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3,493,231

MAGNETIC BELT RECORDER

Filed Nov. 13, 1968

2 Sheets-Sheet 1

FIG. 1

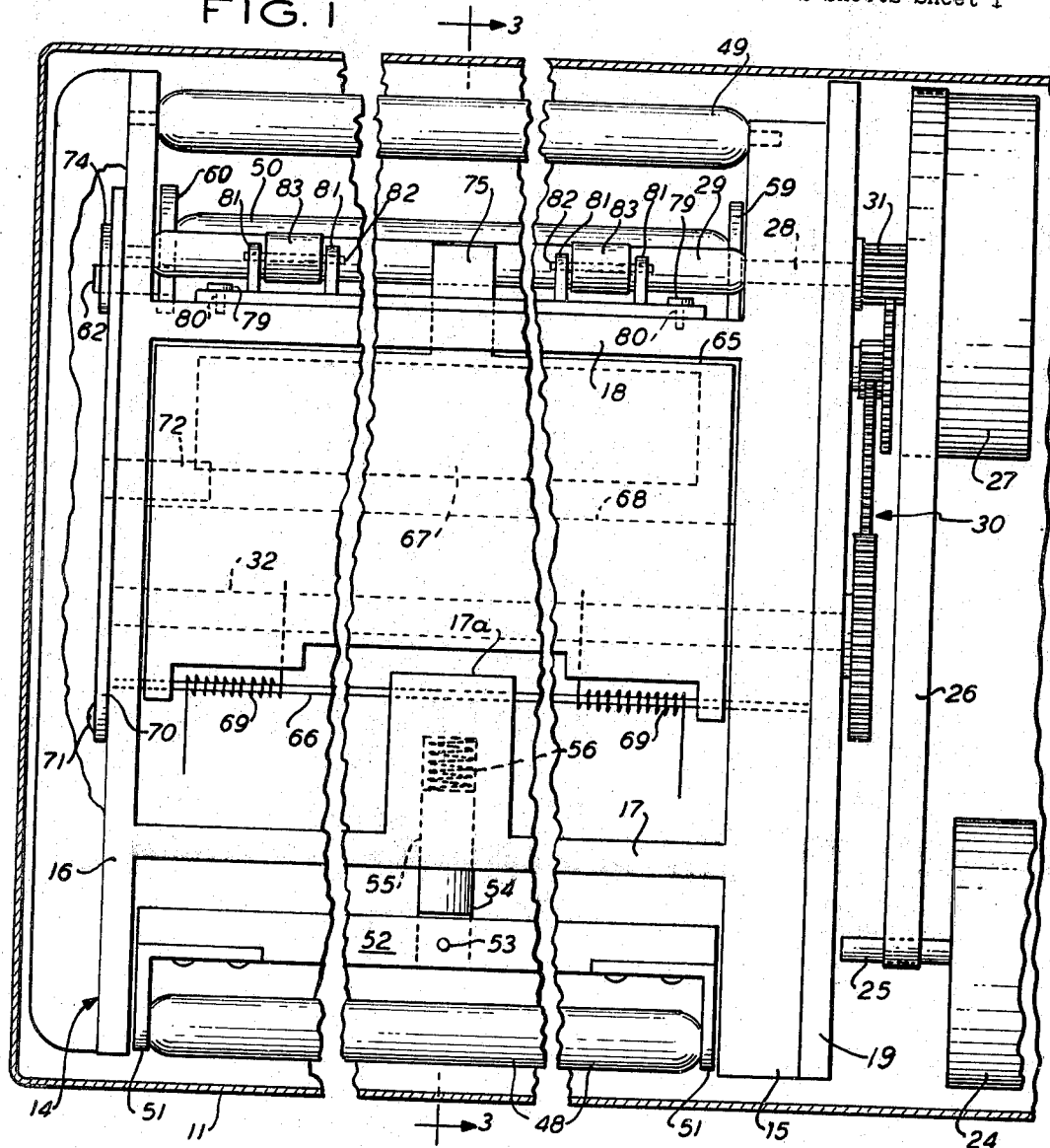
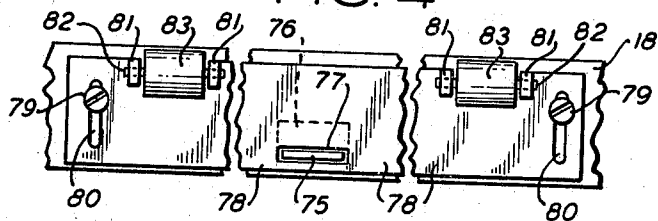


FIG. 4



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FIG. 2

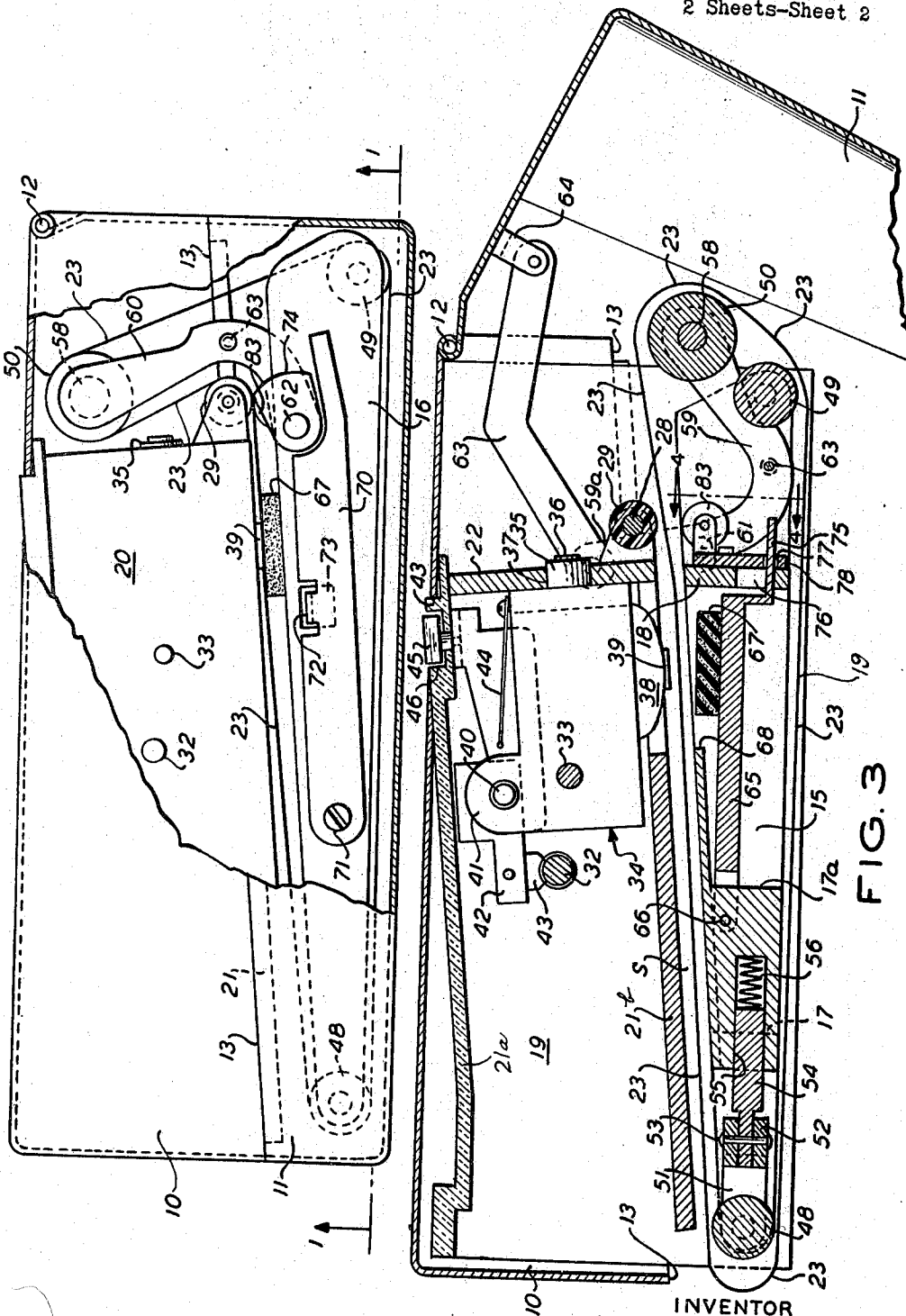


FIG. 3

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MAGNETIC BELT RECORDER

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U.S. Cl. 274—4

8 Claims

ABSTRACT OF THE DISCLOSURE

A magnetic belt recorder is provided in a compact "pocket-size" form by using a belt supporting mechanism which unfolds as the case is opened into a flat configuration for easy loading and unloading of the magnetic belt, and which folds as the case is closed into an L configuration drawing the belt under tension around a drive roller and into pressure engagement with a magnetic recorder head.

An object of the invention is to provide a small compact magnetic belt recorder adapted to serve as a portable pocket-size machine for recording dictation.

Another object is to provide such machine with a drive and belt supporting mechanism of novel design permitting easy loading and unloading of the belt record.

Another object is to provide such drive and supporting mechanism which is shiftable between running and loading conditions as the case is closed and opened.

A still further object is to provide such machine of a simple and economical design and construction.

In the description of my invention reference is had to the accompanying drawings, of which:

FIGURE 1 is a bottom plan view of the drive mechanism for a magnetic belt recorder according to the invention, as seen from the line 1—1 of FIGURE 2;

FIGURE 2 is a right hand view of this belt recorder showing the case closed and partly broken away and showing the belt supporting mechanism in its running condition;

FIGURE 3 is a left hand sectional view taken on the line 3—3 of FIGURE 1 showing the case in open condition and the belt supporting mechanism in loading condition; and

FIGURE 4 is a fractional view taken on the line 4—4 of FIGURE 3 showing a detail of the belt drive mechanism.

The present portable belt recorder has a rectangular case comprising an upper housing section 10 and a lower closure section 11. The housing section is of an inverted pan shape with an open back wall and the closure section is of an upright pan shape with an upstanding back wall hinged at 12 to the housing section so that the two sections can swing apart from a break line 13 at the sides fractionally shown in FIGURES 2 and 3. The upper case section has suitable controls at the top and sides which need not be herein described for purposes of the present invention. Mounted in this upper case section is a frame-work 14 comprising a lower shallow casting with left and right sidewalls 15 and 16 joined by front and back cross-bars 17 and 18, and a deeper upper casting with a left wall 19 (FIGURE 3) secured to the lower wall 15 as by screws not shown and a right wall 20 above the lower casting (FIGURE 2) joined to the left wall 19 by upper and lower walls 21a and 21b and a rear wall 22. In this construction the two castings are supported in cantilever fashion from their joined left walls leaving a space S therebetween for receiving the upper run of a belt record 23 as is later more fully described.

Mounted at the front left hand portion of the machine is a motor 24 having a drive shaft 25 coupled by a belt

26 to a flywheel 27 at the rear left portion of the machine. The flywheel is mounted on a shaft 28 journaled in the frame wall 19 and extending to the right thereof throughout the distance between the side walls 19 and 20. On the portion of the shaft 28 between the sidewalls is mounted a sleeve 29 as of suitable plastic to form a drive roller for engaging and propelling the magnetic belt record 23.

Coupled by a train of gears 30 to a pinion 31 on the shaft 28 is a feed screw 32 journaled at its ends in the sidewalls 19 and 20. Also spanning these sidewalls is a support rod 33. Mounted slidably on the support rod 33 is a U-shaped carriage 34 (as viewed from the top) having a roller 35 journaled on a stud 36 staked to the back-wall thereof and riding in a cross slot 37 in the frame wall 22. The carriage is thus supported for traveling movement crosswise of the upper run of the belt record 23. Mounted in the carriage 34 is a magnetic recorder-reproducer head 38 having pole pieces 39 at its lower end for engaging the belt record. Pivoted at 40 between two upstanding ears 41 of the sidewalls of the carriage 34 is a rocker 42 carrying a feed nut 43 at its forward end for engaging the feed screw 32 responsive to a biasing of the rocker by a spring 44 between the rocker and the carriage. Secured to the rear end of the rocker is a push button 45 upstanding through a slot 46 in a top wall of the case. By pressing downwardly on this button the feed nut 43 can be disengaged from the feed screw 32 to permit the carriage to be shifted manually crosswise of the belt record. When the feed nut is engaged and the motor is running the head 38 is driven gradually across the belt record in synchronism with the revolving movement thereof to describe a track of successive convolutions of equal pitch on the belt record.

The lower casting above-described carries the magnetic belt supporting mechanism. This supporting mechanism comprises a front take-up roller 48, a back idler roller 49 and a guide roller 50. The take-up roller 48 is journaled between the side arms 51 of a yoke 52 secured at its center by a vertical pivot 53 to a plunger 54. The plunger is slidably mounted from the front of the machine in a horizontal aperture 55 provided in a central block-shaped portion 17a of the crossbar 17. The plunger is backed by a compression spring 56 to urge the take-up roller forwardly while allowing the roller to tilt sidewise about the central vertical pivot 53. The idler roller 49 is journaled on a fixed axis between the side plates 15 and 16. The guide roller 50 is journaled on a shaft 58 secured rigidly at its ends in left and right levers 59 and 60 both of which are pivoted on a common axis. For example, the left lever 59 is pivoted on a stud 61 in the side plate 15 (FIGURE 3) and the right lever 60 is secured to a stub shaft 62 journaled in the end plate 16 (FIGURE 2). The two levers may be further rigidly interconnected by a cross rod 63 so that when the left lever 59 is turned it will swing the guide roller in parallel with the idler roller 49. Such turning movement of the lever 59 is effected as the closure 11 is opened and closed as by a link 63 pivoted at one end to a bracket 64 on the inner wall of the closure 11 and pivoted at its other end to an arm 59a of the lever 59 extending rearwardly past the pivot stud 61. Thus, when the closure is open the guide roller 50 is in a lower backward position about in line with the take-up roller 48 and idler roller 49 as shown in FIGURE 3, but as the closure is swung to closed position the guide roller 50 is swung upwardly past the back side of the drive roller 29 into the position shown in FIGURE 2.

When the guide roller 50 is in its lower position the belt supporting mechanism is in a collapsed condition allowing the belt record 23 to be inserted from the right side of the machine into a position loosely enveloping

the rollers 48, 49 and 50 and the lower casting with the upper run of the belt passing through the space S between the lower and upper castings (FIGURE 3). As the closure 11 is swung to closed position the guide roller 50 is swung to its upper position causing the upper run of the belt to be wrapped around the back side of the drive roller 29. Also, in this upward movement of the guide roller the span around the rollers 48, 49 and 50 via the back side of the drive roller 29 is lengthened causing the belt record to be tensioned around the drive roller with suitable retraction of the take-up roller 48 against the action of the compression spring 56.

Within the lower casting structure is a platen 65 pivoted at its forward end on a cross rod 66 secured at its ends in the side plates 15 and 16. This platen extends forwardly past the recorder head 38 and has thereon a pressure pad 67 as of soft felt movable through an opening 68 in the top wall of the lower casting. When the platen is in a free condition it is urged upwardly by a pair of torsion springs 69 on the cross rod 66 (FIGURE 1) to move the pressure pad 67 against the underside of the upper run of the belt record 23 and hold it thus in engagement with the pole pieces 39 of the recorder head.

At the outer side of the right end plate 15 of the lower casting is a lever 70 pivoted at its forward end on a stud 71 in the end plate 16. This lever has an inwardly bent lug 72 extending through an opening 73 in the end plate 16, which overlies the right edge of the platen 65 intermediately thereof. When the closure 11 is in closed position the lever 70 is unrestricted with the result that the spring 69 then moves the pressure pad 67 upwardly to engage the upper end of the belt with the recorder head. However, as the closure 11 is opened a cam 74 on the stud 62 turns downwardly against the lever 70 to shift the platen 65 into a lower position to disengage the pressure pad 67 from the recorder head.

On the central rearward portion of the platen 65 is a rearwardly extending lug 75 passing through a clearance hole 76 in the wall 18 and through a narrow coupling hole 77 in a crossbar 78 (FIGURE 4). The crossbar 78 is slidably mounted for vertical movement by two studs 79 in the back wall 18 passing with clearance through respective slots 80 in the crossbar. This crossbar has two pairs of lugs 81 struck forwardly therefrom each of which carries a shaft 82 on which is journaled a pinch roller 83.

When the platen 61 is released for free upward movement the pinch rollers 83 are pressed against the drive roller by the springs 69 to provide a firm driving engagement of the drive roller with the belt record. Since the pressure pad 67 is of a soft springy character it provides sufficient pressure of the belt record against the recorder head without reducing substantially the pressure of the pinch rollers 83 against the drive roller. When the closure 11 is opened the platen 65 moves the crossbar 78 downwardly therewith away from the drive roller to clear a space between the pinch rollers and the drive roller to permit the unloading and reloading of a belt record from and into the machine.

The embodiment of my invention herein particularly shown and described is intended to be illustrative and not necessarily limitative of my invention since the same is subject to changes and modifications without departure from the scope of my invention.

I claim:

1. In a dictating machine for recording on and reproducing from an endless flexible belt record: the combination of a frame, a guide roller, a take-up roller in spaced parallel relation to said guide roller, journal means on said frame at the ends of said take-up roller mounted for freedom of movement in directions towards and away from said guide roller and biased away from said guide roller, said guide roller having a loading position permitting a belt record to envelop loosely said guide and take-up rollers, an idler roller journaled to said frame

on a fixed axis within said belt record adjacent to the loading position of said guide roller, a drive roller journaled to said frame on a fixed axis for engaging the outer surface of said belt record adjacent to said guide roller, and means for shifting said guide roller from said loading position to an operating position in parallel movement away from said idler roller and past said drive roller whereby to tauten the belt record around said rollers with one run of the belt being trained partially around said drive roller in driving engagement therewith.

2. The dictating machine set forth in claim 1 including means carried with said shifting means for pressing said belt record against said drive roller when said guide roller is in operating position.

3. The dictating machine set forth in claim 1 wherein said belt record has a magnetic coating, including a magnetic recording and reproducing head for engaging said belt record to record on and reproduce therefrom, a pressure pad for holding the belt record in operative engagement with said head, and means on said shifting means for retracting said pressure pad from said head as said guide roller is returned to loading position.

4. The dictating machine set forth in claim 1 wherein said shifting means comprises a lever pivoted to said frame on a fixed axis within said belt record adjacent to said drive roller, including a journal on the outer end of said lever for said guide roller.

5. The dictating machine set forth in claim 4 wherein said lever is L-shaped to clear said drive roller as said guide roller is shifted to said operating position.

6. The dictating machine set forth in claim 4 wherein said belt record is provided with a magnetic coating on its outer surface, including a magnetic recorder-reproducer head for recording on and reproducing from said belt record, a spring-pressed pad for pressing the belt record against said head, and a roller carried by said lever intermediately thereof for pressing the belt record against said drive roller when said guide roller is in said operating position and for withdrawing said pad from said head as said guide roller is shifted back to loading position.

7. The dictating machine set forth in claim 4, including a case having top and bottom sections hinged at one end for opening movement to expose the outer ends of said rollers for a mounting and removal of a belt record, and means coupling said lever to said case for operating said lever to shift said guide roller between said loading and operating positions as said case is opened and closed.

8. A support and drive mechanism for an endless flexible belt record, comprising a frame, an idler roller having a fixed journal in said frame, a take-up roller spaced in a given plane from said idler roller in parallel relation thereto, a journal for said take-up roller slidably mounted in said frame for movement in said given plane and spring urged to bias said take-up roller away from said idler roller, a drive roller offset from a point on said given plane, a guide roller for drawing a belt record trained around said take-up and idler rollers in an L configuration with the inner run of the belt record in partial wrap around relation with said drive roller and with the belt record tensioned by said take-up roller, and means mounting said guide roller for swinging movement to a position beyond said idler roller from said take-up roller to enable the belt record to be trained during loading around said take-up, idler and guide rollers in a substantially flat configuration with said inner run of the belt record leading past said drive roller.

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