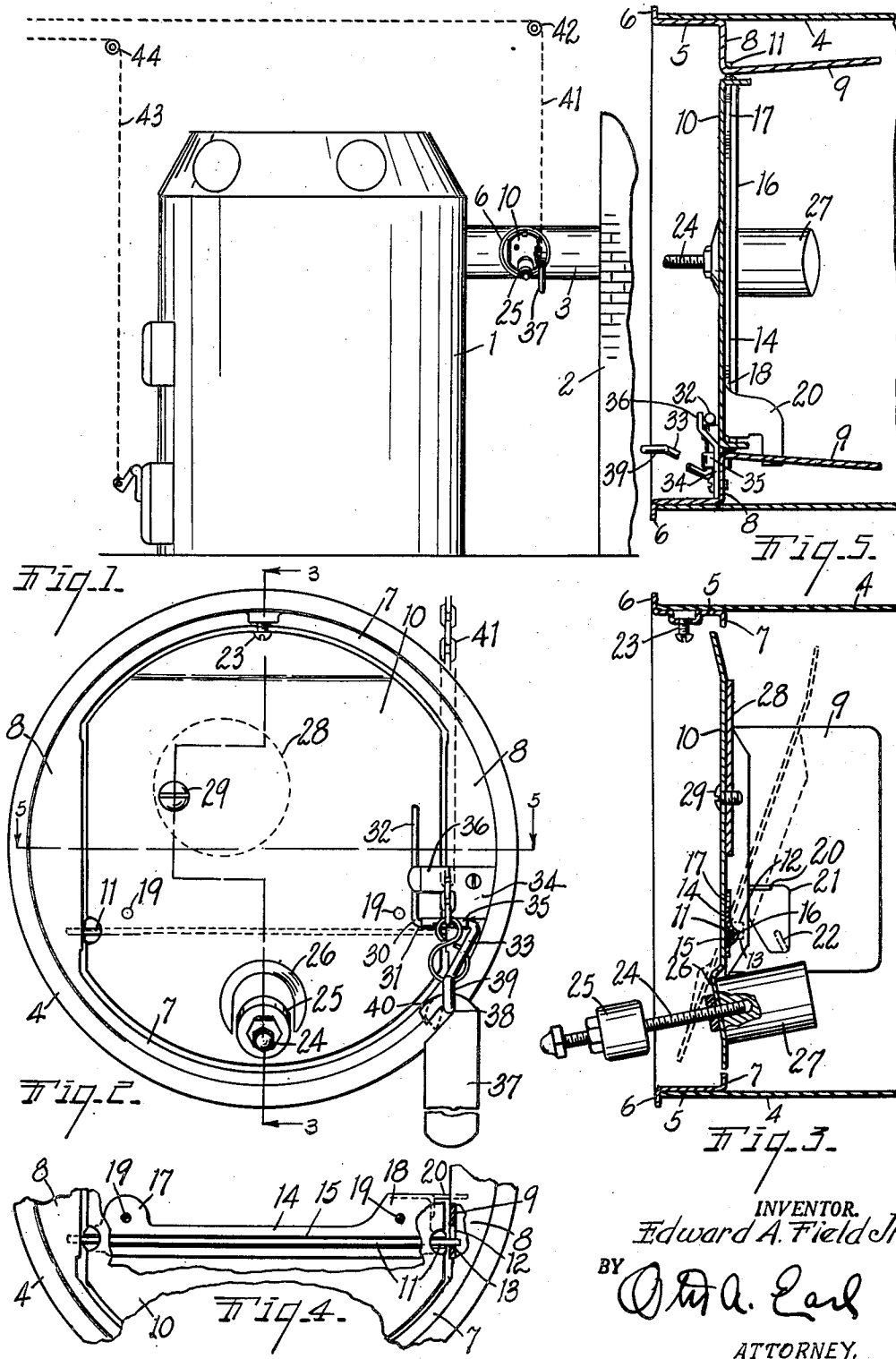


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E. A. FIELD, JR
DRAFT LIMITING DAMPER

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DRAFT LIMITING DAMPER

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This invention relates to improvements in draft limiting damper.

The main objects of this invention are:

First, to provide an improved barometric draft control which may be manually actuated to hold it in open position under certain conditions, for example, when it is desired to bank or check the fire in a furnace to which the control is applied.

Second, to provide a draft control of this character which may be very economically produced and may be readily installed and also one in which the parts are so arranged that the gate and its supports cannot be injured in the event of excessive force being applied to the manual control.

Third, to provide a draft control in which the gate or damper may be held in open position by means of a remote control such, for example, as a chain or cable; also being operatively connected to an ashpit draft door or, alternately, may be actuated by a thermostat and damper motor.

Fourth, to provide a draft control of this type which may be assembled as a unit and readily installed in a furnace.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevational view of a furnace mainly shown conventionally with the draft control of the invention installed in the flue thereof.

Fig. 2 is a front elevational view of the control with portions broken away and other portions shown conventionally.

Fig. 3 is a fragmentary view mainly in vertical section on the broken line 3—3 of Fig. 2, the gate being shown in closed position by full lines and in partially open position by dotted lines.

Fig. 4 is a fragmentary elevational view showing structural details.

Fig. 5 is a fragmentary view in horizontal section on a line corresponding to line 5—5 of Fig. 2.

In the accompanying drawings, 1 represents a furnace, 2 the chimney, and 3 the flue which is provided with a laterally projecting housing 4 opening thereto. I provide an annular gate frame 5 fitting within the end of the housing 4 and provided with an outwardly projecting flange 6 at its outer end which serves as a locating means and also as a reinforcing means for the frame which is desirably formed as a sheet metal stamping.

The gate frame is provided with an inwardly

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projecting flange 7 at its inner edge, this flange having segmental enlarged portions 8 on opposite sides thereof, these segmental portions 8 having inwardly projecting wings 9 extending from their edges. These wings are in spaced parallel relation to receive the gate 10 between them.

The gate swings between the wings which serves to substantially reduce or minimize the passage of air around the sides of the gate, thus providing a much more uniform control or regulation than would be possible without the wings.

The gate is provided with a pintle or pivot rod 11 arranged substantially below the center of the gate. The wings are provided with bearing openings 12 of substantial size so that the pintle or pivot may have rolling engagement with the bottom edges 13 thereof.

The pintle is secured to the rear side of the gate by means of a plate 14 having a longitudinal groove 15 in its front side, the groove being formed by a longitudinal corrugation 16 in the plate.

The plate has upwardly projecting ears 17 and 18 receiving the rivets 19 for clampingly securing the pivot with its ends projecting into engagement with the bearing surfaces 16. To provide a stop for limiting the rearward swinging movement of the gate, the ear 18 of the pivot plate is provided with a rearwardly and laterally projecting angular arm 20 which extends through an opening 21 in one of the wings 9, see Fig. 3, the stop arm serving to limit the forward movement of the gate as shown by full lines in Fig. 3 as well as its rearward tilting movement as shown by dotted lines at 22, Fig. 3.

The screw 23 is provided for clamping the frame within the housing 4. The counterweight arm 24 is provided with an adjustable weight 25 and projects through the gate which is offset at 26 so that the arm is in the desired angular relation to the gate.

The balancing weight 27 is threaded upon the rear end of the threaded arm 24. The weight 25 is adjustable to provide suitable barometric control. A supplementary disk-like weight 28 is mounted by the screw 29 above the pivot and on the rear side of the gate, this being adjustable to accurately counterbalance the gate and it is not intended that this shall be adjusted for barometric control once the gate is properly balanced, desirably at the factory.

In operating a furnace, there are certain conditions where it is desirable to prevent or eliminate the barometric action of the gate—for example, when it is desired to bank or check the fire in the furnace to which the control is ap-

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plied. To this end, I provide a control lever designated generally by the numeral 30 and comprising a pivot portion 31, an arm 32 at the inner end of the pivot portion adapted to engage the front of the gate and a downwardly and forwardly projecting actuating arm 33 at the other end of the pivot. The lever is mounted on a bracket 34 secured to the front side of one of the segments 8 of the inwardly projecting frame flange. This bracket is formed as a sheet metal stamping and has a knuckle portion 35 at its lower edge receiving the pivot of the lever and a laterally projecting stop 36 limiting the return movement of the lever under the action of the weight 37. This weight is desirably formed as a flat stock or as a stamping and has an eye 38 at its upper end engaging the eye 39 on the outer end of the arm 33. Desirably the eye 38 is formed by transversely slotting the weight at its upper end as is indicated by dotted lines in Fig. 2 and after the hook part 40 is passed through the eye of the lever it is clamped down to the position shown by dotted lines.

The lever is actuated by a chain or cable 41 extending over suitable guide pulleys 42, the chain 41 being preferably operatively associated with the chain 43 arranged over the guide pulley 44, the chains extending to a remote control station to be manually operated or to be actuated by a thermostatically controlled motor.

It will of course be appreciated that the lever 30 may be controlled entirely independently of the draft if that is desired. The lever is desirably formed of wire which not only results in a light economical structure but the wire is desirably of such gauge that it will bend and prevent the gate or its pivots being distorted or damaged by excessive pull on the cable 41. The lever is carried by the frame and is mounted within the frame so that it is fully protected thereby.

I have illustrated and described a highly practical embodiment of the invention. I have not attempted to illustrate or describe other embodiments or adaptations as it is believed that this disclosure will enable those skilled in the art to embody or adapt the invention as may be desired.

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

1. In a draft control, a cylindrical housing, an annular gate frame disposed within said housing and having an out-turned outer flange on its front edge engaging the end of the housing and provided with an inturned flange at its inner end defining a gate opening having opposed segmental side portions, wings integral with said frame projecting rearwardly from the edges of said segmental side portions and having pintle openings therein, a gate dimensioned to swing within said frame opening and between said wings, a pintle, a pintle supporting plate having a longitudinal corrugation receiving said pintle, said plate being secured on the rear side of said gate and having a rearwardly and laterally projecting stop arm at one end thereof, the adjacent wing being provided with an opening, the opposed edges of which constitute stops for limiting the swinging movement of the gate, the gate being substantially balanced in closed position and weighted for barometric draft control, means for holding said gate in an open position against the return action of its weight comprising a lever pivotally mounted within said gate frame to en-

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gage said gate, and remote control means for said lever.

2. In a draft control, a housing, a gate frame disposed within said housing and provided with an inturned flange at its inner end defining a gate opening having opposed segmental side portions, wings integral with said frame projecting rearwardly from the edges of said segmental side portions and having pintle openings therein, a gate dimensioned to swing within said frame opening and between said wings, a pintle, and a pintle supporting plate having a longitudinal corrugation receiving said pintle, said plate being secured on the rear side of said gate and having a rearwardly and laterally projecting stop arm at one end thereof, the adjacent wing being provided with an opening, the opposed edges of which constitute stops for limiting the swinging movement of the gate, the gate being substantially balanced in closed position and weighted for barometric draft control.

3. In a draft control, a housing, a gate frame disposed within said housing and provided with an inturned flange at its inner end defining a gate opening having opposed segmental side portions, wings integral with said frame projecting rearwardly from the edges of said segmental side portions and having pintle openings therein, a gate dimensioned to swing within said frame opening and between said wings, a pintle, a pintle supporting plate having a longitudinal corrugation receiving said pintle, said plate being secured on the rear side of said gate and having a rearwardly and laterally projecting stop arm at one end thereof, the adjacent wing being provided with an opening, the opposed edges of which constitute stops for limiting the swinging movement of the gate, the gate being substantially balanced in closed position and weighted for barometric draft control, means for holding said gate in an open position against the return action of its weight comprising a lever pivotally mounted within said gate frame to engage said gate, and remote control means for said lever.

4. In a draft control, a housing having an open outer end, a gate frame disposed within said housing and having a gate opening spaced inwardly from the open outer end of the housing and having rearwardly projecting wings at opposite sides of its gate opening, said wings having pintle openings therein, a gate dimensioned to swing within said frame opening between said wings, a pintle secured to said gate and projecting into said pintle openings, said gate having a laterally projecting stop arm, the adjacent wing being provided with an opening, edges of which constitute stops for engaging said stop arm for limiting the swinging movement of the gate, the gate being weighted for barometric draft control, means for holding said gate in an open position against the return action of its weight comprising a lever pivotally mounted within said gate frame and in rearwardly spaced relation from the open outer end of said housing and closely adjacent the pivotal axis of the gate, said lever including a gate engaging arm disposed substantially parallel to the plane of the gate when the gate is in closed position, and remote control means for said lever.

5. In a draft control, a housing, a gate frame disposed within said housing and having rearwardly projecting wings at opposite sides of its gate opening, said wings having pintle openings therein, a gate dimensioned to swing within said

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frame opening between said wings, a pintle projecting into said pintle openings, and a pintle supporting plate for securing said pintle to said gate, said plate having a laterally projecting stop arm integral therewith, said pintle being disposed between said plate and gate, said plate being fixedly secured to the gate between the pintle and stop arm, the adjacent wing being provided with an opening, edges of which constitute stops for engaging said stop arm for limiting the swinging movement of the gate, the gate being weighted for barometric draft control.

6. In a draft control, a housing, a gate frame disposed within said housing and having at its inner end an intumed flange and segmental side portions and having wings projecting rearwardly from said segmental side portions at opposite sides of its gate opening, said wings having pintle openings therein, a gate dimensioned to swing within said frame opening between said wings, a pintle, a pintle supporting plate, said gate having a laterally projecting stop arm, the adjacent wing being provided with an opening, edges of which constitute stops for limiting the swinging movement of the gate, the gate being weighted for barometric draft control, means for holding said gate in an open position against the return action of its weight comprising a lever including a pivot portion and gate engaging arm at the inner end of the pivot portion and an actuating arm at the outer end thereof, a supporting bracket for said lever mounted upon the front side of one of the segmental side portions and having a pivot knuckle at its lower end receiving and having a forwardly offset lever stop arm projecting into the path of said gate actuating arm, said lever being supported within said gate frame with the end of its actuating arm projecting forwardly beyond the front edge of the frame, and a cable connected to said actuating arm.

7. In a draft control, a housing, an annular gate frame disposed within said housing and provided with an inwardly projecting flange defining a gate opening and having opposed segmental side portions, a gate, a pintle for said gate carried by said frame, said gate being weighted for barometric draft control, and means for holding said gate in an open position against the return action of its weight comprising a lever, a supporting bracket for said lever on which said lever is pivoted mounted upon the front side of one of the segmental side portions of said flange and having a lever stop arm projecting into the path of said gate actuating arm, said lever being supported within said gate frame with the end of its actuating arm projecting forwardly, and a cable connected to said actuating arm.

8. In a draft control, a housing, an annular gate frame disposed within said housing and provided with an inwardly projecting flange defining a gate opening and having opposed segmental side portions, a gate, a pintle for said gate carried by said frame, said gate being weighted for barometric draft control, and means for holding said gate in an open position against the return action of its weight comprising a lever including a pivot portion and gate engaging arm at the inner end of the pivot portion and an actuating arm at the outer end thereof, a supporting bracket for said lever on which said lever is pivoted mounted upon the front side of one of the segmental side portions and having a lever stop arm projecting into the path of said gate actuating arm, said lever being supported within said gate frame with the end of its actuating arm

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projecting forwardly, a cable connected to said actuating arm, and a weight at the outer end of said actuating arm acting to normally hold said lever in retracted position against said stop and to apply return pull stress to the cable.

9. In a draft control, a housing, a gate frame disposed within said housing and defining a gate opening, a gate pivotally mounted within said frame and weighted for barometric draft control, and means for holding said gate in open position against the return action of its weight comprising a lever formed of wire and including a pivot portion and a gate engaging arm at the inner end of the pivot portion and an actuating arm at the outer end thereof projecting forwardly from said frame, a sheet metal member on said gate frame provided with an outwardly projecting offset portion for receiving said pivot portion of said lever, a cable connected to said actuating arm, and a weight operatively associated with said actuating arm and acting to normally hold said lever in retracted position, said lever being of relatively light wire stock so that it will spring or bend under such stress as might distort the gate or its mounting.

10. In a draft control, a housing, a gate frame disposed within said housing and defining a gate opening, a gate pivotally mounted within said frame and weighted for barometric draft control, and means for holding said gate in open position against the return action of its weight comprising a lever formed of wire and including a pivot portion and a gate engaging arm at the inner end of the pivot portion and an actuating arm at the outer end thereof projecting forwardly from said frame, a sheet metal member on said gate frame provided with an outwardly projecting offset portion for receiving said pivot portion of said lever, and a cable connected to said actuating arm, said lever being of relatively light wire stock so that it will spring or bend under such stress as might distort the gate or its mounting.

11. In a draft control, a housing, a gate frame disposed within said housing and defining a gate opening, a gate pivotally mounted within said frame for movement of the upper portion of the gate inwardly and weighted for barometric draft control, and means for holding said gate in open position against the return action of its weight comprising a lever pivoted at the side of the gate frame intermediate the top and the bottom thereof and having an arm for engaging the gate above the pivot thereof and having an actuating arm projecting forwardly from said frame, said lever being formed of resilient relatively light wire stock bent to provide said gate engaging and actuating arms and a relatively long pivot portion intermediate said arms, means on the gate frame for pivotally supporting said lever pivot portion intermediate said arms, a cable connected to said actuating arm, and a weight operatively associated with said actuating arm and acting to normally hold said lever in retracted position.

12. In a draft control, a housing, a gate frame disposed within said housing defining a gate opening and having opposed segmental side portions, a gate, a pintle for said gate carried by said frame, said gate being weighted for barometric draft control, a lever supporting bracket mounted on one of said frame side segments, a lever pivotally mounted on said bracket and comprising a gate engaging arm disposed in front of the gate and an actuating arm disposed closely to the frame and lying mainly normally within the

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frame, said bracket being provided with a stop arm projecting into the path of the gate actuating arm, a remote control connected to said actuating arm, and a weight operatively associated with said actuating arm to normally hold the lever in retracted position against said stop, said lever being of relatively light stock so that it will bend or spring under such stress as might distort the gate or its mounting.

13. In a draft control, a housing, a gate frame disposed within said housing defining a gate opening, a gate, a pintle for said gate carried by said frame, said gate being weighted for barometric draft control, a lever supporting bracket mounted within said frame, a lever pivotally mounted on said bracket and comprising a gate engaging arm disposed in front of the gate and an actuating arm disposed closely to the frame and lying mainly normally within the frame, said bracket being provided with a stop arm projecting into the path of the gate actuating arm, a remote control connected to said actuating arm, and a weight operatively associated with said actuating arm to normally hold the lever in retracted position against said stop, said lever being of relatively light stock so that it will bend or spring under such stress as might distort the gate or its mounting.

14. In a draft control, a housing, a gate frame disposed within said housing defining a gate opening, a gate, a pintle for said gate journaled on said frame, said gate being weighted for barometric draft control, a lever supporting bracket mounted within said frame, a lever pivotally mounted on said bracket and comprising a gate engaging arm disposed in front of the gate and an actuating arm disposed closely to the frame and lying mainly normally within the frame, said bracket being

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provided with a stop arm projecting into the path of the gate actuating arm, and a remote control connected to said actuating arm.

15. In a draft control, a housing, a gate frame disposed within said housing and defining a gate opening, a gate pivotally mounted within said frame for movement of the upper portion of the gate inwardly, said gate being weighted for barometric draft control, a lever pivotally mounted on said frame at one side of the frame and intermediate the top and bottom thereof and having a gate engaging arm and an actuating arm projecting forwardly, said gate engaging arm being disposed to engage the gate above the pivot thereof, said lever being formed of resilient relatively light wire stock bent to provide said gate engaging and actuating arms and a relatively long pivot portion intermediate said arms, means on the gate frame for pivotally supporting said lever pivot portion intermediate said arms, a remote control connected to said actuating arm, and means associated with said lever for normally holding it in retracted position.

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