

Sept. 16, 1969

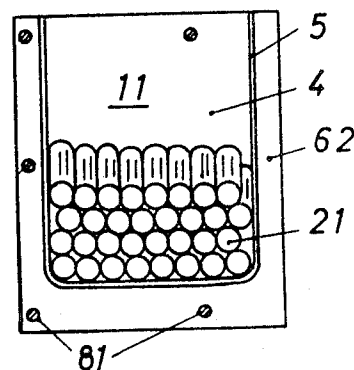
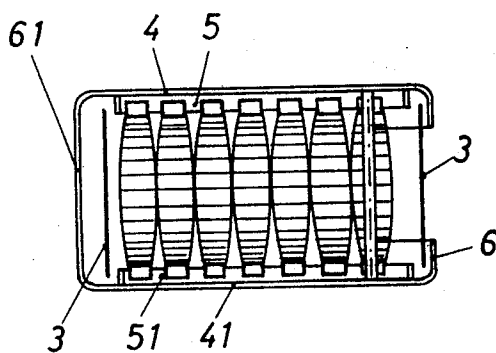
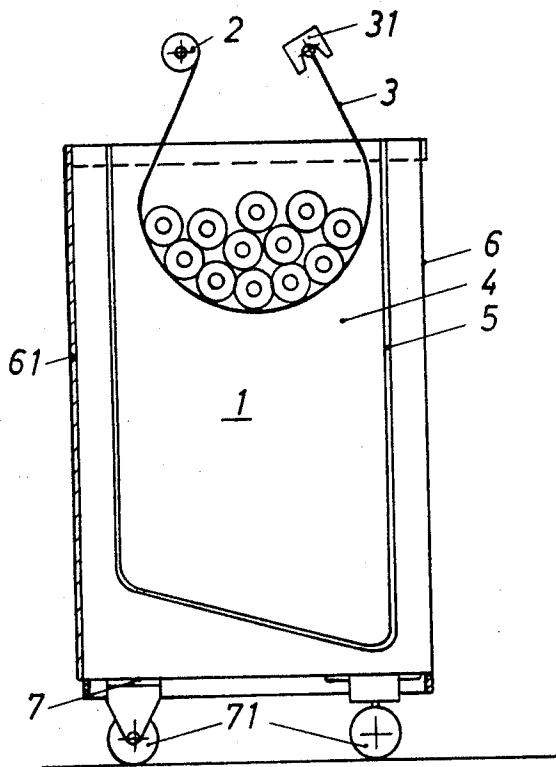
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SPOOL OR CARTRIDGE CONTAINER

Filed July 6, 1967

2 Sheets-Sheet 1



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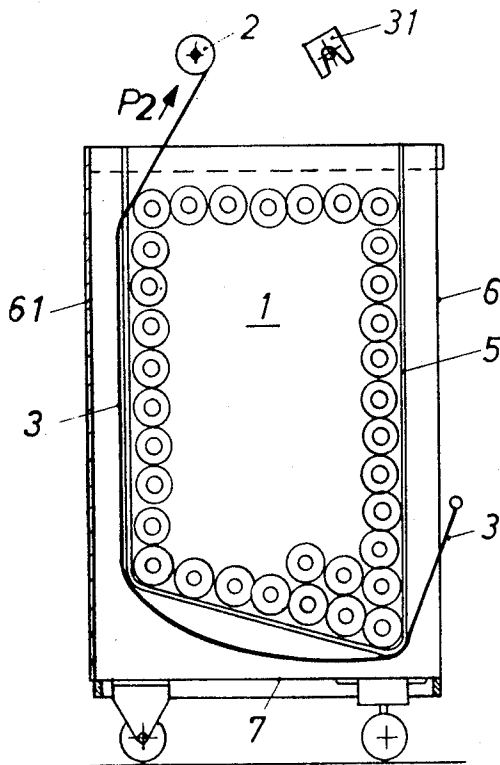


Fig 2

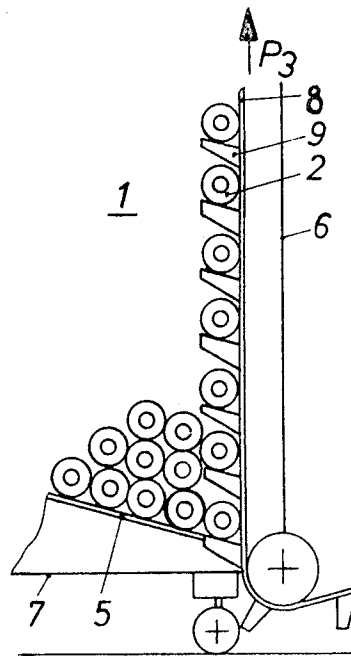


Fig 4

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SPOOL OR CARTRIDGE CONTAINER

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4 Claims

ABSTRACT OF THE DISCLOSURE

A pair of parallel U-shaped guides at opposite sides of a container and opening upwardly are engaged by the opposite ends of the spools in the peripheral row of a stack of spools stored in the container. The spools are placed in a belt loop with their lengths disposed transversely of the belt and the loop is expanded progressively downwardly into the container to lower the spools within the guides until the ends of the lowest spools rest on the guide bottoms. One belt end is released from a clamp and the belt is pulled from beneath the spool stack by reeling the other belt end onto a reel. The spools can be removed from one side of the stack by shelves on an upright conveyor inserted between the guides. The guide bottoms slope toward the conveyor to feed the spools to it.

To manipulate yarn or thread spools or cartridges automatically for use in spinning and winding processes, for example, such spools or cartridges must be arranged in an orderly manner. If such spools, for example, are simply dropped into a storage or shipping container, they would be deposited in random disorder. In the past, containers have been filled by depositing the spools onto a belt and lowering such belt into the container, but, when the container was filled, the belt was trapped between the spool and the container bottom and walls. The belt was then disconnected from its supporting and operating mechanism to avoid disarranging the spools and remained in the container until it was emptied. Consequently it was necessary to provide and install another belt for each container to be filled.

To provide a container of the desired capacity, yet which is compact, the container must be quite deep and cannot be easily unloaded manually. If the container is tipped to pour out the spools they will become disarranged.

It is a principal object of the present invention to provide a container which can be automatically filled with spools in an orderly arrangement and emptied easily, progressively and methodically.

It is a further object to deposit spools into such container in an expandable sling, which sling can be removed after the spools are deposited.

Another important object is to provide a container from which the spools can be unloaded automatically in orderly fashion.

FIGURE 1 is a side elevation with parts broken away of a portable container illustrating an initial stage of depositing spools therein, and FIGURE 2 is a similar view in which the container has been filled and the spool-depositing belt is being removed.

FIGURE 3 is a plan of the filled container.

FIGURE 4 is a fragmentary side elevation, with parts broken away of the container showing unloading mechanism.

FIGURE 5 is a side elevation of a modified form of container with parts broken away.

The container of the present invention can be used to store or transport elongated objects of any type in an orderly stack, but is particularly useful for spools or cartridges for spooling machines, yarn changing machines, cartridge cleaning machines and similar devices. The representative item illustrated is a spool on which thread or yarn has been or may be wound.

As shown in FIGURES 1 and 3, the container 1 has side walls 4 and 41, a rear wall 61 and an open front 6. The open front may be closed by a removable panel, if desired. Beneath floor 7 wheels 71 may be mounted if the container is to be mobile. The interior width of the container between side walls 4 and 41 corresponds approximately to the length of the spools to be placed in the container, as shown in FIGURE 3.

Projecting inwardly from wall 4 is a generally U-shaped guide rail 5 opening upwardly, and projecting inwardly from wall 41 is a similar guide rail 51 parallel to and spaced from rail 5. Each guide rail defines a ledge for engagement by the ends of spools in the outer or peripheral row of a stack of spools, as seen best in FIGURE 2. The upright side of each rail adjacent to wall 61 is substantially parallel to and spaced inwardly from such wall. The rail bottom portions connecting the upright side portions are inclined downwardly toward the container's open side 6 and are spaced from the container bottom 7. When a stack of spools is lowered into the container arranged with their lengths parallel to wall 61 and floor 7, opposite end portions of the spools in the bottom row of the stack will be supported by rails 5 and 51, respectively.

In order to deposit spools in the container in a stack with their axes substantially parallel and horizontal, a belt 3, having its ends fastened above the container, forms an expandable loop or sling depending downwardly into the open top of the container. The belt width is less than the spacing between parallel rails 5 and 51. One end of the belt is retained in a suitable releasable clamp 31 and the opposite end portion is wound on a roll or reel 2. Spools may be placed in the sling as shown in FIGURE 1 and as additional spools are added reel 2 will rotate in a clockwise direction, as viewed in FIGURE 1, to expand the depending belt loop. When the loop is expanded by paying out the belt progressively from one end only, the spools cradled in the loop may roll along it to the bottom of the loop but their axes will always remain parallel.

When the belt has been paid out sufficiently so that end portions of the spools on the bottom of the stack engage the inclined bottom portions of rails 5 and 51, the belt can be lowered somewhat farther into the space between such rail bottom portions and the container bottom 7. The belt end clamp 31 is then released to drop one belt loop end and the belt is wound onto roll 2, as indicated by arrow P2 in FIGURE 2. Since the spools are retained within the storage space defined by the guide rails, the belt can move freely through the circumferential space between the rails and container bottom 7 and wall 61, respectively, without disturbing the spools. The container can then be transported to its destination or stored. The free end of the belt can then be secured again in clamp 31 for loading the next container. The longer upright leg of the U-shaped rails 5 and 51 may be located at the right edges of container walls 4 and 41 as seen in FIGURES 1, 2 and 3, instead of being spaced from such edges.

FIGURE 5 shows a modified container 11 in which the wall 61 and bottom 7 are replaced by horizontal bolts 81 to connect side walls 4 and 41. The bolts are arranged to provide space for movement of the loading belt 3 around the outer periphery of rails 5 and 51, and to pro-

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vide an unobstructed opening 62 in the front of the container for receiving an unloading conveyor.

As described previously, the container 1 or 11 has a front portion 6 or 62 which is open or can be opened to facilitate unloading. The spools can be unloaded individually in succession from the container by an upright spool-elevating conveyor 8, shown in FIGURE 4, having outwardly and upwardly inclined shelves inserted through the open front 6 of container 1 between guide rails 5 and 51. The shelves may be of wedge shape to facilitate their insertion between spools in the first vertical row. As the first row of spools is carried upward by the conveyor, as indicated by the arrow P3 in FIGURE 4, other spools in the stack will be urged toward the open front 6 of the container and the discharge conveyor by gravity and the pressure of spools behind them because of the downwardly sloping rail bottom portions, so that spools will continue to be fed automatically to the conveyor until the container is empty. Because the spools are shifted incrementally a distance not exceeding one spool diameter at a time the spools will be picked up by the conveyor shelves with their axes horizontal and parallel to the conveyor.

I claim:

1. A container for elongated spools to be filled by an expandable belt loop comprising a pair of spaced upright side walls, a pair of parallel generally U-shaped rails having an upper opening and projecting inwardly from said side walls, respectively, said rails defining a spool-receiving chamber and being spaced apart a distance slightly less than the length of spools to be received therein, and wall-connecting means connecting said upright side walls at the side of the nearer corresponding upright portions of said rails opposite said spool-receiving chamber, and said wall-connecting means and said upright rail portions being spaced apart for movement of the belt loop therebetween.

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2. The container defined in claim 1, in which the wall-connecting means are arranged to provide an upright opening between the upright side walls of a depth at least as great as the depth of the spool-receiving chamber and affording access between the rails to the spool-receiving chamber, and the rail bottom portions are inclined downwardly toward such upright opening.

3. The container defined in claim 1, in which an upright opening unobstructed by the wall-connecting means and affording access from the exterior of the container to the interior of the spool-receiving chamber is provided between the corresponding upright portions of the U-shaped rails at the side of the spool-receiving chamber farther from the wall-connecting means.

4. In combination, a container for elongated spools including a pair of spaced upright side walls defining a spool-receiving chamber therebetween for receiving spools with their lengths disposed substantially perpendicular to said upright side walls, wall-connecting means connecting said upright side walls while leaving unobstructed an upright opening between said upright side walls at one side of said spool-receiving chamber affording access from the exterior of said container to the interior of said spool-receiving chamber, and spool-unloading conveyor means having portions insertable through such upright opening for engagement with spools in said spool-receiving chamber to remove them from said chamber.

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