United States Patent

Dickens et al.

[15] **3,653,608**

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[54] WEB CARTRIDGE

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[30] **Foreign Application Priority Data**

Mar. 14, 1969 Great Britain 13,443/69

[52] **U.S. Cl.** ..... **242/199,** 206/52 F

[51] **Int. Cl.** **G03b 1/04,** G11b 15/32, G11b 23/04

[58] **Field of Search** ..... 242/197–200; 206/52 W, 52 F, 59 E

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[57] **ABSTRACT**

A six-sided web storage device having three fixed sides and three movable sides. The movable sides are mounted to the fixed sides of the device by spring biased hinges. The movable sides are releasably held in enclosing relation by the cooperative action of latching means on the fixed sides. A pair of web reels are captively mounted for rotation between fixed sides of the device. Resilient means are included in the mounting of the reels to provide rotational drag when the reels are disengaged from a driving means, the device being properly apertured to permit operation of the reels by the driving means. Release of the enclosing movable sides exposes a web which may be wound between the reels and provides access through apertures in the fixed sides for withdrawing the web from the device.

10 Claims, 8 Drawing Figures

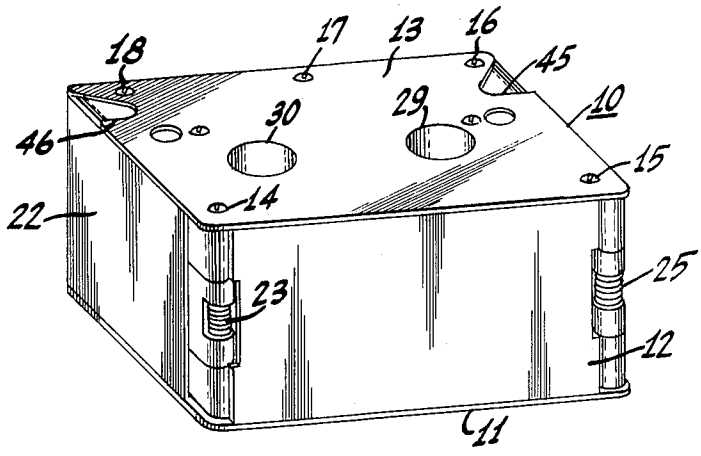


Fig. 1.

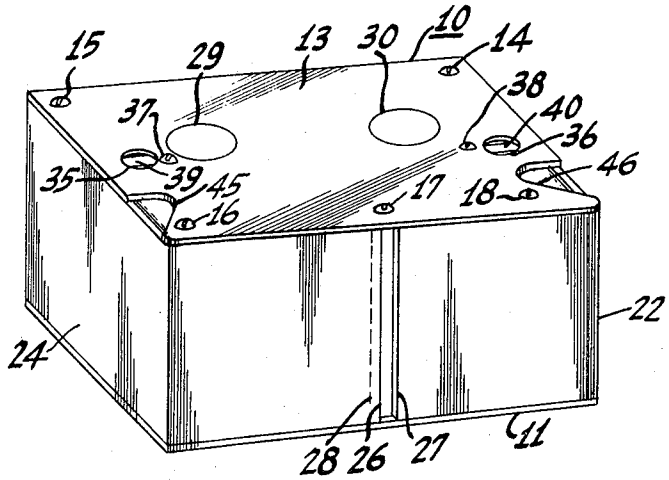
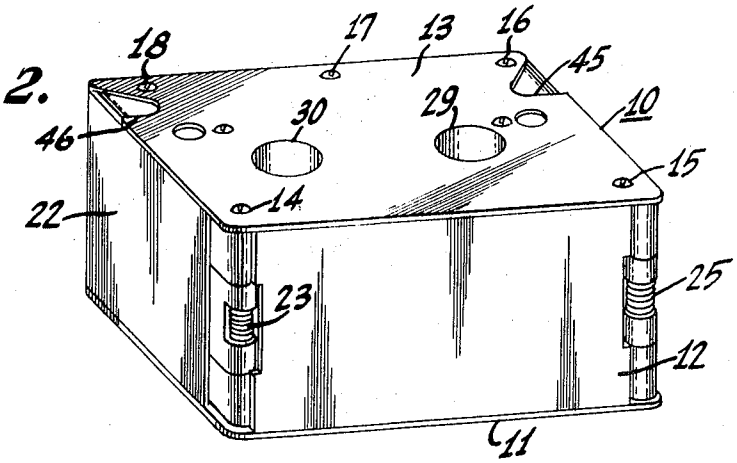


Fig. 2.



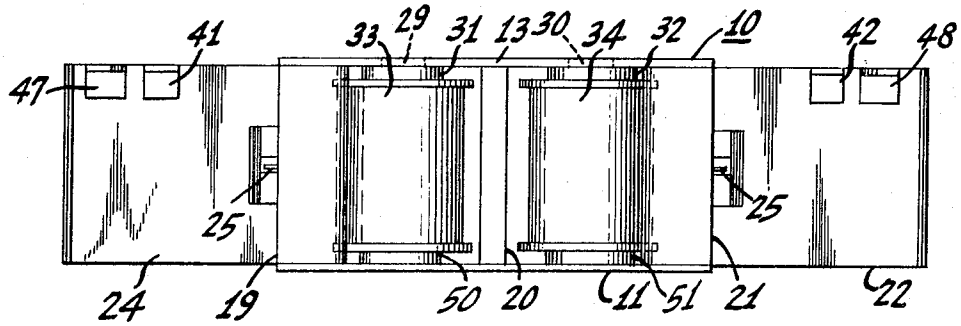


Fig. 3.

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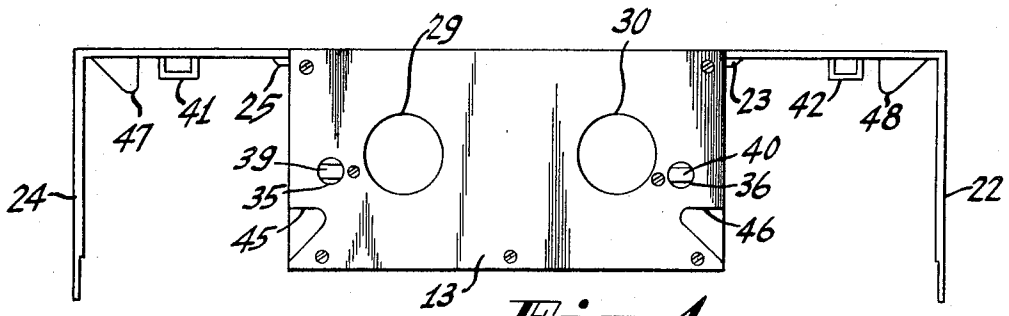

Fig. 4.

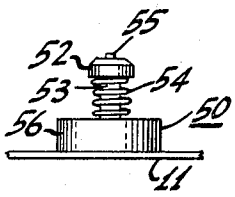

Fig. 5.

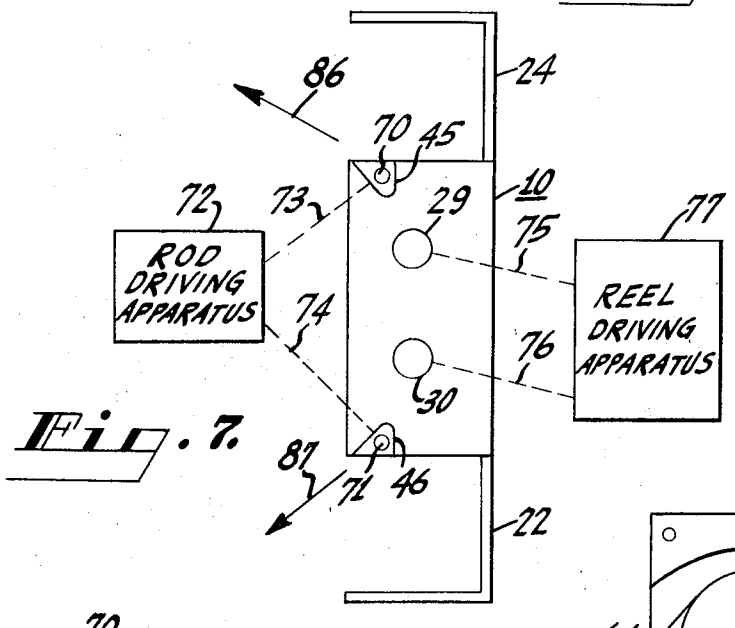

Fig. 7.

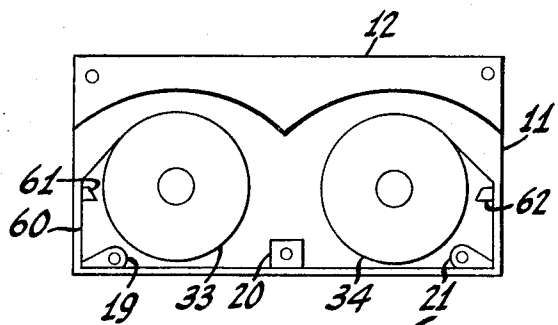

Fig. 6.

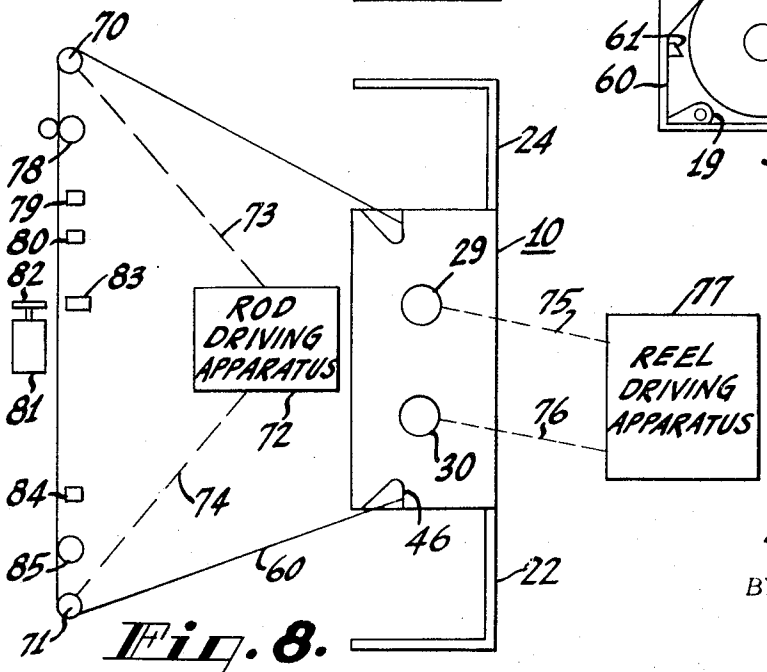

Fig. 8.

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WEB CARTRIDGE

This invention relates to a web storage apparatus having movable web enclosing means to permit at least a portion of the web to be removed for operation thereon and returned to the storage apparatus.

A wide variety of cartridges designed to handle web-like material exist. Generally, these cartridges are intended to hold a web-like material while some action takes place with respect thereto as the material is moved within the cartridge. However, a need does exist for a cartridge which will completely enclose and safely store therein a web-like material when not in use, permit the material to be removed from the cartridge when the material is to be acted upon, and thereafter permit the material to be returned to and enclosed within the cartridge for further storage, all of the above being accomplished while the material remains secured to reels within the cartridge. The present invention provides a cartridge suitable for such use.

FIG. 1 is a front view in perspective and

FIG. 2 is a rear view in perspective of one embodiment of a web cartridge in a closed, non-operative condition according to this invention.

FIG. 3 is a front view and FIG. 4 is a top view of the cartridge of FIG. 1 when in an operable condition.

FIG. 5 is a view showing further details of a portion of the cartridge of FIG. 3.

FIG. 6 is a top view showing an arrangement of the web within the cartridge of FIGS. 1–4.

FIGS. 7 and 8 are diagrammatic views of the cartridge in conjunction with a recorder-reproducer system.

Turning to the FIGS. 1 through 4, the cartridge **10** includes a bottom, flat member or side **11** made of a plastic or other light weight, durable material. A backing member or side **12** made of the same material as member **11** is fixedly secured to the bottom member **11** as by gluing or may in practice be molded as a continuation of the bottom member **11**. A top, flat member or side **13**, again made of the same material as the bottom member **11**, is mounted with the bottom and backing members **11** and **12** to form a three-sided enclosure. The top member **13** may be mounted in the assembly by screws **14, 15** which coact with the backing member **12** and screws **16, 17, 18** which coact with posts **19, 20, 21**, respectively, shown in FIG. **3** at the front of the cartridge. The posts **19, 20, 21** serve to space the top member **13** from the bottom member **11**.

A first L-shaped member **22** is mounted by way of a spring-loaded hinge **23**, secured to an open side of the backing member **12**, so as to enclose one side and a portion of the front side of the three sided enclosure formed by the members **11, 12** and **13**. A second L-shaped member **24** is likewise mounted by a spring-loaded hinge **25** to the remaining open side of the backing member **12**, so as to enclose the other side of the remaining portion of the front side of the enclosure. As shown in FIG. **1**, the front edges of the members **22** and **24** can be keyed so that the end **26** of the member **24** fits into the end **27** of the member **22** as indicated by the dotted line **28**, to provide a solid flush wall across the front of the cartridge **10**. The members **22, 24** may be made of a light metal or other durable material.

The top member **13** includes a pair of apertures **29** and **30** which are formed with respective collars **31, 32** which extend into the enclosure of the cartridge **10** as shown in FIG. **3**. As will be more fully explained, the collars **31** and **32** serve to mount a pair of reels **33, 34** within the cartridge **10**. The apertures **29, 30** provide access to the reels **33, 34** through the collars **31, 32** for driving the reels **33, 34** from the outside of the cartridge **10**. A further pair of apertures **35, 36** are positioned in the top member **13** to provide in each case access to a releasable latching means. In the present embodiment leaf springs **39, 40** are secured to the underside of member **13** as by rivets **37, 38**. As shown in the view of FIG. **4**, a U-shaped member **41** is fastened to the inside surface of the member **24**. When the member **24** is closed upon the enclosure formed by the members **11, 12** and **13**, the spring **39** locks with the member **41** to hold the member **24** in place. A U-shaped member **42** on the member **22** acts similarly with the spring **40** to hold the member **22** in closed position.

Also included in the top member **13** are a pair of notches **45, 46** which provide access into the cartridge **10** from the outside thereof through the member **13** for a purpose to be described. A wedge shaped metallic member **47** is secured to the inside surface of the member **24** so that when the member **24** is closed upon the cartridge **10**, the member **47** passes beneath the member **13** to provide a dust cover for the notch **45**. Likewise, a wedge shaped metallic member **48** on the member **22** serves as a dust cover for the notch **46**.

While various techniques may be used for mounting the reels **33, 34** within the cartridge **10**, in the approach shown in FIG. **3**, a pair of circular, raised members or annulus **50, 51** are positioned on the bottom member **11**. The reel **33** is supported for rotation between the collar **31** and annulus **50**, while the reel **34** is supported for rotation between the collar **32** and annulus **51**. Each annulus **50, 51** may be made in the manner of that shown in FIG. **5**. The annulus **50** or **51** includes a raised portion **56** which captively holds the reel **33** or **34** for rotation. A washer **52** is held on the end of a rod **53** by a suitable clamping means **55** within the portion **56**, so that the washer **52** extends up into the center of the reel **33**, a spring **54** serving to force the washer **52** in an upward direction. The collar **31**, reel **33**, and annulus **50** are made so that when the reel **33** is idle, a friction drag is exerted upon the reel **33**, tending to hold the reel **33** from movement. When driving means, not shown, are inserted into the reel **33** through the aperture **29**, a downward force is exerted against the spring **54**, providing a positive drive with a minimum of frictional drag on the reel **33**. Reel **34** can be operated in a similar manner via collar **32** and annulus **51**.

A typical web path within the cartridge **10**, constructed in the manner shown in FIG. **1** through **4**, is shown in FIG. **6**. The backing member **12** may be provided with the curved contour as shown to accommodate the two reels **33,34**. A web-like material **60** is securely fastened at one end to the hub of the reel **33** with the other end securely fastened to the hub of the reel **34**. The remainder of the web **60** being wound on the respective reels **33, 34**. The web **60** in passing between the two reels **33, 34**, traverses a post **61** supported between members **11** and **13**, posts **19, 20, 21** as shown in FIG. **3**, and a post **62** supported between the members **11** and **13**.

Thus a cartridge **10** is provided by the construction described, having a storage mode as shown in FIGS. **1** and **2**, whereby the web therein is completely enclosed and protected. When some use of the cartridge **10** and of the web therein is intended, pressure applied through the apertures **35, 36** on springs **39, 40** releases the members **22, 24** which are immediately made to fly open by the hinges **23, 25** to the positions shown in FIGS. **3** and **4**. Access can then be had to the web **60** for operation therewith.

While the cartridge **10** can be used in various applications, one example of the use thereof is shown in FIGS. **7** and **8**. The use of quadruplex television magnetic tape recorders is well known. Assume that it is desired to operate such a recorder using the cartridge **10** of the present invention. In such case a length of two-inch wide magnetic tape is wound on the reels **33, 34**. The cartridge **10** is positioned in a suitable mount, not shown, and the members **22, 24** are released to expose the tape as it passes over the posts **61, 19, 20, 21, 62** in the manner shown in FIGS. **3** and **6**. A pair of rods **70, 71**, operated from a suitable driving means **72**, by mechanical means represented by the dotted lines **73,74** are inserted through the respective notches **45, 46** in the member **13**. The notches **45** and **46** are cut and the rods **70, 71** are moved therein so as to pass within the loop of tape within the cartridge **10**. At the same time, a driving means in the form of suitable shafts, represented by dotted lines **75, 76** operated from a driving apparatus **77** engage the reels through the apertures **29, 30**. In so doing the shaft serves to hold one reel, for example, reel **34**, immobile, while the other reel **33** is permitted to rotate freely or against a drag. While not shown, the reels are assumed to be con-

structed in a manner to accommodate the means **75, 76** and to operate therewith in the manner described. The rods **70, 71** are now caused to move in the direction of the respective arrows **86, 87**. When the tape **60** is extended to be aligned with a tape path as shown in FIG. **8**, the tape **60** can be threaded into that tape path by a suitable mechanism, not shown, and the rods **70, 71** retracted to their starting position out of operation with both the cartridge **10** and tape **60**. The tape **60** would thus be threaded over the transport path including a capstan assembly **78**, audio and/or control magnetic heads **79, 80**, a quadruplex magnetic head wheel assembly including a motor **81**, the head wheel **82** and guide shoe **83**, an erase head **84** and a corner pulley **85**. Thus, when the tape **60** is extended by the rods **70, 71** as shown in FIG. **8**, the mechanism provided, not shown, may drop the tape down between the head wheel **82** and the shoe **83**, as well as along the tape path shown. The tape transport path shown in FIG. **8** is meant to be symbolic only, and the components thereof can be arranged to suit the particular application. The driving apparatus **77** thereafter operates on the reels through the means **75, 76** along with the capstan assembly **78** to drive the tape **60** between the reels along the tape path to provide a signal recording or reproduction in a conventional manner. When the recording or reproduction is completed, the above-described operation of the driving apparatus is reversed. The rods **70, 71** are operated by the apparatus **72** to form the tape loop shown in FIG. **8** as by moving the tape **60** up from between the head wheel **82** and shoe **83**, the tape **60** also being free of the other elements in the tape path. As the rods **70, 71** return to the notches **45, 46**, the tape **60** likewise is wound up on the reels by the action of the driving apparatus **77** on the reels. When the tape **60** is returned to the tape path within the cartridge **10** as shown in FIG. **6**, the rods **70, 71** are removed from the notches **45, 46**. The members **22, 24** can be closed upon the cartridge **10**, and the cartridge **10** removed from the mount, not shown, for storage.

We claim:

1. A cartridge for an elongated web, comprising:

a first member having a first portion interconnecting second and third portions in substantially opposite relation to form one part of an enclosure which is open on three sides;

at least one reel rotatably mounted between said second and third portions and adapted to receive said web;

second and third members having generally an L-shape; and

means including hinges for mounting said second and third members to said first member with said second and third members in first position thereof being disposed along the exposed sides of said enclosure to form a completely enclosed enclosure, and in a second position thereof being in non-enclosing relation to provide access to said web via said three open sides.

2. The invention according to claim **1**, and including releasable latching means affixed to said first member for holding said second and third members in said first position, and said mounting means including spring means operable to move said second and third member to said second position upon release of said latching means.

3. A cartridge for an elongated web, comprising:

a first member having a first portion interconnecting two parallel planar portions to form three sides of an enclosure;

first and second reels rotatably mounted in spaced relation between said planar portions;

a plurality of posts spanning said planar portions along the exposed edges of said first member, said posts defining a path for said web between said reels;

second and third generally "L" shaped members hinged to opposite exposed edges of the first portion of said first member, said second and third members extending about the open sides of said first member completely enclosing said reels and said web;

releasable means for holding said first, second and third members in said enclosing relation; and

means coupled between said first member and said second and third member, and operable upon release of said holding means to rotate said second and third members away from said first member exposing said web along said open sides of said first member.

4. The invention according to claim **3**, wherein each of said planar portions of said first member have a pair of raised annular portions between which said reels are captively rotatable, and said reel mounting means further includes means urging said reels axially into frictional relation with one of said pair of annular portions.

5. The invention according to claim **3**, wherein the planar portions of said first member have a first pair of apertures therein, and at least one other aperture, said first pair of apertures being substantially registered with the respective axis of rotation of said reels, and said other aperture being substantially registered with respect to said holding means.

6. The invention according to claim **3**, wherein one of said planar portions has a pair of notches therein, communicating with an edge of said first member, said notches extending along said planar portions to a point within said web path defined by said posts.

7. The invention according to claim **6**, wherein each of said second and third members having further portions arranged to cover said notches when said second and third members are in enclosing relation with said first member.

8. In combination:

a recorder-reproducer system of the type using a web-like record medium;

a web cartridge for use in said system having a plurality of fixed portions, and at least one movable portion mounted to said fixed portion, said cartridge in a first condition having said movable portion forming with said fixed portions a completely enclosed hollow enclosure, at least one reel rotatably mounted between opposite fixed portions of said cartridge, said reel being adapted to have said web wound thereon, and said cartridge in a second condition thereof having said movable portion spaced from said fixed portions to provide access by said system to said web;

releasable means coupled between said fixed and movable portions, for holding said cartridge in said first condition thereof;

means for releasing said holding means; and

means operable upon the release of said holding means for urging said movable portion to dispose said cartridge in said second condition thereof.

9. In combination with a recorder-reproducer system having a transport including means arranged to define a path for an elongated web,

a web cartridge having a plurality of fixed sides and at least one movable side hinge-mounted to said fixed sides, said movable side in a first position thereof forming with said fixed sides a completely enclosed hollow enclosure,

first and second reels rotatably mounted within said enclosure,

a plurality of web guiding members mounted in parallel spaced relation to said reels, said members adapted to have said web pass from one of said reels about said members to the other of said reels,

releasable means for holding said sides in enclosing relation,

means operable upon release of said holding means to move said movable side to a second position thereof, in which said movable side is rotated away from said fixed sides to expose said web,

web engaging means movable between said cartridge and said transport means;

means for interposing said web engaging means between said guide members and said reels when said movable side is in said second position; and

means for driving said web engaging means to withdraw said web from said cartridge and to dispose said web for positioning in said path defined by said transport means.

10. The invention according to claim 9 and further including means associated with at least one of said reels for opposing withdrawal of said web from said reel.

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