Nov. 15, 1949 D. S. SWARTHOUT ET AL 2,488,482

RECORDING AND TRANSCRIBING MECHANISM

Filed Oct. 15, 1947 3 Sheets-Sheet 1

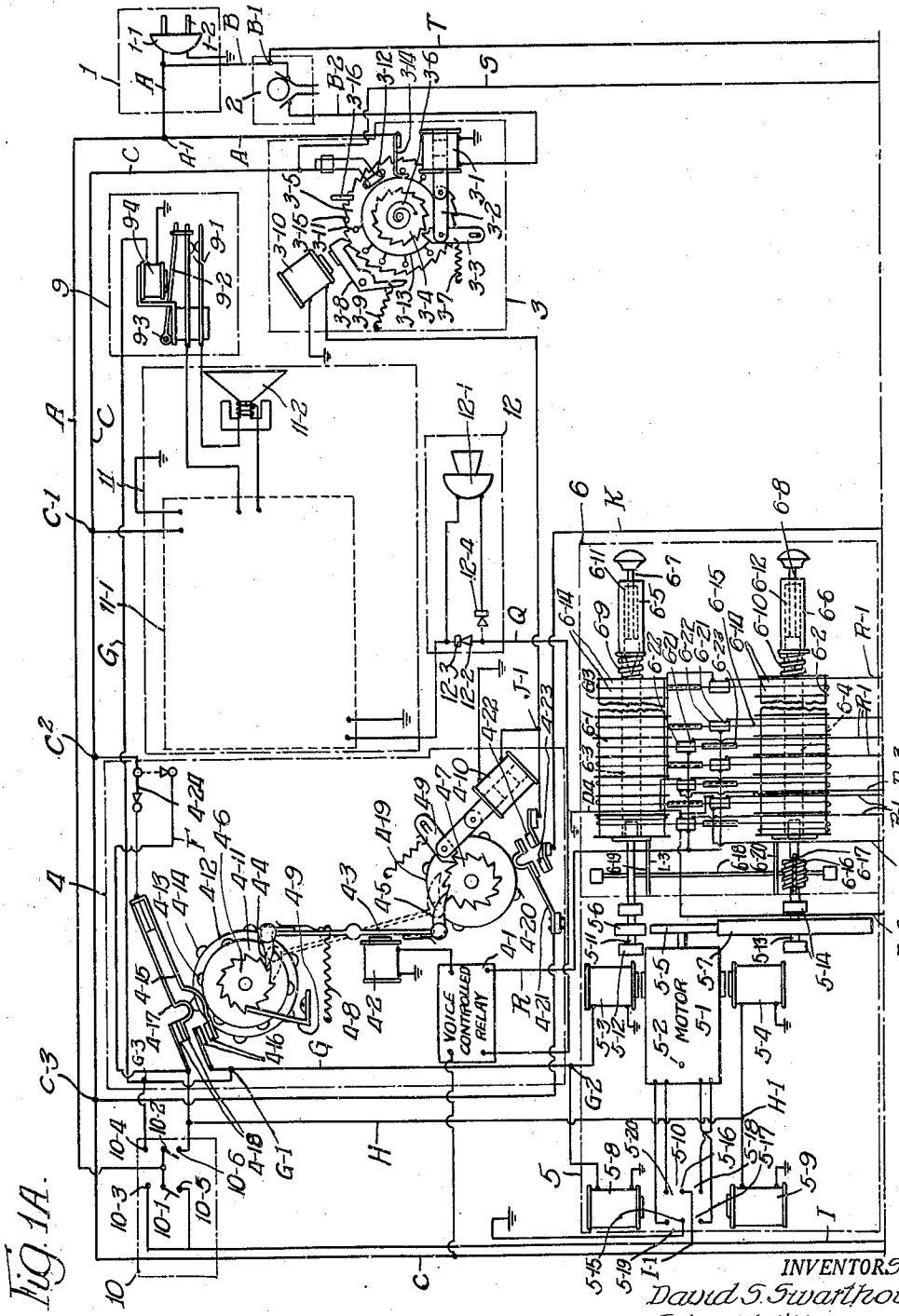

Fig. 1A.

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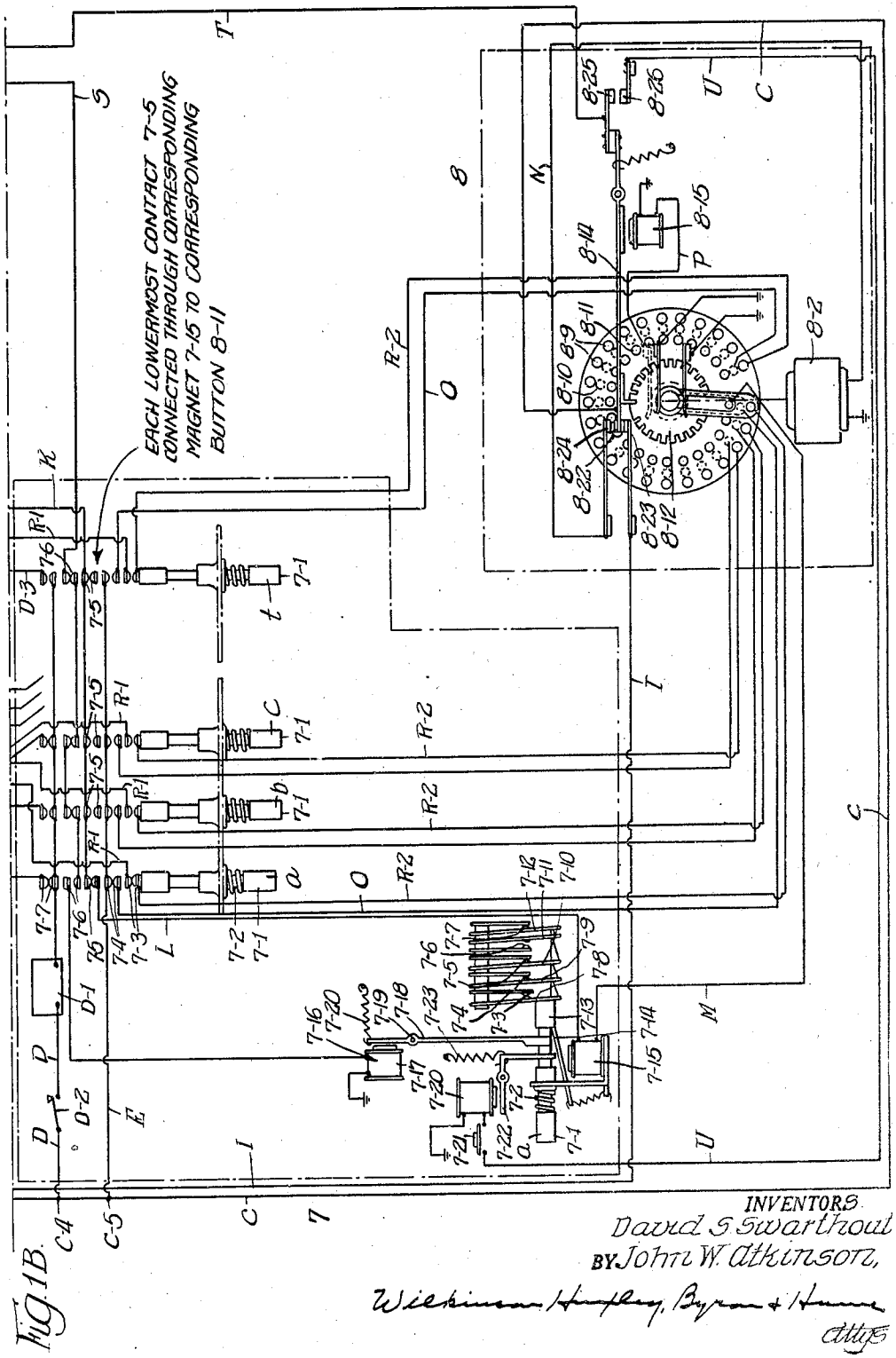

FIG. 1B.

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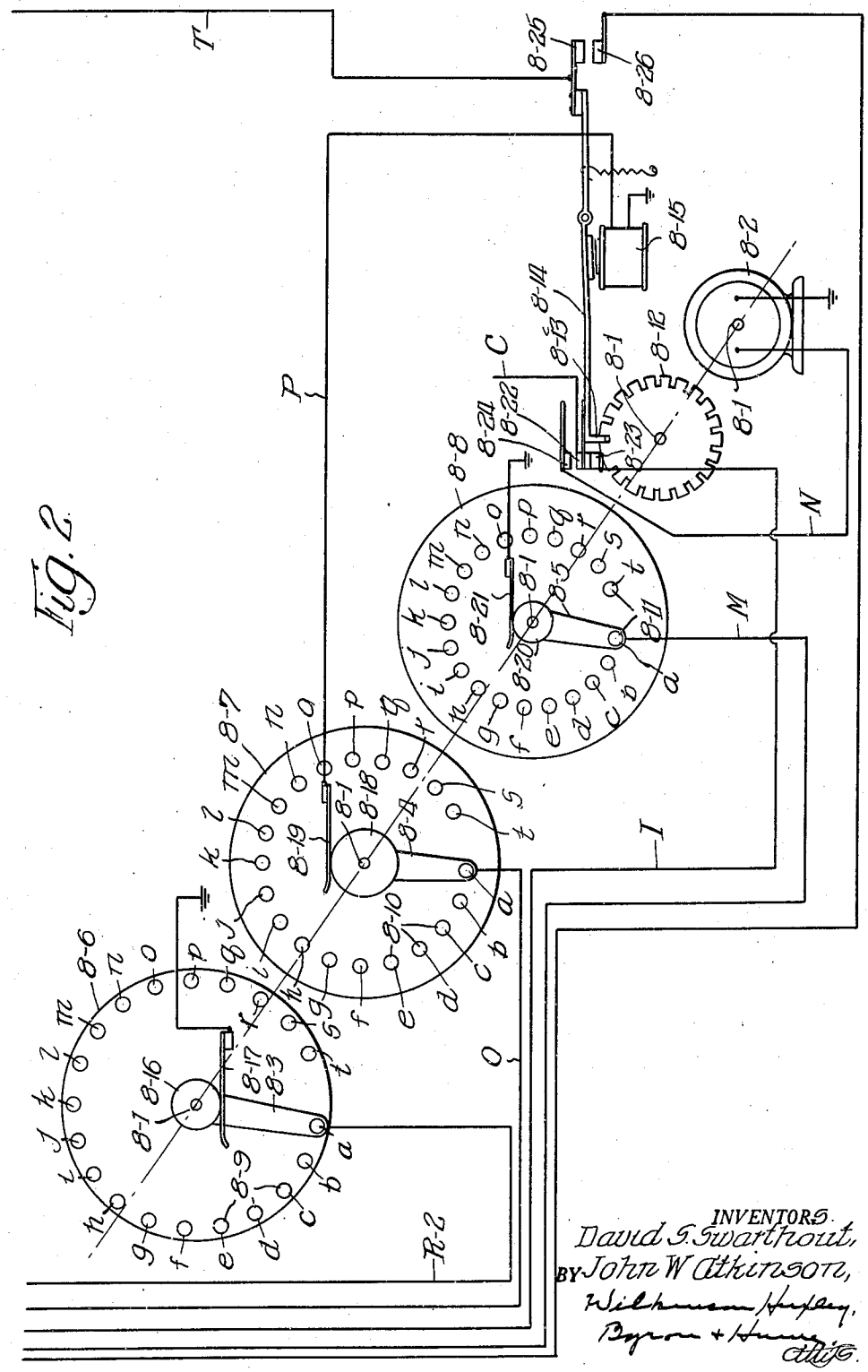

Fig. 2.

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RECORDING AND TRANSCRIBING MECHANISM

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Application October 15, 1947, Serial No. 779,900

5 Claims. (Cl. 179—100.2)

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The present invention relates to improvements in recording and transcribing mechanism.

More particularly, the present invention relates to mechanisms for recording and transcribing sound and relates particularly to the type of mechanism employing a wire strip or the like adapted to be charged with magnetic impulses which may be transcribed in the form of music, speech or other sound.

An object of the present invention is to provide improved mechanism of the type referred to employing a plurality of strips of magnetizable material together with improved means for selectably charging any or all the said strips and for transcribing the recordings from said strips.

A further object is to provide improved recording mechanism employing a plurality of magnetizable strips well adapted for use in place of the usual juke box.

A further object is to provide improved mechanism of the type referred to which is sturdy, reliable, relatively inexpensive to manufacture and not likely to get out of order.

A further object is to provide recording mechanism employing a plurality of magnetizable strips which mechanism may be automatically operated as, for example, upon the deposition of coins or other tokens, said mechanism being provided with safeguards to prevent injury in the event that the mechanism is not used according to directions.

Further object is to provide a mechanism of the type referred to well adapted to meet the needs of ordinary service.

Referring to the drawings:

Figure 1—A is a schematic view illustrating portion of the instrumentalities and connecting wiring of a preferred embodiment of the present invention;

Figure 1—B is a schematic view of the remaining portion of the instrumentalities and connecting wiring of said embodiment of the present invention, Figure 1—A and Figure 1—B being matched along a matched line; and

Figure 2 is a schematic view showing one of the instrumentalities of the mechanism in an exploded view.

For simplicity of explanation, the disclosures of Figures 1—A and 1—B have been divided up into a plurality of instrumentalities which cooperate in the functioning of the mechanism. These instrumentalities have been outlined in boxes defined by dot and dash lines and may be described as follows:

Instrumentality 1 embodies an outlet plug 1—1, having one of its terminals 1—2 grounded to a

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common electrical connection as, for example, to the chassis of the phonograph or the mechanism upon which the device is used. The other terminal of the outlet 1—1 is connected through wiring to be described presently to the other instrumentalities in the mechanism.

Instrumentality 2 is a switch adapted to be closed momentarily upon the insertion of a coin or other token. Switches suitable for the purposes are well known to those skilled in the art and need not be described in detail herein. It is sufficient to state that one side of the coin operable switch 2 is connected to the ungrounded side of the outlet plug 1. The other side of the coin operable switch 2 is connected to instrumentality 3 which will now be described.

Instrumentality 3 is a ratchet mechanism adapted to be rotated with a step by step movement upon energization of the electromagnet 3—1, which is adapted to be energized intermittently upon the insertion of coins or the like into the switch 2. The electromagnet 3—1, when energized, is adapted to move the bar 3—2 to the right as the parts are viewed on the drawing, swinging the lever 3—3 in a clock-wise direction. The extremity of said lever 3—3 is provided with a tooth adapted to engage a corresponding tooth upon the ratchet 3—4. Disposed in fixed relationship with the ratchet 3—4 is the ratchet 3—5, having a plurality of teeth double in number to and spaced symmetrically with the teeth upon the ratchet 3—4. As illustrated, the ratchet 3—4 is provided with 13 teeth and the ratchet wheel 3—5 is provided with 26 teeth, the illustration showing the operative faces of each of the teeth of the ratchet 3—5 as being coincident radially with the teeth on the ratchet 3—5 or located intermediate of the radii defining the teeth of the ratchet 3—4. The ratchets 3—4 and 3—5 are biased in a clock-wise direction by the clock spring 3—6. The lever 3—3 is biased out of engagement with the ratchet 3—4 by the spring 3—7. Co-operating with the ratchet 3—5 is an escapement 3—8 having teeth adapted to engage the teeth of the ratchet 3—5. Said escapement 3—8 has its upper right-hand extremity biased into engagement with the ratchet 3—5 by means of the spring 3—9. Said escapement 3—8 is adapted to be moved out of engagement with the ratchet 3—5 upon energization of the electromagnet 3—10, one terminal of which is connected to instrumentality 4 in a manner to be described presently. The other terminal of the electromagnet 3—10 is connected to ground. Fixedly disposed relative to the ratchets 3—4 and 3—5 are a plurality of contacts 3—11 electrically con-

nected together. There are 12 of the contacts 3—11 and they are adapted to be engaged successively by the brush 3—12. Said contacts 3—11 are connected to the slip ring 3—13 engaged by the brush 3—14 which is connected to the ungrounded side of the outlet plug 1—1. Fixedly carried by the ratchet 3—5 is a pin 3—15 adapted to engage the left side of a stop 3—16. Said brush 3—12 should be sufficiently wide to engage two adjacent contacts 3—11 at each position of the ratchet 3—5 except when the pin 3—15 is in engagement with the stop 3—16.

Referring now to instrumentality 4, said instrumentality embodies the voice controlled relay 4—1 adapted to control the energization of an electromagnet 4—2. The details of the voice controlled relay 4—1 need not be described in detail, such relays being well known to those skilled in the art. It will be sufficient to state that said voice controlled relay will be effective to deliver operative current to said electromagnet 4—2 when electric impulses are being sent therethrough, as for example, those resulting from transcriptions from the recording strips, to be referred to more in detail presently. The voice controlled relay 4—1 should preferably be of the type embodying a time delay feature so that said voice controlled relay will not be operative to open-circuit the electromagnet 4—2 until after the lapse of an appreciable time after the cessation of electric impulses in said relay 4—1. Electromagnet 4—2 is adapted to control the lever 4—3, said lever being provided at one of its ends with a pawl 4—4 and at its other end with a pawl 4—5. Said pawl 4—4 is adapted to engage a ratchet 4—6 and the pawl 4—5 is adapted to engage a ratchet 4—7. Said lever 4—3 is biased out of proximity with the electromagnet 4—2 by means of the spring 4—8.

The ratchet 4—6 is provided with the detent 4—9 which stops said ratchet from counterclockwise rotation.

Also co-operating with the ratchet 4—7 is the swinging lever 4—9, having a tooth adapted to engage successively the teeth of said ratchet 4—7. Said lever 4—9 is responsive to energization of the electromagnet 4—10.

Connected to rotate with the ratchet 4—6 are two discs 4—11 and 4—12. Said disc 4—11 is provided with a plurality of peripherally spaced abutments 4—13 and the disc 4—12 is provided with a plurality of peripherally spaced abutments 4—14, the abutments 4—13 being disposed along radii disposed intermediate of the radii marking the abutments 4—14. Said abutments 4—13 are adapted to engage in succession a resilient arm 4—15 adapted to close the contacts 4—16. The abutments 4—14 are adapted to engage the resilient arm 4—17 and to close the contacts 4—18. Figure 1—A shows an abutment 4—14 in position to hold the contacts 4—18 in closed position.

Fixedly mounted with respect to the ratchet 4—7 is the disc 4—19 provided with the peripherally spaced abutments 4—20 adapted to engage successively against the resilient arm 4—21 and to engage the contacts 4—22 and 4—23. It may be stated at this point that the pawl 4—5, when it engages a tooth of the ratchet 4—7 will result in the engagement of the arm 4—21 with the contacts 4—22 and 4—23. This engagement is of only momentary character, however, and the said contacts will be disengaged shortly by operation of the electromagnet 4—10 through the instrumentality of the lever 4—9 in a manner to be referred to presently. The numeral 4—24 indicates a manually operable two-position switch. In one position said switch is connected in circuit with the juncture between arms 4—15 and 4—17. In the other position of said switch 4—24, it is connected in circuit with one of the uppermost of the contacts 4—18.

Instrumentality 5 embodies mechanism including a reversible electric motor 5—1 pivoted at the point 5—2 to have a swinging movement. Said motor is swung selectably upon energization of the electromagnets 5—3 and 5—4. Carried on the shaft of the motor 5—1 is a friction disc 5—5 adapted when the motor is swung upwardly to engage the periphery of the driven wheel 5—6 and when the motor is swung downwardly to engage the periphery of the driven wheel 5—7. The driven wheel 5—6 is of much smaller diameter than the driven wheel 5—7 in order that the driven wheel 5—7 may be rotated at a relatively high speed for the purpose of rewinding the recording strips to be described presently. Connected in parallel with the electromagnet 5—3 is the electromagnet 5—8 and connected in parallel with the electromagnet 5—4 is the electromagnet 5—9. Said electromagnets 5—8 and 5—9 are adapted to control the double-pole, double-throw switch 5—10, biased to open position. The driven wheel 5—6 is mounted upon a shaft 5—11 carried by bearings 5—12 and the driven wheel 5—7 is carried by the shaft 5—13 mounted in bearings 5—14. The double-pole, double-throw switch is provided with the relatively stationary contacts 5—15 and 5—16. Co-operating with said contacts is the pair of lower switch arms 5—17 and 5—18 adapted to be moved, as a pair, into and out of engagement with contacts 5—15 and 5—16, respectively. Also co-operating with the contacts 5—15 and 5—16 is the pair of upper switch arms 5—19 and 5—20 adapted to be moved, as a pair, into and out of engagement with contacts 5—15 and 5—16. The electromagnet 5—8, when energized, is adapted to move the upper pair of switch arms of the double-pole, double-throw switch 5—10 into engagement with the fixed contacts 5—15 and 5—16. Alternatively when the electromagnet 5—9 is energized, it is adapted to move the lower pair of switch arms of said double-pole, double-throw switch 5—10 into engagement with said fixed contacts 5—15 and 5—16.

Referring now to instrumentality 6, the numeral 6—1 indicates a rewind spool and the numeral 6—2 indicates a windup spool. Said spools 6—1 and 6—2 are co-operatively related to the shafts 5—11 and 5—13, respectively. As will be explained presently, the spools 6—1 and 6—2 should have axial movements in the operation of the apparatus and should be releasable from the shafts 5—11 and 5—13, respectively. In order to provide such relative movement while preserving the driving relationship between the spools 6—1 and 6—2, respectively, the shafts 5—11 and 5—13 may be provided with non-round projections which non-round projections may, if preferred, be square in cross section. Said non-round projections on the shafts 5—11 and 5—13 have loose fit within conforming non-round holes in the shafts 6—3 and 6—4 which are axially disposed within the spools 6—1 and 6—2, respectively. Said spools 6—1 and 6—2 are splined to their respective shafts 6—3 and 6—4 and are slidable along said shafts. The right-hand extremities of the spools 6—1 and 6—2, as the parts are viewed in Figure 1—A, are supported by means of brackets 6—5 and 6—6, respectively. Said brackets 6—5 and 6—6 are provided with reciprocable pins 6—7 and 6—8, each provided at

this outer extremity with a finger grip. The left-hand extremities of the pins 6—7 and 6—8 may be of conical contour whereby to fit into conforming services in the right-hand ends of the shafts 6—3 and 6—4, respectively. A spring 6—9 is interposed between the bracket 6—5 and the spool 6—1, biasing said spool toward the left as the parts are viewed in Figure 1—A. A spring 6—10 performs a similar function on the spool 6—2. The bracket 6—5 may be provided with a spring 6—11 for biasing the pin 6—7 into co-operative relationship with the corresponding shaft 6—3 and the bracket 6—6 may be provided with a spring 6—12 for biasing the pin 6—8 into co-operative relationship with the corresponding end of the shaft 6—4.

The spools 6—1 and 6—2 are divided by the fins 6—13 into a plurality of sections 6—14, 6—14, each section being provided with a recording strip 6—15. The recording strip 6—15, 6—15 may be wires or ribbons, in accordance with well known practice, and in order that said strips may be wound neatly and efficiently upon the spools 6—1 and 6—2, said spools, as indicated above, should be given axial movements to conform to the movements of the strips 6—15, 6—15. In order to provide such axial movement, cam means are provided driven from the shaft 5—13. Said shaft 5—13 has fixedly mounted thereon the worm 6—16 having meshing relationship with the worm wheel 6—17. Said worm wheel 6—17 has driving relationship with the shaft 6—18 mounted in suitable bearings. Carried by said shaft 6—18 is the cam 6—19 adapted to engage against the left-hand extremity of the spool 6—1. Also carried by the shaft 6—18 is the cam 6—20 having camming relationship with the left-hand extremity of the windup spool 6—2. It will be understood that as the drive shaft 5—13 drives the windup spool 6—2 and said spool takes up the recording strips 6—15, 6—15, the spool 6—2 will be moved in an axial direction to permit the smooth and efficient winding of said recording strips upon corresponding sections of the spool 6—2. Correspondingly, when the drive shaft 6—11 is communicating turning movement to the spool 6—1 to rewind the recording strips onto said spool 6—1, a corresponding turning movement will be communicated to the spool 6—2, turning the worm 17, shaft 18 and cam 6—19 to permit corresponding axial movement on the spool 6—1 under the influence of the spring 6—9 whereby the recording strips are wound neatly and efficiently upon their corresponding sections of said spool 6—1.

According to the illustrated embodiment of the present invention, each of the recording strips 6—15 is provided with its own individual pickup head and erasing head as well as with its own individual shield. It will be understood, of course, that, if preferred, a lesser number of pickup heads and erasing heads could be provided, said heads being moved from strip to strip when they are to perform their functions. In the drawing only a few of the multiplicity of recording strips are illustrated. Each of the strips is provided with a pickup head 6—21, the erasing head 6—22 and the shield 6—23. Each pickup head, in the manner well understood in connection with wire recorders, may function also as a recording head and in this application, the heads 6—21 will sometimes be referred to as recording heads. According to practice preferred at the present time, the shield 6—23 will take the form of a cylinder or an open cylinder or will have a cross section approximating a horse shoe whereby the wires may be conveniently mounted within their respective shields. The shield 6—23 associated with each strip 6—15 is located between the sets of pickup heads and erasing heads upon the two neighboring strips whereby to effectually protect each pickup head from interference from other pickup heads. In other words, the shields 6—23 are in staggered relationship with respect to the sets of pickup heads 6—21 and erasing heads 6—22 so that each set of pickup and erasing heads is out of adjacency with the set of pickup and erasing heads on the next neighboring strip. Further, each set of pickup and erasing heads is shielded from any nearby pick-up and erasing head by means of a shield 6—23.

Referring now to Figure 1—B, certain controls are illustrated, identified as instrumentalities Nos. 7 and 8. Instrumentality No. 7 has primarily to do with the selection of the particular recording strip which is to perform its functions. Instrumentality No. 7 is provided with a plurality of push buttons or the like indicated by the numerals 7—1, 7—1, equal in number to the number of recording strips 6—15. Said push buttons are biased outwardly by means of springs 7—2 and each of said buttons is adapted to control engagement of a plurality of sets of contacts, indicated by the numerals 7—3, 7—4, 7—5, 7—6 and 7—7. In Figure 1—B the push button 7—1 at the extreme left (indicated by the letter "*a*") is in its innermost or operative position, that is, its unbiased position, and under these conditions the sets of contacts 7—3, 7—4, 7—5 and 7—7 are engaged whereas the set of contacts 7—6 is disengaged. Under other conditions when the push buttons 7—1 are in their outer or inoperative positions, that is, biased positions, contacts 7—6 are engaged whereas contacts 7—3, 7—4, 7—5 and 7—7 are disengaged. For simplicity of disclosure, one of the push buttons 7—1 (to wit, the one marked "*a*") is disclosed in side elevation in the left-hand portion of Figure 1—B whereas certain of the push buttons 7—1 are shown in top elevation in the region adjacent to the middle of Figure 1—B. The push button illustrated in side elevation shows the push button 7—1 in engagement with a resilient arm 7—8 carrying one of the sets of contacts 7—3. Said resilient arm 7—8 will be biased to a position to cause disengagement of the corresponding contacts 7—3. Adjacent to the resilient arm 7—8 is the resilient arm 7—9 which holds one of the sets of contacts 7—4 and is biased to cause disengagement of contacts 7—4. Adjacent to the arm 7—9 is the resilient arm 7—10 which carries one of the sets of contacts 7—5 and is biased to cause disengagement of contacts 7—5. Next in order to resilient arm 7—10 is the resilient arm 7—11 which carries one of the set of contacts 7—6 but is biased to a position causing engagement between said contacts 7—6. Next succeeding resilient arm 7—12 carries one of the set of contacts 7—7 and is biased to a position to cause disengagement of said contacts 7—7. The resilient arm 7—8 is provided with an insulated abutment adapted when said arm is swung toward the right as the parts are viewed in Figure 1—B to move the resilient arm 7—9 toward the right. Likewise said arm 7—9 is provided with an insulated abutment adapted when said arm 7—9 is swung toward the right to move the resilient arm 7—10 toward the right. Likewise the resilient arm 7—10 is provided with an in-

sulated abutment adapted when said arm 7—10 is swung toward the right to move the resilient arm 7—11 toward the right. The shaft of each push button 7—1 is provided with the collar 7—13 of insulating material, the left-hand extremity of which is adapted to be engaged by the detent 7—14 which has the function of holding the corresponding push button 7—1 and associated parts in its right-hand, that is, unbiased position when said push button has been pushed inwardly. Each detent 7—14 is adapted to be controlled by a corresponding electromagnet 7—15, each of said magnets 7—15 having the function, when energized, of withdrawing the corresponding detent 7—14 from engagement with the collar 7—13 to permit the spring 7—2 to move the corresponding push button 7—1 and associated parts to the left, that is, to the biased or inoperative position. There are as many electromagnets 7—15 as there are push buttons 7—1.

In the event that an operator deposits coins in the coin switch 2 and neglects to push in any of the push buttons 7—1, a mass selector 7—16 will take charge. Said mass selector 7—16 includes the electromagnets 7—17 controlling the lever 7—18 swung about the axis 7—19. A spring biases the lever 7—19 in a clock-wise direction as the parts are viewed in Figure 1—B. The lower extremity of the lever 7—18 is provided with yoke means adapted to engage all of the collars 7—13 associated with all of the push buttons 7—1 whereby, when said electromagnets 7—16 are energized, all of the push buttons will be moved inwardly and held in their innermost positions by the detents 7—14 whereby the recording strips 6—15 will perform their functions in succession by reason of automatic selection provided for by instrumentality 8 to be described presently.

The instrumentality 7 also provides for the mass rejection of any selection or selections which had been made by the pushing in of one or more of the push buttons 7—1. The mass ejector provided for this purpose embodies the electromagnet 7—20 adapted to be energized on the closure of the push button 7—21, biased to open position. Electromagnet 7—20 is adapted to control the bell crank lever 7—22 biased away from the magnet 7—20 by means of the spring 7—23. When the lever 7—22 is attracted by the magnet 7—20, the lower right-hand extremity of said lever 7—22 is moved into tripping engagement with all of those detents 7—14 which are up in detent relationship with push buttons 7—1, thereby releasing said detents from their respective collars 7—13, allowing all of the push buttons 7—1 which had been pushed in to be returned to their outermost or inoperative positions.

Figure 1—B also embodies instrumentality 8 which may be termed a distributor. For simplicity of disclosure, instrumentality 8 has been shown in an exploded view in Figure 2. Instrumentality 8 embodies a shaft 8—1 adapted to be rotated by means of a motor 8—2. Fixed to said shaft 8—1 are three rotating contact arms 8—3, 8—4 and 8—5. Said contact arms 8—3, 8—4 and 8—5 are insulated from each other and from the shaft 8—1. Each of said contact arms 8—3, 8—4 and 8—5 is adapted to engage successively with a plurality of contact buttons circumferentially disposed upon the corresponding discs 8—6, 8—7 and 8—8 which are relatively fixed. The contact buttons on the disc 8—6 are indicated by the numerals 8—9; the contact buttons on the disc 8—7 are indicated by the numerals 8—10; and the contact buttons upon the disc 8—8 are indicated by the numerals 8—11. The number of contact buttons 8—9, 8—10 and 8—11 is equal to a number of push buttons 7—1. Contact buttons 8—9, 8—10 and 8—11 are marked with letters "a," "b," "c," "d," et cetera corresponding to the push buttons 7—1, 7—1 with which they are connected. Also mounted upon the shaft 8—1 is the detent wheel 8—12. Said detent wheel 8—12 is fixed relative to the shaft 8—1 and is provided with a plurality of notches adapted to be engaged in succession by the extremity 8—13 of the detent lever 8—14. The number of notches in the detent wheel 8—12 is equal in number to the push buttons 7—1. The contact buttons 8—9, 8—10 and 8—11 and the notches in the detent wheel are preferably equispaced, the first and last button in each series and the first and last notch being separated by a double space.

The detent lever 8—14 is pivoted intermediate of its length and is adapted to be controlled by the electromagnet 8—15. Said lever 8—14 is biased out of detent relationship with the detent wheel 8—12 by means of a spring or the like.

The contact arm 8—3 is provided with the slip ring 8—16 engaged by the brush 8—17. The contact arm 8—4 is provided with the slip ring 8—18 engaged by the brush 8—19. The contact 8—5 is provided with the slip ring 8—20 engaged by the brush 8—21.

The detent lever 8—14 is provided at its swinging left-hand extremity with a contact member 8—22 adapted when said lever is performing its detent functions to engage with the contact 8—23. When said detent 8—14 is in its biased position, that is, out of detent relationship with the detent wheel 8—12, said contact member 8—22 is in engagement with the contact member 8—24. The right-hand swinging extremity of the lever 8—14 is provided with the contact member 8—25 adapted when said lever is in its biased position to engage with the contact member 8—26.

Instrumentality 9 illustrated in Figure 1—A constitutes a circuit breaker. Circuit breaker 9 includes a pair of contacts 9—1 biased into engagement with each other. The numeral 9—2 indicates a lever swung about an axis 9—3 adapted when raised to disengage the contacts 9—1. Said lever 9—2 is controlled by the electromagnet 9—4.

Instrumentality 10 embodies a double-pole, double-throw switch indicated by the numeral 10—1. Said instrumentality provides means for causing rotation of the motor 5—1 selectably in the rewind direction or windup direction at the will of the operator without transcribing recordings from the recording strips 6—15 or erasing the recordings therefrom.

Instrumentality 11 is an amplifier embodying the amplifying unit 11—1 and a speaker 11—2 connected to said amplifying unit 11—1.

Instrumentality 12 embodies a microphone 12—1 controlled by the manually operable single-pole, two-way switch 12—2. Said switch 12—2 embodies a swinging arm adapted selectably to engage the contact 12—3 or the contact 12—4.

The instrumentalities above referred to are connected into operative relationship by certain wiring connections which will now be referred to.

The plug 1—1, as indicated hereinabove, has one of its terminals grounded to an electrically conductive part of the mechanism such as the chassis. The other terminal of said plug 1—1,

which may be referred to as the ungrounded terminal, is connected by means of the wire A to a juncture point A—1 whence said wire A extends to the brush 3—14, forming part of instrumentality 3. Leading from the conductor A is the conductor B provided with the juncture point B—1. Said conductor B is, through juncture point B—1, connected to one side of the coin controlled switch 2, the other side of which is connected through the juncture point B—2 to one side of the solenoid 3—1, the other side of which is grounded. Connected to the brush 3—12 is the conductor C, provided along its length with the juncture points C—1, C—2, C—3, C—4 and C—5. Said juncture point C—1 is connected to one terminal of the amplifier unit 11—1, the other terminal of which is connected to ground. The juncture point C—2 is connected to one terminal of the manually operable switch 4—24. The juncture point C—3 is connected to the arm 4—21 of instrumentality 4, which arm 4—21 is electrically connected to a pair of contacts adapted to engage the relatively fixed contacts 4—22 and 4—23. The juncture point C—4 is connected through the wire D to an oscillator D—1 and to one of the terminals 7—7 associated with each of the push buttons 7—1. The circuit between the juncture point C—4 and the oscillator D—1 is controlled by means of the switch D—2 biased to open position. Said switch D—2 is to be closed when erasing and recording functions are to be performed upon any of the recording strips 6—15.

The uppermost contacts 7—7 are connected through a plurality of conductors D—3 to the erasing heads 6—22 associated with the various recording strips 6—15. The other terminal of each of the erasing heads 6—22 is connected to ground through a corresponding conductor D—4.

The juncture point C—5 is connected through the conductor E to the uppermost contacts 7—4 associated with the various push buttons 7—1. Said conductor C, as shown in the lower right-hand portion of Figure 1—B, is connected to the contact 8—22 which forms part of instrumentality 8.

One of the two contacts adapted to be engaged by the switch 4—24 is connected by means of the conductor F to the relatively fixed contact 4—18. The other of the contacts adapted to be engaged by the switch arm 4—24 is connected to the juncture between the arms 4—15 and 4—17. The relatively fixed contact 4—16 is connected to the conductor G provided with the juncture points G—1 and G—2. Connected to the juncture point G—2 are the electromagnets 5—3 and 5—8, the other sides of both of said electromagnets being connected to ground. When said electromagnets 5—3 and 5—8 are energized, the motor 5—1 will be swung upwardly about its pivot 5—2 to have operative connection with the rewind spool 6—1 and said motor will be connected to rotate in a direction to drive said spool in the rewind direction. The conductor G is connected through juncture points G—1 and G—3 to one side of the electromagnet 9—4, the other side of which is connected to ground. Connected to the wire F adjacent to the relatively fixed contact 4—18 is the wire H which leads to the juncture point H—1. Branch conductors lead to the electromagnets 5—4 and 5—9, the other sides of which are connected to ground. When said electromagnets 5—4 and 5—9 are energized, the motor 5—1 will be swung downwardly about the pivot point 5—2 into the driving relationship with the windup spool 6—2 and said motor will rotate in the direction to take up the recording strips 6—15 upon said windup spool 6—2.

As indicated above, the switch arms 5—17 and 5—18 operate in unison and the switch arms 5—19 and 5—20 operate in unison. When switch arms 5—17 and 5—18 are in engaging relationship with their contacts 5—15 and 5—16, respectively, the arms 5—19 and 5—20 will be out of engagement with said contacts 5—15 and 5—16. Conversely, when said arms 5—17 and 5—18 are out of engagement with their respective contacts 5—15 and 5—16, said arms 5—19 and 5—20 will be in engagement with their respective contacts 5—15 and 5—16. Contacts 5—15 is grounded and contact 5—16 is connected to the juncture point I—1 which, through the conductor I, is connected to the relatively fixed contact 8—23 of instrumentality 8.

Referring now to instrumentality 4, the two relatively stationary contacts 4—22 and 4—23 are adapted to be engaged by the co-operating contacts carried by the swinging arm 4—21. When so engaged by the contacts carried by the arm 4—21, circuit may be traced from the juncture points C—3 through the arm 4—21, thence in parallel to the contacts 4—22 and 4—23. The contact 4—22 is connected through the conductor J to the juncture point J—1, whence circuit may be traced through the solenoid 4—10 to ground. Circuit may also be traced from the juncture point J—1 through the solenoid 3—10 to ground.

Relatively fixed contact 4—23 is connected to the conductor K which is connected to all of the upper contacts 7—5 associated with the various push buttons 7—1. The lowermost contacts 7—5, associated with the push buttons 7—1, are connected by means of a plurality of conductors L to a corresponding reject solenoid 7—15. There are as many conductors L and as many reject solenoids 7—15 as there are push buttons. The other side of each of the reject solenoids 7—15 is connected through a corresponding conductor M to a corresponding contact button 8—11 forming part of instrumentality 8. Said contacts 8—11, which are illustrated in Figure 1—B and Figure 2 as being the innermost of the three co-axially disposed series of contact buttons, are adapted to be engaged in succession by the contacting arm 8—5 which, through the slip ring 8—20 and brush 8—21, is connected to ground.

Circuit has been traced hereinabove through the conductor C to the swinging contact 8—22. When said contact 8—22 is in its uppermost position to which it is biased, circuit may be traced from the contact 8—24 through the conductor N to one side of the motor 8—2, the other side of which is connected to ground. When said swinging contact 8—22 is in its lowermost position, that is, its unbiased position, said contact 8—22 will engage the contact 8—23, thereby connecting conductor C to the conductor I which, as mentioned hereinabove, supplies current to the reversible swinging motor 5—1. The swinging arm 8—14 carrying the contact 8—22 is adapted to be swung from its biased position by the electromagnet 8—15, the circuit of which may be traced as follows:

Extending from the lowermost contacts 7—4, associated with the various push buttons 7—1, are a plurality of conductors O equal in number to the push buttons 7—1, which conductors O

are connected to the contact buttons 8—10 adapted to be engaged in succession by the contact arm 8—4 which, through the slip ring 8—18 and brush 8—19, is connected to the conductor P which leads to the electromagnet 8—15, the other side of which is connected to ground.

The input connections to the amplifying unit 11—1 will now be referred to. One terminal of the input connections is connected to ground. The other input terminal is connected to the terminal 12—3 adapted to be contacted by the switch 12—2. Said switch 12—2 has two alternative positions, one (in engagement with the contact 12—3) in short-circuiting relationship with the microphone 12—1. The other of the alternative positions of the switch 12—2 is in engagement with the contact 12—4 which connects the amplifier unit 11—1 in circuit with the microphone 12—1. The switch 12—2 is connected by means of the conductor Q to one terminal of the voice controlled relay 4—1, the other terminal of which is connected through the conductor R to all of the pickup heads 6—21, the other terminals of said pickup heads being connected through a plurality of conductors R—1 to the uppermost contacts of the sets of contacts 7—3. The lowermost contacts of the sets of contacts 7—3 are connected through a plurality of conductors R—2 to the outermost series of contact buttons 8—9 on the disc 8—6. Said contact buttons 8—9, as shown in Figure 2, are adapted to be engaged in succession by the rotating arm 8—3 which, through the slip ring 8—16 and brush 8—17, is connected to ground, thereby completing the circuit for the amplifying unit 11—1.

The output connections of the amplifying unit 11—1 will now be referred to. The output terminals are connected to the magnetic coil of the speaker 11—2 through the switch contacts 9—1 which are controlled by the arm 9—2 responsive to energization of the electromagnet 9—4.

The present invention provides means for automatically playing a recording or recordings in sequence, in case an operator should deposit one or more coins in the coin-controlled switch 2 without pressing in a corresponding number of push-buttons 7—1. For this purpose a conductor S is provided connected to the conductor C and leading to the series of contacts 7—6.

According to the example illustrated in which 20 push-buttons 7—1 are provided lettered from "*a*" to "*t*," the conductor S will be connected to the uppermost contact 7—6 of that push-button 1—1 which is marked "*t*." The lowermost contact 7—6 of push-button 7—1 marked "*t*" is connected to the lowermost contact 7—6 of the preceding push-button which may be called "*s*." The uppermost of the contacts 7—6 of push-button "*s*" is connected to the uppermost of the contacts 7—6 of push-button "*r*." This staggered relationship is continued throughout the push-buttons over to push-button "*a*." The contacts in each set of contacts 7—6 are biased to closed position and are opened when the corresponding push-button is pushed in.

According to the embodiment of the invention being described, the uppermost contact 7—6 of push-button "*a*" is connected to electromagnet 7—16, the other side of which is connected to ground. Completing the circuit for electromagnet 7—16 and the contacts 7—6 of push buttons 7—1, circuit may be traced from the uppermost of the contacts 7—6 of the last push-button (marked "*t*") through conductor S to brush 3—12, contacts 3—11 (engaged because the coin-operated switch has caused the ratcheting of ratchet wheel 3—4 from its zero position), slip ring 3—13, brush 3—14, to conductor A, which is connected to the ungrounded side of the outlet plug 1—1. Therefore if someone should place one or more coins in the coin-controlled switch 2, neglecting to push in any of the push-buttons, the electromagnet 7—16 will be energized to move all of the push-buttons to their operative positions and recordings will be transcribed in succession from the recording strips 6—15, depending upon the location of the arm 8—5 which controls the motor 8—2.

The present invention also provides the mechanism, permitting mass rejection of any selections which may have been made by the pushing in of one or more of the push-buttons 7—1. This mechanism is embodied in the conductor T which is connected to the conductor B which, in turn, is connected to the ungrounded side of the plug 1—1. Said conductor T is connected to the contact 8—25 which is mounted upon the swinging arm 8—14. Said contact 8—25 is biased into contacting relationship with the contact 8—26. Said contact 8—26 is connected through the conductor U to the push-button 7—21, biased to open position. The other terminal of said push-button 7—21 is connected to the electromagnet 7—20, the other side of which is connected to ground. As indicated above, said electromagnet 7—20 is adapted to attract the armature 7—22 and to move all of the detents 7—14 (associated with the various push-buttons 7—1) out of detent relationship with the collars 7—13 of said push-buttons.

A mode of operation of the above described embodiment of the present invention is substantially as follows:

It may be assumed that all of the push-buttons 7—1 are in their outermost positions. All of the mechanism is assumed to be at a standstill.

When the operator desires to make a selection of one or more transcriptions to be played, he will push in a corresponding number of push-buttons 7—1. These push-buttons will be held in unbiased position by the corresponding detents 7—14. In the drawing the parts are illustrated in the positions which will be assumed when the operator has pushed in the first of the push-buttons 7—1, that is, the push-button furtherest to the left which is marked "*a*". Under these conditions the detent 7—14 will hold the corresponding push-button in its innermost position, thereby providing engagement of the pairs of contacts 7—3, 7—4, 7—5 and 7—7 and disengaging the normally engaged contacts 7—6. The operator will then deposit a coin or a plurality of coins in succession in the coin-controlled switch 2 thereby momentarily completing circuit in succession to the electromagnet 3—1, ratcheting the ratchet wheel 3—4 in a counter-clockwise direction a number of steps corresponding to the number of coins deposited. This will bring a pair of contacts 3—11 into engagement with the brush 3—12, permitting current to pass from the plug 1—1 to conductor A through brush 3—14, slip ring 3—13 and contacts 3—11 to the conductor C, supplying current to the amplifying unit 11—1. Current will also pass from the juncture point C—2 to the switch 4—24, contact arm 4—17, contacts 4—18 and conductor H to the juncture point H—1, whence current may pass to the electro-

magnets 5—4 and 5—9 whence current passes to ground. Energization of the electromagnet 5—9 will move the switch arms 5—17 and 5—18 into engagement with their corresponding contacts 5—15 and 5—16. Energization of the magnet 5—4 swings the motor 5—1 downwardly about its pivot 5—2 bringing said motor into driving relationship with the windup spool 6—2. Current also flows from the conductor C to the switch contact 8—22 (Figure 1—B) which at this time is in engagement with the contact 8—24. Circuit may be traced from contact 8—24 through the conductor N to one side of the motor 8—2, thence to ground. The arm 8—14 is at this time out of locking engagement with the detent wheel 8—12 and accordingly the motor 8—2 will be operated to turn the shaft 8—1 carrying with it the arms 8—3, 8—4 and 8—5. When the arm 8—4 comes in contact with the button 8—10, which is connected to the first of the push-buttons 7—1 which has been pushed in, circuit will be completed from the corresponding button 8—10 through the conductor O to the lowermost of the contacts 7—4 of the first of the push-buttons which has been pushed in. From the uppermost of said contacts 7—4 circuit may be traced through the conductor E to the juncture point C—5. Therefore current from conductor C may proceed from the arm 8—4, the slip ring 8—18, brush 8—19, through the conductor P to the electromagnet 8—15, thence to ground. The resulting energizatoin of the electromagnet 8—15 will move the arm 8—14 out of its biased position whereby the detent 8—13 on the arm 8—14 will be moved into a corresponding notch on the detent wheel 8—12, thereby stopping rotation of the shaft 8—1 and holding said shaft fixed. The movement of the arm 8—14 will break the engagement between the contacts 8—22 and 8—24 and will cause engagement between contacts 8—22 and 8—23, thereby completing circuit from the conductor C through the conductor I to the juncture point I—1. Current may pass from conductor I through the contact arms 5—17 and 5—18 to the motor 5—1, thereby setting said motor into operation. Inasmuch as the motor 5—1 has already been swung into driving relationship with the take-up spool 6—2, the result will be rotation of said take-up spool 6—2. This will result in the movement of all of the recording strips 6—15 past the eraser heads 6—22 (the functions of which will be discussed presently) and past the pick-up heads 6—21. The particular pick-up head 6—21 which is connected to the button 8—9, which is contacted by the arm 8—3, will be in circuit to provide a transcription of the recording upon that particular recording strip 6—15. According to the illustration, the particular contact button 8—9 associated with the first push-button 7—1 is being contacted by the arm 8—3 and accordingly a transcribing circuit may be traced from the amplifying unit 11—1 through the switch 12—2 and conductor Q to the voice-controlled relay 4—1, thence through the conductor R to the pick-up head 6—21 associated with the first push-button 7—1, thence through the conductor R—1 through the contact 7—3 and conductor R—2 to the arm 8—3 through the corresponding contact button 8—9. From said arm 8—3 circuit may be traced through the brush 8—17 to ground and from ground back to the amplifying unit 11—1. The switch contacts 9—1 will be in their biased (that is, closed) position at this time and consequently the speaker 11—2

will be connected in circuit to transcribe sound from the amplifying unit 11—1. When the magnetic strips 6—15 have progressed to a point beyond the magnetic recording of the particular strip which is being transcribed, the voice-controlled relay 4—1 will be de-energized. The energization of the voice-controlled relay 4—1 will have resulted in the completion of a circuit through the electromagnet 4—2 from the conductor C to ground. The energization of the electromagnet 4—2 will move the arm 4—3 in a clockwise direction, putting the pawls 4—4 and 4—5 into their withdrawn positions. When the recording strips 6—15 have progressed to a region at which the particular recording strip being played has moved to a point beyond the recording thereon, the voice-controlled relay 4—1 will no longer be energized and consequently the electromagnet 4—2 will no longer be energized. The spring 4—8 will then draw the arm 4—3 in a counter-clockwise direction, thereby moving the ratchet wheels 4—6 and 4—7 one step in a clockwise direction. Clockwise rotation of the ratchet 4—6 will result in the removal of the abutment 4—14 from the arm 4—17, thereby causing disengagement of the contacts 4—18. Said clockwise movement of the ratchet 4—6 will also cause the engagement of an abutment 4—13 with the arm 4—15, resulting in the engagement of contacts 4—16. Circuit may now be traced from the conductor C, juncture point C—2, switch 4—24 and contacts 4—16 to conductor G and thence through the electromagnet 5—3 and 5—8, in parallel, to ground. Energization of the electromagnet 5—3 will cause the swinging of the motor 5—1 about its pivot 5—2, bringing said motor into driving relationship with the rewind spool 6—1. The energization of the electromagnet 5—8 will result in the movement of the switch arm 5—19 and 5—20 into engagement with the contacts 5—15 and 5—16, respectively, thereby connecting the motor 5—1 for reverse operation to drive the take-up spool 6—1 in a rewind direction. The shaft 8—1 is still locked in stationary position by the detent arm 8—14 and circuit may still be traced from conductor C through the conductor I to the juncture point I—1 which is connected to the control switch for the motor 5—1. The closing of the contacts 4—16 completes a circuit from the power conductor C through the switch 4—24, contacts 4—16, juncture point G—1, conductor H to the electromagnet 9—4, thence to ground. Energization of the electromagnet 9—4 results in the disengagement of the contacts 9—1 which controls the connection of the speaker 11—2 to the amplifying unit 11—1. Consequently as the recording strip, the recording on which has just been transcribed, passes its corresponding pickup head 6—21 in the rewind direction, there will be no sound emitted from the speaker 11—2. However, the magnetic recording upon said magnetic strip 6—15 will cause operation of the voice-controlled relay 4—1 to again cause energization of the electromagnet 4—2, moving the pawls 4—4 and 4—5 again to their withdrawn, that is, cocked positions. After the particular magnetic strip under consideration has progressed to a point at which the magnetic recording thereon has passed the corresponding pickup head 21, the voice-controlled relay, after a lapse of a predetermined time delay, will cause the de-energization of the electromagnet 4—2, thereby allowing the spring 4—8 to move the pawls 4—4 and 4—5 to move

the ratchet wheels 4—6 and 4—7 another step in a clockwise direction. This will cause the disengagement of contacts 4—16 and the reengagement of the contacts 4—18. The opening of the contacts 4—16 and the closing of the contacts 4—18 will result in the de-energization of the electromagnets 5—4 and 5—9, and the energization of the electromagnets 5—3 and 5—8, causing the disengagement of the contacts 5—17 and 5—18 from the corresponding contacts 5—15 and 5—16 and the engagement of contacts 5—19 and 5—20 with said contacts 5—15 and 5—16. This will ready the motor 5—1 to drive the wind-up spool 6—2 in the wind-up direction. Rotation of the ratchet 4—7 will also cause the engagement of one of the abutments 4—20 against the arm 4—21, thereby completing circuit from conductor C in parallel to the contacts 4—22 and 4—23. Circuit from the contact 4—23 may be traced through the conductor K to the uppermost contact of each of the sets of contacts 7—5 associated with the push buttons 7—1. Circuit may be traced from the lowermost contacts on the sets of contacts 7—5 through the plurality of conductors L to the plurality of electromagnets 7—15, thence through the particular conductor M which is connected to the button 8—11 which is contacted by the arm 8—5, thence through the brush 8—21 to ground. Energization of the particular electromagnet 7—15, which is connected in circuit, will result in the operation of the detent 7—14, thereby allowing the corresponding push button which has been pushed in to be moved out by the action of the spring 7—2.

Immediately upon withdrawal of button 7—1, the corresponding contacts 7—4 are opened, thereby breaking the circuit from conductor C through the conductor E through the corresponding conductor O to the particular button 8—10 which is engaged by the arm 8—4. This open-circuiting of the circuit results in the de-energization of the electromagnet 8—15, permitting the withdrawal of the detent arm 8—14 from engagement with the detent wheel 8—12. This action results in the disengagement of the contacts 8—22 and 8—23, thereby open-circuiting conductor I to de-energize the motor 5—1. This same movement of the arm 8—14 causes the engagement of contacts 8—22 and 8—24, completing circuit from conductor C through the conductor N to the motor 8—1 to ground, thereby energizing said motor. The connection of contact 4—22 with the power conductor C through the juncture point C—3 closes a circuit through the conductor J to the electromagnet 3—10, thence to ground. Energization of the electromagnet 3—10 moves the escapement member 3—8 against the tension of the spring 3—9. The upper right-end of said escapement member is moved out of detent relationship with the ratchet 3—5. Also left-hand end of said detent member is moved into detent relationship with a tooth of the ratchet 3—5, allowing the ratchet 3—5 to be rotated a distance of one tooth in a clockwise direction. As noted above, there are twice as many teeth on the ratchet 3—5 as there are on the ratchet 3—4 fixed to said ratchet 3—5. During the interval when the detent member 3—8 has its upper right-hand extremity out of engagement with the ratchet 3—5 and before the lower left-hand extremity of said detent member is in engagement with said ratchet 3—5, the spring 3—6 will move the ratchets 3—5 and 3—4 in a clockwise direction a distance equal to one tooth of ratchet 3—5. As will be explained presently, the electromagnet 3—10 is energized momentarily. When said electromagnet is again de-energized, the escapement member 3—8 will be allowed to swing in a clockwise direction under the influence of the spring 3—9, moving the lower left-hand end thereof out of detent relationship with the ratchet 3—5 and moving the upper right-hand end into detent relationship with said ratchet 3—5. In the interval said ratchet 3—5, under the influence of the spring 3—6, will be moved the distance of one tooth on the ratchet 3—5.

Closure of the arm 4—21 against the switch contact 4—22 has the effect of completing a circuit from the conductor C through said arm 4—21, contact 4—22, conductor J, juncture point J—1 to the electromagnet 4—10, thence to ground.

The design of the electromagnet 4—10 will be such that it is slower in action than the magnet 3—10 and also slower in action than each of the plurality of electromagnets 7—15. Energization of the electromagnet 4—10 will have the result of moving the ratchet 4—7 the distance of one tooth, removing an abutment 4—20 from engagement with the arm 4—21, resulting in the opening of both contacts 4—22 and 4—23. This will result in the de-energization of the electromagnet 3—10, thereby providing the function above mentioned that said electromagnet is energized only momentarily.

This completes a cycle of operation inaugurated by an operation of the coin switch 2, resulting in the transcribing of the magnetic recording on the particular recording strip which has been chosen for operation, followed by the rewind of the spools 6—1 and 6—2, readying the mechanism for operation for the next succeeding transcribing operation.

If the operator has in the first instance deposited more than one coin in the coin-controlled switch 2, the electromagnet 3—1 will be energized a corresponding number of times to turn the ratchet 3—4 a corresponding number of teeth in a counter-clockwise direction in opposition to the pull on the spring 3—6. Ratchet 3—5 is fixed relative to 3—4 and will rotate with ratchet 3—4. At each position of said ratchets (except at the zero position when the pin 3—15 is in engagement with the stop 3—16) the brush 3—12 will engage two adjacent contacts 3—11. Therefore conductor C will be connected through the conductor A to the ungrounded side of the outlet plug 1—1 through the slip ring 3—13 and brush 3—14. Consequently the mechanism will be in condition to move recording strips 6—15 back and forth a number of times equal to the number of coins which have been deposited in the switch 2 and those recording strips 6—15 corresponding to the push buttons 7—1 which are in pushed-in position will have their recordings transcribed in the order, in a clockwise direction, of the corresponding contacts 8—10 engaged in the rotation of the arm 8—4.

For example, if the operator has deposited three coins and has pushed in the first, third and fifth push buttons, that is, those designated by the letters "*a*," "*c*" and "*e*," the motor 8—2 will rotate to a position to cause engagement of the arm 8—4 with the contact 8—10 designated as "*a*" (Figure 2) and the magnetic recording of the first magnetic strip 6—15 will be transcribed. Upon the completion of that transcription and the rewinding of all of the wires upon the rewind spool

6—1, the corresponding electromagnet 7—15 will be energized to withdraw the detent 7—14, allowing the push button 7—1 to be withdrawn by the spring 7—2. This results in the de-energization of the electromagnet 8—15, releasing the detent wheel 8—12 and completing an energizing circuit for the motor 8—2, moving the shaft 8—1 in a clockwise direction, thereby moving the arm 8—4 in a clockwise direction. Circuit may now be traced from the power conductor C (still energized because more than one coin has been deposited in the coin-controlled switch 2) through the contact 7—4 associated with push button "c" (which has been closed since push button "c" has been pushed in), thence through the corresponding conductor O to the contact 8—10 designated as "c," thence through the arm 8—4, through electromagnet 8—15 to ground. Energization of the electromagnet 8—15 will cause counter-clockwise swing of the arm 8—14, open-circuiting the motor 8—2 and moving the detent 8—13 into detent relationship with the wheel 8—12. The mechanism will now be ready for the transcribing of the magnet strip associated with the third push button, that is, the one designated as "c." Continuing with the example in which the first, third and fifth push buttons have been pushed in, the mechanism will operate automatically after the transcribing of the magnetic recording on the third magnetic strip to rewind the strips upon the rewind spool 6—1 followed by the transcribing of the magnetic recording on the magnetic strip corresponding to the fifth push button after which the mechanism will come to a stop with the shaft 8—1 in a position engaging the fifth contact button 8—10, that is, the one designated as "e." Considering the situation in which an operator has deposited one or more coins in the switch 2, but has pushed in none of the push buttons 7—1, the following comments may be made: As previously indicated, the insertion of the coins into the switch 2 will energize the power conductor C from the conductor A which is connected to the ungrounded side of the plug 1—1. Circuit may be traced from the power conductor C through the conductor S through all of the contacts 7—6 (all of which are closed since no push buttons are pushed in) through the electromagnet 7—16 to ground. Energization of the electromagnet 7—16 will cause the movement of the lever 7—18 in a counter-clockwise direction, moving all of the push buttons 7—1 to their in-positions. Accordingly, transcription will start from the recording strip 6—15 associated with the particular button 8—10 which happens to be contacted by the arm 8—4. Following the procedure above described, the first transcription will be followed by the rewinding of all of the recording strips and the transcription from the next succeeding recording strip 6—15 until circuit is broken between conductor A and conductor C by reason of the fact that no more coins have been deposited to complete this connection.

The present invention provides a mechanism making it easy for an operator to throw out any of the push buttons 7—1 which have been pushed in provided he has not yet inserted coins into the switch 2. Considering a case in which an operator has pushed in one or more of the push-buttons 7—1, before he has inserted any coins in the switch 2, he may eject those push buttons which have been pushed in by momentarily closing the switch 7—21. This action completes a circuit from the conductor A through the conductor T to the contact 8—25, which is biased into engagement with contact 8—26. From contact 8—26, circuit may be traced through the conductor U to the push button 7—21, thence through the electromagnet 7—20 to ground. Energization of the electromagnet 7—20 will result in the attraction of the bell crank lever 7—22, causing the downwardly extending end of said lever to engage the plurality of detents 7—14, thereby releasing all of the buttons 7—1 which are in in-position. The contacts 8—25 and 8—26 are engaged except when electromagnet 8—15 is energized, that is, said contacts 8—25 and 8—26 are in engagement at all times except when a transcribing operation is being performed and during rewind of the spools 6—1 and 6—2.

The present invention provides mechanism making it easy to erase the magnetic recording from any selected recording strip 6—15 and immediately place a new magnetic recording upon said strip.

As hereinbefore stated, each of the recording strips is provided with an eraser head 6—22 as well as a pick-up head 6—21. According to known practice, each pick-up head 6—21 may also function as a recording head. The erasing head and the recording head associated with each strip are closely grouped together. However, the groups of erasing heads and recording heads associated with adjacent strips are preferably staggered with relation to each other. A group of recording heads and erasing heads on each strip 6—15 is shielded from the group of erasing heads and recording heads associated with the second neighboring recording strip by means of a shield 6—22, all as above described.

When it is desired to erase a magnetic recording from any particular recording strip 6—15 and to place a new magnetic recording upon that strip, the operator will move the switch 4—24 into electrical connection with the conductor F, will move the switch 12—2 into engagement with the contact 12—4 and will close the switch D—2. The operator will then push in the push button 7—1 corresponding to the particular magnetic strip which he desires to operate upon. He will then operate the ratchet mechanism 3 into a position wherein a pair of contacts 3—11 are engaged by the brush 3—12 either by depositing coin in the coin-controlled switch 2 or by manually operating said ratchet mechanism 3.

In accordance with the procedure as above recited, the motor 5—1 will be rotated and will be swung into driving relationship with the take-up spool 6—2. The particular magnetic strip 6—15 corresponding to the push button which has been pushed in will pass its corresponding erasing head 6—22 which is now operative through a circuit which may be traced as follows: from contact point C—4 through switch D—2 through the oscillator D—1 through the lowermost contact of the corresponding set of contacts 7—7 and from the uppermost contact thereof through conductor D—3 to one side of the corresponding erasing head 6—22, thence through the conductor D—4 to ground. This operation will erase the recording from that particular recording strip.

At the same time sound such as music or speech will be delivered into the microphone 12—1. Power input to the amplifying unit 11—1 is modulated by reason of the music or speech delivered to the mircophone 12—1. Circuit may be traced from the amplifying unit 11—1 through the microphone 12—1 and conductor Q to the voice-controlled relay 4—1. From said voice-controlled relay 4—1 circuit may be traced

through the conductor R to one side of each of the pick-up or recording head 6—21. At this time the pick-up head 6—21 will function as a recording head. From the other side of the pick-up or recording head 6—21 associated with the particular recording strip 6—15 being operated upon, circuit may be traced through the corresponding conductor R—1 to the contacts 7—3 of the corresponding push button 7—1. From said contacts 7—3 circuit may be traced through the corresponding conductor R—2 to the corresponding contact button 8—9 and thence through the arm 8—3 and brush 8—17 to ground. This will result in the placing of a magnetic recording upon the corresponding magnetic strip 6—15. Inasmuch as the placing of a recording on said recording strip 6—15 has occurred almost immediately after the erasure of a preceding recording on said magnetic strip, there will be no opportunity for the mechanism to automatically rewind until the proper time for such rewinding occurs. When the transmission of sound to the microphone 12—1 has ceased, the voice-controlled relay 4—1, after the lapse of a predetermined time interval, will allow the electromagnet 4—2 to become de-energized and thereby cause the rewinding of the spools.

Under certain circumstances it will doubtless be desirable to wind all of the recording strips 6—15 completely upon either the spool 6—1 or the spool 6—2. Both of said spools are readily removable from their corresponding shafts, it being necessary only to withdraw the corresponding pin 6—7 or 6—8 and to lift out the corresponding spool 6—1 or 6—2.

In order to wind up the recording strips 6—15 completely upon either of said spools 6—1 or 6—2, the double-pole, double-throw switch 10 is provided. Said switch 10 is provided with the swinging arms 10—1 and 10—2 which are connected together and are connected to the conductor A. Said arms 10—1 and 10—2, when swung upwardly, will engage the contacts 10—3 and 10—4, respectively, and when swung downwardly will engage the contacts 10—5 and 10—6, respectively. When said switch 10 is thrown upwardly, the conductor (connected to the ungrounded side of the outlet plug 1—1) is connected through the switch 5—10 to energize the electromagnets 5—3 and 5—8 to energize and bodily swing the motor 5—1 to wind up the spool 6—1 in a rewind direction. According to practice which is preferred in wire recorders, each recording strip 6—15 will be releasably held at both ends by the spools 6—1 and 6—2 and when each strip is completely unwound from either of said spools, it will pull of harmlessly, the result being that all of the strips will be rewound upon the rewind spool 6—1.

Conversely, if it is desired to wind up all of the strips completely upon the wind-up spools 6—2, the switch 10 will be thrown downwardly, thereby causing the electromagnets 5—4 and 5—9 to energize and bodily swing the motor 5—1 to communicate turning movement to said winding spool 6—2, thereby accomplishing the result that all of the magnetic strips will be wound up on said wind-up spool 6—2. As indicated above, either spool may then be readily moved and replaced by another spool.

The present invention has the advantage that the valuable features of a wire recorder may be had in a mechanism employing a plurality of magnetizable strips, the mechanism having the advantage of simplicity, relative low cost and certainty in action. A further advantage is attributable to the fact that the invention provides an effective and simple means for determining just when the mechanism should be reversed due to arrival at the end of a recording being transcribed. A further advantage is attributable to the fact that the mechanism operable after an operator has chosen a recording is simple, effective and quick in action.

A further advantage is that at the will of the operator any recording may be erased and immediately replaced by another recording upon any of the magnetic strips. Further advantage lies in the fact that it is a simple matter for an operator to remove either or both of the spools and to replace either or both of said spools. The new spool, if so desired, may carry an entire new set of recordings, occupying a minimum of space and involving a minimum of weight. The present invention has the further advantage that it may be embodied in compact form. Another advantage is that the mechanism may be readily serviced.

Inasmuch as the mechanism is simple, it adapts itself readily to remote control whereby, for example, patrons seated at a plurality of locations have equal opportunity to operate the mechanism.

Though a preferred embodiment of the present invention has been described in detail, many modifications will occur to those skilled in the art. It is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is:

1. In mechanism of the character described, in combination, a plurality of magnetizable strips, spool means for carrying said strips and moving said strips in unison, reversible motive means for driving said spools to move said strips selectably in a transcribing operation or rewind operation, pickup means adapted to respond selectably to magnetization on any of said strips and means responsive to said pick-up means for controlling said motive means to control the direction of movement of said strips, a plurality of selector means for selectably readying said pick-up means for co-operative relationship with any one of said strips, said pick-up responsive means including means operative after impulses from said pick-up means have ceased during a rewind operation for readying said motive means for moving said strips for a transcribing operation and for ejecting the selector means corresponding to the strip which has just been transcribed.

2. In a device of the character described, in combination, a plurality of magnetizable strips, spool means for carrying said strips, motive means for driving said spool means to reciprocate said strips for transcribing and rewind operations, pick-up means co-operating with said strips, a distributor, an amplifier, selector means adapted when in operative position to ready said pick-up means for connection selectably through said distributor to said amplifier, a motor for operating said distributor, detent means for holding said distributor in predetermined positions for connecting said pick-up means in co-operative relationship with any one of said strips and means adapted upon the cessation of impulses from said pick-up means in the rewind operation of said strips to ready said motive means for operation, to eject from operative position the particular selector means corresponding to the strip which has just been transcribed, for releasing said distributor and for closing circuit to said motor to ready said motor to move said distribu-

tor to a position connecting said pick-up means in co-operative relationship with one of said strips corresponding to a selector means which is in operative position.

3. In mechanism of the class described, in combination, a plurality of magnetizable strips, means for moving said strips in unison in reverse directions for transcribing and rewind operations, pick-up means, an amplifier, selector means for selectably connecting said pick-up means to pick up magnetic recordings from any one of said strips and delivering impulses to said amplifier responsive to impulses from said pick-up means for controlling the direction of movement of said strips, said direction controlling means including step-by-step mechanism, a speaker co-operatively related to said amplifier and means responsive to said step-by-step mechanism for disconnecting said speaker from said amplifier when said strips are being moved in a rewind operation.

4. In mechanism of the character described, in combination, a plurality of magnetizable strips, spool means for carrying said strips and moving said strips, reversible motive means for driving said spools to move said strips selectably in a transcribing operation or rewind operation, pick-up means adapted to respond selectably to magnetization on any of said strips and means responsive to said pick-up means for controlling said motive means to control the direction of movement of said strips, a plurality of selector means for selectably readying said pick-up means for co-operative relationship with any one of said strips, said pick-up responsive means including means operative after impulses from said pick-up means have ceased during a rewind operation for readying said motive means for moving said strips for a transcribing operation and

for ejecting the selector means corresponding to the strip which has just been transcribed.

5. In mechanism of the class described, in combination, a plurality of magnetizable strips, means for moving said strips in reverse directions for transcribing and rewind operations, pick-up means, an amplifier, selector means for selectably connecting said pick-up means to pick up magnetic recordings from any one of said strips and delivering impulses to said amplifier responsive to impulses from said pick-up means for controlling the direction of movement of said strips, said direction controlling means including step-by-step mechanism, a speaker co-operatively related to said amplifier and means responsive to said step-by-step mechanism for disconnecting said speaker from said amplifier when said strips are being moved in a rewind operation.

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Certificate of Correction

Patent No. 2,488,482 November 15, 1949

DAVID S. SWARTHOUT ET AL.

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 10, line 16, for the word "Contacts" read *Contact*; column 19, lines 46 and 47, for "conductor" read *conductor A*; line 56, for "of", second occurrence, read *off*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of March, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.