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HOT FLUID GUN

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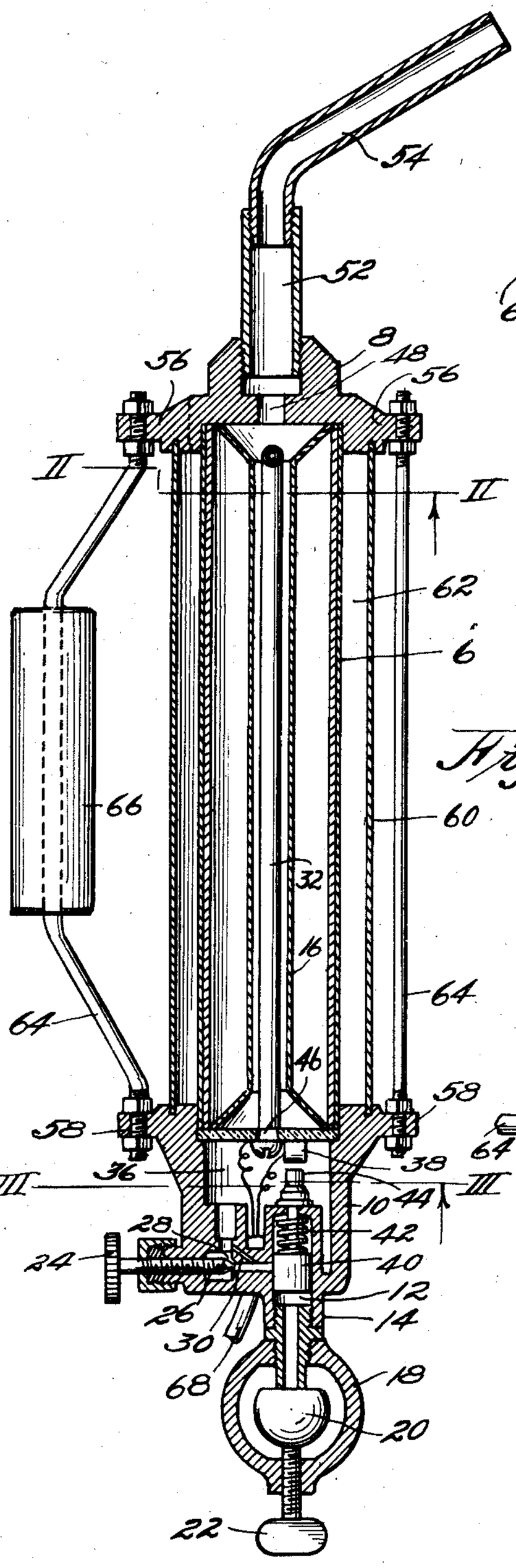


Fig. 1

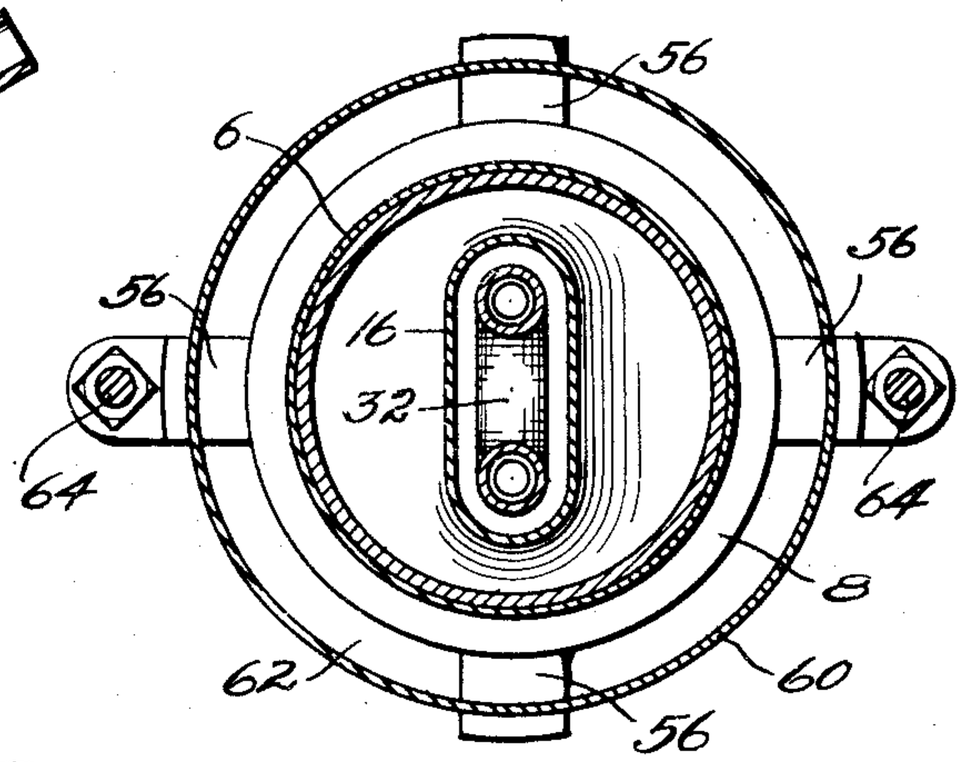
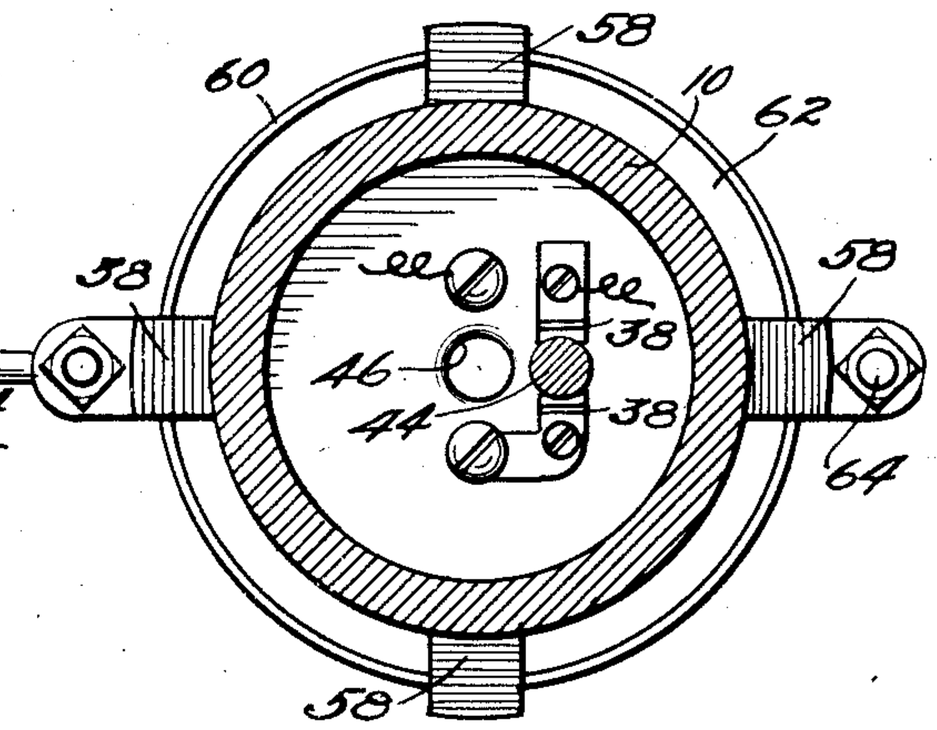


Fig. 2

Fig. 3



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HOT FLUID GUN

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8 Claims. (Cl. 219—39)

This invention relates to air treating and handling appliances and has particular reference to a fluid ejecting gun, wherein said fluid is heated as it is being forced through the gun, and the primary object of the invention is the contemplation of unique and specially formed parts, whereby to create a hot fluid gun that will effectually and positively raise the temperature of fluid without working a destructive force upon any part of the assembly.

One of the important aims to this invention is the provision of a hot fluid gun, having as a part thereof, specially formed and positioned fluid tubes and passages, and unique positive means for causing the heating element of the gun to act so long as fluid of a predetermined pressure is passing through the gun.

Since many of the more important objects of the invention lie in the combination and formation of the parts of the fluid gun, it remains to make clear these objects during the course of the following specification, referring to the accompanying drawing, wherein:

Figure 1 is a longitudinal sectional view through a fluid gun embodying this invention.

Fig. 2 is a cross section through the same, taken on line II—II of Fig. 1, and,

Fig. 3 is a cross section through the gun, taken on line III—III of Fig. 1.

Fluid handling equipment illustrated in the accompanying drawing may be used in forcing grease from differentials, crank cases or similar housings, and is especially useful when the grease has become hard or, as a result of low temperatures, the grease or oil has congealed to a point where removal becomes difficult unless heat is applied.

This gun might also be used in heating oil in the crank cases of airplane engines prior to starting and, in fact, the gun may be used wherever it is desired to bring into play a steady, constant flow of hot fluid under pressure.

Parts making up the fluid gun are assembled in such a manner that the heat unit acts directly upon fluid passing through the gun without creating a destructive force upon any part of the apparatus. The gun should be costructed to present an insulated casing 6 that is substantially closed at each end by suitably cast headers 8 and 10. Header 10 has an intake port 12 formed therein which extends from boss 14 to compartment 36. A fixture 18, in screw-threaded engagement with boss 14, may be used to clamp the air hose end 20 in position to supply a constant flow of air under pressure. Thumb screw 22 may be moved to position to hold hose end 20 in place, as shown in Fig. 1.

It is desirable to control the flow of fluid through intake port 12, and to accomplish this aim, an adjustable control valve 24 is provided which may be moved to alter the effective size of intake port 12 at a point where seat 26 is created. Valve 24 terminates in the form of a conical end 28, and when valve 24 is moved against seat 26, the only way left for fluid to pass into tube 16 is through by-pass 30 that interconnects intake port 12 at each side of seat 26. In this manner a predetermined minimum amount of air or other fluid always passes through the gun regardless of the position of valve 24 when air hose 20 is in place.

A U-shaped heating element 32 is employed and should be so circumscribed by ovoid tube 16 that a spaced relation with heating element 32 is established, as shown in Fig. 2. A transverse partition 34 adjacent one end of casing 6 forms compartment 36, and it is upon this partition 34 of insulating material that a suitable electrical switch is mounted to control the flow of current to element 32. Switch points 38 are spaced apart and when these points are bridged, the circuit is closed and the heating element functions.

It is desirable not to have heating element 32 act unless fluid is passing through tube 16. To automatically fulfill this requirement, therefore, intake port 12 has positioned therein a valve member 40 which is yieldably maintained in an intake port closing position by a spring 42. Valve member 40 is much like a piston and when air or fluid strikes the top of the same, it is moved against the action of spring 42 to a point where intake port 12 is unobstructed. Intake port 12 is formed to have portions meeting at right angles and, as a result, member 40 may function as illustrated in Fig. 1. Air of a predetermined pressure will move member 40 to open that part of the intake port 12 which is in axial alignment with valve 24, and when such pressure is maintained, and at all times during the flow of air under that pressure through intake port 12, spring 42 will be compressed and switch points 38 will be closed by stud 44 which is moved thereagainst when valve member 40 moves to open intake port 12.

A passage 46 formed through partition 34 allows the escape of air to the interior of tube 16 from compartment 36 and opening 48 will, in turn, permit the air to pass into connections 52 and 54. Suitable connections 52 and 54 are attached to header 8 in communication with tube 16 through the medium of opening 48, and

a constant flow of fluid under pressure will be heated when it passes through tube 16. Each end of tube 16 is flared outwardly to meet the inner wall of casing 6, as shown in Figs. 1 and 2. Each of headers 8 and 10 respectively has radial lugs 56 and 58 respectively formed integrally therewith and between these radially extending lugs there is positioned a jacket 60 which is spaced apart from casing 6 so that a chamber 62 is formed. Air may freely circulate in this chamber by passing longitudinally through jacket 60. Tie bars 64 hold headers 8 and 10 in place and one of said tie bars is angled outwardly, as shown in Figs. 1 and 2, to support a handle 66 that may be grasped by the user as the fluid gun is being moved to and from engagement with its work.

Obviously, a cord 68 is used in combination with switch points 38 to complete the means for supplying current to heater 32, and since all of the parts of the gun are thoroughly cooled and ventilated where necessary, it becomes obvious that no destructive heat can be transmitted from element 32 to any part of the gun whatsoever. Tube 16 may be made of any suitable metal, and since the same is formed in the fashion shown and described, it is obvious that an especially large amount of heat is absorbed by fluid passing therethrough before outlet opening 48 of header 8 is reached.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A hot fluid gun comprising a casing having an inlet port and an outlet port formed therethrough; a tube extending from the inlet port to the outlet port within the casing; an electrical heating element within the tube having switch connection to a source of electrical energy; and means, operable by the passage of fluid through said inlet port, for closing and maintaining the said switch connection in condition to furnish energy to said heating element, said tube being spaced from the casing to form an air receiving chamber between the tube and casing, said tube being in communication with the inlet and outlet port to convey air from the former to the latter, the said chamber being closed at each end thereof, whereby to form a dead air space additionally insulating the said tube.

2. A hot fluid gun comprising a casing having an inlet port and an outlet port formed therethrough; an electrical heating element within the casing; a switch to control the flow of current to said element; a valve member disposed within the inlet port and movable from a position closing said port to a position opening the same by action of fluid passing through the said inlet port; and means carried by the said valve member for closing the switch when the former is in the port-opening position, said valve member being slidably mounted in the inlet port for rectilinear reciprocation.

3. A hot fluid gun comprising a casing having an inlet port and an outlet port formed therethrough; a tube extending from the inlet port to the outlet port within the casing; an electrical heating element circumscribed by the tube; a switch to control the flow of current to said element; a valve member disposed within the inlet port and movable from a position closing said port to a position opening the same by the action of fluid passing through said inlet port; and means carried by said valve member for closing said switch when the former is in the port opening position.

4. A hot fluid gun comprising a casing having an inlet port and an outlet port formed therethrough; a tube extending from the inlet port to the outlet port within the casing; an electrical heating element circumscribed by the tube; a switch to control the flow of current to said element; a valve member disposed within the inlet port and movable from a position closing said port to a position opening the same by the action of fluid passing through said inlet port; a spring to urge said valve member toward the port closing position against the action of the fluid passing through the inlet port; and means carried by said valve member for closing said switch when the former is moved to the port opening position by a flow of fluid through said inlet port of sufficient intensity to overcome and compress the said spring.

5. A hot fluid gun comprising a casing; a tube within the casing; an electrical heating element within the casing and circumscribed by the said tube; an apertured partition transversely of the casing and setting off a compartment at one end thereof; and an automatic fluid controlled switch housed in the compartment for controlling the flow of current to said heating element, said switch being held in the closed position by fluid passing to said tube through the aperture of the partition.

6. A hot fluid gun comprising a casing; a header at each end of said casing; an inlet port formed through one of said headers; an outlet port formed through the other of said headers; a tube within the casing and connecting said inlet and outlet ports; a heater circumscribed by the tube to heat fluid as it passes through the latter; and an adjustable control valve to vary the effective size of the said inlet port.

7. A hot fluid gun comprising a casing; a header at each end of said casing; an inlet port formed through one of said headers; an outlet port formed through the other of said headers; a tube within the casing and connecting said inlet and outlet ports; a heater circumscribed by the tube to heat fluid as it passes through the latter; an adjustable control valve to vary the effective size of the said inlet port; and a by-pass formed by the header, connecting points on each side of said control valve whereby when the valve is closed a passage of air is permitted through the said inlet port by way of said by-pass.

8. A hot fluid gun comprising a casing having an inlet port and an outlet port; an electrical heating element intermediate the said inlet port and outlet port to heat the fluid as it passes from the former to the latter; a switch to control the flow of current to said element; and means, mounted in the inlet port for rectilinear reciprocation movable to one end of its path of travel by the passage of fluid through the said casing, for closing and maintaining the said switch in a circuit closing position there being a spring for returning the said means to the other end of its path of travel when the flow of fluid is stopped.

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