

UNITED STATES PATENT OFFICE

CHARLES E. BURKE AND WALTER E. LAWSON, OF WILMINGTON, DELAWARE, ASSIGNORS
TO E. I. DU PONT DE NEMOURS & COMPANY, OF WILMINGTON, DELAWARE, A COR-
PORATION OF DELAWARE

WATERPROOFING COMPOSITION AND ARTICLES TREATED THEREWITH

No Drawing.

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This invention relates to the art of water-
proofing compositions, and more particular-
ly to the waterproofing of paper and articles
made therefrom, such as shotgun shells.

accomplished by coating or impregnating
paper or articles made therefrom with the
compositions set forth below in the form of
spraying or dipping lacquers. It should be
understood that these compositions are mere-
ly set forth by way of illustration and not as a
limitation. 80

5 Present methods of waterproofing shot-
gun shells usually involve the use of paper
treated with paraffin, vegetable oils, or py-
roxylin, or combinations of these materials,
as impregnating or coating agents. It has
10 been found, however, that shells so treated
have not possessed the desired characteristics
of being waterproof and sufficiently rigid to
hold their shape and at the same time pre-
serve their elasticity.

Example 1

	Parts by weight	
Meta styrene-----	18	55
Tricresyl phosphate-----	3.6	
Solvent—Ethyl acetate 20; butyl ace- tate 30; toluene 30; xylene 20-----	100	

15 It is therefore an object of this invention
to improve the waterproofing of paper and
articles treated therewith.

Used as a spraying lacquer over paraffin 60
impregnated shells, one coat increased the
time limit for total immersion in water with-
out swelling or opening of crimp from two
hours to seven hours. Used as a dipping
lacquer, two coats increased the time limit 65
to eight hours.

It is another object of this invention to
produce a stiffer and more uniform shell, so
20 that better patterns are secured and more
uniform velocity is obtained, and to produce
a shell having an improved appearance.

Example 2

	Parts by weight	
Vinyl chloride, alpha polymer-----	18	70
Blown China wood oil (containing 0.5 pts. cobalt linoleate drier)-----	18.5	
Solvent—Acetone 36; ethyl acetate 36; butyl acetate 45; chlorobenzene 45; hexalin acetate 20-----	182	75

It is a further object of this invention to
improve the waterproofing and stiffening of
25 a shotgun shell without unduly sacrificing its
elasticity.

This composition gave results similar to
those in Example 1.

It is also an object of this invention to make
shells more resistant to abrasion, which is
caused by the long continued tumbling often
30 encountered when shells are carried loose in
a hunting jacket, so they will retain their
close shooting qualities.

Example 3

	Parts by weight	
Polymerized vinyl chloroacetate-----	25	80
Solvent—Ethyl acetate 40; butyl acetate 35; acetone 15; cellosolve acetate 10--	100	

We have found that these objects can be
accomplished by treating paper or articles
35 made therefrom, such as shotgun shells, with
solutions containing a polymerizable sub-
stituted ethylene. An example of such a
polymerizable substituted ethylene is styrene
which can be dissolved in a suitable solvent
40 (with or without a softener, and with or
without coloring matter), applied to the
shell, and polymerized by standing, or (more
rapidly) by heating to form a hard, resistant,
and waterproof surface.

Used as a dipping lacquer, two coats on 85
shotgun shells increased the time limit for
total immersion without swelling or crimp
loosening from two hours for the untreated
shells to from five to five and one-half hours
for the treated shells. 90

45 We have found that these objects can be

Example 4

	Parts by weight
Vinyl chloride, acetone soluble polymer	11
5 Polymerized vinyl acetate	11
Solvent—Acetone 20; ethyl acetate 20; butyl acetate 30; chlorobenzene 30	100

Used as a dipping lacquer, two coats increased the time limit to seven hours.

10

Example 5

Instead of using a mixture of two vinyl compounds polymerized separately, a product obtained by polymerization in mutual contact may be used, as in the following case:

	Parts by weight
Vinyl chloride-vinyl acetate polymer	37
20 Solvent—acetone 25; ethyl acetate 25; butyl acetate 20; toluene 30	100

This mixture, being of greater viscosity than any of the preceding lacquers, gave exceptionally high protection. Shotgun shells were protected for 20 to 24 hours and even longer without any change in their appearance.

Although the examples given are limited to meta styrene and vinyl esters, many other compositions are useful for this purpose, such as polymers of other vinyl esters, especially the esters of higher fatty acids and polymerized vinyl ethers; polymers of allylene compounds; homologues of meta styrene, such as polymers of ethyl styrene and paramethyl styrene; and polymers of other highly unsaturated hydrocarbons.

We have found it desirable to modify meta styrene and its homologues, such as meta paramethyl styrene and other substitution products, to soften them and render them less brittle, suitable softeners including dibutyl phthalate, tricresyl phosphate and butyl stearate.

We have also found it desirable to modify polymerized vinyl chloride, by treating with suitable softeners, such as dibutyl phthalate or glyceryl dibenzyl ether, by mixing with drying oils, such as China wood, linseed, and perilla oils, or by adding other compatible vinyl derivatives, such as vinyl acetate.

These compounds may be incorporated in spraying or dipping lacquers and used as coating compositions on loaded shells, or may be employed for the impregnation of shells previous to loading. If desired, the impregnated shells, previous to loading, may be subjected to a baking process to increase their water resistance. For example, the water resistance of shells treated with polymerized vinyl chloracetate is markedly increased by baking at 65° C. for two hours, or at higher temperatures for correspondingly shorter periods of time. If the loaded shells are of the ordinary paraffin impregnated type, it is usually advisable to wash the shells with a

solvent for paraffin such as benzene or gasoline, or to subject them to a moderate buffing treatment.

Although we have stressed herein the use of our coating composition for waterproofing shotgun shells, it is equally useful for waterproofing or moisture-proofing paper for other purposes.

As many apparently widely different embodiments of this invention may be made without departing from the spirit thereof, it is to be understood that we do not limit ourselves to the foregoing examples or description, except as indicated in the following patent claims.

We claim:

1. A shotgun shell treated with a composition containing meta styrene.
2. A shotgun shell coated with a composition containing meta styrene.
3. A shotgun shell coated with a waterproofing composition containing about 18 parts by weight of meta styrene, about 3.6 parts by weight of tricresyl phosphate, and about 100 parts by weight of solvent.

In testimony whereof we affix our signatures.

CHARLES E. BURKE.
WALTER E. LAWSON.