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REMOVABLE TEAR STRIP CLOSURE

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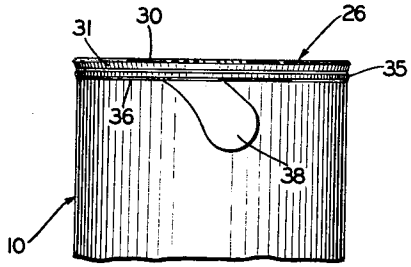


Fig. 1

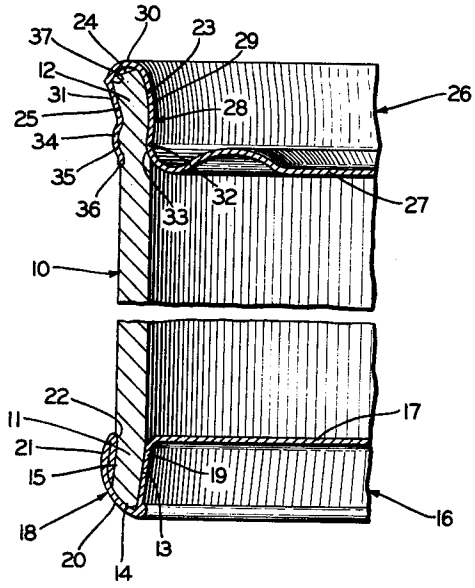


Fig. 2

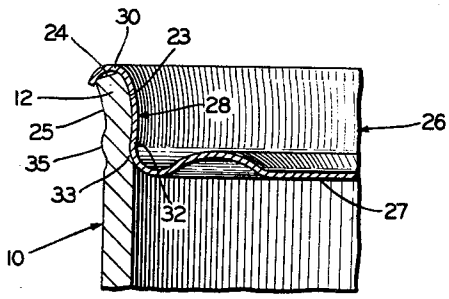


Fig. 3

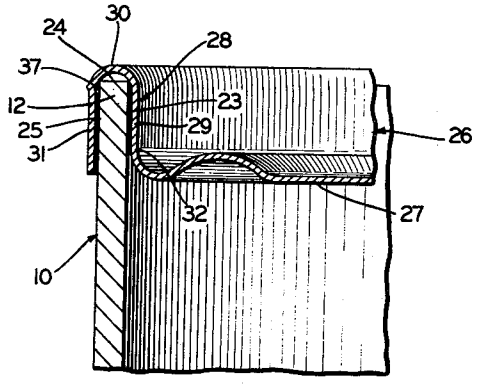


Fig. 4

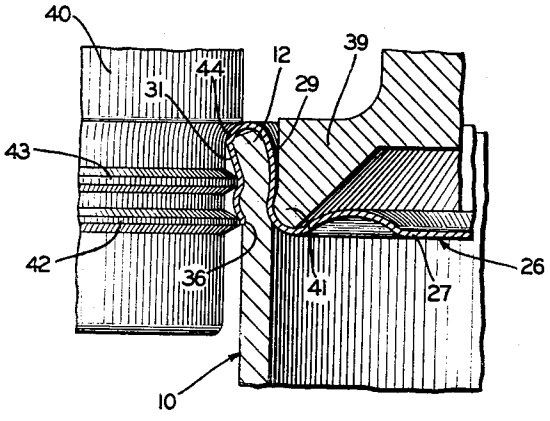


Fig. 5

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REMOVABLE TEAR STRIP CLOSURE

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Our invention relates to fiber container manufacture, and more specifically to a construction and method of forming a fiber container having a tubular fiber body with a metal closure for an open end thereof. Even more specifically, our invention relates to a construction and method of forming a tubular fiber container having a metal closure secured over an open end thereof in a unique manner, such that the closure will normally remain secured over the container open end and upon removal of a tear strip forming a part of the closure, the closure may be selectively removed from and reinserted into the container open end by a "snap-out" and "snap-in" action.

Certain prior fiber container constructions have been provided for retaining certain dry products, and these prior fiber containers have frequently been provided with metal ends forming closures therefor. Furthermore, in the more recent developments for various uses of metal foils, such as aluminum foil, and various plastic coatings, it has been possible to provide a metal foil lining or plastic coating for fiber containers so that the dry products may be better protected, and even certain liquid products may be contained therein for at least limited periods of time and under particular conditions.

Most of these prior fiber container constructions having metal closures have, however, been formed such that it is impossible to open or remove the metal closures without completely destroying the same, that is, it has been necessary to use one of the usual cutting tools for providing a permanent opening in the closure. In the relatively recent development of metal closures having tear strips thereon, it has been possible to provide these metal closures for fiber containers with which the tear strips may be easily removed by hand and without special tools, making it possible to remove a closure with relative ease.

One of the major difficulties with this tear-strip type of metal closure construction for fiber containers has been the difficulty of providing a proper seal between the closure edge portion and the fiber container wall, such that the closure will normally remain secured on the fiber container, while still providing a proper functioning tear strip which can be relatively easily removed.

A further difficulty with these prior tear-strip closure constructions for fiber containers has been the fact that, once the tear strip is removed, the closure becomes loose in the container open end so that, unless the entire contents of the container is used immediately after the tear strip is removed, the remaining contents in the container is not protected, since the closure cannot be even partially resealed over the container open end.

It is, therefore, a general object of the present invention to provide a fiber container construction and method which overcomes the foregoing difficulties and provides improvements over the prior constructions.

It is a primary object of the present invention to provide a fiber container construction and method in which a metal closure is formed for an open end of the fiber container, which closure will normally be properly retained over the container open end, yet may be selectively removed from the container open end and reinserted therein with at least a partial seal satisfactory for usual storage.

It is a further object of the present invention to provide a fiber container construction and method of the foregoing type in which the metal closure is provided with a tear strip for selective removal thereof from the container end, yet the closure, after such initial removal, may be reinserted and removed from the container end by a unique "snap-in" and "snap-out" action.

Finally, it is an object of the present invention to provide a fiber container construction and method of the foregoing type and satisfying all of the above objects which may be easily formed in a relatively inexpensive and simple manner.

These and other objects are accomplished by the parts, constructions, arrangements, combinations, methods and procedures, and subcombinations, comprising the present invention, a preferred embodiment of which—illustrative of the best mode in which applicants have contemplated applying the principles—is set forth in the following description and illustrated in the accompanying drawings, and which is particularly and distinctly pointed out and set forth in the appended claims forming a part hereof.

In general terms, the fiber container construction comprising the present invention may be stated as including a tubular, preferably cylindrical, fiber-walled container having an open upper end with a metal closure of this container open end. The closure is formed with a central disc-like body portion terminating outwardly in a peripheral edge portion which is inverted, generally U-shaped in cross section, so as to provide the closure edge portion with inner and outer generally axially extending flange portions and a connecting portion between said flange portions.

Further, the metal closure is received near the container open end with the U-shaped edge portion telescoped with the container wall to position the closure inner and outer flange portions at inner and outer sides of the container wall and the closure connecting portion over the end of the container wall. Still further, the closure inner flange portion is formed with an outwardly extending bead spaced from the connecting portion and compressed into the inner side of the container wall, to thereby form a compressed permanent depression in the container wall inner side spaced from the wall end.

The closure outer flange portion is formed with a permanently deformed engaging part compressively engaged with the container wall outer side forming a matching permanently deformed compressed engaging part on the wall outer side, and this outer flange portion engaging part of the closure is preferably an outwardly extending bead with a matching permanently deformed compressed bead on the wall outer side. Finally, a tear strip score line is formed in the closure outer flange portion intermediate the outer flange portion engaging part or bead and the connecting portion.

The closure may also be further formed for providing more secure engagement with the fiber container, such as forming the inner and outer flange portions angling slightly outwardly between these flange portion beads and the connecting portion, with the container wall compressed between these flange portions conforming to this outward angling. Also, the free edge of the closure outer flange portion may be permanently compressed into the container wall outer side so as to limit the exposure of this closure free edge.

Thus, with the fiber container construction of the present invention, the permanent compressive deformation of the fiber container wall between the metal closure inner flange portion bead and outer flange engaging part or bead will normally retain the metal closure tightly on the fiber container end. Further, after removal of the tear strip outer flange portion of the metal closure, this tear strip removal will release the closure for "snap-out" and "snap-in" removal and insertion, wherein the inner flange portion bead of the closure will snap out of and

into the permanent depression in the container wall inner side.

The method of forming the metal closure on the tubular fiber-walled container comprising the present invention may be stated in general terms as including the steps of forming the closure and positioning the same on the open end of the container, with the closure U-shaped edge portion telescoped over the container wall end, to thereby locate the inner flange portion of the closure edge portion adjacent the inner side of the container wall, the outer flange portion of the closure edge portion adjacent the outer side of the container wall, and the connecting portion of the closure edge portion over the container wall end.

The method further includes the steps of forming the outwardly extending bead on the closure inner flange portion spaced from the connecting portion, and forming the inner flange portion bead outwardly compressively into the wall inner side, to thereby form a permanent compressed depression in the wall inner side spaced from the wall end.

Still further, the method includes the steps of forming the permanently deformed engaging part on the closure outer flange portion with said engaging part preferably being an outwardly extending bead, and forming this outer flange portion engaging part or bead compressively against the wall outer side, to thereby form a matching permanent compressed engaging part or bead on the wall outer side.

It is preferred that the various forming of the closure inner and outer flange portions, and the permanent compressive formation of the container wall inner and outer sides are all accomplished at the same time. Further, it is preferred that the closure outer flange portion engaging part or bead is formed substantially outwardly aligned from the inner flange portion bead, placing the compressed outer side engaging part or bead of the container wall substantially outwardly aligned with the compressed depression on the wall inner side.

Finally, the method includes the step of forming a tear strip score line in the closure outer flange portion intermediate the engaging part or bead and the connecting portion. Also, the method may include the step of forming the closure inner and outer flange portions between the beads or engaging part and the connecting portion outwardly angled during the bead formation of these flange portions, and at the same time forming the container wall substantially conforming to this outward angling of the closure flange portions, and further, during the forming of the closure outer flange portion bead, permanently compressing the free edge of this outer flange portion into the container wall outer side.

By way of example, an embodiment of the fiber container construction and method of the present invention is illustrated in the accompanying drawings forming a part hereof, wherein like numerals indicate similar parts throughout the several views, and in which;

FIG. 1 is a fragmentary side elevation illustrating a fiber container construction incorporating the principles of the present invention;

FIG. 2 an enlarged fragmentary vertical section, part in elevation, of the container of FIG. 1;

FIG. 3 a view similar to FIG. 2, but with the closure tear strip removed;

FIG. 4 a view similar to FIG. 2, but prior to the formation of the closure edge portion for securing the closure to the container end;

FIG. 5 a view similar to FIG. 2, showing the dies for forming the closure edge portion to form the part of FIG. 4 into the final form of FIG. 2.

Referring to FIGS. 1 and 2, an embodiment of the fiber container construction of the present invention is shown as including a preferably cylindrical, tubular, fiber-walled container, generally indicated at **10**, having an open lower end **11** and open upper end **12**. This container **10** may be formed in the usual manner, such as by the usual spirally wound paper tubing, and may be provided with the usual inner surface coatings, such as metal foils or plastic films, dependent on the particular material to be contained therein.

The container lower end **11** is provided with an inner side surface **13**, an end surface **14** and an outer side surface **15**. A bottom metal closure, generally indicated at **16**, having a central disc-like portion **17** and a peripheral edge portion **18** is positioned with the edge portion telescoped over the container lower end **11** and the central disc-like portion closing the container lower end.

The edge portion **18** of the bottom closure **16** is formed generally U-shaped having an inner flange portion **19**, a connecting portion **20** and an outer flange portion **21**, which outer flange portion is doubled back as at **22**. Further, this edge portion **18** is telescoped over the container lower end **11** with the inner flange portion **19** adjacent the inner side surface **13**, the connecting portion **20** over the end surface **14** and the outer flange portion **21** adjacent the outer side surface **15**.

The edge portion **18** of this bottom closure **16** is then rolled or otherwise formed in the usual manner to secure this bottom closure to the container lower end **11**, as shown in FIG. 2. Further, this bottom closure **16** and the manner of securing the same to the container lower end **11** is of usual construction and does not form a part of the present invention other than in the combination shown.

The container upper end **12** is also provided with an inner side surface **23**, an end surface **24** and an outer side surface **25**. Further, a top closure generally indicated at **26**, preferably formed of metal, such as aluminum, is positioned over and closing this upper end **12** with this top closure having a central disc-like portion **27** and a peripheral edge portion **28**.

Still further, the edge portion **28** of the top closure **26** is formed inverted generally U-shaped in cross section having the inner flange portion **29**, the connecting portion **30** and the outer flange portion **31**. This top closure **26** is positioned with the edge portion **28** thereof telescoped over the container upper end **12** so that the closure inner flange portion **29** is adjacent the container inner side surface **23**, the connecting portion **30** preferably closely overlies the end surface **24**, and the outer flange portion **31** is adjacent the outer side surface **25**.

The inner flange portion **29** of the top closure **26** is formed with an outwardly extending bead **32**, spaced downwardly from the closure connecting portion **30** and the container end surface **24**. Further, the container inner side surface **23** is formed with a permanent compressed depression **33** conforming to the closure bead **32** with the closure bead received engaged in the container depression **33**.

The outer flange portion **31** of this top closure **26** is formed with an outwardly extending bead **34** spaced downwardly from the closure connecting portion **30**, and preferably generally outwardly aligned with the closure inner flange portion bead **32** and container depression **33**.

Further, the outer side surface **25** of the container upper end **12** is formed with an outwardly extending permanent compressed bead **35** conforming to and received compressively into the bead **34** of the closure outer flange portion **31**, so that this container bead **35** is also generally outwardly aligned with the inner flange portion bead **32** of the closure **26** and the container depression **33**, as well as being spaced downwardly from the end surface **24** of the container upper end **12**.

As shown in FIG. 2, both the closure inner flange portion **29** between bead **32** and connecting portion **30**, and outer flange portion **31** between bead **34** and connecting portion **30**, may be formed slightly outwardly angled, with the container upper end **12** conforming thereto, so that the container inner and outer side surfaces **23** and **25** are slightly outwardly angled above the de-

pression 33 and bead 35 to the end surface 24. Also, the free edge 36 of the closure outer flange portion 31 is permanently compressively embedded in the outer side surface 25 of the container upper end 12.

Thus, the closure inner flange portion bead 32 and the container depression 33, as well as the closure outer flange portion bead 34 and container bead 35, form engaging parts between the top closure 26 and container upper end 12 for normally securely retaining this top closure on the container upper end.

Furthermore, this retention is aided by the conforming outward angling of the closure inner and outer flange portions 29 and 31 and the container upper end 12, particularly in view of the fact that the container upper end extends upwardly closely adjacent or underlying the closure connecting portion 30.

Still further, although the embedding of the lower free edge 36 of the container outer flange portion 31 into the container outer side surface 25 also aids somewhat in this retention, a further purpose of this free edge embedding is to limit the exposure of this free edge and thereby prevent the accidental loosening of the engagement between the top closure 26 and the container upper end 12.

The outer flange portion 31 of the top closure 26 is formed as a tear strip by forming the internal tear strip score line 37 between the outer flange portion bead 34 and the closure connecting portion 30, and also by providing the usual downwardly extending tear strip tab 38, shown in FIG. 1, on this outer flange portion 31. It is preferred that this score line 37 is positioned approximately at the line of joinder between the closure connecting portion 30 and outer flange portion 31, which locates this score line close to the end surface 24 of the container upper end 12.

This score line 37 is formed in the usual manner of proper depth so that, by pulling on the tab 38, virtually the entire outer flange portion 31 of top closure 26 may be torn from the closure connecting portion 30, preferably around the entire circumference of this closure, so that this closure is released from the outer side surface 25 of the container upper end 12, as shown in FIG. 3. This will release the top closure 26 for selective removal from and reinsertion into the container upper end 12, and during this removal and reinsertion, the bead 32 on the closure inner flange portion 29 will snap out of and into the permanent compressed depression 33 formed on the inner side surface 23 of container upper end 12, thereby forming a top closure 26 selectively releasable from the container upper end 12, yet when reinserted in this container upper end, will be retained in place with a reasonable amount of force.

According to the method of the present invention for forming the container and closure construction described in the foregoing, the top closure 26 is first formed as shown in FIG. 4 by usual die means, not shown, and after this initial formation, the closure inner and outer flange portions 29 and 31 are substantially straight. Furthermore, in this same forming operation, or by a subsequent usual forming operation, the tear strip score line 37 is also formed.

Thereafter, this top closure 26 is positioned over the container upper end 12 with the closure edge portion 28 telescoped down over the container upper end to the position shown in FIG. 4. At this time, the container inner and outer side surfaces 23 and 25 are also perfectly straight, and this telescoping positions the closure inner flange portion 29 adjacent the container inner side surface 23, the closure outer flange portion 31 adjacent the container outer side surface 25, and the closure connecting portion 30 closely overlying the container end surface 24.

Next, and preferably substantially simultaneously, the closure inner flange portion 29 is engaged by a rotatable forming die 39 and the closure outer flange portion 31 is

engaged by a rotatable forming die 40. These rotatable forming dies 39 and 40 are supported and operated in the usual manner well known in the container industry, although the contours thereof are unique and according to the principles of the present invention.

The lower edge of forming die 39 is provided with the arcuately outwardly extending forming bead 41, and by outward rolling, this forming bead 41 forms the outwardly extending bead 32 in the closure inner flange portion 29 totally around the circumference thereof, and preferably at the same time, forms this closure bead 32 into the inner side surface 23 of the container upper end 12, thereby forming the permanent compressed depression 33 into this inner side surface 23 and totally around the circumference thereof.

The side surface of the rotatable forming die 40 is provided with the spaced projections 42 and 43, and the upper arcuate forming shoulder 44. This forming die 40 is engaged with the closure outer flange portion 31, as well as the closure connecting portion 30.

The location of forming die 40 is such that the projection 42 engages the free edge 36 of the closure outer flange portion 31 and the projection 43 engages the closure outer flange portion spaced thereabove, while at the same time, the forming shoulder 44 engages the closure connecting portion 30. The inward pressure of the die projections 42 and 43 forms the outwardly extending bead 34 on the closure outer flange portion 31, and at the same time, tightly compresses this outer flange portion against the container inner side surface 23 forming the permanent compressed outwardly extending bead 35 on this container outer side surface.

Still further, the inward pressure of the die projection 42 forces the lower free edge 36 of the closure outer flange portion 31 to embed into the container outer side surface 25. Finally, the combined inward pressure of the die projections 42 and 43 and the outward pressure of the die forming bead 41 causes the closure inner and outer flange portions 29 and 31 to angle outwardly, so that the closure connecting portion 30 conforms with the die forming shoulder 44 with the container upper end 12 being forced to substantially conform to this outward angling of the closure inner and outer flange portions.

Thus, preferably by a single final forming or rolling operation, using the rotatable forming dies 39 and 40, the entire unique configuration of the finally formed closure inner and outer flange portions 29 and 31 are provided, as well as the matching unique configurations of the container inner and outer side surfaces 23 and 25.

It should be pointed out that the unique configurations formed on the inner and outer side surfaces 23 and 25 of the container upper end 12 by the closure inner and outer flange portions 29 and 31 are permanent compressed configurations, actually formed on the wall of container 10 by the top closure 26. Thus, although the container inner and outer side surfaces 23 and 25 are originally perfectly straight, the unique configurations formed therein by the closure inner and outer flange portions 29 and 31 will remain after being formed, even though the top closure 26 is removed from the container upper end.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiment of the improved construction illustrated and described herein is by way of example and the scope of the present invention is not limited to the exact details of construction shown.

Having now described the invention, the construction, the methods and procedures, and the operation and use of the preferred embodiment thereof, and the advantageous new and useful results obtained thereby, the new and useful construction and methods, and reasonable

mechanical equivalents thereof obvious to those skilled in the art are set forth in the appended claims.

We claim:

1. In fiber container construction of the type in which a tubular fiber-walled container having an open end is provided with a metal closure for the open end, in which the metal closure is formed with a central disc-like body portion terminating outwardly in a peripheral inverted generally U-shaped cross-section edge portion, in which the edge portion is formed with inner and outer generally axially extending flange portions and a connecting portion between the flange portions, and in which the metal closure is received over the container open end with the U-shaped edge portion telescoped with the container wall positioning the edge inner flange portion abutting an inner side of the wall and the edge outer flange portion abutting an outer side of the wall and the edge connecting portion adjacent an end of the wall; the improvements including the closure central disc-like body portion being connected to the inner generally axially extending flange portion of the closure edge portion by an arcuate outwardly extending bead compressed into the container fiber wall inner side forming a compressed permanent depression in said fiber wall inner side spaced from the wall end and at said connection between said closure disc-like body and edge portions, the outer flange portion of the closure edge portion being formed with an arcuate outwardly extending bead generally outwardly aligned with said closure arcuate outwardly extending bead and said container fiber wall inner side depression, the container fiber wall outer side being compressed into the arcuate outwardly extending bead in the outer flange portion of the closure edge portion forming a permanent arcuate outwardly compressed bead on the container fiber wall outer side matching and received into the outer flange portion bead of the closure edge portion, the closure inner and outer flange portions being formed angling generally outwardly from the inner flange portion bead to the connecting portion and from the outer flange portion bead to the connecting portion, the container wall being compressed between the closure inner and outer flange portions substantially conforming to the outward angling of said flange portions, and the part of the outer flange portion from above said outer flange portion bead downwardly being formed into a removable tear strip as defined by a tear strip score line formed in the outer flange portion of the closure edge portion above said outer flange portion bead and having an integral tear strip tab extending downwardly from said outer flange portion; whereby the permanent beaded compressive deformation of the container fiber wall engaged with the closure edge portion beads will normally retain the closure tightly on the container end, and removal of the outer flange portion of the closure edge portion along and below the tear strip score line will release the remainder of the closure for snap-out and snap-in removal and insertion with the closure inner flange portion bead snapping into and out of the container wall inner side permanent depression.

2. Fiber container construction as defined in claim 1 in which the closure outer flange portion terminates below the outer flange portion bead in a downwardly extending free edge and said free edge is permanently compressed into the container fiber wall outer side.

3. In fiber container construction of the type in which a tubular fiber-walled container having an open end is provided with a metal closure for the open end, in which the metal closure is formed with a central disc-like body portion terminating outwardly in a peripheral inverted generally U-shaped cross-section edge portion, in which the edge portion is formed with inner and outer generally axially extending flange portions and a connecting portion between the flange portions, and in which the metal closure is received over the container open end with the U-shaped edge portion telescoped with the container wall positioning the edge inner flange portion abutting an inner side of the wall and the edge outer flange portion abutting an outer side of the wall and the edge connecting portion adjacent an end of the wall; the improvements including the closure central disc-like body portion being connected to the inner generally axially extending flange portion of the closure edge portion by an arcuate outwardly extending bead compressed into the container fiber wall inner side forming a compressed permanent depression in said fiber wall inner side spaced from the wall end and at said connection between said closure disc-like body and edge portions, the outer flange portion of the closure edge portion being formed with an arcuate outwardly extending bead generally outwardly aligned with said closure arcuate outwardly extending bead and said container fiber wall inner side depression, the container fiber wall outer side being compressed into the arcuate outwardly extending bead in the outer flange portion of the closure edge portion forming a permanent arcuate outwardly compressed bead on the container fiber wall outer side matching and received into the outer flange portion bead of the closure edge portion, the closure outer flange portion terminating below the outer flange portion bead in a downwardly extending free edge and said free edge being permanently compressed into the container fiber wall outer side, and the part of the outer flange portion from above said outer flange portion bead downwardly being formed into a removable tear strip as defined by a tear strip score line formed in the outer flange portion of the closure edge portion above said outer flange portion bead and having an integral tear strip tab extending downwardly from said outer flange portion; whereby, the permanent beaded compressive deformation of the container fiber wall engaged with the closure edge portion beads will normally retain the closure tightly on the container end, and removal of the outer flange portion of the closure edge portion along and below the tear strip score line will release the remainder of the closure for snap-out and snap-in removal and insertion with the closure inner flange portion bead snapping into and out of the container wall inner side permanent depression.

References Cited in the file of this patent

UNITED STATES PATENTS

1,064,787	Taylor	June 17, 1913
2,072,149	Young	Mar. 2, 1937
2,104,344	Heymann	Jan. 4, 1938
2,363,352	O'Brien	Nov. 21, 1944
3,073,478	Henchert	Jan. 15, 1963

FOREIGN PATENTS

384,927	France	Feb. 19, 1908
566,338	Italy	Aug. 30, 1957
641,196	Great Britain	Aug. 9, 1950