

April 26, 1938.

G. MORRISON ET AL

2,115,689

TIME OPERATED CONTROLLING MEANS

Filed April 1, 1936

2 Sheets-Sheet 1

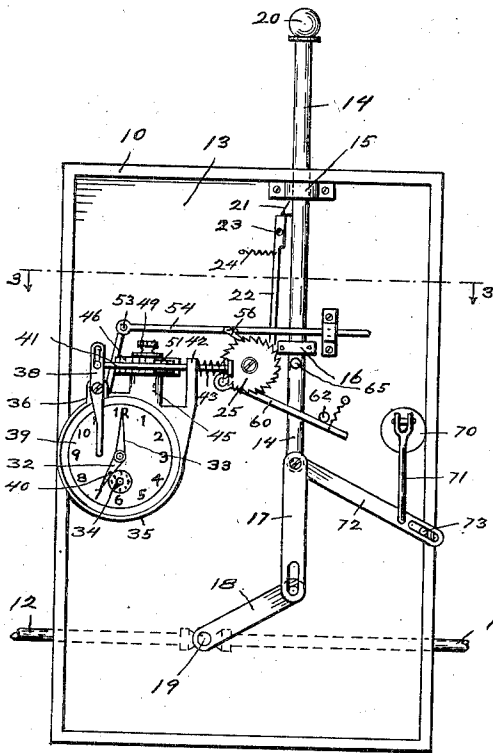


Fig 1

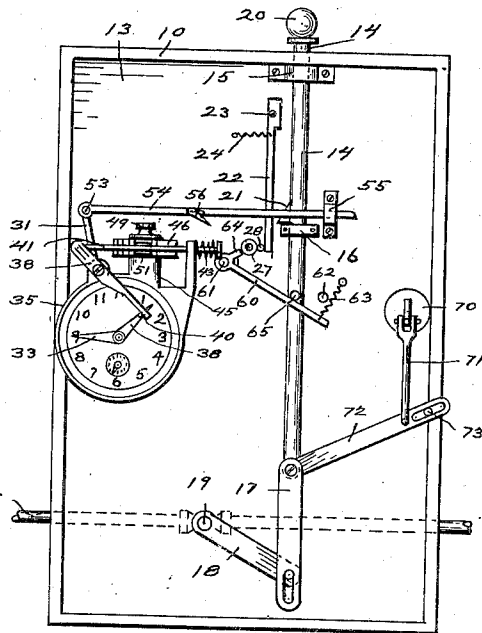


Fig 2

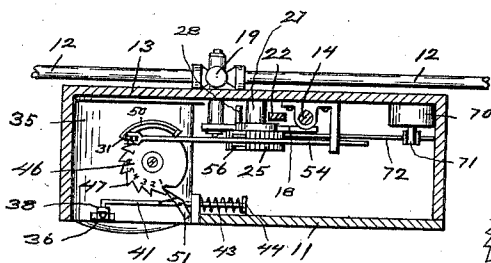


Fig 3

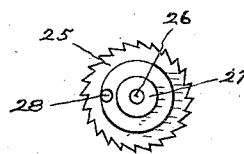


Fig 4

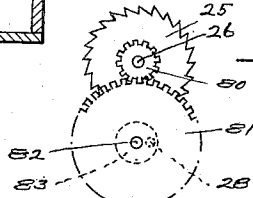


Fig 5

George Morrison.
Charles Cameron.

Inventors

John Thompson

Attorney

April 26, 1938.

G. MORRISON ET AL

2,115,689

TIME OPERATED CONTROLLING MEANS

Filed April 1, 1936

2 Sheets-Sheet 2

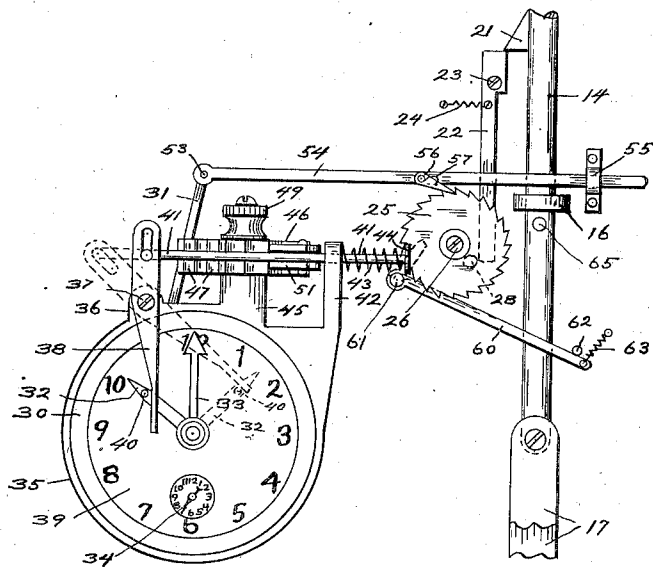


Fig 5

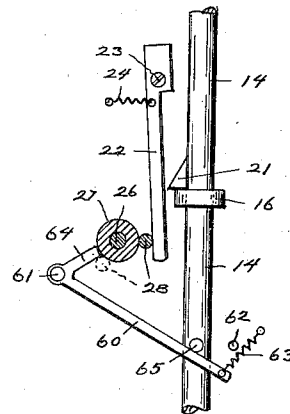


Fig 6

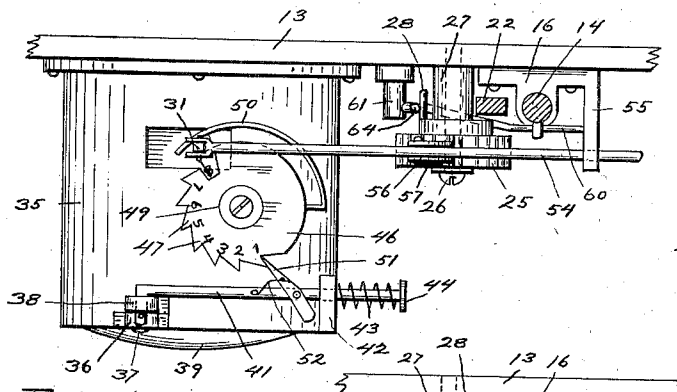


Fig 7

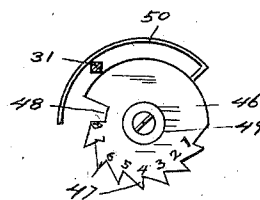


Fig 8

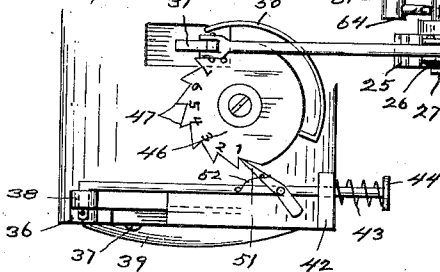


Fig 9

Inventors
George Morrison.
Charles Cameron.

By

John J. Thompson
Attorney

UNITED STATES PATENT OFFICE

2,115,689

TIME OPERATED CONTROLLING
MEANSGeorge Morrison, Poughkeepsie, N. Y., and
Charles Cameron, Hasbrouck Heights, N. J.

Application April 1, 1936, Serial No. 72,088

1 Claim. (Cl. 161—7)

This invention relates primarily to a time operated controlling means of that class whereby certain mechanism may be operated in an automatic manner at predetermined times or periods; and the invention relates particularly to a device whereby a valve may be opened to admit gas or water to heating devices, such as type-metal melters, water heaters, cooking stoves, furnace dampers, and the like, or for operating time locks, electrical circuits, or any mechanism at a predetermined time.

Clock operated mechanisms have been employed for this purpose, but when a twenty-four hour clock is used, it requires winding every day, and when an eight day clock is employed in industrial plants for operating heaters, locks, or flow of gas, etc., where it is not desired to operate on holidays and Sundays, an eight day clock will function every day of the eight, and thus on holidays and Sundays, the apparatus will have to be reset, the same as the other days.

The amount of force exerted by the alarm mechanism of an alarm clock is very small; and to turn valves, switches, locks, dampers, and the like, it requires considerable force and it will be found necessary to incorporate into a device of this kind, suitable mechanism whereby the force exerted by the clock is stepped up or compounded in a mechanical manner and not by electrical means which are liable to fail through interruption of the current supply.

In the operation of gas or water valves, switches and the like, it is important that they be operated in as near an instantaneous manner as possible, and not by a slow movement. It is therefore desirable that the clock operating mechanism act in a quick and positive manner.

To overcome these and other objections, we have devised a simple, durable, and efficient instrument operated by a clock mechanism, but which is capable of being "set" to operate only on predetermined days or hours within its capacity of an eight-day winding.

The object of the invention is to provide a clock controlled and operated mechanism whereby at predetermined intervals, certain devices may be operated to release, lock, or otherwise function.

Another object of the invention is to provide means whereby the operation may be set to skip certain days.

Another object of the invention is to provide means whereby, when the gas valve has been opened, no further action takes place until the valve operating rod has again been "reset".

With these and other objects in view, our invention consists in certain novel construction and combination of parts as will hereinafter be fully described and claimed, and further illustrated in the accompanying drawings which form a part hereof, and in which like figures of reference refer to corresponding parts in all of the views, and it is understood that slight changes may be made without departing from the spirit of the invention.

Referring to the drawings:—

Figure 1 is a front elevation of the device with the cover removed, and shows the mechanism set to operate at 7:00 A. M., to open the valve in a gas pipe.

Figure 2 is a similar view, with the ratchet wheel removed, but showing the changed position of the several parts after the operation has taken place, and the gas valve has been opened.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is an enlarged detail rear view of the ratchet wheel and trip pin.

Figure 5 is an enlarged partial vertical elevation of the clock and the mechanism operated thereby, showing the operating lever "set", and the timing means.

Figure 6 is a partial top plan view of the same, partly in section, and set to operate at 7:00 A. M.

Figure 7 is a similar view, but showing the timing means in position to release the latch operating device.

Figure 8 is a partial detail view of the latch and its operating mechanism, in released position, with the valve operating rod in open position, and the lock lever in operative position.

Figure 9 is a detailed view of the timing disk.

Figure 10 is a detail view of a compound gear drive and kick-off for exerting greater power.

In the drawings:—

The device as here shown, comprises a casing 10, having a removable front cover 11, and back 13 adapted to be mounted adjacent to a feed gas pipe 12, or other device which it is intended to operate, and which may be an electric switch, door latch, etc.

The operating mechanism is mounted upon the inner surface of the back 13, and comprises a rod 14 vertically reciprocable in the bearings 15 and 16; the lower end of said rod 14 being connected by the links 17 to the end of the valve lever 18 of the valve 19 controlling the gas pipe 12. The upper end of the rod 14 extends above the casing 10, and, being provided with a

hand knob 20, it may be raised to a "set" position.

This rod 14, between the bearings 15 and 16, is provided with a lug 21, square at the bottom and beveled on the upper side to allow it to freely pass the latch 22 upon the upward movement of the rod 14, as actuated by the hand knob 20.

The latch 22 is pivoted as at 23 near its upper squared end to the back 13 and is normally retained with its upper end contacting with and in an engaging position with the lug 21 of the rod 14 by a spring 24 having one end attached to the latch 22 below its pivot point. The other end of the spring 24 being attached to the back 13, thus retaining the latch 22 in engagement with the lug 21 to retain the rod 14 in its raised position, and the valve lever 18 "closed".

For moving the lower end of the latch 22 towards the rod 14 and thereby the upper end away from the rod 14 to release the lug 21 and allow the rod 14 to "drop" and turn the valve lever 18 to "open", a ratchet wheel 25 is rotatably mounted upon a stud 26 attached to the back 13. This wheel 25 is formed with a long hub 27 and a pin 28 extending from the rear face of the wheel 25, parallel to, and spaced from the hub 27 in such a manner, that once during each complete revolution of the wheel 25, the pin 28 will contact with and swing the latch 22 on the pivot 23 to move over the lower end of the latch 22 and release the upper end from the lug 21.

This latch 22 is designed to be operated at predetermined times by a clock operated mechanism which may be set for a certain time each day. In addition to this, we have so designed the clock operated mechanism, that it may be set to "skip" certain days, as holidays, and the like.

For this purpose we employ an eight-day alarm clock 30 of the usual type, having a vibrating clapper arm 31; an hour hand 32; a minute hand 33; an alarm set hand 34; and the usual winding keys, etc. The bell is removed from the clock, and the clock is removably secured within a frame 35 secured to the back 13.

This clock frame 35 has a lug 36 to which is pivoted as at 37, an arm 38 which extends downward over the face of the clock and back to the bezel 39 and in front of the hour hand 32. A pin 40 is secured to, and projects from, the hour hand 32 and is adapted to contact with the said arm 38 and move the same across the clock face, as far as the hour hand 32 travels through that part of a revolution; moving the said arm 38 once during every twelve hours, the arm 38 being carried back by the spring 43 and rod 41.

Pivoted to the upper end of the arm 38, is a rod 41 slidably mounted in a bearing 42 secured to the frame 35; the projecting end of the rod 41 having a spring 43 and collar 44 to normally retain the rod 41 and the arm 38 in the position shown in Figure 5.

Adjacent to this rod 41, a vertical stud 45 is formed on the clock frame 35, and upon this is rotatably mounted a timing disk 46, which is formed with seven ratchet teeth 47, and a notch 48 corresponding to the eighth tooth.

This disk 46 is provided with a knurled knob 49, by which it may be turned to set it, and also has a curved peripheral guard 50 having one end secured to the disk and its free end extending past to the notch 48.

For moving the disk 46 tooth by tooth, or one tooth per day, a pawl 51 is mounted on the rod 41 in engagement with the teeth of the disk 46

and retained by a spring 52, which may be released for resetting.

The clapper arm 31 of the clock 30 extends upward, and when the disk 46 is in the position shown in Figure 9, it is held between the periphery of the disk 46 and the guard 50 and is thus prevented from vibrating until the disk 46 is moved to bring the notch 48 into registry with the said clapper arm 31, when it may have free vibratory movement as actuated by the alarm mechanism of the clock.

To the upper end of this clapper arm 31 is pivoted, as at 53, a reciprocating rod 54, the free end of which is slidably mounted in a bearing 55 attached to the back 13. This rod 54 passes by the ratchet wheel 25 and has mounted therein a pawl 56 in engagement with the teeth of the ratchet 25 and retained by a spring 57 in such a way, that when the clapper arm 31 is released by the timing disk 46, the alarm mechanism of the clock 30 imparts a fast vibratory movement to the rod 54 and thus rotates the wheel 25 quickly to operate the latch 22 and release the rod 14.

For preventing further rotation of the ratchet wheel 25, after the rod 14 has descended and opened the valve 19, and before the rod 14 has again been raised and reset, by the knob 20, a lever 60 is pivoted to the back 13 as at 61, and is formed with a long arm extending past the rod 14 and retained in normal engagement with a stop pin 62 in the back 13 by a spring 63; and has a short arm 64 extending upward. As the rod 14 descends, a pin 55, secured thereto contacts with, and moves the arm 60 downward, bringing the short arm 64 into the path of the pin 28 on the ratchet wheel 25 and preventing the further rotation of said wheel 25, until the rod 14 is raised, allowing the spring 63 to move the arm 60 upward and the arm 64 out of the path of the pin 28.

In the operation of the device, assuming that it is desired to open the valve 19 in the gas pipe 12 at 7:00 A. M. each day.

The clock 30 is wound, both time and alarm, and the hand 34 on the alarm dial is set for "7", the pawl 51 is placed in the tooth number seven. Assuming that the apparatus is started at 8:00 P. M., the rotation of the hour hand 32, which, due to the contact of its pin 40 with the lever 38, moves the rod 41 and pawl 51 advancing the timing disk 46 one tooth, as shown in Figures 6 and 7, bringing the notch 48 into registry with the clapper arm 31. When the hands 32 and 33 of the clock 30 indicate 7:00 A. M., the clapper arm 31 will vibrate, rotating the ratchet wheel 25 to kick off the latch 22 and release the rod 14, allowing it to drop and turn the valve lever 18.

When the pin 65 on the rod 14 has contacted with the lever 60 it prevents further rotation of the wheel 25, and, upon the next complete rotation of the hands no further action will take place until the rod 14 is reset.

Should it be desired to skip a day or so, as in the case of holidays and Sundays, the pawl 51 is set into the proper tooth of the disk 46 so that the hand 32 can make several complete revolutions, advancing the disk 46 one tooth at a time until the notch 48 is in registry with the clapper arm 31, the said clapper arm 31 being prevented from vibrating while confined within the guard 50.

Other devices such as, an electrical switch 70 may be operated at the same time, by connecting them by a rod 71 to an arm 72, having one

end pivoted to the rod 14 and the other to a pin 73 in the casing 10.

As shown in Figure 10, the ratchet-trip may be compounded for hard work by the addition of a pinion 80 to the shaft 26, in mesh with and driving a gear 81 on a stud 82; and this gear 81 has a hub 83 corresponding to the hub 27 of the ratchet 25, and a kick-off pin 28.

Having thus described our invention, what we claim is new and desire to secure by Letters Patent, is:—

A time controlled valve actuating mechanism comprising in combination with a clockwork mechanism having an hour hand and an alarm mechanism provided with a vibratory arm, of a vertically moveable plunger connected to said control mechanism, a pivotally supported latch normally retaining the plunger in raised inoperative position, a pawl and ratchet connection between the vibratory arm of the clockwork alarm mechanism and said latch and operable to release

the plunger to actuate the control mechanism when the alarm mechanism is in operation, a rotatable index plate having an arcuate guide slot engageable with the vibratory arm to normally restrain movement of the latter for a plurality of indexed positions of said plate, and said plate having an enlarged opening communicating with said guide slot, means engageable with the hour hand for each revolution of the latter and operatively connected to said index plate to intermittently index the latter to bring said enlarged opening of the index plate in position to disengage the vibratory arm and throw the alarm mechanism into operation at its predetermined time setting to actuate the pawl and ratchet mechanism and release said latch from the vertically moveable plunger to effect actuation of the valve control mechanism.

GEORGE MORRISON.
CHARLES CAMERON.

20