# United States Patent

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[72] Inventors **Peter Bishop;**
**Arthur S. Christy, Jr.; Virgil E. Linnell, all of Portland, Maine**



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[73] Assignee **United Industrial Syndicate Inc.**
**Portland, Maine**


[54] **STATIC NEUTRALIZER**
**15 Claims, 5 Drawing Figs.**


[52] **U.S. Cl.** ..... **317/2 F**
[51] **Int. Cl.** ..... **H05f 3/06**
[50] **Field of Search** ..... 317/2 F, 2 R, 4; 339/252



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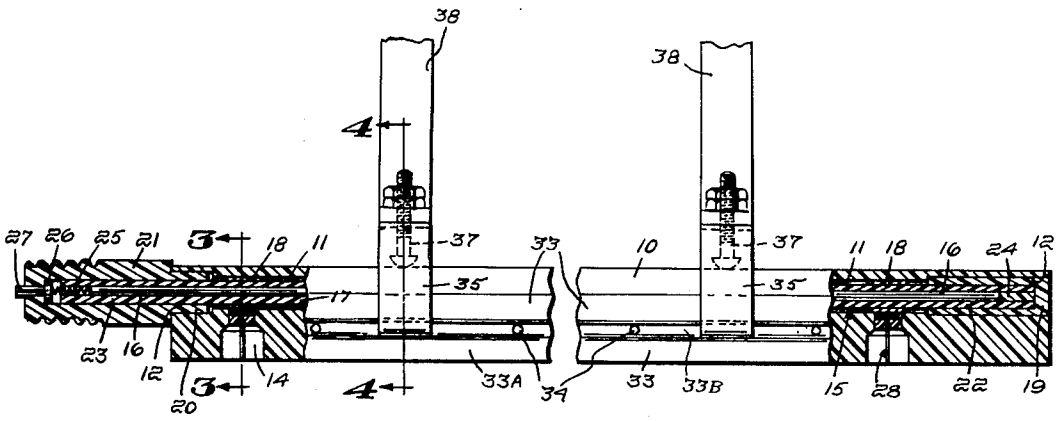
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*Primary Examiner*—William H. Beha, Jr.
*Assistant Examiner*—Harry E. Moose, Jr.
*Attorney*—Abbott Spear



**ABSTRACT:** A static electric neutralizer is disclosed in which a bar of a dielectric material has a lengthwise chamber open at least at one end and a series of bores in communication with the chamber. A sheathed conductor is confined in the chamber and discharge devices, one for each bore, are held capacitatively coupled to the sheathed conductor by plugs in the bores, the discharge points of the devices extending through the plugs. The open end of the chamber is closed by a terminal through which the contact section of the conductor extends. The bar, terminal, and plugs are of dielectric material and bonded together to prevent surface electrical leakage except along the discharge points.

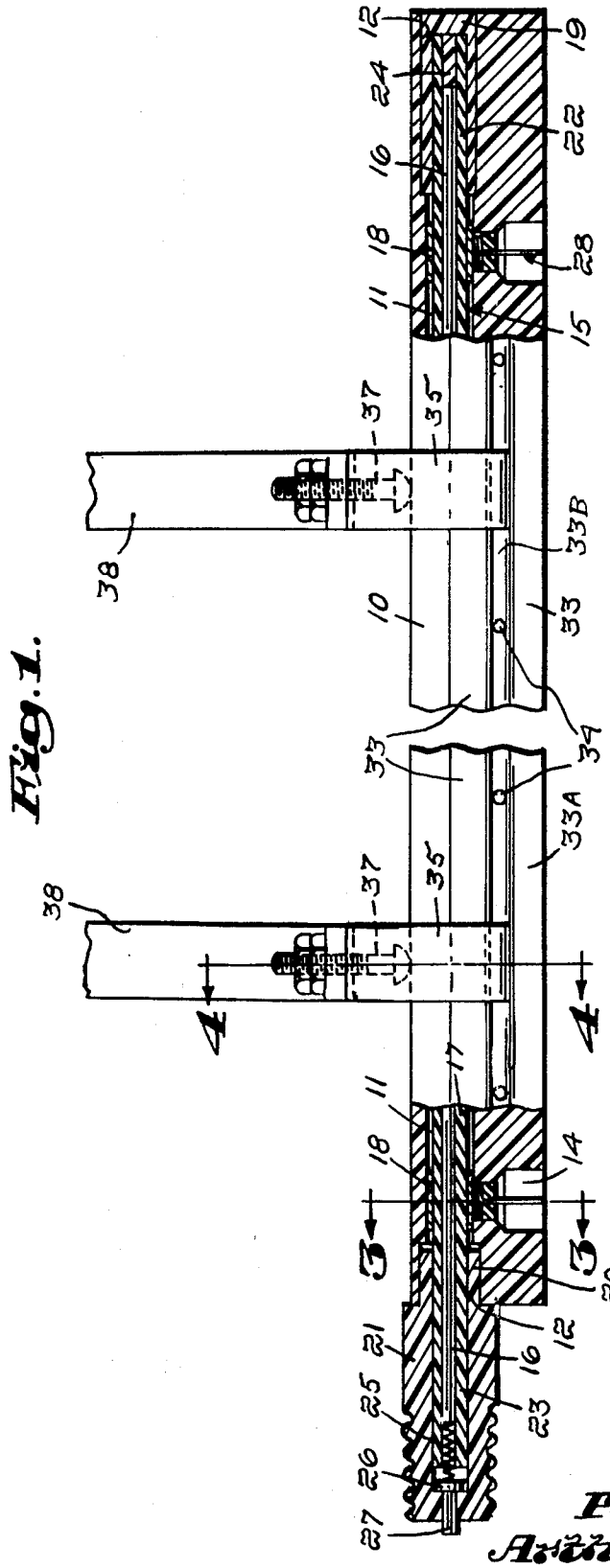


Fig. 1.

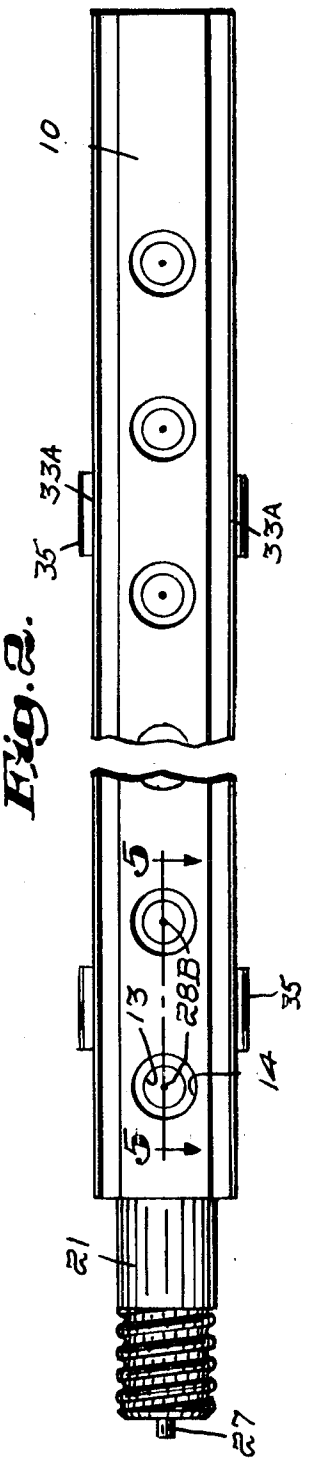


Fig. 2.

Inventors:
Peter Bishop,
Arthur S. Christy, Jr.
Virgil E. Linnell,
By Attorney

Fig. 3.

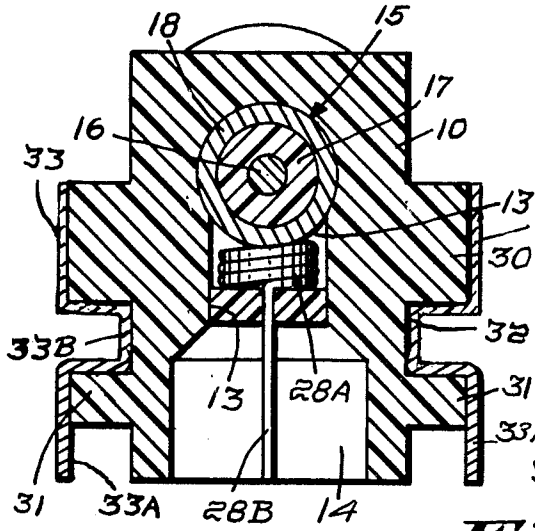



Fig. 4.

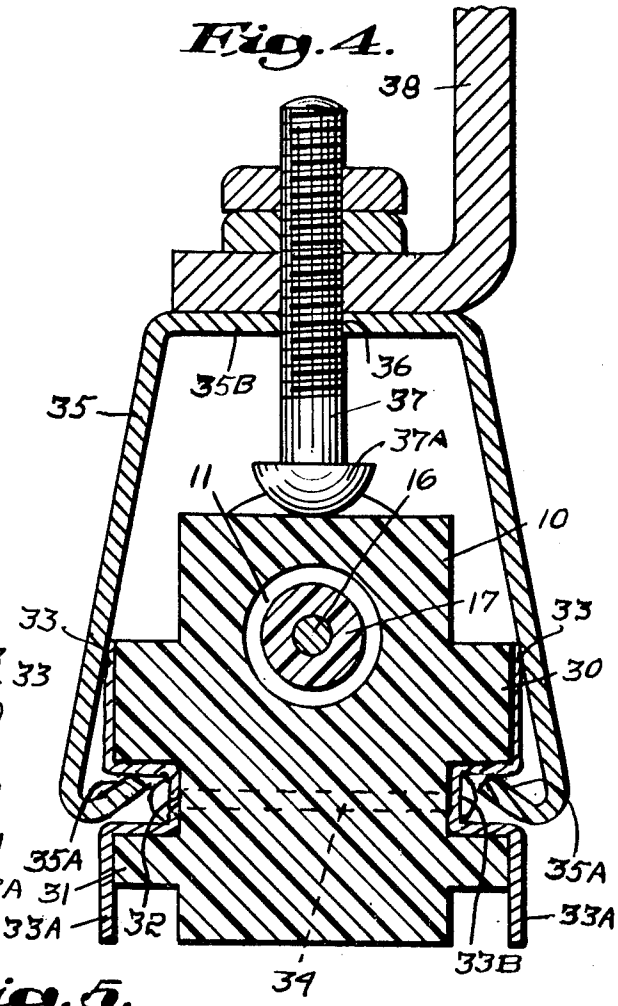
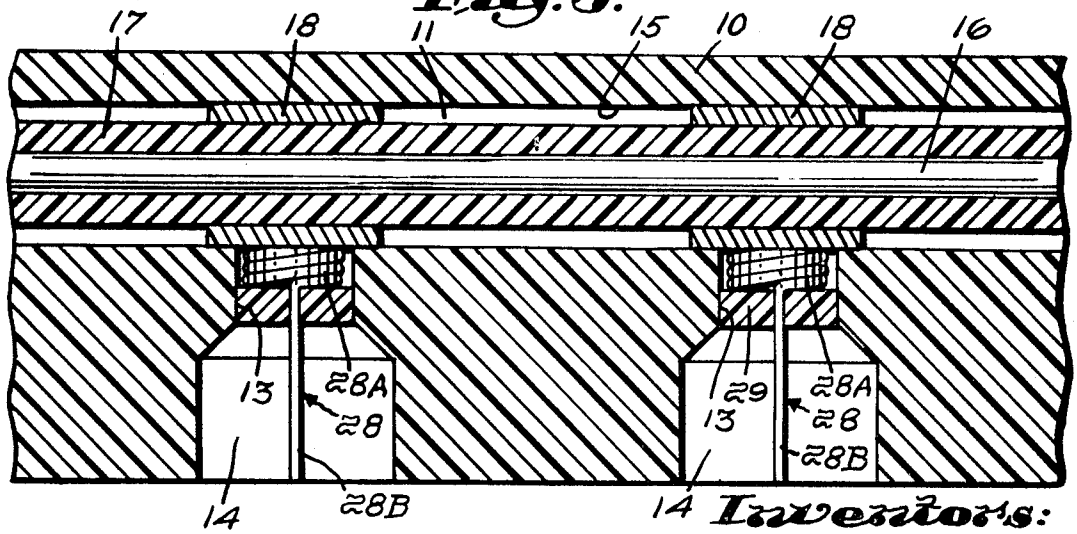



Fig. 5.




Inventors:
Peter Bishop,
Arthur S. Christy, Jr.
Virgil E. Linnell,
by Attorney

# STATIC NEUTRALIZER

The present invention relates to static neutralizers in which surface electrical leakage except along the discharge points is prevented.

Many operations result in the development of troublesome charges of static electricity. Such charges can be and are eliminated by means of neutralizers, each having an insulated conductor connected to a source of a high potential and a series of discharge points capacitatively coupled to the conductor and spaced from grounding means.

Such neutralizers have long been used but for many installations it is desired that the neutralizers be substantially shockproof, dustproof, and waterproof. A more demanding requirement is that such neutralizers be so constructed that there will be no surface electrical leakage from the bar except along its discharge points. The general objective of the present invention is to meet the last-named requirement, an objective attained by providing a discharge bar having a chamber opening through at least one end and also having a series of bores spaced lengthwise of the bar and opening into the chamber. A conductor extends lengthwise of the chamber and includes a main section and a contact section, the main section having an insulating sheath. A discharge device is located in each bore with its discharge point extending through a plug seated in that bore and having a portion held seated against suitable means on the sheath ensuring that the discharge devices are capacitatively coupled to the conductor. A terminal closes the open end of the chamber with the contact section of the conductor extending therethrough. A ground member extends along at least one side of the bar and is secured thereto. The bar, plugs, and terminal are of dielectric material capable of being sealed together, preferably by sonic or solvent welding providing a construction that ensures against surface electrical leakage except along the discharge points and accordingly is both dust resistant and water resistant and at the same time is adaptable to embodiments.

Another objective of the invention is to ensure a satisfactory ground, an objective attained by providing the bar with a channel extending along at least one of its sides and a ground member including a first marginal portion wider than the channel, a second marginal portion, and an intermediate portion with reference to which the marginal portions are so angularly disposed that when the first marginal portion is lodged in the channel, the second marginal portion is disposed in predetermined spaced relation to the discharge points.

Another objective of the invention is to utilize clamps in the attachment of the bars, each clamp being attachable to a bar and including a hook portion to be caught in the channel and, desirably, when used with the above-referred to ground member, also serving to lock them in place.

Yet another objective of the invention is to provide a neutralizer construction adapted to meet production requirements, an objective attained with a bar having its chamber opening through both ends and with a counterbore in each end, one to receive the terminal and the other to receive a dead end plug of a dielectric material material that can be sonic or solvent welded to the bar. The terminal and the dead end plug have axial sockets receiving the ends of the sheathed conductor. Desirably, the main conductor section is separate from the contact section and terminates short of its sheath, there being a metallic spring between the conductor sections and held at least partly compressed thereby and an insulating plug is seated in the other end of the sheath against the main conductor section.

In the accompanying drawings, there is shown an embodiment of the invention illustrative of these and other of its objectives, novel features and advantages.

In the drawings:

FIG. 1 is a side view of a neutralizer in accordance with the invention with both ends sectioned;

FIG. 2 is a bottom view of the neutralizer;

FIG. 3 is a cross section, on an increased scale, taken approximately along the indicated lines 3—13 of FIG. 1;

FIG. 4 is a section taken along the indicated lines 4—4 of FIG. 1; and



FIG. 5 is a section taken along the indicated lines 5—5 of FIG. 2.

The neutralizer shown in the drawings consists of a bar 10 of a dielectric material having a chamber 11 extending from end to end thereof provided with end sockets or counterbores 12. The bar 10 also has a series of bores 13, each opening into the chamber 11 and having a counterbore 14.

An insert generally indicated at 15 is dimensioned to fit within the chamber 11 and comprises a conductor 16 shown as terminating short of the ends of a sheath 17 of plastic tubing or other suitable insulating material, and a sheath-encircling metal band 18 to overlie each bore 13. While the band 18 may be common to some or all of the bores, in the embodiment of the invention shown in the drawings, there is a separate band 18 for each bore 13.

A dead end plug 19 is fitted in one end socket 12 and the plug end 20 of a terminal 21 is filtered within the other end socket 12. The plug 19 and the terminal 21 have axially aligned sockets 22 and 23, respectively, to receive the ends of the insert 15. In the case of the dead end plug 19, there is an insulating plug 24 fitted within the proximate end of the sheath 17 and seated against the corresponding end of the conductor 16. In the case of the terminal 21, a metallic spring 25 is supported within the other end of the sheath 17 with one end seated against the proximate end of the conductor 16 and its other end resiliently backing the head 26 of a contact 27 extending through the terminal 21.

Each bore 13 has a discharge device seated therein. The discharge devices are generally indicated at 28 and each is shown as of a type formed from wire with a coiled portion 28A and a discharge point 28B. A plug 29 of dielectric material is seated in each bore 13, each plug 29 having a discharge point 28B extending through it and seating a coiled portion 28A against the periphery of the overlying band 18 to effect a capacitive couple between the discharge devices and the conductor 16. In practice, each contact point 28B is of substantial length to facilitate its threading through a plug 29, the excess then being trimmed to provide the appropriate discharge point length.

The bar 10 is shown as having a laterally projecting pair of ribs 30 and 31 on each side, each pair defining a lengthwise channel 32. A ground strip 33 is provided for each side of the base 10, each ground strip having an exposed margin 33A spaced a predetermined distance from the discharge points 28B and having a central channel portion 33B shaped and dimensioned to fit a bar channel 32. The ground strips 33 are anchored in place by rivets 34 interconnecting their channel portions 33B.

While the discharge bars may be otherwise grounded and otherwise secured in place, clips 35 are shown that may be used for both purposes. Each clip 35, see FIG. 4, is substantially U-shaped with its free ends 35A turned upwardly and inwardly for entry into contact with the channel portions 33B of the ground strips. The central portion 35B of each clip has a threaded bore 36 for an anchoring bolt 37 shown as having its head 37A bearing against the bar 10 and extending upwardly through the foot of a bracket 38.

In practice, the bar 10, the dead end plug 19, the terminal 21 and the plugs 29 are formed from plastic material that can be bonded together as by solvent or sonic welding thus to prevent electrical leakage except along the discharge points. Desirably the bar stock is an extrusion so that desired lengths can be cut with the ends of the passage therethrough that do not constitute the chamber then being counterbored and the desired number of bores 13 bang-bored. While other plastics may be used, acrilonitrile-butadeine-styrene with polyvinylchloride added to make the material self-extinguishing has proved satisfactory.

We claim:

1. A static electric neutralizer comprising a bar having a lengthwise bore defining an elongated chamber opening through at least one of its ends and a series of bores spaced lengthwise thereof, each bore opening into said chamber, an insert in said chamber comprising a conductor including a

main section and a contact section at one end, an insulating sheath for said main section, said sheath-carried means being circular in section and a sliding fit in said chamber-defining bore, a series of discharge devices, one for each bore and seated therein, each device including a discharge point and a contact portion, means carried by the sheath and overlying each bore and effecting, when engaged by the contact portion of a discharge point, the capacitative coupling thereof with said main conductor section, a plug for each bore through which the point of a discharge device extends and seating the contact portion thereof against said coupling means, at least one ground member extending lengthwise of said bar and secured thereto in spaced relation to said discharge points, and a terminal closing the open end of the passage with the contact section of the conductor extending therethrough, said bar, plug, and terminal being of dielectric material and so bonded together that the only surface paths of electrical leakage are along said discharge points.

2. The static electric neutralizer of claim 1 in which the chamber is also open at its other end and en end plug closing the other end, the end plug also being of a dielectric material and bonded to the bar.

3. The static electric neutralizer of claim 2 in which the open ends of the chamber are sockets, one for the terminal and one for the end plug, the socket entering ends of the terminal and of the end plug having axial sockets into which the ends of the sheathed conductor extend, the ends of the conductor terminate short of the ends of the sheath, and a dielectric plug is seated in the sheath at the plug end thereof.

4. The static electric neutralizer of claim 3 in which the main and contact sections of the conductor are separate and a spring seated in the sheath at the terminal end thereof is held compressed between the conductor sections.

5. The static electric neutralizer of claim 1 in which the main and contact sections are separate and a spring is confined between the two sections and is held at least partly compressed thereby.

6. The static electric neutralizer of claim 5 in which the terminal has an axial socket in which an end of the sheathed conductor extends, the conductor terminates short of said end, the contact includes a head within the terminal socket, and a spring seated within said end is held at least partly compressed between the conductor and the contact head.

7. The static electric neutralizer of claim 1 in which each of the series of bores has a counterbored outer portion.

8. The static electric neutralizer of claim 1 in which the bar has a lengthwise channel extending along at least one of its sides and a ground member extends along that side and includes a portion locked in the channel and a portion in spaced relationship to the discharge points.

9. The static electric neutralizer of claim 1 in which a ground member extends lengthwise along one side thereof, and at least one supporting ground clip in engagement with the ground member.

10. The static electric neutralizer of claim 8 in which the bar has a pair of outwardly projecting ribs defining the channel.

11. The static electric neutralizer of claim 9 and at least one supporting ground clip secured to the bar and including a channel-entering and ground-member-engaging member.

12. The static electric neutralizer of claim 8 and at least one U-shaped supporting clamp, the free ends of the clamp being in the form of hooks shaped and dimensioned for entry into the channel and to be retained by the sidewall of the channel remote from the free ends of the discharge points.

13. The static electric neutralizer of claim 1 in which the bar has a lengthwise channel extending along its sides, a ground member extending along each side and including a portion within each channel, and at least one bar-supporting ground clip including end portions caught under the upper surface of each bar channel and in engagement with the channel entering portions of the ground members.

14. The static electric neutralizer of claim 13 in which the channel entering portions of the ground members are channels fitting the bar channels and interconnected through the bar.

15. The static electric neutralizer of claim 1 in which the bond between the bar, terminal, and plug is characteristic of sonic or solvent welding.