The present invention relates to a bidirectional jet flame igniter for aerosol fire suppression apparatus, comprising igniter bracket (5) and igniter cup (6), wherein the igniter cup (6) is fixed in relation to the igniter bracket (5), and has ignition chemical agent (3) and ignition head (4) therein; the ignition head (4) is fixed at the center of the ignition chemical agent (3), and is connected with ignition head lead wire (1). Compared to that in the prior art, the flame igniter in the present invention has satisfactory air-tightness and moisture-proof performance, and can effectively protect the ignition chemical agent therein against vibrations; in addition, the flame igniter achieves synchronous bidirectional ignition.
BIDIRECTIONAL JET FLAME IGNITER FOR AEROSOL FIRE SUPPRESSION APPARATUS

FIELD OF THE INVENTION

[0001] The present invention belongs to the technical field of gas fire suppression, and relates to a bidirectional jet flame igniter, especially a bidirectional jet flame igniter for aerosol fire suppression apparatus.

BACKGROUND OF THE INVENTION

[0002] In aerosol fire suppression apparatuses, the design and reliability of flame igniter is of crucial importance to the functionality of the entire apparatus, wherein the species and amount of the chemical agent in an ignition pack, air tightness, water resistance, shock resistance, assembly of primary explosive, explosive molding process, and ignition performance must be considered, and vibration of the chemical agent in the ignition pack must be prevented. Especially, for an apparatus that jets aerosol in both directions, synchronization of ignition in both directions must be considered.

[0003] In the prior art, a bidirectional piezoelectric flame igniter is disclosed in Patent Application No. JP56165832 (A), and the flame igniter is designed to decrease the failure rate of electric flame igniter in fire suppression apparatus; the structural characteristics of the piezoelectric flame igniter are: A cam with two control parts and a control lever are arranged in the piezoelectric flame igniter, so that the ignition hammer is driven twice in a single ignition operation to discharge and ignite twice. However, such a flame igniter only decreases the failure rate of ignition partially but doesn’t solve safety and synchronization problems, and the structure is bulky and complex. At present, in bidirectional horizontal jet aerosol fire suppression apparatuses available in the domestic market, the ignition element still employs an ignition pack bound up with a transparent tape, with the ignition chemical agent sealed in a zip-lock bag. There are many defects related with ignition with such an ignition pack, for example, the loading of chemical agent in the ignition pack is not quantified, the air-tightness of the ignition pack is not satisfactory, the zip-lock bag may fail easily in hot test, the initiation of ignition is not synchronous, and the ignition effect is poor, etc. Moreover, in the transportation process, the ignition pack may displace from the central position or break up due to vibrations, and therefore can’t initiate the apparatus successfully. As a result, the apparatus can’t be used to suppress fire timely. In the 37 patent documents obtained by literature searching, the flame igniters are mainly used for safety gas bags (e.g., CN86203126, CN2008520011152.8, 8610332, 200610023912.2) or rocket engines (e.g., CN03218960.5; 200320103882.1, 200620147019.X), etc., and the ignition is implemented by means of hot lithium electric ignition (CN9623673.1) or shock-wave ignition (CN00261694.7), etc.; all of these documents don’t involve the chemical agent and structural design of flame igniters for aerosol fire suppression apparatuses.

SUMMARY OF THE INVENTION

[0004] In view of the present situation in the prior art, the object of the present invention is to provide a bidirectional jet flame igniter for aerosol fire suppression apparatus that is simple in structure, safe and reliable, and easy to operate, to overcome the technical drawbacks of existing flame igniters for aerosol fire suppression apparatuses, such as unsatisfactory air-tightness and failure in hot test, etc.

[0005] The technical solution of the present invention will be described as following:

[0006] A bidirectional jet flame igniter for aerosol fire suppression apparatus, comprising igniter bracket and igniter cup, wherein the igniter cup is fixed to the igniter bracket, and has ignition chemical agent and ignition head therein; the ignition head is fixed at the center of the ignition chemical agent, and is connected with ignition head lead wire.

[0007] Furthermore, a tubular rivet is fixed at one end of the igniter cup and the ignition head lead wire is fixed in relation to the tubular rivet.

[0008] Furthermore, a connecting piece is installed outside of the igniter cup and the ignition head lead wire is fixed in relation to the connecting piece.

[0009] Furthermore, the wall of the igniter cup has external threads for screwing with the connecting piece and the connecting piece is screwed together with the igniter cup.

[0010] Furthermore, the igniter cup has a volume of 4 cm³ – 10 cm³.

[0011] Furthermore, the ignition heads comprise two ignition heads connected in shunt and the shunt resistance of the two ignition heads is within the range of 1.2Ω – 1.8Ω.

[0012] Furthermore, an igniter cup is fixed to the port on one end of the igniter cup and flame jets are arranged on the igniter cup and igniter cup.

[0013] Furthermore, 1-100 flame jets are arranged on the igniter cup and igniter cup and the flame jets have a diameter of ø10.1 mm – ø20 mm.

[0014] Furthermore, 5-30 flame jets are arranged on the igniter cup and the flame jets have a diameter of ø1 mm – ø5 mm.

[0015] Compared to that in the prior art, the flame igniter in the present invention has satisfactory air-tightness and moisture-proof performance and can effectively protect the ignition chemical agent therein against vibrations; in addition, the flame igniter achieves synchronous bidirectional ignition.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Bidirectional jet flame igniter for aerosol fire suppression apparatus in the present invention will be further detailed with reference to the drawings, to make the forementioned advantages of the present invention be understood more clearly.

[0017] FIG. 1 is a schematic structural diagram of an example of the bidirectional jet flame igniter for aerosol fire suppression apparatus in the present invention;

[0018] FIG. 2 is a schematic structural diagram of another example of the bidirectional jet flame igniter for aerosol fire suppression apparatus in the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0019] The present invention will be further detailed with reference to the drawings.

[0020] FIG. 1 is a schematic structural diagram of an example of the bidirectional jet flame igniter for aerosol fire suppression apparatus in the present invention. As shown in FIG. 1, the bidirectional jet flame igniter for aerosol fire suppression apparatus comprises igniter bracket and igniter cup, where the igniter cup is fixed to the igniter bracket, wherein the igniter cup is made of a metal material, such as copper. A specific amount
of ignition chemical agent 3 is filled in the igniter cup 6, and an ignition head 4 is installed at the center of the ignition chemical agent 3; the ignition head 4 has specific resistance; in this example, the ignition head comprises two ignition heads connected in shunt, with 1.2Ω shunt resistance. A tubular rivet 2 is fixed at the top center of the igniter cup 6; parallel ignition head lead wires 1 pass through the tubular rivet 2 and are connected to the ignition head 4; the ignition head lead wires 1 are fixed in relation to the tubular rivet 2. In this example, the distance from the ignition head 4 to the tubular rivet 2 is 16 mm, the ignition head lead wires 1 are fixed to the tubular rivet 2 with AB adhesive, and the tubular rivet 2 is bonded to the cup 6 with AB adhesive.

Furthermore, 30 flame jets in Φ1 mm diameter are arranged on the side wall of igniter cup 6 and an igniter cup 7, and the igniter cup 6 are coupled to the igniter cap 7 by means of mold closing.

In case of fire in the protective area, the control element of the aerosol fire suppression apparatus detects the fire signal, and the annunciator alarms automatically and switch on the power supply quickly; thus the ignition head 4 ignites the ignition chemical agent 3, and the flame spurt out of the flame jets on the igniter cup 6 from the limited space in the igniter cup 6 at high speed under gas pressure, creates a narrow and long flame in jet length more than 30 cm, and ignite the aerosol generating chemical agent in the bidirectional horizontal jet aerosol fire suppression apparatus, and thereby initiates the fire suppression apparatus.

FIG. 2 is a schematic structural diagram of another example of the bidirectional jet flame igniter for aerosol fire suppression apparatus in the present invention. As shown in FIG. 2, the bidirectional jet flame igniter for aerosol fire suppression apparatus comprises igniter bracket 5 and igniter cup 6, wherein the igniter cup 6 has external threads on its wall for screwing with a connecting piece 9, the connecting piece 9 is screwed together with the igniter cup 6, and ignition head lead wire 1 is fixed in relation to the connecting piece 9.

The igniter cup 6 can be made of a metal material, such as stainless steel. A specific amount of ignition chemical agent 3 is filled in the igniter cup 6, and an ignition head 4 is installed at the center of the ignition chemical agent 3; the ignition head 4 has specific resistance; in this example, the ignition head comprises two ignition heads connected in shunt, with 1.8Ω shunt resistance.

In addition, 30 flame jets in Φ1 mm diameter are arranged on the top of the igniter cup 6, and the port of the igniter cup 6 is sealed with a sealing tin foil plate for moisture-proofing.

In case of fire in the protective area, the control element of the aerosol fire suppression apparatus detects the fire signal, and the annunciator alarms automatically and switch on the power supply quickly; thus the ignition head 4 ignites the ignition chemical agent 3, and the flame breaks through the tin foil plates on the two ends of the flame igniter and spurt out from the limited space in the igniter cup 6 under gas pressure, and ignites the aerosol generating chemical agent in the two ends of the bidirectional horizontal jet aerosol fire suppression apparatus synchronously, and thereby initiates the fire suppression apparatus.

Furthermore, the cup of the bidirectional jet flame igniter for aerosol fire suppression apparatus in the present invention has a volume of 4 cm³–10 cm³.

On the basis of the above instruction for the present invention, those skilled in the art can easily make modifications or variations to the embodiments without departing from the spirit of the present invention; however, all these modifications or variations shall be deemed as falling into the protective scope of the present invention. Those skilled in the art shall appreciate that the above description is only provided to elaborate and explain the object of the present invention, instead of constituting any confinement to the present invention. The protective scope of the present invention shall only be confined by the claims and their equivalence.

1. A bidirectional jet flame igniter for an aerosol fire suppression apparatus, comprising igniter bracket and igniter cup, wherein the igniter cup is fixed in relation to the igniter bracket, and has ignition chemical agent and ignition head therein; the ignition head is fixed at the center of the ignition chemical agent, and is connected with ignition head lead wire.

2. The bidirectional jet flame igniter for an aerosol fire suppression apparatus according to claim 1, characterized in that a tubular rivet is fixed to one end of the igniter cup and the ignition head lead wire is fixed in relation to the tubular rivet.

3. The bidirectional jet flame igniter for an aerosol fire suppression apparatus according to claim 1, characterized in that a connecting piece is arranged outside of the igniter cup and the ignition head lead wire is fixed in relation to the connecting piece.

4. The bidirectional jet flame igniter for an aerosol fire suppression apparatus according to claim 3, characterized in that the igniter cup has external threads for screwing with the connecting piece and the connecting piece is screwed together with the igniter cup.

5. The bidirectional jet flame igniter for an aerosol fire suppression apparatus according to claim 1, characterized in that the igniter cup has a volume of 4 cm³–10 cm³.

6. The bidirectional jet flame igniter for an aerosol fire suppression apparatus according to claim 1, characterized in that the ignition head comprises two ignition heads connected in shunt and the shunt resistance of the two ignition heads is within the range of 1.2Ω–1.8Ω.

7. The bidirectional jet flame igniter for an aerosol fire suppression apparatus according to claim 1, characterized in that an igniter cap is fixed to the port at one end of the igniter cup and flame jets are arranged on the igniter cup and igniter cap.

8. The bidirectional jet flame igniter for an aerosol fire suppression apparatus according to claim 7, characterized in that 1–100 flame jets are arranged on the igniter cup and igniter cap and the flame jets have a diameter of Φ0.1 mm–Φ20 mm.

9. The bidirectional jet flame igniter for an aerosol fire suppression apparatus according to claim 1, characterized in that 5–30 flame jets are arranged on the igniter cup and the flame jets have a diameter of Φ1 mm–Φ5 mm.

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