

TAPE RECORDER

This invention relates to a tape recorder.

Conventionally, in a cassette tape recorder, for example, a main chassis and the associated mechanism parts to be mounted upon the main chassis may be of
5 metallic or other material. If of metallic material, it becomes difficult to form the main chassis of a complicated structure and some relevant items of such associated parts, respectively, in the form of an integral combination. To give such integral
10 combination, therefore, the chassis parts and such relevant items are incorporated for attachment in a previously combined form. This means that it becomes necessary to prepare a number of members for such attachment in advance of such incorporation. Further,
15 the process step for manufacturing the main chassis and the associated mechanism parts also becomes complicated. For example, a separate positioning mechanism having elastic members is required to permit the head chassis to be held in place without failing to
20 be kept fixed onto the main chassis. Thus, the rise in price, and the increase in size and weight, of the cassette tape recorder product have posed an important problem.

In recent years, therefore, in a cassette tape recorder, for example, for the purpose of decreasing the size, the weight, and the price of the product, it has widely been carried out to mold by plastic the chassis and the associated mechanism parts to be mounted upon it which were conventionally formed respectively of metallic material. The plastic molding of the chassis and the associated mechanism parts is not only effective in miniaturizing and lightening and cheapening the product but also facilitating the production of it. It further offers the merit that the resulting chassis and the resulting associated parts become capable of absorbing the impact sounds and vibration sounds peculiar to a cassette tape recorder which generate, for example, at the time of operation of the movable members incorporated in the said associated mechanism parts.

In the cassette tape recorder having the above-mentioned plastic-molded chassis and its similarly molded associated mechanism parts, the next demand therefore is to make more smooth the operation of the respective mechanism parts and minimize the number of such parts required. Namely, it is to more miniaturize and lighten and more reduce in price the product than in the conventional case.

To meet such demand, it is necessary to organically construct the said mechanism parts and chassis and also to efficiently combine one of such parts with

another and such parts with the chassis.

An object of the present invention is to provide a tape recorder having a simple construction which contributes to miniaturization and reduction of weight and also reduction in price of the tape recorder.

According to the present invention, there is provided a tape recorder which comprises:

- (a) a main chassis which has a through hole;
- (b) an operating member which is reciprocally slidable between a non-operating position and an operating position on one side of said main chassis;
- (c) a head chassis which is reciprocally slidable on another side of said main chassis between a first position and a second position respectively corresponding to the non-operating position and the operating position of said operating member, said head chassis being provided with a rod at a first end towards said first position engageable with said operating member through said through hole of said main chassis;
- (d) a guiding member for guiding the transfer of said head chassis between said first and second positions, said guiding member being rigid with said main chassis in a position such that said guiding member is engaged by a second end of said head chassis towards the second position; and

(e) a spring which is suspended between said head chassis and said operating member for urging said rod of said head chassis in the direction towards the second position to engage with said operating member, the arrangement being that said head chassis is able to slide in accordance with the movement of said operating member, said spring further urging said head chassis to rotate so that the second end of the head chassis is biased away from the main chassis to engage said guiding member and said first end of said head chassis is urged towards and engages said main chassis, the biasing force of the second end of said head chassis against said guiding member increasing as the distance between said guiding member and the centre of rotation of the head chassis is reduced, said second end of said head chassis being guided by said guiding member when said head chassis is driven into the second position in accordance with the movement of said operating member actuated into the operating position and the engagement of the second end of said head chassis with said guiding member allowing actuation of said head chassis when said head chassis is in the first position.

This invention can be more fully understood from the following detailed description when taken in conjunction with the accompanying drawings, in which:-

Fig. 1 is a plan view showing a cassette tape recorder to which a tape recorder according to an embodiment of this invention is applied;

Fig. 2 is a plan view showing the cassette tape recorder of Fig. 1 with a main chassis detached from the tape recorder;

Figs. 3a and 3b are a plan view and front view, respectively, showing a head chassis for the cassette tape recorder of one embodiment of this invention;

Figs. 4 and 5 are a plan view and a partly-omitted plan view, respectively, for explaining an operation of the embodiment of Fig. 3a;

Figs. 6 and 7 are a side view and plan view, respectively, showing an interlocking relation between a reproducing member and a spring;

Figs. 8, 9a and 9b are respectively side views illustrating the operation of the spring, in cooperation with the associated elastic member;

Fig. 10 is a back-side view of the main part of the tape recorder according to the said embodiment; and

Fig. 11 is a plan view of an automatic stopping mechanism of the cassette tape recorder illustrated in Fig. 1.

There will now be described in detail in connection with the appended drawings a case where a movable member attaching mechanism for a tape recorder according to an embodiment of the invention is applied to a cassette tape recorder.

Fig. 1 shows a basic construction of the tape recorder according to the embodiment of the invention, which will hereinafter be explained in detail. Numeral 11 denotes a main chassis of the cassette tape recorder which is formed of synthetic resin material. On the forward side (downwards of the illustration) of the main chassis 11 is provided an operating-member assembly 12 which consists of a plurality of operating members 13, 15, 16, 17, 18, and 19 for bringing the cassette tape recorder into a specified mode of operation or inoperation. The assembly 12 is so arranged as to be slidable in a direction indicated by arrows in Fig. 1. The operating member 13 is a stop/eject member for stopping the recorder operation or also for ejecting operation. By operating that stop/eject member 13 the specified operational mode of the cassette tape recorder is stopped or an ejecting mechanism 14 is operated which serves to take out a tape cassette not shown as set. Further, the operating member 15 is a recording

member which sets the tape recorder in prerecording mode. When this member is actuated, the reproducing member 16 is concurrently operated in interlocking relation with the recording member 15 by means of a substantially L-shaped projecting piece 151 (see Fig. 2) provided on one side of the member 15. Further, 17 and 18 are a rewinding member and a fast forwarding member, respectively. 19 is a pause operating member for temporarily stopping the operational mode for recording or reproduction.

On the upper surface of the said main chassis 11 is provided a metallic head chassis 20 which is a movable member. The head chassis 20 is formed with notches 53 and 54 to be fitted under those engaging projections 51 and 52 as later described which are integrally provided for the main chassis 11. The head chassis 20 is so arranged as to be made slidable, in interlocking relation with the operation of the reproducing member 16, in the same direction as that in which the reproducing member 16 operates. On a specified portion of the head chassis 20 is provided an attaching member 21 which is formed of synthetic resin material. On this member 21 are provided a recording and reproducing head 22, eraser head 23, tape-stop detecting lever 24 and a spring 25. The spring 25 serves to bring the head chassis 20 into interlocking relation with the reproducing member 16, which relation will be described later. Further, on _____

the attaching member 21 are formed an elastic bifurcate holding section 211 and another similar section 212 in the neighborhood thereof. Each of such sections 211 and 212 is for the purpose of collectively sandwiching the
5 connecting leads 26, 27 which are connected to the recording and reproducing head.

At the left side end of the attaching member 21 is formed an elastic thin piece 213. The main chassis 11 is integrally formed with an engaging piece 111 which is
10 so arranged as to be engageable with the elastic thin piece 213.

The recording and reproducing head 22 is connected to a recording and reproducing circuit not shown through leads 26 and 27 indicated by one-dot chain line in the
15 Figure.

On the right side of the illustrated head chassis 20 is provided a pinch lever 29 made of synthetic resin material which, with the sliding movement of the head chassis 20, is rotatable or swingable in two opposite
20 directions A, B about a pivotal shaft 28. At one end of the pinch lever 29 is provided a pinch roller 31 which is pressed against a capstan 30 when the pinch lever 29 is rotated in a direction indicated by an arrow A, which capstan 30 is provided coaxially with a flywheel as
25 later described.

On the rearward side (the upper side of the

illustration) of the main chassis 11 is provided an error-erasure preventing mechanism 32 made of synthetic resin material which detects the presence or absence of an error-erasure preventing pawl provided on the said tape cassette, thereby to render the recording member 15 operative or inoperative.

Numerals 33 and 34 designate guide pins, respectively. Numerals 35 and 36 denote left and right reel rest, respectively, and numeral 37 shows a motor.

Fig. 2 schematically shows the construction of various mechanisms provided beneath the chassis 11 of the cassette tape recorder shown in Fig. 1. The above-mentioned recording, reproducing, rewinding and fast forwarding members 15 to 18 are arranged to be locked at their respective operating positions by a locking plate 38 which is provided in such a manner that it intersects the members 15 to 18 substantially at right angles thereto and so that it can slide in opposite directions C and D by being engaged with the members 15 to 18. Further, a switch slider 39 is provided substantially in parallel with the locking plate 38 so that it can slide in opposite directions E and F by being engaged with the said members 15 to 18. When moved in the direction E, that switch slider 39 acts to turn on a power supply switch 40 of the motor 37.

Further, each of the reproducing and rewinding members 16 and 17 is given a biasing force to urge it

downwards of the illustration by a coil-like spring 41 bent in the form of substantial V-shape. The recording member 15 is rendered inoperative by the rearward end portion of an erroneous-recording preventing mechanism 42 made of synthetic resin material when the remaining members 16, 17, and 18 are under operation in advance of the operation of the member 15. Further, the tape-travel stop detecting lever 24 is arranged to drive an automatic operation stop mechanism 43 as later described, made of synthetic resin material and provided at the right and lower side of the illustrated chassis 11 in Fig. 2.

Numeral 44 denotes a flywheel which is connected to the motor 37 through a rotating pulley 45 and belt 46 so as to permit a rotating force from the motor 37 to be transmitted to the flywheel 44.

Fig. 3a and Fig. 3b each shows the above-mentioned head chassis 20 in detail. The head chassis 20 made of metallic material is formed into a substantial L-shape. The rearward end portion 201 and the forward end angular portion 202 of the head chassis 20 are formed with notches 53 and 54 serving as substantially rectangular engaging portions, respectively. The notches 53 and 54 are fitted under those engaging projections 51 and 52 integrally formed on the main chassis 11, respectively, which serve as guiding portions each of a substantial T-shape as taken when viewing the tape recorder from

in front thereof. The head chassis 20 is thus slidable in opposite directions G and H. In the deepest portion of the notch 54 is formed an enlarged notched portion 541 which has a size permitting a top portion 521 of the
5 said engaging projection 52 to be inserted therein. The head chassis 20 is thus attached to the main chassis 11 by taking the procedure of inserting the top portion 521 of the engaging projection 52 thereof into the said enlarged notched portion 541 formed in the notch 54 of
10 the head chassis 20.

Further, the head chassis 20 is covered with the attaching member 21 at a specified portion of its lower end portion illustrated in Fig. 3a. A protruded
portion 55 is formed on that portion of the attaching
15 member 21 which covers the angular portion 203 of the side end portion of the head chassis 20. On the tip end portion of the protruded portion 55 is formed a bent engaging-stopper piece 551 which serves as a position regulating member.

20 The pinch lever 29 provided with the said pinch roller 31 is formed in the shape of a substantial L seen in Fig. 3a. The pinch lever 29 is rendered rotatable in the arrow indicated directions A and B about the pivotal shaft 28 integrally formed on the
25 chassis 11, by being fitted over the pivotal shaft 28. The pinch lever 29 is formed with an engaging-stopper section 291 at its one end portion, said section 291

having a spring 58 engaged therewith. The spring 58 is engaged with and stopped by the section 291 at one end of the spring 58 and, after wound around a cylindrical protrusion 56 formed on the attaching member 21, is engaged with and stopped by a bent engaging-stopper section 57 similarly formed on the attaching member 21. By the spring 58 the pinch lever 29 is given a biasing force to cause the same 29 to rotate about the pivotal shaft 28 in the arrow A indicated direction. One end of the pinch lever 29 is formed with an engaging piece 292 extended toward the head chassis 20. This piece serves as a member for regulating the position of the pinch lever 29. The protruded portion 55 of the attaching member 21, as above mentioned, is formed with a bent engaging-stopper piece 551 against which said engaging piece 292 abuts. The bent engaging-stopper piece 551 projects upwards to a specified length from the protruded portion 55 and is so constructed as to be bent in the arrow H indicated direction. Accordingly, the forward rotation of the pinch lever 29 is limited to a position at which the piece 292 abuts on said bent engaging-stopper piece 551. Therefore, when the reproducing member 16 shown in Fig. 1 is not operated, that is to say, when the head chassis 20 is situated at a position illustrated in Fig. 3a, the pinch roller 31 is kept disengaged from the capstan 30.

Further, the bent engaging-stopper piece 551 does

not only act to regulate the rotation of the pinch lever 29 but also to restrict movement of the pinch lever 29 in a direction indicated by an arrow I (see Fig. 3b). Namely, when a force is so given as to
5 disconnect the pinch lever 29 from the rotating shaft 28 from above, the engaging piece 292 of the pinch lever 29 engages the bent engaging-stopper piece 551 thereby to prevent such disconnection. Further, in the normal state of operation, the height of the pinch
10 lever 29, i.e., the height of the pinch roller 31 is defined by the bent engaging-stopper piece 551.

Hereinafter, we explain the procedure of attaching the head chassis 20 and pinch lever 29 to the main chassis 11 as stated above. Firtly, the head chassis
15 20 is moved in the arrow G indicated direction while it is kept attached to the main chassis 11 by the said engaging projections 51 and 52 as mentioned above. In this state, the pinch lever 29 is brought to a position at which it is fully rotated in the arrow B indicated
20 direction and its angular portion is fitted over the pivotal shaft 28. Then, without having the engaging piece 292 of the pinch lever 29 engaged with the bent engaging-stopper piece 551 of the attaching member 21, the pinch lever 29 is fully fitted over the rotating
25 shaft 28. At this time, however, a cylindrical projection 59 is attached to the other end of the pinch lever 29 in a manner that it extends into the upper surface of the main chassis 11. The projection

59 is inserted through an opening 60 formed in the main chassis 11.

When the reproducing member 16 is actuated, the head chassis 20 is also moved in the arrow G indicated direction and in interlocking relation with such actuation. Thus, the head chassis 20 is brought to a position illustrated in Fig. 4. At this time, with this movement of the head chassis 20, the pinch lever 29 is also rotated in the arrow A indicated direction by the action of the biasing force of the spring 58. Thus, the pinch roller 31 is pressed against the capstan 30, whereby the head chassis 20 and the pinch roller 31 are brought to the positions which correspond to the operational condition intended by the actuation of the reproducing member 16. It is also to be noted here that the rearward movement of the head chassis 20 in the arrow G indicated direction is limited to a position at which the engaging piece 204 formed on one side portion of the head chassis 20 abuts against the guide pin 34.

Assume now that the pinch lever 29 has been rotated in the arrow B indicated direction as shown in Fig. 5 for the purpose of drawing the pinch lever 29 out of the pivotal shaft 28 with the reproducing member 16 kept inoperative. Then, however, such forward rotation of the pinch lever 29 is limited to a position at which the projection 59 thereof abuts against one side of

the opening 60 formed in the main chassis 11. Since, therefore, at that position, the engaging piece 292 of the pinch lever 29 is still kept engageable with the bent engaging-stopper piece 551 of the attaching member 21, the pinch lever 29 still remains incapable of being drawn out of the pivotal shaft 28.

We will now explain the interlocking relationship of the reproducing member 16 with the head chassis 20. As shown in Fig. 6, the head chassis 20 is provided with a pin 205 projecting downwards. The main chassis 11 and the reproducing member 16 are formed with openings 112 and 161, respectively, through which said pin 205 is inserted. The opening 112 of the main chassis 11 is set to a size which does not prevent the sliding movement of the head chassis 20. On the attaching member 21 provided on the head chassis 20 are formed a projection 62 being wound with the spring 25 and an engaging-stopper portion 61 which one end portion 252 of the spring 25 is engaged with and stopped by. In the reproducing member 16 is formed an engaging-stopper notched portion 63 which the other end portion 251 of the spring 25 is engaged with and stopped by. Thus, as shown, the spring 25 is wound around the projection 62 and is supported by the attaching member 21 by having its said one end 252 engaged with the engaging stopper portion 61. Said other end 251 of the spring 25 is engaged with the engaging stopper portion 63 of

the reproducing member 16 while it is being given a biasing force acting in the arrow N indicated direction. By this biasing force imparted to said other end 251 of the spring 25, the pin 205 is biased in the arrow K indicated direction and thus is pressed against the end face of the opening 161 as shown in Fig. 7. Thus, the head chassis 20 and the reproducing member 16 provided, respectively, on the upside and downside of the main chassis 11 are integrally connected and thus are brought into a mutually interlocked relation. Note here that Fig. 7 shows the state in which said other end portion 251 of the spring 25 is kept engaged with and stopped by the engaging-stopper portion 63 of the reproducing member 16 and in which the pin 205 is also kept engaged with the end face of the opening 161.

When the reproducing member 16 kept in such state is actuated in the arrow K indicated direction, the head chassis 20 engaged with the member 16 is also moved in the same direction. When the reproducing member 16 is locked by the locking plate 38 at its operating position, the head chassis 20 is also stopped at the corresponding position. Note here that since in this state the forward movement of the head chassis 20 is limited by the guide pin 34, the pin 205 is kept at a position slightly spaced from the end face of the opening 161. At this time, when, as shown in Fig. 2, the locked state of the reproducing member 16 is unlocked

by actuating, for example, the stop/eject member 13, the reproducing member 16 is returned by the biasing force of the spring 41 to the original position and at the same time the head chassis 20 is also returned to the original position. The position of the head chassis 20 at this time is the position illustrated in Fig. 3a. Namely, this position is a one at which the notches 53 and 54 of the head chassis 20 are not disengaged from the engaging projections 51 and 52 of the main chassis 11, respectively.

We will now explain a mechanism for installing the head chassis 20 in the cassette tape recorder having the foregoing construction,

As shown in Fig. 6, a biasing force acting in the arrow N indicated direction is given to said one end 251 of the spring 25 for establishing the above-mentioned interlocking relation between the reproducing member 16 and the head chassis 20, in a state wherein all of its associated members are already installed in their respective positions as a reaction force against such biasing force, a biasing force acting in the arrow M indicated direction is imparted to the attaching member 21. This biasing force acts upon the head chassis 20 as the rotating torque thereof which causes the head chassis 20 to rotate, in the arrow M indicated direction, about the engaging portion of the engaging-stopper

portion 63 of the reproducing member 16 with said one end 251 of the spring 25. In this case, the rotating torque of the head chassis 20 varies depending upon the spring constant of the spring 25 and the amount of bias thereof. On the other hand, by the action of that rotating torque a force causing the head chassis 20 to be directed to the main chassis 11 acts upon the forward end angular portion 202 of the head chassis 20 while a force causing the head chassis 20 to be spaced from the main chassis 11 acts upon the rearward end 201 of the head chassis 20. For this reason, the forward end 202 of the head chassis 20 is always pressed against the projecting portion 71 formed on the main chassis 11 in the neighbourhood of the engaging projection 52 thereof. On the other hand, the rearward end 201 of the head chassis 20 is always pressed against the underside of the engaging projection 51 of the main chassis 11. In this way, since the forward end and rearward end of the head chassis 20 elastically abuts against the projections 51 and 71, respectively, the attachment of the head chassis 20 to the main chassis 11 is firmly established.

Next, when actuating or pushing in the reproducing member 16 as shown in Fig. 8, the head chassis 20 is integrally moved up to its abutment against the guide pin 34 by engagement of the end face of the opening 161 with the pin 205 having the spring pressed thereagainst.

In this case, since the amount of bias of the spring 25 remains uncharged, the rotating torque of the head chassis 20 due to the action of the spring 25 is kept constant. The rotating torque of the head chassis 20 which acts on the portion of abutment of the head chassis 20 against the projection 51 increases because the distance between this projection 51 and the center of rotation of the head chassis 20 shortens due to the said movement of the head chassis 20. This means that the attachment of the head chassis 20 to the main chassis 11 is more firmly established than when the reproducing member 16 is not pushed in. In such more firmly attached state of the head chassis 20, however, the reproducing member 16 is not engaged with the locking plate 38. Thus, the reproducing member 16 is pushed in.

By this pushing-in operation of the reproducing member 16, the head chassis 20 is moved to abut against the guide pin 34 and thus is held in that abutting position, but the reproducing member 16 continues to move and is brought into engagement with the locking plate 38 and thus is locked by the locking plate. In this locked state, the amount of bias of the spring 25 increases due to a relative change in position of the head chassis 20 to the reproducing member 16. Thus, the rotating torque of the head chassis increases. Thus, the urging force of the head chassis which acts upon

the projections 51 and 71 increases. This means that the attachment of the head chassis 20 to the main chassis 11 is fully firmly established by having the head chassis 20 more firmly attached to or supported on the main chassis 11 as such.

Further, an engaging piece 111 formed on the main chassis 11 as shown in Fig. 1 is shaped into a substantial Γ (gamma in Greek letter) as taken from Fig. 3b. When the reproducing member 16 is not actuated, namely, when the head chassis 20 is located at the position shown in Fig. 3a, the said engaging piece 111 is located in a position at which it is not engaged with an elastic piece 213 of the attaching member 21, as shown in Fig. 9a. When the reproducing member 16 is actuated whereby the head chassis 20 is brought to the position shown in Fig. 4, the said elastic piece 213 is engaged with the underside of the engaging piece 111 as shown in Fig. 9b. Thus, the elastic piece 213 is moved in a direction indicated by an arrow O, against the elastic force. This means that the engaging piece 111 is given a biasing force for it to be theoretically pushed upward of the illustration. Thus, the portion of the head chassis 20 at which the elastic piece 213 is provided, i.e., the left end portion of the head chassis 20 shown in Fig. 4 is kept reliably fixed by its elastic engagement with the engaging piece 111.

According to the above-mentioned construction,

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therefore, under the condition wherein the reproducing member 16 is actuated, the head chassis 20 is given, by the spring 25, a biasing force for it to be lifted from the upper surface of the main chassis 11 and also is given, by the spring 25, a biasing force for it to be pressed against the upper surface of the main chassis 11. Further, since the left end portion of the head chassis 20 shown in Fig. 4 is pushed by said elastic piece 213 downwardly of the main-chassis surface, the head chassis 20 can thus be firmly held in the position shown in Fig. 4 without being displaced from that position at the time of actuation of the reproducing member 16.

We will now explain the function of the spring 25 in the cassette tape recorder having the above-mentioned construction. Fig. 10 is a view _____

of the head chassis 20 which is taken from the underside thereof. The spring 25 engaged with the engaging-stopper portion 63 (see Fig. 6) of the reproducing member 16 is contacted with one end of the metallic head chassis 20. This means that, as mentioned previously, the spring 25 formed of metallic material is kept in contact with both of the head chassis 20 and the reproducing member 16 as shown in Fig. 6. For this reason, an electric conduction is established between the head chassis 20 and the reproducing member 16,

whereby both have the same potential.

Since, according to the above-constructed cassette tape recorder, the main chassis 11 formed of synthetic resin material is interposed between the metal-made head chassis 20 and the reproducing member 16, unless any electric conduction between the head chassis 20 and the reproducing member 16 is established whereby both have the same potential, a so-called capacitor will be formed. The head chassis 20 has the recording and reproducing head provided via the attaching member 21, so that said capacitor has an undesirable effect upon a magnetizing coil not shown provided within the recording and reproducing head 22. For instance, according to the frequency of a recording or reproducing signal being fed to the magnetizing coil, it is very often possible that an undesired resonance occurs with a result that a signal being recorded in the relevant tape or a signal taken out of the tape for reproduction fails to be recorded or reproduced as it stands.

If, therefore, the head chassis 20 is rendered conductive to the reproducing member 16 by means of the spring 25 and is thereby rendered to have the same potential as the reproducing member 16 as mentioned above, then such capacitor as above referred to will not be created thus to eliminate said undesirable effect upon the magnetizing coil.

The spring 25 is supported by the projection 62

formed on the attaching member 21, which projection 62, however, may be integrally formed on the head chassis 20 without being formed on the attaching member 21.

Further, in a conventional plastic version of this type of tape recorder, for the purpose of preventing such creation of a capacitor the head chassis is connected to the reproducing member by means of leads. In this regard, in the present embodiment such connection is made by the spring 25 to establish the above-mentioned interlocking relation both members 20 and 16, so that the present embodiment necessitates no leads and thereby becomes simple in construction.

We will now explain the automatic operation-stopping mechanism 43 shown in Fig. 2. The tape-travel stop detecting lever 24 provided on the attaching member 21 of the head chassis 20 as shown in Fig. 1 is rotatably supported, at its intermediate portion, by a rotating shaft 70 formed on the attaching member 21. A tape tension acts on one end of the tape-travel stop detecting lever 24 under the state as later described in which the tape travel is stopped. Thus is provided at said one end of the lever 24 a tape tension acting section 241 which is adapted to be operated by being depressed. The other end of the lever 24 is rendered engageable with an engaging portion 721 provided on one end of the said substantially L-shaped automatic recorder operation stop lever 72. This lever is

rotatably supported, at its bent portion, on the pivotal shaft 73 formed on the main chassis 11. On the other end portion of the automatic recorder-operation stop mechanism lever 72 is provided an engaging-stopper portion 722 with one end of which a spring 75 is engaged. The spring 75 is then wound around the pivotal shaft 73 of the automatic recorder-operation stop lever 72. The other end of the spring 25 is engaged with and stopped by an engaging-stopper portion 74 formed on the main chassis 11. Thus, the automatic recorder-operation stop lever 72 is given an urging force causing it to be rotated in the counterclockwise direction as taken in Fig. 11. On the one end of the lever 72 at which the said engaging portion 721 is formed is rotatably fitted a gear 76 which has an engaging projection 761 at a position near one side of said one end of the lever 72. The gear 76, when the lever 72 is rotated in the clockwise direction as taken in Fig. 11, is intermeshed with another gear 77 which is provided coaxially with the flywheel 44 and rotatable jointly therewith. Further, the engaging projection 761 of the gear 76 is made engageable with a engaging bent portion 381 formed on one end portion of the locking plate 38 (see Fig. 2). Note here that when this locking plate is moved in the arrow P indicated direction, the locked condition of any member of the operating member assembly 12 is unlocked.

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Assume now that the reproducing member 16 is actuated and locked to the locking plate 38. In this state, said other end portion of the tape-travel stop detecting lever 24 provided on the attaching member 21 of the head chassis 20 is kept in abutment against the engaging portion 721 of the automatic recorder-operation lever 72, as shown. This means that the tape tension acting section 241 of the tape-travel stop detecting lever 24 is held in its position without being pushed back by the travelling tape. Suppose in this state tape-travelling that the tape has been allowed to travel to the end, whereby the tape travel has been stopped. Then, the tape tension at this time acts on the tape tension acting section 241 of the tape-travel stop lever 24, thereby to push the same 24 back to cause it to be rotated in the arrow Q indicated direction. Thus, the automatic recorder-operation lever 72 is rotated clockwise against the counterclockwise biasing force of the spring 75, whereby the gear 76 is intermeshed with the gear 77 of the capstan 44. Since, at this time, the flywheel 44 receives a rotating force transmitted from the motor 37 and thus is kept rotated in the arrow R indicated direction, the gear 76 on the automatic recorder-operation lever 72 is rotated in the arrow S indicated direction. Thus, the engaging projection 761 of the gear 76 is brought into engagement with the engaging bent portion 381 of the locking plate 38 to

cause the locking plate 38 to be moved in the arrow P indicated direction. Thus, the locked reproducing member 16 is unlocked, whereby the automatic recorder-operation stop is rendered effective due to the stop of the tape travel.

As above described, the tape recorder is constructed such that one end portion of the head chassis 20 can be pressed toward the main chassis 11 with the head chassis kept located at its operating position. This eliminates the necessity of providing, for example, a separate keeping or pressing member and enables the head chassis to be firmly held in place without being displaced from its intended location. Thus, the present embodiment provides a tape recorder provided with an excellent positioning mechanism which has a simple construction contributable to the miniaturization and lightening and also the reduction in price of the tape recorder.



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CLAIMS

1. A tape recorder which comprises:
 - (a) a main chassis which has a through hole;
 - (b) an operating member which is reciprocally slidable between a non-operating position and an operating
 - 5 position on one side of said main chassis;
 - (c) a head chassis which is reciprocally slidable on another side of said main chassis between a first position and a second position respectively corresponding to the non-operating position and the
 - 10 operating position of said operating member, said head chassis being provided with a rod at a first end towards said first position engageable with said operating member through said through hole of said main chassis;
 - (d) a guiding member for guiding the transfer
 - 15 of said head chassis between said first and second positions, said guiding member being rigid with said main chassis in a position such that said guiding member is engaged by a second end of said head chassis towards the second position; and
 - 20 (e) a spring which is suspended between said head chassis and said operating member for urging said rod of said head chassis in the direction towards the second position to engage with said operating member, the arrangement being that said head chassis is able to

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slide in accordance with the movement of said operating member, said spring further urging said head chassis to rotate so that the second end of the head chassis is biased away from the main chassis to engage said guiding member and said first end of said head chassis is urged towards and engages said main chassis, the biasing force of the second end of said head chassis against said guiding member increasing as the distance between said guiding member and the centre of rotation of the head chassis is reduced, said second end of said head chassis being guided by said guiding member when said head chassis is driven into the second position in accordance with the movement of said operating member actuated into the operating position and the engagement of the second end of said head chassis with said guiding member allowing actuation of said head chassis when said head chassis is in the first position.

2. A tape recorder according to claim 1, wherein said operating member has a hole larger than said rod, an end of said rod engaging with said operating member by passing through said hole.

3. A tape recorder according to claim 2, wherein said spring is a torsion spring and said head chassis is provided with an attachment member over which the coil of said torsion spring is fitted.

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