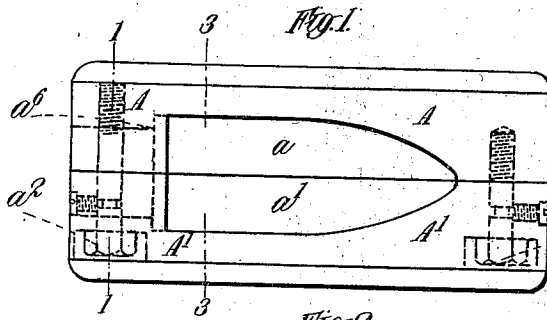
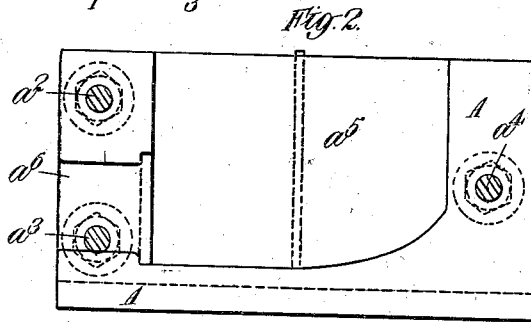
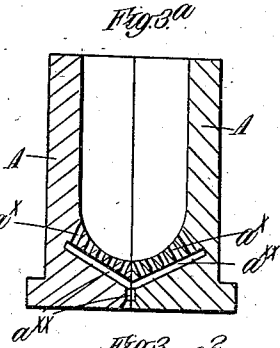
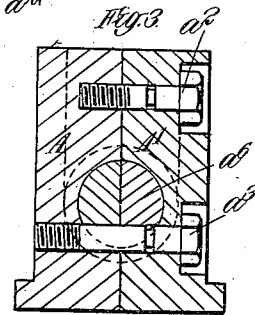
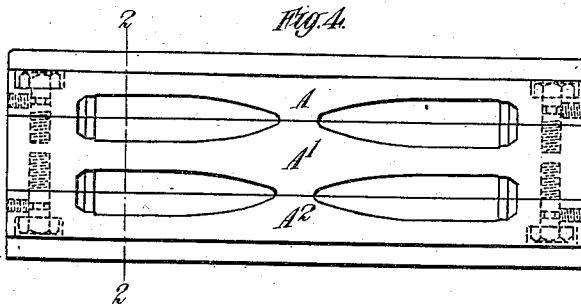
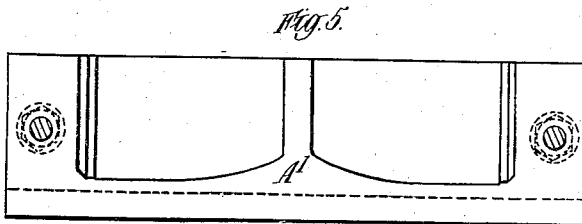
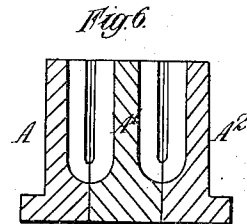


J. A. CARTER.
MANUFACTURE OF COMPRESSED GUNCOTTON CHARGES.
APPLICATION FILED NOV. 5, 1907.

903,840.

Patented Nov. 17, 1908.

2 SHEETS—SHEET 1.



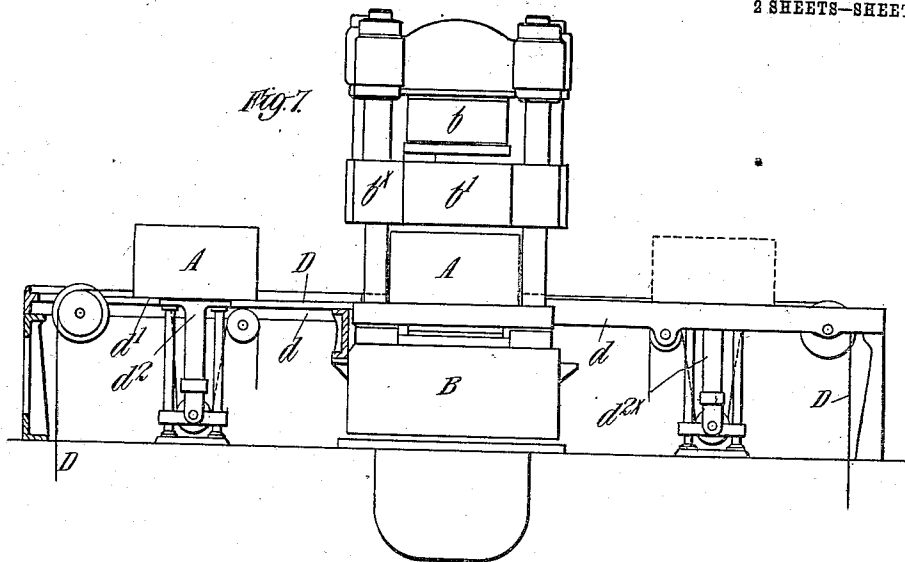
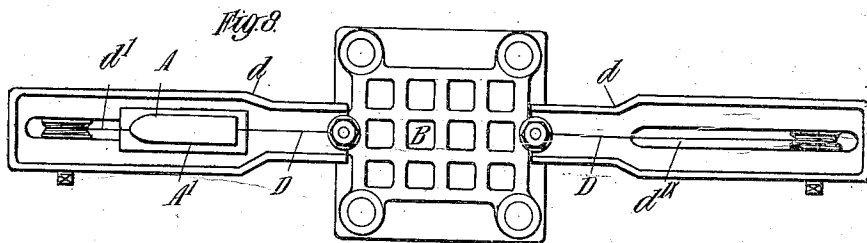
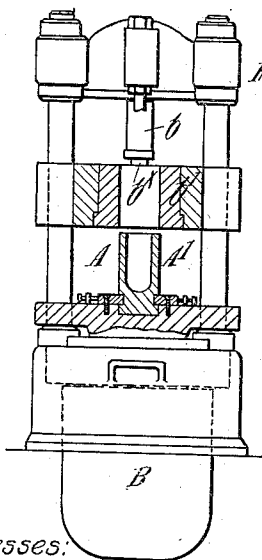
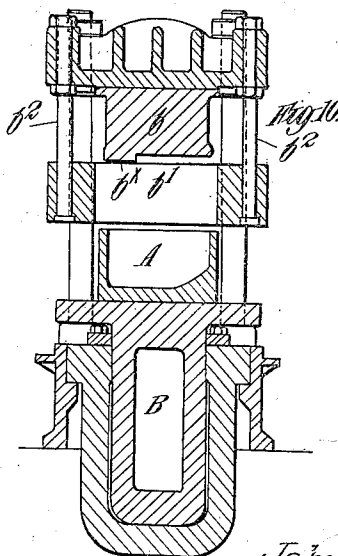
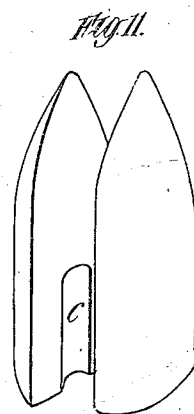
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A. D. Gardner.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN ARTHUR CARTER, OF STOWMARKET, ENGLAND, ASSIGNOR TO THE NEW EXPLOSIVES COMPANY LIMITED, OF LONDON, ENGLAND.

MANUFACTURE OF COMPRESSED-GUNCOTTON CHARGES.

No. 903,840.

Specification of Letters Patent.

Patented Nov. 17, 1908.

Application filed November 5, 1907. Serial No. 400,786.

To all whom it may concern:

Be it known that I, JOHN ARTHUR CARTER, a subject of the King of Great Britain, residing at Stowmarket, in the county of Suffolk, England, engineer, have invented certain new and useful Improvements in and Relating to the Manufacture of Compressed-Guncotton Charges, of which the following is a specification.

This invention relates to the manufacture of compressed gun cotton charges for explosive projectiles, torpedoes, submarine mines and the like. Heretofore it has been usual to obtain these charges by compressing gun cotton pulp in molds by pressure exerted in a direction longitudinal with respect to the molds, whereby blocks of the compressed gun cotton were obtained of more or less cylindrical shape. In some instances these blocks were sufficiently large to form the charge in one solid piece, in other instances they were in the form of disks or segments, a specified number of these being assembled together to form one charge. In both instances they were subsequently finished in a turning lathe to form a charge of the requisite shape and dimensions to fit the explosive projectile or the like with which they were intended to be used.

According to this invention instead of manufacturing the charges in one solid piece or in a considerable number of independent pieces, they are made in longitudinal sections or halves of the requisite shape to fit the explosive projectile or the like, the said sections or halves being obtained in molds by subjecting the gun cotton pulp to pressure exerted in a direction transverse to the longitudinal axis of the charges instead of lengthwise as heretofore. The said longitudinal sections or halves may be attached together by means of collodion solution or the like so as to form a single body for insertion as one piece into the explosive projectile or other object with which they are to be used. By thus manufacturing the charges they do not require to be turned in a lathe to render them of proper shape to fit the explosive projectile or the like and by reason of the small number of component parts of which the charges consist, they are rendered very convenient to handle.

In order that the said invention may be clearly understood and readily carried into effect the same will be more fully described

with reference to the accompanying drawings, in which:—

Figure 1 is a plan of a two-part mold suitable for use in manufacturing the improved charges. Fig. 2 is a side elevation of one of the sections of the said two-part mold. Fig. 3 is a vertical section taken on the line 1, 1 of Fig. 1. Fig. 3^a is another vertical section taken approximately on the line 3, 3 of Fig. 1. Fig. 4 is a plan of a modified form of the mold intended for use in forming a number of my improved charges simultaneously. Fig. 5 is a side elevation of one of the sections of the said mold. Fig. 6 is a vertical section taken on the line 2, 2 of Fig. 4. Fig. 7 is a general elevation of the hydraulic press for use in compressing the gun cotton in the molds. Fig. 8 is a plan of the same. Figs. 9 and 10 are vertical sections of the press at right angles to each other. Fig. 11 is a perspective view showing a complete charge made in accordance with this invention and intended for a shell, the parts of the charge being shown separated.

In all these figures like letters of reference indicate similar parts.

Referring to Figs. 1, 2 and 3, A A' represent the two-part mold which is made of steel or other suitable metal having its interior lower portions *a a'* formed to the shape of the exterior contour of one half of the charge. That is to say if the charge is intended for use with an explosive projectile or shell, the said mold has its lower interior portions of semi-cylindrical form terminating at one end in a semi-ogival shape to suit the nose of the shell as shown in these figures. This mold after being filled with the gun cotton pulp is subjected to pressure in an hydraulic press, like that shown at B in Figs. 7 to 10, the head *b* of which is adapted to fit the interior of said mold and is flat on its active face except at the part corresponding with the base portion of the charge, where it may be provided with a protuberance *b'* to form the recess or cavity *c* in the charge for the reception of the detonator as shown in Fig. 11. The resulting compressed pulp obtained by this operation constitutes one half of the charge, two of such charges (as shown in Fig. 11) being combined together to form the complete charge. The two vertical halves A A' of the said mold are held together by transverse screws *a² a³ a⁴*, so that after the completion of the compressing operation, the

halves of the mold can be moved apart or separated by slackening the said screws and thus enable the compressed charge to be readily removed therefrom.

- 5 In order to permit of the escape of the moisture from the pulp during the compressing operation, the said mold is formed with perforations a^x (Fig. 3^a) leading to appropriate drains or channels a^{xx} .
- 10 For the purpose of avoiding undue pressure at the nose of the charge, which might result in the removal of too much of the moisture from this part during the compressing operation, the said mold may be provided
- 15 with a vertical transverse partition adjacent to the semi-ogival end of the mold, as shown by the dotted lines in Fig. 2, so that during the filling of the mold with the gun cotton pulp the space a^5 adjacent to the said semi-
- 20 ogival end is left empty. Prior to the compression of the pulp in the press, the said partition is removed, so that during the actual compression, the pulp is able to reach the semi-ogival end of the mold without
- 25 enduring a pressure materially greater than that exerted upon the other portion of the pulp in the mold.

- The head b of the hydraulic press in which the pulp is subjected to pressure is provided
- 30 with a frame b' which is loosely suspended by guide rods b^2 depending from the head b and which as the ram ascends, fits around the mold $A A'$ and moves upward with it, thus reinforcing the mold and aiding it to resist
 - 35 the lateral pressure it has to sustain. This frame b' also permits of filling pieces being introduced therein when molds of smaller dimensions than the largest sizes are being acted upon, thus enabling one press to be
 - 40 used for molds of different sizes. In conjunction with the said press, means may be provided whereby the mold can be carried beneath the head b and removed therefrom
 - 45 by mechanical means. That is to say the said mold may be connected by means of chains, cords or the like D , with suitable winding or similar gear for moving it along a table d to a position beneath the head, and
 - 50 after the compressing operation has been performed, the said mold can be removed from beneath the head by a reverse operation, to a position on the table where the compressed charge can be removed from the mold (see
 - 55 Fig. 7). The said table may also be provided with an opening d' at the point where the mold arrives after the compressing operation, so that when the sections $A A'$ of the mold have been separated by the slackening of the aforesaid screws $a^2 a^3 a^4$, a platform
 - 60 or the like d^2 can be caused to ascend and carry the charge from out of the mold into a suitable position to permit of its ready removal. Or instead of the platform d^2 suitable lever mechanism may be provided for
 - 65 elevating the pressed charge from the mold

into a position where it can be readily removed by hand.

In some cases more than one mold may be employed for each press (as shown in Fig. 7 where two are employed) the said molds being then connected together by a chain D or the like so that as one mold is carried beneath the head b of the press by a movement to the left in Fig. 7, the other one will also be carried to the left over the aforesaid opening d' in the table d . After the removal of the compressed charge as aforesaid from the left hand mold, the right hand mold, which has in the meantime been subjected to pressure, can be removed from the press by a movement to the right over an opening d'^x and the left hand mold (recharged with the gun cotton pulp) brought into its place beneath the head b ; the right hand mold containing the previously compressed charge having its charge removed by a platform d^{2x} or lever mechanism as stated above.

For facilitating the manufacture of the mold it may be provided at the end remote from the semi-ogival end, with an opening to permit of the introduction of the tool used for turning the semi-ogival surface, said opening being subsequently closed by a divided plug a^6 (see Figs. 1 to 3) introduced into the said opening. When the said mold is constructed to enable more than one charge to be compressed at a time, it may be made as shown by Figs. 4 to 6 in which case it comprises three members $A A' A^2$ instead of two as in the previously described mold shown by Figs. 1 to 3.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In the manufacture of compressed gun cotton charges, means whereby the gun cotton pulp can be subjected to pressure in a mold in a direction transverse to the longitudinal axis of the charge, so that the said charge can be made in separate longitudinal sections or halves of a shape suited to that of the shell or other object with which the charge is to be employed.

2. In the manufacture of compressed gun cotton charges, a mold composed of separable longitudinal sections having the interior lower portions formed to the shape of the exterior contour of one half of the charge and provided with perforations or drainage channels, the upper part of said mold being open to admit a press-head which has a projection to form a cavity or recess in the charge for the reception of the detonator.

3. In the manufacture of compressed gun cotton charges, the combination with the mold of means whereby undue pressure is avoided at the nose of the charge during the compressing operation.

4. In the manufacture of compressed gun cotton charges, the combination with the

mold of a detachable vertical transverse partition adapted to be placed in the mold adjacent to the semi-ogival end of the latter during the filling of the mold with the gun 5 cotton pulp, so that after the removal of the partition a space is left for the pulp to enter during the compressing operation without enduring a pressure materially greater than that exerted upon the other 10 portion of the pulp in the mold.

5. In the manufacture of compressed gun cotton charges the combination with a press

and a mold of means for enabling the mold to be carried beneath the press-head and removed therefrom mechanically, and means 15 for mechanically raising the charge from the mold after the compression has been effected and the mold removed from the press.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN ARTHUR CARTER.

Witnesses:

L. G. DUFF GRANT,
A. H. BERRY.