Dec. 17, 1940. B. L. KLINE ET AL 2,225,247

METHOD OF AND APPARATUS FOR ELECTRICAL RECORDING

Filed May 18, 1937

FIG. 1

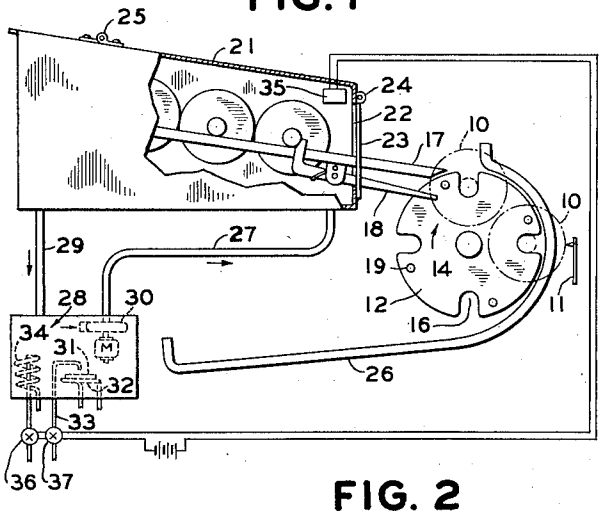


FIG. 3

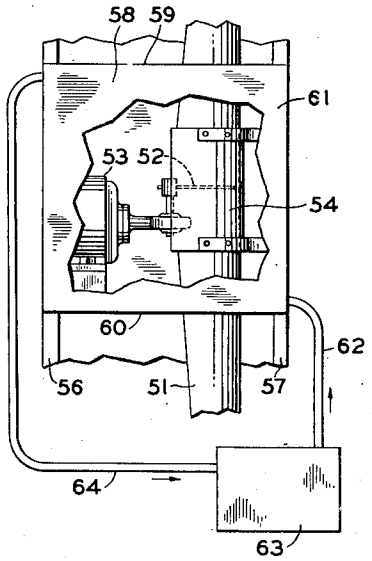


FIG. 2

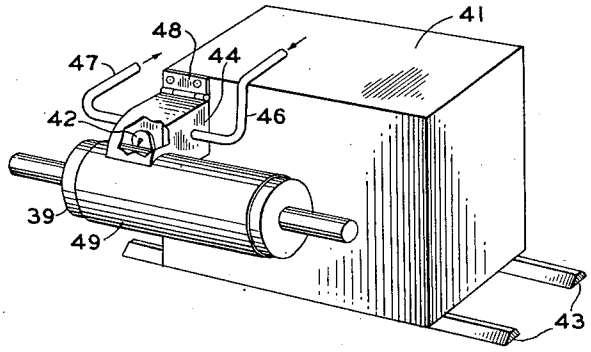


FIG. 6

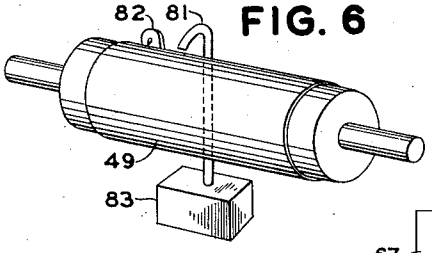


FIG. 4

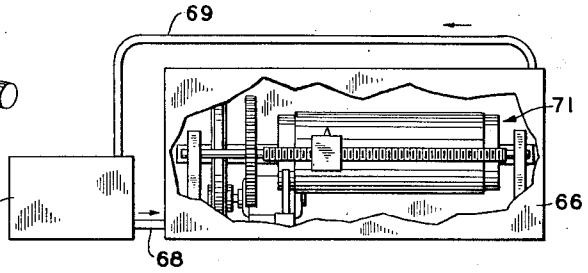
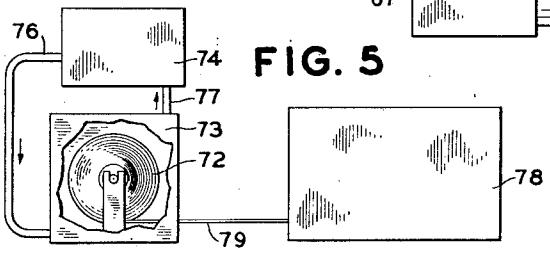


FIG. 5



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METHOD OF AND APPARATUS FOR ELECTRICAL RECORDING

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Application May 18, 1937, Serial No. 143,392

3 Claims. (Cl. 234—59)

The present invention relates to apparatus for recording and more particularly to novel arrangements for conditioning electrical recording blanks by controlling humidification of the same.

In accordance with the present invention, a sheet or layer of paper or other fibrous material is prepared in any suitable manner by the application of a substance which becomes conductive when moistened. Certain of these substances known to the prior art will change color upon application of an electric current thereto in the wet state, whereas others serve merely as electrolytes, in which case blanks to be used in the novel manner disclosed herein will be coated, impregnated, or otherwise supplied with a color changing medium in addition to the electrolyte. Ammonium nitrate, ammonium sulphate, sodium nitrate and nickel sulphate are examples of electrolytes which will cause a blank to become conductive when the blank is used in a moist atmosphere. The present invention is based upon the discovery that certain recording blanks of the prior art as well as the recording blank disclosed and claimed in a copending application Ser. No. 59,780, filed January 18, 1936, of B. L. Kline, will readily change color upon passage of an electric current when they are exposed to moist air either before or during recording, or if closer control of the process is desired, when they are exposed to a specially humidity controlled atmosphere in the same way. Accordingly, one important object of the present invention resides in the provision of a novel method of recording electrical impulses or signals.

Another and related object is to provide recording apparatus embodying means for supplying humidity controlled air to facilitate recording by electrical means.

A further object of the present invention is to provide novel recording means to permit use of greatly simplified recording apparatus of the type employing a device for moistening the record sheet.

A still further object of the present invention resides in the provision of novel methods and means for artificially maintaining humidity and temperature conditions surrounding an electrical recorder.

Still another object of the present invention is to provide novel means for bringing humidity-controlled air into contact with a recording blank within limited successive areas thereof.

The foregoing and more specific objects will appear in the following complete disclosure of the invention in its several aspects. Referring to the drawing:

Fig. 1 is a view in side elevation of a recorder suitable for use in practicing the present invention, certain of the parts thereof being omitted for the sake of simplicity;

Fig. 2 is a perspective view of a recorder embodying the present invention in modified form;

Fig. 3 is an elevational view of a continuous type of recorder embodying the present invention in modified form;

Fig. 4 is a view illustrating a recorder enclosed within a housing to insure proper recording conditions;

Fig. 5 is an elevational view of a storage device from which given lengths of recording paper may be dispensed or which may feed a continuous recorder of the general type suggested by Fig. 3 of the drawing; and

Fig. 6 is a view similar to Fig. 2 and illustrates modified apparatus for practicing the invention.

Referring for the present to Fig. 1 of the drawing, reference character 10 designates copyholders illustrated as cylinders, each of which is adapted to receive a record blank in contact with its periphery. Apparatus for feeding copyholders automatically into position to cooperate with an axially movable stylus 11 is disclosed by Figs. 6 and 7 in the application of R. J. Wise et al., Ser. No. 110,760, filed Nov. 13, 1936, and, therefore, details of the apparatus which are unnecessary to an understanding of the present invention are omitted. The recording stylus 11 is supported upon a movable carriage as disclosed in the above mentioned application and a pair of discs 12, one of which appears in Fig. 1 of the drawing, are secured to a shaft 14, the latter being turned intermittently to bring a cylinder 10, resting in aligned notches 16 in the discs, into position where it is rotated in contact with the stylus 11 by a mechanism which is fully disclosed in the application above referred to. A storage rack or magazine 17, along which the cylinders 10 are conveyed to the discs 12, is provided with a latch member 18 adapted to be operated by pins 19 to release the cylinders one at a time. It will be understood that the improvement illustrated in Fig. 1 may be applied to any type of recorder in which loaded copyholders are stored and fed one at a time into recording position.

The major portion of the storage rack or magazine 17 is enclosed in a housing 21 of suitable dimensions which is open at one side as indicated by the reference character 22 to permit the cylinders to roll along the rack 17 onto the aligned notches 16 of the discs 12. The opening 22 is

preferably covered by a flap 23 hinged at 24. To facilitate loading of the rack 17, the top of the housing may be hinged at 25. The cylinders, which are discharged after being scanned by the stylus 11, roll along a conveyor 26 to an accessible position.

Air is supplied through a conduit 27 to the housing 21 from an air conditioning device 28, and, if desired, air may be circulated through the housing 21 and returned to the device 28 through another conduit 29. The device 28 is provided with a blower 30 or other suitable means for moving conditioned air along the conduit 27 to the housing 21 and moistening of the air may be accomplished by evaporating water or other liquid in a boiler 31 which is adapted to be heated by an arrangement such as the coil 32. The water for moistening purposes is supplied to the evaporating device 31 through a conduit 33. In the event that atmospheric humidity is excessive, this excess may be removed by a refrigerated coil 34 or suitable chemicals or solutions of chemicals for maintaining any desired humidity. The coil 34 may be an evaporator for a liquid refrigerant, or it may be a coil carrying a cooled liquid such as brine.

To ensure a proper degree of humidity in the housing 21, a humidostat 35 is provided which is connected to valves 36 and 37 in the supply line to the coil 34 and in the conduit 33.

Operation of the apparatus disclosed in Fig. 1 will be obvious from the foregoing. The blanks on the cylinders 10 which remain within the housing 21 for an appreciable time before they are successively placed in position to cooperate with the recording stylus 11, will be moistened to a degree sufficient to make them conductive. The mechanism which rotates the shaft 14 a quarter of a revolution causes the pin 19 to raise the latch 18 which depresses the portion in contact with the cylinder on the rack 17 so that it rolls down into the upwardly positioned aligned notches 16. The latch 18 returns immediately to retain the next cylinder in the housing 21 until the cylinder, which is in position adjacent the stylus 11, is scanned.

Referring to Fig. 2 of the drawing, an arrangement is shown for conditioning a limited portion of the blank with conditioned air as a scanning operation is performed. For the purpose of illustrating this form of the invention, a scanning device is shown which comprises a scanning cylinder 39 which is rotated by suitable apparatus (not shown) and a housing 41 to which is secured the scanning electrode or stylus 42. The housing 41, which may contain the amplifiers necessary for feeding the stylus 42, is mounted to slide upon rails 43 along which it is propelled at scanning speed by a lead screw (not shown). An arrangement of this type is disclosed in Fig. 1 of the drawing of the Wise et al. application above referred to. A hood 44 is carried by the housing 41 and is open at one end and formed to fit over the cylinder 39. The hood 44 is provided with conduit connections 46 and 47 which are in communication with a source of conditioned air such as the device 28 described in connection with Fig. 1. To facilitate observation and adjustment of the stylus 42, the hood 44 is hingedly mounted at 48 so that it may be raised bodily away from the cylinder 39. It will be understood that the conduits 46 and 47 can be readily made of flexible material so as to permit raising of the hood 44 when desired. In operation of the device of Fig. 2, a record blank 49 on the cylinder 39 will be subjected to the flow of conditioned air within the hood 44 in the immediate neighborhood of the stylus 42 which in most instances will be sufficient to make the blank 49 conductive enough for recording purposes.

Fig. 3 of the drawing shows the invention as applied to receiving apparatus of the continuous type in which the blank is in the form of a continuous web or sheet 51. The web 51 is curved at the point where the record is impressed upon it to permit operation thereon of a revolving stylus or a plurality of styli 52, which is energized in accordance with the received signals and is driven by a motor or other mechanical driving means 53.

The scanning motor 53 and an electrically conducting platen 54 are carried upon a suitable frame comprising the members 56 and 57 which support side walls 58 and top and bottom walls 59 and 60 to form a compartment or housing 61 enclosing the stylus 52 and the platen 54. The housing 61 is supplied with conditioned air through a conduit 62 leading from a conditioning device indicated by the reference character 63. To provide recirculation of the conditioned air a second conduit 64 leads from the housing to the conditioning device 63. With the arrangement just described the recording process is conducted in an atmosphere which may be readily controlled with respect to temperature and moisture conditions, the latter being maintained at the point best suited for recording without danger of softening the web 51 to the point where it would tear because of the tension imposed by the sheet propelling means (not shown).

In Fig. 4 of the drawing an electrical recorder is enclosed in a hood or housing 66 which is arranged to be supplied with humidity-controlled air from the air conditioning device 67, the latter being similar in function and operation to the device 28 described in connection with Fig. 1. Conduits 68 and 69 are arranged to provide recirculation of air through the housing 66. The facsimile receiver 71 may be of any known type or kind, this figure of the drawing serving only to illustrate a facsimile recorder which is enclosed so that recording occurs in a specially controlled atmosphere. A recorder which is similar to the recorder 71 chosen for the purpose of illustration, is disclosed in an application of R. J. Wise, Ser. No. 23,927, filed May 28, 1935.

Fig 5 of the drawing discloses a modified apparatus for practicing the invention in which a quantity of recording paper may be stored in a specially conditioned atmosphere prior to its use in the recording machine. Referring to Fig. 5, the recording paper is illustrated as being stored in the form of a roll 72 within a cabinet or housing 73. The latter is supplied with humidity-controlled air from the air conditioning device 74 through the conduit 76. The conduit 77 provides for recirculation of the conditioned air in the manner already described in connection with other figures of the drawing. If the record paper is stored in the cabinet 73 in the form of a roll, it may be conveniently fed to a facsimile recorder 78 of the general type disclosed in Fig. 3 of the drawing. The web of recording paper 79 which extends between the cabinets 73 and 78 is preferably made very short so that the recording paper will not have an opportunity to become dry prior to recording. If the recorder is to be used at infrequent intervals, it should be covered and supplied with moist air as shown in Figs. 3 and 4 of

the drawing. It will then be possible to start the recorder at any time with properly conditioned record paper.

Fig. 6 of the drawing discloses an arrangement in accordance with the invention by which the record sheet 49 may be moistened by moist air blown out of the pipe 81 located near the recording stylus 82. The pipe 81 connects with an air moistening device 83 which is provided with an arrangement for moistening the air or generating steam which is to be blown upon the record blank 49.

The structure such as shown in Figs. 1 and 5 herein is not disclaimed, but comprises the subject matter of a divisional application Serial No. 365,692, filed November 14, 1940.

From the foregoing it will be seen that there is provided a recording method and means which permits simplification of a recording operation and also avoids all objectionable features of prior recording methods and apparatus wherein it is necessary to apply a liquid for the purpose of enhancing the conductivity of a record blank.

The nature of the invention will be determined from the foregoing and the scope thereof is defined in the appended claims.

What is claimed is:

1. The method of electrically recording signals which comprises selectively applying an electrical potential to elemental areas of a recording blank capable of conducting electricity when moist and at the same time conditioning said blank by contact with a humidity-controlled atmosphere in the area in which recording is being done.

2. In a recorder, recording means, means for operatively maintaining a recording blank in operative relationship with said recording means, means for progressively changing the position of said blank relative to said recording means, and means surrounding said recording means for supplying moist air to the recording blank while in operative relationship wtih said recording means.

3. In a recorder, recording means, means for operatively maintaining a recording blank in operative relationship with said recording means, means for progressively changing the position of said blank relative to said recording means, and means to provide a humidity-controlled atmosphere surrounding said recording means during recording.

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