United States Patent

[11] 3,584,878

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[21] Appl. No. **12,041**
[22] Filed **Feb. 17, 1970**
[45] Patented **June 15, 1971**
[32] Priority **Jan. 17, 1968**
[33] **Spain**
[31] **349.826**
Continuation-in-part of application Ser. No. 791,305, Jan. 15, 1969, now abandoned.

[54] **TAPE RECORDER CONTROLS**
10 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **274/4**
[51] **Int. Cl.** **G11b 5/56**
[50] **Field of Search** ..... 274/4, 11; 179/100.2 CA; 74/54

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ABSTRACT: A tape recorder having controls for aligning the magnetic head with preselected tracks of a tape. The head is carried by a support structure for movement transversely of the tape to locations aligned with different tracks thereof. A cam coacts with the supporting structure to locate the latter at different positions, and a ratchet coacts with the cam to displace the latter from one camming position to another camming position. A rock lever has at one end a pawl tooth coacting with the ratchet and at its other end a rotary friction component which is eccentrically mounted, and a continuously rotating drive shaft is adapted to coact with the friction component to act therethrough to swing the rock lever through an operating cycle. An electromagnetic releasable holding device coacts with the rock lever to hold the latter normally in a rest position while being actuated to release the rock lever for movement back and forth through a predetermined operating cycle.

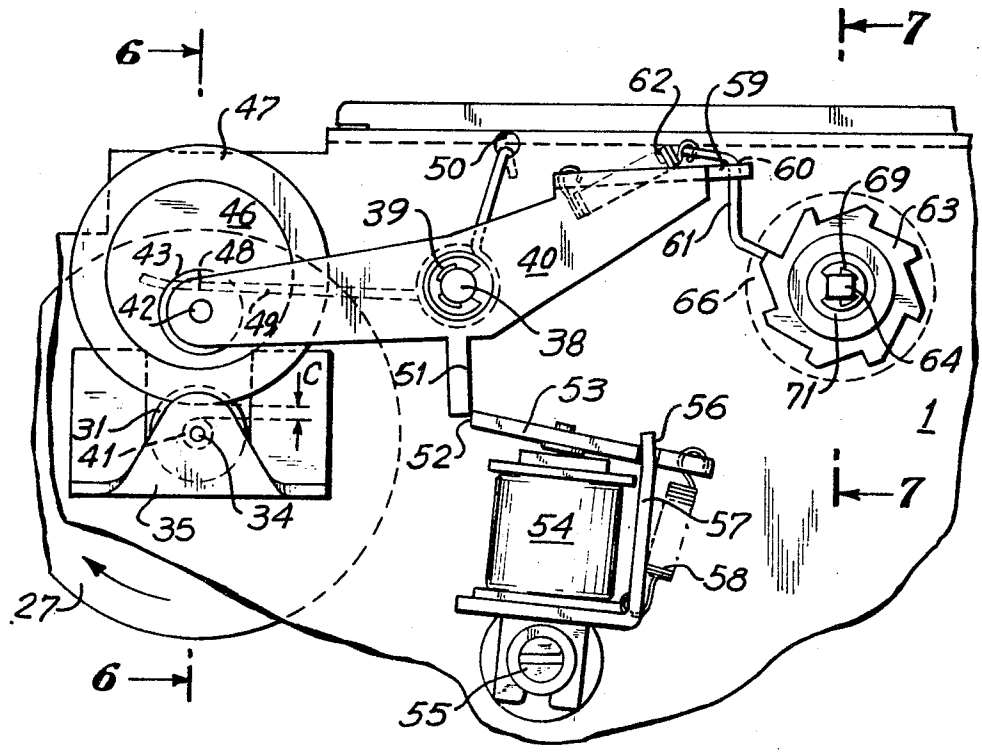

FIG. 1

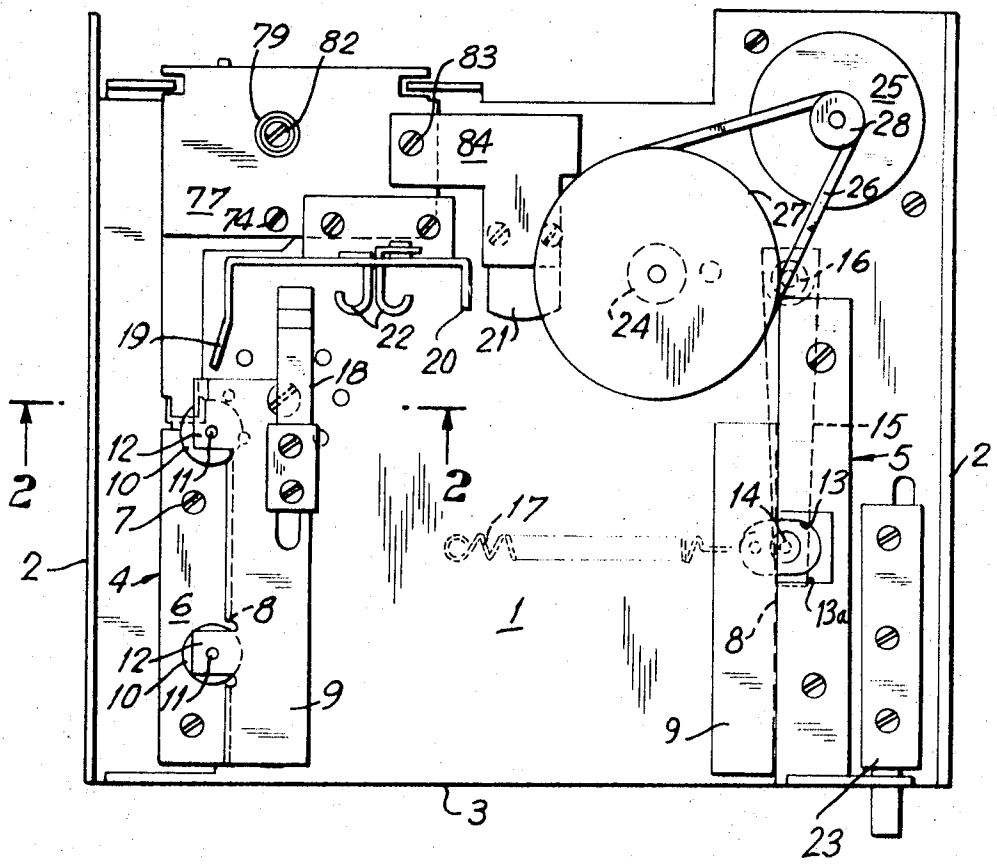

FIG. 2

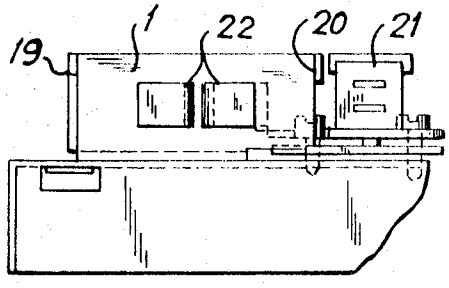

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FIG. 3

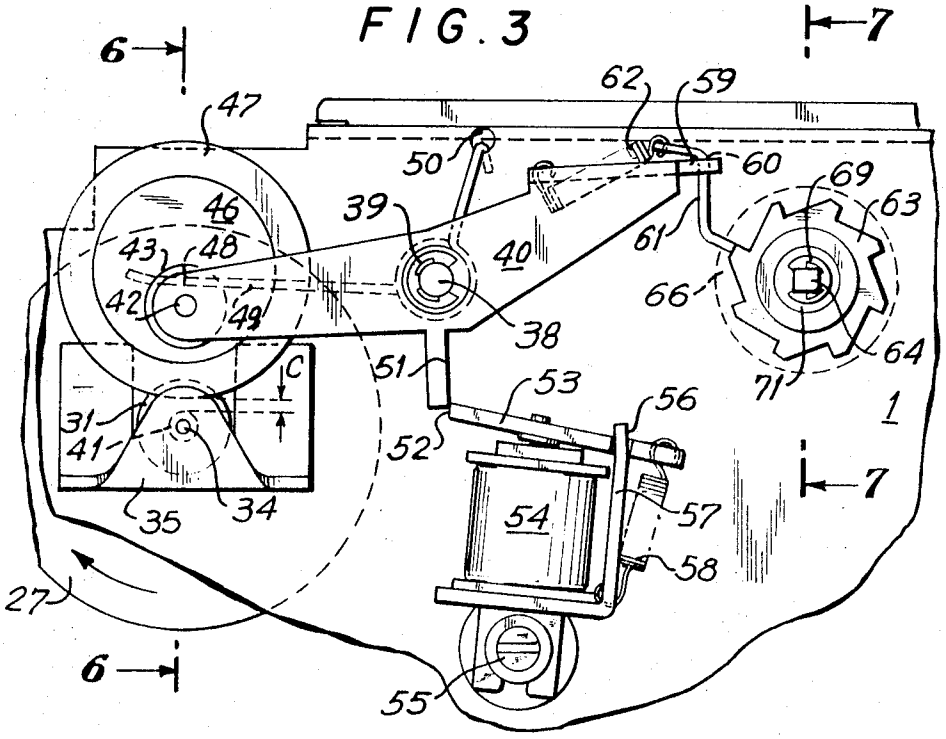

FIG. 6

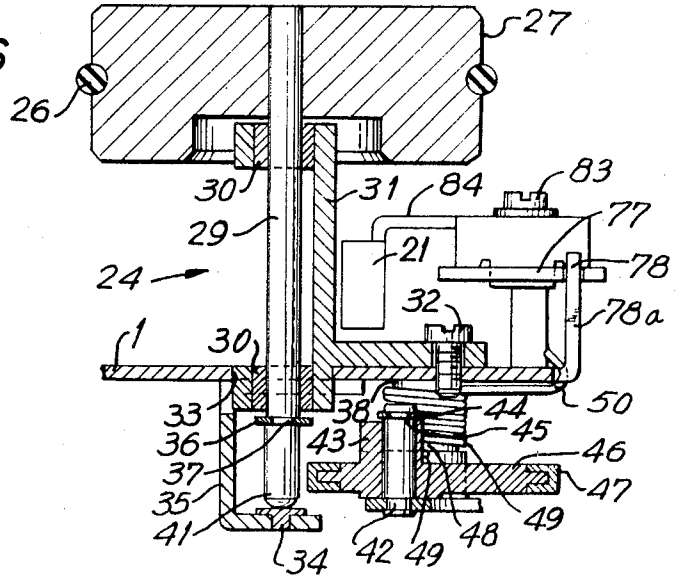

FIG. 7

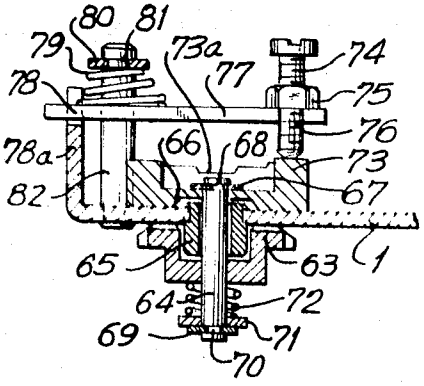

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FIG. 4

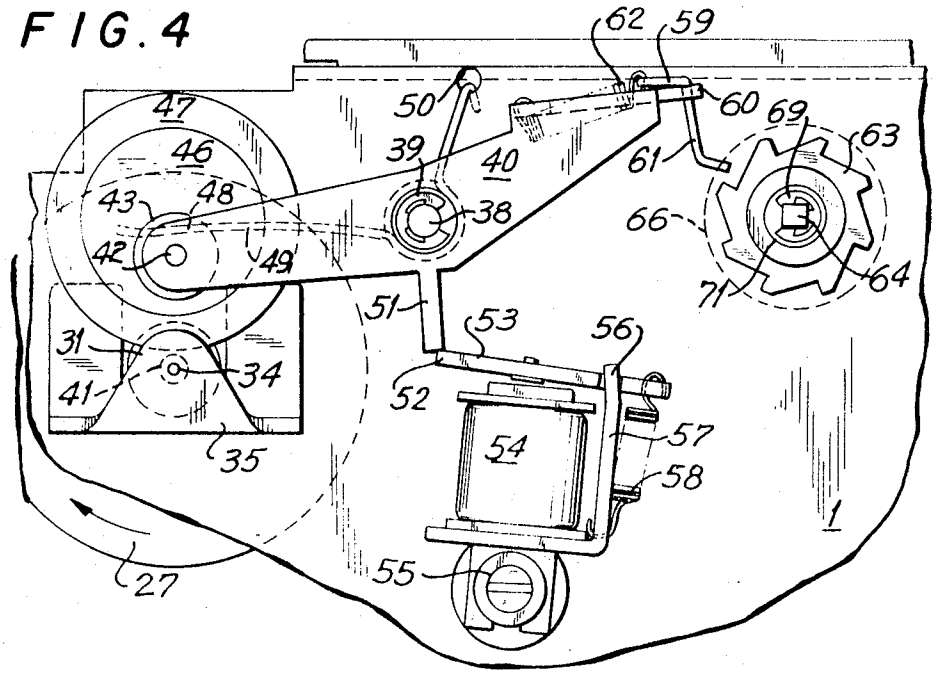


FIG. 5

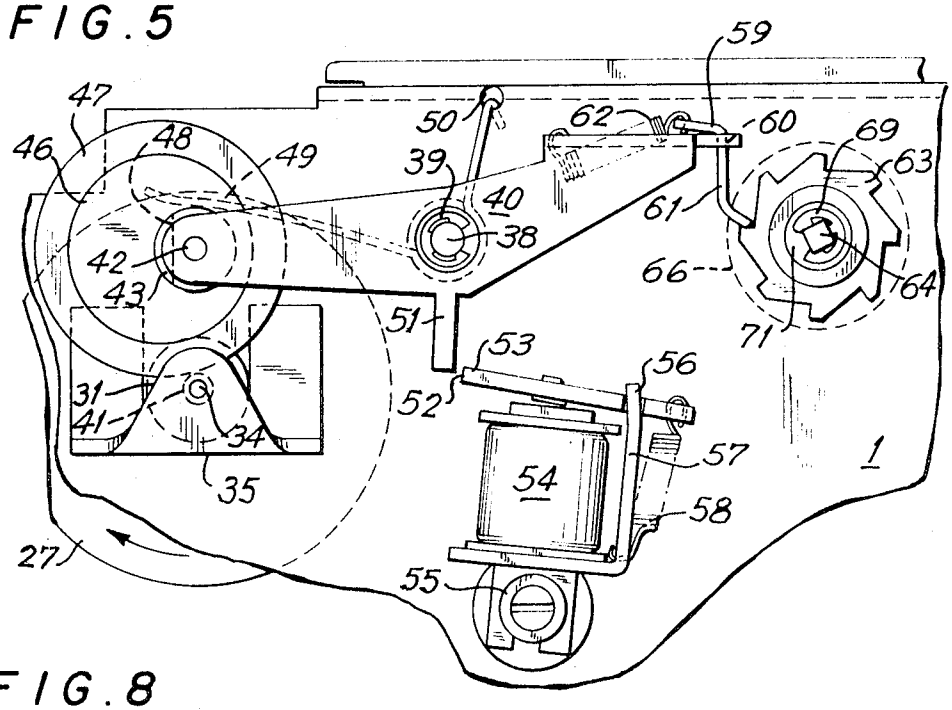


FIG. 8

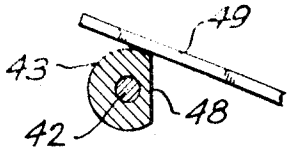
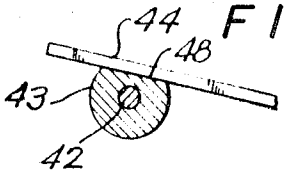


FIG. 9



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TAPE RECORDER CONTROLS

CROSS-REFERENCE TO RELATED CASE

This application is a continuation-in-part of copending application Ser. No. 791,305, filed Jan. 15, 1969, now abandoned, and entitled ACTUATING MECHANISM FOR THE LOADING DEVICE OF TAPE RECORDERS.

BACKGROUND OF THE INVENTION

The present invention relates to tape recorders.

More particularly, the present invention relates to controls for determining the position of a magnetic head with respect to a tape so that the magnetic head will be aligned with predetermined tracks of the tape.

Devices for aligning a magnetic head of a tape recorder with predetermined tracks with tape are of course well known. However, such devices are complex and cumbersome to operate. Thus, for example, a substantial amount of power is required to shift the magnetic head into alignment with given tracks of a tape, and because of this power requirement the known devices are bulky and expensive.

SUMMARY OF THE INVENTION

It is accordingly a primary object of the present invention to provide a construction which will avoid the above drawbacks.

In particular, it is an object of the invention to provide a device where the controls do not require a large consumption of power.

In particular, it is an object of the invention to provide a construction utilizing the power of the drive which in any event is used for tape recorder operations in order to bring about the change in the position of a magnetic head with respect to the tracks of a recording tape.

Thus, it is an object of the invention to provide a control structure which is capable of releasing components to be driven by the drive of the tape recorder through a given operating cycle during which the position of the magnetic head is changed with respect to the tracks of the tape.

Furthermore, it is an object of the invention to provide a construction of this type which lends itself either to an automatic change in the positioning of the magnetic head or to a manual change thereof whenever desired by the operator.

Also, it is an object of the invention to provide a construction which is relatively simple, rugged, and reliable in operation and which can easily be accommodated in a tape recorder with most of the components situated beneath the top wall of the recorder where the cassette is received and where the magnetic playback head is located.

According to the invention the magnetic head is carried by a support means which coacts therewith for positioning the magnetic head transversely of a tape in alignment with preselected tracks thereof. A cam means coacts with the support means for controlling the position thereof and has a series of camming portions which respectively will locate the support means and the head therewith at different positions where the head is aligned with given tracks of a recording tape. The cam means is circular and has a stepped end edge having the camming steps circumferentially distributed about the cam axis, and a cam-moving means includes a ratchet wheel coaxially fixed to the cam and adapted to be turned through a given increment by a pawl. This pawl forms part of a motion-transmitting means and is carried at one end of a rock lever of the motion-transmitting means. The other end of the rock lever carries a rotary friction wheel of the motion-transmitting means, this friction wheel being eccentrically mounted and being adapted to move into and out of frictional engagement with a rotary drive shaft forming part of a drive means which operates continuously as long as the tape recorder is turned on. A releasable holding means coacts with the motion-transmitting means to release the latter for operation by the drive means through one operating cycle during which the cam-moving means acts to displace the cam means so that one of the camming portions or steps thereof is displaced out of and the next camming portion of step thereof is displaced into engagement with the support means part of which engages the steps of the cam to act as a cam follower with respect thereto. This releasable holding means takes the form, for example, of an electromagnet which can be operated either through a manually actuated switch or through an automatically actuated switch responding to tracks on the tape of the recorder, and the releasable holding means includes an armature normally holding the rock lever in position where the friction wheel does not engage the drive shaft. When the electromagnet is energized, however, the armature is displaced to a release position releasing the rock lever for movement to locate the eccentric friction wheel in engagement with the drive shaft to be operated thereby.

BRIEF DESCRIPTION OF DRAWINGS

The invention is illustrated by way of example in the accompanying drawings which form part of this application and in which:

FIG. 1 is a fragmentary top plan view schematically illustrating that part of a tape recorder which has the structure of the invention;

FIG. 2 is an elevation of part of the structure of FIG. 1 taken along line 2–2 of FIG. 1 in the direction of the arrows;

FIG. 3 is a fragmentary schematic illustration of the plate visible in FIG. 1 as it appears when looking at the underside thereof showing structure connected to and situated at the lower side of this plate;

FIG. 4 shows the structure of FIG. 3 in a position which it takes when released for operation;

FIG. 5 shows the structure of FIGS. 3 and 4 at a further stage in an operating cycle beyond that illustrated in FIG. 4;

FIG. 6 is a fragmentary sectional elevation taken along line 6–6 of FIG. 3 in the direction of the arrows but showing the structure oriented in an upright position;

FIG. 7 is a fragmentary sectional elevation taken along line 7–7 of FIG. 3 in the direction of the arrows and also showing the structure oriented in an upright position;

FIG. 8 is a schematic representation of a part of the structure as it approaches the end of an operating cycle; and

FIG. 9 shows the structure of FIG. 8 when it has reached the end of an operating cycle.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIG. 1, the plate 1, the top face of which is visible in FIG. 1, forms the upper part of an enclosure in which various components are situated. Thus, this plate 1 will conventionally be set into the upper portion of a boxlike container in which various components of the tape recorder are located, as is well known. It is the upper surface of the plate 1 which is visible to the operator.

The plate 1 is provided at its edge regions with upstanding flanges, such as the flanges 2, by means of which the plate 1 is fixed to the inner side surfaces of the boxlike container of the tape recorder. The front edge 3 of the plate 1 will engage the inner surface of the casing or container of the tape recorder.

The plate 1 fixedly carries at its upper surface a pair of angled guides 4 and 5 which serve to guide a cassette which is introduced across the front edge 3 of the plate 1 along the upper surface thereof toward the rear of the tape recorder. These guides 4 and 5 are parallel to each other and each has a lower web section 6 directly fixed to the plate 1 as by the screws 7. The inner edges of the webs 6 are joined with vertical webs 8 of the guides 4 and 5, and the top edges of the webs 8 are integral with the pair of horizontal inwardly extending free webs 9 which are situated over the plate 1 by a distance sufficiently great to accommodate the side edge regions of a cassette between the webs 9 and the plate 1. Thus, this construction will serve to guide a cassette for movement inwardly toward the central region of the tape recorder.

In order to facilitate the shifting of the cassette, a part of the web 8 of the guide 4 is struck out to form a lug 12 carrying a pin 11 on which a roller 10 is supported for free rotary movement. As is apparent from FIG. 1, the guide 4 is formed with a pair of these lugs 12 carrying the pins 11 on which the rollers 10 are freely turnable, and of course these rollers will engage the left side edges of a cassette where the cassette extends beneath the left web 9, as viewed in FIG. 1.

The guide 5 has an opening 13*a* punched out of its central web 8 and base web 6. This opening 13*a* registers with an opening 13 which is formed through the plate 1. An elongated finger 14 extends upwardly through the opening 13 and it is capable of pressing against the right side edge of a cassette, as viewed in FIG. 1, through the part of the opening 13*a* which is formed in the upright web 8. This finger 14 is fixed to one end of an elongated lever 15 which is supported for pivotal movement on a pin 16 fixed to and extending downwardly from the plate 1. Beneath the plate 1 the finger 14 is fixed to one end of a spring 17, the other end of which is fixed to any stationary component so that the lever 15 is urged to turn in a clockwise direction, as viewed in FIG. 1, enabling the finger 14 to press against a cassette in the manner described above. In this way the pressure finger 14 will act to press the cassette against the guide rollers 10.

With this construction a cassette will be guided toward the rear of the plate 1. The leading edge of the cassette, which is the rear edge thereof as the cassette is introduced into the tape recorder in the manner described above, will automatically actuate a switch 18 which is automatically closed in this way when a cassette is introduced into the apparatus, and this will result in the automatic turning on of the tape recorder whenever a cassette is introduced into the tape recorder.

The tape is guided from the reel of the cassette through guides 19 and 20 which are in the form of forks having upper and lower fingers between which the tape passes. These fingers of the tape guides 19 and 20 are visible in FIG. 2. Thus, the guides 19 and 20 will prevent the tape from shifting laterally as it progresses through the tape recorder.

The tape recorder includes a magnetic head 21 serving as a playback head, when a tape is to have a recording thereon played back, and also serving in a well-known manner as a recording head when a recording is to be made. Because of the guides 19 and 20 it is not possible for the tape to be laterally shifted undesirably during vertical displacement of the head 21 transversely of the tape. This movement of the head 21 transversely of the tape is required in order to align the head 21 with preselected tracks of the tape.

Between the guides 19 and 20 are a pair of electrical contacts 22 which are engaged by the magnetic tape, and the tape has conductive sections adapted to bridge the contacts 22. These contacts are inserted into the control circuit of the mechanism for shifting the head 21 so that it is possible automatically at the end of playing one track to shift the head to a position for playing another track. However, instead of an automatic bridging of contacts 22 by the tape itself in order to bring about movement of the head 21 in a manner described in greater detail below, the electrical circuit includes also a manually operable switch 23, shown at the lower right-hand corner of FIG. 1. This switch 23 has a pushbutton accessible to the operator so that the operator may actuate the switch in order to bring about shifting of the head 21 transversely of the tape whenever desired by the operator.

As was indicated above, the tape recorder is automatically turned on as soon as the switch 18 is closed by a cassette which is introduced into the tape recorder in the manner described above. This circuit which is closed upon closing of the switch 18 includes the electric motor 25 which forms part of the drive means which operates continuously as long as the tape recorder is turned on. This drive means includes a pulley 28 continuously driven by the motor 25 and driving an endless belt 26 which is received in a circumferential groove of a combined pulley and flywheel 27 shown most clearly in FIG. 6. This drive means includes the tape-moving assembly 24. Part of this assembly, and thus part of the drive means, is formed by the rotary shaft 29 which is fixed coaxially to the flywheel 27 for rotation therewith. This shaft 29 in cooperation with other unillustrated elements will, in a well-known manner, bring about forward movement of the tape during normal playback or recording, and of course the components can be actuated in a well-known manner to bring about fast forward movement of the tape until a desired part thereof reaches the head 21 or rearward, rewinding movement of the tape. The continuously rotating shaft 29 of the drive means is supported for rotary movement in plain friction bearings 30 carried by a bracket 31 fixed by screws 32 (FIG. 6) to the plate 1. It will be noted that the distance of the flywheel 27 above the plate 1 is sufficient to enable the cassette to reach at the exposed part of the magnetic tape the central region of the rotary shaft 29 between the bearings 30. The lower end of the shaft 29 which is distant from the flywheel 27 extends with the lower bearing 30 and the lower part of bracket 31 through an opening 33 which is formed in the plate 1. The bottom end of the shaft 29 is supported for rotary movement on a thrust or end bearing 34 which is carried by a bracket 35 fixed also to the plate 1. A snap ring 36 is situated in a groove 37 of the shaft 29 to limit upward movement of the shaft 29 so that it cannot be raised up out of the bearings 30 until the ring 36 is removed.

FIGS. 3 and 6 also illustrate a pin 38 which is fixed to and extends downwardly from the plate 1. This pin 38 extends through a substantially central opening of a rock lever 40 which forms part of a motion-transmitting means of the invention. Thus the lever 40 of the motion transmitting means is free to swing about the axis of the pin 38. At its lower end region the pin 38 is formed with an annular groove receiving a snap ring 39 which serves to retain the rock lever 40 on the pin 38. This lever 40 of the motion-transmitting means has opposed ends one of which is situated adjacent the shaft 29 of the drive means and the other of which is situated adjacent a cam-moving means referred to in greater detail below. Thus, in FIG. 3 it is the left end of the lever 40 which is adjacent the shaft 29, while the right end thereof is adjacent the cam-moving means.

The left end of the lever 40, which is also visible at the lower right portion of FIG. 6, fixedly carries an upstanding pin 42 which extends into the central opening of a hub portion 43 of a friction wheel 46 of the motion-transmitting means. This hub portion 43 is spaced from the center of the wheel 46, as is particularly apparent from FIG. 3, so that the lever 40 eccentrically supports the friction wheel 46. The upper end region of the pin 42 is formed with a groove 45 which receives a snap ring 44 which retains the friction wheel 46 on the shaft or pin 42. This pin 42 is parallel to the lower end region 41 of the shaft 29. The rim of the wheel 46 is provided with a ring 47 of a material having a high coefficient of friction so that when the ring 47 engages the lower portion 41 of the drive shaft 29 the eccentric wheel 46 will be rotated about the shaft 42. As is indicated in FIGS. 3 and 6 as well as FIGS. 8 and 9, the hub 43 of the eccentric wheel is provided with a flat exterior surface region 48. This flat 48 is directed toward that part of the eccentric wheel 46 which is most distant from the pin 42. An elongated wire spring 49 is coiled about the pin 38 and has an elongated free end portion adapted to press against the flat 48 so as normally to hold the friction wheel 46 in the angular position thereof which is illustrated in FIG. 3. Another part of the spring 49 extends from the pin 38 and terminates in a hook portion which extends through an opening 50 of the plate 1, as shown most clearly in FIGS. 3 and 6.

The rock lever 40 of the motion-transmitting means includes a control arm 51 which normally rests against the end 52 of an armature 53 of a releasable holding means which serves to releasably hold the structure in the rest position thereof, which is shown in FIG. 3. This armature 53 is adapted to be actuated by an electromagnet 54 of the releasable holding means. This electromagnet 54 is secured by a fastener such as a screw 55 to the plate 1. The armature 53 is swingable at 56 on the component 57 of the electromagnet, and the spring 58 acts on the armature to hold it normally in the position

shown in FIG. 3. When the switch 22 or the switch 23 are closed, the circuit of the electromagnet 54 is closed so that the armature 53 will be momentarily attracted toward the coil 54 in opposition to the spring 58.

The end of the rock lever 40 which is distant from the friction wheel 46 terminates in a flat tongue 59 which is in a vertical plane parallel to the axis of the pin 38. This tongue 59 is formed at its right end, as viewed in FIG. 3, with a vertical slot 60 which passes through the tongue 59. A pawl 61 in the form of a strip of metal angularly bent as indicated in FIG. 3 extends through the slot 60 so as to be supported therein for swinging movement about an axis situated at the slot 60. One end of the pawl 61 is connected to a tension spring 62, the other end of which is connected to the lever 40 so as to urge the pawl 61 to turn in a counterclockwise direction, as viewed in FIG. 3.

The structure of the invention includes a cam-moving means made up in part by the ratchet wheel 63 which is illustrated in FIG. 3. In the rest position of the parts illustrated in FIG. 3, the free end of the pawl 61 is urged by the spring 62 against an outer end surface of a tooth of the stationary ratchet wheel 63.

The ratchet wheel 63 is formed with a central opening of square configuration through which a shaft 64, also of square cross section, extends so that the ratchet 63 and shaft 64 will rotate together while the ratchet 63 can move axially along the square shaft 64. This shaft 64 is supported for rotary movement in a bearing 65 fixed to and extending through the plate 1 in the manner shown in FIG. 7. The upper end of the shaft 64 extends through the central web region 66 of a cam means made of nylon, for example, and this web 66 is also formed with a central square opening so that the cam means is constrained to rotate with the ratchet 63 and the shaft 64. Just above the web 66 the shaft 64 is formed with a groove 68 receiving a snap ring 67 which retains the cam means on the upper end of the shaft 64.

The lower end of the shaft 64 carries a snap ring 69 in a groove 70. This ring 69 serves to support on the shaft 64 a washer 71 against which the bottom end of a coil spring 72 presses. The upper end of the coil spring 72 presses against the hub of the ratchet 63 so as to urge the latter upwardly toward the plate 1. The web 66 forms part of a circular cam means 73 which has an upper stepped surface provided with successive camming portions circumferentially distributed about the shaft 64 and situated at the different elevations apparent from FIG. 7. It will be noted that with this construction the spring 72 acts to press the cam means 73 and ratchet 64 respectively against the upper and lower surfaces of the plate 1, so that through this frictional engagement with the plate 1 the ratchet 63 and cam 73 will remain in the positions to which they are turned in a manner described in greater detail below.

Thus, it will be seen that the cylindrical or circular cam means 73 of the invention is provided at its upper end surface with the camming portions 73*a* in the form of steps situated at different elevations. It is these camming portions 73*a* which serve to determine the elevation of the magnetic head 21 so as to align the latter with selected tracks of a tape. For this purpose the magnetic head 21 is carried by a support means which includes the screw 74 shown in FIG. 7 pressing against one of the camming portions of the cam means 73. This screw 74 forms a cam follower and is part of the support means for the magnetic head 21. A lock nut 75 serves to fix the screw 74 at a selected axial position with respect to the support plate 77 which is formed with a threaded opening 76 through which the screw 74 extends so as to coact with the threads of the opening 76. The support plate 77 of the support means has a rear portion 78 extending through a notch or slot which is formed in the rear flange 78*a* of the plate 1, so that in this way the plate 77 can swing about an axis situated in the notch at the upper edge region of the flange 78*a*. A pin 82 extends freely through an opening of the plate 77 and is urged downwardly by a spring 79 which presses against a snap ring 80 situated in a groove 81 formed in the pin 82 which is fixed to and extends upwardly from the plate 1. In this way the cam follower part 74 of the support means for the head 21 is pressed against the camming portion 73*a* to provide for the plate 77 an elevation determined by the elevation of the particular camming portion 73*a* which is engaged by the bottom end of the screw 74. One or more screws 83 (FIG. 6) serve to fix to the plate 77 an overhanging arm 84 which directly carries the magnetic head 21, so that through this support means the elevation of the head 21 will be determined by the elevation of the particular camming portion 73*a* which engages the cam follower 74. Of course, the several camming portions 73*a* respectively correspond to the several teeth of the ratchet wheel 63.

When the control components of the invention are at rest they have the position shown in FIG. 3. At this time the tape recorder is turned on, the shaft 29 of the drive means is rotating, and part of the tape is being played back, for example, while the tape moves past the head 21. Of course, it is also possible at this time for the tape to be rewound or to be moved forward quickly.

A signal for transversely shifting the head 21 is brought about either by bridging of the contacts 22 or by manual operation of the switch 23, as set forth above. In either case, the electromagnet 54 will be energized so as to attract the armature 53 and thus this releasable holding means is placed in its released position releasing the motion-transmitting means for cyclical operation through one cycle. The movement of the end 52 of the armature 53 away from the arm 51 of the lever 40 releases the latter to be swung by the spring 49 in a counterclockwise direction from the position of FIG. 3 into the position of FIG. 4 so that now the friction wheel 46 directly engages the shaft 29, at its portion 41, to be driven thereby. It is to be noted from FIG. 4 that the arm 51 overlaps the left end region of the armature 53 to prevent the latter from being returned by the spring 58 to the position of the armature 53 which is shown in FIG. 3. Moreover, the counterclockwise swinging of the rock lever 40 has displaced the pawl 61 to a location where it is free to be swung by the spring 62 into position as shown in FIG. 4. Thus, during subsequent clockwise turning of the lever 40 the pawl 61 will engage a tooth of the ratchet wheel 63 and will turn the latter in a counterclockwise direction, as viewed in FIG. 4, so that in this way the cam-moving means formed by this structure will serve to rotate the cam means 73 to situate the next step 73*a* thereof in engagement with the follower 74. Of course, as a result of the movement of the lever 40 in the counterclockwise direction the eccentric wheel 46 is driven by frictional engagement with the drive shaft of the drive means. When the parts are at rest the rim 47 of the friction wheel has with respect to the drive shaft the clearance C indicated in FIG. 3, and this clearance is sufficient for the pawl 61 to be displaced from the position of FIG. 3 to the position of FIG. 4 when the friction wheel engages the drive shaft.

The drive shaft turns in a clockwise direction, as indicated by the arrow in FIG. 3, with the result that the eccentric wheel 46 is turned in a counterclockwise direction, and of course at the same time the rock lever 40 is turned in a clockwise direction so that the parts progress from the position of FIG. 4 to the position of FIG. 5, and of course then beyond the position of FIG. 5 back to the position of FIG. 3. As a result, the pawl 61 engages a tooth of the ratchet 63 so as to turn the latter through an increment sufficient to displace the next step 73*a* into engagement with the follower 74, and thus situate the head 21 at the next level in alignment with preselected tracks of the tape. As soon as the part of the wheel 46 which is of greatest eccentricity moves beyond the drive shaft portion 41, the rock lever 40 starts swinging in a counterclockwise direction back toward the position of FIG. 3. Of course, the wheel 63 stops turning as soon as the lever 40 starts to turn back toward its starting position. As is apparent from FIG. 5, the clockwise turning of the lever 40 from the position of FIG. 4 into the position of FIG. 5 has caused the arm 51 to release the armature 53 so that the spring 58 returns the armature 53 to its holding position shown in FIGS. 3 and 5. Therefore, during the continued counterclockwise turning of the lever 40 the

arm 51 will at the end of an operating cycle engage the end 52 of the armature 53 so that the releasable holding means will again hold the parts in their rest position when an operating cycle has been completed.

Just before the end of a complete operating cycle is reached, the hub 43 will have the position shown in FIG. 8 with respect to the spring 49. As soon as the hub 43 moves slightly in a counterclockwise direction beyond the position of FIG. 8, the spring 49 acts to snap the flat 48 to the position of FIG. 9, thus quickly displacing the friction wheel 46 at the end of the operating cycle through an increment sufficient to situate the smallest radius of the eccentric friction wheel between the pin 42 and the drive shaft, thus achieving in this way the clearance C referred to above. The parts will now remain in the position shown in FIG. 3 until a new operating cycle is initiated by closing either of the switch 23 or of the switch 22 in the manner described above.

It is to be noted that the power required by the structure of the invention is exceedingly small. The only power is that which is required for energizing of the electromagnet 54. Thus, all that is required is to displace the armature 53 from the holding position of FIG. 3 to the release position of FIG. 4. From that point on all of the power is derived directly from the electric motor 25 which is operating continuously in any event. Thus the invention makes use of the power of a rotary drive shaft which in any event rotates in order to bring about the shifting of the magnetic head, and in this way the components such as the electromagnets or the like need not be made powerful enough to bring about the required displacement of the magnetic head. All that is required is to control the structure with a relatively weak electrical force in order to bring about the release of the components to the energy of the driving motor of the tape recorder.

What I claim is:

1. In a tape recorder, a magnetic head, a support means supporting said head for movement transversely with respect to a moving tape into alignment with preselected tracks thereof, cam means coacting with said support means and having a series of camming portions respectively coacting with said support means for situating the latter and said head therewith at positions where said head is respectively in alignment with given tracks of a tape, cam-moving means coacting with said cam means for moving the latter to displace one camming portion out of engagement with said support means and another camming portion into engagement with said support means for changing the position of said head with respect to a tape, drive means operating continuously as long as the tape recorder is turned on, cyclically operating motion-transmitting means coacting with said drive means and cam-moving means for operating through a cycle during which said motion-transmitting means transmits movement from said drive means to said cam-moving means for operating the latter sufficiently to displace one camming portion of said cam means out of engagement with said support means and another camming portion of said cam means into engagement with said support means, during one cycle of operation of said motion-transmitting means, releasable holding means releasably holding said motion-transmitting means out of operative engagement with said drive means until said holding means is released, for freeing said motion-transmitting means from movement into operative engagement with said drive means, said releasable holding means coacting with said motion-transmitting means for automatically retaining the latter out of engagement with said drive means after one operating cycle of said motion-transmitting means has been completed, and release means coacting with said releasable holding means for releasing the latter to bring about operation of said motion-transmitting means through one operating cycle thereof.

2. The combination of claim 1 and wherein said release means is manually actuated.

3. The combination of claim 1 and wherein said release means includes a switch located in the path of movement of tracks of a tape to be automatically actuated thereby for bringing about a predetermined release of said holding means.

4. The combination of claim 1 and wherein a spring means coacts with said support means for urging a part of the latter into engagement with said cam means, said part of said support means acting as a cam follower, and said cam portions being in the form of steps of said cam means which successively become aligned with said part of said support means.

5. The combination of claim 4 and wherein said cam means is of a circular configuration and has an axis about which said steps are circumferentially distributed.

6. The combination of claim 5 and wherein said cam-moving means includes a ratchet wheel coaxially fixed with said cam means, said motion-transmitting means including a pawl coacting with said ratchet wheel for angularly displacing the latter through a given increment during an operating cycle of said motion-transmitting means.

7. The combination of claim 6 and wherein said drive means includes a rotary drive shaft, said motion-transmitting means including a rock lever carrying said pawl at one end thereof and carrying at its opposite end a friction component for frictionally engaging said shaft of said drive means to be driven thereby to rock said shaft for displacing said pawl sufficiently to turn said ratchet wheel through said increment.

8. The combination of claim 7 and wherein said friction component is a rotary friction wheel eccentrically carried by said rock lever for rocking the latter as said wheel turns while frictionally engaging said shaft.

9. The combination of claim 8 and wherein said releasable holding means is formed by an armature and electromagnet, said armature normally holding said rock lever at a position where said friction component is spaced from said drive shaft and said electromagnet when energized displacing said armature to a position releasing said rock shaft for movement to a location where said friction component engages said shaft.

10. The combination of claim 9 and wherein said friction component has a hub provided with a flat face and said rock lever carries a spring coacting with said flat face of said hub for snapping said friction component at the end of an operating cycle to a location where it is displaced away from said shaft.