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METHOD OF AND MEANS FOR NEUTRALIZING ELECTROSTATIC CHARGES ON MOVING TAPES AND THE LIKE

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FIG. 1

TAPE CHARGED

TAPE DISCHARGED

FIG. 2

FIG. 3

FIG. 4

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Method of and Means for Neutralizing Electrostatic Charges on Moving Tapes and the Like

My invention relates to a method of and means for removing or neutralizing the electrostatic charges that accumulate on moving webs or tapes, and more particularly to neutralizing such charges on printer, ticker, perforator and similar tapes employed in telegraph receiving and transmitting apparatus.

In printing telegraph systems having a central office and a number of associated outlying branch offices or customers' offices, it has been found advantageous to provide a switching center for controlling the telegraph channels between the respective offices. At the switching center each incoming message is received on a tape perforator which punches successive rows of holes in a paper tape, the holes of each row being permuted in well known manner in accordance with the permutation code signals of the message received over the incoming channel. From the perforator the tape passes through a chute into an accumulator or storage compartment capable of holding a quantity of perforated tape containing messages which are awaiting retransmission. From the accumulator the tape again passes through the chute and into a tape transmitter which retransmits in permutation code, over an outgoing channel to the desired office, the messages stored in the perforated tape. After leaving the transmitter, the tape passes through another chute into a storage bin for "sent tape."

By reason of the friction between the moving tape and various parts of the perforator, tape chutes, accumulator, tape transmitter and other apparatus which the tape contacts during its travel, electrostatic charges are generated and accumulate on various portions of the tape. The charged tape is attracted to the surfaces over which it passes and tends to adhere to these surfaces, thus delaying or stopping the normal movement of the tape at these places, with the result that the tape piles up and becomes tangled, which disrupts the system. These electrostatic charges on the tape are especially troublesome when the surrounding air is dry and substantially non-conductive. Although various methods, including the use of grounded wires or brushes maintained in contact with the travelling tape, have heretofore been employed in an effort to remove or neutralize the electrostatic charges on the tape, none of these has proved practicable under varying service conditions.

An object of the invention is a suitable method of and means for removing or neutralizing the electrostatic charges that accumulate on moving tapes, belts and the like.

An additional object is to remove or neutralize electrostatic charges on a tape, without placing any drag or friction on the tape.

A more specific object is to neutralize electrostatic charges on printer, ticker, perforator and similar tapes used in telegraph receiving and transmitting apparatus.

Other objects and attendant advantages of the invention will be apparent from the following detailed description, taken in connection with the accompanying drawing, in which:

Fig. 1 shows a telegraph switching center having a receiving and retransmitting tape system embodying the features of the invention;

Fig. 2 is a plan view of one form of device which may be employed for neutralizing the electrostatic charges on the tape;

Fig. 3 is a longitudinal section taken along the line 2—3 of Fig. 2; and

Fig. 4 shows another form of the invention.

Referring to Fig. 1, there is shown a receiving perforator 10, mounted on a support 11, which receives the incoming telegraph signals and perforates a paper tape T in accordance therewith, the perforated tape issuing from the left hand side of the perforator as viewed in the figure. The tape passes over a guide plate 12 and under a guide 13, and thence over the upper end and down along one side 14a of a metal tape chute 14 that extends downwardly and opens into an accumulator chamber 16 in which the perforated tape is stored pending the retransmission of the messages punched in the tape. Preferably, and as shown, the front wall 15 of the tape chute is composed of glass or other transparent or translucent material in order that the condition of the tape within the chute may readily be observed, and for the same reason the front wall 17 of the accumulator preferably is composed of transparent material.

Due to the friction between the tape and various parts of the perforator 10, the tape as it issues from the perforator has an electrostatic charge thereon, as indicated by the legend "Tape charged" in Fig. 1. If not prevented, this charged portion of the tape would stick to the side 14a of the chute 14 and clog the tape chute. To obviate this, an electrostatic charge eliminator device 18 is secured to the upper end of the chute side 14a, the charged tape passing over the eliminator. As shown in detail in Figs. 2 and 3, the eliminator may comprise a shallow container or receptacle 19, preferably of aluminum, having end portions 19a for securing the container, as by screws that pass through openings 19b, to the
which an ionized gaseous zone is produced by the emanations from a cathode ray tube 30. The tube may be of any suitable construction such as, for example, as disclosed in the Slack Patent No. 1,961,715, issued June 5, 1934, in which the cathode rays are emitted through a thin glass window 31. The tape T in its travel passes between the window and through the gaseous zone which is ionized by the tube 30, at which time the electrostatic charges on the tape are removed or neutralized. Any other method of producing a suitable ionized zone through which the tape is passed may, of course, be employed.

While the static charge eliminators have been shown as positioned at two places only in the tape system disclosed, it will be understood that they may be employed at any place in the system where the charge on the tape is likely to interfere with the proper movement of the tape. Since these eliminators apply no drag or friction to the tape, they may be used in any desired number and may have any suitable configuration other than that shown.

The invention has been shown with reference to one particular application thereof, but it will be understood that it may be employed for neutralizing electrostatic charges on various kinds of tapes and moving webs at places where the charges are apt to prove troublesome, and the invention is therefore not limited except as indicated by the scope of the appended claims.

I claim:

1. A telegraph apparatus comprising a telegraph signal device, a message signal control form comprising a printed sheet of signal device means including control form guide means for moving said control form relative to said signal device, said control form having the characteristic of accumulating electrostatic charges during movement of the form, the charged portions of the form tending to cause the tape to stick to said guide means, and means for preventing the control form from sticking to the guide means comprising means for producing an ionized gaseous zone through which the control form passes for removing said electrostatic charges from the control form.

2. A telegraph apparatus comprising a telegraph signal device, a paper tape on which telegraph messages are stored, said tape coacting with said signal device, means including tape guide means for moving the tape relative to the signal device, said tape having the characteristic of accumulating electrostatic charges during movement of the tape, the charged portions of the tape tending to cause the tape to stick to said guide means, and means for preventing the tape from sticking to the guide means comprising means for producing an ionized gaseous zone through which the tape passes for removing said electrostatic charges from the tape.

3. A telegraph apparatus comprising a telegraph signal device, a tape on which telegraph messages are stored, a tape storage device, means including a tape chute for said tape, means for locating said tape between said signal and storage device means, and means for preventing the tape from sticking to the guide comprising means for producing an ionized gaseous zone through which the tape passes for removing the electrostatic charges from the tape.

4. A telegraph apparatus comprising a device for perforating a tape to store messages on the tape,
a tape storage device, means including a tape chute for passing the tape between the perforating apparatus and the tape storage device, said tape having the characteristic of accumulating electrostatic charges during movement of the tape, the charged portions of the tape tending to cause it to stick to said chute, and means for preventing the tape from sticking to the chute comprising means for producing an ionized gaseous zone through which the tape passes for removing the electrostatic charges from the tape.

5. Telegraph apparatus comprising a telegraph tape transmitter, a perforated tape on which messages are stored, a tape storage device, means including a tape chute for passing the tape between the transmitter and the storage device, said tape having the characteristic of accumulating electrostatic charges during movement of the tape, the charged portions of the tape tending to cause it to stick to said chute, and means for preventing the tape from sticking to the chute comprising means for producing an ionized gaseous zone through which the tape passes for removing the electrostatic charges from the tape.

6. Telegraph apparatus comprising a perforator for perforating a tape to store messages on the tape, a tape transmitter operable by the perforated tape for transmitting the messages thereon, means including tape guide means for passing the tape from the perforator to the transmitter, said tape having the characteristic of accumulating electrostatic charges during movement of the tape, the charged portions of the tape tending to cause it to stick to said guide means, and means for preventing the tape from sticking to the guide means comprising means for producing an ionized gaseous zone through which the tape passes between the perforator and transmitter for removing the electrostatic charges from the tape.

7. Telegraph apparatus comprising a perforator for perforating a tape to store messages on the tape, an intermediate tape storage device for storing the perforated tape that issues from the perforator, means including tape guide means for passing the tape from the perforator to said intermediate storage device, said tape having the characteristic of accumulating electrostatic charges during movement of the tape, the charged portions of the tape tending to cause it to stick to the tape guide means, a tape transmitter, means for passing the perforated tape from the intermediate storage device to the transmitter for sending the messages on the tape, a sent tape storage device, means including other tape guide means for passing the tape from the transmitter to the sent tape storage device, and means for preventing the tape from sticking to the tape guide means comprising means for producing at least two ionized gaseous zones through which the tape passes for removing said electrostatic charges from the tape, certain of said ionized zones being positioned between the perforator and said intermediate storage device and another of said ionized zones being positioned between the transmitter and said sent tape storage device.

8. Means for removing or neutralizing electrostatic charges that accumulate on a moving tape, comprising a container positioned adjacent to the moving tape, means comprising a radioactive substance in said container for producing a zone of ionizing rays through which the tape passes, and means prior to the passage of said ionizing rays and interposed between said radioactive substance and said tape to prevent the tape from contacting the radioactive substance.