

Oct. 12, 1965

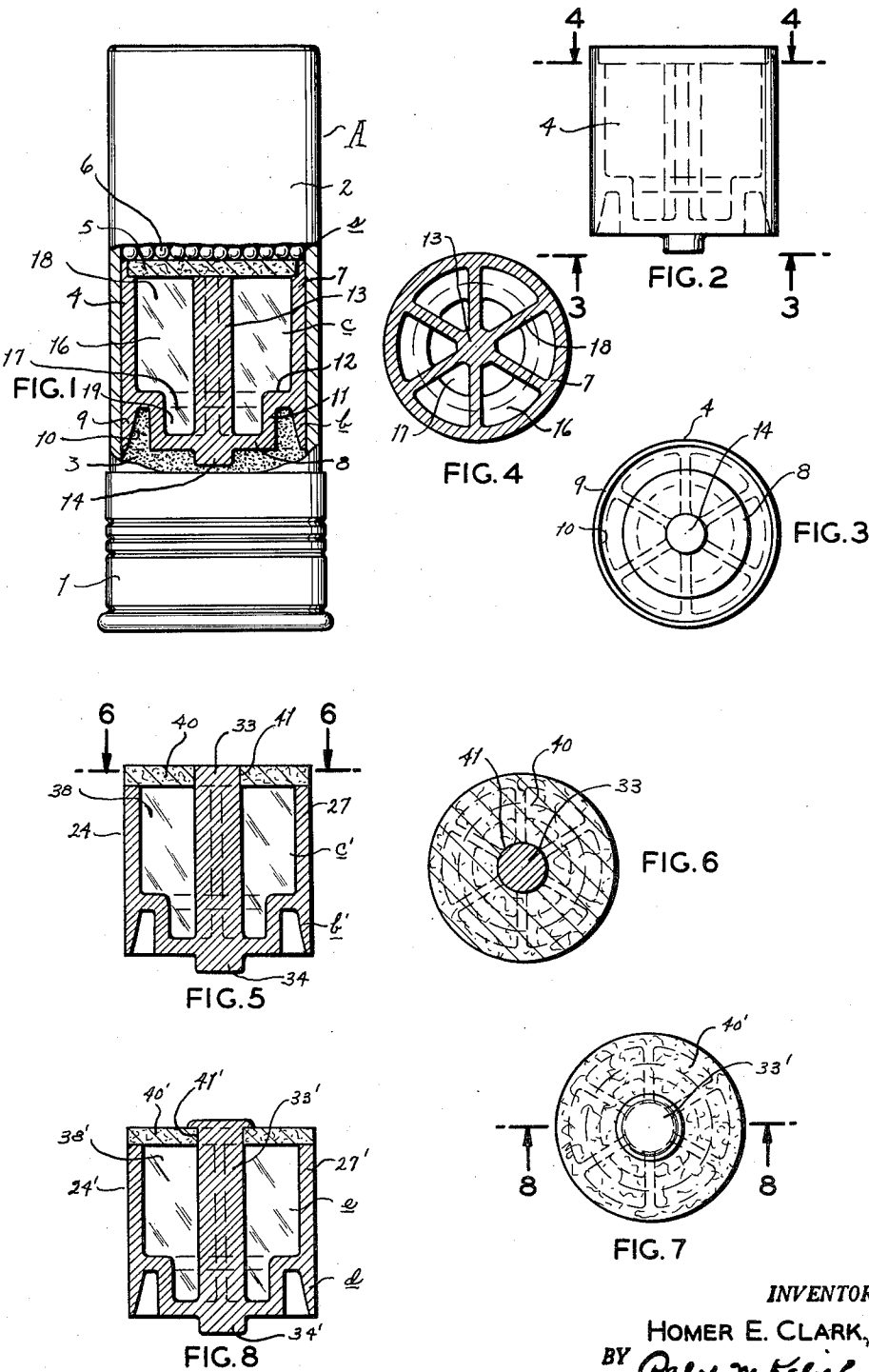
H. E. CLARK, JR

3,211,100

WAD COLUMN

Filed March 13, 1961

3 Sheets-Sheet 1



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WAD COLUMN

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3 Sheets-Sheet 2

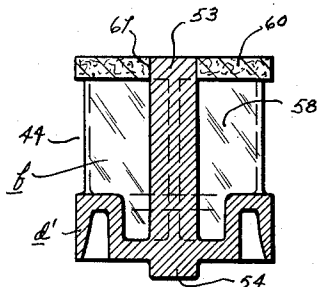


FIG. 9

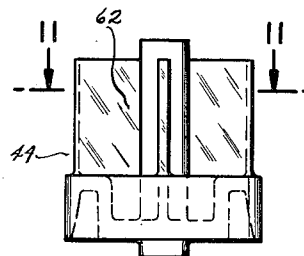


FIG. 10

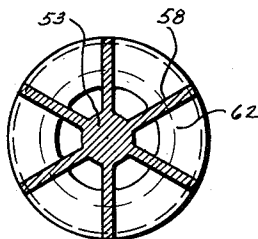


FIG. 11

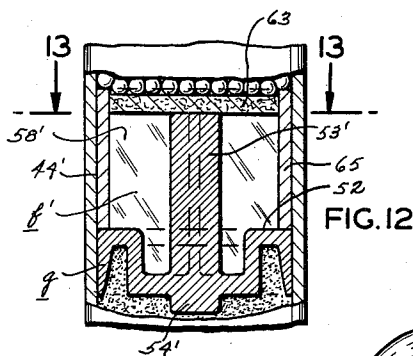


FIG. 12

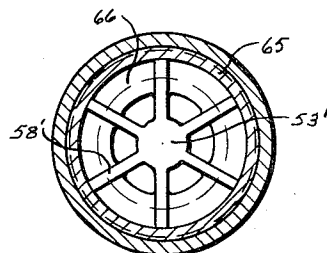


FIG. 13

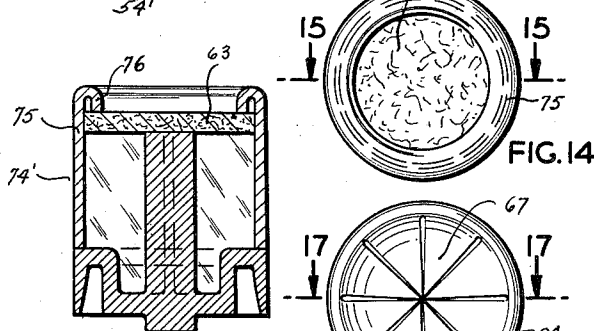


FIG. 14

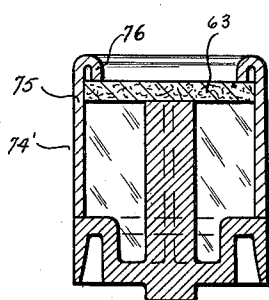


FIG. 15

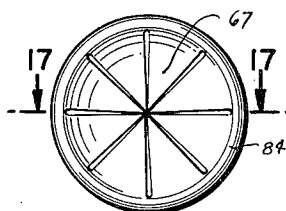


FIG. 16

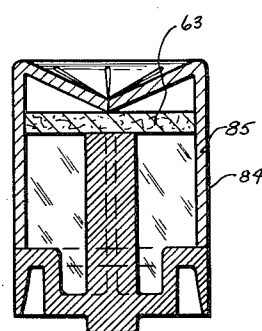


FIG. 17

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WAD COLUMN

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3 Sheets-Sheet 3

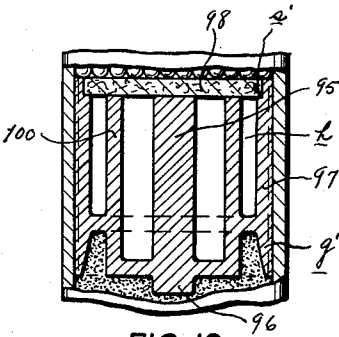


FIG. 18

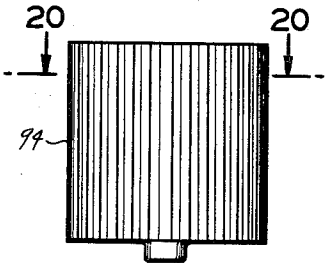


FIG. 19

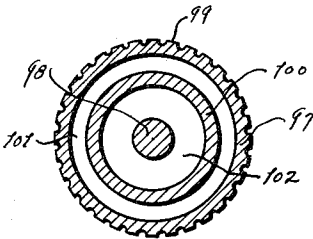


FIG. 20

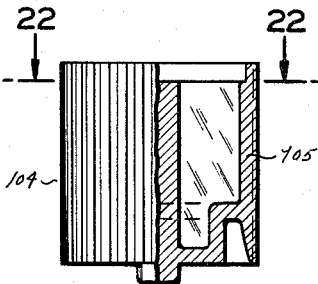


FIG. 21

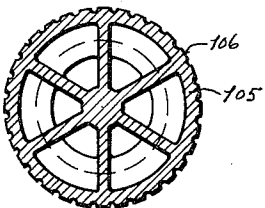


FIG. 22

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WAD COLUMN

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Filed Mar. 13, 1961, Ser. No. 95,126

4 Claims. (Cl. 102—95)

This invention relates in general to shotgun cartridges and, more particularly, to certain new and useful improvements in pre-assembled wad columns therefor.

With the current greatly expanding interest in trap shooting, hunting, and other like endeavors, requiring the utilization of firearms, and particularly, shotguns, many individuals prefer to load their own cartridges. Normally, this would be a rather time-consuming, somewhat tedious procedure, since it is requisite that the various types of wads, such as, closure wads, filler wads, and obturating wads, must be located and placed in properly aligned condition. By the development of a unitary wad column all of the various types of wads may be inserted in the cartridge as a unit, but it is necessary that such wad columns provide appropriate gas sealing, air cushioning upon explosion, and lubrication for the gun barrel wall. A wad column incorporating novel gun barrel lubrication means is disclosed in my co-pending application, Serial No. 45,135, filed June 25, 1960, now Pat. No. 3,095,817, upon a Wad Column.

Therefore, it is an object of the present invention to provide a pre-assembled wad column for shotgun cartridges which permit expeditious loading of the same by individual users, allowing of a single operation rather than a multiplicity of steps; and which incorporates a barrel-lubricant impregnated member for direct, scrubbing contact with the gun barrel upon firing, preventing leading thereof as well as inhibiting pattern loss.

It is a further object of the present invention to provide a pre-assembled wad column which may be fabricated most economically, as from moldable plastic material; which is adapted for desired longitudinal compressibility, with resultant lateral expansion upon firing; which is durable and reliable in usage; and which uniquely contains a readily impartable barrel lubricant.

Other objects and details of the invention will be apparent from the following description, when read in connection with the accompanying drawings (two sheets) wherein:

FIGURE 1 is a side view of a shotgun cartridge, a portion of the body wall being broken away, having a wad column constructed in accordance with and embodying the present invention.

FIGURE 2 is a side view of the wad column illustrated in FIGURE 1.

FIGURE 3 is a bottom plan view of the wad column of FIGURE 1, as taken on the line 3—3 of FIGURE 2.

FIGURE 4 is a horizontal transverse section taken on the line 4—4 of FIGURE 2.

FIGURE 5 is a vertical transverse sectional view of another form of wad column constructed in accordance with and embodying the present invention.

FIGURE 6 is a horizontal transverse section taken on the line 6—6 of FIGURE 5.

FIGURE 7 is a vertical transverse section of a further type of wad column constructed in accordance with and embodying the present invention.

FIGURE 8 is a top plan view of the wad column illustrated in FIGURE 7.

FIGURE 9 is a vertical transverse sectional view of an additional form of wad column constructed in accordance with and embodying the present invention.

FIGURE 10 is a side view of the wad column illustrated in FIGURE 9.

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FIGURE 11 is a horizontal transverse section taken on the line 11—11 of FIGURE 10.

FIGURE 12 is a vertical transverse section of a still further form of wad column constructed in accordance with and embodying the present invention, illustrating same in conjunction with adjacent elements of a shotgun cartridge.

FIGURE 13 is a horizontal transverse section taken on the line 13—13 of FIGURE 12.

FIGURE 14 is a vertical transverse section of another form of wad column constructed in accordance with and embodying the present invention.

FIGURE 15 is a top plan view of the wad column illustrated in FIGURE 14.

FIGURE 16 is a vertical transverse section of another form of wad column constructed in accordance with and embodying the present invention.

FIGURE 17 is a top plan view of the wad column illustrated in FIGURE 16.

FIGURE 18 is a vertical transverse section of another form of wad column constructed in accordance with and embodying the present invention.

FIGURE 19 is a side elevation of the wad column shown in FIGURE 18.

FIGURE 20 is a horizontal transverse section taken on the line 20—20 of FIGURE 19.

FIGURE 21 is a side elevation, in partial vertical section, of a further form of wad column constructed in accordance with and embodying the present invention.

FIGURE 22 is a horizontal transverse section taken on the line 22—22 of FIGURE 21.

Referring now by reference characters to the drawings which illustrate practical embodiments of the present invention, A designates a shotgun shell or cartridge having a base 1 and the usual tubular body 2 fabricated as of paper, metal, or the like. A primer assembly (not shown) is mounted in base 1 and thereabove, within body 2, is disposed a propellant charge 3 in immediately overlying and confining relationship to which is presented a wad column 4, further illustrated in FIGURES 2, 3 and 4. As will be described hereinbelow, wad column 4 carries at its upper end a closure wad 5 upon which is superimposed the shot charge 6, preferably of multi-missile character; the upper end of shell A being closed in any customary manner, as, for example, by infolding of body 2.

Wad column 4 is of basically cylindrical configuration and is relatively elongated with its length comparable to the combined length of a conventional obturating wad, a plurality of customary filler wads and a closure wad. Said wad column 4 integrally incorporates at its lower end an obturating wad-defining section *b*, which embodies the structural features of the obturating wad set forth and described in my co-pending application Serial No. 778,093, filed December 4, 1958, now Patent No. 2,986,998. The portion of column 4 upwardly of said section *b* defines a filler wad section, indicated broadly *c*. Wad column 4 comprises a body having a continuous side wall 7 being open at its upper end and having a base wall 8. The lower end of side wall 7 constitutes a base flange 9 which on its inner face is upwardly and inwardly inclined as at 10. Flange 9 being relatively thin in its lower region provides a zone of flexibility for reasons presently appearing, and is spaced radially outwardly of base wall 8 and an inner circular side wall 11, which is presented upstandingly from said base wall 8 with its upper end merging into a flat, annular shoulder 12 extending between same and side wall 7.

Projecting upwardly of base wall 8, within column 4, and coaxially therewith, is a center post or hub 13, the upper end of which terminates spacedly below the upper

end edge of column 4 and in alignment with a relatively shallow lip or upper shoulder *s* formed on the inner face of side wall 7. On the underside of base wall 8 is a short, downward extension 14, coaxial with post 13 and of like diameter.

Shoulder 12 divides the interior of wad column 4 into an upper, relatively extensive recess 16 communicating with the upper, open end of column 4 and a lower, relatively short, diametrically reduced recess 17. Radiating in general spoke-like formation from post 13, throughout its length is a plurality of circumferentially spaced ribs 18, having upper and lower portions 19, 19', which at their outer ends are respectively integral with the inner face of side wall 7 and inner wall 11. Ribs 18 thus connect the outer portions of wad column 4 with the center post 13 thereby integrating or tying together the inner and outer portions of column 4 to provide a sturdy, composite structure.

Lip *s* is spaced from the upper end of wad column 4 a short distance for accommodating a closure wad 5 which will be firmly supported upon said lip *s* as well as the upper end of post 13 and ribs 18, in providing a closure for the upper end of column 4.

Wad column 4 is fabricated of molded, unitary construction, as of a resilient, plastic material, such as, polyethylene. It has been found that this material is preferred as it possesses the sturdiness, durability and resilience requisite for desired performance. However, the polyethylene, prior to fusing for molding operations, may be treated with a lubricating agent. Normally, polyethylene will be in the form of small beads and the same may contain or be coated with such agent, which may be any suitable, well-known animal fat, wax, or the like. Such agent possesses an inherent physical affinity for polyethylene so that upon molding into a wad column 4 the same will adhere to the surfaces of said formed wad column 4, such as, the exterior face of side wall 7, to provide a source of barrel lubricant.

Wad column 4 thus integrally incorporates an obturating wad portion, a filler wad portion, a closure wad, and may thus be inserted within a cartridge during assembly as a single unit; thereby assuring proper alignment of all components. Heretofore, a plurality of steps had been requisite to accurately locate the individual wads which are now constituents of the single unit of the present invention.

In assembled position within a cartridge, column 4 will be disposed directly upon the propellant charge 3 (see FIGURE 1) which latter will be received within the space intervening between base flange 9 and inner side wall 11; with shot charge 6 being presented directly upon closure wad 5.

Upon firing, the gases of explosion will, on expanding, immediately exert an outward pressure upon flange 9 to force same into sealing engagement with the inside of the cartridge case, and thence the gun barrel, preventing gas leakage. The flexibility of the lower end portion of flange 9 assures the substantially simultaneous development of a seal upon firing, as such relatively thin edge portion will, requiring relatively less pressure, be brought into engagement with the gun barrel immediately in advance of the upper thicker portions of said flange 9 and side wall 7. Under the force of the combustion and explosion gases wad column will be subjected to an axial or longitudinal compressive force causing a temporary contraction which might normally develop into an undesirable buckling. However, with the present construction, ribs 18 effectively resist any tendency toward buckling and exert a radially outwardly directed force against the outer portions of wad column 4 so as to drive the upper portions of the side wall 7 into sealing engagement with the gun barrel. It will be seen that a double sealing action is provided since ribs 18 serve to produce sealing by the upper portions of the side wall 7 while the lower portions are forced outwardly under the gas pressure operating against

flange 9. In actual practice, it has been found that the outer peripheral surface of wad column 4 throughout its entire extent maintains sealing contact with the gun barrel so that actually a "scrubbing" action is developed.

Ribs 18, closure wad 5, and base wall 8 define closed air cells 15 which provide for shot cushioning upon firing.

As side wall 7 is forced outwardly against the barrel under the sealing action above described lubrication will be imparted to the barrel wall to prevent leading thereof as well as to prevent pattern loss. Consequently, during the course of the "scrubbing" action, the barrel wall will be continuously provided requisite lubrication to assist the cartridge shell therethrough without undesirable effects. By its unique material of construction, wad column 4 may thus present a smooth surfaced exterior, integrally incorporating a quantity of lubricant for barrel scrubbing action.

Thus, wad column 4 constitutes a single unit which may be easily and economically manufactured; and readily incorporated in a cartridge by the average user so that it is amenable to usage on a so-called "do it yourself" basis. Furthermore, by its inherent nature it assures proper gas-sealing, shock cushioning, and barrel lubrication.

Referring now to FIGURES 5 and 6, there is shown another form of the present invention which comprises a wad column indicated at 24, being also of molded, plastic construction, preferably of polyethylene, and of generally cylindrical formation. In this particular form of the invention the polyethylene need not have been pre-treated with a barrel lubricant. Wad column 24 is of basically similar construction as wad column 4 above described as, being open at its upper end, it incorporates a side wall 27 and a lower, obturating-wad portion *b'*, a filler wad portion *c'*, a center post 33, an extension 34, and ribs 38, radiating from post 33, which correspond to the related portions of wad column 4, with the exception that center post 33 extends at its upper end beyond the upper end surfaces of ribs 38 and side wall 27, which latter is devoid of a shoulder.

Seated upon the upper end of wad column 24 is an annular, closure wad 40 of like diameter as column 24 and being fabricated of felt, fibre, or other like absorbent material; said wad 40 having a central opening 41 dimensioned for snug reception therein of the projecting upper end of center post 33, in the manner of a press-fit. If desired, a suitable adhering agent, such as, glue, may be used, to maintain closure wad 40 against premature displacement.

The outer, peripheral surface of closure wad 40, which is aligned with the outer face of side wall 27, is presented to the barrel wall for imparting lubricant thereto upon firing, as lateral expansion will develop under the resulting compressive forces. By the incorporated closure wad 40 being impregnated, a requisite amount of lubricant is contained in column 24 for providing a coating to the gun barrel wall to inhibit leading. The novel construction of wad column 24 assures the requisite lateral expansion for bringing wad 40 and its lubricant into direct contact with the gun barrel wall. Thus, wad column 24 is likewise endowed with the critical characteristics of providing a positive gas-seal, a shot cushion, and necessary lubrication.

In usage, wad column 24 thus unitarily combines an obturating wad, filler wad and closure wad, for easily accomplished insertion in a cartridge wherein it will be disposed in the same relative position as wad column 4 hereinabove described.

Referring now to FIGURES 7 and 8, there is disclosed another form of wad column, indicated 24', which is of molded plastic construction and the same general character and size as wad column 24 hereinabove described, having a side wall 27', a lower obturating-wad portion *d*, a filler wad portion *e*, a center post 33', an extension 34', ribs 38', and a lubricant-impregnated closure wad 40', with central opening 41' for receiving center post 33';

all of said elements corresponding to the related portions of wad column 24 above described. However, in this particular form of the invention, it will be noted that center post 33 projects upwardly above closure wad 40' whereby such extended portion may be laterally expanded, as by subjection to heat, for engagement with said wad 40' in rivet-like manner to secure same against inadvertent displacement. The wad column 24' operates in the same manner as wad column 24, with lubricant being provided the gun barrel by wad 40'.

Directing attention to FIGURES 9, 10 and 11, there is illustrated a further form of wad column 44 which is constructed in accordance with the present invention. Said wad column 44, being formed of molded plastic, as polyethylene, comprises a lower obturating-wad portion d', a filler wad portion f, a center post 53, extension 54, ribs 58, and a lubricant-impregnated closure wad 60 having a central opening 61 for receiving the upper end of center post 53, all of said elements being identical to the corresponding portions of wad 24 above described. But, it will be noted that wad column 44 is devoid of a side wall portion, with ribs 58 being free at their outer ends which terminate spacedly slightly inwardly of the outer peripheral surface of closure wad 60, the intervening spacing being understandably exaggerated in the drawings.

Upon firing, the said closure wad 60 will be driven outwardly, laterally into contact, upon its circumferential surface, with the gun-barrel wall for imparting lubrication thereto. In this form the gun barrel wall cooperates with the closure wad 60 and ribs 58 to define air cells 62 to provide desired cushioning effect.

Turning now to FIGURES 12 and 13, there is illustrated another form of the present invention wherein a wad column indicated 44', which, being also formed of molded plastic construction, such as of polyethylene, incorporates a lower obturating wad portion g', a filler wad portion f', a center post 53', an extension 54', with ribs 58' radiating from the center post 53', which ribs are free at their outer ends and terminate inwardly of the outer surfaces of obturating wad portion g'. Said center post 53' is aligned on its upper end surface with the upper end surfaces of ribs 58' which cooperate to form a seat for a closure wad 63 which is of like diameter as the filler wad portion f'. Provided enclosingly about ribs 58' and wad 63, is a sleeve 65 fabricated as of cardboard or like absorbent material with its normally lower or powder-proximate end being disposed abuttingly upon the shoulder, as at 52, of obturating wad g' and with its upper or shot-charge proximate end extending slightly above closure wad 63 for securely holding same in position. Sleeve 65 thus defines the outer limits of air cells 66. Sleeve 65 is impregnated with a barrel lubricant and being smooth-surfaced on its exterior face is adapted for flushwise engagement with the gun barrel wall as upon lateral expansion due to the longitudinal compression of wad column 44' upon firing of its related powder charge. Thus, the lubricant is brought into active coating relationship with the gun barrel to prevent leading thereof, and pattern loss.

Wad column 44' may be easily and quickly assembled as the integral parts thereof are so related that they will interfit in snug-unit-forming manner, resistant to relative displacement, and with the said column 44' being adapted for facile reception in a cartridge. If desired, a limited amount of a suitable adhesive may be utilized for securing sleeve 65 and closure wad 66 in assembled relationship.

FIGURES 14 and 15 disclose a wad column 74' which is identical to wad column 44' with the single distinction in that the same incorporates an absorbent sleeve 75, as of cardboard, or the like, which at its upper end projects substantially beyond the associated closure wad 63 for inward, axially directed turning to provide a rounded retaining rim as at 76, which abuts on its inner edge against wad 63; said latter being thus partially obscured by said rim 76. Rim 76 thus integrates the components of

wad column 74' into a tight, compact unit. Sleeve 75 is impregnated with a suitable barrel lubricant, such as, wax, or the like, and functions, upon firing, in the identical manner as sleeve 65 above described in conjunction with wad column 44'.

FIGURES 16 and 17 present another wad column, as designated 84, which is in all respects similar to wad column 44' and 74' above described, but wherein the same includes an absorbent sleeve, fabricated as of cardboard or the like, indicated at 85, being impregnated with a barrel lubricant, and which is of sufficient length so that the normally upper or shot charge-proximate end thereof may be turned inwardly upon itself in a crimping manner for effecting a substantial end closure 67 obscuring the incorporated closure wad, as at 63.

Referring now to FIGURES 18 and 19, an additional form of wad column, designated 94, is shown which in similarity to wad column 4 above described embodies a lower obturating wad portion g', a filler wad portion h, a center post 95, extension 96 and side wall 97, with a shallow lip or shoulder s' being formed on the inner face of side wall 97 spacedly downwardly from its upper end for receiving a closure wad 98. The outer face of side wall 97 is longitudinally of fluted or serrated character, as by spaced, flat-topped ridges 99, which latter on the outer ends abut the gun barrel wall. The intervening grooves or flutings provide passages through which air, displaced by the insertion of the wad column 94, may be led or bled off. This feature assures positive seating of the wad column 94 above the powder charge for effecting reaction upon firing, thereby preventing the development of any undesired air pockets caused by the trapping of air during cartridge loading. Upon firing, with the resultant lateral expansion of wad column 94, the side wall 97 being substantially continuous on its outer surface as the ridges 99 will be increasingly flattened by such action and the grooves will be forced outwardly, so that desired gas sealing action will eventuate. Internally, wad column 94, within its filler wad portion h, is provided with an annular partition or inner wall 100 concentric with center post 95, and approximately equidistant from same and the inner face of side wall 97. The upper ends of said annular wall 100 and center post 95 are aligned and terminate substantially at shoulder s' to provide additional support for closure wad 98. Said inner, annular wall 100 cooperates with side wall 97 and center post 95 to provide outer and inner, annular air cells 101, 102, respectively, for effective cushioning upon firing. Gun barrel lubrication will be effected with this form of the invention by utilizing a material of construction similar to that discussed above for wad column 4 wherein the plastic material is provided with a lubricating agent.

FIGURES 20 and 21 disclose a still further form of wad column 104 which may be in all respects similar to wad columns 4, 24, and 24' above described, but which differs therefrom by providing the outer face of the embodied side wall 105 with longitudinal ridges 106, having a preferably flat top for air bleeding, as described in conjunction with wad column 94 above, to assure proper seating.

Thus, the present invention discloses a novel concept for economically produced wad columns, which incorporate within a single unit air cells for cushioning and trapping of air upon combustion, gun barrel lubricating means, and means for sealing the powder gases. The present wad columns are adapted for reliable longitudinal compression upon firing to effect a wedging action for proper obturation and with resulting lateral expansion for purposes fully set forth hereinabove.

The use of the present invention obviates the heretofore tedious procedure of inserting within cartridges obturating wads, filler wads, and closure wads in a step-by-step procedure, by permitting the single step of inserting a wad column which embodies the structural fea-

tures above described and which have the novel characteristics set forth.

It should be understood that changes and modifications in the formation, construction, arrangement, and combination of the several parts of the wad column may be made and substituted for these shown herein and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. An over-powder, pre-assembled wad column for a shotgun cartridge comprising a substantially elongated tubular body being open at one end, said body having an obturating wad portion integrally closing its other end, a center post provided axially of said body, a closure wad closing said one end of said body, means provided on said body for receiving said closure wad, and annular wall-forming means provided within said body to define a plurality of air cells.

2. An over-powder, pre-assembled wad column for a shotgun cartridge as defined in claim 1 and further characterized by said annular wall-forming means being in concentric relationship to the said center post so that the air cells defined thereby are annular and in concentric relationship to said center post.

3. An over-powder, pre-assembled wad column for a shotgun cartridge as defined in claim 1 and further characterized by said center post terminating spacedly from the open end of said tubular body, said closure wad engaging the adjacent end of said center post, said annular

wall-forming means comprising a single annular wall in concentric relationship to said center post, said wall forming an outer and an inner air cell in said body.

4. An over-powder, pre-assembled wad column for a shotgun cartridge comprising a substantially elongated tubular body being open at one end, said body having an obturating wad portion integrally closing its other end, a closure wad closing said one end of said body, means provided on said body for receiving said closure wad, and a single annular wall fixed concentrically within said body to define an inner and an outer air cell in said body, the inner end of said wall being rigid with the closed end of said body, the outer end of said wall terminating spacedly from the open end of said body.

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