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TAPE RECORDERBACKGROUND OF THE INVENTION1) Field of the Invention

This invention relates to a tape recorder wherein a tape feeding motor is deenergized immediately after a stopping operating member is manually pushed.

2) Description of the Prior Art

A tape recorder is already known and disclosed, for example, in Japanese Utility Model Publication No. 63-47929 wherein, when one of a plurality of operation mode operating members for causing feeding of a tape is manually operated to move from a home position to an operative position, an arresting plate which is movable back and forth in a direction perpendicular to the direction of movement of the operation mode operating member is moved forwardly against resilient force of an arresting plate returning spring to change over a controlling switch for a tape feeding motor to cause rotation of the motor to drive a reel shaft to rotate by way of a rotation transmitting mechanism thereby to put the tape recorder into a predetermined operation mode, and when the operation mode operating member thus operated comes to the operative position, the arresting

plate is returned a little and arrests. at the position.
the operation mode operating member at the operative
position while the operation mode operating member
thereafter inhibits returning movement of the arresting
5 plate, but subsequently when a stopping operating member
is manually operated to move from a home position to an
operative position, a pressing portion of the stopping
member pushes a pressed portion of the arresting plate
to move the arresting plate forwardly to cancel the
10 arrested condition of the operation mode operating
member.

In a conventional tape recorder of the type
mentioned, even if the stopping operating member is
manually operated in order to cancel the arrested
15 condition of a precedently operated operation mode
operating member, the controlling switch for the motor
is not changed over immediately. Rather, when the
operating force to the stopping operating member is
removed after the arrested condition of the operation
20 mode operating member has been cancelled, the stopping
operating member is first returned to its home position,
and then the arresting plate is returned to its home
position, and thereupon, the controlling switch for the
motor is changed over at last to put the motor into a
25 deenergized condition.

Meanwhile, generally a rotation transmitting mechanism for transmitting force of rotation of a motor to a reel shaft is held at a neutral position outside a rotation transmitting route when the tape recorder is in a rest condition wherein all operation mode operating members are at individual home positions thereof, and when one of the operation mode operating members is manually operated to move to its operative position, the rotation transmitting mechanism is moved into the rotation transmitting route. Consequently, a moving mechanism is required for moving the rotation transmitting mechanism into the rotation transmitting route in response to a manual operation of an operation mode operating member.

For example, in a tape recorder which can select one of three operation modes for playing, rewinding and forward feeding, it is necessary to provide a first moving mechanism for moving a rotation transmitting mechanism from a neutral position into a rotation transmitting route on the take-up reel shaft side and a second moving mechanism for moving the rotation transmitting mechanism into another rotation transmitting route on the supply reel shaft side. Even in a tape recorder wherein only operation modes for playing and fast feeding are available, it is necessary to provide such a first

moving mechanism as described above.

By the way, in a tape recorder which does not include a mechanism for holding a rotation transmitting mechanism at a neutral position and has several operation modes, for example, for playing, rewinding and fast feeding, if the rotation transmitting mechanism is normally held in a rotation transmitting route on the take-up reel shaft side but is moved into another rotation transmitting route on the supply reel shaft side only when a rewinding operation is to be performed, then a mechanism for holding the rotation transmitting mechanism at its neutral position is unnecessary. Besides, a mechanism for moving the rotation transmitting mechanism must be provided only for the movement from the take-up reel shaft side to the supply reel shaft side. Accordingly, the tape recorder of the type just mentioned is simplified in construction.

On the other hand, in a tape recorder wherein only operation modes for playing and fast feeding are available, both of a mechanism for holding a rotation transmitting mechanism at a neutral position and a mechanism for moving the rotation transmitting mechanism are unnecessary. Accordingly, the construction is further simplified.

However, in a tape recorder of the construction

wherein, when an operation mode is to be ended, a motor is not stopped only by manual operation of a stopping operating member but is stopped in response to returning movement of the stopping operating member to its home position as in a conventional tape recorder described hereinabove, there is a problem that, if the tape recorder does not include a mechanism for holding the rotation transmitting mechanism at a neutral position, a tape will be fed even for an interval of time until the motor is stopped after the manual operation of the stopping operating member. Accordingly, simplification of entire construction of the tape recorder cannot be achieved by omission of a mechanism for holding a rotation transmitting mechanism at a neutral position nor by simplification of construction for the movement of such rotation transmitting mechanism.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a tape recorder which eliminates a mechanism for holding a rotation transmitting mechanism from a motor to a reel shaft at a neutral position and eliminates or simplifies in construction of a mechanism for moving the rotation transmitting mechanism.

In order to attain the object, according to the

present invention, there is provided a tape recorder wherein, when one of a plurality of operation mode operating members for causing feeding of a tape is manually operated to move from a home position to an operative position, an arresting plate which is movable back and forth in a direction perpendicular to the direction of movement of the operation mode operating member is moved forwardly against resilient force of an arresting plate returning spring to change over a controlling switch for a tape feeding motor to cause rotation of the motor to drive a reel shaft to rotate by way of a rotation transmitting mechanism thereby to put the tape recorder into a predetermined operation mode, and when the operation mode operating member thus operated comes to the operative position, the arresting plate is returned a little and arrests the operation mode operating member at the operative position while the operation mode operating member thereafter inhibits returning movement of the arresting plate, but subsequently when a stopping operating member is manually operated to move from a home position to an operative position, a pressing portion of the stopping member pushes a pressed portion of the arresting plate to move the arresting plate forwardly to cancel the arrested condition of the operation mode operating

member, characterized in that said rotation transmitting mechanism remains in a rotation transmission route from said motor to said reel shaft and, after the amount of forward movement of arresting plate upon forward movement of said stopping operating member has reached an amount sufficient to cancel the arrested condition of any operation mode operating member said pressing portion of said stopping operating member is disengaged from said pressed portion of said arresting plate thereby to release the inhibition of returning movement of said arresting plate.

10 With the tape recorder, if the stopping operating member is manually operated to move to the operative position in order to cancel the arrested condition of an operation mode operating member, then after the amount of forward movement of the arresting plate reaches an amount sufficient to cancel any arrested condition of the operation mode operating member, the pressing portion of the stopping operating member is disengaged from the terminal end of the pressed portion of the arresting plate, and

15

20 consequently, the arresting plate is returned to the home

position. Accordingly, when the stopping operating member is manually operated to move to the operative position, then the tape feeding motor is stopped immediately. Thus, feeding of a tape is stopped immediately in response to such operation of the stopping operating member while the rotation transmitting mechanism remains in the rotation transmitting route. Consequently, such a possible disadvantage that, while the rotation transmitting mechanism remains in the rotation transmitting route, a tape is fed even after the stopping operating member is manually operated to move to the operative position is eliminated. Besides, a mechanism for holding the rotation transmitting mechanism at a neutral position can be eliminated and also a mechanism for moving the rotation transmitting mechanism can be eliminated or simplified in construction.

Preferably, the rotation transmitting mechanism remains in the rotation transmitting route from the motor to a tape take-up reel shaft when all of the operation mode operating members are at the individual home positions thereof. Thus, the load upon operation for the playing is reduced, and the operating member for the playing mode can be manually operated with comparatively small force.

At least one of the pressing portion of the stopping operating member and the pressed portion of the arresting plate may have an inclined edge or face which is inclined with respect to the direction of movement of the stopping operating member by manual operation such that, when the stopping operating member is manually operated to move to the operative position, the arresting plate is moved forwardly by an action of the inclined edge or face upon engagement of the pressing portion with the pressed portion.

A specific embodiment of the present invention will now be described in detail by way of example with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a bottom plan view of a mechanism of a tape recorder showing a first preferred embodiment of the present invention:

FIGS. 2 to 4 are enlarged partial bottom plan views showing the tape recorder mechanism of FIG. 1 at different stages of operation:

FIGS. 5 and 6 are bottom plan views of the tape recorder mechanism of FIG. 1 showing different positions of a rotation transmitting mechanism:

FIG. 7 is a partial bottom plan view showing a

modification to the tape recorder mechanism shown in FIG. 1:

FIG. 8 is a partial bottom plan view showing another modification to the tape recorder mechanism shown in FIG. 1: and

FIG. 9 is a partial bottom plan view of a mechanism of another tape recorder showing a second preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

Referring to FIGS. 1 to 6, there is shown a mechanism of a tape recorder to which the present invention is applied. The tape recorder mechanism includes a base plate 1, and a take-up reel shaft 2, a supply reel shaft 3 and a capstan 4 all mounted for rotation on an upper face of the base plate 1. A lower end portion of the take-up reel shaft 2 extends through and farther than a lower face of the base plate 1, and a take-up reel gear 5 is supported on the lower extension of the take-up reel shaft 2 by way of a slip mechanism not shown. Also a lower end portion of the supply reel shaft 3 extends through and farther than the lower face of the base plate 1, and a supply reel gear 6 is supported on the lower extension of the supply reel shaft 3. An intermediate gear 7 supported for rotation

on a lower face of the base plate 1 is held in meshing engagement with the supply reel gear 6.

Also a lower end portion of the capstan 4 extends through and farther than the lower face of the base plate 1. and a small diameter gear 8 and a flywheel 9 are supported on the lower extension of the capstan 4. The flywheel 9 has a belt groove (not shown) formed on an outer periphery thereof and is connected to a pulley 12 of a tape feeding motor 11 by way of an endless belt 10. Thus, force of rotation of the motor 11 is transmitted from the pulley 12 to the flywheel 9 by way of the endless belt 10 so that the small diameter gear 8 and the capstan 4 are rotated in an integral relationship with the flywheel 9.

A transmitting gear 13 which serves as a principal element of a rotation transmitting mechanism is held in meshing engagement with the small gear 8. The transmitting gear 13 is supported for rotation on a lower face of a free end portion of a support lever 14 by means of a shaft 15. The support lever 14 is mounted for pivotal motion in a coaxial relationship with the capstan 4 and has a base end portion located between the small gear 8 and the lower face of the base plate 1. The support lever 14 is normally biased in a counterclockwise direction in FIG. 1 by a return spring

38. The transmitting gear 13 has a first gear section 13a of a small diameter for the playing and the fast feeding and a second gear section 13b of a large diameter for the rewinding provided in a coaxial and integral relationship on a lower face of the first gear section 13a.

Three operation mode operating members including a playing operating member 16, a rewinding operating member 17 and a fast feeding operating member 18 and a stopping operating member 19 are mounted for individual back and forth movement in directions indicated by a double-sided arrow mark A and B on the lower face of the base plate 1. The operating members 16 to 19 are disposed in this order from the right to the left in FIG. 1.

The playing operating member 16 is normally biased in its returning direction, that is, in the direction of the arrow mark B by a return spring not shown. Meanwhile, the rewinding operating member 17 and the fast feeding operating member 18 are normally biased in their returning direction indicated by the arrow mark B by another common return spring 20, and the stopping operating member 19 is biased in its returning direction indicated by the arrow mark B by a further return spring 21.

Each of the operating members 16 to 18 for the playing, rewinding and fast feeding can be arrested at its pushed in position, that is, a position fully moved in the direction of the arrow mark A by an arresting plate 22. The arresting plate 22 is mounted on the lower face of the base plate 1 for back and forth movement in directions indicated by a double-sided arrow mark C and D, that is, in directions perpendicular to the directions of movement of the operating members 16 to 19. The arresting plate 22 is normally biased in its returning direction indicated by the arrow mark D by the return spring 21 which is common to the stopping operating member 19. Accordingly, the return spring 21 serves as a returning operating member returning spring and also as an arresting plate returning spring.

It is to be noted that, while such arresting mechanism between the arresting plate 22 and the operating members 16 to 18 is shown in FIGS. 1 to 4, since such mechanism is well known in the art and is disclosed in detail in Japanese Utility Model Publication No. 63-47929 mentioned hereinabove, detailed description thereof is omitted herein.

If one of the operating members 16 to 18 for playing, returning and fast feeding is manually operated to move in the direction of the arrow mark A, then the

arresting plate 22 is first moved in the direction of the arrow mark C. Then, after the operating member thus operated reaches its operative position, the arresting plate 22 is moved back a little in the direction of the arrow mark D, and at that position, the arresting plate 22 arrests the operating member at the operative position while the operating member in turn inhibits returning movement of the arresting plate 22 after then. When the arresting plate 22 is in such arresting condition, if the stopping operating member 19 is manually operated to move in the direction of the arrow mark A, then a pressing portion 23 of the stopping operating member 19 is engaged with an inclined face 24a of a pressed portion 24 in the form of a bent lug on the arresting plate 22 to move the arresting plate 22 in the advancing direction indicated by the arrow mark C against the biasing force of the arresting plate returning spring 21. Consequently, the arrested condition of the operating member till then is cancelled.

After the amount of the forward movement of the arresting plate 22 upon manual operation of the stopping operating member 19 reaches an amount sufficient to cancel the arrested condition of the operating member 16, 17 or 18, the pressing portion 23 of the stopping

operating member 19 is disengaged from a terminal end 24b of the pressed portion 24 of the arresting plate 22. Consequently, the arresting plate 22 is moved back to its initial or home position by the arresting plate
5 returning spring 21.

It is to be noted that, when the arresting plate 22 is in its home position as seen in FIG. 1, the pressed portion 24 thereof is not positioned on the passage of movement of the pressing portion 23 of the
10 stopping operating member 19 as seen in FIG. 1, and consequently, if the stopping operating member 19 is manually operated to move in the direction of the arrow mark A, the pressing portion 23 thereof will not be engaged with the pressed portion 24 of the arresting
15 plate 22.

A controlling switch 25 for the motor 11 is mounted on the lower face of the base plate 1. The controlling switch 25 is of the normally open type and has a pair of contacts 25a and 25b for contacting with
20 each other, and a pressed member or actuator 26 made of a synthetic resin is mounted on the contact 25a.

When one of the operating members 16 to 18 is manually operated to move in the direction of the arrow mark A thereby to move the arresting plate 22 in the
25 direction of the arrow mark C, a switch pressing element

27 provided on the arresting plate 22 pushes the actuator 26 on the contact 25a of the controlling switch 25 to move forwardly, that is, upwardly in FIG. 1 against the resilient force of the contact 25a.

5 Consequently, the contact 25a is put into contact with the other contact 25b to turn the controlling switch 25 on. In this instance, after the operating member which has been manually operated reaches its operative position, the arresting plate 22 is moved back a little
10 in the direction of the arrow mark D until the operating member is arrested at its operative position while the controlling switch 25 is still maintained in an on-state after then.

When the arresting plate 22 cancels its
15 arresting condition of the operating member 16, 17 or 18 to allow the latter to be moved back in the direction of the arrow mark B and is moved by itself back in the direction of the arrow mark D, the pushed condition of the actuator 26 on the contact 25a of the switch 25 by
20 the switch pressing portion 27 on the arresting plate 22 is cancelled so that the contact 25a is moved back by its own resilient force away from the other contact 25b to turn off the controlling switch 25.

Referring particularly to FIGS. 5 and 6, an
25 engaging pin 30 is provided at an end of a pivotal plate

29 and located for sliding engagement with an inclined face 28 at a base end portion of the support lever 14. The pivotal plate 29 is mounted at a substantially middle portion thereof for pivotal motion on the lower face of the base plate 1 by means of a shaft 31. Another engaging pin 32 is provided at the other end of the pivotal plate 29 and normally held in engagement for pivotal and linear movement in an elongated hole 33 formed at a substantially middle portion of the rewinding operating member 17. Thus, when the rewinding operating member 17 is manually operated to move in the direction indicated by the arrow mark A in FIG. 1 from the home position shown in FIG. 6 to the operative position shown in FIG. 5, the pivotal plate 29 is pivoted in the counterclockwise direction around the shaft 31 by way of engagement between the elongated hole 33 and the engaging pin 32. Upon such counterclockwise pivotal motion of the pivotal plate 29, the engaging pin 30 is slidably engaged with the inclined face 28 of the support lever 14 to pivot the support lever 14 in the clockwise direction against the biasing force of the return spring 38 as seen in FIG. 5. To the contrary, when the rewinding operating member 17 is moved back to the home position, the pivotal plate 29 is pivoted in the clockwise direction to allow the support lever 14 to be

pivoted in the counterclockwise direction to the position shown in FIG. 6 by the biasing force of the return spring 38.

5 ~~An abutting edge 34 is provided at an end~~
portion of the pivotal plate 29 remote from the engaging pin 32, and when the rewinding operating member 17 is at its home position, the abutting edge 34 abuts with an abutting projection 35 in the form of a bent lug formed on the support lever 14 as seen in FIG. 6. Further, an
10 arcuate pressing edge or side projection 36 is provided on an edge of the pivotal plate 29 between the engaging pin 30 and the shaft 31 while a pressed member 37 in the form of a bent lug is formed on the support lever 14 and located for abutting engagement with the arcuate
15 pressing edge 36.

Referring to FIG. 1, the tape recorder further includes an automatic stopping mechanism 39 which operates such that, when a tape in a tape cassette (not shown) loaded in position on the tape recorder is taken
20 up completely from the supply reel 3 side to the take-up reel shaft 2 side, it moves the arresting plate 22 in the advancing direction indicated by the arrow mark C against the biasing force of the arresting plate returning spring 21 to cancel the arrested condition of
25 any of the operating members 16 to 18 by the arresting

plate 22 thereby to put the tape recorder into a rest condition.

Subsequently, operation of the tape recorder is described. FIG. 1 shows the tape recorder mechanism in the rest condition. In the rest condition, the rotation transmitting mechanism including the transmitting gear 13 is positioned on the tape take-up reel shaft 2 side. In particular, the first gear portion 13a of the transmitting gear 13 remains in meshing engagement with the take-up gear 5. Thus, if a tape cassette (not shown) is loaded in position on the two reel shafts 2 and 3 and then the playing operating member 16 is manually operated to move in the advancing direction indicated by the arrow mark A, then a magnetic head (not shown) is moved forwardly together with the playing operating member 16 until it is contacted with a tape in the tape cassette.

Meanwhile, upon forward movement of the magnetic head, a pinch roller not shown is resiliently pressed against the capstan 4. Further, when the playing operating member 16 is moved forwardly in the direction of the arrow mark A, the arresting plate 22 is moved in the advancing direction indicated the arrow mark C. After the playing operating member 16 reaches its operative position, the arresting plate 22 is moved back

a little in the direction of the arrow mark D. and consequently. the playing operating member 16 is arrested at its operative position by the arresting plate 22. Consequently, the magnetic head is thereafter held in contact with the tape while the pinch roller is held in a resiliently pressed condition against the capstan 4 with the tape interposed therebetween, and the arresting plate 22 is inhibited from returning movement after then by the playing operating member 6. Further, when the playing operating member 16 is moved forwardly so that the arresting plate 22 is moved forwardly in the direction of the arrow mark C, the controlling switch 25 for the motor 11 is changed over to an on-state as seen in FIG. 2 so that the motor 11 is rotated, and even after the arresting plate 22 is returned a little in the direction of the arrow mark D, the condition of the controlling switch 25 is maintained. Then, force of rotation of the motor 11 is transmitted to the capstan 4 and the small diameter gear 8 by way of the pulley 12, endless belt 10 and flywheel 9. Further, rotation of the small diameter gear 8 is transmitted to the take-up reel shaft 2 by way of the transmitting gear 13 and take-up gear 5. Consequently, the capstan 4 and the take-up reel shaft 2 are individually rotated in the clockwise direction in FIG. 1 so that the tape is fed

from the supply reel shaft 3 side to the take-up reel shaft 2 side, and a playing operation of the tape is performed on the tape recorder.

5 In the meantime, if the fast feeding operating member 18 is manually operated in the rest condition of the tape recorder shown in FIG. 1, then rotation of the transmitting gear 13 is transmitted to the take-up reel shaft 2. Consequently, the take-up reel shaft 2 is rotated at a high speed in the clockwise direction to
10 feed the tape at a high speed.

On the other hand, if the rewinding operating member 17 is manually operated in the rest condition of the tape recorder shown in FIG. 1, then the rotation transmitting mechanism is changed over from the take-up
15 reel shaft 2 side to the supply reel shaft 3 side. In particular, the support lever 14 is pivoted in the clockwise direction in FIG. 1 around the axis of the capstan 4 by way of the pivotal plate 29 so that the second gear section 13a of the transmitting gear 13 is
20 moved out of meshing engagement with the take-up gear 5 while the second gear section 13b is put into meshing engagement with the intermediate gear 7 as seen in FIG. 2. In this condition, rotation of the transmitting gear 13 is transmitted to the supply reel shaft 3 by way
25 of the intermediate gear 7 and supply gear 6.

Consequently, the supply reel shaft 3 is driven to rotate in the counterclockwise direction in FIG. 1 to rewind the tape at a high speed from the take-up reel shaft 2 side to the supply reel shaft 3 side.

5 If the stopping operating member 19 is manually operated when the tape recorder is in the rewinding operation condition as seen in FIG. 2, then the pressing portion 23 thereof is engaged with the inclined face 24a of the pressed portion 24 on the arresting plate 22 to
10 move the arresting plate 22 forwardly in the leftward direction in FIG. 2 indicated by the arrow mark C against the biasing force of the arresting plate returning spring 21. Then, after the amount of such forward movement of the arresting plate 22 reaches an
15 amount sufficient to cancel the arrested condition of the rewinding operating member 17, the arrested condition of the rewinding operating member 17 at the operative or forwardly moved position is cancelled as seen in FIG. 3. Consequently, the rewinding operating
20 member 17 is moved back in the direction of the arrow mark B by the biasing force of the spring 20 to its home position as seen in FIG. 4 while the pressing portion 23 is disengaged from the terminal end 24b of the pressed portion 24 of the arresting plate 22. Consequently, the
25 arresting plate 22 is moved back in the direction of the

arrow mark D by the biasing force of the arresting plate returning spring 21 to its home position as seen in FIG. 4.

When the arresting plate 22 is moved back in the direction of the arrow mark D as described above, the controlling switch 25 is turned off as seen from FIG. 4, and consequently, rotation of the motor 11 is stopped. Then, if the manually operated condition of the stopping operating member 19 is cancelled in the condition shown in FIG. 4, then the stopping operating member 19 is moved back in the direction of the arrow mark B to its initial position by the biasing force of the return spring 21.

Such returning movement of the stopping operating member 19 is performed rapidly without being hindered by the pressed portion 24 of the arresting plate 22 or any other element because the pressing portion 23 passes in the rear, that is, a left-hand side position in FIG. 4, of the pressed portion 24. Such rest condition of the tape recorder mechanism as seen in FIG. 1 is restored in this manner.

It is to be noted that, also when the fast feeding operating member 18 is manually operated to move in the direction of the arrow mark A, the controlling switch 25 is turned on similarly as in the case when the

rewinding operating member 17 is manually operated to move in the direction of the arrow mark A.

Meanwhile, when the rewinding operating member 17 is manually operated to move in the direction of the arrow mark A as described above, the support lever 14 is pivoted in the clockwise direction by way of sliding engagement between the inclined face 28 thereon and the engaging pin 30 on the pivotal plate 29 to move the pressed portion 37 thereon toward and into abutting engagement with the pressing edge 36 of the pivotal plate 29 as shown in FIG. 5. Here, the relationship between a distance L_1 from the center of pivotal motion of the pivotal plate 29 to the engaging pin 32 in the directions indicated by the doubled-sided arrow mark C and D and another distance L_2 from the center of pivotal motion of the pivotal plate 29 to a top end of the pressing edge 36 in the directions of the double-sided arrow mark C and D is set as $L_1 > L_2$. The reason of such setting is such as follows. When, in a rewinding operation condition of the tape recorder, the tape is rewound completely to the supply reel shaft 3 side and a last end of the tape is reached, the intermediate gear 7 is stopped, and consequently, the contacting pressure between teeth of the second gear 13b and intermediate gear 7 rises suddenly. Accordingly, if the returning

spring 38 for the support lever 14 is not sufficiently strong, then a situation may occur wherein the support lever 14 cannot be pivoted in the returning direction. Therefore, in the tape recorder of the present

5 embodiment, the returning force when the rewinding operating member 17 is to be moved back in the direction of the arrow mark B is increased at a rate equal to the ratio between L_1 and L_2 , and the thus increased returning force acts upon the pressed portion 37 of the

10 support lever 14 to help the second gear 13b to be moved away from the intermediate gear 7. Thus, when the rewinding operating member 17 is moved back from the position shown in FIG. 5 to the position shown FIG. 6, the pivotal plate 29 is pivoted in the clockwise

15 direction in FIG. 5 around the shaft 31 in response to such returning movement, and thereupon, the pressing edge 36 thereof pushes the pressed portion 37 of the support lever 14. Accordingly, the support lever 14 can readily move the second gear 13b away from the

20 intermediate gear 7 and can be pivoted to the position shown in FIG. 6. As a result, the return spring 38 for the support lever 14 need not be very strong, and the load when the rewinding operating member 17 is manually operated can be reduced and the operability can be

25 improved. Further, in the condition shown in FIG. 6,

the abutting projection 35 of the support lever 14 abuts with the abutting edge 34 of the pivotal plate 29 to prevent pivotal motion of the support lever 14 in the clockwise direction.

5 Referring now to FIG. 7, there is shown a modification to the tape recorder mechanism of the embodiment shown in FIGS. 1 to 6. The modified tape recorder mechanism is substantially similar in construction to the tape recorder of the embodiment
10 except that an arresting plate 22' is molded from a synthetic resin and a pressed portion 24' in the form of an inclined rib extends laterally in an integral relationship from a lower face of the arresting plate 22' while a pressing portion 23' in the form of a
15 circular projection for slidably contacting with an inclined face 24'a of the pressed portion 24' extends laterally from an upper face of a stopping operating member 19'. The tape recorder operates substantially in similar manner as the tape recorder of the embodiment
20 described hereinabove, and overlapping description of such operation is omitted herein to avoid redundancy.

Referring now to FIG. 8, there is shown another modification to the tape recorder mechanism of the embodiment. The present modified tape recorder
25 mechanism is different from the tape recorder of the

embodiment only in that a stopping operating member 19" is molded from a synthetic resin and a pressing portion 23" in the form of an inclined rib extends laterally on an upper face of the stopping operating member 19" while a pressed portion 24" in the form of a bent lug for slidably contacting with an inclined face 23"^a of the pressing portion 23" extends laterally from a side edge of an arresting plate 22". The tape recorder also operates in a similar manner as the tape recorder of the embodiment described above.

Referring now to FIG. 9, there is shown a mechanism of another tape recorder to which the present invention is applied. The tape recorder is of the type which has only two operation modes for playing and fast feeding. The tape recorder includes a base plate 41 made of a synthetic resin. The base plate 41 has a take-up reel shaft 42 mounted for rotation thereon and has a fixed shaft 43 formed in an integral relationship thereon such that a supply side reel not shown of a tape cassette not shown is to be loaded. An endless belt 48 extends between a motor pulley 45 directly coupled to a motor 44 and a flywheel 47 directly coupled to a capstan 46 while another endless belt 51 extends between a pulley 49 directly coupled to the capstan 46 and a take-up reel pulley 50 mounted in a coaxial relationship with

the take-up reel shaft 42 so that rotation of the motor 44 may be normally transmitted to the take-up reel shaft 42.

Two operation mode operating members including a playing operating member 52 and a fast feeding operating member 53 and a stopping operating member 54 are mounted for back and forth movement in directions indicated by a double-sided arrow mark A and B on the base plate 41. The fast feeding operating member 53 and the stopping operating member 54 are mounted on a rear face of the base plate 41. Meanwhile, the playing operating member 52 is formed in an integral relationship with a head mounting plate (not shown) having a magnetic head (not shown) mounted thereon and is mounted on an upper face of the base plate 41. A bent lug 55 is formed on the head mounting plate and extends laterally downwardly to a location on the rear face side of the base plate 41.

A return spring 56 in the form of a torsion spring normally biases the fast feeding operating member 53 and the stopping operating member 54 in its returning direction indicated the arrow mark B while the playing operating member 52 is normally biased in its returning direction indicated by the arrow mark B by a return spring (not shown) for the head mounting plate.

An arresting plate 57 is mounted for back and

forth movement in directions indicated by another double-sided arrow mark C and D on the rear face of the base plate 41. The arresting plate 57 is normally biased in the direction of the arrow mark D by a return spring 58.

A switch changing over element 59 in the form of a bent lug is formed at a left end in FIG. 9 of the arresting plate 57. A controlling switch 60 of the normally open type for controlling the motor 44 is mounted on the rear face of the base plate 41 in an opposing relationship to the switch changing over element 59. Thus, when the arresting plate 57 is moved in the direction of the arrow mark C, the switch 60 is changed over to an on-state by the switch changing over element 59.

An inclined portion or edge 61 is formed on the arresting plate 57 in an opposing relationship to the bent lug 55 on the head mounting plate such that it may be engaged by the bent lug 55 when the head mounting plate is moved forwardly in the direction indicated by the arrow mark A. An arresting portion 62 is formed in a contiguous relationship to a terminal end of the inclined portion 61 of the arresting plate 57.

Another inclined portion or edge 63 is formed on the fast feeding operating member 53 while a bent lug 64

is formed on the arresting plate 57 in a forwardly opposing relationship to the inclined portion 63.

A pressing portion 65 in the form of a bent lug is formed on the stopping operating member 54, and a
5 pressed portion 66 also in the form of a bent lug is formed on the arresting plate 57 at a position forwardly of the pressing portion 65 in the direction of the forward movement. The pressed portion 66 is inclined with respect to the directions of the arrow marks A and
10 B as seen in FIG. 9.

The tape recorder mechanism operates in the following manner.

If the playing operating member 52 is manually operated when the tape recorder mechanism is in such a
15 rest condition as shown in FIG. 9, then the head mounting plate is moved in an integral relationship therewith to contact the magnetic head with a tape within a tape cassette loaded in position on the tape recorder while a pinch roller not shown is contacted
20 with the capstan 46 with the tape interposed therebetween. Upon such forward movement of the head mounting plate, the bent lug 55 thereon is slidably engaged with the inclined portion 61 of the arresting plate 57 to move the arresting plate 57 forwardly in the
25 direction of the arrow mark C. Upon such movement of

the arresting plate 57, the switch changing over element 59 thereon changes over the controlling switch 60 to an on-state to cause the motor 44 to rotate, thereby putting the tape recorder into a playing mode. Then, after the bent lug 55 on the head mounting plate is disengaged from a terminal end of the inclined edge 61 of the arresting plate 57, the arresting plate 57 is moved back a little so that the arresting portion 62 thereon is engaged with the bent lug 55 of the head mounting plate to arrest the playing operating member 52 and the head mounting plates at their operative position. In this condition, returning movement of the arresting plate 57 in the direction of the arrow mark D is inhibited by the bent lug 55, that is, by the playing operating member 52, and consequently, the controlling switch 60 is thereafter maintained in an on-state.

On the other hand, if the fast feeding operating member 53 is manually operated in the rest condition of the tape recorder mechanism shown in FIG. 9, then the inclined portion 63 thereon is slidably engaged with the bent lug 64 on the arresting plate 57 to move the arresting plate 57 forwardly in the direction of the arrow mark C. Thereupon, the switch changing over element 59 on the arresting plate 57 changes over the controlling switch 60 to an on-state to cause the motor

44 to rotate, thereby putting the tape recorder into a fast feeding mode. After the terminal end of the inclined portion 63 of the fast feeding operating member 53 is disengaged from the bent lug 55 of the arresting plate 57, the arresting plate 57 is moved back a little so that the bent lug 64 is engaged with a stepped portion at the terminal end of the inclined portion 63 to arrest the fast feeding operating member 53 at its operative position. In this condition, returning movement of the arresting plate 57 in the direction of the arrow mark D is inhibited by the fast feeding operating member 53, and the switch 60 is held in an on-state after then.

In order to end such a playing mode or a fast feeding mode as described above, the stopping operating member 54 may be manually operated. In particular, if the stopping operating member 54 is manually operated to move in the direction of the arrow mark A, then the pressing portion 65 thereon is slidably engaged with the pressed portion 61 of the arresting plate 57 so that the arresting plate 57 is moved in the direction of the arrow mark C to cancel the arrested condition of the playing operating member 52 or fast feeding operating member 53 to allow the operating member to be returned to its home position. Then, after the pressing portion

65 is disengaged from the pressed portion 61. the
arresting plate 57 is immediately returned in the
direction of the arrow mark D. thereby to cause the
motor 44 to be stopped similarly as in the tape recorder
5 of the first embodiment described hereinabove.



CLAIMS:

1. A tape recorder wherein, when one of a plurality of operation mode operating members for causing feeding of a tape is manually operated to move
5 from a home position to an operative position, an arresting plate which is movable back and forth in a direction perpendicular to the direction of movement of the operation mode operating member is moved forwardly against resilient force of an arresting plate returning
10 spring to change over a controlling switch for a tape feeding motor to cause rotation of said motor to drive a reel shaft to rotate by way of a rotation transmitting mechanism thereby to put said tape recorder into a predetermined operation mode, and when the operation
15 mode operating member thus operated comes to the operative position, said arresting plate is returned a little and arrests the operation mode operating member at the operative position while the operation mode operating member thereafter inhibits
20 returning movement of said arresting plate, but subsequently when a stopping operating member is manually operated to move from a home position to an operative position, a pressing portion of said stopping member pushes a pressed portion of said arresting plate



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to move said arresting plate forwardly to cancel the
arrested condition of the operation mode operating
member, characterized in that said rotation transmitting
mechanism (5, 13, 8, 9, 10, 12; 50, 51, 49, 47, 48, 45) remains in
5 a rotation transmission route from said motor (11; 44) to said
reel shaft (2; 42) and, after the amount of forward movement of
arresting plate (22; 22'; 22"; 57) upon forward movement of said
stopping operating member (19; 54) has reached an amount
sufficient to cancel the arrested condition of any operation mode
10 operating member (16, 17, 18; 52, 53), said pressing portion (23;
23'; 23"; 65) of said stopping operating member (19; 54) is
disengaged from said pressed portion (24; 24', 24"; 66) of said
arresting plate (22; 22'; 22"; 57) thereby to release the
inhibition of returning movement of said arresting plate (22; 22';
15 22"; 57).

2. A tape recorder as set forth in claim 1.
characterized in that said rotation transmitting
mechanism (13) remains in said rotation transmitting
route from said motor (11) to a tape take-up reel shaft
20 (2) when all of said operation mode operating members



(16, 17, 18; 52, 53) are at the individual home positions thereof.

3. A tape recorder as set forth in claim 1 or 2, characterized in that at least one (24; 24'; 23"; 66) of said pressing portion (23; 23'; 23"; 65) of said stopping operating member (19; 54) and said pressed portion (24; 24'; 24"; 66) of said arresting plate (22; 22'; 22"; 57) has an inclined edge or face (24a; 24'a; 23"a) which is inclined with respect to the direction of movement of said stopping operating member (19; 54) by manual operation such that, when said stopping operating member (19; 54) is manually operated to move to the operative position, said arresting plate (22; 22'; 22"; 57) is moved forwardly by an action of said inclined edge or face (24a; 24'a; 23"a) upon engagement of said pressing portion (23; 23'; 23"; 66) with said pressed portion (24; 24'; 24"; 66).

4. A tape recorder substantially as hereinbefore described with reference to and as shown in, the accompanying drawings.