PATENT SPECIFICATION

Application Date: Aug. 4, 1923. No. 20,009/23. **216,398**

Complete Left: Nov. 26, 1923.

Complete Accepted: May 29, 1924.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Flash Light Apparatus and the like.

We, ROBERT ERNEST STEPHENS, British subject, and JOHN JOSEPH YATES, British subject, both of 55, Market Street, Manchester, do hereby declare the nature of this invention to be as follows:—

This invention relates to apparatus for use in firing a charge and primarily directed to flash light apparatus as used in taking photographs.

The main object of the invention is to provide an improved apparatus for ensuring the ignition of suitable material, whether in a powdered or solid form. A further object of the invention is to cause the flash to synchronise with the exact moment of exposure of the photographic plate.

According to one feature of the invention a battery of one or more units is provided controlled by a suitable switch actuated either pneumatically or through a Bowden wire or other suitable means. In the circuit of said battery is an induction spark coil the secondary coil of which is in circuit with a fitting having a sparking gap and which is adapted to receive the flash powder or material.

According to another feature of the invention the battery switch is controlled by a pneumatic, Bowden wire or electrically actuated fitment coupled to and actuated synchronously with the camera shutter control mechanism.

In carrying the invention into effect according to one convenient method a high tension induction coil is provided mounted in a suitable container having the trembler or contact breaker mounted on one end thereof. Said container is placed in a casing in which is also placed a dry battery or accumulator preferably of the multi-cell dry type one pole of which communicates with a terminal on the top of the coil container which communicates with the primary coil while the other pole contacts with a conductor leading to the fixed terminal of a switch mounted on a block of insulating material such as ebonite secured to the inside of the casing. The removable element of said switch comprises a spring bar arranged on the top of the ebonite block between which and the strip a pneumatic bulb or plunger is placed. Two flexible leads complete the circuit between the other terminal of the coil and the high tension terminal. The two terminals of the switch are provided with sockets extending through the wall of the casing to receive the plug connections of flexible leads which are attached to the terminals of the sparking fitment. The latter preferably comprises a central electrode surrounded by insulating material and mounted in a tubular casing somewhat after the manner of a sparking plug as used for internal combustion engines. The casing is preferably mounted on a tray attached to a block of insulating material such as ebonite formed with a screwed socket, or otherwise adapted, for attachment to the usual photographic stand or other relatively fixed object. The central electrode, which is vertically arranged, is adapted to receive a small pan having a hole in the bottom through which the electrode projects and into which the flash powder can be placed. The latter may, if desired, be compounded into a solid and moulded into ring formation adapted to be placed on to the upwardly projecting electrode, in which case the pan may be dispensed with. The tray may be provided with a dust cap and or box or cover to retain the smoke or fumes of the burning material. It may also be provided with a reflector and/or a diffuser.

[*Price* 1/-]

More than one of such sparking fitments may be provided arranged in line or any desired formation to give an extended light.

The pneumatic bulb or plunger extends through the casing and is provided with a nipple, for attachment to a tube which communicates with the pressure bulb and also the actuating bulb for the camera shutter so that the flash occurs synchronously with the exposure of the sensitised plate.

Instead of controlling the flash light and camera shutter by pneumatic means they may be controlled by interconnected Bowden wires or electro magnets arranged in series, or parallel, or by other suitable means.

By these means a very certain and efficient flash is obtained.

Dated this 3rd day of August, 1923.

For the Applicants,
JOHN G. WILSON & Co.,
Chartered Patent Agents,
55, Market Street, Manchester.

COMPLETE SPECIFICATION.

Improvements in or relating to Flash Light Apparatus and the like.

We, ROBERT ERNEST STEPHENS, British subject, and JOHN JOSEPH YATES, British subject, both of 55, Market Street, Manchester, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to apparatus for use in firing a charge and primarily to flash light apparatus as used in taking photographs in which the flash material is ignited by a high tension electrical discharge which is synchronised with the exact moment of exposure of the photographic plate.

The object of this invention is to provide an improved apparatus for ensuring the ignition of the charge. Apparatus for firing a powdered solid or like explosive charge and made in accordance with this invention comprises a fixed central rod electrode extending at each end through a surrounding insulator, mounted in a tubular casing, forming the other electrode, the device being adapted to receive the flash powder in the form of a ring lying on the electrodes, and being either provided with a powder pan and/or the powder moulded into a ring for this purpose.

The synchronisation and actuation of the mechanism operating the camera shutter and producing the ignition current may be pneumatically controlled or may embody Bowden wire control or other suitable means.

A preferred form of the complete apparatus embodying this invention will be described by the aid of the accompanying drawings, wherein:—

Figure 1 is a general view showing the invention applied to a pneumatically actuated camera.

Figure 2 is a sectional plan of the coil and battery container, and

Figure 3 is a diagram of the wiring.

In carrying the invention into effect according to one convenient method as illustrated a high tension induction coil a is provided mounted in a suitable container b having the trembler or contact breaker c mounted on one end thereof. Said container is placed in a casing d in which is also placed a dry battery or accumulator e, preferably of the multicell dry type one positive pole f of which communicates with the low tension negative terminal g on the side of the coil container which communicates with the primary coil h while the other pole i contacts with a conductor i^1 leading to the movable terminal j of a switch mounted on a block of insulating material k such as ebonite secured to the inside of the casing d. Said movable element comprises a spring bar j arranged on the top of ebonite block between which and the strip j a pneumatic bulb l^1 or plunger is placed. A flexible lead m^1 completes the circuit between the other terminal m of the switch and the combined low and high tension terminal n of the coil, the other high tension terminal n^1 of which is connected by the flexible lead m^2 to the high tension terminal o. The two terminals m and o are provided with sockets extending through the wall of the casing d to receive the plug connections p^1, p^1, of flexible leads p, p which are attached to the terminals of the sparking fitment q. The latter comprises a central electrode q^1 surrounded by insulating material such as wax having a high melting point and mounted in a tubular

casing q^2, forming the other electrode, somewhat after the manner of a sparking plug as used for internal combustion engines. The casing q^2 is mounted on a block q^3 of insulating material such as ebonite formed with a screwed socket or otherwise adapted for attachment to the usual photographic stand or other relatively fixed object. The casing q^2 which is vertically arranged is adapted to receive a small pan q^4 having a hole in the bottom through which the electrode q^1 projects and into which the flash powder can be placed. The latter may if desired be compounded into a solid and moulded into ring formation adapted to be placed on to the upwardly projecting electrode q^1, in which case the pan may be dispensed with. The tray may be provided with a dust cap and/or box or cover to retain the smoke or fumes of the burning material. It may also be provided with a reflector and/or a light diffuser. The pan q^4 may form an extension of the casing electrode q^2.

More than one of such sparking fitments may be provided, arranged in line or any desired formation to give an extended light.

The pneumatic bulb l^1 or plunger extends through the casing d and is provided with a nipple l^2, for attachment to a tube l^3 which communicates with the pressure bulb l and also the actuating bulb l^4 for the camera shutter r so that the flash occurs synchronously with the exposure of the sensitized plate.

Instead of controlling the flash light and camera shutter by pneumatic means they may be controlled by interconnected Bowden wires or electro magnets arranged in series or parallel or other suitable means.

By these means a very certain and efficient flash is obtained.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An ignition device for firing a powdered solid or like explosive charge in which the charge is ignited by a high tension electrical discharge, comprising a fixed central rod electrode extending at each end through a surrounding insulator, mounted in a tubular casing, forming the other electrode, the device being adapted to receive the flash powder in the form of a ring lying on the electrodes, and being either provided with a powder pan and/or the powder moulded into a ring, for the purpose described.

2. An ignition device according to Claim 1, in combination with synchronised mechanism to actuate a camera shutter substantially as and for the purpose described.

3. The ignition device in combination with the complete apparatus substantially as described with reference to and as illustrated in the accompanying drawings.

Dated this 12th day of November, 1923.

For the Applicants,
JOHN G. WILSON & Co.,
Chartered Patent Agents,
55, Market Street, Manchester.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1924.

[This Drawing is a reproduction of the Original on a reduced scale]

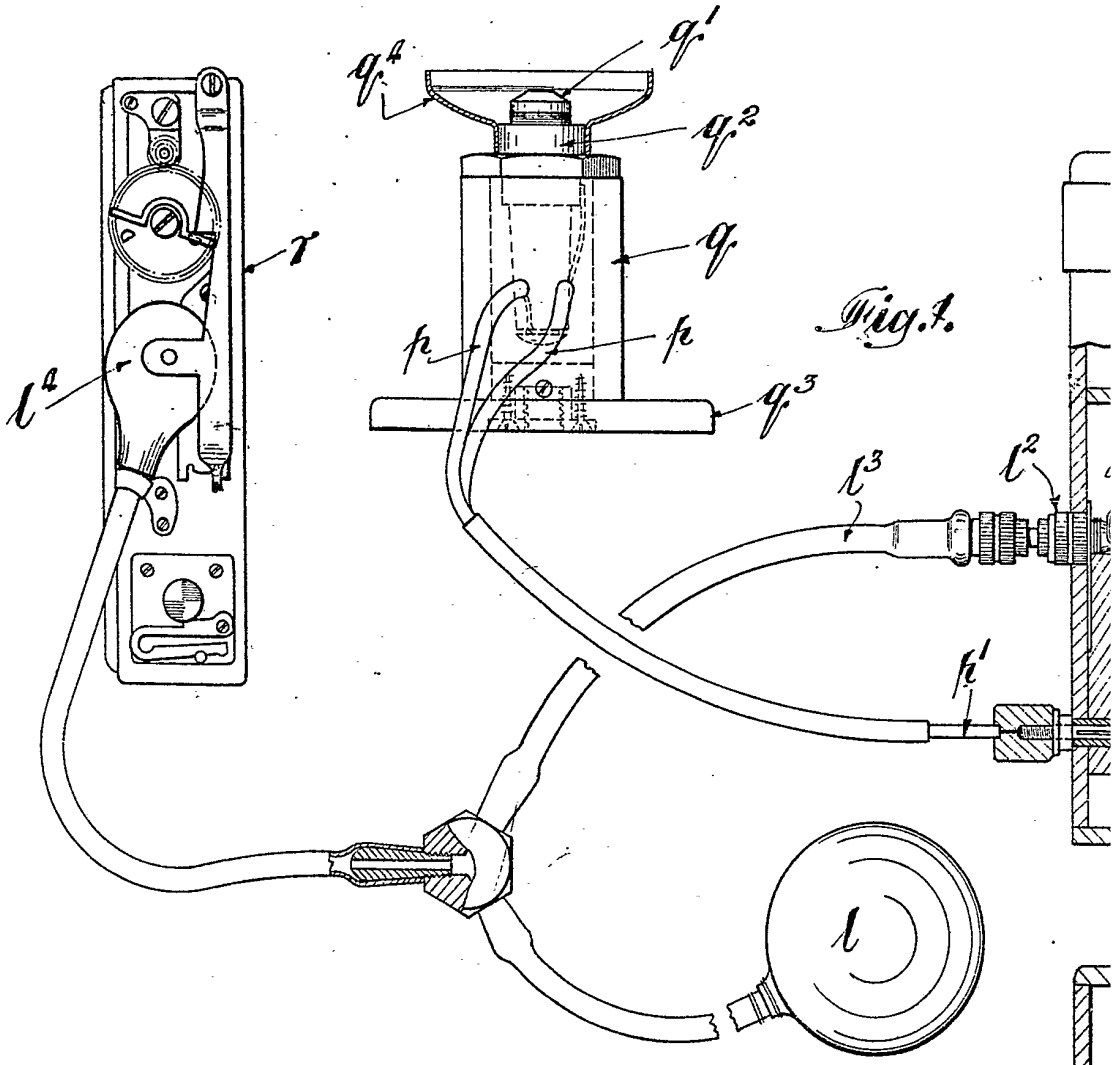


Fig. 1.

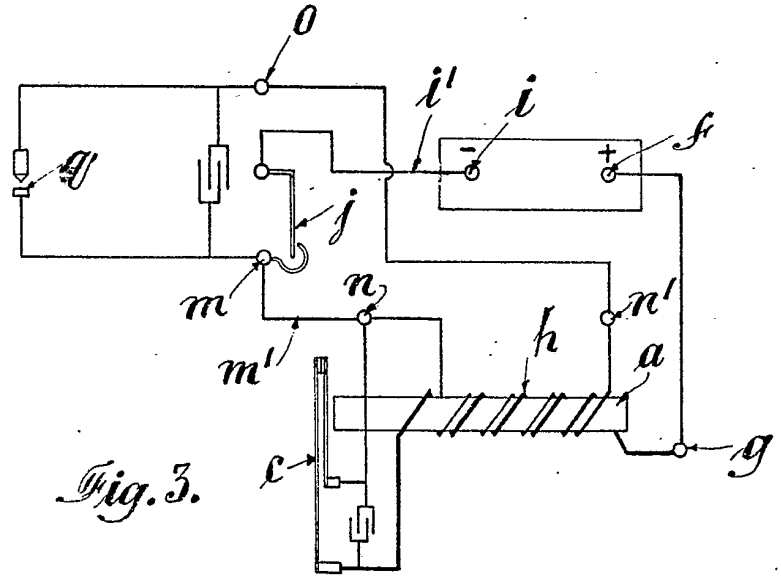


Fig. 3.

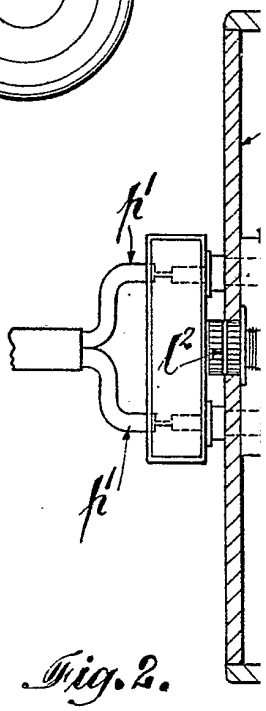
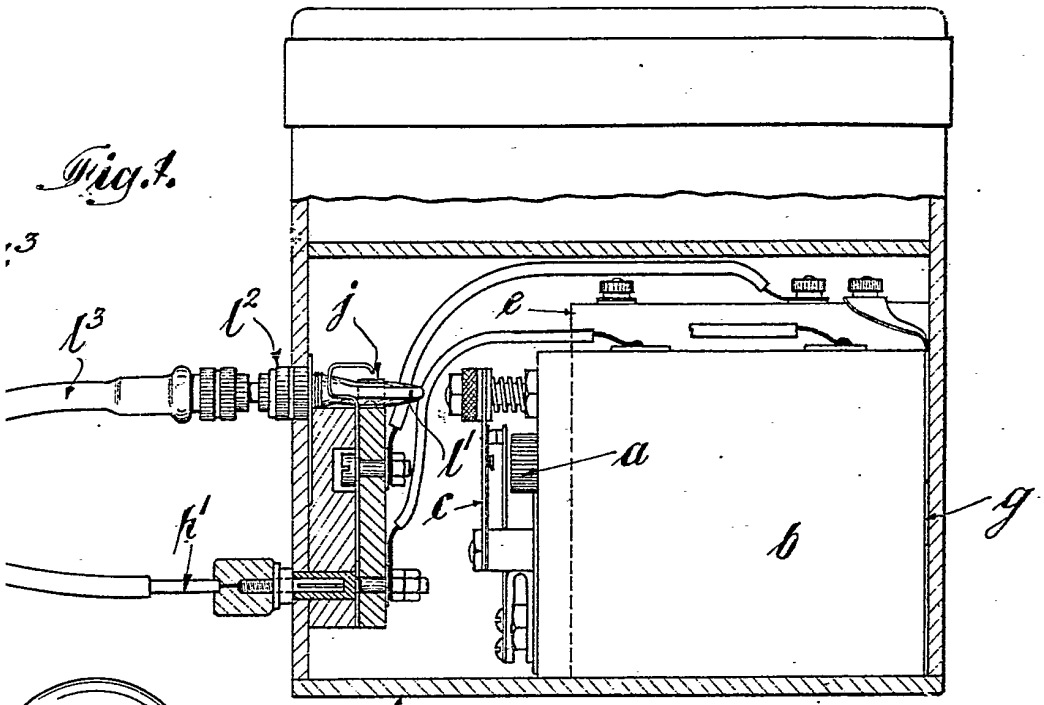


Fig. 2.

Fig. 1.



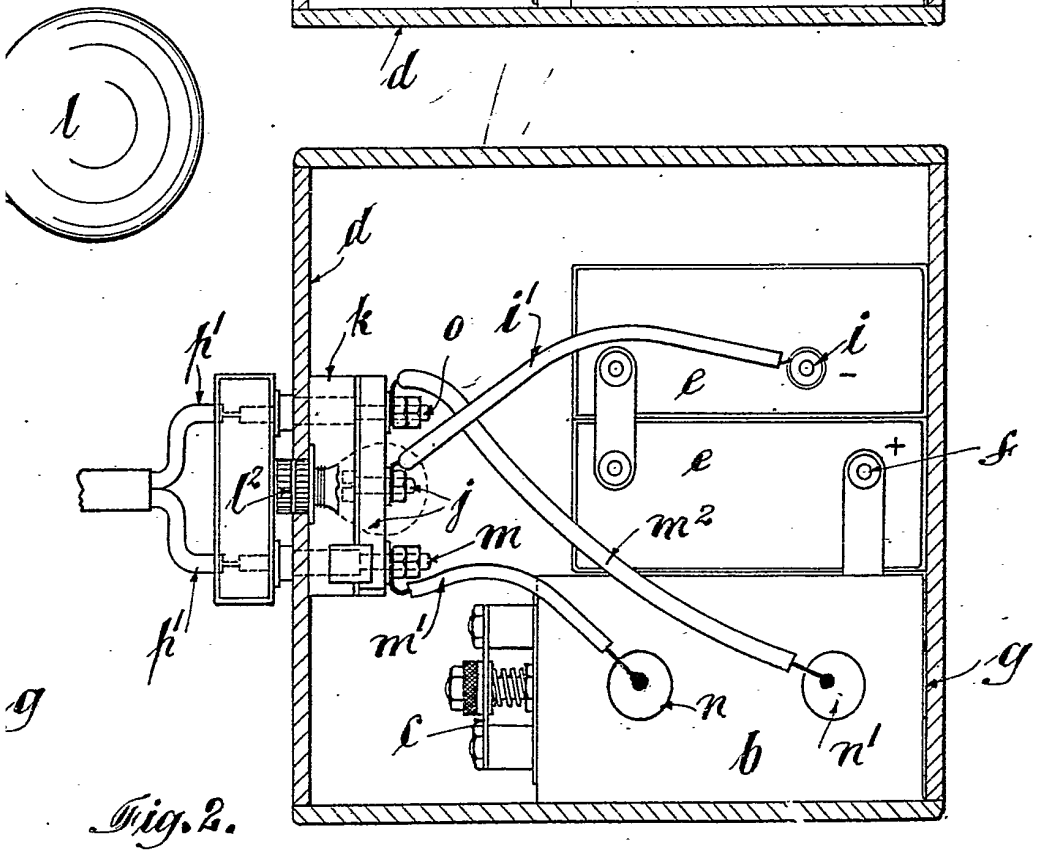
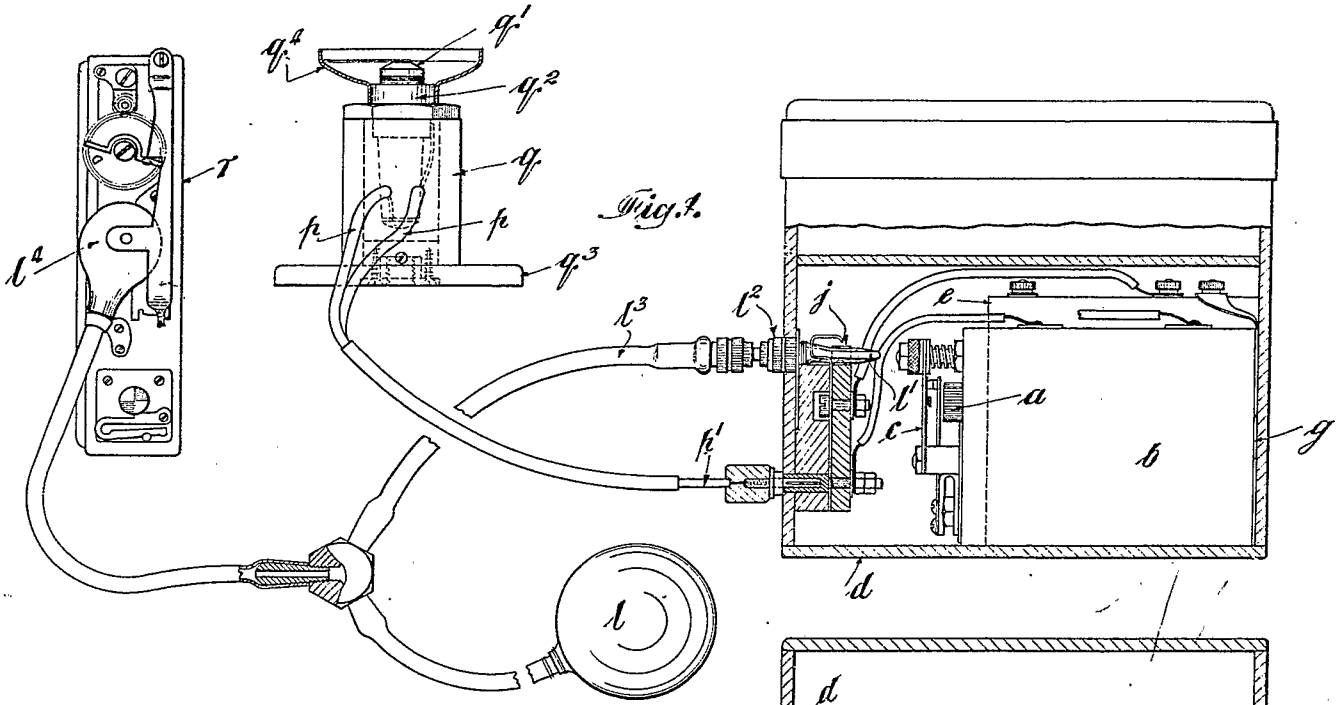


Fig. 2.

Malby & Sons, Photo-Litho



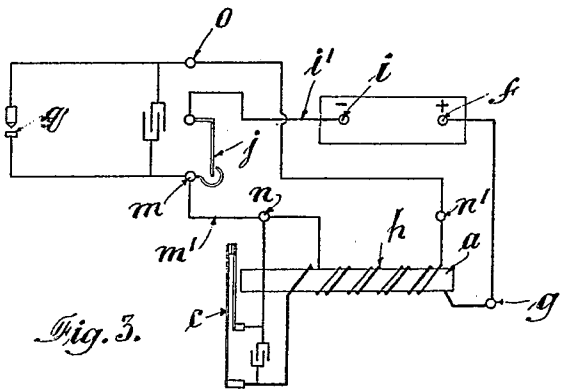
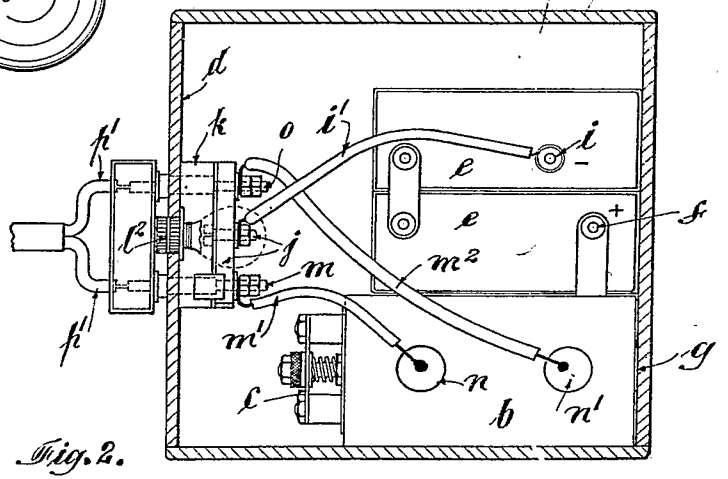


Fig. 3.



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Malby&Sons, Photo-Litho