World War II Axis Booby Traps and Sabotage Tactics

GORDON L ROTTMAN

ILLUSTRATED BY PETER DENNIS

ABOUT THE AUTHOR AND ILLUSTRATOR

GORDON L ROTTMAN entered the US Army in 1967, volunteered for Special Forces and completed training as a weapons specialist. He served in the 5th Special Forces Group in Vietnam in 1969–70 and subsequently in airborne infantry, long-range patrol and intelligence assignments until retiring after 26 years. He was a Special Operations Forces scenario writer at the Joint Readiness Training Center for 12 years and is now a freelance writer, living in Texas.

PETER DENNIS was born in 1950. Inspired by contemporary magazines such as *Look and Learn* he studied illustration at Liverpool Art College. Peter has since contributed to hundreds of books, predominantly on historical subjects, including many Osprey titles. A keen wargamer and modelmaker, he is based in Nottinghamshire, UK.

Elite • 100

World War II Axis Booby Traps and Sabotage Tactics

GORDON L ROTTMAN ILLUSTRATED BY PETER DENNIS
Consultant editor Martin Windrow

First published in 2009 by Osprey Publishing
Midland House, West Way, Botley, Oxford, OX2 0PH, UK
443 Park Avenue South, New York, NY 10016, USA
E-mail: info@ospreypublishing.com

Print ISBN 978 1 84603 450 3
PDF e-book ISBN 978 1 84603 877 8

Editor: Martin Windrow
Design: Ken Vail Graphic Design, Cambridge, UK (kvgd.com)
Typeset in Sabon and Myriad Pro
Index by Alison Worthington
Originated by PPS Grasmere, Leeds, UK
Printed in China through WorldPrint Ltd.

09 10 11 12 13 10 9 8 7 6 5 4 3 2 1

A CIP catalogue record for this book is available from the British Library.

FOR A CATALOGUE OF ALL BOOKS PUBLISHED BY OSPREY MILITARY AND AVIATION PLEASE CONTACT:

Osprey Direct, c/o Random House Distribution Center, 400 Hahn Road, Westminster, MD 21157
Email: iuscustomerservice@ospreypublishing.com

Osprey Direct The Book Service Ltd, Distribution Centre, Colchester Road, Frating Green, Colchester, Essex, CO7 7DW, UK
E-mail: customerservice@ospreypublishing.com

Buy online at www.ospreypublishing.com

ACKNOWLEDGEMENTS

The author is indebted to William Schneck, William Howard of the Technical Intelligence Museum, Bruce Hanesalo of Military/Info Publishing, Andrew Etherington, David Bingham of the Fort Polk Military Museum, Freeman Shell of the Fort Polk Library, Leroy "Red" Wilson, Paul Lemmer, and Sgt C. J. Harper.

ABBREVIATIONS

detcord	detonating cord (aka instantaneous detonating fuse,. primacord, cordex)
g	gramme (metric weight – 0.03oz)
in	inch (25.4mm)
kg	kilogramme (2.2lb)
lb	pound (0.45kg)
Mk	Mark
mm	millimetre (0.04in)
No	number
PETN	**p**enta**e**rythrite **t**etra**n**itrate (high explosive)
TNT	**tri**nitro**t**oluene (high explosive)

WEIGHT CONVERSIONS

200g = 7.5oz
300g = 10.5oz
400g = 14oz
500g = 15.5oz

'FUZE' AND 'FUSE'

Fuze spelt with a 'z' refers to a mechanical device to initiate an explosive at a particular time (delay fuze) or place (impact fuze).

Fuse spelt with an 's' refers to any combustible train, e.g. the delay component in a detonating device, a length of waterproofed safety fuse, etc.

ARTIST'S NOTE

Readers may care to note that the original paintings from which the colour plates in this book were prepared are available for private sale. All reproduction copyright whatsoever is retained by the Publishers. All enquiries should be addressed to:

Peter Dennis, 'Fieldhead', The Park, Mansfield, Notts NG18 2AT, UK

The Publishers regret that they can enter into no correspondence upon this matter.

THE WOODLAND TRUST

Osprey Publishing are supporting the Woodland Trust, the UK's leading woodland conservation charity, by funding the dedication of trees.

CONTENTS

WORLD WAR II AXIS BOOBY TRAPS AND SABOTAGE DEVICES

INTRODUCTION

The use of booby traps in World War II has long intrigued many, due to the ingenuity demonstrated in employing them and the impact on the morale of those who suffered them. Popular World War II literature frequently mentions booby traps, and implies that the enemy's employment of such insidious and devious devices was wickedly underhanded or, at best, "unfair" (begging the question, what's unfair in war?). The fact of the matter is that booby traps have long been an accepted reality of warfare, and no international law prohibits their use in combat zones. Even the recently signed Ottawa Convention to ban landmines fails to address booby traps, and does not prohibit booby-trapping antitank mines, which in effect makes them antipersonnel mines. These "treacherous weapons" may seem deceitful to those suffering their effects, but none would hesitate to use them themselves if the tactical situation were reversed.

The purpose of this book is to provide historical information on the employment of booby traps by the Germans and Japanese in World War II. The information contained herein was extracted from Allied intelligence documents, whose purpose was to alert Allied troops to new types of booby traps, booby-trapping techniques employed by the enemy, the materials used in their construction, and how to avoid, detect and neutralize them. The month and year of the intelligence document in which the report appeared is indicated in the heading; the actual period in which the events described took place was usually one to two months earlier than that date.

The primary source of the information for this book is the *Intelligence Bulletin*, a series of 36 monthly pamphlets published by the US War Department's Military Intelligence Division from September 1942 to August 1945. The bulletins provided a wide range of information on new enemy weapons and equipment, small-unit tactics and techniques, methods of operation, tips of the trade, lessons learned, and other intelligence information valuable to junior leaders and soldiers.

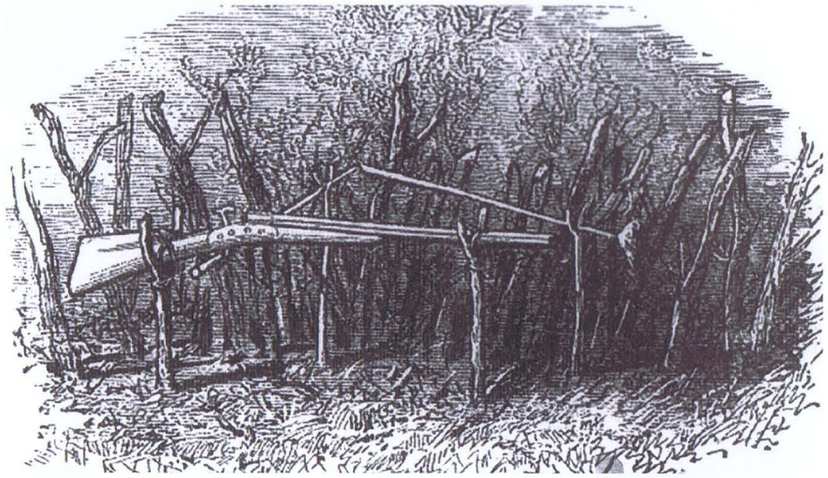
Another source was *Tactical and Technical Trends*, a booklet initially published twice monthly and later monthly, from June 1942 to June 1945. "*Triple-T*" covered the same categories of intelligence information as the *Intelligence Bulletin*, but in more depth; it had additional information and subjects, more tactical studies, and was oriented to higher-level staffs.

Abandoned vehicles were favored for booby-trapping, the charge being activated simply by opening a hatch, or by a tripwire located to catch anyone entering the dark interior. Charges set amongst stored shells in the interior racks could trigger catastrophic explosions. Here two US soldiers pose with a charge removed from a German Wespe 10.5cm self-propelled howitzer.

SAFETY AND LEGALITY

Booby traps are designed to inflict casualties and/or cause material damage. This can apply as easily to the maker, installer, friendly personnel and innocent individuals as to the intended victims. The manufacture of booby trap components, especially explosives and detonators, can be extremely dangerous. Setting up and arming a booby trap can be almost as dangerous to the person doing it as to the intended victims. This book is emphatically **not** meant to be a "how-to" manual; the information is intended only for historical study. Readers are implored not to attempt to manufacture or employ any form of booby trap or their components. The devices described in this book are fabricated mostly from standard military issue munitions and accessories, which are seldom available today, and are not homemade expedients.

Laws vary greatly between countries, but for the most part national and local laws prohibit the use of explosive and "infernal" devices – that is, **any** form of unattended device that may cause harm to a person or property,



A 19th century set shotgun used as a game trap. Such "set guns" were occasionally encountered on battlefields, often with a tripwire to fire them down an approach path likely to be used by the enemy. If nothing else, they served as an early-warning device.

whether that person has entered the property legally or illegally. The manufacture of booby traps, whether explosive or non-explosive, can lead to a charge of criminal possession of a weapon. In the light of today's virtually unrestrained liability suits, it would be **extraordinarily foolish** for a person to construct any form of booby trap, regardless of its intent or the degree of injury it might inflict. Additionally, the much heightened security measures since September 11, 2001 have created an environment in which **any** form of suspicious device or material, including inert replica devices used by re-enactors, can get a person into serious trouble. Use good judgment when making, transporting, and employing such devices; anything that looks even remotely like an ordnance device will invoke a strong response by authorities in all developed countries – if confronted by authorities, immediately declare such devices.

Never, under any circumstances, attempt to modify or tamper with any component of any type of live ordnance device.

THE MILITARY USE OF BOOBY TRAPS

Booby traps are, by definition, mainly defensive weapons. Forces employing them are usually on the defensive, or in some form of retrograde movement – anything between a planned withdrawal and a panicked rout. Armies *in extremis* leave booby traps behind to delay, harass and demoralize an advancing or pursuing enemy. Booby traps are also emplaced to protect defensive positions, provide early warning of the enemy's approach, hamper his attempts to breach obstacles, hinder his advance on specific routes, or delay his use of captured equipment or material. Booby traps can be employed as early-warning devices by placing them within obstacles, or in avenues of approach to friendly positions; examples of these include trip-wired grenades or other explosive devices integrated into barbed wire or roadblocks. Booby traps may be employed offensively to some degree, in that they can be left behind in enemy territory by a raiding force or reconnaissance patrol, and they can usefully be emplaced on supply routes in conjunction with mines.

Booby traps do not win battles, and they seldom have a significant impact on tactical events except at the most local levels; but if employed in abundance, with variety and imagination, they can delay the enemy and instill a heightened degree of caution and uncertainty. They may be able to channel the enemy into areas covered by fire, in a manner similar to minefields and other obstacles. However, the time, effort, and resources needed to effectively sow enough booby traps to have even a moderate impact is substantial. Their main contribution to warfare is their potential for adversely affecting the enemy's morale and slowing him down. They are very much a psychological weapon, intended not only to inflict casualties but to place more stress on enemy combat troops. On the other hand, once their presence is known or suspected, it leads to heightened alertness, and alert troops can often detect them easily. For generations, commands have conducted schools to teach selected troops how to detect and neutralize booby traps, and these men would pass this information on to their units.

In certain instances the use of booby traps can rebound upon the force employing them, especially if it counterattacks to retake an area (seldom accomplished by the same unit that originally occupied the area and placed the booby traps). Equally, friendly patrols and raids into areas previously occupied by their own forces may encounter these booby traps. They can create adverse public opinion, or cause casualties among friendly or neutral civilians still in the area.

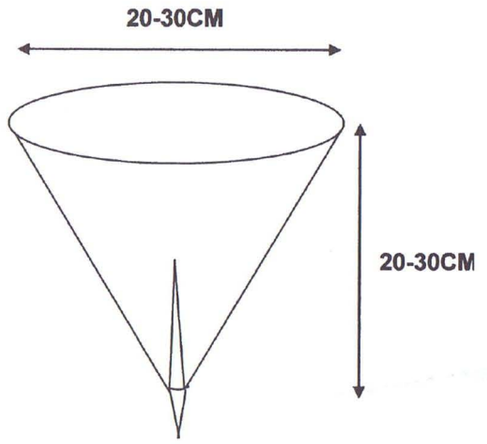
A Brief History of Booby Traps

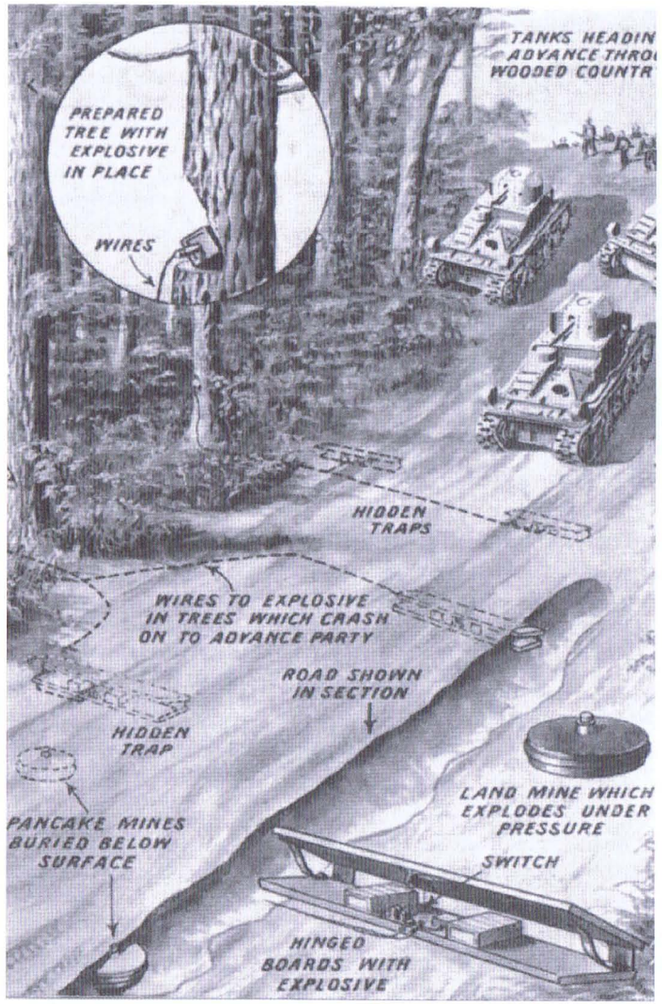
A booby trap is defined as an explosive or non-explosive device or other material, deliberately placed to cause casualties when an apparently harmless object is disturbed, a normally safe act is performed, or an assumed safe place is occupied. Booby traps are devices so concealed or disguised that they will be triggered by an unwary victim.

Booby traps have been around for some time, although the idiom was not coined until about 1850 (though the term "booby" for an awkward, foolish person originated in the 17th century). The first booby traps were pitfalls, a term dating back to the 14th century, although the concept of pits concealed by a flimsy cover dates back into pre-history, when they were first used by hunters to capture animals driven into them, or were left unattended to catch

Below left
The "wolf pit" trap dates from early antiquity, but saw limited use by the Germans, especially on the Eastern Front to hamper massed infantry and cavalry charges. They would be placed in staggered rows a yard or so apart.

Below right
An instructional photo of a Tommy of the Great War supposedly detonating a booby trap while breaking through a barricade. While overshadowed in most accounts by the more dramatic horrors of warfare on the Western Front, booby traps were more widely encountered during World War I than is commonly understood. The basically defensive positions of both sides led logically to the booby-trapping of the thick belts of barbed wire that faced any trench-raiding party, and of barricades erected to stop penetration down the length of trenches.





An early-war British depiction of the German deployment of antitank mines and traps. What the British called "pancake" mines were *Tellerminen* – "platter mines."

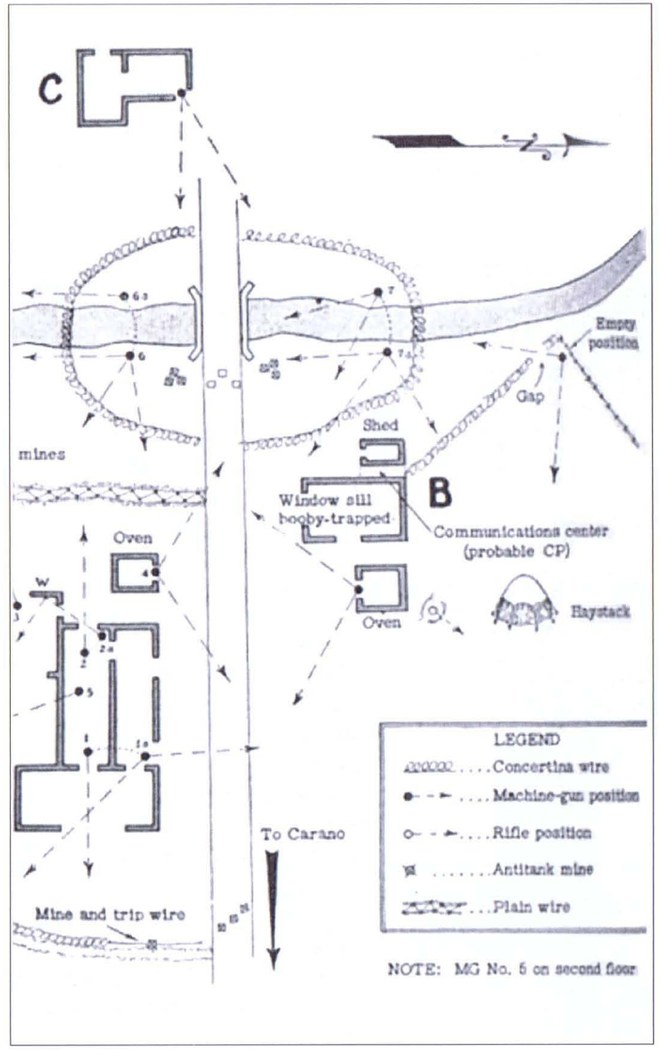
animals and checked periodically. As humans began to wage war, pitfalls with sharpened stakes in the bottom were constructed to trap marauding enemies approaching camps or settlements. Deadfalls of logs or rocks were also used to disable large animals or men, tripped by the victim or remotely activated to send them thundering down a hillside or into a ravine. In this manner they were – to use modern military terminology – employed to deny the use of a chokepoint on an avenue of approach. Occasionally a large rock or heavy log was fastened to a rope and suspended from a properly situated tree; activation by a tripwire or the pull of a rope sent the object swinging down a trail to smash into a briefly startled enemy. Sharpened wooden stakes and spikes simply driven in the ground and concealed under vegetation also constituted booby traps, to slow an enemy's advance or to inflict casualties – the enemy either being chased into the traps, or unsuspectedly advancing into them.

Another early form of booby trap was to emplace an array of fish hooks dangling from thin lines inside windows or dark corridors to ensnare trespassers. (Even poisonous snakes could be employed in a similar manner, but the considerable logistical, installation, maintenance, and removal problems of this method render it rather impractical...).

The first explosive booby traps were used by the Chinese against invading Mongols in 1277, but details are obscure. In the 18th and 19th centuries some use was made of modified firearms as booby traps – usually an old pistol, blunderbuss or shotgun was rigged in a stationary position to cover a door, window or trail, with its trigger attached to a tripwire – a "set gun." A few purpose-built "trap guns" or "spring guns" were made, usually to catch poachers or stock thieves; these were large-caliber, shot-loaded, pistol-like weapons mounted on a swivel. The swivel stake was driven into the ground and one to three tripwires were attached to cover different openings or paths; when a tripwire was disturbed the trap gun would swivel in the intruder's direction and discharge.

Other than those based on hunting traps, the use of booby traps through the 19th century was limited, and it was not until the Industrial Revolution that the use of effective mechanical booby traps became widespread. The first recorded, albeit limited use of explosive booby traps in the Western world was during the Second Seminole War (1835–42). In 1836 a booby trap was left by troops abandoning Fort Alabama in west central Florida; it was activated by Seminoles entering the fort on their heels, and the fort was destroyed. Details are not available, but it was probably a tripwire-activated flintlock igniting kegs of black powder. Some use was made of explosive booby traps in the American Civil War; termed "land torpedoes," "sub-terra torpedoes" or "sensitive shells," these were 24lb and 32lb cannon and 8in and 10in mortar shells buried as landmines, with a percussion-capped detonator nipple exposed (landmines are, after all, a form of booby trap). These were first used by the Confederates in 1862 at Yorktown, VA. There were also instances when a desirable object, such as a jackknife, was attached by a pull-cord to a buried shell fitted with a friction igniter as used to fire cannon. The morality and legality of such "infernal contrivances," employed with "devilish ingenuity," was bitterly argued by both sides.

World War I saw the introduction of mechanical firing devices, and it was not long before they were incorporated into booby traps and landmines. Tripwire-activated hand grenades rigged in barbed wire obstacles saw widespread use, to cause casualties, delay the enemy, and provide early warning of raiding patrols and infantry attacks. Booby traps played only a small part in the overall mass carnage of the Great War, however, and little is now heard of them.



A reconstruction diagram of a World War II German small unit defense plan in Italy, showing the locations of riflemen and machine gunners. Note also that in the large central building on the right side of the road a window sill is booby-trapped, and in the lower left corner a tripwire-activated "S"-mine is marked.

WORLD WAR II BOOBY TRAPS

The contemporary stereotype image of the Japanese as inscrutable and sneaky led to expectations of a high degree of booby trap usage, but it was actually comparatively limited in the Pacific theater. The most prevalent use of booby traps *(shikake bakudan)* by the Japanese was to booby-trap their own and Allied dead, as well as abandoned weapons and other desirable objects to kill or injure souvenir-hunters – a well-known habit of the Allies. Grenades and adapted artillery and mortar projectiles were the main sources of booby-trap materials, and standard demolition charges, typically of 1kg and less, were also used in this way.[1] The use of triggering trip- or pull-cords or wires (*tessen* – steel wire) was extensive. The Japanese significantly increased their use of booby traps as the war progressed;

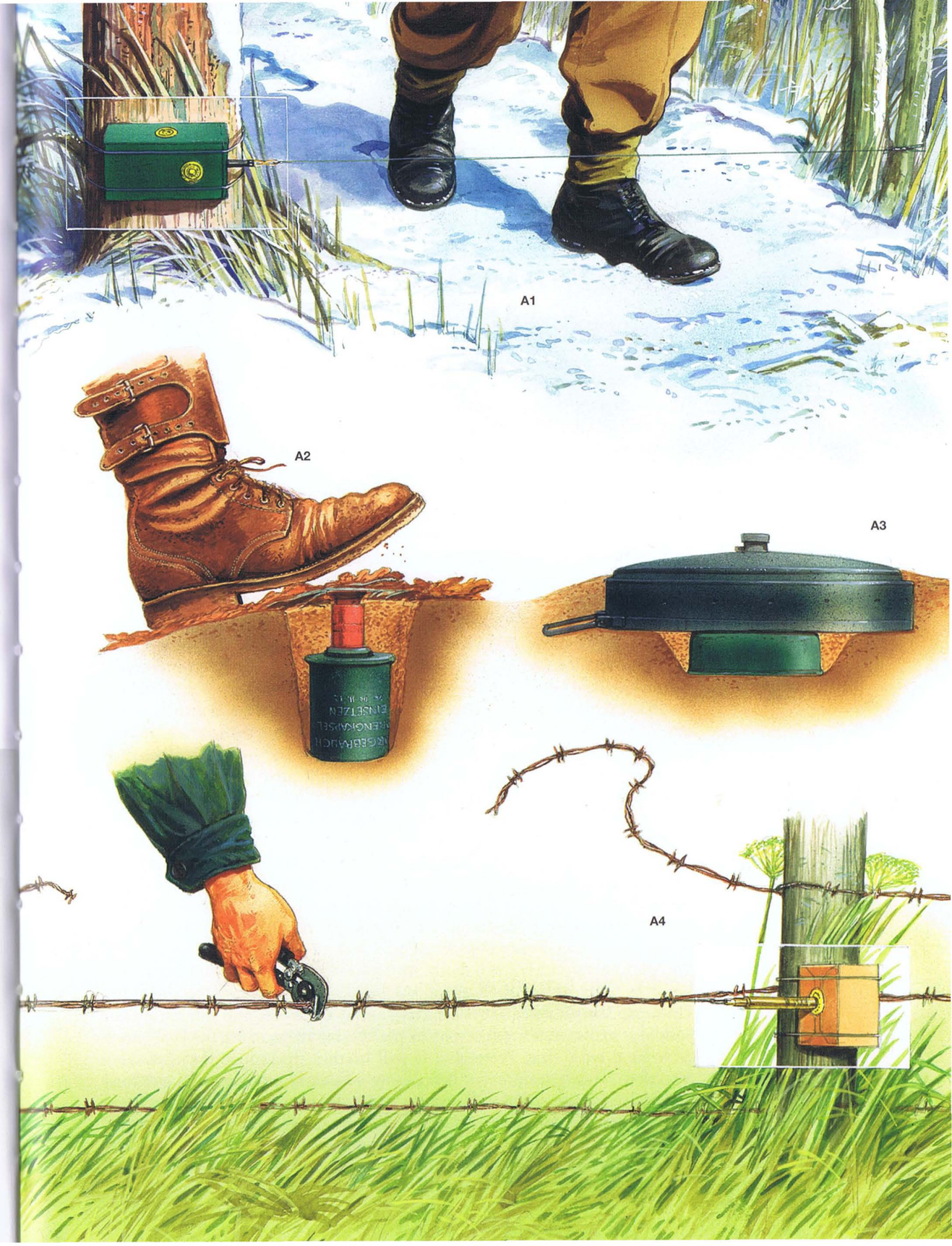
1 See Elite 160: *World War II Infantry Assault Tactics*

prefabricated booby traps began to appear in 1944, especially in the Philippines, where suitable manufacturing facilities existed.

The German use of booby traps – *Sprengfalle* (explosive trap), *versteckte Ladung* (hidden charge), or *Minenfalle* (mine trap) – was much more widespread. This was largely due to the nature of combat in Africa, the Mediterranean and on the continent of Europe, to the wide variety of available explosive materials and triggering devices, and to inherent German ingenuity and imagination. Tripwires (*Stolperdraht*) and pull-wires (*Zugdraht*) were among the main means of activating booby traps. Like other armies the Germans emplaced booby traps to catch unwary souvenir-hunters, but they also used them to cause casualties among Allied small-unit leaders by locating them in possible command post and observation post sites. One example of this was to conceal a booby trap behind a framed picture left hanging crooked on an interior wall of a house: the Germans reasoned that only an officer would be irritated enough to bother with straightening the picture. The Germans excelled at predicting the thought processes of Allied troops in order to develop unpredictable booby-trap situations.

Booby traps were also used to hamper technical intelligence personnel and others attempting to recover abandoned military equipment. Booby-trapping of landmines to kill combat engineers trying to lift them was very widespread – in fact, many of the quoted wartime passages in this book concern German booby-trapping of mines. The Wehrmacht mainly used grenades, mines and demolition charges for booby traps, triggered by a wide variety of purpose-made mechanical firing devices in addition to the humble tripwire.

Both the Germans and Japanese used otherwise harmless-looking objects as "booby trap bait," as well as obviously desirable items such as food containers and alcohol bottles. Booby-trapping military items was one thing, but in the view of many victims booby-trapping "comfort" items was particularly devilish – in some obscure way it seemed to violate soldierly fellow-feeling. Both Germany and Japan used captured Allied grenades, mines, dud artillery and mortar rounds and aerial bombs to construct booby traps.



A **BOOBY TRAP FIRING DEVICES**

The two most common methods of activating booby traps were to either pull or push something. In these illustrations, obviously, the concealment of the booby traps has been unrealistically reduced for the sake of visibility.

(1) Pull-release was by far the most common, being activated by a pull on a tripwire; this either released the spring-loaded firing pin, or withdrew an arming pin to activate the firing device, or pulled a friction igniter. The tripwire itself did not need to be directly pulled, but might be attached to a moveable object such as a door. Here, a German 1kg *Sprengbüchse 24* explosive charge is fitted with a stick grenade's B.Z. 24 friction igniter with the 4.5-second delay element removed.

(2) Pressure, or push, firing devices were activated by stepping on or otherwise pushing on the detonator or an object. Landmines were the most common examples of the pressure firing device. Here a German *Stielhandgranate 24* stick grenade head is fitted with a D.Z. 35 pressure fuze and emplaced as an expedient mine. Six more heads with the handles removed could be wired around the central fuzed head to make a light anti-vehicle mine.

(3) Pressure-release firing devices had an object placed on them before arming; when its weight was lifted the device would detonate. Such devices were in fact scarce in World War II, but this is a dome-shaped German E.Z.S.M. 2 anti-lifting device. It looks like a small mine itself, and is here emplaced beneath a *Tellermine 35*, though it could be placed under any heavy object as a booby trap. It contained a 0.5lb TNT charge and was armed with a pull-cord by the installer; a clockwork mechanism provided a 60- to 90-second delay before arming. Once armed it was impossible to disarm. It was common for antitank mines to be hastily laid and left exposed on the ground to discourage tanks, which misled mine clearance teams as to the danger of booby-trapping.

(4) Tension-release, or pull-and-cut devices were activated when a taut tripwire was cut or broken. This example shows a 200g *Sprengkörper 28* explosive charge with a Z.u.Z.Z. 35 pull- or push-firing device. The taut wire has been strung along a strand of the barbed-wire fence.

While not inflicting large numbers of casualties, booby traps did take their toll on Allied forces. In an effort to counter German and Japanese booby traps and mines, the US Army and Marine Corps and the British Army sent engineer teams around units to provide demonstrations of the latest enemy booby-trapping and mining techniques, common munitions, how to detect them and how to neutralize them. World War II combatants also capitalized on the adverse psychological impact booby traps had on their enemy's morale and effectiveness.

BOOBY TRAP MATERIALS

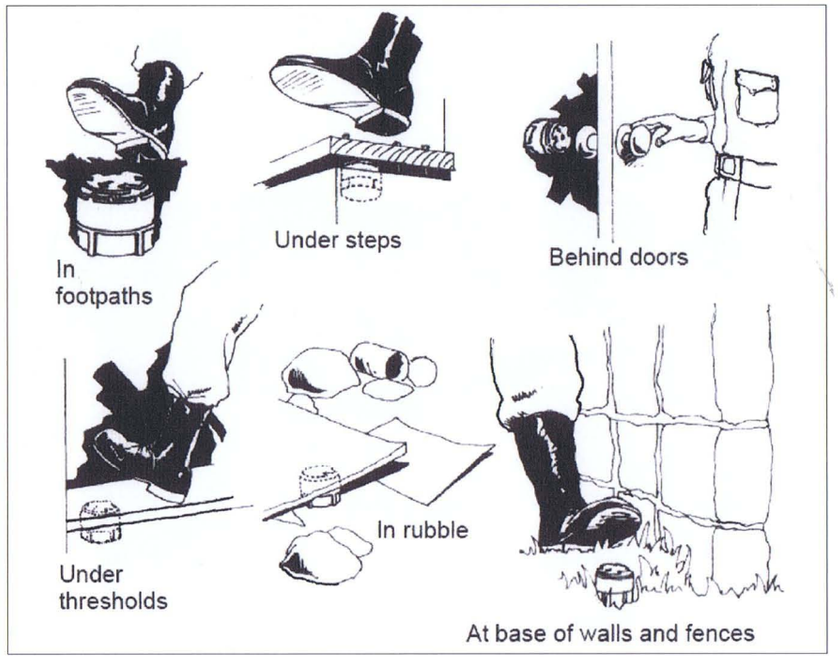
HAND GRENADES AS BOOBY TRAPS

Due to their design, size and activation by arming pins, most Allied grenades were easily adapted to the booby-trap role (more easily than the German stick type, with its friction-pull activation). The most common means of activating booby traps was the tripwire; a tug on the tripwire would pull out the grenade's arming pin, so that it detonated either after the normal time delay (usually 4–5 seconds, depending on the model and nationality), or instantaneously, if the delay train had been removed. Alternatively the fuze might be replaced with some other form of firing device (pressure-release, pull-release, tension-release, or simple pressure). Another common means of activation was to remove the arming pin and carefully place the grenade under an object (a dead body that would have to be recovered, or a discarded weapon, ration container or other desirable object) that was heavy enough to keep a safe pressure on the grenade's activating lever or "spoon." When the object was lifted off the grenade the arming lever flew off, and it detonated after its normal delay. Seeing the lever fly off, a nimble soldier could avoid the detonation. Grenades with friction-pull fuzes could be used in this same manner, but both the pull-cord and the grenade had to be solidly attached, to the movable object and the ground respectively. Sometimes the delay train was removed from the grenade – not to set up an instantaneously detonating booby trap, but in order to leave it discarded in the hope that enemy soldiers might attempt to use it (often, however, the delay element could not be removed by troops in the field). The Germans and Japanese would also use captured Allied lever-activated grenades in booby traps.

Grenades as booby traps were extensively used for all the tactical purposes outlined above: incorporated into obstacles to hamper their breaching or removal, placed on avenues of approach to delay the enemy and provide early warning of their approach, and to booby-trap landmines.

Booby Trap Activation

The most common means of activating booby traps was and is the tripwire. Besides actual wire, a tripwire may be made using string, cord, field telephone cable or even a vine. Preferably it will be thin (to reduce the chance of detection), strong (to prevent it breaking when tripped), and of a subdued color (also to prevent detection). A pull on the tripwire will activate some form of instantaneous firing device or pull a grenade's arming pin to detonate the explosive charge. Both the booby-trap end and the anchor end of the tripwire must be securely fastened if it is to operate properly. The firing device



Examples of common places booby traps might be encountered. In reality the list was virtually endless, and limited only by imagination and available materials; see Plate F.

may be either an integral component of an explosive device such as a hand grenade or landmine, or a purpose-built device offering one or more means of activation:

Pull-release One of the most common firing devices is the pull-type. A tug on the tripwire releases the firing pin on the device and detonates the booby trap. A tripwire attached to a grenade operates by pulling out the safety/arming pin or pulling a friction igniter.

Pressure This is activated by placing pressure on it, for example by stepping on a landmine (many antipersonnel mines can also be fitted simultaneously with pull-release devices and tripwires). The Germans called this a "push" igniter.

Pressure-release A more sophisticated firing device, activated by removing the weight of an object that has been placed on it before arming.

Tension-release This is another sophisticated type, activated when a tripwire under tension is cut or otherwise broken. It is attached to the explosive device, which is then armed after tension is applied to the tripwire. The Germans called this a "pull-and-cut" igniter.

Most firing devices can be disarmed by inserting a safety/arming pin. However, the booby trap must first be detected, and caution must be observed to confirm that it is not itself booby-trapped, and that other booby traps are not set in the immediate vicinity. Occasionally booby traps were set up in such a manner that once the first caused a casualty, additional casualties would be inflicted by secondary booby traps when soldiers came to the first casualty's aid.

Casualty-producing grenades usually had a 4–5-second delay fuse, but some types of pyrotechnic grenades (smoke, flare), used as early-warning devices, might have only a 2-second delay. There were four basic types of hand grenade fuzes in general use in World War II:

Lever-release type (some British, most US, many Soviet and many French).

Axis troops often used captured Allied grenades for booby-trapping, especially those with "fly-off" safety/arming levers – such as this Soviet F-1 *limonka*, the US Mk II "pineapple" and the British and Commonwealth No. 36 "Mills bomb." Here a "lemon" grenade is planted – and unrealistically exposed – beneath a Belgian 9mm FN-Browning pistol, which the Germans used as the P.640(b). If the pistol is picked up the removal of its weight from the lever will arm the grenade. Care was taken to ensure that the buried grenade's lever could still rotate after the hole was back-filled with soil. Another deliberately unrealistic touch in this reconstruction is the safety/arming pin of the grenade left lying in the foreground – such carelessness would be an immediate warning to the unwary.

This type of fuze was activated by pulling a safety/arming pin (cotter or split pin) to release a spring-loaded arming lever when the grenade was thrown. It detonated after a time delay was initiated by the activation of a "mousetrap" firing pin striking a primer and igniting the delay train. The grenade remained safe until the lever was released, but constant pressure had to be maintained on the lever once the arming pin was removed.

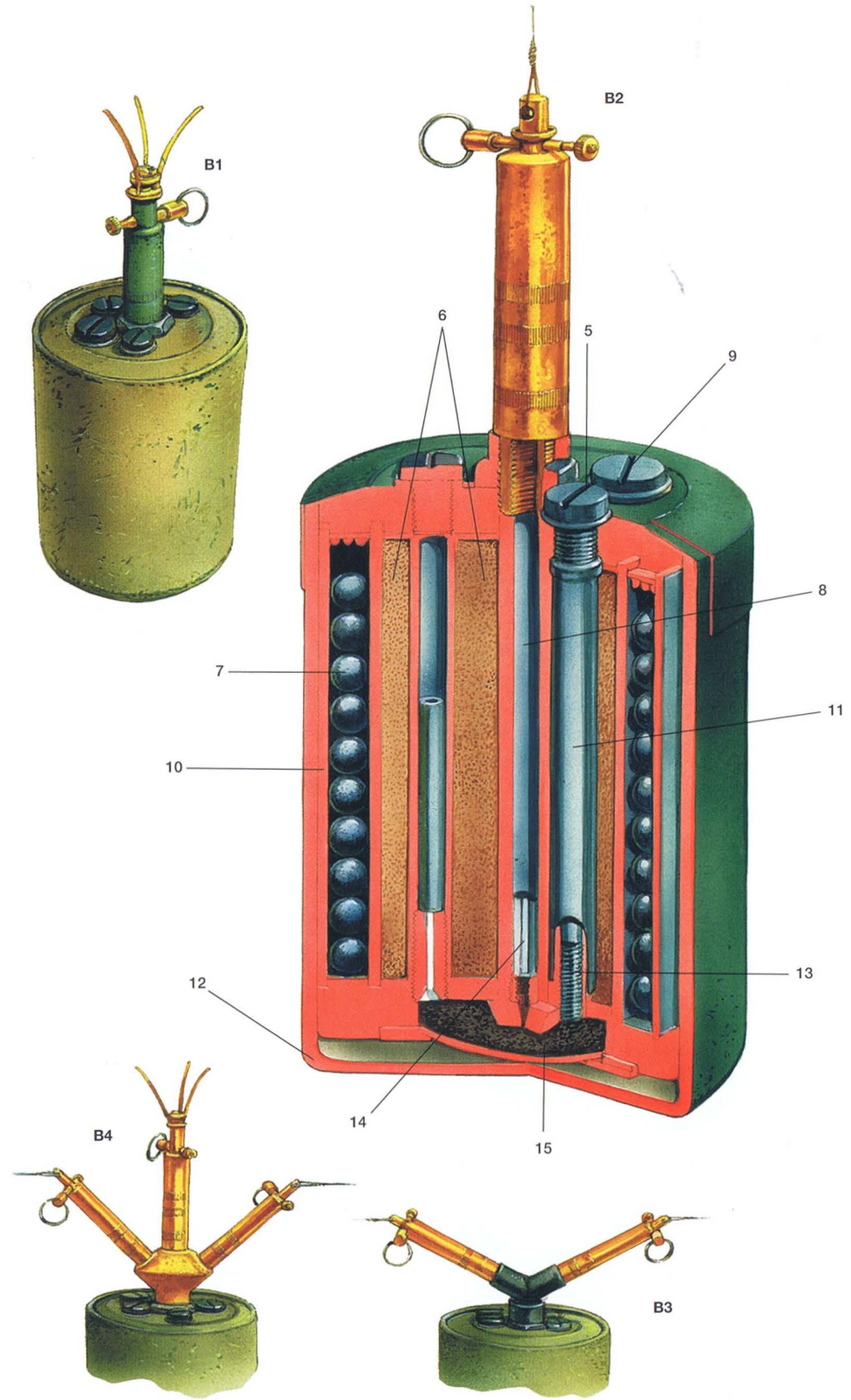
Pull-igniter type (most German, some Japanese). A cap was unscrewed, exposing the pull-igniter, which was a ball or ring attached to a cord. The cord was pulled and the match-like friction igniter activated the delay train. This type of igniter had a high failure rate, due either to the igniter failing to light the delay train (no second pull was possible) or the cord breaking, and it was also susceptible to moisture.

Percussion-igniter type (most Japanese). An arming pin was removed to free

B GERMAN "S"-MINE

A German munition widely employed for booby-trapping, besides its core use as a tripwire- or pressure-activated antipersonnel mine buried in the conventional manner, was the *Schrapnellmine 35* (S.Mi.35). The Germans sometimes referred to it as a *Springmine* or *Splittermine* (spring-mine or splinter-mine), and produced almost 2 million examples. Officially termed the "S"-mine by the Allies, it was known to soldiers – without affection – as the "bouncing Betty," "bouncing baby," "bouncing bitch," "jumping Jack," "castrator" or "de-bollocker." This bounding-type antipersonnel mine was thrown into the air by an initial charge and then detonated 4–10ft above ground, spraying out 360 steel ball bearings. When used as a booby trap it could be fitted with the S.Mi.Z. 35 pressure fuze **(B1);** Z.Z. 35 pull fuze **(B2);** Y-shaped fitting holding two Z.Z. 35 pull fuzes **(B3);** three-way adapter with an S.Mi.Z. 35 fuze in the centre between two Z.Z. 35 fuzes **(B4);** or the Z.u.Z.Z. 35 pull-release fuze **(see Plate E3).** Regardless of the means of activation, after a 3.9-second delay the inner case was projected 4–10ft into the air to detonate, blasting ball bearings to a radius of over 150 yards. The 9lb "S"-mine was used to booby-trap antitank mines and any other movable object. The body was 5in long by 4in diameter. The component parts illustrated are:

(5) Detonator well plug (x3)
(6) TNT detonating charge (6.5oz)
(7) Steel ball bearings (x360)
(8) Detonating fuze well
(9) Filler plug
(10) Inner casing
(11) Detonator wells and detonators (x3)
(12) Outer canister
(13) 0.4- to 1.4-second delay pellets (x3)
(14) 4.5-second main delay pellet
(15) Black powder expelling charge



an internal firing pin. The grenade was then sharply rapped on a solid object (helmet, boot heel, rifle stock, rock), releasing the firing pin to strike a primer and ignite the delay train.

Since most booby traps are intended as antipersonnel weapons, they are designed to cause casualties by blast and fragmentation; booby traps generating incendiary effects were also used, and explosive charges lacking sufficient fragmentation effect were often enhanced by adding nails, scrap metal, cut-up barbed wire, live cartridges, gravel or broken glass.

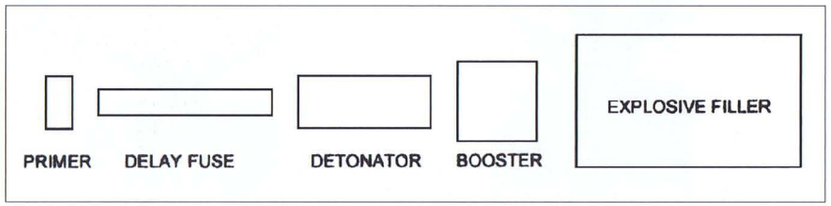
Early-warning devices fall on the edge of the booby trap category, in that they are activated by the unwary and are concealed or disguised. They seldom directly caused casualties, but ignited a flare, smoke cartridge or whistling device, resulting in unwanted attention. Needless to say, a detonating explosive booby trap served as an early-warning device as well as inflicting casualties; those who set the trap would be alerted by the sound of its explosion, over other battle noises.

Explosive train

Explosive booby traps include a number of different types of small explosive components: detonators, blasting caps, booster charges, fuse-igniters, primers, igniter pellets, delay or safety fuse, and instantaneous detonating fuse (detcord). While small and seemingly inconsequential, these items can be dangerous in their own right due to their sensitivity and explosive force. The entire explosive and delay train consisted of an interconnected series of explosive components. There are many variants, but the diagram below serves as a typical example for a hand grenade. The means of activation (lever-release, pull-igniter, percussion) is immaterial. The delay fuse is a short length of safety fuse, the detonator is a blasting cap, and the booster charge is only present if the main explosive is insensitive to the detonation of the small blasting cap. A landmine or other explosive charge will not possess a delay fuse. There are three items in the explosive train that should be clearly understood.

Safety fuse (aka time, delay, mining, Bickford's fuse, or in German *Zeitzündschnur*) was a key component of most grenade fuzes. Prior to the introduction of safety fuse, time fuses consisted of coarse twine rolled in damp black powder and dried. It was far from uniform in its burn rate, and it was not waterproof. Modern safety fuse as used in World War II was about 0.25in (6.5mm) in diameter, and consisted of a black powder or pyrotechnic compound core, burning at a uniform rate, within a tightly spiral-wrapped fiber sheath with an outer waterproofing cover of treated fabric (however, it was not completely waterproof). The burning rate of safety fuse depended on the country of manufacture and varied between manufacturers' lots.

Detonating cord or instantaneous detonating fuse – aka detcord or primacord (US slang), cordex (UK), *Knallzündschnur* (German) – was used to link



A simple schematic of an explosive detonating train. The primer was activated by some form of firing device (pull, pull-release, pressure or pressure-release). A delay fuse component was seldom used in booby traps, for obvious reasons, and a booster was needed only for less sensitive explosives.

demolition charges to achieve simultaneous detonation. It should not be confused with safety fuse. Detcord was usually 0.25in in diameter and covered with a plastic or treated fabric waterproof covering. The cord was filled with a high-velocity explosive, usually PETN, which detonates at a speed of 21,000ft per second (6,405 meters per second). To detonate it, a non-electric blasting cap is fastened to an end and a length of safety fuse is inserted in the cap; alternatively, an electric blasting cap is used, or some form of mechanical firing device is attached. The detcord can be inserted in the fuse wells of grenades, mines, or demolition charges (with a blasting cap crimped to the end to ensure detonation of the main charge), or several wraps of the cord can be made around the explosive charge to link any number of charges. When the detcord is fired it detonates instantaneously, blowing all connected charges at once.

The most common **detonators** were the commercial No. 8 non-electric blasting caps used the world over. It is a thin-walled, non-corrosive metallic tube (aluminum, copper) 2.5in (64mm) long and 0.25in in diameter (sizes varied) partly filled with PETN and topped with a highly sensitive initiator charge. One end of the tube is open to allow a length of safety fuse or detonating cord to be inserted and crimped into place.

Discarded Allied equipment was sometimes booby-trapped – here an M1 Garand rifle, wired to a stick grenade hidden in rubble – in the hope that a GI would think it had been carelessly left lying around by a comrade. (In this, and all other instructional drawings, the tripwire and concealment are deliberately obvious; in reality a fine wire passing between two bricks immediately adjacent to the weapon would be easy for a tired or preoccupied man to miss, especially in poor light conditions.)

GERMAN BOOBY TRAPS

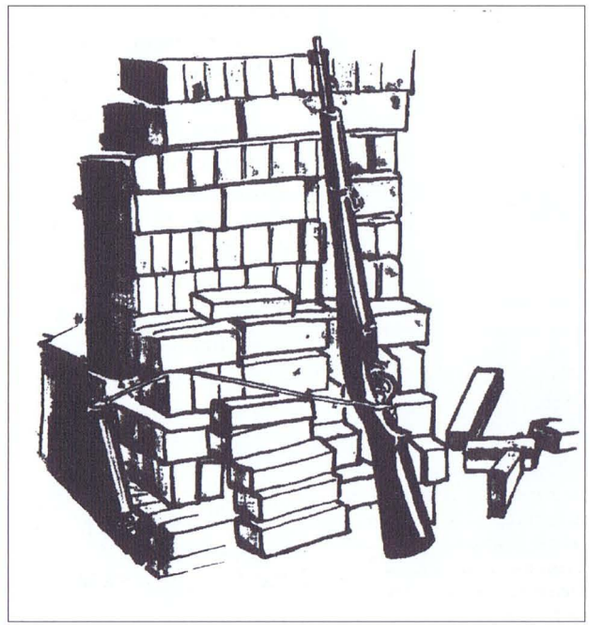
The following accounts and descriptions of booby traps are from the Allied intelligence publications described above, though the entries are sometimes edited for brevity, clarity, and to prevent needless repetition. The first appeared in the first issue of *Intelligence Bulletin*, and gave information obtained from British sources:

A. German Booby Traps (September 1942)

1. General

A booby trap is any form of concealed explosive which causes destruction of men, equipment, or communications. It is so placed that it will be accidentally set off or will function automatically by means of a time mechanism. Although explosives are the normal method of destruction, booby traps may also be designed to utilize flares or incendiary bombs.

The reason for employing such traps is to create an atmosphere of uncertainty and to make the enemy very cautious and uneasy, thereby lowering his morale and slowing his actions. Since booby traps get their success from surprise, both the charge and the operating mechanism are either concealed or made to resemble some common, harmless object.

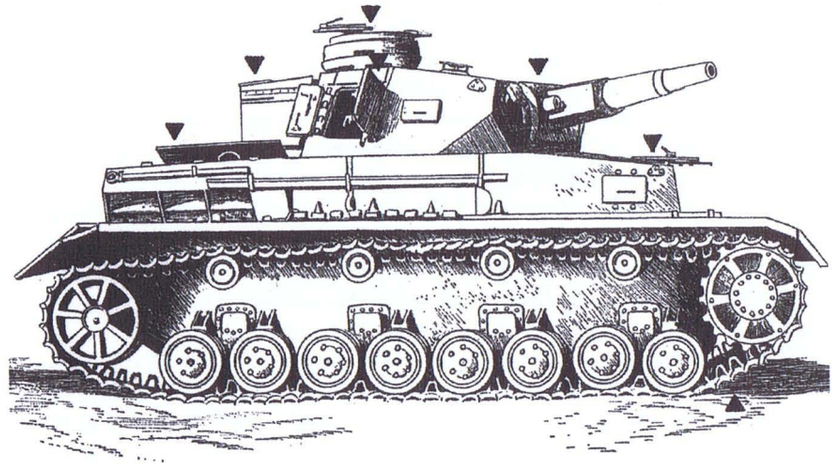


2. Operation

In almost every case booby traps may be operated by one of the following methods:

The Motion Picture Myth

Motion pictures sometimes depict an unfortunate soldier stepping on a mine, hearing an ominous click, looking down at his boot to find he is standing on a mine, and freezing in place. The rest of the platoon gathers round in a cluster warning him not to move his foot or the mine will explode. In recent movies about post-Cold War conflicts similar mines have been depicted, usually with the unfortunate doomed individual left standing all alone until he either tries to run for it, or can no longer stand. But there is not and never has been any such mine fuze in anybody's inventory.This myth originated from the German "S"-mine and a misunderstanding of how it functioned. Whether the mine was activated by a pressure fuze or tripwire made no difference, since it was activated and would fire in a few seconds regardless of whether one removed one's foot or not. The buried "S"-mine was activated by horizontally strung tripwires set a few inches off the ground. When tripped the mine fired a cylinder several feet into the air with a muffled pop, which then detonated showering nearby troops with 360 steel ball bearings. It could also be fitted with a pressure fuze that detonated the mine when stepped on. Either way there was an average 3.9-second delay between tripping the wire or stepping on the mine before the cylinder was fired, during which time soldiers knew their goose was cooked and that they could not outrun it, even if they realized they had triggered it. The shrapnel could reach over 150 yards; it made no difference if they removed their foot from it or not.



a. Direct pressure of a foot, wheel, or track on the hidden explosive.
b. Movement of some harmless-looking object.
c. Movement of some hidden object, such as a thin tripwire.
d. Some form of automatic, delayed-action machine designed to explode without any human touch. The delay may be a few hours or many days.

In the first three cases, the trigger may fire the charge at once, or the explosion may not go off for several minutes.

3. Principles of Use

The following general methods are ordinarily used by the enemy in setting booby traps; by studying how the traps are set, we can more easily find and safely destroy them.

a. Keeping normal appearance. Every attempt is made to disturb the surroundings as little as possible and to remove or hide carefully all signs of preparation after laying the trap.
b. Small spaces. The smaller the space in which the trap is laid – for example, passages, stairways, dugout inclines, and defiles – the more chance there will be of the trap being sprung.
c. Many traps in one place. Many traps are usually laid in one place so that there will be less chance of finding them all without springing some. Dummies may be used freely.
d. Double bluff. An easily recognized trap is often used to mask a well-concealed trap nearby.
e. Curiosity. The natural desire to handle souvenirs, pictures, food and drink containers, musical instruments, and other articles is a consideration in setting the trap.
f. Everyday operations. Traps may be fired by the opening or closing of doors or windows, the use of telephones or electric-light switches, etc.
g. Firing. Each trap may be set off by two or more methods.
h. Variety. As many different types as possible are usually used in any one locality.

4. Detection

a. General. Since there may not be enough engineer troops to have complete charge of finding traps, it is necessary that other soldiers be on the lookout for them. A detailed reconnaissance should include, so far as time permits, the marking of known or suspected booby-trapped areas as well as disarmament of detected traps. Reports of the types of traps found are also extremely important. To find and safely destroy booby traps, soldiers must be trained to recognize telltale marks and clues quickly, and must know what the enemy uses for traps and how they are fixed. Valuable information can often be obtained from prisoners, particularly engineers, about the sites where traps have been laid and their nature. Local inhabitants may give valuable information about the activities of the enemy before his withdrawal.
b. Places for traps. Some of the more common places which are utilized for setting booby traps are:
(1) Roads. Cuts, embankments, blind bends, bridges, culverts, obstacles, wooded stretches, junctions, crossroads, and general debris.
(2) Open country. Woods, trees, posts, gates, paths, hedges, obstacles, stores, dumps, and general debris.
(3) Buildings and dugouts. Steps, floors, doors, windows, cupboards, passages, furniture, fireplaces, water taps, closets, supplies, telephones, light switches, floor coverings, pictures, documents, and debris.
c. Suspicious signs. The following signs may indicate the existence of an enemy's booby trap:
(1) Disturbed ground, especially after the rain.
(2) Explosive wrappings, sawdust, nose caps from shells, etc.
(3) Traces of camouflage, withered vegetation, etc., showing some attempt at concealment.
(4) Breaks or disturbances in vegetation, dust, paintwork, timbering, etc.
(5) The presence of pegs, nails, electric leads, or pieces of wire or cord for

Opposite
A German Pz.Kpfw IV medium tank with common possible external locations for booby-trapping indicated. From front to rear: antitank mine in track path to detonate when towed off; driver's or radio-operator's hatch; main gun when elevated or depressed; turret side escape hatch; commander's hatch; turret rear stowage bin, and engine access hatch. Any number of items and controls inside could be booby-trapped. The Germans knew that eventually some Allied soldier would always have to gain access to an abandoned tank, which could not be left on the battlefield unexamined.

Below
There was no standard marker system to warn of booby traps; where necessary, any clear warning sign would do, or simply strips of cloth used in the same way as modern police crime-scene tape – Allied soldiers were familiar with minefield-marking tapes.

A posed group of African American US Army engineers demonstrate the use of the SCR-625 mine detector. These were often used in pairs so as to sweep more rapidly a path of vehicle width. A man probing by hand would precisely locate and examine the mine discovered by the detector. Road verges were a favorite site for mines and booby traps, to catch unwary drivers who ran a wheel off the road when passing other traffic or speeding at a bend, or personnel, who habitually walked up each side of a road rather than on it.

which there is no apparent use.
(6) Marks on trees, on paths, on the ground, or on walls of buildings for no obvious reason.
(7) Movable objects, such as equipment, souvenirs, musical instruments, food and drink containers, and kitchen utensils.
(8) Minor obstructions of all kinds on roads, in trench systems, and in buildings.
(9) Irregular tracks of foot or wheeled traffic where there is no apparent reason for such marks.
(10) Any indication that an area has been carefully avoided.

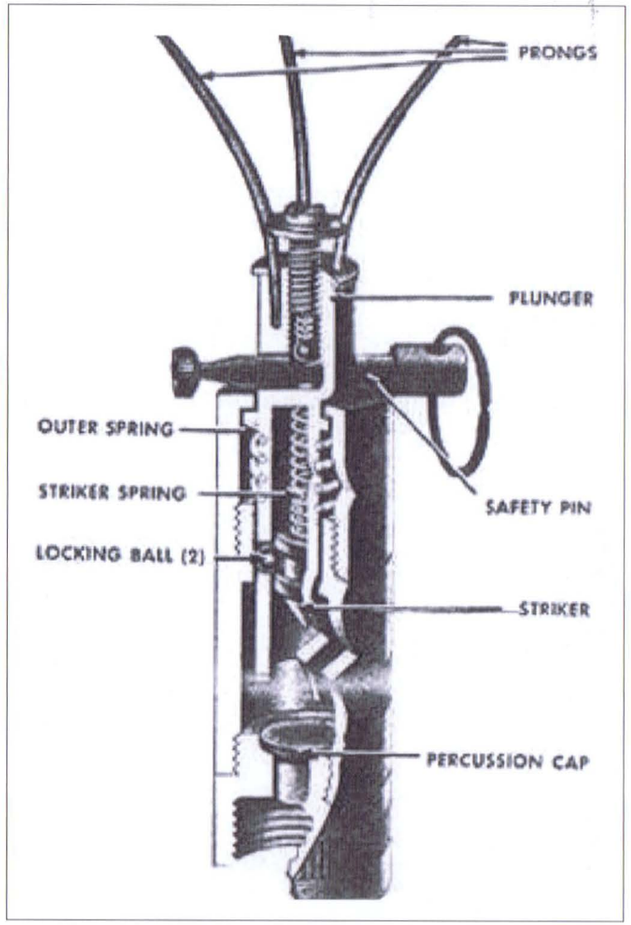
5. Details of Booby Traps

a. General. The following traps are typical of those which have been set by the Axis, principally the Germans. Variations on them are limited only by the smartness of the enemy, but they are usually apt to be based on the push- or pull-igniter, and can be disarmed fairly easily once they are detected and their type is determined.

b. Shaving stick booby trap. [This] consists of an aluminum cylinder, painted yellow, with walls 0.039in thick. It contains 1/3lb of high-explosive as a block filling. In the top of the filling are three black powder pellets. The top of the bomb is riveted to the body, and carries the ignition mechanism. A 2in length of cord is attached at one end to a disc in the cap, and at the other end to a loop in the friction wire, *A*. If the cap is pulled more than 2in the friction wire causes the friction composition to ignite the pellet, *B*, which fires the compressed pellets, *C*. When the bombs are found complete, they are harmless. If the cap has been left unscrewed, the cord may be cut and the cap replaced to protect the friction wire. [See Plate C4. This was a purpose-built booby trap – official designation unknown. It was sometimes confused with a grenade and Allied soldiers occasionally attempted to use it as such, with regretable results.]

c. Stick grenades used as booby traps. The German *Stielhandgranate 24* stick hand grenade may sometimes be modified to form a booby trap by removing the delaying device. When friendly troops attempt to use the captured grenade, pulling of the friction wire causes the grenades to explode at once, without the usual 4.5-second delay. To see whether or not the delaying device has been removed from the grenade, it may be tested as follows:
(1) Unscrew the explosive cylinder from the wooden handle.
(2) Remove the detonator and the fuze, which project from the handle.
(3) Unscrew the cap at the end of the handle and let the porcelain bead hang down.
(4) Unscrew the delayed-action device in the top of the handle to make sure that the delayed-action cylinder actually contains the compressed gun powder.
The grenades can then be put together again by carrying out the above operations in the reverse order.
If time is important, it will be all right to take one of each batch of suspected grenades, to unscrew the handles from them and operate the fuzes by pulling the cords from a distance. It will then be obvious whether the explosion takes place at once or after an interval of 4.5 seconds.

d. Miscellaneous booby traps. It is reported that the Germans in Libya have laid anti-lifting devices, using a pull-igniter, under mines. Tar barrels have been left on roadsides, with three 15cm shells in them, the whole device to be fired electrically. At points where the road is cut into a hillside, stick grenades have been hung by wire down the steep bank, overlooking the road, with a tripwire carried from them across the road. On one occasion a German whistle, of a dark brown bone type, was found to have a small charge in the body of the whistle exploded by a striker and cap. When the whistle is blown, the vibrating pea hits the striker, thus causing the explosion. A German plane which landed recently at Malta had a new type of radio. When the British attempted to remove the radio, an explosion resulted in which five men were killed. Because of the extent of the damage, no details of the booby trap are available. Similar results have frequently been experienced in connection with the removal of radios from other German planes.



The S.Mi.Z. 35 pressure fuze was used on the "S"-mines 35 and 44, as well as on other booby traps. To arm it, a small nut on the safety pin (here, at left end) was unscrewed and the pin pulled, usually by a string tied to the ring. Putting about 15lb of pressure on any one of the three prongs would then initiate detonation.

B. Booby Traps in Relation to Minefields and Demolitions

Captured German documents from the Middle East make it clear that the German command considers the placing of booby traps a routine part of the mining operations to be undertaken before abandoning a position. Elaborate instructions have been issued for the laying of landmines and for improvised mines, which contain practical suggestions for the arrangement of booby traps. How essential a part of the whole mining defenses the booby trap may become can be shown by the British experience at Agedabia, Libya: the ground was mined with landmines in a circle 3–5mi from the center of the village, all the roads were mined, in many cases the shoulders as well as the centers, and the detours made by the Germans for their own use were heavily mined with both antitank and armor-piercing mines. In fact, the whole British account emphasizes the extreme resourcefulness of the Germans in varying the standard patterns laid down in their training manuals. In the midst of these manifold contrivances were many booby traps. Wells and cisterns, for example, were left deliberately undestroyed, but the principal ones were artfully prepared with charges; the main cistern contained a 40lb charge and a landmine, connected with a pull-igniter and cord to the manhole cover.

Many of the houses were equipped with similar traps, consisting generally of a landmine, connected with a pull-igniter either directly on the door or to a tripwire across the door. In some cases hand grenades were fixed inside the door, in such a fashion as to indicate that the man who had set the trap had then left by the window. In general, the Germans seem to be using pull-igniters to kill or disable soldiers more frequently than prepared demolition charges.

C HAND GRENADES USED AS BOOBY TRAPS

Grenades were readily available and provided the most common explosive devices for booby traps. The typical 4- or 5-second delay hampered their effectiveness as booby traps, but in some cases the delay element in the firing train could be removed. These illustrations are to a common scale.

(1) The most common German grenade was the *Stielhandgranate 24* (Stg. 24) – 'stick hand grenade 1924' – filled with 6oz of TNT. It had a pull-type friction igniter with a 4.5-second delay. A porcelain bead was attached to the pull cord and could be attached to a tripwire. (The grenade is 13.4in long with cap removed.)

(2) The *Eihandgranaten 39* (Eihgr. 39) – "egg hand grenade 1939" – had a 4oz TNT filling and was normally fitted with a 4.5-second delay pull-type friction igniter. Unscrewing the blue cap revealed the pull cord, and a tripwire could be fastened to this. There was also a red-capped 1-second delay fuse (as on the so-called "shaving stick grenade," below), specifically for booby-trapping.

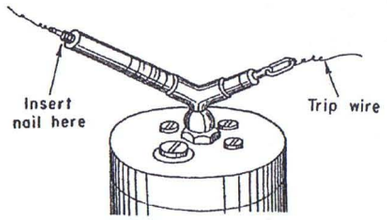
(3) The "new type" Eihgr. 39n.A. had protective "ears" and a carrying ring added, both of which served as securing anchors when it was employed as a booby trap. This one has been fitted with a Z.Z. 35 pull fuze.

(4) The "shaving stick grenade," so called because in size and shape it resembled the cylindrical sticks of shaving soap commonly used for wet shaving in the 1940s. Its actual German designation is unknown, but with this fuse variant it was specifically produced as a booby trap. The red-capped 1-second delay fuse detonated a 6oz charge, although its thin aluminum body generated few deadly fragments. Some Allied troops, finding them lying around and believing that they were normal delay-fused hand grenades, attempted to use them as such, with bloody consequences. This grenade was also provided with a conventional 4.5-second delay fuse, distinguishable by its blue cap. It could also be fitted with a D.Z. 35 pressure detonator.

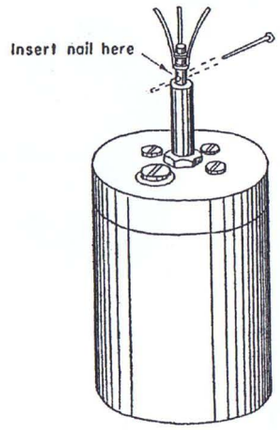
Most Japanese grenades had percussion igniters, making them ill-suited for use as booby traps. For booby-trapping the Japanese tended to use captured US and British Commonwealth grenades, as well as two Chinese models, all attached to pull-type tripwires.

(5) The Type 98 (1938) stick grenade was a copy of a Chinese grenade (which was also used), produced in a Japanese factory in Manchuria. It had a pull-type friction igniter with a 4- to 5-second delay activated by a pull ring. The poorly fragmenting head was filled with only 3oz of picric acid.

(6) The Chinese-made Type 23 (1933) grenade had a screw-on cap with a cord attached inside to a friction-igniter in the body. It had a small thumb-release lever to hold the cap in place. The cap was unscrewed 1½ turns and pulled to ignite the 5.5-second delay. Captured grenades were used as booby traps, with the cap removed and the cord attached to a tripwire instead; two rings were provided to anchor it when used as a booby trap. Early intelligence reports listed it as Japanese-made.



WITH 2 PULL IGNITERS



WITH 3 PRONG PRESSURE IGNITER

Above left
A US paratrooper removes an "S"-mine 35 with an S.Mi.Z. 35 pressure fuze; it was located by probing with a trench knife.

Above right
The means of neutralizing "S"-mines fitted with different types of fuzes, by inserting a small nail, a length of stiff wire, or a US grenade safety pin. The fuze could then be unscrewed from the mine.

C. Recent Trends in the German Use of Mines and Booby Traps (June 1943)

1. Introduction

When the Germans were increasingly forced to assume the defensive in North Africa they added variations in their methods of laying mines and preparing booby traps. These notes deal with recent trends in Tripolitania and Tunisia.

2. Antitank Mines

The Tellermine 35 (T.Mi. 35) is still the standard German antitank mine. In addition, the Germans occasionally make use of captured mines and Italian mines. Recent reports indicate an increased use of wooden box mines *(Holzminen)* containing TNT, captured British guncotton, or German prepared charges. These wooden mines are difficult to locate with mine detectors, especially when Bakelite® igniters are used. [Bakelite® is a plastic-like resin used by the Germans for components of munitions and explosive devices. Bakelite® cannot be detected by mine detectors, nor does it conduct electricity.

Not only are antitank mines frequently booby-trapped (by the addition of pull-igniters), but antitank and antipersonnel mines are often laid in the same area.

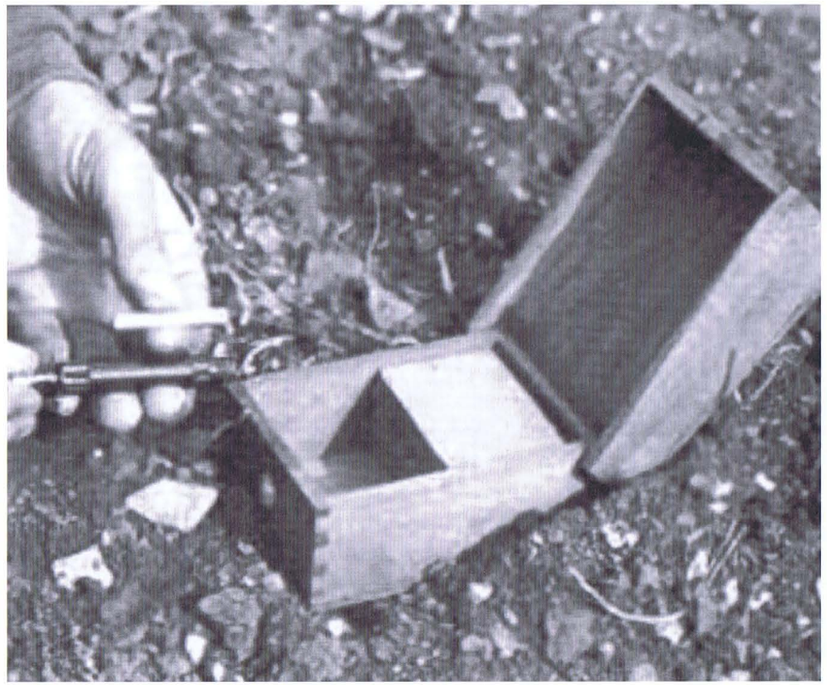
The Germans, often retreating in haste, have found that a tar-bound macadam road, especially one which has a rock foundation, cannot be mined quickly. This has led them to do a great deal of mine-laying in road shoulders, chiefly using Tellermines and burying them deep at irregular intervals along a road. The enemy carefully removes all evidence of excavated earth, and occasionally scatters small stones or fragments of wood or metal on the site as an aid to concealment. Axis troops usually collect all empty Tellermine crates, and throw them away farther along the line of retreat. In some cases, once the existence of a mined area has been established, it is possible to locate the mines merely by inspection; even so, it has been found that the use of detectors over all such areas is the best procedure.

The Germans are especially likely to choose the following types of places when laying mines in road shoulders:

a. At crossroads and junctions, and sometimes on an "island" not surfaced with tar-bound macadam.
b. Near roadside houses or other obvious turn-outs, where vehicles are likely to pull off the road.
c. In defiles, where passing vehicles sometimes go over the edge of the macadam.
d. In entrances to detours.
e. At sharp corners, where traffic is always likely to go over on the shoulders.

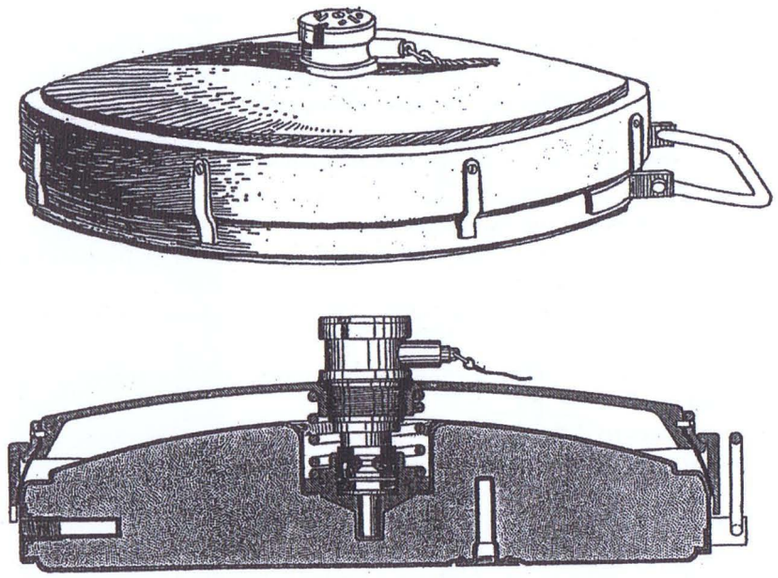
In sandy stretches, where the sand might be expected to blow across the road, the Germans sometimes place mines on the road surface and cover them with sand strewn in such a manner that it appears wind-blown. On hard-beaten tracks, holes are bored with earth-augers. This makes the mines much harder to locate visually.

When time and the condition of a road or trail permit, the Germans often mine it according to a definite pattern. The anti-vehicle mining of railroad crossings is common. Eight mines in a V-pattern, eight to 12 mines in a Z-pattern, and 24 mines in a block are among the various arrangements which have been reported. In villages mines are likely to be laid in open spaces, such as squares and courtyards, which might conceivably be used as parking areas.



The small size of the German *Schü-Mine 42* is apparent here; fitting a large charge to antipersonnel mines was simply wasteful, since just enough to blow off a foot would at once take three men out of the line – the casualty himself, plus two others to carry him. Here the GI's hand holds the removed Z.Z. 42 pressure fuze (dark color) and detonator, and the 200g charge is seen in the wooden box. The fuze had a Bakelite® body and only the striker and tripwire loop were steel, so it would not register when ground was being searched with an electronic/magnetic mine detector.

The Tellermine 35 was one of the most common types of German antitank mines. The two secondary fuse wells are apparent in the cutaway, at the left side and underneath. In these sketches the arming pin is still inserted.



3. Booby-trapping of Tellermines

The German Tellermine contains two recesses, one in the side and one in the bottom, to receive standard German detonators. Axis troops usually booby-trap Tellermines by driving pegs into the ground, either below the mine or to one side of it, and connecting them with thin wire to pull-igniter devices screwed into the recesses. In some cases tripwires are erected; these are usually attached to small stakes about 6in high. Pressure devices are also employed. In general, it may be said that whenever enough time is available the Germans fit a high percentage of their mines with anti-lifting devices. The following instances of booby-trapped Tellermines have been reported recently:

a. Apparently unarmed Tellermines lying exposed, with the pin in and the arming wire still wrapped around the igniter, but with an anti-lifting device underneath.
b. One Tellermine directly on top of another, with the two connected by a pull-igniter and the bottom mine inverted so as to make disarming more difficult. Also, Tellermines have been connected with British mines placed above and beside them.
c. Five barrels, filled with earth, blocking a road; one or two of the barrels containing Tellermines with pull-igniters pegged to the road, so that the mines exploded when the barrel was moved.
d. Barrels similarly arranged, packed with large charges such as shells and placed on a culvert, so that when the barrels were moved the explosion blew in the top of the culvert.
e. A truck partly obstructing a road, with a wire leading from an axle to a pull-igniter in the side recess of a Tellermine. This mine is laid on top of another, and connected to it by a pull-igniter. The second mine, in turn, has a pull-igniter underneath it, which is pegged into the ground by means of wire.
f. Tellermines buried under fecal matter sprinkled with dust.

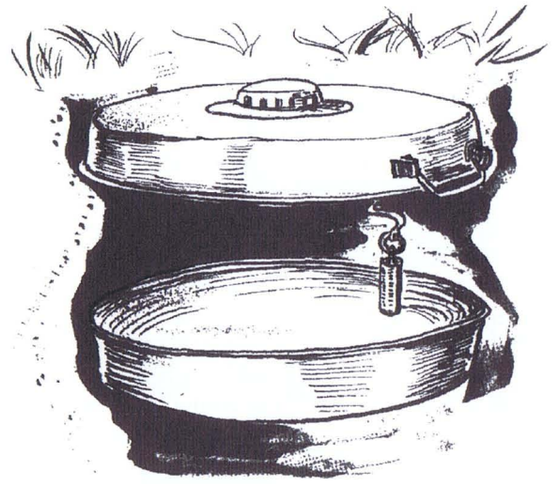
g. Cord or tripwire connecting a pull-igniter in the side of a Tellermine with a nail or peg in the door of a building or derelict aircraft.
h. Wooden box mines connected to pull-igniters in Tellermines, which are buried underneath the box mines.

5. Booby Traps (Prepared Charges)

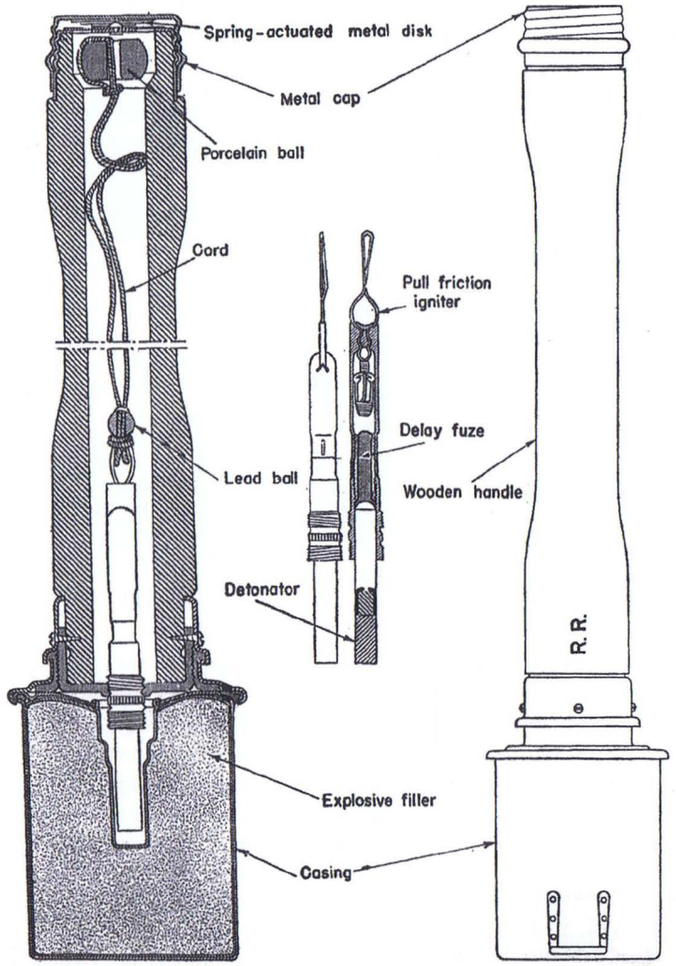
Although all mines fitted with pull-igniters and tripwires are sometimes lumped together under the general name of "booby traps," the expression in its exact sense refers to explosive charges or mines ignited by standard pressure-, pull-, release-, or combination-firing devices, or by improvised means such as electrical connections. The igniter may be attached by fine binding wire to tripwires, marking stakes, low bushes, or loose bits of scrub used to camouflage mines. To date the Germans have booby-trapped almost every conceivable type of movable object, especially doors, windows, steps, floors, pictures, furniture (especially the drawers), cupboards, water taps, telephones, light switches, rugs, mats, documents, flashlights, cigarette cases, fountain pens, and even the bodies of their own dead. In fact, the list has included virtually everything that the perverted imagination of the enemy could encompass. Often the booby trap serves no tactical object whatever. The best precaution is to remember that everything movable in an area formerly occupied by the enemy must be treated with the greatest suspicion. The following are recent notes by military observers on the subject of German booby traps:

a. Anything in the least out of the ordinary may indicate the presence of a booby trap – for example, German notice boards facing us instead of the enemy, loose strands of wire, stones with wire wrapped around them, and so on. This observation, however, only supplements the basic rule regarding booby traps – *everything movable and seemingly harmless must be suspected and treated with caution.*
b. Stakes with booby traps under them are generally dug in, while others are knocked in.
c. Notice boards with skull-and-crossbones painted on them indicate the presence of booby traps in the immediate area.
d. Small heaps of stones, sometimes piled so as to support the base of a picket, are likely to be wired to prepared charges. This is also true of discarded gasoline, oil, and water cans and drums.
e. Obstacles on roads, tracks, and trails are almost invariably booby-trapped.
f. The standard German antipersonnel grenade is now booby-trapped.
(1) The German Army's small egg-shaped hand grenade (*Eihandgranaten 39* – Eihgr. 39) can be identified by its gray-green body and blue primer cap. A 4.5-second fuse is fired when the blue cap is unscrewed and the enclosed string pulled.
(2) The same grenade with a red primer cap, instead of the blue, is a booby trap. When the red primer cap

The use of a second fuse well in the bottom to link the mine to a second placed upside-down beneath it. Sympathetic detonation of both together would be devastating to a tank, let alone to an unwary engineer attempting to remove the first mine without checking for a second. There were instances in which even a third mine or other explosive device was incorporated. See Plate D.



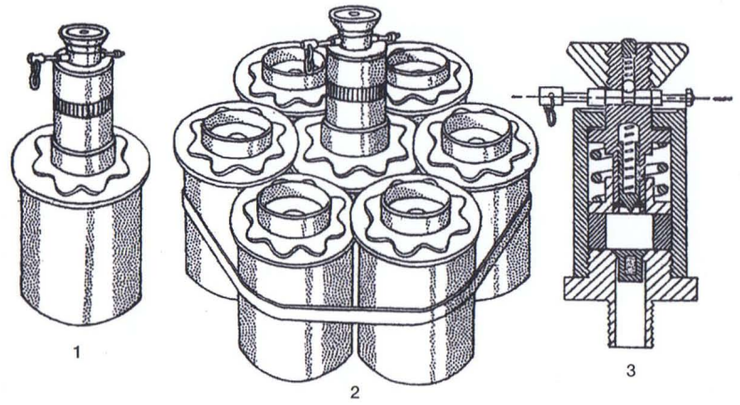
The German *Stielhandgrenate 24* (Stg. 24) was commonly used in booby traps, with the 4.5-second delay element removed and a tripwire attached to the pull-cord, here contained beneath the screw-off end cap of the handle. The B.Z. 24 friction igniter (center) was sometimes attached to other explosive charges used as booby traps.



is removed and the enclosed string pulled, a 1-second delay is fired, killing the operator.

g. The Germans are likely to lay a new type of booby trap on landing strips or in any clearing that we may be expected to enlarge. On at least one occasion the Germans buried two "S"-mines under a low bush, and apparently connected a well-concealed tripwire to a lower branch of the bush. When the bush was dug up in the course of clearing operations, the mines were detonated.

h. The Germans have been known to booby-trap an improvised device for cutting the tires of planes attempting to use an airfield. Using a type of wooden container manufactured to hold three "S"-mines, they cut the metal rim-bands with a hacksaw and bend them upward to form spikes. The container is then sunk in the ground with only the spikes protruding. A prepared charge with a pull-igniter is attached to the container, so that anyone who lifts it detonates the charge. "S"-mines may also be buried close to the box.



The Stg. 24 "potato masher" grenade could be turned into an antipersonnel mine (1) or a light antitank mine (2) by removing the handles and fitting a D.Z. 35 pressure detonator (3).

D. US Wounded Discuss Axis Mines and Booby Traps (August 1943)

A number of US soldiers, who were wounded by Axis mines and booby traps in Tunisia, have made interesting and useful comments based on their experiences with such devices:

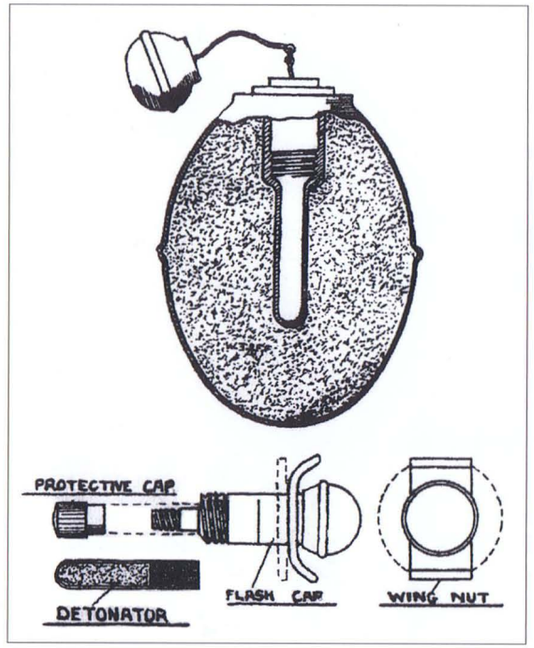
1. We had laid a good many British Mk V mines in the approach to Faid Pass. The Germans, realizing that we were about to lift our own minefield, sneaked up at night and booby-trapped the mines on the edges nearest them with anti-lifting devices.

When the Germans lay their "bouncing babies" ("S"-mines) in shell holes, shell craters, they generally set the mines for pressure. What the enemy hopes is that our boys will hastily jump into the holes to take cover, without even suspecting the presence of mines. It doesn't take our men very long to learn that the enemy is always trying to outguess us, that he's smart, and that caution pays.

I'd like to say something about "double-bluffs" as we call them; you see something which looks like a tripwire, and which would ordinarily lead to a pull-igniter. The wire is taut. Also, it's out in full view – suspiciously so. If you cut the wire, a hammer sets off a charge of some kind – perhaps not a mine at all. It's just another instance of the enemy trying to outguess us.

2. An important point to remember about enemy methods is that they aren't cut-and-dried. You can't depend on the Axis always doing the same thing, day in and day out. The enemy goes in for variety to catch us off our guard.

3. I can certify that going blindly up a gully which may be the wrong one is a damn fool stunt. The reason I lost a leg is simply this: I didn't pick out landmarks carefully enough in the daytime, and when I was retracing some ground in a jeep at night, I deviated just a little from a route I'd gone over



The *Eihandgranaten 39* (Eihgr. 39) was frequently used as a booby trap, either with the delay element removed from the normal firing train, or fitted with a special 1-seond delay fuse identified by a red cap in place of the normal 4.5-second delay fuse with a light blue cap. The "wing nut" ears were a later addition designed to protect the fuse cap.

only once before. I was heading for a certain gully. Instead of being absolutely sure that I was entering the right one, I took a chance and entered what I vaguely guessed was the right gully. A Tellermine got the jeep, and it got me, too. What I should have done was to go back a bit and get my bearings.

4. If I were to go through the North African campaign again, I'd train myself better in using my eyes at night and I'd form the habit of noting landmarks more carefully during the daytime. Even though a lot of terrain features are lost at night there's always a good chance that a remembered landmark will remind you of the position of another, in relation to it.

5. If you see a sign saying *Achtung! Minen!*, that's one time when you want to believe in signs! We learned not to play the smart-aleck game of firing or throwing stones at objects in an area where there was a warning sign. This kind of tomfoolery sometimes disturbed delicate mines and booby-trap mechanisms so that they were harder to detect and neutralize later. Also, there was the ever-present danger of sympathetic detonation, whereby one explosion would cause another, and of course you couldn't predict where.

I lost my right hand by picking up a German egg grenade that I saw lying on the ground, with its pin apparently in. Feeling confident that it was safe, I went right ahead and picked it up. It hadn't occurred to me that fine piano wire might lead from the other end of the grenade to a stake sunk into the ground directly underneath.

Something even worse happened to a British squad leader I knew over in Tunisia. The squad came across a nice German Luger lying on the ground, just waiting to be picked up. The squad leader was wary. He said, 'It's probably booby-trapped. I want all you men to stand aside and watch

D GERMAN MINE BOOBY-TRAPPING

(1) The "S"-mine 1944 (*Schrapnellmine 44* – S.Mi. 44) had only one detonator well instead of three (see Plate B). When triggered, the charge casing was blown out of the ground trailing a wire, which pulled the detonator to explode about 4ft above ground. The shrapnel was ¼in x ³/₈in rod sections. This "S"-mine's tripwire, attached to a Z.Z. 35 pull fuze, is buried beneath a 300-round machine gun ammunition can, which is lying on its side so that the wire can be threaded under the lid, which is closed to secure it. There was nothing on the bottom of the can to which a wire could be attached, and fastening it to a lid handle was too conspicuous.

(2) The *Schü-Mine 42* ("shoe mine" – from its similarity to a shoe box) was a small impregnated plywood box containing a 200g *Sprengkörper 28* explosive charge and a Z.Z. 42 pull detonator. The mine was detonated by stepping on it, which pressed the part-open lid down on a detonator release. The few metal parts made them difficult to detect with electronic detectors, and they were often seeded among antitank mines to discourage mine detectors. This one is placed under a loose floorboard, with an 8cm mortar bomb beside it, its nose fuze removed to increase the chance of sympathetic detonation; such a blast would be devastating inside a room. Again, in reality the device would obviously be emplaced so that the floorboard was almost flush, and the mat would be folded back to cover it. The board chosen would be immediately inside a door or window, on a staircase, or wherever an unwary step was most likely.

Antitank mines were relatively easy to detect with mine detectors and by probing. German engineers devised all sorts of means of booby-trapping mines, to catch Allied personnel trying to lift them. Tellermines had auxiliary fuse wells in the side and bottom for firing devices.

(3) This 21lb *Tellermine 35 Stahl* ("platter mine 1935 steel" – T.Mi. 34) is doubly booby-trapped, with unusual thoroughness. Two Z.Z. 35 pull igniters are fitted in the side and bottom wells, with pull-wires attached to buried stakes (ignore the cutaway effect – earth would be backfilled into all the cavities shown here). In North Africa it was often observed that if the carrying handle was oriented upwards the pull igniter was fitted in the side, and if it faced downwards the igniter was below it. Obviously, lifting the mine will detonate it; the intention is that the lifter will relax after finding and deactivating one of the traps.

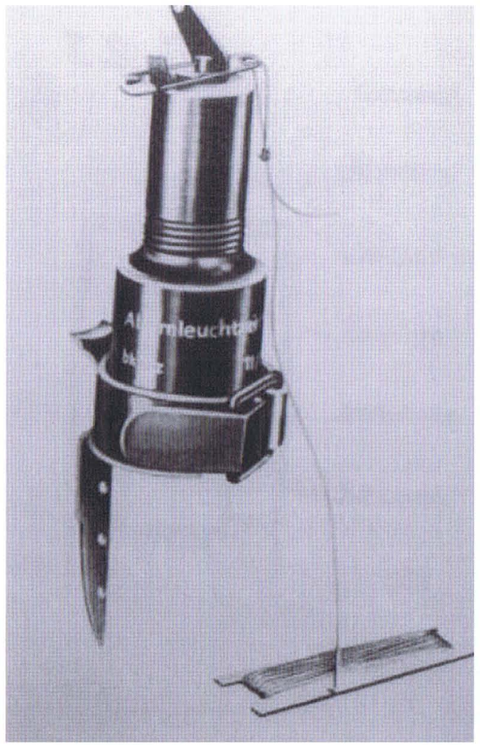
(4) In a much more hasty booby trap, this 18lb Tellermine 43 simply rests atop a British Mk 36M No.1 hand grenade; captured ordnance was often used for booby-trapping, and the "fly-off lever" mechanisms used to ignite the fuzes of both British and US fragmentation grenades lent itself to such employment. If the mine is lifted the grenade will detonate in 4 seconds.

carefully while I show you a safe way of testing it.' He tied a cord to the trigger guard, and carried the other end of the string over to a foxhole, which was about 15–20ft away. "Now here's what I'm going to do," he said. "I'll crouch in the foxhole, and draw the cord so that the Luger will move and detonate any pull-igniter which may be attached to it." The squad leader jumped into the foxhole, and instantly there was an explosion. The Germans, anticipating just what his line of reasoning would be, had mined the foxhole with a couple of "bouncing babies" set for pressure – and, incidentally, hadn't even bothered to booby-trap the Luger at all.

I'd like to say something very frankly to fellows who haven't yet had experience in fighting the Germans. Everybody in my outfit will back me up in this, too. Remember that the enemy is just as smart as you are, and possibly smarter. Don't be careless, this is just what the Germans hope you will be. And don't form the habit of showing off, either. Cockiness can be the curse of green troops.

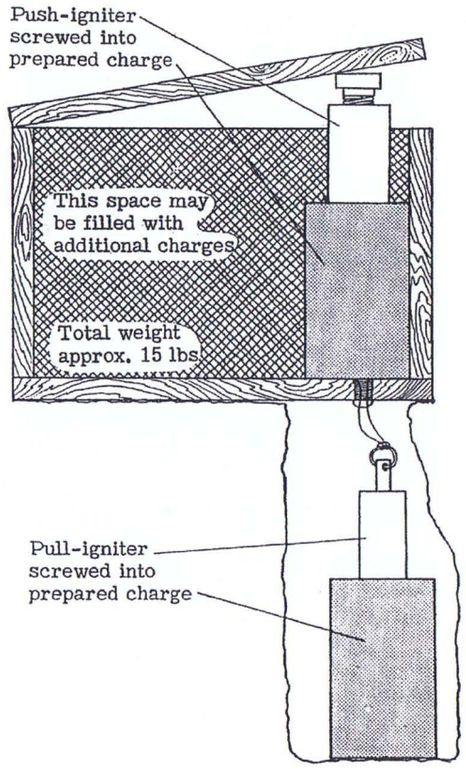
6. The Germans think ahead. They try to anticipate what we'll do under every circumstance. If our fellows take this fact into account every minute, and move as surely and as carefully as Indians, they aren't going to be caught unaware.

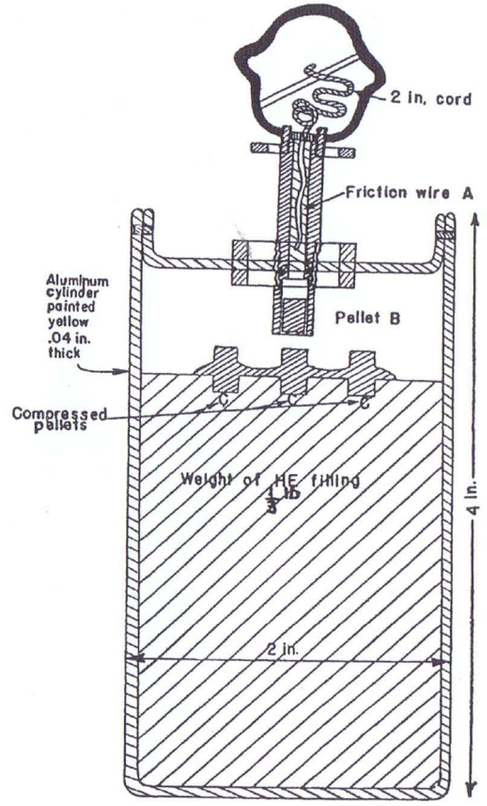
It's true about Tellermines being laid in the shoulders of roads, especially where vehicles are likely to swerve out somewhat, as on turns. I was the guard in a jeep that got blown up that way. Two men were killed, and I lost my right leg and my left foot. I'd been over the road once before, but it was the driver's first time. There's a possibility that the mine had been laid at night by a German slipping back into our territory, but of course it may have been there all the time. We went over on the shoulder as we rounded a curve, going a little too fast.



The *Alarmleuchtzeichen* ("alarm illumination indicator") was one of several types of German tripwire-activated devices that would ignite a magnesium flare to alert defenders and illuminate attackers. Such devices were placed within wire obstacles and on avenues of approach.

7. Our M3 tanks were advancing across a plain, and were engaged in hot and heavy action. A Tellermine got the left track of my tank. None of us realized that the track had been smashed; we didn't notice this particular explosion, and we weren't thrown against the sides of the tank or anything like that. We were in the heat of battle, and were firing continuously. I tried to back off to execute a maneuver, and only then did I realize that the track was broken and off. At this point we were hit by an 88mm and were set on fire. I gave the order to abandon the tank. The driver was wounded as he was climbing out. A couple of minutes later I was lying on my belly, keeping as well down as possible and trying to dress the driver's wound. He was lying on his back. I happened to move my leg just a little, and it may have caught a wire which detonated an antipersonnel mine. I hadn't noticed any wire, because I'd been so busy trying to dress the driver's wound and meanwhile avoid all the fire which was going on overhead. Maybe the pressure of my foot or leg would have been enough to detonate a pressure-type igniter even while I was lying prone. I'm not sure about this. (Note. It is entirely possible. The soldier in question is heavy-set, and, when he shifted his leg, he may have brought it down on the igniter with considerable force.)





The terrain was characterized by sandy stretches and grass clumps. Even though I was in a mighty hot spot, I wish now that I'd investigated the ground in that immediate neighborhood for tripwires, or for those little three-pronged igniters that stick up just above the ground, or for suspicious signs of any kind. When I realized that a Tellermine had got our tank track, I should have had sense enough to suspect the presence of antipersonnel mines, too. The Germans very often lay "S" and other antipersonnel types near their "T"s.

I don't want to sound at all boastful, but up until this time I hadn't felt nervous, and honestly I still didn't. Perhaps it was because so much hell was popping that no one thing had a demoralizing effect. Anyway, when the mine got my foot it put a good many fragments here and there in both legs, too – I had to leave the driver and start crawling back across the plain. I crawled back more than a mile. I kept looking for buried mines, too, believe me! Eventually I was discovered by a British tank. The Germans use mines so liberally, especially when they're on the defensive, that you've got to suspect every inch of terrain. I'm not trying to make a high-sounding statement for effect. I'm speaking literally!

8. By and large, you won't find booby traps in places that are inaccessible. If you make your own trail, you're likely to be a lot safer. We soon learned to leave suspicious-looking objects alone and notify the engineers. Once my platoon worked for the better part of a day in a little clearing, paying

Above left
An example of a German field expedient box mine, using any available small wooden box and an explosive charge fitted with a D.Z. 35 pressure fuze. Here another charge is hidden beneath the mine and is fitted with a Z.Z. 35 pull fuze, to detonate if a careless attempt is made to lift the box mine.

Above right
The German "shaving stick grenade" saw use mainly in North Africa and Italy. This diagram shows the simplicity of this low-cost booby trap and grenade. It could be fitted with a 1-second delay fuse (red cap) as a booby trap, or a 4.5-second fuse (light blue cap) for use as a grenade. However, the thin aluminum body provided little fragmentation (see Plate C4).

It is sometimes forgotten that masses of field telephone wires were strung through trees and on existing or temporary poles erected by signal troops. Abandoned German wires were pulled down, so these could be booby-trapped by German infiltrators. Night patrols also cut Allied cables, and booby-trapped them close to the cut ends to catch the linesmen who had to find and repair the breaks.

absolutely no attention to a beautiful silver watch that lay on the ground right smack in the middle of it. When we finally left the clearing, the engineers still hadn't come up. Even so, we left the watch lying there. Don't think we didn't arrive at this state of discipline through experience, though!

In paths and defiles the Germans used a number of antipersonnel switches that they had captured from the British. Official the "switch, No. 8, anti-personnel," this was a pressure-release device shaped like a pencil. It usually is sunk in a path or narrow defile and its 0.75in tip concealed with mud, dirt, or leaves. It projects a [cone-shaped .50cal] bullet upwards. Our nickname for these switches is 'castrators,' but most of the time what they really do is go up through your foot, or through the tire of a vehicle.

E GERMAN AND JAPANESE FIRING DEVICES

Mechanical firing devices – variously called detonators, igniters, exploders or fuzes – were essential to the functioning of booby traps. Friction igniters, pull-type, pull-release, tension-type, and pressure-type were the most commonly found firing devices. These illustrations are to a common scale, and show safety/arming pins in place, where applicable.

German:

(1) B.Z. 24 friction igniter from Stg. 24 stick grenade (body without pull-loop, 2.5in long).
(2) Z.Z. 35 pull detonator.
(3) Z.u.Z.Z. 35 push/pull detonator.
(4) Z.Z. 42 pull detonator from *Schü-Mine 42*.
(5) D.Z. 35 pressure detonator (125–165lb pressure).
The B.Z. 24 and Z.Z. 42 were, of course, used in other booby traps as well. The horizontal pins with nuts on one end are the safety pins. A ring was provided to attach a pull string, allowing the detonator to be armed after the booby trap was emplaced somewhere difficult to access with the hand.

Japanese:

(6) Pull-type friction igniter.
(7) Pull-type friction igniter.
(8) Waterproof fuse lighter, used to light safety fuse; a blasting cap could be fitted and used for booby traps.
(9) Pull-type firing device. A blasting cap was housed in the 6.5mm cartridge in the bottom; the pull release is in the side.
(10) Type 1 chemical delay detonator. A small reservoir in the top was filled with cupric chloride, the amount variable for delays of between 45 and 65 minutes – the more acid, the shorter the delay.

A staged photo of US troops in a captured German ration depot with containers of dried beans, and one soldier holding double loaves of black bread. Such sites were highly prone to booby-trapping.

E. Miscellaneous Booby Trap Reports from France, Italy, and Germany

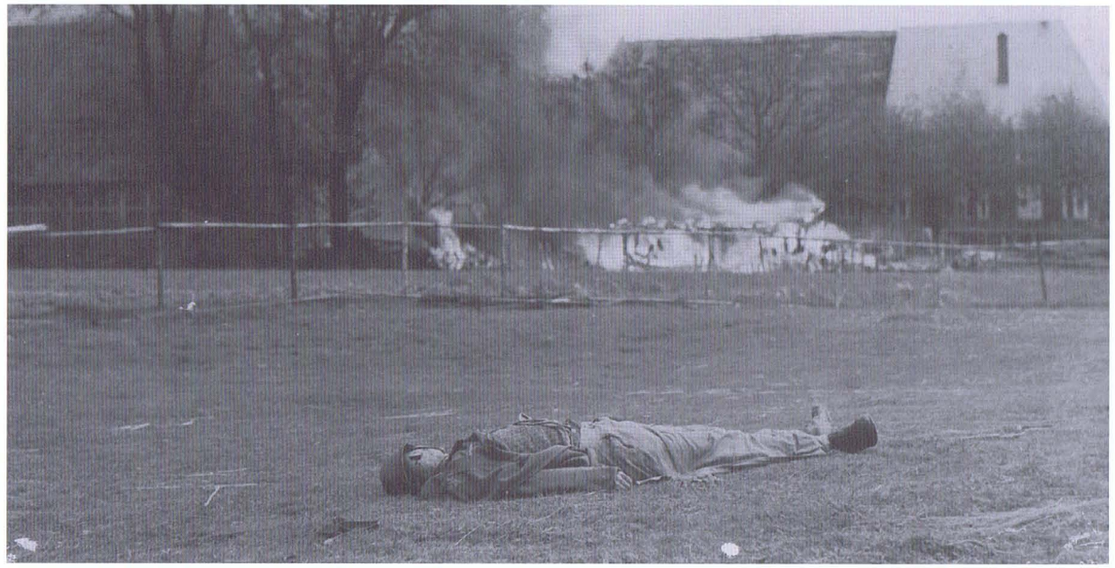
1. Booby Traps in Italy (October 1943)
Recently the following German booby traps have been reported:

a. A Tellermine propped in a tree by means of a long pole. A pull-igniter was screwed into the mine, and wire led from the igniter to a second branch. The idea presumably was that when someone disturbed the pole, the mine would fall and explode in mid-air.
b. A 3kg prepared charge, with a pull-igniter attached to the carrying straps in such a way that anyone lifting the charge by the straps would detonate it.
c. A small cake of what appeared to be cream-colored soap, with the brand name "Bourgois" on one side and "Made in England" on the other. (When it was placed in a can of water, there was no apparent reaction during the first 24 hours, but on the second day it separated in half, as if a seam had opened. The cake seemed to have some kind of metallic core. When a concussion charge was fired 6in from the can, there was a sympathetic detonation of considerable violence, and the bottom of the can was entirely blown out.)

2. German Booby Traps in Italy (May and July 1944)

a. Recently a German patrol operating at night came across an artillery observation post telephone line, cut it, and booby-trapped the loose ends of the wire in the following manner. The enemy buried two "S"-mines about 10yd apart, so that in each case about an inch of the detonator showed above the ground. Each of the loose ends of the telephone wire was attached to one of the "S"-mines with a 12in length of fine strong thread. It was the German intention that a linesman would carelessly pick up what he would assume to be merely a loose end of wire, and thus detonate an "S"-mine. At the place where this booby-trapping was done, the telephone line ran quite close to an unimproved road. Four Tellermines were laid in the road, evidently for the purpose of destroying any maintenance truck which might be brought up. The Tellermines were not actually buried, but were covered with mud. The Germans probably realized that neither part of this ruse would offer much danger in daylight, but hoped that it would prove effective during the night if prompt maintenance of the line were attempted.
b. Since the Germans use pull-release devices, as well as regular pull-igniters, it has been found essential to take the precaution of cutting only those tripwires which are slack – and, even then, not until it has been established that no booby traps of any description are connected with the wires. In any case, whether wires are slack or taut, it is only prudent to neutralize every igniter before touching the wires. Double leads may be electric leads. If they are, and are cut simultaneously, the wire cutters may cause a short circuit and detonate the charge.
The Germans continue to booby-trap movable objects of every conceivable kind. Jerry cans (20liter, 5gal) and oil drums still are favorite objects for this kind of activity.
b. It has been reported that the Germans, in an effort to interfere with United Nations mine-detecting equipment, have covered Italian wooden

Knowing the dead would be searched and eventually recovered for burial, the Germans occasionally booby-trapped bodies – both their own and Allied. Grave registration personnel recovering the dead learned to carefully check bodies, weapons and equipment before moving them.



box mines with rubbish including tin cans, paper, garbage, brushwood, and earth. Also, booby traps have been attached to various articles in these rubbish heaps. Because of the presence of tin cans in the rubbish, it is necessary to exercise extreme caution in locating and removing the mines.

3. Enemy Booby-Trapping Activities in France (October 1944)
[This report was in the form of a discussion with enlisted men on enemy tactics. Only the booby trap and related mine portions are addressed here.]

"The Germans are using numerous booby traps as they retreat in France. One of the cleverest was constructed of a couple of planks, a potato-masher grenade, a stick, and length of string. Two planks were placed [side by side] across a ditch, with one plank slightly higher than the other. One end of a 3-to-4ft stick was inserted between the two planks. Then the potato-masher grenade was tied to the end of the stick away from the two planks, and its pin

A US paratrooper rushes toward a barbed-wire fence. While the fence itself may not be booby-trapped, there could be antipersonnel mines or tripwires to booby traps on the other side, to catch soldiers crossing over or through the fence. The skilled booby-trapper gave much thought to psychology, trying to predict the routes and the cover that would attract soldiers trying to avoid obvious dangers. The most elementary example was booby-trapping ditches beside roads at points where they would come under fire.

F **WHERE ARE THEY?**

While booby traps could be found anywhere, some spots were more likely than others, and invited special precautions. Routes of movement and means of access – paths, doors, windows and gates – were especially dangerous. Anything that could be operated, set in motion, or removed was a potential means of triggering booby traps. Enticements such as enemy weapons and equipment, food containers and bottles and desirable souvenirs were extremely likely to be booby-trapped. This reconstruction of a German farmyard and house – unrealistically over-booby-trapped for illustration purposes – provides examples of typical locations. Details of the actual booby traps are immaterial – this is to illustrate their locations, by the colored ringed Xs:

Red – tripwire-activated.
Green – pressure-activated.
Yellow – pull-activated.
Black – pressure-release activated grenade.
Blue – on cartwheel, an obvious decoy trap to channel troops towards mines between shafts.

was attached to the length of string or fine wire. The string, in turn, was attached to a stake driven into the ground. Obviously, when our men approached the ditch and someone stepped on the slightly higher plank in order to get across, the force exerted downward would cause the stick to swing upward. This would yank the pin from the grenade, and the resulting explosion would take place about 3-to-4ft above the ground and very close to the soldier setting off the booby trap."

"We saw many instantaneous fused grenades with very fine wire attached to the head of the pull-cord. Sometimes these wires led to stakes, and sometimes to small objects of interest, such as a little skull-and-crossbones medallion, a fancy pair of dice, or some other trinket which might attract a souvenir-hunter. The Germans also booby-trapped pistols that were left behind, since they knew that American soldiers particularly like to get hold of Luger pistols for souvenirs and for use as auxiliary weapons. The Germans placed explosive charges in the magazines of these pistols. The charges were designed to explode as soon as pressure was exerted on the magazine release catch. I suppose the Germans hope that the soldier who discovers such a booby trap will first attempt to remove the magazine to see whether the pistol is loaded."

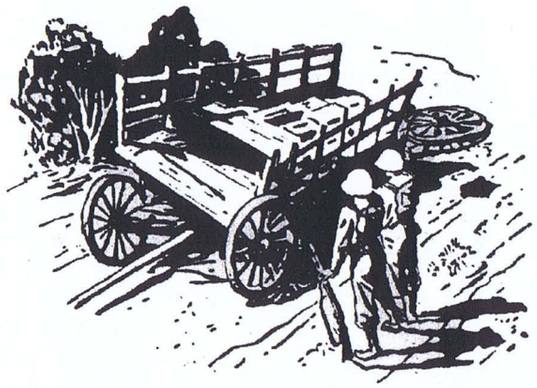
"A favorite German trick is to select a point at random along our wire line of communication, cut the wire, lay antipersonnel mines in the vicinity, and then retire. This procedure of course is intended to trap any men who may be sent out to investigate the break in the line and make repairs."

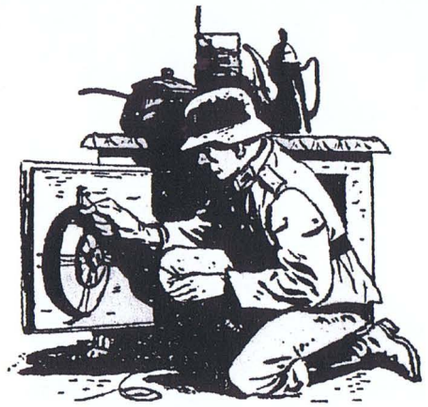
"The Germans often lay antipersonnel mines in and near paths leading to creeks and water holes, as well as in haystacks from which our soldiers might be expected to obtain straw for bedding."

"Our combat engineer unit was assigned to clear a field which was to be used as a cemetery. As sometimes happens, the Germans had not removed the skull-and-crossbones signs which had indicated to their own men the presence of mines in the area. We were ordered to detonate the mines, instead of lifting them. It proved to be a field of Tellermines. Nearly always, as a Tellermine was detonated, a second and lighter explosion took place about 20ft away. These lesser explosions were from antipersonnel mines with pull-type igniters, indicating that almost every Tellermine had been booby-trapped."

4. Recent Mine Trends in Italy (October 1944)
According to a German prisoner, the enemy has been experimenting with the booby-trapping of containers, presumably food or munition containers, to be dropped in hostile territory. The booby traps are attached in such a manner that any attempt to open the container causes an explosion.

a. A new German method of fitting an "S"-mine with an anti-lifting device has been reported from Italy. An "S"-mine, with the familiar three-pronged S.Mi.Z. 35 push-igniter, is laid in the usual manner in a fairly steep hillside. A short length of light wire is wound around the base of the S.Mi.Z. 35 igniter, and one end of the wire is attached to a Z.Z. 35 pull-igniter, which has been screwed into a 1kg (2.2lb) TNT change. Persons authorized to lift mines should note that if the S.Mi.Z. 35 igniter is unscrewed from the mine before the mine is removed, and that if care is taken to ensure that the wire is not caught on the neck of the central flash tube, the mine will be safe to pick up.
b. Enemy use of Tellermines for antipersonnel effect only has been reported on numerous occasions by Fifth Army units. The Tellermines are buried





Top left: An apparently innocuous broken-down farm wagon blocking a roadway was a prime site fora booby trap; sooner or later, somebody would have to move it off the road, and they might be incautious enough to assume that because it was a civilian item it would not have been booby-trapped.

Bottom left: This booby trap was specifically reported: a Tellermine 35 is attached to the inside of an oven door and rigged with a pull-release device anchored in the dark at the back, before the door is almost closed. Opening the oven door would detonate the mine, which would have a devastating effect in an enclosed space. Stoves and ovens were ideal for booby-trapping in cold weather,when any Allied troops occupying a house overnight would probably try to light them.

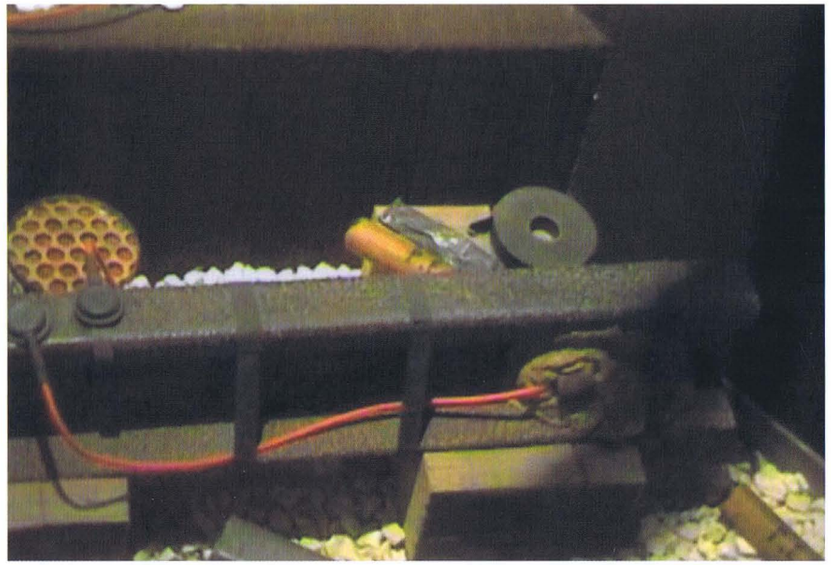
Top right: A German soldier prepares a tripwire-activated booby trap among stacked planks in a lumber yard – an explosive charge to shatter and ignite a large bottle of petrol or other inflammable liquid.

upside-down and activated by tripwires attached to Z.Z. 35 or Z.Z. 42 pull-igniters.

c. The German practice of varying true and dummy booby traps in roads no doubt is motivated by two factors, temporary supply shortages in certain sectors, and the enemy's desire to slow down Allied troops by forcing them to examine carefully each suspected instance of road mining.

F. Rounding Up German Booby Traps (February 1945)
"We haven't seen any booby traps for the past two weeks." That's the kind of statement that can spell trouble if it leads to any slackening of precautionary measures. As soon as Allied vigilance relaxes, the stage is set for the Germans to use one of the most vicious techniques of modern warfare. They would mix dummy and live booby traps in hopes of catching a man off-guard.

A well-prepared booby trap looks like a perfectly harmless object, of course. A bicycle resting against a farmhouse, a wheelbarrow standing outside the barn, a bucket waiting to be dipped into the cool well – these are everyday sights in the country, and yet nothing is simpler than for a German soldier to connect each of these to a pull-igniter before his unit withdraws. Clearly, certain elementary precautions are necessary when it is known that the enemy has occupied, or even merely passed though a certain area. Trip and tension wires may be present in what seem to be the least likely places. After all, traps may be detonated by any normal activity



A display of a railway fog signal attached to a length of detcord and a plastic explosive charge. The fog signal's detcord attachment had to be on the outside of the rail to prevent it from being cut by the train wheel rim riding on the inside of the rail. To be fully effective the charge needed to be tamped with a sandbag or rocks. (Courtesy Andrew Etherington)

such as opening a door or window, treading on loose floor boards, or disturbing any inanimate object indoors or out. Nothing should be interfered with simply out of curiosity. In this business, continuous vigilance is the price of safety.

What sort of booby traps has the enemy been using lately? Here is a roundup, from the Western and Southern fronts, of typical instances of recent German booby-trapping activity. The traps may be divided into four categories: those actuated by pull-igniters, those actuated by pressure, mines with anti-lifting devices, and miscellaneous contrivances.

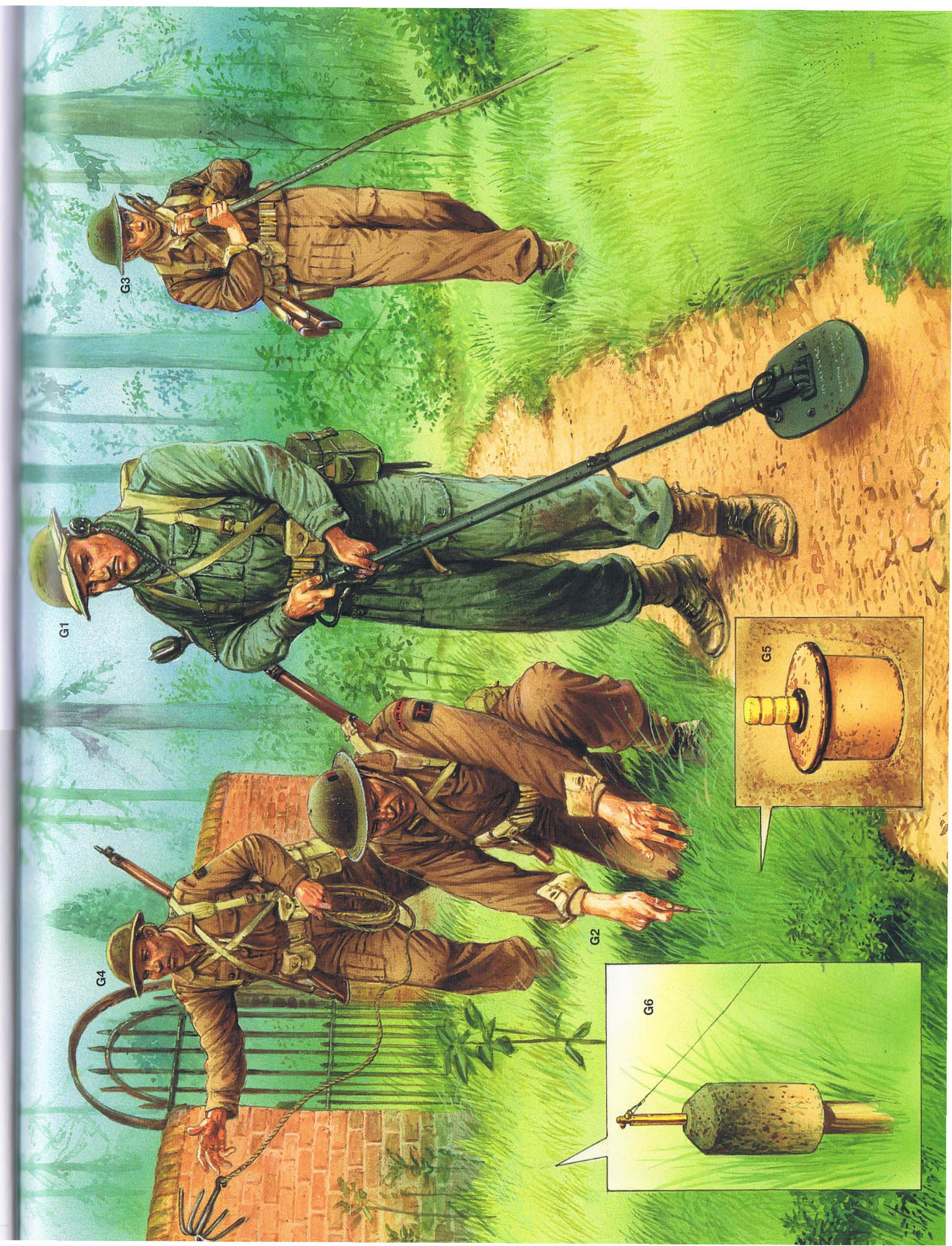
G DETECTING ANTIPERSONNEL MINES AND BOOBY TRAPS IN THE OPEN

Naturally, for illustration purposes these sappers from a Royal Engineers company of 50th Division are grouped much too closely together. Although risks were often taken under combat conditions, when circumstances allowed soldiers would always leave a safe distance to avoid multiple casualties – especially when using, for instance, a grappling hook to detonate charges deliberately. The purpose of some methods was to detonate charges at a safe distance.

Magnetic mine detectors **(1)** could locate buried metallic mines and booby traps within 12in of the surface; but many devices contained little metal, and the search might always be confused by other metal objects in the area – shell fragments, barbed wire, discarded junk of any kind, and even intentional decoys. Probing with a bayonet or purpose-made probe **(2)** helped locate mines and traps if no electronic detector was available, or after a detector sounded the first contact. Thin steel rods with wooden handles were more effective than a bayonet, particularly in hard ground, and pointed wooden skewers were also used; the handle was held loosely, so that the hand would slide forward when the probe met resistance.

To detect tripwires **(3),** a man crept slowly forward lightly holding a thin stick angled downwards, to touch wires lightly. This was impossible amongst high grass, brush and barbed wire, but grappling hooks **(4)** could be thrown forwards into suspected areas and pulled back from under cover to snag wires and detonate mines. (However, a hook could get hung up in thick brush and barbed wire, making it difficult to recover safely.)

Two German late-war munitions are also illustrated: the *Behelfs-Schützenmine A200* ("auxiliary defence mine," popularly known as the "mustard-pot") and the *Stockmine 43* ("stake mine 1943"). The "mustard-pot" **(5)** was 87mm high x 75mm diameter, and contained 112g (4.95oz) of explosive. About 35lb of pressure crushed a thin metal Buck-type chemical fuze, igniting the detonator by releasing sulphuric acid into potassium chlorate powder. The more basic Sto.Mi.43 **(6)** had a concrete head 165mm (6.5in) long mixed with ball bearings, bullets and pebbles, with a central well for a charge (often the standard 100g *Bohrpatrone 28*) and the fixing stake. It took standard fuzes, here the Z.u.Z.Z.35 with a tripwire.



1. Devices actuated by pull-igniters

a. Helmet. A steel helmet lying on the ground covered a *Sprengkörper 28* charge containing a Z.Z. 35 pull-igniter, which was connected by wire to the inside of the helmet. A second wire connected the charge to a fixed point. Lifting or kicking the helmet would have set off the trap.

b. Mine in oven. A Tellermine 42 was found secured to the rear of an oven door in the kitchen of a private house. A Z.Z. 35 igniter had been inserted in the mine, with a wire connecting the igniter to the back of the oven. The door was slightly ajar; if it had been opened further, the mine would have exploded.

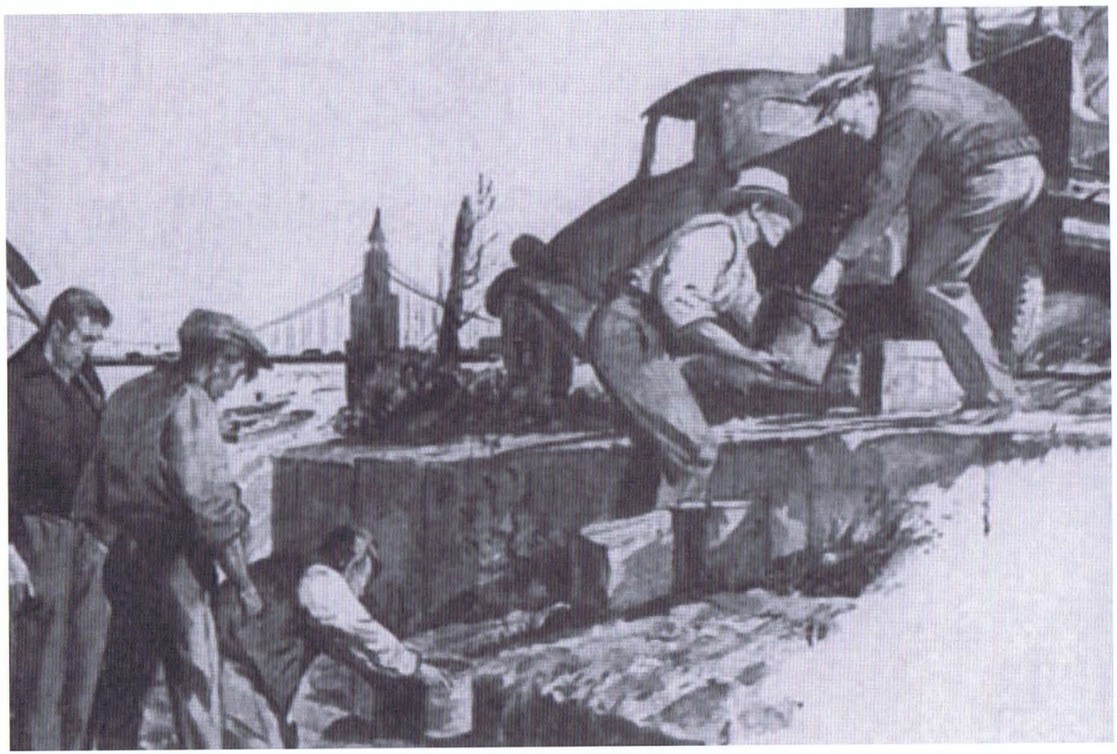
c. Corpses. Grenades have been placed in the pockets of enemy dead. The actuating cords of the grenades are tied to strings, and the strings in turn are tied to inconspicuous pickets driven into the ground nearby. When the corpse is moved, the grenade explodes.

d. Fruit trees. Fruit trees have been fitted with wires leading to pull-igniters and charges of high explosive. When Allied soldiers reach for the lower branches or try to climb the tree, the charges are detonated. [Mines were also buried around tempting fruit trees.]

e. Hedges. The following instance of booby-trapping a hedge at a point where Allied soldiers would be likely to work their way through is typical of many others. Three [200g] picric acid blocks with Z.Z. 35 pull-igniters inserted in them were covered with stones, and were connected with wires to a nearby hedge.

f. Fence posts. Tripwires leading from the base of fence posts, and connected to pull-igniters and large buried charges of TNT, have been reported. Also, taut wires have led from fence posts to tension-release igniters (Z.u.Z.Z. 35). The latter set off small charges, which fire detonating fuses and large buried charges.

A hypothetical scene of German saboteurs recovering their hidden supply of explosives and sabotage devices. In the event, although equipment was prepared for them, German "stay-behind" or underground saboteurs were almost never reported as active in areas abandoned by the Wehrmacht. Despite fears to the contrary, the "Werewolf" turned out to be a mythical beast.



g. River banks. The banks on either side of a river ford, usable only at certain times of the year, were booby-trapped in the following manner. Three 3kg (6.6lb) charges (*geballte Ladung* – concentrated charge) were laid side by side in each bank, with two Z.Z. 42 pull-igniters screwed vertically into the outer charges. Ten-foot lengths of tripwire led from the igniters and were secured to wooden stakes. Anyone attempting to use the banks would have been likely to trip the wires.

h. Roads. The Germans have tied grenades to trees on each side of narrow roads, and have strung tripwires across the roads so that the fish-pole aerials or other parts of vehicles will trip the wires.

i. Telephone lines. An enemy patrol came across an artillery observation post line and cut it. In the immediate vicinity they buried two "S"-mines, about 10yd apart, so that the prongs of the igniters were about 1in above the ground level. Each loose end of the telephone wire was attached to a piece of fine cord about 12in long, and each cord led to a mine. The result was that, in the dark, a linesman picked up what he thought was merely a loose end of wire, and an "S"-mine exploded. (As the *Intelligence Bulletin* has previously reported, this ruse has also been employed by the Japanese.) The potential danger of such booby traps is of course considerably less in the daytime.

j. Rubbish heaps. The usual booby trap in a rubbish heap consists of an attention-catching object of some value as a souvenir, which is connected to a pull-igniter and a charge or antipersonnel mine by means of a wire or cord.

k. Molotov cocktails as traps. Molotov cocktails may be used as booby traps when the Germans believe that particularly successful damage can be caused by fire. Just such a trap was found in a lumberyard. A small explosive charge of cordite with a detonator and primer had been attached to a large bottle of gasoline, which in turn had been lashed to a board. The device was to have been detonated by a pull-igniter, actuated by a tripwire. If the trap had worked it would have spread flaming gasoline over a fairly large area, probably inflicting severe burns on personnel and certainly making firefighting extremely difficult.

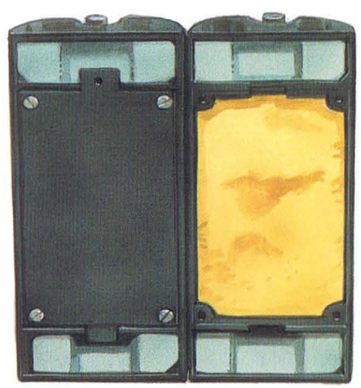
l. A US platoon leader reports an unusual booby trap that the Germans had rigged in a building that the lieutenant's division subsequently used as a command post. The building was a wooden structure, with a tin roof. When rain began to fall, it was noticed that there was a small hole in the roof, which permitted the rain to leak into the building. A soldier was directed to go up on the roof and mend the leak. He found that a sheet of tin roofing apparently had slipped out of place. When he drew the sheet back into place, he caused a pull-type booby trap to detonate, and suffered a serious injury.

2. Devices actuated by pressure

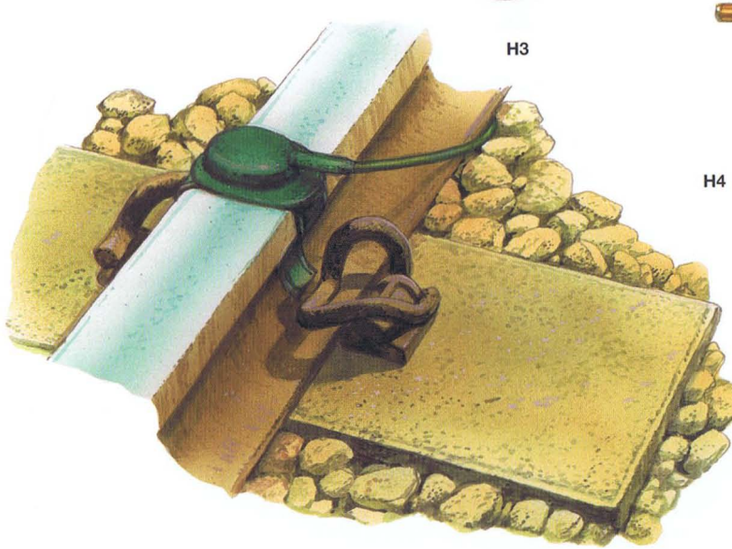
a. Inverted Tellermines. The Germans often inverted a Tellermine, and inserted a D.Z. 35 push-igniter in the bottom hole to make the device antipersonnel in effect.

b. Mines under planks. A combination of "S"-mines and Tellermines may be buried in a road trail, and covered with a plank. Thus pressure caused either by a vehicle or by personnel would lead to detonation.


H1


H2

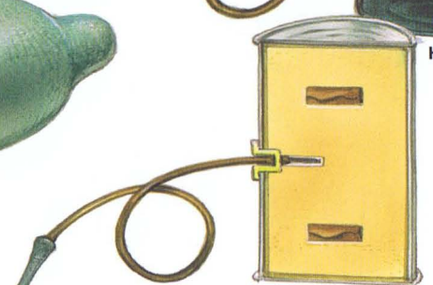

2a


H3

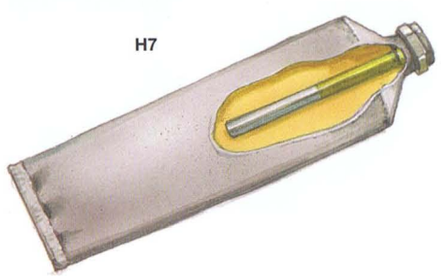

H4

H5

H6



H7



H8

3. Anti-lifting devices on mines

a. Delay igniters. Thirty-second delay igniters have been reported fixed to mines, presumably directed against personnel who may attempt to lift such mines by using a cable.

b. Dummy tripwires. Recently a new type of anti-lifting device has appeared – one which could be used with almost any type of mine, and particularly with wooden [box] mines. Such a device, used in conjunction with an Italian four-igniter mine, employed a stake driven into the ground about 3ft from the mine, which had been buried about 1.5ft below ground level. A dummy tripwire connected the top of the mine with the stake, while another wire led from a pull-igniter in the bottom of the mine to the bottom of the stake. If the latter wire had been disturbed, it of course would have produced detonation.

c. Devices on "S"-mines. A wire may connect an "S"-mine with a standard 1kg charge. One end of the wire is wound around the base of the mine's S.Mi.Z. 35 igniter, while the other end is attached to a Z.Z. 35 pull-igniter screwed into the 1kg charge. Also worth mentioning is an instance in which a wooden stake about 12in long was driven into the ground, with its top about 2in below the surface. A standard 200g charge

H SABOTAGE DEVICES

(1) The *Wehr 36* ("Weapon 36") incendiary device was found in Italy in 1944. Packed in a tin canister, it consisted of a Bakelite-encased, half-cylindrical shaped "clamshell" explosive charge, 1½in x 3in x 3in, linked to a magnesium flare by 1m of detcord. A Buck-type chemical delay igniter (time pencil) was fitted to the top of the flare, and this was placed beneath the fuel tank of a parked vehicle or aircraft; the clamshell charge was attached by its four magnets (illustrated light grey) to the underside or side of the fuel tank, and the time pencil was activated. The flare would ignite, which ignited the detcord, to immediately detonate the charge, rupturing the fuel tank and pouring fuel onto the burning flare.

(2) Another German device consisted of two magnetic "clam" charges stowed face-to-face, each filled with 8oz of plastic explosive in Bakelite® casings (1½in x 2½in x 2½in). The charge was detonated by a British No.10 "switch" – a 5¼in Buck time delay pencil **(2a),** of which large numbers were captured. The charge was attached to a vehicle or other equipment.

(3) Railroad fog signals – used to warn train drivers in fog of track obstructions ahead, by detonating with a loud report when a locomotive ran over it – were modified to accept a short length of detcord attached to an explosive charge buried under the rail.

(4) Germany, Japan, the US and Britain all made small demolition charges realistically disguised as lumps of coal; the Japanese example measured 2in x 3in, and a ¼in plugged filling hole is just visible in the near side. They were tossed into coal piles in hopes of blowing up ship and locomotive fireboxes, and heating stoves in military buildings. The Japanese also made an "incendiary brick," a block of compressed potassium chlorate, sulphur, coaldust, powdered iron, and wax for bonding. Wax-coated and painted brick red, it was the same size as an actual masonry brick; there was no detonator well. It was ignited by kindling a fire with flammable materials.

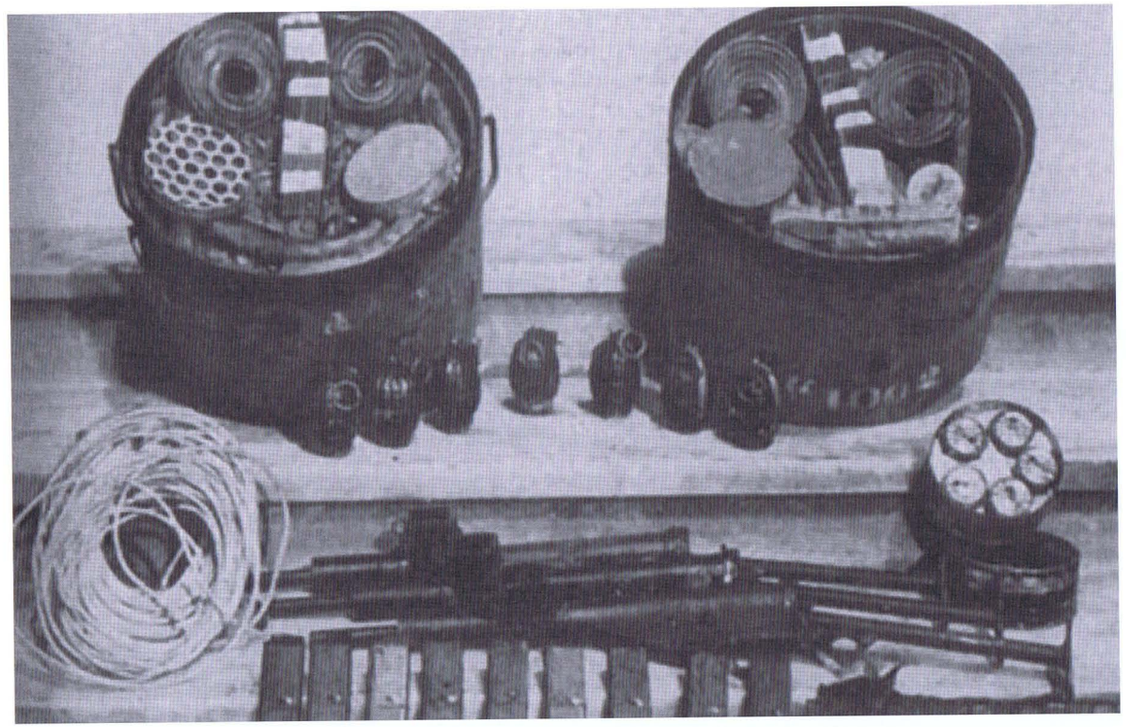
(5) This German incendiary device was a thin rubber tube with nipple-shaped projections on both ends, filled with a thickened mixture of gasoline and paraffin. It was 14in long by 3in thick, and 9½in of the length (grey here) was coated with a rigid matchhead composition. It was meant to be placed among flammable materials, ignited by striking it with some abrasive material, and left to burn.

Japanese sabotage devices were camouflaged to appear as innocent items to allow them to be smuggled through checkpoints.

(6) The Japanese manufactured in Manila food cans filled with plastic explosive. Beneath the label was a detonator well, located by feel and punctured to insert a blasting cap crimped to a length of time fuse with a friction igniter. These were found in 14oz size (4½in long), with labels for "Libby's Long Slices Fancy Pineapple" and "Del Monte Mixed Salad Vegetables" and a 1lb 4oz can of "Libby's Strawberries/ Extra Heavy Syrup." The cutaway shows the screw-in brass plug for the detonator, with two containers of heavy mineral oil centred in the RDX charge either side of the well. The cans were lined with heavy corrugated brown paper.

(7) This 4¼oz toothpaste tube contained plastic explosive and a detonator well; the cap could be unscrewed and an igniter assembly screwed in. This consisted of a blasting cap, a delay train several seconds long, and a scratch igniter protected by a safety cap.

(8) What appeared to be 14oz bars of "Ivory" soap (with "Proctor and Gamble" molded on the other side) were made of barium nitrate, paraffin, magnesium, aluminum, rosin, ferrosoferric oxide and nitrocellulose. Ignited by an external flame source, it burned intensely, but was easy to extinguish with water.



An example of sabotage gear hidden by the Germans in waterproof containers; visible here are captured British No. 36 grenades and 9mm Sten Mk II sub-machineguns. The Germans recovered a great deal of British SOE and American OSS gear dropped to the French Resistance, and put it to their own use.

(Sprengkörper 28) was wired to the stake, and a Z.Z. 35 pull-igniter screwed into the charge. An "S"-mine with a wire string attached was then placed in a prepared hole and the other end of the wire was connected to the igniter. The igniter safety pin was withdrawn, and the "S"-mine itself was armed. As a result, detonation would be caused by anyone lifting the mine carelessly and rapidly, without having disconnected the wire.

d. Pressure-release anti-lifting device. A mine may be laid on the pressure-lifting device E.Z. 44 *(Entlastungzünder 44)*, which is subsequently armed and packed around with earth. Lifting the mine allows a rod, which has been kept down by the weight of the mine, to rise and release a striker on the E.Z. 44. This sets off the charge in the igniter and detonates the mine.

4. Miscellaneous

a. Abandoned vehicles. Abandoned vehicles, either wrecked or still intact, are often booby-trapped so that any movement of the wheels will result in an explosion. In the case of a motor vehicle, the booby trap may be intended to function when the engine is started. The Germans sometimes use farm wagons in road blocks, and the possibility that such vehicles may have been booby-trapped should not be ignored. On a road in Holland three abandoned farm wagons had been loaded with 15 cases of grenades and miscellaneous shells, and left blocking the road in such a manner as to give the impression that they had been abandoned in haste. Fortunately, a corporal inspected them carefully before ordering his detail to move them off the road. He found ten 200g charges on the bottom of one of the wagons, with a friction-igniter (*Adschn. Anz. 29*) attached by means of wire to a spoke of one of the wheels. Any movement of this wagon would have resulted in detonation.

b. Tellermine crates. Tellermines in their original packing cases have been found fitted with igniters to prevent the mines from being withdrawn and used.

c. Charges concealed in weapons. The Germans sometimes conceal a small charge in the mechanism of a rifle or Luger pistol that they plan to leave behind in a fairly obvious place, to attract the attention of Allied soldiers. The charge, which is sufficiently powerful to injure a man severely, is detonated if the trigger of the weapon is pressed.

d. False signs. The Germans have been known to post signs in English indicating that road shoulders have been cleared of mines when mines actually are present in these areas.

GERMAN SABOTAGE EQUIPMENT

Unlike the American Office of Strategic Services (OSS) and British Special Operations Executive (SOE), which generated a seemingly endless array of ingenious sabotage devices, the Germans mainly used standard explosive and incendiary devices and even captured Allied munitions (see opposite). Many of the previously discussed booby traps were used for sabotage purposes. The following are, again, extracts from contemporary Allied publications.

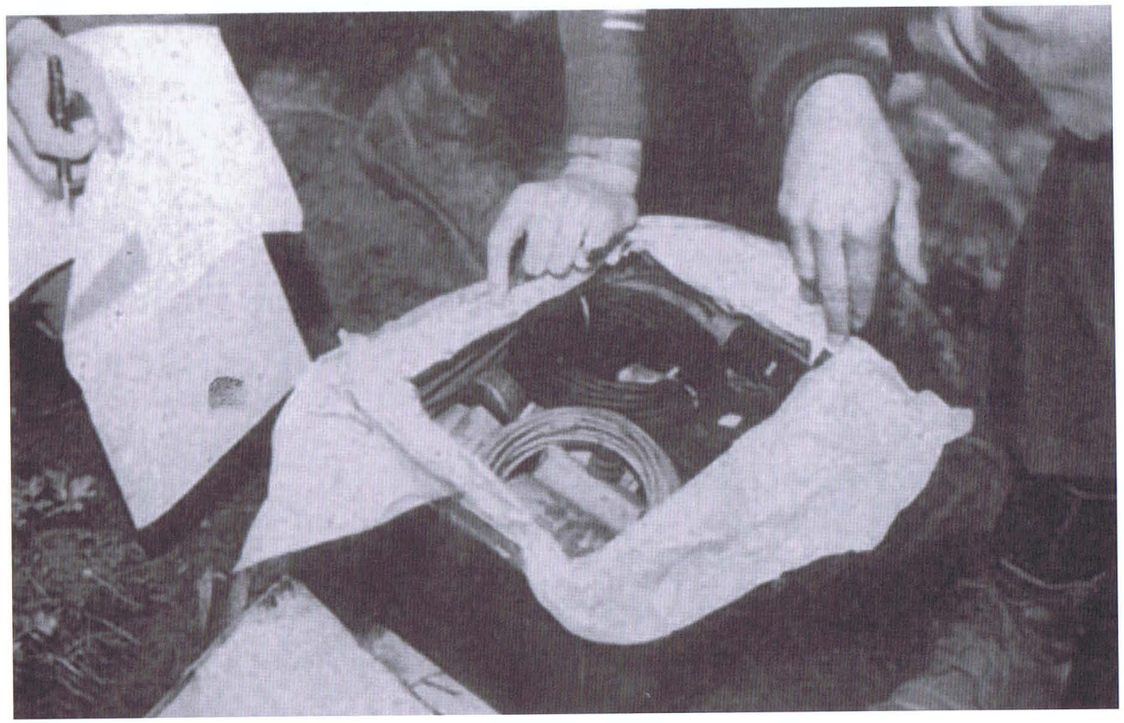
A. Special Kits are Hidden for Agents

The Germans have been ruthless in destroying key installations and facilities in the course of their withdrawals and may be expected to lay continued emphasis on this practice at they retreat further into the Fatherland. At the same time the Germans probably will continue to attempt as much sabotage behind Allied lines as may be possible within their resources. Conveniently arranged enemy sabotage kits have been found hidden near important installations in France. They were probably earmarked for destruction when opportunities arise. These kits included standard German demolition items, special-purpose sabotage devices, and captured British munitions.

The kits found in Germany consisted of two large can-like containers packed in a rectangular metal box about 9in x 24in x 24in. There were at least eight different types of kits containing different combinations of hand grenades, prepared explosive and incendiary charges, detcord, safety fuse, delay time pencils, friction igniters, blasting caps, adhesive tape, Vaseline tubes for waterproofing, abrasive Vaseline for sabotage, railroad fog signals to rig as detonators, etc. These German sabotage efforts were mainly aimed at transportation capabilities: seaports, rail yards, airfields, and road traffic. They seemed to place a great deal of reliance in incendiary devices and firing fuel supplies. After VE-Day there were few sabotage attacks and the much-anticipated "Werewolves" never emerged from their dens.

B. Allies Nab Saboteur Ring in Rome

German plans to have a ring of German-trained Italian saboteurs operate in Rome after the city had been occupied by Allied troops collapsed when the ring was uncovered and buried sabotage materials located.



Another recovered German container of sabotage gear, including safety time fuse and detcord. The metal containers used for this purpose were well waterproofed.

The ring, left by the retreating Germans under the direction of an Italian leader amply supplied with money and jewelry, was composed of both men and women. Before the Germans quit the city, explosives, detonators, and sabotage devices were packed in large cans and buried. They were to be dug up as needed.

All of the ring's members had been trained in a German four-week course. It covered explosives, both plastic and solid; incendiaries, bombs of various types, instructions in placing explosives to ensure maximum damage and time for escape without detection, methods of eluding Allied troops and investigators, driving, repair, and sabotage of both automobiles and motorcycles, pistol, rifle, and submachine gun firing, and gymnastics.

The Germans, however, wasted this training on poor underground prospects. This particular group of Italians showed no eagerness to carry out the missions assigned by their retreating German masters, although there was ample time to do so. All were arrested. More determination to carry out sabotage orders may be expected from the Germans themselves – in their own country. They may also employ devices similar to those left in Rome. The variety of sabotage devices, of course – like the variety of booby traps – is as wide as human ingenuity. Hidden throughout Rome were numerous approximately 3-gallon cans containing incendiary and explosive charges, time fuse, detcord, time delay pencils, and fake lumps of coal containing an explosive change.

C. Sabotage Techniques

Various techniques alleged to be used by German "fifth columnists" were reported through the war. For the most part there was no need for specialized gear:

1. Placing open cans of gasoline under parked trucks and attaching slow fuses to ignite the fuel.
2. Mixing sand with grease in the journal-box of freight cars to create "hot boxes" by friction in the axle mechanism.
3. Removing the sleeper plates and bolts fastening railroad rails together.
4. Laying charges under rails to explode when the locomotive passes over (detonated by fog signals).
5. Sabotaging a large quality of gasoline by adding soap flakes.
6. Placing abrasives (probably sand or sugar) in vehicle gas tanks to plug fuel lines or block carburetors.
7. Cutting truck spark plug wires and other wiring.
8. Short-circuiting electric power lines by throwing ropes over two or more lines and pulling them together.
9. Cutting and removing lengthy sections of telephone and telegraph lines.
10. Port workers cutting straps on life jackets aboard merchant ships.

JAPANESE BOOBY TRAPS

This first section was extracted from a report titled "Landmines, Grenades, and Booby Traps"; only the discussion of booby trapping is provided here:

A. Japanese Booby Traps (August 1943)

Four types of booby traps which the Japanese may use in future operations are described. The sketches and explanatory wording were compiled from various Japanese notes. They may have been copied from enemy instructions or they may have been devised by individual Japanese soldiers with technical experience.

1. Device using a parasol. This booby trap is apparently a combined explosive and incendiary device. Opening of the parasol probably breaks the acid vial, which in turn ignites the ignition mixtures.
2. Device using a flashlight. In this type of booby trap, the flashlight switch is used to connect a circuit through an electric detonator. When the switch is pressed, the explosive is ignited.
3. Device using a [tobacco] pipe. It included a safety pin, which, while inserted, prevented the unscrewing of the pipe stem. When the device is placed as a booby trap, the safety pin would be removed; after this, unscrewing of the stem would release the striker pin, which would fire the percussion cap and explosive.
4. Electric booby traps. Watch out for electrically detonated booby traps. Any vehicle, searchlight, generator, light circuit, or other electrical gear can be rigged easily so that the current will detonate a charge. Before any captured equipment is handled, it should be examined for electrical as well as mechanical booby traps.

B. Supplementary Notes on Japanese Booby Traps and Mines (December 1943)

While the Japanese have made no extensive use of booby traps to date, it is known that the subject has been under study in the enemy training program. (As a safeguard against booby traps, the Japanese have been observed beating trails ahead of them with bamboo poles.)

The Japanese pull-type hand grenade [actually the Chinese 23rd Year (1933), which was copied by a Japanese plant in China] is well suited for booby-trapping purposes, and the enemy may use it extensively in future

defensive operations. Several ways in which the Japanese may use this grenade as a booby trap are illustrated below. Most of the diagrams were taken from an enemy publication.

1. With 75mm shell. Figure 50 shows how the Japanese tied a pull-type grenade and a Type 91 (1931) grenade to a 75mm shell to form an improvised booby trap. This combination was found by our troops during recent operations in the South Pacific. The pull-igniter string of the pull-type grenade was tied to some vines which were stretched between two trees. A person or a vehicle striking the vines would have activated the booby trap, which was hidden in some grass nearby. Detonation of the pull-type grenade would have set off the shell and the Type 91 grenade. In improvising booby traps similar to the above, the Japanese are likely to use any type of high-explosive shell or other type of explosive conveniently at hand.
2. Attached to a rifle. The rifle in figure 51 is connected to the pull-igniter of the grenade by means of a string, cord, or wire. A pull on the rifle will activate the grenade and the attached shell. Instead of the rifle, the Japanese may use any other object they think will be attractive to Allied soldiers. The booby trap illustrated in figure 52 is placed in a shallow hole and then covered. It may also be concealed in grass or bushes.
3. Attached to a door. Figure 52 shows how the pull-type grenade can be rigged to a door. Opening the door will activate the weapon.
4. Attached to loose rocks. This arrangement, figure 53, of the pull-type grenade works on the same general principles as the other types. A wire, string, or cord connects the pull-igniter to one of several loose rocks, which are placed in a road or trail for obstruction purposes. Lifting the rock connected with the grenade will activate it. Here again the grenade may be tied to some other type of explosive at hand to increase the blast effect.
5. Attached to felled trees. This arrangement is practically the same as in figure 54. The grenade, tied to a mine in this case, is attached to one or more of the felled trees by means of a vine or string. Instead of trees the enemy might use almost any type of obstructing material.

The Japanese often mined or booby-trapped supply routes and waited for Allied trucks to set them off. They would then attack the stalled convoy, mainly with the intention to loot it for rations.

C. Miscellaneous Booby Traps

The following Japanese booby trap reports were extracted from various 1944 sources:

1. The March 1944 *Intelligence Bulletin* briefly discussed booby traps found by the Marines on Betio Island, Tarawa Atoll in the Gilbert Islands in November 1943. The Japanese left very few booby traps, and these were crudely constructed. A few grenades, with their fuses adapted for instantaneous activation, were found buried in emplacements and tunnels. These grenades [their fuzes] projected about 0.5in above the ground. The door of one captured truck was wired on the inside to a grenade.
2. *Marine Corps Technical Bulletin No. 166* (1944) reported a pressure-activated, electrically detonated booby trap. It consisted of an explosive charge placed under floorboards of a building. A section of bamboo was cut to provide two flexible arms in which bolts were fitted to the ends through holes. The section of bamboo was securely fastened to a support beam under the floor. An electrical wire was attached to each bolt. One led directly to the explosive charge. The other was attached to one terminal on a battery. A third wire was attached to the battery's other terminal and led to the explosive charge. The two wires leading to the explosive charge were attached to an electrical detonator. The upper arm of the bamboo section and its bolt were placed directly beneath a loose floorboard. When pressure on the loose floorboard was applied, i.e., stepped on, the electrical circuit was closed and the charge detonated.
3. The official Marine Corps World War II history reports that near the landing beaches on Tinian, Mariana Islands in July 1944, the Japanese left booby-trapped cases of *sake* and individual wristwatches laying about. Veterans of the 4th Marine Division, having just seized Saipan, and earlier Roi-Numar, easily avoided them.
4. This report was extracted from the *Australian Military Forces Weekly Intelligence Review No. 116* (spring 1944). Two booby traps set up in dumps have been encountered in the Hansa Bay area on north-east New Guinea. In both cases the enemy has incorporated US 23lb M41 parafrag bombs with nose fuze AN-M120. In one case four parafrag bombs were covered with a sheet of galvanized iron. It relied on the sensitivity of the AN-M120 fuze so that any careless movement of the iron would ignite it. The second booby trap had three US parafrag bombs incorporated as well as a Japanese 50kg (110lb) HE bomb. The 50kg bomb was concealed in a detcord dump. From this, a length of detcord was taken and this in turn had a detonator non-electric Type 3 [not to be confused with the Type 3 pressure-firing device mentioned in Section G3 below] with a length of safety fuse to which a detonator was fastened. A tripwire ran from the detonator and was attached to a coil of detcord. Three branch lines ran from the main length of the instantaneous fuse, each to one parafrag bomb. The following conclusions were arrived at after examination:
   a. In the first case the trap would most likely have caught souvenir-hunters, but the trap was quickly recognized as such by Royal Australian Engineers personnel.
   b. The second case was recognized by the badly concealed instantaneous fuse. It is doubtful if the instantaneous fuse would have detonated the parafrag bombs, but the sudden shock might have caused the sensitive AN-M120 fuze to function.

Even more simple than the trap opposite, a lever-activated grenade could be set in a forked tree limb. It usually required the bark to be shaved away to ensure the grenade was pulled smoothly out of the fork by pressure against the tripwire. Such traps would be carefully camouflaged with small leafy twigs.

D. Two Booby Traps Devised by the Japanese (April 1944)

Although the Japanese have actually used only a comparatively few booby traps to date, they are known to have devised several types, principally by rigging fragmentation grenades in various ways. The enemy is known to have at least five types of such grenades, all of which can be adapted for booby-trapping purposes. Japanese mines and artillery shells also have been improvised for use as booby traps.

1. Details of tube-type

a. Construction. The tube itself is made of steel, iron, bamboo, or any other suitable material. It is about 15in long, with a diameter large enough to admit a grenade (Type 91 [1931] grenade is shown in the diagram). Three holes are drilled through the tube to accommodate the suspension wire (1), the safety wire (2), and the support wire (3). The grenade is placed in the tube. The base of the tube is closed by use of a stone or a piece of iron, while the upper opening is covered with similar material as a protection against rain. To complete the rigging process, the tube is strapped to a stake which is driven in the ground.

b. Operation. The support wire (3), which holds the grenade in place during the assembling process, and the safety wire (2) are removed at the same time. The grenade is now held in place by the suspension wire (1). When this wire is removed the grenade falls down the tube and, upon hitting the hard base, the firing pin is forced into the cap. This causes the detonation of the grenade in 4 to 8 seconds.

c. Ways of rigging:
(1) Spring method. A cross wire at a height of about 1ft is used. Attached to the cross wire is another wire, which is also attached to the suspension wire. When the cross wire is pulled, it will extract the suspension wire. To allow for the movement of the cross wire, a spring is attached to the end of the cross wire which is opposite to the direction of the pull. The same principle is used when it is necessary to set a booby trap around a corner or a curve. The only change is that a bent nail is used as a pulley.
(2) Weight method. The spring used in the spring method is substituted by a weight, which allows for two directions of movement. When the cross wire is pulled the weight is lifted, thus causing one movement, and, when the cross wire is cut or loosened, the weight falls to the ground and causes a movement in the opposite direction. Either movement will withdraw the suspension wire.
(3) Stake method. In this method a stake or limb which has elasticity and weight is used. The tree or stake is placed in such a manner that the cross wire holds it in position. When the cross wire is pulled, the elasticity of the tree permits sufficient movement to the cross wire to extract the suspension wire. If the cross wire is cut or freed at the end opposite to that attached to the tree, the latter will fall to the ground and pull out the suspension wire.

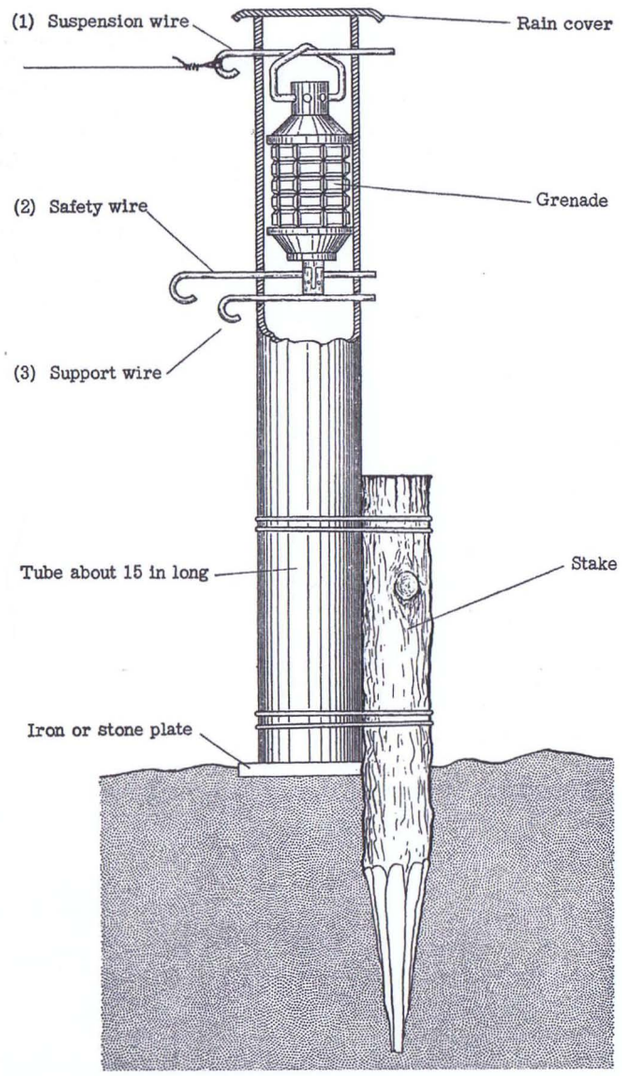
3. Details of spring-type

To rig up the Japanese spring-type booby trap, two trees adjacent to each other are selected. A hole is drilled through the trunk of each tree, and a length of easily broken string is passed through the holes. On each end of the string is attached a grenade whose safety wire has been removed. Tied into the string between the grenade and the tree are three nails. When that portion of the string which is suspended between the trees is pulled, the nails prevent the movement of the string. Therefore, if the force is great enough, it will break. This frees the grenades and they fall to the ground, striking a rock, steel plate, or another hard surface placed there. The firing pin is forced into the cap; this action detonates the grenade.

E. Supplementary Notes on Japanese Booby Traps (May 1944)

These supplemental notes on Japanese booby traps deal with six improvised types found in the South Pacific and on Kiska Island in the Aleutian Islands.

Lever-armed grenades could be inserted in a ration tin fastened to a tree or stake, and the safety/arming pin pulled; a tripwire fastened to the grenade would pull it free, releasing the lever. The tripwire itself could be fastened to an object or thick vegetation so that it was out of immediate view, and camouflaged (obviously, white string is used in this reconstruction simply for visibility in the photograph).



Japanese grenades were percussion-ignited – that is, after the safety/arming pin was pulled a percussion cap (here at the bottom of the grenade) still had to be struck on a hard object such as a helmet, rifle butt or boot heel). This made them more complicated to rig as booby traps. Here a steel pipe or bamboo tube is staked to the ground, camouflaged, and the grenade rigged to drop onto a metal plate or flat stone. The support pin (3) would be pulled first, then the safety pin (2). A tripwire was attached to the suspension pin (1).

Practically all of the comparatively few Japanese booby traps found to date have been improvised, and many of them have been crudely conceived. In [almost] all cases of actual booby traps found on Kiska, the cords and wires used were not concealed.

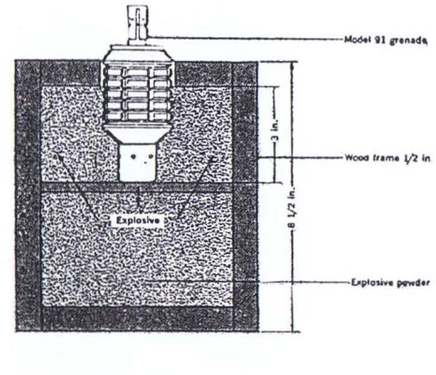
[The 5,100-man Japanese garrison embarked aboard evacuation ships in one hour on July 27, 1943, leaving little time to activate booby traps. Nonetheless, three Americans were killed and a number wounded by booby traps.]

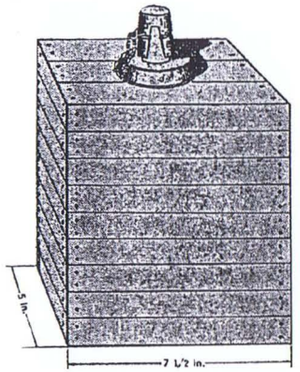
2. Southwest Pacific

This type of improvised Japanese booby trap, found in New Guinea, consists of a Type 97 hand grenade and a Type 89 (1929) grenade discharger ("knee mortar") shell, wired together with the percussion fuze of the shell resting on the base of the grenade and the grenade fuze pointing downward. Apparently it works on the same principle as the enemy tube booby trap. The grenade discharger shell apparently was added to the grenade to increase the effect. However, it is doubtful if the detonation of the grenade would cause detonation of the shell. The whole idea was probably conceived by personnel inexperienced in the technical makeup and effectiveness of explosives.

The grenade discharger shell and hand grenade booby trap combination is designed to utilize a cartridge case, or some sort of tube, as described for the tube booby trap. The suspension string for the booby-trap assembly apparently hangs on a suspension wire at the top of the tube or cartridge case, similar to the tube booby trap arrangement. A tripwire is attached to the suspension wire. Before operation of this booby trap, it is necessary to pull out the safety wire in the fuse of each weapon. Then the application of sufficient pressure against the tripwire pulls out the suspension wire and allows the entire assembly to fall, with the grenade striker hitting a hard surface. Explosion of the grenade depresses the fuse striker on the grenade-discharger shell and, theoretically, causes detonation. The delay train (4 to 5 seconds) was not removed from the grenade which was used in the booby trap found in New Guinea.

If necessary to neutralize this type of booby trap, carefully replace the safety wires.





The Japanese produced numerous types of mines and grenades locally, especially in the Philippines. This explosive-filled wooden box mine – measuring 7½in x 5in x 7½in high – was initiated by a Type 91 (1931) grenade with its percussion fuze pointing upwards. Although intended for anti-vehicle use, it could also be detonated by a boot treading on it.

3. Kiska

a. **Piece of bamboo** This booby trap was constructed as follows: A piece of bamboo was sawed out to give a clothes-pin effect. Single wires were run along the outer edges and taped securely. Nut and bolt contacts were screwed into the ends. Very slight pressure was required to make contact. The wires ran from contact to a dry-cell battery and on to a charge of explosive. In one instance this consisted of two *sake* bottles filled with loose picric acid and placed inside a 120mm (4.9in) shell case. In another instance the explosive consisted of a metal-covered block of picric acid weighing 3.5 to 4lb. Electric blasting caps were used as initiators to set off the charges. Two of these booby traps were found, both under boards at the entrance to caves. Little attempt was made to conceal the wiring.

b. **Phonograph** In booby-trapping a phonograph [gramophone, record-player], the Japanese arranged an electrical contact on the pick-up assembly in such a manner that moving of the phonograph arm to play a record (approximately 0.5in at contact point) would connect the current and set off a charge. Both the charge and battery were under floor boards. No attempt was made to conceal wires leading from the phonograph to the charge.

c. **Radio** In utilizing a radio for a booby trap, the Japanese removed all except one battery and filled the cavity with blocks of picric acid. Electrical contact wires went from the switch to the battery and to the charge.

d. **Antitank mines** The Japanese booby-trapped a 7.5cm Type 41 (1908) infantry gun [original text incorrectly called this an antitank gun] by using four Type 93 (1933) antitank mines [a platter-type mine nicknamed the "measuring tape mine"]. A mine was placed in front of, and behind, each wheel; under each mine, six blocks of picric acid were placed. The whole was covered neatly with earth.

4. Burma

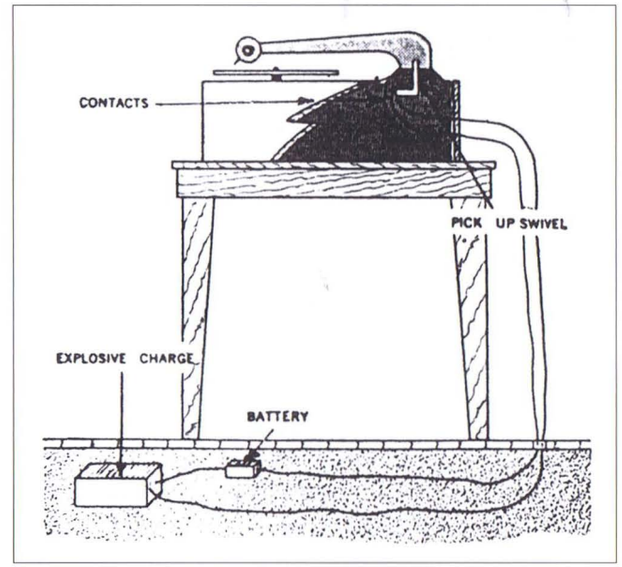
a. **General** In a recent engagement in Burma the Japanese used booby traps on a large scale for the first time. The enemy attempted to block off the approach to a center of resistance by booby-trapping a jungle-covered area 100yd wide and 200yd long, on a high and narrow mountain ridge. Within this area more than 100 booby traps had

An exceedingly simple Japanese booby trap was constructed of a section of bamboo approximately 2¾in (70mm) long glued to a small baseboard. A small nail was driven through the board, protruding 1/8in (3–4mm) up inside the tube section, and a 7.7mm rifle cartridge was inserted. The device was then buried with only the bullet tip exposed; stepping on it detonated the cartridge and seriously crippled the victim.

been laid. The booby traps were all made with British No. 36M Mk 1 grenades, and were extremely simple in principle. The grenade was booby-trapped in two ways:

b. **Tin-can method** Part of the side of a tin can is cut to make it adaptable for use as a booby-trap mechanism, and the grenade is placed in the can. One end and a portion of the side of the can are cut away, and a hole is punched in the remaining end of the can for the purpose of attaching a tripwire inside. In preparing the grenade for booby-trapping, the Japanese remove the safety pin, but hold the release handle down so that the grenade will not fire. Then they insert the grenade into the cut-out tin can so that the release handle is held inside the remaining circular portion of the can. Holding the can and grenade together, the enemy places them on the ground. The grenade functions when a pull on the tripwire draws the can away from the grenade and thereby allows the release handle to fly up. Since the grenade is relatively heavy, it remains in place.
   As a variation of the tin-can method, the Japanese place the grenade in the can as outlined above, and then balance the can on a tree limb. When pressure is exerted on the tripwire, the can falls over, the grenade drops out (releasing the handle), and the grenade detonates.
c. **Tree-fork method** [This] works on the same principle as the variation of the tin-can method just described. The space between the tree limbs serves the same function as the can. When the tripwire is pulled, the grenade falls out of the tree and explodes.

d. **Tripwires** The tripwires used in rigging the Japanese booby traps were strung loose in the heavy undergrowth, and were frequently attached to long vines and creepers. The enemy used ordinary field telephone wire for tripwire, and made no attempt to camouflage either the wires or the grenades, other than the concealment afforded by dense vegetation.

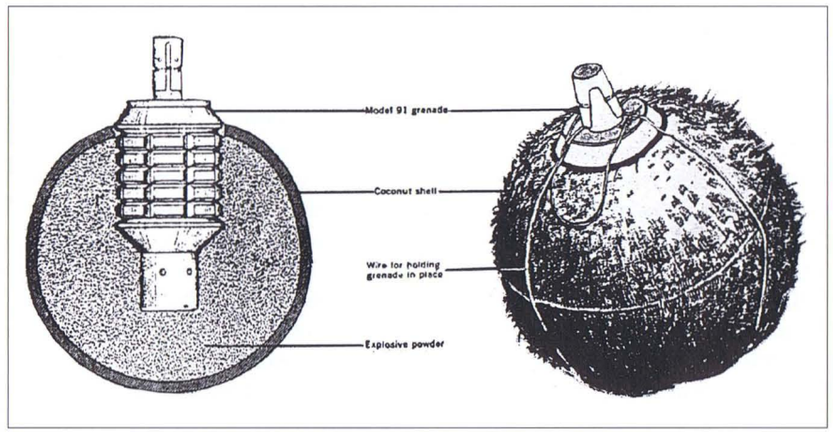


A much more sophisticated Japanese booby trap was electrically activated by moving the arm of a record player to place the needle in contact with the record. The electrical wires in the back were not concealed, however, and the trap was detected through this basic piece of carelessness.

F. Miscellaneous Japanese Booby Trap Reports

1. Japanese firing device for booby traps or mines (July 1944)

a. **General** A Japanese pressure-type firing device, for booby traps and other similar uses, was recovered in the Marshall Islands (Kwajalein, Roi-Numar, Eniwetok). This was the first reported instance of the Japanese employing any arsenal-manufactured device for such purposes. Although there is no visible means of securing this firing device either to a prepared or improvised explosive charge, the instrument can be used in a prepared charge with a seating recess, or it can be used in a framework attached to a charge of plastic explosive.
b. **Description** The firing device is constructed of machined steel, and is finished with a light coating of black paint. The device consists simply of a pressure plate and the body, which has two threaded openings to receive the firing pin holder and the booster. The booster incorporates both the primer and detonator, and consists of 0.1g of lead with a small black powder initiator and 3.5g (0.123-ounce) of tetryl. This booster is powerful enough to detonate Japanese plastic explosive. The firing-pin holder contains a firing-pin and firing-pin spring. When assembled, the firing-pin spring is compressed. However, the firing-pin holder in no way holds or secures the firing-pin. The pressure plate has a wide, mushroom head



Another crude mine using a Type 91 (1931) grenade was made by filling a coconut shell with explosives and wiring a grenade in place inside, again with the fuze protruding upwards; this was strictly an antipersonnel device. The use of the grenade naturally made all these improvised mines easily locatable by magnetic mine detectors.

with a safety pin hole, a shear wire hole, and a slotted keyway. The firing-pin holder bears against a narrow portion of the keyway. The larger opening permits the firing-pin to enter and pierce the primer.

c. **Functioning** After the device has been secured to the charge, the safety pin is withdrawn. The shear wire in the device recovered in the Marshalls can be broken by a pressure of approximately 6lb. As the pressure plate moves down, the large hole in the keyway also moves down until the action of the spring forces the firing pin into the primer. Shear wires are not necessary, and the device may be found without them. Shear wires of various thicknesses were recovered during the operations in the Marshalls.

d. **Safety precautions** To make this device safe, a small wire or nail should be inserted in the safety pin hole. The firing-pin holder or booster may be removed if no safety pin is present. Serious injury can result from a booster of this size; therefore, the apparatus should be carefully handled until the booster has been unscrewed.

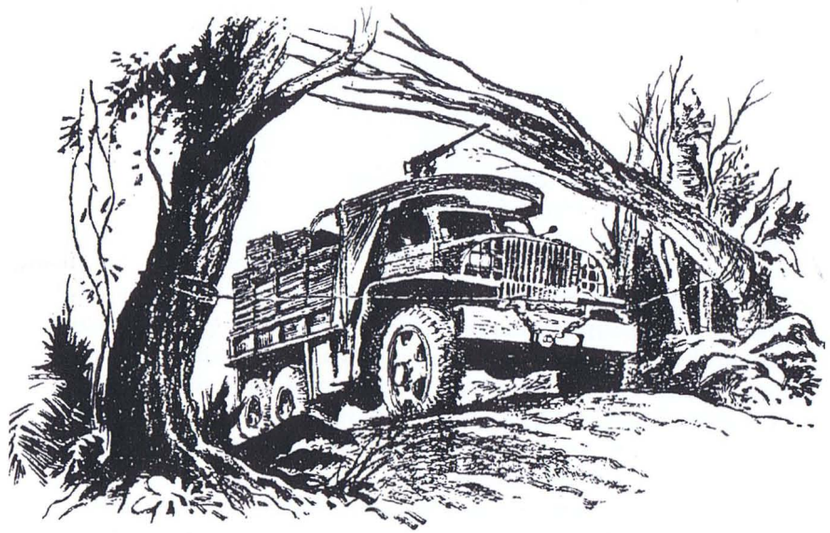
2. Prefabricated booby traps (August 1944)
In the Arakan [coastal region of southwest Burma] the Japanese are now using a small prefabricated booby trap device. It is of very simple construction, and is intended for use with a tripwire. There is a possibility that the Japanese may decide to employ the device extensively, either in its present version or a modified form.

The container for the explosive charge looks like an ordinary tin can. The explosive itself is believed to be picric acid. The firing mechanism, a pull-igniter, is a single unit. Its body is a brass tube, which is threaded so that it can be screwed into the side of the container. It is reported that a loop of wire (or possibly a stout cord) leads into the tube, where it is attached to an igniter wire. This igniter wire, in turn, is imbedded in a matchhead composition. Beyond the matchhead composition are a detonator and a booster charge.

In the jungle it is dangerously easy to mistake a tripwire for a tropical vine. Not only do such vines grow profusely, but their tendrils are quite likely to creep across trails and roads, especially in a rainy season. The two best safeguards against tripwires are to keep trails as clear as possible and to develop the habit of keeping a sharp lookout for booby traps when moving in terrain where the enemy may have had an opportunity to prepare such devices. The Japanese soldiers themselves have learned this lesson, and move with caution over terrain believed to have been occupied by Allied soldiers.

3. Automatic road block (February 1945)
This tactic, a sort of deadfall for trucks, was reported to have been used by Japanese diversionary troops ("commandos") operating behind American lines in the Philippines. A tree on the side of a mountain road is cut almost through. A steel wire, tied to the tree, is stretched across the road and fastened to another tree so that a passing vehicle that strikes the wire will fell the tree, thus causing damage to the vehicle.

4. Japanese booby-trapping of ammunition dumps (July 1945)
Retiring Japanese troops on the Bataan Peninsula, Luzon, ingeniously booby-trapped three sizable ammunition dumps in the vicinity of Imoc Hill. The existence of probable hidden demolitions in this area was revealed by the shattered bodies of two civilians and a dog, who had paid the price of



A trap as crude as the deadfalls rigged up since prehistory to catch animals was sometimes effective against vehicles even in World War II. A thin but strong wire cable was strung across a road between one tree and a second almost completely cut through; this was especially hard for a driver to spot in darkness or bad weather, and the impact of a truck might topple the cut tree onto it. With the road blocked, Japanese troops could initiate an ambush.

inquisitiveness. Ammunition dumps at Gapan also had been booby-trapped, and one of these, too, had been detonated by the unwary.

An investigation of the remaining munitions in both areas revealed that other dumps had been cleverly booby-trapped. The munitions booby-trapped in a typical instance (see accompanying sketch) consisted of 75 boxes of Type 99 (1939) 7.7mm rifle and machine gun ammunition, and 15 boxes of Type 89 (1929) 5cm grenades. The boxes were neatly stacked six high within a revetment cut into the side of a hill. This revetment was only large enough for the munitions. Entrance and encirclement were not possible on the ground level, and inspection could be made only from one end and from above. From the top of the embankment, the site resembled a poor attempt at concealment of a trench. Loose dirt, twigs, and grass had been thrown on top of a roof consisting of two sheets of corrugated iron and a plywood door, presumably from nearby dwellings.

Fastened beneath the main components of the roof to long branches were the strings of six pull-type friction-igniters fixed in box-type mines. These mines were placed directly on top of the stacks of munitions and carried the entire weight of the roof. Therefore, any attempt to move any portion of the covering materials would be likely to pull at least one of the igniters, detonate the picric acid contents of a box mine, and cause the explosion of the ammunition.

G. More Notes on Japanese Booby Traps and Devices (April 1945)

Recent campaigns in the Pacific and Asia have shown that the Japanese, when given the time, are not content to retreat without planting booby traps and other explosives to injure personnel and to destroy abandoned materiel. Although the Japanese soldier has been taught to improvise to a great extent with hand grenades and dynamite when preparing his traps and demolitions, the Japanese Army has experimented with some mechanical devices which may be encountered by US troops. Most Japanese booby traps thus far encountered have been constructed with an ordinary hand grenade or

friction-type fuse lighter to act as the igniter. However, the Japanese have also experimented with at least four machine-made igniters. Although there has been no reported instance where a Japanese booby trap has been fitted with one of these firing devices, their use should be anticipated. [The "type" designations were assigned by US Intelligence.]

1. **Type 1** A simple device [consisting] of a striker held back from a primer by a retaining pin. A tension spring is attached to the striker and, when the retaining pin is drawn, pulls the striker down on the primer cap. When rigged with a charge as a booby trap, a tripwire is attached directly to the retaining pin.
2. **Type 2** [This] is a time-delay igniter. A striker, under pressure from a compressed spring, is held back from a primer cap by a thin copper wire fastened from the striker to the opposite end of the igniter. A small glass vial of acid is located in the top of the igniter near the wire. When the vial is broken, the acid corrodes the wire and releases the spring-loaded striker. There appears to be no safety device with this igniter, and the actuating pressure is not known. (The delay time was not reported.)
3. **Type 3** [This] is a pressure-type igniter consisting of a primer cap and a spring-loaded striker, the base of which is anchored firmly to the igniter case. A chisel-like pressure shaft is set at right angles to the striker. Pressure on this shaft forces the chisel edge down on the striker base, cutting the striker free so that, under pressure of the spring, it is driven into the primer cap.
4. **Type 4** An electric igniter, the Type 4 device is housed in a waterproof rubber tube of undetermined length. It consists chiefly of two parallel metal strips placed one over the other and held apart by blocks of insulating material fixed between the ends. Wires hooked to one end of each strip can be attached to a battery and an electric cap set in the demolition charge. Pressure on the rubber tube presses the strips together, thus closing the electric circuit and detonating the charge.

SUMMARY: THE IMPACT OF BOOBY TRAPS

Overall, booby traps inflicted only a very small proportion of casualties. Within the US armed forces booby traps were the cause of the lowest number of casualties of any weapon: 0.2 percent of those killed and 0.5 percent of those wounded. This can be compared to landmines, which inflicted 2.7 percent of the killed and 3.4 percent of the wounded (although this includes booby-trapped mines).

Regardless of the number of casualties booby traps inflicted, they certainly had an adverse psychological impact. They slowed unit movement, hampered the occupation of positions, and forced troops to take extreme precautions. Occupying a house, passing through an obstacle, recovering abandoned equipment, clearing a minefield, or simply walking down a street were made even more dangerous. Soldiers learned to be constantly vigilant and to take nothing for granted. They avoided paths, climbed over low walls rather than passing through gates, checked ditches and foxholes before diving into them, entered buildings through blasted holes or windows rather than doors, and were suspicious of anything the enemy had left behind, touching nothing that appeared enticing. Booby traps increased their stress and eroded their morale. Besides deaths, close proximity to booby-trap detonations resulted in frequent loss of fingers, hands, arms, feet or eyes.

A high percentage of total booby-trap casualties were found among those personnel sent to disarm and remove them. In the US Army this was accomplished by engineer battalions and Ordnance Department explosive ordnance disposal units, in the Marine Corps by engineer and pioneer battalions, and bomb disposal companies. In the British Army, Royal Engineer and Royal Army Ordnance Corps units took care of booby traps and unexploded munitions.

The 1981 Inhumane Weapons Convention enshrines the principle that certain conventional weapons should neither inflict excessive injury nor cause unnecessary suffering, and that they should be directed only at military forces and not be used indiscriminately to harm civilian populations. This has been ratified by few countries, and it anyway fails to address booby traps. Regardless of advances in weapons technology demonstrating much increased lethality and accuracy, booby traps are still very much with us, and have in some instances become the highest reaper of soldiers' lives and limbs. While the munitions may have changed, today's booby traps and improvised explosive devices (IED) use many of the same employment principles, means of concealment and triggering techniques, to accomplish the same goals – to delay and demoralize an enemy – as when they were employed over 60 years ago.

RECOMMENDED READING

Jones, Ian *Malice Aforethought: A History of Booby Traps from World War One to Vietnam* (London: Greenhill Books, 2004)

Land Mines and Booby Traps, FM 5-31, November 1943 with 18 Changes to May 1945

Enemy Land Mines and Booby Traps, TM 5-325, April 1943 with 1 Change

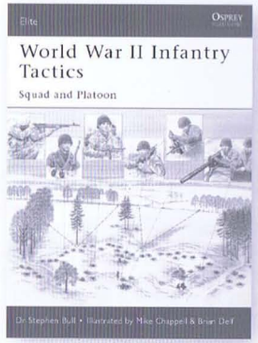
Handbook on German Military Forces, TM-E 30-451, March 1945

Handbook on Japanese Military Forces, TM-E 30-480, October 1944

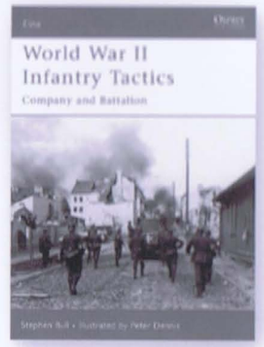
(The above manuals are available from www.military-info.com.)

INDEX

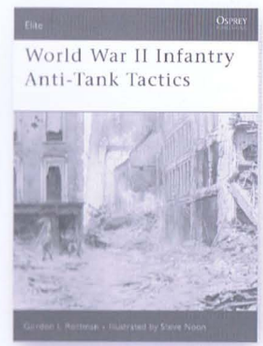
RELATED TITLES



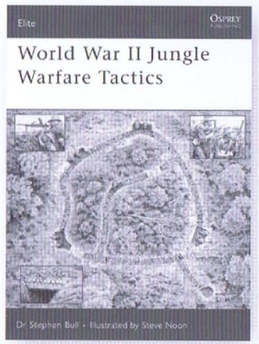
ELI 105 ▪ 978 1 84176 662 1



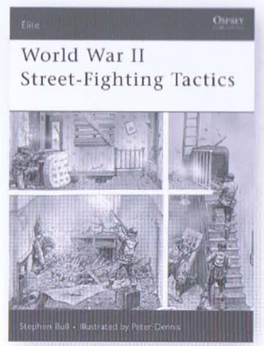
ELI 122 ▪ 978 1 84176 663 8



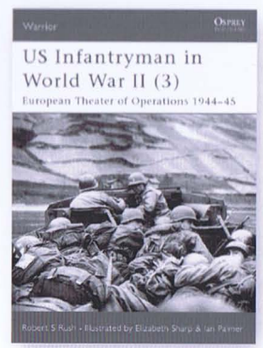
ELI 124 ▪ 978 1 84176 842 7



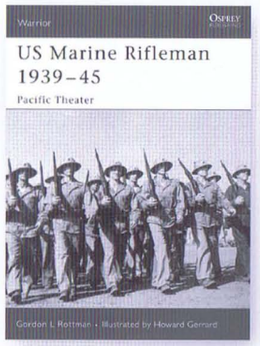
ELI 151 ▪ 978 1 84603 069 7



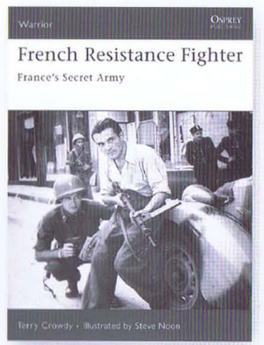
ELI 168 ▪ 978 1 84603 291 2



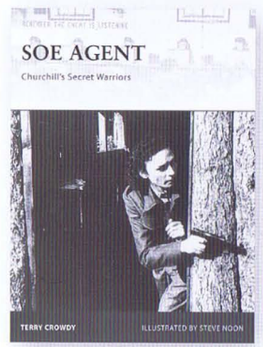
WAR 56 ▪ 978 1 84176 332 3



WAR 112 ▪ 978 1 84176 972 1



WAR 117 ▪ 978 1 84603 076 5



WAR 133 ▪ 978 1 84603 276 9

VISIT THE OSPREY WEBSITE

Information about forthcoming books ▪ Author information ▪ Read extracts and see sample pages ▪ Sign up for our free newsletters ▪ Competitions and prizes ▪ Osprey blog

www.ospreypublishing.com

To order any of these titles, or for more information on Osprey Publishing, contact:

North America: uscustomerservice@ospreypublishing.com
UK & Rest of World: customerservice@ospreypublishing.com

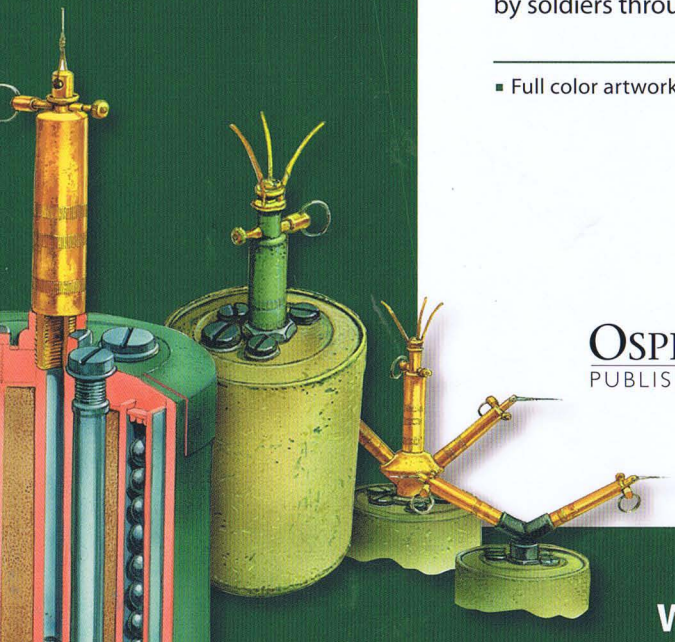
Elite • 100

The history of military forces, artifacts, personalities and techniques of warfare

World War II Axis Booby Traps and Sabotage Tactics

Booby traps set by troops in war zones in World War II are largely neglected in histories and memoirs, and rarely examined in detail. Yet on the battlefield the threat of booby traps had to be at the forefront of a soldier's mind, and an ability to find and disarm them was essential. In territory which had been occupied by the enemy, anything – a discarded fruit can, a tempting souvenir, or an abandoned truck – could have been wired to explode. This is the first comprehensive study of World War II's battlefield booby traps, using information from rare wartime intelligence publications to identify, illustrate and describe the tactics of German and Japanese saboteurs. Examining all aspects of this subject, from the devices used to the sophisticated techniques of placing and finding them, this book uncovers the hidden risks faced by soldiers throughout the course of the war.

▪ Full color artwork ▪ Unrivaled detail ▪ Photographs ▪ Diagrams



US $18.95 UK £11.99
CAN $22.00

ISBN 978-1-84603-450-3

OSPREY PUBLISHING