Nov. 12, 1929. W. H. CHAPMAN 1,735,494

NEUTRALIZER BAR

Filed Feb. 12, 1925

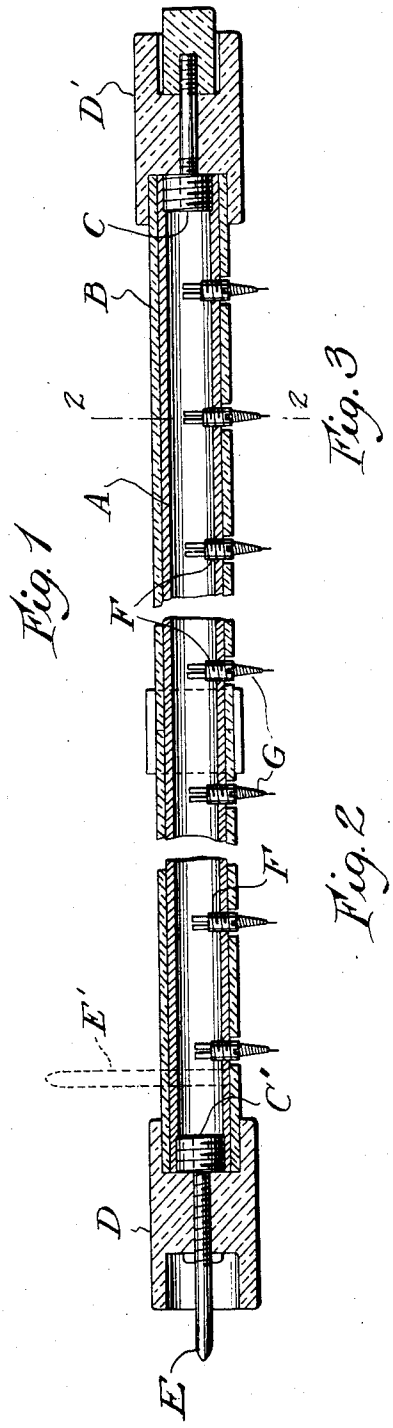


Fig. 1

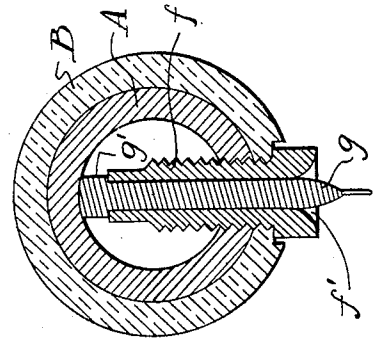


Fig. 3

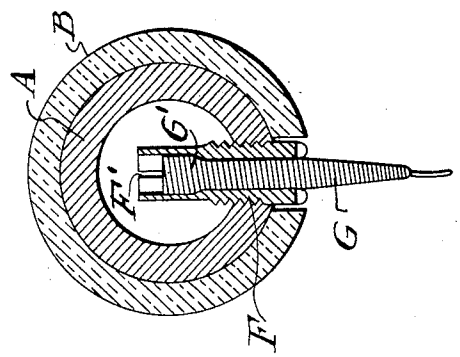


Fig. 2

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UNITED STATES PATENT OFFICE

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NEUTRALIZER BAR

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My invention consists of a new and improved type of discharge bar for removing static electricity from the surface of charged paper or other flat surfaces, as in a printing press.

The object of my invention is to provide a bar with flexible discharge points which are sufficiently stiff to retain their erect position in relation to the bar whatever may be the position of the bar with reference to the surface of paper to be treated and yet flexible enough to yield readily to anything that happens to strike them.

I attain my object by constructing discharge points of fine spring wire of steel or phosphor bronze wound with a cone shaped end and retained in a suitable cylindrical receptacle and having a metallic connection with the conductor of the bar.

A bar constructed according to my invention is shown in the accompanying drawing in which:—

Fig. 1 is a longitudinal upright section,

Fig. 2 is a cross section on the line 2—2 of Fig. 1, and

Fig. 3 is a section like Figure 2 but showing a modification.

A is an iron pipe, B is a fibre insulating sheath or tube inclosing it, and D and D′ are hard rubber insulating bushings which provide a point of attachment for a supporting bracket (not shown).

C and C′ are metal plugs screwed into the end of the pipe. E is a steel terminal point to receive a bayonet socket for connection with a transformer or other source of high tension electricity. An optional position for this terminal point is shown by dotted lines at E′. A series of brass receptacles F are screwed into the pipe A each containing a spring G of fine wire formed with a cone shaped end by winding the wire closely onto a sharp pointed arbor, the winding being finished at the point where a short piece of the wire is left projecting. The arbor on which the spring is wound has a slightly enlarged portion at the starting point of winding which forms an enlarged portion G′ and a shoulder on the spring. The receptacle F has an enlarged opening at its inner end to receive the enlarged portion of the spring and this end is slotted as at A′ so that after the spring is put into place the end of the receptacle can be pinched together with suitable pliers so as to retain the spring firmly in position with its shoulder against the shoulder in the receptacle.

I construct these springs preferably of No. 25 tinned steel spring wire wound on an arbor which makes the body of the spring $\frac{1}{8}$ inch outside diameter with a base portion $\frac{5}{32}$ outside diameter tapering at the outer end to a point. A spring thus constructed can be doubled over against the side of the bar without injury as it has sufficient elasticity to restore itself to erect position after bending.

In using a bar of the type disclosed it is positioned in a machine with respect to the traveling paper or fabric and so that its discharge points are properly spaced from the traveling material. Accordingly it is important that these points be at and remain at a fixed distance from the axis of the bar, except as they may temporarily yield when struck by the material or an operator. Therefore the spring G is wound closely with its convolutions in contact with one another to prevent any yielding of the point in direction away from the material and along its own longitudinal axis which is at right angles to the longitudinal axis of the bar. When the bar is positioned on the machine and the points are properly spaced from the material they will retain their initial relationship therewith since they cannot be compressed longitudinally and, when bent over laterally, are returned by their own resiliency to their initial position. This arrangement enables the bars to be used with their points projecting upward or downward or in any other desired direction and at a predetermined distance from the surface of the material being neutralized, and insures that this distance will be maintained.

Discharge bars with rigid points have caused bad wounds in the hands and arms of operators accidentally getting against them as they work about the machines on which they are placed.

To avoid this some bars have been constructed with the active points enclosed in a sheath of rubber or porcelain and having only the extreme end of the point exposed. Others have been constructed with a flexible metal tape hanging down from the bar to constitute the active point. In the former case the enclosing sheath of insulating material requires frequent cleaning as it gets clogged up with lint, ink or dirt of various kinds and in the latter case the bar cannot be used with the active points directed upward or horizontally as is required in some kinds of printing presses where the paper runs vertically or over the discharge bar. My present bar obviates both of these difficulties and can be used in any position.

In Fig. 3 I have shown a modification in which the retaining device *f* for holding the point *g* is constructed of hard rubber instead of metal. By using hard rubber instead of metal the effective length of the point is increased as the retaining device *f* is a non-conductor instead of a conductor and the current must flow through the entire length of the point from the pipe A.

The retaining device or hard rubber receptacle *f* has a flaring opening *f'* which permits the end of the point *g* to be bent when encountered by any object. The inner end *g'* of the point *g* is enlarged to rest on the end of the receptacle *f* and is pressed firmly against the inner wall of the pipe A.

I claim:—

1. A discharge bar for neutralizing static electricity having a series of discharge points, each point consisting of a single wire wound helically with its convolutions in contact and forming a cone-shaped end terminating in a straight section of wire.

2. A discharge bar for neutralizing static electricity comprising a conducting tube; a series of receptacles secured in said tube along one side thereof; and a discharge point supported in each receptacle having electrical connection with said tube, each point being a wire helically wound with its convolutions in contact with one another to provide a hollow body portion with cone shaped end terminating in a straight section of the wire and being arranged in said receptacle so as to permit the point to yield laterally but not along its axis toward the receptacle upon contact with an object and to be returned to its initial position by its own resiliency.

3. A discharge bar for neutralizing static electricity comprising a conductor; a series of discharge points projecting therefrom along one side thereof having electrical connections with said conductor; each said point being a helically wound wire with its inner end fixed in position and with its convolutions in contact with one another so that it can not yield toward the receptacle but so that its external end can yield laterally upon contact with an object and by its resiliency be returned to its initial position.

4. A discharge bar for neutralizing static electricity comprising a conductor tube; a series of separated discharge points projecting therefrom along one side thereof and having electrical connection therewith; and a receptacle for each point inserted in said tube with its point extending outside thereof and being adapted to be removed to permit replacement of said points separately.

WILLIAM H. CHAPMAN.