

W. A. INGLEHART.  
 OIL BURNER AND DRIVING MEANS THEREFOR.  
 APPLICATION FILED JAN. 21, 1920.

1,362,001.

Patented Dec. 14, 1920.

2 SHEETS—SHEET 1.

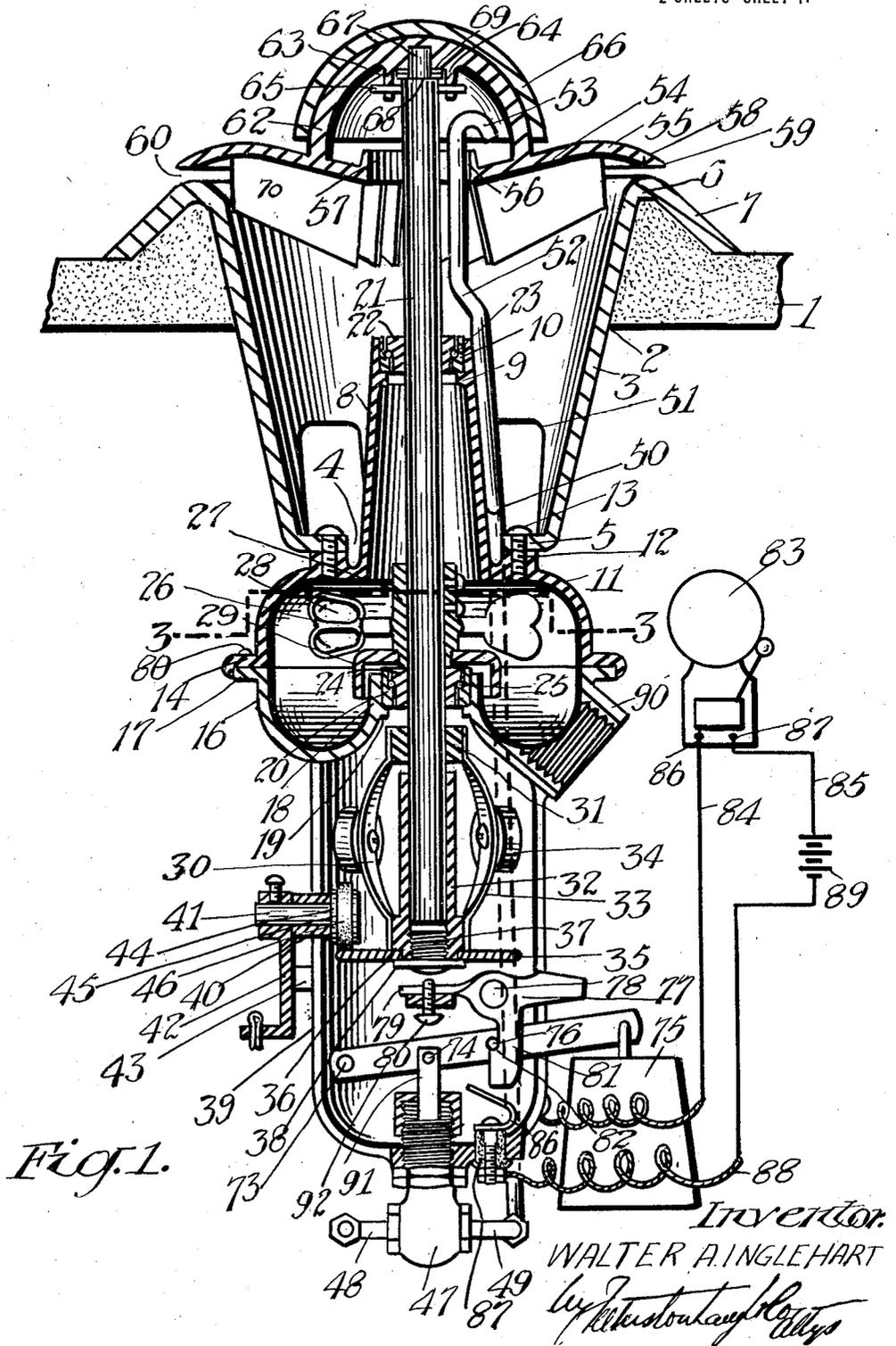


Fig. 1.

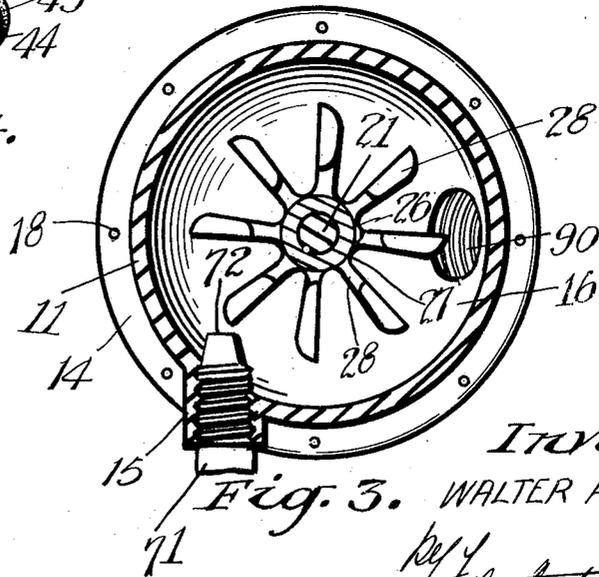
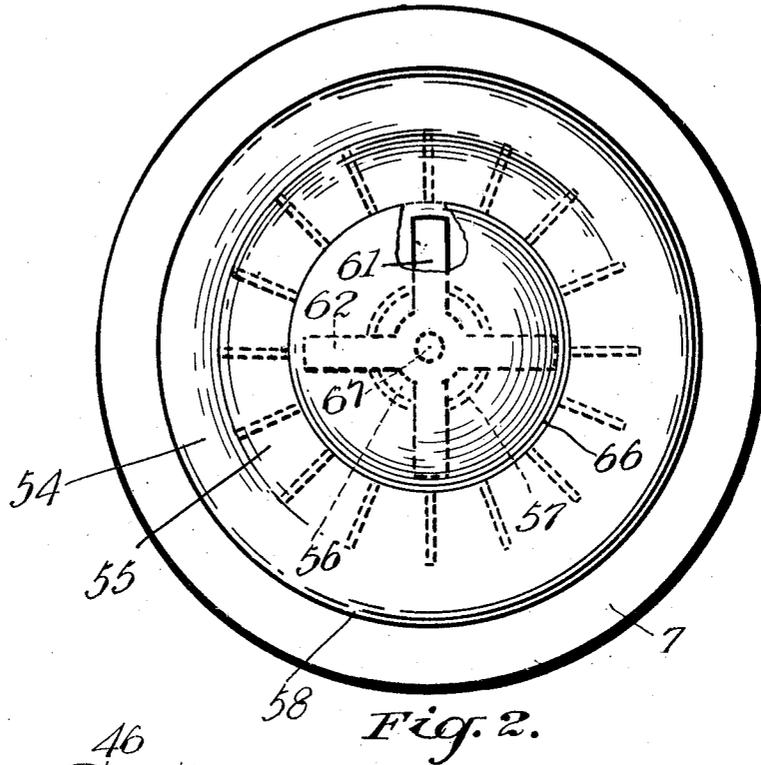
Inventor:  
 WALTER A. INGLEHART  
 by *Walter A. Inglehart*

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att'y.

# UNITED STATES PATENT OFFICE.

WALTER ANDREW INGLEHART, OF OAKVILLE, ONTARIO, CANADA.

OIL-BURNER AND DRIVING MEANS THEREFOR.

1,362,001.

Specification of Letters Patent. Patented Dec. 14, 1920.

Application filed January 21, 1920. Serial No. 352,946.

*To all whom it may concern:*

Be it known that I, WALTER ANDREW INGLEHART, a subject of the King of Great Britain, residing on Dundas street, in the town of Oakville, in the county of Halton, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Oil-Burners and Driving Means Therefor, of which the following is the specification.

My invention relates to improvements in oil burners and driving means therefor and the object of the invention is to provide a burner in which the driving means is capable of being carried on the main shaft of the atomizer without being affected detrimentally by the heat generated by the burner, to provide a simple means automatically operated by the speed of the motor sinking below a predetermined minimum for cutting off the flow of the oil supply to the burner, to provide means for automatically operating an automatic signal to indicate when such oil flow is cut off, and lastly to provide such a construction which will eliminate the objectionable humming sound caused by the revolving of the atomizer and it consists essentially of the arrangement and construction of parts as hereinafter more particularly explained.

Figure 1 is a sectional view through my burner.

Fig. 2 is a plan view of my burner.

Fig. 3 is a sectional view on line 3-3, Fig. 1.

Fig. 4 is a perspective detail of the brake member.

In the drawings like characters of reference indicate corresponding parts in each figure.

1 indicates a floor wall of fire clay supported in the furnace and separating that portion of the furnace corresponding to the fire pot from that portion corresponding to the ash pit. The wall 1 is provided with an orifice 2. 3 is a hanger casing member which is cylindrical in form tapering downward and provided at its lower end with an orifice 4 into which extend lugs 5 for a purpose which will hereinafter appear.

The upper portion of the hanger member is provided with an annular upper edge 6 from which depends downwardly a flange 7 and is bedded in the fire clay carried by the wall 1. 8 is an upper bearing member which is in the form of a hollow tapered cylinder

extending upward through the orifice 4. The upper portion of the member 8 is provided with an internal flange 9 carrying the inner ball race 10. The lower end of the bearing member 8 is provided with an upper casing member 11 provided with orifices 12 into which extend screws 13 which screws pass through the lugs 5 hereinbefore referred to thereby connecting the bearing member 8 and casing member 11 to the hanger member 3 so as to be carried thereby. The lower edge of the member 11 is provided with an out turned flange 14. 15 is an internally threaded boss the orifice of which is directed tangentially into the interior of the upper casing portion 11. 16 is a lower casing portion which is provided with a flange 17 opposing the flange 14 and secured thereto by screws 80. 90 is a boss extending downwardly from the casing member 16 and provided with an internally threaded orifice which is preferably located at the opposite side of the casing to the boss 15. The central portion of the casing member 16 is curved up so as to form a hollow boss 18 provided with an annular internal flange 19 supporting the annular ball race 20.

21 is the main shaft of my burner adapted to carry an atomizer at its upper end the construction of which I will hereinafter describe. 22 is a bearing cone secured to the shaft 21 and fitting within the ball race 10, the cone 22 and ball race 10 being provided with ball bearings 23. 24 is a bearing cone extending within the ball race 20 and provided with interposed ball bearings 25. 26 is a water wheel formed by the central sleeve 27 secured to the shaft 21 and from which radiate blades 28 which blades may be of any approved type. 29 is a hood which is carried by the lower end of the sleeve 27 so as to shield the bearing formed by the ball race 20, cone 24 and balls 25 from the splash of water which passes through the casing member 16. 30 is a speed governor which comprises a collar 31 secured to the shaft 21, and sleeve 32 slidable upon the lower end of the shaft and spring arms 33 carrying the governor weights 34. 35 is a disk which is secured in the annular recess 36 formed in the lower end of the sleeve 32 by means of a screw 37 which is screwed into the internally threaded end of the sleeve 32 and by the washer 38 which bears against the lower face of the disk 37 thereby making the disk form an integral

part of the governor. 39 is a supplemental hanger casing which depends from the lower casing member 16 and in the upper portion of which the governor 30 is contained. 40 is a sleeve bearing formed on the supplemental hanger casing 39 in which is journaled the short shaft 41.

On the outer end of the shaft 41 is secured an operating arm 42 which may be operated from any desired location by any suitable link and lever mechanism connected thereto. 43 is a stop projection for limiting the movement of the arm 42. 44 is a wheel eccentrically mounted upon the shaft 41 such shaft being provided with an annular groove 45 in which is secured a frictional band 46. By operating the arm 42 the friction band may be carried in and out of contact with the disk 35 so as to regulate the speed of the mechanism as desired. 47 is an oil supply valve which is carried at the lower end of the hanger member 39. 48 is an oil supply pipe leading to the valve from any suitable source of supply. 49 is a pipe leading from the valve, the pipe 49 extending upward to the outside of the hanger portion 39 to a point above the casing member 11 being bent inward at 50 through the opening 51 formed in the hanger 3 the pipe then extending upward in close proximity to the bearing member 8 and being again bent inward at 52 into proximity with the shaft 21 being provided at its upper end with an outwardly turned spout portion 53.

54 is my atomizer which comprises a disk 55 which is in the form of a shallow conically shaped saucer having a central orifice 56 provided with an upwardly extending annular flange 57 and a downwardly curved outer edge portion 58 having a knife edge 59 and downwardly curved portion 58 opposing the upper end of the hanger 3 to form an annular discharge mouth 60. 61 and 62 are spoke members extending upward from the atomizer disk 54 and set at right angles one to the other such spokes being semi-circular in form and provided at their point of intersection with depending notched lugs 63 and 64. 65 is a pin extending diametrically from the upper end of the shaft 21 and protruding from each side thereof through notched lugs 63 and 64 thereby supporting the atomizer member 54 upon the shaft 21 so as to revolve therewith. 66 is a semi-spherical hood member which is freely supported upon the semi-spherical spokes 61 and 62. The upper end of the shaft 21 is provided with a reduced extension 67 so as to form a shoulder 68 upon which may be placed washers 69 on which the intersecting portions of the spoked members 61 and 62 bear so as to regulate the height of the atomizer member 54 and consequently the size of the annular discharge orifice 60. The lower face of the atomizer disk 54 is

provided with vanes 70 which are arranged radially and depend into the upper end of the hanger member 3. 71 is a water supply pipe which is provided with a nozzle 72. The water is fed into the casing formed by the casing members 11 and 16 in a tangential direction having impact upon the blades 28 which radiate from the shaft 21 and are rigidly connected thereto. The shaft 21 is thereby rotated in the bearings formed within the upper ball race 23 and the lower ball race 25 revolving automatically the disk 54 onto the upper face of which oil is fed from the spout portion 53 of the pipe 49. The oil fed onto the atomizer plate 54 is carried radially outward and formed into a film which is ejected from the edge 59 air being drawn upward and forced radially through the discharge orifice 60 so as to mix with the oil film as it is discharged. As the speed increases the speed is controlled by the disk 35 contacting with the friction band 46.

Under certain conditions the water pressure may sink so low as to allow the burner to go out. It is, therefore, necessary to provide means for automatically cutting off the oil supply when these conditions are brought about. In order to do this I provide the following mechanism.

91 is the valve stem of the valve 47. 92 is a lever which is pivoted at one end on the pin 73 carried by the hanger portion 39. 74 is a pin connecting the valve stem 91 to the lever 92 intermediately of its length. 75 is a weight which is carried by the outer or free end of the lever 92. 76 is a trip pin extending from the lever 92 intermediately between the valve stem 91 and weight 75. 77 is a tripping lever swung upon the pin 78 carried in the hanger member 39. The tripping lever 77 is provided with an inwardly extending arm 79 in which is screwed an adjusting screw 80, which is located centrally of the burner and directly beneath the center of the screw 37. The tripping lever 77 is provided with a depending arm 81 provided with a notch 82 engaging the trip pin 76.

83 is an alarm bell provided with circuit wires 84 and 85 leading from the bell terminals 86 and 87. The wire 84 is grounded on the hanger portion 39 and 88 is a wire electrically connected to the spring contact finger 86 which is insulated from the hanger member 39 at 87. 89 is a battery to the terminals of which the wires 85 and 88 are connected.

When the water pressure decreases below the minimum the governor arms are drawn inward carrying the sleeve 32 downward and the head of the screw 37 into contact with the screw 80 so as to depress the arm 79 of the trip lever 77. By this means the notched portion 82 of the trip lever is car-

ried out of engagement with the trip pin 76 thereby freeing the lever 92 which is carried downward by means of the weight 75. The tripping of the lever 72 forces the valve stem 91 downward to close the valve 47 and thereby cut off the supply of oil automatically. Simultaneously with this operation the lever 92 engages the spring finger 86 thereby completing the circuit from such spring finger through the wire 88 to one terminal of the battery 89 and from the other terminal of the battery through the wire 85 to the bell terminal 87 through the bell magnet to the terminal 86 and from thence by the wire 84 to the grounding point on the hanger member 39 which is formed of conducting material allowing the circuit to be completed through the hanger member, lever 92 to the spring contact 86 thereby sounding the alarm.

From this description it will be seen that I have devised a burner in which a simple drive is provided which is carried by the shaft for revolving the atomizer and such as will not be affected by the heat generated by the burner. Also I have provided simple means for cutting off the oil supply and sounding an audible alarm simultaneously with the cutting off of such supply so that there will be absolutely no danger of the oil overflowing when the burner goes out. At the same time I have provided an atomizer which is located entirely on the outside of the hanger support and being of a large diameter it may be revolved at a low speed at the same time producing a high peripheral speed and thereby overcoming the humming sound which is produced by revolving atomizers as previously constructed.

The great detriment in centrifugal burners has been that the motor could not be directly connected to the driving shaft without being seriously affected by the heat generated by the burner. By the employment of a water motor such as described I am enabled to simplify the driving means by connecting it directly to the shaft of the burner and yet in such a way as to prevent it being injured by the great heat of the burner which is in close proximity thereto.

What I claim as my invention is.

1. In a centrifugal oil burner, the combination with a hollow casing having its upper end open and arranged to protrude at its upper end into the fire box of the furnace and at its lower end into the ash pit portion of the furnace, a suitably driven vertical shaft revolubly mounted centrally within the casing, an atomizer carried at its upper end, a governor carried by the lower end of the shaft and means co-acting with the governor for checking the speed of the shaft as it revolves above a predetermined speed.

2. In a centrifugal oil burner, the com-

ination with a hollow casing having its upper end open and arranged to protrude at its upper end into the fire box of the furnace and at its lower end into the ash pit portion of the furnace, a suitably driven vertical shaft revolubly mounted centrally within the casing, an atomizer carried at its upper end, a governor carried by the lower end of the shaft, a disk carried by the governor so as to rise and fall with the operation of the governor, and a brake member carried by the casing adapted to be drawn in and out of engagement with the disk.

3. In a centrifugal oil burner, the combination with a hollow casing having its upper end open and arranged to protrude at its upper end into the fire box of the furnace and at its lower end into the ash pit portion of the furnace, a suitably driven vertical shaft revolubly mounted centrally within the casing, an atomizer carried at its upper end, a governor carried by the lower end of the shaft, a disk carried by the governor so as to rise and fall with the operation of the governor, a shaft turnably carried by a bearing carried by the casing, an eccentric wheel secured to the shaft at its inner end and provided with a frictional surface adapted to engage the face of the disk and means carried by the outer end of the shaft for adjusting the position of the eccentric wheel in relation to the disk.

4. In a centrifugal oil burner, the combination with a hollow casing having its upper end open and arranged to protrude through the floor of the fire box of the furnace and its lower end into the ash pit portion of the furnace, a suitably driven shaft journaled in the casing, and an atomizer supported freely on the upper end of the shaft so as to assume a horizontal position when rotated.

5. In a centrifugal oil burner, the combination with a hollow casing having its upper end open and arranged to protrude through the fire box of the furnace and its lower end into the ash pit, a revolving shaft journaled in the casing, an atomizer carried by the upper end of the shaft, means for feeding oil on to the upper face of the atomizer, means for automatically shutting off the flow of oil to the atomizer upon the speed of the shaft falling below a predetermined speed, and automatic means operated by the oil cut off means for sounding an alarm.

6. In a centrifugal oil burner, the combination with a hollow casing having its upper end open and arranged to protrude through the floor of the fire box of a furnace and its lower end into the ash pit, a vertical shaft revolubly mounted within the casing, an atomizer carried by the upper end of the shaft, a governor carried by the lower end

of the shaft, an oil supply duct for feeding oil to the atomizer, a shut-off valve therein and a trip device operated by the governor as the speed of the shaft sinks below a predetermined speed, and means released by the operation of the trip device for closing the valve.

7. In a centrifugal oil burner, the combination with a hollow casing having its upper end open and arranged to protrude through the floor of the fire box of a furnace and its lower end into the ash pit, a vertical shaft revolubly mounted within the casing, an atomizer carried by the upper end of the shaft, a governor carried by the lower end of the shaft, an oil supply duct for feeding oil to the atomizer, a shut-off valve therefor, a trip device operated by the governor as the speed of the shaft sinks below a predetermined speed, means released by the operation of the trip device for closing the valve, an alarm bell, a normally open operating circuit for the alarm bell, and means for automatically closing the circuit operated by the valve closing means when tripped.

8. In a centrifugal oil burner, a hollow casing, a vertical shaft extending centrally through the casing and journaled in bearings therein, an atomizer carried by the

upper end of the shaft and co-acting with the upper end of the casing, and a motor comprising a casing body which is carried by the lower end of the hanger casing and a rotor secured to the shaft, and means for controlling the speed of the shaft as it rises above a predetermined speed.

9. In a centrifugal oil burner, a hanger casing, a vertical shaft journaled in the casing, an atomizer carried by the upper end of the shaft, a water driven motor the co-acting members of which are carried respectively by the hanger casing and shaft, means for preventing the speeding up of the motor above a predetermined speed when the water pressure increases above a predetermined point.

10. In a centrifugal oil burner, a supporting casing, a vertical shaft journaled intermediately of its length in the casing, an atomizer carried by the upper end of the shaft, a water motor carried by the lower end of the casing and by the shaft, means for preventing the speeding up of the motor above a predetermined speed when the water pressure increases above a predetermined point.

WALTER ANDREW INGLEHART.