

Nov. 10, 1925.

1,560,633

A. M. ALLEN

IGNITING DEVICE FOR FURNACES

Filed Oct. 8, 1921

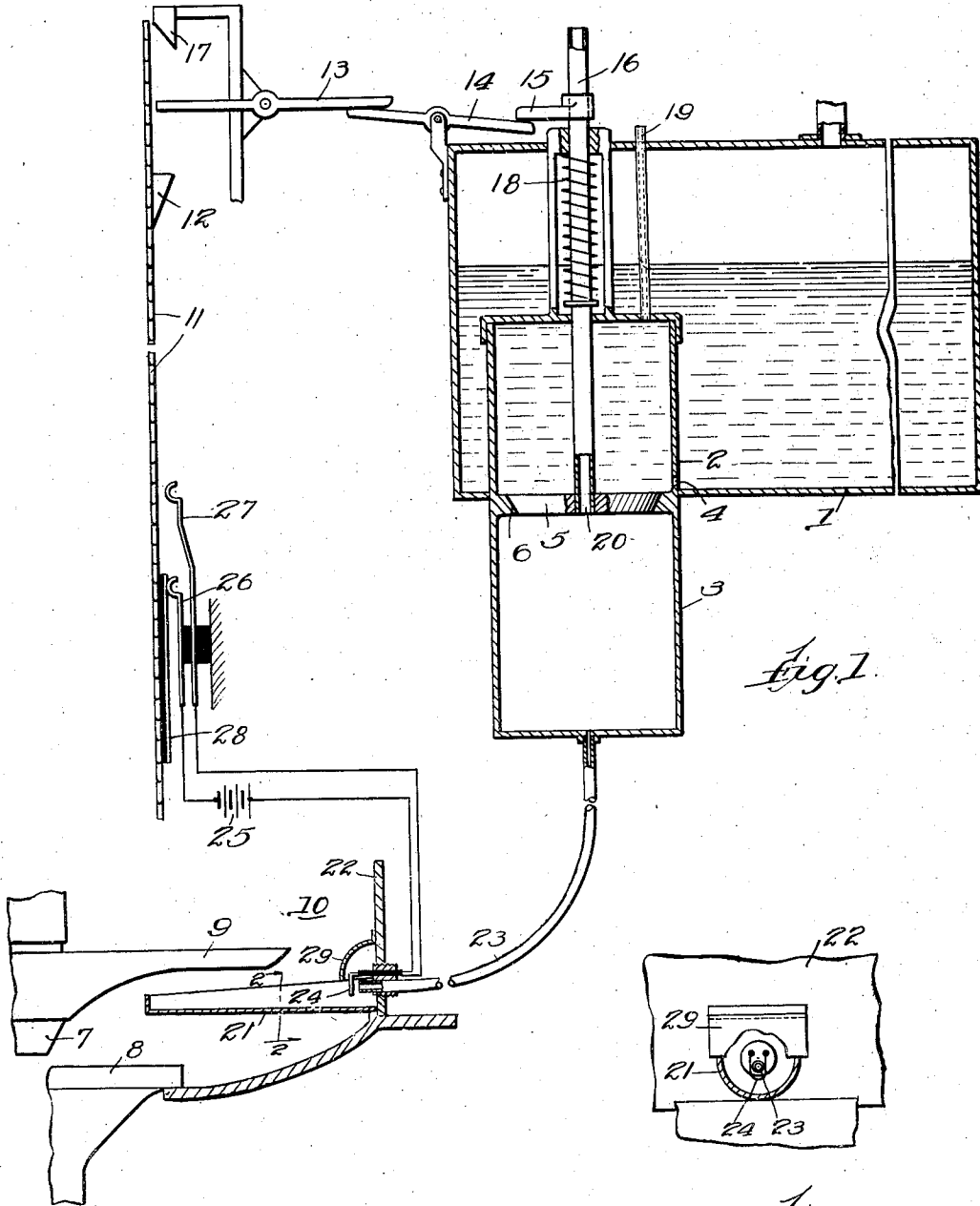


Fig. 2.

Inventor:
Adolphus M. Allen,

By Benton & Benton
his Atty's.

Witness:
C. S. Hunter

UNITED STATES PATENT OFFICE.

ADOLPHUS M. ALLEN, OF MINNEAPOLIS, MINNESOTA.

IGNITING DEVICE FOR FURNACES.

Application filed October 8, 1921. Serial No. 506,437.

To all whom it may concern:

Be it known that I, ADOLPHUS M. ALLEN, a citizen of the United States, residing in the city of Minneapolis, in the county of Hennepin, in the State of Minnesota, have invented certain new and useful Improvements in Igniting Devices for Furnaces, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide a simple and reliable mechanism for igniting fuel in a furnace, the apparatus shown being particularly suited to small heating plants such as are used for domestic purposes and in connection with which a thermostat located at a distance from the furnace regulates the operation thereof. The invention consists in the combination of various features and elements constructed and arranged as hereinafter described and shown in the drawings and as indicated by the claims.

In the drawings:—

Figure 1 is a diagrammatic view which may be considered as an elevation of the apparatus with certain parts shown in section.

Figure 2 is a detail section taken as indicated at line 2—2 on Figure 1.

In a domestic heating plant in which the principal fuel is a petroleum product such as fuel oil or kerosene, or in which powdered coal is employed with a forced air draft so that in either case fairly perfect combustion is effected, it is found that the operation is more economical if a given room temperature be maintained by alternately operating the furnace and shutting off the fire rather than by attempting to vary the intensity of the fire through any wide range. This method of operation if regulated by automatic means such as a thermostat located in the room or space which is to be heated requires some means for relighting the fire after it has been shut off for a time. Ordinarily a gas pilot light has been maintained for this purpose, but as is well known, this is both expensive and dangerous since the pilot flame is likely to be extinguished by a draft, leaving the combustion chamber to be filled with unburned gases ready to cause an explosion when the failure of the pilot light is discovered and the furnace is lighted by other means.

My invention is designed to eliminate both

the danger and excessive cost of operating a gas pilot and it comprises means for furnishing a definite small quantity of liquid fuel of readily inflammable character to the furnace and igniting it by an electrically heated wire or by an electric spark so as to produce an initial flame from which the principal fuel will take fire as it is fed into the furnace. Referring to the drawing, a supply tank, 1, for a quantity of liquid fuel such as kerosene is shown provided with a feeding device which includes a metering chamber, 2, and a receiving chamber, 3, situated below it. The metering chamber communicates at all times with the supply tank, 1, through a small orifice, 4, and may communicate with the receiving chamber, 3, through a large orifice nearly as great as its own cross section and controlled by a valve, 5, engaging a valve seat, 6. An oil burner for the furnace is diagrammatically indicated as consisting of a feed nozzle, 7, and an air distributing plate, 8, arranged to supply a spray or vapor mixture of air and oil directed against a deflector, 9, and outwardly into a combustion space, 10, in the furnace. The control of air and oil may be understood to be regulated by any suitable valve devices connected to the vertically movable chain, 11, of a thermostatically controlled motor device, not shown, such as is commonly in use for operating the drafts or dampers of furnaces of various types in domestic installations. It may be understood that after the fire has been shut down for a time and the room temperature has fallen sufficiently to operate the regulating thermostat, the motor device referred to will move the chain, 11, upwardly for a limited distance thereby opening the oil and air feed valves supplying the fuel elements to the parts, 7 and 8. By the same movement an abutment, 12, on said chain, 11, is made to engage a lever, 13, which in turn operates against a lever, 14, rocking the latter so as to lift the abutment, 15, on the stem, 16, of the valve, 5, thus opening the valve and permitting the contents of the metering chamber, 2, to discharge suddenly by gravity into the receiving chamber, 3. In view of the large area of the valve, 5, such discharge will be promptly completed and as the abutment, 12, passes a fixed cam, 17, disposed adjacent the path of the chain, 11, it will encounter the cam, causing the chain to be deflected and disengaging the abutment, 12,

from the end of the lever, 13. The lever, 13, and its connected parts being thus released, the valve, 5, will be quickly closed by the action of gravity supplemented by the pressure of its spring, 18, and the chamber, 2, will refill gradually through the small opening, 4.

Prompt discharge of the contents of the chamber, 2, is insured by providing an air vent, 19, leading therefrom outside the tank, 1. An air vent for the receiving chamber, 3, is afforded by making the valve stem, 16, in the form of a hollow tube communicating with an opening, 20, in the valve, 5, and extending beyond the top of the tank, 1.

In the path of the fuel vapors which are fed past the deflector plate, 9, in the furnace an upwardly open trough or pan, 21, extends from the side wall, 22, and leading to said trough or pan, 21, is a feed pipe, 23, of restricted cross section communicating with the chamber, 3. The metered charge of liquid fuel dumped into the chamber, 3, from the chamber, 2, is thus permitted to feed gradually into the pan, 21. Adjacent the outlet of the pipe, 23, an electrical igniting device is positioned. As shown this may consist of a loop of resistance wire, 24, connected into an electric circuit with a battery, 25, and adapted to become incandescent when the circuit is closed. Or, if preferred, a spark plug such as that commonly used in an internal combustion engine may be substituted and connected with any suitable device for producing a high tension electric current and a sufficiently hot spark to ignite the liquid fuel in the pan, 21. In either case the primary electric circuit will be provided with a pair of contacts, 26 and 27, and a conductor bar, 28, may be mounted on the chain, 11, so that as the chain rises, the said bar will extend into contact with both the arms, 26 and 27, closing the circuit and energizing the igniting device, 24. The bar, 28, may be made of such length that the contact will be maintained long enough to insure ignition of the initial quantity of liquid fuel discharged into the pan, 21. As this quantity is consumed it will be replenished through the pipe, 23, until the entire charge of fuel in the chamber, 3, is exhausted and by this time combustion of the regular fuel supply from the nozzle, 7, will have been started in

the combustion zone, 10. To protect the ignition device, 24, from unnecessary punishment due to the heat in the zone, 10, a shield, 29, may be provided overhanging the igniter, 24, and the outlet of the pipe, 23.

It will be noted that the lever, 13, is not positively connected to the lever, 14, but is adapted to actuate it only in one direction. This permits the reverse and downward movement of the chain, 11, to take place without affecting the valve, 5, or its connections other than moving the lever, 13, which will be swung away from the lever, 14, as the abutment block, 12, passes said lever, 13, in returning to its lower limiting position. After such reverse movement of the chain, 11, which will occur when the determined maximum room temperature has operated the thermostatic regulator, the parts of the igniting mechanism will be ready to again relight the fire when the thermostat operates to move the chain, 11, upwardly.

I claim:—

1. An igniter for a furnace comprising a supply receptacle for readily inflammable liquid fuel, a metering chamber in constant communication therewith through a relatively small orifice, a receiving chamber below the metering chamber with a relatively large orifice affording communication between said chambers, and a valve controlling it, an open trough or pan in the furnace connected with the receiving chamber and electrical igniting means associated with the pan, together with means for simultaneously energizing the electrical igniter and opening the valve for releasing a charge of liquid fuel from the metering chamber.

2. In the combination defined in claim 1, means for yieldingly resisting the opening of said valve and operating to close it quickly after release of the charge of liquid fuel from the metering chamber.

3. In the combination defined in claim 1, the pan or trough in the furnace communicating with the receiving chamber by a restricted passage to permit gradual flow of the charge of liquid fuel to the pan.

In testimony whereof, I have hereunto set my hand this 5th day of October, 1921.

ADOLPHUS M. ALLEN.