Feb. 20, 1923. 1,445,904.

W. C. NEAHR.

ELECTRIC FIREWORK IGNITER.

FILED FEB. 20, 1922.

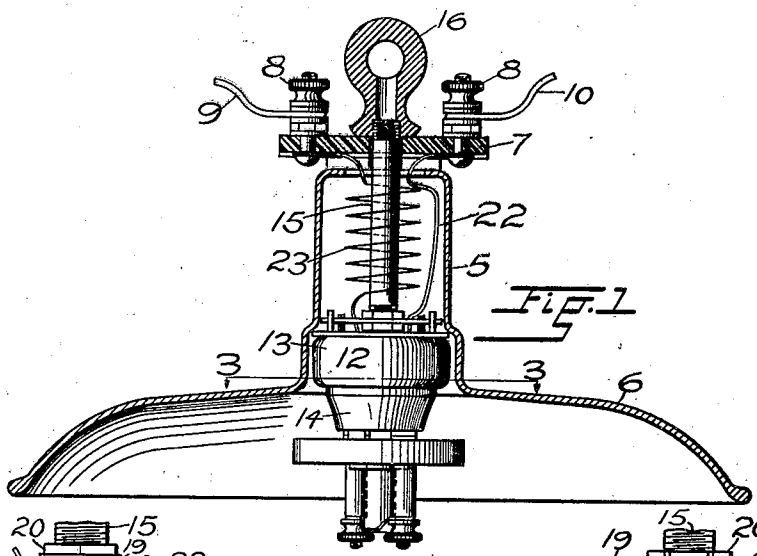


Fig. 1

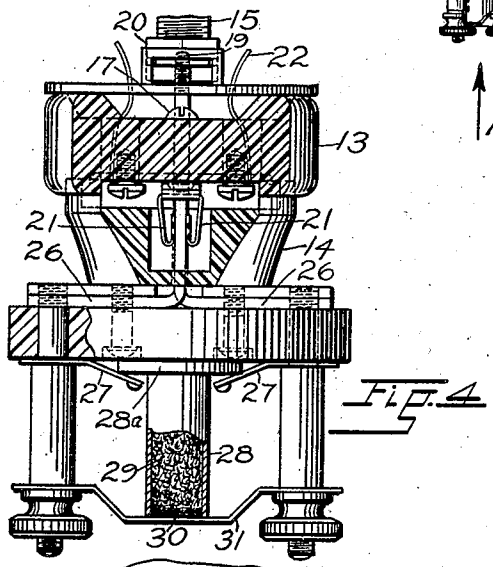


Fig. 4

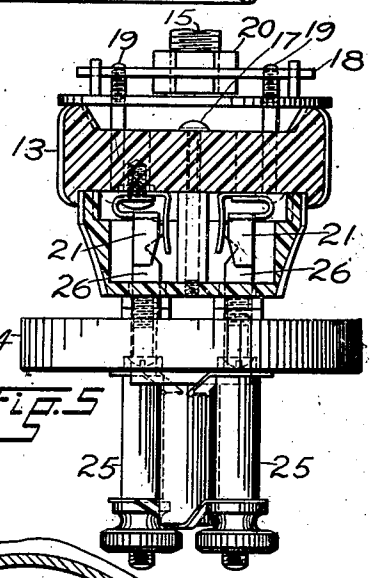


Fig. 5

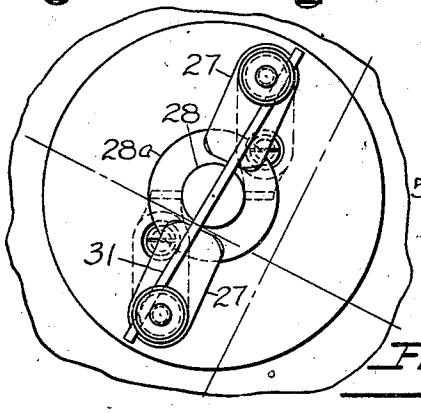


Fig. 2

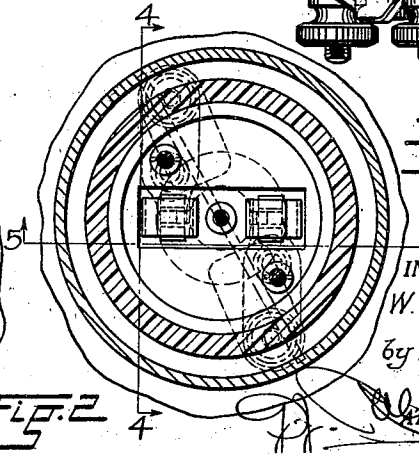


Fig. 3

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Patented Feb. 20, 1923. 1,445,904

UNITED STATES PATENT OFFICE.

WILL C. NEAHR, OF DENVER, COLORADO.

ELECTRIC FIREWORK IGNITER.

Application filed February 20, 1922. Serial No. 537,887.

To all whom it may concern:

Be it known that I, WILL C. NEAHR, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Electric Firework Igniters, of which the following is a specification.

My invention relates to firework igniters and its principal object is to provide an electrical appliance which by the current flow in an electric circuit in which it is connected, automatically ignites a pyrotechnic composition contained in a suspended cartridge which is constructed and disposed to discharge its contents in a shower of brilliant scintillations.

My invention is particularly adapted for use in ceremonials, rituals and theatrical productions, and the shower of burning particles aside from producing a pleasing and impressive spectacle, may be employed to ignite bengal-lights or other combustible compositions placed in receptacles beneath the point at which the appliance is suspended.

An embodiment of my invention has been illustrated in the accompanying drawings in which similar characters of reference denote corresponding parts throughout the several views and in which—

Figure 1 represents a vertical sectional elevation of an electrical appliance constructed in accordance with my invention;

Figure 2, an underneath view of the ignition element of the same looking in the direction of the arrow A, Figure 1, drawn to an enlarged scale;

Figure 3, a similarly enlarged horizontal section on the line 3—3, Figure 1;

Figure 4, a vertical section taken on the line 4—4, Figure 3; and

Figure 5, an elevation partially sectioned along the line 5—5, Figure 3.

Referring more specifically to the drawings, the appliance consists of a cylindrical casing 5 which at the edge of its open lower end, flares outwardly into a canopy 6 of comparatively large diameter, which in the operation, functions as a shield to protect the ceiling or other support from which the appliance is suspended, from the heat and fire of the burning matter, and which also serves as a reflector to enhance the spectacular effect produced by the shower of ignited particles.

The casing is fastened to a superposed cap 7 of non-conductive material which at opposite sides of the vertical axis of the casing, carries binding posts 8 by which the operative elements of the device are connected in an electric circuit, the leads of which have been designated in Figure 1 of the drawings, by the numerals 9 and 10.

A porcelain holder 12 preferably composed of two axially alined sections 13 and 14, is suspended in the lower portion of the casing at the end of a bolt 15 which passes through a central opening of the cap and is secured by a socket nut 16 screwed upon its protruding upper end.

An eye formed in the extended upper portion of the nut serves to suspend the casing from a hook in a ceiling, beam or other overhead support.

The two sections of the holder are fastened together by a screw 17, and the holder is connected with the suspension bolt through the medium of a plate 18 which is fastened on top of the upper section by means of screws 19 and which is adjustably attached to the bolt by nuts 20 screwed on the threaded lower end thereof.

The upper section of the holder carries two pairs of resilient contact blades 21 which extend in insulated relation to each other into an open-ended recess of the lower section of the same. One of the pairs of blades is connected to one of the binding posts on the cap by means of a wire 22, and the other pair is connected at an end of a resistance coil 23 placed in the casing around the suspension bolt, with its opposite end in electrical connection with the other binding post.

The two pairs of contact blades are provided to secure and connect in the circuit, the element of the appliance which holds the pyrotechnic cartridge and provides for its ignition by the flow of current through the circuit.

The element consists of a disk 24 of heat resisting, non-combustible and insulating material, such as, stone, fire clay or other suitable composition, which in electrical connection with two downwardly extending elongated binding posts 25, carries a pair of

metallic fingers 26 adapted to enter in the recess of the lower section of the porcelain holder and between the resilient members of the contact devices 21 disposed therein. The contacts 21 frictionally engage with the fingers placed between their members and thereby serve to suspend the disk 24 and at the same time establish an electric connection between the binding posts on the disk and those on the cap 7.

The disk is furthermore provided with oppositely arranged clips 27 of resilient metal which at their outer ends, are fastened against the under surface of the same by the binding posts 25.

The pyrotechnic cartridge shown partially in section in Figure 4, consists of a paper shell 28 which at one end has a flange 28ª for its suspension from the disk through the medium of the resilient clips 27.

The shell contains a charge 29 of pyrotechnic combustibles, and at the lower end thereof, a small quantity of black powder 30 or other readily ignitable material, and a naked fuse-wire 31 composed of a readily melting alloy, is attached between the binding posts in contact with the lower end of the cartridge, as best shown in Figure 4 of the drawings.

When by the adjustment of a hand switch, the normally open circuit, in which the appliance is connected, is closed, the current passing through the wire of the fuse sets fire to the inflammable substance at the lower end of the cartridge, which in turn ignites the pyrotechnic composition.

The heat of combustion causes the fuse to melt and the burning pyrotechnic substance is discharged out of the paper shell in a spreading shower of scintillations, the brilliancy of which is enhanced by the reflective surface of the canopy.

After the display is over, the carrier is detached from the holder in the casing, and a new loaded cartridge is attached thereto by means of the clips in the place of the empty shell.

By providing a number of these carriers, the device may be operated repeatedly in rapid succession, and by placing containers with bengal fire or other combustible substances beneath the device within the range of the falling sparks, the spectacular display of fire work may be further extended.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. An electric fire work igniter comprising a casing, a non-conductive cap at the upper end thereof, a non-conductive holder in the casing, contact devices on the holder, binding screws on the cap in electric connection with said contact devices, a bolt connecting the cap and the holder, a cartridge-carrier, binding posts thereon, members on the carrier in electric connection with said binding posts and adapted to connect the carrier with the holder by engagement with said contact devices, a pyrotechnic cartridge suspended from the carrier, and a fuse on the binding posts in ignitable proximity to the cartridge.

2. An electric fire work igniter comprising in combination with an elevated holding element, a pyrotechnic cartridge connected therewith and having an outlet disposed to emit a downwardly directed shower of sparks upon ignition of its charge, an electric circuit, and a fuse in the circuit, disposed on the holding element in ignitable proximity to the cartridge.

3. An electric fire work igniter comprising in combination with an elevated holding element, a pyrotechnic cartridge connected therewith and having an outlet disposed to emit a downwardly directed shower of sparks upon ignition of its charge, an electric circuit, binding posts on the holding element, and a fuse connecting said posts and extending across the outlet of the cartridge.

4. An electric fire work igniter comprising in combination with an elevated holding element, a pyrotechnic cartridge connected therewith and having an outlet disposed to emit a downwardly directed shower of sparks upon ignition of its charge, an electric circuit including a resistance on the holding element, and a fuse in the circuit, disposed on the holding element in ignitable proximity to the cartridge.

5. An electric fire work igniter comprising in combination with an elevated holding element, a pyrotechnic cartridge connected therewith and having an outlet disposed to emit a downwardly directed shower of sparks upon ignition of its charge, an electric circuit, a fuse in the circuit, disposed on the holding element in ignitable proximity to the cartridge, and a canopy on the holding element, above the cartridge.

6. An electric fire work igniter comprising in combination with an elevated holding element, an electric circuit, a cartridge carrier, binding posts thereon, a fuse connected to the binding posts, a pyrotechnic cartridge having an outlet, means on the carrier to hold the cartridge in proximity to the fuse, and conductive fastening devices on the carrier and the holding element co-operating to secure the one to the other so as to dispose the outlet of the cartridge to emit a downwardly directed shower of sparks upon ignition of its charge, and to simultaneously connect the binding posts in the circuit.

7. An electric fire work igniter comprising in combination with an elevated holding element, an electric circuit, a cartridge carrier, binding posts thereon, a fuse connected to the binding posts, a pyrotechnic cartridge flanged at one end and having an outlet at

its opposite end, clips on the carrier to hold the cartridge in proximity to the fuse by engagement with its flange, and conductive fastening devices on the carrier and the holding element co-operating to secure the one to the other so as to dispose the outlet of the cartridge to emit a downwardly directed shower of sparks upon ignition of its charge, and to simultaneously connect the binding posts in the circuit.

In testimony whereof I have affixed my signature.

WILL C. NEAHR.