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F. I. DU PONT.

CARTRIDGE AND PROCESS OF MANUFACTURE THEREOF.

APPLICATION FILED SEPT. 7, 1905.

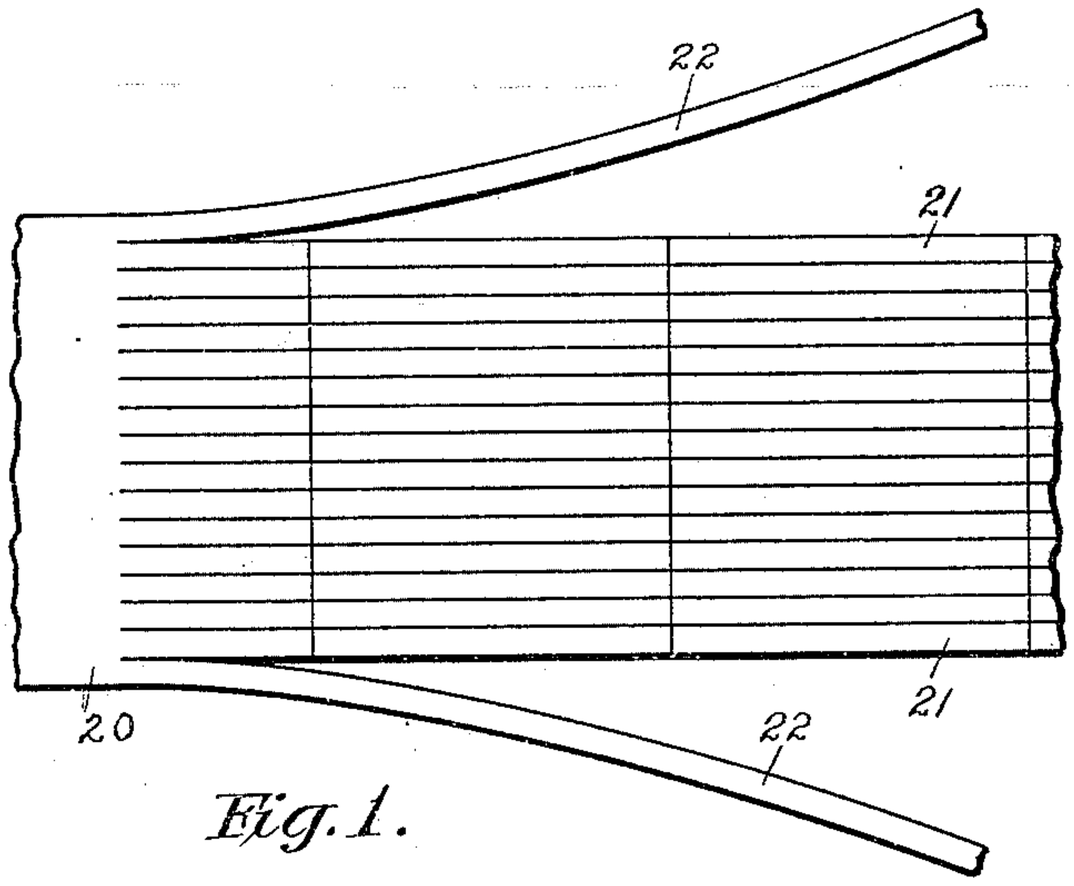

Fig. 1.

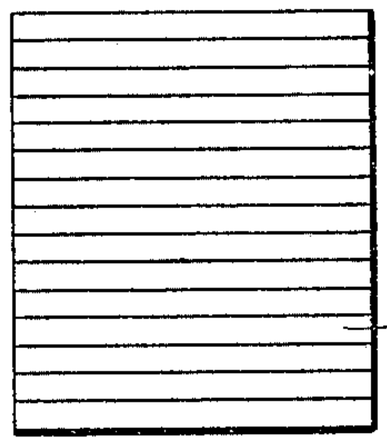

Fig. 2.

Fig. 3. Fig. 4.

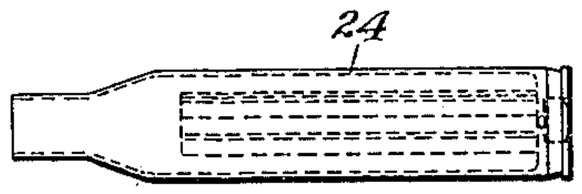

Fig. 5.

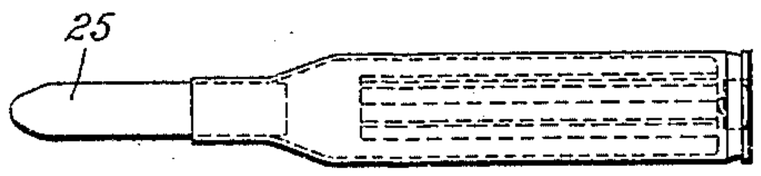

Fig. 6.

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CARTRIDGE AND PROCESS OF MANUFACTURE THEREOF.

No. 846,612. Specification of Letters Patent. Patented March 12, 1907.

Original application filed July 12, 1905, Serial No. 269,306. Divided and this application filed September 7, 1905. Serial No. 277,312.

To all whom it may concern:

Be it known that I, FRANCIS I. DU PONT, a citizen of the United States, residing at Wilmington, county of Newcastle, and State of Delaware, have invented a new and useful Improvement in Cartridges and Processes of Manufacture Thereof, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The object of my invention is to load cartridge-cases with charges of sheets or strips of smokeless powder so as to produce substantially absolute uniformity in explosive power between one cartridge and another. In large pieces this has been heretofore attempted by forming the powder into sheets, cutting the sheets into strips, and inserting a definite weight of strips into the shell. Notwithstanding the fact that this method insured the insertion into each shell of a definite weight of powder, and consequent uniformity in this respect between cartridge and cartridge, there is more or less variation in the explosive force of the different cartridges. The reason for this variation I have found is due to the following conditions: The sheets from which the strips are cut vary in thickness and different parts of the same sheet vary in thickness. Consequently, comparing cartridge with cartridge, a definite weight of strips therein does not insure uniformity in the total superficial area of the strips. If the thickness of the smokeless-powder strips is sufficiently great for the burning of these to continue throughout the whole travel of the projectile from the chamber to the muzzle of the piece, it is on the superficial area of the strips and not on the weight of the powder contained in the strips that the explosive power of the cartridge depends. To particularize, a cartridge charged with relatively thick strips of a definite total weight will present a smaller superficial area of powder than a cartridge charged with relatively thin strips of the same total weight, and hence will be of inferior explosive force.

It will be understood that if it were feasible to form the sheets of explosive powder of uniform and unvarying thickness the objection to the method of charging by weight would be overcome; but as it is practically impossible to do so I have attained the object of uniformity of explosive force between one cartridge and another by charging into each shell a sheet of explosive powder of definite superficial area.

I preferably carry out my method by first taking a sheet or roll of explosive powder of any dimensions, cutting the sheet to definite width and at the same time cutting it longitudinally into strips, then cutting the strips transversely to form sets of strips of definite length, then bunching the strips so formed, and then inserting the bunched strips into the shell. By this process I attain substantially absolute uniformity of explosive force between one cartridge and another, notwithstanding variations in weight of powder resulting from variations in the thickness of the original sheet or roll. It is true that in calculating the absolute total surface area of the strips the area of the edges, as well as of the sides, should, strictly speaking, be considered and that therefore, even with my process, there will be a certain variation in the superficial area of the strips in the different shells. Owing, however, to the fact that the strips are very thin, the ratio of the surface area of the edges to that of the sides is so minute that any variation in surface area arising from variation in thickness of the strips is practically negligible.

The process can be carried out by hand, although the economic use of the process demands mechanism that will carry out the process expeditiously and as far as possible automatically. I have accordingly devised a machine for so carrying out the process, which machine forms the subject of an application filed by me July 12, 1905, Serial No. 269,306, of which this application is a division. In the present application I have described and claimed only the process and the cartridge formed thereby.

Figure 1 is a plan view of the sheet cut into strips. Fig. 2 is a plan view of the sheet of Fig. 1 cut to length. Fig. 3 is an end view of the strips bunched preparatory to insertion in a shell. Fig. 4 is a side view of Fig. 3. Fig. 5 is a side view of the shell charged with the bunched strips. Fig. 6 is a side view of the shell of Fig. 5 loaded with a bullet.

I shall first describe the preferred way of carrying out my process. I first take a sheet or roll 20 of explosive material and cut or

shear it lengthwise into strips 21, which are preferably of equal width, as shown in Fig. 1. The original sheet may be precisely the width of the combined width of the strips 21; but in carrying out my process by machinery it is more feasible to have the original sheet of greater width and cut or shear off the excess 22 on each side thereof. The strips so formed are then cut transversely to a definite length, as shown in Fig. 2, forming a plurality of sets of strips 23, each set composed of a definite and unvarying number of strips each of a definite and unvarying length and width. The strips of a single set or the strips of a definite and unvarying plurality of sets of strips are then bunched together, as shown in Figs. 3 and 4, and inserted into a shell 24, as shown in Fig. 5. In Fig. 6 is shown a completed cartridge with bullet 25 inserted.

It will be understood from the foregoing description that shells charged by my process will each contain a definite number of strips of equal length and breadth, and therefore that all the shells will necessarily contain powder charges presenting substantially equal superficial areas and will therefore be of equal explosive power, notwithstanding variations in weight of powder.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. The process of charging shells which consists in cutting a sheet of explosive material into strips of predetermined total width, cutting the strips transversely along lines spaced apart at uniform distances to form sets of strips of equal and predetermined length, bunching the sets of strips, and inserting the bunched sets of strips into shells.

2. The process of charging shells which consists in cutting a sheet of explosive material into strips of equal width and of predetermined total width, cutting the strips transversely along lines uniformly spaced apart to form sets comprising strips of equal numbers and dimensions, bunching the sets of strips, and inserting the bunched strips into shells.

3. A cartridge having a charge of predetermined superficial area composed of strips of predetermined total width and of predetermined equal length, formed from a single sheet of explosive material cut successively longitudinally and transversely and bunched before insertion into the shell.

4. A cartridge having a charge of predetermined superficial area composed of strips of equal width, and of predetermined total width and of predetermined equal length, formed from a single sheet of explosive material cut successively longitudinally and transversely and bunched before insertion into the shell.

In testimony of which invention I have hereunto set my hand, at Wilmington, Delaware, on this 29th day of August, 1905.

FRANCIS I. DU PONT.

Witnesses:
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J. K. EASLEY.