April 18, 1933. J. SIMONS 1,903,840

COMBINED INK SETTER AND STATIC ELIMINATOR

Filed Jan. 29, 1930

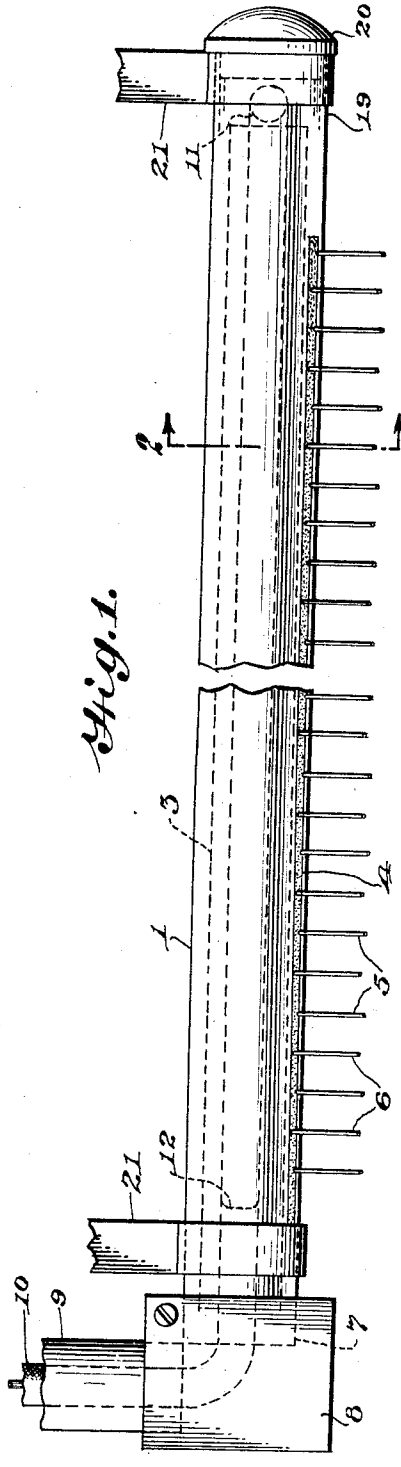


Fig. 1.

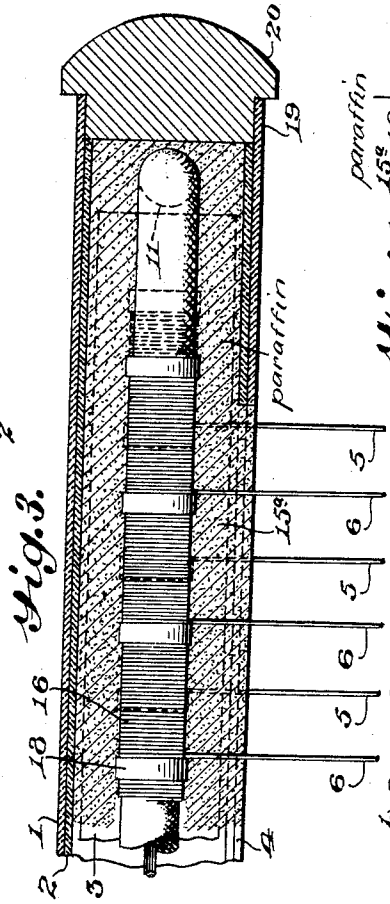


Fig. 3.

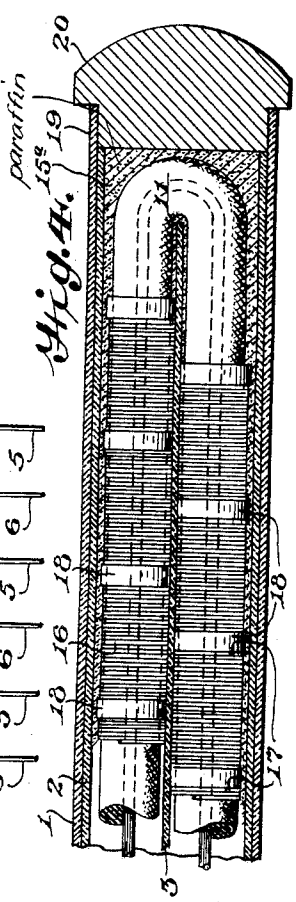


Fig. 4.

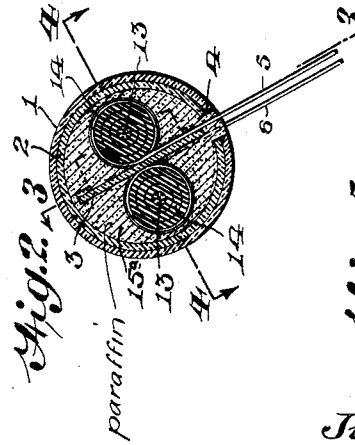


Fig. 2.

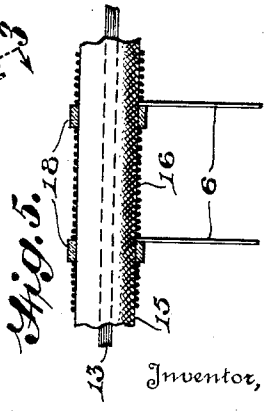


Fig. 5.

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Patented Apr. 18, 1933 1,903,840

UNITED STATES PATENT OFFICE

JULIUS SIMONS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO SIMCOE MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

COMBINED INK SETTER AND STATIC ELIMINATOR

Application filed January 29, 1930. Serial No. 424,148.

The object of the invention is to provide improvements in means adapted to be attached to, as used in association with, such devices as printing presses and other processing machines in which a paper, cloth, or other sheet or web receives an ink impression or treatment, to remove charges of static electricity therefrom and to simultaneously set, dry, harden, or otherwise affect, such ink or other matter which may have been added thereto, this application being a continuation in part of copending application, Serial No. 273,701.

In order to accomplish the removal of static charges, a more specific object is to produce a powerful, high-tension, oscillating, electric discharge, both in the path of and adjacent to the material being processed, thereby either neutralizing such original charge, or supplementing the same to a point at which it overcomes the resistance of the surrounding air dielectric and escapes to the grounded processing machine, or otherwise as may be provided for.

Again, in order to accomplish the setting, drying, or hardening, of the material, as referred to, an object is to provide a compact device of this character from which normally flows a concentrated electric discharge of high potential in a given plane, there being discharged in such plane high potential electricity from a plurality of relatively small condenser elements, the axes of which with their corresponding primary cores lie in transversely spaced relation.

With these and other objects in mind, the present invention comprises further details of construction and operation which are fully brought out in the following description, when read in conjunction with the accompanying drawing, in which Fig. 1 is a plan view of one embodiment of the invention; Fig. 2 is a section on the line 2—2 of Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 2; Fig. 4 is a section on the line 4—4 of Fig. 2; and Fig. 5 is a fragmentary detail of the device, partly in section.

Referring to the drawing, the device is here illustrated as comprising one embodiment in which it may be constructed, it being understood that the invention does not depend upon all of the minor details of construction, insulation, and the like, hereinafter described.

For convenience and economy, the improved ink setter is made cylindrical in shape, and progressing from its outer surface radially inwardly it preferably comprises an outermost tube 1 of bakelite, vulcanized fibre or the like, immediately adjacent to the inner surface of which is a second cylindrical insulating tube 2 of bakelite, fibre or other material, having high electrical resistance. The interior of this inner cylinder or tube is divided by means of a diametrically extending partition 3, also of vulcanized fibre or substantially equivalent electric resistive material. Extending through the tubes 1 and 2 for the greater portions of their lengths is a relatively wide saw-cut or equivalent 4, in alignment with said partition, so that the alternate condenser discharge wires 5 and 6 may extend in actual relation with and align the opposite sides of said partition, and thence directly outwardly through said saw-cut, adjacent to the laterally opposite limitations of the same, without the necessarily bending of the discharge wires, unless such is desired, in order to bring their free end or terminal discharge portions into a substantially exact plane.

One end portion 7 of either or both of the protective tubes 1 and 2 preferably extends into one side of a block 8, while from another side of said block there preferably extends for a short distance an insulating guard tube 9. Extending through this last-named tube 9 is a heavy insulated cable 10, which is normally connected to a source of relatively high frequency alternating current, such for instance as the secondary of an electric transformer. This cable extends thence through the block 8 and into the combined tubes 1 and 2 upon one side of the partition 3, passing throughout substantially the entire length of said first-named tubes, and at the opposite end thereof being reversely curved at 11 towards the opposite side of said partition, whence it extends again throughout substantially the entire length of said first-named tubes to a point approximately represented by the dotted line 12.

As the cable 10 is designed to carry a high frequency current of relatively high voltage, it preferably comprises a central core 13 of laminated wire, surrounded by a plurality of concentric layers of rubber or the like 14, beyond which said cable is preferably covered by means of a heavy woven sheathing 15, surrounded by and embedded in a waxy insulating material such as paraffin 15ª.

Upon the outside of each of the two parallel sections of the cable 10, there are positioned at intervals coils of copper, phosphor bronze, or other wire 16, comprising a plurality of independent condensers one end 17 of each of which is merely "dead" or terminates abruptly, while the opposite end comprises the terminal discharge portions 5 and 6, hereinbefore referred to. Between the "dead" end and terminal portions of each of said condenser coils, the successive convolutions of the latter are slightly spaced apart, or if desired the wire of these coils may be covered in any suitable manner, as for instance by silk, cotton, rubber, or other material. Finally, surrounding the cable 10, and separating adjacent coils from each other are cylindrical washers 18, as clearly illustrated. With the composite structure thus assembled, the spaces surrounding the cable upon the opposite sides of the partition 3 are preferably filled with tallow, paraffin, asphalt, or other suitable insulating material which is inexpensive, possesses high insulation qualities, and will flow freely into the crevices surrounding the adjacent coils, and between the convolutions of each coil condenser.

The opposite end 19 of the device may be closed by means of a suitable cap 20, and the device as a whole may be operatively supported with respect to a printing press or other processing machine by means of suitable brackets 21. It will also be noted that it is only necessary to connect one end of the cable 10 to one terminal of the secondary of an electric transformer. As shown in the drawing, the actual end portions of the discharge terminals 5 and 6 are not in alignment, but are separated to the same degree that the adjacent sides of the oppositely positioned coils 16 are separated, but as before mentioned, these terminal portions may be bent into exact alignment if such is desired. In each case, however, the electric discharge from the multiplicity of condensers is so great as to set up a field of static electricity of such transverse extent that it matters little whether or not said terminals are in exact alignment.

Some of the advantages of this device may be summed up as presenting no fire risk; it does not dry out the paper or crystallize the ink, thereby maintaining original degree of moisture and texture of paper and other processed materials; it permits jogging of printed sheets; it maintains its normal operating characteristics regardless of vibrations; it is economical to operate, consuming usually no more than about fifty watts for a complete installation; it eliminates the carbon monoxide, carbon dioxide, heat and other fumes produced by other systems; it requires no repair or up-keep effort, as its parts are subject to no wear; it produces an atmosphere of ionized air, which in addition to oxidizing the ink produces a condition which is physically beneficial to machine operators; it resultingly improves the product as by aiding registration and preventing offsetting in multicolor work; and it thereby permits increased production of high grade.

It is usually required that the pressroom foreman arrange his work so as to obtain the greatest production from his presses, but in doing so he must not sacrifice quality. It is not ordinarily very difficult to calculate when a particular job will be off the press, but it is frequently difficult to estimate when the ink will be sufficiently set in order that the job may be rehandled, or when the ink will become too dry to properly receive a following color.

As an example, consider a four-color job run upon single color presses. Here it is desirable to keep the ink moist, but there must be no offset. To prevent such offset the sheet has heretofore been passed through the gas flame, which causes the ink to dry, and the pressroom foreman as a result is often worried when the schedule of these presses does not permit him to run the color following the yellow as soon as he would like. It is very difficult to tell how rapidly this yellow may become too dry to take the following color properly. This improved ink setter, on the other hand, does not dry the ink too soon, but creates an intensely ionized field, which forms concentrated oxygen or ozone within the ink itself, and merely sets the ink, so that the sheets may be handled and several colors successively applied with the proper blending insured and tendency to offset minimized, if not entirely prevented.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:

1. An ink setter, comprising an electrical conductor leading from a source of high tension alternating current and in turn comprising a plurality of substantially parallel sections lying closely adjacent to one another and of the same potential, a plurality of condenser elements surrounding said sections and having discharge terminals, the terminals of said last-named conductors about one of said sections alternating with the terminals of those conductors about another of said sections, a common casing for said conductor sections, and a waxy insulating medium filling the otherwise unoccupied spaces within said

casing, to prevent moisture from entering and condensing therein.

2. An ink setter, comprising an electrical conductor leading from a source of high tension alternating current and in turn comprising a plurality of substantially parallel sections lying closely adjacent to one another and of the same potential, a plurality of condenser elements surrounding said sections and having discharge terminals, the terminals of said last-named conductors about one of said sections alternating with the terminals of those conductors about another of said sections, an insulating member separating the condensers about the respective sections of said first conductor, a common casing for said conductor sections and said insulating member, and a waxy insulating medium filling the otherwise unoccupied spaces within said casing, to prevent moisture from entering and condensing therein.

3. An ink setter, comprising a hollow insulator, an insulating partition within and dividing the interior of said hollow insulator into a plurality of compartments, a single electrical conductor extending through one of said compartments and thence through another compartment, independent condensers surrounding the sections of said conductor in the respective compartments and having terminal portions extending outwardly through the walls of said insulator and in substantially the same plane.

4. An ink setter, comprising a hollow tubular insulator having an insulating partition, a conductor extending through said insulator upon one side and thence reversely upon the opposite side of said partition, independent condenser elements encircling the respective sections of said conductor upon the opposite sides of said partition and having terminal portions extending through the walls of said insulator.

5. An ink setter, comprising an electrical conductor in turn comprising a plurality of substantially parallel sections, a plurality of conductors surrounding said sections and having discharge terminals in substantial alignment, the terminals of said last-named conductors about one of said sections alternating with the terminals of those conductors about another of said sections, an insulating member separating the condensers about the respective sections of said first conductor, an insulating casing surrounding said conductor sections, the intervening insulating member and all but the terminal portions of said condenser elements and a moisture-proof insulating substance filling all of otherwise unoccupied spaces within said casing to prevent moisture from entering and condensing therein.

In testimony whereof I have affixed my signature.

JULIUS SIMONS.