July 29, 1930. A. S. O'NEIL ET AL 1,771,898

CARTRIDGE SHELL AND PROCESS OF MAKING THE SAME

Filed Nov. 21, 1925

Fig. 1.

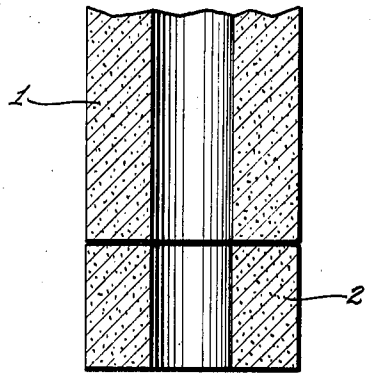


Fig. 2.

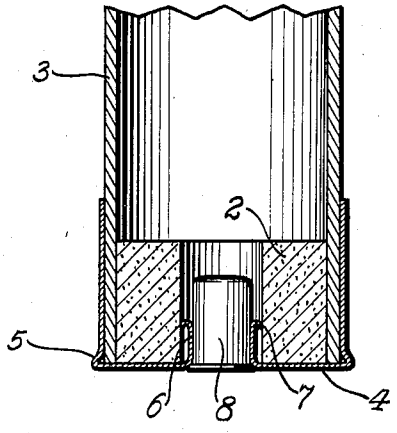


Fig. 3.

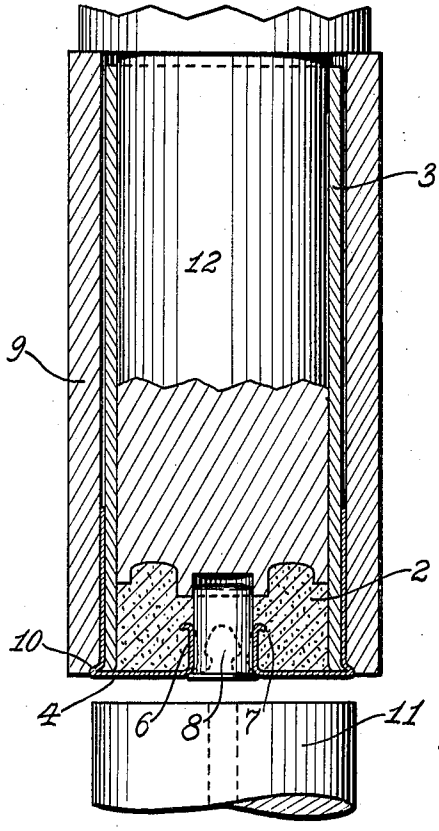
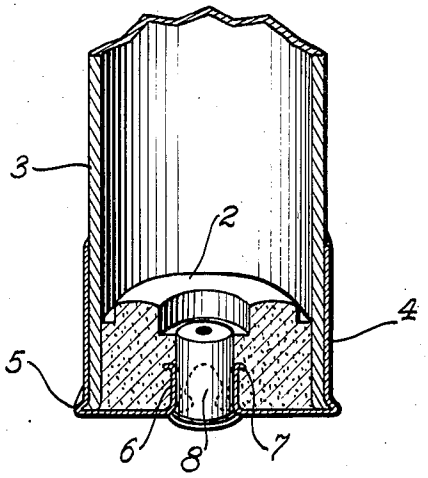


Fig. 4.



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UNITED STATES PATENT OFFICE

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CARTRIDGE SHELL AND PROCESS OF MAKING THE SAME

Application filed November 21, 1925. Serial No. 70,646.

This invention relates to cartridges or shot shells, and more particularly to base wads employed therein.

A shot shell usually comprises a metal base having a tube usually of paper inserted therein and in the base of the shell is a base-wad which is condensed therein and around the primer socket or cup, thereby forming a base seal against the escape of gases. Heretofore base-wads for shot shells have been formed by winding strips of paper into a roll, inserting the same into the paper tube and setting or condensing the same by pressure on a shell heading machine, as, for instance, described in Patent No. 1,541,438, issued June 9, 1925. In some processes the paper is coated with an adhesive gum or resin to cause better adhesion between the layers of paper. Due to the fact, however, that paper is porous and that the union between the layers is never complete, there is always the probability that the gases formed when the shell is fired will penetrate the base-wad and cause it to fracture, which in turn causes such defects as cut-off and split shells, blown out primers, gas-leaks, etc. Moreover paper is not really plastic but is more or less resilient; accordingly even when subjected to the heavy pressures in heading machines, the base-wad will not set completely in its final condition, but will spring back to a more or less extent after the release of the compressing plunger; accordingly the desired perfect seal against the high pressures developed in the gun is not attained. Moreover upon firing of the shell and development of the pressure, the gas will rather leak through passages than close the same by any pressure on the base-wad surfaces.

One of the objects of this invention, therefore, is to provide a base-wad which overcomes the objectionable features referred to, and which will form a continuous and solid body.

Another object is to provide a cartridge shell, the base-wad of which is plastic and non-resilient so that it will flow when subjected to the pressure in the heading machine and set in that condition so as to form a complete and effective seal.

Another object is to provide a cartridge shell, the base-wad of which is non-resilient and becomes plastic under the pressures developed in the gun when the shell is fired so that it will flow into close sealing engagement with the shell and primer socket or battery cup so as to make and maintain an effective gas seal.

Further objects will appear from the detail description taken in connection with the accompanying drawing, in which:

Figure 1 is a sectional view showing the formation of the base-wad embodying this invention;

Figure 2 is a sectional view showing the base-wad assembled in the shell;

Figure 3 is a similar view showing the step in the process of condensing the base-wad and interlocking the parts of the shell; and

Figure 4 is a perspective view, partly in section, showing the parts interlocked.

In accordance with this invention, the base-wad may be of any suitable material having the desired characteristics. This material is preferably such that it will flow when subjected to pressures, either cold or at elevated temperatures, and distend and set in distended condition. In accordance with one embodiment of this invention the wad comprises a filler and a binder which are combined to form a plastic non-resilient mass. The binder may be of a plastic nature and substances which have been suitable are plastic pitches (stearine, wood, coal or synthetic pitches); stearine pitch is especially suitable for this purpose. A satisfactory filler is wood flour, wool flock, cotton fibre, cork or any other comminuted cellular or granular material, the choice and proportion of a filler being dependent upon the degree of plasticity desired. A suitable mixture is stearine pitch 30%, wood flour 60% and wool flock 10%; these percentages may, however, vary from 20% to 40% stearine pitch, 70% to 50% wood flour, and 15% to 5% wool flock.

In preparing the mixture, the pitch is introduced into a jacketed mixer which may

be heated. The material is caused to soften or melt through the application of heat and the filler selected is introduced in small proportions while the mixing proceeds. The mixing is then continued until the filler is thoroughly coated and impregnated with the plastic material. When thoroughly mixed the material is ready to be formed into the desired shape; that may be accomplished in any well known manner as: by rolling under pressure into sheets and punching the wads therefrom; extrusion from a die into rods and slicing the wads therefrom; or by separately pressing portions of the material in individual dies to form finished wads. Any waste material resulting from the cutting of the wads from the sheets or in any other manner may be returned to the mixer and reheated either alone or in connection with fresh material.

In Figure 1 the base-wad material is shown in the form after it has been extruded through a die to form a perforated rod or tube 1. From this a base-wad blank 2 may be cut. It will, however, be understood that the base-wad blank 2 may be formed by punching from a sheet or by separate formation by a die.

Referring to Figures 2 and 3, the paper tube 3 and the metallic base 4 of a shot shell are shown, the rim 5 being shown as only partially formed in Figure 2. The base 4 is provided with a primer socket 6 of any suitable construction, the specific one shown being that illustrated in Patent No. 1,541,438 and being provided with anchors 7, while arranged in the socket is a primer or battery cup 8 of any suitable construction. The base-wad blank 2 being inserted in the shell and over the primer socket, is subjected to pressure in a heading machine as illustrated in Patent No. 1,541,438 and as shown in Figure 3, in which 9 designates a tubular support having an annular recess 10 to receive the flange 5, while insertible into the tube is a plunger 12 cooperating with a second or perforated plunger 11. In operation the plunger 11 is moved towards the support 9 and against the base of the shell, while the plunger 12 is moved into the shell to act upon the base-wad. This will cause the base-wad to be condensed and to close in on the battery cup and anchor, to cause the anchor to become firmly imbedded in and interlock with the base-wad. Furthermore the cooperation of the plunger 11 with the plunger 12 not only causes the end of the tube to be forced into the annular recess formed by the incomplete flange 5, but the end of the plastic base-wad itself will flow out against the end of the tube; furthermore the pressing of the base against the shoulder 10 will complete the upsetting of the flange 5 and thus firmly crimp the base on the tube. The result is, therefore, that the elements of the tube will become firmly interlocked as shown in Figure 4 with the base-wad interlocked with the base and with the tube, while the tube is interlocked with the base.

It will, therefore, be seen that the invention accomplishes its objects. The provision of the plastic base-wad not only causes the material thereof to become distended and flow under the pressure in the heading machine, but this material will flow into firm engagement with the base and the tube and will act in a sense hydraulically to force the tube into firm engagement with the base. Moreover the material being plastic, upon release of the pressure, the wad will remain in its completely set condition and there will be no tendency to spring back and open any recesses or crevices through which gas may escape. Moreover when the shell is fired, the pressure developed in the gun acting against the plastic wad will serve rather to close any gas leaks, in that the material will flow into firm sealing engagement with the parts of the shell. Accordingly all leakage of gases will be avoided.

It is obvious that various changes may be made in details of construction without departing from the spirit of this invention; it is, therefore, to be understood that this invention is not to be limited to the specific details shown and described.

Having thus described the invention, what is claimed is:

1. A cartridge shell having a base wad, the composition of the wad being wood flour, wool flock and stearine pitch, thereby to render said wad plastic under pressure.

2. A cartridge shell having a non-resilient base wad, composed of comminuted filler and stearine pitch, said filler and pitch acting to render the wad plastic under pressure.

3. A cartridge shell having a non-resilient base wad composed of wood flour, wool flock and stearine pitch, said pitch acting to render the wad plastic under pressure.

4. A cartridge shell comprising a base, a tube seated therein, and a non-resilient base wad condensed against and interlocking said tube and said base, said base wad being formed of wood flour, wool flock and stearine pitch, which flows and sets under the pressure developed in condensing the same to secure such interlocking.

In testimony whereof we affix our signatures this 16th day of October, 1925.

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