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SHOTGUN SHELL TUBE OR CARTRIDGE

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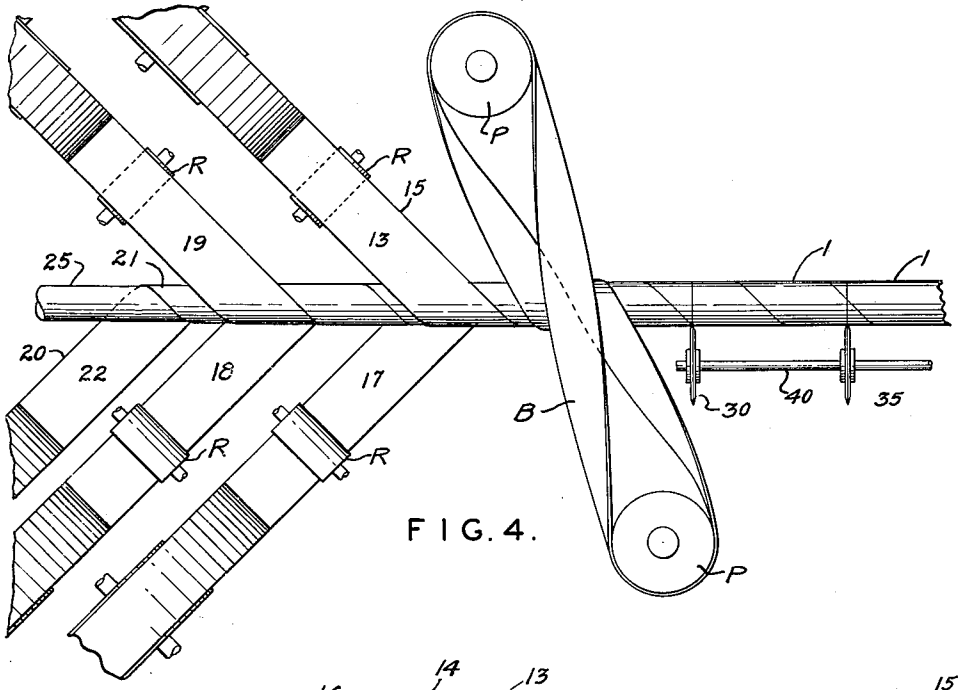


FIG. 4.

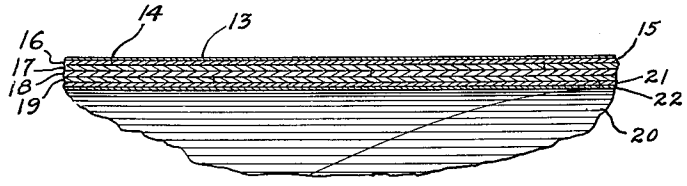


FIG. 3.

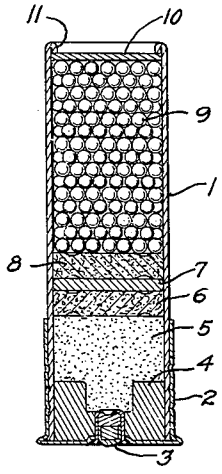


FIG. 1.

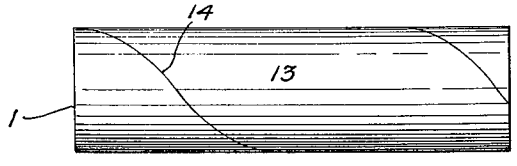


FIG. 2.

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SHOTGUN SHELL TUBE OR CARTRIDGE

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This invention relates generally to a cartridge for a shotgun, and more specifically to a novel shell tube or casing for a cartridge, together with the method of manufacturing the same.

It is customary in the formation of shell tubes for shot shells to roll sheets of paper which have been covered with paste or other adhesive upon a mandrel in such a manner that the wall of the tube is composed of spiral convolutions of paper. In this process, a plurality of shell tubes are made simultaneously by selecting a sheet of paper of a sufficient length. Subsequent to winding, the tube is severed at a plurality of spaced intervals of the correct length to form a shell tube for a shot shell.

In order to waterproof the shell tube and to prevent internal charring of the paper upon firing of the cartridge, it is necessary to apply to the sheet a coating material in precise zones. These coatings are well known in the art, and the use of wax, pitch, or asphalt for this purpose provides the necessary characteristics to absorb the heat of the burning powder so as to prevent charring and waterproof the shell tube against moisture. Any coating which is waterproof and will dissipate heat rapidly has been deemed suitable for the purpose.

This invention does not exclude the use of conventional coatings heretofore used where these are desirable, but one object of the invention is to construct a shot shell tube which has all of the desirable characteristics of a metal tube and yet is cheaper to manufacture than the conventional shotgun shell tube.

According to this invention, the inner surface of the shot shell tube is provided with a liner of aluminum foil which is impervious to gases and moisture, and resistant to charring in that the foil reflects and dissipates heat very rapidly. This is due to the inherent characteristics of the aluminum foil, which has a bright heat reflecting surface and high heat conductivity. As a further insurance against penetration of moisture, the outer surface of the shell tube may also be covered with a wrapper of aluminum foil which may be attractively colored and decorated, if desired, by anodizing or printing.

While it might be possible to manufacture a shotgun shell casing with an inner metallic liner and an outer metallic wrapper by present processes, in which the shell tube is convolutely wound, it would require a composite sheet of paper and foil with precise zones, of precise length, having strips of metallic foil of precise width. It is therefore inescapable that the shell tubes would be more expensive to manufacture than those presently on the market. Applicants have found, however, that by departing from the conventional manufacturing processes, it is possible not only to obtain the advantages inherent in such a construction, but also to lower the manufacturing costs to one competitive with conventional shot tubes. In this novel process for manufacture, paper tapes are helically wound on a mandrel in such a manner that the edges of a single tape form a tight butt joint, and these joints are staggered throughout the length of the tube. This forms a continuous tube, which may then be severed

at intervals to form shot shell tubes of the required length. The machine used in this process is the same as that used in the manufacture of paper cans, and the resulting product is a shot shell tube with, what might be termed, spirally-wound layers of paper. This can better be defined as helically-wound layers to differentiate from the spiral formed in convolute winding. The inner and outer tapes are preferably composite sheets of paper coated with aluminum foil so as to form the inner liner and outer metallic wrapper. The other layers of paper need not be of the highest quality in order to perform successfully. If desired, a final waterproofing step may be performed on the shot tubes by a simple dipping process.

Illustrated and described hereinafter is a single preferred form of the invention, together with the preferred manner of manufacturing the invention. Further objects and advantages will appear as this description proceeds, when taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of a shotgun shell.

Fig. 2 is a view illustrating the exterior of a shell tube such as used in the shell shown in Fig. 1.

Fig. 3 is a fragmentary section on an enlarged scale illustrating the construction of the shell tube shown in Figs. 1 and 2; and

Fig. 4 is a schematic view illustrating the apparatus and manner of manufacture of the shell tubes shown in Figs. 2 and 3.

Since the invention here is concerned primarily with the shell tube construction and its method of manufacture, a detailed description of the construction of a shotgun shell does not appear necessary for a complete understanding of the invention. However, in Fig. 1 the construction is shown generally.

The shot tube **1**, later to be described in detail, has a metallic cap **2** closing one end thereof, in which is located a primer **3**. Surrounding the primer **3** is a base **4** which supports the powder charge **5**. This charge may be confined by several wads such as **6**, **7** and **8**, the upper one of which is a short wad constructed to propel the shot pellets **9** from the shot tube. These pellets are, in turn, confined within the tube by a wad **10** held in place by the crimped edges **11** of the shot tube.

Fig. 2 illustrates a shot tube before being assembled and loaded. As will be seen, the shot tube **1** has an outer metallic wrapper **13**, which is a continuous strip, helically wound, as at **14**. The enlarged section in Fig. 3 clearly illustrates the construction of the shot tube. The outer layer is a composite sheet **15** formed of a metallic foil **13** and a similar paper tape **16**. Several intermediate layers of paper have been shown, such as **17**, **18** and **19**. These are added for strength purposes only, and to form a tube of suitable thickness to fit the firing chamber of the gun. The liner **20** is of metallic foil formed by helically winding a composite sheet formed of a layer of paper **21** and a strip of metallic foil **22**.

Method of manufacture

Fig. 4 illustrates a machine for winding the shot shell tubes in a continuous manner, and cutting them into proper length. This machine has a mandrel **25** for determining the internal size of the shot shell tube. In this particular case, the tube is formed of five layers, **15**, **17**, **18**, **19** and **20**. Consequently, there are five tapes, **15**, **17**, **18**, **19** and **20** fed into the machine from suitable rolls supported at an angle to the mandrel **25**. The tapes **15**, **17**, **18**, and **19** pass over suitable adhesive-applying rollers, indicated as R, which coat the inner side of each of these tapes. The inner sides of both tapes **15** and **20**

carry the metallic foil strips **13** and **22** so as to provide the liner and the wrapper of metallic foil.

Pulleys P, one of which is power driven, support the belt B, which is wrapped around the mandrel **25** and frictionally engages the outer surface of the tape **15** so as to simultaneously rotate the tube and cause it to traverse the length of the mandrel **25** from left to right. A traveling series of knife blades such as **30** and **35** are mounted on a shaft **40** in such a manner as to engage the tube and travel with it during engagement so as to sever it into the shot tubes **1**, as illustrated.

It is contemplated that the tube may be composed of different numbers of layers and of different kinds of coated or uncoated tapes; likewise, that the apparatus upon which the tubes are made may take other forms, all of which come within the scope of the appended claims.

We claim:

1. A shotgun shell of the type having a tube and a base mounted thereon, said tube comprising separate layers of helically wound paper tape with joints in successive layers in staggered relation and with said separate layers secured together to form an integral tube.

2. A shotgun shell of the type having a tube and a base thereon, said tube comprising a plurality of separate, concentric, helically wound layers of paper tape wound one upon the other with joints in successive layers in staggered relation and with separate layers secured to form an integral tube, said tube including an inner layer of paper tape with a metal coating.

3. A shotgun shell of the type having a tube and a base thereon, said tube comprising, a plurality of separate, concentric, helically wound layers of paper tape wound one upon the other with joints in successive layers in staggered relation and with separate layers secured together to form an integral tube, one of said layers of paper tape being a composite tape of a metal foil on a paper tape backing.

4. A shotgun shell of the type having a tube and a base thereon, said tube comprising, a plurality of separate, concentric, helically wound layers of paper tape wound one upon the other with joints in successive layers in staggered relation and with separate layers secured together to form an integral tube, said tube including an inner layer and an outer layer of paper tape with each of said layers having a metal coating.

5. A shotgun shell of the type defined in claim 4 in which said inner layer of paper tape and said outer layer of paper tape are formed of paper tapes with a metal foil on a paper tape backing to provide the inner and outer metal coating.

6. A shotgun shell of the type having a tube and a base thereon, said tube comprising, a cylinder formed of a plurality of separate, concentric layers of paper tapes, each tape being helically wound to form a single layer, and said layers being helically wound in a concentric manner one upon the other with joints in successive layers in staggered relation and with separate layers secured to form an integral tube, said tube including an inner layer and an outer layer of paper tape with each layer having a metal coating arranged to form a metal liner and wrapper for said tube.

7. A shotgun shell of the type having a tube and a base thereon, said tube comprising a plurality of separate, concentric cylindrical layers of paper tape, each paper tape being helically wound one upon the other to form said separate, concentric cylindrical layers of paper tape with joints between tapes in successive layers in staggered relation, and said layers of paper tape being secured together to form an integral paper tube.

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