

"Recording and/or reproducing apparatus"

The invention relates to a recording and/or reproducing apparatus for a magnetic tape which is accommodated in a cassette that can be introduced into the apparatus and can be drawn out of the cassette through an opening therein, comprising a drum-shaped scanning device for the magnetic tape, around the outer surface of which the magnetic tape drawn out of the cassette can be wrapped in a given angular range, a tape guide device which is adapted to draw the magnetic tape out of the cassette and to wrap it around the scanning device and which has at least one tape guide which can be displaced between a rest position and an operating position by means of a displacement device, is secured to a holder and in whose rest position it engages behind the magnetic tape accommodated in the cassette at the area of its opening and in whose operating position the magnetic tape taken along by it during its displacement is kept wrapped around the scanning device, a positioning device for positioning the tape guide in its operating position, which is arranged on a displaceable support subjected to the force of a spring, and a tape tension adjustment device which comprises a tape tension indicator and serves to adjust the tape tension when the magnetic tape wrapped around the scanning device is driven.

Such an apparatus is known, for example, from US-PS 4,060,840. In this known apparatus, the tape tension adjustment device comprises as tape tension indicator a tape tension sensor lever, which upon displacement of the tape guide by means of the displacement device from its rest position into its operating position has to be displaced whilst the displacement device additionally takes along the magnetic tape from an inactive position into an active position, in which a tape tension sensor pin secured to the tape tension sensor lever is in operative connection

with the magnetic tape taken along by the tape guide, which requires a comparatively laborious and complicated construction. The magnetic tape is then wrapped around the tape tension sensor in a comparatively small angular range, which is disadvantageous with respect to the desired high sensitivity of the tape tension indicator. Furthermore, the tape tension sensor pin in the travel path of the tape cooperates with the magnetic tape at a comparatively large distance from the scanning device and several guide and scanning members cooperating with the magnetic tape and varying the tape tension are provided between the tape tension sensor pin and the scanning device so that it is not possible with this tape tension indicator to detect in fact the tape tension of the magnetic tape in the immediate proximity of the scanning device and to adjust the tape tension of the magnetic tape, notably at the area of the scanning device, by means of the tape tension adjustment device. However, an adjustment of the tape tension of the magnetic tape at the area of the scanning device is just of particular importance for a perfect recording and/or reproducing operation by the scanning device provided for this purpose with at least one magnetic head. For positioning the tape guide in its operating position, the known apparatus has a positioning device provided on a displaceable support, the displaceability of the support being utilized solely for positioning purposes. Due to this displaceability of the support, the positioning device provided on this support can be automatically adapted during a positioning operation to a further positioning device for positioning the holder for the tape guide.

The invention has for its object to avoid in an apparatus of the kind mentioned in the opening paragraph the problems stated above and to provide an apparatus of simple construction, in which the tape tension of the magnetic tape can be detected and adjusted in a simple manner at the area of the drum-shaped scanning device. For this purpose, the invention is characterized in that the displacement device for the tape guide, when the tape guide

is in its operating position, is constructed so that it can be disengaged therefrom, in that an urging device for urging the tape guide, which is in its operating position, against the positioning device is provided on the support so as to be displaceable with respect to this support between a disengaged position and an urged position, and in that the support constitutes the tape tension indicator of the tape tension adjustment device and is arranged so as to be displaceable substantially parallel to the longitudinal plane of symmetry of the freely extending magnetic tape section immediately adjacent the scanning device under the tape tension exerted by the magnetic tape on the tape guide situated in its operating position and urged against the positioning device on the support against the force of the spring. Thus, it is achieved that the tape guide, which is as yet present in the apparatus for wrapping the magnetic tape around the drum-shaped scanning device, is additionally utilized to detect the tape tension of the magnetic tape in its operating position, in which it is held in the positioning device on the support by the urging device, the support fixedly connected to the tape guide in the operating position of the latter constituting the tape tension indicator of the tape tension adjustment device. Thus, it becomes superfluous to provide a separate tape tension indicator, which results in a considerable simplification and saving in space and in an increase of the reliability of the apparatus in use. The detection of the tape tension via the tape guide, which is located near the scanning device in order to keep in its operating position the magnetic tape wrapped around the scanning device, moreover affords the great advantage that the tape tension in the immediate proximity of the scanning device is detected by this tape guide and that in accordance with the detection result the tape tension is advantageously adjusted via the tape tension adjustment device at the area of the scanning device, which is of major importance for a perfect recording and/or reproducing operation. A further advantage consists in that the tape guide in its operating

position is wrapped by the magnetic tape in a comparatively large angular range, which is advantageous with a view to a high sensitivity of the tape tension indicator. Due to the disengagement of the tape guide in its operating position from the displacement device, the tape guide can follow all the tape tension variations without hindrance so that also small tape tension fluctuations are certainly detected by this tape tension indicator. Due to the fact that the support is arranged so as to be displaceable substantially parallel to the longitudinal plane of symmetry of the freely extending magnetic tape section immediately adjacent the scanning device, it is achieved in a simple manner that the travel path of the magnetic tape at its level with respect to the scanning device remains unchanged during the tape tension adjustment operation. It should be noted that the tape tension indicator can be based on different principles; for example, it may be constructed as a photo-electric, magneto-electric or mechanical indicator.

The displacement device for the tape guide may be constituted, for example, by a lever arrangement, the connection of this lever arrangement with the holder of the tape guide being eliminated, when the tape guide is in its operating position, by a separate actuation device. It has proved advantageous when the displacement device for the tape guide has a ring for displacing the holder for the tape guide which is adapted to be rotated on an instrument panel about the scanning device and to be driven and a guide coaxial to the ring for guiding the holder during its displacement, the ring is provided with a perforation to the instrument panel and a sliding rod is pivotably connected to the holder, the angular free end of this rod engaging the ring in the perforation upon rotation of the ring for displacing the tape guide to its operating position and being slidably supported by the instrument panel and upon rotation of the ring for displacing the tape guide from its operating position being lifted off the instrument panel and engaging an abutment at the ring,

while the instrument panel has a further perforation which, when the tape guide is in its operating position, at least partly overlaps the perforation in the ring, wherein the holder is detached from the guide for disengaging the displacement device from the tape guide which is in its operating position and is urged against the positioning device on the support, the sliding rod is introduced into the two perforations so as to be freely movable, the sliding rod is brought by the ring into engagement with an angular free end at the abutment for coupling the displacement device with the tape guide upon displacement of the latter from its operating positions and the holder is connected with the guide. As a result, a stable reliable displacement device with low friction is obtained, in which a simple and reliable disengagement of the device from the tape guide and also a simple coupling of the device with the tape guide are attained without the use of separate auxiliary means.

The urging device may be constituted, for example, by a slide mechanism which can be controlled by the displacement device and can be locked in its urged position. It has proved to be advantageous when the urging device is constituted by a dead centre lever arrangement which can be automatically adjusted to its urged position upon displacement of the tape guide to its operating position and can be automatically adjusted to its urged position upon displacement of the tape guide from its operating position. Such a dead centre lever arrangement advantageously has a simple construction and can be simply controlled by its automatic tilting.

In the travel path of the magnetic tape between the scanning device and the tape guide there may be arranged a tape guide element which cooperates with the magnetic tape, is fixedly arranged and ensures that the magnetic tape is continuously kept wrapped around the scanning device in the same given angular range independently of the displacement of the support and the tape guide fixed to this support in its operating position

during the tape tension adjustment operation. It has proved to be advantageous when the freely extending magnetic tape section immediately adjacent the scanning device extends to the tape guide situated in its operating position and urged
5 against the positioning device on the support and the support is constituted by a slide arranged so as to be displaceable in the longitudinal direction of this freely extending magnetic tape section. As a result, it is achieved without the use of separate auxiliary means that
10 the magnetic tape remains continuously wrapped in the same given angular range around the scanning device also during the tape tension adjustment operation.

The invention will now be described more fully with reference to the accompanying drawings, which show two
15 embodiments, to which the invention is not limited, however. Fig. 1 shows diagrammatically in plan view the parts essential to the invention of a magnetic tape recording and/or reproducing apparatus for television signals in a first embodiment, in which a positioning
20 device for the tape guides of a tape guide device is provided on a pivotable supporting plane constituting a mechanical tape tension indicator, the tape guides being in their rest position. Fig. 2 shows in the same manner as Fig. 1 the same apparatus, the tape guides being now in
25 their operating position, in which they are positioned by the positioning device. Fig. 3 shows diagrammatically on a larger scale than Fig. 2 in side elevation taken on the arrow III in Fig. 2 a drum-shaped scanning device of the apparatus shown in Figures 1 and 2 with magnetic tape
30 wrapped around it. Fig. 4 shows on a larger scale than Fig. 1 in sectional view taken on the line IV-IV in Fig. 1 the tape guide device of this apparatus, its tape guides being in their rest position. Fig. 5 shows on a larger scale than Fig. 1 in side elevation taken on the arrow V in Fig. 1
35 the tape guide device, its tape guides being in their rest position. Fig. 6 shows in sectional view taken on the line VI-VI in Fig. 5 a detail of a displacement device of this apparatus for the tape guides. Fig. 7 shows on a larger

scale than Fig. 2 in side elevation in the direction of the arrow VII in Fig. 2 the tape guide device, its tape guides now being in their operating position and being positioned by the positioning device. Fig. 8 is a plan view taken on the arrow VIII in Fig. 7 of the positioning device for the tape guides arranged on the supporting plate, the tape guides not being in their operating position, however. Fig. 9 shows in the same manner as Fig. 8 in plan view the positioning device for the tape guides provided on the supporting plate, the tape guides being in their operating position. Fig. 10 shows in the same manner as Figs. 8 and 9 in plan view the supporting plate for the positioning device represented only by its contours and an adjustable locking device for the supporting plate. Fig. 11 shows diagrammatically in plan view the parts essential to the invention of a magnetic tape recording and/or reproducing apparatus for television signals in a second embodiment, in which the positioning device for a tape guide of a tape guide device is arranged on a slide constituting an electromagnetic tape tension indicator.

A cassette 2 indicated diagrammatically by dot-and-dash lines can be introduced into the apparatus 1 shown in Figures 1 and 2, this cassette accommodating a magnetic tape 3 which is guided inside the cassette from a first tape reel 4 through a first guide roller 5 and a second guide roller 6 to a second tape reel 7, whilst the magnetic tape section extending between the two guide rollers 5 and 6 extends at the area of an opening 8 of the cassette 2, through which the magnetic tape 3 can be drawn out of the cassette.

The apparatus 1 comprises for driving the two tape reels 4 and 7 two winding mandrels 10 and 11 rotatably journaled on an instrument panel 9, which mandrels can be driven by a motor in a manner not shown. A tape tension adjustment device 12 cooperates with the winding mandrel 10 and this adjustment device has a braking disk 13 coaxial to the winding mandrel 10 and connected thereto in a manner so as to be locked against rotation and a braking tape 14

cooperating with its end face. The more firmly the braking tape 14 urges against the end face of the braking disk 13, the stronger the magnetic tape running off the tape reel 4 is braked, as a result of which the tape tension of the magnetic tape increases. With decreasing braking effect of the braking tape 14 on the braking disk 13, the tape tension of the magnetic tape is reduced.

The apparatus 1 comprises a drum-shaped scanning device 15, which is composed of a drum half 16 fixedly arranged on the instrument panel 9 and in a stationary position and of a drum half 17 which is coaxial to the first drum half, which can be rotationally driven and on which are arranged two magnetic heads 18 and 19 arranged diametrically to each other and passing through the gap formed between the two drum halves. The magnetic heads 18 and 19 serve to record and reproduce television signals in and from so-called oblique tracks, respectively, on the magnetic tape, which can be wrapped for this purpose in a given angular range around the outer surface of the scanning device 15 in a helical path. The axis 20 of the scanning device 15 is then inclined in the direction of the arrow 21 with respect to the instrument panel 9, as a result of which the helical travel path of the magnetic tape around the scanning device is obtained in known manner. For recording and reproducing sound signals associated with the television signals, the apparatus 1 has a fixedly arranged recording/reproducing magnetic head 22 and for erasing sound signals a fixedly arranged erasing magnetic head 23. The useful gaps of these two magnetic heads 22 and 23 then extend at right angles to the instrument panel 9. For simultaneously erasing all the signals recorded on the magnetic tape, the apparatus has a further fixedly arranged erasing magnetic head 24, whose useful gap, adapted to the travel path of the magnetic tape section immediately adjacent the scanning device 15 and extending freely to the magnetic head 24, is inclined in the direction of the arrow 25 with respect to the instrument panel 9. When wrapping the magnetic tape 3 drawn

out of the cassette 2 around the drum-shaped scanning device 15, the magnetic tape is also brought into scanning connection with the magnetic heads 22, 23 and 24. For driving the magnetic tape 3 drawn out of the cassette 2 at a constant given speed of movement, the apparatus 1 has a driving shaft 26 which can be driven by a motor, is aligned perpendicularly to the instrument panel 9 and against which the magnetic tape can be urged by a pressure roller 28 which can be displaced in a manner not shown and can be pivoted about a pivot point 27.

The apparatus 1 is provided with a tape guide device 29 for drawing the magnetic tape 3 out of the cassette 2 and for wrapping this tape around the scanning device 15. The tape guide device has two tape guides 32 and 33 which can be displaced between a rest position shown in Fig. 1 and an operating position shown in Fig. 2 by means of a displacement device 30 and are provided on a block-shaped holder 31. As appears in detail from Figures 4, 5 and 7, the tape guide 32 consists of a roller 34 which is provided with flanges and is rotatable about a shaft 35 passing through the holder 31, an intermediate part 36 in the form of a truncated cone being placed on the shaft 35 between the roller 34 and the holder 31. The tape guide 33 is in the form of a pin which is inserted into the holder 31 and is inclined with respect to the tape guide 32.

The displacement device 30 for the tape guides 32 and 33 has a ring 37 for displacing the holder 31 for the two tape guides 32 and 33, which ring is rotatably pivoted on the instrument panel 9 about the scanning device 15 in a manner not shown and can be driven. For driving the ring 37, the latter is provided at its outer end face with a toothing, which is engaged by a driving toothed wheel 38 that can be driven by a motor not shown, which is automatically switched off after the tape guides have reached their rest position and their operating position, respectively, as is known, for example, from AT-PS 373,429 for another displacement device for displacing tape guides. The displacement device 30 further

has an arcuate guide 39 coaxial to the ring 37 for guiding the holder 31 during its displacement. The guide 39 extends at the area of its end located more closely to the cassette parallel to the instrument panel 9, as appears from Figures 4 and 5, and has towards its other end a path ascending away from the instrument panel 9, as appears from Fig. 7. The guide 39 is provided with a dovetail-shaped guiding rim 40, on which the holder 31 is slidably arranged, four guide noses 41, 42, 43 and 44 provided on the holder engaging the guiding rim 40 and thus keeping the holder 31 in a position so as to be displaceable along this rim, as appears from Figures 4, 5 and 7.

The ring 37 is provided with a perforation 45 to the instrument panel 9 and from this perforation a further perforation 46 leads to the outer end face of the ring, which, however, is also open towards the instrument panel 9. A sliding rod 47 pivotably connected via a ball-and-socket joint to the holder 31 projects into the perforation 45 by its angular free end 48, which is passed through the further perforation 46. Upon rotation of the ring 37 in the direction of the arrow 49 for displacing the tape guides 32 and 33 provided on the holder 31 to their operating position, the angular free end 48 of the sliding rod 47 engages with the boundary wall 50 of the perforations 45 and 46 the ring 37 and the free end 48 is slidably supported by the instrument panel 9, the driven ring 37 displacing the tape guides 32 and 33 provided on the holder 31 to their operating position via the sliding rod 47.

The displacement device 30 for the tape guides 32 and 33 can be disengaged from the tape guides when the latter are in their operating position, as appears from Fig. 7. From disengaging the displacement device from the tape guides, firstly the holder 31 for the tape guides is detached from the guide 39. This is achieved in that the holder 31 is displaced downwards by the guiding rim 40, this holder then being held on a positioning device for the tape guides, which will be described in detail hereinafter.

Secondly, for disengaging the displacement device from the tape guides, the driving connection between the ring 37 and the sliding rod 47 is disengaged. For this purpose, the instrument panel 9 has a further perforation 51, which, when the tape guides are in their operating position, partly overlaps the perforation 45 in the ring 37 and into which the free end 48 of the sliding rod 47 slidably supported on the instrument panel 9 is passed automatically upon displacement of the tape guides to their operating position in the direction of the arrow 49 a short time after the tape guides have reached their operating position. When the tape guides are in their operating position, the sliding rod 47 then passes through the two perforations 45 and 51 in their overlapping range so as to be freely movable so that the sliding rod 47 no longer has a connection with the ring 37 and with the instrument panel 9. Thus, without the use of separate means an automatic disengagement of the displacement device 30 from the tape guides 32 and 33 is obtained.

Upon rotation of the ring 37 against the direction of the arrow 49, in order to displace the tape guides 32 and 33 from their operating position, the boundary wall 52 of the perforation 45 abuts against the sliding rod 47, as a result of which the latter is pivoted out of the further perforation 51 in the instrument panel 9 and the angular free end 48 of the sliding rod 47 is pivoted into the further perforation 46 in the ring 37. Upon further rotation of the ring 37, the angular free end 48 engages the boundary walls 53 and 54 of the further perforation 46 constituting an abutment for this end, the ring 37 detaching the holder 31 from the positioning device, as will be described hereinafter, and slipping it further onto the guiding rim 40. Thus, without the use of separate means, an automatic coupling of the displacement device 30 with the tape guides 32 and 33 is also obtained, after which the ring 37 can pull the tape guides 32 and 33 provided on the holder 31 via the sliding rod 47 out of their operating position along the guide 39 into their rest

position.

5 In the rest position of the tape guides 32 and 33 shown in Fig. 1, these guides engage behind the magnetic tape 3 accommodated in the cassette 2. When the ring 37 is driven in the direction of the arrow 49, the holder 31 is displaced via the sliding rod 47 along the guiding rim 40 of the guide 39, the tape guides 32 and 33 being displaced to their operating position, in which the magnetic tape taken along by the tape guides upon their displacement is kept wrapped around the scanning device 15. During this displacement of the tape guides 32 and 33 to their operating position, a further tape guide 55 is displaced in a manner not shown by the ring 37 from a rest position shown in Fig. 1, in which the magnetic tape in the cassette is engaged, to an operating position shown in Fig. 2, in which it keeps the magnetic tape at a certain distance from the scanning device 15. Furthermore, upon displacement of the tape guides 32 and 33 to their operating position, two tape guides 58 and 59 each pivotable about a pivot point 56 and 57, respectively, are displaced in a manner not shown from a rest position shown in Fig. 1, in which the magnetic tape in the cassette is engaged, to an operating position shown in Fig. 2, in which the tape guide 58 keeps the magnetic tape at a certain distance from the scanning device 15 and the tape guide 59 keeps the magnetic tape wrapped around the driving shaft 26. It should be noted that, when the tape guide 55 is in its operating position, its axis is inclined in the direction of the arrow 60 with respect to the instrument panel 9, that, when the tape guide 32 is in its operating position, its axis is inclined in the direction of the arrow 61 with respect to the instrument panel 9 and that, when the tape guide 33 is in its operating position, its axis is inclined in the direction of the arrow 62 with respect to the instrument panel 9.

Due to the inclined arrangement of the scanning device 15 and of the tape guides 55, 33 and 32 and of the magnetic head 24 with respect to the instrument

panel 9, the following travel path of the magnetic tape kept wrapped by the tape guides 32 and 33 around the scanning device 15 is obtained, reference being made to Figures 2, 3 and 7. The magnetic tape section extending from the tape reel 4 via the tape guide 58 to the tape guide 55 has a longitudinal plane of symmetry extending parallel to the instrument panel 9. Due to the inclined tape guide 55, the magnetic tape is guided so that the longitudinal plane of symmetry of the magnetic tape section extending between the tape guide 55 and the tape guide 33 encloses an angle β with the instrument panel 9, as shown in Fig. 7. Due to the inclined tape guide 33, the magnetic tape is guided so that the longitudinal plane of symmetry of the magnetic tape section extending from the tape guide 33 via the tape guide 32 and the magnetic head 24 to the scanning device 15 encloses an angle γ with the instrument panel 9, which is smaller than the aforementioned angle β , as shown in Fig. 7. The magnetic tape extends around the scanning device 15 with its tape centre line in a helical path 63, as shown in Fig. 3. Due to the inclination of the scanning device 15, this track 63 is chosen so that the magnetic tape section extending from the scanning device via a further tape guide 64, the two magnetic heads 23 and 22 and the tape guide 59 to the tape reel 7 again has a longitudinal plane of symmetry extending parallel to the instrument panel 9. The longitudinal plane of symmetry of the magnetic tape section extending from the tape guide 33 via the tape guide 32 and the magnetic head 24 to the scanning device 15 corresponds to any plane which is constituted by the tangent 65 to the helical path 63 described by the tape centre line in the terminal point 66 of the angular range α wrapped by the magnetic tape facing the tape guide 32 and the radius vector 67 from the axis 20 of the scanning device 15 to this terminal point 66. It should be noted that the longitudinal plane of symmetry of a magnetic tape section continuously passes through the tape centre line, while the magnetic tape can extend along a completely flat path, but also along a twisted path, as

is the case with the use of conical tape guides.

For a perfect recording and reproducing of signals it is important that the travel path of the magnetic tape described above is maintained accurately and in a continuously reproducible manner. In order that this is guaranteed, the two tape guides 32 and 33 in their operating position are positioned accurately in their spatial position. For this purpose, the apparatus 1 has a positioning device 68, which will be described hereinafter with references to Figures 7, 8, 9 and 10. The positioning device 68 is arranged on a supporting plate 70 which is pivotable about a shaft 69 inserted into the instrument panel 9, which supporting plate is subjected to the force of a tensile spring 71 engaging it. The shaft 69 of the supporting plate 70 is inclined in the direction of the arrow 72 with respect to the instrument panel 9, as is indicated in Figures 1 and 2. The inclination of the shaft 69 is chosen so that the pivotable movement of the supporting plate 70 about the shaft 69 takes place parallel to the longitudinal plane of symmetry of the freely extending magnetic tape section immediately adjacent the scanning device 15, this longitudinal plane of symmetry enclosing the angle τ with the instrument panel 9, as is indicated in Figures 3 and 7.

The supporting plate 70 has an arcuate positioning slot 73 which is open at one end and which at its closed end terminates in a V-shaped positioning notch 74, when the tape guides 32 and 33 are in their operating position, cooperates with the end of the shaft 35 for the tape guide roller 34 passing through the holder 31. A capstan 75 projects in the form of a collar in the direction of the shaft 60 and this capstan has at its free end a lobe 76 which is aligned parallel to the supporting plate 70 and at which is provided a further V-shaped positioning notch 77, which is aligned to the positioning notch 74 in the direction of the shaft 69 and which, when the tape guides are in their operating position, cooperates with the free end of the shaft 35 for the tape guide roller

34 passing through this roller, as appears from Fig. 7. The two positioning notches 74 and 77 form part of the positioning device 68 and define the spatial inclined position of the tape guides, the shaft 35 of the tape guide 32 being at right angles to the longitudinal plane of symmetry of the freely extending magnetic tape section immediately adjacent the scanning device 15, which longitudinal plane of symmetry encloses the angle α with the instrument panel 9.

10 An urging device for urging the tape guides in their operating position against the positioning device 68 is provided on the supporting plate 70 so as to be displaceable with respect to this plate between a disengaged position shown in Fig. 8 and an urged position
15 shown in Fig. 9. The urging device is constituted by a dead centre lever arrangement 78 which can be automatically adjusted to its urged position by the intermediate part 36 upon displacement of the tape guides to their operating position and is automatically adjusted by the intermediate
20 part 36 to its operating position upon displacement of the tape guides from their operating position. It has a pressure lever 80 which can be pivoted about a shaft 79 inserted into the supporting plate 70 and which is engaged by a Ω -shaped wire spring 81 bearing on the supporting
25 plate 70. The wire spring 81 keeps the pressure lever 80 in its disengaged position shown in Fig. 8 urged against an abutment 82 formed on the supporting plate 70. The pressure lever 80 has at its free end a U-shaped recess 83, whose boundary wall is bevelled.

30 Upon displacement of the tape guides to their opening position by means of the displacement device 30, during which operation the end of the shaft 35 of the tape guide roller 34 passing through the holder 31 passes into the positioning slot 73 open at one end in the supporting
35 plate 70, the intermediate part 36 in the form of a truncated cone situated on the shaft 35 penetrates into the recess 83 in the pressure lever 80, as a result of which, upon further displacement of the tape guides by means of

the displacement device 30, the pressure lever 80 is also displaced. It is then pivoted over such a distance that it is displaced over its dead centre position, which is reached when the shaft 79 and the two engagement points of the wire spring 81 are located on a straight line. As soon as the pressure lever 80 has exceeded its dead centre position, it is displaced further by the force of the wire spring 81, while it takes along via the intermediate part 36 the tape guide 32 as well as the holder 31 and the tape guide 33 also provided on this holder. Thus, the pressure lever 80 is displaced to its urged position shown in Fig. 9, in which it is supported under the force of the wire spring 81 with the bevelled boundary wall of its recess 83 on the intermediate part 36, as shown in Fig. 7. As a result, two force components are exerted on the intermediate part 36 via the bevelled boundary wall of the recess 83, one of these components acting at right angles to the shaft 35 and one component acting in the direction of the shaft 35. By the component acting at right angles to the shaft 35, the shaft is urged with its two free ends against the positioning notches 74 and 77, as a result of which the spatial inclined position of the tape guides is accurately defined. By the component acting in the direction of the shaft, the tape guide roller is urged with its flange facing the lobe 76 against this lobe, as a result of which the spatial height position of the tape guides is accurately defined. The lobe 76 thus also forms part of the positioning device 68, which defines the spatial height position of the tape guides.

As stated, the pressure lever 80, after having exceeded its dead centre position, also displaces the holder 31 carrying the tape guides, as a result of which the holder is pulled downwards by the guiding rim 40 and the sliding rod 47 is brought into its position, in which it passes the two perforations 45 and 51 so as to be freely movable, as shown in Fig. 7. Upon this displacement of the holder 31, besides the end of the shaft 35 passing through the holder, a positioning pin 84 projecting from the holder

passes into the positioning slot 73 open at one end, as a result of which also the position of the holder 31, when the tape guides are in their operating position, is accurately defined. Thus, the position of the second tape guide 33 provided on the holder is therefore also accurately spatially defined. The positioning slot 73 consequently also forms part of the positioning device 68, which is provided for defining the position of the holder 31 and of the second tape guide 33 provided on the holder.

10 In order to displace the tape guides from their operating position by rotation of the ring 37 against the direction of the arrow 49, first the sliding rod 47 is coupled with the ring 37, as already described above, after which the holder 31 is pulled away from the supporting
15 plate 70. The pressure lever 80 is then displaced via the intermediate part 36 from its urged position, which lever, after having exceeded its dead centre position, returns by the force of the wire spring 81 to its disengaged position and contributes to the displacement of the holder 31. The
20 holder 31 is then again slipped onto the guiding rim 40, after which the holder is pulled back again along the guide 39 into its starting position corresponding to the rest position of the tape guides.

The supporting plate 70 has an arm 85 which
25 projects laterally of this plate and to the free end of which the braking tape 14 of the tape tension adjustment device 12 is secured by one of its ends, the other end of the braking tape 14 being held in a fixed position. The supporting plate 70 thus constitutes the tape tension
30 indicator of the tape tension adjustment device 12, which is arranged so as to be displaceable under the tape tension exerted by the magnetic tape on the tape guides being in their operating position and urged against the positioning device 68 on the supporting plate 70 against the force of
35 the tensile spring 71 engaging the supporting plate parallel to the longitudinal plane of symmetry of the freely extending magnetic tape section immediately adjacent the scanning device 15. When the tape tension of the

magnetic tape increases, the supporting plate 70 is pivoted against the force of the spring 71. Due to this pivotal movement, the end of the braking tape 14 connected to the supporting plate 70 is displaced in a manner such that the
5 braking tape is relieved and consequently the braking action of the braking tape on the braking disk 13 is reduced, which leads to a reduction of the tape tension. When the tape tension of the magnetic tape decreases, the braking action of the braking tape on the braking disk is
10 on the contrary increased, which leads to an increase of the tape tension. Thus, fluctuations of the tape tension during the operation of driving the magnetic tape wrapped around the scanning device in the direction from the first tape reel 4 to the second tape reel 7 can be neutralized so
15 that a substantially constant tape tension of the magnetic tape is always attained. The operation of the tape tension indicator in the present case is based on a purely mechanical principle.

The supporting plate 70 is held, when the tape
20 guides are displaced from their operating position, in a given position, in which the braking tape is released with respect to the braking disk 13 and therefore does not exert any braking action on the braking disk, as is shown in Fig. 1. Thus, it is achieved that the magnetic tape
25 remaining within the cassette can be rewound in a rewinding operation between the two tape reels 4 and 7 without the braking tape exerting a braking action, which is disturbing in this case, on the braking disk and hence on the winding mandrel coaxial to this disk. In order to hold the
30 supporting plate 70 in this given position, the apparatus 1 has, as appears from Fig. 10, a locking lever 87, which is pivotable about a shaft 86 inserted into the instrument panel 9 and which can be displaced between a locked position indicated in Fig. 10 by dotted lines and a
35 disengaged position shown in Fig. 10 by broken lines. The locking lever 87 is engaged by a tensile spring 88, which in its locked position keeps it urged against an abutment 89 fixedly present on the instrument panel 9. The locking

lever 87 has a U-shaped recess 90, into which, when the locking lever is in its locked position, a locking pin 91 projecting from the supporting plate 70 is passed, as a result of which a pivotal movement of the supporting plate 70, which takes place substantially at right angles to the longitudinal direction of the U-shaped recess, is avoided. In order to bring the locking lever 87 into its disengaged position and to hold it in this position, the ring 37 of the displacement device 30 has a protrusion 92 which radially projects from it and which, when the tape guides are in their operating position, holds the locking lever 87 displaced in its disengaged position via an arm 93 of this lever, in which position the locking pin 91 is situated outside the U-shaped recess 90 in the locking lever 87. Upon displacement of the tape guides from their operating position, the protrusion 92 projecting from the ring releases the arm 93 of the locking lever 87, the locking lever 87 returning to its locked position under the force of the tensile spring 88. The locking pin 91 on the supporting plate 70 is passed into the U-shaped recess 90 independently of the instantaneous position of the supporting plate 70, which is attained by a wedge-shaped widening of the recess 90.

In the apparatus described above, the tape guides provided for wrapping the magnetic tape around the drum-shaped scanning device are moreover utilized to detect the tape tension of the magnetic tape kept wrapped around the scanning device, the supporting plate for the positioning device for positioning the tape guides constituting at the same time the tape tension indicator of the tape tension adjustment device, as a result of which a simple and inexpensive construction is obtained. The tape tension at the area of the scanning device can advantageously be determined by means of the tape guides arranged in their operating position in the immediate proximity of the scanning device, which results in that the tape tension adjustment device adjusting the tape tension in dependence upon the detection result of the tape tension

indicator adjusts in fact the tape tension at the area of the scanning device, which is important with a view to a perfect scanning of the oblique tracks on the magnetic tape by means of the scanning device. The tape guides utilized to detect the tape tension are wrapped by the magnetic tape in a comparatively large wrapping range, which is advantageous with a view to a high sensitivity of the tape tension indicator. Since the displacement of the supporting plate constituting the tape tension indicator is effected during the tape tension adjustment parallel to the longitudinal plane of symmetry of the freely extending magnetic tape section immediately adjacent the scanning device, it is advantageously attained that in spite of the resulting displacing movement of the tape guides the travel path of the magnetic tape remains unchanged in level with respect to the scanning device. The magnetic head fixedly arranged between the scanning device and the tape guides utilized for the tape tension detection ensures that, independently of the displacing movements of the tape guides during the tape tension adjustment also the wrapping range of the magnetic tape around the scanning device remains constant. Due to the disengagement of the displacement device from the tape guides situated in their operating position and utilized for tape tension detection, it is achieved that also small tape tension fluctuations are detected without hindrance by the tape guides.

In the apparatus 1 shown in Fig. 11, a tape guide device 29 for drawing the magnetic tape 3 out of the cassette not shown here and for wrapping this tape around a drum-shaped scanning device 15 has only one tape guide 32 constructed as a roller provided with flanges. The tape guide 32 is provided on a block-shaped holder 31, which is displaceably guided along a guide 39 and which is displaceable via a sliding rod not shown by means of a drivable ring 37 of a displacement device 30. For positioning the tape guide 32 in its operating position, which tape guide is then disengaged from the displacement device 30, a positioning device 68 is provided, which also

has two positioning notches 74 and 77 aligned in the direction of the shaft 35 of the tape guide 32 and in the present case an abutment surface 94 for positioning the holder 31 disengaged from the displacement device 30.

5 The support for the positioning device 68 is constituted in this apparatus by a slide 97 guided slidably in two rectilinear guides 95 and 96. The slide is guided by the guides 95 and 96 parallel to the longitudinal plane of symmetry of the freely extending magnetic tape section
10 immediately adjacent the scanning device, which section extends in the present case freely from the scanning device 15 to the tape guide 32 situated in its operating position, so as to be displaceable in the longitudinal direction of this freely extending magnetic tape section. Thus, it is
15 achieved that in spite of the displacing movement of the tape guide during the tape tension adjustment without the use of separate tape guides the wrapping range of the magnetic tape around the scanning device continuously remains unchanged. The slide 97 is engaged by a spring 98,
20 which counteracts the tape tension exerted on the tape guide 32 kept urged against the positioning device on the slide.

For urging the tape guide 32 against the positioning device 68, in this apparatus the slide 97 is
25 provided with a pivotable pressure lever 99, which is subjected to the force of a spring 100 pulling this lever into its urged position shown in Fig. 11. The pressure lever 99 carries an adjustment pin 101 which projects from this lever to the ring 37 of the displacement device 30 and
30 which cooperates with an adjustment coulisse, not shown, provided on the ring 37, which, when the tape guide 32 is in its operating position, releases the adjustment pin 101 and, upon rotation of the ring against the direction of the arrow 49 in order to displace the tape guide from its shown
35 operating position, displaces the adjustment pin 101 over such a distance that the pressure lever 99 pivots via this pin into its disengaged position and is also held therein by the adjustment coulisse. After the tape guide 32 has

been displaced from its operating position by a corresponding rotation of the ring against the direction of the arrow 49, due to the failing action of the tape tension, the slide 97 is pulled against an abutment 102 by the force of the spring 98.

The slide 97 carries a rod 103 of permanent magnetic or magnetizable material, which cooperates with a coil, not shown, through which current flows. Upon displacement of the slide 97 due to tape tension fluctuations, the relative position of the rod and the coil is varied, which leads to value variations in the current flowing through the coil. These value variations are processed in known manner in a tape tension adjustment device by an electronic adjustment circuit for a tape winding drive motor for adjusting the tape tension to a substantially constant value. In the present case, the operation of the tape tension indicator constituted by the slide is consequently based on an electromagnetic principle. When the slide, with a tape guide displaced from its operating position, bears on the abutment 102, the tape tension adjustment device can be switched off by means of a switch actuated by the slide.

As a matter of course, the invention is not limited to the two embodiments described above. For example, the tape guide device may also comprise tape guides provided on two holders, which are positioned away from the cassette at substantially opposite sides of the scanning device each in one positioning device arranged on a displaceable support, at least one of these two supports constituting a tape tension indicator. For the construction of the tape tension indicators, the prior art offers a series of possibilities. Of course, also other displacement devices may be used, for example devices with toggle joint drives, chain member drives or rope drives. With respect to the urging device constructed as a dead centre lever arrangement, it should be noted that the latter may also be adjusted by the holder for the tape guides or by the ring of the displacement device. Of course, also other

positioning devices may be used for the tape guides.

CLAIMS:

1. A recording and/or reproducing apparatus (1) for a magnetic tape (3) which is accommodated in a cassette (2) that can be introduced into the apparatus and can be drawn out of the cassette through an opening therein, comprising a drum-shaped scanning device (15) for the magnetic tape, around the outer surface of which the magnetic tape drawn out of the cassette can be wrapped in a given angular range, a tape guide device (29) which is adapted to draw the magnetic tape out of the cassette and to wrap it around the scanning device and which has at least one tape guide (32, 33) which can be displaced between a rest position and an operating position by means of a displacement device (30), is secured to a holder and in whose rest position it engages behind the magnetic tape accommodated in the cassette at the area of its opening and in whose operating position the magnetic tape taken along by it during its displacement is kept wrapped around the scanning device, a positioning device (68) for positioning the tape guide in its operating position, which is arranged on a displaceable support (70) subjected to the force of a spring, and a tape tension adjustment device (12) which comprises a tape tension indicator and serves to adjust the tape tension when the magnetic tape wrapped around the scanning device is driven, characterized in that the displacement device (30) for the tape guide (32, 33), when the tape guide (32, 33) is in its operating position, is constructed so that it can be disengaged therefrom, in that an urging device (78; 99) for urging the tape guide (32, 33), which is in its operating position, against the positioning device (68), is provided on the support (70; 97) so as to be displaceable with respect to this support between a disengaged position and an urged position, and in that the support (70; 97) constitutes the tape tension indicator of the tape tension adjustment device (12) and is arranged so as to be displaceable substantially parallel to the longitudinal plane of



symmetry of the freely extending magnetic tape section immediately adjacent the scanning device (15) under the tape tension exerted by the magnetic tape (3) on the tape guide (32, 33) situated in its operating position and urged
5 against the positioning device (68) on the support (70; 97) against the force of the spring (71; 98).

2. An apparatus as claimed in Claim 1, characterized in that the displacement device (30) for the tape guide (32, 33) has a ring (37) for displacing the
10 holder (31) for the tape guide (32, 33) which is adapted to be rotated on an instrument panel (9) about the scanning device (15) and to be driven and a guide (39) coaxial to the ring (37) for guiding the holder (31) during its displacement, the ring (37) is provided with a perforation
15 (45) to the instrument panel (9) and a sliding rod (47) is pivotably connected to the holder (31), the angular free end (48) of this rod engaging the ring (37) in the perforation (45) upon rotation of the ring (37) for displacing the tape guide (32, 33) to its operating
20 position and being slidably supported by the instrument panel (9) and upon rotation of the ring (37) for displacing the tape guide (32, 33) from its operating position being lifted off the instrument panel (9) and engaging an abutment (53, 54) at the ring (37), while the instrument
25 panel (9) has a further perforation (51) which, when the tape guide (32, 33) is in its operating position, at least partly overlaps the perforation in the ring (37), wherein the holder (31) is detached from the guide (39) for disengaging the displacement device (30) from the tape
30 guide (32, 33), which is in its operating position and is urged against the positioning device (68) on the support (70), the sliding rod (47) is introduced into the two perforations (45, 51) so as to be freely movable, the sliding rod (47) is brought by the ring (37) into
35 engagement with an angular free end (48) at the abutment (53, 54) for coupling the displacement device (30) with the tape guide (32, 33) upon displacement of the latter from its operating position and the holder (31) is connected



with the guide (39) (Figures 4, 5, 6, 7, 8, 9).

3. An apparatus as claimed in any one of the preceding Claims, characterized in that the urging device (78) is constituted by a dead centre lever arrangement which can be automatically adjusted to its urged position upon displacement of the tape guide (32, 33) to its operating position and can be automatically adjusted to its disengaged position upon displacement of the tape guide (32, 33) from its operating position (Figures 7, 8, 9).

4. An apparatus as claimed in any one of the preceding Claims, characterized in that the freely extending magnetic tape section immediately adjacent the scanning device (15) extends to the tape guide (32) situated in its operating position and urged against the positioning device (68) on the support (97) and the support (97) is constituted by a slide arranged so as to be displaceable in the longitudinal direction of this freely extending magnetic tape section (Fig. 11).