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CONTROLLING APPARATUS FOR OIL BURNERS

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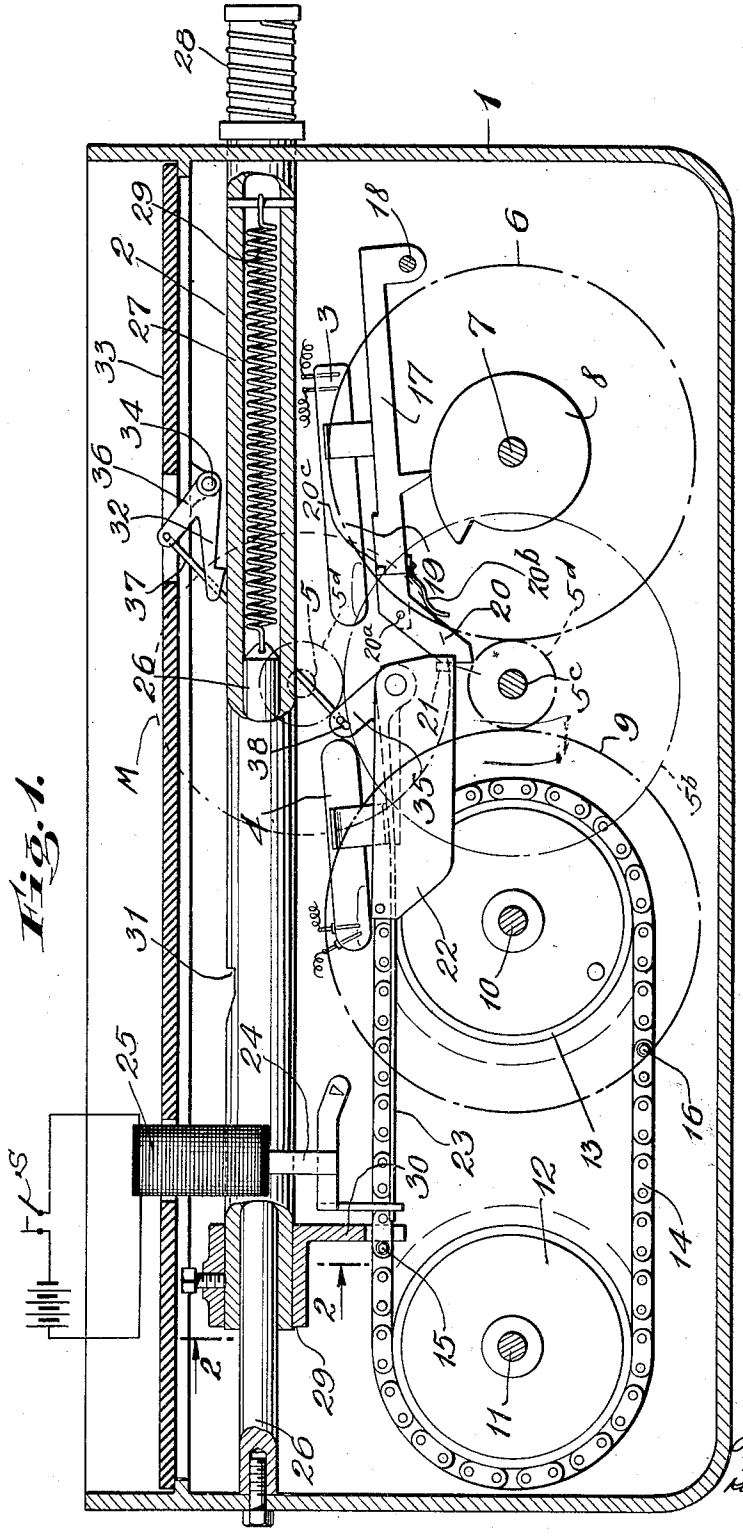


Fig. 1.

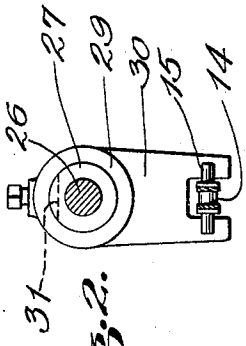


Fig. 2.

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CONTROLLING APPARATUS FOR OIL BURNERS

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This invention relates to an improvement in controlling apparatus for oil burners of the type wherein the igniter is moved to and from firing position automatically, the present invention being directed specifically to the mechanism whereby such movement of the igniter is effected.

Inasmuch as the present invention is directed only to the control feature above referred to we have deemed it unnecessary to illustrate the entire control mechanism, the accompanying drawings, as will be presently explained, illustrating merely the specific features to which the present invention relates.

In general, the present invention relates to apparatus comprising a cycling motor or control motor adapted to make and break various electric control circuits in predetermined order so that the operation of the burner as a whole is entirely automatic, the novelty in our invention residing in the construction whereby, as above mentioned, the igniter is caused to move in and out of firing position, our invention providing a construction which is exceedingly compact and in which the number of parts have been reduced to a minimum.

In the drawings accompanying this application:

Fig. 1 is an elevational view in partial section of our improved construction; and

Fig. 2 is a section on the line 2—2 of Fig. 1.

Referring to the drawings in detail, our apparatus comprises a box 1 in which the entire apparatus is adapted to be mounted. 2 designates the igniter mechanism as a whole, 3 an ignition switch and 4 a switch which initially is in the electric circuit for the cycling motor M. The armature shaft of this motor is designated 5.

The armature shaft 5 has secured thereto a pinion 5*a* which is in mesh with a gear 5*b* freely mounted on a shaft 5*c*. A pinion 5*d* integral with the gear 5*b* is also mounted on the shaft 5*c* and in mesh with a gear 6 on the shaft 7, this shaft carries a cam 8. This pinion 5*d* is also in mesh with a gear 9 on shaft 10 whereby the gears 6 and 9 will be driven by the cycling motor.

11 designates another shaft spaced from the shaft 10 and carrying a sprocket 12. The shaft 10 is also provided with a sprocket 13. These sprockets 12 and 13 carry a sprocket chain 14. The chain 14 is provided with two pins 15 and 16, these pins being so spaced from each other that when the chain has moved from the position shown in Fig. 1 to move the pin 15 to the position in which the pin 16 has been illustrated, the pin 16 will have been moved to the position in which the pin 15 has been illustrated.

The cam 8 is adapted to actuate a pivoted arm 17, pivoted at 18, and mounting a mercury tube switch 19 which is the ignition switch of the control system.

Pivoted member 17 is provided with a downwardly extending portion or nose 20 which is adapted to cooperate with a lug 21 provided on a pivoted member 22. The nose 20 on the pivoted mount 17 and the lug 21 are so positioned relatively that when the member 17 has been elevated sufficiently to tip the tube 19 to the right to its extreme position the nose 20 will rest upon the lug 21 and the tube and the mount therefor will be held in this position. It will be noted that the nose 20 is pivoted to the member 17 at 20*a* so as to swing in a counter-clockwise direction when the member 17 moves in a clockwise direction so that the nose 20 may be depressed by its contact with lug 21 after it moves past said lug. A spring 20*b* is provided to move the nose 20 back to position against a stop 20*c* when the nose has passed the lug 21 so that it will rest on the lug 21 to maintain the ignition switch closed.

The member 22 is adapted to be pivoted upwardly from the position shown in Fig. 1 by a rod 23 which is attached to the armature 24 of a solenoid 25. The circuit of this solenoid is controlled by a switch S which is closed when ignition at the burner is completed or initiated.

Extending across the box 1 is a fixed rod 26 mounted within a longitudinally movable tube 27 the outer end of this tube, which projects through the wall of the box, carrying igniter element 28. Within the tube 27 is a spring 29, one end of which is anchored tc

the end of the rod 26 and the other end of which is anchored to the tube so that when the tube is moved longitudinally the spring will be placed under tension.

The rear end of the igniter tube 27 is provided with a yoke 29 having a downwardly extending fork 30 which is adapted to be engaged by the pin 15 or the pin 16, as the case may be, carried by the sprocket chain 14 as above described.

The upper face of the igniter tube 27 is flattened as shown at 31 and this flattened portion is adapted to be engaged by a latching lever 32 which is mounted above the tube as for example on the cover 33 of the box or container 1. The latching lever 32 is pivoted at 34. The pivoted member 22 above referred to is provided with an offset or arm 35 and the latching lever 32 is also provided with an offset arm 36. 37 designates a tie rod uniting these two offset arms 35 and 36. The end of the tie rod 37 is secured to the offset 35 in a slot 38 which permits of lost motion between tie rod and arm.

In operation with the cycling motor rotating to drive its armature shaft 5, the upper part of chain 14 we will assume is moving to the right as viewed in Fig. 1, the sprockets 12 and 13 it being assumed being driven clockwise. Under these conditions the pin 15 will engage the fork 30 secured to the igniter tube 27 and will move the tube to the right as viewed in Fig. 1 which is toward operative position, that is, firing position. The parts are so disposed that when the tube 27 is moved to its extreme right hand position the latching lever 32 will engage the flattened portion 31 on the tube, thus holding the tube 27 in operative position against the action of the coil spring 29 which it will be understood is placed under tension by this movement of the tube relatively to the rod 26.

The pin 15 of course will on continued movement of the sprocket chain 14 disengage from the fork 30. On ignition being completed, as will be understood, the solenoid 25 will receive current and raise its armature 24 and through the rod 23 rock the pivoted member 22 upwardly about its pivot carrying with it the offset arm 35. This movement of the arm 35 will, through the rod 37, raise the latching lever 32 to release the igniter tube 27 and the same will return to its initial position under the action of the spring 29. In the meantime the pin 16 has been moved to the position occupied by the pin 15 in the drawing so that on the next operation of the cycling motor the cycle so far as operation of the igniter mechanism is concerned will be repeated. It will be understood that the movement above described on the member 22 on energizing of the solenoid 25 will move the lug 21 away from beneath the nose 20 of member 17 to permit the ignition switch 3 to rock to open position.

What we claim is:—

1. Controlling mechanism for oil burners comprising in combination a cycling motor, an endless driving member driven thereby, a movably mounted igniter element, means carried by said driving member for moving said igniter element to operative position, latching mechanism for holding said igniter element in operative position, and combustion controlled means for releasing said latching mechanism to permit the igniter element to move to inoperative position upon combustion being initiated.

2. Controlling mechanism for oil burners comprising in combination a cycling motor, a sprocket chain driven thereby, a movably mounted igniter element, means carried by the chain and adapted to move the igniter element to operative position, a latching mechanism for latching the igniter in operative position, and combustion controlled means for releasing said latching mechanism after combustion is initiated.

3. Controlling mechanism for oil burners comprising in combination a cycling motor, an ignition switch adapted to be closed by said cycling motor, latching mechanism for holding said ignition switch in closed position, a movably mounted igniter element driven by said cycling motor to operative position, latching mechanism for holding said igniter element in operative position and combustion controlled means for releasing both of said latching mechanisms upon combustion being initiated thereby to permit the ignition switch to open and the igniter element to move to inoperative position.

4. Controlling mechanism for oil burners comprising in combination a cycling motor, a sprocket chain driven thereby, an igniter element, a movably mounted tube for carrying said element and a yoke carried by said tube and adapted to be engaged by pins carried by said sprocket chain to move the igniter element to operative position.

5. Controlling mechanism for oil burners comprising in combination a cycling motor, a sprocket chain driven thereby, pins carried by said sprocket chain, a movably mounted igniter tube, a forked yoke attached to said tube and adapted to be engaged by either of said pins whereby upon rotation of the cycling motor the igniter tube will be actuated into operative position, latching mechanism automatically operative to hold the igniter tube in operative position, combustion controlled means for releasing said latching mechanism and a spring for returning the igniter tube to initial inoperative position.

6. Controlling mechanism for oil burners comprising in combination a cycling motor, an intermittently operated sprocket chain driven thereby, a movably mounted igniter tube, a yoke carried by said tube, pins carried by said chain adapted to cooperate with

said yoke to move the tube forward in the direction of travel of the sprocket chain, an igniter element carried by said tube, a fixed rod within the tube, a spring attached thereto and to said igniter tube, latching mechanism adapted to hold or latch the igniter tube in its forward position and combustion controlled means for releasing said latching mechanism to permit said spring to return the tube to its initial inoperative position, said pins carried by the sprocket chain being so positioned thereon that upon the return of the igniter tube to its initial position one of said pins will be in position to engage said yoke during the next operation of the cycling motor.

7. Controlling mechanism for oil burners comprising in combination a cycling motor, an ignition switch adapted to be closed by said cycling motor, latching mechanism for holding said ignition switch in closed position, a movably mounted igniter element driven by said cycling motor to operative positon, latching mechanism for holding said igniter tube in operative position, said latching mechanism being connected to the first-mentioned latching mechanism and combustion controlled means for releasing said latching mechanisms simultaneously upon completion of combustion to permit the ignition switch to move to open position and the igniter element to move to inoperative position.

8. Controlling mechanism for oil burners comprising in combination a cycling motor, an ignition switch adapted to be closed thereby, latching mechanism for maintaining the ignition switch in closed position, a sprocket chain driven by said cycling motor, a movably mounted igniter tube, means carried by said sprocket chain for moving said tube to operative position, latching mechanism cooperating with said tube to hold the tube in such position, means connecting said latching mechanisms, and combustion controlled means for releasing said latching mechanisms simultaneously to permit the ignition switch to open and the igniter to move to inoperative position.

9. In controlling mechanism for oil burners, the combination of a cycling motor, a sprocket chain driven thereby, pins carried by said sprocket chain, a movably mounted igniter tube, a yoke carried thereby and adapted to be engaged by either of said pins whereby the tube is moved into operative position, a latching mechanism for holding the tube in operative position, a spring for returning said igniter tube to inoperative position upon the release of said latching mechanism and a movably mounted ignition switch latching mechanism therefor and an ignition controlled solenoid for releasing said latching mechanisms simultaneously.

This specification signed this 23rd day of September, 1929.

JAMES N. MACRAE.

This specification signed this 23rd day of September, 1929.

CALVIN P. PACKARD.