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## FOREIGN PATENTS

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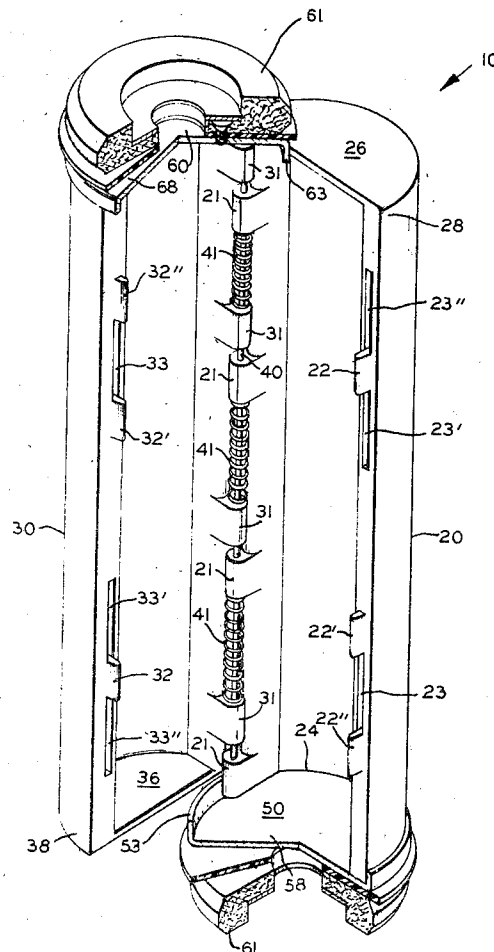
Primary Examiner—Harvey C. Hornsby  
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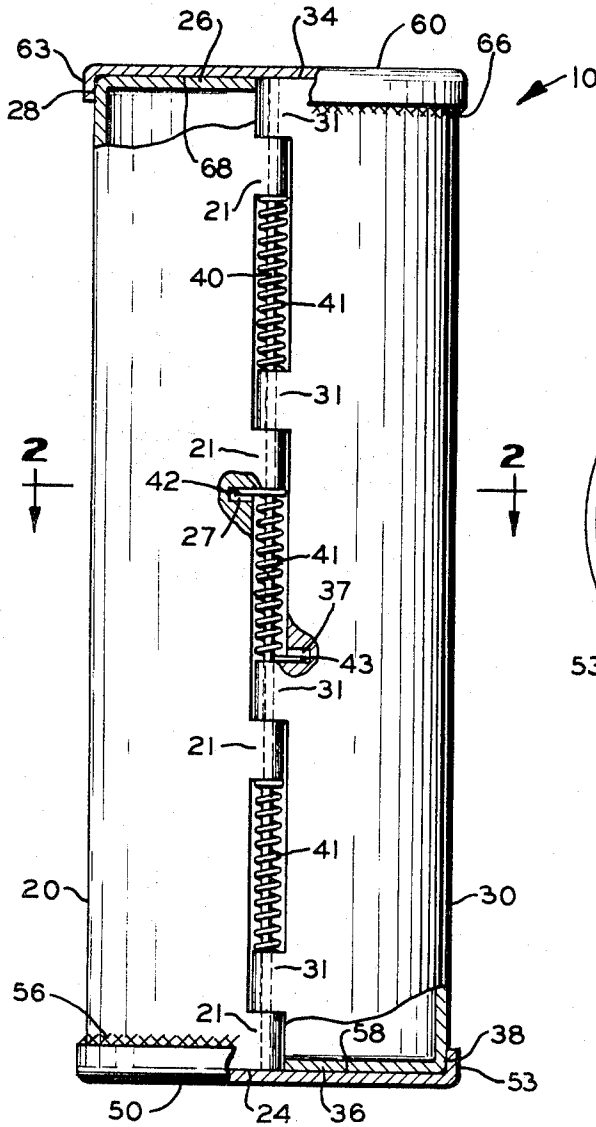
[54] **CONTAINER FOR PNEUMATIC CARRIER SYSTEMS**  
**20 Claims, 11 Drawing Figs.**

[52] U.S. Cl. 243/34,  
 243/39  
 [51] Int. Cl. B65g 51/06  
 [50] Field of Search 243/32, 34,  
 35, 39; 229/93; 220/5 A, 32

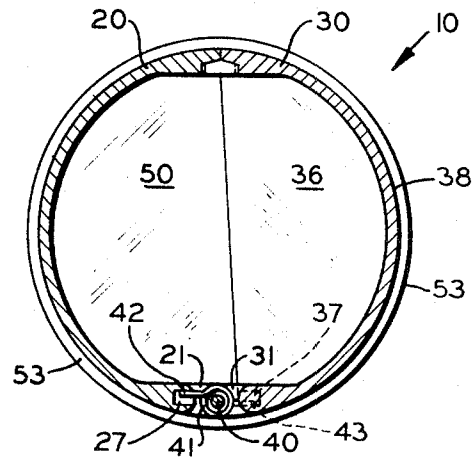
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**UNITED STATES PATENTS**  
 242,459 6/1881 Leaycraft 243/32  
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**ABSTRACT:** An elongated container for holding articles having two symmetrical semicylindrical body sections which are hinged together along one of their adjacent longitudinal edges for movement thereabout. A cup-shaped cap is attached to one end of each body section with the open face of each cap adapted to move axially toward and away from the end of at least one of the body sections. Thus these caps when moved toward each other lock the two body sections together, and when moved away from each other permit the body sections to open about their hinge. These caps may be axially movable relative to the ends of both body sections by cam means against the bias of springs or magnets, or the body sections may move axially relative to each other to move the caps away from one body section. The outer faces of the caps may be provided with buffer pads to protect the container during handling and use thereof.





**FIG. 1**



**FIG. 2**

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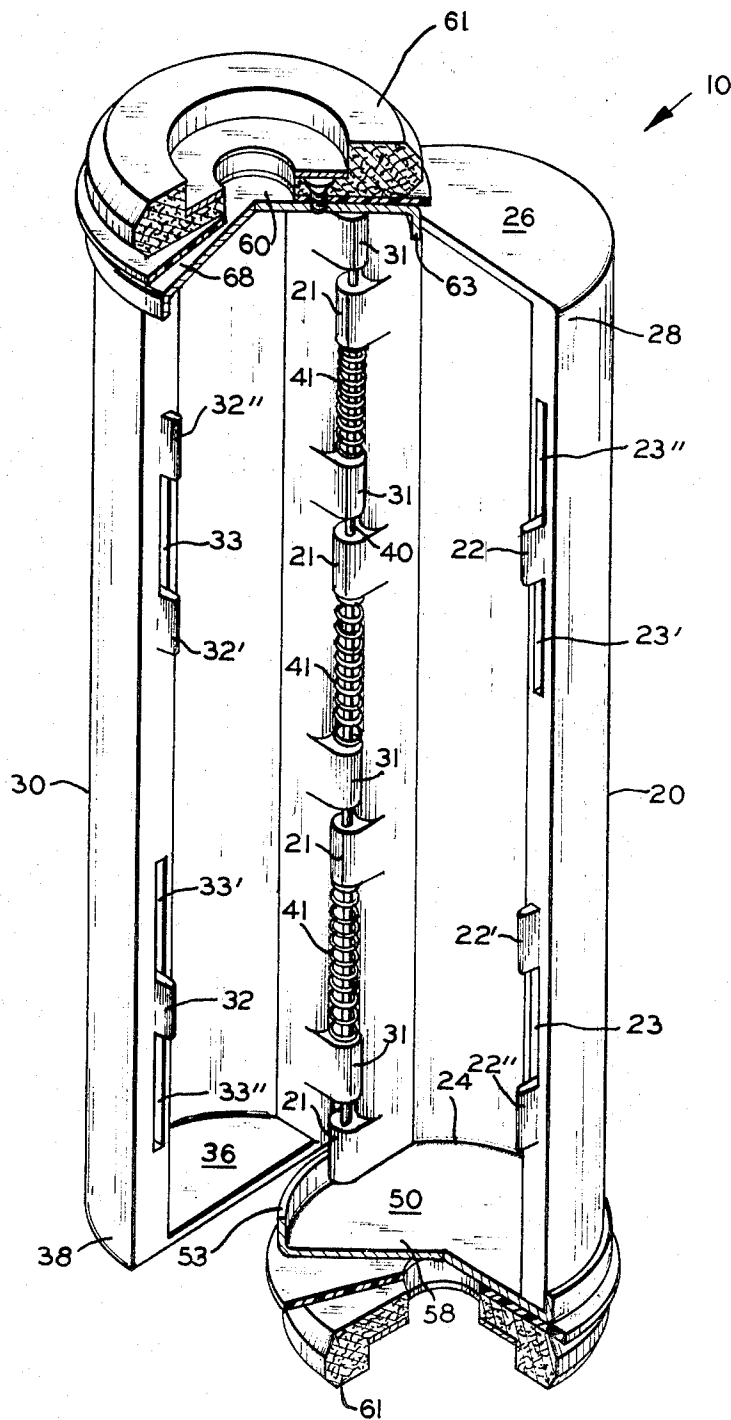
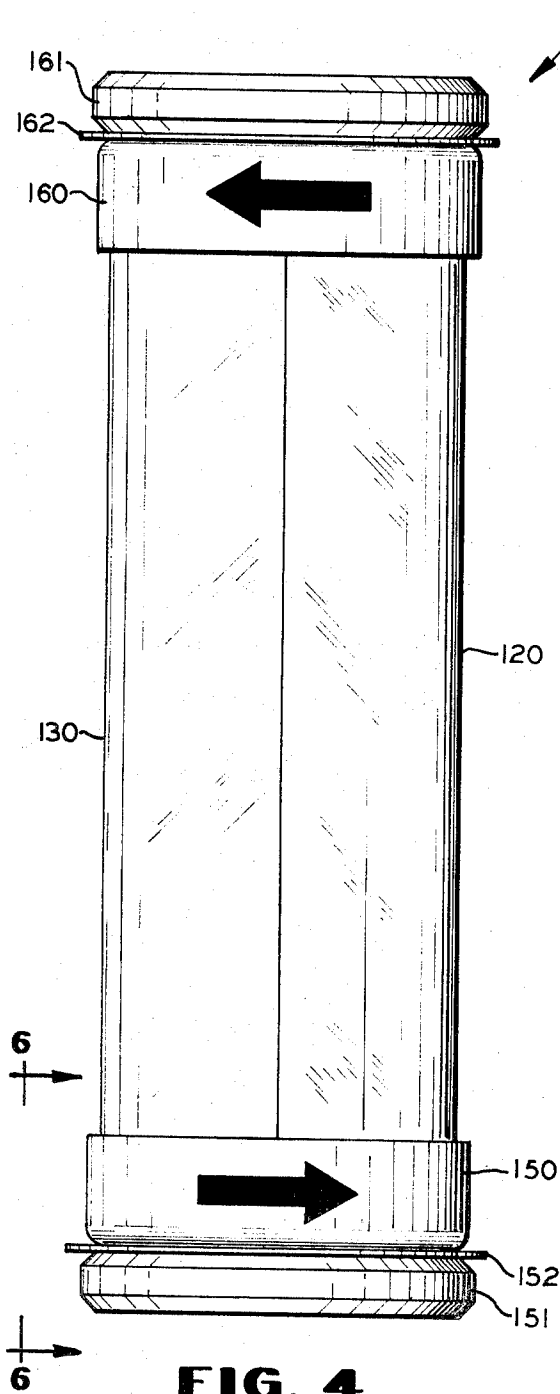


FIG. 3

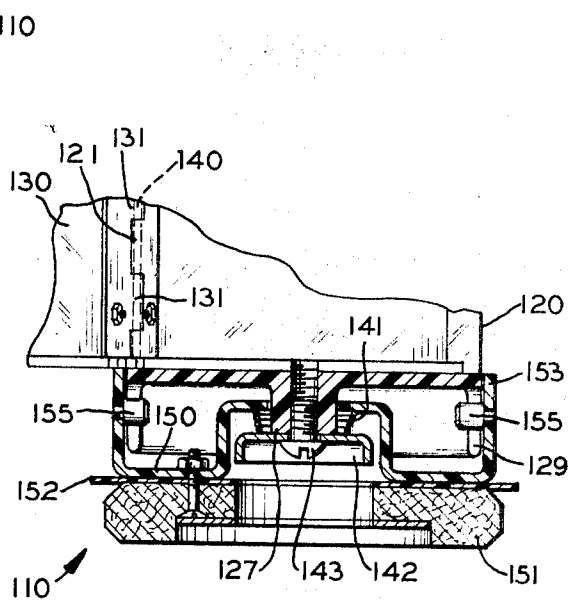
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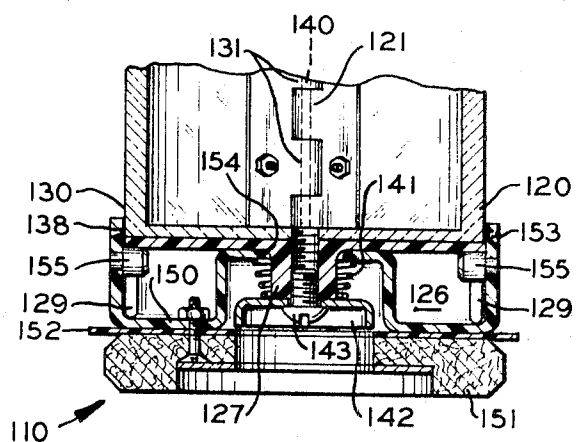
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**FIG. 4**



**FIG. 7**



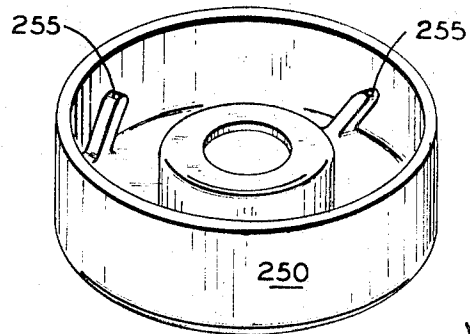
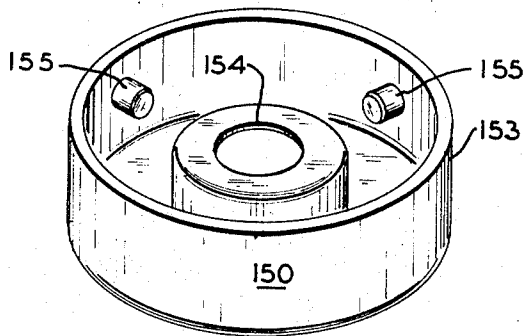
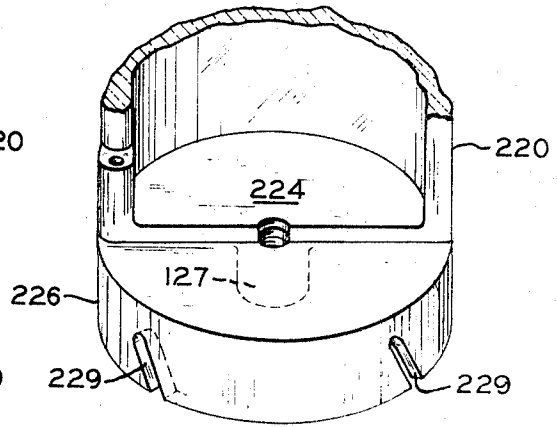
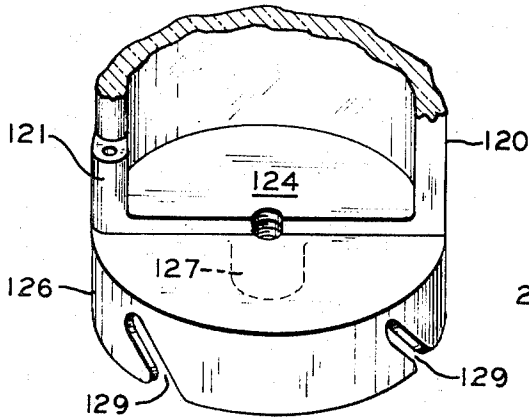
**FIG. 6**

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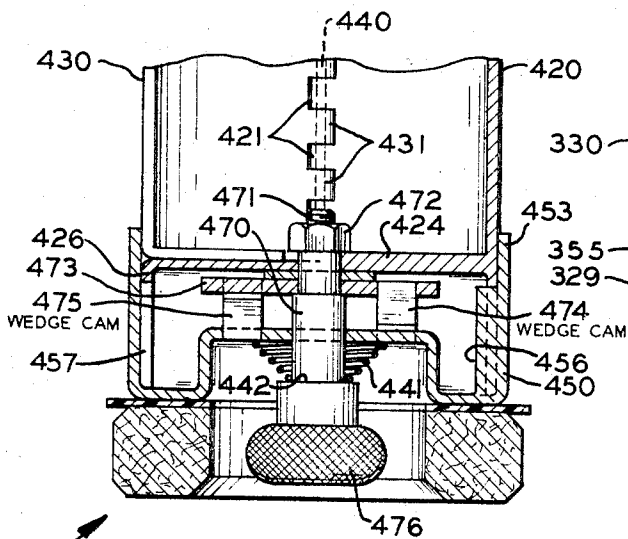
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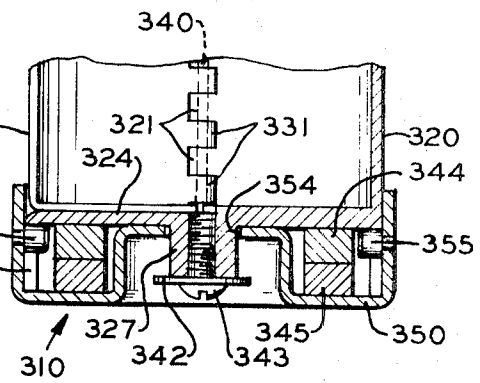


**FIG. 8**

**FIG. 9**



**FIG. 11**



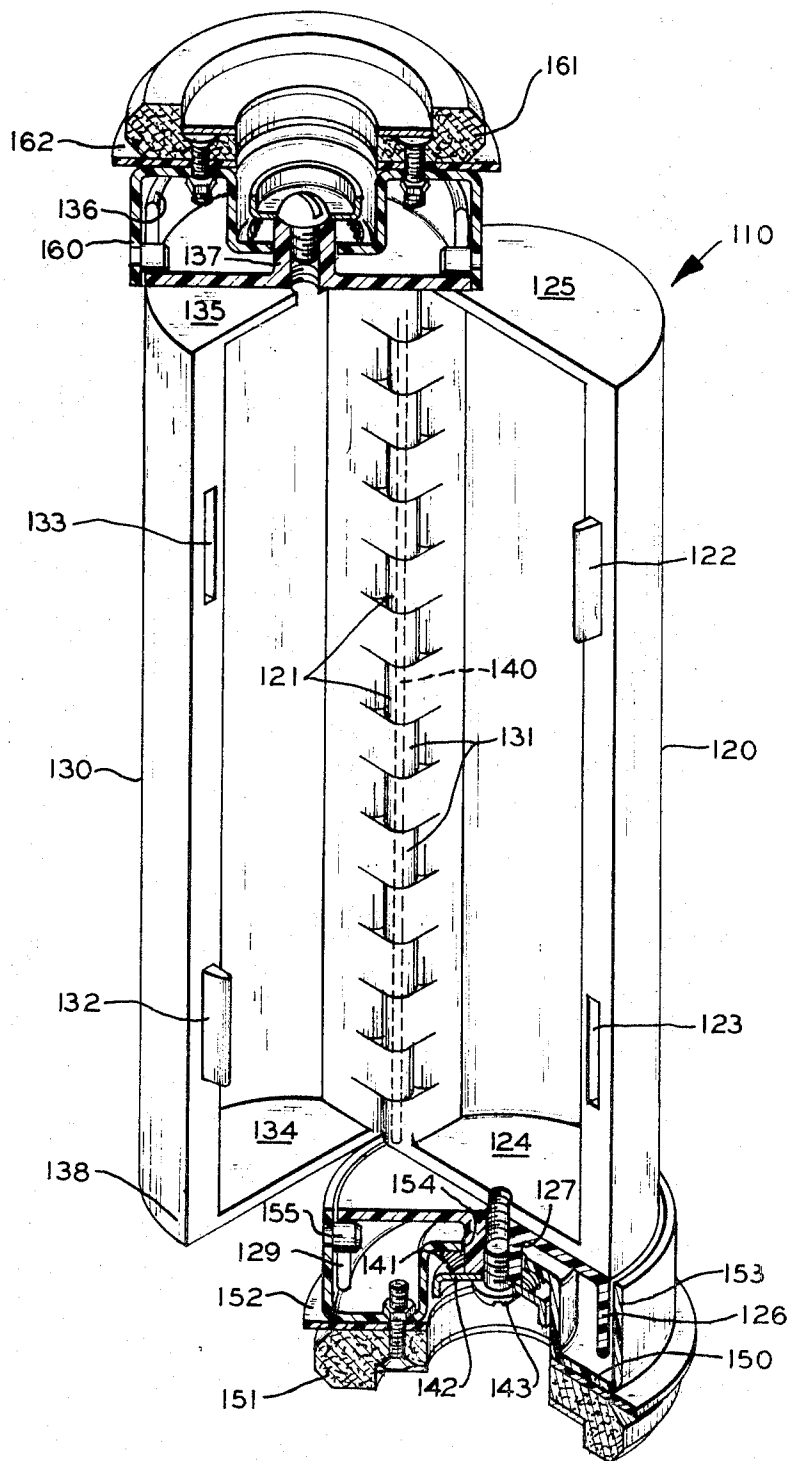
**FIG. 10**

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## CONTAINER FOR PNEUMATIC CARRIER SYSTEMS

### BACKGROUND OF THE INVENTION

#### A. Field of the Invention

This invention relates to longitudinally hinged containers for use in pneumatic tube systems wherein the container is provided with means which positively lock it in a closed position when it slides within a pneumatic tube.

#### B. Description of the Prior Art

Although longitudinally hinged containers are known in the prior art, their latching mechanisms are complex and/or are positioned within the container compartment and could interfere with the articles contained therein, see for example U.S. Pat. No. 242,459 issued on June 7, 1881. Moreover such containers are subject to opening during use when many articles are jammed therein, and thus may open and clog or obstruct the pneumatic tube.

Another problem of the prior art containers, such as shown in U.S. Pat. No. 769,233 issued on Sept. 6, 1904, is that if the container is openable by longitudinal movement, the container halves may twist relative to each other and become elongated within the tube, so that the container would not be able to negotiate the bends in the pneumatic tube.

### SUMMARY OF THE INVENTION

#### A. Gist of the Invention

Generally speaking, this invention embodies a longitudinally hinged two-section closed end container body having longitudinally or axially movable cup-shaped end caps, the sidewalls of which fit over the exterior surfaces adjacent the ends of the two-section container body when closed for normally locking these two sections in their closed position. These caps may be movably affixed to the ends of alternate complementary body sections, or these caps may be integrally secured to these ends when the two body sections are also longitudinally movable relative to each other.

In the case of the movably affixed caps, cam means may be positioned between each cap and the end of its respective body section to move the cap away from this end for permitting opening of the container body sections. Springs or magnets may be provided to urge normally the caps into locking engagement with the two body sections. These cam means may be actuated by rotating in opposite direction or twisting the two end caps of the container, or by twisting knob means at the ends of the container which are separate from the caps.

In the case of integrally secured caps, the two body sections are joined together along one adjacent longitudinal edge by a sliding hinge means. In order to unlock these body sections the two caps are pulled apart axially against spring means in the sliding hinge that normally urges the two body sections into their locked position.

#### B. Objects and Advantages

Accordingly, it is an object of this invention to provide a longitudinally hinged two-part container with means for positively locking the two sections together, and which means will not interfere with the contents in the container compartment.

Another object of this invention is to provide a container with locking means which operate in opposite directions of rotation so that the container will not accidentally open when in use.

Yet another object of this invention is to provide a simple, effective, efficient, economical and durable container for use in a pneumatic carrier system.

### BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned and other features, objects, and advantages and the manner of attaining them are described more specifically below by reference to the embodiments of the invention shown in the accompanying drawings, wherein:

FIG. 1 is a plan view with some parts broken away of one embodiment of a container incorporating the features of this invention;

FIG. 2 is a sectional view taken along line 2-2 of FIG. 2;

FIG. 3 is a perspective view with some parts broken away of the embodiment shown in FIG. 1 with the container in its open position;

FIG. 4 is a plan view of a container which embodies a preferred form of the locking means of this invention;

FIG. 5 is a perspective view of the container shown in FIG. 4 in its open position with portions thereof broken away;

FIG. 6 is a diametrical cross section view taken in the direction of the arrows 6-6 of FIG. 4 showing one end locking cap according to this invention in its normal or locked position;

FIG. 7 is a view similar to FIG. 6, but showing the one end locking cap in its unlocked position and a portion of the container sections open;

FIG. 8 is a perspective view of the inside of one of the end caps shown in the embodiment of FIGS. 4, 5 and 6 with most of its adjacent container section broken away, showing a pin and slot cam arrangement;

FIG. 9 is a perspective view of a cap, similar to FIG. 8, but showing helical lugs and grooves integrally formed in the component parts;

FIG. 10 is a diametrical cross-sectional view of a cap similar to FIG. 6, but of another embodiment showing magnets instead of a spring for urging the end cap into engagement with the container body; and

FIG. 11 is a diametrical cross-sectional view of a cap similar to FIG. 6, but of still another embodiment showing a wedge cam means for axially moving an end cap by rotation of a knob separate from the cap.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

#### A. The Axially Movable Body Section Container

In FIGS. 1, 2, and 3 there is shown a longitudinally hinged pneumatic capsule or container 10 which may be made of metal or plastic, having two semicylindrical hollow complementary body sections 20 and 30 hinged together by a pin 40 along one of their thickened adjacent longitudinal edges. This pin 40 connects pairs of integral longitudinally spaced knuckles 21 and 31 which project from each body section 20 and 30, respectively. Compression springs 41 disposed between a knuckle 21 and a knuckle 31 of adjacent pairs of spaced knuckles surround the pin 40 and urge the body sections 20 and 30 to an axially retracted position as shown in FIG. 1. Each end 42 and 43 of at least one of the springs 41 may project transversely of its axis into apertures 27 and 37 in the body sections 20 and 30, respectively, thereby torsionally urging these body sections 20 and 30 toward their closed position (see FIGS. 1 and 2).

The alternate ends 24 and 34 of each body section 20 and 30 are enclosed by inwardly facing cup-shaped discs or caps 50 and 60, respectively. The caps 50 and 60 may be fastened such as being welded, if made of metal, or adhesively bonded if made of plastic, as at 56 and 66, respectively, to the ends 24 and 34 and have at least semicircular free portions 58 and 68 with upstanding cylindrical flanges or walls 53 and 63. As shown in FIG. 1, the walls 53 and 63 of the caps 50 and 60 surround and snugly engage peripheral surfaces 28 and 38 of the adjacent ends of the complementary body sections 20 and 30. The ends adjacent the surfaces 28 and 38 may be enclosed by integral semicircular transverse disc portions 26 and 36, respectively.

The free, partable, or separable thickened longitudinal adjacent edges of the body sections 20 and 30 may be provided alternately with three sets of lugs 22, 22', and 32, 32', 32'' which project into elongated slots 33, 33', and 23, 23', 23'', respectively (see FIG. 3), to prevent relative twisting of the two body sections when they are in their closed posi-

tion. The caps 50 and 60 on the ends of body sections 20 and 30 may be provided with buffer pads 61 as shown in FIG. 3.

#### B. The Axially Immovable Body Section Containers

##### 1. General

For the purpose of clarity, the same parts in all the following figures will have the same reference characters, and similar parts or parts with similar functions in the different embodiments will have similar reference characters, but with correspondingly different hundredths digits. Specifically, the embodiment shown in FIGS. 4 through 8 will have reference characters of the 100 series, the embodiment of FIG. 9 will have the 200 series, the embodiment of FIG. 10 will have the 300 series, and the embodiment of FIG. 11 will have the 400 series.

Referring now to FIGS. 4 through 11, there are shown four embodiments of a pneumatic carrier tubular container 110, 210, 310 and 410 which comprise longitudinally hinged two-section compartmental bodies which are locked in a closed position by inwardly facing axially movable cup-shaped end caps, the inner cylindrical surfaces of the walls of which caps engage the outer cylindrical surfaces of the ends of the body sections.

##### 2. The Clamshell-Type Container Bodies

Referring primarily to FIGS. 4, 5, 9, 10 and 11, there are shown longitudinally hinged pneumatic containers 110, 210, 310 and 410 or portions thereof, made of molded and/or machined metal or plastic, respectively, each having two semicylindrical complementary clamshell-type body sections 120, 130; 220; 320, 330; and 420, 430, respectively. Each pair of body sections are hinged together by a pin 140, 340 and 440 along one of their adjacent longitudinal edges. These pins 140, 340, and 440 connect interleaved knuckles 121, 131; 321, 331; and 421, 431 which knuckles may be on leaves attached to each body section as shown in FIGS. 6 and 7 or be integral with each body section as shown in FIGS. 5, 8, 9, 10 and 11 and circumferentially project from adjacent hinged edges of each body section 120, 130; 320, 330; and 420, 430, respectively.

The free, thickened, partable, or separable longitudinal adjacent edges of the respective body sections are alternately provided with antitwisting means such as lugs 122 and 132 which project circumferentially into slots 133 and 123, respectively, (see FIG. 5) for preventing relative twisting of each pair of body sections when they are in their closed positions.

The ends of each body section 120, 130; 220; 320, 330; and 420, 430 may be enclosed with integral semicircular transverse end plates or discs 124, 125, and 134, 135 such as shown for the embodiment 110 in FIG. 5, or circular end plates or discs 224, 324 and 424 for the embodiments shown in FIGS. 9, 10 and 11, respectively. One end 124 of the body section 120 and the alternate end 135 of the body section 130 have integral therewith outwardly extending cylindrical flanges 126 and 136, and centrally disposed axial studs 127 and 137, respectively, the functions of which will be described hereinafter. These flanges 126 and 136 may be separate members as shown in FIGS. 5, 6 and 7 affixed to the ends of the body sections as by welding if the body sections are made of metal or adhesively bonded if made of plastic. On the other hand, these flanges may be integrally formed with their respective body sections as shown in FIGS. 8, 9, 10 and 11.

##### 3. The Locking End Caps

###### a. The Oppositely Rotatable Axially Movable Locking End Caps

Referring now to FIGS. 4 through 8, the end 124 of one body section 120 and the opposite end 135 of the other body section 130 are provided with locking end caps 150 and 160, respectively. Each of these caps 150 and 160 may be provided with end buffer pads 151 and 161 the peripheral edges of which may extend beyond the outside diameter of the container and caps. Between these buffer pads 151 and 161 there also may be provided still larger diameter elastic discs 152, 162 to seal the container in its pneumatic tube.

For simplicity, only the end locking cap 150 will be described, since the only difference between these structures is that the caps are rotated in opposite directions.

As shown in FIG. 6, the axially extending cylindrical wall 153 of cap 150 surrounds the end cylindrical flange 126, and in its retracted position engages the peripheral surface 138 of the body section 130 locking this section 130 closed to the complementary section 120. A conical compression spring 141 surrounds a stud or pin 127 of the body section 120 which stud 127 extends through a centrally located aperture 154 in the cap 150. One end of this spring 141 bears against the cap 150 adjacent the aperture 154 and the other end of this spring 141 bears against a collar or stop 142 attached to the end of the stud 127 by a cap screw 143, thus urging the cap 150 into its locking position.

Cam means comprising a plurality of equally spaced angularly disposed or helical slots 129 are provided in the flange 126 of the body section 120. These slots 129 receive follower pins 155 which extend radially inwardly from the cylindrical wall 153 of the cap 150. Rotation of the cap 150 relative to the body sections 120 and 130 will move the pins 155 in the helical slots 129 and the cap 150 axially away from the body sections 120 and 130, thus releasing the ends of body section 130 from the end of body section 120 (see FIGS. 5 and 7).

Instead of pins and slots shown in FIGS. 4 through 8, the cam and its follower may comprise angularly disposed grooves 229 molded in the flange 226 of the body 220 and angularly disposed lugs 255 integrally formed in the cap member 250, respectively as shown in the embodiment of FIG. 9.

In the embodiment shown in FIG. 10 instead of the spring 141, the cap 350 may be held in its retracted position by a pair of opposite polarity ring magnets 344 and 345.

The magnet 344 is secured to the face of the end plate or disc 324 of the container section 320, and the other magnet 345 is secured to the inner face of the cap 350. The outer end of the stud 327 in the center of the plate 324 mounts a collar 342 by means of a cap screw 343, which collar acts as a stop to retain the cap 350 adjacent the edge of its central aperture 354, when the cap is rotated to separate the magnets 344 and 345 by action of its cam slot 329 and follower pins 355.

###### b. The Axially Movable Locking End Caps

In the embodiment shown in FIG. 11, keys 456 projecting radially inwardly from the inner surface of the cap walls 453 engage slots 457 in the body section end flange 426 to prevent the cap 450 from rotating, but permits it to move axially. A centrally disposed rotatable shaft 470 is secured to, such as by a shoulder bolt 471 and nut 472, and extends from the end disc 424 of the body section 420. A plate 473 secured to this shaft 470 for rotation therewith is provided with a plurality of cam wedges 474 which bear against complementary cam wedges 475 secured to the inner face of the cap 450 for axially moving the cap 450 toward and away from the ends of body sections 420 and 430. A compression spring 441 is disposed between a collar 442 on the shaft 470 and the outer face of the cap 450 for urging the cap into its locked position. The outer end of this shaft 470 is provided with a wing or knob 476 for manually rotating the shaft and its wedge cam 474 for axially moving the cap 450 into its unlocked position.

##### I claim:

1. A longitudinally split tubular container comprising:

- a pair of complementary container sections,
- a hinge along adjacent edges of one side of each section to permit opening and closing of said sections like a clamshell,
- an axially movable flanged cap larger and surrounding one end of each section forming a seat within its flange for the adjacent end of the other section, and
- means for urging said caps toward each other so that said sections are locked together by said flanges on said caps when said sections are closed.

2. A container according to claim 1 wherein said sections are hollow semicylinders closed at their ends.