

Magnetic-tape apparatus with at least two push-buttons.

The invention relates to a magnetic tape apparatus having at least two push-buttons which, when their push-button rods are pressed in separately, perform separate functions upon apparatus parts,

- 5 - which push-button rods, which are loaded in tension towards their initial rest positions by means of springs, can each be locked in the pressed-in position by means of a spring-loaded latching member which forms latching arrangements of different construction with latching noses on the push-button rods,
- 10 - the latching member comprising a latching edge extending transversely of the press-in direction, a first sliding edge which is inclined relative to the press-in direction and, between the latching edge and the inclined first sliding edge, an inclined second sliding edge extending at an obtuse angle relative to the first sliding edge, and the inclined first sliding edge
- 15 unlocking one push-button rod during the inward movement and the inclined second sliding edge unlocking another push-button rod during the outward movement.

DE-PS 2,233,127 describes a magnetic-tape apparatus in which a plurality of push-button rods each have a latching nose adapted to engage in recesses of a transversely movable latching member in the form of a slide. The

20 latching noses are engageable in associated latching recesses after they have moved the latching member aside by means of inclined edges of the recesses upon depression. In this way the push-button rods, which are thus locked in the pressed-in position, can set certain operating functions in the apparatus. When a previously moved out push-button rod is pressed in this push-button rod also

25 presses the latching member aside *via* its latching nose. If the previously locked other push-button rod is not manually held in the pressed-in position this push-button rod will be moved outwards when the other push-button rod is pressed in.

If both push-button rods are pressed in together to select another function the latching noses of both push-button rods engage behind latching edges of the recesses and in this way they are both locked. These two push-button rods can be unlocked only with the aid of a third push-button rod which moves the latching member with an inclined edge so far that both locked latching noses are disengaged from the latching edges. All the push-button rods are spring-biassed in the outward direction so that they always return to their initial positions when the latching noses are released.

US-A 4,179,721 describes an actuating mechanism in a magnetic-tape apparatus in accordance with the preamble of Patent Claim 1, in which a latching member in the form of a slide has inclined sliding edges acting in the inward and in the outward direction. The sliding edges extend at an obtuse angle relative to one another. A depressed first button, which is locked by the latching member, is unlocked upon depression of a second button. The depressed and locked second button is unlocked upon depression of the first button. Moreover, one of the two buttons cannot be locked when both buttons are depressed simultaneously. When released the button which is then not locked is returned to its initial position by a pretensioned spring and causes the other depressed button to be unlocked *via* one of the inclined sliding edges.

In the known constructions each push-button rod cooperates with another latching member recess and the latching member therefore has a rather intricate and protruding construction.

It is an object of the invention to make the latching mechanism of the push-button rods in a magnetic-tape apparatus smaller while maintaining a construction which always enables the push-button rods to be unlocked even when they are pressed simultaneously.

According to the invention this object is achieved by means of the characteristic features defined in Patent Claim 1.

By constructing the latching member as a pivotable latch this latching member can be very compact, which is of great importance with apparatuses of small dimensions. The construction as an injection-moulded part enables the spring to be integrated in the latch and also enables this spring to be

pretensioned by the relevant pressed-in push button rod so as to produce the spring force providing the locking action. Such a latch construction can be manufactured simply and does require the additional mounting of a spring. The spring is pretensioned only when a button is depressed. The arrangement is compact and of special advantage in car-radio cassette apparatuses, where not much space is available. The manufacture of an apparatus thus becomes more economical.

Since the push-button rods have different latching noses or latching arrangements it is ensured that in the case of a latching member having only one latching edge and only two inclined sliding edges one latching nose runs onto an inclined sliding edge and thereby unlocks the other latching arrangement of the two latching arrangements regardless of whether a push-button rod is pressed in or is released upon pressing in.

In a further embodiment of the invention the latching noses are constructed in such a way that the respective inward travel of a push-button rod before another previously locked push-button rod is released is always substantially the same. The different construction of the latching noses may, for example, reside in their length in the inward direction or in the provision of an additional nose. In any case, this ensures that for unlocking all push-button rods with different types of latching arrangements perform the same inward travel until they unlock. This results in a more convenient operation.

The invention will be described in more detail on the basis of the exemplary embodiments shown in the drawings. In the drawings:

Figure 1 is a plan view of a magnetic-tape apparatus to be mounted in a car radio and having two push-buttons in their rest positions,

Figure 2 shows another arrangement or allocation of a latch to latching noses of push-button rods,

Figure 3 is a plan view of the construction shown in Figure 2,

Figure 4 illustrates the principle of a latching slide with associated latching noses of push-button rods.

The magnetic-tape apparatus shown in Figure 1 has a frame 1 carrying a unidirectional drive motor 3 via a support 2. The drive pinion 4 of the

motor 3 guides a belt 5 passed over a flywheel 8. The flywheel 8 is supported in the frame 1 and is fixedly connected to a capstan 10. The flywheel 8 is further connected to a gear wheel 12. A further gear wheel 14, which is coaxial with the gear wheel 12, is rotatably arranged on the flywheel 8 *via* a friction coupling.

5 Moreover, the frame 1 supports winding mandrels which are fixedly connected to fast-wind wheels 22, 23. A play wheel 25 is connected to one of the winding mandrels *via* a friction coupling. A member 26, which is movable in the frame, supports two juxtaposed gear wheels 28, 29. A spring 30 constantly urges the member 26 into an initial position shown in Fig. 1.

10 The member 26 carries two pins 28a and 29a which are movable in the frame 1 in a triangular hole 28b and a slot 29b respectively.

 Two push-buttons 31, 32 are provided for fast forward and reverse operation. These push-buttons 31, 32 are connected to slides 35, 36 *via* push-button rods 33 and 34. These slides 35 and 36 act on the member 26. For
15 this purpose, the slide 35 has a projection 37. Likewise, the slide 36 has a run-on surface 38. The projection 37 and the run-on surface 38 act upon a pin 39 of the member 26. Moreover, the slides 35, 36 have run-on surfaces 35a, 35b and 36a, 36b respectively, which can act upon pins 74c and 74d respectively of a head-mounting plate, not shown. This head-mounting plate is situated at the other
20 side of the frame 1.

 The gear-wheel 29 first meshes with the gear-wheel 13 when the projection 37 is pressed against the pin 39 of the member 26 when the push-button rod 33 is pressed in and latched by a latching member 20. The pin 28a then performs a movement in the direction indicated by the arrow b and the pin
25 29a performs a movement in the direction indicated by the arrow c'. As the movement proceeds the pin 29a moves further in the direction indicated by the arrow b' and the gear-wheel 29 meshes with the gear-wheel 23. The magnetic tape is now rapidly wound by the winding mandrel connected to the gear-wheel 23. If the other push-button rod 34 is pressed in and locked by the latching
30 member 20 in a manner to be described hereinafter the run-on surface 38 acts upon the pin 39 of the member 26, as a result of which the pin 28a moves in the direction indicated by the arrow c and the pin 29a moves in the direction

indicated by the arrow c', causing the gear-wheel 29 to mesh with the gear-wheel 13 and the gear-wheel 28 to mesh with the gear-wheel 22. Consequently, the other winding mandrel, which is connected to the gear-wheel 22, is driven for fast winding.

5 Figs. 2 and 3 show diagrammatically the cooperation of the push-button rods 33, 34 with the latching member 20, the slides 35 and 36 shown in Fig. 1 being omitted for the sake of simplicity. The latching member 20 is constructed as a latch which is pivotable about a spindle 40. The latch 20 comprises a latch body 41 and a resilient plastics arm 42 which is integral with
10 this injection-moulded plastics latch body. Since the spindle 40 of the latch 20 extends perpendicularly to the direction 43 of movement of the push-button rods 33, 34 the latch body 41 can pivot in the directions indicated by a double arrow 44. A latching edge 45 is situated at the location of the free end of the latch body 41. The latching edge 45 is adjoined by a second inclined sliding edge 46, which
15 extends at an obtuse angle relative to a first inclined sliding edge 47 adjoining it. The free end 42a of the plastics arm 42 can cooperate with inclined surfaces 48 and 49 of the push-button rods 33 and 34.

The push-button rods 33 and 34 are urged in the outward direction by means of springs 50, 51. The springs 50 and 51 are coupled to the
20 frame 1. The push-button rods 33 and 34 have latching noses 52, 53. The latching noses 52 and 53 extend tangentially of the latch pivot 40 and have a different length in the direction of the latch body 41. The length of the latching nose 52 is greater than the length of the latching nose 53. The difference in length between the latching noses 52 and 53 is d.

25 In Figs. 2 and 3 the push-button rod 33 is in the pressed-in condition so that the latching nose 52 has engaged behind the latching edge 45. As a result of pressing-in the inclined surface 48 of the push-button rod 33 presses against the plastics arm 42 and the latch body 41 is thus spring-loaded in the clockwise direction, which yields a stable locking. Moreover, it is shown that
30 the push-button rod 34 has also been pressed in at the same time, so that the latching nose 53 has also engaged behind the second inclined sliding edge 46. Thus, the latching nose 53 is not locked but is pulled back by the spring 51 in

the direction indicated by an arrow 54. The latch body 41 thus pivots in the anti-clockwise direction and also releases the latching nose 52. This ensures that when the two push-button rods 33 and 34 are pressed in together both push-button rods are unlocked and moved out at the same time.

5 In this respect it is important that the latching nose 52 and the latching edge 45 on the one hand and the latching nose 53 and the latching edge 45 on the other hand form different types of latching arrangements. Both latching arrangements each enable only one of the push-button rods 33 and 34 to be pressed inwards and to be locked in a reliable manner. The latching
10 arrangements are constructed in such a manner that when pressed in alternately the push-button rods with a different latching arrangement are released for outward movement by the latching member 20 and when these push-button rods 33 and 34 are pressed in together the latching member 20 likewise releases these two push-button rods for outward movement. In this respect it is important that
15 the latching noses 52, 53 extend tangentially of the latch pivot 40 and latching noses of two different latching arrangements have different tangential extents, the distance d (Fig. 2) being smaller than the length of the excursion e or g which can be produced by the latching nose 53.

 As can be seen in Fig. 1 the latching nose 53 may have an
20 additional projection 55. This additional projection ensures that the respective inward travel of a push-button rod before another previously locked push-button rod is released is always substantially the same.

CLAIMS:

1. A magnetic tape apparatus having at least two push-buttons (31, 32) which, when their push-button rods (33, 34) are pressed in separately, perform separate functions upon apparatus parts,

- 5 - which push-button rods (33, 34), which are loaded in tension towards their initial rest positions by means of springs (50, 51), can each be locked in the pressed-in position by means of a spring-loaded latching member (20) which forms latching arrangements of different construction with latching noses (52, 53) on the push-button rods (33, 34),
- 10 - the latching member (20) comprising a latching edge (45) extending transversely of the press-in direction, a first sliding edge (47) which is inclined relative to the press-in direction and, between the latching edge (47) and the inclined first sliding edge (47), an inclined second sliding edge (46) extending at an obtuse angle relative to the first sliding edge ((47), and the inclined first sliding edge (47) unlocking one push-button
- 15 rod (33) during the inward movement and the inclined second sliding edge (46) unlocking another push-button rod during the outward movement,

characterised in that

- 20 - the latching member (20) is constructed as a pivotable latch which is pivotable against spring force by the latching noses (52, 53) via the sliding edges (46, 47),
- the latching noses (52, 53) extend tangentially of the latch pivot (40) and latching noses (52, 53) of two different push-button rods (33, 34) have different tangential extents in such a manner that only the latching nose (52) of one of the push-button rods engages against the latching edge (45)
- 25 and locks the associated button (31) when the buttons (31, 32) are pressed together,
- the length (e) of the excursion of the latching member (20) at the latching



edge (45) during the movement of one of the latching noses (52, 53) of the push-button rods (33, 34) along one of the associated inclined sliding edges (46, 47) is always greater than the length (d), tangentially of the latch pivot, over which the other latching nose engages with the latching edge (45),

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- the latch (20) is constructed as an injection-moulded plastics part having an integral resilient plastics arm (42) which, when the push-button rods (33, 34) are pressed inwards, can be pretensioned resiliently by the inclined edges (48, 49) of the push-button rods (33, 34) engaging with said arm, to provide the spring force producing the locking action.

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2. A magnetic-tape apparatus as claimed in Claim 1, characterised in that the latching noses (52, 53) are constructed in such a way that the respective inward travel of a push-button rod (33, 34) before another previously locked push-button rod is released is always substantially the same.