

United States Patent

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[33]		Japan
[31]		42/52,296

[56]

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[54] TAKEDOWN REEL
10 Claims, 8 Drawing Figs.

[52]	U.S. Cl.....	242/115, 242/118.8
[51]	Int. Cl.....	B65h 75/22
[50]	Field of Search.....	242/115, 118.8, 77.4, 77.3, 110

ABSTRACT: A takedown reel having a pair of drum-forming resilient plates hinged together at opposite ends thereof and a pair of flanges. The drum-forming plates can be shaped into a cylindrical form against the resiliency thereof, so that the flanges can be detachably secured thereto by a separate fastening means.

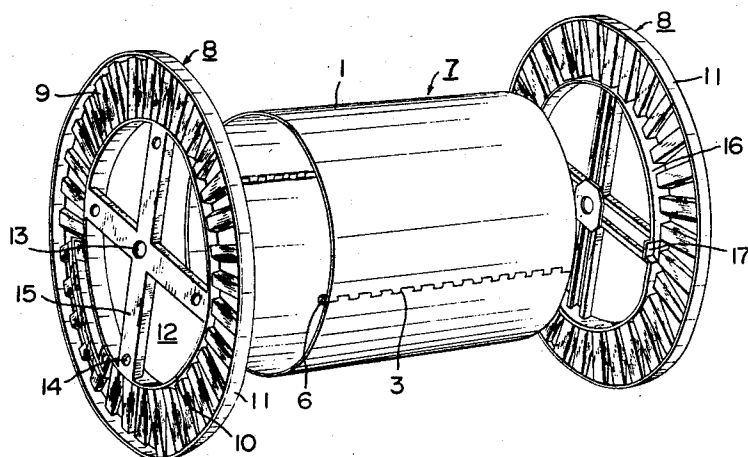


Fig. 1

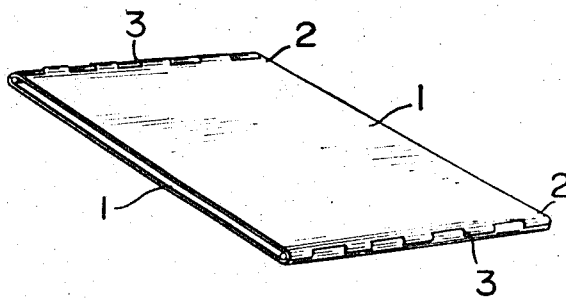


Fig. 2

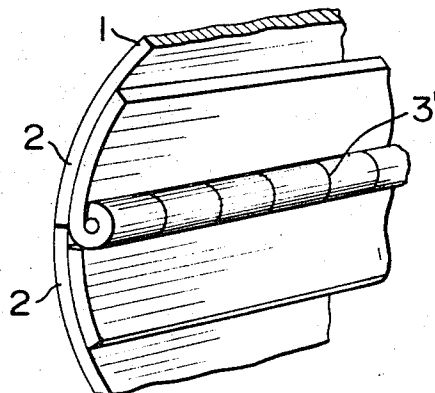


Fig. 3

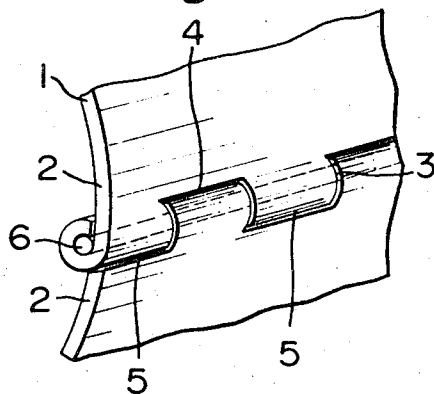


Fig. 4

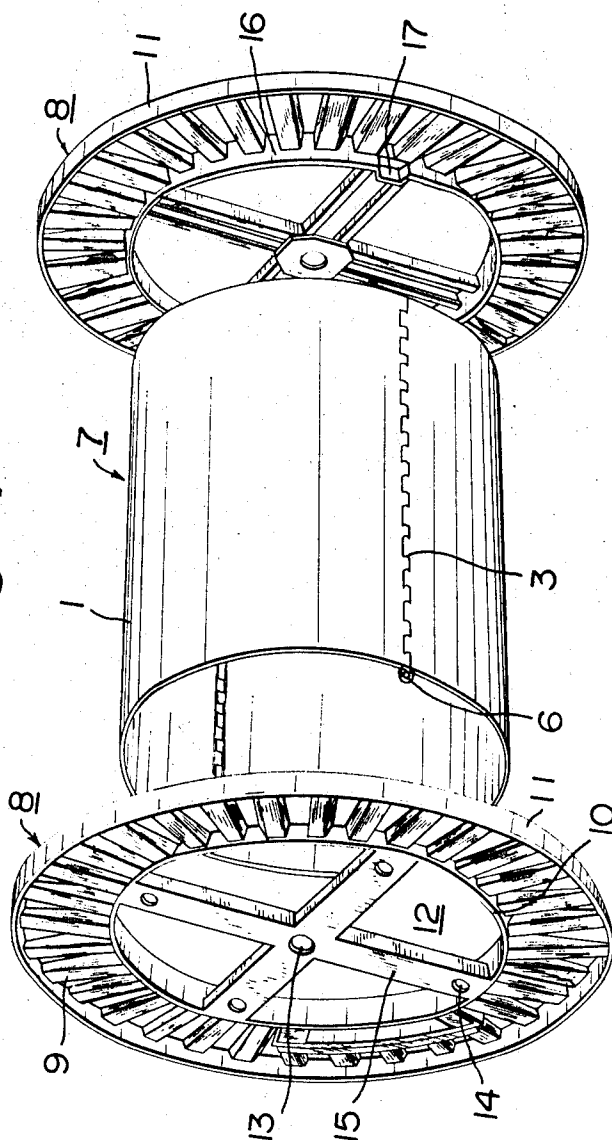


Fig. 5

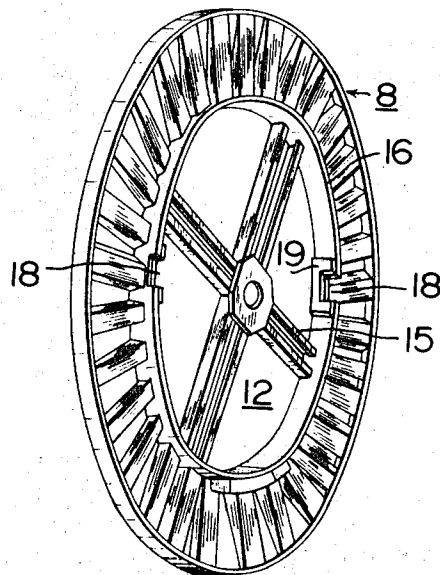


Fig. 6

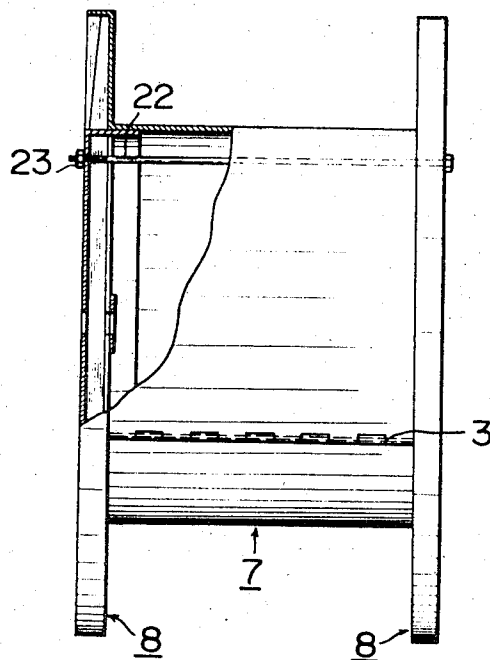


Fig. 7

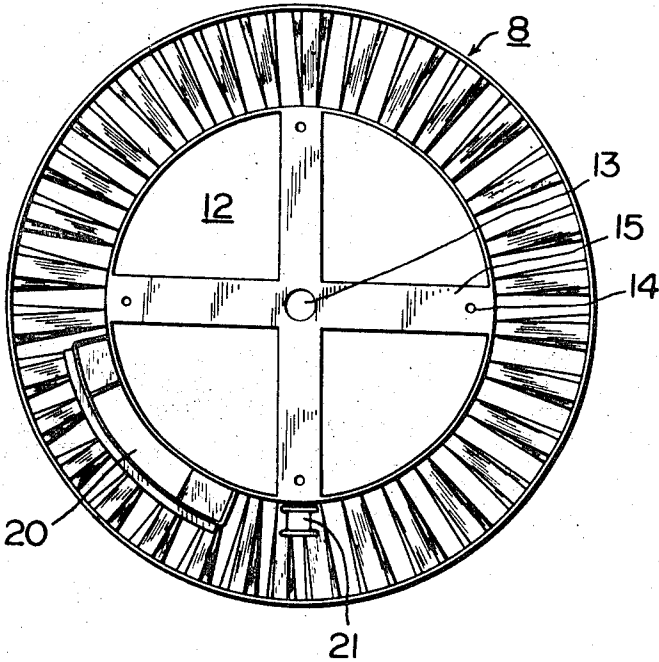
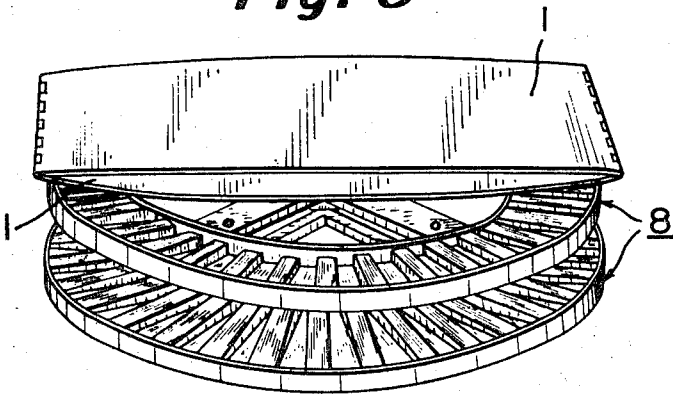


Fig. 8



TAKEDOWN REEL

This invention relates to a takedown reel, and more particularly to a takedown reel usable for transporting and storing power cables, communication cables and the like, which can easily be assembled and disassembled.

Wooden reels have heretofore been used for transporting and storing power cables and communication cables, which are made by assembling suitably cut wooden boards by nailing. Such wooden reels have disadvantages in that they are not mechanically strong, and that they must be made larger as the size of the cable increases for higher transmission capacity, with a resultant rise in their manufacturing cost. The wooden reels are usually discarded after cables are taken out of them at site.

To obviate such disadvantages of wooden reels, it has been proposed and practiced to a certain extent to make cable reels with metal, which is, lighter, more durable and yet less expensive than wooden reels, and to use them repeatedly for cable transportation to reduce the cable packing and shipping cost. However, to give it a sufficient mechanical strength, such metallic reels are so formed that a drum and flanges are fixed together in an integral whole, and hence, it requires considerably large space to transport and store such metallic reels in the empty state, or without cable wound thereon. Accordingly, there was a need for the so-called takedown reels, whose drum and flanges are freely detachable from each other. A known takedown reel has a drum consisting of a plurality of pieces, each having an arcuate cross section, detachably jointed together and a pair of flanges connected to the drum with bolts at the both ends. Such known takedown reels have drawbacks in that a plurality of arcuate drum pieces require a high manufacturing cost and are so bulky that they cause much inconvenience to transportation of empty reels in sections. Furthermore, the assembly of arcuate barrel pieces is not easy, because they tend to produce gaps between them. To assemble such pieces into a drum, a number of bolts and nuts are used, which not only require considerable time and labor for assembling and disassembling but also necessitate the provision of spare bolts and nuts to make up for their possible loss.

Accordingly, there has been a strong demand for an improved takedown reel, free from the aforesaid disadvantages of known wooden and metallic reels and easy to assemble and disassemble.

Therefore, an object of the present invention is to meet such demand by providing a takedown reel, comprising a pair of drum-forming plates made of resilient material and hinged together at opposite ends thereof and a pair of flanges, said drum-forming plates being adapted to be shaped in a drum against their resiliency to which are detachably secured said flanges.

Another object of the present invention is to provide a takedown reel, whose drum can be flattened when disassembled, so that the space to be occupied by the reel can be minimized to facilitate its transportation and storage as well as to simplify its assembling and disassembling process.

A further object of the present invention is to provide a takedown reel of very simple construction, which can be manufactured at a low cost and which is sturdy enough for repeated use.

For a better understanding of the invention, reference is made to the accompanying drawings, in which:

FIG. 1 is a perspective view of the drum-forming plates used in a takedown reel, according to the present invention, shown in the flattened state;

FIG. 2 is an enlarged partial perspective view of an embodiment of a hinged portion of the drum-forming plates;

FIG. 3 is a view similar to FIG. 2, illustrating a hinge formed integrally on the drum-forming plates;

FIG. 4 is an exploded view of a takedown reel, according to the present invention;

FIG. 5 is an enlarged fragmentary view, showing a slot to be formed on the annular projection of a flange of the takedown reel;

FIG. 6 is an elevation of a takedown reel, according to the present invention, with a part thereof cut away;

FIG. 7 is a side view of the takedown reel; and

FIG. 8 is a perspective view of the takedown reel, disassembled and placed in order.

Referring to FIG. 1, a pair of drum-forming plates 1, made of resilient material, are jointed with hinges 3 at two opposite ends 2 thereof. The resilient material for the drum-forming plates for carrying heavy commodities, such as wires and cables, is preferably steel, especially carbon steel. When carbon steel plates are used, the thickness of the drum-forming plate can preferably be selected in the range of 1.2 to 2.3 millimeters. Such material and thickness are just for illustration, and the present invention is not limited to the particular material and thickness of the drum-forming plates. In fact, the drum-forming plates can be made of any resilient material, such as resilient synthetic resin plates or sheets.

As shown in FIG. 2, commercially available hinges 3' of suitable size can be secured to the opposite ends 2 of the drum-forming plates 1, by any known securing means, such as welding, screwing, adhesives, etc. The hinge 3' need not extend continuously over the entire width of the drum-forming plates 1, but a plurality of short hinges can be used at suitable intervals, depending on the mechanical strength of each such short hinge.

FIG. 3 shows details of end portions 2 of the drum-forming plates 1 of FIG. 1, which have hinges 3 formed as an integral part thereof. In the FIG., the opposite ends 2 of each drum-forming plate 1 are serrated in such manner that teeth 5 of the serration formed on one drum-forming plate 1 fit in spaces 4 between teeth 5 formed on the serration of the other drum-forming plate 1. The teeth 5 of the drum-forming plates 1 are folded back and a pin 6 is inserted into them. Thus, a pair of drum-forming plates 1 are jointed together with the pin 6, in a hingelike manner.

The hinged pair of drum-forming resilient plates 1 are so bent as to form a drum 7, as shown in FIG. 4. To form such drum from the pair of hinged plates in a flattened state, as shown in FIG. 1, against the resiliency thereof, the hinged drum-forming plates 1 are placed upright on the ground with the hinges 3 in the horizontal direction so that they may be bent by their own weight to form an elliptic shape, and then a wire rope is wound in a loop form around the drum-forming plates 1 and gradually tightened until drum-forming plates 1 are turned into a desired cylindrical shape.

A pair of flanges 8 are detachably connected to the drum 7. Each flange has a radially corrugated annular main plate 9, an outer rim 11 secured to the outer periphery of the main plate 9, an inner rim 10 secured to the inner periphery of the annular main plate 9, and spoke 15 integrally secured to the annular main plate 9 across the central opening 12 thereof. The spoke 15 has an arbor hole 13 bored in the center thereof and a plurality of bolt holes 14 to receive bolts 22 to secure the flanges 8 to the drum 7. In this particular embodiment, as illustrated in the FIG., the spoke 15 is in the form of cross structure consisting of bars welded together. The inner rim 10 has an annular projection 16, adapted to be registered in the circular opening of the drum 7 and having an outer diameter almost equal to the inner diameter of the drum.

A pair of recesses 17 are formed at diagonally opposite positions of the annular projection 16, so as to receive the hinges 3 of the drum-forming plates, when the end portions of the drum 7 is fitted to the annular projections 16 of the flanges 8. FIG. 5 shows a slot 18 usable in lieu of the recess 17. A reinforcing piece 19 is secured to the annular projection 16 at the slot 18, to protect the projection 16 against a bending or twisting force generated when the flange 8 is jointed to the drum 7. If the hinge 3 is made shorter than the full width of the drum-forming plates 1, then the aforesaid recess 17 or slot 18 can be dispensed with.

In order to facilitate the connection of the flange 8 to the drum 7, with the annular projections 16 of the flanges 8 fitted in the circular opening of the drum 7 at both ends thereof, it is preferable to round off the tips of the cylindrical projections

16. Thereby, the projections 16 can be easily registered to the inside of the body 7.

A cable end passage 20 is formed through the annular main plate 9 of the flange 8, on the outside of the inner rim 10. For fastening the cable end to the drum, a cable end holder 21 is mounted on the annular main plate 9, in the proximity of the cable end passage 20.

In the illustrated embodiment, the annular main plate 9 of the flange 8 is corrugated to increase the mechanical strength, but such corrugation is not essential to the present invention. For instance, flat annular plate can also be used as the main plate 9 of the takedown reel of the present invention.

The flange 8 is made by assembling suitably formed steel plates, flat steel, and shape steel by a proper securing means, such as welding. The material for the flange 8 is not limited to steel, but other light materials, such as aluminum and plastics, can be also used. However, it is desirable that in case if the drum 7 is made of steel, the flange 8 are also made of steel.

Referring to FIGS. 6 and 7, the annular projections 16 of a pair of flanges 8 thus constructed are fitted to either ends of the drum 7, which is formed into a drum by squeezing a pair of resilient drum-forming plates 1 hinged together at both ends 2 thereof against resiliency thereof, and then bolts 22, each slightly longer than the overall width of the reel, are inserted through bolt holes 14 bored on the spokes 15 secured to the central portion of each flange 8, so that the flanges 8 are tightly secured to the drum 7 by fastening nuts 23 engaged with the bolts 22.

In order to disassemble the thus assembled takedown reel, for transportation and storing purposes, the aforesaid assembling process can be followed in the opposite sequence. In other words, the nuts, such as hexagonal nuts, are removed at first, and the takedown reel is laid flat on the ground with the bolts 22 upright. Thus, the bolts 22 can be easily removed from the reel. If bolts having integrally formed bolt heads are used, the reel is so laid as to keep the bolt heads on the upper side of the reel. Then, the flanges 8 are separated from the drum 7. At this moment, the drum 7 automatically flattens itself by resiliency. By arranging the thus disassembled components of the takedown reel in an orderly manner, e.g. as shown in FIG. 8, the process of disassembling is completed.

As described in the foregoing, according to the present invention, a takedown reel is provided, which can be assembled by forming a drum by squeezing a pair of resilient drum-forming plates hinged together at opposite ends thereof, and detachably mounting a pair of flanges to the drum at both ends thereof. With such construction, the takedown reel according to the present invention can be packed in a very compact form upon disassembling, for ease of transportation and storage thereof. The takedown reel can be easily assembled. It is also very simple in construction, and can be manufactured at a low cost. Besides, it is very sturdy and can be used repeatedly.

We claim:

1. A takedown reel comprising, a pair of substantially identical rectangular resilient drum-forming plates; a pair of parallel hinges connecting opposite edges of one plate with the corresponding opposite edges of the other plate, said drum-forming plates being normally flattened in an inoperative position thereof, said drum-forming plates being resiliently deformable into the form of a drum, whose axis is parallel to the hinges, by bending each plate in the form of a semicircle representing one half of the drum and hinged to another semicircle formed by the other plate; and a pair of flanges, each having a circular hub means to fit the inner peripheral edge at either end of the drum made by bending the drum-forming plates, whereby a reel is formed by bending the drum-forming plates in the drum form and fitting the flanges at longitudinally opposite ends of the drum while allowing folding of the reel into a compact form by separating the drum from the flanges and flattening the drum plates.

2. A takedown reel according to claim 1, further comprising at least one bolt member disposed within the drum and extending longitudinally therein and detachably fastening said flanges to said drum.

3. A takedown reel according to claim 2, wherein each flange has inner and outer rims integrally secured thereto.

4. A takedown reel according to claim 1, wherein each of said pair of hinges consists of two sets of interengaging serrations formed along abutting edges of the two drum-forming plates, each set of serrations having alternately disposed teeth and spaces, the teeth of each set being rolled and alternately fitted into the spaces of the other set, and a pin penetrating through the teeth of the two sets to swingably connect the two plates.

5. A takedown reel according to claim 1, wherein each of said pair of hinges consists of a separate hinge secured to abutting edges of the two plates.

6. A takedown reel according to claim 1, wherein said drum-forming plates are made of steel.

7. A takedown reel according to claim 1, wherein said flanges are made of steel.

8. A takedown reel according to claim 2, wherein said hub of each flange has a pair of axially extending recesses formed at diametrically opposite positions thereof for receiving the hinges connecting the two drum-forming plates, when the plates are curved in the form of the drum and the hinges are disposed at diametrically opposite portions of the drum.

9. A takedown reel according to claim 2, wherein said hub of each flange has a pair of axially extending slots formed at diametrically opposite positions thereof for receiving the hinges connecting the two drum-forming plates when the plates are curved in the form of the drum and the hinges are disposed at diametrically opposite portions of the drum.

10. A takedown reel according to claim 1, wherein said pair of hinges are axially shorter than the full width of the plates between the two flanges.

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