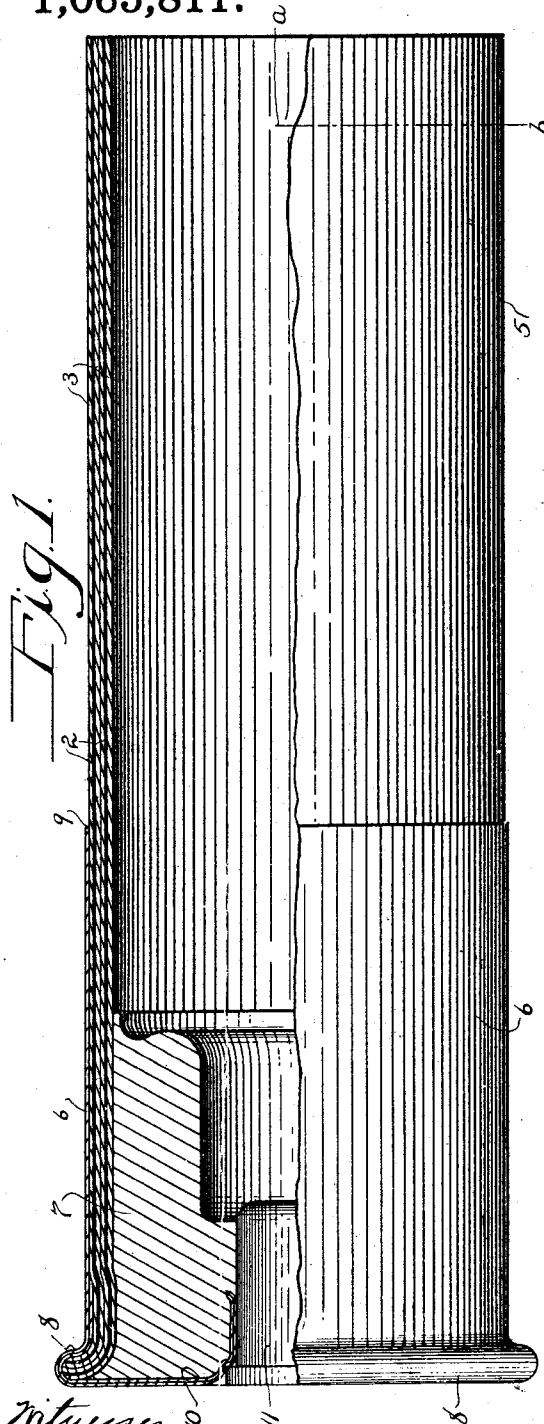


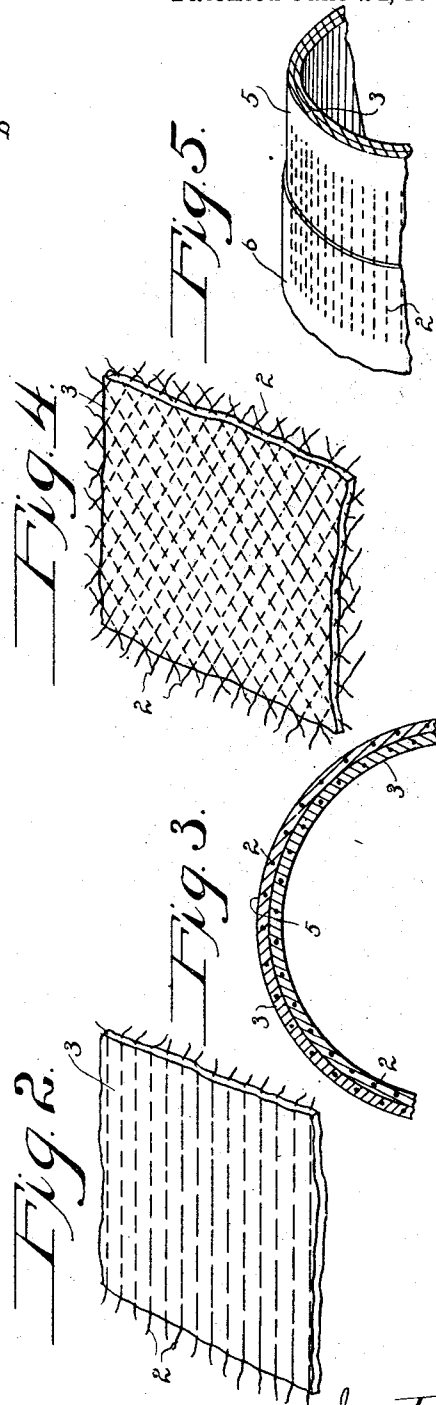
T. C. JOHNSON.
PAPER SHOT SHELL.
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1,065,811.

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UNITED STATES PATENT OFFICE.

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PAPER SHOT-SHELL.

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To all whom it may concern:

Be it known that I, THOMAS C. JOHNSON, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Paper Shot-Shells; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application, and represent, in—

Figure 1 a view in central longitudinal section of a paper shot-shell constructed in accordance with my invention. Fig. 2 a broken perspective view showing a section of paper shot-shell tube paper in which reinforcing threads have been embedded. Fig. 3 a broken sectional view on the line *a-b* of Fig. 1. Fig. 4 a perspective view of a fragment of paper shot-shell tube paper in which the reinforcing threads are arranged diagonally. Fig. 5 a sectional view of a modified form of reinforced paper shot-shell paper in which the reinforcing threads are localized.

My invention relates to an improvement in paper shot-shells in the manufacture of which a short tube of paper is inserted at one end into a drawn sheet metal cap and fixed therein by the outward pressure of a paper base-wad consisting of a coil of paper condensed under great pressure after its introduction into the tube. Paper shot shells so made were loaded for a great many years with black powders which did not develop pressures great enough to cause the paper to "cut off" at the mouth of the metal cap to any extent. The term "cut-off," I may here explain, is the term generally used by the consumer to describe the separation of the projecting forward end of the paper tube from that portion of it within the cap when the cartridge is exploded in the gun, with the result that the forward end of the tube is left in the said chamber when the cap is extracted therefrom, entailing delay and annoyance, since special means must then be resorted to to remove the cut-off portion of the tube from the cartridge-chamber in the gun-barrel. However, since the public began between fifteen and twenty years ago to demand the loading of the paper shot shells with smokeless powders developing high

pressure, "cut-offs" have been a source of trouble and annoyance to all users of paper shot shell ammunition. The difficulty has seemed largely beyond control, and to vary with the seasons and atmospheric changes, as well as with the intrinsic character of the paper employed in the production of the tubes, the character of the waterproofing material used, the age of the shells, the character and hygroscopic condition of the powder used, etc.

A great variety of expedients have been adopted by makers of paper shell ammunition to eliminate "cut-offs" for which different reasons have been advanced by different experts. The whole question is made difficult of explanation and solution by the fact that cut-offs take place at the instant of firing when the shell is in the cartridge-chamber of the gun-barrel and therefore where it cannot be observed. It seems clear, however, that at the moment of firing the paper and metallic portions of the shell are diametrically expanded and forced into intimate contact with the walls of the cartridge-chamber in the gun-barrel. If both the paper tube and metal cap should at this time be held against any longitudinal movement whatsoever, except longitudinal movement together, it would appear that cut-offs would not take place. However, in case at the time of firing there is any unoccupied space, however small, between the head of the cap and the front end or face of the breech-closure, the pressures developed by the ignition of the powder will set the cap back into contact with the breech-closure. This results in the tearing away or cutting off of the paper along the edge or mouth of the cap for the reason that the exposed paper projecting beyond the edge or mouth of the cap has at this time been forced into intimate contact with the walls of the cartridge chamber and so firmly held there by the force of explosion that it cannot move rearward with the cap to which its inner end is fastened. A great variety of expedients have been, as aforesaid, employed for preventing cut-offs, but thus far they have been only measurably successful.

The object of my invention is to produce a paper shot-shell which will not be affected, so far as cut-offs are concerned, by age or atmospheric variations, and which will reduce cut-offs to a negligible percentage.

With these ends in view, my invention consists in a paper shot-shell comprising a paper tube, a sheet-metal cap and a condensed base-wad, the paper tube being provided with reinforcing strands located at the mouth of the metal-cap and extending forward and rearward of the edge thereof.

My invention further consists in a paper shot shell comprising a paper tube, a sheet metal cap, and a condensed base-wad, the paper of the tube being furnished throughout its length with embedded reinforcing strands.

My invention further consists in a paper shot-shell having certain details of construction as will be hereinafter described and pointed out in the claim.

In carrying out my invention as herein shown, I embed in any of the ways understood by paper manufacturers, threads 2 of silk, linen or other strong fiber, in the sheets of paper 3 especially manufactured for being coiled into tubes to be subsequently cut up into paper-cartridge shell lengths. The threads 2 may be arranged longitudinally with respect to the axis of the shell, as shown in Figs. 2 and 3, or they may be arranged diagonally as shown in Fig. 4, or in any other way which will accomplish the desired result. A sheet of paper so reinforced by threads 2 is coiled in the usual manner upon a mandrel into a tube and cut up into paper-cartridge shell lengths one of which forms what is known as the paper tube 5 of a paper shot shell. This tube is inserted at one end into a drawn sheet-metal cap 6 the depth of which may be varied within a considerable range, but the form of which will remain the same. For fastening the tube 5 in the metal cap 6, a coil of soft paper is introduced into the tube 5 and cap 6 and subjected therein to tremendous pressure for its condensation into a so called base-wad, whereby the paper of the coil is caused, as it were, to flow outward against that portion of the tube 5 lying between the coil 7 and the cap 6 whereby the tube 5 is fastened to the cap, especially by the forcing of the extreme inner end of the tube into the hollow rim 8 of the cap as clearly shown in Fig. 1.

As shown, the reinforcing threads 2 extend throughout the entire length of the tube 5 and strengthen it, particularly against all longitudinal strains. Included in this strengthening of the tube is of course that

portion of the tube extending inward and outward with respect to the edge 9 forming the mouth of the cap. This strengthening of the paper tube in front of and in rear of the edge 9 of the metal cap 6, is of paramount importance since it is at this point that cut-offs occur, owing apparently to the enforced rearward movement of the metal cap away from the body of the tube at a time when the same is so pressed against the walls of the cartridge-chamber of the gun-barrel that it cannot respond to the pull of the cap and move rearward therewith.

While I consider it advantageous and preferable to have the threads 2 extend throughout the length of the paper tube, cut-offs will be reduced to a negligible percentage by the localization of the reinforcing threads in those portions of the tube lying on both sides of the edge 9 of the metal cap as shown in Fig. 5.

In the particular shot shell chosen for illustration, a sheet-metal reinforce 10 is employed for strengthening the cap and preventing the rearward escape of the gases developed by explosion, but this is not, of course, essential to my present invention. The shot shell shown is also provided with a primer 11 which may be of any approved construction.

I claim:—

As a new article of manufacture, a paper shot-shell comprising a paper tube, a flanged metal cap and a base-wad, and longitudinally arranged reinforcing fibers embedded in the paper of the tube and extending from the rear end thereof to a point in front of the edge of the cap when the tube is positioned therein, the said wad being condensed under pressure and forced outward to pinch the inner end of the tube between the wad and the cap, and to force the inner edge of the tube into the flange of the cap, whereby the inner ends of the fibers are anchored in the flange of the cap, and whereby the forward portions of the fibers by extending beyond the edge of the cap, prevent the tube from being cut off along the edge of the cap. In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

THOMAS C. JOHNSON.

Witnesses:

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DANIEL H. VEADER.