United States Patent

[11] 3,610,634

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[45] Patented **Oct. 5, 1971**

[73] Assignee **International Business Machines Corporation**
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[54] **DICTATING AND TRANSCRIBING APPARATUS FEATURING RECORD MEDIA EJECT CONTROL**
10 Claims, 24 Drawing Figs.

[52] **U.S. Cl.** ..... **274/4 J,** 179/100.2 T
[51] **Int. Cl.** **G11b 25/06**
[50] **Field of Search** ..... 274/4.2, 17, 19–22; 179/100.1 DR, 100.2 T

[56] **References Cited**

UNITED STATES PATENTS

2,735,578	2/1956	Woodruff	221/253 X
2,680,545	6/1954	Malheit	221/253 X
3,056,606	10/1962	Schueler	274/17
3,323,804	6/1967	Wolfner	274/17 X
3,390,884	7/1968	Helm	274/17

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ABSTRACT: A dictating unit has an associated microphone with control buttons for establishing modes of operation, and otherwise controlling the unit. The dictating unit is arranged for loading and unloading of a magnetic belt from the side. A transcribing unit has an associated headset and foot control and is arranged for loading and unloading of the magnetic belt from the front of the unit. However, each unit makes use of the same basic frame and common operating mechanisms. For maximum convenience, the common mechanisms are oriented in a preferred direction, differing by 90°. In each unit, the microphone or headset, as the case may be, is retractable into a storage compartment. A media (belt) eject control feature enables rapid ejection of the media but in a controlled manner to prevent excess belt speed near the end of the eject operation.

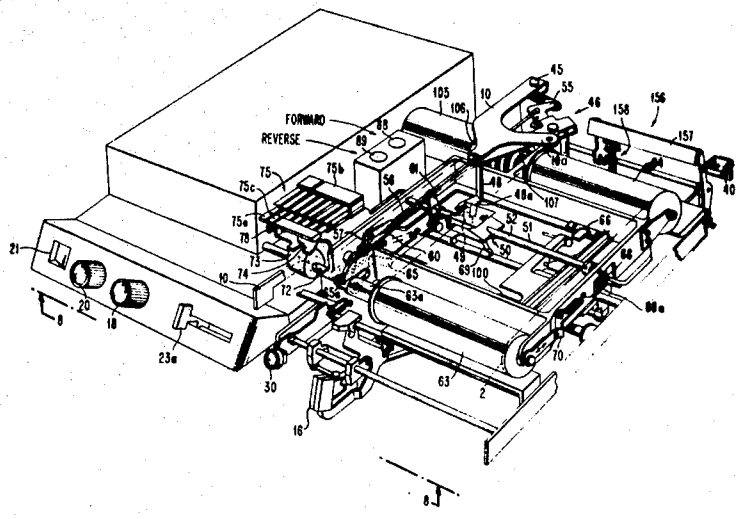


FIG. 1

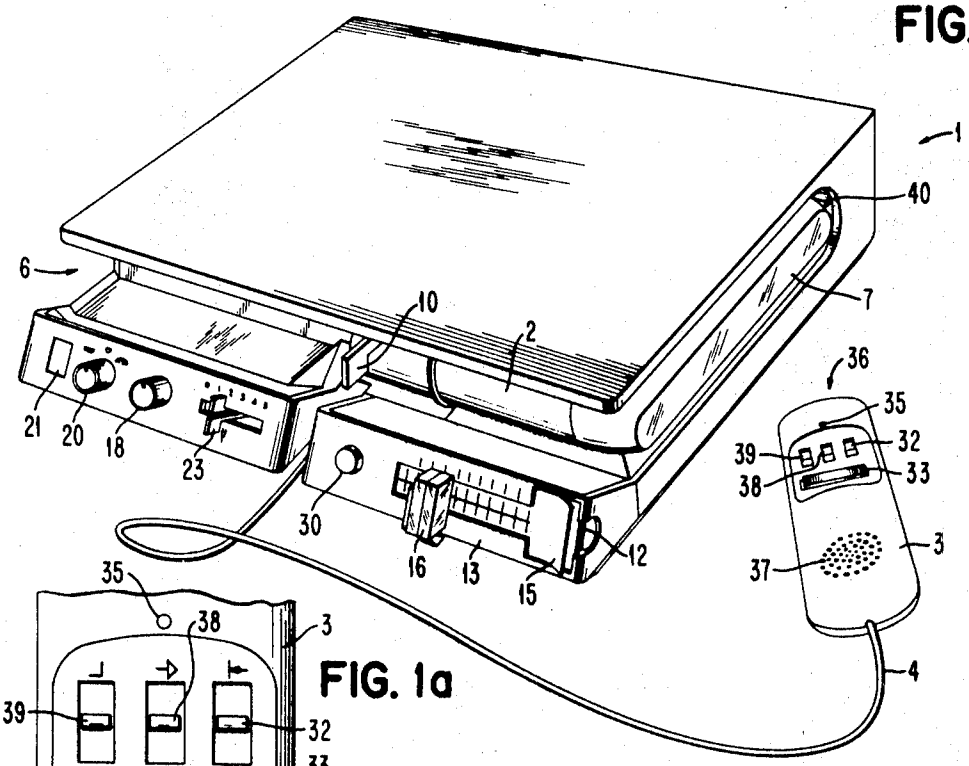


FIG. 1a

FIG. 2

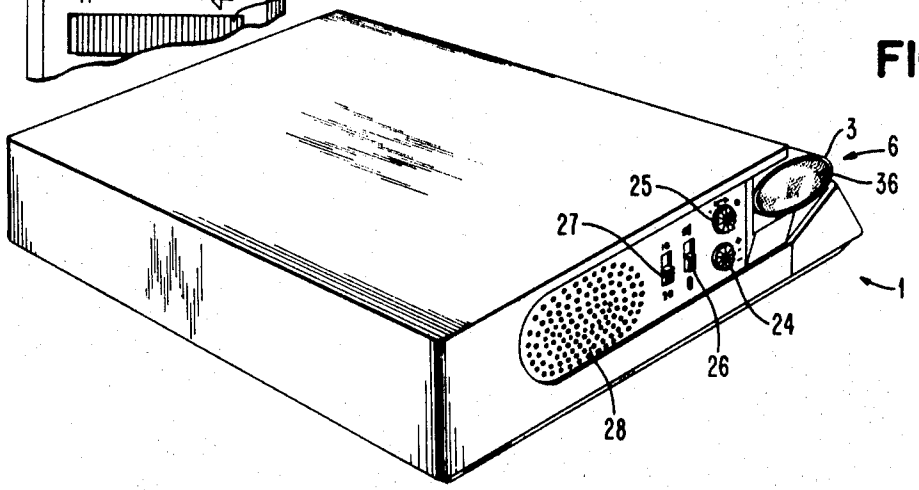
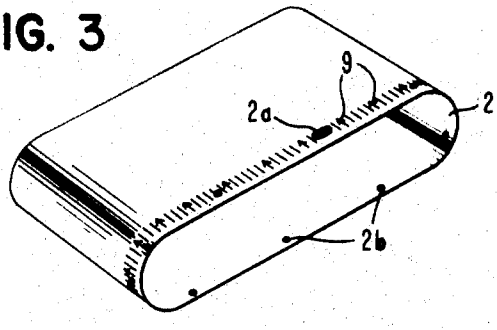


FIG. 3



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ATTORNEY

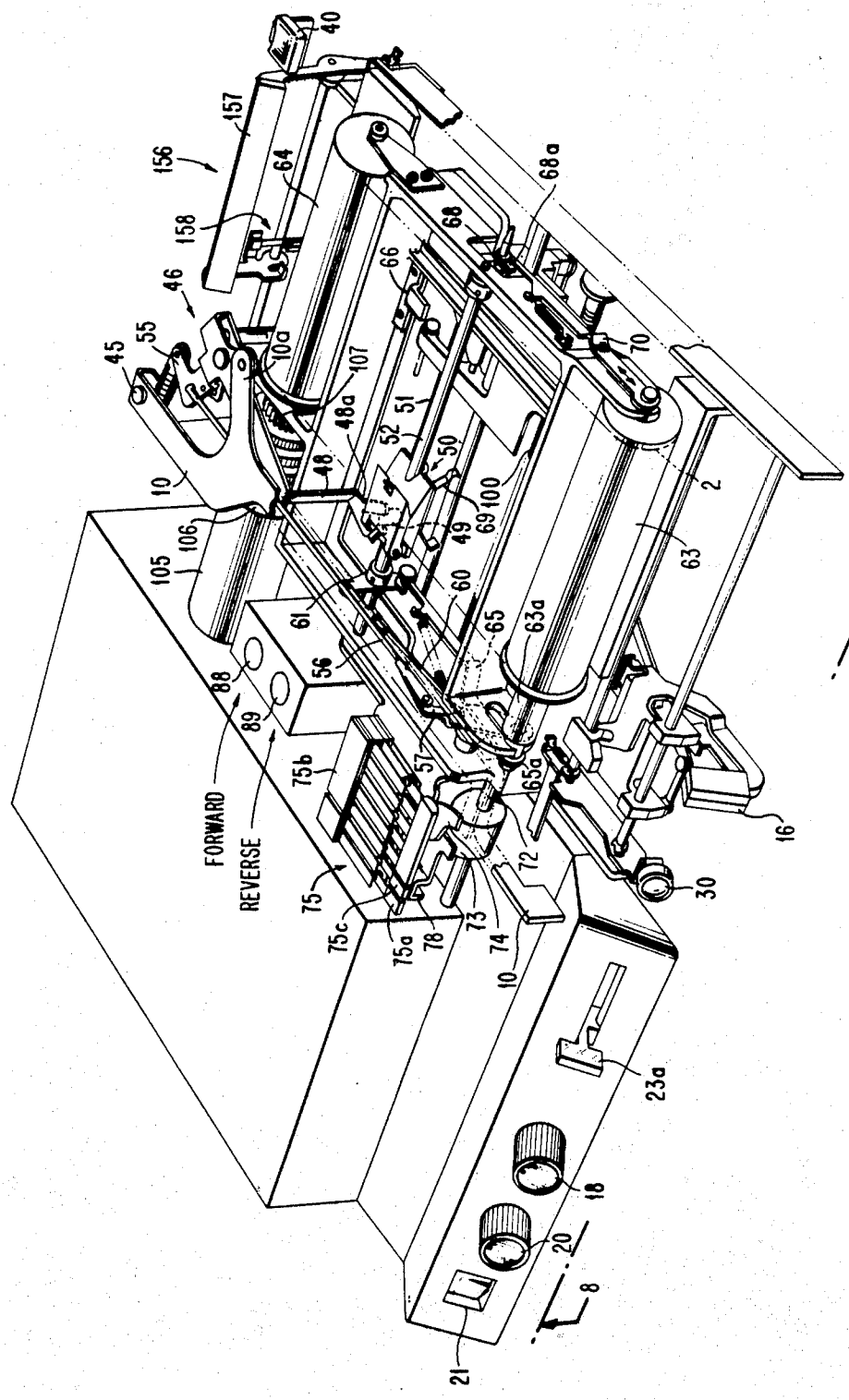

40
157
156
64
68a
158
68
66
46
45
55
10a
107
70
48a
51
52
50
48
100
2
10
106
69
49
105
63
60
61
65
63a
56
88
89
FORWARD
REVERSE
57
65a
75b
72
16
30
75
75c
75a
78
73
74
10
23a
18
20
21
8
8

FIG. 4

FIG. 5

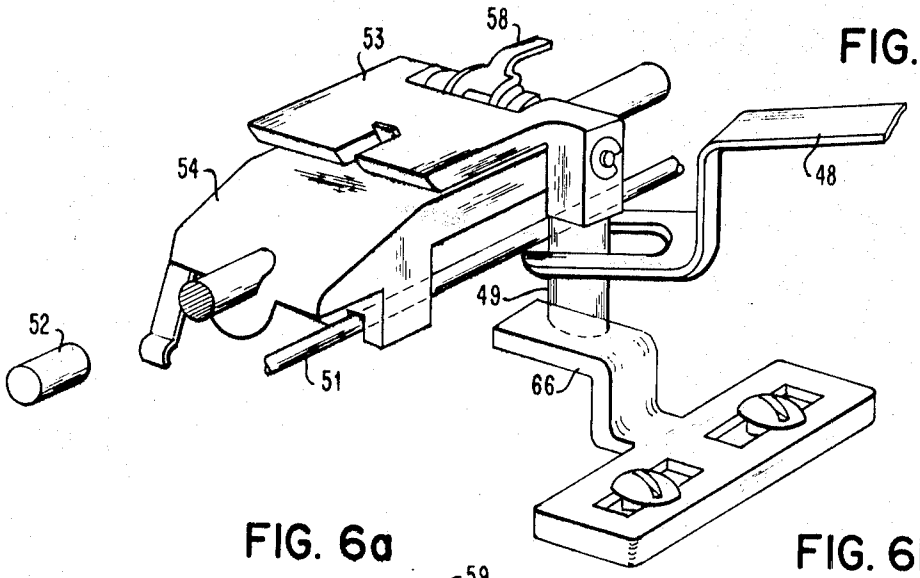


FIG. 6a

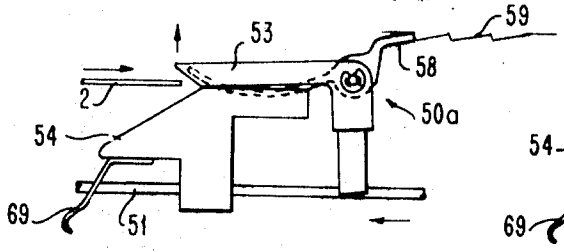


FIG. 6b

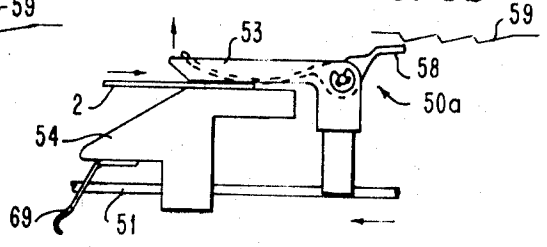


FIG. 6c

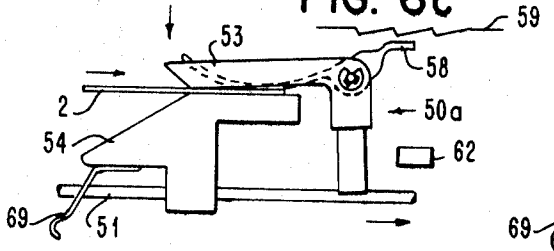


FIG. 6d

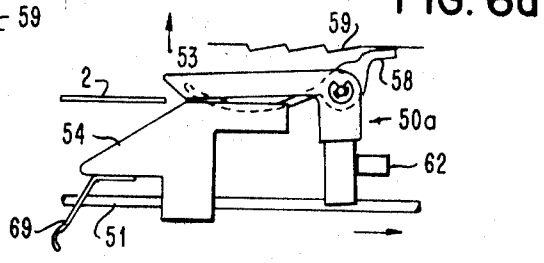


FIG. 7a

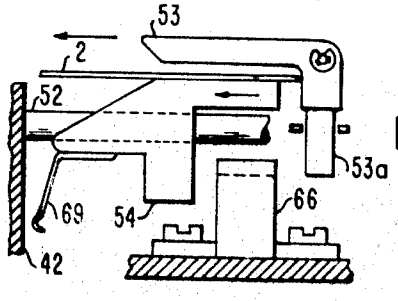


FIG. 7b

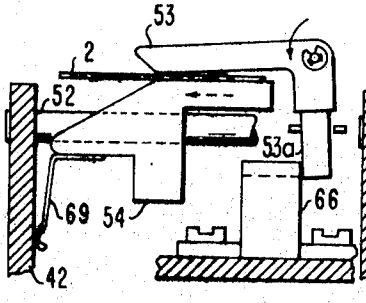
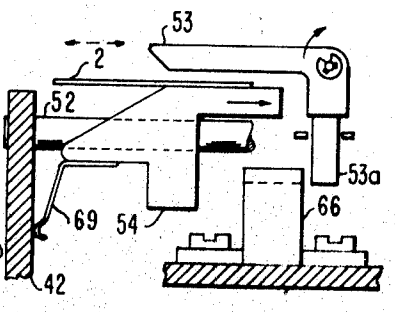


FIG. 7c



DICTATING UNIT
BOTTOM VIEW

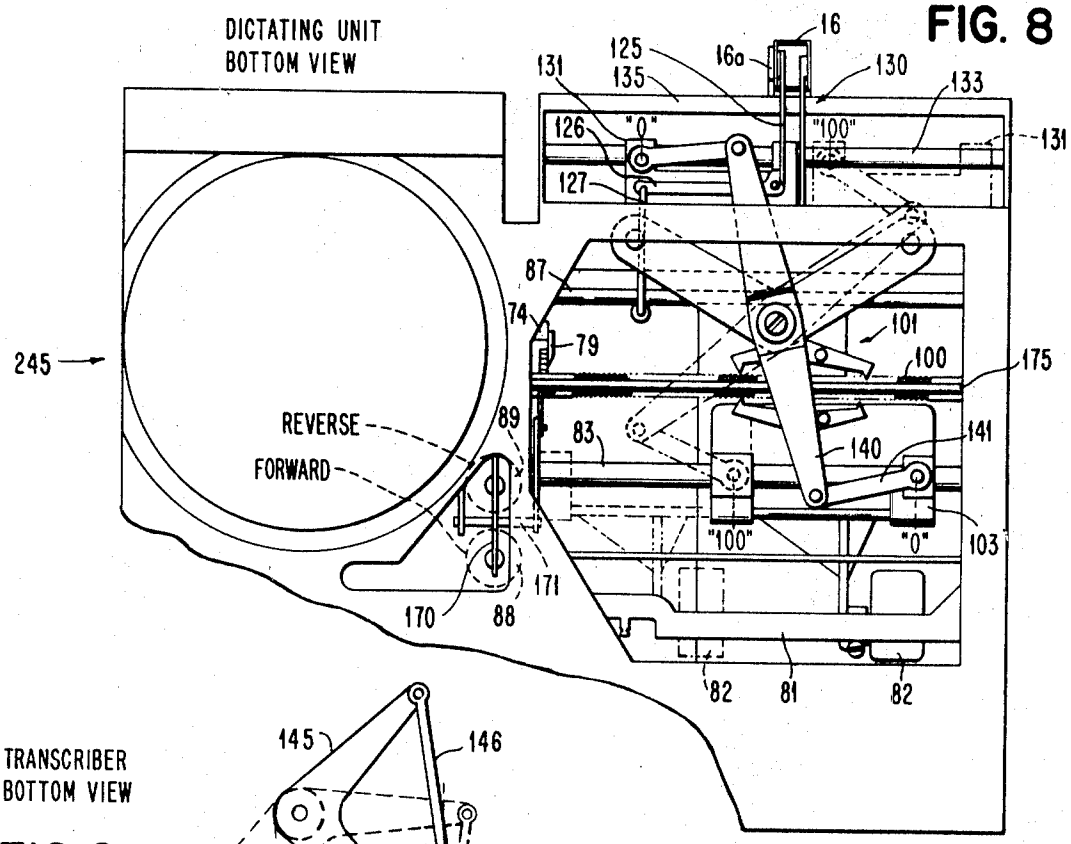


FIG. 8

TRANSCRIBER
BOTTOM VIEW

FIG. 8a

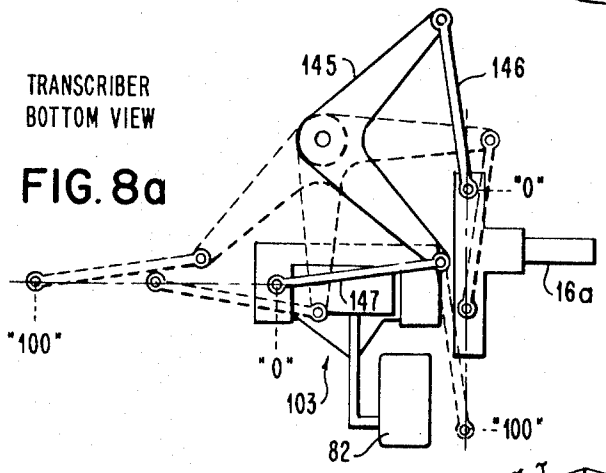


FIG. 9

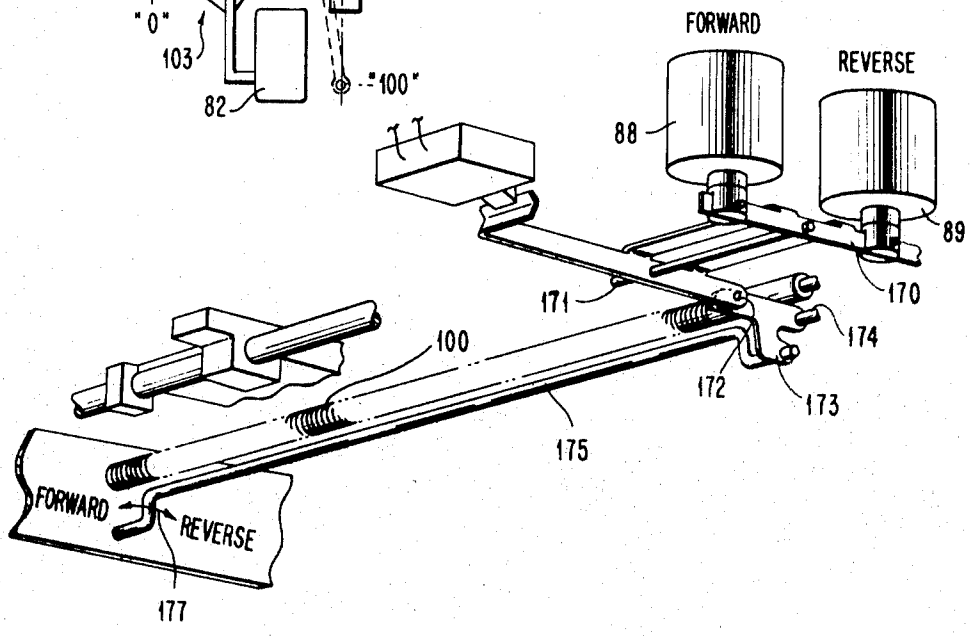


FIG. 10

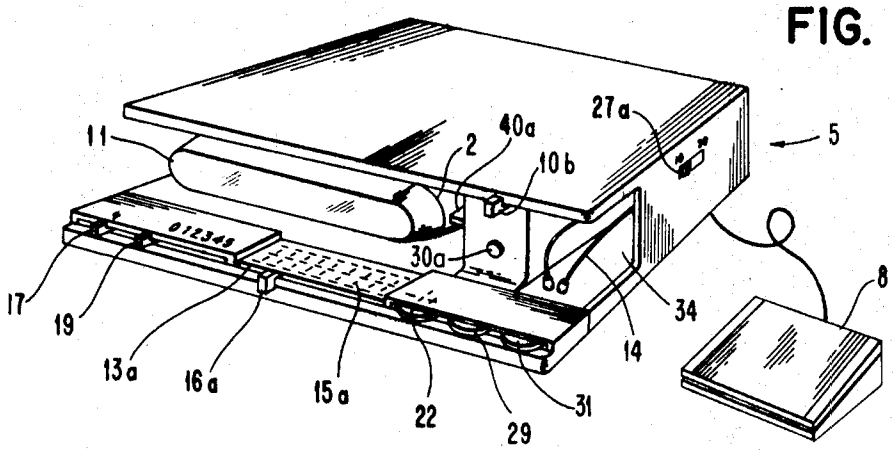


FIG. 11

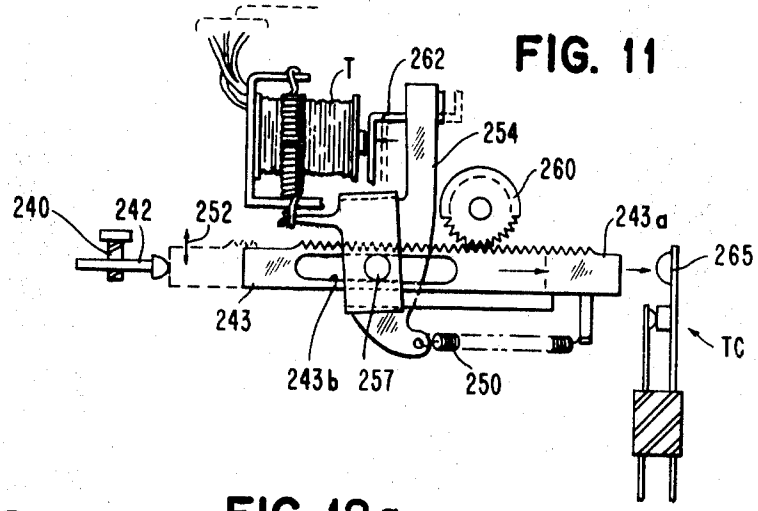


FIG. 12a

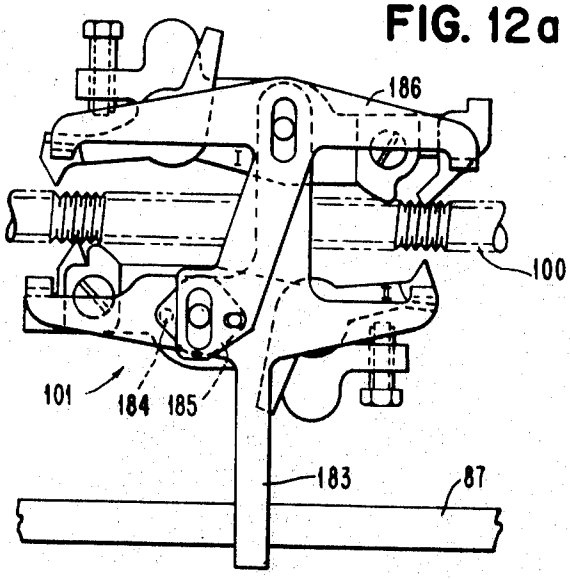
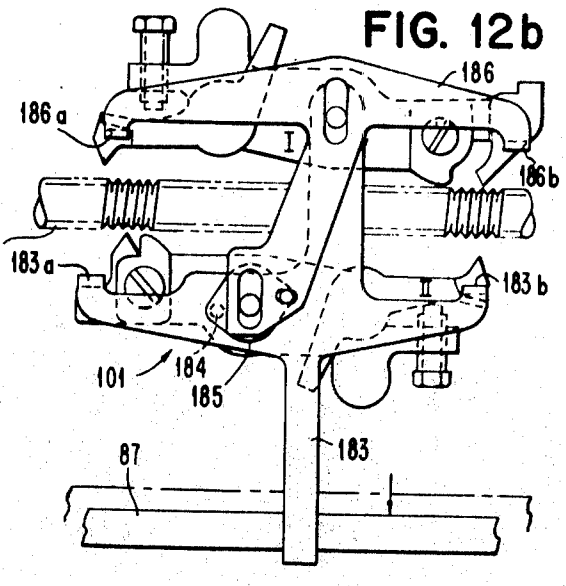
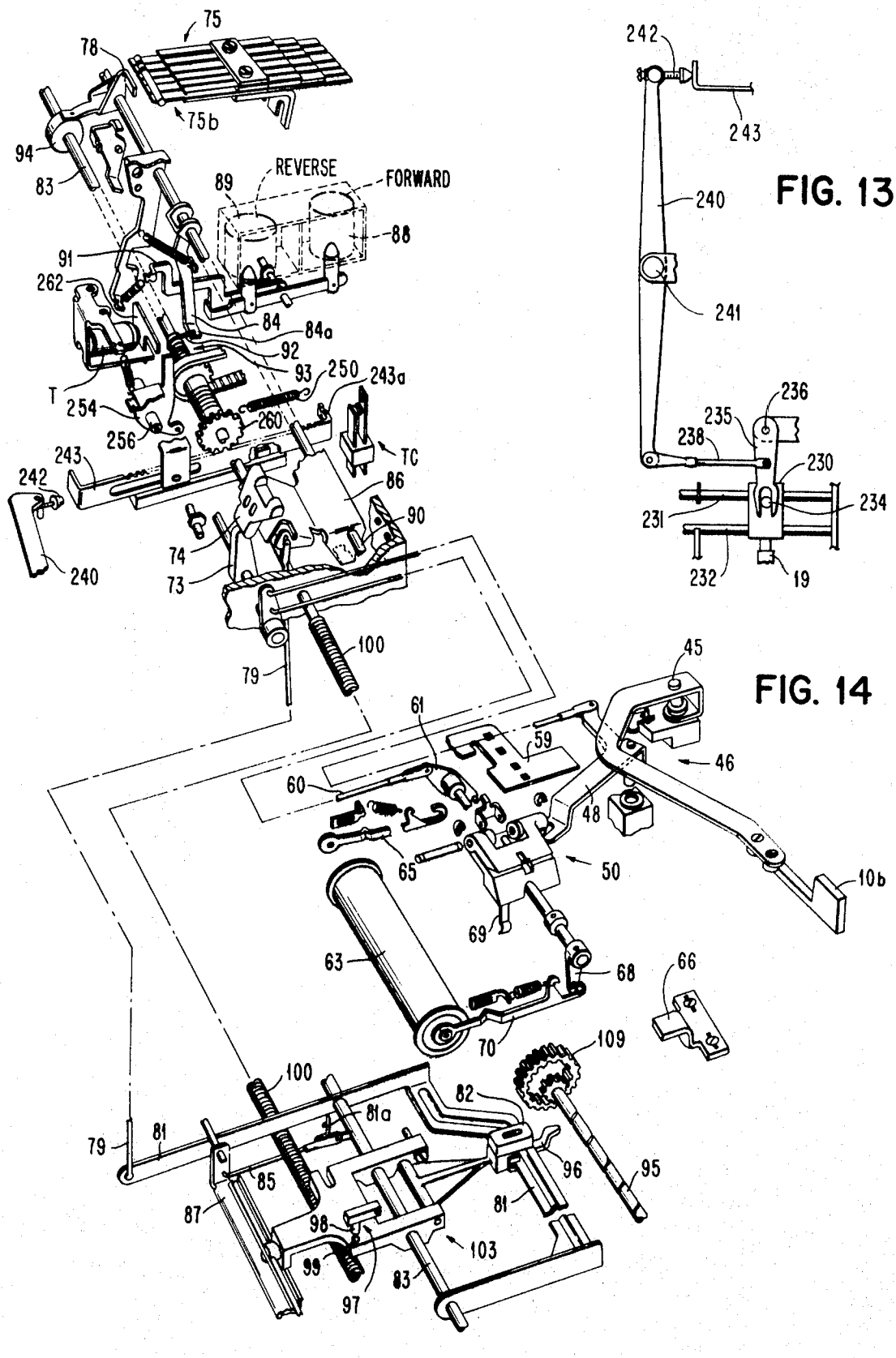


FIG. 12b




75
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REVERSE
FORWARD
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84a
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250
243a
T
254
260
256
TC
243
242
86
90
74
73
240
100
79
45
61
59
46
60
48
65
50
10b
69
63
68
66
70
109
100
82
81a
79
81
85
96
95
87
81
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103
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FIG. 13

FIG. 14

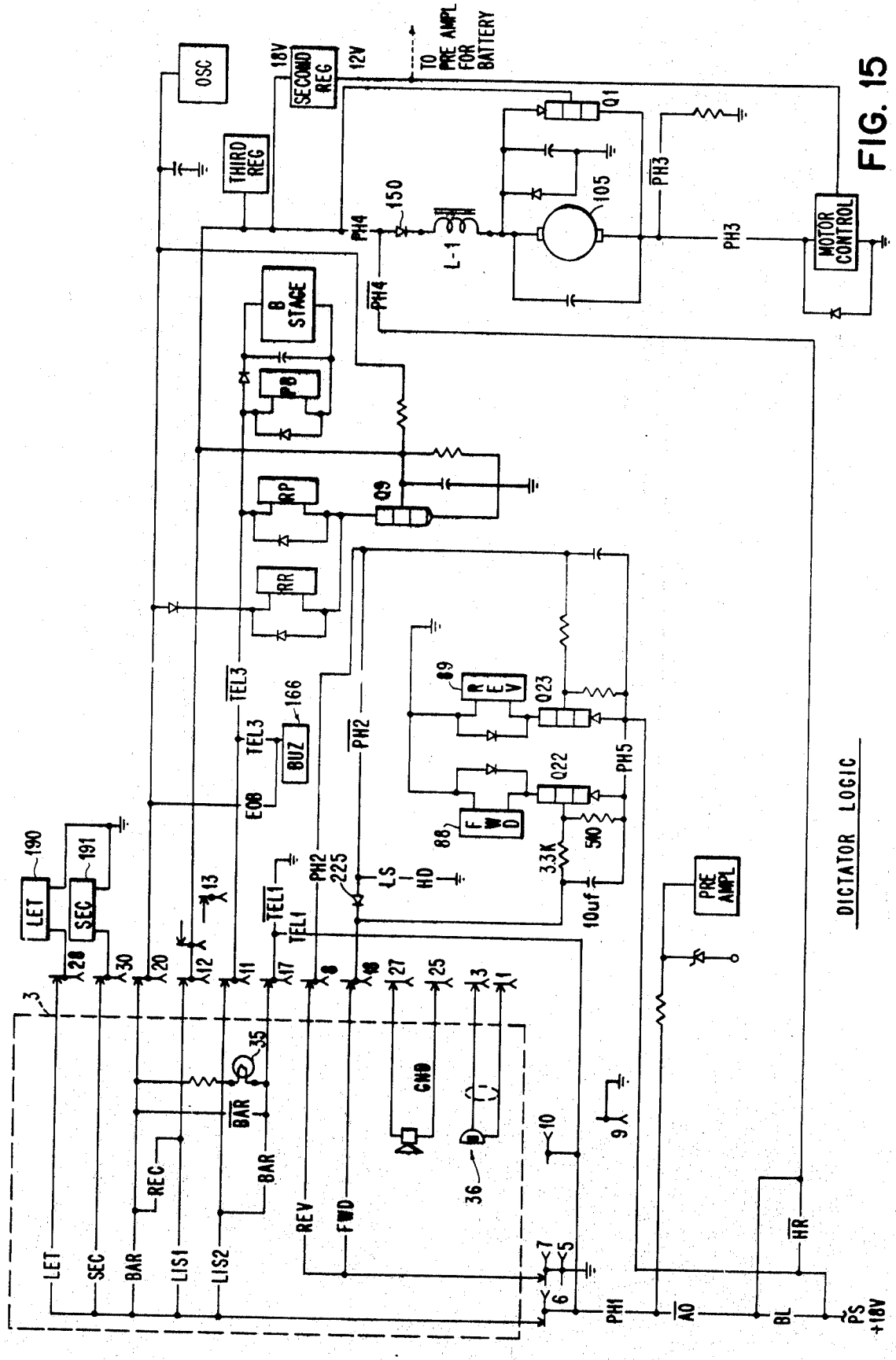
OSC
THIRD REG
SECOND REG
18V
12V
TO PRE AMPL FOR BATTERY
Q1
105
150
L-1
PH4
PH3
MOTOR CONTROL
B STAGE
PB
RP
RR
Q9
TEL3
166
BUZ
EOB
PH2
89
REV
Q23
Q22
PH5
88
FWD
3.3K
560
10uf
LS
HD
225
TEL1
190
LET
191
SEC
PRE AMPL
DICTATOR LOGIC
35
BAR
REC
LIS1
LIS2
REV
FWD
GND
36
10
9
7
5
6
AO
BL
HR
PS
+18V

FIG. 15

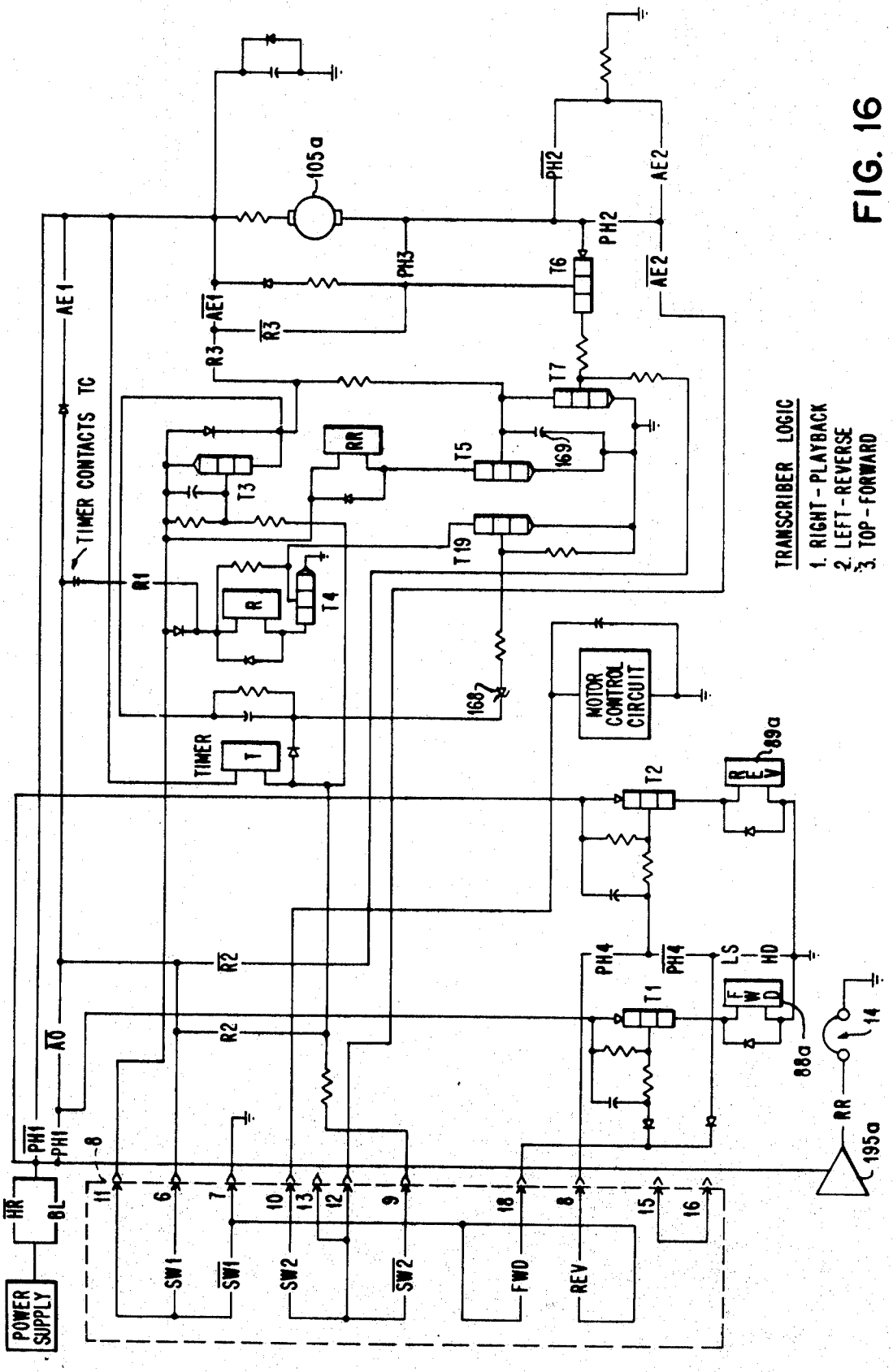
TRANSCRIBER LOGIC
1. RIGHT - PLAYBACK
2. LEFT - REVERSE
3. TOP - FORWARD
TIMER CONTACTS TC
MOTOR CONTROL CIRCUIT
TIMER
POWER SUPPLY
105a
195a
169
168
89a
88a
SW1
SW2
FWD
REV
RR
LS
HD
14

FIG. 16

DICTATING AND TRANSCRIBING APPARATUS FEATURING RECORD MEDIA EJECT CONTROL

CROSS-REFERENCE TO RELATED PATENTS AND APPLICATIONS

U.S. Pat. No. 3,203,000, W. L. Dollenmayer, inventor; entitled "Marking Device for Dictating Machine."

U.S. Pat. No. 3,222,460, N. J. Albanes, et al., inventors; entitled "Multiple Station Selection System".

U.S. application Ser. No. 699,259 filed Jan. 19, 1968, inventors: C. M. Fackler, et al.; entitled "Dictating and Transcribing Apparatus with Automatic and semiautomatic Operator Controlled Facilities".

U.S. Application Ser. No. 699,246 filed Jan. 19, 1968; inventors: J. Cater, et al., entitled "Dictating and Transcribing Apparatus with Rapid Transducer Alignment and Movement Facilities."

U.S. application Ser. No. 699,253 filed Jan. 19, 1968; inventors: C. L. Ridings, et al.; entitled "Transcribing Apparatus with Variable Automatic Recall Facilities."

U.S. Pat. No. 3,532,837 issued Oct. 6, 1970 inventors: J. Richard Dyar, et al.; entitled "Headset Featuring Collapsibility for Storage and Expandibility for Use."

OTHER REFERENCES

The following additional references are of interest:

IBM Technical Disclosure Bulletin, June 1963, p. 22 and 23, authored by B. F. Wehmer, entitled "Backspacer for Portable Dictator."

IBM Technical Disclosure Bulletin, May, 1967, p. 1776 and 1777, authored by W. F. wing, entitled "Retractable Cord Take-Up Reel with Auto-Reset Cord Stop."

Customer Engineering Instruction Manual, Dictation Equipment, IBM Models 211, 212, and 213, form No. 241-5071, dated Oct. 5, 1962.

Reference Manual, Dictation Equipment, IBM Models 211, 212, 213, and 214, form No. 241-5132, dated Oct. 22, 1962.

BRIEF BACKGROUND OF INVENTION, INCLUDING FIELD AND PRIOR ART

General

The field of the invention encompasses dictating and transcribing apparatus, particularly those having provision for recording and reproducing sound on a magnetic record media, such as a magnetic belt. Devices of this nature normally have means for operator control of the equipment. Thus, a dictating unit generally has an associated microphone with control buttons and a transcribing unit generally has a headset and a foot control. Prior art of interest is indicated below.

The Albanes, et al., patent noted in cross-references section describes a magnetic belt dictating machine that is also representative of a prior art device of this nature. Comparable apparatus is also described in the Customer Engineering Instruction Manual and Reference Manual listed in the "Other References" section above.

Machine Controls and Circuits

Considering the dictating unit, the operator controls permit the establishment of a Record an a Listen mode of operation, together with forward spacing and backspacing in order to review previously dictated material. The transcribing units generally operates in a Listen mode but also has provision for reviewing various portions of a previously dictated belt. Yerkovich U.S. Pat. No. 2,318,828 describes a belt dictation apparatus with provision for recording and reproducing information and also providing signals to indicate various conditions of the apparatus.

Belt Loading and Unloading, Phasing, Head Restoring, and Related Circuits and Mechanisms

The apparatus described herein features a significantly efficient belt loading and unloading action together with a phasing operation as set forth in the Fackler, et. al., application, that is activated during belt loading to establish an initial starting point on the magnetic belt in order to insure accurate transducer tracking from machine to machine. The Yerkovich

U.S. Pat. Nos. 2,318,828; 2,371,116; and 2,409,006 are representative of belt loading and unloading mechanisms in the prior art. The Albanes patent, noted in the "Cross-Reference" section above describes a dictating machine with manual loading and unloading of the belt.

Indexing

Most of the prior dictating and transcribing products have included some means for making index markings on a slip for latter reference by a transcriber. The IBM device described in the Albanes patent and the Customer Engineering and Reference Manuals noted previously has provision for perforating an index slip. The Dollenmayer U.S. Pat. No. 3,203,000 describes an ink marking device for dictating machines that is similar in some respects to the marking mechanism used in the apparatus herein.

Retractable Microphone for Dictating Unit and Retractable Headset for Transcribing Unit

Mundy U.S. Pat. No. 1,171,745 is typical of a prior art cord winder mechanism with two levels and a spring tension mechanism. The IBM publication authored by W. F. Wing, and previously noted, describes a retractable cord mechanism that is comparable in some respects to that used in the present apparatus.

Summary

The invention concerns dictating and transcribing apparatus with increased efficiency of operation and improved compatibility. The equipment makes use of magnetic belt recording media and has provision for semiautomatic belt loading and unloading and initial phasing to insure proper transducer tracking. The same basic belt-handling mechanism is used in the dictating unit and the transcribing unit, differing primarily in the direction of orientation with respect to the operator. In the dictating unit, the mechanism is arranged for belt insertion and injection from the right side of the unit, while in the transcribing unit the mechanism is arranged for a front belt load and unload operation. This arrangement insures both operating and manufacturing efficiencies. Ordinarily, the dictating unit requires a greater number of operator controls than the transcribing unit and the side loading and unloading of the belt permits the arrangement of the primary controls, besides those on the microphone, within easy access range of the dictator.

Both units have circuitry and mechanisms for effecting forward and reverse movement of the transducer in relation to the belt media including a measured review (incremental stepping) as well as a continuous spiral driving relationship in both the forward and reverse directions. The incremental stepping action is repeatable, at the option of the operator.

OBJECTS

Accordingly, an object of the invention is to provide dictating and transcribing apparatus having inherent efficiency and compatibility, particularly with respect to orientation and arrangement of the various mechanisms.

Another object of the invention is to provide dictating and transcribing apparatus with greater flexibility of operation while maintaining effective operator control.

Still another object of the present invention is to provide for semiautomatic belt loading and unloading with initiation of either operation performed by the operator of the equipment.

Still another object of the present invention is to provide for sound head restoration in connection with belt unloading to insure a proper initial position of the sound head in relation to the media during a subsequent loading operation.

Also, a further object of the invention is to provide certain common mechanisms differently oriented for retracting a microphone in the case of the dictating unit and a headset in the case of the transcribing unit.

Also, an object of the invention is to provide simplified mechanisms for dictating and transcribing apparatus wherein movement of a sound head is effected in a direction either op-

posite to movement of the index indicator on the front of the equipment or at an angle, such as 90°, with respect to movement of the index indicator.

A further object of the invention is to effect proper loading of a media and insure that "false" loading does not occur.

The foregoing and other objects, features, and advantages of the invention will be apparent from the following more particular description of the preferred embodiments of the invention as illustrated in the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a perspective view of a dictating unit with associated microphone incorporating a variety of features according to the present invention. FIG. **1***a* illustrates a number of operator controls on the microphone.

FIG. **2** is a rear perspective view of the dictating unit of FIG. **1**.

FIG. **3** illustrates a magnetic recording belt media for use in the dictating unit of FIG. **1**. The belt media may also be used in a transcribing unit.

FIG. **4** is a right front perspective view of the dictating unit of FIG. **1** with the covers removed.

FIG. **5** represents a finger and interposer mechanism in the dictating unit of FIG. **1** for guiding and gripping an inserted belt during belt loading operations.

FIGS. **6***a* –**6***d* illustrate an operational sequence of the mechanism of FIG. **5**.

FIGS. **7***a* –**7***c* represent operation of the belt gripper mechanism during unloading.

FIG. **8** is a bottom elevation of the dictating unit of FIG. **1** taken on the line **8**—**8**, FIG. **4**. FIG. **8***a* is a comparable bottom elevation of the transcribing unit except on a reduced scale.

FIG. **9** shows solenoids, pawls and other mechanisms associated with forward and backspacing incrementing.

FIG. **10** illustrates a transcribing unit with provision for loading and unloading a belt record media from the front and having an associated head set and foot control.

FIG. **11** shows an automatic recall rack and associated components for the transcribing unit of FIG. **10**.

FIGS. **12***a* and **12***b* represent engaged and disengaged conditions of the forward and reverse pawls shown in FIG. **8** in connection with a manual scanning operation.

FIG. **13** represents an automatic recall control button and associated linkage for adjusting the recall rack in FIGS. **11** and **14**.

FIG. **14** is a semiexploded view of various components in the transcribing unit of FIG. **10** particularly showing portions of the belt loading-unloading mechanism, head restoring mechanism, head driving mechanism, forward and reverse mechanism, and an auto recall mechanism corresponding to that shown in FIG. **11**. A large portion of the mechanism is similar to that used in the dictating unit of FIG. **1**

FIG. **15** is a simplified logic diagram of circuit actions in the dictating unit of FIG. **1**.

FIG. **16** is a logic diagram for the circuit actions in the transcribing unit of FIG. **10**.

TERMINOLOGY AND ABBREVIATIONS

The following terminology and abbreviations are used in several places in the diagrams of the present case:

AE	Automatic Erase
Auto Off (AO)	Automatic power shut off
B Stage	Power Amplifier Stage
BAR	Dictate (Record) bar on microphone
BL	Belt is loaded
BUZ	Buzzer
CON	Conference
DIC	Dictate
EOB	End of Belt
FWD, F	Forward
HOLE	Initial phasing aperture in belt
HD	Hole Detect
HH	Head is in home position ("0" Index)
HR	Head Restore
LS	Lead Screw contact
LET, END LTR, or LTR	Letter indication (index slip)
LIS 1, LIS 2	Listen (Playback) contacts No. 1, No. 2
MOT CONT	Motor Control
OSC	Oscillator
PB	Playback relay
PH1, PH2, etc.	Phase contacts No. 1, No. 2, etc. transferred; Also Φ1, etc.
$\overline{PH1}$, etc.	Phase contacts No. 1, etc., not transferred; Also $\overline{\Phi 1}$, etc.
PS	Power Supply
R	Relay in transcriber unit
RP	Relay in dictator unit
RR	Relay in dictator unit (also transcriber unit)
RRP	Dictator Foot Control Relay
REC	Record mode
REG	Regulator
REV, R	Reverse (Backstep) or Review
SEC	Secretary indication (index slip)
Second	Circuit associated with transistor
Regulator	Q7
SPKR	Speaker
STP CONT	Stepping Control
SW1 and SW2	Switches in foot pedal
T	Transcriber Relay
TACH	Tachometer
TEL	Telephone
$\overline{TEL}$	Conference or Dictate
TRA	Telephone Recording Attachment
X and Y	Wiring connections (P. 2 of 2)
Φ	Phase

DICTATING UNIT

General Description, Features, Operating Instructions, and Indexing

The dictating unit **1** according to the present invention is shown in FIGS. **1** and **2**, which are external views of the unit, and FIGS. **4**–**9** and **12***a* and **12***b*, that illustrate various internal mechanisms in the unit. The unit makes use of a magnetic belt record media **2** shown in FIG. **3**.

Dictating unit **1**, has an associated microphone **3** attached thereto by a cord **4**. The cord is retractable by mechanisms to be described. Microphone **3**, when not in use, is positioned in a microphone well **6**, FIGS. **1** and **2**.

Dictating Unit Operating Instructions

For convenience, typical operating instructions for dictating unit **1** are presented below:

Loading the Belt

1. Belt **2** is placed on the machine by sliding it over mandrel **7**. The arrows **9** on the belt should point toward the machine. The belt is inserted as far as it will go without forcing it.

2. Belt release lever **10** is moved to the left to complete belt loading.

Removing Belt

Belt release lever **10** is moved to the right to partially extend the belt from the machine for easy removal.

Index Slip Loading and Removal

For loading purposes, a complete pad **12** (25 slips) is inserted in holder **13** by sliding the slips to the left. An individual slip **15** is removed by grasping the right end and sliding it out.

Unit Operating Controls

1. Scanning Lever **16**

This lever is used to manually locate sound head to any position on the recording belt.

2. Volume Control **18**

Controls range of sound volume during playback.

3. Input Selector Switch **20**

This switch is placed in the center position for Dictation. It also has a Telephone position (right) and Conference position (left).

4. Voice Modulation Indicator **21**

The indicator shows voice or record level. It also serves as a battery indicator for those units equipped with battery.

5. Tuning Lever **23**

This lever is normally used for transcribing to adjust the sound head position for proper tracking of sound track.

6. Speed Control **24**

This control is used by the transcriber to adjust belt reproducing speed slower (—) or faster (+). It is an optional feature.

7. Input Sensitivity Control **25**

Rotating this control clockwise (toward large dot) increases the recording level. Rotating the control counterclockwise (toward small dot) decreases recording level. This is adjusted to give satisfactory record volume with volume control set at the midposition (dot on volume knob at 12 o'clock.)

8. Speaker Selector Switch **26**

This switch selects microphone playback (lower position) or speaker playback (upper position).

9. Recording Time Selector **27**

This switch gives the dictator the choice of 10 (upper) or 20 (lower) minutes of recording time. Normally this switch will be in the 10-minute position.

Microphone

Removing

The microphone **3** is removed by lifting it from the machine and extending the cord **4** by pulling the cord from the machine.

Replacing

The microphone is replaced by depressing the retract button **30** and guiding the microphone into its rest position in microphone well **6**.

Operating controls

1. Dictating

Preparation for dictating is begun by placing the record-listen selector button **32** in the Record (upper) position, |←, FIG. **1***a*. Dictate bar **33** is depressed and the dictator begins speaking into the pickup element **36**. When speaking continuously for long periods, dictate bar **33** can be locked into position by depressing and sliding it to the left, FIGS. **1** and **1***a*. It is unlocked by sliding to the right or moving selector button **32** to the Playback (middle) position. A red lamp **35** on the microphone glows when recording to indicate that the machine is in the record mode.

2. Reviewing

Dictation is reviewed by moving selector button **32** to the Review position, ←, and releasing. The selector is spring loaded to return to a position midway between Record and Review, which is the Playback position. When the speaker selector switch **26** is in the Microphone position (lower), playback is from a speaker **37** located in microphone **3**. Otherwise, it is from a speaker **28** in the dictating unit. Each time selector button **32** is moved to the Review position, ←, the sound head in unit **1**, moves back into the recorded material on belt **2** approximately 10 words or 6 seconds. As an option, holding selector button **32** in the Review position causes the sound head to move continuously back in 6-second increments. If the recording time selector **27** is in the 20-minute position, each increment is 12 seconds.

3. Forward Spacing

The sound head is advanced by moving the Forward spacing selector button **38** away from the dictate bar. The sound head then moves forward approximately 10 words or 6 seconds. As an option, holding the forward selector up causes the sound head to move forward continuously in 6-second increments. When the Forward selector is operated, the record selector button **32** reverts to the playback mode. If the recording time selector **27** is in the 20-minute position, each increment will be 12 seconds.

4. Index Marking

Moving the secretarial selector button **39** away from the dictate bar to the ⌊ position places a red dot, indicating End of Letter, on the top half of index slip **15**. Moving the selector toward the dictate bar to the ⌊⌊ position places a red dot on the lower half of index slip **15** indicating to the transcriptionist that special instructions are recorded on the belt at that location.

Erasing the Belt

The erase bar **40** is not normally used by the dictator. However, occasionally it may be desirable to completely erase the entire belt. To do this, the erase bar is manually depressed. Since it locks into position, it is not necessary to hold it down. The microphone Record-Listen selector button **32** is placed in the Listen Position.

Warning Tone

A warning tone may be generated at various times, any one of which requires some action on the part of the user. These are:

1. Attempting to dictate with the input selector switch **20** in the Telephone mode results in a warning signal. Moving selector switch **20** to the individual Dictate position, ◡, restores the machine to normal.

2. A short warning tone is generated 1 minute from the end of the belt. At this time, if dictation is to be continued, the user identifies himself, indicates he is continuing on another belt and places another unused or erased belt on the machine.

3. An end of belt warning signal is generated 15 seconds before the end of the belt. If the dictator continues to record through this signal, the machine automatically shuts off. If this occurs, the belt must be changed or the scanning lever **16** manually moved to the left.

Belt Loading and Initial Phasing

A significant feature of the dictating and transcribing apparatus is the belt loading and initial phasing operation. The apparatus includes mechanisms and circuitry that are operable upon insertion of a magnetic belt on mandrel **7**, FIG. **1**, to rotate the belt to a predetermined initial position. This insures that the sound head transducer will track a helical path on the belt beginning at an identical position each time the belt is inserted. Belt **2**, FIG. **3**, has an elongated aperture **2***a* that is sensed in the machine during the loading and phasing operation to establish the initial starting position on the belt.

Reference is made to FIGS. **1–8** for the dictating mechanisms and to FIG. **15** for various circuit logic involved for the dictating unit. The transcribing unit belt unloading and phasing mechanisms are shown partially in FIG. **14** and the circuit logic in FIG. **16**. FIG. **8***a* illustrates the transcribing unit indexing (scanning) mechanism in particular.

A more detailed description is found in the Fackler, et al. application, but in essence, the same basic belt loading and unloading mechanisms are used both in the dictating unit and the transcribing unit, with a 90° difference in position or orientation.

In the case of the dictating unit, FIG. **4**, belt lever **10** extends toward the front of the unit in parallel with belt **2** when in loaded position and at right angles to rollers **63** and **64**. In the transcriber unit, FIG. **14**, the same basic mechanisms are used and the belt lever **10***b* extends toward the front of the unit, but at right angles to the belt, when mounted and parallel with the rollers, such as roller **63**.

The functions of the belt loading and unloading mechanisms are:

1. Draw the belt into the machine from a partially inserted position.
2. Accurately position the belt in its running position.
3. Prevent partial loading of belt.
4. Partially eject the belt for easy removal.
5. Retract the idler tension roller and drop the sound head for ease of inserting and removing belt.

In order to load a belt **2** in the dictating unit, belt lever **10** is moved to the right. Lever **10** is pivotally mounted on pivot stud **45**. Movement of lever **10** to the right operates various associated linkages and mechanisms to prepare the unit for receiving a belt. Lever **10** has an extension **10***a* that is pivotally attached to a bell crank assembly **46**, FIG. **4**. Attachment of extension **10***a* to assembly **46** rotates assembly **46** counterclockwise when lever **10** is moved to the right. Assembly **46** includes a link **48** that is attached by extension **48***a*, FIG. **4**, to a pin **49** associated with a belt gripper assembly **50**. A simplified gripper assembly **50***a* is shown in FIGS. **5**, **6***a–6d* and **7***a–7c* to illustrate the principles of operation of this assembly. Assembly **50** is mounted for sliding movement on guide rods **51** and **52**. Due to the interconnection of lever **10** with assembly **46** and particularly link **48**, movement of lever **10** to

the right also moves gripper assembly **50** to the right in readiness to receive a belt inserted in the unit.

Attached to another member **55** of assembly **46** is a link **56**. The front end of link **56** is attached to a rotatable crank **57** that is movable front to back and vice versa. Crank **57** has a link **60** interconnecting it with another crank **61** that is fixedly mounted on rod **52**. The function of crank **61** is to move front idle roller **63** to the rear toward rear drive roller **64** to enable the insertion of a belt on the rollers. This is done by provision of various linkages including link **65** that is attached at **65***a* to a smaller diameter axial portion **63***a* of roller **63**. Attached to the rightmost end of rod **52** is a crank **68** having an extension **68***a* attached to a slider **70**, also connected to the axial center of roller **63**.

The action in contracting rollers **63** and **64** in relation to one another to receive a belt can be observed by reference to FIG. **4**. As lever **10** is moved to the right, link **56** is operated toward the front of the machine. This rotates crank **57** toward the front of the machine and due to the interconnection of link **60**, crank **61** is rotated in a clockwise direction. Rotation of crank **61** pulls link **65** toward the rear of the machine and also rotates crank **68** so that its connection to slide **70** pulls slide **70** toward the rear of the machine. This action, therefore, moves roller **63** to the rear closer to roller **64**.

Mounted on the same shaft **72** as crank **57**, is a contact-operating cam **73** mounted under an operating member **74** to transfer various contacts in a contact assembly **75**. A set of belt load contacts **75***a* is opened with movement of lever **10** to the right. A set of Phase contacts **75***b* is transferred to a not phased ($\overline{\text{Phase}}$) condition.

Attached to operating member **74** is link **79** shown in FIG. **8** that is connected to a head bail **81** for moving magnetic head **82** into and out of engagement with belt **2**. At this time, head **82** is moved out of engagement. Bail **81** is pivotally and concentrically mounted about a shaft **83**. Attached to extension **81***a* of bail **81** is a link **85**. The other end of link **85** is connected to an operating portion of a pawl retract bail **87**, FIGS. **12***a* and **12**. Certain of these mechanisms can be seen to advantage in FIGS. **8** and **14**.

Extending as a part of the operating member **74** is a bell-crank **86** that is pivotally mounted at **90** and a link **84** having an extension **84***a* movable to the left in FIG. **14** for engagement with a pin **92** on a clutch member **93**.

The various mechanisms just described move head **82** out of the way for insertion of a new belt and into engagement with a head restore lead screw **95** by way of a drive-engaging member **96**, FIG. **14**. Concurrently with this action, link **85** moves pawl retract bail **87** from the engaged condition shown in FIG. **12***a* to the disengaged condition shown in FIG. **12***b*. This action disengages various pawls from a driving lead screw **100** which frees head **82** for driving movement to home position which is the right margin of the belt. The pawl mechanisms shown in FIGS. **12***a* and **12***b*, also serve for incremental Forward spacing and Reverse spacing. Reference is also made to FIG. **14** that represents an exploded view of various belt-loading mechanisms in the transcriber unit of FIG. **10** that are quite similar to the mechanisms just discussed in FIGS. **4** and **8**. Corresponding elements are similarly designated. Certain of the shapes of the elements may differ from the dictator to the transcriber unit, but the functions performed are similar. Reference is also made to FIG. **9** which shows the Forward and Reverse solenoids from the rear and underneath the dictating unit. To insure proper orientation among the various views of the stepping solenoids, the terms "Forward" and "Reverse" have been included in the drawings wherever appropriate.

Head-Restoring Action

With disengagement of head **82** from belt **2** and the pawls in assembly **101**, FIGS. **12***a* and **12***b*, conditions are established for driving head **82** to the home position. This involves movement of the index assembly **16** to the left in relation to an inserted belt and movement of head **82** to the right in relation to the belt. See FIG. **8**. Since the belt loading and unloading mechanisms are positioned at a 90° angle in the transcriber from the position shown in the dictating unit, the direction of head restoring is to the front of the transcribing unit as viewed in FIGS. **10** and **14**.

When a belt is unloaded from the machine by movement of lever **10** to the right as previously discussed, the belt load contacts **75***a* are transferred to their normally open condition. However, an additional set of contacts as described in the Fackler, et al. case, remains closed and serves to provide a parallel circuit to operate the drive motor for restoring the head to home position. The Auto Phase contacts **75***b*, FIGS. **4** and **14**, are also transferred to their nonphased condition.

Ordinarily, when a belt is in the dictating unit (or the transcribing unit, for that matter), the belt load contacts **75***a* in the units are closed. The various driven devices in the unit derive their source of power from a motor **105**, particularly shown in FIGS. **4** and **5**. The motor output is reduced by a speed reducer assembly **106**, FIG. **4**, which drives an output gear **107**. When a belt is in position, motor **105** is rotating to drive gears **107** and **109** constantly. Upon movement of belt lever **10** to the right during an unloading operation, the belt load contacts are opened so that the circuit to motor **105** now is primarily controlled by the head restore contacts, described in the Fackler, et al. case.

Restore lead screw **95** is driven at a relatively high rate of speed by rotation of gear **109**, FIG. **14**, and due to the engagement of follower **96** with it, drives head **82** toward the head restore contact assembly. Motor drive ceases with head **82** positioned all the way to the right as shown in FIG. **8**, which is the home or restored position of head **82**.

With the foregoing action, the equipment is now in readiness to receive an inserted belt.

Belt Loading and Initial Phasing

Belt-Loading Action

In order to load belt **2**, FIG. **3**, in dictating unit **1**, the operator grasps belt **2** with arrows **9** pointing in toward the unit and slips the belt over mandrel **7**. The belt is inserted as far as it will go without forcing it. As is usual, the placement of belt **2** on mandrel **7** may be at any location with respect to timing aperture **2***a*, FIG. **3**. The positioning of aperture **2***a* is immaterial at this time, since means is provided for rotating belt **2** under control of aperture **2***a* to a predetermined initial position with respect to magnetic head **82**. This applies to any belt that may be inserted in dictating unit **1**. It also applies to any belt that is inserted in the transcribing unit, FIGS. **10** and **14**.

Following insertion of belt **2** on mandrel **7**, the operator moves belt lever **10** to the left, FIGS. **1** and **4**.

Prior to and during such movement of belt lever **10** to the left, gripper assembly **50** (**50***a*) is operated according to the sequence shown particularly in FIGS. **6***a*–**6***d*. FIG. **6***a* shows the gripper assembly just prior to insertion of belt **2** between the upper and lower fingers **53** and **54**. Movement of belt **2** between fingers **53** and **54** operates a sensing lever **58**, FIG. **6***b*. Normally, when no belt **2** is inserted in gripper assembly **50** (**50***a*), sensing lever **58** contacts a rack **59** which retains gripper assembly **50** (**50***a*) in the ready condition and prevents movement of the entire belt gripping and loading assembly, including belt lever **10**, to the left.

However, insertion of belt **2** operates sensing lever **58** to clear rack **59** as at FIGS. **6***b*, **6***c*, and **6***d*. Link **48**, FIG. **5**, acts to rotate upper finger **53** to grip belt **2** when lever **10** is moved to the left. It should be observed that the gripper assembly in FIGS. **5** and **6***a*–**6***d* is shown from the rear of the machine and that movement of belt **2** in these figures is just the opposite to such movement in FIG. **4**.

In the event the newly inserted belt is in a damaged condition or not properly inserted, the belt may not follow the grippers into the machine. If this happens, the belt will likely slip from under sensing lever **58** which will then rotate counterclockwise and become engaged with another notch in rack **59** to prevent further movement of the loading mechanisms and a consequent false loading operation. Gripping of belt **2** continues until belt lever **10** and gripper assembly **50** have almost

reached the furthest position in unit 1 during the belt-loading operation. Toward the very end of such movement, finger 53 encounters a stop 62 which rotates finger 53 to release belt 2. The timing is such that the release of belt 2 occurs just as the leftmost edge of belt 2 (rightmost edge in FIGS. 6*a*–6*d*) comes in contact with the flanges on rollers 63 and 64.

The movement of belt lever 10 to the extreme left or belt-loaded condition, FIG. 4, reverses the movement of all of the various mechanisms associated therewith including the gripper operating assembly 46, links 56 and 60, cranks 57, 61, and 68, and cam member 73. Rotation of cranks 61 and 68 moves roller 63 further away from roller 64 and applies tension to belt 2 in the unit.

Phasing

Movement of cam 73 also closes belt load contacts 75*a* to supply power to energize motor 105 which thereafter operates clutch assembly 93, shown in FIG. 14. The activation of clutch assembly 93 drives shaft 83 which also supports lead screw 100, FIG. 14. Associated with clutch assembly 93 is a lead screw phase cam 94 which operates against a lead screw zero phase operating member 78, FIG. 14. Engagement of clutch assembly 93 and driving of lead screw 100 from motor 105 rotates cam 94 which is fixed on shaft 83 in a predetermined condition to indicate a zero phase condition of lead screw 100. As soon as lead screw 100 reaches a zero phase condition, cam 94 operates member 78 to transfer zero phase contacts 75*c* in contact assembly 75. The structure is so arranged that pin 92 simultaneously encounters extension 84*a* of link 84, FIG. 14.

The engagement of pin 92 with extension 84*a* disengages clutch assembly 93 and the rotation of lead screw 100 stops when in the zero phase condition. As stated, the lead screw contacts 75*c* are closed to indicate such condition.

Following zero phasing of the lead screw, motor 105 continues to run and rotates belt 2 through the connection of gear 107 with drive roller 64, FIG. 4. Belt 2 has been rotating all during the time of rotation of lead screw 100 prior to lead screw 100 reaching the zero phase condition.

Positioned in unit 1 in line with aperture 2*a* of any inserted belt 2 is a set of aperture-sensing contacts 97, FIG. 14. Contact assembly 97 comprises an upper contact element 98 arranged to drop through aperture 2*a* and a lower electrical contact 99 mounted on a portion of sound head carriage member 103, FIG. 14. Contact assembly 97 is also referred to as the "-Hole Detect" (HD) assembly, FIG. 15. As soon as aperture 2*a* is detected during rotation of belt 2, contact assembly 97 closes and completes a circuit to ground through the previously closed lead screw contacts 75*c*. As described in the Fackler, et al., application, the completion of the foregoing circuit energizes Reverse magnet 89, FIGS. 14 and 15. The energization of magnet 89 moves latch 91 and releases link 84 which permits bellcrank 86 and contact-operating member 74 to rotate counterclockwise, thereby transferring contact assembly 75 to the "phased" condition.

The dropping of bellcrank 86 also moves bail 81 counterclockwise through line 79 to move head 82 into engagement with belt 2 and to reengage the lead screw driving pawls due to movement of retract bail 87, FIG. 12*a*.

By the foregoing action, belt 2 has been moved into operating position on rollers 63 and 64, lead screw 100 has been phased to a zero condition, and belt 2 has been rotated to an initial phased condition with respect to sound head 82. This action occurs in dictating unit 1 or transcribing unit 5 each and every time that a belt 2 is inserted in one of the respective units. In this fashion, each belt, when initially inserted in position for operation, is accurately phased with respect to the sound head 82 and tracking during recording and playback, or during subsequent transcription of a belt proceeds in a precise manner. The parameters of the system are such that the tracking is accurately maintained within desired limits throughout the remainder of the recording area on an inserted belt. Essentially, this eliminates the necessity for resynchronizing or phasing the belt with respect to the transducer on each and every cycle of rotation of the belt, as in some prior art devices.

Belt Unloading

Upon termination of dictation, or end of belt, belt 2 is ejected from dictating unit 1 by operation of belt lever 10 to the right, FIGS. 1 and 4, in a manner comparable to that described under the section concerning initial belt-loading conditions. Such operation moves roller 63 closer to roller 64, operates cam 73, moves head 82 away from the belt record media and retracts the pawl assembly 101 in preparation for insertion of another belt record media.

In the case of the transcribing mechanisms shown in FIG. 14, the belt eject and unloading operation proceeds in a comparable manner to that for the dictating unit. The difference lies primarily in the direction of belt ejection, which in the case of the transcriber, is from the front of the unit, FIG. 10.

Belt Eject Control

A feature of the present invention is the belt eject control mechanism illustrated particularly in FIGS. 7*a*, 7*b*, and 7*c*.

The purpose of this mechanism is to prevent the inadvertent discharge of the recording belt from the dictating or transcribing machines due to inertia of the belt and the rapid speed of the belt unload operation.

The antidischarge mechanisms prevents the discharge of the belt by causing load finger 53 to close momentarily at the end of the unload operation, gripping the belt and braking its forward velocity.

Referring to FIGS. 7*a*–7*c*, as belt lever 10 is moved toward the unload position the belt load arm 48 moves finger 53 and slider finger 54 along guide shaft 52 carrying belt 2 to the unload position.

Near the end of the unload travel the lower portion 53*a* of finger 53 strikes a stop 66 causing the finger 53 to rotate to the closed position clamping belt 2 against the slider 54 at which position stop 66 prevents further forward motion of the belt load mechanism.

Spring 69 attached to slider 54 reacts against frame 42, at the end of the unload travel causing slider 54 to move backward allowing finger 53 to rotate to the open position permitting removal of belt 2.

In this manner, belt 2 is retained in convenient position for removal by the operator.

Operation of Dictation Unit

Preparation for Dictation

It is assumed that the mode control knob 20 has been positioned to the center, or Dictate position. Volume control 18 is set to a midrange position. Following insertion of belt 2 and the automatic initial phasing just described, the unit is essentially ready for dictation. The operator inserts a pad of index slips 12 in housing 13. Head 82 is now located at the home position on belt 2 as reflected by the relative location of scanning lever 16 with respect to the top index slip 15. As seen in FIG. 1, scanning lever 16 is somewhat displaced to the right from the home position. At any time during the course of dictation, head 82 may be manually moved to a desired location on belt 2 by operation of scanning lever 16. Reference is made to FIG. 8 for the action involved. FIG. 8 represents a bottom elevation of the dictating unit with the front of the unit at the top of the figure. Scanning lever 16 has a depressable control element 16*a* that operates through a link 125 and additional members 126 and 127 to move bail 87 between the two conditions shown in FIGS. 12 *a* and 12*b* to engage and disengage the pawl assembly 101, Depression of button 16*a* , therefore, disengages pawl assembly 101 enabling ready movement of sound head 82 back and fourth in relation to an inserted belt 2.

Scanning lever 16 forms part of a scanning assembly 13 that includes a member 130 mounted for movement from the full line condition shown in FIG. 8 to the dashed line condition on a guide rod 133. Pivotally attached to member 131 is a link 135 that operates a lever 140 having another link 141 attached to its rearmost extremity. Link 141 is attached to sound head carriage 103 that mounts sound head 82. With the

structural arrangements shown, movement of scanning lever **16** from left to right in FIG. **12** moves carriage **103** from right to left, thereby moving sound head **82** from right to left in relation to an inserted magnetic belt **2**. Conversely, movement of scanning lever **16** from right to left moves sound head **82** from left to right in relation to the belt record media **2**.

In the dictating unit, the belt media is loaded into position with a first edge against flanges on the belt mandrels and the opposite edge representing home position for scanning. A centrally pivoted linkage connects the transducer that scans from right to left with a scanner index assembly positioned at the front of the unit and moving left to right adjacent an index slip in a conventional manner. The foregoing establishes compatibility of scanning of information between the present equipment and various other equipment using comparable media, such as the IBM Model 210 series and the Model 224 portable, but loading the opposite edge of the belt against flanges. The transcriber unit has similar adaptability.

Prior to commencement of dictation, the dictator will also have selected a 10-minute or 20-minute recording time by operation of button **27**, FIG. **2**. He will also have moved button **26** to select speaker **28** in unit **1** or speaker **37** in microphone **3** for use during playback of dictated material.

Following preparation for dictation as discussed, the dictator grasps microphone **3**, which is assumed to be stored in microphone well **6**, FIGS. **1** and **2**, and pulls it toward him a convenient distance for use during dictation. Microphone **3** is interconnected with the machine circuits through cord **4** and when microphone **3** is stored in well **6**, cord **4** is wound on a cord reel assembly **245**, that is better seen in FIG. **12**. Cord reel assembly **245** maintains a spring tension on cord **4** that tends to pull the cord into the unit. When microphone **3** is in use, cord **4** is maintained at a length determined by the dictator. When dictation is finished, the dictator may retract cord **4** by depressing button **30**, FIG. **1**, whereupon cord reel assembly **245** pulls cord **4** into the unit. Microphone **3** is permitted to follow the cord as it winds into the unit and is again placed in storage well **6**.

Reference is made to the Wing publication in the May, 1967 IBM Technical Disclosure Bulletin in the "Other References" section for a description of a typical cord reel assembly that will fulfill the functions required by cord reel assembly **245**.

Dictator Logic

The detailed circuits for the dictating unit fully described in the Fackler, et al. case are somewhat simplified in the logic diagram of FIG. **15**. Only the major components involved in operation of the dictator unit are shown in FIG. **15**. These include microphone **3** shown in the dashed box so designated and various interconnecting terminals that correspond to an accessory connector. A complete sequence of operations of the dictator unit will clarify the logic involved.

In FIG. **15**, loading of a magnetic belt in the unit closes the belt load contacts (BL). This completes a circuit from the Power Source (PS) through the Not Head Restore ($\overline{HR}$) and Not Phase 4 ($\overline{PH4}$) contacts to drive motor **105**. Mechanisms associated with belt loading are latched to prevent dictation until the lead screw has reached a zero phased condition and the aperture **2***a*, FIG. **2**, in the belt **2** is sensed by the apparatus. The latching mechanism is released by operation of Reverse solenoid **89** that is driven by transistor Q23. Rotation of lead screw **100** to a zero condition closes Lead Screw contacts (LS). Sensing of aperture **2***a* in belt **2** closes the Hole Detect (HD) contacts. A circuit to ground is thereby completed through the LS and HD contacts, through Not Phase **2** to the base of transistor Q23 to saturate it and energize Reverse solenoid **89** to release the latching mechanism and indicate that the phasing operation has been completed.

A Dictate mode is established by positioning of mode knob and switch assembly **20** to the center or Dictate position which prepares the logic for recognition of the Record (REC) status. Mode control button **32** on microphone **3** is also moved to the upper or Record position to prepare the machine circuits for recording of dictation. When the operator of the unit desires to dictate, he depresses dictate bar **33** that completes a number of circuits as follows. A circuit exists from Power Supply (PS) through Belt Load (BL) contacts, Not Auto-Off ($\overline{AO}$), through Phase **1** (PH1), Connector **6**, Dictate Bar (BAR), and thence to several circuits in FIG. **15**.

Power is applied through connector **20** to pick relay RR that completes a circuit to the magnetic head for recording signals. This also activates the oscillator for bias and erase signals.

A parallel circuit exists through the Record (REC) logic, connector **12** to the base of transistor Q9 in connection with energizing relay RR and also to the top of motor **105** through Phase **4** (PHe) contacts, diode **150**, and coil L-1 for driving belt and head mechanisms to trace a helical path on belt **2**.

During dictation, movement of the Letter-Secretary button **39** to the Letter position (LET), energizes the Letter solenoid **190** to mark a letter indication on index slip **15**. Movement of button **39** to the lower position closes Secretary (SEC) contacts to operate the Secretary solenoid **191**, thereby making a Secretary Instruction mark on index slip **15**.

During dictation, the fact that the equipment is in a Record mode is indicated by the energization of lamp **35** on microphone **3**.

If it is desired to review material previously dictated, the dictator moves mode button **32**, FIG. **1***a*, to the lowest position against the spring bias which closes a connection to ground through connectors **5** and **7**, the Review switches (REV), connector **8**, Phase **2** contacts (PH2) to transistor Q23 to energize the Reverse solenoid **89** and backstep head **82**. Optionally, a repeated backstepping may be obtained by continued depression of button **32** to the Review position.

Stepping of head **82** forwardly in relation to belt **2** is accomplished by movement of button **38** on microphone **3** to the upper position. This completes logic through the Forward (FWD) contacts, connection **18**, to the base of transistor Q22 for energizing Forward solenoid **88**.

The signals during recording are provided from microphone transducer **36** to the machine amplifier circuits from terminals **1** and **3**.

In order to listen to previously dictated material, the dictator moves mode button **32** t the center position which operates Listen (LIS) logic. Closure of the Listen contacts (LIS **1** and LIS **2**) completes several circuits. The circuit from LIS **1** through connector **12** biases transistor Q9 on to activate motor circuit transistors Q2–Q8, the second regulator, and energize motor **105**. Another circuit activates Playback relay PR, relay RP, the power amplifier (B stage), through Not Telephone **3** ($\overline{TEL\ 3}$), connector **11**, and Listen **2** (LIS **2**).

With battery, power for the preamplifier is denied from the third regulator stage and controlled by switch LIS **1**, with AC, power comes from the $\overline{AO}$ contact.

During the operation of motor **105**, regulation is provided by the motor control block under control of the second regulator block. A third regulator circuit is also provided

Dynamic braking is provided by transistor Q1 which conducts upon termination of dictation and listening and that serves as an effective short circuit across motor **105** to bring motor **105** rapidly to a standby condition. During dictation, the preamplifier states (PRE-AMPL) are activated from the Not Automatic Off connection ($\overline{AO}$). During a Listen mode, the connection to the oscillator is effectively open since Dictate bar **33** is not depressed.

The logic includes buzzer **166** that is operated as an example by the END of Belt (EOB) contact.

Forward Spacing and Backspacing

As described in the Cater, et al. application, the dictating and transcribing apparatus are provided with unique facilities in the form of a symmetrical Forward and Backspacing mechanism operated by energization of Forward and Reverse solenoids, when desired.

In FIG. **9**, solenoids **88** and **89** are connected to operate a bail member **170** mounted for pivoting action on rod **171**. Bail member **170** is connected by pin **172** to an operating member **173** mounted for reciprocating movement about fixed pin

174. Operation of Reverse solenoid 89 moves bail 170 in a counterclockwise direction about rod 171, FIG. 9, and by the connection at 172 rotates operating member 173 in a clockwise direction about rod 174. Connected to operating member 173 is a stepping bail 175 mounted for reciprocating movement indicated by arrow 177, FIG. 9. As shown in FIG. 8, stepping bail 175 is arranged to pass between the upper and lower sets of escapement pawls in assembly 101.

With the arrangement shown in FIG. 9, energization of Reverse solenoid 89 operates bail 170 to move stepping bail 175 in such a manner that pawl assembly 101 is operated to effect stepping of magnetic head 82 in a reverse direction with respect to an inserted belt, while energization of Forward solenoid 88 operates bail 170 and stepping bail 175 to control operation of pawl assembly 101 for effecting movement of magnetic head 82 in a Forward direction with respect to an inserted belt. From previous discussion it will be recalled that home position of head 82 is to the right in FIG. 8, thereby establishing movement of head 82 to the left as a Forward scanning movement. Pawl assembly 101 is thereby operated to move the carriage assembly 103 to the left along lead screw 100 for a Forward stepping operation and to the right for a Reverse stepping operation.

Manual Retraction of Pawl Assembly 101

The manual retraction of pawl assembly 101 was previously alluded to in connection with operation of scanning knob 16, FIGS. 1 and 8. More specifically, operation of scanning knob 16 moves pawl retract bail 87 and by interconnection shown in FIGS. 12*a* and 12*b* operates retractor 183 in a downward direction. Retractor 183 is connected at 184 with a retractor driver 185 that is rotated from the condition shown in FIGS. 12*a* to that shown in FIGS. 12*b*. Such rotation of retractor driver 185 moves retractor 186 upwardly to retract assembly 1 from lead screw 100.

To summarize, movement of pawl retract bail 87 from the normal position in FIG. 12*a* to the activate position in 12*b* moves retractor 183 downwardly and retractor 186 upwardly to disengage all pawls from lead screw 100. The actual disengagement is effected by extensions 183 and 183*b* of retractor 183 and 186*a* and 186*b* of retractor 186.

Semiautomatic Erase

The apparatus is equipped with mechanisms for erasing a magnetic belt in its entirety, whenever desired by the operator of the equipment. In one form, the erase structure includes the erase button 40, FIGS. 1 and 4, and a pivotally mounted magnet structure 156 that is manually moved toward the magnetic belt, when inserted in the machine and held against the belt while the motor drives the belt past the magnet. The structure includes a permanent magnet 157 that extends coextensively with the transverse width of the belt and that effectively restores the belt to a neutral condition for subsequent recording operations. This is similar to the erasing operation described in the IBM Customer Engineering Instruction and Reference Manuals in the "Other References" section.

In another form, the magnetic assembly 156 is moved toward the magnetic belt as in the first structure but is provided with latching means, not shown, to retain the structure against the belt even through button 40 is only temporarily operated. In this version, movement of the magnetic structure operates contact assembly 158, FIG. 4, to provide a circuit connection for driving the motor at high speeds. The structure is arranged in such a manner that at least one revolution of the entire belt is accomplished past permanent magnet 157, whereupon unlatching means, not shown, is operative to restore the magnet structure 156 to the normal inactive condition.

Transcribing Unit

General Description

In accordance with the present invention, a transcribing unit is provided that makes use of essentially the same basic belt record media handling, loading, ejecting, and phasing mechanisms as are used in the dictating unit with the exception that the mechanisms are oriented to face the transcriber during normal operation for easier loading and unloading operations. The transcriber unit is pictured in FIG. 10. Various mechanisms concerned with belt loading and unloading, phasing, reverse and forward scanning and other mechanisms are shown in FIGS. 11, 12*a* and 12*b*, and 14. Additional mechanisms concerned with a Word Recall operation as set forth in the Ridings, et al., application are specifically shown in FIGS. 11, 13, and 14.

As with transcribing units in the prior art, the primary objective of the transcribing unit according to the present invention is to facilitate the transcription of previously recorded media. Operating instructions for the unit are set forth below.

Transcribing Unit Operating Instructions

Loading Belt

1. The belt 2 is placed on the machine by sliding it over the mandrel 11 with the arrows pointing toward the machine. The belt is inserted into the machine as far as it will go without forcing it.

2. The belt release lever 10*b* is moved to the left to load the belt. Thereafter, the belt rotates at high speed. When it stops it is automatically phased.

Removing belt

1. Belt release lever 10*b* is moved to the right. The belt will partially extend from the machine at this time.

2. The belt is then manually removed from the machine Scanner lever 16*a* automatically returns to the left margin.

Index Slip Loading and Removal

1. The index slip 15*a* is inserted into the holder 13*a*.

2. The slip is slid out of the holder for removal.

Headset

Removing

1. The operator grasps and pulls headset 14 out of the unit a convenient distance. Tension is released on the headset cable allowing the cord to lock into position. (Note the Dyar, et al., pat.)

2. The earpieces are twisted sideways until they snap into an expanded condition.

3. The earpieces are spread apart to put the headset on.

Replacing

1. The earpieces are pushed together.

2. The earpieces are twisted until they snap into their rest position or until they lie side by side.

3. The headset is held securely in one hand. The rewind button 30*a* is depressed to retract the headset cable.

4. The headset is guided into the storage compartment.

5. The rewind button 30*a* is released.

Foot Control

Operating

1. Start-Stop

The right side of the foot control 8 starts the machine when depressed. The machine stops when the right side is released.

2. Review

When the left side of foot control 8 is depressed, the sound head is moved back approximately 10 words or 6 seconds of recording time when the recording time selector 27*a* is in the 10-minute position. With an optional feature, holding the left side depressed moves the sound head back continuously in 6-second increments, thus giving an extended review. If the recording time selector 27*a* is in the 20-minute position the measured review will be 12 seconds or approximately 20 words. For most dictating and transcribing, the switch is in the 10-minute position.

3. Forward Review

Depression of top of foot control 8 moves the sound head forward approximately 10 words or 6 seconds. With an optional feature, keeping the foot control depressed causes the sound head to advance continuously in 6-second increments. If recording time selector 27*a*is in the 20 minute position, the forward movement will be in 12-second increments or approximately 20 words.

Unit Operating control

1. Tuning Control

Tuning control **17** is not normally used. This control is provided so that belts recorded on other dictating equipment can be transcribed on the present transcriber. If a belt without an initial phasing aperture is placed in the transcriber, the automatic initial tuning feature is not operative. The belt will continue to rotate, but is stopped by tapping the forward review (top) portion of the foot control. Manual tuning can now be accomplished by moving tuning control **17** left or right.

2. Automatic Word Recall

Releasing the right side of foot control **8** activates the autorecall mechanism. This allows the last few words of dictation to be repeated the next time the right side of the foot control is depressed. The amount of recall is adjustable from: No recall to about five words. This feature is adjusted to the amount of recall desired by moving recall lever **19** left or right. The panel is marked in seconds from 0–5 seconds.

3. Scanner Lever.

Scanner lever **16*a*** is provided to allow manual location of the sound head to any position on the belt. Any portion of the recorded information can be reached by pushing the lever toward the machine and sliding left or right. If the right side of foot control **8** is depressed when moving the scanner lever, the transcriber can at the same time listen to what is recorded on the belt. If scanner lever **16*a*** is moved, either manually or by depressing the forward review position of the foot control, to the far right of the index slip area, the transcriber will automatically shut off. The unit is turned back on by manually moving the scanner lever to the left.

4. Speed Control

The playback speed is adjusted by speed control knob **22**, which is rotated left or right for adjustment. The speed is decreased by turning it to the left and increased when turned to the right. The dot in the center of the control indicates the middle of the speed range.

5. Tone Control

The tone can be adjusted by control **29**. The dot in the center of this control indicates the middle of the range.

6. Volume Control

Volume control **31** varies the loudness of the dictation heard through headset **14**. The dot on the knob represents the middle of the volume range.

Erasing the Belt

The erase knob **40*a*** is used to initiate complete erasure of the entire belt after it has been transcribed. This feature is semiautomatic. Once the knob has been depressed, it latches into position, and as soon as the belt has been completely erased, returns to its normal position. The machine stops to indicate the belt has been erased.

Headset

Headset **14** is positioned for storage in compartment **34** of transcribing unit **5**. As described in the Dyar, et al., patent indicated in the "Cross-Reference" section above, headset **14** is collapsible for storage in unit **5** and when withdrawn from the unit is expandable for normal use by the transcriber.

Preparation for Belt Loading and Phasing

Following removal of a previous magnetic belt **2** from unit **5**, the sound head in unit is restored to the home margin in a manner similar to that described in connection with the dictation unit. This is effected by engagement of sound head **82** with restore lead screw **95**, FIG. **14**, and the application of power from transistor T8 through the Not Head Restore ($\overline{HR}$) contacts to the motor through the Not Phase 1 ($\overline{PH\text{-}1}$) contacts.

Normally, the transcriber selects an index slip **15*a*** that is related to the belt to be transcribed and positions it in the index retainer **13*a***, FIG. **15**. Another belt **2** is then slipped onto mandrel **11** into the transcribing unit as far as it will go. Thereafter, belt lever **10*b*** is moved to the left and belt **2** is pulled into unit **5** on the drive rollers, such as drive roller **63**, FIG. **14**, by a gripper assembly such as that described in connection with FIGS. **5** and **6*a*–6*d***. Movement of belt lever **10*b*** to the left latches various belt loading and phasing mechanisms and applies power to the motor in the unit to rotate lead screw **100** and belt **2**. Member **84** is latched by latch member **91**, FIG. **14**, and clutch **93** is engaged to drive lead screw **100**. As soon as lead screw **100** reaches a zero phase condition as reflected by pin **92** contacting member **84**, clutch **93** is disconnected. Belt **2** continues to drive until aperture **2*a*** is sensed by contact assembly **97**. Rotation of lead screw **100** to the zero phase condition closes the lead screw contacts while detection of aperture **2*a*** closes the Hole Detect contacts. A circuit is thereupon completed to actuate forward magnet **89*a*** to release the mechanisms previously latched which includes release of member **86** and transfer of the Phase contacts thereby indicating that the lead screw and belt have been phased to a proper initial position. The unit is thereupon ready for use by the operator and control by appropriate movement of foot control **8**.

Transcriber Logic

FIG. **16** illustrates the logic involved in operation of the transcriber circuits described in detail in the Fackler, et al., case. The logic is clarified by consideration of a typical transcribing operation. The logic includes the foot control **8** with switch **1** and **2** contacts (SW1 and SW2) that are movable by depression of foot control **8** on the right side. The foot control includes Forward (FWD) and Reverse (REV) contacts for operating Forward and Reverse solenoids **88*a*** and **89*a*** under control of associated transistors T1 and T2. The logic further includes timer T, timer contacts TC, an R relay and associated transistor T4 controlled by transistor T19, and RR relay controlled by transistor T5 that is in turn selectively controlled by transistors T6 and T7 and motor **105*a*** together with a motor control circuit for regulating its speed in a selected speed range.

A typical sequence of operations involves unloading a belt and reloading a new belt to continue transcription. When a belt is ejected from transcribing unit **5**, the sound head is usually away from the home margin position as reflected by Head Restore (HR) contacts being closed as indicated with the designation Not Head Restore ($\overline{HR}$). Such contacts being closed complete a circuit through Not Phase 1 contacts to drive motor **105*a*** for restoring sound head to the initial margin location. When the transcriber inserts a belt into the unit, the belt load (BL) contacts close to further supply driving power to motor **105*a*** through the Not Phase 1 contacts. This also conditions amplifier stage **195*a*** for operation when the RR relay becomes energized later.

Immediately following insertion of a belt in the unit, the lead screw is phased to a zero condition and aperture **2*a*** of belt **2** is sensed to establish a desired initial relationship between sound head **82** and belt **2** in the unit. The belt loading and phasing mechanisms are latched with all of the phase contacts in an inactive or logical Not condition and retained in such condition until the lead screw is phased and the belt aperture is sensed. The mechanisms are reset upon such occurrence under control of a latch member operated by the Reverse solenoid **89*a***. Closure of the lead screw (LS) contacts indicating a lead screw zero phase condition and the Hole Detect (HD) contact complete a circuit to ground for biasing transistor T2 on to energize the Reverse solenoid **89*a***, thereby unlatching the phasing mechanisms and indicating the unit is ready for operation. This moves all of the phase contacts to their phased condition.

To operate the unit, the transcriber depresses foot control **8** on the right side which transfers switch assemblies SW1 and SW2 to supply power to the various circuits of the machine. Power is from the power supply through the belt load (BL) contacts, Phase 1 (PH1) contacts, Automatic Off ($\overline{AO}$), terminal **6** of foot control **8**, switch **1**, and terminal **11** to the upper side of relays R and RR, rendering the latter relays active and transferring the associated contacts. The relay RR contacts complete the amplifier circuits to headset **14**. Power is also supplied from terminal **8**, R3, and $\overline{AE\text{-}1}$ to the upper side of motor **105*a***. The lower side of the motor circuit is completed through the automatic erase contacts $\overline{AE\text{-}2}$ through switch SW2, connector **10**, to the motor control cir-

cuit. Motor 105*a* thereupon operates to drive sound head in unit 5 in relation to magnetic belt 2 in order to trace a helical path on the belt.

During operation, the transcriber may wish to scan the belt forwardly or reversely and does so by appropriate depression of foot control 8. A forward scan is initiated by depression of the top of foot control 8 closing the forward (FWD) contacts to terminal 18 and driving transistor 71 to energize Forward solenoid 88*a*. This operates the escapement pawl assemblies described elsewhere. Scanning of the sound head in a reverse direction with respect to magnetic belt 2 is effected by depression of the left side of foot control 8 which closes the reverse contacts and biases transistor T2 to operate the Reverse solenoid 89*a*.

The unit has an automatic recall feature that is controlled by movement of automatic recall lever 19 on the front of the unit through a range from No recall to approximately five words of recall. While in a Playback mode with switches SW1 and SW2 transferred, the circuits of the equipment are prepared to supply an automatic recall operation upon termination of the Playback.

Relay R is held through its own R1 contacts and timer contacts TC that are controlled by the timer rack 243, FIG. 16.

Assuming that the automatic recall lever 19 is set at a position other than the zero position, the operation of the automatic recall feature is as follows. Release of foot control 8 establishes the Not switch 1 and Not switch 2 conditions ($\overline{SW1}$ and $\overline{SW2}$) and reverses connections to motor 105*a* to reverse the direction of driving of motor 105*a* in order to drive belt 2 in a reverse direction in relation to the sound head. Also, this rotates gear 260, FIG. 16, to drive rack 243 toward strap 265 of contact assembly T-1 in order to open contact assembly TC and terminate the recall operation. The extent of recall is determined by the relative location of rack 243 in relation to strap 265 as determined by the setting of stop 242 that is directly controlled by movement of automatic recall lever 19.

The circuit connections for reversing the rotation of motor 105*a* are from power supply, belt load (BL) contacts, Phase 1 (PH1), Not Automatic Off ($\overline{AO}$), R2 contacts, Not Switch 2 ($\overline{SW2}$), connection 12, Not automatic Erase contacts $\overline{AE2}$, Phase 2 contacts to the bottom of motor 105*a*. This supplies approximately 18.0 volts on this side of the motor for driving purposes. The opposite side of the motor is grounded through the automatic erase contacts the R3 contacts, transistor T3 connector 11, Not Switch 1 ($\overline{SW1}$), connector 7 to ground. Ground is also applied to the timer coil which through the mechanisms shown in FIG. 16 moves rack 243 into engagement with gear 260. Opening of the timer contacts TC drops relay R and timer T. In this manner, a desired amount of recall is automatically obtained in the equipment.

If the operator wishes to terminate the timer operation prior to its normal completion, she again depresses foot control 8 to transfer the playback switch contacts SW1 and SW2 into a Playback mode. Such transfer of the SW1 and SW2 contacts opens the circuits for reverse driving of motor 105*a* terminates the energizing circuit for the timer, and through transistor T19 drops relay R to permit the circuits to settle down. Relay R is then able after a predetermined length of time to become energized again as in a normal Playback mode of operation. Transistors T5, T6, and T7 are effective to control the relay RR that in turn controls muting of the audio circuits.

Scan Operation

Pushing scanning lever 16*a* in toward the machine enables movement of the scanner mechanism and magnetic head to any desired position on index slip 15*a* with respect to belt 2. The movement of scanning lever 16*a* operates pawl retract bail 87, FIG. 12*a*, to disengage pawl assembly 101 from lead screw 100 and permit easy movement of the sound head in the unit.

FIG. 8*a* illustrates the scanner mechanism in the transcribing unit on a reduced scale as seen from the bottom of the unit. A comparison of FIGS. 8 and 8*a* reveals the structural differences in the dictating and transcribing unit scanner mechanisms in order to achieve the 90°difference in orientation between the two units.

In FIG. 8, a bottom elevation of the dictating unit, movement of the scanner lever 16 left to right from "0" index to "100"index is accompanied by opposite movement of sound head carriage 103 (and sound head 82) from "0" index to "100"index. The converse is true. In the transcribing scanner mechanism, FIG. 8*a*, (also a bottom elevation) on the other hand, movement of the scanner lever 16*a* top to bottom from "0" index to "100" index through bellcrank 145 and attached linkages 146 and 147 effects movement of sound head carriage 103 (and sound head 82) right to left from "0" index to "100"index. Link 147, FIG. 8*a*is connected to the opposite end of carriage 103 from the connection of link 141, FIG. 8.

Automatic Recall Feature

The transcribing apparatus and the dictating apparatus, if desired, incorporates means for automatically repositioning sound head in relation to the magnetic belt 2 each time that the foot control is released following a Playback operation in order to pick up the last several words of dictation when the equipment is started again. The recall is adjustable by means of the recall lever 19, FIG. 10, anywhere from a No Recall condition to approximately five words. The recall feature includes various structures shown particularly in FIGS. 11, 13 and 14 and is fully described in the Ridings application. For convenience, a brief description follows.

The operator adjusts recall lever 19 prior to a transcribing operation, normally, and readjusts as desired during the course of transcribing operations. In FIG. 13 recall lever 19 extends from a block 230 that is slidably mounted for movement to the left and right on guide rods 231 and 232. Extending from block 230 is a pin 234 cooperating with a link 235 mounted for pivotal movement at 236. Connected to link 235 by clevis link 238 is a lever 240 centrally mounted for pivoting at 241. Lever 240 has an adjustable stop 242 arranged for cooperation with a timer rack 243, the latter three items also being shown in FIGS. 11 and 14. Rack 243 is arranged for movement left to right and right to left in the figures with a spring member 250 maintaining rack 243 generally to the left against stop 242. Positioned adjacent extremity 243*a* of rack 243 is the set of timer contacts TC. Rack 243 is also movable slightly upwardly and downwardly as indicated by arrow 252, FIG. 11, under control of a timer magnet T. This is effected by movement of a timer arm 254 engaging rack 243 in slot 243*b* by pin 256. Rack 243 is positioned adjacent a driving gear 260 for driving from left to right during its operation.

Considering the structural aspects first, rack 243 normally rests against stop 242 and by energization of timer magnet T through armature 262 is moved upwardly under control of arm 254 and pin 256 into engagement with gear 260 driven from motor 105*a* through clutch 270. For clarity, armature 262 is shaped slightly differently in FIG. 11 in comparison with FIG. 14. Adjustment of recall lever 19 moves rack 243 closer or further away from contact assembly TC. Contact assembly TC is incorporated in a driving circuit for motor 105*a* to drive the motor and hence the sound head in relation to magnetic belt 2 a varying distance depending upon the time it takes rack 243 to encounter operating strap 265 of the timer contact assembly TC and open contacts TC. Reference is made to the Transcriber Logic section and to the Ridings case, for further details of operation.

While the invention has been particularly shown an described with reference to several embodiments, it will be understood by those skilled in the art that various changes in form and detail may be made without departure from the spirit and scope of the invention.

What is claimed is:

1. Media control mechanism for loading and unloading record media in a utilization device, such as belt record media, comprising:

mounting means for receiving and mounting a record media following loading in said utilization device;

load-unload means movably mounted in said device for movement with respect to said mounting means and positioned for moving a said record media to said mounting means for loading and moving a said record media from said mounting means for ejection of said record media from said device, said load-unload means comprising a record media gripping means that is actuatable between gripping and nongripping conditions and that is operable during loading to grip a said record media in order to move said media into engagement with said mounting means, but that is normally in nongripping condition when said record media is mounted on said mounting means as well as during unloading movement of said record media; and eject control means operable during unloading movement of said media to temporarily and positively engage said gripping means with said record media during unloading movement of said record media to control the rate of ejection of said record media from said device below a selected rate in order to retain said media in proximity to said device.

2. The mechanism of claim 1 wherein said media is a magnetic recording belt, and further comprising:

drive means;

a transducer for scanning a record media mounted in said device; and

means for relatively driving a said mounted media and said transducer to scan a said record media.

3. The mechanism of claim 1, further comprising:

an operator control adjunct connected to operate said load-unload means.

4. The mechanism of claim 1 wherein said gripping means comprises a pair of gripper fingers one of which is actuated against the other as required to grip a said media, and further comprising:

means in said eject control means for operating said one gripper finger temporarily against the other during unloading movement of a said record media to control the rate of ejection.

5. The mechanism of claim 1, further comprising:

means mounting said gripping means for movement substantially in a linear path to and from said mounting means; and

a member fixedly mounted in said device, said member being incorporated in said eject control means and positioned in the path of movement for operating engagement with said gripping means and to temporarily engage and operate said gripping means during unloading movement.

6. The media mechanism of claim 1, further comprising:

loading control means responsive to undue slippage of a media with respect to its normal path of movement during a loading operation to prevent further movement of said media load-unload means.

7. The mechanism of claim 6 wherein a said record media is insertable in said device, and further comprising:

a stop rack;

a sensing finger positioned in proximity to said stop rack during loading movement of a said record media for sensing slipping movement of a record media during loading movement of a said record media, said sensing finger being mounted for contact by a record media upon insertion in said device and responsive to presence of a record media in said load means to enable loading movement; and movable into engagement with said stop rack responsive to absence or slippage of a media to an undue extent with respect to its normal path of movement to prevent loading movement.

8. The mechanism of claim 7, further comprising:

means mounting said sensing finger in said load-unload means; and

means mounting said stop rack in the path of movement of said load-unload means and said sensing finger.

9. Media control mechanism for unloading record media in a utilization device, such as a belt record media, comprising:

mounting means for mounting a record media in said utilization device;

unload means movably mounted in said device for movement with respect to said mounting means and positioned for moving a said media from said mounting means for ejection of said record media from said device, said unload means comprising a record media gripping means that is actuatable between gripping and nongripping conditions and that is normally in nongripping condition when said record media is mounted on said mounting means as well as during unloading movement of said record media; and

eject control means operable during unloading movement of said media to temporarily and positively engage said gripping means with said record media during unloading movement of said record media to control the rate of ejection of said record media from said device below a selected rate in order to retain said media in proximity to said device.

10. The mechanism of claim 9 wherein said media is a magnetic recording belt, and further comprising:

drive means;

a transducer for scanning a record media mounted in said device; and

means for relatively driving a said mounted media and said transducer to scan a said record media.