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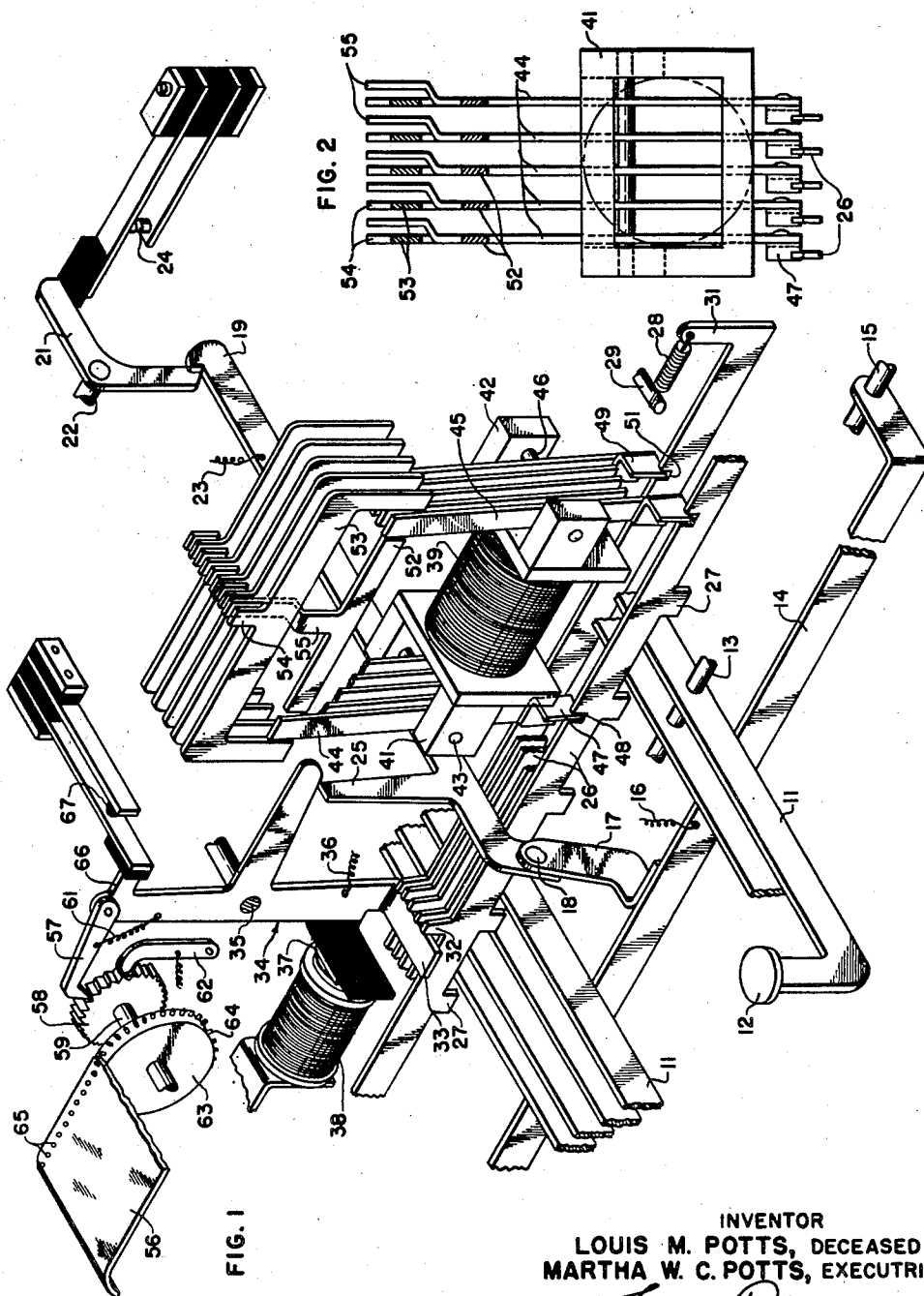
L. M. POTTS

2,560,474

KEYBOARD OPERATED MAGNETIC RECORDER

Filed June 18, 1947

2 Sheets-Sheet 1



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FIG. 3

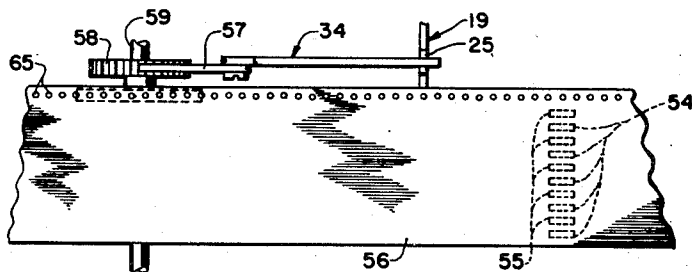


FIG. 4

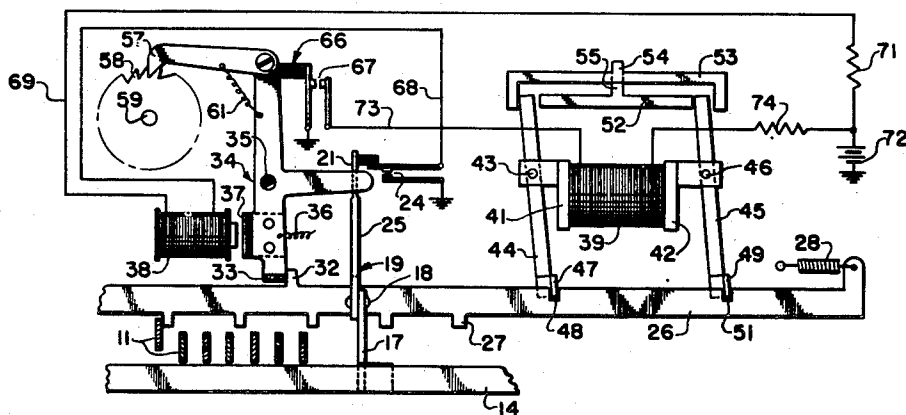
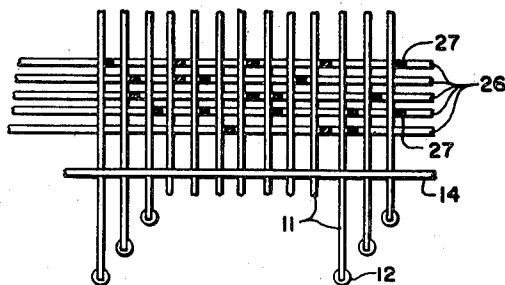


FIG. 5



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KEYBOARD OPERATED MAGNETIC RECORDER

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a corporation of Delaware

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1 Claim. (Cl. 346—74)

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This invention pertains to recorders and more particularly to keyboard operated magnetic recorders.

The principal object of the invention is to provide a device for preparing a magnetic record on a steel tape.

Another object of the invention is to produce on a steel tape a magnetized record comprising a plurality of transverse rows of magnetized areas, one area for each element of the code, in which the poles are arranged in one manner for spacing impulses and in the reverse manner for marking impulses.

Specifically, the device according to the present invention comprises a keyboard adapted to control a permutation code selector mechanism which in turn governs a series of elements of magnetic material which are influenced magnetically by a single magnet to produce a magnetic path, including the steel tape, so as to leave on said tape areas which have been magnetized according to the code determined by the key operated.

The foregoing and other objects and features of the present invention will be more fully described in the following specification when interpreted in the light of the accompanying drawings, wherein:

Fig. 1 is a perspective view of the keyboard operated magnetic tape recorder according to the present invention;

Fig. 2 is a vertical transverse sectional view taken substantially through the selector mechanism and pole pieces;

Fig. 3 is a top view of the tape and tape stepping instrumentalities;

Fig. 4 is a schematic view showing the electrical diagram and associated mechanical elements; and

Fig. 5 is a fragmental bottom view showing the relation between the code bars and key levers.

Having reference to the drawings wherein like reference characters represent like parts throughout the several views, there is shown in Fig. 1 a plurality of key levers 11 having keytops 12. Levers 11 are pivotally mounted on a pivot shaft 13 suitably positioned in the apparatus, and are normally biased in a clockwise direction (as viewed in Fig. 1) by individual springs (not shown) in a manner well known in the art. A universal bail 14 of U-shaped conformation is positioned below the key levers 11 and is rotatably mounted on a shaft 15. Bail 14 is normally biased upwardly against the lower edges of the key levers 11 by a spring 16.

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A bracket 17 is fixed to the bail 14, and pivotally articulated to the bracket 17 at 18 is a rearwardly directed member 19 the free extremity of which is shouldered to cooperate with the depending arm of a bell crank lever 21 pivotally mounted on a stud 22. A spring 23 normally biases the member 19 counterclockwise about pivot 18 to facilitate cooperation of member 19 with its associated elements. The horizontal arm of bell crank lever 21 cooperates with a contact member 24. Member 19 is also provided with a vertically directed projection 25, the function of which will hereinafter appear. Appropriately positioned above the key levers 11 is a selector mechanism comprising a series of code bars 26 which are suitably mounted in the apparatus so as to render them slidable longitudinally.

Code bars 26 are provided along their lower edges with depending code lugs 27 variably spaced according to codes assigned to the key levers 11. This arrangement is more clearly indicated in Fig. 5. As shown in Fig. 4, the lugs 27 are arranged to the right of their respective key levers 11 so that when a key lever 11 is operated the rear portion thereof will be raised into the path of motion of the lugs 27 and will provide a stop to limit the motion of bars 26 having lugs 27, but not of those not having lugs 27. Leftward motion (as viewed in Figs. 1 and 4), is imparted to the code bars 26 by their individual springs 28 distended between a spring post 29 and lugs 31 on the code bars.

Code bars 26 are provided with further vertical lugs 32 which cooperate with a reset bail 33 integral with a combination reset and tape feed lever 34 pivotally mounted at 35. A spring 36 normally biases lever 34 in a counterclockwise direction (as viewed in Figs. 1 and 4) so that bail 33 acts through lugs 32 to urge code bars 26 rightwardly against the action of springs 28. Code bars 26 are retained in their rightward position since spring 36 is of greater strength than the combined strengths of the springs 28.

Secured to the depending arm of lever 34 is an armature 37 which is adapted to coast with an electromagnet 38, which when energized will attract the armature 37 and stretch the spring 36 to permit leftward movement of code bars 26 in accordance with the permutative setting of the lugs 27 and the key lever 11 operated.

An electromagnet 39 is suitably positioned above the code bars 26 and is provided with pole pieces 41 and 42. Pivotally supported at 43 in pole piece 41 are a series of levers 44 of magnetic material corresponding in number to the code

bars 26. Similarly, a series of levers 45 of magnetic material is pivotally supported on shaft 46 journaled in pole piece 42 and corresponds in number to the number of code bars 26. The lower end of each lever 44 is provided with an angle element 47 which fits into a slot 48 in its associated code bar 26 to which it is thus pivotally articulated. Similarly, each lever 45 has fixed to its lower extremity an angle element 49 which cooperates with a slot 51 to effect pivotal articulation with its associated code bar 26. Elements 49 may be made of flexible material for the purpose of insuring that both levers 44 and 45 make contact with the pole pieces 52 and 53.

Fixedly mounted in suitable spacer combs (not shown) are two series of pole piece members 52 and 53 also of magnetic material. Each pair of pole pieces 52 and 53 is arranged in the same plane with its associated levers 44 and 45. Each member 52 is adapted to coact with the upper portion of the confronting edges of its associated levers 44 and 45. Moreover, each member 53 is provided at each end with depending arms adapted to coact with the remote edges of levers 44 and 45. Each member 53 is provided with a vertically extending projection 54. Each member 52 is provided with a vertically extending projection 55 which is offset to clear the member 53 disposed thereabove. Projections 54 and 55 are arranged in transverse alignment, as shown in Figs. 1 and 4, and the upper extremities thereof terminate in the same horizontal plane so that a hardened steel tape 56 which is passed thereover is always in contact therewith.

Lever 34 is provided with a horizontal arm which cooperates with the projection 25 to effect the disengagement of lever 19 from the bell crank lever 21, as will hereinafter appear. Lever 34 also pivotally carries at the extremity of its vertical arm a pawl 57 which is adapted to cooperate with a tape stepping ratchet 58 fixed to a shaft 59 suitably journaled in the apparatus. A spring 61 functions normally to hold pawl 57 in contact with the ratchet 58. A spring loaded detent 62 is also provided to cooperate with the ratchet 58 in well known manner. A toothed feed wheel or sprocket 63 is also fixed to the shaft 59, the teeth 64 of which coact with a row of feed holes 65 provided along one margin of the steel tape 56. Lever 34 is further provided at its upper end with a laterally directed projection 66 which operates a contact 67.

In the operation of the arrangement according to the present invention a key lever 11 is depressed and caused to rotate about the pivot shaft 13 to bring the rear end of the key lever into the path of motion of the lugs 27. This operation of the key lever also depresses the universal bail 14 which through the bracket 17 imparts forward (leftward as viewed in Fig. 1) movement to member 19 which in turn rotates bell crank lever 21 to close the contact 24. When the contact 24 is thus closed a circuit (Fig. 4) is completed for the energization of magnet 38 from ground, through contact 24 (now closed), over conductor 68, through the winding of magnet 38, over conductor 69, through resistance 71 to grounded battery 72.

When the magnet 38 is energized, the armature 37 is attracted and the lever 34 is rotated clockwise to retract the bail 33 from the lugs 32, thereby permitting the springs 28 to function to actuate the code bars 26 leftwardly. However, only those code bars 26 will move leftwardly which

are devoid of lugs 27 adjacent the operated key lever 11. The remaining code bars will not move because the lugs 27 thereon will abut the side of the key lever.

In response to those code bars 26 which are permitted to move leftwardly the levers 44 and 45 associated therewith will be rotated clockwise to bring the upper end of lever 44 into contact with the left end of member 52, and the upper end of lever 45 into contact with the right depending arm of member 53, thereby completing a path for a magnetic circuit traced as follows: From the core of magnet 39, through the upper end of lever 45, through the right half of member 53, through projection 54 (in contact with the steel tape 56), through the tape 56, through the projection 55, through the left half of member 52, through the upper portion of lever 44 to the core of the magnet 39. If a code bar 26 is not shifted leftwardly the magnetic circuit would be traced, as shown in Fig. 4, from the core of magnet 39, through the upper portion of lever 45, through the right half of member 52, through projection 55, through steel tape 56, through projection 54, through left half of member 53, through the upper portion of lever 44, back to the core of magnet 39.

Now, when the lever 34 was rotated, the contact 67 was closed to complete an energizing circuit for magnet 39 extending from ground, through contact 67, over conductor 73, through the winding of magnet 39, through resistance 74 to grounded battery 72. Since the lever 34 in rotating clockwise due to the energization of magnet 38 not only closes contact 67, but also acts through projection 25 to disengage member 19 from bell crank lever 21 to open contact 24, thereby breaking the circuit for magnet 38, the magnet 38 may be made somewhat slow-to-release, if necessary, to insure the proper energization of magnet 39 and proper establishment of the afore-described magnetic circuits.

As previously mentioned, the levers 44 and 45 are of magnetic material which serve to extend the magnetism produced by magnet 39 to the pole pieces 52 and 53. In the position shown in Fig. 4, for example, for a certain direction of current in magnet 39, pole piece 53 may be the north pole and pole piece 52 the south pole, and for the same direction of current with levers 44 and 45 rotated clockwise, pole piece 53 will be a south pole and pole piece 52 will be a north pole. According to the position of the bars 26 when magnet 39 is energized, the five pairs of pole pieces 52 and 53 will be magnetized, one north and one south, as determined by the code to be set. Upon energization of magnet 39, the tape 56 is magnetized in five areas across the tape with the direction of magnetization in each area according to the key lever 11 depressed.

When the magnet 38 was energized and the lever 34 was thereby rotated clockwise, the pawl 57 was actuated rightwardly to engage the next tooth in the ratchet wheel 58. Then, when the magnet 38 was de-energized after the energization of magnet 39 and consequent magnetization of the tape 56, the pawl 57 was actuated leftwardly under the influence of spring 36 to rotate ratchet wheel 58 to step the tape one step. At the same time, the bail 33 becomes effective to shift the code bars 26 rightwardly.

Although the present invention has been described in connection with a certain specific embodiment thereof, it is understood that other equivalent arrangements are contemplated, and

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that the present invention is limited only by the range and scope of the appended claim.

What is claimed is:

In a magnetic recorder for impressing marking and spacing conditions on a magnetically conductive record strip, a plurality of magnetic circuits including means for producing a magnetic flux comprising an electro-magnet having a metallic core, a plurality of pairs of magnetically conductive instrumentalities, corresponding members of each pair pivotally supported on respective ends of said core, a first set of magnetic conductors interposed between the upper inner edges of said pairs of instrumentalities and severally associated therewith, corresponding ones of said pairs of instrumentalities adapted to have contactual engagement alternatively with respective ends of said first set of conductors, a second set of magnetic conductors associated severally with said first set of magnetic conductors and disposed over said first set of conductors and the upper ends of said instrumentalities, said corresponding ones of said pairs of instrumentalities adapted to have contactual engagement alternatively with respective ends of said second set of conductors, each magnetic conductor of said sets provided with a pole determining projection, said

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projections arranged in juxtaposition, and a key controlled selector means pivotally articulated to the lower ends of said instrumentalities, whereby in response to the operation of a key, said instrumentalities are operated into one or the other of said alternative contactual engagements to establish said magnetic circuits to produce on said record strip groups of pairs of magnetized areas arranged in accordance with a predetermined code in which the poles of each pair of areas are arranged in one manner for spacing conditions and in the reverse manner for marking conditions.

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Executrix Under the Last Will and Testament of Louis M. Potts, Deceased.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,258,106	Bryce	Oct. 7, 1941
2,333,463	Bryce	Nov. 2, 1943
2,334,534	Ballweg	Nov. 16, 1943
2,359,617	Bryce	Oct. 3, 1944