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EQUIPMENT FOR DRIVING AND POSITIONING MAGNETIC RECORD SHEETS ON DRUM SUPPORTS

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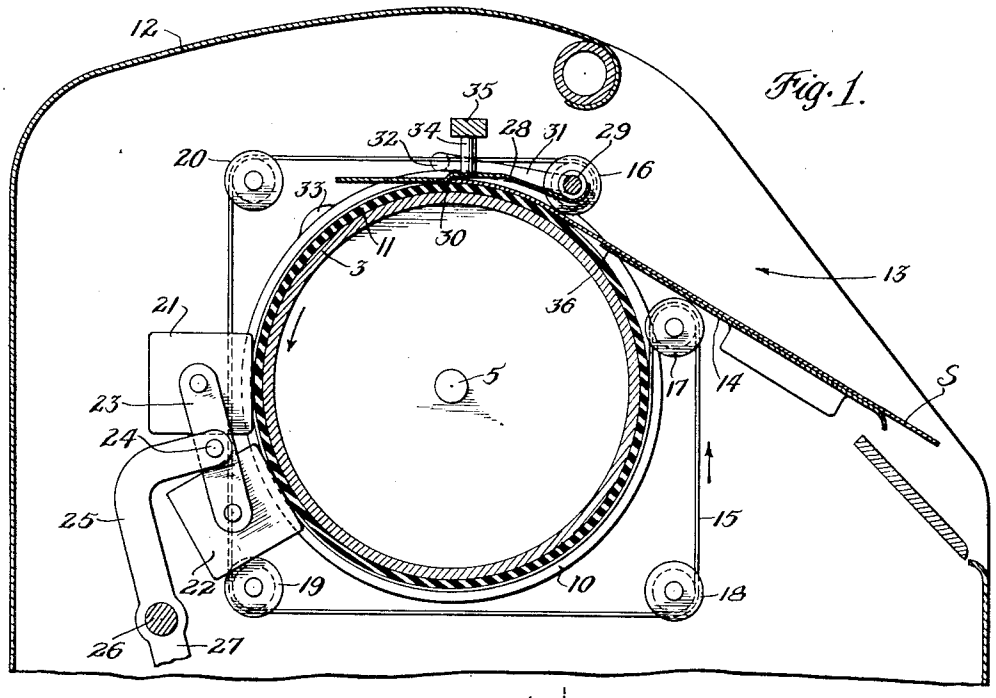


Fig. 1.

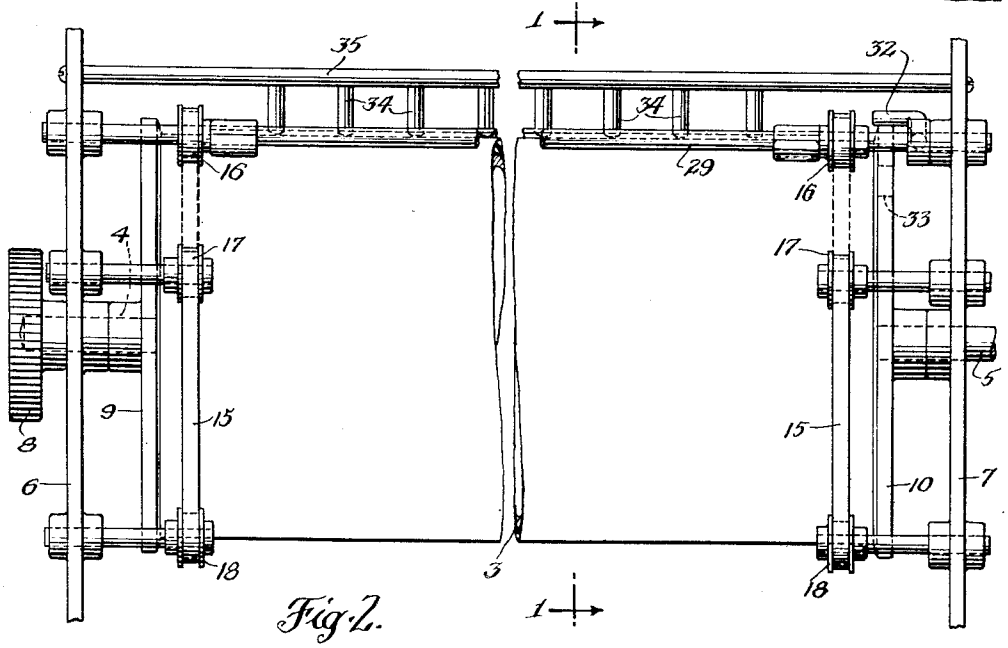


Fig. 2.

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EQUIPMENT FOR DRIVING AND POSITIONING MAGNETIC RECORD SHEETS ON DRUM SUPPORTS

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9 Claims. (Cl. 274—4)

This invention relates to equipment for use with magnetizable records in the form of flexible rectangular record sheets, for instance record sheets comprising a sheet of paper carrying a coating with magnetizable particles dispersed therein.

The invention is particularly concerned with equipment of the type incorporating a rotatable drum on which a record sheet is adapted to be wrapped, the sheet being helically scanned by one or more magnetic scanning devices. A machine of this general type is disclosed in copending application of Bruce Roberts, Serial No. 740,653, filed April 10, 1947, now Patent No. 2,653,819, issued September 29, 1953, assigned to the assignee of the present application. With equipment of this type a record sheet may be inserted in the machine and recorded and may then be immediately reproduced, or the record may be taken out of the machine and subsequently re-introduced into the same or a similar machine for the purpose of reproduction. Such a machine is particularly well suited to use as an office dictation machine.

For the above purposes it is of importance that means be provided for ensuring re-insertion of a recorded sheet into the machine, with the sheet in exactly the same position in which it was recorded, so that the scanning occurring upon reproduction will accurately follow the helical track in which the sheet was initially recorded.

One of the primary objects of the present invention is to provide mechanism for indexing a record sheet with respect to the supporting drum during scanning, i. e., mechanism which acts to predetermine the position in which a sheet is wrapped upon the supporting drum.

According to the invention a novel retaining means is also provided for ensuring that the record sheet is driven with the drum in the properly indexed position.

In accordance with another aspect of the invention, the equipment is arranged to accomplish the foregoing without utilizing any guide or other elements requiring positive interlocking or interfitting with the record sheet, the drive of the sheet on the drum being effected by friction means adapted to retain the sheet in the properly indexed position.

How the foregoing and other objects and advantages are attained will appear more fully from the following description referring to the accompanying drawing, in which—

Figure 1 is a vertical sectional view through a portion of a machine according to the invention, the plane of the section being transverse the axis of the record supporting drum as indicated by the section line 1—1 on Figure 2; and

Figure 2 is an elevational view of certain portions of the equipment, taken from the right of Figure 1, but with the casing and certain parts omitted for the sake of clarity of illustration.

Referring to the figures, the reference numeral 3 designates a drum which is adapted to be rotatively mounted by supporting shafts 4—5 which are journalled in supporting frame members 6—7. Shaft 5 is adapted to be driven through a disconnectible drive mechanism of the type shown, for example, in copending application of Bruce Roberts, above identified. Alternatively, the drum may be manually rotated as by means of the knurled knob 8 which is fixed on the shaft 4. The drum has a pair of end flanges 9—10 and carries a resilient surfacing layer 11 suitably formed of sponge rubber, as disclosed in

application of Lloyd J. Bobb, Serial No. 743,807, filed April 25, 1947, now abandoned, assigned to the assignee of the present application. A record sheet, such as indicated at S, is adapted to be wrapped upon the drum between the flanges 9—10. Preferably the sheet and drum are so proportioned that the end flanges 9—10 serve to position the sheet axially of the drum and further so that when wrapped upon the drum, the adjacent edges of the sheet overlap each other. In a typical and preferred machine of this general type, for instance as disclosed in the copending applications above referred to, the drum is so proportioned as to handle a letter-size record sheet in the manner above described, advantageously a record sheet having the standard 8½ x 11" dimensions.

As seen in Figure 1, the machine is enclosed in a casing 12 having an opening indicated by the arrow 13 for the introduction and removal of record sheets. Upon introduction a sheet is guided by the guide plate 14 providing for the edgewise feed of a sheet generally tangentially to the drum.

The sheet is wrapped around the drum and held during rotation of the drum by means of a pair of endless belts 15 arranged one toward each end of the drum. Each belt is carried by a pair of rollers 16—17 providing two belt runs, one of which, as clearly appears in Figure 1, extends around the major portion of the circumference of the drum, and the other of which is retained out of engagement with the drum by means of the guide rollers 18, 19 and 20. The elements 16 to 20 inclusive may either be rotatively mounted or may comprise smooth surfaced non-rotative guide members.

Attention is now called to the fact that the opening 13 for introduction of a sheet is arranged in the region between the rollers 16 and 17, so that the edge portion of the sheet is introduced under the runs of the drive belts which engage and move with the drum. Therefore by frictional inter-engagement of the belts 15, the record sheet and the surfacing 11 on the drum, the sheet is positively driven with the drum. While being rotated with the drum, the sheet is adapted to be scanned by a magnetic erasing device 21 and also by a scanning device 22 adapted alternatively to be employed for recording and reproduction. The devices 21 and 22 are preferably carried by an equalizer arm 23 which is pivotally mounted at 24 on the carriage 25 which is slidable axially of the drum on the guideway 26. The carriage 25 is also oscillatable about the axis of guide 26 so as to provide for engagement and disengagement of the scanning devices with respect to the drum. Such engagement and disengagement is desirably manually controllable by control means associated with arm 27 of the carriage, such control means forming no part of the present invention per se but being fully disclosed in the copending application of Bruce Roberts above referred to. It may here further be noted that the specific manner of mounting the scanning devices 21 and 22 above described forms no part of the present invention per se, being described and claimed in copending application of Chester C. Pond, Serial No. 743,806, filed April 25, 1947, now Patent No. 2,530,029, issued November 14, 1950, assigned to the assignee of the present application.

It will be understood that appropriate control circuits are also associated with the magnetic scanning devices 21 and 22 in order to provide for the functions of erase, record, and reproduction.

To ensure accurate reproduction of a recorded sheet which has been removed from the machine and then reintroduced, it is desirable that the position of the sheet on the drum be accurately predetermined. For this purpose the invention provides a guide plate 28 fixed on the shaft 29, which shaft (see Figure 2) is journalled in the side frame members 6—7 of the machine to provide for oscillation thereof. This shaft also serves to carry the roller 16 for the belts 15. Plate 28 is provided with a notch or abutment 30 which is adapted to contact the leading edge of a record sheet S being introduced into the machine. The abutment 30 serves to prevent further introduction of a sheet to be wrapped around the drum until the guide plate 28 is oscillated upwardly about the axis of shaft 29, at which time the engagement of the belts

15 with the sheet draw the sheet into the machine and wrap it around the drum and thereafter continue to retain the sheet in proper position on the drum during scanning thereof.

For the purpose of lifting the guide plate 28, the shaft 29 carries an arm 31 fixed thereto, which arm has an end portion 32 bent to overlie the flange 10 at the adjacent end of the drum. The flange 10 is provided with a cam 33 adapted to lift the arm 31 and thus the guide plate 28, when the cam passes the cooperating part 32 of the arm. This mechanism provides for lifting of the guide plate 28 in a pre-determined relation with respect to the rotational position of the drum and, in consequence, whenever a record sheet is introduced into the machine, it is always properly indexed circumferentially of the drum.

To ensure disengagement of the leading edge of a sheet from the abutment 30, the guide plate 28 is provided with a series of apertures adjacent to the abutment 30 through which pins 34 project, the pins being carried by a fixed bar 35.

In use of the equipment, therefore, a record sheet S is merely fed into the machine on the surface of the guide 14 until the leading edge comes against the abutment 30 and the drum is then rotated and the sheet will be drawn into the machine in the proper circumferential position on the drum at the time when the cam 33 acts to lift the abutment out of the path of the leading edge of the sheet. The record sheet introduced may then be recorded and/or reproduced. When it is desired to remove a sheet from the machine, the drum is manually rotated in reverse direction by means of the knurled knob 8. When this occurs the outer one of the overlapped edges of the sheet is stripped from the drum when it reaches the edge 36 of the guide plate 14, such edge being in close proximity to the drum, and the sheet slides out of the machine along the guide plate 14.

The arrangement described provides for drive of a sheet on the drum without necessitating any interlocking engagement of any part of the sheet with any other element of the machine, the drive being achieved through frictional engagement of the sheet with the belts 15 and the drum surfacing 11. Moreover, the invention provides for proper indexing of the position of the sheet on the drum without the necessity for perforating the sheet or employing any other positive interlocking means.

We claim:

1. Equipment for use with magnetizable records in the form of flexible rectangular sheets, comprising a drum for rotatively supporting a record sheet in tubular form with the leading and trailing edges overlapped, magnetic means for helically scanning a sheet while wrapped on the drum, and mechanism for retaining a sheet on the drum comprising a retaining element bearing against a sheet on said drum and having a contact surface movable with such sheet throughout a portion only of the circumference of the drum, whereby the retaining element acts to hold the sheet on the drum without rubbing contact therewith, and said mechanism including a further element disposed to engage the overlapped edges of the sheet when said edges are released by said surface and to conduct said edges into re-engagement with said surface.

2. A construction in accordance with claim 1, and further including means adapted to cooperate with the edge of a sheet fed to the drum to pre-determine the position of said edge circumferentially of the drum when the sheet is wrapped thereon.

3. A construction in accordance with claim 1, and further including, a displaceable abutment in the path of feed of a sheet to the drum adapted to cooperate with the edge of a sheet fed to the drum to restrain wrapping of such sheet on the drum, and means for effecting displacement of said abutment at a predetermined rotational position of the drum to provide for wrapping of a sheet on the drum and to predetermine the position of said edge circumferentially of the drum when the sheet is wrapped thereon.

4. A construction in accordance with claim 1, and further including, a member adjacent the periphery of the drum cooperating therewith to guide an edge of a sheet fed therebetween to a position adjacent the surface of the drum, a displaceable abutment in the path of feed of a sheet to the drum adapted to cooperate with the edge of a sheet fed to the drum to restrain wrapping of such sheet on the drum, and means for effecting displacement of said abutment at a pre-determined rotational position of the drum to provide for wrapping of a sheet on the drum and to pre-determine the position of said edge circumferentially of the drum when the sheet is wrapped thereon.

5. Equipment for use with magnetizable records in the form of flexible rectangular sheets, comprising a rotatable drum adapted to support a record sheet wrapped thereon, means for securing a sheet in wrapped position on the drum and arranged to receive a sheet fed thereto edgewise, magnetic means for scanning a record sheet on the drum, mechanism for circumferentially predetermining the position of engagement of the edge of a sheet on the drum comprising sheet engaging means displaceable to initiate wrapping of a sheet upon the drum in a pre-determined rotational position thereof, and a cam rotative with the drum adapted to effect displacement of said sheet engaging means.

6. Equipment for use with magnetizable records in the form of flexible rectangular sheets, comprising a rotatable drum adapted to support a record sheet wrapped thereon, means for securing a sheet in wrapped position on the drum and arranged to receive a sheet fed thereto edgewise, magnetic means for scanning a record sheet on the drum, and mechanism for circumferentially predetermining the position of the edge of a sheet wrapped upon the drum comprising a displaceable abutment in the path of feed of a sheet to the drum, and a cam rotative in timed relation with the drum for displacing said abutment.

7. Equipment for use with magnetizable records in the form of flexible rectangular sheets, comprising a rotatable drum adapted to support a record sheet wrapped thereon, means for securing a sheet in wrapped position on the drum and arranged to receive a sheet fed thereto edgewise, magnetic means for scanning a record sheet on the drum, and mechanism for circumferentially predetermining the position of the edge of a sheet wrapped upon the drum comprising a displaceable abutment in the path of feed of a sheet to the drum, means for displacing said abutment, the displacing means being connected with the drum to move therewith to displace the abutment once per revolution of the drum at a predetermined rotational position of the drum, and means for disengaging a sheet from the abutment upon displacement thereof.

8. Equipment for use with magnetizable records in the form of flexible rectangular sheets, comprising a rotatable drum adapted to support a record sheet wrapped thereon, means for securing a sheet in wrapped position on the drum and arranged to receive a sheet fed thereto edgewise, magnetic means for scanning a record sheet on the drum, mechanism for circumferentially predetermining the position of engagement of the edge of a sheet on the drum comprising sheet engaging means displaceable to initiate wrapping of a sheet upon the drum in a predetermined rotational position thereof, and a movable device for displacing the sheet engaging means, said device being connected with the drum to move in timed relation therewith once for each revolution of the drum.

9. Equipment for use with magnetizable records in the form of flexible rectangular sheets, comprising a rotatable drum adapted to support a record sheet wrapped thereon, means for securing a sheet in wrapped position on the drum and arranged to receive a sheet fed thereto edgewise, magnetic means for scanning a record sheet on the drum, mechanism for circumferentially predetermining the position of engagement of the edge of a sheet on the drum comprising sheet engaging means displaceable to initiate wrapping of a sheet upon the drum in a predetermined rotational position thereof, and a movable device for displacing the sheet engaging means, said device being connected with the drum to move in timed relation therewith.

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