Nov. 7, 1950 G. A. KINGSTON 2,528,959

REINFORCING MEANS OF SHIPPING FRANGIBLE TUBES

Filed Dec. 6, 1946

FIG. 1

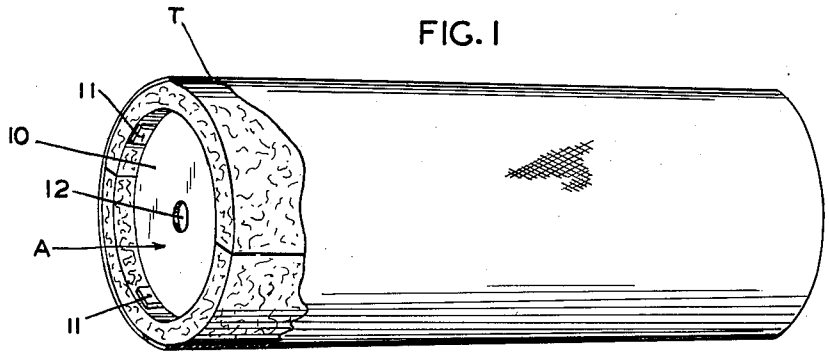


FIG. 2

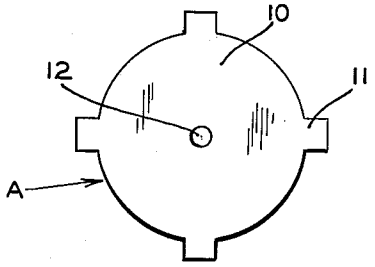


FIG. 3

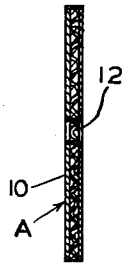


FIG. 4

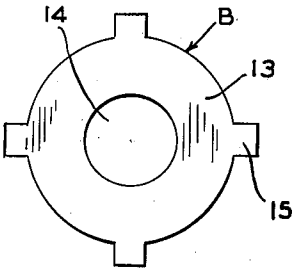


FIG. 5

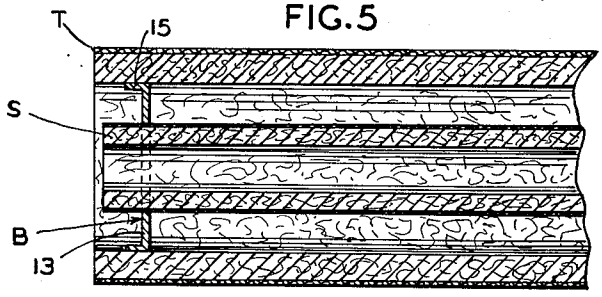


FIG. 6

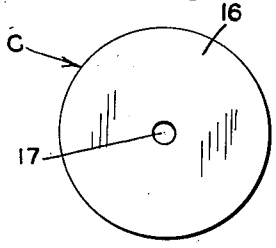
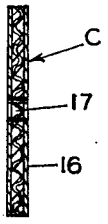


FIG. 7



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REINFORCING MEANS OF SHIPPING FRANGIBLE TUBES

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3 Claims. (Cl. 206—46)

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This invention relates to sectional, frangible tubes and means for substantially reducing breakage in the shipping and storing of the same.

Insulating pipe coverings are often made from highly frangible material such as magnesia. Such coverings are tubular in shape, being made of a pair of cooperating semi-tubular sections. Breakage of such highly frangible tubes during shipping and storage is substantial. These sections are temporarily clamped together by a wrapping of light weight fabric such as duck or cheesecloth, forming a tubular pipe covering. For shipping and storing prior to installation, this wrapping is held in place temporarily by a bonding material applied to several spots on the cylindrical outer surface adapting the wrapping to be easily removed for installing the tubes around pipes. When the wrapping is removed along one joint, the sections can be split at that joint and being hinged at the opposite joint, the sections can be installed around a pipe and the flexible wrapping re-applied. After installation, a bonding material is applied to the entire outer surface of the wrapping and tube to firmly integrate the sections with the wrapping tube and to clamp the same together about the pipe.

Prior to application of the tubes and during shipment and storage, this wrapping only loosely adheres to the encased frangible material and any jarring or vibration may cause displacement between opposing longitudinal edges of the two abutting sections. Often these displaced edges and end portions of the sections are badly chipped, rendering them inefficient for the insulating function the tubes are to perform. This problem would not be as acute if the tubes were of integral construction.

After extensive research and experimentation, I unexpectedly discovered that the fracturing and disintegration of even three foot lengths of such frangible tubes which occurs through impacting during transit and storage, may be substantially eliminated by applying at spaced points, preferably near the ends of the assembled tube sections, comparatively thin, light weight reinforcing plug elements preferably constructed of somewhat compressible material. These plugs support the internal surface of the tube and have a cushioning action against any jarring or vibration along with the reinforcing action.

It is an object of my invention to provide a novel and inexpensive means for materially reducing breakage of frangible tubes.

More specifically, it is an object to provide an expandable, slightly compressible disc of light

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weight for reducing chipping and breakage of highly frangible tubes.

It is a further object to provide a plug member adapted to reduce breakage of two concentrically disposed frangible tubes.

It is another object of my invention to provide as an article of manufacture a sectional, frangible tube constructed with a plurality of plug members for reducing chipping and breaking in shipment and storage.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the various views and in which:

Fig. 1 is a perspective view showing a sectional frangible tube bound together by a fabric wrapping, constructed with a plug member inserted in one end thereof;

Fig. 2 is an elevation view showing one form of the disc-like plug removed;

Fig. 3 is a central, transverse section through the form of the disc shown in Fig. 2;

Fig. 4 is an elevation view showing another form of the plug, which plug is adapted to receive a small, frangible tube and concentrically retain said tube within the reinforced, larger tube;

Fig. 5 is a longitudinal, sectional view showing the form of the plug shown in Fig. 4 with the concentrically disposed tubes reinforced thereby;

Fig. 6 is an elevation view of an alternative form of the plug; and

Fig. 7 is a central, transverse sectional view of a form of plug shown in Fig. 6.

The plug members of my invention are inexpensively constructed and can be made from cardboard, composition board, laminated cardboard, plywood and the like or preferably of slightly compressible material such as laminated, corrugated cardboard.

Figs. 1 through 3 show one form of my invention designated as form A. A plug or disc member 10 preferably made from slightly compressible shock-absorbing material such as corrugated or laminated cardboard is provided. The periphery of said disc 10 conforms to the internal periphery of a sectional tube T and is adapted to embrace somewhat resiliently, said internal periphery of the tube T. A plurality of spaced, retaining tabs or flap members 11 is attached to the periphery of said disc 10 for stabilizing and retaining the disc within the sectional tube T. Corrugated board is adapted to be bent and if such a mate-

rial is used the tabs 11 can be integrally formed with the disc 10 forming blanks shaped as shown in Fig. 2. Before the discs 10 are put into reinforcing position within the tube T the tabs 11 are bent out at right angles to the plane of the disc 10 so that the periphery of the disc 10 conforms to the inside periphery of the tube T. The free end of each retaining flap 11 resists removal of the disc 10 and tends to hold said disc 10 in reinforcing position within the tube T. An aperture 12 is provided in the said disc 10 to receive a finger for adjusting and positioning said disc within the tube T. By embracing the internal periphery of the tube T, this plug member 10 has the function of supporting the walls of the cooperating semi-tubular sections of the frangible tube T when said sections are lightly clamped together on the disc 10. The action of the fabric wrapping material in clamping the two sections together and against the periphery of the reinforcing disc 10 provides an integral, stabilized, tubular construction of surprising strength notwithstanding the highly frangible nature of the walls of the tube T.

Figs. 4 and 5 show a second form of my invention designated as form B. A disc 13 having a peripheral shape to conform with the inside periphery of a sectional tubular member for materially reducing breakage of said tube. A large aperture 14 is centrally disposed in disc 13, aperture 14 having a periphery to conform with the outside periphery of a small tube S for concentrically suspending the small tube S within the large tube T. A plurality of circumferentially spaced flaps 15 is attached to the periphery of the disc 13 and in the form shown, integrally formed therewith, by cutting the shape of corrugated board shown in Fig. 4. Fig. 5 shows plug B inserted in a tube T and having a small tube S inserted through the central aperture 14. The tube S is supported concentrically in a substantially floating shock proof position within the large tube T being retained by disc 13 as it is retained within the large tube T. Thus, form B supports two tubes and materially reduces chipping and breakage of both tubes simultaneously as it conserves space in shipping and storing.

Figs. 6 and 7 show a form C of the reinforcing disc designated as 16. Disc 16 is adapted to fit tightly within a tube T, its periphery conforming closely to that of the internal periphery of the tube T. An adjusting finger aperture 17 is centrally disposed within a disc 16 for positioning and adjusting the disc within the tube T.

These sectional tubes do not need to be of round cross-sectional shape but might well be polygonal or oval depending upon the shape of the article they are to cover. The internal plug member may be adapted to reinforce tubes of any desired shape.

While as previously pointed out, embodiments of my invention may be well applied as an attachment to assembled or connected frangible insulating tubes and the like, it should be understood that the combinative relationship of my fracture-preventing and reinforcing elements with the frangible tube sections and wrapping temporarily attached thereto, constitutes and is particularly well adapted for a completed article of manufacture.

More specifically, in the assembly of the longitudinal tube sections at the manufacturing plant, the reinforcing plugs or discs may be very easily inserted in the lower tubular sections as two complementary sections are being assembled and temporarily held together by the encircling fabric wrapper.

Indentations, detents or grooves if desired, may be utilized to facilitate precise positioning of the discs or plugs. The top sections are assembled lightly clamping against the peripheries of the plug discs and the wrapper is thereafter applied and bonded lightly thereto, completing the manufacture of the frangible tube, specially constructed for shipment and storage.

It will be seen that in the article of manufacture an efficient, strong, integral tube has been provided which will resist and materially reduce chipping and breaking. The disc-like plugs are of very light weight and would add little to the shipping cost of the tube and would not increase the space required for the shipping and packaging of these tubes.

It will also be seen that an effective plug has been provided to reinforce highly frangible tubes and to materially reduce breakage and chipping in the shipping and storage of such tubes. These plugs are of very light construction and being placed within the tube, take up no additional space in shipping and packing and add little, if any, appreciable weight. A type B plug will actually save shipping space by providing a means of retaining a small, frangible tube concentrically within a larger tube and reinforcing both tubes to resist chipping and breakage. The actual strengthening of the frangible tubes by such an inserted plug member, is surprisingly great when the highly frangible character of the tube is considered. It has been found, however, that chipping and breakage can be very materially reduced by the use of such reinforcing plugs. The problem is greater in shipping sectional, frangible tubes than if such tubes were of unitary construction because the material used in binding the sections together is bonded to the exterior periphery of the sections by only spotted applications of a bonding material. This allows movement between the sections and displacement which makes the edges of each section and the ends of the tube formed, more susceptible to chipping and breakage. By placing a member within the tube formed to embrace and strengthen the interior periphery of the tube, a comparatively strong, stable unit can be constructed from a structure in which the abutting sections were previously susceptible of displacement.

It will of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention.

What I claim is:

1. As an article of manufacture, a sectional, frangible tube constructed for shipment and storage, comprising a pair of cooperating, semi-tubular sections constructed of highly frangible material, said sections being positioned with their corresponding edges substantially in abutment, a plurality of integral plug elements interposed between said sections and having peripheries closely conforming to the internal periphery of said assembled sections, a flexible wrapping surrounding at least the greater portion of said sections and having overlapping edges, and means for temporarily securing said overlapping edges to retain said sections against said plug elements.

2. A sectional, frangible tube constructed for shipment and storage, comprising a pair of cooperating semi-tubular sections constructed of

highly frangible material, said sections being assembled with their corresponding edges substantially in abutment, a pair of integral plug elements each being positioned within one of the ends of the assembled tube and conforming in peripheral shape to the interior thereof, a flexible wrapping surrounding at least a portion of the assembled tube and retaining said sections against said plug elements, and means for temporarily securing said wrapping to said sections.

3. As an article of manufacture, a sectional frangible tube constructed for shipment and storage comprising precisely as essential elements a pair of semi-tubular sections having longitudinally abutted edges, a plurality of integral plug members inserted into the opening formed by said abutted sections to closely conform to the internal periphery thereof, a flexible wrapping surrounding said sections and releasably adhered thereto to permit said sections to be opened and said plug elements removed to permit functional use of said tubes substantially as described.

GEORGE A. KINGSTON.

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