UNITED STATES PATENT OFFICE.

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SHOTGUN-SHELL.

1,340,245. Specification of Letters Patent. Patented May 18, 1920.

No Drawing. Application filed May 23, 1919. Serial No. 299,326.

To all whom it may concern:

Be it known that I, HARLEY T. PECK, a citizen of the United States, residing at Lebanon, in the county of Warren and State of Ohio, have invented certain new and useful Improvements in Shotgun-Shells, of which the following is a specification.

This invention has for its object the provision of shot gun shells made of paper or similar fibrous material which shall be of improved construction and operation, and also the provision of an improved method of manufacturing such shells.

Persons familiar with the use and manufacture of paper shot gun shells are acquainted with a defect frequently present in such articles and commonly known as "cut off". This term has reference to the rupture of the fibrous material of which the shell is composed when the shell is fired. The cutting off usually occurs at the edge of the metallic cup with which the shell is equipped and is largely due to the effect of the heat produced by the combustion of the powder when the shell is fired. The hot flame from the burning powder penetrates the pores of the paper shell and destroys the strength of the fibers so that the shell breaks under the pressure of the explosion. The liability to cut off varies somewhat with atmospheric conditions and is increased by the absence of moisture in the air.

To overcome this defect I treat the paper of which the shells are composed with a lubricating material which is non-combustible in the ordinary sense in which the word non-combustible is used. This does not mean that the material need be absolutely proof against oxidation, but that it is not injuriously affected by the temperatures produced by the explosion of the powder or propellent material within the shell.

Various materials may be used for this purpose, among which are graphite, either natural or artificial, finely powdered metals which have lubricating qualities, such as lead, tin, copper, aluminum and brass, and powdered minerals, such as mica, talc, and silky and serpentine asbestos. These materials when used as an ingredient for treating paper shot gun shells in the manner hereinafter described will penetrate the pores of the paper and the spaces between the fibers of the paper in such a manner that the paper will present to the flame of the burning powder a non-combustible and heat-proof wall. The cellulose of the paper is thereby protected from burning and will retain its original strength and elasticity and resist the tendency to cut off or separate.

The fire-proofing ingredients for the paper shells are preferably first reduced to an exceedingly fine powder and the ingredients may then be mixed with the paste or adhesive material with which the paper shell tubes are rolled. The fire-proofing material may also be applied by coating the material of the finished paper shell tube with the powdered material in dry form or mixed with varnish, paint, paste, etc. Another method of impregnating the paper with the fire-proofing material is by mixing the fire-proofing material with the substances from which the paper sheet for the shells are originally made. When the fire-proofing material is applied as part of the paste with which the tubes are rolled, the powdered metals named above may be further useful in imparting to the exterior of the paper shot gun cartridge a metallic finish or color of various shades. In addition to preventing the injurious effect known as cut off the treatment of shells in the manner described also has the effect of rendering the shells water-proof without the necessity of the usual coating of oily or greasy materials now applied to the shells. The various substances named above in addition to being substantially fire-proof have lubricating characteristics which render the paper treated by them proof against the effects of moisture, and a shell rendered water-proof in accordance with the present invention is superior to a shell treated with greases and oils, for the reason that the greases and oils used for this purpose have been found to produce injurious effects by being absorbed by the propellent powder of the cartridge under certain conditions of high temperatures and have resulted in destroying the ballistic qualities of the cartridge.

I claim:—

1. A shot gun shell comprising walls made of fibrous sheet material, said sheet material having finely divided graphite included within the body thereof, said sheet material being arranged to form the outer wall of said shell and having its outer surface exposed.

2. A shot gun shell comprising walls

made of fibrous material having finely divided graphite included within the body thereof and disposed upon the outer surface thereof to protect said fibrous material from the heat caused by the explosion of firing the charge within said shell, the surface of said fibrous material being arranged to constitute the outer exposed surface of the walls of said shell.

3. A shot gun shell comprising walls made of combustible material and having said material impregnated with finely divided graphite to protect said material from the effects of heat caused by the explosion of the firing charge within said shell, the surface of the material thus treated being arranged to constitute the outer exposed surface of the walls of said shell.

In testimony whereof I have signed my name to this specification on this 19th day of May, A. D. 1919.

HARLEY T. PECK.