Oct. 7, 1969 W. F. NETTEKOVEN 3,471,030

STORAGE RACK

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FIG. 1

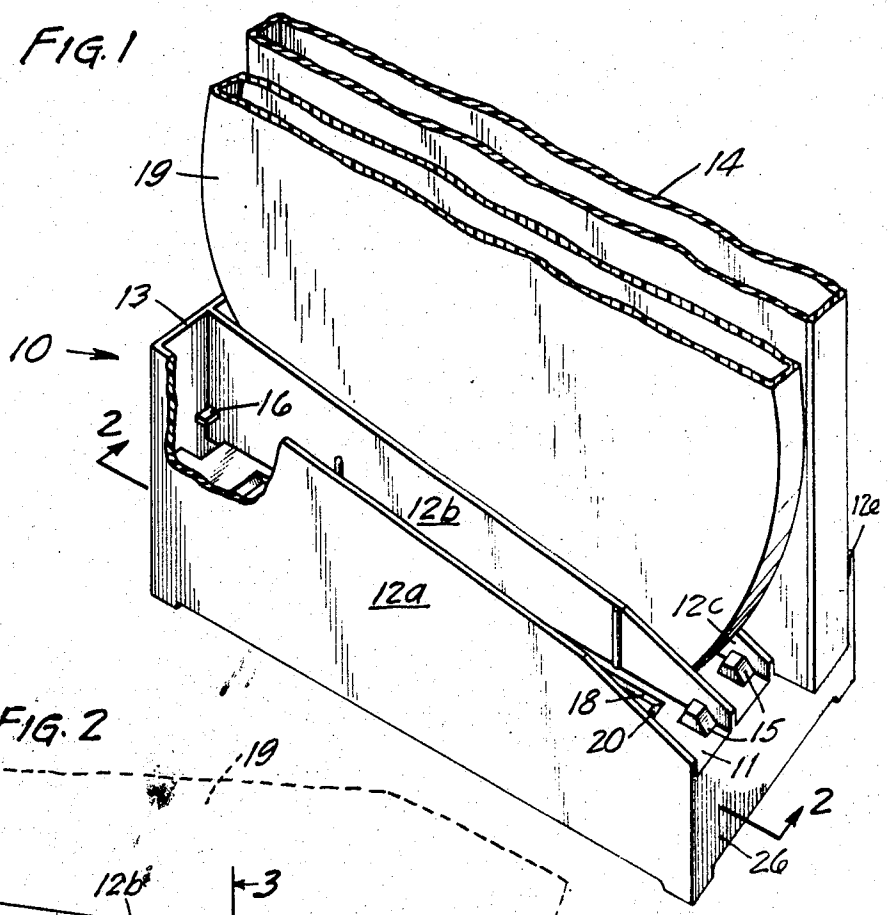


FIG. 2

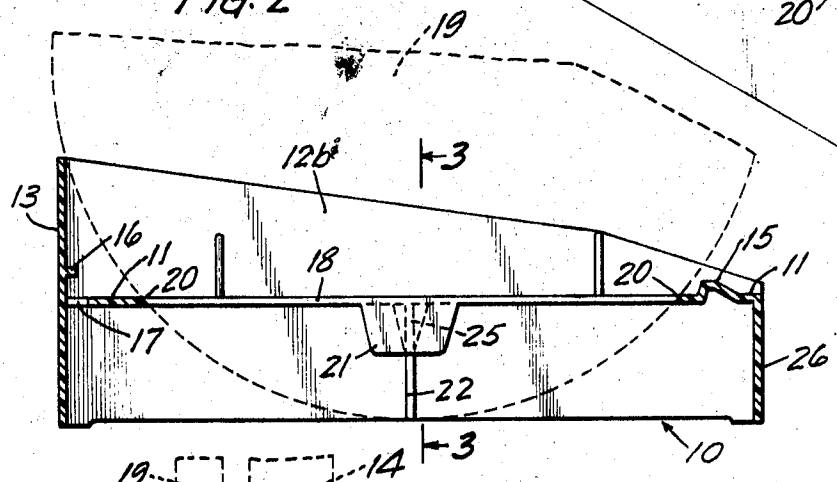
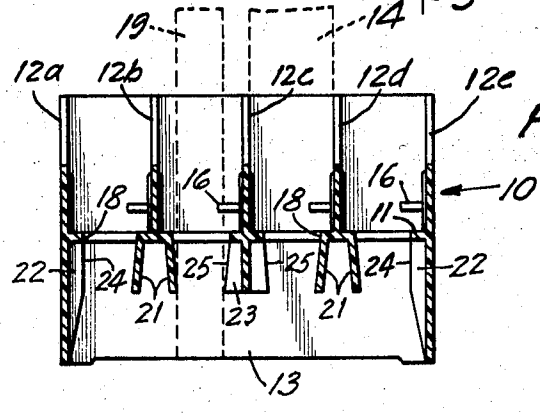


FIG. 3



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STORAGE RACK

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ABSTRACT OF THE DISCLOSURE

A storage rack having a plurality of shallow open compartments to accommodate thin rectangular reel cases in vertical juxtaposition. A central slot in the floor of each compartment accepts circular reels which are held in a vertical position by virtue of a flat spring means at the edge of each slot which presses the reel against rigid guide means at the other edge of the slot. The entire rack may be molded of plastic in one piece.

Background of the invention

Users of audio tape recorders have long been concerned with the problem of storing reels of recording tape. Commonly a reel to be stored is placed in a rectangular container which is put on a flat shelf along with similar containers like a set of books. Often the user would prefer not to use the container, but if he puts the reel on its edge alongside the boxes, it may fall and break. Even if the user always places a reel in a container before putting it on the shelf, removal of one container sometimes accidentally causes an adjacent container to fall.

Accordingly, there has long been a need for more convenient means for storing reels of recording tape, and the present invention is directed to that need.

Summary of the invention

The present invention provides a rack which affords convenient and inexpensive storage of both reels of recording tape and rectangular reel containers. The novel rack can be inexpensive inasmuch as it can be molded as a single piece of plastic using a conventional two-piece mold involving no moving parts. The cost is sufficiently low to permit one to purchase sufficient racks for his entire collection of recording tapes, including racks of different size for the different size reels which one may possess. Since standard 7-inch and 5-inch reels predominate, two rack sizes should usually be sufficient.

The rack of the present invention has a flat floor and thins side and rear partitions which provide a plurality of shallow open compartments, each of which will snugly accommodate a rectangular reel container of a standard size. The floor is cut away to provide a rectangular slot in each compartment. Each slot has a width slightly exceeding the thickness of a standard reel or the thickness of the reel in a dust cover. The length of the slot is less than the diameter of the reel so that an appreciable portion of the reel extends beneath the floor when placed in a slot. At least 1/10 but not more than 1/4 of the diameter of the reel should extend beneath the floor. Downward projections from both sides of each slot hold the reel in a substantially vertical position. In a preferred embodiment, the downward projections are a rigid guide at one edge of the slot and a flat leaf projection at the other edge which acts as a spring means to press the reel against the surface of the rigid guide to lightly clamp the reel in a vertical position. Also extending downward from the floor are leg means for supporting the rack of a flat surface such that reels mounted in the slot do not touch the surface. Most conveniently, the leg means are provided by downward extensions of the rear and outer side partitions. Preferably, means are provided to hold the reel front above the floor for easy removal of the reels and reel containers, without danger of the containers being accidentally knocked off the rack.

Brief description of the drawing

FIGURE 1 is a perspective view of a rack which is a preferred embodiment of this invention molded of plastic in one piece; a tape reel and reel container are schematically shown in storage position;

FIGURE 2 is a cross section along line 2—2 of FIGURE 1; and

FIGURE 3 is a cross section along line 3—3 of FIGURE 2.

In the embodiment shown in FIGURES 1–3, the storage rack **10** includes a flat floor **11**, thin side partitions **12***a*, **12***b*, **12***c*, **12***d* and **12***e* and rear partition **13**. Each adjacent pair of side partitions **12** and rear partition **13** together with the floor **11** form a shallow open compartment of a width and length to snugly accommodate a rectangular reel container **14** of standard size. Projections **15**, **16** on the rack **10** cooperate with recesses (not shown) in the contaner **14** to insure that the container remains in position until lifted from the rack. In order to permit the storage rack to be molded in one piece, the floor **11** is provided with an opening **17** immediately beneath each projection **16**.

The floor **11** is cut away in each compartment to provide a central slot **18** of a width which easily accommodates the thickness of a tape reel **19** of standard size, either by itself or enclosed by a close-fitting dust cover as schematically illustrated in FIGURE 1. The length of the slot is such that approximately one-sixth of the diameter of the reel extends below the floor as may be seen in FIGURE 2. The slot **18** is preferably tapered at its lengthwise extremities **20** to conform to the circular periphery of the reel **19**.

At one edge of each slot **18** is formed a flat leaf **21** which extends from the floor **11** downward and inward toward the slot at an angle of about 2 degrees from the vertical as shown in FIGURE 3. At the opposite edge of each slot, the rack **11** is formed with a rigid guide **22** or **23**. The surfaces **24** and **25** of the guides **22** and **23**, respectively, which face the slot extend inward toward the slot in a straight line inclined about 2 degrees from the vertical. Since the leaf **21** is not braced, it is free to flex and thus act as a spring means to press the reel **19** against the opposing rigid guide **22** or **23** to hold the reel **19** in a vertical position.

It will be appreciated that the shape of the leaves **21** and the angle of inclination of the guide surfaces **24**, **25** are not critical as long as the reel **19** is not compressed to the extent that the flanges of the reel are pressed against tape wound on the reel. Angles of about 0 to 5 degrees from the vertical for the guide surfaces **24**, **25** and from about ½ to 10 degrees for the flat leaves **21** are considered to be suitable, and the spring means may even extend further into the space beneath the slot **18** if it is sufficiently resilient that tape wound on the reel is not damaged.

The outer side partitions **12***a* and **12***e* and the rear partition **13** extend below the floor **11**, as does a face **26** from the front edge of the floor, to provide leg means to permit the rack to stand on a flat horizontal surface. These leg means should extend downward a distance sufficient to maintain a clearance between the reel **19** and any flat surface on which the rack may be placed.

As will be appreciated by those skilled in the art of molding plastics, the rack **10** may be molded in a simple two-piece mold having no moving parts. The mold halves essentially separate at the floor **11** except for upward offsets to the projections **16** and downward offsets along the

reel-contacting surfaces of the springs **21** and the guide surfaces **24, 25.**

I claim:

1. A rack **(10)** for storing a plurality of circular reels **(19)** of a given size and then rectangular containers **(14)** for said reels in random vertically juxtaposition, which rack is adapted to be molded of plastic in a single piece and comprises:

a floor **(11)** and thin side **(12)** and rear **(13)** partitions defining a plurality of shallow open compartments, each of which will accommodate a said rectangular container,

said floor being cut away in each compartment to provide a rectangular slot **(18)** having a width slightly exceeding the thickness of a said reel and a length somewhat less than the reel diameter so that at least 1/10 but not more than 1/4 of the diameter of the reel extends beneath the floor when a said reel is placed in the slot,

means **(21, 22, 23)** at both sides of each slot projecting downward from said floor to hold in a substantially vertical position a reel which is placed in the slot,

leg means **(12*a*, 12*e*, 13, 26)** extending downward from said floor at least as far as a said reel protrudes beneath the floor when placed in a slot.

2. A rack as defined in claim **1** which is a single piece of molded plastic.

3. A rack as defined in claim **1** including projections **(15, 16)** adapted to fit into corresponding recesses in a said reel container **(14)** for insuring against the container being accidentally knocked off the rack.

4. A rack as defined in claim **1** wherein the downward projecting means consist of a rigid guide **(22, 23)** at one edge of each slot **(18)** and spring means **(21)** normally inclined from the other edge of the slot toward the rigid guide means to press the reel against the rigid guide means.

5. A rack as defined in claim **4** wherein said spring means **21** is a flat leaf, the reel-contacting surface of which is normally inclined 1/2 to 10 degrees from the vertical.

6. A rack as defined in claim **4** wherein said rigid guide means **(22, 23)** has a surface **(24, 25)** extending downward from the edge of the slot **(18)** in a straight line inclined 0 to 5 degrees from the vertical toward the spring means.

7. A rack as defined in claim **4** wherein the reel-contacting surfaces of the spring means **(21)** and of the rigid guide means **(22, 23)** are each normally inclined toward the other from the edge of the slot about 2 degrees from the vertical.

8. A rack **(10)** for storing a plurality of circular reels **(19)** of a given size and thin rectangular containers **(14)** for said reels in random vertical juxtaposition, which rack is a single piece of molded plastic and comprises:

a flat floor **(11)** and thin side **(12)** and rear **(13)** partitions defining a plurality of shallow open compartments, each of which will snugly accommodate a said rectangular container,

said floor being cut away in each compartment to provide a rectangular slot **(18)** having a width slightly exceeding the thickness of a said reel and a length somewhat less than the reel diameter so that at least 1/10 but not more than 1/4 of the diameter of the reel extends beneath the floor when a said reel is placed in the slot,

a flat leaf spring means **(21)** projecting downward from said floor at one edge of each slot and inclined into the slot to press against one side of a reel which is placed in the slot,

a rigid guide means **(22, 23)** at each slot projecting downward from said floor and having a surface **(24, 25)** extending straight from the edge of the slot into the slot at an angle not exceeding 5 degrees from the vertical to provide a spacing from said leaf spring means which is normally less than the thickness of a said reel, and

leg means comprising the outer side partitions **(12*a*, 12*e*)**, the rear partition **(13)** and a front face **(26)** which extend downward from said floor a distance sufficient to maintain clearance between a reel in said slot and any flat surface on which the rack may be placed.

References Cited

UNITED STATES PATENTS

2,813,633	11/1957	Welling	211—41
2,939,586	6/1960	Dumaine	211—41
3,391,792	7/1968	Makar	211—40

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