Sept. 6, 1949. W. H. TRIBBLE 2,480,890

RAISED HELIX FOR FACSIMILE APPARATUS

Filed Aug. 30, 1946

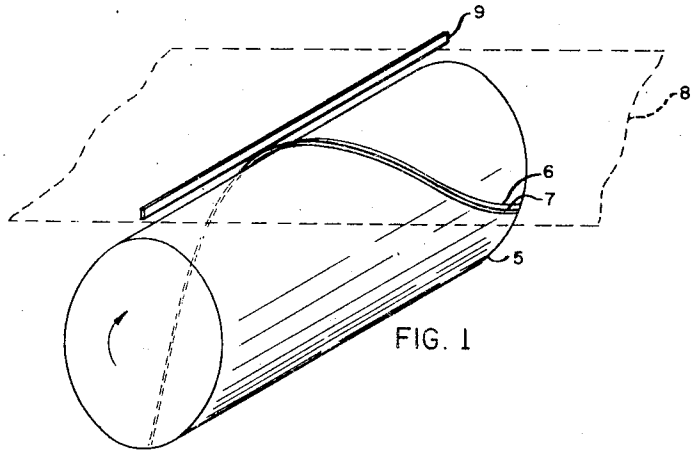


FIG. 1

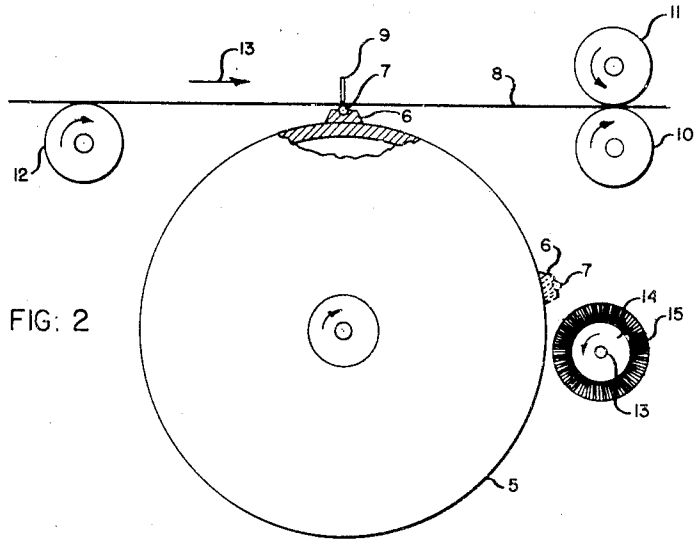


FIG. 2

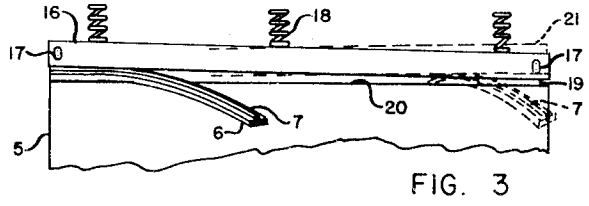


FIG. 3

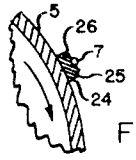


FIG. 5

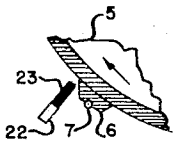


FIG. 4

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Patented Sept. 6, 1949

2,480,890

UNITED STATES PATENT OFFICE

2,480,890

RAISED HELIX FOR FACSIMILE APPARATUS

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Application August 30, 1946, Serial No. 694,013

1 Claim. (Cl. 346—101)

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The present invention concerns facsimile recorders and more in particular, recorders embodying helical recording electrodes.

In facsimile recorders employing a helical electrode, said electrode is supported on any suitable insulating material which is carried by the helix drum. The helix drum is caused to rotate under a moist electrolytic record sheet. A horizontal electrode commonly referred to as a printer blade or linear electrode is so mounted that a point of firm contact between the electrodes and through the record sheet is caused to move between the printer blade and the helical electrode across the paper to establish a point-by-point and line-by-line contact. Due to the constant rotation of the drum wherein the helical electrode is constantly wiping the under-surface of the record sheet against the linear electrode, fibers from the paper accumulate on the surface of the helix wire, which, together with dust or other particles of foreign matter, effectively insulate portions of the helix so that faulty electrical contact will exist between two electrodes. This faulty electrode contact between the electrodes establishes a high resistance between said electrodes, thereby preventing an electrical signal from properly passing between said electrodes. This condition is commonly referred to as "blocking."

In addition, moisture from the paper condenses on the recording drum which, together with dust and residue from the paper will be urged against said helical electrode to aggravate or increase the blocking condition.

According to the present invention, the helical electrode is sufficiently raised above its driving drum so that electrolyte scraped from the recording surface, paper fibers, and other waste products may be kept away from the surface of the recording sheet. According to the present invention the recording helix is raised to a point such that it keeps the recording sheet out of contact with the drum upon which the helix is mounted during the recording process.

Electrolyte and waste products which may therefore accumulate on the drum upon which the helix is mounted are kept from contact with the recording sheet. The electrolytic recording process is critical and depends in a large measure upon a very clean helical recording electrode.

According to the present invention a further means is provided to keep the helical recording electrode clean and in proper condition for recording which comprises a bristle brush either of the rotatable form or in the form of a linear brush along the length of the drum supporting

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the helix which brush bears against the helix and cleans it from accumulation at least once during each revolution of the helix. In its preferred form the present invention provides a helical electrode which is raised from the driving drum to a point which prevents the record sheet from coming in contact with this drum and its accumulated waste products.

One object of the present invention is to provide in an electrolytic facsimile recorder means for providing long, attention-free operation.

Another object of the present invention is to provide means for improved detail in an electrolytic recording facsimile scanner.

A further object of the invention is to provide, in an electrolytic facsimile recorder embodying a helical recording electrode, a feature of automatic cleaning of the helical electrode to provide for long attention-free operation of said recorder.

A further object of the invention is to provide a helical electrode supporting structure, which structure is carried by the recording drum but distinctly elevated therefrom.

A further object of the invention is to provide a means for distinctively spacing the helical electrode from the surface of the recording drum to permit an automatic cleaning action of said helical electrode by a cleaning member which will definitely engage the helical electrode but avoid contact with the helix drum per se.

It is a still further object of the present invention to provide a facsimile recorder wherein the helix is so raised above the surface of the drum that the flexible linear electrode of the recorder is thereby prevented from touching the surface of the drum upon which the helix is mounted.

A further object of the present invention is to provide a mounting for the helical electrode wherein wide variations in size and shape of the electrode may be utilized while still maintaining optimum performance from the facsmile scanner.

Other and further objects of the invention will become apparent from a reading of the following specification taken in conjunction with the drawings.

In the drawings:

Fig. 1 is a perspective view of the helix drum having the horizontal electrode operably positioned in relation to the helix drum.

Fig. 2 is a side view of the helix drum showing a desired arrangement of associated parts.

Fig. 3 is a partial front view of the helix drum shown in relation to the helical electrode.

Fig. 4 is a partial sectional end view of a modi-

fication of the helical electrode cleaning means.

Fig. 5 is a modification of the helical electrode supporting member showing the supporting member having parallel sides with inclined leading and trailing edges adjacent the outer surface of the supporting member which carries the helical electrode.

Referring to the drawings and more particularly to Fig. 1, the helix drum 5 is shown having a ridge or a helical electrode supporting member 6 carried by the drum with the helical electrode 7 positioned on said supporting member.

The electrolytic record paper 8 (shown dotted) is positioned between the helix drum and the horizontal electrode 9. In Fig. 2 the helix drum 5 is shown with the helical electrode supporting member 6 having a helical electrode 7 definitely spaced from the surface of the helix drum per se. The horizontal electrode 9 is shown engaging the upper surface of the electrolytic record paper 8 while the helical electrode 7 is shown engaging the lower surface of the electrolytic record paper. A drive roller 10 is shown engaging the lower surface of the electrolytic record paper 8, while the upper drive roller 11 is shown engaging the upper surface of the electrolytic record paper. A guide roll 12 is shown engaging the lower surface of the electrolytic record paper and said paper is held in engagement with the guide roll 12, so that when the drive roll is rotated as indicated by the arrow on said drive roll, the electrolytic record paper will be urged in the direction shown by the arrow 13. A cylindrical-type bristle 14 is revolubly mounted on a shaft 13. The bristles 15 will impinge the helical electrode 7 in a rotating motion so that the electrode is wiped by the rotating brush along its entire electrical contact surface once every revolution of the helix drum.

The helical electrode supporting member is shown dotted in an advanced position to more clearly indicate the relative position of a cylindrical-type brush and the helical electrode and its supporting member.

In Fig. 3 a partial front view of the helix drum 5 is shown having the helical electrode supporting member 6 with the helical electrode 7 positioned thereon. The horizontal electrode 16 is mounted in any suitable manner such as by the elongated slots 17 which permit vertical movement of the horizontal electrode under action of the springs 18, which springs urge the horizontal electrode against the upper surface of the record sheet to press the lower surface of the record sheet against the helical electrode.

It will be seen that the electrical contact edge 19 of the helical electrode is not parallel with the helix drum surface 20 due to the left end portion of the horizontal electrode being slightly elevated because of the presence of the helical electrode as shown. The horizontal electrode is shown dotted at 21 to indicate that the right end portion of the horizontal electrode would be higher than the left end portion of said electrode when the helical electrode 7 is in engaging position with the horizontal electrode through the record sheet as shown dotted. Due to this type of action on the part of the flexible linear electrode 17 and the necessity that the springs 18 constantly bias the electrode 17 against the helix 7, unless a raised helix is used, the flexing of the linear electrode 17 will force the record sheet against the surface 20 of the drum 5 at points where the flexible electrode is not cooperating with the helical electrode. This pushing of the record sheet against the surface of the drum will upset the biasing effect of the springs 18 and will affect the recording qualities of the record sheet, as described above.

Fig. 4 is a modification of the helical electrode cleaning member which is in the form of an elongated brush 22 having bristles 23, which brush is permanently supported in spaced relation from the surface of the helix drum but so disposed as to wipe the electrical contact surface of the helical electrode and certain of the area of the helical electrode supporting member adjacent said electrode. The helical electrode supporting member 6 is shown positioned on the helix drum 5 in the same manner as shown in Fig. 2.

Fig. 5 is a modification of the cross sectional contour of the helical electrode supporting member 24 having helical electrode 7 carried by said supporting member. The supporting member is positioned on the helix drum 5 in a manner similar to that shown in Fig. 2.

In Fig. 5 it will be seen that the sides of the supporting member are parallel and that the upper surface is at right angles to said sides. The leading and trailing edges of the upper surface of the helical electrode supporting member are shown inclined at 25 and 26, respectively. This is shown in contradistinction to the helical electrode supporting member 6 which in cross section has an upper surface with two inclined side surfaces, said inclined side surfaces terminating in the upper surface of the supporting member and the helix drum proper.

The helix wire ordinarily has to be very narrow in order to provide a very narrow edge which is being presented to the recording surface of the record sheet. This means that either a fine wire of round, oval or rectangular cross-section, or a thin strip of metal must be used as the helical electrode. While a thin strip of metal may not be a practical form of helical electrode due to the problems encountered when mounting same, it is to be understood that it may be employed.

In employing a helical electrode carried by a supporting member which definitely spaces said electrode from the surface of the drum proper, it will be seen that the waste products of the electrolytic record sheet and residue in general will be wiped from the helical electrode. The "blocking" of the signal is substantially, if not entirely, eliminated since the non-conducting layer of residue which ordinarily forms on the helical electrode is no longer present. By elevating the electrode in the manner disclosed in the present invention, the accumulations do not take place as rapidly since they are periodically brushed away.

Formerly, with the type of helical scanner which employs the helical electrode carried very close to the surface of the drum, accumulations adjacent the electrical contact surface of the helical electrode would frequently smear the under side of the recording sheet and then return again to the helical electrode due to the constant wiping action of said electrode against the record sheet.

By employing the present invention it will be seen that the record sheet does not come in contact with the surface of the drum proper so that any accumulation from the drum itself will not return to the helical electrode.

In the present invention it will be seen that the condition of "blocking" may be substantially, if not entirely eliminated if the helical electrode is constantly cleaned due to the wiping action as set forth in the present invention. The result is that

a long period of operation may be obtained due to the substantial elimination of the condition which formerly caused blocking of the signals.

While but one form of the invention has been shown and described herein, it will be readily apparent to those skilled in the art that various minor modifications may be made without departing from the spirit of the invention or the scope of the appended claim.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

In a facsimile recorder, the combination of, a rotatable recorder drum, a ridge on the surface of said drum extending in helical fashion at least partly around said drum, a metallic helical electrode mounted on the upper surface of said ridge to form a recording electrode, a flexible linear electrode to cooperate with said helical electrode to produce a recording, and means for maintaining pressure contact between said flexible linear electrode and said helical electrode, said ridge being of sufficient height to prevent said flexible electrode from touching the surface of said recorder drum.

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