figs. 2, 3 and 4, and when in this position its front edge and its ends rest upon the upper edges of the irons 10, 14 and 14'. The rear edge of the damper is pivotally supported between parallel lugs 16 which are preferably formed integrally with the rear angle-iron and face the throat. By this arrangement the damper is held in position by gravity without any other securing means, and may be readily and quickly applied or removed.

The operating mechanism for the damper will now be described.

17 represents a link or lever which is pivoted at one end to lugs 18 carried by the under side of the damper 15, by a pin or

bolt 19. The opposite end of the link is pivoted by a pin 20, to an arm 21 carried by a segment-gear 22, which is pivotally supported and journaled on a stud 23, which is carried by the end iron 14. The gear 22 is rotated by a rack 24, which is disposed directly beneath the gear and is mounted upon, or may form a part of, a bar or rod 26 which extends forwardly to the front side of the fire-place. The forward portion of the bar 26 is preferably flat, and passes through a number of open lugs 27, which depend from the underside of the soffit iron 9. The extreme outer end of the bar 26 is formed into a loop 28 to which is attached a ring 29, which may be grasped by the hand for reciprocating the bar, as indicated by the full and dotted lines in Figs. 3 and 4.

30 represents a spring which is disposed between the underside of the arch iron 9 and the top of the bar 26. This spring is employed for pressing and holding the bar 26 in the bottom of the loops 27, as well as for exerting its tension against the said bar for preventing the accidental closing of the damper by its own weight. One end of the spring 30 is pivotally secured to the iron 9 by a pin 29', which permits the said spring to swing out as indicated by the dotted lines in Figs. 1 and 5, for allowing the insertion and withdrawal of the bar and rack through the loops 27. The other end of spring 30 engages a groove or socket 30' formed in the underside of plate 9 for holding it in place.

31 represents a stop which is carried by the bar 26 near the front end of the rack portion. The stop preferably consists of a cotter-pin which pierces the bar and is employed for limiting the outward movement of the bar and rack when operated, as indicated by dotted lines in Fig. 4. The stop 31 should be positioned at a point which will allow the damper to be rocked from the closed position, shown by the full lines, to the open position, shown by the dotted lines, in Fig. 4. The rack 24 is so disposed and its teeth are so proportioned that when the bar 26 is pulled out about two inches the damper will be operated to its wide-open position. The withdrawal of the pins or bolts 19, 20 and 31 allows the damper and its operating parts to be removed readily and quickly.

In order to carry out the full intent and object of my invention, certain parts of the interior of the chimney immediately above the throat have been specially designed. The inner wall of the arch is carried upwardly vertically for a considerable distance beyond the top edge of the iron 10, as indicated at 32, so that when the damper is opened part way, as shown by the full lines in Fig. 3, as well as, when it is opened

to the full extent, as shown by the dotted lines in Fig. 4, the products of combustion are compelled to rise perpendicularly a sufficient distance to cause them to follow the front side of the throat, and in order to induce the smoke and hot gases to hug the front side of the chimney, the wall is then sloped rearwardly for a distance, as shown at 33. The other variation from the common run of fire-place chimney construction consists of providing the broad shelf or ledge 13 which lies directly back of, and substantially on a level with the rear or lowest edge of the damper. This broad ledge not only provides a roomy space for the accumulation of soot and ashes which gravitates from the chimney and holds the same clear and free from the damper, but by broadening the shelf 13 rearwardly, as indicated, the down-draft, which during the early stages of a fire is generally cold and damp, is given a direct and unobstructed course, and upon impinging the said shelf will turn and pass upwardly again, as indicated by arrows in Fig. 3. Where the shelf 13 is made narrow and the front wall 9—32 of the throat slopes rearwardly, the products of combustion are directed across the flue to the rear wall 34, which diverts the cold and damp down-draft to the front side of the chimney allowing it to force its way into and through the throat, and thus cause the fire-place to belch smoke and reek into the room. But with my improved construction and arrangement of the throat and damper, and the provision of the long vertical front wall 32, as well as the broad rearwardly extending shelf 13, which is preferably broader than the throat, all danger of smoke being forced into the room by the down-draft is obviated. Furthermore by the peculiar construction and arrangement of the throat of the fire-place which consists of a long narrow opening or well extending horizontally between the forwardly sloping back wall 5 and the arch, and also the positioning of the throat entirely above the lower side or edge of the arch, a more satisfactory and perfect control of the draft is obtained, and when the damper is properly adjusted, a greater amount of heat is produced from a given quantity of fuel, and the heat is thrown into the room without any loss or waste. After the gas and smoke pass up the chimney, the damper 15 may be entirely closed as shown by the full lines in Fig. 4, and when in this position, the space between the damper and the bottom of the arch comprises a pocket which is immediately filled with the hot air. After this pocket is filled, the rest of the heat will pass out into the room. In order to guard against any gas escaping into the room after the damper is closed, I provide a number of small holes or openings along the free edge of the damper which

allows the gas to escape from the throat or pocket into the chimney.

It is obvious that some changes or modifications may be made in the device within the scope defined by the appended claims without departing from the spirit of the invention.

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

In a fire-place, a throat formed by the forwardly inclining back wall, the sloping reveals, and the vertical wall of the arch, a metal frame disposed in the throat, one member of said frame adapted to support the said arch, the other member of said

frame having parallel lugs disposed at the top of the throat, a damper comprising a rectangular plate, one edge of said plate disposed between, and supported by said lugs during the opening and closing movements of said damper, a reciprocating rod for operating said damper, and a spring adapted to exert its tension against said rod for preventing the accidental closing of said damper.

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

MERVIN V. ARNOLD.

Witnesses:

WM. C. ANDERSON,
HARRY DE WALLACE.

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