Nov. 15, 1927. 1,648,950

C. J. KNAGGS

FURNACE ATTACHMENT

Filed Nov. 13, 1925

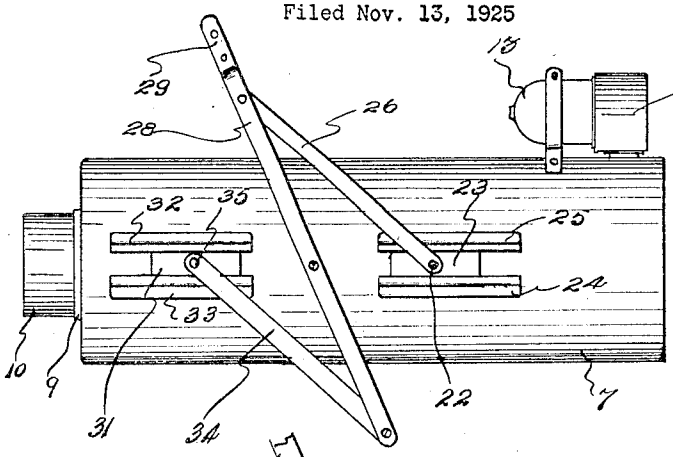

Fig. 1

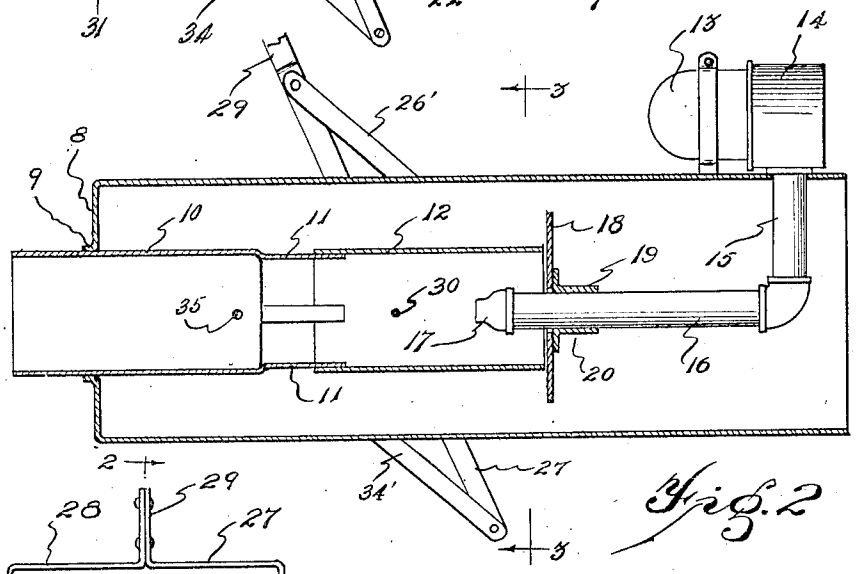

Fig. 2

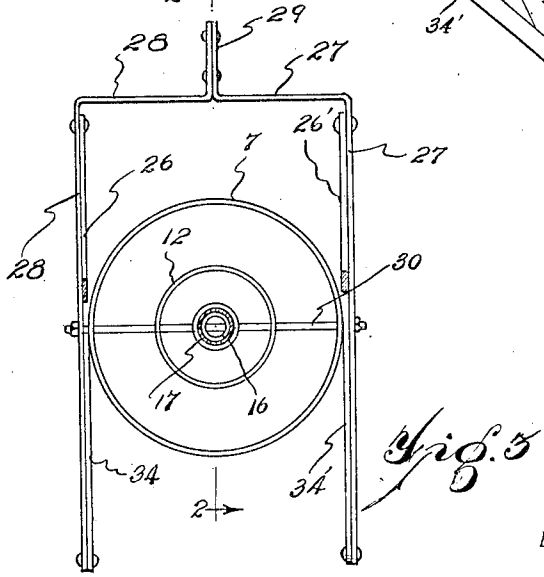

Fig. 3

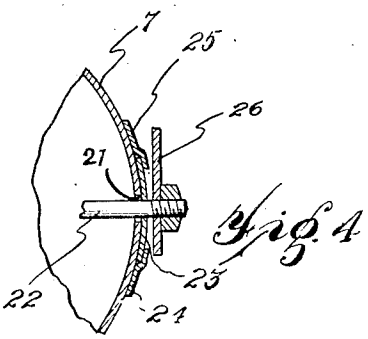

Fig. 4

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Patented Nov. 15, 1927. 1,648,950

UNITED STATES PATENT OFFICE.

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FURNACE ATTACHMENT.

Application filed November 13, 1925. Serial No. 68,780.

My invention relates to a new and useful improvement in a furnace attachment, and comprises a device adapted for attachment with a furnace intermediate the combustion chamber and the chimney outlet, the term "furnace" in this application being used to designate the heating unit used for heating regardless as to whether or not the device is used as a whole for hot air heating purposes as a boiler or for developing motive power. As the description proceeds, it will be evident that the device is adapted for use with a heating unit in which combustible fuel is used and which is provided with a waste outlet or chimney.

It is an object of the present invention to provide an attachment which may be mounted in communication with the chimney and the combustion chamber forming a passage communicating these parts through which the waste or escaping gases may pass in moving to their exit, and so arranged and constructed as to increase the efficiency of the furnace, assure more complete combustion of the fuel used, provide a means for regulating the amount of combustible fuel used during periods of operation and to provide a vacuum system for creating, controlling and regulating the draft to which the combustible fuel is subjected.

Other objects will appear from the description of the invention embodying the specific structure set out and the functions illustrated as attained.

The invention consists in the combination and arrangement of parts hereinafter described and claimed.

The invention will be best understood from a reference to the accompanying drawings, which form a part of this specification and in which,

Fig. 1 is a side elevational view of the invention,

Fig. 2 is a sectional view taken on substantially 2—2 of Fig. 3,

Fig. 3 is a sectional view taken on substantially line 3—3 of Fig. 2,

Fig. 4 is a slightly enlarged fragmentary sectional view illustrating one of the sliding shields used in the invention.

The invention is. as already pointed out, adapted for insertion into the chimney or other conduit used for carrying the waste gases from the furnace to the atmosphere, or other desirable place, and in this description will be set forth as being inserted in the chimney of the furnace, the mounting of the device being between the furnace and the outlet of the chimney.

As shown in the drawings, the invention comprises a tubular section 7 of piping, which preferably is of the same diameter as the piping used on the furnace, and is adapted for telescoping at its opposite ends therewith in the usual manner. One end of the section 7 is turned inwardly as at 8, the inwardly turned section being again turned at right angles to provide the flange 9. which embraces the reduced pipe section 10, slidably positioned therein. In the drawings, I have illustrated the application of the invention with a pipe 7 of approximately 10″ in diameter, the section 10 being represented as approximately 6″ in diameter, this illustration being given to indicate the variation in the size of diameters of the piping 7 and the section 10. Projecting outwardly from and preferably integral with the inner end of the section 10 are tongues 11, which project into and are slidable in a pipe section 12. which is mounted stationary relatively to the section 7. As shown, the section 12 is the same diameter as the section 10. Mounted upon the pipe 7 is an electric motor 13 of conventional design, suitably connected to a source of electrical energy. This motor 13 is intended to drive a blower 14, also of conventional design. The blower 14 is adapted to direct a current of air through the pipe 15 which projects radially inwardly of the piping 7 and communicates with the longitudinally extending piping 16, which is positioned preferably axially of the piping 7. It will be noted that the sections 10 and 12 are concentrically arranged relatively to the section 7. A reducing nozzle 17 is mounted on the free end of the piping 16. Positioned slidably on the piping 16 in embracing relation is a metallic disc 18 having guide straps 19 and 20 projecting outwardly from one face thereof in embracing relation to the piping 16, so as to assure uniform movement of the disc 18 longitudinally of the piping 16, when the adjustment hereafter described is made.

In the piping 7, there are two sets of pairs of slots diametrically opposite each other, the construction of the device at each of these slots being the same. It is believed, therefore, that a description of one will suffice for all and the structure is clearly shown in Fig. 4. Formed in the piping 7 is a

longitudinally extending slot 21, through which is projected a bolt 22 connected to the disc 18 fixedly, this connection being the same at opposite sides of the disc 18. A cover shield 23 is slidably mounted on the periphery of the section 7, for the purpose of covering the slot 21. This cover shield 23 is held in position by the guide strips 24 and 25 which are welded, riveted, or otherwise suitably secured to the piping 7 at opposite sides of the slot 21. Connected to the bolt 22 is an operating arm 26 at one side of the piping 7 and a similar operating arm 26′ at the opposite side, each of these operating arms being pivotally connected at their other ends to yoke legs 28 and 27, respectively. The yoke legs 27 and 28 are angularly turned as at 27′ and 28′, the angularly turned portions 27′ and 28′ being again angularly turned and secured together to form a handhold 29. Projected through the pipe 7 is a rod 30, upon which the yoke legs 27 and 28 are pivotally mounted, this rod 30 being projected through the yoke legs 27 and 28, as clearly appears in Fig. 3. As shown in Fig. 3 and Fig. 2, the rod 30 passes through the section 12 so as to retain the section 12 immovable longitudinally of the piping 7. At diametrically opposite points on the piping 7 are positioned cover shields 31 held in position by the guide strips 32 and 33. Only one of these cover strips 31 is shown in the drawings, as the structure at the opposite side is a duplicate of the structure shown. Connected pivotally at one end to a bolt 35, which is projected through the cover strips 31 and through the section 10 is an operating arm 34, the opposite end of which is connected to the lower end of the yoke leg 28. A similar operating arm 34′ is connected at the opposite side of the piping 7 to the lower end of the yoke leg 27.

When the device is attached to the chimney or furnace pipe, as described, and it is desired to start a furnace, the motor 13 is set into operation, which serves to direct a current of air through the pipe 16 and through the nozzle 17, this current of air being directed away from the furnace and in the direction of the chimney outlet, so that the smoke is drawn from the furnace through the chimney. It will be noted that the smoke is drawn and not driven; the traveling of the smoke through the chimney being assisted because of the vacuum set up by the current of air ejecting from the nozzle 17. When the furnace is being started, the section 10 is moved away from the section 12, leaving a space between adjacent ends of these sections for the entry of smoke into the section 10. This movement of the section 10 relatively to the section 12 is effected by rocking the yoke on its pivot 30 the arms 34 and 34′ serving to effect the movement of the section 10. At the same time, the disc 18 is moved away from the end of the section 12, so as to leave the end of the section 10 open for the entry of smoke and gas thereinto. After the fire has been started, so that the excessive amount of smoke has passed through the chimney, for a most efficient operation of the furnace and a practical use of the device, the yoke 28 should be rocked in its opposite direction to bring the end of the section 10 into closer relation to the adjacent end of the section 12 and to move the disc into close relation to the opposite end of the section 12. It will be noted that when the disc 18 is moved into close relation to the section 12, the end of the section 12 may be entirely closed so that the current of air passing from the nozzle 17 will set up a vacuum in the pipe 12. The connection between the disc 18 and the end of the section 12 is not an airtight one, so that the vacuum will have a tendency to draw the gases toward the section 12, when the piping 16 enters, thus retarding the gases to a considerable extent. The space between the adjacent ends of the sections 10 and 12 being also reduced to a small size, the outlet for the gases is considerably reduced, so that the retarding of the gases is quite effective. This retarding of the gases does not interfere with the draft of the furnace but rather assists it because of the increased draft resulting from the current of air projected through the pipe 16. By retarding the gases, the piping 7 between the furnace and the pipe section 12, is filled with gases, so that the entire area of this portion of the piping is used when the furnace is in operation. Under normal conditions, without the use of applicant's device, the gases fill only a small portion of the piping. It is, of course, evident that in addition to the gases arising from the fuel being combusted that the air coming through the grates also is contained within the piping, thus establishing ideal conditions for complete combustion of the combustible gases.

While I have illustrated and described the preferred form of structure, I do not wish to limit myself to the precise form of structure shown, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. A device of the class described, comprising an enlarged pipe section; a blower communicating with said pipe section and adapted for directing a current of air longitudinally thereof; a reduced pipe section, slidably mounted in said first mentioned pipe section; a reduced pipe section fixedly mounted in said first mentioned pipe section; slidable means for closing one end of said stationary reduced pipe section; and common means for moving said closing means

and said slidable reduced pipe section relatively to said stationary reduced pipe section.

2. A device of the class described, comprising a pipe section; a blower communicating with said pipe section, adapted for directing a current of air longitudinally thereof; a reduced pipe section mounted concentrically in said first mentioned pipe section, stationary relatively thereto; a closure for one end of said pipe section, movable relatively thereto; a reduced pipe section mounted concentrically of said first mentioned pipe section and movable relatively to said stationary reduced pipe section; tongues projecting outwardly from said slidable reduced pipe section and engaging the inner surface of said stationary reduced pipe section; and means for simultaneously moving said closure and said slidable reduced pipe section relatively to said stationary reduced pipe section, said slidable reduced pipe section and said closure moving always in opposite directions relatively to each other, and said stationary reduced pipe section being positioned between said closure and said slidable reduced pipe section.

3. A device of the class described, comprising a conduit; a blower adapted for directing a current of air longitudinally of said conduit axially thereof; a reduced pipe section mounted concentrically in said conduit intermediate its ends; a reduced pipe section slidably mounted in said conduit and projecting beyond one end thereof, said end of said conduit being reduced in diameter; tongues projecting from the inner end of said slidable pipe section engaging in said stationary pipe section; a slidably mounted closure for the opposite end of said stationary pipe section; and means exterior of said conduit for moving said slidable pipe section and said closure simultaneously in opposite directions.

4. A device of the class described, comprising a conduit; a stationary pipe of reduced diameter mounted concentrically in said conduit, fixedly intermediate the ends thereof; a reduced pipe section slidably mounted in said conduit and projecting from one end thereof, said end of said conduit being reduced in diameter; tongues projecting from the opposite end of said slidably mounted reduced pipe section, engaging in said stationary pipe section and serving as guides for guiding said slidably mounted pipe section upon movement of the same relatively to said fixedly mounted pipe section; a closure for the opposite end of said fixedly mounted pipe section, slidably mounted; and means exterior of said conduit for moving said movable pipe section and said closure relatively to said fixedly mounted pipe section in either direction at will, the direction of movement of said closure and said slidably mounted pipe section being in opposite directions.

In testimony whereof, I have signed the foregoing.

CHRISTOPHER J. KNAGGS.