Dec. 19, 1939. F. W. SULLIVAN 2,183,876

PACKAGE FOR A LENGTH OF TUBULAR MATERIAL

Filed Feb. 19, 1938

Fig. 1.

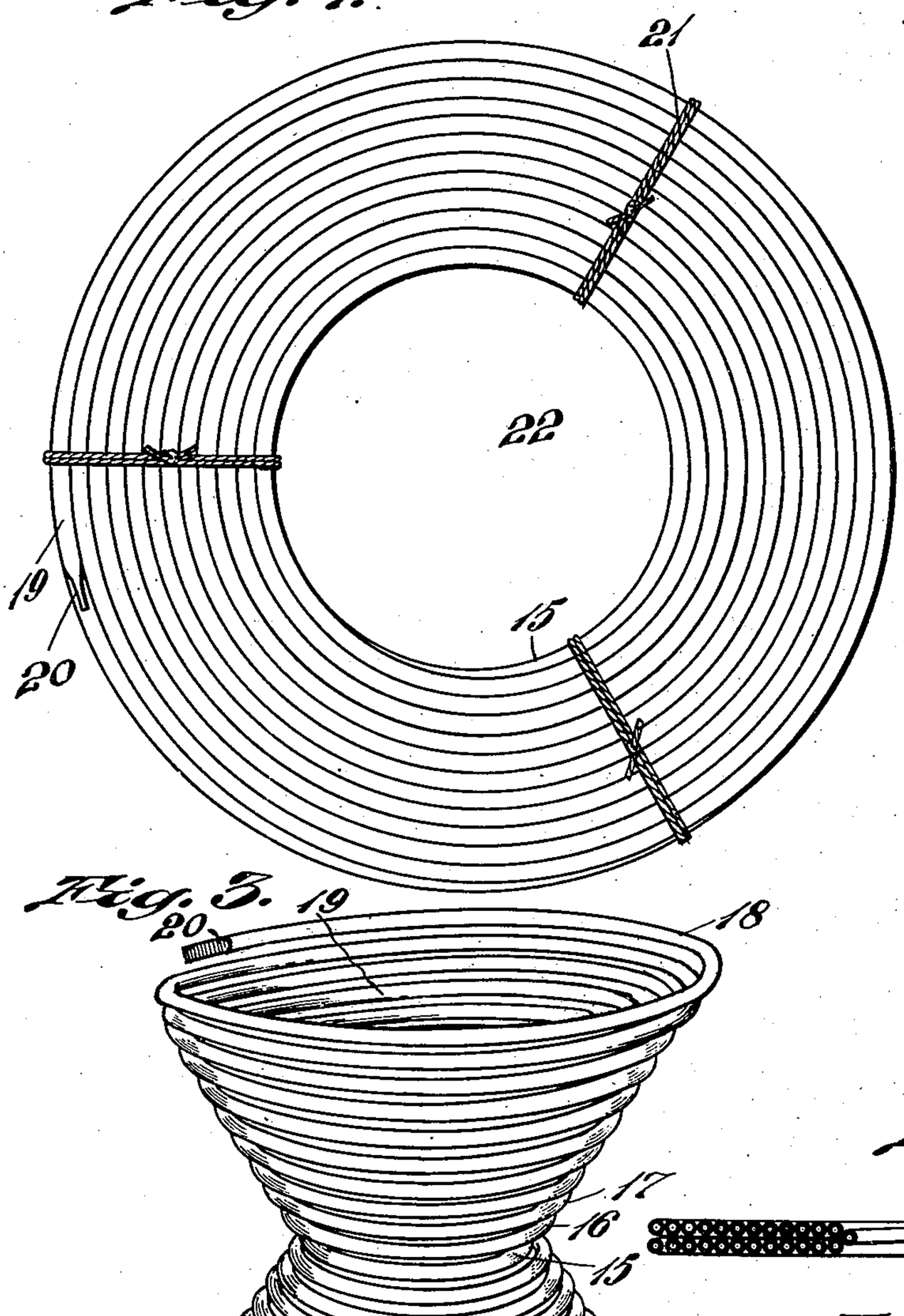

Fig. 2.

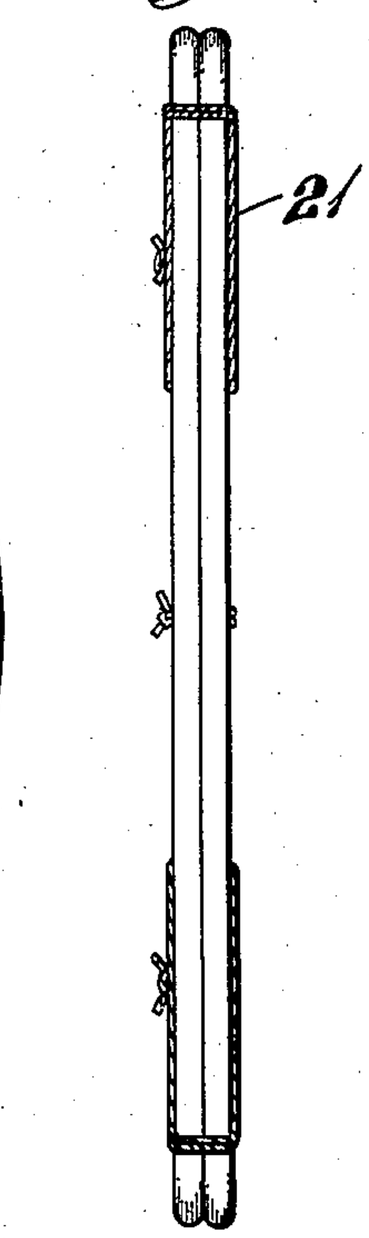

Fig. 3.

Fig. 4.

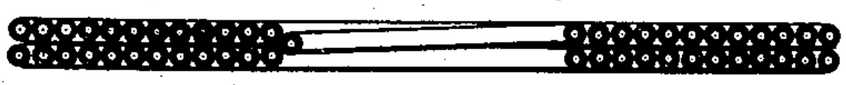

Fig. 5.

Fig. 6.

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PACKAGE FOR A LENGTH OF TUBULAR MATERIAL

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Application February 19, 1938, Serial No. 191,428

2 Claims. (Cl. 206—59)

This invention relates to the packaging of tubular material; and has for one of its objects to provide a compact package in which the tube will have no small internal diameter and in which one coil will be so supported by another that chattering due to transit will not dent the surfaces of the tube.

Another object of the invention is the method of winding such a coil so that it may be mechanically formed.

Another object of the invention is to provide a package of tubing which is so arranged that the tubing may be wrapped with a cover of paper or the like in a machine for accomplishing this purpose.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is a top plan view of a package formed in accordance with this invention;

Fig. 2 is an end elevation thereof;

Fig. 3 is a perspective view of the tube coiled in hourglass form prior to shortening of its axial length

Fig. 4 is a sectional view of the formation of Fig. 3 after being flattened;

Fig. 5 is an enlarged sectional view diagrammatically showing the position of the coils of the tube at the center portion of the arrangement shown in Fig. 3;

Fig. 6 is a view similar to Fig. 5 after the coils have been moved together into the position shown in Fig. 4.

Tubing is largely used in industries at the present time, particularly for refrigerating installations. This tubing is usually of a relatively thin wall copper material although thin wall aluminum, steel or tubing of other material is equally within the purview of this invention. Tubing of this character has heretofore been coiled either in the form of a helix with each of the revolutions of the tube being of equal diameter and packed in a container which occupies a considerable length in the axial extent of the helical coil, or the tubing may be coiled in what is known as a "pancake" coil which is in the form of a spiral with each of the convolutions in substantially a single or the same plane; and in order that the proper length of tubing be had in such a pancake coil the inside coil and adjacent coils are of so small a diameter that they will kink and produce trouble in connection with an attempt to straighten them out such as in use.

The package which I provide avoids the objection of each of these previous used packages in that it is compact in its axial extent and yet the inside diameter of the convolutions of the tubing are sufficiently large so that no kinking or other trouble is had when in use. Further, my coil provides the additional advantage with respect to the "pancake" coil of having both of its ends at the outer surface where they are readily accessible and the advantage of its layers being so supported one from the other that the unit package may be placed in a wrapping machine and wrapped with paper, which cannnot be accomplished on the previous pancake package; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawing, I have illustrated in Fig. 3 the closed end 10 of a length of tubing 11 which is coiled in such a manner that progressively each convolution is smaller than the previous convolution and the convolutions are raised one higher than the other. That is, the lower or first convolution 12 is larger than the next convolution 13 and the convolution 13 larger in diameter than the next convolution 14, while each is raised higher than the other until one-half of the length of the tube which is to be coiled is so arranged, the inside or smaller diameter being designated by the convolution 15. From this point the next convolution 16 is larger and higher than the convolution 15 while the next following convolution 17 is larger and higher than the convolution 16, as shown in Fig. 3. The last convolution 18 terminates in an end portion 19 closed as at 20, the entire arrangement being in hourglass shape. This coiling may be readily had mechanically by progressively and simultaneously adjusting the three or more guiding helically grooved rolls about which the tubing is coiled.

After this hourglass formation of the tubing is had I find that by axial pressure upon the outer convolutions the structure may be flattened into two layers of tubing, as shown in Figs. 2 and 4, in which the tubing is spirally arranged in two layers. The tube will be so arranged with one portion substantially on top of the other, as shown in Fig. 4 (or possibly slightly to one side or the other of a direct alignment of their centers parallel to the axis of the coil) so that the spiral coil in one layer supports the spiral

coil in the other layer. In Fig. 1 it will be noted that the coil spirally progresses from the end portion 19 in Fig. 1 inwardly with each of the convolutions in the same plane and then the center convolution 15 moves from the plane of this spirally coiled layer to an adjacent plane and then progressively increases in diameter with each convolution in contact with the convolution of the other spiral layer to its terminus 10.

On a more enlarged scale in Figs. 5 and 6 the coils are shown in section in their relative arrangements so that it will be clear that upon axial pressure the convolutions will move from the hourglass position first provided as in Fig. 5, to the position shown in Fig. 6 where the coils are supported one upon the other in the two spiral layers. A package thus formed may be provisionally bound by some tie cords 21 and is of sufficient strength by reason of one spiral layer supporting the next spiral layer so that it may be placed in a wrapping machine, a paper, or other cover wrapped about the coil.

The opening 22 in the package is of sufficiently large diameter so that the inner convolution 15 does not kink when the tubing is used.

The package is compact and occupies less than one-third the space of a package containing the same amount of material coiled by the old method.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. A self-supporting package of a single length of malleable metal tubing comprising a spirally coiled layer of tubing in substantialy a single plane with the convolutions of the tube closely adjacent each other and then extending to a different plane and providing a spirally coiled layer with the convolutions also closely adjacent and lying in substantially a single plane, and means to bind said layers into juxtaposed mutually supporting relation one with the other.

2. A self-supporting package of a single length of malleable metal tubing comprising a spirally coiled layer of tubing in substantially a single plane with the convolutions of the tube closely adjacent each other and with the end of the tube in the outer convolution, the tube extending from the inner convolution to a different plane and providing a second spirally coiled layer with the convolutions also closely adjacent and lying in substantially a single plane and with the end of the tube in the outer convolution, and means to bind said layers into juxtaposed mutually supporting relation one with the other.

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