C. F. NEWPORT.

DAMPER MECHANISM FOR WATER HEATERS OR BOILERS.

APPLICATION FILED MAY 19, 1911.

1,068,809. **Patented July 29, 1913.**

Fig. 1.

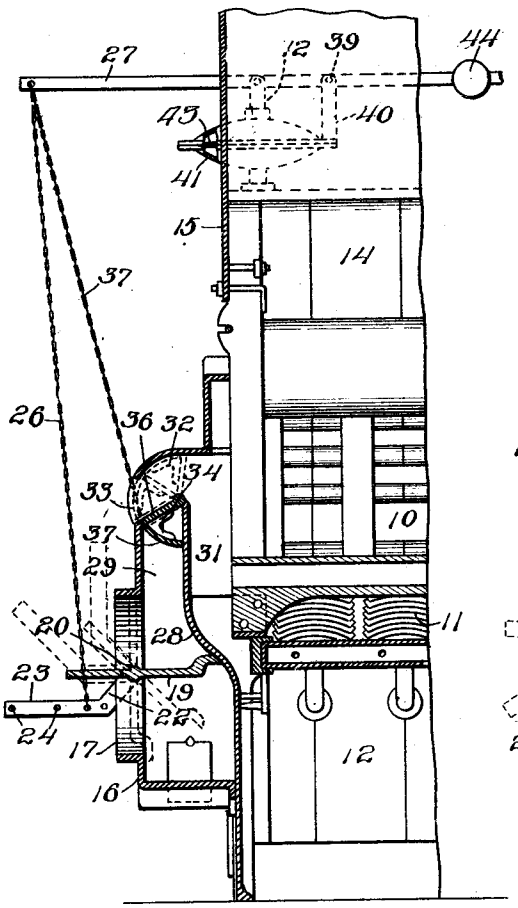


Fig. 2.

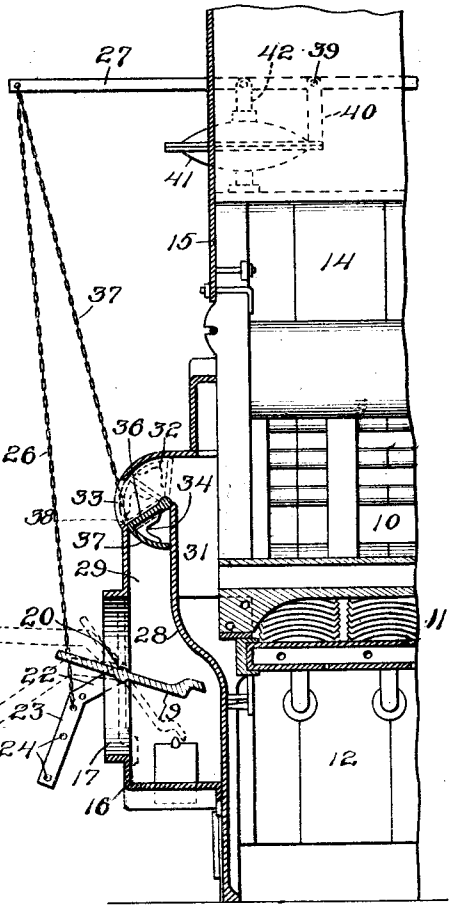


Fig. 3.

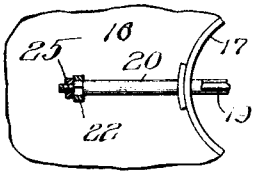
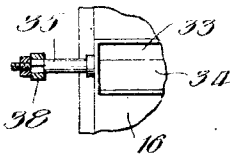


Fig. 4.



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UNITED STATES PATENT OFFICE.

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DAMPER MECHANISM FOR WATER HEATERS OR BOILERS.

1,068,809. Specification of Letters Patent. Patented July 29, 1913.

Application filed May 19, 1911. Serial No. 628,264.

To all whom it may concern:

Be it known that I, CHARLES F. NEWPORT, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Damper Mechanism for Water Heaters or Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in furnaces for water and steam boilers, more especially adapted to supplying hot water or steam to house heating systems.

The invention relates more specifically to a novel combined draft and check draft damper arranged to control the supply of fresh air to the furnace and also to check and control the draft of the furnace.

Among the objects of the invention is to provide, in a single device, means arranged to control the supply of air to the furnace and to check the draft thereof, so constructed that when the device or damper is moved into position to cut off the supply of fresh air to the furnace, it simultaneously opens a check draft passage, whereby the draft of the furnace is checked.

A further object of the invention is to provide a novel means of controlling the exit or smoke box damper arranged to vary the movement and position of said damper to correspond with the draft conditions.

A still further object of the invention is to provide pressure controlled means associated with the pressure space of the boiler to control either of said dampers alone or both simultaneously, with due regard to the operating conditions.

As shown in the drawings, Figure 1 is a central vertical sectional view of the rear end of a water heater or boiler equipped with my improvements. Fig. 2 is a similar view with parts in changed positions. Fig. 3 is a detail illustrating the manner of connecting the exit flue damper to an arm through which the position of the damper is controlled. Fig. 4 is a detail illustrating the manner of connecting the combined air feed and check draft damper to its controlling means.

The heater or furnace shown is generally like the construction illustrated in my co-pending application for United States Letters Patent, Serial No. 627,200 filed on the 15th day of May, 1911. As shown in said figures, 10 designates the fire box, 11 the furnace grate at the bottom of the fire box and 12 the ash pit below the grate. The portion of said heater embracing the boiler 14 is formed of sections fitted together in the manner illustrated in by aforesaid co-pending application.

15 designates a portion of the magazine arranged above the fire box from which the fuel is delivered to the fire box.

16 designates as a whole a smoke box or hood with which communicates the smoke passage flues of the heater to receive the products of combustion therefrom, as shown in my aforesaid co-pending application, and said smoke box is provided at its rear side with an exit opening 17 surrounded by a flange to which is adapted to be connected an exit flue (not shown). The said exit opening 17 of the smoke box is controlled by a damper 19 which is pivoted by means of a horizontal pivot rod 20 to swing vertically.

Attached to the pivot rod 20 of the damper 19, at a point exterior to the smoke box, is an actuating arm comprising a short inner oblique portion 22 and an outer straight portion 23 provided with a plurality of spaced openings 24. Said actuating arm is detachably fixed to the pivot rod 20, the arm being shown as provided with a squared opening (Fig. 3) which fits over a squared portion of the end of the damper pivot rod and is held thereon by a nut or key 25. Said damper actuating arm may, therefore, be arranged with its straight part horizontal as shown in Fig. 1, or may be removed and reversed so that said straight portion extends obliquely downwardly, as shown in Fig. 2. The said smoke box damper may be actuated by hand, as through the medium of a chain or cable 26, or said cable may be connected to the operating bar 27 of a pressure controlled actuating device, as hereafter described.

Arranged inside of the rear wall of the smoke box is a partition 28 which extends from a point near the top of the rear wall of the smoke box to the ash pit wall, as herein shown. Between said partition 28 and the rear wall of the smoke box is formed an

air check passage 29. Between the partition 28 and the rear wall of the heater is formed a draft passage 31 which communicates at its lower end with the ash pit 12. The said air check passage 29 and the draft passage 31 communicate at their upper end with the space 32 at the upper side of the smoke box, which latter space communicates through an inlet opening 33 with the atmosphere.

34 designates a combined draft and check draft damper which is pivotally mounted on a pivot rod 35 (Fig. 4) that has suitable bearing in the smoke box at the upper edge of the partition 28. Said damper 34 comprises a straight portion 36 which extends from the pivot rod 35 to the lower margin of the opening 33, when the damper is in the position shown in Figs. 1 and 2, and an arcuate portion 37 that is formed on the free end of the part 36 and extends downwardly.

When the damper 34 is in the position shown in full lines in Fig. 1 there is a free passage for fresh air through the opening 33 and the draft passage 31 to the ash pit below the grate 11 to supply fresh air to the burning fuel on the grate. When the said damper 34 is in the intermediate dotted line position shown in Figs. 1 and 2, in which the arcuate portion 37 covers the opening 33, the supply of air is cut off from the opening 33 to the ash box and to the air check passage 29. When said damper 34 is in the upper position indicated in dotted lines in Figs. 1 and 2, with the free edge of the arcuate portion above the opening 33, the passage of fresh air is cut off to the grate through the air supply passage 31, so that no fresh air will be supplied to the burning fuel in the grate, but the air check passage is in open communication with the opening 33 to permit the fresh air to pass downwardly into the smoke box and thereby check the draft. The said damper 34 may be actuated by a chain or cable 37 which is attached at its lower end to an arm 38, fixed to the pivot rod of the damper, said chain or cable being adapted to extend upwardly from its attachment to the pivot rod for manual actuation, or to be attached to and actuated by the actuating bar 27 of the automatic pressure controlled device before referred to.

As shown in Figs. 1 and 2 both of the chains and cables 26 and 37 of the dampers 19 and 34 are fixedly attached at their upper ends to said bar 27 so that the bar actuates both dampers. The said bar is pivoted at 39 to the upper end of a standard 40 which rises from the casing 41 of a familiar form of diaphragm actuating device which is supported on the upper side of the boiler in the manner shown in Figs. 1 and 2. The bar 27 is pivotally connected between its fixed pivot 39 and its outer end to the upper end of a stem 42 which rises from and is attached at its lower end to a diaphragm 43 extending across the casing 41. The said casing below the diaphragm is in open communication with the steam space in the boiler. The actuating bar 27 is provided on the side of its pivot remote from the chains or cables 26 and 37 with a weight 44 which tends to raise the outer end of the arm and thereby aids to raise the dampers attached by the cables or chains 26 and 37 to the outer end of said bar. When there is no pressure in the boiler and therefore under the diaphragm 43, the weight of the dampers 19 and 34 overbalances the counterweight 44 so that said dampers are held by their weight in the full line positions shown in said Figs. 1 and 2. The counterweight being slidable on the bar 27 it may be located to more or less nearly counterbalance the weight of the dampers, and thereby vary the extent of pressure required to open the dampers. In the positions of the dampers shown in Figs. 1 and 2 the exit opening in the fire box permits the products of combustion to pass freely therefrom and the draft passage 31 is in open communication with the draft opening 33 to admit air freely to the ash pit beneath the grate. Upon the rise of pressure in the boiler and beneath the diaphragm 43, the diaphragm is raised, thereby raising the outer end of the actuating bar 27 and the dampers 19 and 34 and thus limit the passage of the products of combustion from the smoke box and the passage of fresh air to the ash pit below the grate. A further rise of pressure beneath the diaphragm 43 serves to further raise the dampers 19 and 34. When the damper 34 is in the intermediate dotted line position indicated in Figs. 1 and 2 the passage of fresh air is cut off from the ash pit and the exit of the products of combustion is further retarded, and when the damper 34 occupies the upper dotted line position shown in Figs. 1 and 2 the supply of fresh air is entirely cut off to the ash pit below the grate and the exit of the products of combustion from the smoke box is further limited. In this latter position of the damper the arcuate portion 37 thereof is raised above the opening 33 so as to permit air to pass through said opening and downwardly into the smoke box, thereby checking the draft through the smoke box. By properly adjusting the weight 44 on the bar 27 the dampers 19 and 34, or either of them, may be adjusted to maintain a desired pressure within the boiler. When the damper 34 is used with a water boiler where no pressure is generated therein, the said damper may be operated at a point distant from the heater, as by means of the chain or cable 37 which may extend to a room above. Likewise also the damper 19 may be manually operated.

The arrangement shown is a convenient and desirable one inasmuch as the action of the lever or bar on the dampers, through the cables or chains 26 and 37 is direct, thereby avoiding the necessity of guiding pulleys or sheaves over which to train said chains or cables, and the consequent friction and lack of delicate adjustment. Furthermore the said dampers are actuated by gravity against the action of the pressure beneath the diaphragm 43, and the weight 44 serves to counterbalance the parts so that the dampers may be actuated by small changes of pressure and thereby accurately regulate the supply of air to and the exit of the products of combustion from the furnace or heater.

By reason of the use of the detachably affixed smoke box damper arm, which comprises the oblique and straight portions, the latter having the spaced holes 24, I am enabled to vary the damper opening by the use of the same length of operating chain or cable 26 This may be done to a certain extent by shifting the lower end of the cable or chain to one or the other of the openings 24, in the damper actuating arm. By removing the arm and changing it from the position shown in Fig. 1 to that shown in Fig. 2 the normal position of the damper 19 may be changed from a full open position, as shown in Fig. 1, to a partially closed position, as shown in Fig. 2. In the adjustment shown in Fig. 1 the final position of the smoke box damper, when acted upon to the largest extent by the automatic pressure controlled device is less than a completely closed position, while in the arrangement shown in Fig. 2, with the normal position of the damper 19 partially closed, the final position thereof when the diaphragm 43 is raised to its highest position, may be a full closed position.

It will be noted that the shape of the damper arm 23 is such, with respect to the point of suspension of the chain or cable 26, that the various positions of the damper referred to, in the different adjustments of the arm and the chain on the arm, are effected without changing the length of the chain or cable. In the adjustment shown in Fig. 1 the openings 24 that receive the end of the chain 26 are arranged in a series substantially concentric to the point on the bar 27 from which the chain or cable is suspended.

I claim as my invention:—

1. An updraft furnace comprising a fire box provided with an air inlet passage leading to the fire box, with a smoke exit passage and with an air check passage connecting the smoke exit passage with the fresh air inlet passage, all arranged at the smoke exit end of the furnace, and a single combined draft and check draft damper arranged at the intersection of the air check passage and fresh air inlet passage to control the supply of air to the fire box and to the air check passage, and constructed to open the air check passage only after the fresh air inlet passage to the fire box is closed.

2. An updraft furnace provided with an air inlet passage leading directly from a source supplying fresh air to the fire box and provided with an inlet opening, with a smoke exit passage, and with an air check passage arranged with its receiving end adjacent to said inlet opening to receive air directly from said source, all arranged at the smoke exit end of the furnace, and a single combined check draft and draft damper located adjacent to said inlet opening and to said receiving end of the air check passage and provided with a part which passes over the air inlet passage and arranged to control communication between said opening and the fresh air and check draft passages.

3. A furnace provided with a fresh air passage leading to the fire box and having an inlet opening, with a smoke exit passage and with an air check passage leading to the smoke exit passage and arranged with its receiving end adjacent to said inlet opening, and a swinging, combined draft and check draft damper comprising a straight portion which is pivoted at one side and is provided on its other side with an arcuate portion arranged concentric to the pivot of the damper, said damper closing the inlet opening to the air check passage at one limit of its movement, and arranged to close the fresh air passage at the other limit of its movement, and the arcuate portion of the damper being arranged to pass over said inlet opening as the damper swings from one limit to the other of its movement.

4. A furnace comprising a fire box provided with a fresh air inlet passage leading directly from a source supplying fresh air to the fire box and having an inlet opening, with a smoke exit passage and with an air check passage leading from said source to the smoke exit passage and arranged with its receiving end adjacent to said inlet opening, and a swinging combined draft and check draft damper with means to actuate the same, and arranged in one position to close the air check passage and in another position to close the fresh air passage, and having means to maintain one of its controlled passages approximately closed until the other passage is closed.

5. A furnace comprising a fire box provided with a fresh air inlet passage leading to the fire box and having an inlet opening, with a smoke exit passage and with an air check passage leading to the smoke exit passage and arranged with its receiving end adjacent to said inlet opening, a single swinging, combined draft and check draft damper, pivoted at one side to the furnace structure, with a part adapted to pass over the inlet opening, and arranged in one po-

sition to close the air check passage and in another position to close the air passage, and means connected with the side of the damper remote from its pivot and supporting the weight thereof for actuating the damper.

6. A furnace provided with a smoke exit passage, a swinging damper therein having a pivot, an actuating arm for the damper, a damper actuating lever, and flexible means directly connecting the lever to said arm, said arm being crooked between its outer end and its pivot engaging portion and provided along its length with spaced points of attachment for the flexible means.

7. A furnace provided with a smoke exit passage, a swinging damper therein having a pivot, an actuating arm for the damper, a damper actuating lever, flexible means directly connecting the lever to said arm, said arm being crooked between its outer end and its pivot engaging portion and provided along its length with spaced points of attachment for the flexible means and means whereby the damper arm may be removed from its pivot and reversed thereon.

8. A furnace comprising a fire box provided with an air supply passage leading to the fire box, with a smoke exit passage and a check draft passage connected with the smoke exit passage, all arranged at the smoke exit end of the furnace, a single combined draft and check draft damper arranged at the intersection of the check draft passage and fresh air passage to control the supply of fresh air to the fire box and to the check draft passage, a swinging damper arranged in the smoke exit passage, a single controlling element for said dampers, and means directly connecting said dampers to and supporting them from said element.

9. A furnace provided at one end with a smoke box having a smoke exit passage, and provided also at the same end thereof with an air supply passage and with an air check passage, a combined draft and air check damper located at the intersection of the air supply and air check passages for controlling said air check and air supply passages, a damper for controlling the smoke exit passage, a controlling device for said dampers, and connections extending directly between each damper and said controlling device.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 9th day of May A. D. 1911.

CHARLES F. NEWPORT.

Witnesses:
WILLIAM L. HALL,
WILLIAM GOLDBERGER.