G. D. ROGERS.

MEANS FOR REMOVING STATIC ELECTRICITY FROM MATERIALS.

APPLICATION FILED JAN. 14, 1915.

1,169,428. Patented Jan. 25, 1916.

FIG. 1

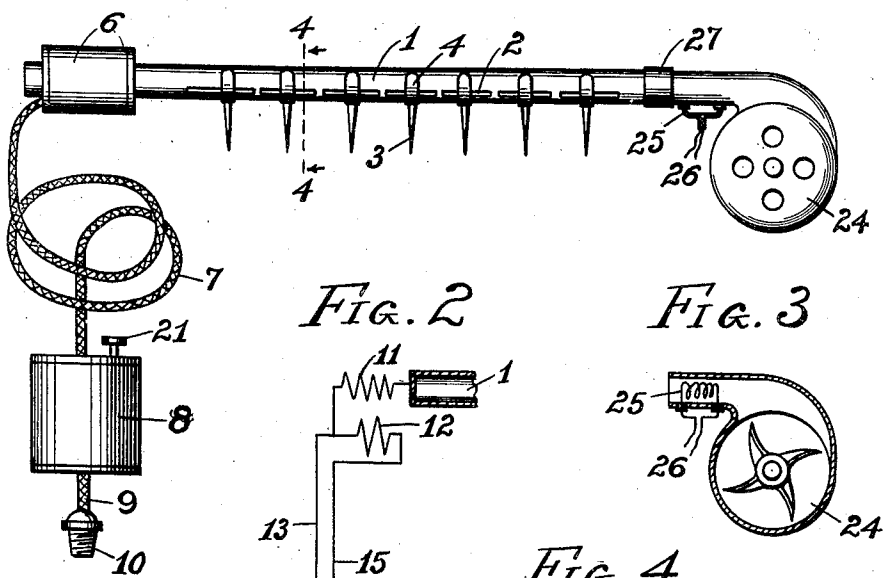


FIG. 2

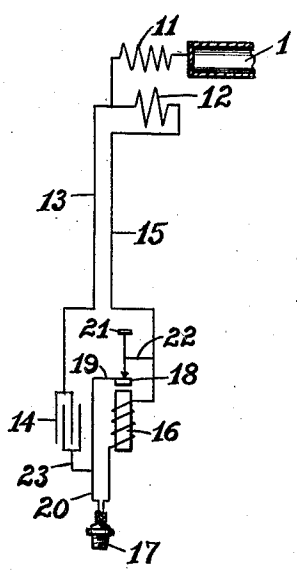


FIG. 3

FIG. 4

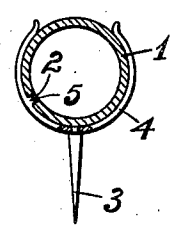


FIG. 5

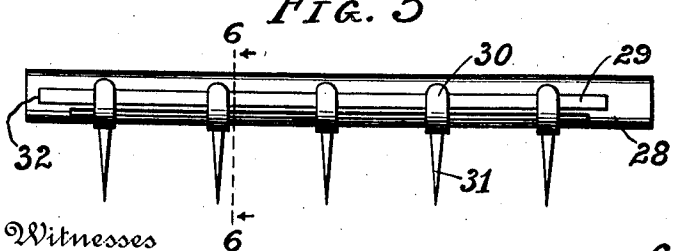
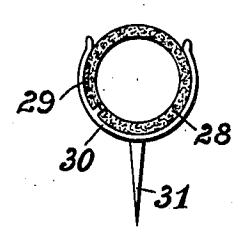


FIG. 6



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MEANS FOR REMOVING STATIC ELECTRICITY FROM MATERIALS.

1,169,428. Specification of Letters Patent. Patented Jan. 25, 1916.

Application filed January 14, 1915. Serial No. 2,098.

To all whom it may concern:

Be it known that I, GEORGE D. ROGERS, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Means for Removing Static Electricity from Materials, of which the following is a specification.

This invention relates to means for neutralizing and removing the static electricity usually found between layers of various materials and particularly sheets of paper, which develops during the process of manufacture while the same are passing through the different machines, and also while the materials are being worked upon by passing through other machines.

As is well known, the static electricity causes the layers of material to cling together, thereby interfering with the proper operating of the machinery and the rapid handling of the material.

The principal object of the invention is to provide means for entirely removing the static electricity between sheets of paper passing through a printing press. This is accomplished by introducing a neutralizing electric current and also by shooting a blast of hot air against the surface of the paper as it travels through the press.

Another object of the invention is to provide a device, which is adapted to be connected to an ordinary electric light service socket and will produce a neutralizing current of great strength without being dangerous to workmen.

A further object of the invention is to adjustably mount the electrical distributing points upon the air tube so that the same may be conveniently positioned to suit different widths of paper.

With the above and other objects in view as will be readily understood, the invention will be hereinafter fully described with reference to the accompanying drawings, which illustrate a preferred form of the same, and the novel features of the invention will be distinctly pointed out in the appended claims.

In the drawings like characters of reference indicate corresponding parts.

Figure 1 is a side elevation of an apparatus constructed in accordance with my invention, Fig. 2. is a diagrammatical view illustrating one end of the air tube and the circuit of the high tension discharge apparatus connected thereto, Fig. 3 is a sectional view of the air forcing fan and heating coil employed at the other end of said tube, Fig. 4 is an enlarged cross section of the air tube taken on line 4—4 of Fig. 1, Fig. 5 is a side elevation of a modification of the air tube, and Fig. 6 is an enlarged cross section of the same taken on line 6—6 of Fig. 5.

Referring to the drawings, 1 represents a tube preferably constructed of copper to provide a good electrical conductor. This tube is adapted to have hot air forced therethrough and one of its lower quarters is provided with a longitudinal slot, or preferably a plurality of alining slots, indicated by 2, for the escape of the air. The portions of metal between the slots 2 are left in order that the tube will not be weakened as much as by having a continuous slot. Electrical distributing points 3 are securely fixed to and depend from spring clips 4, which are adapted to slip over said tube and slide longitudinally thereon. In order to prevent the spring clips rotating upon the tube and hold the electrical distributing points perpendicular, the clips are provided with nibs 5 for engaging the slots 2. As will be understood, said tube is supported upon a printing press in any suitable manner with the electrical distributing points 3 arranged adjacent the surface of the moving paper, and the slots 2 so positioned as to shoot hot air upon the paper in the same direction as its travel.

Electric current may be applied to the tube 1 by any suitable means, but the high tension discharge apparatus covered by my former patent 1,092,398 is the most desirable, as it produces current of high frequency and intensity from an initial current of comparative low voltage, and there is no danger from shocks to workmen employed about the machinery. As shown in Fig. 1, the high frequency coils of the high tension discharge apparatus are inclosed in a cylindrical box 6 arranged at one end of the tube 1, and leading therefrom are covered wires indicated by 7, which are connected to the vibrator and condenser inclosed in a box 8. Covered wires, as 9, extending from the latter box, terminate in a plug 10, which is adapted to be connected to an ordinary electric light socket. It has been found in practice, that the discharge current from the distributing points 3, is of greater intensity when the high tension dis-

charge apparatus is connected to the tube as described, than when the high frequency coils in the box 6 are placed adjacent the vibrator and condenser in the box 8, and a lcng wire extends therefrom to the tube. The circuit of the high tension discharge apparatus will now be explained. The free end of the secondary winding 11 is connected to the tube 1, and its other end to the primary winding 12. One free end of the secondary winding, as 13, leads to a condenser 14, and its other end 15 passes around a core 16, then leads to the plug 17. An armature 18 carried by a spring 19 is adapted to be attracted by the core 16, and extending from the spring to said plug is a wire 20. An ordinary adjustable contact 21 is connected to the wire 15 by a wire 22, and the condenser to the wire 20 by a wire 23. As will be understood, the rapid automatic operation of the armature 18 will make and break the circuit described, the condenser will thereby become charged and then discharge with great frequency, thus inducing currents of high frequency tension into the primary winding 12 and the secondary winding 11. These high frequency tension currents are thus induced in the tube 1, and are conducted by the distributing points 3 to the surface of the moving paper.

Atmospheric conditions have much to do with the difficulty of neutralizing and removing static electricity from sheets of paper and other materials, more trouble being experienced in damp or cold weather than in dry and warm weather. To overcome the troublesome effect of atmospheric conditions, hot air is forced through the tube 1, and escaping through the slots 2, is directed against the surface of the moving paper. A fan blower 24, driven by any suitable power, is connected to the end of the tube 1, for forcing air therethrough, and an electrical heating coil 25 is arranged in the nozzle of the blower for heating the air before it enters the tube. The free ends 26 of the heating coil may be connected to any suitable source of electrical energy. It is important to insulate the fan blower from said tube, and this may be done by a sleeve 27 of insulating material.

In the modification shown in Figs. 5 and 6, the tube 28 is constructed of asbestos, and is provided with a longitudinal recess for receiving a strip of metal 29. Spring clips 30, carrying electrical distributing points 31, are adapted to fit over said tube and engage the metal strip 29, and the free end of the secondary winding of the high frequency coils, indicated by 32, is connected to said metal strip.

It will be understood, that the electric current or the hot air blast may be employed separately, or both means used at the same time, for neutralizing and removing static electricity from sheets of material passing through machinery. Also that slight changes in the details of construction and arrangement of the parts may be made within the scope of the claims.

Having fully described my invention, what I claim is:

1. A method of neutralizing and removing static electricity from materials in motion, consisting of arranging electrical distributers adjacent the surfaces of the materials, and directing a blast of hot air against the surfaces of the materials, substantially as described.

2. In an apparatus for neutralizing and removing static electricity from materials in motion, the combination of a tube, means for electrifying the tube, distributing points carried by the tube and adapted to be arranged adjacent the surfaces of the materials, means for forcing hot air through the tube, and the tube being provided with openings for directing the hot air against the surfaces of the materials, substantially as described.

3. In an apparatus for neutralizing and removing static electricity from materials in motion, the combination of a tube, means for electrifying the tube, distributing points carried by the tube and adapted to be arranged adjacent the surfaces of the materials, a blower fixed to the end of the tube, an electrical heating coil for heating the air being forced into the tube by the blower, and the tube being provided with a plurality of longitudinal slots for directing the hot air against the surfaces of the materials, substantially as described.

4. In an apparatus for neutralizing and removing static electricity from materials in motion, the combination of a tube, means for electrifying the tube, distributing points carried by the tube and adapted to be arranged adjacent the surfaces of the materials, and means for permitting longitudinal adjustment of the distributing points but preventing rotation thereof, substantially as described.

5. In an apparatus for neutralizing and removing static electricity from materials in motion, the combination of a tube, means for electrifying the tube, means for forcing air through the tube, the tube being provided with longitudinal slots for directing the air against the surfaces of the materials, spring clips for engaging the tube, distributing points carried by the spring clips and adapted to be arranged adjacent the surfaces of the materials, and nibs projecting from the spring clips for entering said longitudinal slots in the tube to permit longitudinal adjustment thereof but prevent rotation of the same, substantially as described.

6. In an apparatus for neutralizing and removing static electricity from materials in

motion, the combination of a tube, means for forcing air through the tube, the tube being provided with openings for directing the air against the surfaces of the materials, distributing points carried by the tube and adapted to be arranged adjacent the surfaces of the materials, a secondary winding and a primary winding of a high frequency coil, the secondary winding having one end connected to the primary winding and its free end connected to said tube, a vibrator and a condenser connected to the free ends of the primary winding, and means for inducing electric current in the vibrator and condenser circuit, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE D. ROGERS.

Witnesses:
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