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APPARATUS FOR NEUTRALIZING STATIC CHARGES.

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1,208,238.

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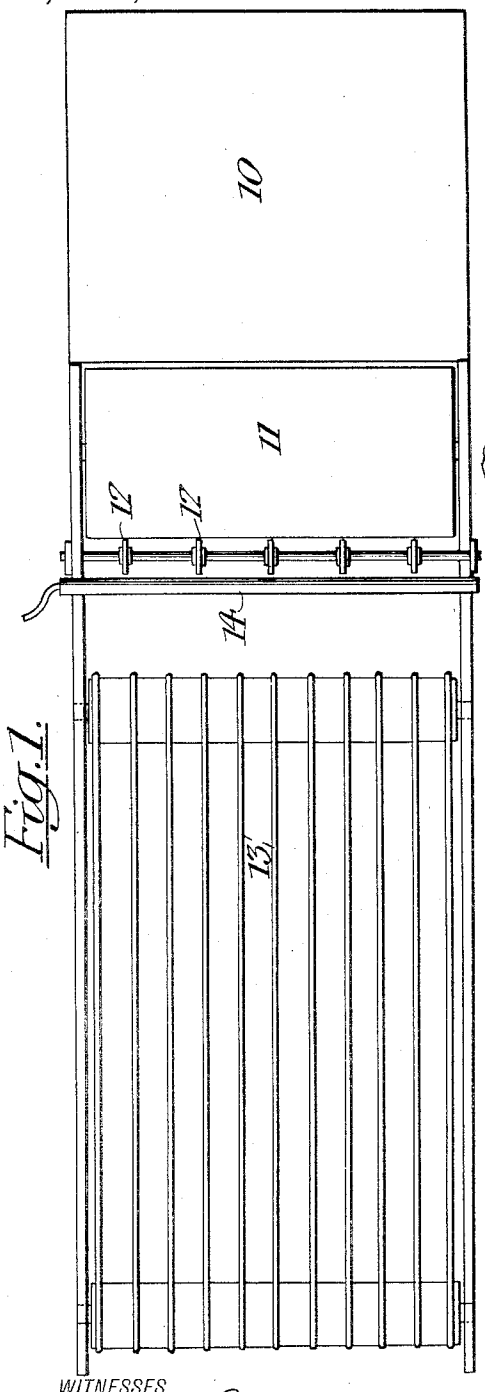


Fig. 1.

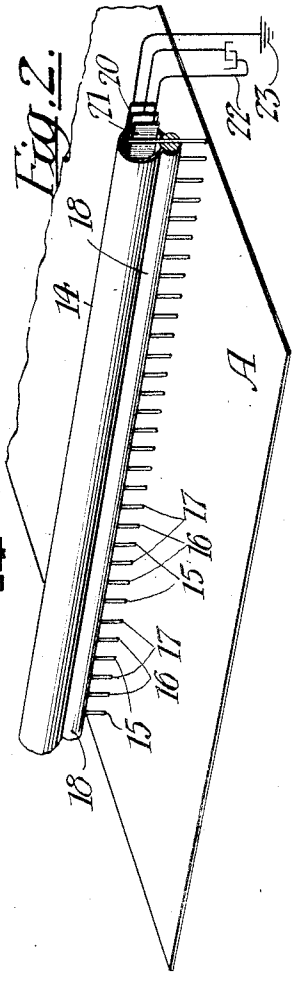


Fig. 2.

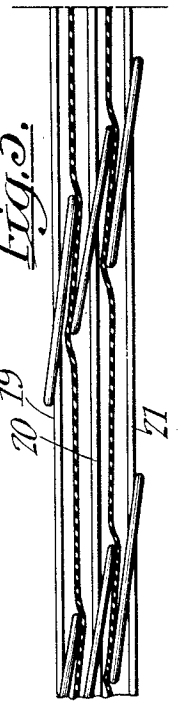


Fig. 3.

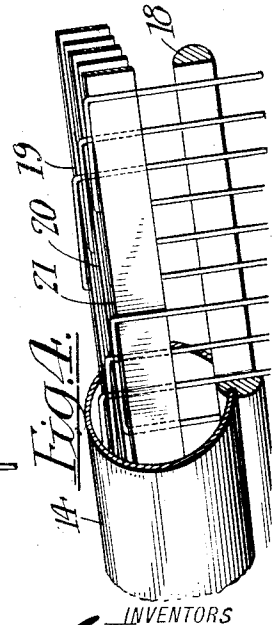


Fig. 4.

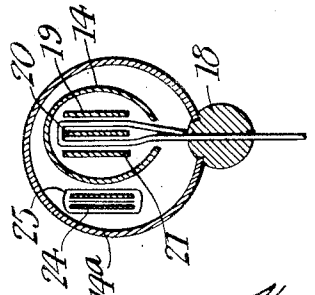


Fig. 5.

WITNESSES

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APPARATUS FOR NEUTRALIZING STATIC CHARGES.

1,208,238. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed March 24, 1914. Serial No. 826,867.

To all whom it may concern:

Be it known that we, HARRY C. TOOKER and BARTON S. HALLENBECK, citizens of the United States, and residents of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Apparatus for Neutralizing Static Charges, of which the following is a specification.

This invention is adapted for use in connection with various different types of machines in which static electricity is liable to develop during the passage through the machine of the material operated upon.

The invention is particularly applicable to printing presses or other similar machines which handle sheet material such as paper, where the development of static electricity tends to cause the sheets to adhere and to render difficult the proper handling of the paper.

We wish it particularly understood that our invention is not limited for use in connection with any specific type of machine or in any specific position on the machine.

In carrying out our invention we provide a brush having a series of collectors disposed closely adjacent to the material or part carrying the electrical charge and with each collector or terminal insulated from certain other collectors.

As an important feature of our invention we provide a condenser, to the opposite terminals of which we connect separate groups of collectors. Still other collectors may be grounded. By interspersing the collectors of one group with those of the others and by arranging the collectors closely adjacent to each other and by forming them as pins or needles with no two adjacent collectors electrically connected, the electricity in the paper or other material passing the brush is either liberated, discharged or neutralized.

We are unable to state with absolute certainty the direction and character of flow of the electricity or with scientific accuracy the theory or principle upon which the device operates, but we do know that the passage of a grounded brush over the sheet or other body carrying the static charge will only remove a portion of that charge. Apparently the unstable condition and the state of electrical tension existing in the condenser effects some change in the character of the varying charge existing in different portions of the sheet and thus enables the grounded collectors to remove or neutralize all of the charge.

Reference is to be had to the accompanying drawings in which similar reference characters indicate corresponding parts throughout the several views, and in which:

Figure 1 is a top plan view of a portion of the delivery end of a printing press having one form of our improved device connected thereto; Fig. 2 is a perspective view of a portion of the sheet with the device in position in respect thereto and a portion of the casing of said device broken away; Fig. 3 is an enlarged plan view of the strips and pins; Fig. 4 is a perspective view of the brush on an enlarged scale, portions being broken away; and Fig. 5 is a transverse section through a slightly modified construction, in which the condenser is carried in the brush holder.

In the drawings we have illustrated our invention as applied to a printing or lithographing press in which the paper travels from a feed table 10 beneath a printing cylinder 11, and beneath paper guiding rollers 12 to the delivery tapes 13. At any suitable position in the path of the paper, as for instance, closely adjacent to the guiding rollers, we mount our improved device. This is illustrated as a brush comprising a tubular casing, holder or back 14, from which there projects a series of collectors in the form of pins, needles or brush points 15, 16 and 17. These are similar in appearance and project downwardly from the casing or back, so as to terminate in substantially the same plane and closely adjacent to the surface of the paper A, or other sheet material, from which it is desired to neutralize or discharge the static electricity. As shown all of the pins are in a single row and are rigidly clamped by passing through a bar 18 or by being held between two strips rigidly secured together to make up the bar 18.

In the specific form illustrated there are three conductors in the form of plates or strips 19, 20 and 21, within the casing or back 14, and closely spaced but thoroughly insulated from each other. These conductors may be in the form of cold rolled steel strips one half inch wide by one thirty-second of an inch thick and of a length dependent upon the width of the machine, but this material and these dimensions are not essential. The sheets of insulating material between may be of any suitable charac-

ter. The pins are divided into three separate series, or groups, the pins of each series or group being attached to or electrically connected with a different conductor. Thus approximately one-third of the pins are secured to each conductor. The pins connected to different conductors are preferably arranged so that no two successive pins are connected to the same conductor.

A very simple and efficient way of forming the pins and connecting them to their respective conductors is by employing a series of pieces of wire bent to substantially U-shape, the two legs or sides of the U forming two pins and the connecting portion extending lengthwise of and across the top of a strip and of a length substantially equal to three times the desired distance between successive pins of the complete device. In assembling it is only necessary to hang the separate U-shaped loops over the plates, properly space them and clamp the plates together with layers of insulating material therebetween. Preferably the three strips or plates are protected and retained within a tubular casing 14, and are insulated from the latter except as hereinafter stated. The separate pins may project through a slot in one side of the casing, and all of the parts may be rigidly secured together by pouring the casing full of an insulating material in a plastic form. This device is mounted in any suitable manner in any suitable position on the machine with the needle or pin point closely adjacent to the material from which it is desired to discharge or neutralize the static electricity.

The three separate plates or conductors within the casing 14 each has its separate terminal and two of these terminals are connected by suitable wiring to a condenser 22. This condenser may be of any suitable character, such for instance as a Leyden jar. In Fig. 2 we have only illustrated the condenser diagrammatically. The third conductor within the casing has its terminal connected by wiring or in any other suitable manner to the frame work of the machine or to any ground 23. The plates or strips 19, 20 and 21 themselves have a material condenser action and therefore, in some special constructions no other condenser than these plates need be employed, but a satisfactory action is better assured by either enlarging the plates or employing a separate condenser.

In the construction illustrated in Figs. 2, 3 and 4 we contemplate the provision of a condenser separate from the electrical collectors and conductors, but we may if desired provide a special form of condenser and mount it within the casing or back. In such construction the same principle as is employed in a Leyden jar may be utilized, but the parts may be in the form of elongated plates or bars insulated from each other, and supported in respect to each other within the casing 14^a, as shown in cross-section in Fig. 5.

In such a construction two of the three conductors 19, 20 and 21 would be connected to the two terminals of the condenser within the casing 14^a, and the other one of the three conductors could be grounded in any suitable manner, as for instance by connecting to the casing 14^a itself, which could be of metal and attached to a metal part of the frame. Thus all wires could be eliminated, and in installing the device it would merely be necessary to properly fasten it in the desired position on the machine. It will be noted that our invention does not involve the use of any batteries or utilize any outside electrical current as from a lighting system and therefore there is nothing about it which requires attention or adjustment or can readily get out of order.

We have described in detail an operative construction, which in practice has produced highly satisfactory results. It is of course evident that various changes may be made in the construction illustrated and within the scope of the appended claims without departing from the spirit of our invention.

Having thus described our invention, what we claim as new and desire to protect by Letters-Patent, is:

1. An apparatus for removing static electrical charges comprising a series of needles, a condenser, connections between certain of said needles and one plate of said condenser, and connections between certain other of said needles, and the other plate of said condenser.

2. An apparatus for removing static electrical charges comprising a series of needles, a condenser, connections between certain of said needles and one plate of said condenser, connections between certain other of said needles, and the other plate of said condenser, and connections between certain other of said needles and a ground.

3. An apparatus for removing static electrical charges from bodies including a series of conductors insulated from each other, and extending substantially parallel to said body, a series of collectors extending from each conductor toward said body and terminating closely adjacent thereto, and a condenser having one plate connected to one of said conductors and another plate connected to another of said conductors.

4. An apparatus for removing static electrical charges from bodies including a series of conductors insulated from each other, and extending substantially parallel to said body, a series of collectors extending from each conductor toward said body and terminating closely adjacent thereto, and a condenser having one plate connected to one

of said conductors and another plate connected to another of said conductors, and still another of said conductors being grounded.

5. An apparatus for removing static electrical charges from bodies including a series of conductors insulated from each other, and extending substantially parallel to said body, a series of collectors extending from each conductor toward said body and terminating closely adjacent thereto, and a condenser having one plate connected to one of said conductors and another plate connected to another of said conductors, and still another of said conductors being grounded, no two successive collectors being connected to the same conductor.

6. In combination a series of metal strips arranged substantially parallel and insulated from each other, a series of pins connected to each of said strips and extending substantially parallel in approximately the same plane, and means for holding said strips and pins rigid in respect to each other.

7. In combination a series of metal strips arranged substantially parallel and insulated from each other, a series of pins connected to each of said strips and extending substantially parallel in approximately the same plane, means for holding said strips and pins rigid in respect to each other, and a condenser having one terminal connected to one of said strips and the other terminal connected to another of said strips.

8. In combination three substantially flat metallic strips arranged substantially parallel and insulated from each other, a series of wires bent to substantially U-shape, and each looped over one of said strips, and in electrical contact therewith but insulated from the remaining strips, and means for holding said strips and said wires rigid in respect to each other.

9. In combination three substantially flat metallic strips arranged substantially parallel and insulated from each other, a series of wires bent to substantially U-shape, and each looped over one of said strips, and in electrical contact therewith but insulated from the remaining strips, means for holding said strips and said wires rigid in respect to each other, a condenser, connections between the opposite terminals of said condenser and two of said strips and a connection between the other of said strips and the ground.

10. In combination three substantially flat metallic strips arranged substantially parallel and insulated from each other, a series of wires bent to substantially U-shape, and each looped over one of said strips, and in electrical contact therewith but insulated from the remaining strips, means for holding said strips and said wires rigid in respect to each other, a condenser, connections between the opposite terminals of said condenser and two of said strips, and a ground casing inclosing said strips and said condenser and connected to the other of said strips.

11. An apparatus for removing static electrical charges from moving sheets including a pair of parallel condenser plates insulated from each other and from the ground and extending transversely of the sheet, and two series of collectors, one series depending from each of said plates and terminating closely adjacent said sheet.

12. An apparatus for removing static electrical charges from moving sheets including a pair of parallel condenser plates insulated from each other and from the ground and extending transversely of the sheet, two series of collectors, one series depending from each of said plates and terminating closely adjacent said sheet, a grounded conductor extending parallel to said plates and insulated therefrom, and a series of collectors depending from said conductor adjacent said first mentioned series of collectors.

Signed at New York city, in the county of New York and State of New York, this 18th day of March, A. D. 1914.

HARRY C. TOOKER.
BARTON S. HALLENBECK.

Witnesses:
C. W. FAIRBANK,
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