

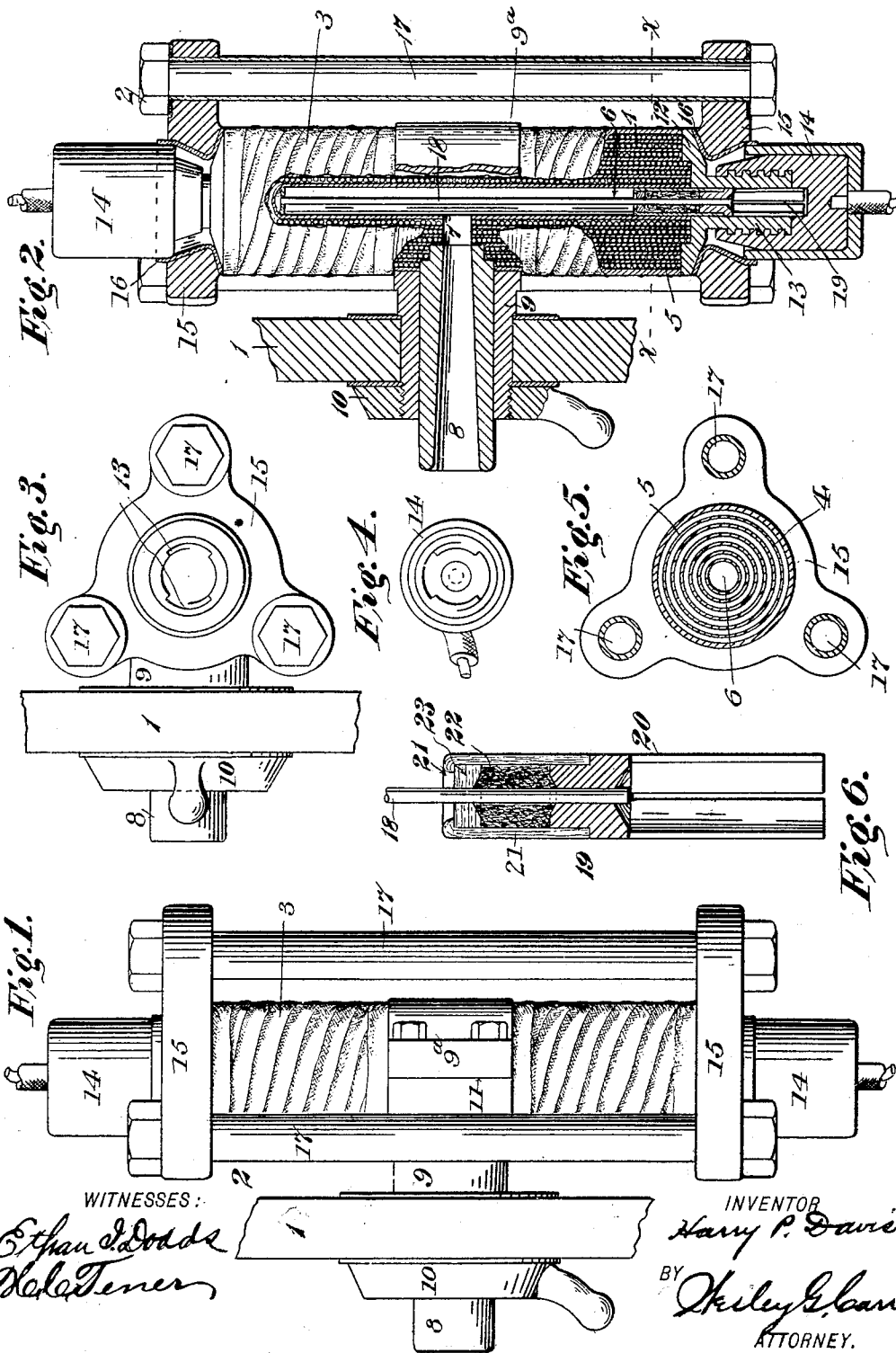
No. 644,850.

Patented Mar. 6, 1900.

H. P. DAVIS.
FUSE BLOCK.

(Application filed Jan. 30, 1899.)

(No Model.)



WITNESSES:

Ethan S. Ladd
Dele Toner

INVENTOR

Harry P. Davis

BY

Wiley E. Lane

ATTORNEY.

UNITED STATES PATENT OFFICE.

HARRY P. DAVIS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, OF PENNSYLVANIA.

FUSE-BLOCK.

SPECIFICATION forming part of Letters Patent No. 644,850, dated March 6, 1900.

Application filed January 30, 1899. Serial No. 703,776. (No model.)

To all whom it may concern:

Be it known that I, HARRY P. DAVIS, a citizen of the United States, residing in Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Fuse-Blocks, (Case No. 799,) of which the following is a specification.

My invention relates to fuse-blocks for electric circuits; and it has for its object to produce a device of this character which shall be strong and durable in construction and effective in operation under any conditions of service to which it may be subjected.

The fuse-blocks heretofore devised have generally been used in connection with fuses of sufficient capacity to carry the normal current of the circuit to be protected, and in every case where such devices have been utilized effectively the inclosed fuse has been subjected to only a comparatively-low degree of energy.

The protection of translating devices from the effects of overloads and short circuits where the normal energy is large is generally effected by means of electromagnetically-released circuit-breakers which mechanically open the circuits in which they are connected. Such circuit-breakers are usually provided with an auxiliary protective means of some sort so arranged that injury to the main terminals may be obviated, a fuse connected in shunt to the main-circuit-breaker terminals being one of such auxiliary devices. My present invention is designed for use in such relations, though it might be utilized as the sole protective device if a fuse of sufficient current-carrying capacity were employed.

In cases where the entire energy supplied by one or more generators of great power is suddenly thrown upon a shunt-connected fuse by the opening of the main circuit an enormous explosive force is exerted in the fuse-chamber. The preservation of the fuse-blocks for continued service and the safety of attendants and adjacent apparatus therefore demand devices of special construction for this class of work.

It is for the purpose of meeting the conditions above specified that I have designed the fuse-block forming the subject-matter of

this application, though, as has already been stated, it may be used in other relations, if desired.

In the accompanying drawings, Figure 1 is a plan view of my fuse-block and a portion of a supporting-base therefor, and Fig. 2 is a longitudinal sectional view of the same. Fig. 3 is an end elevation of the fuse-block, the corresponding terminal-head being removed. Fig. 4 is an inner end view of the clamping terminal-head removed from the end of the fuse-block shown in Fig. 3. Fig. 5 is a transverse sectional view of the fuse-block, taken on line *xx* of Fig. 2. Fig. 6 is a longitudinal sectional view of one of the fuse terminal-pieces and a portion of the fuse connected therewith.

The details of the invention illustrated in the drawings are as follows:

1 1 represent the supporting-base for the fuse-block, which may be a switchboard-panel or other suitable slab or plate, and 2 is the fuse-block, the main body portion 3 of which is built up in cylindrical form of alternate layers of paper 4 and steel piano-wire 5, as is clearly indicated in Figs. 2 and 5. This body portion may be differently constructed as regards shape and materials, provided the necessary strength and other functional requisites are secured, and I therefore do not intend to limit my invention to the details illustrated and described.

The body portion 3 is provided with a longitudinal fuse-chamber 6 and a lateral blow-out opening 7, with which communicates a tube or chimney 8. The latter projects through a bushing 9, the outer end of which is screw-threaded to receive a clamping-nut 10. The inner end of the bushing 9 is expanded to form a semicircular half of a supporting-clamp 11, the other half 9^a of the clamp being bolted to the part 9, as shown in Figs. 1 and 2.

Each end of the body portion 3 has fitted to it a metal piece 12, which has a longitudinal bore in alinement with and constituting a continuation of the fuse-chamber 6. The outwardly-projecting end of the piece 12 is provided with external interrupted screw-threads 13, with which engage corresponding

internal interrupted screw-threads on a terminal-head 14. A heavy metal plate 15 is fitted against each end piece 12, a sheet or strip of insulating material 16 being interposed between the correspondingly-inclined faces of these parts. These plates 15 are connected by means of suitably-insulated bolts 17, three of these bolts being employed in the device shown in the drawings. These plates and bolts constitute a clamping and reinforcing frame to resist the pressure exerted longitudinally in the fuse-chamber when a fuse is blown.

The fuse 18 is provided at each end with a terminal piece 19, consisting of a metal base 20, the inner end of which is longitudinally perforated to receive the fuse end and the outer portion of which is made in the form of a comparatively thin split tube in order that it may yield more or less to compression, so as to make good electrical contact with the bore of the end piece 12. The inner end of the base 20 is reduced circumferentially sufficiently to receive a shell or tube 21 of cartridge-paper or other suitable material. This shell is provided with a loosely-packed filling 22 of asbestos or other suitable non-combustible and non-conducting material, and above this filling 22 is placed a follower 23, preferably of fiber or some other suitable insulating material. The ends of the shell or tube 21 may be crimped inward over the follower 23, as indicated in the drawings, in order to retain the contents of the shell in proper position.

When the fuse-block, constructed as above described, is suddenly subjected to the energy supplied by a powerful generator, the fuse will be instantly vaporized, such vaporization being attended by a violent explosion. The force of this explosion will be partially spent through the blow-out opening 7; but it will also exert an enormous pressure both laterally and longitudinally against the walls of the fuse-chamber, and while it will volatilize the fuse it will at the same time exert sufficient pressure against the followers 23 to force them outward, thus packing the loose filling in each tube 21 into a compact layer over the inner end of the base 20, thereby preventing injury to any of the parts constituting the fuse-block terminals, such as would result if no means were employed to close the passage into and through the base 20. This follower 23 and the filling 22 therefore act as a valve device to close the outlet at the end of the fuse-chamber. Other forms of valve device may obviously be employed, if desired, in lieu of the form shown, and, in fact, other forms have been employed by me in practice.

While I have found the form shown in the drawings more satisfactory than any others that I have used, I desire it to be distinctly understood that my invention is broad enough to cover any form of valve, whether compressi-

ble or incompressible, that is seated by the explosion resulting from the blowing of the fuse in such manner as to protect the fuse-terminals from injury.

In general, my invention is intended to comprise any and all variations from the construction specifically shown and described which do not involve a material departure in mode of operation and result.

I claim as my invention—

1. In a fuse-block for electric circuits, a fuse, provided with end terminals and a protective device so located adjacent to each terminal as to be forced, longitudinally of the fuse-chamber, against said terminal by the explosive action resulting from the blowing of the fuse.

2. In a fuse-block for electric circuits, a fuse provided with end terminals and a cut-off-valve device so located in front of each terminal that the air and gas expansion caused by the blowing of the fuse will force said device against the end of the terminal and thus protect the same from the arc.

3. A fuse-block for electric circuits having a fuse-chamber provided with a blow-out opening, in combination with a fuse having a terminal-piece at each end comprising a shell, a filling of loosely-packed non-combustible material and a metal base, making removable spring-contact with the corresponding end of the fuse-block.

4. In a fuse-block for electric circuits, a fuse having a terminal-piece at each end comprising a shell, a metal base, a filling of loosely-packed non-combustible material and a follower.

5. In a fuse-block for electric circuits, a fuse having a terminal-piece at each end comprising a shell, a metal base, a filling of loosely-packed asbestos or similar material and a follower.

6. A fuse-block for electric circuits comprising a body portion having a longitudinal fuse-chamber and a lateral blow-out opening, end plates connected by clamping-bolts, and removable terminal-heads.

7. A fuse-block for electric circuits comprising a body portion having a longitudinal fuse-chamber and a lateral blow-out opening, a clamping and reinforcing frame and terminal-heads having a locking-joint connection with the body portion.

8. A fuse-block for electric circuits comprising a non-conducting body portion having metal ends, a fuse-chamber and a blow-out opening, a reinforcing-frame and terminal-heads detachably locked to said metal ends.

9. A fuse-block for electric circuits comprising a hollow non-conducting body portion having metal ends and reinforced both longitudinally and laterally to resist internally-exerted pressure and terminal-heads having an interrupted screw-thread locking engagement with said metal ends.

10. A fuse-block for electric circuits, com-

prising a cylinder built up of alternate wire helices and insulating-tubes, and metal ends clamped to said cylinder by a reinforcing-frame, in combination with a fuse provided with terminal-protecting means and terminal-heads detachably locked to said metal ends.

11. A fuse-block for electric circuits comprising a body portion having a fuse-chamber, a blow-out opening and detachable terminal-heads, in combination with a fuse having terminal-pieces each of which comprises a shell filled with loosely-packed non-combustible material, a metal base and a follower.

12. A fuse-block for electric circuits, comprising a wire-wound body portion having solid metal ends, a frame for clamping said ends to said body portion, detachable terminal-heads and means for clamping the block to a supporting-base.

13. A fuse-block for electric circuits comprising a body portion having a longitudinal chamber and a lateral blow-out opening, auxiliary means for resisting both longitudinally and laterally exerted internal pressure, and detachable terminal-heads, in combination with a fuse having terminal-pieces provided with protective valve devices.

In testimony whereof I have hereunto subscribed my name this 28th day of January, 1899.

HARRY P. DAVIS.

Witnesses:

WESLEY G. CARR,
H. C. TENER.