

July 21, 1925.

1,546,842

T. LAFITTE

SHELL FOR INFANTRY USE

Filed Jan. 8, 1923

2 Sheets-Sheet 1

Fig. 1.

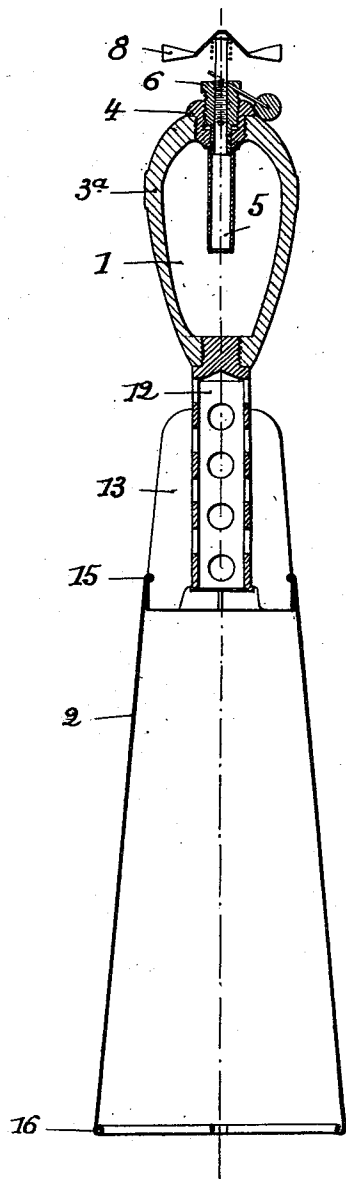


Fig. 2.

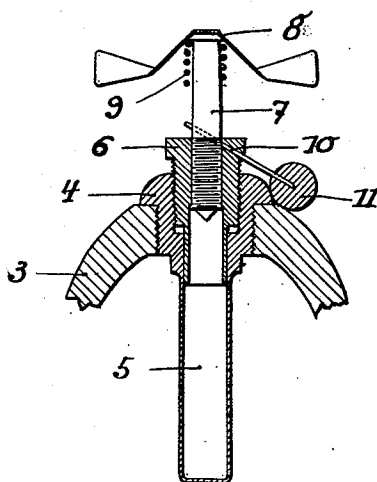


Fig. 3.

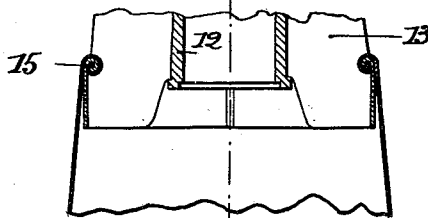


Fig. 4.

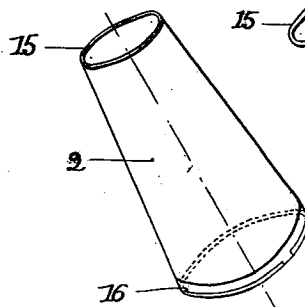
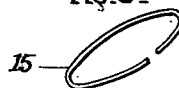


Fig. 5.



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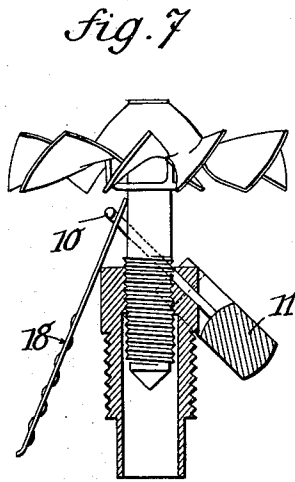
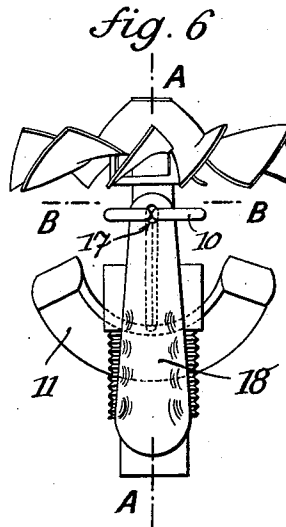
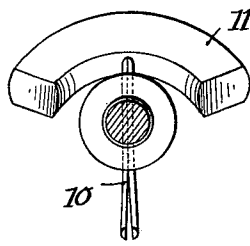


fig. 8



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UNITED STATES PATENT OFFICE.

THÉODORE LAFITTE, OF PARIS, FRANCE.

SHELL FOR INFANTRY USE.

Application filed January 8, 1923. Serial No. 611,518.

To all whom it may concern:

Be it known that I, THÉODORE LAFITTE, a citizen of the Republic of France, and residing at Paris, Seine Department, No. 15 Avenue Pasteur, in the Republic of France, engineer, have invented certain new and useful Shells for Infantry Use, of which the following is a specification.

The shell of the winged type according to the present invention is intended to be fired by hand or by an infantry cannon without being obliged to make any great modifications for such purposes. As a particular feature, the said projectile may be fired by means of the infantry cannon which is set forth in patent filed on this date for "infantry cannon." It also provides for a perfect stability which is due to the application of a ring to the rear end of the wings, as well as an entire safety as regards the striker arrangement.

Two constructional forms of said shell are shewn by way of example in the appended drawings.

Fig. 1 is a section on the axis of the first constructional form of the shell.

Fig. 2 is a section of the striker arrangement on a large scale.

Fig. 3 is a view of the rear end of the wings and of the device for attaching a sleeve.

Fig. 4 is a perspective view of the sleeve.

Fig. 5 is a like view of one of the rings of the sleeve.

Fig. 6 is an elevational view of the striker arrangement of the second constructional form.

Fig. 7 is a vertical section on the line A—A of Fig. 6.

Fig. 8 is a horizontal section on the line B—B of Fig. 6 with the tongue or plate removed.

1 indicates the shell properly so called, and 2 a removable sleeve which is used only for hand firing.

The shell is constituted by a hollow receptacle in cast iron 3 of a suitable shape; at about two-thirds of its height it comprises a turned cylindrical portion 3^a of the same diameter as the cannon bore, save for a slight play. At either end of the shell is a screw-threaded hole and a machined flat surface. Upon the upper screw-threaded part is fitted the striker device, and upon the lower screw-threaded part the tail piece with the wings.

The striker device comprises a screw-threaded detonator tube 4, the detonator 5 being fitted into the narrow part thereof; said tube is screwed directly into the main body of the shell by means of notches formed in its collar by milling; into the said detonator tube is screwed a nut 6 which serves to hold the detonator 5. Into the internal threaded part of said nut which has in all cases a left thread, is inserted a striker 7 upon whose end is soldered a conical cup 8 of pressed sheet metal having at the periphery a set of inclined blades which are directed towards the right. A spring 9 is disposed between the said cup and the nut 6. A split pin 10 carrying a mass of lead 11 prevents the striker from rotating within the nut holding the detonator. The internal and external threads of the nut 6 are in all cases in the contrary sense, and the blades of the said cup and the screwthread of the striker also have their threads in the contrary sense.

The lower screwthread of the main body of the shell is adapted to receive a steel tail piece 12 which is apertured and is bored out for the major part of its length. To the said tail piece are soldered the sheet metal wings 13, connected together at the bottom by the ring 14 which is soldered to said wings.

The device forming the shell properly so called has removably secured thereto a sleeve 2 of textile fabric having a tapered shape, Fig. 4, the sleeve being maintained in the round form by means of two elastic rings 14, 15 of piano wire which are extensible because the ends are not soldered, Fig. 5.

As above stated, the said shell can be fired by means of a suitable cannon, or in other cases by hand.

Cannon firing.—In this case the shell is not provided with the said sleeve. A cartridge is placed within the bore of the tail piece 12 and is fitted in with a rather hard friction. The shell is then allowed to drop into the cannon through the muzzle. Firing of the cartridge is performed by operating the percussion mechanism of the cannon.

The gas from the explosion of the cartridge will escape through the lateral holes in the tail piece 12 and will occupy the space between the breech block of the cannon and the shell, whereby the latter is given the requisite impulse for the distance to be

covered. The lead weight 11, as above stated, is connected with the shell solely by the pin 10 which is disposed in the oblique and aligned holes of the striker 7 and the nut 6; the ends of said pin are normally spread apart in order to hold the safety weight; said pin prevents the striker 7 from turning, so that it cannot come into contact with the detonator 5, as this might cause serious accidents during the manipulations. The said pin must be drawn out when starting, so as to give free action to the striker device, and this is automatically produced by the inertia of the safety mass, because the mass will have at the start by reason of its inertia a negative acceleration with respect to the shell as a whole, and this will suffice to remove the said pin from the striker. The safety weight when thus released will now be withdrawn from the cannon by the shell. The striker when disengaged will set up a rotation under the effect of the resistance of the air acting upon the blades of the cup 8; as above stated, the blades and the screwthread of the striker are in contrary sense, so that the striker becomes screwed into the nut 6 until the last threads extend out said nut. At this time the striker is free to rotate as well as to move in a straight line; it is only separated from the detonator by the spring 9 which comes in contact with the base of the nut 6. To prevent the air pressure due to the great velocity produced by the cannon firing from driving the striker into the detonator, various holes 17 are made in the conical part of the cup to provide for an increased air flow. In this manner, the shell is primed so that even a slight impact upon the end of the cup will cause the striker to be driven in, and the point of the striker will thus come into contact with the detonator.

The latter will explode, thereby causing the explosion of the charge contained in the shell.

The shell must always have the point turned in the direction of the movement; this result will be obtained because the blades 13 are connected together by the ring 14 which directs the air through channels and prevents any swaying motion, so that the shell will always maintain a stable position upon the trajectory.

By the use of the said improvement it will no longer be necessary as in known devices to heavily load the forward part of such shells, but on the contrary the mass may be more regularly distributed over the length of the shell and a substantially uniform thickness can be given to its walls, this being advantageous as regards the complete and effective subdivision of the shell. The disposition of the ring 14 also has the advantage of providing in combination with the bearing portion 3^a for a long guiding of

the shell in the cannon, and the shell will thus have a very exact direction at the discharge.

The fact that the external and internal screw-threads of the nut 6 are in contrary sense will provide for safety in the assembling. When the detonator is placed in the detonator tube, one screws in the combination of the nut 6 and the striker 7 which is properly secured by the pin; but the workman may fail to observe that the pin has come out or has been sheared off. Should the pin no longer be in the device, the workman may turn the striker in the sense of the screwing of the said combination without any danger, because the striker now becomes unscrewed and cannot come into contact with the detonator.

It is preferable to charge the shell with cartridges having various loads according to the range of firing. With this variation of charge, combined with the differences in the inclination of the cannon, a latitude of range will be offered which may be comprised for example between 60 and 1500 meters for a cannon of 60 millimeter base. In order to readily distinguish the cartridges for use, these are painted a different colour for each class, and each colour corresponds to a given range, for instance as follows: 60 to 200 meters, white; 200 to 500 meters, yellow; 500 to 900 meters, blue; 900 to 1,500 meters, red.

These colours may still be seen when the shell is charged, by reason of the lateral orifices of the tail piece 12. A facility of manipulation and a rapidity for the firing operations which has been hitherto unknown can now be obtained.

Hand firing.—As above stated, the minimum range for the cannon is about 60 meters. Should the enemy continue to advance, the gunners will be enabled to defend themselves by throwing the shells by hand, after removing the mass carrying the safety pin. But as the initial speed of the shell is much smaller than for the cannon firing, the lower wings will not suffice to properly maintain the shell upon its trajectory and to cause the striker device to assume the forward position when falling. The stability of the shell is obtained in this event by adding the removable sleeve 2, which is put in place by disposing the upper expanding ring 15 around the ring pertaining to the set of wings, so that the expanding ring will close upon the wings in order to maintain the said sleeve. When the shell is upon its course, streams of air will flow through the said sleeve and will produces a couple of such nature as to bring back the shell to its normal trajectory should it tend to leave the same.

It has been observed that a left thread is used for the striker in all cases. For

cannon firing; the number of turns which must be made by the striker is considerable, in order to obviate all premature explosion, so that a relatively large number of threads must be in engagement. But for the hand firing, as the speed in the air is much slower, it is necessary to have but a small number of threads engaged. The inability to comply with these two contradictory conditions stood in the way of a practical construction of shells adapted for hand and for cannon firing.

In the present shell the striker has a left thread in order to obviate this drawback. The striker has a sufficient number of threads for the normal cannon firing. For hand firing, the natural impulse given to the shell by a gunner throwing it with the right hand is in fact a left-hand rotation; since the striker, which acts against this rotation by its inertia, has a left thread, it will begin screwing under the impulse, and will continue during the trajectory to move forward by the few remaining threads which it became necessary to add for the normal cannon firing.

In the constructional form hereinbefore described, safety is ensured by the use of a split pin which passes obliquely through the striker spindle and its screwthreaded guide, the rear end or head of the said pin being weighted by a mass of lead, the ends of the pin being bent out so as to prevent any improper escape of the said pin during the manipulations. During the loading, it is necessary to partially straighten out the bent ends of the pin so that they shall not offer an excessive resistance to the release of the safety device which might occur if these parts were bent at a great angle, for any such action would prevent the explosion of the projectile. This straightening operation has been hitherto performed solely by means of the fingers, but this occasions a loss of time and the operation may be carried out in an irregular or imperfect manner or might even be neglected.

To obviate this drawback, one employs for the proper bending of the branches of the pin a strip or plate with calibrated hole which is disposed upon the pin before its ends are bent over. It is simply necessary to draw upon the said plate during the last part of the operation so as to pull it off the pin, in order to bring the branches together by a quantity which is always equal, and in this manner the pin can always be disengaged at the start in a reliable manner by reason of the inertia of the lead weight; the operation thus becomes rapid and regular, and there is less danger that it will be neglected, because of the presence of the said plate which is of course very apparent.

The construction of the striker device as

shewn in Figs. 6, 7 and 8 is the same as above described. But in this case the split pin 10 is engaged in a hole 17 in the plate of thin sheet metal 18 which has for example a spoon shape. When inserting the shell in the cannon, the gunner pulls off the plate by a strong effort, and this obliges the two branches to come together as shewn in Fig. 8. To enable the fingers to take a better hold of the plate, it can be made of corrugated shape or with a roughened or striated surface, or the like, for example as herein illustrated. Since the hole 17 has a suitable diameter, one may be certain that the branches of the said pin will be brought together by exactly the right amount to enable the mass 11 to be disengaged at the start.

By the use of the said arrangement, the plate may be put on and the branches of the pin can then be bent at a right angle, and this will ensure the safe holding of the pin so that it cannot escape during transportation or handling, and the latter will take place in the maximum conditions of safety.

Claims:—

1. In a shell for infantry use of the winged type, the combination with the wing arrangement for the shell of a removable sleeve made of textile fabric this sleeve permitting to increase the surface of the wing arrangement for hand firing and being adapted to be instantaneously removed for the cannon firing.
2. In an infantry shell of the wing type, the combination of the wing arrangement for shells, a removable sleeve forming an additional wing arrangement, and a ring which is coaxial with the shell and is disposed rearwardly of said wing arrangement, said ring being adapted to contribute to a considerable degree towards the stability of the projectile upon its trajectory by directing the air through channels.
3. In an infantry shell of the wing type, the combination of a striker which is adapted to be screwed by the action of blades disposed upon a central cup, the latter being apertured so as to obviate all improper percussion upon the detonator of the shell.
4. In an infantry shell of the wing type, the combination of a striker adapted to be screwed into a nut by the action of the blades of a propeller, and a heavy mass disposed within an oblique aperture formed through the said striker and its nut, said mass providing for safety conditions when handling the said shell.
5. In an infantry shell of the wing type, the combination of a striker adapted to be screwed into a nut by the action of the blades of a propeller, the screwthread of the striker being directed in contrary sense to the external screwthread of the said nut

screwing into the shell, whereby all improper screwing of the striker during the assembling operation shall be obviated.

6. In an infantry shell of the wing type
5 provided with a striker adapted to be
screwed by the action of the blades of a
propeller, said striker having a left thread
whereby an additional rotation shall be ob-
tained when the shell is thrown by hand
10 so as to insure the complete screwing of the
striker in spite of the short trajectory of
the shell.

7. In an infantry shell of the wing type,
the combination of a striker adapted to be
15 screwed into a nut by the action of the
blades of a propeller, a heavy mass disposed
within an oblique aperture formed through
the said striker and its nut, and a split pin
supporting the said mass, the end of said

pin engaging a calibrated hole in a thin 20
metal plate intended to be pulled off dur-
ing the firing operation.

8. In an infantry shell of the wing type,
the combination of a striker adapted to be
screwed into a nut by the action of the 25
blades of a propeller, a heavy mass disposed
within an oblique aperture formed through
the said striker and its nut, and a split pin
supporting the said mass, the end of said
pin engaging a calibrated hole in a thin 30
metal plate intended to be pulled off during
the firing operation, said plate being suit-
ably roughened in order to be readily seized
by the fingers.

In testimony that I claim the foregoing 35
as my invention I have signed my name.

THÉODORE LAFITTE.