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EXPLOSIVE CONTAINER

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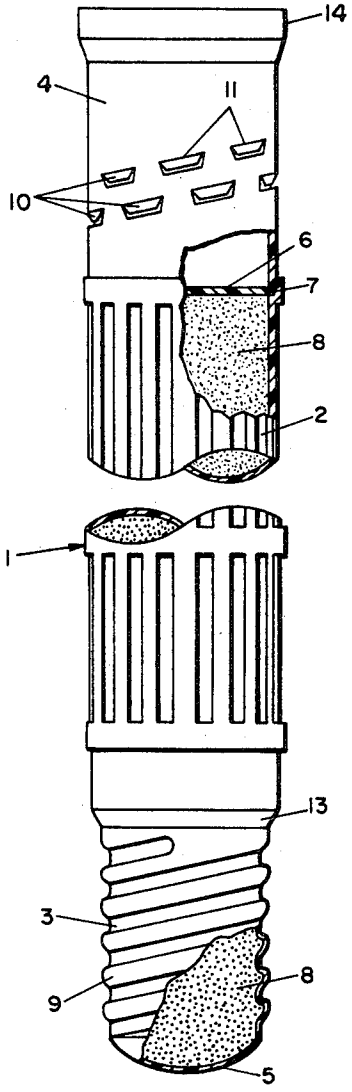


FIG. 1

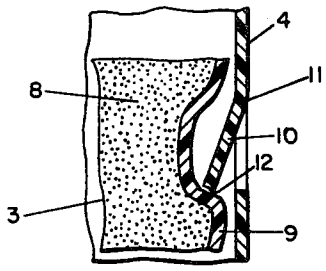


FIG. 3

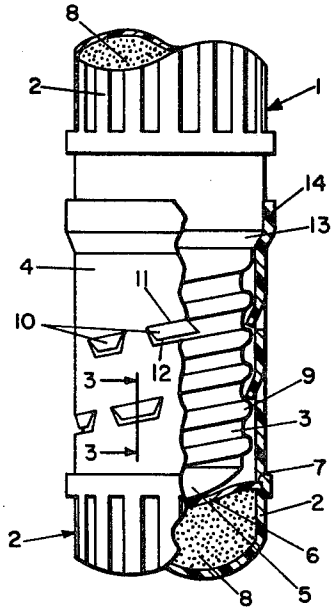


FIG. 2

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EXPLOSIVE CONTAINER

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ABSTRACT OF THE DISCLOSURE

This invention relates to a blow-molded plastic container for explosives that has external thread means at one end and an internal thread means at the other end for connecting a plurality of like containers together end-to-end to form an explosive column, the invention being characterized in that the internal thread means comprises inwardly bent tabs punched from the side wall of a tubular end portion, which tabs are deflected by the threads of the externally threaded end when it is inserted endwise into the tubular end portion to provide a quick-couple between two containers and to cooperate with the threads to define a threaded connection for tightening and releasing the two containers.

The present invention relates to an explosive container of the type that forms the subject matter of the United States patent of Hamilton, No. 3,125,092, and particularly to the coupling means for connecting a plurality of the containers together endwise to form an explosive column assembly.

The objects of the present invention are to provide such a coupling means for a container for explosives, which container is economical in that it can be readily formed as a thinwalled, blow-molded plastic article, which is quick and easy to assemble with other like containers to provide an explosive column, and which also can be readily removed from the column if desired, as well as tightened to provide firm contact between the explosive in adjacent containers in the column to insure propagation of the explosion. Further objects will be apparent from an understanding of the following description of a preferred embodiment of the invention.

Briefly, the present invention relates to a blow-molded plastic container of the type illustrated in the above-mentioned Hamilton patent that is filled with an explosive and has coupling means for connecting a plurality of the containers together end-to-end, the coupling means comprising a male connector at one end of each container and a cooperating female connector at the other end of each container. In accordance with this invention, the male connector comprises a external screw thread and the female connector comprises a tubular end portion having a plurality of inwardly extending tabs that are arranged spirally about the periphery of the tubular end portion on a helix angle corresponding to that of the thread of the male portion. The tabs are adapted to be deflected by the thread of the male connector to provide for sliding two containers together endwise for substantially the entire length of the connector and are adapted to recover so that the free ends thereof, which are the active edges of the tabs, extend into the thread grooves to cooperate therewith and thereby provide a threaded coupling between the containers. Thus, with the present coupling means, not only can two containers be quickly secured together, but also, by virtue of the threaded coupling, can be released as well as further turned down to develop a firm contact between the adjacent ends of the containers and thus improve propagation of the explosion.

A preferred embodiment of the present invention is

hereinafter disclosed with reference to the accompanying drawings, in which:

FIG. 1 is an elevational view of an explosive container in accordance with this invention, with parts broken away for convenience and for showing the underlying construction.

FIG. 2 is a fragmentary view, partly in elevation and partly in section, of the adjacent ends of two of the containers of FIG. 1 joined together end-to-end.

FIG. 3 is a detail sectional view taken substantially on the line 3—3 of FIG. 2.

With reference to the drawings, the present invention is illustrated as embodied in a container **1** that is blow molded from a suitable plastic material such as high density polyethylene. The container **1** consists essentially of a relatively thin, elongated, substantially cylindrical side wall that includes a central body portion **2** which constitutes the major portion of the container, and at the opposite ends thereof a threaded end portion **3** and a tubular end portion **4**. The container is closed at the opposite ends thereof by closure means comprising an end wall **5** formed integrally at the end of the threaded end portion **3** and a transverse seal **6** having the peripheral edge thereof seated in a groove **7** internally of the side wall at the juncture of the body portion **2** and the tubular end portion **4**. The closed portion of the container **1**, that is, the body portion **2** and the threaded end portion **3**, is filled with an explosive **8**.

For connecting a plurality of the containers **1** together end-to-end to form an explosive column assembly, there is provided a coupling means comprising an external screw thread **9** formed integrally on the periphery of the threaded end portion **3**, which is the male coupling element, and a series of tabs **10** formed in the side wall of the tubular end portion **4**, which is the female coupling element. The tabs **10** are resilient and are adapted to be deflected by the individual turns of the thread **9** as the thread is forced past the same endwise of the container and to cooperate with the thread upon recovery thereof to provide a threaded connection between adjacent containers.

The tabs **10** are preferably formed in the side wall of the tubular end portion **4** by punching. The tab is partially severed from the side wall so that it is connected to the side wall along a substantially straight bend line **11**. When the tab is punched, it is given an inward set as by the use of a heated punch or die whereby the free or active edge **12** thereof is disposed inwardly at the side wall in the direction radially of the container. The tab is also arranged so that the bend line **11** is disposed toward the end of the container at the tubular end portion **4** and the active edge **12** of the tab is toward the opposite end of the container. The tab is thus inclined inwardly radially of the container and toward the end at the threaded end portion **4** lengthwise of the container. The tabs are also arranged on a line spirally of the container and having a helix angle corresponding to the angle of the thread **9**. While the bend lines **11** of the successive tabs **10** are illustrated as aligned spirally, it will be apparent that this specific arrangement is not critical. It is necessary only that the active edges **12** of the tabs **10** be aligned spirally, that is, the free edges which in effect define the active surface of an internal thread on the tubular end portion **4** and which are adapted to cooperate with the thread **9**.

The thread **9** may be a standard single lead screw and has a configuration in cross section that is designed for convenient blow molding and to provide an active surface that is adapted to cooperate with the active edges **12** of the tabs **10**. The maximum diameter of the thread **9** is less than the internal diameter of the tubular end portion **4** by an amount that provides clearance for endwise

sliding of the threaded end portion 3 of one container into the tubular end portion 4 of another container.

In use, a plurality of the containers 1 are assembled into an explosive column assembly by sliding the threaded end portion 3 of one container endwise into the tubular end portion 4 of another container and by effecting a relative rotation of the two containers when the containers are seated. During the sliding, because of the resilience of the tabs 10, the thread 9 forces the tabs outwardly toward a position flush with the side wall of the container. As each turn of the thread 9 passes, the tabs 10 recover and the active edge 12 thereof snaps into the thread groove between adjacent turns of the thread. Thus, as the threaded end portion 3 is inserted endwise into the tubular end portion 4, the active edges 12 of the tabs 10 alternatively are deflected by the individual turns of the thread and recover to snap into the thread grooves between the individual turns of the thread 9.

With the active edges 12 of the tabs 10 on one container seated in the grooves of the thread 9 of another container, there is a threaded coupling between the two containers. Thus, after the two containers have been pushed together endwise, there is effected a relative rotation in opposite directions between them to draw them together to the final position. The amount of rotation required depends upon the angular orientation or alignment of the two containers at the time they are joined endwise, but at most, the rotation required would normally be about one turn with a single lead thread and one-half turn with a double lead thread.

When seated, as illustrated in FIG. 2, a tapered area 13 at the juncture of the threaded end portion 3 and the body portion 2 is seated in the flared free end 14 of the tubular end portion 4 of the adjacent container. The parts are dimensioned such that when seated, the end wall 5 of one container, which preferably is outwardly convex as illustrated, is thrust against the seal 6 of the other container to provide an intimate contact between the explosive in the one container with the explosive in the other container to insure propagation of the explosion. The end portions 3 and 4 are also made relatively long so that there is a significant overlap between the tubular end portion of one container with the threaded end portion of another container and the clearance between the thread 9 and the inner face of the tubular end portion 4 is as small as possible consistent with economical molding practices. In this manner, there is provided good bending strength at the coupling between adjacent containers in a column, whereby the column is sufficiently strong and rigid so that a plurality of the containers can be assembled on the ground and then lifted to a vertical position for dropping the column into a bore hole.

Another advantage of the threaded coupling between

the two containers is that if it were decided for any reason to remove a container from the column, this can be readily accomplished by effecting a relative rotation of the containers in reverse to unthread the same.

What we claim and desire to protect by Letters Patent is:

1. In a blow-molded plastic cointainer adapted to be filled with an explosive and to be connected with like containers to form an explosive column assembly, said container comprising:

(a) a substantially cylindrical side wall including a central body portion with a threaded end portion and a tubular end portion at the opposite ends thereof,

(b) closure means for closing said container at the end of said threaded end portion and at the juncture of said tubular end portion and said body portion,

(c) an integrally formed external screw thread on said threaded end portion and dimensioned relative to said tubular end portion whereby the threaded end portion of one container is adapted to be inserted into the tubular end portion of a like container with the closure means at the adjacent ends of such containers in contact,

(d) and a plurality of tabs formed in the side wall of said tubular end portion with each of said tabs having an active surface disposed on a line spirally of said tubular end portion on a helix angle corresponding to that of said thread, said tabs being resilient whereby the active surfaces thereof are adapted to be deflected by said thread to permit endwise sliding of said tubular end portion of one container onto the threaded end portion of another container for substantially the entire length thereof and to cooperate upon recovery with said threads to provide a threaded coupling between such containers.

2. In a blow-molded plastic container in accordance with claim 1 in which said tabs are connected to the side wall of the tubular end portion of the container along a bend line and are severed from the side wall on all other edges, said tabs being set to stand inwardly about said bend line whereby the free end thereof is adapted to engage the thread.

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