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CROSS REFERENCE

EXAMINER

N. J. NEALL.
ELECTRICAL DISCHARGE APPARATUS.
APPLICATION FILED JAN. 24, 1906.

936,656.

Patented Oct. 12, 1909.

313-243

Fig. 1.

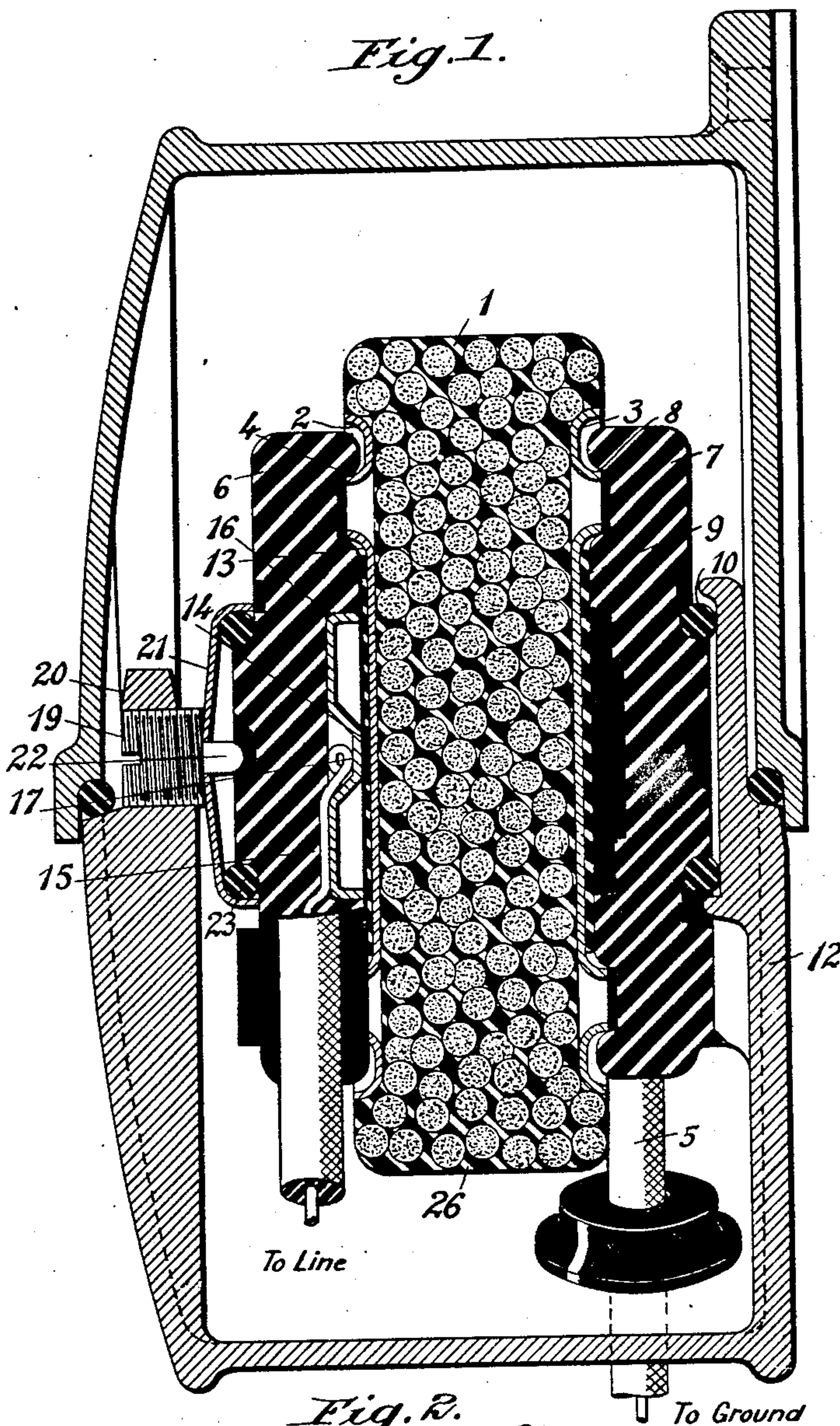
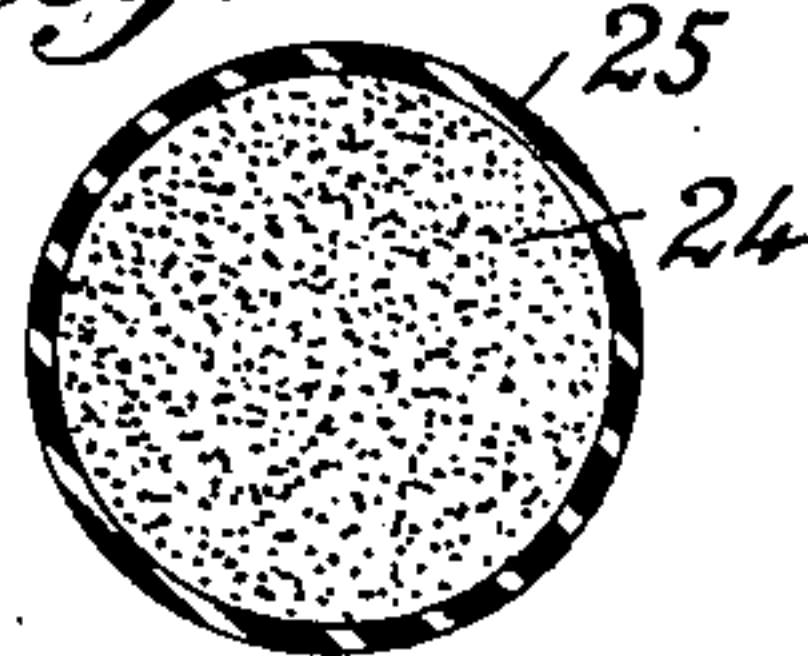


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTRICAL DISCHARGE APPARATUS.

936,656.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed January 24, 1906. Serial No. 297,690.

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To all whom it may concern:

Be it known that I, NEWITT J. NEALL, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electrical Discharge Apparatus, of which the following is a specification.

My invention relates to devices that are commonly known as lightning arresters, and particularly to discharge or conducting blocks that are employed in such devices for causing static discharges to divide among a large number of paths.

The object of my invention is to provide a novel and improved method of forming such discharge blocks and a novel composition of material therefor.

One form of lightning arrester heretofore used comprises one or more blocks or plates interposed in the path of a static discharge and providing a large number of independent discharge paths, the character of the paths being such that dynamo current is prevented from following a static discharge. Such discharge blocks have heretofore been composed of an intimate mixture of granulated carborundum or other conducting substance of fixed composition and preferably produced or disintegrated electro-chemically or at very high temperatures, powdered spar or other suitable non-conducting material and water-glass or other binder. The carborundum or conducting substance may also be mixed with shellac and cement, magnesium oxid and magnesium chlorid, fireclay or other suitable non-conducting substances that may serve both as fillers and binders, the mixture being dried or baked, according to the manner in which the binder may be caused to harden. With such mixtures, however, it has been found that while the filler and binder are in a plastic state and before or during the process of hardening, the carborundum particles, because of their greater specific gravity, settle and concentrate in the lower parts of the blocks, thus preventing the formation of blocks of homogeneous texture. It has also been found difficult, in the process of manufacture, to accurately predetermine what has been termed the equivalent spark gaps of such discharge blocks and also the opposition offered by them to the passage of dynamo current after discharges. The equivalent spark gap of a

circuit may be determined by connecting an air-gap in shunt to the circuit and adjusting the gap until discharges will occur across it as readily as through the circuit. To overcome the above-mentioned difficulties, I propose to form the carborundum or conducting material into pellets or bodies and to coat them with an insulating material that is preferably porous. Inasmuch as the pellets or bodies are provided with insulating shells or coatings before being mixed with the plastic binding and filling material, a sufficient number may be employed to insure contact between the shells of adjacent pellets and, consequently, a uniform distribution throughout the mass. The equivalent spark gap of each pellet or body and its ability to oppose the passage of dynamo current may be accurately determined and, consequently, the same characteristics may be determined for a complete block composed of pellets that are in contact with each other, if the thickness of the pellets and of the block is known.

Figure 1 of the accompanying drawing is a transverse, sectional view through a device that embodies my invention, and Fig. 2 is an enlarged sectional view of one of the conducting bodies of which the discharge block comprising my invention is composed.

A flat, cylindrical discharge block 1 is provided with dished or recessed faces with which correspondingly shaped conducting plates 2 and 3 are adapted to engage and to which they are preferably cemented, each of the plates being provided with a pair of studs or bosses 4 that are punched therefrom or that are formed in any other suitable manner, the exposed edges of the block being preferably enameled to prevent the absorption of moisture. A conducting lead 5, that is adapted to be connected to the ground, is soldered or otherwise connected to the plate 3. The block 1 and the plates 2 and 3 are supported in position between blocks 6 and 7 of porcelain or other insulating material, the inner faces of which are provided with recesses 8 into which the bosses 4 project for the purpose of preventing relative displacement of the engaging parts. A piece of suitable insulating material 9, such as fish-paper or fuller-board, is interposed between the block 7 and the plate 4 and a gasket 10 is interposed between the block 7 and the inner face of the lower half of an inclosing

and supporting casing 12, both being for the purpose of affording cushions for the insulating block 7.

One or more sheets 13 of suitable insulating material, such as mica, having central apertures 14, are placed between the porcelain block 6 and the plate 2, and a dish-shaped plate 15, that is located in a central recess 16 in the block 6, is placed with its concave face toward the insulating piece 13. The plate 15 is provided with a central boss 17 that is punched therefrom or formed in any other suitable manner and that is located directly over the apertures 14 in the mica sheets 13, an air-gap being thereby provided between the boss 17 and the plate 2. The width of the air-gap may be adjusted by varying the number or thickness of the mica sheets. The parts are all clamped together by means of a set-screw 19 that is threaded into a rib 20 in the interior of the lower half of the inclosing casing 12. A dish-shaped plate 21 having a central aperture through which a reduced portion 22 of the set-screw projects and that is placed with its concave face toward the insulating block 6, serves as a wearing piece and affords mechanical protection to the insulating block 6, a gasket 23 being interposed between the plate 21 and the block 6 for the purpose of affording a cushion for the block.

The discharge block 1 is composed of a large number of pellets or bodies 24 of conducting material, such as carborundum, provided with coatings of an insulating and preferably porous material 25, such as clay, that are hardened upon the bodies before the block is formed. The pellets or bodies may be bound together by means of a suitable insulating material 26, such as fireclay, water-glass, a mixture of magnesium oxid and magnesium chlorid, cement and shellac, the block being either dried or baked, according to the character of the binder, to cause hardening thereof. The equivalent spark gaps and the capability of single pellets and of two or more pellets in series to oppose the passage of dynamo current may be measured and, if the diameters or thicknesses of the pellets and the thickness of the discharge block are known, similar characteristics thereof may be accurately predetermined, so that the blocks may be readily formed to conform to the voltage, current and other conditions of the circuit in connection with which the device is to be employed. When so constructed, the blocks will also be uniform in texture throughout their thickness.

It is conceivable that blocks or plates having the structural and electrical characteristics herein described may be advantageously utilized in other relations and for other specific purposes, and I therefore de-

sire and intend to include within the scope of my invention all blocks or plates having the structural and functional characteristics herein described, whatever may be the particular service in which they are employed.

It will be understood that the blocks may be composed of pellets the coatings upon which are not first hardened, or the pellets may be unprovided with coatings and mixed with non-conducting fillers and binders and thereby maintained out of contact with each other substantially in the same manner as is effected by the coatings.

I claim as my invention:

1. A block composed of electrical conducting bodies having individual coatings of insulating material and bound together by other insulating material in which they are embedded.

2. A block composed of electrical conducting bodies having individual coatings of porous insulating material and bound together by other insulating material in which they are embedded.

3. The method of forming blocks or plates for electrical discharge devices which consists in forming a conducting material into a plurality of bodies, providing such bodies with individual coatings of insulating material and binding the bodies together by other insulating material.

4. The method of forming blocks or plates for electrical discharge devices which consists in forming a conducting material into a plurality of bodies, coating the bodies individually with porous insulating material and binding the coated bodies together by porous insulating material.

5. The method of forming blocks or plates for electrical discharge devices, which consists in forming conducting material into pellets, coating the pellets individually with insulating material, hardening the insulating coatings, binding the coated pellets together in a plastic insulating material and hardening the insulating binder.

6. A block composed of bodies of high-resistance conducting material individually coated with insulating material and bound together by other insulating material in which they are embedded.

7. A block composed of bodies of refractory conducting material individually coated with insulating material and bound together by other insulating material in which they are embedded.

In testimony whereof, I have hereunto subscribed my name this 18th day of January, 1906.

NEWITT J. NEALL.

Witnesses:

R. B. INGRAM,
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