OFFICIAL

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GAS MANUAL

Part V

Use of Gas by Air Service

General Headquarters
American Expeditionary Forces, France
March, 1919

GENERAL HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES

March, 1919.

The "Gas Manual," in six parts, is approved and published for the information and guidance of the American Expeditionary Forces. Although this manual presents the practice in the American Expeditionary Forces, its publication is not intended to convey approval for adoption in the future military service of the United States of any details of organization contained herein.

BY COMMAND OF GENERAL PERSHING:

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GAS MANUAL

PART V

USE OF GAS BY AIR SERVICE

INCENDIARY BOMBS.

General.

1. Gas Warfare material, used by the Air Service, comprises incendiary and smoke bombs.

2. The only incendiary bomb available for use by the American Air Service at the present time is the French Chanard incendiary bomb. A description of the method of operation, action, marking, etc., of this bomb follows: The French Chanard bomb is of the intensive type and is for use against well defined targets. Other bombs of the same type under development are the American incendiary bombs, Mark II and Mark III.

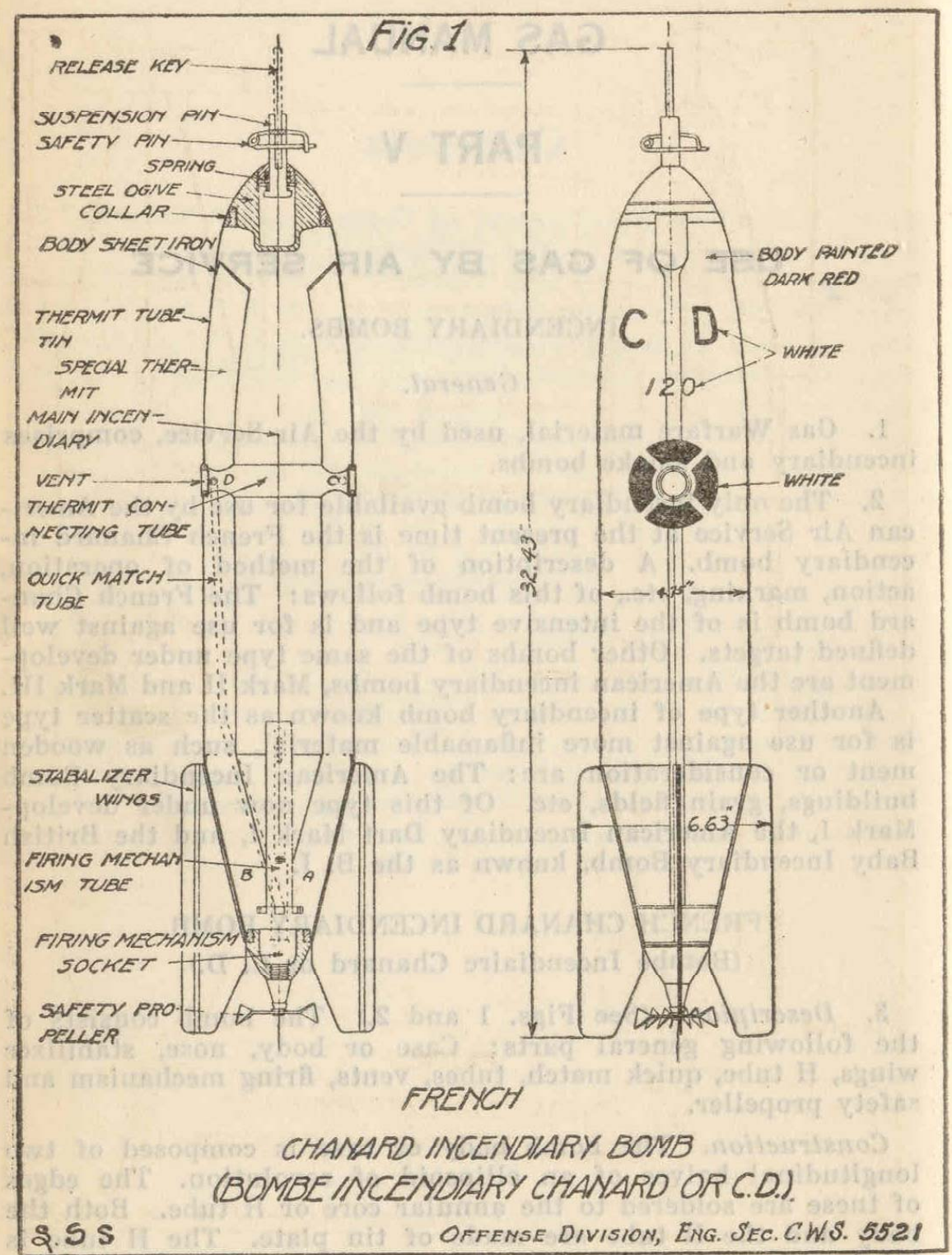
Another type of incendiary bomb known as the scatter type is for use against more inflamable material, such as wooden ment or consideration are: The American Incendiary Bomb buildings, grain fields, etc. Of this type now under develop- Mark I, the American Incendiary Dart Mark I, and the British Baby Incendiary Bomb, known as the B. I.

FRENCH CHANARD INCENDIARY BOMB.

(Bombe Incendiaire Chanard or C. D.)

3. *Descripion.* (See Figs. 1 and 2.) The bomb consists of the following general parts: Case or body, nose, stabilizer wings, H tube, quick match, tubes, vents, firing mechanism and safety propeller.

Construction. The bomb body or case is composed of two longitudinal halves of an ellipsoid of revolution. The edges of these are soldered to the annular core or H tube. Both the body and the H tube are made of tin plate. The H tube is filled with special Thermit mixture which is known as C. D. powder or Daisite No. 2. The charge is 275 grams. The main body is filled with Chanard incendiary material. This material consists of a plastic semi-fluid mass which on combustion flows freely. It consists principally of nitrocellulose and resin with a mixture of turpentines.



FRENCH

CHANARD INCENDIARY BOMB

(BOMBE INCENDIARY CHANARD OR C.D.)

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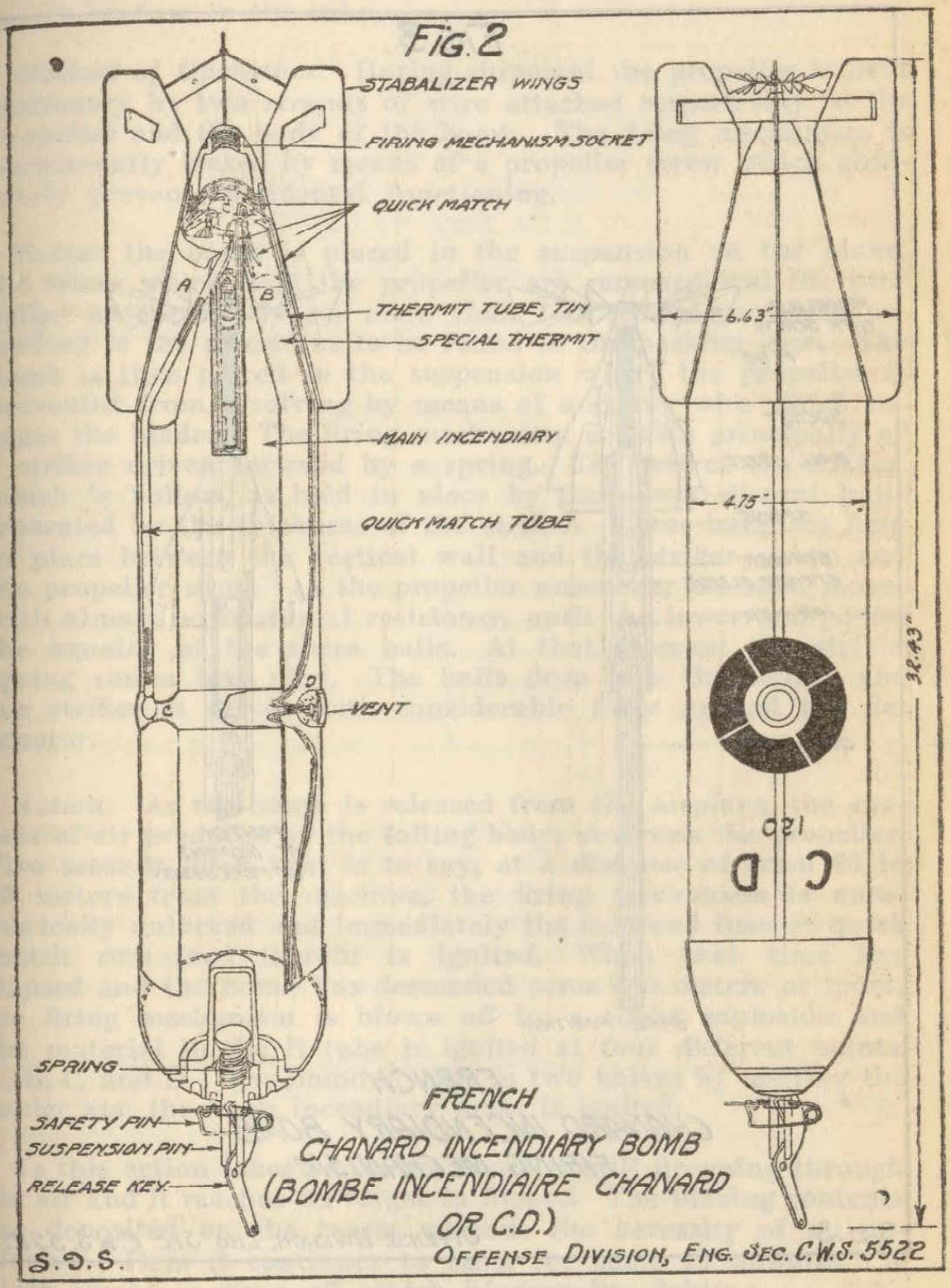
FIG. 2
STABALIZER WINGS
FIRING MECHANISM SOCKET
QUICK MATCH
A
B
THERMIT TUBE, TIN
SPECIAL THERMIT
MAIN INCENDIARY
QUICK MATCH TUBE
C
D
VENT
SPRING
SAFETY PIN
SUSPENSION PIN
RELEASE KEY
6.63"
4.75"
32.43"
120
C
D
FRENCH
CHANARD INCENDIARY BOMB
(BOMBE INCENDIAIRE CHANARD
OR C.D.)
S.O.S.
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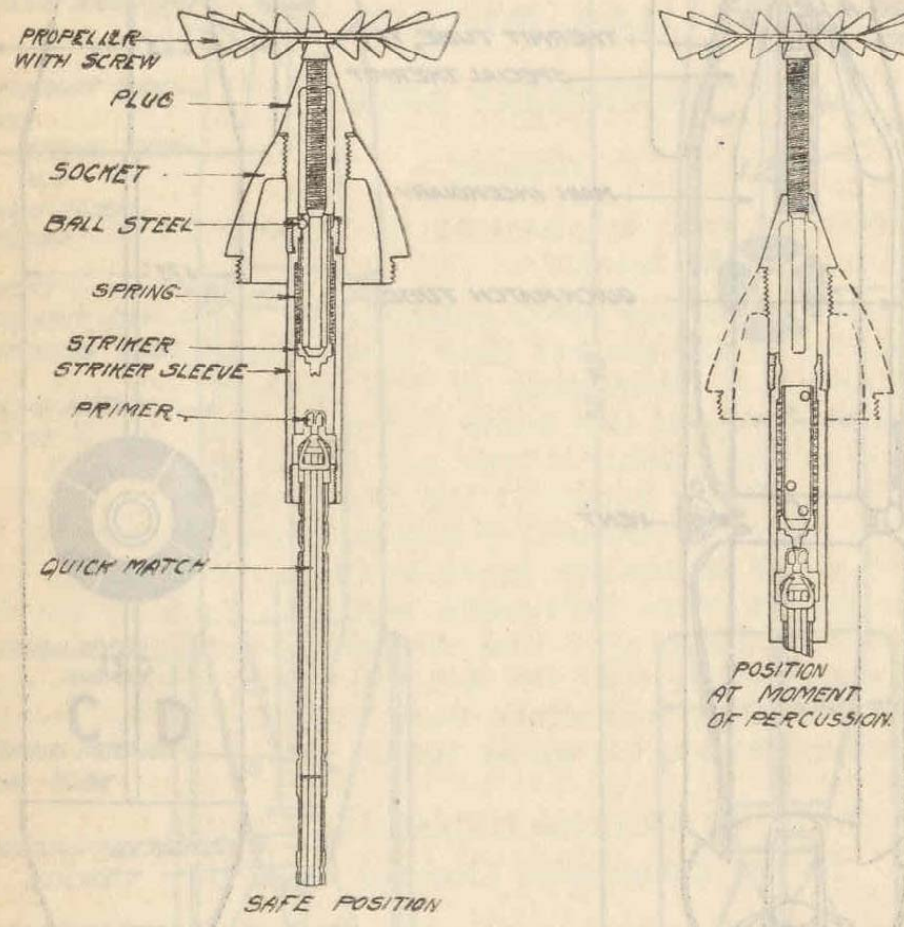
FIG. 3



FRENCH
CHANARD INCENDIARY BOMB
FIRING MECHANISM

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Firing Mechanism. (See Fig. 3.) This consists of a safety propeller with screw and plug into which screws a socket, striker, striker spring, three steel balls, striker sleeve, and quick match or fuse in the tube.

Method of Operation. During shipment the propeller is held stationary by two strands of wire attached respectively to the propeller and the body of the bomb. The firing mechanism is permanently locked by means of a propeller screw which absolutely prevents accidental functioning.

Before the bomb is placed in the suspension on the plane, the wires which hold the propeller are removed and the propeller unscrewed by no more than four complete turns, according to the directions to be found in the packing case. The bomb is then placed in the suspension where the propeller is prevented from revolving by means of a spring wire which engages the blades. The firing mechanism consists principally of a striker driven forward by a spring. The tail of the striker, which is hollow, is held in place by three equi-distant balls separated by the thickness of the striker. These balls are held in place between the vertical wall and the striker sleeve and the propeller stem. As the propeller unscrews, the stem moves with almost no frictional resistance, until the lower end passes the equator of the three balls. At that moment the striker spring comes into play. The balls drop into the striker and the striker is driven with considerable force against the detonator.

Action. As the bomb is released from the airplane, the current of air produced by the falling body, unscrews the propeller. Five seconds later, that is to say, at a distance of from 60 to 80 meters from the machine, the firing mechanism is automatically unlocked and immediately the 8-second fuse or quick match contained therein is ignited. When that time has elapsed and the bomb has descended some 500 meters or more, the firing mechanism is blown off by a slight explosion and the material in the H tube is ignited at four different points, A, B, C, and D. The bomb is split in two halves by melting the solder and the main incendiary mass is ignited.

As this action takes place, the bomb is still dropping through the air and it reaches its target in flames. The blazing contents are deposited on the target without the necessity of an explosion. Here it continues to burn for some 18 minutes. A black smoke is given off which hinders fire fighting.

Marking. The bomb is painted with light red oil paint. Around the vent holes are painted white circles and on the body of the bomb are the markings "C. D. 120," shown on the plate. The lot number and date of loading also are shown on the plate.

Packing. The bombs fully assembled with the propeller tied as previously described, are packed two in a case. This case is painted red and bears the following inscription on the cover:

"AVIATION"
BOMBE INCENDIAIRE
C. D.
120
Lot No.
On the side: A RETOURNER
A LA 2eme RESERVE.

When these bombs are removed from the case, they should be lifted by their suspension keys. If replaced, they should be deplaced in a horizontal position with the suspension keys crossed.

TACTICAL USE.

4. *The Chanard Incendiary Bomb is designed for setting fire to buildings of either light or heavy construction.* It is so designed that it will penetrate an ordinary roof and deposit its contents in the interior of the building. The incendiary material of the bomb being already ignited when it hits the target, it continues to melt, run and burn as it runs communicating this fire to any inflammable material which it reaches. A bomb of this type should, of course, be used only against well defined targets where a direct hit is possible, for if it should miss the target and strike on the ground or other uninflammable material its effect would be nil.

5. *Incendiary bombs of the scatter type are for use against light building construction, grain fields, etc.* They possess the advantage of not requiring a direct hit, because the material scatters to a certain extent; but they possess a disadvantage in that the amount of incendiary material in any one place is small and unless the material is quite inflammable it will not be set on fire.

6. The number of bombs that can be carried by planes in use by the American Air Service are as follows:

Day Pursuit: The Spad XIII has cells for 2 Chanard bombs.
Day Observation: 6 American Mark I or Mark II.
Night Pursuit: Same as Day Pursuit.
Night Observation: Same as Day Observation.
Observation planes carry 6 bombs if equipped with the American Mark V release.
Day Bomber (DH-4): 6 Mark I or Mark II.
Breguet: 8 Mark I or Mark II.
Night Bomber (Handley-Page): 16 Mark II.
The American Mark V Release will carry 5 Chanard bombs per trap or 10 per plane.

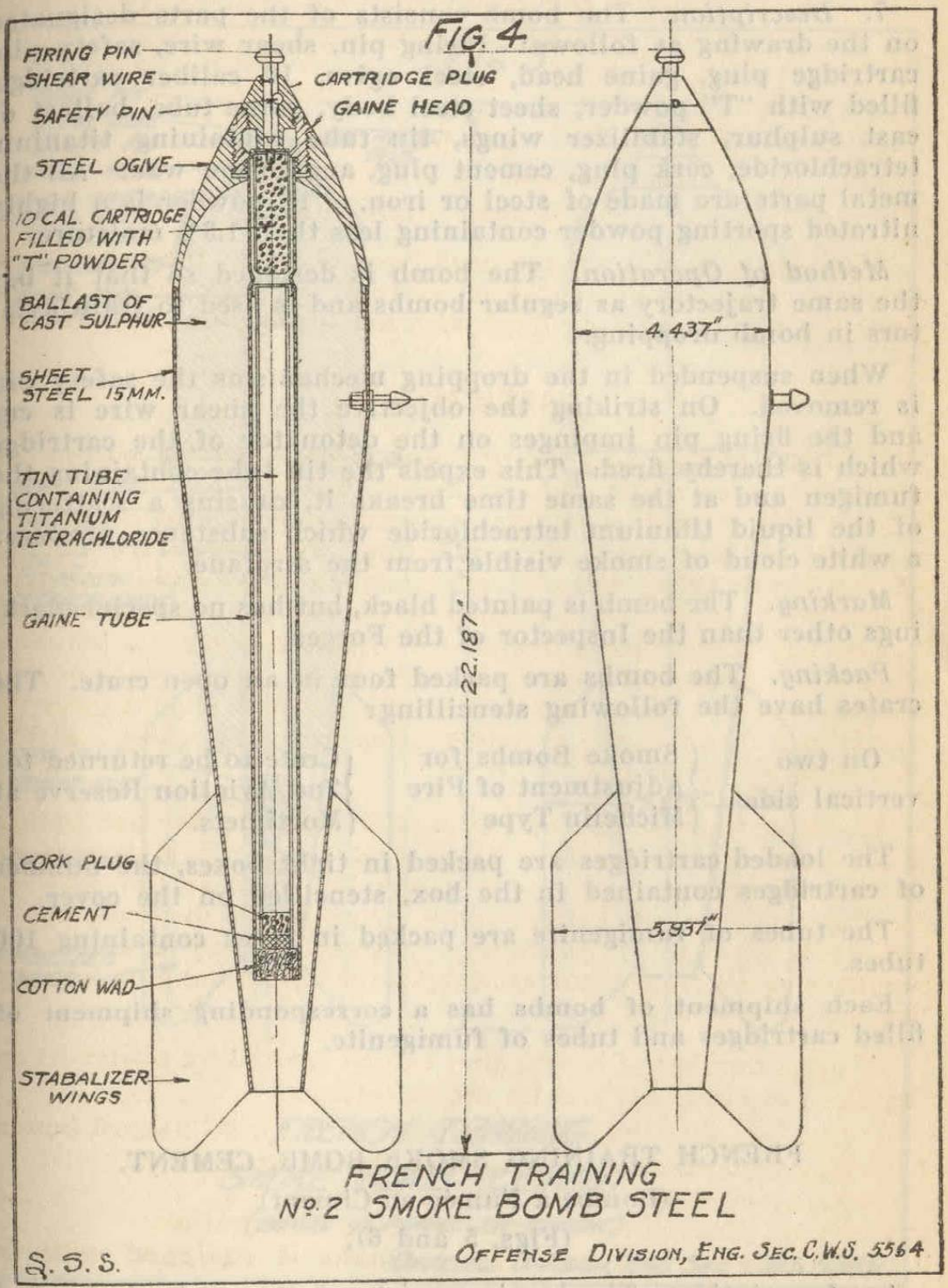
FIG. 4
FIRING PIN
SHEAR WIRE
SAFETY PIN
STEEL OGIVE
10 CAL CARTRIDGE FILLED WITH "T" POWDER
BALLAST OF CAST SULPHUR
SHEET STEEL 15MM.
TIN TUBE CONTAINING TITANIUM TETRACHLORIDE
GAINE TUBE
CORK PLUG
CEMENT
COTTON WAD
STABALIZER WINGS
CARTRIDGE PLUG
GAINE HEAD
22.187"
4.437"
3.937"
FRENCH TRAINING
Nº 2 SMOKE BOMB STEEL
S. S. S.
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FRENCH TRAINING NO. 2 SMOKE BOMB, STEEL.

(Fig. 4).

7. *Description.* The bomb consists of the parts designated on the drawing as follows: Firing pin, shear wire, safety pin, cartridge plug, gaine head, steel ogive, 10 caliber cartridge, filled with "T" powder, sheet steel body, gaine tube, ballast of cast sulphur, stabilizer wings, tin tube containing titanium tetrachloride, cork plug, cement plug, and cotton wad. All the metal parts are made of steel or iron. "T" powder is a highly nitrated sporting powder containing less than 1.3% moisture.

Method of Operation. The bomb is designed so that it has the same trajectory as regular bombs and is used to train aviators in bomb dropping.

When suspended in the dropping mechanisms the safety pin is removed. On striking the objective the shear wire is cut and the firing pin impinges on the detonator of the cartridge which is thereby fired. This expels the tin tube containing the fumigen and at the same time breaks it, causing a scattering of the liquid titanium tetrachloride which substance produces a white cloud of smoke visible from the airplane.

Marking. The bomb is painted black, but has no special markings other than the Inspector of the Forges.

Packing. The bombs are packed four in an open crate. The crates have the following stencilling:

On two vertical sides	Smoke Bombs for Adjustment of Fire Michelin Type	Crate to be returned to 2nd Aviation Reserve at Mortimets.

The loaded cartridges are packed in tight boxes, the number of cartridges contained in the box, stencilled on the cover.

The tubes of fumigenite are packed in cases containing 100 tubes.

Each shipment of bombs has a corresponding shipment of filled cartridges and tubes of fumigenite.

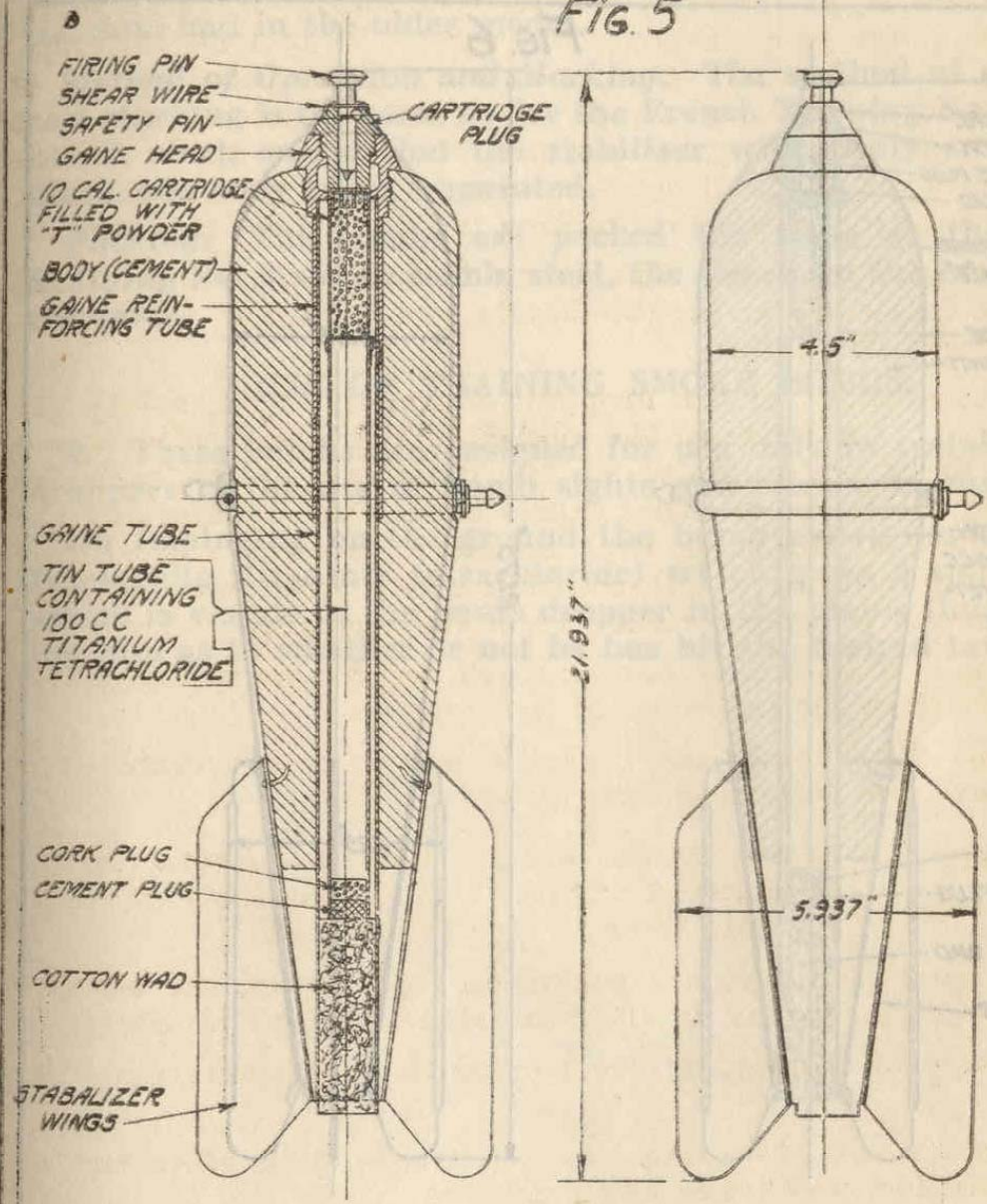
FRENCH TRAINING SMOKE BOMB, CEMENT.

(Bombe à Fumée en Ciment)

(Figs. 5 and 6).

8. *Description.* The bomb consists of the parts designated on the drawings. Two plates of this type of bomb are shown. One is simply a later modification of the other. The one having the narrower stabilizer wings and a more stream like shape is the later model. It will be noted that in the later design a different gaine head is used and also the gaine reinforcing tube

FIG. 5



FRENCH TRAINING
SMOKE BOMB – CEMENT
(BOMBE A' FUMEE EN CIMENT)

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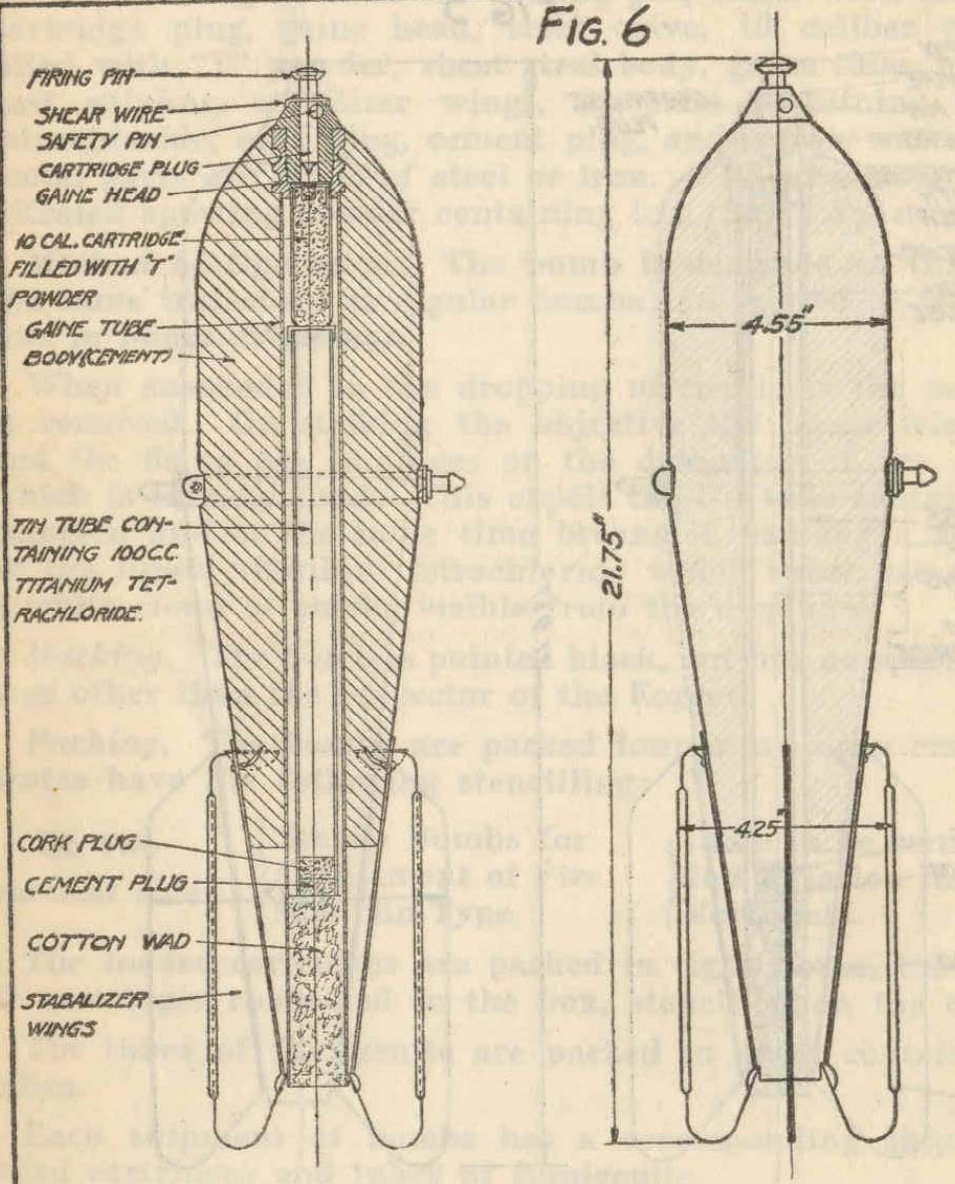
FIG. 6



FRENCH TRAINING
SMOKE BOMB —CEMENT
(BOMBE A' FUMEE'EN CIMENT)

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has been done away with. The main difference between this bomb and the French Training No. 2 smoke bomb, steel, is that the body is made of cement rather than of steel filled with cast sulphur, and that the gaine tube has a reinforcing tube near the nose end in the older model.

Method of Operation and Marking. The method of operation and marking is the same as for the French Training No. 2 smoke bomb, steel, except that the stabilizer wings only are painted black, the body being unpainted.

Packing. The bombs are packed the same as the French Training No. 2 smoke bomb, steel, the labels on the crates being the same.

USE OF TRAINING SMOKE BOMBS.

9. These bombs are designed for use only in training bomb droppers in the use of bomb sights and release mechanism.

On impinging on the ground the bomb expels its charge of fumigenite (titanium tetrachloride) which gives a smoke cloud which is visible to the bomb dropper in the plane, thus informing him as to whether or not he has hit the desired target.