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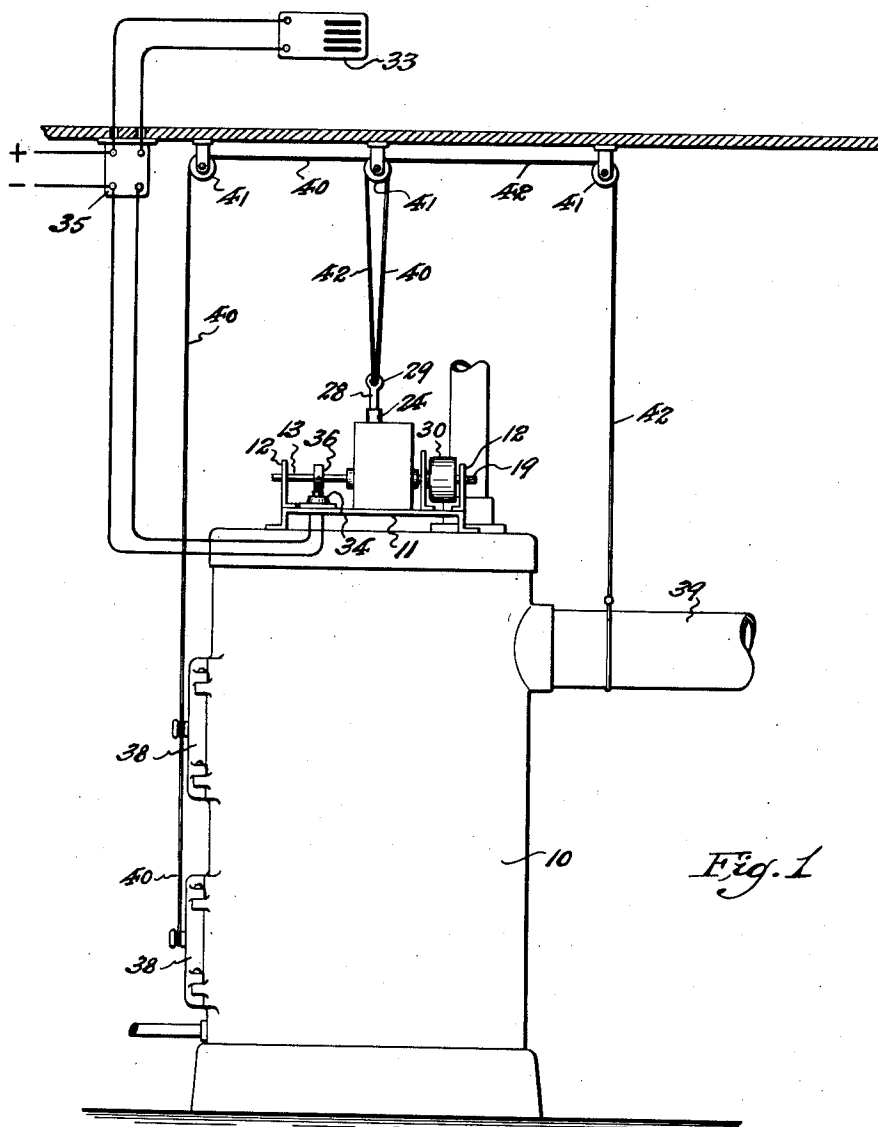
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ALARM SYSTEM FOR OIL AND GAS FIRED HEATING FURNACES

Filed April 20, 1950

2 Sheets-Sheet 1



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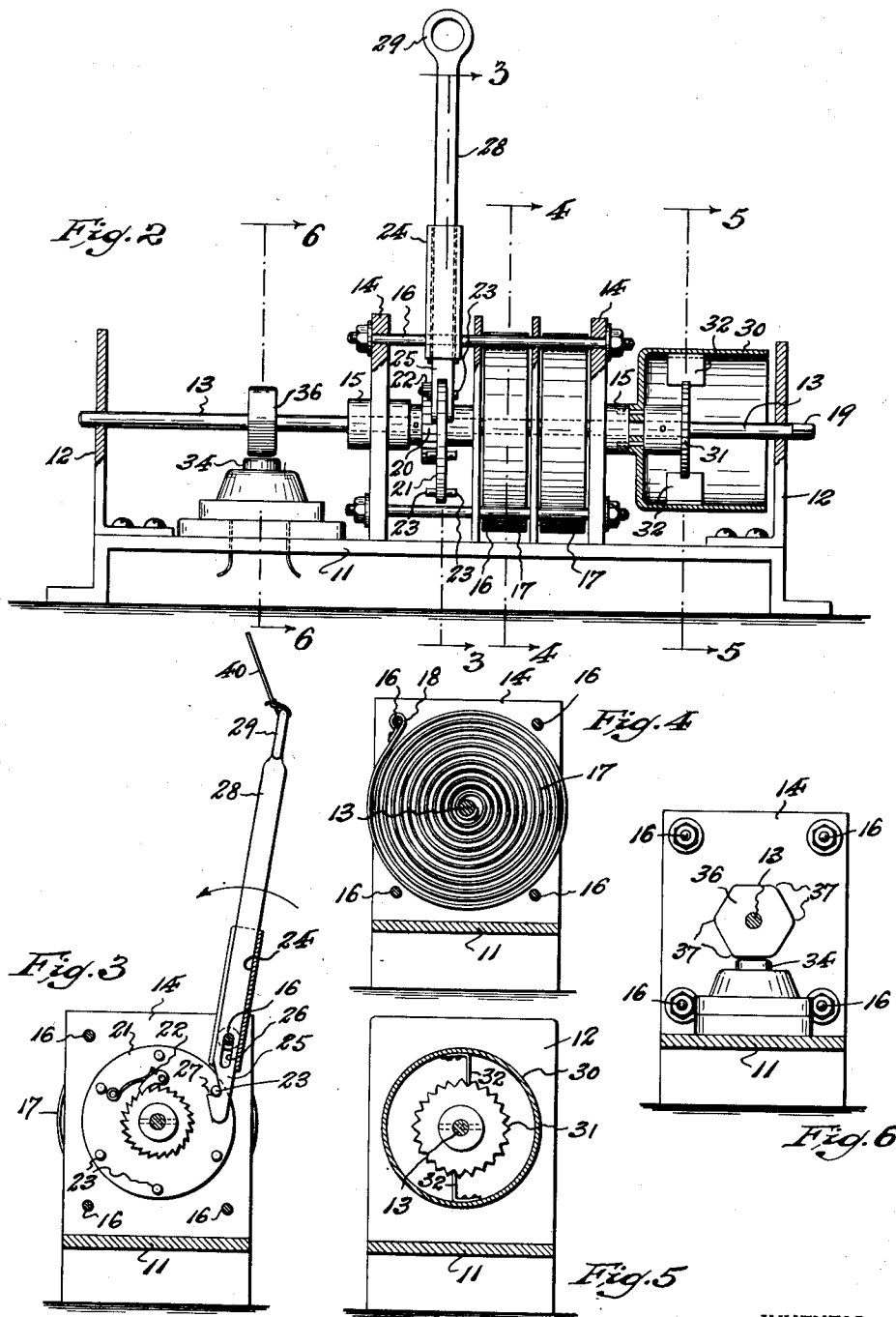
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ALARM SYSTEM FOR OIL AND GAS FIRED HEATING FURNACES

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2 Sheets-Sheet 2



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ALARM SYSTEM FOR OIL AND GAS FIRED
HEATING FURNACES

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2 Claims. (Cl. 116—100)

1

This invention relates to an alarm system for use in connection with oil or gas fired furnaces employed as a source of heat for building heating installations.

In the use of oil or gas fired furnaces which serve as the heat source for building heating systems, it not infrequently happens that back fires or explosive combustion of the fuel occurs within the fire-box or other internal parts of the furnace, with the result that the furnace doors are blown open or the furnace smoke is displaced so that smoke, fumes and soot are discharged from the furnace into the building interior, to the damage of said interior and discomfort of the building occupants, and with risk of fire. Resultant fire risk and damage could be greatly diminished, if not entirely avoided, if prompt warning of such occurrence were given so that remedial steps could be quickly taken.

Having the above circumstances in view, it is an object of this invention to provide a novel and efficient alarm system which is adapted to give prompt notice and warning in the event that abnormal combustion of fuel in the furnace occurs and results in discharge of smoke, fumes and soot into the building, so that immediate steps can be taken to remedy the condition, and thus avoid fire risk and possible damage and discomfort which would ensue if the condition were long neglected.

The invention has for a further object to provide a novel alarm system for the purposes stated which includes a local alarm operative at the furnace and a remote alarm or alarms for location in selected part or parts of the building interior.

Other objects of this invention, not at this time more particularly mentioned, will be understood from the following detailed description of the same.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which:

Fig. 1 is an elevational view of a furnace equipped with the novel alarm system of this invention, showing the connection of the latter to the doors and smoke-pipe of the furnace.

Fig. 2 is a side elevational view of the alarm control mechanism, with parts in section; Fig. 3 is a transverse sectional view, taken on line 3—3 in Fig. 2; Fig. 4 is also a transverse sectional view, taken on line 4—4 in Fig. 2; Fig. 5 is another transverse sectional view, taken on line 5—5 in Fig. 2; and Fig. 6 is still another transverse sectional view taken on line 6—6 in Fig. 2.

2

Similar characters of reference are employed in the hereinabove described views to indicate corresponding parts.

The alarm system of this invention comprises an alarm control mechanism which is adapted to be mounted and suitably supported on the furnace desired to be served thereby, or in a location in the adjacent vicinity of said furnace. As shown in Fig. 1, said alarm control mechanism is mounted on the top of a furnace 10, and comprises a base 11 having standards 12 upstanding from the respective ends thereof. Journaled in and between the bearing standards 12 is a rotatable shaft 13. The shaft 13 is arranged to be driven by a spring motor.

The spring motor is located between spaced apart transverse housing plates 14 which upstand from the base 11. Said housing plates also have bearings 15 through which the shaft 13 extends, and said housing plates are tied together by longitudinal tie-rods 16 which respectively extend between the corner portions thereof. One or more motor springs 17 (two being shown) have outer ends 18 thereof suitably affixed to and anchored by a tie rod 16, the inner ends of said motor springs being affixed to and in coupled connection with the shaft 13. The motor spring or springs 17 are wound to store tensional energy thereof by rotation of the shaft 13 counterclockwise. To permit this, an end of shaft 13 is provided with a squared portion 19 for engagement by a winding crank or key (not shown).

Tripable check means is provided for releasably holding the shaft against rotation under power transmitted by stored tension of the spring motor. In an illustrative form thereof as shown, the tripable check means comprises a ratchet wheel 20 which is fixed on the shaft 13 so as to turn therewith, and rotatably mounted on said shaft, contiguous to the ratchet wheel 20, is a check wheel or disc 21. This check wheel or disc 21 is of larger diameter than the diameter of the ratchet wheel, and pivotally mounted on the face of said check wheel or disc which opposes the ratchet wheel is a spring pressed pawl 22 adapted to engage the teeth of the latter whereby to obstruct spring power actuated rotation of the shaft 13 in operative clockwise direction. Carried by the check wheel or disc 21 are a plurality of laterally projecting check pins or studs 23 disposed in circumferentially spaced relation around the marginal portions thereof. Pivotaly supported on a tie rod 16 is a slide-way member 24 in which a detent bar 25 is slidably supported. Said detent bar is provided

with a slot 25 through which the last mentioned tie rod 16 extends, whereby the detent bar can be swung about the tie rod as a fulcrum and can also slide longitudinally in the slideway member 24. At its lower end, the detent bar 25 is provided with a stop shoulder or hook 27 which is adapted to be normally engaged with a check pin or stud 23 of the check wheel or disc 21. The upper end portion of the detent bar, which extends above the pivoting tie rod 16, provides a trigger arm 23 for tripping the detent bar. Said trigger arm 23 preferably terminates in an eye or ring 29.

The local alarm and actuating means therefor comprises an outwardly open sound amplifier shell 30, the closed inner end of which is suitably affixed to an adjacent housing plate 14, whereby said shell is maintained stationary. The shaft 13 extends through this sound amplifier shell 30. Fixed on the shaft 13 so as to be rotated thereby within the interior of the sound amplifier shell 30, is a toothed wheel 31. Affixed to the side walls of the sound amplifier shell 30 are sounder elements 32, the free ends of which are engageable by the teeth of the toothed wheel 31, whereby, when said toothed wheel 31 is rotated, the sounder elements will be vibrated thereby with loud sound producing effect.

An electrically operated remote alarm means, such e. g. as an electric buzzer or bell 33, is provided for selected location within the building served by the furnace 10. The means for controlling operation of the buzzer or bell 33 comprises a push-button switch 34 which is mounted on the base 11 of the alarm control mechanism and beneath the shaft 13 thereof. Said switch 34 is connected in electrical circuit with the buzzer or bell 33, preferably through a transformer 35. Fixed on the shaft 13, so as to be rotated thereby, is a cam wheel 36, the periphery of which is provided with one or more cam nosings 37 adapted, in operation of the cam wheel, to depress the push button of the switch, whereby to close the latter and the electrical circuit and thus cause the remote alarm buzzer or bell to sound.

The alarm control mechanism is so connected with a door or doors 38 of the furnace 10 and with the furnace smoke pipe 39 that, in the event abnormal combustion of fuel in the furnace should blow open the door or doors or displace the smoke pipe, the alarm control mechanism will be tripped so as to cause actuation of the local and remote alarm means. To this end, a pull cable 40 is suitably connected with the door or doors 38 to extend therefrom, over suitably located guide pulleys 41, to the detent bar 25; being suitably secured to the eye or ring 29 of the trigger arm 23 of the latter. Similarly another pull cable 42 is suitably connected with the smoke pipe 39 to extend therefrom to the detent bar 25, being likewise suitably secured to the eye or ring 29 of the trigger arm 23 of the latter.

To condition the alarm control mechanism for use, the motor spring or springs 17 are wound to store tensional energy thereof ready for transmission to the shaft 13 for alarm operation. This is done by rotating the shaft 13 in counterclockwise direction. Preparatory to thus winding up the motor spring or springs 17, the trippable check means is set to releasably hold the motor spring or springs in wound condition. To this end the detent bar 25 is slid down in the

slideway member 24 to the limit of its downward movement as determined by engagement of the upper end of its slot 26 with the pivoting tie rod 16, whereupon the detent bar 25 is swung inward to engage its stop shoulder or hook 27 beneath a selected check pin or stud 23 of the check wheel or disc 21, thus holding said check wheel or disc against rotation. Under these conditions, the ratchet wheel 20 is free to turn past the pawl 22 in counterclockwise direction as the shaft 13 is turned in such direction to wind the motor spring or springs 17, but is prevented by the pawl 22 of the restrained check wheel or disc 21 from rotation in operative clockwise direction, thus holding the motor spring or springs 17 under wound tension. In thus setting the detent bar 25 in holding relation to the check wheel or disc 21, the trigger arm 23 is both lowered and somewhat outswung, whereby the pull cables 40 and 42 are tautened in their extension respectively from the furnace door or doors 38 and the furnace smoke pipe 39.

The alarm control mechanism being conditioned for use in the manner above described, if occurrence of abnormal combustion of fuel in the furnace 10 results in blowing open the furnace door or doors 38 and/or in displacing the smoke pipe 39, the opening movement of said door or doors and/or the displacing movement of the smoke pipe 39 will exert pull upon one or both cables 40 and 42. Any such pulling movement of the cables 40 and/or 42 will exert an inward and upward pull upon the trigger arm 23 which thereby operates to swing the detent bar 25 about the pivoting tie rod 16 in an outward direction, thus withdrawing the stop shoulder or hook 27 from the check pin or stud 23 with which it was engaged, and thereupon freeing the check wheel or disc 21 for clockwise rotation. Such freeing of the check wheel or disc 21 releases the shaft 13 for like operative clockwise rotation under the power of the unwinding motor spring or springs 17. As the shaft 13 is operatively rotated by the spring motor, the toothed wheel 31 of the local alarm will be rotated in engagement with the sounder elements 32, thus causing the latter to be vibrated with loud alarm sound producing effect. At the same time, the cam wheel 36 will be rotated so that its cam nosings 37 will intermittently actuate the push button switch 34 so as to simultaneously sound the remote alarm 33. The local alarm will continue to sound until the spring motor runs down. When the power of the spring motor has been substantially extended, its force will be diminished to the point where it is not strong enough to overcome the frictional resistance offered by the depressed push button switch to passage of an engaging cam nosing 37 of the cam wheel 36, and consequently the cam wheel 36 and actuating shaft 13 will come to rest while the push button is depressed to switch closing position, so that the switch will remain closed and the remote alarm will sound continuously until attention is given to the signaled condition and the switch is manually released.

From the above it will be understood that the instant invention provides a simple and yet efficient alarm system for the indicated and like purposes. I am aware that various changes could be made in the above described alarm control mechanism and in the detail parts thereof without departing from the scope of this invention as defined by the following claims. It is, therefore, intended that all matter described in

5

the foregoing specification and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. In an alarm mechanism of the kind described, an alarm operating shaft, a spring motor for rotating said shaft, tripable check means to hold the spring motor under tension subject to release for shaft actuating operation, said check means comprising a check wheel rotatable on the shaft and having at least one laterally projecting check pin, a ratchet wheel fixed on the shaft, a spring pressed pawl carried by the check wheel to engage said ratchet wheel whereby to prevent alarm operating rotation of the shaft by the spring motor when rotation of the check wheel is restrained, a pivoted detent bar having means to engage a check pin to restrain rotation of the check wheel, and a pull cord to move said detent bar to check pin disengaging position whereby to release the check wheel from restraint and thereby permit spring motor driven actuation of the shaft for alarm operation.

2. In an alarm mechanism of the kind described, an alarm operating shaft, a spring motor for rotating said shaft, tripable check means to hold the spring motor under tension subject to release for shaft actuating operation, said check means comprising a check wheel rotatable on the shaft and having at least one laterally projecting check pin, a ratchet wheel fixed on the shaft, a spring pressed pawl carried by the check wheel to engage said ratchet wheel whereby to

6

prevent alarm operating rotation of the shaft by the spring motor when rotation of the check wheel is restrained, a pivoted slideway means adjacent to said check wheel, a detent bar supported by said slideway means subject to limited longitudinal movement therein, said detent bar having means to engage a check pin to restrain rotation of the check wheel, and a pull cord connected with said detent bar, said pull cord being adapted to be tautened to operative condition by longitudinal and in-swinging movement of the detent bar into check pin engaging position, whereafter pull upon said pull cord will move said detent bar to check pin disengaging position whereby to release the check wheel from restraint and thereby permit spring motor driven actuation of the shaft for alarm operation.

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