July 24, 1934. A. G. SCHURICHT 1,967,844

SHOT SHELL TUBE

Filed June 30, 1932

Fig. 1.

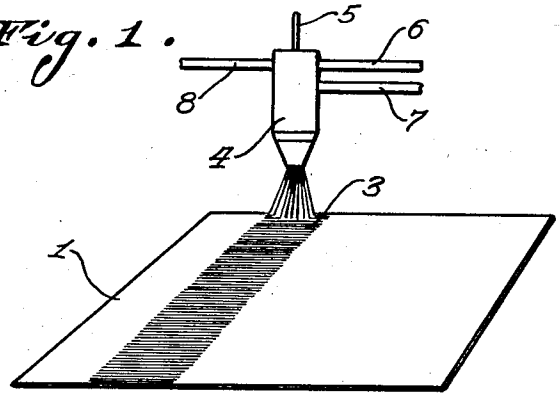


Fig. 3.

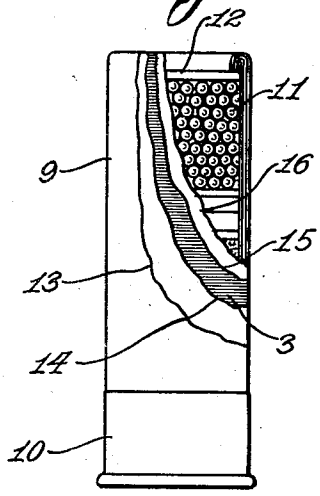


Fig. 2.

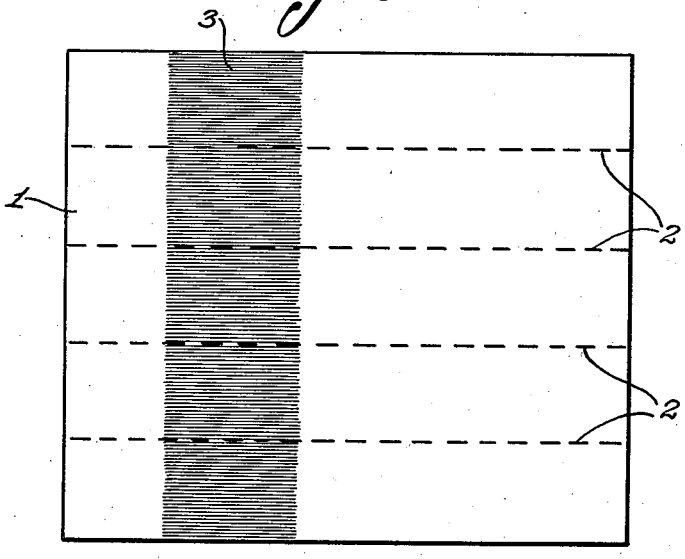


Fig. 5.

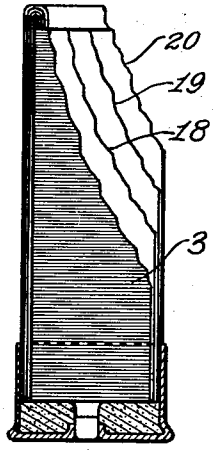
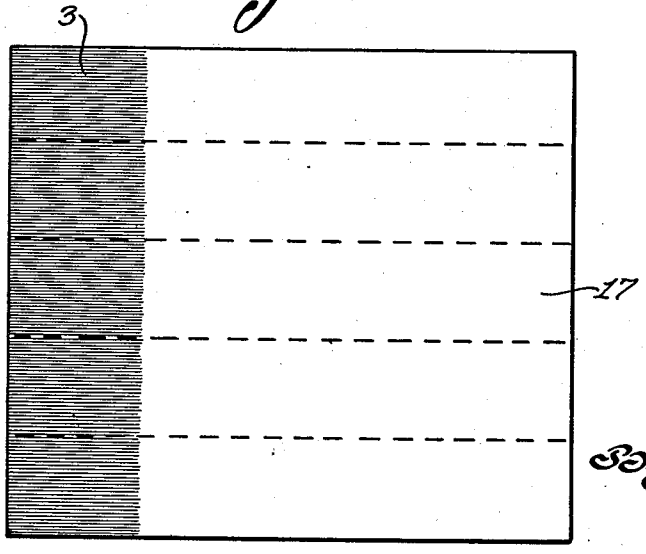


Fig. 4.



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SHOT SHELL TUBE

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Application June 30, 1932, Serial No. 620,190

3 Claims. (Cl. 93—94)

This invention relates generally to shot shells, and particularly to a method of manufacturing shot shell tubes whereby the same are rendered impervious to powder gases and the usual charring or burning is reduced.

The ordinary shot gun shell consists of a paper tube comprising a plurality of convolutions upon one end of which there is mounted a metallic head and in which there is contained a charge of powder and shot suitably wadded. In the manufacture of shot shell tubes the customary procedure is to roll a sheet of paper of sufficient length to form four or five tubes into a long tube. This roll generally comprises four or five convolutions and after being wound on a suitable mandrel and joined together by adhesive or cement the long tube may be cut to form shot shell tubes of an appropriate length. It is well known, however, that paper is not itself impervious to the penetration of hot powder gases and consequently efforts have heretofore been made to so treat shot shell tubes so as to render the same more gas-proof. Furthermore an ordinary paper shot shell tube will ordinarily badly char or burn, especially the inner convolutions thereof which are exposed to fire. This burning weakens the tube to such an extent that it will either cut off completely, fracture or split. Among the efforts which have heretofore been made to overcome these unfavorable conditions which are present in ordinary paper shot shell tubes is the provision of a suitable gas proofing and heat absorbing medium between the convolutions of the tube. Thin sheets of metal foil have been inserted as metal inlays for this purpose, but it will be understood that considerable difficulty and additional manufacturing expense is encountered when this procedure is followed. The sheet of metal foil although satisfactory in that it provides not only a gas proof wall but also reduces the burning or charring and consequently avoids disadvantages of cut offs and fractures of the tube, is, nevertheless disadvantageous from the manufacturing standpoint. It is among the objects of the present invention therefore to provide a shot shell tube and the process of making the same whereby all the advantages of metal foil inserts in shot shell tubes may be taken advantage of and the process of manufacture at the same time so simplified as to render the metallic treatment of shot shell tubes practical.

An object of the present invention generally stated is to provide a process of applying a coating of metal or other gas-proofing and char-reducing material to shot shell tubes.

A further object of this invention is to provide a shot shell tube having a metallic film in the walls thereof and so constructed and arranged that the metallic film does not interfere with the action of the usual adhesive.

A more specific object of this invention is to provide a process of making shot shell tubes wherein the treating material is applied to the shot shell tube paper as a spray.

Other objects will become apparent to those skilled in the art when the following description is read in connection with the accompanying drawing, in which:—

Figure 1 is a perspective view illustrating one form of apparatus for applying the tube treating material in accordance with the present invention.

Figure 2 is a plan view of a sheet of paper treated in accordance with the present invention.

Figure 3 is a detail view of a loaded shot shell, the tube of which is formed from a sheet of paper treated as shown in Figure 2 and having a section torn away to expose the convolutions.

Figure 4 is a plan view of a sheet of paper treated in accordance with the present invention and having the treated portion in such position that the material deposited will form the innermost wall of the tube.

Figure 5 is a longitudinal sectional view of a shot shell tube formed from a sheet of paper treated in accordance with Fig. 4.

In accordance with the present invention generally stated a film of suitable material adapted to render shot shell tubes impervious to hot powder gas and prevent weakening or fracturing of the tube incident to burning or charring is applied to a portion of a sheet of paper which is subsequently to be rolled into tube form. In accordance with the present invention a film of such material is sprayed on to a sheet of paper, it being understood that the material is first reduced to liquid form and then atomized by suitable mechanism. In this manner it is possible to accurately control the thickness of the coating applied and in case of metal the coating adheres very firmly to the paper and is non-porous and dense. The reason that the coating adheres firmly to the paper is because of the fact that the metal when sprayed on the paper penetrates and sinks into the porous surface of the sheet. This not only permits the sheet to be readily rolled into a closely wound tube avoiding displacement, as distinguished from where a loose sheet of metal is employed, but it also improves the structure of the resultant shell and

avoids burning or charring which would cause weakening or fracturing of the tube. It will be understood that it is not necessary to coat the entire sheet of paper which is subsequently to be wound to tube form but only sufficient thereof to constitute one complete convolution of the tube need be coated. In view of the fact that the coating or treating material when applied in accordance with the present invention adheres very firmly to the sheet of paper it is apparent that the entire sheet, if desired, may be coated since the presence of the film or coating does not interfere with the action of the usual cement or adhesive. Ordinarily, however, only one or two convolutions of the tube will be coated and it will be understood that these convolutions will be either in such position as to form interior walls of the tube or such as to form the innermost wall which will be in contact with the charge. Tubes treated in accordance with the present invention advantageously lend themselves to the usual water proofing treatments.

Referring now particularly to the drawing for an illustrative embodiment of the present invention which will be described with particular reference to the application of metal as a spray, a sheet of paper 1 is shown which in accordance with the usual practice is of such size that the same may be sub-divided along lines 2 so that in the embodiment illustrated the sheet after being rolled into tube form may be subdivided axially to form individual shot shell tubes of the desired length. In the embodiment illustrated the sheet 1 is provided with a coating 3 of metal which may be for instance copper, aluminum, zinc, lead, tin, iron, nickel, or any of the various alloys. It will be understood, therefore, that the invention is not limited to the use of any particular material or metal but that practically all metals may be applied in accordance with the present invention and advantageous results achieved. In accordance with the present invention the coating 3 is as before mentioned applied in the form of a spray. The metal may first be reduced to liquid form and applied through a suitable atomizing nozzle. In the embodiment diagrammatically illustrated in Figure 1, however, the metal is fed to a nozzle 4 in the form of a wire 5. As the wire 5 passes through nozzle 4 the same is melted by means of a suitable flame, as for instance an oxy-hydrogen or oxy-acetylene flame. The oxygen, for instance, may be introduced into nozzle 4 through a suitable conduit 6 while the hydrogen or acetylene may be introduced through conduit 7. It will be understood that the gas after leaving the respective conduits may be fed to a nozzle in such manner as to produce the hot flame well known to those skilled in the art. The nozzle 4 may also be supplied as through a conduit 8 with compressed air which may, for instance, be so directed as to atomize the metal of wire 5 when it is melted at the hot flame within nozzle 4. The atomized metal may then be sprayed directly on the sheet of shot shell paper as illustrated in Figure 1. In this manner the metal is readily applied to the paper and the thickness of the coating may be controlled within narrow limits. It is possible in accordance with the present invention to spray on a coating of metal which is non-porous and dense at any thickness varying from 0.001 inches upward to any desired thickness.

The area or section of the sheet of paper which is covered by the coating 3 may be readily controlled in accordance with the present invention. In the embodiment illustrated in Figure 2 the width of the coating 3 will be understood to be slightly in excess of the circumference of the finished tube. In this manner the position of the coating 3 with reference to the marginal edges may be accurately controlled and when of this width it will be understood that the coating will form at least one full convolution of the tube. In the embodiment illustrated in Figure 2 the position of the coating 3 with reference to the edges of the sheet 1 is such that the coated convolution will appear as one of the interior convolutions of the finished tube.

In Figure 3 there is illustrated a loaded shot shell comprising a tube 9 constructed in accordance with the Figure 2 and having the usual base cup 10. A portion of the tube is broken away to expose the shot charge 11 and wad 12. As illustrated in Figure 3 the tube comprises four convolutions, the edges of which are indicated as 13, 14, 15 and 16. The convolution whose edge is indicated as 15 is the coated convolution which, it will be apparent, is next to the innermost convolution. It will be understood, however, that the position of the coated convolution may be varied as is desired.

In the embodiment illustrated in Figure 4 the coating 3 is applied to a sheet 17 in such position that when wound to tube form it will form the innermost convolution or interior wall of the shot shell tube. In Figure 5 there is illustrated a sectional view of a shot shell the tube of which is wound from a sheet of paper 17. In this embodiment the coating 3 forms the wall which comes into contact with the charge contained within the tube while as shown the next succeeding convolutions indicated as 18, 19 and 20 are untreated.

From the foregoing description it is apparent that many modifications of a shot shell tube and the process of making the same hereinbefore described will present themselves to those skilled in the art without departing from the spirit of this invention. It is to be understood that the invention is not limited to the specific details set forth for the purpose of illustration or herein referred to. It is to be understood, therefore, that such modifications and the use of such individual features and subcombinations of features as do not depart from the spirit of this invention are, although not specifically described herein, contemplated by and within the scope of the appended claims.

Having thus described the invention what is claimed is:

1. In the art of making shot shell tubes, the process comprising, spraying metal on a sheet of paper, and rolling the sprayed sheet to form a closely wound hollow tube.

2. In the art of making shot shell tubes, the process comprising, spraying metal on a section of a sheet of paper having a width substantially equal to the circumference of a finished tube, and rolling the sprayed sheet to form a hollow closely wound tube.

3. A shot shell tube comprising a series of convolutions of paper, and a coating of metal penetrating the paper and firmly adhering to one of the convolutions.

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