

(No Model.)

F. W. OLIVER.

CARTRIDGE CASE AND PROCESS OF MAKING SAME.

No. 601,902.

Patented Apr. 5, 1898.

Fig: 1.

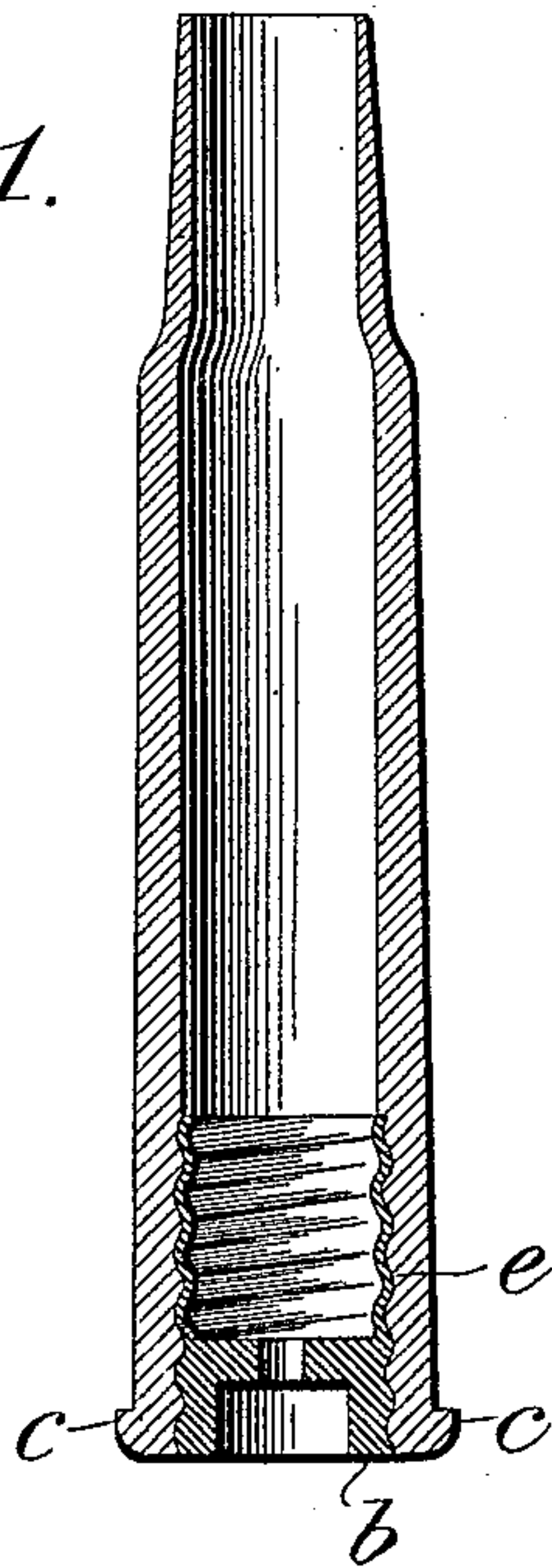


Fig: 2.

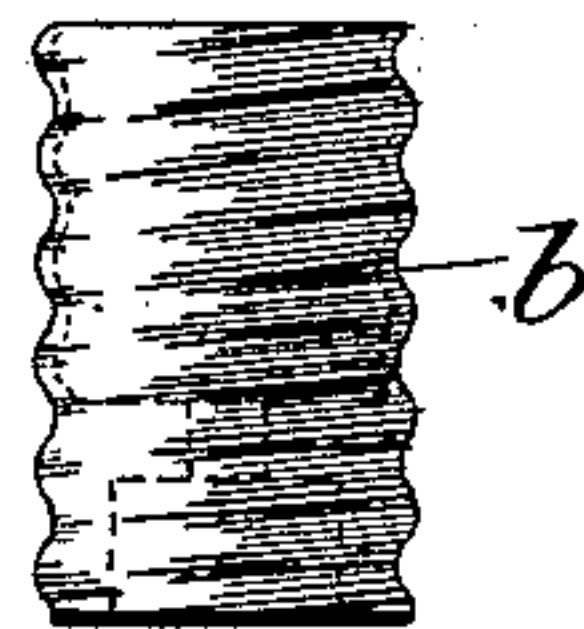


Fig: 3.

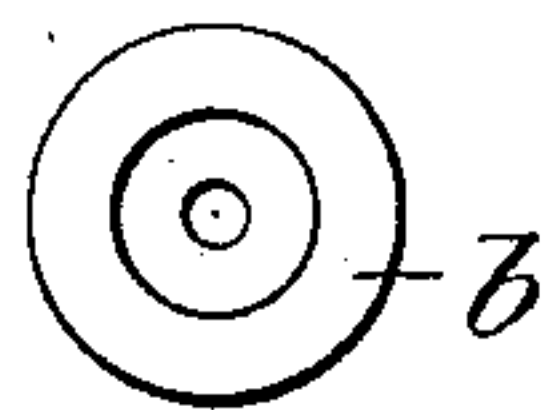


Fig: 5.

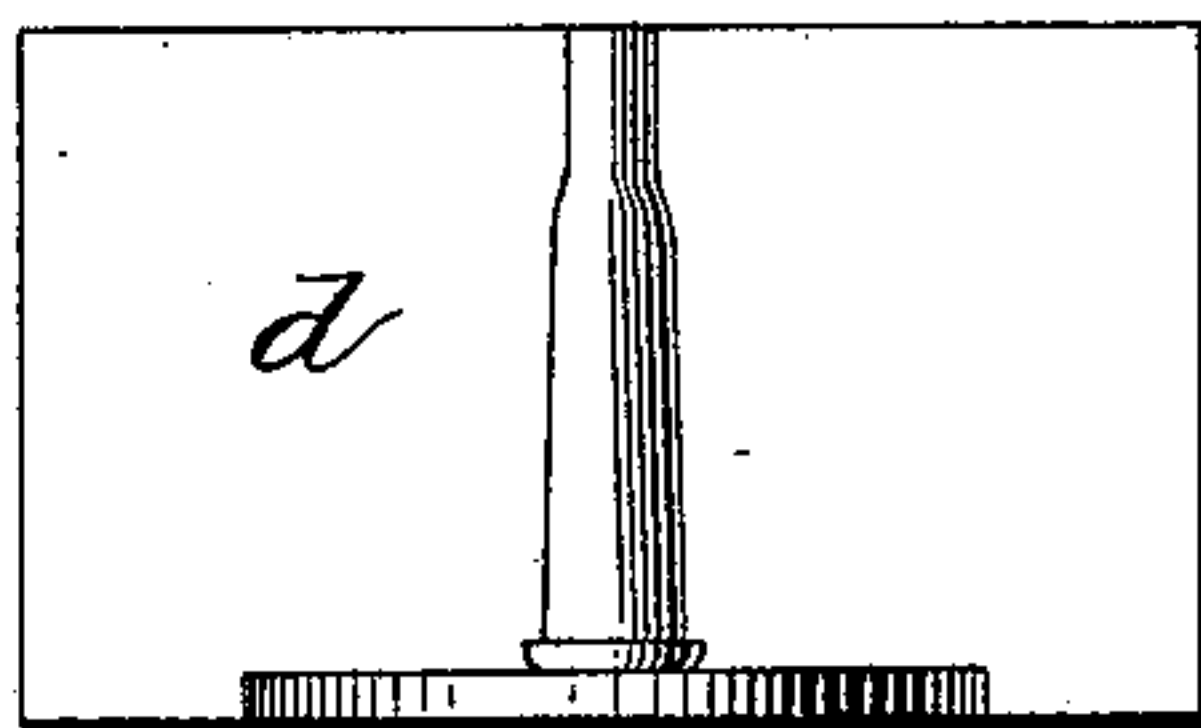


Fig: 4.

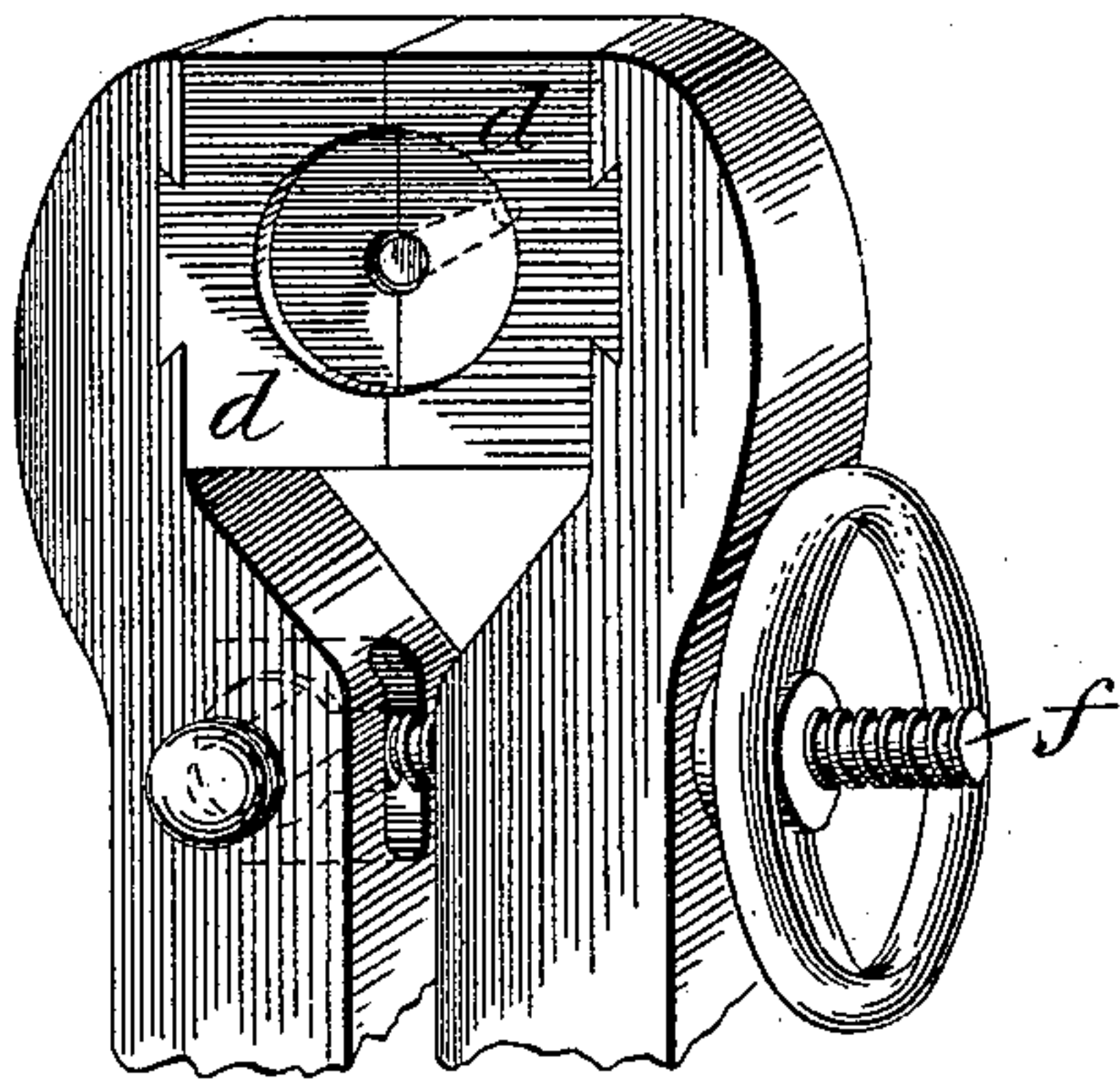
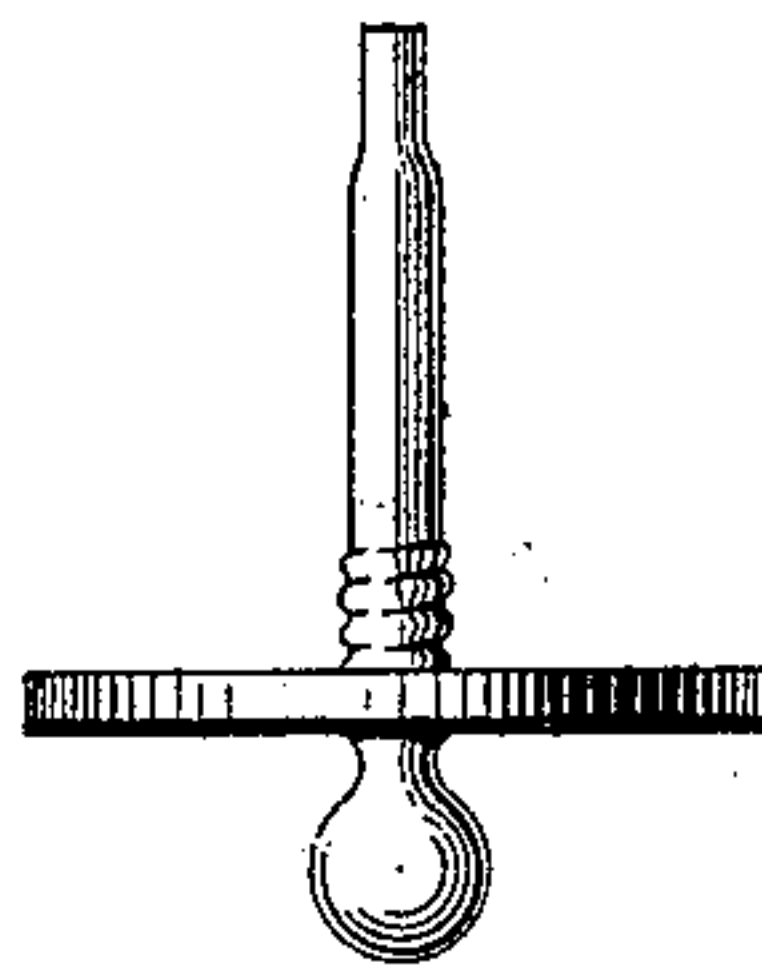


Fig: 6.



Witnesses:
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UNITED STATES PATENT OFFICE.

FREDERICK WEAVER OLIVER, OF LONDON, ENGLAND, ASSIGNOR TO THE PUBLISHING, ADVERTISING AND TRADING SYNDICATE, LIMITED, OF SAME PLACE.

CARTRIDGE-CASE AND PROCESS OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 601,902, dated April 5, 1898.

Application filed January 25, 1897. Serial No. 620,650. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK WEAVER OLIVER, a subject of the Queen of Great Britain, residing at No. 40 King street, Cheap-
5 side, London, England, have invented certain new and useful Improvements in Cartridge-Cases and in the Process of Making the Same, of which the following is a specification.

The object of my invention is to produce
10 waterproof cartridge-cases, more particularly for rifles and sporting-guns, without seams or joints in the cylinder or body, with smooth interior and exterior surfaces and of uniform solidity and homogeneity throughout their
15 substance, and having at the same time walls of proper thickness and chambers of proper size for the reception of the explosive and projectile. I also by my invention produce shells composed of but one material or com-
20 pound, with the exception of the exploding device, which is generally made of metal.

A variety of ways has heretofore been proposed of making cartridge-cases, but none, as far as I am aware, like that herein described,
25 nor by such methods have or could cartridge-cases like those produced by me be made. Thus it has been proposed to cast the case from a plastic or semifluid compound, giving it initially the interior and exterior form of
30 the finished case; but this process is slow and is also one in which the common imperfections—as air-bubbles and flaws, for instance—incident to all casting operations may occur, resulting in porous imperfect cases unsafe in
35 use. It has also been proposed to make a composite case composed of a number of parts and after assemblage to form them to the desired shape by pressure—for instance, to take a tube of proper length and diameter, insert
40 into one end a shorter tube, and place within the shorter tube an apertured plug or wad that closes or forms the end of the tube, and then by pressure to reduce the diameter at that end so as to ultimately receive a base or
45 head the flange of which is outside the tube; then in a further operation to place the article thus made in a closed die with a screw-core on the bottom of the die occupying the aperture in the wad, and then to compress the wad
50 by a plunger moving longitudinally against

the screw-core to mold the thread of the core in the opening in the wad, after which the metal base is placed over the reduced end of the shell and the primer attached to the head or base is screwed into the threaded aperture
55 of the wad. This is a complex and expensive method of manufacture. The exterior of the shell is not a smooth unbroken surface of one material. The exterior joint between the base and the shell is a source of weakness,
60 and the integrity and perfection of the shell depend upon the union of the two tubes, the wad and the base, all of which are necessary to its construction.

I am also aware that it has been proposed
65 to make cartridge-cases by bending or rolling up sheets of celluloid or paper and cementing the joints to form the body of the case. Where celluloid has been so used, it has also been proposed to cement in the end of the
70 tube a flanged cap to close its end; but such mode of manufacture is not economical and is not adapted to produce uniformly perfect shells nor shells of any great durability or strength, and these cases belong to the class
75 of combustible-envelop cartridges, a type now almost, if not quite, universally disapproved and abandoned. Where paper has been so used and the flanged head is to be screwed
80 onto the shell, it has been proposed to crimp or soften one end of the tube, insert a sheet-metal thimble having a screw-thread spun or rolled into it, work the crimped paper down to conform to such thread, and then over the
85 thread thus formed in the outer face of the paper to screw the flanged head. I am also aware of the common method of making ordinary paper shells with metal heads, which are so largely used in sporting-guns.

In the accompanying drawings, which illus-
90 trate my invention, Figure 1 is a longitudinal section of a finished cartridge-case. Fig. 2 is a side elevation, and Fig. 3 a plan, of the end or cap. Fig. 4 is a perspective view of the press. Fig. 5 is an elevation of one-half
95 of the split die. Fig. 6 is an elevation of the mandrel.

In practising my improved process of making cartridge-cases I use a porous material—
such as wood-pulp, asbestos, &c.—in a loose 100

divided condition, mixed with liquid celluloid. When using wood-pulp, I find good results are obtained by impregnating or saturating one part of wood-pulp, by weight, with from two to three parts of liquid celluloid. This compound when well mixed and in a good plastic condition is formed into a tube of proper diameter and with walls of proper thickness. The tube may be formed by forcing the compound, when heated to about 250° Fahrenheit, through an annular die around a centrally-disposed core, in the way in which lead pipe is ordinarily made, or it may be formed otherwise, care being taken to have it of uniform quality or density at all points, as that is desirable. The diameter of the tubes should be equal or about equal to the greatest diameter or caliber of the cartridge-case to be made, and the thickness of the wall of the tube should preferably be equal or about equal to the greatest thickness of wall of the finished case if the shell is to be tapered, but slightly thicker if the finished shell is to be cylindrical, and in all cases the quantity of material in the tube should be such as is necessary to afford the proper degree of compression of its substance and at the same time completely fill the die-space determining the interior and exterior conformation of the completed case when the tube is pressed diametrically to form the body or shell of the case, as hereinafter described. A suitable length cut from this tube is placed on a mandrel *a*, having the correct dimensions for the interior of the case and furnished with a screw-thread at that end of the mandrel upon which the base end of the shell is formed. The mandrel with the tube upon it is placed between the split dies *d*, which have the correct internal shape for the exterior of the case, and the dies are so forced together as to compress the tube diametrically between them and the mandrel by means of the screw *f* or other appropriate mechanical means. In this way the walls of the tube are consolidated and formed into the finished shell or body, having a screw-thread molded in one end at the same operation. The plug or cap *b*, (shown separately in Figs. 2 and 3,) which may be either made of metal or be molded by pressure out of the pulp, or partly of both, is screwed into the bottom of the tube, which is preferably warmed at the time and may also be advantageously slightly softened by the application of a solvent to the interior. The shoulder *c*, Fig. 1, may either be pressed up out of the tube, as shown, or it may be formed out of the cap. When pressing the tube by means of the die, as above mentioned, the die and mandrel should both be heated. By this method of operation it will be apparent that the tube being first formed and then shaped in dies by heat and pressure, the compound forming the case must be of substantially the same solidity and homogeneity at every point. It must also have hard smooth continuous surfaces

without joint of any kind, and therefore be free from structural weakness or joints liable to admit moisture. The plugs or caps of the same material being formed in dies are similarly solid and strong. Also on account of the characteristics of the compound the plug becomes welded to the shell when screwed in place after the softening of the compound forming the thread *e* by heat or by a solvent of celluloid. Thus there is practically no joint even around the plug, because the plug *u* in effect and in fact, becomes integral with the substance of the casing.

The material employed by me can readily be worked when in a very hard and solid form if heat be applied, and I do not therefore have to deal with an unstable or feebly cohesive mass, and am therefore able to produce tubes strong and solid in structure, which, when compressed in dies to complete the formation, possess all the qualities hereinbefore mentioned. It is also apparent that the operation of making these cases is simple and economical, since the completed shell or body, with the screw-thread *e*, is produced from the tube at one operation.

I claim as my invention—

1. The herein-described process of manufacturing bodies for cartridge-cases from a waterproof compound composed of a porous material impregnated with celluloid, which consists in first forming a tube of such compound, and then compressing the walls of the tube diametrically while heated to give it the interior and exterior conformation of the finished body.

2. The herein-described process of manufacturing bodies for cartridge-cases from waterproof compound, which consists in first forming a tube of the compound, then compressing the walls of the tube diametrically while heated to give it the interior and exterior conformation of the finished body, and simultaneously by such diametrical pressure molding a screw-thread in one end of the body for the reception of a correspondingly-threaded cap or plug.

3. The herein-described process of manufacturing bodies for cartridge-cases from a waterproof compound composed of a porous material impregnated with celluloid, which consists in first forming a tube of such compound, then compressing the walls of the tube diametrically while heated to give it the interior and exterior conformation of the finished body, and simultaneously by such diametrical pressure molding a screw-thread in one end of the body for the reception of a correspondingly-threaded cap or plug.

4. The herein-described process of manufacturing cartridge-cases from a waterproof compound composed of a porous material impregnated with celluloid, which consists in first forming a tube of such compound, then compressing the walls of the tube diametrically while heated to give it the interior and exterior conformation of the finished case, si-

multaneously by such diametrical pressure
molding a screw-thread in one end of the body,
and then softening the thread as described
and introducing a correspondingly-threaded
5 cap or plug molded from a compound contain-
ing celluloid.

10 5. As a new article of manufacture, the
herein-described homogeneous cartridge-case
having an integral waterproof body composed
of a compound of porous material and cellu-
loid molded under heat and pressure into
shape, open at both ends and having an in-
ternal screw-thread molded in one end, and

a cap or plug molded from a like compound,
having a corresponding screw-thread, and 15
screwed into and integrally united with the
threaded end of the body by softening the
substance of the plug and the substance of
the body to cause their surfaces in contact to
weld or intimately unite. 20

Dated in London this 8th day of January,
1897.

FREDERICK WEAVER OLIVER.

Witnesses:

W. W. HAWS,
P. G. HARDING.