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This invention relates to an improved type of shotshell capable of producing better patterns, reduced barrel smutage as well as leading and abrasion, reduced sensation of gun recoil, and economy in shotshell loading and production in general.

These advantages are realized by the use in a shotshell of a unique, unitarily-molded component of resilient plastic material having the functions of (1) a gas-sealing wad, (2) a resilient or cushioning wad, and (3) an open-end shot carrier which protects and guides the shot pellets during the time the pellets are passing through the gun barrel.

By utilizing a unitary polyethylene combined wad column and shot carrier, a flexible unit is provided which responds very well to shotshell control. Manufacturing costs can be decreased because of the one-mold operation and necessity of having only one component to feed in loading the shell. Moreover, the low specific gravity of polyethylene means less cartridge weight and thus a minimum gun recoil. Finally, the shot capsule eases the strain on a shotshell body tube because it eases the transition of the shot charge from the shotshell through the forcing cone of the gun to the bore surface.

A more precise explanation of the invention along with other objects and advantages thereof will become more apparent from consideration of the following specification referring to the attached drawings in which:

FIGURE 1 is a longitudinal section view through a loaded shotshell utilizing the combination wad column/shot carrier which is the principal part of this invention. FIGURE 2 is a longitudinal section view of the combination wad column-shot carrier. FIGURES 3 and 4 are cross-sectional views on the lines 3—3 and 4—4 of FIGURE 2. FIGURE 5 is a view similar to FIGURE 2 showing the combination wad column-shot carrier as recovered after firing.

Referring to the drawing by reference numbers, it will be seen that FIGURE 1 illustrates a loaded shotshell embodying a metal head 1 having a tubular body 2 attached thereto and a basewad 3 inserted within said body. The body 2 may be a conventional body made of paper but is preferably formed of biaxially-oriented high density polyethylene, as disclosed in application Ser. No. 37,298, filed June 21, 1960.

Within body 2 is found the usual powder charge 4 and a combination wad column and shot carrier 5 to which this invention primarily relates and which is illustrated more specifically in FIGURES 2, 3 and 4. A shot charge 6 is at least partially confined in the forward portion 7 of the combination wad/carrier 5 and the forward end of the shell body 2 is closed by a folded crimp 8 to maintain the shotshell assembly intact until firing.

Referring specifically to FIGURE 2, the combination wad/carrier 5 is seen to consist of a unitary, cylindrical molded structure of polyethylene or other suitable resilient, plastic material having a diameter slightly less than the inside diameter of the shotshell casing 2 in which the molded structure is inserted. An over-power, transverse, imperforate wall 9 is spaced from the lower end of the structure 5 so as to define a circular, rearwardly extending flange or skirt 10. This skirt 10 is positioned adjacent to and partially confines the powder charge 4 so that upon firing, the skirt is forced radially against the walls of the shell body 2 and effectively prevents the explosive gas from leaking past the structure 5 and upsetting and/or deforming the shot pellets 6.

An under-shot imperforate wall 11 is spaced from the over-power wall 9 and acts as a base for a shot containing container defined by said wall 11 and the upper open-end portion 12 integrally attached thereto and extending therefrom. A plurality of circumferentially spaced and longitudinally extending slits 13 extend from the open end of tubular portion 12 to points adjacent said wall 11 thus forming a plurality of discrete panels 14. At least the major portion of the shot pellets 6 are confined by the tubular shot carrier 12.

Joining the walls 9 and 11 is a collapsible cushioning section defined by a plurality of spaced-apart relatively thin web members 15 which define a plurality of chordwise extending air pockets 16. The gas-sealing skirt 10 should make a fairly snug fit in the shell body 2 and the bore of the firearm barrel (not shown) and be thin enough to be expanded by internal gas pressure to effectively bar the escape of propellant powder gases on firing.

When firing takes place, the inertia of the shot charge 6 and the resistance to opening of the crimp 8 both delay any forward movement of the charge. During this interval, the air pockets 16 are decreased in volume as the cushioning webs 15, which are placed in compression, buckle under the load of powder gas pressure. The outer pair of webs 17 are in engagement with the shotshell body and when they buckle, can only buckle inwardly. To assist in symmetrical buckling of the inner pair of webs, they are preferably formed with offset portions 18, in their central portions in order to predispose them into collapsing toward the center of the shell. The collapse of this structure can be readily controlled by selection of materials and dimensions to insure adequate cushioning for good ignition of the propellant powder and adequate cushioning to minimize shot distortions from too rapid acceleration by the powder charge. As the forces within the shell build up, the crimp 8 unfolds to allow the wad column and shot carrier to carry the shot charge through the gun bore.

During the acceleration and travel of the shot charge, the forces of inertia acting on the individual shot pellets tend to cause them to flow like a fluid and to exert linear pressure on the walls of the shell body 2 and radial pressure on the walls of the shot carrier 12. In the absence of a shot carrier, the outer layer of pellets are exposed to abrasive action by the walls of the gun barrel bore and to erosion by any gas which may have escaped from the propellant charge. During this interval, the shot carrier 12 of the present invention encloses and protects the shot pellets both from abrasion and from the eroding and scarring effects of the bore, expanding gas. Similarly, the shot carrier protects the barrel from leading caused when the hot gas melts portions of the shot pellets and deposits the lead on the walls of the barrel or when
the lead is physically abraded much as sand paper or
ceramic paper abrades a soft material.

Upon emerging from the muzzle of the gun, the panels
14, which make up the walls of the tubular shot carri-
er 12, are no longer radially or laterally supported.
To the extent that the shot carrier may still be accelerat-
ing, the laterally exerted pressure of the shot pellets will
tend to spread these panels. In any event, the effect of
driving the shot carrier into the ambient air will be to
open these panels like a parachute and rapidly decelerate
the wad column/shot. Under these circumstances, there
will be a clean symmetrical release of the shot charge
within a very short distance of the barrel muzzle and
the shot will travel in a short compact column producing
 optimum pattern.

What is claimed is:
1. A combination wad column and shot carrier for
a shotgun including a unitary, substantially cylin-
drical member made of a flexible plastic material, which
member includes: a collapsible cushion means integra-
ly formed in one piece with and of the same material as the
rest of said plastic cylindrical member, said cushion means
including an imperforate wall spaced upwardly from the
lower end of said unitary cylindrical member, a circum-
ferentially continuous skirt wall means integral with and
protecting rearwardly from said imperforate wall, said wall
and skirt means being positioned adjacent the charge
of propelant powder so that the skirt means partially en-
closes a portion of said propelant charge and acts as a
gas seal therefor, a shot carrier integrally formed in one
piece with and of the same material as said cushion means
and extending in a direction opposite to the skirt means,
said shot carrier comprising an open-ended, thin-walled
tubular portion which encloses at least the major portion
of the shot charge, and a plurality of circumferentially-
spaced longitudinal slits in said tubular wall portion ex-
tending from the open end of said tubular portion to
points adjacent said cushion means.
2. A combination wad column and shot carrier for
a shotgun as recited in claim 1 wherein said cushion means
includes thin-walled, collapsible sections spaced apart
from each other to define air spaces therebetween, said thin-walled sections being of insufficient strength to with-
stand propelant gas pressure without buckling.
3. A combination wad column and shot carrier as re-
cited in claim 1 wherein said cushion means includes means
defining a plurality of transverse openings extending chorde-
sively through said cylindrical member between said imperforate wall and said tubular shot car-
rier portion.
4. A combination wad column and shot carrier as re-
cited in claim 3 wherein said means defining a plurality of
transverse openings includes a plurality of parallel
thin-walled sections extending chordevously through said
cylindrical member and connecting said imperforate wall
adjacent said skirt means and an upper imperforate wall
adjacent said shot carrier, and means to predispose said
connecting sections to buckle symmetrically towards each
other and towards a diameter of said member parallel to
said transverse openings upon being subjected to propel-
ant gas pressure.
5. A combination wad column and shot carrier as re-
cited in claim 3 in which an uneven number of said trans-
verse openings are provided in uniformly spaced rela-
tionship, with the axis of the central opening being posi-
tioned on a diameter of said member parallel to said trans-
verse openings.
6. For use in a shotgun having a cylindrical body cas-
ing with a closed lower end portion in which a propel-
ant charge is placed and an open upper end portion
through which shot pellets are expelled upon firing, an
improved combination wad column and shot carrier adapted
to be positioned within said shotgun, said com-
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portions which have a tendency to buckle inwardly upon pressure being applied on the transverse end wall portions.

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Disclaimer


Hereby enters this disclaimer to claim 1 as an independent claim of said patent.

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