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INVESTIGATING AUTOMOBILE FIRE CAUSES

GLEN A. SHIFFLETT

The author has served as a Special Agent for the National Automobile Theft Bureau for the past ten years and has had earlier experience in law enforcement work with the Virginia State Police and industrial security work with Merck and Company. He served during World War II with the United States Navy as an instructor in Damaged Control. During his association with the National Automobile Theft Bureau he has also participated as an instructor in numerous police schools in Virginia and in other states and as a lecturer on arson investigations at programs given under the auspicious of the University of North Carolina, University of South Carolina, College of William and Mary, and the University of Virginia. This paper was presented at the 14th Annual Seminar for Arson Investigators held at Purdue University in the spring of 1958—EDITOR.

This paper is based on practical experience derived from participating in many automobile fire investigations that are case histories, numerous automobile burnings for demonstration purposes at police and fire official schools, and auto burnings which were burned in every conceivable way specifically to develop any consistencies or inconsistencies for our own knowledge through experimentation. The conclusions drawn from the foregoing practices have been corroborated by approximately one hundred fifty confessions and/or polygraph examinations.

It should be clearly understood that a thorough investigation will not always result in a break. However, if you make a thorough investigation in each and every case, you will be pleased with the results.

One thing should be taken into consideration. If the auto burned within a city, it is usually extinguished a short time after the fire is discovered. Therefore, the fire has not been in progress long enough for the vehicle to be completely destroyed as the fire has not been permitted to complete its normal course. This type of fire in most cases is a result of incendiarism, but due to the small amount of damage (possibly only the interior is destroyed, the paint is burned from the exterior of the top while the paint remains intact on the greater portion of the vehicle and all tires are standing and not damaged by fire), the investigators are prone to let this go down in the records as an accidental fire-cause; a short in the electrical system. If, however, an aggressive and conscientious investigation had been made, it might have resulted in another broken case.

It is a known fact that there are few auto arson cases where we have an eye witness. Therefore, it is necessary to develop facts and evidence with

which to confront the suspect during your interrogation. There are multiple reasons for this. Most successful auto arson cases have resulted from securing a confession with corroborating evidence. For the reasons stated heretofore, the salvage examination is a matter of importance, second only to the interrogation itself. By making a thorough and systematic salvage examination (which is actually the corpus delicti or body of the crime), you are able in most instances to develop evidence and many other factors to be used in the interrogation which often leads to a confession. Not only this, but the facts developed from the salvage examination will corroborate the confession. This is necessary in most states to secure a conviction in court. It is suggested that the salvage be examined step-by-step in the following manner.

THE FUEL SYSTEM

Is gas cap intact to gas tank filler tube? If not, why?

Examine flanges of filler tube neck to see if they are damaged. If cap was blown off as a result of an explosion within the gas tank, the aforementioned flanges will be damaged. If flanges are damaged, examine gas tank for corroboration. If an explosion did occur within the gas tank (which very seldom happens, as the writer has examined only one tank in the past ten years which had actually exploded), the tank should be misshaped. The ends and sides should be bulged outwardly.

Remember that in many cases the gas cap is removed by the arsonist to siphon gas out of the tank for the purpose of burning his vehicle. This is especially true if there is a mechanical failure and the fire is motivated because of this failure and is not premeditated.

Examine the drain plug in the bottom of the gas

tank. Is it intact or missing? If missing, is the collar surrounding the plug missing? It is a known fact that if the collar is intact and the drain plug is missing, it had to be removed by someone. We have had numerous cases where the drain plug was removed for the purpose of obtaining gasoline to burn the vehicle.

If drain plug is intact, examine gas tank to see if area around drain plug is clean or covered with dirt and road film. See if there are any fresh tool marks on the plug. This indicates recent removal. If so, make a note with which to confront suspect and have him explain why.

Examine fuel line and fitting where it connects to the gas tank. Is it intact? If disconnected, why? If intact, check fitting for fresh tool marks.

On vehicles where this line connects near the bottom of the gas tank or about half way down from the top, we have had cases where it was disconnected, the gas was permitted to feed by gravity onto the ground under the car and then ignited. We have, also, had cases where it was drained into a container for the purpose of throwing the gasoline into the interior of the vehicle or on the motor.

If gasoline was permitted to drain on the ground underneath the vehicle, there should be more severe damage to the rear of the vehicle such as rear tires burned off, evidence of fire on the ground, etc. It would be advisable in a case of this type to dig down into the soil six or eight inches and get a sample of the soil. On several occasions we have been able to get said samples which reeked with the odor of gasoline as long as two weeks following the fire even though we know that under most circumstances gasoline will soon evaporate and the odor dissipate. It will be necessary to take the terrain into consideration as the accelerant will naturally drain toward the lowest point. Usually, the pattern of burning on the ground will indicate the proper place to attempt to secure the soil sample. Naturally, the soil is more porous in some parts of the United States than others. Therefore, the length of contamination will vary. Weather conditions such as rainy, cold or hot, will effect this.

Trace the fuel line from the gas tank to the fuel pump. Look for breaks in the line. Look for plier marks. Get an explanation for any breaks or disconnections. Trace the fuel line from the fuel pump to the carburetor in the same manner.

Inspect fuel pump and carburetor. Gasoline is sometimes obtained by disconnecting the fuel line from the fuel pump and running the starter.

Check for any missing parts of the fuel pump or carburetor and evidence of tampering. If any parts of the fuel system are missing at the time of the fire and the suspect claims the car was running when the fire started, this is good ammunition to use in the forthcoming interrogation.

Remember that it is very unusual for the carburetor and fuel pump to melt in an accidental fire even though it is constructed of white metal.

THE ELECTRICAL SYSTEM

A shortage in the electric wiring is the most common excuse offered for the origin of an automobile fire. Developing a fire from a short sufficient to destroy a vehicle is practically negligible. Engineers have virtually eradicated this hazard through design, conduit, and use of fire resistant materials. Remember you can locate evidence of a short in the following manner.

Check the battery to see if it is in a charged or exhausted condition. We have had cases where cars were alleged to have burned as a result of a short in the electrical system and in several instances have proved that the battery was not even in the vehicle when it burned. Therefore, it was impossible for a short to have caused the fire.

If the battery was in the vehicle at the time of the fire and plenty of current remains in it, you can be reasonably sure that the fire did not originate from a short. If there is a short sufficient to destroy the vehicle, the battery should be exhausted. Also if you examine a vehicle and find the battery exhausted, this does not necessarily mean the car burned as a result of a short. On many occasions a good battery is removed, and an old one used to replace it when the fire is premeditated. In many cases the burned salvage has been towed to a garage and left on a back lot. If it is a matter of several weeks before you examine said salvage, the battery could be discharged due to not having been used.

In examining the wiring of the electrical system, keep in mind that a short will melt the strands of wire apart and cause small beads or knots of melted wire to form on either end and/or both ends of the wires. However, wires that are burned in two by flames during the progress of the fire will be sharp pointed.

Bear in mind, if you do find what appears to be a shorted wire, that the small blaze which starts from a short must be close enough to some inflammable substance to spread the fire.

If the fire started from a short while the motor

was running, the distributor points should be stuck or fused. Likewise, if the fire starts from a short while it is parked and not running, the points in the voltage regulator should stick or fuse.

If a short is found in the electrical system, usually the insulation is damaged as the heat traverses along the length of wire. As a rule this is found to be true with no damage to adjacent parts.

MOTOR, RADIATOR, AND PARTS UNDER AND NEAR THE HOOD

Remember there is not much here for the flames to feed on.

The only possible place for an accidental fire at this location is around the fuel pump, carburetor, and the wiring. Check for cause of any other heat. If the radiator hose top and bottom, heater hose, plug wiring, and fan belt are destroyed by fire, this is an indication that accelerants have been used.

The same is true if the front rubber motor mounts at the base of the motor are damaged. Also, if accelerants are used on the motor, usually there will be a fire pattern on the valve plate cover or side plate cover where the oil and grease have been burned from same. There will be soot deposits and/or carbon deposits indicating where the accelerants have been thrown onto the motor and burned off. As mentioned heretofore, if the fuel pump and carburetor are melted, this, also, indicates accelerants.

Examine the motor and dust pans very carefully as we have had several cases where we found the match which was used to ignite the accelerants which had been thrown on the motor. In these cases the suspect in his confession stated this was the type match he had thrown onto the accelerant to start the fire.

Examine the muffler, manifold and tail pipe for breaks or leaks.

Check the wheels and tires for signs of recent removal and substitution. If the tires burned on the wheels, strands of wire should be left; a cross section of the tire is usually left between the bottom of the rim and the ground. Usually, this leaves a ten to twelve inch cross section of the tire. We have had cases where the suspect stated he had just installed a new set of tires on the vehicle just prior to the fire. Yet, the cross section of the tires mentioned above were completely slick. As a general rule, you can determine from said cross section of tire if it was a recap or otherwise.

Check the motor to see if compression is good. Consider the fact that serious motor trouble may have been the motive for the fire. Examine the cylinder head and motor block for cracks.

Check the differential, drive shaft, and transmission. In this day of automatic transmissions this is more difficult than the standard transmission. With reference to the automatic transmission, sometimes it is necessary to have it dismantled and examined by a competent mechanic, whose specialty is automatic transmission work. On other occasions it is possible to replace some wiring and a few minor parts, start the motor and operate the automatic transmission in drive and reverse.

The body of the car is usually so badly burned that in the opinion of many investigators it affords little evidence. The writer disagrees with this theory for the following reasons. For example, he can recall three cases where the vehicle was parked in the yard of the owners. After they had retired for the night, they were awakened by a car horn blowing. Upon looking out the window, they saw their vehicle was on fire. In these particular three cases the owners happened to be hunters. They stated they could have probably extinguished the fire upon discovering same, but they were afraid to go near the car because as it was hunting season, they had a box of ammunition in the glove compartment. Upon sifting the debris, we were unable to find any brass from the alleged ammunition. We all know that the cartridge cases will not be destroyed in an automobile fire.

In another case a colored minister stated he had to jump out of his vehicle to keep from being burned. Due to the rapidity of this fire he alleged he was unable to remove several suits and a top coat from the vehicle, which he stated were on wire hangers. In sifting the debris, we were unable to find any wire hangers, bone buttons, or zippers from the clothing that was supposed to have been destroyed in the fire.

In three cases this year while sifting the debris of burned vehicles, we have gotten pieces of the felt matting normally found under the front floor mat and said matting was saturated with the odor of gasoline. These samples were put into an air tight container. At the trials which followed, this container was opened and passed to each member of the jury. All three cases resulted in convictions.

If the glasses are melted out of the vehicle, examine the glass channels, and you can determine if the glasses were up or down at the time of the

fire. It certainly is suspicious if you find all glasses were down in a burned vehicle when your investigation reflects that it burned in zero weather. This indicates someone wanted a set fire to have plenty of oxygen to support combustion and make certain that the interior of the vehicle would be completely destroyed.

We have found in burning vehicles for experimentation purposes where we use accelerants on the interior of the vehicle that greasy soot deposits and/or carbon deposits are prevalent on the glass found in the debris and on the underneath side of the steel top. In vehicles where we did not use accelerants, this was not true. It is true that the foam rubber padding now used in the seats of most modern cars will give off ropey soot deposits. However, these deposits do not have an oily base.

Check the manner in which the hood shows the effect of the fire. If the hood was raised during the fire, the paint on the top may be blistered but not burned off.

Remember, the direction of a strong wind will cause different effects pertaining to the way the paint is burned from the exterior of the vehicle. If the wind is blowing from the rear of the car toward the front, there will be more fire damage to the front section of the vehicle. If the wind is blowing from the front of the car toward the rear, there will be more fire damage to the rear portion of the vehicle.

If dirt has been thrown into the vehicle, examine same as it will sometimes absorb the odor of any accelerants, if present. Usually, you can tell if the dirt is thrown into the vehicle after the fire or during the progress of the fire. Burned soil is usually lighter in color. Also, you can usually detect at what stage of the fire the soil was thrown into the vehicle. Is the soil on top of the debris, underneath the debris or between two layers of debris?

Are tools or spare tire in car? If not, why? Are any accessories missing? If so, why? In many premeditated auto fire cases accessories are removed prior to the fire.

You can usually tell if the doors were open or closed at the time of the fire by the burned pattern of the paint on the doors and adjacent to the doors.

If any wheels or tires are missing at the time of your inspection, you can determine if the tire burned on the wheel by examining the paint on the fenders. If the tire was intact at the time of the fire, the paint will be burned from the fenders.

INSPECT THE SCENE OF THE FIRE

Look for containers used to transport accelerants to the scene of the fire or containers used to pour gasoline on the car after getting it out of the tank by a siphon hose, by a drain plug in bottom of gas tank, or by disconnecting the fuel line at the tank.

Look for match boxes or book matches, etc.

Attempt to locate tire tracks of the car in question as well as imprints of tires of other vehicles. It is often possible by this inspection to ascertain if a car other than the owner's was at the scene of the fire, indicating that a friend may have picked up the owner after the fire and transported him to his home.

An investigation at the scene of the fire frequently discloses neighborhood witnesses who can give additional information.

CONCLUSION

It is important that the investigator secure his first arson confession. Success creates confidence, and confidence, plus patience and hard work combine to form the winning combination for the successful investigation of succeeding arson cases. If an investigator develops a capacity for detail, reasons from effects to causes, uses his inherent knowledge of human psychology to trap a dishonest person, perseveres in his efforts to prove his suspicions with facts and follows each logically to a conclusion of the case and a confession and/or conviction, there will soon develop a new consciousness among the arson minded.

The investigator's value is directly dependent, first upon the extent to which he is mentally equipped to conduct an arson investigation, and second upon his perseverance and determination in spite of disappointment and patience to wait for the "break" in the case. If he is lacking in the first, he fails in ability. If he is lacking in the second, he fails in his duty. If he fails in either, he fails as an investigator.