

The first of its kind detailed look at the use and analysis of incendiary devices found during actual arson investigations. The author is a internationally known expert on arson, arsonists, and serial arson investigations. The book is designed to be a reference guide for arson and serial arson investigators and arson profilers.

INCENDIARY DEVICES: Investigation and Analysis

by ED NORDSKOG

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ED NORDSKOG

*Investigation
and Analysis*

**INCENDIARY
DEVICES**

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1.

The Myths surrounding Incendiary Devices

There is a belief among arson investigators that arsonists are extraordinary and clever criminals who are obsessed with fire and frequently make and employ exotic and complicated delay incendiary devices. I have been in this business for over twenty years and have heard such observations at dozens of training sessions. Many “experts” in our business believe that most, if not all, arsonists routinely employ *signature devices* in their fire setting. This mindset could not be further from the truth. My analysis of thousands of arson cases has shown that incendiary device use is, in fact, quite unusual. In the rare case when an incendiary device is employed, the item is typically crude, or of very simple design, and in many of the cases, fails miserably. However, firehouse war stories and pop culture has influenced many people within our field to believe the contrary.

In the 1972 movie *The Mechanic*, actor Charles Bronson plays a sophisticated hit man named Bishop. The opening fifteen minutes of this movie has Bishop arranging the assassination of a mark by

burglarizing his apartment via a lock pick, replacing his tea bags with sleep inducing tea, and then setting up an incredibly complex incendiary device utilizing, among other things, the natural gas stove, some acid, and a highly sensitive explosive paste. The mark comes home, drinks his tea, and falls asleep. After several hours, a time-release compound extinguishes the pilot light of the gas stove, followed shortly by the acid drip that burns a hole into the gas line allowing natural gas to fill the apartment. At the proper time, Bishop initiates the hit by breaking the glass windows of the apartment from a long distance with a scoped air rifle for the sake of silence. Once the window is broken, it allows a large amount of air to enter the room and achieve the appropriate stoichiometric ratio of fuel/air. The air gun pellet continues its flight to impact the highly sensitive primary explosive paste that Bronson/Bishop has smeared in a book, causing detonation/ignition, which in turn creates an instantaneous fireball that erupts and blows all the windows out of the apartment, killing the mark, obliterating all forensics, and satisfying the contract. The genius of this Hollywood-dreamed-up scenario is that it gives the impression that the fire and explosion were accidental in nature. While I could publish a doctoral thesis on the absurd complexity of this arrangement and the dozen or so junctures at which it would fail, the actual odds of an incendiary arrangement like this functioning as designed are practically zero. Even the dumbest investigator would wonder why a book was blown up in a bookcase, twenty feet away from the natural gas stove. This outlandish scenario is typical of Hollywood, but in real life is merely arson investigator fantasy porn. Yet several times in my career, I have heard professional arson investigators at scenes postulate a similarly outrageous scenario and try to sell it by saying, "Well, it's possible that..." No, it probably isn't possible.

This James Bond view of arsonists by fire investigators is rooted within our own history and is perpetuated even today. In 1954, a fire insurance investigator and a law enforcement investigator wrote a book entitled *Arson-A Handbook of Detection and Investigation*. The book was reprinted numerous times over the next twenty years. The book is interesting reading and contains fewer facts and less science, and more

stories and anecdotes about arson fires and arsonists. The book has good points, great points, and some ridiculous points. The interesting part of the book is that it treated most arsonists, despite their varying motives and skill sets, as similar offenders who mostly used some sort of pre-arranged device to set their fires. In a telling line in the chapter titled Touch Offs, the authors assert that matches are the preferred method of ignition by only two groups of arsonists, “juveniles and *pyros*”, and that all of the other types of arsonists generally employ a time delay device for their ignition. Perhaps more folks did use devices in the 1950’s, and perhaps they did not. But this is easily the most ridiculous assertion in the book. This current study will reveal that a time delay ignition device is a true rarity in any type of arson.

When I reviewed the grainy photos of devices found at “true crime scenes” in *Arson-A Handbook of Detection and Investigation*, they looked suspiciously like many of the training scenario devices I have seen over the years. I suspect that some or many of those devices in the book were, in fact, constructed by the authors or other people for training purposes. If so, they wouldn’t be the first or the last people in our business to contrive devices in training, and then later represent them as being from real crime scenes. It did not surprise me at all to note that the primary author claimed to have worked as a spy for the Office of Strategic Services (OSS) during WWII. This would explain his James Bond view of arsonists.

In more recent years, a video documentary was produced in 1995 describing the extensive investigation into the John Orr arson case. The documentary, *Nova: Hunt for the Serial Arsonist*, offered profiles of serial arsonists and discussed arson investigator training. In one clip, a veteran arson investigation instructor is seen having students (other investigators), set up ignition scenarios within structures “as an arsonist would”. The documentary then shows a few fairly exotic ignition scenarios including the use of multiple intermixed trailers, a cigarette/matchbook delay in a structure fire, dabbing petroleum gel on outlets to give the appearance of an electrical fire (staging the scene), and the use of firecrackers as an ignition source. In my career and through my studies of thousands of cases and incendiary devices, I have never, ever

seen or even heard of any of these things actually having been found at an arson scene as depicted. The fact that this was presented in the documentary as typical arson investigation training gives our profession the image of being a bunch of goofballs.

In my own professional experience, I attended a major federal arson school in 2005. During the final live burn scenarios, the instructors made the promise that the scenes would be realistic and based on true case histories. When the class was concluded we found that the actual scenes were set up with incredibly exotic and sophisticated delay incendiary devices, and scenarios that none of the students, all of whom were veteran investigators, had ever heard of. The instructors eventually admitted that they had concocted the scenarios, but believed that arsonists could be using these types of ignition devices.

These four short vignettes show highly exotic and improbable incendiary devices. The first is excusable because it is Hollywood fantasy and is strictly for entertainment purposes. The last three tales are worrisome as they were based on actual training by recognized arson instructors. They were advertised as something that routinely occurs in the real world. After close examination, no professional investigator has ever encountered such devices. Professional arson investigators should know the difference between the realities of our world and undocumented folk tales.

INCENDIARY DEVICES IN FICTION

Case analysis has shown that a lot of criminals learn to commit crimes by watching movies, television, or reading books. This sort of exposure influences the way they shoot guns (think of modern street gang movies where everyone holds a handgun sideways), drive cars, and even start fires. This is **learned behavior**. Most new military and police recruits hold weapons in the improper and unsafe ways they see in movies on their first day at the range. It takes weeks of repetitive proper training to teach these new recruits the correct, safe, and effective ways to use firearms and vehicles.

The same holds true with fire starting. Everybody knows that gasoline

starts fires. That's why fledgling arsonists tend to use an excessive amount of gasoline at their fire scenes. They really, really want to start a fire, and they assume that if a little gas will do it, a lot of gas will do it better. What they don't know is that gasoline is a highly volatile fuel and is manufactured specifically to explode when mixed properly with air; hence the internal combustion engine, which is basically a series of controlled explosions. It is not uncommon to find arsonists with very little experience having injured themselves in the act of starting a fire. They are merely copying something they have seen modern action movie characters do a hundred times. Again, this is learned behavior, albeit unsafe and unreliable behavior.

Fiction literature has also significantly added to the misconceptions and misinformation. The fire suppression field has an entire genre of fiction books written for and about it. Most of these are feel good books, in that they almost always portray the fire service in a positive light and as a noble, courageous profession, which it is. However, some of these authors, in order to spice up otherwise mundane stories, usually paint the most serious and deadly of fires as always being started by arsonists. They usually portray the arsonist as an incredibly clever and sinister character, with some bizarre sexual appetites. Finally, many of these stories offer the opinion that the arsonists are usually intent on injuring or killing fire fighters. Most of the above characterizations are simply not true when compared to real life cases.

Normally, I wouldn't comment on fictional books and movies as they are produced strictly for mindless entertainment. However, a few well regarded authors have also weighed in on arsonists, serial arsonists and incendiary devices. Because a couple of these folks actually sell a lot of books to members of our industry, I will offer some commentary.

One of the technically best fiction authors in the world is Michael Connelly, whose books on police detectives and criminal attorneys are always bestsellers. Connelly is highly regarded as the most accurate and informed police chronicler since Joseph Wambaugh. He is a master at describing life within the Los Angeles Police Department, and its homicide detectives. However, even a master can make a mistake or two. In his 2013 book *Gods of Guilt*, Connelly describes an arson

murder with the use of an incendiary device. The device is used in a structure fire and consists of a cigarette and a matchbook delay, something that is rare in a structure fire, but semi-common in wild land fires. In discussing the device, one of the characters mentions that, because of self extinguishing cigarettes in the United States, most arsonists use foreign cigarettes. Connelly is well known for consulting subject matter experts for the intimate details of his stories. In this case he must have chosen the wrong arson expert, as there has never been so much as a rumor in our business, let alone a documented report of an arsonists making the conscious choice to use a cigarette from a foreign manufacturer. This minor detail doesn't affect my opinion that Connelly is a fantastic writer.

Another author who is fairly successful at marketing his string of books to firefighters lives in Southern California. He is closely associated with the fire community and fills his fiction stories with intimate details involving tactics and equipment used by fire fighters in Los Angeles. He claims his books are so accurate that he classifies them as *faction*, as opposed to fiction.

I was asked to review one of his books a few years back. The book was the author's attempt at telling a story about a serial arsonist burning up Los Angeles County with a unique incendiary device. The device is described by the author in intimate detail, and I found it to be a close copy of a device used several times in the past by animal rights groups. It involved a kitchen timer, highway flare, matches, battery and a bridge wire as an initiator. It is a viable device.

In that book the skilled arsonist left the device purposely in a manner so that it would not burn, and would be found by arson investigators. The arsonist set two brush fires with the device. The second fire is a catastrophic brush fire that decimated Malibu and killed citizens. The arsonist became irritated when the device was attributed to a different suspect. Immediately, the miffed arsonist switched to a bomb built with high explosives that demolished a restaurant.

While all of this is typical fiction from authors outside of our business, and any literary exaggerations could be accepted, the author throws in a real twist at the end of the book. For no reason whatsoever,

he names the arsonist as a twenty-four year-old female weathergirl, who apparently has Daddy Issues. The female arsonist has no special education, no military experience, no technical training whatsoever, but the readers are supposed to believe that she could construct two technical incendiary devices and a large bomb! *There has never been an arsonist that fits that description, ever.* The writer's claim that his book is *faction* is just silly. His understanding of how arson investigation works in Los Angeles isn't even close. There are almost no cases reported of a female serial arsonist using a device of this complexity.

Because he is a fiction writer, and I thought the story was at least semi-interesting, I chose not to savage it with a negative review. There were a dozen things he got wrong, but it's fiction, so who cares! I opted not to publish my review. It was clear to me that he wrote the ludicrous plot line in hopes of getting some sort of Hollywood movie deal out of it. A year or two later, the same author showed up on a national news site as a columnist, giving opinions on real cases of arson and serial arson. His analysis, posted online, was generic, antiquated, and not at all in line with the opinion of true arson experts. Several commentators skewered him with criticism. In real life the author is not a professional fire fighter, but an attorney. Normally he would get a pass from the experts, however, once he claimed to have expertise in the world of arson, he opened himself up to my scrutiny and that of my colleagues.

As part of my research I have read more than sixty books on arson, arsonists, and fires. Many of them are non-fiction, but a dozen or so are fiction. In almost all of the fiction books, the arsonists, serial arsonists, and incendiary devices are depicted in exactly the same way. The problem is, the way they are depicted in these books does not at all reflect most real-world cases. Arson investigators struggle with this misinformation by fiction writers every time we go into a courtroom.

LEARNED BEHAVIOR THROUGH POP CULTURE

We can take some learning points from Hollywood and its ability to influence criminal behavior. In a true case of life imitating art and vice versa, we find a pair of real armed robbers apparently copying some fictional robbers from a Hollywood crime drama.

From 1995-1997, two desperadoes were engaged in a series of armored car and bank robberies in Southern California. The duo was armed with high capacity assault rifles and carried thousands of rounds of ammunition, including armor piercing ammo. They used quasi-military tactics and were not at all shy about shooting their weapons. They were highly successful and eventually made off with over three million dollars.

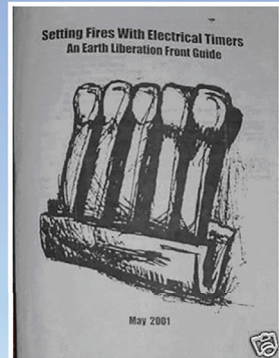
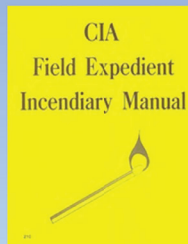
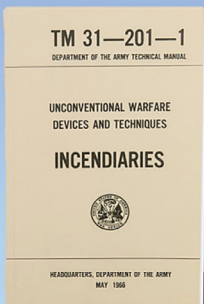
Coincidentally, in late 1995, the motion picture *Heat*, starring Robert De Niro and Al Pacino was released and became a major success. The film depicted a team of highly organized armored car and bank robbers who utilized aggressive, military style tactics and carried high capacity assault weapons. During one of their robberies early in the film, the movie bandits used a time delay explosive incendiary device to obliterate the forensics in one of their vehicles. The device was high tech in that it consisted of a container of gasoline, wrapped in detonation cord (high explosive), and set off with a blasting cap affixed to a timer. Near the end of the film, the robbery crew engaged dozens of LAPD officers in a massive gun fight in the streets of Los Angeles.

A year and a half after the film's release, the real life bank robbers held up a Bank of America in North Hollywood. They then engaged dozens of responding LAPD officers in a forty-four minute shootout where thousands of rounds were fired, which was eerily similar to the movie. This incident, the **North Hollywood Shootout**, was the most violent confrontation in the history of the Los Angeles Police Department. When both of the bank robbers were shot dead at the end of the incident, investigators eventually searched their get-away vehicles and their homes. During the investigation, LAPD investigators found evidence that the two real life robbers had been big fans of the

movie *Heat*, and had watched it numerous times, to the point that they started to copy some of the tactics used in the movie. One unique fact that investigators discovered was that the robbers' two vehicles each contained incendiary devices prepared and ready to be deployed. The devices were somewhat crude and were made of large, two gallon size plastic pickle jars filled with gasoline. Taped to the top of each jar of fuel was a bundle of wood matches fashioned into a picket fence design. Investigators eventually concluded that these items were attempts by the real-world robbers to emulate the anti-forensic measures the thieves in the motion picture used.

In the movie the robbery team had the skills and resources to obtain high explosives and digital timers for their devices. However, the real world version was based on the less effective skills and abilities of the bandits. It was much more low-tech. Nonetheless, these events illustrate the point of **incendiary device use being learned behavior**.

Use of a Device is often “Learned Behavior”



CASE HISTORY: HARRY BURKHART- THE HOLLYWOOD FIRE DEVIL

****Note:** Ed Nordskog was a co-Lead Investigator on this massive investigation.

Harry Burkhart, aka the Hollywood Fire Devil, in just a couple of months managed to catapult himself onto the short list of most significant serial arsonists in recent history. Harry set 52 fires in four days in 2012. His relentless frequency of fire setting over that short period of time—17 fires each night, he took one night off in the series—has never been matched by any other arsonist, ever. By the third night of his arson orgy, over 400 investigators from the largest agencies in the western United States were tracking the elusive “Hollywood Fire Devil”. It was the largest arson task force ever assembled. Their efforts focused on his consistent choice of targets, tactics, and devices.

Because of one failed device early in the series, investigators were able to document the item in its pristine state. The item consisted of a fairly simple three-step ignition process. The main fuel was a small fire log similar to a Duraflame, about the size of a brick. On top of that, Burkhart used a chemical booster which increased the speed at which the device ignited, which made the flame almost triple in height. Burkhart ignited the top booster, a hexamine tablet, with a small hand-torch he carried.



Hollywood Fire Devil: Device was a small fire log with a chemical booster placed on top. The combined flame height reached 14-18 inches, which started the underside of vehicles on fire. *From Ed Nordskog's case files*



Over the course of the investigation, due to various surveillance video images, we were able to figure out the tactics of the arsonist. Burkhart drove a dark van to a selected target in Hollywood. The area is notorious for not having sufficient street parking available. Burkhart pulled up to his target and turned on the flashers of his van. He exited wearing all dark clothing, and was seen carrying a cloth grocery bag toward the target. This tactic was fairly genius in that these activities closely resembled food and restaurant delivery services which are common in that area. No one ever gave him a second glance while he approached his targets.



Burned Devices: Despite a large amount of fire damage at many scenes, investigators could easily pick out the burned remains of 49 out of 52 devices. *From Ed Nordskog's case files, courtesy LAFD and LAPD.*

The device was placed consistently under the front bumper of cars parked mainly in carports underneath occupied apartments. The targeted vehicles and device placement, along with all of his other tactics, did not vary once throughout this frenetic series. However, Burkhart's device changed about halfway through the series for six fires. He then reverted back to the original design for the final dozen attacks.





Device Evolution: Everything else stayed the same, but in the middle of the series the device changed for two fires. Same fire log, but this time a propane cylinder was placed on top as a booster. The propane cylinders did not function. *From Ed Nordskog's case files*

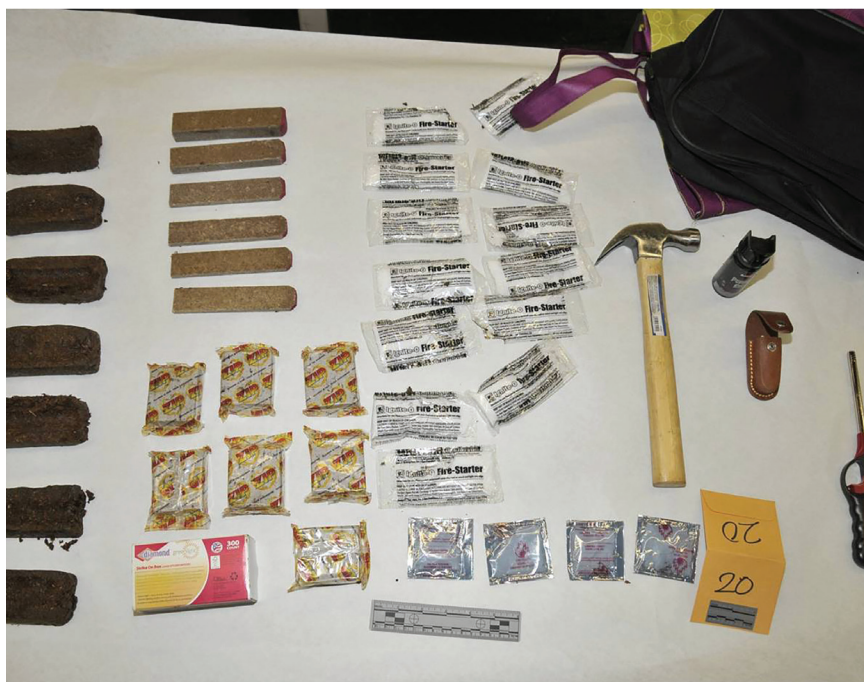


Second Evolution: Burkhart's device changed again for four fires. He abandoned the propane cylinders and began stacking boxes of kitchen matches on top of the fire log as a booster. His results from these fires were poor. *From Ed Nordskog's case files*

Incendiary Devices: Investigation and Analysis

After his arrest, detectives learned that his device changed only because Burkhart ran out of components. He was purchasing his materials at a nearby grocery store and he had exhausted their inventory. On the last day of his series, the store got in a new stock of fire logs and the chemical boosters, hexamine, used to create a higher flame. When he was arrested by Los Angeles Sheriffs, Harry had 15 devices on the seat of his car ready to go. Harry, a German National, learned about this device as it is commonly used by students during protests in Europe.

This was a classic example of a device **evolving out of necessity**. Despite the near identical nature of his attacks and devices, we investigators and the prosecutor did not view these items as signature devices. They were just very cheap, available, and efficient to use. They are quite common in Europe.



Device Components: Found on seat of Burkhart's van when arrested by Los Angeles Sheriffs after leaving his final arson attack. All of the items in the sealed plastic are various brands of chemical boosters for the fire logs on the left. *From Ed Nordskog's case files*

Device Exploitation: Components for Burkhart's devices were all purchased with his club card at a grocery store across the street from his home (L). Trash bin behind Burkhart's home contained empty boxes that had contained the fire logs (R). *From Ed Nordskog's case files and courtesy of LAPD.*



The Hollywood Fire Devil case is a good example of the theory that a serial arsonist will tend to stay with a reliable device. The case was a lesson in device and tactics analysis for all of the investigators involved. The use of this device was learned behavior by Burkhart who had copied hundreds of students in Europe who are known to often use the same fire log materials to burn vehicles during protests. The investigation revealed that Burkhart was a suspect in up to 50 additional fires in Germany, and possibly Canada, in the months prior to the Hollywood attacks. He knew his device was reliable and safe to use. All of the components were available within walking distance from his home. He was well aware that he was being hunted by a massive task force of police and arson investigators, and yet he never deviated from his reliable devices until he was forced to do so.

Burkhart did not seem to care about anti-forensic measures when employing his devices. He assumed, like most civilians, that all of the evidence would be burned up in the fires. He was confronted with the identifiable remains of forty-nine of his devices at trial years later. He was surprised to learn that, despite millions of dollars in damage, his DNA and fingerprints on the items survived some of the incidents. Burkhart will be in prison for the next twenty-five years.

INCENDIARY DEVICES IN FIRE INVESTIGATION LITERATURE

References to complex incendiary devices as being commonly used by arsonists appear throughout many accepted investigation manuals and literature.

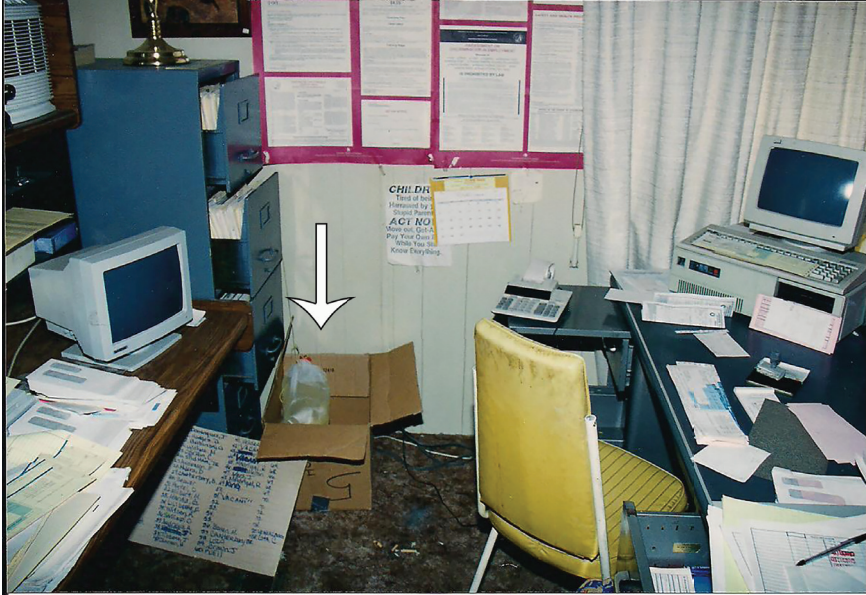
In 1977, an insurance company active in arson investigation published a booklet simply entitled, *Arson*. In its first chapter called “What the Investigator Sees”, the booklet shows several photos of purported arson scenes, each displaying a fairly sophisticated incendiary device as if this was the norm. While a couple of the photos look genuine, many others look like staged photos of overly complicated devices. This may be an indication of how the insurance industry views arsonists—as highly sophisticated plotters who regularly employ exotic devices. A story related to one of the pictures is preposterous. The tale recounts how an arsonist set a time delay with an electric timer then was thwarted at the last minute by the quick action of arson investigators who were out conducting what they called arson prevention patrol. That’s as ridiculous as believing that homicide investigators will interrupt a murder in progress while out on murder prevention patrol. Things like that are the stuff of Hollywood scriptwriters, and not real life.

In 1985, the Kennedys published their massive manual *Fires and Explosions*. In that highly regarded book they correctly state, “There are many types of incendiary devices. There are no standard models as these devices are of homemade origin and are manufactured by the arsonist”. This intelligent analysis is then followed up in the very next paragraph with the claim that “One of the most common devices is...”, and then they go on to describe an outlandish arrangement consisting of an alarm clock, string and wire that somehow agitates a lighter or match. I have never seen one of these in either the real world or in training, and can’t comprehend how that arrangement would actually function. It may have been tried a time or two somewhere, but it’s quite a stretch to call this item common.

The *NFPA-921* in its latest version has correctly downplayed the commonality of incendiary device use. They merely mention in the

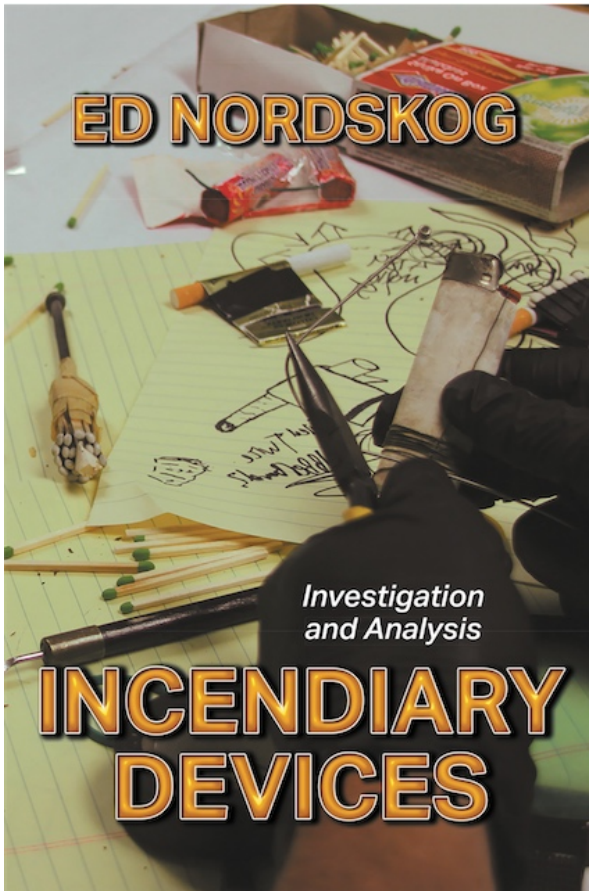
2017 edition that devices can be employed, and have wisely removed the word “commonly”. I would agree that this is the appropriate manner in which to describe the use of complex incendiary devices.

Incendiary devices mentioned within modern wild land investigation literature will be discussed later in this book.



Actual delay device set up to cover embezzlement from an office. Gas jugs suspended over burning candle. Note placement is designed to burn open file cabinets. Item failed due to improper placement of components. This real device demonstrates the crude nature of most incendiaries.

Photos courtesy of John Ament/Ed Nordskog



The first of its kind detailed look at the use and analysis of incendiary devices found during actual arson investigations. The author is a internationally known expert on arson, arsonists, and serial arson investigations. The book is designed to be a reference guide for arson and serial arson investigators and arson profilers.

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