Oct. 16, 1951 B. HAYNES 2,571,133

CARTON

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Fig. 1.

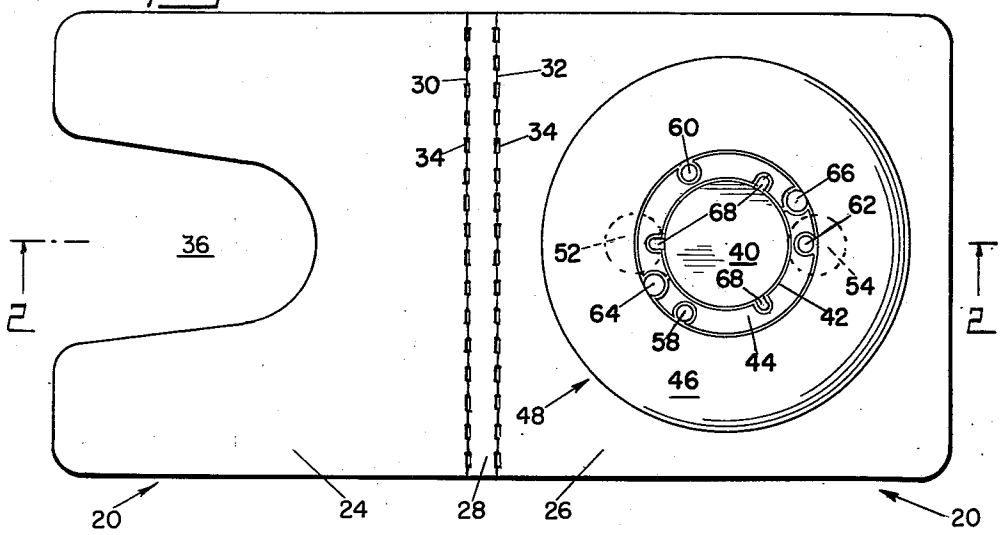


Fig. 2.

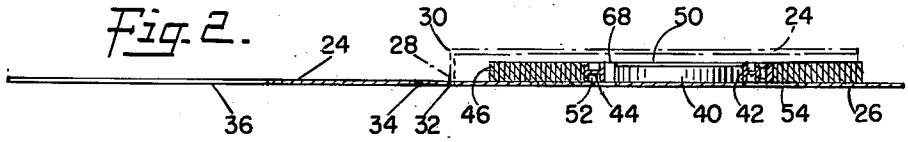


Fig. 3.

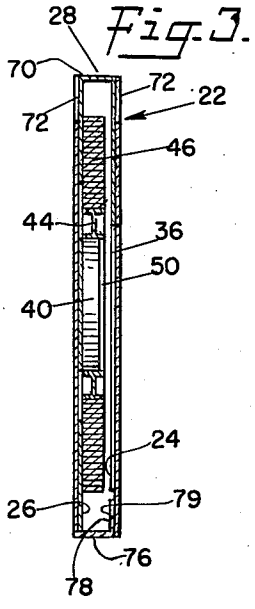
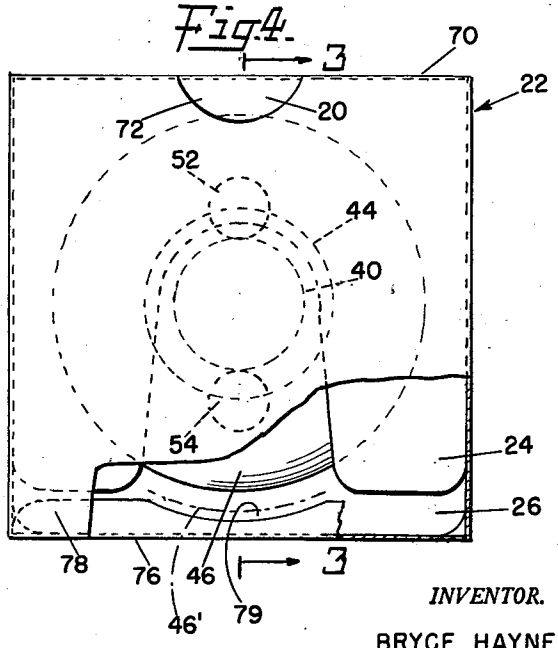


Fig. 4.



INVENTOR.

BRYCE HAYNES

BY

Pennie, Edmonds, Morton & Barrows

ATTORNEYS

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CARTON

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Fig. 5.

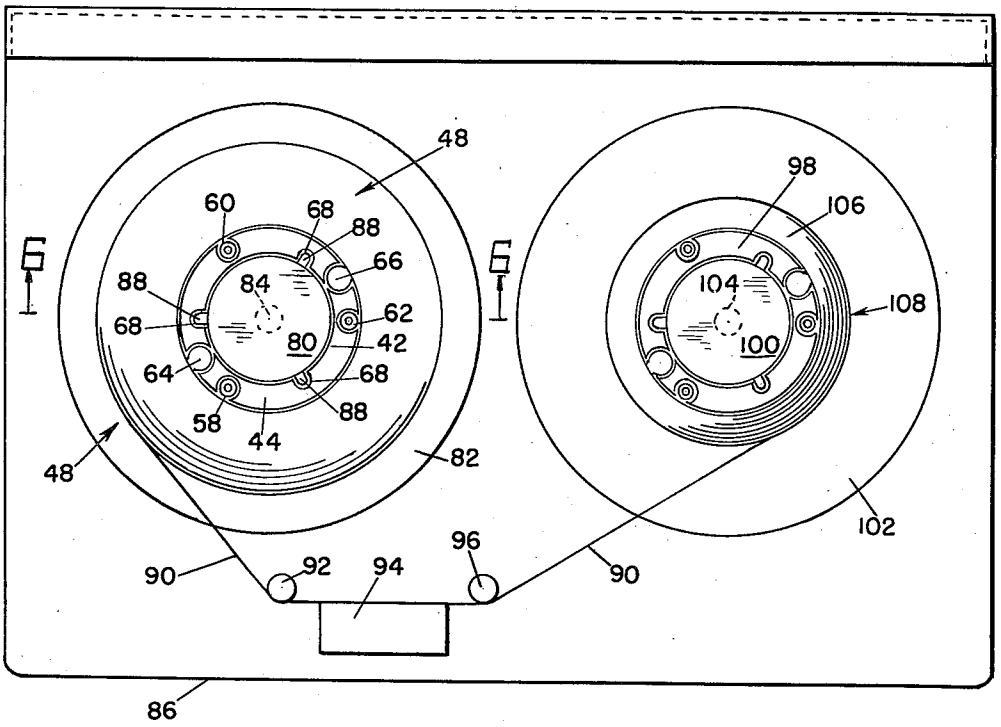
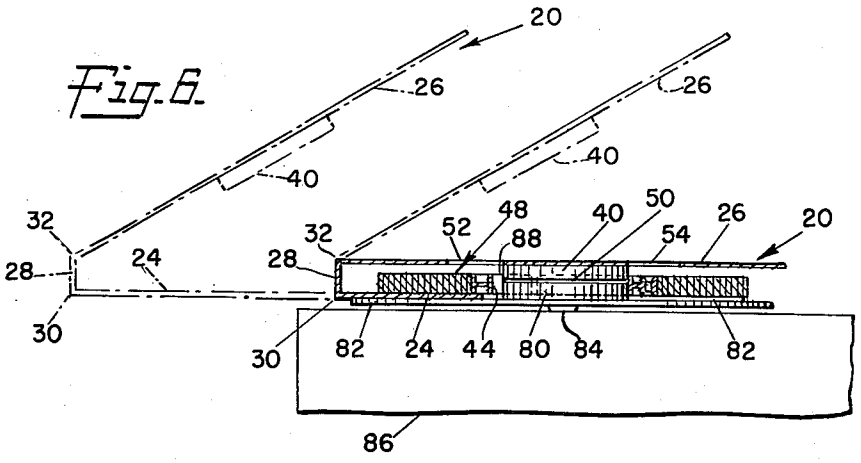


Fig. 6.



INVENTOR.

BRYCE HAYNES

BY

Pennie, Edmonds, Morton & Barrows

ATTORNEYS

Oct. 16, 1951 B. HAYNES 2,571,133

CARTON

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Fig. 7.

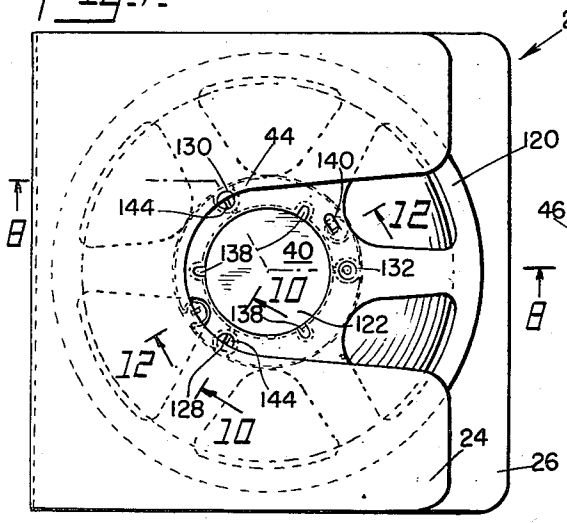


Fig. 10.

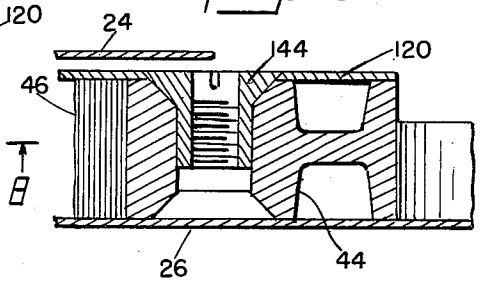


Fig. 11.

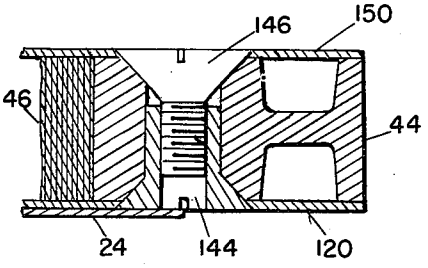


Fig. 8.

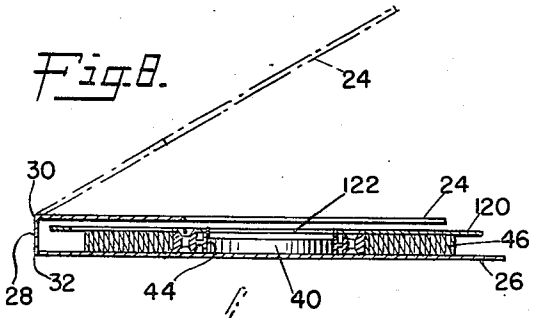


Fig. 9.

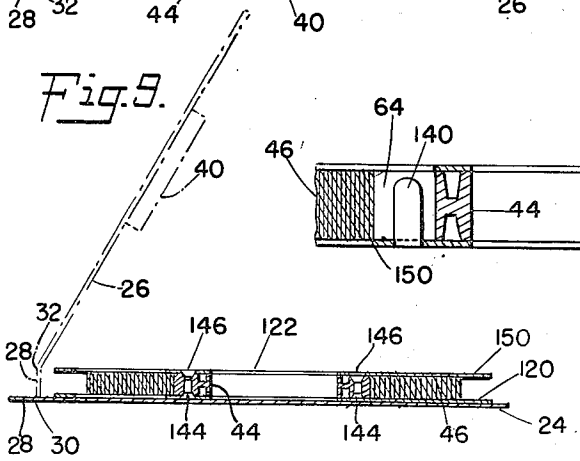
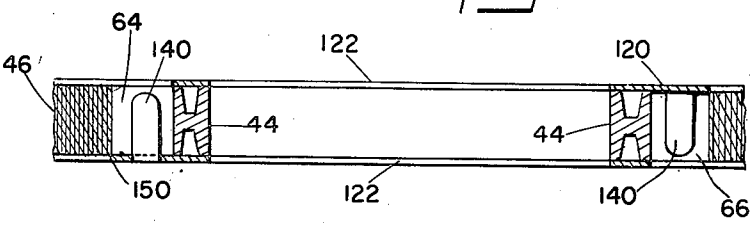


Fig. 12.



INVENTOR.

BRYCE HAYNES

BY

Pennie, Edmonds, Morton & Barrows

ATTORNEYS

Patented Oct. 16, 1951

2,571,133

UNITED STATES PATENT OFFICE

2,571,133

CARTON

Bryce Haynes, Tuckahoe, N. Y., assignor to Audio Devices, Inc., a corporation of New York

Application March 23, 1950, Serial No. 151,454

11 Claims. (Cl. 206—52)

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This invention relates to cartons and has for its object more particularly improvements in cartons for rolls of magnetic sound-recording and sound-reproducing tape.

It is customary to produce magnetic sound-recording and sound-reproducing tape in various lengths, which are distributed and used in roll form. The usual rolls, at the present time, contain the following number of feet: 1250, 2500 and 5000. For convenience in handling and in use the rolls of tape may be mounted on metal or plastic reels; which are 7", 10" and 14" in diameter, respectively. The reels are formed ordinarily of a hub and two spaced side flanges as an integral non-separable unit. Small reels for small rolls are relatively inexpensive, while large reels for large rolls are quite expensive. When the larger rolls, particularly, are used in quantity this creates a serious cost problem.

Several expedients are followed to reduce the cost. One of them is to use reels with separable hubs and side flanges. A roll of magnetic tape is mounted on a hub and when it is used for sound-recording or sound-reproducing purposes two side flanges are attached to the hub; thus creating for the time being a separable reel functionally similar to the conventional non-separable reel. While a hub is required for each roll of tape, a pair of side flanges is sufficient to operate successively any number of such hub-roll units. In this way the cost of reels can be substantially reduced. Such reels are used on machines designed for vertical placement of the reels; although they may be used also on machines designed for horizontal placement of the reels.

A second expedient is to attach only one flange to a hub-roll unit. Such an arrangement is useful for machines designed for horizontal placement of the roll of tape, with or without a turntable.

A third expedient is to use a hub-roll unit without any side flanges. This may be done on machines provided with a horizontally disposed turntable, or a flange adapted to receive such a hub-roll unit.

In further aid of these expedients, the industry has set up certain standard specifications. The hubs are uniform in size and construction. This is also true of the various flange sizes, so that they are interchangeable so far as the hubs are concerned. The same hub may be used to assemble any of the larger reels.

In order to facilitate the use of the hub-roll units, with or without the separable flanges, a

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carton structurally appropriate for the purpose is highly desirable. It should serve the essential needs of all concerned: The manufacturer, the distributor, the recordist, the player-operator, the librarian, etc. And, the carton itself should be relatively inexpensive. The manufacturer and distributor need a carton that will readily and safely hold a hub-roll unit of the magnetic tape. The recordist and player-operator need a carton that is useful in mounting the hub-roll on the turntable of a machine for magnetic sound recording or sound reproducing and then removing the hub-roll; that is useful in assembling a single flange reel and in mounting it on such a machine; and that is useful in assembling a two-flange reel. The librarian, of course, needs a carton useful for cataloging and storing the hub-roll unit.

All of them need a carton that will make unnecessary, or at least reduce to a minimum, direct handling of a hub-roll unit. Since the roll of tape is not protected with flanges, there is a good deal of risk involved in lifting or handling a hub-roll. The tape on the roll, more especially the last turns, sometimes relatively large top sections thereof, and sometimes the entire roll of tape, are apt to slide off laterally. This occurs, for example, when a person picks up a hub-roll unit from a flat surface. He usually inserts a fingernail from each hand under opposite sides of the roll to lift it and then inserts one or more fingers of each hand under the roll to lift the entire unit. The fingernails alone are apt to pull away a number of turns of tape. He then inserts his fingers still further under the roll to lift it, and often pulls up more turns of tape. If he should succeed in getting his fingers under the roll, a relatively large section may slide away. This is apt to occur particularly when the fingers are used in a sudden jerky manner.

Those who have had this happen, and they are numerous, know only too well what dire results may take place. Time is lost in an effort to rewind the displaced turns of tape; they are seldom replaced evenly; the tape is damaged, thus impairing its sound-recording or sound-reproducing characteristics, etc. Such an occurrence is especially bad when a hub-roll is to be used for a radio broadcast in which timing is exceedingly important. It can wreck a program.

My investigations have led to the discovery that a carton can be readily produced which makes unnecessary human contact with the roll of tape. It is quite inexpensive and is designed

structurally so as to be highly useful to those required to handle hub-rolls of magnetic tape.

In accordance with the invention, the carton is formed of an inner removable member and an outer enclosing member for the inner member. The inner member is in turn formed of a pair of juxtaposable flaps hinged to an intermediate end wall. The first flap is provided with a centrally disposed core-slot extending from its periphery. The second flap is provided with a centrally disposed and raised hub-core adapted to be juxtaposed to the inner end portion of the core-slot in the first flap, the hub-core extending from its flap toward the other flap in their normally juxtaposed position, the hub-core also being adapted to fit into the core-hole of the hub of a hub-roll unit of magnetic tape. The first flap is adapted to extend at least in part over the hub of the hub-roll as mounted over the hub-core of the second flap. The two flaps are adapted to be moved toward each other to hold the hub-roll between them. The outer enclosing member is adapted to receive the inner member with the hub-roll mounted between the juxtaposed flaps.

The hub-core is integrally secured to its flap. While the hub-core may be pivotally mounted thereon, so that it can rotate, in a presently preferred practice the hub-core is solidly mounted on the flap so that it does not move relatively thereto.

The hub-core preferably has an effective height less than the depth of the core-hole in the hub to provide free space beyond the free end of the hub-core for receiving the free end of a rotatable hub-core on a machine for magnetic sound recording or sound reproducing.

Another preferred feature is to provide the second flap with at least one hole, and preferably two or more equally spaced holes, adjacent the hub-core which are adapted for the insertion of one or more fingers to push or maneuver a hub-roll unit mounted on the hub-core in placing it on the hub-core of a machine.

In order to facilitate placement of the inner member in the outer enclosing member, particularly when the bottom of the latter contains an insertable tab portion, it is advantageous for one flap to be shorter than the other so that the inner member as a whole may be fitted more readily in the outer enclosing member. In a presently preferred practice the flap with the core-slot is shorter than the flap with the hub-core.

These and other features of the invention will be better understood by referring to the accompanying drawings, taken in conjunction with the following description, in which:

Fig. 1 is a plan view of a carton illustrative of a practice of the invention, showing an opened inner removable member with a magnetic hub-roll unit sound-recording and sound-reproducing tape mounted thereon;

Fig. 2 is a section on the line **2—2** of Fig. 1;

Fig. 3 is a section on the line **3—3** of Fig. 4;

Fig. 4 is a plan view of the carton with a broken away section, showing the inner member fitted into an outer enclosing member;

Fig. 5 is a plan view of a magnetic sound-recording and sound-reproducing machine, showing a hub-roll unit of tape mounted thereon;

Fig. 6 is a sectional view on the line **6—6** of Fig. 5, showing the manner in which the carton may be employed to place the hub-roll unit on the machine;

Fig. 7 is a plan view of the inner member fitted with and folded around a hub-roll unit provided with a single reel flange;

Fig. 8 is a section on the line **8—8** of Fig. 7, showing how the flap with a hub-slot may be operated to place the reel flange in position to be secured to the hub;

Fig. 9 is a similar view, with the carton reversed, showing how the flap with a core may be operated to place a second reel flange in position to be secured to the hub;

Fig. 10 is an enlarged fragmentary sectional view on the line **10—10** of Fig. 7, showing the placement of a screw-sleeve through the first reel flange into a hole in the hub and the holding position of the slotted flap with respect to the screw-sleeve;

Fig. 11 is a similar view, with the carton reversed, showing the placement of a screw through the second reel flange into the screw-sleeve; and

Fig. 12 is a section on the line **12—12** of Fig. 7, showing the manner in which the reel flanges are aligned with the hub.

The carton as shown in Figs. 1 to 4 includes an inner removable member **20** and an outer enclosing member **22**. The inner member is formed of a pair of juxtaposable flaps **24** and **26** hinged to an intermediate end wall **28** in parallel relationship to each other. The members may be made of any suitable material, such as conventional 2-ply inner corrugated paper board. While the boundaries **30** and **32** between the flaps and the end wall may be suitably scored to provide parallel straight-line hinges, a plurality of suitable perforations **34** is preferred because they assure an easy hinge action that permits a flap to be moved away from the other flap without springing back. This is particularly desirable when operating the flaps in the manner to be described below.

Flap **24** is provided with a centrally disposed generally U-shaped core-slot **36** extending from its free end toward the end wall. The sides of the core-slot are tapered and the corners of the flap are rounded as shown to facilitate placement of the slot around a core; or, stated in another way, to facilitate placement of the flap around a core; and also to facilitate insertion of the flap in the enclosing member. For the latter purpose the length of the flap is less than that of the other flap.

Flap **26** is provided with a fixed centrally disposed and raised hub-core **40** adapted to be juxtaposed under or over the deep end portion of core-slot **36** in the other flap. The hub-core is shown fitted into the core-hole **42** of a hub **44** on which is wound a roll of magnetic sound-recording and sound-reproducing tape **46**. The hub and roll form a unit which is conveniently referred to as a hub-roll **48**. As more particularly shown in Figs. 2 and 3, the effective height of the hub-core is less than the depth of the core-hole in the hub to provide a free recessed space **50** beyond the free end of the hub-core; or, to provide a similar free space between the hub and flap **26**, depending on the position of the hub with respect to the hub-core. A pair of oppositely placed holes **52** and **54** are provided in flap **26**, adjacent to the hub-core and directly opposite the side of the hub and the roll of tape to facilitate placement of the hub-roll unit, as will also be described below. The corners of the flap are rounded, as in the case of the other flap, to permit easy insertion in the outer member.

Hub **44** as noted above preferably conforms to standard specifications. It may be made of

metal, plastic, or any other suitable material. One which permits die casting of the hub is preferred. As shown in Fig. 1, the hub is provided with three equally spaced holes 58, 60, 62 near its outer periphery. These holes are countersunk from both sides and are adapted to be fitted with a screw and screw-sleeve combination when one or two reel side flanges are to be attached to the side walls of the hub. The hub is also provided with a pair of oppositely placed combination slot-holes 64 and 66 at its outer periphery. These holes are adapted to receive aligning lugs on the reel side flanges to be described below. The hub is also provided with three equally spaced slots 68 at its inner periphery. The slots are adapted to receive holding lugs on the outer periphery of the rotatable core on a magnetic sound-recording or sound-reproducing machine, as more particularly shown in Fig. 5.

Outer enclosing member 22 is in the form of a rectangular, preferably square, box formed, for example, of a single piece of single-ply cardboard. When made in one piece, the ends of the cardboard, for example, may overlap and be secured to one another to form a side wall, leaving an open top 70. A pair of juxtaposed gripping slots 72 is provided along the open top to facilitate the gripping of inner removable member 20 when it is pushed in or pulled out of enclosing member 22. The bottom 76 of the enclosing member is provided with an inwardly extending tab portion 78 adapted normally to keep the bottom closed. The length of flap 26 is approximately the depth of the enclosing member so that the free end of the flap may extend to the bottom of the closing member. End wall 28 then forms the closed top of the combination, as shown in Figs. 3 and 4. As stated above, flap 24 is shorter than flap 26. This is to permit the former flap to slide into the enclosing member without being stopped by inwardly extending bottom tab 78. The tab is preferably provided with a centrally disposed cut-out or recess 79, which may be arcuate, so that the outer enclosing member may accommodate a larger roll of tape 46' without the tab being brought into contact with the tape on the roll; thus avoiding damage to the tape.

Figs. 5–12 may now be examined to note certain highly useful ways in which the carton may be employed in handling hub-roll units. Going first to Fig. 5, hub-roll unit 48 is shown mounted over and around a turntable hub-core 80 extending upwardly from the top of a horizontally disposed turntable 82 integrally secured to the top of a vertically disposed shaft 84 of a sound-recording and sound-reproducing machine 86. The turntable hub-core is provided at its periphery with three equally spaced holding lugs 88 which fit into slots 68 of hub 44 to hold the hub-roll unit secured to the turntable hub-core.

Tape 90 from the hub-roll unit extends around guide 92, past magnetic head 94, around guide 96 and onto take-up hub 98, similar in construction to the other hub (the hubs are interchangeable), which is mounted over and around a turntable hub-core 100 (similar in construction to the other turntable hub-core) extending upwardly from the top of a horizontally disposed turntable 102 integrally secured to the top of a vertically disposed shaft 104 of the machine. The tape is wound into a roll 106 on the hub to form another hub-roll unit 108. In this arrangement both rolls lie flatly on their respective turntables. The machine may be operated without the use of a reel, with one or two side flanges.

Fig. 6 may now be considered to determine the effective manner in which the carton may be used to place hub-roll unit 48 on the machine, as well as to remove it. First, of course, inner member 20 (Fig. 4) containing the hub-roll unit is removed as a whole from outer enclosing member 22, with flap 24 below and flap 26 above (Fig. 6); the inner member is placed over turntable 82; and hub 44 of the hub-roll unit is dropped over turntable hub-core 80.

The placement of the roll's hub 44 on the turntable hub-core is facilitated by the use of flap hub-core 40, which, it will be recalled, has a height less than the depth of the hub (Fig. 3) to provide recessed space 50, and which space can be shifted or divided depending on the position of the hub with respect to the flap's hub-core 40. As shown in Fig. 6, that space is adjacent the flap hub-core as well as turntable hub-core 80. This permits the use of the flap hub-core, in conjunction of course with the roll's hub, as a feeler in placing the turntable hub-core in the space. In this connection, it is likewise advantageous for the turntable hub-core, like the flap hub-core, to be less in height, as shown, than the depth of the roll's hub. The operator may also be aided by glancing through one or both holes 52 and 54 in flap 26 and, if desirable, he can maneuver one or two fingers in the holes to obtain proper alignment of hub and core and finally to push the hub downwardly around the turntable hub-core.

Since U-shaped slot 36 in lower flap 24 fits around the turntable hub-core, inner member 20 as a whole may be pulled away from the turntable. To this end flap 26 is raised, as shown in dotted lines, about its hinge 32 at end wall 28 (or hinge 30, or both) to clear its hub-core 40 from the roll's hub, and the inner member is then pulled laterally, to the left as shown by the dotted lines in Fig. 6, away from the turntable.

The roll of tape may then be used as indicated in Fig. 5. Whether or not the tape is rewound on its original hub 44 makes no difference so far as the utility of the carton is concerned, although it is customary promptly to rewind the tape so that it is ready for sound reproduction. Since the physical arrangement is the same at one turntable as the other, the carton may be used to remove the unwound or the rewound roll of tape. Assuming, for example, that the tape has been rewound, the operator need only reverse the steps outlined above. Returning to Fig. 6, and moving from left to right, inner member 20 is opened; flap 24 is pushed across the top of the turntable, under the rewound hub-roll unit 48; flap hub-core 40 is pushed downwardly toward turntable hub-core 80 until the former is back in core-hole 42 of the roll's hub 44; flaps 24 and 26 are gripped, held together, and the inner member as a whole is lifted clear of the turntable and inserted in its outer enclosing member 22.

The complete carton with its hub-roll unit is then ready for the librarian who should store it on one of its narrow ends, preferably its narrow bottom 76, rather than on one of its broad sides. Since the roll of tape and its hub are then wholly supported by the flap hub-core, protruding side edges of the tape in the roll will not bear heavily against the flaps and hence will not be injured by bending or curling.

In the case of some machines, as already noted, it may be necessary or desirable to use hubs with

one or two reel side flanges. Figs. 7–12 illustrate how the carton may be used for such purpose. With flap 26 below and flap 24 pulled up, as shown in Fig. 8 with flap 24 in dotted lines, hub-roll unit 48 is mounted over and around hub-core 40 on flap 26; and a reel side flange 120 is then placed on the hub-roll.

The side flanges, like the hubs, are made of metal, plastic, or other suitable material, and are standard in construction. Each flange has a centrally disposed core-hole 122 through which flap hub-core 40 and turntable hub-core 80 (or 100) may extend. In size the core-hole conforms generally to that of core-hole 42 in the roll's hub 44, not being smaller although it may be somewhat larger. In addition, each flange is provided with three equally spaced screw-sleeve holes 128, 130, 132, countersunk on one side and with a tapered annular insert shoulder on the other side, conforming to the three corresponding countersunk screw-sleeve holes 58, 60 and 62 in the hub; as well as three equally spaced slots 138 conforming to the three corresponding slots 68 in the hub; each flange has a laterally extending aligning lug 140 adapted to fit in aligning hole 64 or 66 in the hub. The overall diameter of the side flanges depends, of course, on the size of the roll or the overall length of the tape.

When placing side flange 120 on hub-roll unit 48, its aligning lug 140 is inserted, for example, in aligning hole 66 of the hub; screw-sleeve holes 128, 130 and 132 are placed over corresponding holes 58, 60 and 62 in hub 44; and the tapered annular insert shoulders of the former are inserted in the latter holes. An internally threaded hollow screw-sleeve 144 is then dropped into each of holes 128 and 130, after which flap 24 is folded down toward flap 26 onto the side flange.

As shown in Figs. 7 and 10, U-shaped slot 36 in flap 24 is so cut that a substantial portion of the flap extends over the screw-sleeves to help hold them in place. While the flap is shown as extending over a half portion of the two inserted screw-sleeves, it may extend to, but not over, the periphery of core-hole 122 in the side flange.

Inner member 20 is then carefully turned over so that flap 24 is at the bottom and flap 26 is at the top, to keep the hollow screw-sleeves in their holes, as shown in Fig. 11. If a second side flange is not desired, an externally threaded countersunk screw 146 is dropped into each of hub holes 58 and 60 and are tightly screwed into their hollow screw-sleeves 144.

On the other hand, if a second side flange 150 is desired, it is placed on top of the reversed hub (Figs. 9 and 12); its aligning lug 140 is inserted in aligning hole 64 in the hub; a countersunk screw 146 is dropped into each of holes 58 and 60 in the hub and are tightly screwed into hollow screw-sleeves 144, as shown in Fig. 11.

From what has been said on the use of the carton in handling hub-rolls of tape not mounted on reels, with one or two flanges, as illustrated in Figs. 5 and 6, it will be clear that the carton may be similarly used in handling hub-rolls of tape mounted on reels with one or two flanges. This is especially the case when using a machine with turntables and a hub-roll unit with a single side flange. Reels of tape with two side flanges may be handled in the conventional manner on such turntables; as they can also when the reels are to be mounted vertically.

After the hub-roll with a single or two reel side flanges has been used and taken from the machine, with or without use of the carton, the steps outlined for placement of the flange or flanges need only be reversed to effect their removal from the hub-roll; after which the hub-roll and the inner member may be inserted as a whole into the outer enclosing member for storage.

In further illustration of the versatility of the carton, another method of using it for attaching one or two side flanges to the hub may be considered. Instead of dropping screw-sleeves 144 or screws 146 into flange holes 128, 130 and 132 and hub roles 58, 60 and 62 from the slot or flap 24 side of inner removable member 20 while the hub is mounted on core 40 of flap 26, when it is expedient as noted to drop only two screw-sleeves or screws because the portion of flap 24 adjacent slot 36 can cover only that many, the inner member may be reversed in order to permit the dropping of three screw-sleeves or screws.

Thus, when the inner member is turned up-side-down with slotted flap 24 undermost and unslotted flap 26 uppermost and is so placed on a support, unslotted flap 26 may be raised to expose the opposite side of the hub and hence its holes. When this is done core 40 is also raised out of core-hole 42 of the hub, thus leaving hub-roll unit 48 flatly supported on flap 24. Care is taken not to slide the hub-roll laterally from its position as previously fixed by core 40; although this is not serious because the hub-roll can be readily re-centered.

In any event, three screw-sleeves or screws are then dropped into their holes; flap 26 is brought back; its core 40 is re-inserted in core-hole 42 of the hub; the flaps are grasped and the inner member is turned up-side-down and placed on the support with unslotted flap 26 undermost; slotted flap 24 is raised to expose the holes on the reverse side; three corresponding screws or screw-sleeves are inserted in the holes; and they are screwed tightly together. Since flap 26 is not slotted, it may be readily used to hold the initially placed three screw-sleeves or screws in place, thus facilitating the attachment of one or two reel side flanges to the hub; after which the inner member may be used as above indicated for maneuvering the hub-roll into and out of operating position on the sound-recording or sound-reproducing machine.

It will be clear to those skilled in this art that the carton above described is by way of illustrating a practice of the invention, and that the carton readily lends itself to some useful modifications.

I claim:

1. In a carton of the type and for the purpose described, the improvement comprising an inner removable member and an outer enclosing member for the inner member; the inner member being formed of a pair of juxtaposable flaps hinged to an intermediate end wall, the first flap being provided with a centrally disposed core-slot extending from its periphery, the second flap being provided with a centrally disposed and raised hub-core adapted to be juxtaposed to the inner end portion of the core-slot in the first flap, the hub-core extending from its flap toward the other flap in their normally juxtaposed position, the hub-core also being adapted to fit into the core-hole of the hub of a hub-roll unit of magnetic tape, the first flap being adapted to extend at least in part over the hub of the hub-roll so mounted over the hub-core of the second flap, the two flaps being adapted to be moved toward

each other to hold the hub-roll between them, and the outer enclosing member being adapted to receive the inner member with the hub-roll mounted between the juxtaposed flaps.

2. A carton according to claim 1, in which the hub-core is integrally secured to its flap.

3. A carton according to claim 1, in which the hub-core has an effective height less than the depth of the core-hole in the hub to provide free space beyond the free end of the hub-core for receiving the free end of a rotatable hub-core on a machine for magnetic sound recording or sound reproducing.

4. A carton according to claim 1, in which the hub-core is integrally secured to its flap, and the hub-core has an effective height less than the depth of the shaft-opening in the hub to provide free space beyond the free end of the hub-core for receiving the free end of a rotatable hub-core on a machine for magnetic sound recording or sound reproducing.

5. A carton according to claim 1, in which the flap with the hub-core is in turn provided with at least one hole adjacent thereto adapted for the insertion of a finger to push a hub-roll unit mounted on the hub-core.

6. A carton according to claim 1, in which the hub-core has an effective height less than the depth of the core-hole in the hub to provide free space beyond the free end of the hub-core for receiving the free end of a rotatable hub-core on a machine for magnetic sound recording or sound reproducing, and the flap with the hub-core is

in turn provided with at least one hole adjacent thereto adapted for the insertion of a finger to push a hub-roll unit mounted on the hub-core.

7. A carton according to claim 1, in which one flap is shorter than the other flap so that the innner member as a whole may be fitted more readily in the outer enclosing member.

8. A carton according to claim 1, in which the flap with the hub-slot is shorter than the other flap so that the inner member as a whole may be fitted more readily in the outer enclosing member.

9. A carton according to claim 1, in which the core-slot in the flap is sufficiently small to permit the flap itself to extend over enough of the hub of the hub-roll when fitted over the core of the other flap to cover at least in substantial part at least one screw hole contained in the hub so that a screw or screw-sleeve loosely placed therein may be held therein by the flap when the inner member is turned up-side-down.

10. A carton according to the next preceding claim, in which the core-slot is sufficiently small to permit the flap itself to cover a plurality of such holes contained in the hub.

11. A carton according to claim 1, in which the outer enclosing member is provide with a hinged insertable tab, and the tab has a centrally disposed recess adapted to keep the tab out of contact with the hub-roll unit.

BRYCE HAYNES.

No references cited.