Jan. 12, 1932. W. H. CHAPMAN 1,841,323

NEUTRALIZER BAR

Filed Dec. 18, 1930

Fig.1

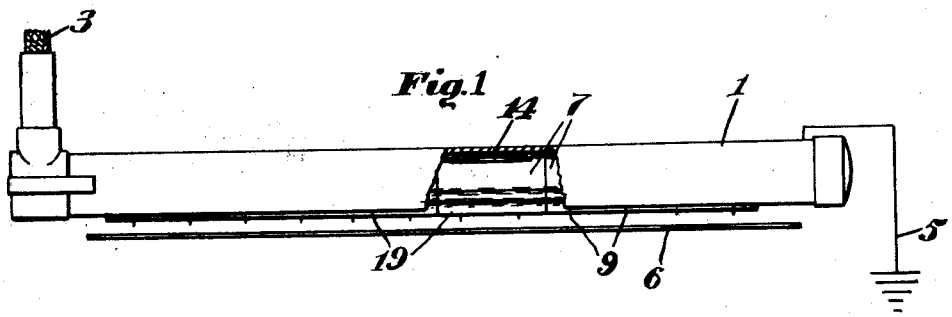


Fig.2

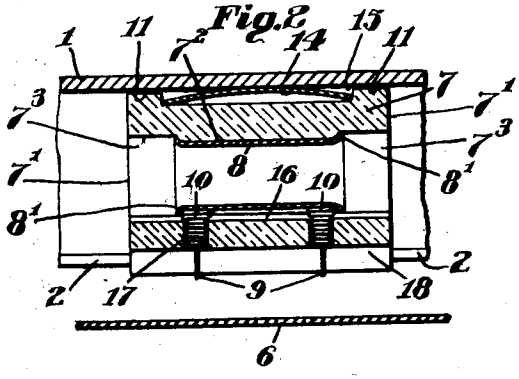


Fig.3

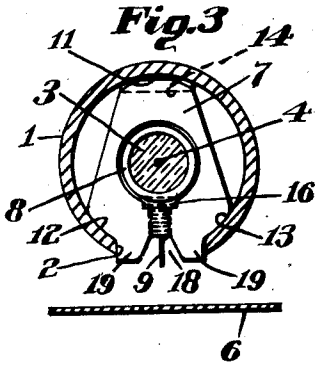
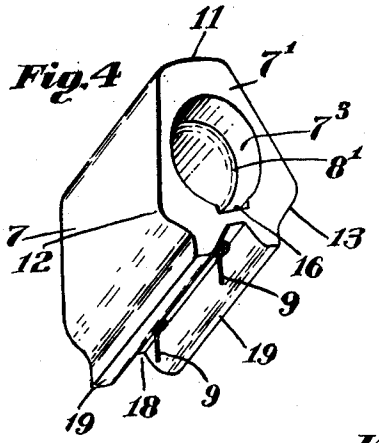


Fig.4



Inventor
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By Attorney

Patented Jan. 12, 1932 1,841,323

UNITED STATES PATENT OFFICE

WILLIAM HENRY CHAPMAN, OF PORTLAND, MAINE, ASSIGNOR TO CHAPMAN ELECTRIC NEUTRALIZER COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE

NEUTRALIZER BAR

Application filed December 18, 1930. Serial No. 503,246.

This invention relates to discharge bars for neutralizing static electricity, and particularly for neutralizing static electricity on moving sheets of paper or fabric occurring in the process of manufacturing such sheets or in printing thereon. As such it involves certain improvements upon my prior Patents 940,431, granted November 16, 1909 and 1,653,599, granted December 20, 1927 to which reference is here made as disclosing a discharge bar of the general type involved herein.

More specifically, my present invention is directed to the removal of certain practical difficulties which have been noted in the use of a discharge bar of this type. One characteristic difficulty has been that spark discharges sometimes occur inside the discharge bar between the ends of the induction sleeves indicated at *g* in Patent 940,431 and at 30 in 1,653,599 and the outside casing, thus reducing the efficiency of the bar.

According to my present invention I overcome this objection by deeply counter-sinking the sleeves in their insulating blocks so that the ends of the sleeves are surrounded by the enclosing ends of the blocks, thus avoiding any spark discharge from the ends of the induction sleeves radially towards the sides of the outside casing.

Another difficulty with all previous discharge bars of this type has been that in order to prevent admission of dirt or other foreign matter into the bar a greater uniformity and accuracy of fit of the insulating blocks therein has been demanded than can be secured in the process of manufacture of the blocks. These blocks are made of porcelain, on account of the superior insulating qualities of this material, but porcelain does not lend itself to molding with sufficient accuracy to afford that tightness of fit so necessary to exclude dirt or other foreign matter from the bar.

I overcome this difficulty in my present invention by the provision of resilient means, as flat steel springs interposed between the outside casing and the insulating blocks and effective to press the blocks firmly against the casing. In this, the configuration of the blocks themselves becomes a factor, my present blocks being purposely configured substantially to conform to the internal curvature of the casing along spaced longitudinal lines of bearing at either side of the slot in said casing, thus effectively sealing the slot against ingress of dirt or other foreign matter. The compression springs are so mounted between the outside casing and the blocks as to be securely anchored against any tendency to work free from the blocks when the discharge bar is assembled.

A further difficulty in all previous types of discharge bars has consisted in the mounting of the discharge points themselves. In order to protect them against injury, such discharge points have been heretofore mounted in their insulating blocks in cylindrical openings having enlarged conical outlets. While adequate to protect them this method of mounting the discharge points however is open to the objection the dirt accumulates in such openings and is difficult to dislodge. Inasmuch as the discharge bar sometimes carries as many as fifty or more discharge points, the matter of cleaning out each individual opening is a long and tedious task involving as it does the introduction of a rag, brush, or other cleaning implement into each individual opening and thereafter twisting the same so as to wipe any accumulated dirt out of the opening.

I overcome this objection in my present invention by providing each insulating block with a longitudinal groove extending from end to end thereof so that when all the blocks are assembled in the bearing a continuous groove is afforded from end to end of the bar which groove can be quickly and completely cleaned by drawing a rag, brush or other cleaning implement from end to end of the bar instead of introducing the rag into each individual opening and twisting the same therein as has been heretofore necessary. With my improved construction the resilience of the cone shaped discharge points permits a vigorous wiping or brushing action without injury to the points and the groove within which the points are located protects them laterally so that the edges of the moving

sheets of paper cannot catch and injure them as would occur if the points were not protected by a suitable enclosure of insulating material. In other words, the continuous groove in my present construction affords even greater protection to the discharge points than did the individual openings in my prior constructions while enabling the discharge bar to be cleaned far more thoroughly and with considerable less effort and time than was possible with such constructions.

Other features of improvement and advantage will be more particularly pointed out hereinafter.

As illustrative of the principles involved I show in the accompanying drawings a form of discharge bar which I have found highly satisfactory under actual service conditions and well adapted to the requirements of manufacture.

In the drawings:—

Fig. 1 is an elevation of a discharge bar equipped in accordance with my present invention, the outside casing being partly broken away to disclose the internal construction.

Fig. 2 is an enlarged fragmentary longitudinal section.

Fig. 3 is a cross section on the same scale as Fig. 2, the insulating block being shown, however, in end elevation, and

Fig. 4 is a perspective view of one of my insulating blocks removed.

As in my said prior patents hereinbefore referred to, the discharge bar consists generally of an outside casing 1 of steel or other suitable material having a longitudinal slot 2 extending from end to end thereof. The casing 1 is mounted in the usual manner for the passage therethrough of charges of alternating current. For the purposes of this application I have simply indicated at 3 a lead adapted to be connected with any suitable source of high tension alternating current. The lead 3 is electrically connected with a cable or the like 4 extending from end to end of the casing, said casing being grounded as at 5. The moving sheet of fabric, paper or other material is indicated at 6 and the discharge bar is mounted in such relation to said sheet as to control the electrostatic charges generated therein during the process of manufacturing or printing such sheets.

Assembled within the casing 1 is a plurality of insulating blocks 7. These blocks may be made of any suitable insulating material but are preferably made of porcelain. They are assembled in end to end abutment within the casing 1 and each block serves as a mounting for a condenser in the form of a metallic sleeve 8 which is fixed axially therein and also carries one or more discharge points 9 of conical form having enlarged heads 10 disposed in electrical conducting relation to the sleeves 8 interior of the block.

As contemplated herein the sleeves 8 are deeply counter-sunk in the blocks 7 so that the ends 8′ of the sleeves terminate inside of the enclosing ends 7′ of the blocks, thus to avoid any danger of spark discharges radially across from the ends of the sleeve to the inside surface of the metal casing 1.

In accomplishing this result the blocks 7 are molded with an axial opening 7^2 the ends of which are enlarged as at 7^3 so that the effect is that of a bore and a counter-bore. Adopting this terminology the bore is the opening 7^2 and the counter-bores are the enlargements 7^3 at the ends of the bore 7^2.

The sleeve 8 fits tightly within the bore 7^2, the ends of the sleeve being headed over if desired to retain the sleeve in place, as best shown in Fig. 2 and as indicated by the reference character 8′.

The shape of each block is such as to fit reasonably tightly within the casing 1 when entered endwise therein, being rounded as at 11, 12 and 13 in Fig. 3 to conform generally to the curvature of the casing.

In order to insure that tightness of fit necessary to exclude the entrance of dirt or other foreign matter into the bar I provide means for positively pressing the individual blocks into firm contact with the casing at the bearing surfaces 12 and 13. Such means may take the form of a series of bowed steel springs 14 each of a length to fit snugly within a cavity 15 formed in the surface 11 of the block. The cavity 15 prevents in the spring 14 from accidentally disengaging from the block when the block is assembled in the casing. In such assembly the spring itself bears against the inside surface of the casing 1 and is compressed thereby and thus presses the block firmly against the casing at the bearing surfaces 12 and 13.

The discharge points 9 may be assembled in any desired manner. As here shown each block is internally grooved as at 16. The groove 16 extends from end to end of the block and opens into the opening 7^2 of the block. Between its ends, each groove is intersected at one or more points by openings 17 within which the helical portions of the discharge points are mounted with the points themselves extending slightly beyond the outermost surface of the block and the enlarged heads or bases 10 of said points lodged in the groove 16 in contact with the sleeve 8.

In order to protect the discharge points against injury by the moving sheets of paper 6 and also to enable the block readily to be cleaned, that portion of the block which registers with the longitudinal slot 2 of the casing 1 is grooved exteriorly from end to end as indicated at 18. The grooves 18 permit the blocks to be cleaned by wiping them from end to end of the bar with a rag or other cleaning implement and the ribs 19 left

by said groove serve to protect the discharge points against injury.

From the foregoing it is believed that the construction and advantages of my present invention will be readily appreciated by those skilled in the art. While I have shown a preferred embodiment of my invention it will be apparent that various changes in the construction and assembly are possible according to the requirements of any particular installation and hence are to be regarded as within the spirit and scope of my invention if within the limits of the appended claims.

What I therefore claim and desire to secure by Letters Patent is:

1. A discharge bar of the class described comprising a casing, an insulating unit mounted therein, and means independent of the casing and the insulating unit and compressively confined therebetween for resiliently urging the insulating unit against the casing.

2. A discharge bar of the class described comprising a casing, an insulating unit mounted therein, and means between the casing and the insulating unit for resiliently urging the insulating unit against the casing, the casing being curved and the insulating unit having bearing surfaces substantially opposite said means conforming generally to the curvature of the casing.

3. A discharge bar of the class described comprising a casing, an insulating unit mounted therein, and a spring compressively confined between the casing and the insulating unit for resiliently urging the insulating unit against the casing.

4. A discharge bar of the class described comprising a casing, an insulating unit mounted therein, and a spring compressively confined between the casing and the insulating unit for resiliently urging the insulating unit against the casing, the casing being curved and the insulating unit having bearing surfaces substantially opposite said spring conforming generally to the curvature of the casing.

5. A discharge bar of the class described comprising a casing, an insulating unit mounted therein and having a cavity, and a bowed spring compressively confined in the cavity of the insulating unit and between it and the casing for resiliently urging the insulating unit against the casing.

6. A discharge bar of the class described comprising a casing, an insulating unit mounted therein and having a cavity, and a bowed spring compressively confined in the cavity of the insulating unit and between it and the casing for resiliently urging the insulating unit against the casing, the casing being curved and the insulating unit having bearing surfaces substantially opposite said spring conforming generally to the curvature of the casing.

7. In a discharge bar of the class described, a slotted casing, a plurality of insulating units assembled within said casing and having discharge points exposed through the slot thereof, each unit having a longitudinal groove from end to end thereof within which the discharge points are centered so as to be protected by the walls of said grooves and said grooves permitting the discharge points to be cleaned by a wiping action from end to end of the bar, the surfaces of said insulating unit on either side of said groove bearing against the casing interiorly thereof, and a spring confined between each insulating unit and the casing opposite said bearing surfaces for resiliently urging said units against the casing.

8. In a discharge bar of the class described, a casing, an insulating unit mounted within said casing, said unit having an axial opening, the ends of said opening being of greater diameter than the opening itself, and a sleeve mounted in said opening with its ends terminating short of the enlarged ends of the opening so as to be protected by the overhanging end portions of the insulating unit against radial sparking to the side of the casing.

9. In a discharge bar of the class described, a casing, an insulating unit mounted within said casing, said unit having an axial opening, the ends of said opening being of greater diameter than the opening itself, and a sleeve mounted in said opening with its ends terminating short of the enlarged ends of the opening so as to be protected by the overhanging end portions of the insulating unit against radial sparking to the side of the casing, the ends of said sleeve being headed over into the enlarged ends of said axial opening in order positively to retain the sleeve in position within said opening.

10. In a discharge bar of the class described, a casing, an insulating unit mounted within said casing, said unit having an axial opening, the ends of said opening being of greater diameter than the opening itself, and a sleeve mounted in said opening with its ends terminating short of the enlarged ends of the opening so as to be protected by the overhanging end portions of the insulating unit against radial sparking to the side of the casing, said axial opening being intersected by a longitudinal groove and said longitudinal groove being intersected by an opening for a discharge point, and a discharge point mounted in said last named opening with its inner end lodged in said longitudinal groove and its outer end exposed beyond said insulating unit.

11. In a discharge bar of the class described, a casing, an insulating unit mounted within said casing, said unit having an axial opening, the ends of said opening being of greater diameter than the opening itself, and

a sleeve mounted in said opening with its ends terminating short of the enlarged ends of the opening so as to be protected by the overhanging end portions of the insulating unit against radial sparking to the side of the casing, the ends of said sleeve being headed over into the enlarged ends of said axial opening in order positively to retain the sleeve in position within said opening, said axial opening being intersected by a longitudinal groove and said longitudinal groove being intersected by an opening for a discharge point, and a discharge point mounted in said last named opening with its inner end lodged in said longitudinal groove and its outer end exposed beyond said insulating unit.

12. In a discharge bar of the class described, a slotted casing, a plurality of insulating blocks assembled in end to end relation within said casing, each block being exteriorly grooved from end to end and each block adjacent said groove having bearing surfaces corresponding in configuration to the general configuration of the casing, a spring assembled upon each block and exposed for compressive engagement by the casting whereby to resiliently press each block against the casing at said bearing surfaces.

13. In a discharge bar of the class described, a slotted casing, a plurality of insulating blocks assembled in end to end relation within said casing, each block being exteriorly grooved from end to end and each block adjacent said groove having bearing surfaces corresponding in configuration to the general configuration of the casing, a spring assembled upon each block and exposed for compressive engagement by the casing whereby to resiliently press each block against the casing at said bearing surfaces, the blocks being formed with cavities to receive said springs.

14. In a discharge bar of the class described, a slotted casing, a plurality of insulating blocks assembled in end to end relation within said casing, each block being exteriorly grooved from end to end and each block adjacent said groove having bearing surfaces corresponding in configuration to the general configuration of the casing, a spring assembled upon each block and exposed for compressive engagement by the casing whereby to resiliently press each block against the casing at said bearing surfaces, each block having an axial opening terminating in enlarged ends, a sleeve mounted in each opening with its ends terminating short of the ends of the block so as to be protected between overhanging portions of the block against radial sparking to the inside surface of the casing, and each block having one or more openings disposed transversely to said sleeves, and discharge points mounted in said openings with their inner ends disposed adjacent said sleeves and their outer ends extending into said external grooves and protected by the walls of said grooves.

15. In a discharge bar of the class described a slotted casing, a plurality of insulating blocks assembled in end to end rotation within said casing, each block being exteriorly grooved from end to end and each block having an axial opening terminating in enlarged ends, a sleeve mounted in each opening with its ends terminating short of the ends of the block so as to be protected between overhanging portions of the block against radial sparking to the inside surface of the casing, and each block having one or more openings disposed transversely to said sleeves, and discharge points mounted in said openings with their inner ends disposed adjacent said sleeves and their outer ends extending into said external grooves and protected by the walls of said grooves.

16. An insulating unit for use with the slotted casing of a discharge bar of the class described, consisting of a block of insulating material assembled within said casing, said block having an axial opening the ends of which are of greater diameter than the opening itself and within which opening a sleeve of less length than the length of the opening is adapted to be mounted so as to be protected by the overhanging end portions of said block against radial sparking to the side of the casing, said block having a longitudinal groove extending from end to end thereof and registering with the slot of the casing, the walls of said groove constituting a protective enclosure for a discharge point which projects outwardly through said groove and slot of casing, and the groove itself permitting the discharge point to be cleaned by wiping action from end to end of the block.

17. An insulating unit for use with the slotted casing of a discharge bar of the class described, consisting of a block of insulating material assembled within said casing, said block having an axial opening the ends of which are of greater diameter than the opening itself and within which opening a sleeve of less length than the length of the opening is adapted to be mounted so as to be protected by the overhanging end portions of said block against radial sparking to the side of the casing.

In testimony whereof I affix my signature.

WILLIAM HENRY CHAPMAN.