April 2, 1929. J. C. MILES 1,707,531

FURNACE ATTACHMENT

Filed May 6, 1926

FIG.-1

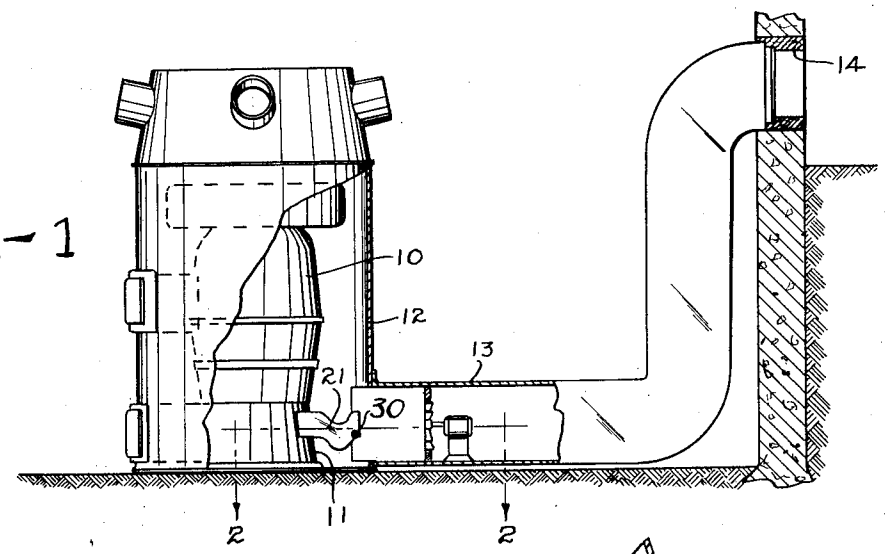



FIG.-2

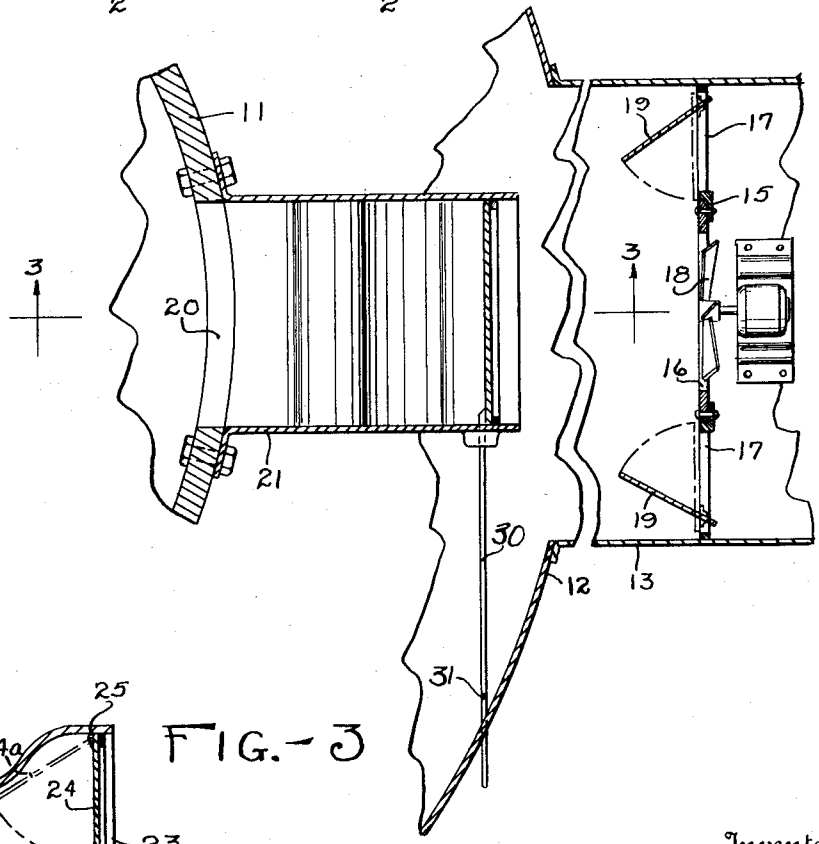
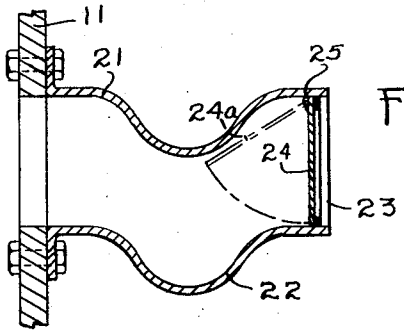



FIG.-3




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Patented Apr. 2, 1929. 1,707,531

# UNITED STATES PATENT OFFICE.

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## FURNACE ATTACHMENT.

Application filed May 6, 1926. Serial No. 107,017.

The principal object of the present invention is to provide means for automatically controlling the rate of combustion in hot air heating furnaces. More particularly the invention is intended for use in connection with a hot air heating furnace which is equipped with means for forcing air through the heating chamber, such as that illustrated, described and claimed in Patent No. 1,598,299 issued to me on Aug. 31, 1926.

Briefly the device set forth in such patent embodies the use of a motor driven fan which is mounted within the inlet conduit to the heating chamber, together with dampers which normally are open when the fan is stopped, but are adapted to be closed when the fan is in operation. Ordinarily, operation of the fan is only required at relatively short periods in order to start the circulation of air through the heating system. During such periods of operation it is advisable to increase the rate of combustion in order to obtain a greater degree of efficiency.

The preferred apparatus for accomplishing the above objects is illustrated in the drawings wherein Fig. 1 is a side elevation partly in section of a hot air heating furnace with an inlet conduit and showing a device embodying my invention attached to the furnace; Fig. 2 is a section taken through part of the apparatus shown in Fig. 1 and on a plane indicated by the line 2—2, while Fig. 3 is a section taken through my device on a plane indicated by the line 3—3 in Fig. 2.

In Fig. 1, I have shown a furnace 10 having a base 11 which provides an ash pit and a heating chamber 12 which surrounds the furnace chamber. The heating chamber has an inlet conduit 13 which may lead to a window 14 in the usual way. Disposed across the inlet conduit, between the heating chamber and the window, I have shown a frame 15 which has a fan opening 16 adjacent the central portion, and a damper opening 17 on each side of the fan opening. A motor driven fan 18 is disposed across the fan opening within the conduit while dampers 19 pivotally mounted to the frame are arranged to close the damper openings at predetermined intervals. The arrangement of fan and dampers is such that the dampers are normally open when the fan is stopped so as to allow the unrestricted flow of air into the system, but are adapted to be closed whenever the fan is set in motion, so that all of the air then enters the system only through the fan opening.

To increase the rate of combustion in the furnace when the fan is in operation and thereby to provide additional heat at a time when the demand on the furnace is at a maximum, I make an opening 20 in the ash pit casing directly in alignment with the conduit 13. I then provide an auxiliary conduit 21 which is preferably bent as at 22 intermediate the ends, and which has an opening 23 disposed directly in the path of air which enters the heating chamber when the fan is in operation. Moreover I provide a damper 24 which is pivotally mounted at 25 adjacent the upper side of the conduit and is adapted to be held by the action of gravity in the closed position, such as that indicated by the full lines in Fig. 3. The damper is comparatively light in weight, however, and therefore is adapted to be swung to open position, as indicated by the broken lines $24^a$ in Fig. 3, whenever the fan is in operation. The opening of the damper allows air from the fan to pass through the conduit 21 and to enter the ash pit, and thereby to increase the rate of combustion within the furnace. This action occurs automatically whenever the fan is started and stops automatically whenever the fan is stopped.

The bent portion 22 provides a trap into which ash dust may collect when the grate is shaken, wherefore opening of the damper 24 will not be hindered when the fan is started. Moreover, as soon as the damper is opened, then the current of air will immediately blow the collected ash dust out of the trap and into the ash pit thus making a self-cleansing attachment which functions in a satisfactory manner.

It may frequently be desirable to lock the damper in closed position while the fan is in operation. To this end I have shown a bar 30 which extends through an opening in the side of the furnace chamber 12 and through another opening in the side of the conduit 21 directly beyond the closed position of the damper. This bar may be slid, whenever desired, into the conduit as shown in Fig. 2 so as to prevent opening of the damper while the fan is in operation. When it is desired to allow automatic opening of the damper, then the bar may be pulled downwardly until a pin 31 in the bar strikes the inner side of the heating chamber

wall. This amount of movement is sufficient to allow the inner end of the bar to clear the damper and at the same time to prevent it from being pulled out of engagement with the conduit.

An important advantage of my invention is the simplicity of construction and the assurance of satisfactory automatic operation. A furnace equipped with my invention will have an increased capacity and operating efficiency in that the production of available heat units will automatically be increased in the furnace chamber, when the demand in the heating system therefor is also increased.

Having thus described my invention, I claim:

1. In a hot air heating furnace, the combination with a heating chamber having an inlet conduit leading thereto, an ash pit having an inlet conduit extending in the same general direction as the first mentioned conduit but out of contact therewith, means within the first mentioned conduit for forcing air into the heating chamber, a damper pivotally mounted on the second named conduit adjacent the inlet end thereof, said damper being disposed in the path of said means and being normally closed by the action of gravity but adapted to be opened whenever said means is in operation for allowing air to enter the ash pit, whereby air may be admitted into the furnace in proportion to pneumatic pressure of said means, said second named conduit having a trap between the ash pit and the damper into which solid particles may collect, whereby the damper may at all times be free to open whenever said means is in operation.

2. In a hot air heating furnace having a furnace chamber and a heating chamber, the heating chamber having an air inlet conduit leading thereto, a motor driven fan associated with the conduit for forcing air under pressure into the heating chamber, said fan being adapted when in operation to change the operation of the furnace from a gravity to a forced air system, said furnace chamber having an opening associated therewith and disposed in the path of the fan and a yieldable closure for said opening, said closure being operable to admit air into the furnace chamber in proportion to the pneumatic pressure of the fan.

In testimony whereof, I hereunto affix my signature.

JAMES C. MILES.