

Aug. 27, 1929.

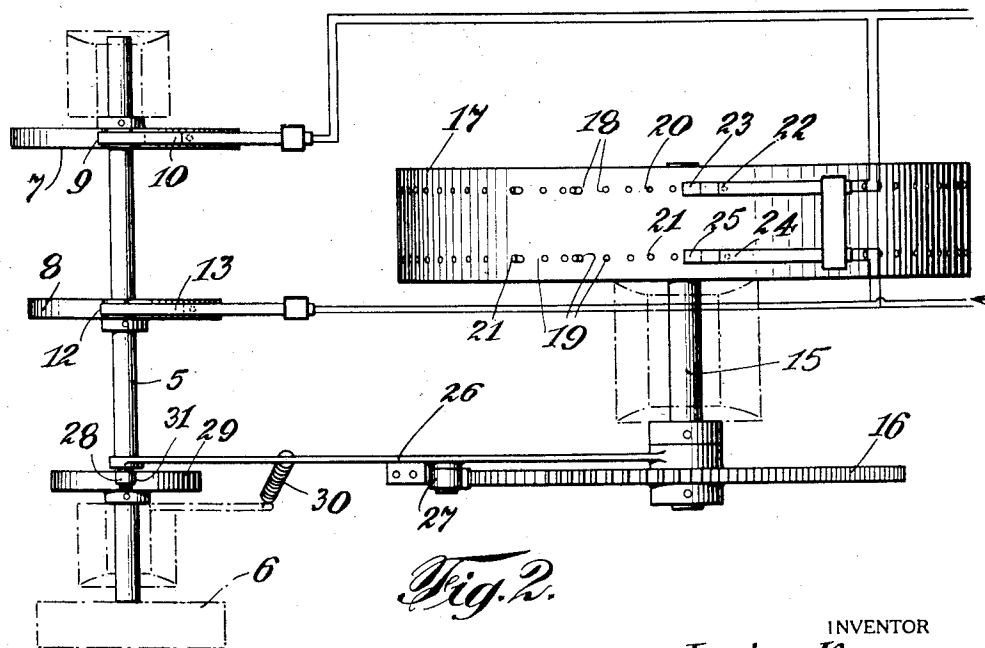
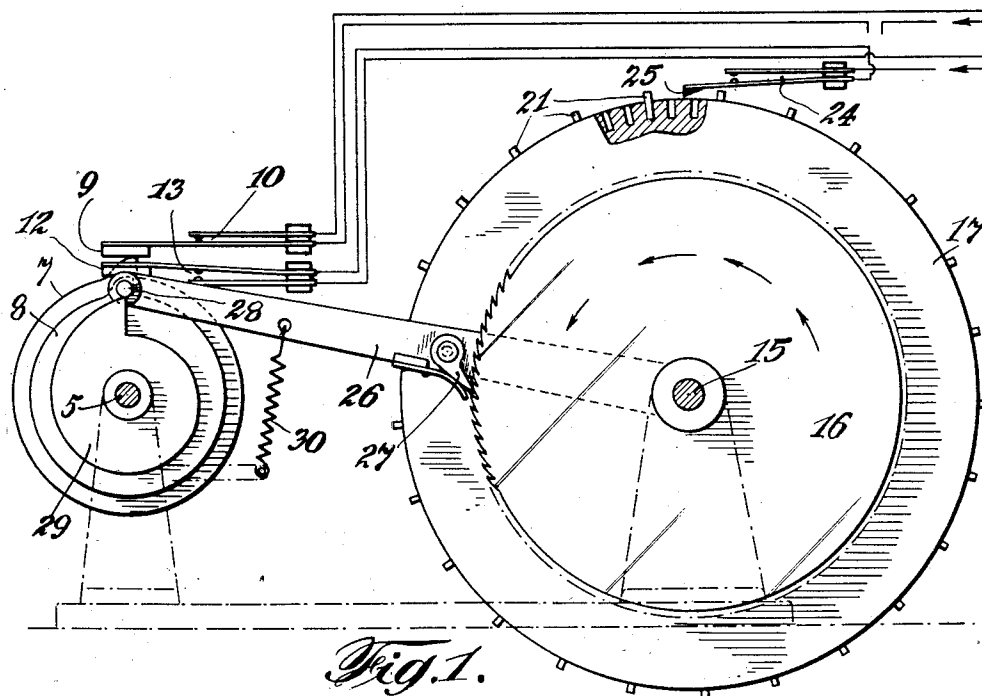
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1,726,520

AUTOMATIC CONTROL MEANS FOR OIL BURNERS

Filed July 3, 1928

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

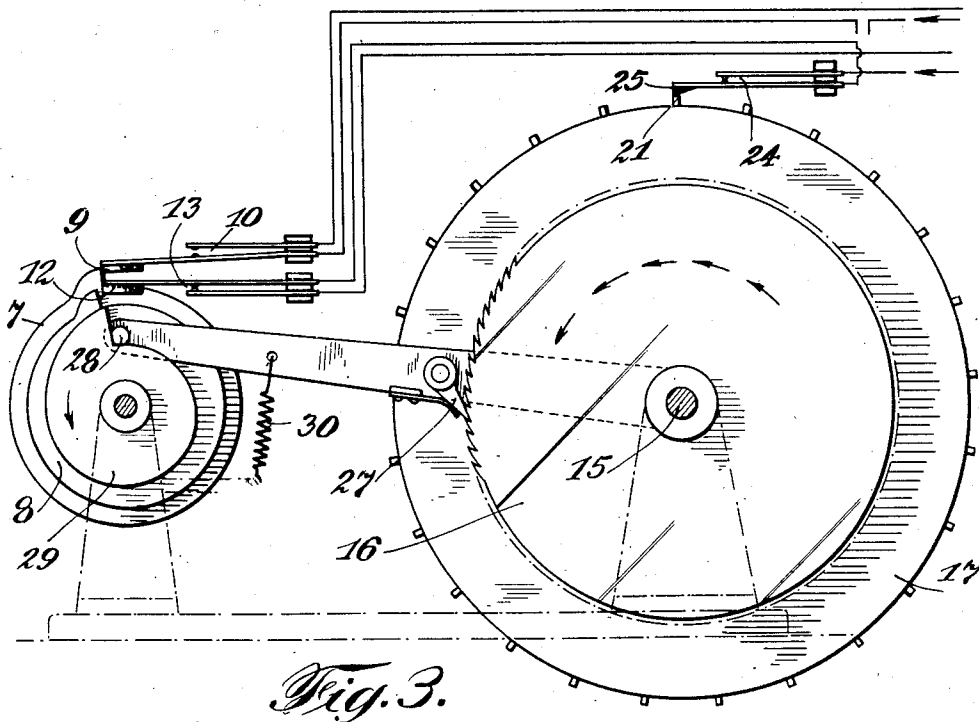


Fig. 3.

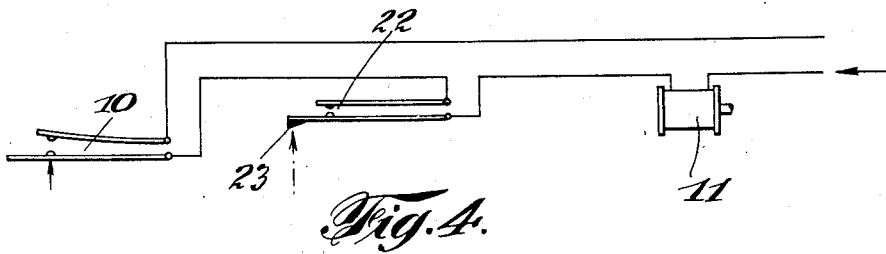


Fig. 4.

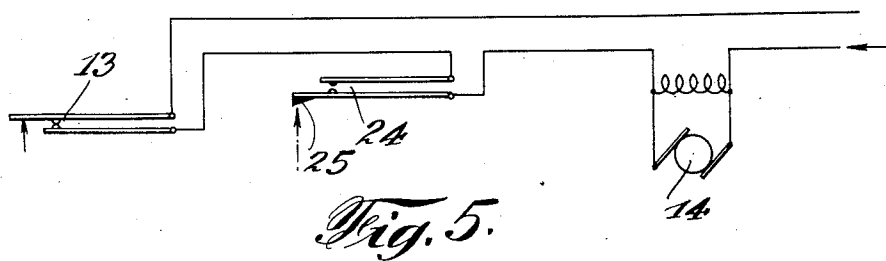


Fig. 5.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC CONTROL MEANS FOR OIL BURNERS.

Application filed July 3, 1928. Serial No. 290,256.

This invention relates to automatic control means for oil burners and other apparatus which it may be desirable to operate at regular intervals for predetermined time periods.

It is the general object and purpose of my present improvement to provide an automatically operating mechanism of simple construction for controlling or regulating the operation of oil burners such as are in more or less general use in connection with the heating plants of private residences, apartment houses and other buildings and comprehends the provision of such an automatic control means which may be readily adjusted or set to cause the operation of the oil burner for predetermined periods of time and at predetermined intervals between such periods of operation; variable at will as may be most desirable in view of variable weather conditions so as to maintain a substantially uniform heating temperature.

It is another important object of my invention to provide such an automatic control mechanism for oil burner heating systems of the type having motor operated fuel supply means and ignition means, which will be positive and reliable in its operation, eliminating the usual thermostatic control, is not liable to get out of order and which will require a minimum of care or attention on the part of the user or attendant.

With the above and other objects in view, the invention consists in the improved automatic control means for oil burners and other apparatus as will be hereinafter more fully described, illustrated in the accompanying drawings, and subsequently incorporated in the subjoined claims.

In the drawings, wherein I have illustrated, more or less diagrammatically, one simple and practical embodiment of the invention, and in which similar reference characters designate corresponding parts throughout the several views,—

Figure 1 is a side elevation partly in section showing one form of my present improvements;

Fig. 2 is a top plan view thereof;

Fig. 3 is a view similar to Fig. 1 showing the relative positions of the parts at another stage in the cycle of operation, and

Figs. 4 and 5 are diagrammatic views illustrating the circuits for the fuel ignition means and the fuel supply means respective-

ly, together with the automatically controlled switch devices interposed in said circuits.

Referring in detail to the drawings, 5 designates a power shaft, mounted and supported in suitable bearings and driven by a suitable clock mechanism conventionally indicated at 6 which may be of the electric type. This shaft is so geared to the clock mechanism that said shaft will make one complete revolution in 15 minutes. Upon said shaft 65 and in spaced relation to each other, the cam discs 7 and 8 respectively, are suitably fixed. The cam 7 is adapted to coact with the insulated contact part 9 carried by one element of a normally open switch 10 which 70 is interposed in the circuit of an electro-magnet 11 of the solenoid type, the movable core of which may be connected with the gas control valve of the ignition means for the oil burner and through the medium of which 75 gas is supplied to the burner to be ignited by a pilot jet. However, the fuel ignition means may if desired, consist of an electric spark device connected in the circuit in the conventional manner so that upon the closing of the switch 10, the spark will be created to ignite the fuel.

The other cam 8 is adapted to coact with the insulated contact member 12 carried by one element of a normally closed switch 13 85 which is interposed in the circuit of the electric motor indicated at 14 through the medium of which atomized oil and air are supplied to the furnace burner.

A second shaft 15 is mounted in parallel relation to the shaft 5, and has fixed to one end thereof a ratchet wheel 16. Upon the other end of this shaft the drum 17 is fixed and is provided in its periphery with the two circumferentially extending series of equidistantly spaced holes or recesses 18 and 19 95 respectively, in which the pins 20 and 21 respectively, are adapted to be removably and adjustably inserted. In the circuit for the ignition means, a second normally open 100 switch 22 is interposed, the movable element of which carries an insulated contact piece indicated at 23 for engagement by the pins 20. A similar normally open switch 24 is also interposed in the circuit of the motor 14, and 105 one of the latter switch elements likewise is provided with an insulated contact piece 25 similar to the contact piece 23 for engagement with the other series of pins 21.

Upon the shaft 15 a lever 26 is loosely jour-

nalled at one of its ends and carries a pawl 27 spring held in engagement at its free end with the teeth of the ratchet 16. The other end of this lever is provided with a pin or roller 28 bearing upon the periphery of a cam disc 29 fixed on the shaft 5 and yieldingly held in contact therewith by means of the spring 30 connected to said lever. The cam disc 29 at one end of its cam face has a radially extending shoulder 31.

The cam 29 is so formed and the number of teeth on the ratchet wheel 16 is such, say 96, that the shaft 15 will make one complete revolution in 24 hours, assuming that one revolution of the shaft 5 takes place each 15 minutes. It will of course, be understood that the ratchet wheel 16 and the drum 17 are so related that in each of the intermittent rotations of the drum, one of the pins 20 and one of the pins 21 will simultaneously act upon the movable elements of the switches 22 and 24 respectively, so as to close the independent electric circuits through these switches.

In the operation of the mechanism above described, assuming that the parts are in the position shown in Fig. 1 and the switch 10 is closed while the switch 13 is open, upon the slight further rotation of shaft 5, the roller 28 of lever 26 moves off of the high part of the cam 29 so that the ratchet wheel 16 and drum 17 are rotated and the two switches 22 and 24 are closed by the pins 20 and 21, providing said pins have been inserted into the proper holes in the drum. Therefore, the circuit of the electro-magnet 11 which is now closed has caused an operation of the valve to turn on the flow of gas which is ignited by the pilot jet and approximately one minute later, cam 8 moves out of engagement with contact piece 12 so that switch 13 closes, thereby closing the circuit of motor 14 through said switch and the switch 24 whereby the atomized oil and air is supplied and ignited by the gas burner. Approximately one minute thereafter, cam 7 moves out of engagement with contact piece 9 so that the switch 10 opens, thereby opening the circuit of the electro-magnet 11 and cutting off the continued flow of gas to the pilot jet. Approximately thirteen minutes later, the switch 13 is again opened and at the same time the switch 10 is closed, thereby breaking the circuit of the motor 14 so that the continued supply of fuel to the furnace burner is cut off. Immediately following, the ratchet wheel 16 is again operated and the cycle of operations above described is repeated, or omitted as the case may be, depending upon whether the pins 20 and 21 have been inserted into the proper holes 18 and 19 at regularly spaced intervals, or certain of said pins omitted. Thus, a proper heating program may be carried out, consisting of periods of operation of the oil burner, interrupted by intervals of time during which the burner

is not in operation, and which time intervals may be regular or irregular as desired.

From the foregoing description, considered in connection with the accompanying drawings, it will be seen that by means of such a mechanism as I have described and illustrated, furnace oil burners may be very economically operated and with very little care or attention by the attendant thereof. This mechanism provides a very satisfactory and reliable substitute for the usual thermostatic control means, which is very delicately constructed and requires more or less frequent repairs. The invention herein described is however, particularly designed for use in connection with large apartment houses and office buildings, where the only means of control for the oil burner is associated more or less directly with the burner installation and is not subject to manipulation or control by the individual tenants residing in the building.

I have herein disclosed an embodiment of my present improvements, which by actual test, I have found to be entirely satisfactory, for the purpose in view. Nevertheless, it is possible that in the adaptation and use of my present invention in connection with various different types of burners, certain modifications of the mechanism may be required, and it is therefore, to be understood that I reserve the privilege of resorting to all such legitimate changes therein as may be fairly embodied within the spirit and scope of the invention as claimed.

I claim:

1. In automatic control means for fuel oil burner systems and other apparatus to render such apparatus alternately active and inactive for predetermined intervals of time, said apparatus including two electrically controlled devices and a separate current supply circuit for each of said devices; in combination with a normally open switch in one of said circuits and a normally closed switch in the other circuit, an additional normally open switch in each circuit, time clock control means for momentarily closing and opening the respective first named switches at the end of predetermined intervals of time, and additional means automatically controlled and actuated by the time clock and including movable means for closing the second named switches while said first named switches are operated upon by the clock controlled means, and for maintaining said second named switches closed after the return of the first named switches to normal condition and during the time interval elapsing until the succeeding operation of said first named switches.

2. In automatic control means for fuel oil burner systems and other apparatus to render such apparatus alternately active and inactive for predetermined intervals of time,

5 said apparatus including two electrically
controlled devices and a separate current sup-
ply circuit for each of said devices; in com-
bination with a normally open switch in one
10 of said circuits and a normally closed switch
in the other circuit, an additional normally
open switch in each circuit, time clock
control means for momentarily closing and
opening the respective first named switches
15 at the end of predetermined intervals of
time, and additional means automatical-
ly controlled and actuated by the time clock
and including movable means for clos-
ing the second named switches while said
20 first named switches are operated upon by the
clock controlled means, and for maintaining
said second named switches closed after the
return of the first named switches to normal
condition and during the time interval elaps-
25 ing until the succeeding operation of said first
named switches, said movable means having
relatively adjustable parts to coact with said
second named switches whereby the time in-
terval elapsing between the successive clos-
ing of said switches may be rendered equiva-
30 lent at will to any desired multiple of the
time interval elapsing between successive op-
erations of the first named switches.

3. In automatic control means for fuel oil
burner systems and other apparatus to render
such apparatus alternately active and inac-
tive for predetermined intervals of time, said
apparatus including two electrically con-
35 trolled devices and a separate current supply
circuit for each of said devices; in combina-
tion with a normally open switch in one of
said circuits and a normally closed switch
in the other circuit, an additional normally
open switch in each circuit, time clock con-
40 trol means for momentarily closing and open-
ing the respective first named switches at the
end of predetermined intervals of time, a ro-

tatably mounted drum, ratchet mechanism
for intermittently rotating said drum, a cam
member actuated by the time clock controlling
45 the operation of said ratchet mechanism, and
relatively adjustable elements mounted in the
periphery of the drum and coacting with
said second named switches to close the same
while said first named switches are in opera-
50 tive position, and to maintain said second
named switches closed during a predeter-
mined number of time intervals elapsing be-
tween successive operations of the first named
switches. 55

4. In automatic control means for fuel oil
burner systems and other apparatus to render
such apparatus alternately active and inac-
tive for predetermined intervals of time, said
apparatus including two electrically control
60 devices and a separate current supply circuit
for each of said devices; in combination with
a normally open switch in one of said circuits
and a normally closed switch in the other cir-
cuit, an additional normally open switch in
65 each circuit, a driven shaft, cam members on
said driven shaft to momentarily close and
open the said first named switches to each
revolution of said shaft, a drum, ratchet
mechanism for rotating said drum, an addi-
70 tional cam on said driven shaft controlling the
operation of said ratchet mechanism, and
members carried by said drum and adjustable
in spaced relation to each other circumferen-
tially of the drum adapted to coact with said
75 second named switch and close the same while
said first named switches are in operated po-
sitions and to maintain the second named
switches closed during a predetermined num-
ber of revolutions of said driven shaft. 80

In testimony that I claim the foregoing as
my invention, I have signed my name hereto.

IRVING KRAMER.