

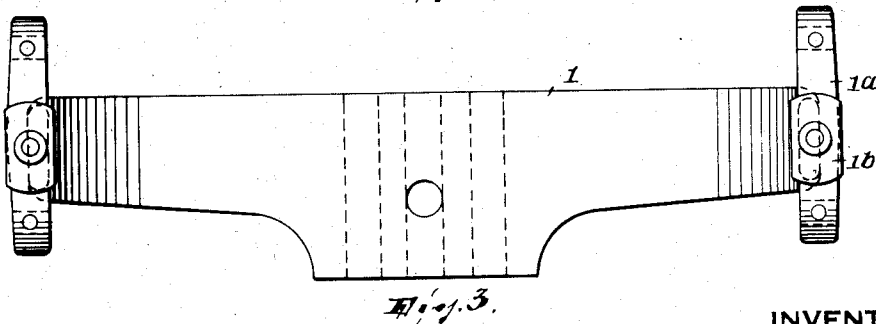
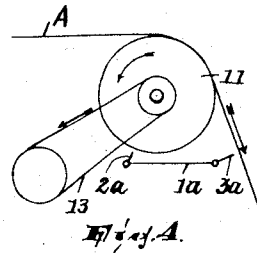
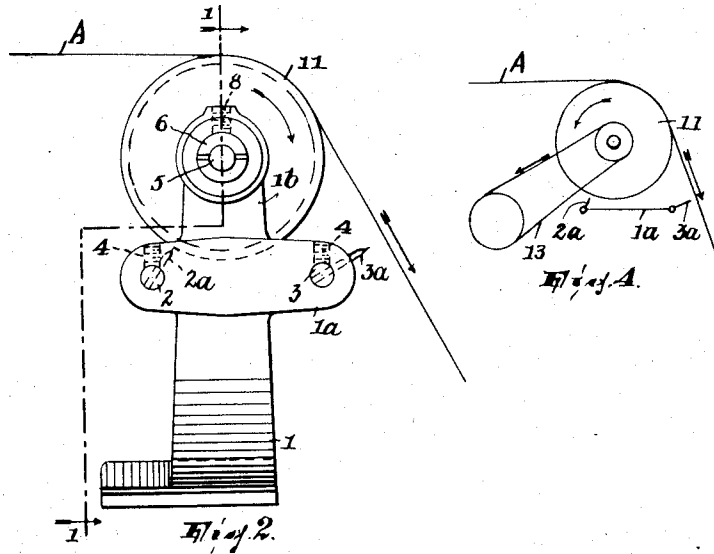
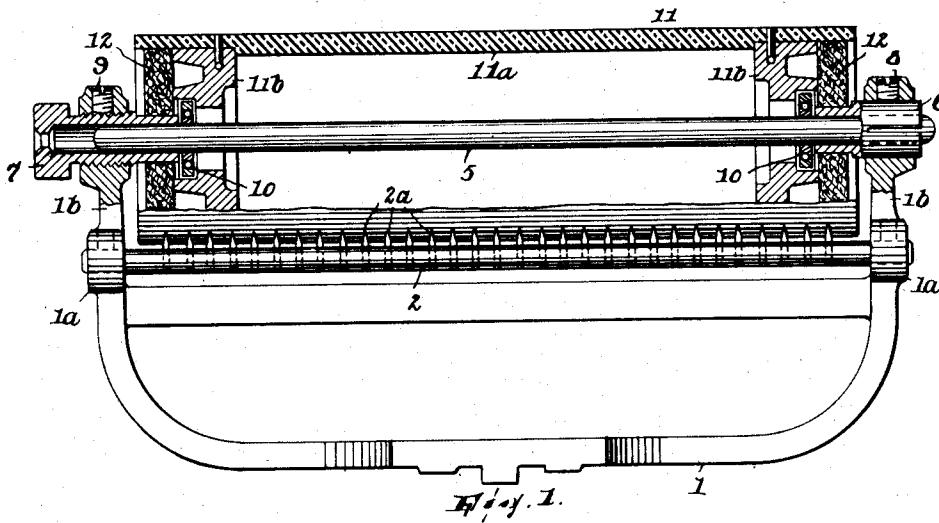
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ELECTROSTATIC ELIMINATOR

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UNITED STATES PATENT OFFICE

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ELECTROSTATIC ELIMINATOR

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4 Claims. (Cl. 175—264)

It is known that in the operation of warping silk and certain other fibers the rubbing of the strands of the warp against parts of the warping apparatus sets up static electricity in the warp, which makes the same difficult to control. This invention contemplates apparatus for neutralizing static electricity developed in moving a warp, or in fact other sheets or webs or other lengths that would cause trouble when charged with static electricity, in contact with any part or parts which produce such electricity therein and to accomplish that object by simpler means than those heretofore proposed, such as for providing for rendering electrically conductive the air surrounding the material by ionization with ultraviolet waves, or by X-rays or by blasts of ionized air, or the use of electrodes forming the terminals of a high-frequency current, or by the use of collectors interconnected through electrical condensers.

I have found that if an element is provided with which the material has superficial contact and of course adapted to be charged electrically oppositely thereto and is movable to cause shifting of the contact over its surface progressively (by which I specifically mean so that a portion of its surface at any time subject to such contact is at a later time not subject thereto) and there is electro-conductive means to establish electrical connection between portions of said material and of the surface of said element which have ceased to contact with each other the desired neutralization of the static electricity in the material may be effected, and that with obviously very simple apparatus.

In practice I prefer that said element be rotative with the material by virtue of the frictional contact between them, said element having its surface of some dielectric material, such as rubber; the construction is simplified if said element is rotary, and if it is revoluble with the material the latter of course, as in the case of a warp, will not be rubbed thereby. The electro-conductive means may comprise some part of a metal bracket or the like in which latter said element, as in the form of a roller, is journaled and rods in electrical contact with the bracket and having teeth or other points projecting one row toward the portion of the surface of the roller, and the other toward the portion of the material, which has departed from the contact. It is not broadly essential that said element rotate with the material, or in the same relative direction that it progresses, as will appear.

In the drawing,

Fig. 1 is a section on line 1—1, Fig. 2, of my apparatus;

Fig. 2 is a side elevation thereof;

Fig. 3 a plan of the supporting yoke or bracket; and

Fig. 4 illustrates a modification diagrammatically.

The yoke or bracket 1 is fork-shaped, the ends of its arms being T-shaped heads 1a in parallel planes. The ends of these heads are connected by parallel collectors in the form of rods 2, 3 each having a row of suitably spaced teeth or points 2a, 3a and each penetrating the two heads and secured therein, in some position to which it is rotatively adjustable, by set-screws 4. Each head has an upright 1b.

A shaft 5 is arranged in bushings 6 and 7 in said portions 1b parallel with the rods, the one (6) of which may be split to clamp and hold the shaft against rotation under pressure of a set-screw 8 tapped into one of said portions and the other of which may be screwed into the other such portion and there held by a set-screw 9.

On ball bearings 10 on the shaft is freely revoluble by the moving sheet A (as of warp threads) a roller 11. This roller comprises a dielectric shell 11a, as of hard rubber, and two end heads 11b which receive the ball-bearings. To prevent dust from admission to the gearings and the escape of oil therefrom the ends of the shell may be closed by felt disks 12.

In the present case the sheet A, assumed to approach the roller in a horizontal plane, then extends downwardly therefrom at an obtuse angle, so that only a portion of the roller's surface, circumferentially, is touched by the sheet. The two rows of points are arranged so as respectively to project into operative relation to the periphery of the roller and that (here down bent) portion of the sheet which has left the roller in its travel, or here so that the row 2a projects toward and close to the roller and the row 3a projects toward and close to said part of the sheet; the two rows respectively project as close as possible to the roller and said part of the sheet, but to prevent the row 3a from possibly interfering with the travel of the sheet and catching thereon it may be somewhat further from the sheet than row 2a is from the roller.

The operation is as follows: The sheet, containing electricity of one polarity, as plus, imparted to it in passing in contact with some apparatus previous to that of the invention, sets up by induction electricity of the opposite polarity in the periphery of the roller. The electricity of the

stated polarity in the sheet and that of the opposite polarity set up in the roller remain therein until that of the sheet reaches the row of points 3a and that of the roller reaches the row of points 2a, whereupon they become neutralized due here to the conductivity of the metal of which, it will be understood, the supporting structure is composed, whereupon that portion of the downbent part of the sheet which has passed the vicinity of the row 3a and that part of the roller periphery which has passed the vicinity of the row 2a are devoid of electricity, said part of the roller remaining in that state until it is again electrified by the sheet. The sheet is assumed by its frictional engagement with the roller to rotate it in the direction of the arrow in Fig. 2, but, whereas the roller should rotate, it is not as stated essential that it do so in the direction indicated; thus, in Fig. 4, where a driving means for the roller is shown, as a belt and pulley drive 13, which rotates the roller reversely to the arrow (whereas the sheet moves in the direction of the arrow applied thereto) the negative electricity induced in the roller by the sheet and the positive electricity of the downbent part of the sheet will become neutralized, the same as in Fig. 3, through the supporting structure, the part of the roller which has passed the row of points 2a and the part of the sheet which has passed the row of points 3a being devoid of electricity.

It is within my invention to neutralize a charge of static electricity existing in a length of flexible material by effecting contact between said material and the surface of a body which is adapted, when said material and body are thereupon separated, to be charged with static electricity of the polarity opposite to that of said charge in the material, and then separating the material and said body progressively of said surface and meanwhile combining the charges in the thus separated portions of the material and said body.

Having thus fully described my invention what I claim is:

1. Apparatus for neutralizing static electricity pre-existing in a moving length of material including an element with which said length has

superficial contact and adapted to be charged electrically by said length oppositely thereto and being movable to cause shifting of said contact over the surface of said element progressively, and electro-conductive means to establish electrical connection between portions of said material and the surface of said element which have ceased to contact with each other in the movement of said element.

2. Apparatus for neutralizing static electricity pre-existing in a moving length of material including an element with which said length has superficial contact and adapted to be charged electrically by said length oppositely thereto and being revoluble to cause shifting of said contact over the surface of said element progressively, and electro-conductive means to establish electrical connection between portions of said material and the surface of said element which have ceased to contact with each other in the rotary movement of said element.

3. Apparatus for neutralizing static electricity pre-existing in a moving length of material including an element with which said length has superficial contact and adapted to be charged electrically by said length oppositely thereto and being freely revoluble with the moving length to cause shifting of said contact over the surface of said element progressively, and electroconductive means to establish electrical connection between portions of said material and the surface of said element which have ceased to contact with each other in the rotary movement of said element.

4. The herein described method of neutralizing a charge of static electricity existing in a length of flexible material which consists in effecting contact between said material and the surface of a body which is adapted, when said material and body are thereupon separated, to be charged with static electricity of the polarity opposite to that of said charge in the material, and then separating the material and said body progressively of said surface and meanwhile combining the charges in the thus separated portions of the material and said body.

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