

**B O M B S
BOMBERS
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—BY—

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Instructor in Bombing
2nd Div. Toronto

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THE BOMBER'S MOTTO

*Bomb the Kaiser, Bomb his Huns,
Bomb his Ships and Bomb his Guns,
Bomb his Fleet, his Army as well,
Bomb the Blasted Lot to H——l.*

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Introduction

I have found in my work amongst the men who are undergoing training in bombing here in Canada, a great desire to obtain all the information they possibly can about this branch (bombing) of a soldier's work. The time allotted to their training is so short (6 days) that to assist them I write this lecture on Bombs and Bombing.

There is nothing new in bombing. It is a very old branch of the method of warfare, and to trace the commencement of this system of warfare we have to hark back to the Chinese, who used this system of warfare hundreds of years ago, when they used their stink pots to throw at their enemies before they charged. At the moment the obnoxious fumes threw their enemy into confusion they would then charge, to their advantage.

In the British army of which we voluntary form a part, bombing was used almost from the moment that the British army was placed on an organized footing, in every regiment there was one company at least who were

grenadiers, the forerunners of our present bombers, and we find that to belong to the grenadier company was considered an honour, because the biggest, smartest, and most courageous soldiers were posted to this company. And we find that in every war they played an important part. But with the introduction of long range weapons this system of warfare fell into disuse. Some of you may remember that after the Boer war it was proposed by some authorities to do away with cavalry (their argument was there would be no more shock action), and some even went so far as to recommend that the infantry be deprived of their bayonets for the same reason. But these authorities received a rude shock when the Japanese war with the Russians took place. We find both sides used the usual shock action and also used hand grenades and trench mortars.

The British army again revived, after the lessons gained by study of the above mentioned campaign, a system of grenade work for their army. A certain number of N. C. O. S. were sent to the School of Engineering, Chatham, E., and were there instructed in the use of the No. 1 (Mark 1) grenade, the aforesaid N. C. O. S. to act as instructors to their

regiments. Also a rifle grenade was invented and instructed on. But it was never contemplated that bombing would form so important a part in warfare as it has in the present campaign against the Huns and their allies. By what I can find out, the stock of manufactured grenades soon gave out after the first few engagements. But the officers and those under them rose to the occasion and made their own grenades and continued their fighting with these home-made bombs with excellent results, but now there are all sorts of manufactured grenades for the use of our soldiers at the front.

In the selection of men for bombers the best must be chosen; many a man may be a good soldier at other branches of a soldier's work but useless as a bomber. The bomber must be cool, courageous, and have great discipline, and thoroughly understand explosives, and his bombs. Many a man can do good work under great excitement, but excitement to a bomber would be disastrous to himself and others. He must above all things keep his head. Courage is nothing to a bomber. Being a bomber it goes without saying that he must be a man of courage, discipline he must have, to go here, to go there, to do this, to do that,

without a question or murmur, on receiving an order. That means great discipline to the authority of the officers over them. Being so valuable to the service, bombers have great privileges given to them that other soldiers, who are not bombers, do not obtain. They have shorter hours of duty, the best billets, more leave, and other privileges. They are also treated with great respect by all who come in contact with them, by some because of their excellent soldierly qualities, and by their comrades unacquainted with bombing, for this reason, that when they see a bomber swinging along with his bombs tied around him, they give him a wide berth; they are scared that he and his bombs will blow up, and themselves included. The ignorant always give them a wide berth and treat them with the respect that ignorance has for knowledge.

THE ORGANIZATION OF BOMBERS

The organization of bombers in their regiments is as follows. There are in every regiment, four sections (one section to each company). The strength of each section as follows: 1 sergeant, 1 corporal, 18 men; the whole under the command of the Regimental Bombing Officer, they form the bombing company

of a regiment, and they perform their ordinary duties as soldiers until called upon to perform bombers' duties. This is the bombing company of a regiment.

In every brigade (a brigade consists of four regiments) we have a bombing company, four sections, as in the battalion company, with a Company-Sergeant-Major and Quarter-Master Sergeant in addition, under a Brigade Bombing Officer. These are the permanent bombers, and they form the school of instruction for bombing for the brigade to which they belong.

DUTIES OF BOMBERS

The duties of bombers are many and varied. The 1st Canadian Division went into the trenches without any knowledge of bombs, and many accidents happened through careless and ignorant handling of bombs. Some of the most important duties of bombing follow:

1. To prevent the approach of enemy's sap heads towards our own trenches.
2. To facilitate the progress of a storming party along the enemy's trenches which have been successfully attacked

3. To prevent the advance of the enemy along our trenches, which they may have succeeded in entering.

4. In house to house fighting, to assist in attacking, or to repel the attack.

TRAINING AND INSTRUCTION

Training and instruction in bombing must be progressive and should commence with practice in throwing dummy bombs; this should be carried out in strictest observance of active service conditions. The men must be fully equipped. Throwing should be practiced from a narrow trench or from behind a barricade. Men should be practiced not merely to throw over a traverse, but at least, into the space beyond the second traverse from them. Men must be able to throw accurately at long as well as short distances; the best results for long distance throwing are obtained by swinging the arm upwards and slightly forward, the hand at the commencement of the swing being about level of the waist. For short distances the grenades should be lobbed from the shoulder by an action similar to putting the shot. Men should be able to concentrate or distribute fire as required.

Before a class undergoing instruction should throw live bombs, they should have explained to them the following: The construction and action of grenades and the properties of fuses, detonators and explosives. They will make up bombs containing small charges to accustom them to the handling of explosives and the cutting of fuses. Give plenty of practice with live bombs, but do not allow any carelessness on the part of the men. For the first fuse allow at least 10 seconds burning; gradually shorten to 5 seconds.

ORGANIZATION OF A TRENCH STORMING PARTY

In the attack upon the enemy's trenches the artillery plays an important part; the opposing trenches are subjected to a tremendous burst of fire from the artillery—this fire is operated by the watch. When fire ceases on a certain time being reached, the trench storming party gets to work as below:

- (a) The bayonet men to cover the party.
- (b) The bombers and wire cutters; each bomber accompanied by a carrier.
- (c) The remaining carriers and bayonet men.

(d) The sand bag men, who carry sand bags half filled. They block side entrances to the trench and finally barricade the furthest point reached in the capture of the trench.

When the trench decided upon to capture has been captured, the artillery is informed of the fact by the raising of two flags, one on either flank of the captured trench. Bombers generally work in groups of three, a thrower, a carrier, a bayonet man, when working down a trench to enfilade it, working from traverse to traverse. There are really two systems for bombers enfilading a trench, viz.:

First System

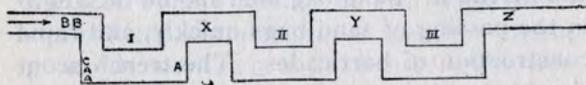
A bayonet man goes first along the trench, acting as the trench scout, followed by a thrower, who is followed by a carrier; the thrower is in command if no N. C. O. is present. Great care must be taken to bomb from traverse to traverse, or sharp angles and passageways, and a good lookout must be kept by the bayonet man who goes first and acts as the trench scout, for machine guns, strong places, etc. And when the trench scout discovers anything suspicious, he will give the direction and distance to the bomber behind him, in this

manner: Half right, thirty yards' throw. The bomber will throw a bomb in the direction given, with a sufficient force to the distance required by the trench scout. If a side trench has to be passed, it is barricaded by the sand bag men, who also insert a loophole in the barricade, and a few bayonet men left to guard and defend it. Sand bag men should be taught in the passing of sand bags quickly, and rapid construction of barricades. The trench scout should always in practice imagine that he has a loaded gun in his hands and on seeing any of the enemy he should at once aim and fire, loading again at once. Shoot first, then bayonet if required. In this system, if an island traverse is met, an additional bayonet man is called up, so that both sides of the traverse may be watched.

Second System

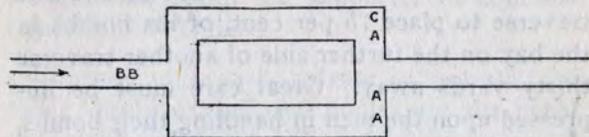
The second system of infilading a trench is as follows: First come 4 bayonet men, 1 A. N. C. O. in charge, followed by 2 throwers, 4 bayonet men follow behind these, and behind them again follow 2 reserve throwers, who in case the throwers in front become casualties, immediately take their place; 4 carriers follow behind these. In addition to the above there

should be spare grenadiers and carriers ready to replace casualties and take over watch of side entrances into the attacked trench from the advanced grenadier party. For the second system the following mode of attack along an enemy's trench has been found successful:



On arriving at traverse 1 the bayonet men should place themselves in positions marked on the sketch A. A. A., the N. C. O. at C. or as may be necessary to direct, the throwers at B. B. behind the traverse, with the spare bayonet men behind them. No. 1 thrower then throws a bomb over the traverse into trench X, also another bomb into trench Y. The leading bayonet man at A peeps round the corner into trench X. if clear, he passes the word and they all rush into similar positions at the second traverse that they held at No. 1 traverse. The throwers then follow and throw bombs into Y. and Z. Until Y. is clear the reserve bayonet men remain behind traverse No. 1, in case the enemy should throw a bomb into trench X.

Should an island traverse be met the bayonet men must watch both sides of it, as below:



All sorts of devices are being tried to find out the best method of carrying bombs. Boxes, baskets, and a specially designed equipment are being tried. In the front line trenches there is generally a splinter proof cover. These shelters or dug-outs are arranged one for each platoon; in these dug-outs there is always a stock of bombs and the battalion bombing officer is responsible that this stock is kept up from the brigade bomb magazine in the rear.

The Germans sometimes sap out from their trenches towards our trench, and from a close distance they throw bombs at us, thirty yards to right and thirty yards to the left. To stop this we sap out to meet them, limit their radius of action or drive them away altogether with our bombs. No British bomber need be scared to meet a German bomber. They use a heavier bomb than we do, so the British bomber generally has the range of his opponent be-

fore the German can get to work with his heavy bomb. When trained, a thrower should be able when standing in a trench behind one traverse to place 75 per cent. of his bombs in the bay on the further side of another traverse thirty yards away. Great care must be impressed upon the men in handling their bombs, because they become so familiar with them they grow careless.

EXPLOSIVES

A few words upon the explosives you are likely, as a bomber, to use or run across.

High explosives pass instantly from a solid or liquid form to gas and act with terrific energy, tearing to pieces any vessel which contains them. They generally require a detonator to make them act in this manner; the detonator applies a violent shock to them and starts the explosion.

Quoting from the book on explosives written by Lt.-Col. W. R. Lang, C.R.E.: For convenience we may divide explosives into two classes, viz., EXPLOSIVE MIXTURES and EXPLOSIVE COMPOUNDS; these in turn may again be sub-divided. By an explosive mixture is understood a mechanical mixture of

some combustible body and some other substance or substances which contain in them, in an available form, the supporter of combustion, viz., OXYGEN.

Chlorate of potash, nitrate of potash, and other highly oxygenated bodies are the usual ones used and may be likened to magazines of condensed oxygen, ready to give up their contents at once when induced to do so by the occurrence of the necessary conditions of temperature, etc.

An explosive compound, on the other hand, contains the combustible and the supporter of combustion, so to speak, already within itself, all combined together to form a molecule. The elements of which the latter class is composed are oxygen, hydrogen, nitrogen, and carbon, and are united together, forming a definite compound in a very unstable condition of chemical equilibrium, and which readily becomes decomposed by a very slight disturbing cause. The action in this case is very rapid, and to this class belongs what we may call the "modern high explosive."

The most important explosive mixture is gunpowder, in which we have carbon and sulphur, the combustible bodies, and potassium

nitrate (saltpetre), the source of oxygen. This salt retains its oxygen firmly in combination, and before it will part with it some very disturbing cause is necessary. Hence in gunpowder we have a perfectly safe substance, as neither friction nor percussion will cause an interaction between its constituents.

Ingredients of British Gunpowder

75 per cent. saltpetre, 10 per cent. sulphur, 15 per cent. charcoal.

French Gunpowder

75 per cent. saltpetre, $12\frac{1}{2}$ per cent. sulphur, $12\frac{1}{2}$ per cent. charcoal.

Explosive compounds are prepared from various organic substances containing carbon, hydrogen, and oxygen, by the action on them of nitric acid. They are commonly spoken of as nitro-compounds.

Nitric Acid (Dr. J. W. Barton.)

Air is composed of two gasses, nitrogen 77, oxygen 23. By weight a small quantity of carbon dioxide and ammonia, and some water. The main use of the nitrogen is to so dilute the oxygen that the lungs can breathe it. If we were to decrease the nitrogen in a certain

ratio, we have nitros oxide (laughing gas), which in a short time would wear out the system by the increased action which it occasions; decrease nitrogen further and the result is the proportion of the two gases that form nitric acid, which will eat the flesh, and nearly all metals, except gold.

This nitric acid plays an important part in practically all modern high explosives.

Picric Acid

The gas works give to us the majority of the chemicals that go to build up modern explosives. Coal tar gives to us phenol or carbolic acid, a body when nitrated gives us picric acid. Picric acid forms the basis for the French high explosive melinite, the Japanese high explosive shimose, and our British lydite.

This picric acid is a safe explosive, but it acts on metals and forms a class of salts called picrates. These picrates are more sensitive to disturbing influence than what picric acid is. It is stated that picric acid has a pressure of 135.820 lbs. to the square inch. Lyddite, the British explosive, the basis of which is picric acid, is very erratic in its action, due to the

fact that it requires a very powerful detonator, and this fact may cause a premature explosion. It also forms picrates in any, except varnished or shellaced shells. The disadvantage in picric acid led to it being displaced by

Trinitrotoloul

Trinitrotoloul, or as it is more commonly known by the abbreviation T.N.T., has a pressure of 119,000 lbs. to the square inch; not so powerful as picric acid, yet the advantages of T.N.T. more than compensate for its loss of power and warrants its use. It does not act on metals so as to create sensitive salts and is thereby more reliable. It is produced by heating troulue with a mixture of nitric and sulphuric acids. Troulue is a liquid hydro-carbon obtained along with benzine.

Gun-Cotton or Tri-Nitro Cellulose

In the process of manufacture, the cotton, after being thoroughly purified, is dipped in a mixture of concentrated nitric and sulphuric acids. The latter serves to absorb the water produced during the reaction and so prevent undue dilution of the nitric acid. Absolute purity of both cotton and reagents, and the

complete removal of all traces of these acids by subsequent washings are essential to the safety of the resulting nitro-cellulose. It is pressed into cakes or slabs, and is very safe, useful, and convenient. You may carry it about wet and it can still be used. When dry it is inflammable, but unless in a large mass may be set fire to with perfect safety; it will simply burn away the same as cotton before nitrated. Gun-cotton is one of the most common forms of explosives that we run across in the service, and every bomber and soldier should be acquainted with its use. The most common form is the 15 oz. slab, with a hole in the centre to take a 1 oz. primer. A primer is simply dry gun-cotton that will readily ignite from a detonator, whereas the 15 oz. slab is wet and will not detonate very easily, if at all. Down the primer, through its centre, there is a hole to admit the entrance of the detonator. (Detonator described later on.)

Dynamite

One of the most common forms of high explosives used in Canada is the above. It is used largely in construction camps. The lumberman uses it a great deal, and the farmer uses it in clearing his land to blow up stumps

of trees. As it is a very common explosive you may run across it and may have to use it. It has a very interesting history, well described in Lt.-Col. W. R. Lang's book on explosives. I give it roughly. Sobriere, a pupil of the celebrated French chemist, Pelouze, decided to try the effect of nitric acid on glycerine, a substance analogous to cotton in composition. Being a liquid it was considered highly improbable that it would be capable of absorbing another liquid like nitric acid and retain it merely in its pores, it was tried and a compound was produced which announced its presence by a violent explosion, without any serious accident. Alfred B. Noble, born at Stockholm, Sweden, heard of this and he commenced his experiments in the production of nitro-glycerine, or as it was first called detonating oil. Noble had lots of hard luck with this new explosive; though a powerful explosive, its equipoise was so delicate that a slight jar would upset its equilibrium, and railroads, etc., refused to handle it for fear it would explode in transit, also Noble's works at Stockholm blew up and he was debarred from building there again. But he continued to manufacture and experiment on a barge on the river, and finally made his great experiment, resulting in dynamite.

mite. (Glycerine and nitric acid, which were antagonistic to each other, was conquered by sulphuric acid.) Noble's experiments resulted in his introduction of an absorbant earth called Kieselghur to his nitro-glycerine, the result being dynamite. Dynamite is nitro-glycerine 75 parts and kieselghur 25 parts. Dynamite will freeze at 40 degrees F., and remain frozen at higher temperatures; great care must be taken in thawing. Dynamite is put up in elongated, circular packages, in waxed paper, in 2, 4 and 8 oz. weights. A fuse and detonator is generally used to fire dynamite. Great care must be observed in handling this explosive; no reckless throwing about or leaving in heated temperature to thaw. It also loses its strength if placed in water for any length of time through loss of nitric acid, but it has so many advantages that it deservedly takes its place as a very popular explosive. The fumes are very trying to sensitive, nervous people, producing nausea.

Cordite

Cordite, an explosive you use in connection with the ammunition for your rifle, was invented by Sir F. Ebel, and consists of nitro-

glycerine 53 parts, gun-cotton 37, vasiline 5, actone, used to harden, 3 parts.

Fulminate of Mercury

Fulminate of mercury, used so much in the manufacture of detonators, was discovered by Howard, in 1800. It consists of 3 parts mercury, 36 of nitric acid, the mixture being kept at a very low temperature until dissolved, 17 parts of alcohol are then added. The first detonating cap was made by Egg, in 1815.

The relative strength of common explosives may be taken to be as follows if well tamped. (Tamping means filling the hole with earth, or covering the explosive so that the air may be excluded from the charge when combustion takes place.) Gunpowder 5, cordite 8, dynamite 9, gun-cotton 10, gelignite 10, gelatine-dynamite 12, blasting gelatine 13.

DESCRIPTION OF DETONATOR No. 8

It consists of a brass tube painted red, the small end of which contains the detonating compound (fulminate of mercury). On top of this is a wooden plug with a hole in it, through which passes a piece of quickmatch. The upper end of the tube is empty for the insertion of

the fuse, and is closed by a small paper cap. They are packed 25 in number in a sealed tin cylinder. No. 8 will detonate dry gun-cotton, but not wet gun-cotton or cordite without a primer. Care should be taken in the handling of detonators, they are small but powerful, and many accidents have occurred with careless handling, and in pinching the detonator on the fuse a pair of plyers should be used for this job, not hammered or bitten.

SAFETY FUSE No. 9

The safety fuse, commonly called safety No. 9, consists of a fine train of fine gunpowder enclosed in flax twist, covered with gutta-percha and waterproof tape. It is colored black. It will burn under water; it burns roughly at the rate of 4 feet per minute, but you must cut a piece and test its rate of burning before using, because fuse will deteriorate, especially under atmospheric conditions, handling, etc. To light a safety fuse you require no flame, a fusee match or portfire, or split the fuse and stick the head of a match in the split and then light with another match.

INSTANTANEOUS FUSE

Instantaneous fuse consists of 3 strands of quick match, enclosed in flax and several lay-

ers of gutta-percha, and waterproof tape. It is of an orange color. It is used in the absence of electric appliances, when the time taken to burn the requisite length of Safety Fuse No. 9 would be inconveniently long. It burns at the rate of 30 yards per second, or practically instantaneously. In the dark it can be distinguished from Safety Fuse No. 9 by the open crossed thread, snaking outside. When using this fuse you must be careful to tie it securely or it will jerk the detonator out of the charge.

The names of some of the grenades you are likely to meet, and where you are likely to find a description of them:

WAR OFFICE PATTERN MARK 1.....

Explosive.. LYDDITE.... (Red band).

Detonator.... Mark..... 2.....

WAR OFFICE PATTERN Mark 1 Modified.

Explosive.. T.N.T....

Detonator.... Mark..... 2.....

HALES HAND GRENADE— (Designed by Martin Hale)....

Explosive.... T.N.T....

Detonator.... Hales..Special..TETRYL.. (Short)..

HALES RIFLE GRENADE....

Explosive.... T.N.T....

Detonator.... Hales..Special.... (Long)

GRENADE.... No. 5.... Mark 1....

TIME FRICTION HAND.... (Two Forms, No. 6 and No. 7.)

Explosive.... T.N.T....

Detonator... No. 8.. Mark 7....

(No. 7 is only used for moral effect.)

JAM TIN OR SOLDIERS, and HAIR BRUSH BOMBS....

There are others, but the above are what you are likely to meet with at the front. Owing to a shortness of manufactured bombs at the front, at the moment of greatest pressure, the soldier had to manufacture his own bombs, and to these the name "Soldiers Bombs" were given. We have the

JAM TIN BOMB

Made up to convenient weight to throw, consisting of a jam tin filled with scrap metal, with a bursting charge of two primers of GUN-COTTON (2 ozs.), a No. 8 detonator, and a length of Safety No. 9, to burn 5 seconds, the whole tied up in a piece of sacking. This is a very useful bomb, to use in teaching young bombers, only instead of using metal in your jam tin, use earth free from stones, and only

ONE primer, with a detonator, or you may use GUNPOWDER tied up in a piece of sack- ing with Safety No. 9. (The harder you tamp the powder the better results you will get.)

JAM TIN GRENADE

The soldiers filled a jam tin with scrap metal, leaving room for half a pound of DYNA- MITE or GUNCOTTON (if dynamite is used, a detonator, and Safety No. 9, is also used), and the jam tin is placed in another tin slightly larger, and the outer edge of the outer tin pressed over the inner tin. It is a very power- ful bomb. If gun-cotton is used, you must use a primer of gun-cotton or your charge will not ignite; 5 seconds is the length of fuse, re- member.

HAIR BRUSH OR RACQUET BOMB

This bomb takes its name from the shape of the piece of wood to which the explosive and missile are attached. To a piece of wood, 20 inches long, the shape of a hair brush, with a hole through the back for the fuse, you attach a slab of gun-cotton, and a primer with deto- nator (fuse through the hole in the wood). On the face of a slab of gun-cotton you tie some metal in a sackcloth, or a piece of metal like a

piece of a grate, the whole being secured to the wood by binding wire. This is a very popular bomb with the soldiers, who call it the hair brush bomb. The French call it the racquet bomb, but anyway they both agree that it makes a racket amongst the Germans when it lands in their midst.

THE No. 1 (Mark 1.) GRENADE (Hand)

A good description (and how to use it) of this grenade may be obtained in musketry reg- ulations, part 1.

MARK ONE. MODIFIED

This pattern is similar to the above, only it is shorter and lighter.

HALES RIFLE GRENADE

Also Called Grenade 303. No. 3 (Mark 1)
(J Pattern)

It consists of a steel rod 10 inches long, which is placed into the barrel of a rifle, loaded with a BLANK round of ammunition. The rod has two spring clips which grip the muzzle of the rifle to keep it steady. The body of the grenade (which is serrated to weaken it, so that it may readily go to pieces on the shock

of explosion) contains the explosive T.N.T., the detonator cap, and a creep spring. Below the body there is a wind vane, with a safety pin to keep vane from rotating. If it did rotate a couple of bolts would fall out, leaving the firing needle free to go forward on impact. When ready for use the safety pin is removed, and rifle is fired, and as the grenade passes through the air, the wind vane rotates and releases the bolts which hold the firing needle, so that the instant that the grenade strikes the ground the needle is forced on to the detonator cap, which it ignites, compressing the creep spring in doing so, the detonator is exploded, and the T.N.T. is exploded and transformed into gas, shattering the whole grenade to pieces. If this grenade was fired from the rifle with a bullet round of ammunition the chances are it would burst the rifle barrel. A special Pedlum sight is issued to be used with rifle firing the above grenade. The range when fired from a short rifle is about 200 yards.

GRENADE No. 5 (Mark 1)

The description of this grenade is very complicated, and as I do not know if the lecture when printed will be successful, I have not made any sketches, but I will give a description of how it is used and how it acts.

It is a self-igniter, that is to say, you hold this bomb in your right hand, with your thumb on the lever. You then remove the safety pin, which holds the lever in its place, the lever is now held by the thumb of the right hand. In the action of throwing, a strong spring inside the bomb flies down, pulling the lever up, this spring contains a striker, and as it flies downward in the action of the spring extending itself, the striker strikes a cap which ignites and sets fire to the safety fuse (which burns 5 seconds) and ignites the detonator and the charge is exploded, bursting the bomb into fragments.

GRENADES (Hand No. 6 & 7) (Mark 1)

The grenades consist of tin vessels filled with high explosive T.N.T. No. 6 is a heavy grenade and weighs about 1 lb. 13 ozs., and contains an outer layer of scrap iron. No. 7 weighs about a pound and is entirely filled with explosive; it is only intended for moral effect. The action of the bomb is very simple. You hold the bomb in the right hand in the manner that you would hold a stone or a ball, with the forefinger of the left hand you seize the loop at the end of the bomb and jerk the igniter and throw the bomb. The action of the

left hand in pulling out the plug or igniter has lit the fuse (which burns 5 seconds) and ignites the detonator and the explosive is detonated, bursting the bomb into fragments, distributing the contents of scrap metal in the case of No. 6, and a tremendous explosion in the case of No. 7.

In the foregoing I have endeavoured to explain the various bombs. In the manufactured bombs there are three methods of ignition.

No. 1 (Mark 1) ignites on impact. In handling this bomb you must be very careful NOT to strike anything (especially when working in a narrow trench) or it will burst in your hand, as has already happened at the front, with dire results to the thrower and those around him.

No. 5 (Mark 1) may be said to be self-igniting.

No. 6 and 7 are lit by the action of withdrawing the igniter before throwing.

REMARKS

A few remarks in closing my lecture.

NEVER TAKE A LIBERTY WITH ANY EXPLOSIVE.

NEVER remove from the building in which you are being trained, ANY POWDER, DETONATORS, GUN-COTTON, DYNAMITE, etc., etc., and carry it to your quarters.

NEVER smoke when handling explosives, especially GUNPOWDER.

When throwing a bomb pay particular attention to your throwing.

DON'T FOOL about with a bomb after you have lit the fuse. There is a fascination about the use of explosives, and with constant use we are apt to get careless.

NEVER be careless with explosives, always be on the watch. Your comrade may be fooling, bring him to his senses with a remark.

Keep a cool head and observe due precautions—you have nothing to fear.

You have in explosives a good servant. Lose your head or become careless, take liberties with explosives and you have a bad master.

You may meet other makes of bombs or explosives while on service, but if you make yourselves acquainted with the method of work and bombs and explosives in this lecture you will be acquainted with practically all there is in bombs, bombers and bombing.