Hall of Flame Museum

Gallery Exhibit Guide

Sponsored By

The National Historical Fire Foundation

A 501(c)3 Non - Profit Organization

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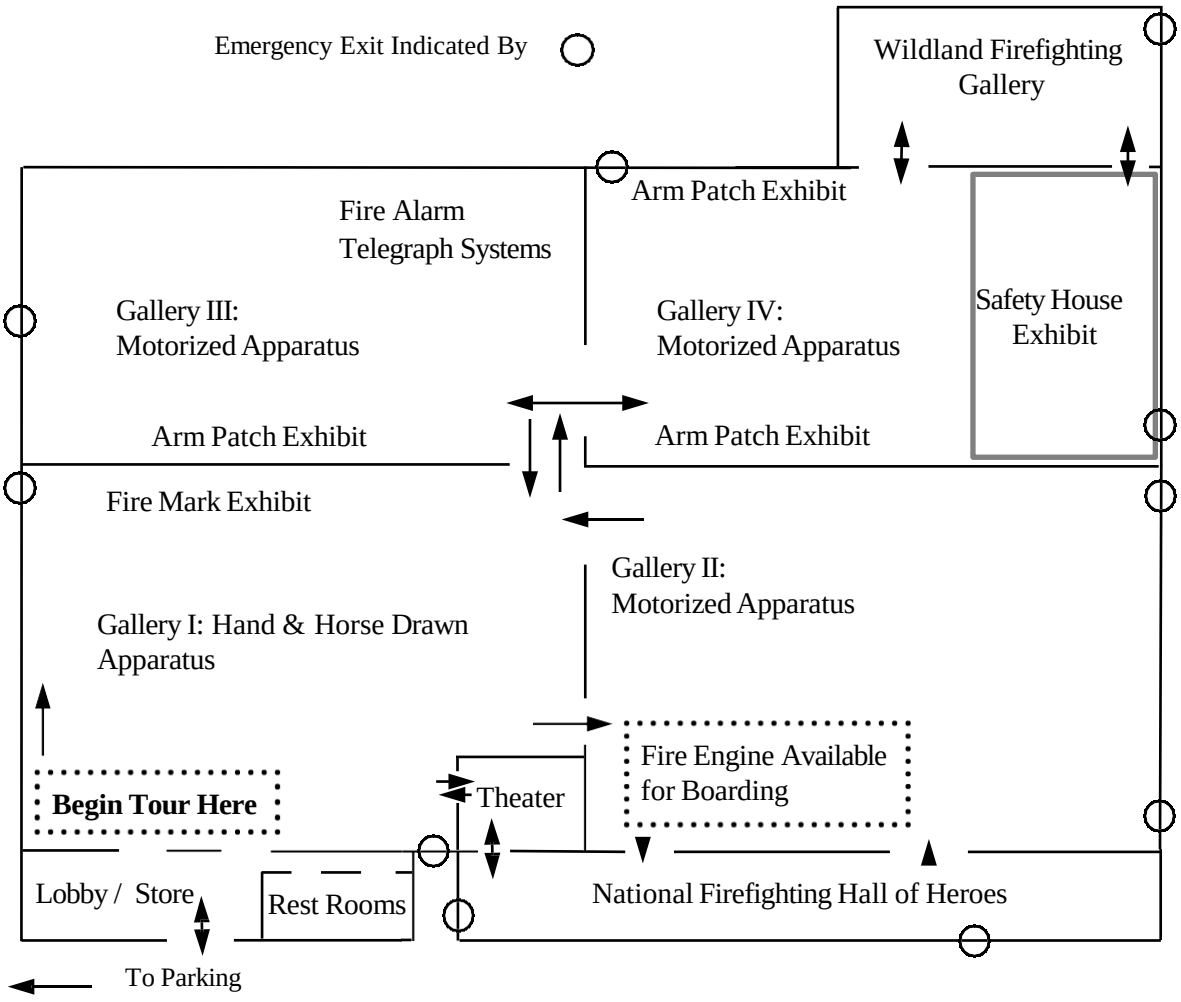
Welcome to the Hall of Flame

We have five exhibit galleries and the National Firefighting Hall of Heroes gallery. The map below will help you to navigate your way through them. This guide provides detailed information about each of the wheeled pieces. It also describes the museum's alarm room exhibits. Please ask one of our docents or volunteers to operate the alarm exhibits for you.

In Gallery II we have a fire engine that is **available for boarding**. We request our visitors to refrain from touching the other pieces of apparatus. Their paint and decoration are easily damaged.

Our Fire Safety House exhibit in Gallery IV is quite popular with children from preschoolers to Grade 5. I t contains clues for kids to point out safety pluses and minuses in the house. We have Milo and Moxie: Safety Rangers workbooks for parents or teachers that identifies these hazards and good ideas. Please ask any staff member if you have questions about the exhibits. Enjoy!

Hall of Flame Gallery Map



National Firefighting Hall of Heroes

The Hall of Heroes opened in 1998. Its purpose is to bring to public attention:

- **American firefighters who have died in the line of duty.**
- **American firefighters who have been honored for acts of heroism.**
- **The Social History of the American Fire Service —Volunteer, Paid, and Wildland.**

Firefighters Who Have Died in the Line of Duty

On its walls and exhibit panels the Hall lists the names and fire departments of American firefighters who have died in the line of duty since 1981, the first year that national records were kept.

A computer is in place in the Hall and is available to all visitors. It contains the names and personal information of American firefighters who have died in the line of duty from colonial times to the present. The database is maintained by the staff of the Hall of Flame. It contains the names of just over 9,000 firefighters. As additional names and information are found in publications or provided by fire departments or visitors to the museum, they are entered into the database.

Firefighters Recognized for Heroism

The premier national award for municipal and rural firefighters is the *Firehouse Magazine® Rescue and Community Service Award*, granted annually by a panel of firefighting professionals under the sponsorship of *Firehouse Magazine®*. These men and women are honored on the walls of the gallery. Other winners of national awards will also be honored on our walls.

The computer contains a database of all heroism award winners, national and local. They are entered in the database by the staff of the Hall of Flame as we receive the appropriate information. Like the Line of Duty database, the Heroes Database is in its early stages of growth.

The Social History of American Firefighting

In the Hall of Heroes Firehouse area we have installed exhibits which we hope will tell the story of the firefighters themselves —who they were, why the became firefighters, and what it was (and is) like to be a firefighter. We include firefighters from colonial days to the present. We describe the volunteers, the paid firefighters who fight fires in cities, and the wildland firefighters who battle fires in the deserts, mountains, and prairies of the United States.

Gallery I

1. Newsham 4th Size Hand Pumper. English. Ca. 1730.

Richard Newsham built pumpers of this modest size for use by small volunteer and parish brigades. Commonly supplied with water by bucket brigades, it could pump about 20 gallons per minute, the output of a pair of garden hoses. This engine was used in an English city, but Newshams were common in most colonial towns. In 1737 New York City purchased a Newsham of identical size as its first fire engine.

2. Newsham 6th Size Estate Engine. English. Ca. 1750.

The engine belonged to the fire brigade of Lord Leconfield at his residence, Petworth House, in Sussex. It is the smallest of Newsham's engines, two of which are on exhibit in this gallery. It was designed for use in an estate, factory or ship. It's too small for an insurance fire brigade. Its compact design allowed firemen to lift it from its chassis and carry it to the seat of a fire. It's light enough to be carried up a ship's mast to allow water to be played onto a sail, allowing the sail to capture more wind. It could also serve as a handy pump for quick attack on a ship or house fire. Built around 1750, the engine discharged water through a copper spout or short lengths of stitched leather hose. It was supplied by a bucket brigade or a suction hose. Output was about 25 gallons per minute.

3. Simpson Manual Engine. English. Ca. 1820.

The exposed construction of this engine shows how almost all manual fire engines work. Pistons in each of the pump's two cylinders suck water in on the pump handle's up stroke and push it out on the down stroke. Thus, water is both drafted and pumped on each stroke of the pump handles.

A pair of valves mounted between the air chamber and cylinders controls the flow of water in and out of the cylinders. Valves were made of leather and needed frequent replacement. The easily accessed valve compartment on this engine was much better than valve arrangements on most other engines. The bulbous air chamber cushions the flow of water on its way to the hose, allowing it to flow in a steady stream. Water comes into the engine either from a suction hose attached to its rear fitting or from buckets of water dumped into the tub. While being restored the maker's name (Simpson) and address (Belgrave Road, in the Pimlico District of London) was found under four layers of paint and primer. The engine probably spent its working life in London.

4. American Hydraulic Company "Coffee Grinder" Rotary Pumper. Ca. 1825.

John Cooper of Guilford, Vermont built dozens of these rotary vane pump engines between 1825 and 1835. They were used in New England and the Middle Atlantic states. Cranked by 8 to 10 men, the pump could supply a large volume of water at low pressure. At high pressures (using a hose nozzle with a small orifice) the cranks became very difficult to turn. This shortcoming reduced the demand for rotaries, despite their simplicity. This engine was probably used by a volunteer company in New York or Pennsylvania.

5. Japanese Fire Fighting Equipment. Ca. 1800 - 1870.

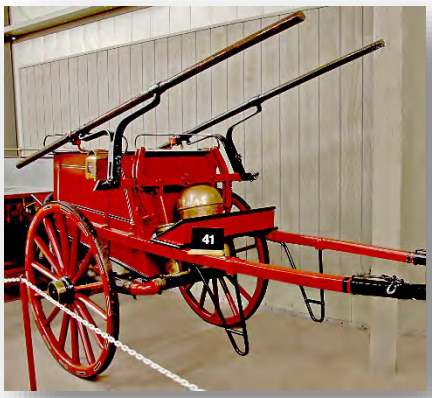
The large engine was once used at the estate of a wealthy rice dealer in Kameoka, near the city of Kyoto. It was designed to go into action very close to a fire. Supplied with water from buckets, the engine's two piston pumps moved the water through a bamboo spout that is missing from this piece. The other equipment was also used in the area of Kyoto. Japan began its modern history in the 1860s when it began trading with European nations and the United States. The Japanese rapidly adapted western technology. By the 1890s their fire engines were as good as those used in any nation.

6. Merryweather Hand Drawn Estate Pumper. English. 1838.

This engine was built by the prominent firm of Merryweather for the Earl of Harrington's estate in Derbyshire. The Earl's coat of arms and motto "For God and King" are on the end piece. Most English estates had their own brigades, which also fought village fires.

7. Merryweather Barrow Pump. English. Ca 1880.

Merryweather built this pump for use at an estate or factory. Two men could easily move it to a fire and get it into action, although a crew of four worked best. During the 1920s Merryweather mounted the pump on a motorcycle side car for use by Industrial Brigades.

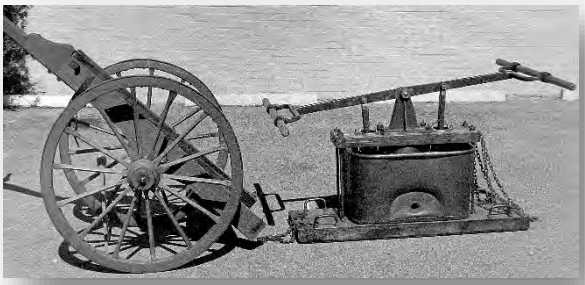


8. Howard and Davis Hand Drawn Pumper. American. 1852.

Howard and Davis was a Boston clock making firm which manufactured a few fire engines. It built this one for the Massachusetts mill town of Grafton, which named the engine for the town's power source, the Blackstone River. The resemblance to the Hunneman-style engine is marked (See Number 14 in this exhibit). The engine was fully restored by Don Hale here at the Hall of Flame. Like most American apparatus, the engine was equipped to be pulled to fires by its crew. American volunteers made every effort to avoid the use of horses because of the expense of upkeep and training. Not until the introduction of heavy apparatus after the Civil War did horses come into wide use by volunteer departments. The paid departments of large cities, which appeared in the years between 1850 and 1880, used horses from their first days because paid departments lacked the manpower to pull rigs to fires.

9. Sohy et Durey Hand Drawn Engine. French. Ca 1840.

This Dutch style was popular in continental Europe as late as 1910. It can be carried from its chassis into a building. The wicker baskets filter out debris in the water from a bucket brigade. It was used by a village near Orleans called Ivoy Le Pré. It is almost identical to the engines introduced by Jan Van der Heyden in Amsterdam in the 1670s. Its copper tub and two-cylinder pump are similar to the design of the Howard and Davis engine in this exhibit (Number 8) and the Hunneman engine (Number 14). Moving pictures dating from World War I show these engines being used to fight fires in French towns.



The engine's large wheels had two advantages. They made it extremely maneuverable when pulled by a couple of firefighters. They also allowed the engine to be connected to a horse drawn two-wheel cart called a limber. Firemen could put hose in the limber and sit atop it to ride to a fire. The large wheels allowed it to be pulled at speed by horses, much like an artillery piece. Small wheels could not be pulled by horses without falling apart.

10. Newsham Manual Fire Engine. 1725. English.

Richard Newsham built the English-speaking world's first successful fire engine in 1718. His engines were popular in such colonial towns as Philadelphia, New York and Williamsburg. This is one of his largest models. A crew of 20 men worked its handles and its foot treadles to pump about sixty gallons of water through its copper nozzle in a minute. The treadles allowed firemen to increase the force of pumping without making the pump handles any longer. This improved the engine's maneuverability in narrow streets and reduced its tendency to rock. This engine spent its working life in northern England. Because of the poor quality of hose in 18th century England, the engine used a metal spout called a branch pipe to play water on fires.

11. Jeffers Philadelphia Style Pumper. American. 1844.

The Philadelphia firm of Joel Bates built this engine in 1844 for the Rhode Island town of Pawtucket. Four years later Pawtucket fireman William Jeffers rebuilt it. Its design dates from about 1800 with the engines of a Philadelphia blacksmith named Pat Lyon. With two sets of pump handles manned by fifty firemen, it can pump over 250 gallons per minute. Used by the volunteers of Pawtucket until about 1870, it was retired and successfully used in "musters" of firefighters in pumping competitions with teams from towns all over New England. It was probably at this time that the engine was modified to be pulled by horses. Firemen rode on the horses, since the engine lacks a seat.

The art on the rig's "condenser box" is original. It portrays Rebecca, the wife of Isaac, at a well; St. Euphemia, a patron saint of firemen; the State Seal of Rhode Island, with the state motto ("Hope"); and a New England sachem.

William Jeffers' success in rebuilding the engine led him to begin to manufacture his own line of pumpers, including manual and steam powered engines.

12. Rumsey Hand Drawn Pumper. American. Ca. 1865.

This village pumper was used by the Badger Volunteer Fire Company of Centerville, Wisconsin. In 1871 the Company, with its little Rumsey, moved by train to Chicago to help fight the terrible fire that destroyed a third of that city. The "Badger" is called a "piano box" style engine because of the shape of its tank and pump housing.

13. Hunneman Hand Drawn Pumper and Hose Cart. American. 1866.

Form follows function in this engine, which carries its suction hose "squirrel tail" style on a graceful crane neck frame. The pre-connected suction can be put to immediate use, and the front wheels can turn at right angles to increase mobility. The elegant curved design of the pump lever allows firemen to work the pump handles closer to the ground. The attached hose cart, called a "jumper," provides several hundred feet of hose. Capacity is about 130 gallons per minute. The "Pacific," and an identical Hunneman called the "Atlantic," were purchased in 1866 and used by the nearby towns of Rockport and Camden, Maine. Since Rockport was four miles west of Camden, its engine was named the "Pacific." The motto "Be Early and Cool" is still used by the Rockport Volunteers.

14. Howe Hand Drawn Pumper. American. Ca. 1900.

Benjamin Howe's first engine was a novel horse drawn unit that sold poorly despite its superior design. Undaunted by the limited success of his rotary sweep pumper , Howe introduced this more conventional engine around 1890. It was a great success and remained in production until about 1915. Although not as stylish as other hand pumpers, it offered a lot of practical advantages. Its double acting pump could deliver up to 100 gallons of water per minute. Its 50-gallon water tank allowed firemen to get water on a fire at once, while others connected its suction hose to a water source. Yet the engine was still light enough to be pulled by hand. This pumper was used by the volunteers of Carrollton and Eldred, Illinois. It successfully fought a house fire in 1941.

15. Hand Drawn Village Ladder Wagon. American. Ca. 1870.

Edgerton, Wisconsin purchased this small ladder wagon in 1886 for its volunteer fire department. It was purchased "used" from an unknown town. From its design and construction, it dates from the period 1860—1880. Its maker is also unknown, but it was most likely built by the Rumsey Fire Apparatus Company of Seneca Falls, New York. It is small, even by the standards of its day, made to be drawn by hand with room for a half dozen beam ladders ranging in size from 10 to 20 feet in length. This would allow the volunteers to reach the second floor of a burning structure. In addition to the ladders, the wagon carried buckets, helmets, and a variety of axes and pike poles. It was pulled to the fire by ropes that were wound onto its rope reels (not wound with rope in this exhibit). Two firefighters steered the rig by means of its tow bar (placed on the floor below the rig to save space). The rig also has several play pipes which would have been useful for the village fire engine. These pipes are far too large for a hand pumped fire engine, so the town must have had a steam pumper.

Very little iron went into the construction of the wagon's frame. Consequently it is rather frail. It was recently extensively rebuilt and restored to its original condition by Don Hale here at the museum.

16. Rumsey Hand Drawn Pumper. American. Ca. 1880.

The Michigan volunteers who bought this engine probably commissioned the maker to paint it. It's a good example of the level of decoration that volunteers favored, and which carried over to the rigs of the professional fire service. This is the largest size pumper made by Rumsey, supplying two discharge hoses with up to 150 gallons of water per minute. To achieve this output, a company of about 30 men would have to work the pump handles at 60 strokes per minute. This pace couldn't be maintained for longer than a few minutes. At a more practical 50 strokes per minute, output was 120 gpm. Firemen pulled the engine with ropes mounted on reels below the tow bar. Two firemen steered the tow bar. They stopped the rig by grabbing the pump handles.

17. Button Hand Drawn Pumper. American. 1855.

The Button Manufacturing Company built this first size engine for the town of New London, Connecticut. A crew of fifty men pulled the rig to a fire and manned the pump's brakes (this is an archaic term for pump handles, but the handles also served as brakes to stop the rig). It can pump about 200 gallons of water per minute.

18. Hunneman Hand Drawn Fire Engine. American. 1852.

This engine shares the same design as Number 14 in this exhibit. It was built in 1852 for the New Hampshire town of Exeter. Like almost all Hunnmans it was highly decorated. The Hunneman Company maintained a staff of several artists and painters to decorate their engines. Most volunteer companies took delivery of their rigs with a simple primer coat of paint and contracted with a local carriage maker to decorate the engine. When we obtained this engine from a New England antique dealer the original paint and decoration had been removed, so restorer Don Hale relied on pictures of other Hunnemans to restore the engine.

19. Pirsch Horse Drawn City Service Ladder Wagon. American. 1908.

City service ladder wagons were built to accommodate a wide range of ladders which matched the needs of the area in which the rig would respond. If a response area had four story buildings, then one of the ladders would be a fifty-foot extension ladder; If it was a neighborhood of residences, only 35-foot extension ladders would be needed. In addition, the wagon contained a variety of smaller ladders for roof work, inside work, and work where access to only the second floor would be necessary. City service wagons also carried a variety of tools for making rescues or searching for hidden fire, portable extinguishers, and extra play pipes or other tools for which there was no room on an engine. This wagon was built by the Peter Pirsch Fire Apparatus Company of Kenosha, Wisconsin for the nearby city of West Allis. It was restored to its original condition here at the museum by Don Hale in the summer of 2000.

20. Gleason & Bailey Hand Drawn Parade Carriage. American. 1889.

For many years after its invention in 1807, riveted leather hose was an expensive part of a fire department's inventory. Only the wealthiest volunteers could afford to organize hose companies, and they commissioned fire apparatus builders to make elaborate carriages to carry the hose. By 1870 inexpensive cotton and canvas hose was replacing the leather variety, and practical but plain hose carts were the norm (See the cart with No. 14 in this Gallery). Not to be deprived of their beautiful carriages, hose companies ordered even more highly decorated and extremely expensive versions of the old carriages, intended only for use in parades or at ceremonial occasions. Many modern departments follow this tradition by carefully restoring their old fire engines for display in parades. This is a great example of such a parade carriage. The woolen hat manufacturer Lewis Tompkins, patron of the Fishkill on Hudson, New York Volunteer Hose Company, bought it for display at parades, musters and fairs. Its New York City maker, Gleason & Bailey, also made an extensive variety of fire apparatus. It was restored by Don Hale.

21. W.W. Wunder Hose Carriage. American. Ca. 1865.
Competition between hose companies in a city fire department led them to build rigs like this, an attractive but functional carriage with a reel capacity of between 300 and 500 feet of 2 ½ inch hose. It was sturdy enough to do the job, but lavishly decorated with nickel plating and mirror siding for the hose reel and tool bins. The builder was the W.W. Wunder Company of Reading, Pennsylvania for the Active Hose Company of Philadelphia. Retired volunteers probably pulled it in parades in the years after 1870 when the department switched from volunteer to paid and equipped all its hose companies with homely but practical horse drawn hose carts. This carriage went into the H.V. Smith collection at the Home Fire Insurance Company. When that collection was disbanded it went to the FASNY Museum, operated by the Volunteer Fire Departments of New York State. In 2007 the Museum sold the carriage to the Hall of Flame.

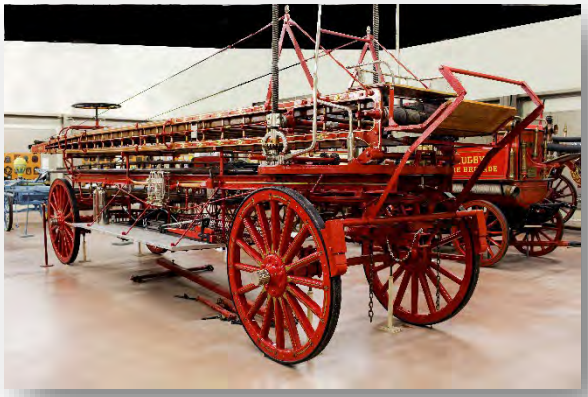
22. Buckley & Merritt Hand Drawn Parade Carriage. American. 1870.
Although patterned after a working hose carriage, this piece has no purpose beyond its elegance and beauty. It was built as a source of pride for the firemen of the Hotchkiss Hose Company of Derby, Connecticut. Pulled by a team of firemen at parades and musters, the beautiful carriage boosted morale and promoted the image of its volunteer company.

23. Boyer Chemical Cart. Ca. 1910.
The Boyer Fire Apparatus Company built a highly regarded chemical cart for use by towns and factories. Its 40-gallon tank was easy to operate and refill, with room for tools and extra soda and acid. This cart was never sold but was used as a sample piece of apparatus by Boyer. It was donated by Mr. Harry T. Armington.

24. Horse Drawn Aerial Truck. American. 1890.

The increasing heights of American buildings led to a flurry of patent ground ladders and vehicles like this with mechanically powered ladders. The first successful "aerial", as it was called, appeared in 1882 in San Francisco.

This aerial was patented by the Chicago Fire Extinguisher Company in 1886. Probably built for the Chicago Fire Department, it was sold in 1894 to the fire department of Benton Harbor, Michigan. Eleven Benton Harbor firemen had died a few months before because of inadequate ladders. The aerial, a large piece of apparatus for such a small town, was probably a reaction to this disaster. In 1927 Benton Harbor sold the truck to Alpena, Michigan. There it was crudely converted to be pulled by a truck. Don Hale fabricated new wheels, a new front end, axles, and many other pieces to restore the rig to its original appearance. Although they were produced in large numbers, No other Babcock aerials have survived.



25. Horse Drawn Rotary Sweep Pumper. American. 1882.

An Indiana inventor named Benjamin Howe designed this pumper to compete with steam fire engines. His engine has a radical design using three double acting piston pumps mounted horizontally beneath a large rotary gear. This gear is turned by a sweep to which horses were attached after pulling the rig to a fire. The big gear drives three small gears connected by cranks and connecting rods to the pumps. The arrangement can produce over 200 gallons per minute, about half the output of a steamer, but twice that of most hand pumpers.

Howe thought that his rig would be popular with volunteer companies needing a powerful engine but lacking the funds for a steamer. He was wrong. Few volunteers used horses. Even many steam fire engines of the day in volunteer departments were hand drawn. Without horses, the rotary was powered by men, and the proud volunteers would not allow themselves to be used like horses. Not many were sold. This is one of very few surviving Howe rotaries. It may have been used in Michigan.

Howe didn't give up. In 1890 he began production of an innovative lightweight pumper that gained great popularity. An example is found in this gallery (Number 15).

26. Phoenix Fire Department Chemical Engine. Ca 1890.

This style engine is typical of horse drawn chemical wagons. Hundreds were built between about 1875 and 1910. It has the same capacity tanks as the Steiner engine (No. 28) , but unlike the Steiner it cannot be easily refilled once its tanks are empty. Since it was intended as a quick attack rig its two tanks were usually adequate. Chemicals were used to attack fires before the arrival of pumpers, or for the control of grass fires.

This rig was probably built by the Fire Extinguisher Manufacturing Company of Chicago around 1885. In 1908 a hose and hose coupling company in Kansas City, Missouri sold it to the Phoenix, Arizona Volunteer Fire Department. When the department went to a paid status in 1914 it replaced the horse drawn chemical with a motorized Seagrave "chemical car".

27. Steiner Horse Drawn Chemical Engine. American. 1872.

This rig uses a pair of chemical tanks. It is probably one of a kind and is one of the earliest examples of what became a popular type of apparatus. Steiner patented the design in 1872. It has two unique features. First, it has an 80-gallon reservoir of fresh water to recharge the copper chemical tanks when they are emptied. Second, the engine has a pump and suction hose to refill the reservoir. Steiner advertised a complete line of apparatus, but no record of his company is found in the Albany, New York archives. This engine was delivered to the Cleveland, Ohio Fire Department, which used it until 1888. It then disappeared from the record until its appearance in Arizona around 1950. Hall of Flame Founder George F. Getz, Jr. purchased it in 1982 and donated it to the museum. It was restored by Don Hale.

Chemical extinguishers date from the 1860s and were probably invented in France. They were built as portable extinguishers of 2 1/2 gallons in capacity, to wagon mounted tanks 30 to 50 gallons in size. The tanks were first filled with water, followed by several pounds of sodium bi- carbonate, depending on the size of the tank. The water and soda were thoroughly mixed. A sealed bottle of sulfuric acid was then suspended in the tank. At a fire, the bottle was either broken or uncorked to allow the acid to mix with the water and soda. A chemical reaction produced a considerable volume of carbon dioxide gas, which was used to expel the water from the tank through a hose onto the fire. Firemen thought that the carbon dioxide gas helped to extinguish the fire, but it actually served only as a propellant for the water. The reaction is like shaking a bottle of soda and spraying the contents. Chemical engines could be recharged with water, soda and acid, but it took a fair amount of time, a big disadvantage at a fire.

They were used as first response rigs, getting 40 to 160 gallons of water on a fire without the need to find a hydrant or other water source. By the time a chemical's water tanks were empty a steamer or manual pumper would be connected to a hydrant and could supply more water.

This engine, which has a separate water reservoir as well as extra bags of soda and bottles of acid, could be recharged in a few minutes. The drawback was that the rig was heavy and unwieldy, as well as quite a bit more expensive than "one shot" chemical engines. No other chemical engines copied Steiner's design. A more typical chemical engine can be found in the Phoenix VFD chemical engine (No. 26).

Soda-acid extinguishers were quite effective on wood or paper fires. Until recently they were commonly used in public buildings. They are now largely replaced by dry chemical extinguishers that are effective on petroleum and electric fires as well as wood/paper fires. Modern fire companies use water extinguishers of the 2 ½ to 5 gallon variety that use compressed air to spray water onto a fire. In the New York City Fire Department the crew member of an aerial truck who carries this extinguisher is called a "can man".

28. Shand Mason Steam Pumper. English. Ca. 1890.

Once used by the town of Rugby, this is a good example of an English steam fire engine. It was rated at about 450 gallons of water per minute, small by American standards, but the pump's size was a good match for the small diameter water supply lines of the day. Unlike American steamers, the rig was designed to carry an entire engine company. A hose wagon was not necessary. A crew sat back-to-back atop the hose bin directly behind the driver. Several hundred feet of hose was stored in the bin. Another bin contained a generous supply of coal to power the boiler. The chassis design is based on the earlier designs of English manual fire engines introduced by James Braidwood, at one time the fire chief of Edinburgh and later of London. The design carried over to English motorized pumpers (See Number 52 in Gallery II).

29. "Metropolitan" Steam Fire Engine. American. 1904.

Steamers came into wide use in American cities from 1855 until about 1915. This one was built in the Ahrens shops in Cincinnati by the American Fire Engine Company for the city of Reno, Nevada. A large engine for its day, it could pump up to 750 gallons per minute. It was drawn by two or three horses and manned by a crew of three firemen: driver, engineer and stoker. The rest of the engine company rode on a hose wagon or ran alongside.

We have connected the engine to a low speed motor that allows it to be turned at about 10 rpm (about 5% of its operational speed). Please ask a docent to operate the engine for you.

30. "Pung" Fire Sleigh. American. Ca. 1890.

Pungs (the Algonquin word for sled) were commonly used in the snowy regions of the northern United States. This one, a converted Studebaker wagon, was built around 1890 by a blacksmith named Chevrette for the firefighters of Negaunee, on the Upper Peninsula of Michigan. It was used to carry hose, ladders, and firefighting equipment. Attempts were made to convert steamers to sleighs, but they proved to be top heavy and difficult to pull, turn, and stop.

31. Seagrave Hose Wagon. American. 1907.

In 1907 the town of Petoskey, Michigan purchased this second size hose wagon from the Seagrave Fire Apparatus Company of Columbus, Ohio. From about 1880 onwards wagons of this type replaced reel style hose tenders. Cotton jacketed, rubber lined hose, available since the 1870s, could be flaked down in the beds of these wagons, together with tools, ladders, and coal for a steam fire engine. An entire engine company crew could also ride in the wagon. The older hose tenders, which carried leather hose on large reels, could not carry any other equipment, and could only accommodate two or three firemen on the tail board (see the Currier and Ives lithograph, "The Metropolitan System", on the walls of this gallery, for a depiction of a hose tender.)

A second size wagon of this type could carry about eight hundred feet of 2 ½ inch hose, a pair of fire extinguishers, and assorted tools. It would accompany a horse drawn steam fire engine like no. 30 in this gallery. A "steamer" and hose wagon, manned by from 6 to 10 firefighters, would constitute an engine company.

Three or four firemen could ride in the hose bed, usually on a removable plank seat. Others could stand on the wagon's rear "step". First size wagons carried a complement of hose plus a ladder and a chemical tank filled with 40 gallons of water.

Few hose wagons have survived. When fire departments phased out their horse drawn apparatus in the years 1910 —1925, they found ready purchasers for their hose wagons from local teamsters, merchants, and farmers, who still used horse drawn wagons, and who favored the sturdily built fire hose wagons.

This wagon was used by a Michigan farmer who sold it to a collector around 1950. The hose bed, seat, and railings had been ruined or lost by the farmer. In 1962 George F. Getz, Jr., bought the wagon from this collector. Its poor condition did not allow its exhibit. In 1999 Don Hale rolled the wagon into his shop and in April of 2000 the wagon was placed on permanent exhibit in this gallery.

Ford Model T Chief's Car. American. 1926

Manufactured by the Ford Motor Company from 1908 to 1927, the Model T, often known as the "Tin Lizzie," was one of the first widely affordable mass-produced automobiles. Many Model Ts were adapted for various uses by fire departments, sometimes in partnership with other companies like American LaFrance and Howe (note exhibit 40 in Gallery 2); this 1926 Model T is believed to have been owned originally by a volunteer firefighter in Yakima, Washington. In the mid-1970s it was acquired and restored by retired Fire Chief Lee G. Madson of the Angle Lake Fire Department/ King County Fire Department, who used it as a parade vehicle. It was donated to the Hall of Flame by Madson's sons Mike and John, both career firefighters with the City of SeaTac, Washington.

Colonial Firefighting

Fire plagued the colonial cities. Boston suffered most, but New York, Philadelphia, and Charleston also endured frequent fires. A few efforts were made to organize firefighting units in the 17th century, but not until about 1720 did efficient fire companies exist in colonial cities. Boston, Newport, New York, and Philadelphia all had excellent volunteer fire departments by 1775. Some companies drew social elites, such as Benjamin Franklin's Union Fire Company. Most companies were manned by artisans and laborers who received exemptions from militia and jury duty in exchange for service. The companies used Newsham pumps like those on exhibit here, together with leather buckets, home-made ladders, iron hooks, and canvas salvage bags. Night watchmen equipped with noise-making rattles enforced colonial curfews and sounded the alarm. A curfew discouraged torches and required colonists to extinguish their home fires after eight or nine in the evening (curfew is from the French "cover your fire"). Fire wardens, equipped with staffs of authority, enforced fire codes and directed the companies at fires. As always, the best fire-fighting programs were preventative. Towns with strict curfews and building codes that required masonry walls , chimneys, and slate roofs suffered the fewest fires. Only 5% of the colonial population lived in cities. Most Americans lived on farms or in tiny hamlets. These Americans fought fires only with buckets of water and home-made ladders.

English Firefighters

Until about 1860, the English fire service consisted of volunteers from towns or parishes, private firefighting brigades from estates or factories, or insurance company fire brigades. Many Church of England parishes maintained volunteer brigades, usually of dubious quality. Landowners and industrialists took pride in organizing their own brigades, which often responded to local fires. Most common were the insurance company brigades, which were England's primary defense against fire until 1860, when Parliament officially required municipal governments to establish fire departments.. It is surprising that the world's leading industrial power of the eighteenth and nineteenth centuries trailed most other European nations, as well as the United States, in its attention to firefighting. The modern English fire service is regarded as one of the world's best.

American Volunteers

From about 1720 onward, American towns organized volunteer fire companies whose members enjoyed exemption from militia and jury duties. Wealthy citizens, insurance companies, or the city or town governments bought the equipment. Rivalry in both performance and style between companies was fierce, and artists were commissioned to decorate apparatus. Unfortunately, rival companies in large cities sometimes fought each other rather than the fires. This problem was aggravated by ethnic and religious tensions arising from the influx of Irish and German immigrants in the years 1820-1860.
In reaction to this problem, city leaders in New York, Cincinnati, and other large cities purchased steam fire engines and hired a few full-time firemen, subject to the same rules as other city employees. These paid departments were in place in most cities by 1880. In towns and villages, volunteer departments remained as highly respected civic organizations. Today almost 75% of American firefighters are volunteers.

Fire Engines

The Romans built rudimentary portable pumps, not unlike the Japanese pumps in this exhibit. Pumps disappeared following the fall of Rome and did not reappear until the 17th century in Germany and Holland. The engines of Amsterdam's Fire Chief Jan Van der Heyden, dating from the 1670's , are regarded as the first modern fire engines.. They were copied by builders in Europe for the next 250 years.

The French engine in this exhibit, Number 7, is almost identical to Van der Heyden's engines. When he seized the English throne in 1689, William III brought Dutch engines to England. In 1718, English inventor Richard Newsham introduced a radical new design, and his engines dominated the English market for the rest of the century.

Almost all colonial American engines were Newshams. Exhibit s one, two, and ten in this gallery are Newsham engines.

New England-style Engines

William Hunneman, an apprentice of Paul Revere, began to manufacture his distinctive pumpers in 1790. His design, based on the Dutch fire engines of the seventeenth and eighteenth centuries, became popular in New England and was copied by half a dozen smaller makers. New England-style rigs were built around a spacious metal tub with a large, two-cylinder, single-acting pump They were pumped from the end to provide more leverage and to free the tub for access by hose men or a bucket brigade. They had two hose connections on each side of the tub, one for suction and the other for discharge. Both were the same size. This allowed engines to be connected to each other in relays. Water could thus be pumped from a distant water source to a fire. In addition, they had a large suction connection at the rear that a single engine could use to draft from a hydrant or a pond. New England-style engines were built to be used with flexible leather hose. They could not be used with a metal spout, like a Newsham engine. Most New England pumpers towed a small hose cart, called a "jumper", that carried several hundred feet of hose. Over 1,000 Hunneman engines were built. Few were made after 1880 because of the growing popularity of steam fire engines. Two New England-style engines are on display in this gallery (Nos. 8 and 13)

Chemical Engines

In 1868 a French inventor introduced the chemical fire extinguisher. A copper tank was filled with water, mixed with several pounds of sodium bicarbonate. A stoppered bottle of sulfuric acid was then suspended in the container. At a fire, the tank was turned upside down and the stopper fell out, allowing the acid to flow into the water/soda solution, generating carbon dioxide gas. The gas expelled water through the tank's hose and nozzle, much like a huge seltzer bottle. There were soon thousands of chemical fire extinguishers, from the size of the Steiner (No. 27) in this gallery, to small $2^{1/2}$-gallon portable extinguishers, which were used until the 1980s. Large chemical engines were popular in the United States until as late as 1920. Cheap and easy to use, they made excellent first response rigs.

Steam Fire Engines

The American Industrial Revolution got its driving force from the steam engine. By 1860, manufacturers were selling "steamers" to fire departments in a wide variety of sizes. Steam engines could pump much more water than hand pumpers, could stay in operation for hours or even days at a time, and required a crew of only three of four men. City governments bought steamers, manned them with full-time firemen, and disbanded their large and sometimes unreliable volunteer companies. Smaller towns retained their volunteers and purchased small steamers that could still be towed by hand. By 1880 many towns and cities had steamers rated from 350 to over 1200 gallons per minute. To supply the steamers with coal, hose, and crewmen, fire departments bought hose wagons, which also served as ambulances. It was important for chiefs to get to fires quickly to be able to direct the placement of equipment. Departments bought buggies to meet this need.

Other American Engine Designs

There were several other popular American engine designs. The Philadelphia-style, as described in the text for No. 11, was popular in the Middle Atlantic and Southern states. The Button Manufacturing Company of Waterford, New York had its own style which several other makers copied. Button rigs were essentially side pumped engines which featured large wooden tubs housing powerful pumps and massive air chambers. Their "crane neck" design made them maneuverable despite their long length (see Nos. 17 and 18). They were popular in every region.

The New Yorker was the least powerful design. New Yorkers were modernized Newsham designs, produced from about 1790 to 1840. The museum does not own a New Yorker. They are depicted in the Currier and Ives "Life of a Fireman" lithographs on display in this gallery. Most popular of all designs was the piano box —a simple wooden tub that resembled a piano. These engines carried a small to medium-size pump, hose, and extra nozzles (see No. 12). Their light weight and compact size made them popular with small volunteer companies and factory fire brigades. They were used in every region until well into the twentieth century.

Hose

As early as 1672 the Dutch used stitched leather and canvas hose for both suction and discharge of their engines, but the weak stitched seams often burst. The problem was most severe with suction hose, which needed only a small hole to collapse, much as a soda straw collapses when it is pierced. Few companies used hose, relying instead on metal spouts for discharge and bucket brigades for water supply.

In 1807, Philadelphia firemen James Selkers and Abraham Pennock began to make leather hose with riveted copper seams. Although heavy and difficult to maintain, riveted hose sparked a revolution in firefighting that led to the creation of hose companies with carriage hauling several hundred feet of hose.

By 1850 less costly hose made of canvas, linen, or cotton remained popular with city departments, which valued its durability and strength, and which had the manpower to keep the hose properly dried and dressed. Not until about 1900 did cotton jacketed hose entirely replace the riveted leather variety.

Water Supply

Until about 1800 firemen relied on rivers, ponds, horse troughs, and wells for their water supply. This worked if towns were small, but the enormous growth of American cities, many of which doubled in population every 20 years, required better water supplies. In 1800, the city of Philadelphia built a steam-powered waterworks that supplied a crude network of buried wooden pipes. Firemen located a pipe, drilled a hole in it, and built a dam around the now spurting pipe for use. Soon firemen were screwing portable fire hydrants into a drilled hole and connecting the hydrant to the engine's suction hose. After the fire, a plug was tamped into the hole in the pipe to stop the flow of water. This is the origin od the term "fire plug".

By 1850 most American cities had underground water supply systems with permanent fire hydrants. European firefighters still carry portable hydrants which they connect to fittings in water lines buried beneath street level. In American towns and villages, the water supply was usually restricted to ponds and streams, but a few towns built strategically located underground cisterns and kept them filled with water for use at fires.

Sprinkler Systems

Until the 1850s there was no truly effective way to extinguish and established fire in a structure — in most cases the structure was a total loss. As the United States became industrialized, its new factories burned to the ground almost as rapidly as they were built. At the industrial city of Lowell, Massachusetts, James Francis, the Chief Engineer of the city's waterpower supply company, invented a system of perforated pipes connected to elevated water tanks. During a fire, water was released into the pipes and applied to the fire. By the 1870s sprinkler systems used special delivery heads that were only triggered when the temperature reached about 160 degrees Fahrenheit. Industrial fire insurance companies soon demanded this type of sprinkler system for all insured properties. By the twentieth century most American factories were sprinklered, although small firms, commercial buildings, hotels, schools, and residences were often unprotected. Thousands of people have lost their lives in fires that could have been extinguished in just a few minutes by sprinklers.

During the past twenty years many cities have begun to require the installation of sprinkler systems in all commercial structures. Some cities, such as Scottsdale and Chandler, Arizona, now require sprinklers for all new homes as well. The Hall of Flame has a very large capacity sprinkler system which is viewable to its visitors. It is our most important safety feature. We urge all our visitors to consider retrofitting their homes r businesses with sprinkler systems.

No one has ever died from a fire in an American home with an operating sprinkler system.

Portable Fire Extinguishers

This case displays a sampling of portable extinguishers for use in homes or vehicles. The earliest portable extinguishers (except for the bucket) appeared in the 1860s in the form of corked bottles filled with a solution of water and calcium chloride, a chemical that slightly lowered the freezing temperature of water. The "grenade" was simply thrown onto the fire forcefully enough to break it and distribute its pint of water.

Another portable device introduced in the 1890s was a cylindrical tube filled with powdered sodium bicarbonate. At a fire, the tube was opened at one end and the baking soda was spread on the fire. While more successful than the water grenade, it was used minimally.

Just after World War I a new type of grenade appeared. It was filled with carbon tetrachloride, a member of the halon family, that works very effectively to extinguish wood, oil, or electrical fires. Carbon Tetrachloride was placed in a variety of bottles, brass syringe extinguishers, and metal containers. Train conductors used them to extinguish overheated wheel bearings on trains; truck drivers used them to knock down engine fires; and homeowners kept them around the house for emergency use. Unfortunately, carbon tetrachloride is a dangerous chemical. It is a serious carcinogen in its original state and, when thrown on a fire, it generates a portion of deadly phosgene and carbon monoxide gas. The people who used the carbon tetrachloride knew that the chemical was dangerous. They simply chose to stay upwind or out of the immediate area. We have not found any accounts of people who suffered ill effects from using the chemical, though undoubtedly some incidents occurred. During the 1960s the Federal Government made it illegal to use carbon tetrachloride fire extinguishers. A wide variety of other chemicals in a finely powdered form came into use in the 1930s. They dry chemical extinguishers have replaced carbon tetrachloride and are in common use today. The powder is harmless and effective but makes a serious mess and is difficult to clean up.

Patent Model Display Case

Until the twentieth century, the U.S. Patent Office required inventors to build a working model of their brainstorms before receiving a patent. Over a dozen varieties of aerial ladder wagons were patented. These models were submitted during the 1880s. By far the most successful aerial designs were the Babcock (No.22) and the Hayes, which was built by La France Fire Apparatus Company (later reorganized as American La France). Babcock and Hayes aerials date from the 1880s. Neither of the models in this case went into production. They lack the maneuverability of the Babcocks' aerial ladder; their construction is not sturdy; their lifting machinery to get the aerial into its proper elevation is weak; and the aerial ladders themselves are too fragile. The roof ladder with the folding ridge pole hooks is a good idea that has been used by many ladder manufacturers down to the present day.

Theater Exhibits

Helmet and Memorabilia Display Cases

On display are over 100 fire helmets from all over the world. Most nations patterned their helmets after military styles. Only the United States favored a design specifically intended for firefighting. Today most nations have specially adapted fire helmets.

Fire Fighting Memorabilia

Among the objects on display are speaking trumpets used by fire chiefs to direct their companies at fires. The more elaborate trumpets were ceremonial pieces presented to fire officers at special occasions. The plain trumpets, some of which are dented from years of use, were as important to fire company officers as bullhorns are to modern fire officers. The origin of the wooden statue of St. Florian is unknown. It was probably built for use in a Catholic Church in Chicago patronized by Poles, Czechs, or Germans. St. Florian is a popular saint among Central European countries, especially Poland. He is a patron saint of firefighters.

32. American LaFrance Type 700 fire engine. 1951

American La France introduced the model 700 in 1946. The cab forward/ midship engine model increased maneuverability, allowed easy access to the pump and engine, and seated a full engine company. This made it unnecessary for crewmen to ride to the fire on running boards or the rear “step”, a practice which had killed hundreds of firemen. Soon most American manufacturers copies the “cab forward” style.

This rig was used by the town of Miami, Arizona. It was in service until about 1985. It has American La France’s largest engine, the V-12, and a 1,250-gpm pump. It has unusual swivel connections for its suction hoses that allow the pump to be hooked up to a hydrant in a shorter time than the usual method. It is in running condition and has a complement of other equipment, which has been removed to make boarding the engine more convenient and safer. The city of Miami, Arizona donated this fine fire engine to the Hall of Flame in 1996.

We invite our visitors to climb aboard the truck and examine its controls. We request parents and guardians to supervise the children in their care to prevent injury while climbing on the rig.

33. Mack / Holloway Ladder and Chemical Truck. 1922.

The Baltimore Fire Department bought several Mack "Bulldog" trucks from the Army after World War I. In 1922 the Department’s Maintenance Shops matched this 1919 Type AC Mack with a Holloway horse drawn ladder/ chemical wagon built around 1885. The truck went into service at Ladder Company 24 in 1923 and remained in use until 1952. As late as 1960 fire departments used escape nets like the one on this truck. Many firemen injured themselves while trying to make rescues with the net, and many of the people who tried to jump into the nets missed, and suffered injury or death. For these reasons the nets were retired from service. Don Hale restored the truck to its original condition in 1989.

34. American La France Type 40 Pumper. 1916.

Built for the downstate Illinois farm town of Paxton, this pumper has a "junior" 350 gallon per minute rotary pump and a generous hose bed. Its pump is almost identical to that used on the 1878 Silsby steam pumper in The National Firefighting Hall of Heroes. On retirement from the Paxton Fire Department, the rig's bell was presented to Chief Popel, who donated it to the Hall of Flame upon the engine's restoration in 1987.

35. Ahrens - Fox Type N Fire Engine. 1931.

Don Hale restored this large piston pumper to its original condition in 1990. It served for almost 25 years with the Rescue Hose Volunteer Fire Company of North Tarrytown, New York. Ahrens-Fox fire engines were highly regarded by firefighters. Their massive piston pumps could draft water from ponds or rivers with great efficiency - a handy capability for towns and cities with harbors or riverfronts. This engine could pump over 600 gpm at pressures approaching 400 psi. Rated capacity at normal pressure of 150 psi was 1,000 gpm. Top speed was close to 40 mph. This engine also has a foam dispenser that allows it to generate Class B foam for use on petroleum fires.

36. American La France Type 75 Triple. 1921.

Edgerton, Wisconsin bought this pumper in 1921. A few years later they removed its chemical tank (like that on the Santa Fe Chemical Car, No. 54 in this gallery) and added a "booster" tank. This is simply a water tank connected by a hose to the engine's pump. Water from the tank flows by gravity into the pump, which can discharge it onto the fire through a small diameter rubber hose stored on a reel near the tank. Water can be applied at once and in a small enough quantity to minimize water damage. The tank can be re-filled from the pump once it starts drawing water from a hydrant. It made no sense to equip pumpers with chemical tanks instead of water tanks, but a few chiefs insisted on their purchase until as late as 1935. Many engines, like this one, were retrofitted with the more capable booster tanks. The engine also features hard rubber tires. Pneumatic tires were common on automobiles and light trucks by 1910 but were not reliable on heavy trucks. Fire engines makers conservatively stuck with hard rubber tires until the mid-twenties, although reliable heavy truck pneumatic tires were available by 1920. By 1930 most departments had replaced their rigs' hard rubber tires with pneumatics that increased the trucks' speed and greatly improved traction on wet or snowy streets. For some reason Edgerton chose to stick with the hard rubber tires.

37. Chicago Fire Extinguisher Co. Chemical Cart. American. Ca. 1890.

This rig uses the chemical reaction of water, sodium bicarbonate, and sulfuric acid to create carbon dioxide gas, which propels water from the tank onto the fire. At a fire, the two-man crew inverted the cart, forcing acid to mix with water and soda. Hose dropped from the basket to the ground, ready for use. Water capacity is about 30 gallons. It ended its career at the Yerkes Observatory, in Wisconsin, around 1950.

38. Seagrave City Service Ladder Truck. 1927.

Seagrave began as a manufacturer of ladders for Michigan cherry orchards. This tradition is evident with the eight high quality ladders carried by this truck. In 1962 its chemical tanks and hose were replaced by a generator and searchlights. Originally owned by Urbana, Illinois, it was bought in 1950 by the town of Downers Grove, Illinois. City Service trucks carried a variety of ladders and tools. With a complement of 4 to 12 firemen, truck companies made rescues and salvaged whatever was possible while the engine company attacked the fire with charged hoselines.

39. Seagrave Fire Engine. 1921.

The Phoenix, Arizona, Fire Department ordered this engine in 1921 for a newly built fire station at 4th Avenue and Moreland (now in downtown Phoenix). With a 1,000-gpm pump and a huge six-cylinder engine, the rig was a powerful addition to the city's inventory of three other engines. It was in service until 1950, when it was sold to a collector from New Mexico. Museum Founder George F. Getz, Jr. found it in New Mexico in 1985. Don Hale restored it in 1991.

40. Ford / Howe Model T Pumper. 1920.

The Howe Fire Apparatus Company adapted its fire pump and booster tank to a Ford Model T chassis for several hundred of these modest little pumpers for the U.S. Army in World War I. This one went as surplus in 1920 to the volunteers of Germantown, Illinois, where it saw service until 1956. The long "squirrel tail" style suction hose came in handy for drafting water from rivers or ponds. The engine could draft water without getting the truck too close to a soggy riverbank.

41. Mack Model 45S "District" Fire Engine. 1948.

During the 1930s many cities couldn't afford Mack's pricey line of first class fire engines. In 1938 Mack introduced a new line of affordable "District" fire engines. Although based on a rugged Mack chassis, the Model 45 used a competent but lower priced Continental six-cylinder engine and drive train, as well as a 500-gpm centrifugal pump. The 45S was smaller than other Macks, but easily met the needs of small and medium sized departments. It was built to compete with engines built on Ford, Chevrolet, and Dodge chassis. Its dual ignition (battery and magneto) made it a first-class engine, but its price tag competed with commercial chassis apparatus. Mack sold a lot of District pumpers. This rig was built in 1948 for the volunteer fire department of Pierre, South Dakota. In 2003 an Arizona businessman donated it to the museum. Don Hale restored it to its original appearance and excellent mechanical condition.

42. American La France Type 400 Fire Engine. 1935.

The town of Norfolk, Ne- braska used this engine from 1935 until the 1960s. It was American La France's largest engine, with a mighty V-12 engine capable of generating almost 250 horse- power. Top speed is over 60 miles per hour. Its 1250 gpm rotary pump sits direct- ly behind the engine, resulting in a majes- tic hood reminiscent of the large touring automobiles of the 1930s. Only about 170 Model 400s were built between 1933 and 1938. Few departments could afford to purchase the pricey trucks. Norfolk had its fire engine painted white. Many towns copied the paint style of nearby large cities. Denver, Colorado painted its rigs white, and many towns in Colorado and Nebraska followed suit. This engine was donated to the museum by Mr. Bernard Lowe. It was restored by Don Hale.

43. Champion / Christie Water Tower. 1897 - 1915.

Water towers came into use around 1880 to fight fires in multi-story buildings. Improved water supplies and steam pumpers made them possible, since they were designed to pump between 1,000 and 3,000 gpm. This one was originally horse drawn. The Toledo, Ohio Fire Department purchased it in 1897. Water towers were used only for large fires. The lack of hydraulic power to raise and extend the tower made it unwieldy and difficult to maneuver. Most departments preferred to use aerial ladder trucks equipped with play pipes attached to the end of the ladder to play water on fires in tall structures. Alt- hough aerial play pipes could only handle a water flow at about 15% the capacity of a tower pipe, the aerial was much easier to maneuver than a tower. It wasn't until the 1960s that hydraulically powered water towers, called snorkels and Squirts, made the water tower a truly useful firefighting tool. In 1915 Toledo motorized its tower with a gasoline fueled tractor built by J. Walter Christie, a noted automotive engineer. It remained in service until 1950. The model on display with the tower is an 1899 La France steam fire engine that has also been modified with a Christie tractor. Over 1000 horse drawn steamers were equipped with tractors in this fashion between 1910 and 1925. This model has a special value. Senator Barry Goldwater built it from a kit as a gift for Mr. Getz.

44. Bayleys Escape Ladder. English. Ca. 1930.

"Escapes" like this were common in Great Britain and the British Commonwealth until about 1970. This one was mounted on a truck like that shown in the model. At the fire, the escape was detached from the truck, rolled into position, and extended for up to 55 feet. Escapes first appeared in London during the 1820s. A private charitable organization purchased the ladders and hired an operator to set it up on a London street and sit in an adjacent shed until a fire was discovered. At this point he would get the escape into action, securing the help of nearby pedestrians. At sunrise he would move the escape to a factory or church yard for storage until evening. When English paid fire brigades came into existence in the 1860s, they incorporated the escapes into their departments, pulling them with horses. When motorized trucks came on the scene English firemen mounted the escapes in the manner shown in this model. This escape was used by the London Fire Brigade until about 1950. Four men could handle an escape with ease. A comparably sized American "Bangor" extension ladder required a crew of six and was much more difficult to maneuver.

45. 1924 American La France Type 45 Triple Combination Fire Engine.

This engine was delivered to the Volunteer Fire Department of Pullman, Washington, where it was in first line service until 1961, when it was placed out of service and sold to a retired Pullman firefighter. He used it in parades for about thirty years. It was sold to Mr. Jonathan Ornstein of Paradise Valley, Arizona in 1992. Mr. Ornstein donated the rig to the Hall of Flame in 2007. Don Hale restored the engine to its original configuration in 2008. The engine has a 1,000 gallon per minute pump of the rotary style. Its original chemical tank was replaced with an 80-gallon booster tank. It can carry over 1200 feet of hose. These three capabilities make it a "Triple Combination" fire engine. It also carries an extension ladder and a roof ladder, but they were rated only as accessories, like an ax or pike pole. The engine has three spark plugs per cylinder. One set is powered by a battery and controlled by a distributor, allowing the engine to use an electric starting motor. Two sets of plugs are powered by a magneto. This allowed the engine to continue running even if the battery became depleted. Three plugs also provided many sparks to ignite the low octane gasoline used by motor vehicles in the 1920s. Most American La France engines in the early 1920s came with hard rubber tires. This rig was delivered with pneumatic tires that allowed it to reach a top speed of about 35 miles per hour.

46. Seagrave "Standard" Fire Engine. 1928.

The Seagrave Fire Apparatus Company of Columbus, Ohio built this 750 gallon per minute pumper for the town of Downers Grove, Illinois. Seagrave pioneered the centrifugal pump, now the standard for the world's fire services. Centrifugals are high speed pumps, well matched to the speed of the internal combustion engine. Rotary and piston pumps used by other firms were well adapted to low-speed steam engines but required large reduction gear boxes to work with gasoline engines. Centrifugals had other advantages, including simplicity, ease of maintenance and resistance to damage from gritty water. Centrifugal pumps could also take advantage of the pressure available from a hydrant. Most hydrants supplied water at from 40 to 80 pounds per square inch. An engine with a centrifugal pump started operations with this pressurized water before even engaging the pump. Engines with rotary or piston pumps did not enjoy this advantage. By 1940 all but a few American engines were built with centrifugal pumps.

Behind the 1928 engine is a Seagrave Two Stage Fire Pump.
This pump was recovered from a badly damaged 1925 Seagrave "Standard" pumper identical to No. 46. It can be turned by hand..

47. Stutz "Junior" Fire Engine. 1924.

The famous auto maker and racer also built fire engines. Stutz began his fire engine business in Indianapolis in 1919 and built engines and ladder trucks until the Crash of 1929. This rig was his smallest model. The town of Havre de Grace, Maryland bought it in 1924. In 1935 they traded it to the New Stutz Fire Engine Company, successor to the original Stutz firm. The New Stutz people replaced the original hose bed with a combined hose bed and 350-gallon booster tank and sold it to the Indiana town of Farmland, which used it until 1950. In 1982 Mr. John Allen of Indianapolis donated the rig to the Hall of Flame. It was in very bad shape and lacked a motor. It has been refurbished to its 1935 appearance with a 1933 Continental drive train from a REO fire engine. In 2001 the Farmland Fire Department donated the rig's original bell.

48. American La France Type 40 Chemical Car. 1924.

The Atchison, Topeka and Santa Fe Railroad bought this "chemical car" as a quick response rig to attack grass fires along the train tracks near its San Bernardino, California yards. A rig like this is designed to get to a fire in its earliest stages and get its 40 gallons of water (propelled by carbon dioxide gas) into action while the fire is small. It can also carry over a thousand feet of large diameter 2 ½ inch hose, which could be used by another fire engine, or which could be connected to a hydrant. Apparently, there were very few grass fires, since this truck has less than 170 miles on its odometer. The poor condition of the hard rubber tires resulted from the long hours it spent exposed to the California sun. The Santa Fe Railroad restored the rig during the 1950s, possibly for advertising, and moved it to Topeka, Kansas. Mr. Getz, a long-time board member of the Santa Fe, purchased it in 1970 from the railroad and later donated it to the Hall of Flame.

49. Brockway Chemical and Hose Truck. 1915.

The Brockway Truck Company of Cortland, New York built a few fire trucks such as this light duty rig purchased by the town of Kutztown, Pennsylvania. Few commercial truck makers built fire equipment because it couldn't be mass produced. After about 1920 Brockway confined itself to making chassis for companies which specialized in fire apparatus. It is worthwhile to compare this rig with the 1924 American La France Chemical Car (No. 48) from the Atchison, Topeka and Santa Fe Railroad. Both trucks have identical purposes and equipment, but the American La France costs over twice as much as the Brockway. The ALF, however, has a much more rugged engine and frame, well matched to the 650 pounds of weight of the chemical tank, plumbing, and booster hose, plus the 800 to 1,000 pounds of large diameter hose in the hose bed and the 600—800 pounds of firefighters riding the tailboard. The Brockway is too light and underpowered for this equipment. It has a lighter chemical tank and would carry only a few hundred feet of hose, plus a crew of four. It was minimally acceptable for the few runs generated in such a small community over the course of a year. Brockway parts were readily available. It was as much of a rig as a small volunteer department could afford.

The museum owns another Brockway that was built in 1921 as a half ton pickup truck called the Torpedo. American La France purchased Torpedo chassis, equipped them with a variety of chemical tanks, and sold them at affordable prices to small departments. Our Torpedo was sold to the town of Lookout Mountain, Tennessee. It is on exhibit in the museum's wildland firefighting gallery.

50. American La France Type 12 Fire Engine. 1924.

This engine marks the beginning of the Hall of Flame Museum. After having expressed a casual interest a few months earlier to own a vintage fire engine for giving rides to children at their Lake Geneva, Wisconsin home, museum founder, George F. Getz, Jr. received it as a Christmas gift from his wife, Olive. He soon became an enthusiastic collector of fire apparatus and memorabilia. He began the National Historical Fire Foundation, which supports the Hall of Flame. Today the Hall is the nation's largest firefighting museum, and Mr. Getz' grandson is now the museum's president.

Called "No. 1" because it was the first object in the collection, the pumper was used by the fire department of Oshkosh, Wisconsin until the 1950s. Sometime during its career it was repainted, its chemical tank was replaced with a water tank, and its hard rubber tires were replaced by pneumatic tires. The rig was restored in 1991 by Don Hale to its 1955 appearance rather than its appearance when it was shipped by American La France in 1924.

American La France was the nation's largest maker of custom apparatus in the 1920s, and the Type 12 was probably its most popular model with city fire departments. It used a 1,000 gallon per minute rotary gear pump driven by a six cylinder engine that generated well over 100 horse- power and a considerable amount of torque, the twisting power that really defines an engine's capabilities. American La France built its own engines because commercial truck engines usually lacked the torque and the endurance to drive a stationary 1000 gpm fire pump for hours at a time without overheating or damaging pistons, connecting rods and valves. In its advertisements La France printed a letter from a fire chief in Alaska who had pumped his Model 12 at a mine fire for three days in freezing temperatures, stopping only to change engine oil and replace broken sections of hose. His Type 12 drafted water from a murky tailings pond and pumped it over 1,000 feet to the seat of the fire. A performance of this scope would tax the capability of a modern engine, to say nothing of a 1924 Type 12.

51. Merryweather Fire Engine. English. Ca. 1915.

This English engine employs a novel three-cylinder piston pump that was used on English fire engines as late as 1940. It was sold to the city of Lima, Peru in 1920, where it joined the International Engine Company 14. Retired in 1957, it came to the United States in 1979. The Museum acquired the rig in 1984, and it was restored by Don Hale in 1985.

In Peru, the original hard rubber tires were replaced with pneumatics, but little else was done. English fire apparatus was very popular with South American nations, and Merryweather, England's oldest manufacturer, dating back to the 18th century, made very high-quality apparatus. It has what is called a Braidwood body, named after the design of a London fire chief of the 1830s, who designed horse drawn man pumped engines that allowed the crew to sit atop the rig's hose "bin". Number 26 in Gallery I, a Shand Mason steam pumper from Rugby, England, also has a Braidwood body. The design proved unsafe for motorized rigs, which could easily throw a fireman from his seat in a crash or violent turn. In the twenties English makers introduced engines with bus like bodies that protected firemen. A few American makers introduced similar designs, but they were unpopular. Closed cabs for American fire crews were not made in significant quantities until the forties, and even then, many American firemen rode the tailboards or running boards of their rigs. Accident rates were very high.

52. Brush Model D Chief's Buggy. 1910.

The Fire Chief of the Owensville, Indiana Volunteers used this 900-pound runabout as his official vehicle until 1920. Local legend has it that he was passed while on his way to a fire by a young boy on a bicycle who wanted to see the fire. The little car, with its one-cylinder engine, wood frame, and wood axles, went into retirement shortly thereafter.

This exhibit is currently on loan and is not on display.

53. American La France Senior 400 Triple. 1938.

Following his restoration of the Norfolk, Nebraska Type 400, Bernie Lowe purchased another Senior 400 once used by the Burlington, Iowa Fire Department. After almost ten years the engine was restored to its original appearance. Bernie then donated this rig to the Hall of Flame. Most fire historians regard the La France Senior 400s as the most attractive of American fire engines. Less than 200 were built during its five years of production – they were too expensive for most Depression Era fire departments. Less than a dozen have survived. Thanks to the generosity of Bernie Lowe, the Hall of Flame is proud to display two fully restored Type 400s. (The other Senior 400 is No. 42 in this gallery)

54. Waterous Hand or Horse Drawn Pumper. 1918.

The Waterous Pump Company of St. Paul, Minnesota was the first American maker of gasoline engine powered pumpers, introducing their first model in 1898. This model appeared in 1906. It is a transitional engine spanning the steam powered fire engine and the motorized engine. Waterous connected one of their excellent rotary pumps, rated at 350 gallons per minute, to a Wisconsin four cylinder gasoline engine. It was light enough to be pulled to a fire by either men or a team of horses. The gasoline engine was much easier to maintain and operate than a steam engine and boiler, and weighed several hundred pounds less than a steamer of similar pump capacity. The engine needs no radiator. Instead water from the pump is circulated into engine's the water jacket and discharges onto the ground. This engine was built in 1918 for the town of Plainfield, Wisconsin. It was restored by Don Hale.

Motor Power

Fire departments all over the world were quick to trade in their horses for motor-powered apparatus. It was costly to buy, train, and maintain horses, whose service life rarely exceeded ten years. As early as 1901, their chief of the New York City Fire Department traded in his horse drawn buggy for a "Locomobile". A number of departments purchased gasoline engine powered pumpers like the Waterous engine on exhibit in this gallery (No. 54), which appeared in 1898. Other added gasoline engine tractors to their horse-drawn apparatus, like the water tower in this gallery (No. 43). By 1914 several companies in the United States and Europe were building fire engines with large gasoline engines that powered both the truck and the pump. As soon as their budgets allowed, fire chiefs replaced all their horse-drawn equipment with motorized models. By 1925, all but the smallest American communities were entirely motorized.

Right-hand Drive

Many visitors wonder why sp many of the engines and ladder trucks on exhibit have their steering wheels on the right. The reason lies in the manufacturing practices of the fire apparatus companies. In the years 1910-1915, the large fire engine builders made their own engines, and they were designed with right-hand drive, which was common in those days. When the United States shifted to left-hand drive, the fire engine builders saw no need to go to the expense of redesigning their engines to move the steering column. Since many of the old engines stayed in production until the 1930s, a lot of fire trucks had right-hand drive. Engine designs dating from the 1920s and later use left-hand drive.

Motorized Fire Pumps

The first motorized apparatus used pumps of similar design to those of steam fire engines – piston pumps and pumps that use gear-like rotors to draft and pump water. Both pumps ran well at from 200 to 400 rpm, a speed that matched up well with most steam engines. Gasoline engines, however, operated at over 1,000 rpm. This required pump builders to install bulky transfer cases to step down the high rpm engine output to the low rpm pump. This added complexity, weight, and cost to motorized apparatus. Another disadvantage with these "positive displacement" pumps was their inability to make use of hydrant pressure – the pressure of water from a hydrant was "0" to these pumps. One major builder, Seagrave, used only centrifugal pumps. Seagrave had never built steam fire engines, and was willing to experiment with centrifugals, which ran best at over 1,000 rpm, and which consequently were relatively cheap to install. Centrifugals could also take advantage of hydrant pressure, creating a higher pressure at the pump discharge with no extra effort by the pump. But centrifugals required an auxiliary "priming" pump to draft water from a river or cistern. By 1930, centrifugal pumps were recognized as cheaper and more efficient that piston or rotary pumps. By 1940, most fire engines used centrifugals. Today, all fire engines employ centrifugal pumps.

Firefighting by the Middle of the Twentieth Century

The internal combustion engine revolutionized firefighting technology and allowed firemen to capitalize on several other important engineering innovations. By 1925, most city fire departments had pumpers which could travel at over 40 miles per hour, pump over 750 gallons per minute, and carry 1200 feet of hose. Most American cities had water supply systems that could supply several of these pumpers at a single fire. The cities also provided their fire departments with miles of paved roads and secure buried fire telegraph lines connected to advanced central fire alarm headquarters. Single story fire stations were replacing the multi-story central stations that typified the horse-drawn era. Firemen were receiving specialized training to use this new equipment at local fire science academies. Several colleges added fire science to their curricula, and insurance underwriters encouraged professional and volunteer fire officers to become experts in fire engineering. Rescue companies of highly trained firemen appeared in many cities after 1915. They specialized in rescuing people from auto wrecks, fires in bridges, tunnels, and other unusual situations. By 1930, several departments had ambulances, and a few firemen were beginning to specialize in first aid for fire and accident victims. Departments were beginning to use wireless radio technologies, and radio systems were common on large city departments by the beginning of World War II. A fireman of 1890 would have been stunned and fascinated by the technology available to a fireman of 1940.

Breathing Apparatus

Until about 1910, firefighters had no truly effective tools to allow them to enter smoke-filled areas. Out of necessity, their tactics were defensive—attacking fires by pumping large quantities of water from positions outside a burning structure. The only device available was a smoke mask connected by a flexible pipe to a bellows located outside the fire. A firefighter with a smoke mask could get a few feet into a smoky area, but his supply of air was tentative and isinglass eyepieces provided little visibility. Around 1910, the Draeger Company of Germany introduced a rebreather. Several other American and European companies followed. This device removed carbon dioxide from already breathed air and mixed it with a quantity of pure oxygen to allow entry into a smoky or poisonous atmosphere. Rebreathers were expensive, complicated, and subject to breakdown. American fire departments used them only when they knew that an area contained poisonous gases or very low levels of oxygen.

One of the mannequins in the Hall of Heroes is equipped with a rebreather.

During World War II, several companies developed self-contained breathing apparatus for use in high-altitude aircraft. After the war they adapted these devices to be used by firefighters. They used tanks of compressed air and efficient metering equipment, allowing firefighters to survive for 15-30 minutes in a hostile atmosphere. SCBAs did not become required equipment until the 1970s, when the firefighter union, the National Fire Protection Association, and the federal government made them mandatory equipment. Together with improved clothing, SCBAs have made it possible for firefighters to make rescues and interiors attacks on fires that would have been impossible just a few years prior.

55. Gamewell Municipal Alarm System. 1925.

This system served the City of Glendale, California, from 1925 to 1970. It's builder, the Gamewell Company, dominated the market for over a century. It has three parts: a system of street alarm boxes, the Central Station, and a system of gongs and repeaters at each fire station.

A. The Street Box:

Each box has its own unique number, which matches a street intersection. When its trip lever is depressed, it releases a clock- like spring mechanism, which opens and shuts a telegraph key, sending the box number to the Central Station. For example, the number of the box on display is 13. It sends this signal to the Central Station, whose operator then knows that there is an alarm somewhere close to Box 13. Glendale had over 250 boxes like this in use, connected to the Central Station by telegraph wires.

B. The Central Station.

The Central Station usually shared the fire department headquarters. A box alarm alerted the operator in two ways: it sounded its number on the station's gong, and it punched out its number on one of the station's tape "registers". In our case the signal is 1-3. The operator then set the station's "repeater" to 0013 and sent the same alarm to all fire stations in the city.

C. The Fire Station.

Each station had a gong, a punch tape, and a list of box locations and assignments. When the box number rang out at the fire station, the fireman on "house watch" checked the box number against his company's assignment list. In our case the gong would ring 1—3, and the punch tape would be punched with 1 perforation, a space, then 3 more perforations. If his company was supposed to respond to that box, then he got his company on the road to the fire.

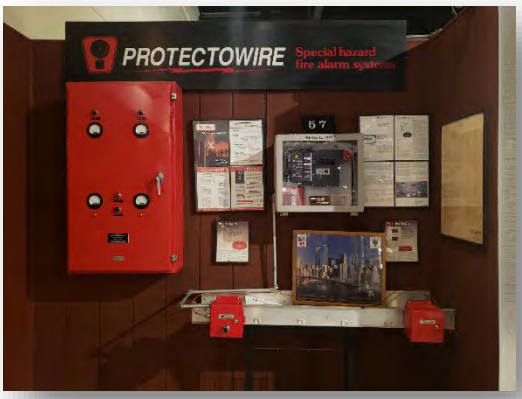
This system works. Please ask a docent to demonstrate it for you.

56. Phoenix Fire Department Alarm Room System. 1956 - 1982.
Although reliable, fire alarm telegraph systems had a lot of faults. They were inflexible — limited to the system of street boxes. Each alarm went to every fire station in the city; and the system took no advantage of the telephone and the radio to send alarms. Fire department leaders fought the use of the telephone because they mistrusted the caller's ability to send in an accurate alarm. They also mistrusted the speed and reliability of telephone exchanges, fearing that a message would not get through in a reasonable time. Finally, they lacked the skills in telephony to design and install large switchboards. The builders of the fire telegraph systems naturally encouraged this attitude toward the telephone. In 1956, the Phoenix Fire Department decided to design an alarm system that would use the existing telegraph system while also taking advantage of modern telephone and radio technology. Firefighters Rae A. Echols and John Simmons built this system from scratch, using a blend of new equipment with military surplus relays and vacuum tubes. Each street intersection in the city had an IBM punch card coded with the names of the companies assigned to respond on the first and subsequent alarms. When a call came in by phone or telegraph it was handled by the telephone operator and referred to one of the two dispatchers for action. The dispatcher located the punch card corresponding to the fire location and placed it in a sender which lit up the dispatching console with the numbers of only the responding companies. The dispatcher then notified those units over the radio and by telephone of the alarm and its location. The alarm room commander could also use the telephone system to contact other fire departments, hospitals and senior officers. The status map told the commander immediately which companies were available and which were on runs.

Over the years there were many improvements. Microfiche readers with city maps helped dispatchers to find street intersections and provide responding units with directions and hydrant locations. Tape recorders kept all calls, adding a time and date stamp. This was the first system in the United States to use an electrical system of relays in a binary system. It worked like a modern computer, although it had no memory and could not be programmed to follow a computer language. Alarm technicians from all over the world visited the Phoenix Alarm Room and copied its designs for their own cities. The computer revolution led to enormous changes in fire alarm systems and soon made this one obsolete. It was replaced by a "911" computer assisted dispatch system in 1982. In 1998 this second system was replaced in its turn. In 1985 the City of Phoenix donated this original system to the Hall of Flame.

57. Protectowire Fire Detection System. 1940-2012.
It provides an automatic fire alarm for large buildings or for structures with hostile working environments. It uses lengths of a special heat sensitive cable which can be installed in runs of thousands of feet. In the event of a fire the cable sends a signal to the control console. The console calculates the distance from the console to the fire. Protectowire cable systems thus provide continuous alarm service, as opposed to a smoke or heat detector which covers a distinct but limited area. Protectowire systems are popular in power plants, bridges, conveyor belt structures, mills, and warehouses.

This exhibit, which was installed by Protectowire, simulates a run of Protectowire cable in a duct full of telephone cable. It operates to simulate an alarm. Firmly press one of the large red buttons. The cable will send its location to the console, flash a strobe lights, and make an audible alarm.



58. Seagrave Quad Fire Engine. 1955.

Seagrave introduced this engine in 1951, the company's 75th year of operation, and named it the Anniversary Model. It was intended to compete with American La France's radical cab forward /midship Type 700 engine , but the Anniversary Model differed little from its predecessors of the 1930s and 40s beyond styling. Its engine, pump, and hose carrying capabilities were the same. But the Anniversary Series was very well received in the fire service because of the high quality of its construction and the reliability of the drive train and pump. Almost 2,000 were built over the next dozen years. Twenty-eight Quads were built, including this rig, used by the fire department of Oak Lawn, Illinois. Quads were popular in towns like Oak Lawn, which had relatively few fires and which sought to combine the roles of a ladder truck and engine. A quad carried at least 200 feet of ground ladders, many more ladders than the more common "triple" engine, which usually carried a single extension ladder and a roof ladder. This Quad stayed in service until the early 1980s, when it was refurbished and placed in reserve. Its original V-12 gasoline engine was replaced by an equally powerful 8-cylinder Cummins diesel. The Oak Lawn Fire Department donated it to the Hall of Flame in June of 1998. Oak Lawn proudly displayed an "ISO 1" rating. Less than 40 fire departments in the United States have this rating. A consortium of insurance companies gives a rating, from 1 to 15, to every municipality in the U.S. that applies for fire insurance. Class 1 has the lowest rates because its fire protection system is judged to be the best possible.

This apparatus is one of several that rotate through Gallery 3 during the year and may not always be on display.

59. American La France Type 700 Aerial Ladder Truck. 1955.

The volunteers of Baldwin, New York put this Model 700 aerial truck into service in their Long Island town in 1955. Twenty years later they sold it to the town of Lynnfield, Massachusetts. In 2000 the town of Lynnfield donated the truck to the Hall of Flame. It's 45 years of front-line service is a testimony to the quality of its design and construction. The truck was designed for a volunteer department, so it has several compartments for each firefighter's helmet and equipment. The truck would often be driven to a fire with just a few of its crew, with the remainder joining the truck at the scene, donning their turnouts, and going into action. Its 75-foot aerial extension ladder could be put into action very quickly. The ladder, or "stick" could be used to gain access to upper stories or a roof for ventilation and rescue. It's "ladder pipe" could also be connected to a 2 ½" hose and used to play large quantities of water from high above the ground. It carried a wide range of accessories, including a generator to provide electricity for power saws, a positive pressure fan/ smoke ejector, and a wide variety of extrication tools, axes, and pike poles. When built the truck had a compartment for the canister equipped breathing masks that were popular until the 1960s, when the far more capable self-contained breathing apparatus took their place. During the 1990s the Lynnfield Fire Department replaced the rig's original gasoline engine and manual transmission with a powerful diesel engine and automatic transmission. This improvement made driving the rig much easier and increased its top speed from about 45 mph to well over 60 mph. The photograph with this rig shows the Baldwin, NY Fire Department on review in 1965. This rig is positioned on the far right. In 2001, a crew of Baldwin firefighters drove the truck from the east coast to the Hall of Flame. As part of this trip the museum, Local 493 of the International Association of Firefighters (Phoenix metropolitan area) and the Baldwin FD launched a fundraising program for the families of three Keokuk, Iowa firefighters who had died in the line of duty. The truck arrived at the museum in excellent shape, and over $16,000 was raised for the families of the Keokuk firefighters. In 2001 Don Hale, assisted by the Hall of Flame volunteers, restored the truck to its 1955 appearance.

This apparatus is one of several that rotate through Gallery 3 during the year and may not always be on display.

60. Mack Model C Engine. 1966.

The Baldwin, New York Fire Department bought this Mack Model C engine in 1966, toward the end of Model C production. Baldwin insisted on an open cab, a rarity for the late 60s, as well as a Mack gasoline motor. During the 1980s the department replaced the gasoline V-12 with Mack's largest diesel motor and re-built the 1,000 gpm Waterous pump and repainted the engine. The restoration was first rate, and the department kept the truck in a pristine state in first line service until 2009, when it was replaced by a new rig. Wanting to keep their beloved rig in top condition, the Baldwin volunteers donated the engine to the Hall of Flame.

This apparatus is one of several that rotate through Gallery 3 during the year and may not always be on display.

61. Buffalo Fire Engine.

In 1948 the Buffalo Fire Apparatus Company of Buffalo, NY sold the West End Fire Company of Stowe, PA this elegant closed cab fire engine. The designers concealed the pump and connections within the truck's body, influenced by the art deco style of the twenties and thirties architecture and vehicle design. The cab is large enough to carry a full engine company in its two rows of benches. It has a 1,000-gpm pump and a two-hundred-gallon booster tank. The West End Fire Company kept it in excellent condition in the sixty years that the engine was in their house. Except for the hood and front fenders, the paint and striping is original. The Company donated the engine to the museum in 2008.

This apparatus is one of several that rotate through Gallery 3 during the year and may not always be on display.

62. Mack Model A Fire Engine. 1951.

Mack built over 24,000 Model A's, about 300 of which were fire engines. The model was popular with volunteer fire departments. Its 550 cubic inch gasoline engine's 180 horsepower is more than adequate for it's 500 gpm pump. Top speed is over 60 miles per hour. The engine served the town of Eagle Valley, New York. Don Hale restored it in 1994.

This apparatus is one of several that rotate through Gallery 3 during the year and may not always be on display.

63. ERF/HCB-Angus Pump Escape. English. 1968.

Hampshire Car Body – Angus built over 6,500 pieces of fire apparatus during its 61 years of existence between 1933 and 1994. The firm built this rig for the fire service of Nottinghamshire. It served the town of Retford until its retirement around 1980. It was eventually owned by Mr. And Mrs. Peter Eichorn, who donated the rig to the museum in August of 1998. The rig is built on an ERF chassis. ERF (E.R. Foden) is a major English builder of heavy-duty trucks and buses. It has a rear mount 750 gpm pump (with engineer panels on both sides of the truck), a 500-gallon booster tank, and capacity for about 1,000 feet of hose. Its Perkins V-8 diesel engine allows it to travel at well over 60 miles per hour, and its crew compart- ment can accommodate 7 firefighters. It is also equipped with a Merryweather escape ladder which four men can remove from the rig, wheel into position, and extend to a length of 55 feet. Most of the rig's body is made of wood with aluminum cladding. The red portions of the truck are fiberglass. This greatly reduces its weight.

This apparatus is one of several that rotate through Gallery 3 during the year and may not always be on display.

1996 HME/Saulsbury FDNY Rescue 4

In Autumn of 2018, the museum received the donation of FDNY's Rescue 4 from retired FDNY firefighter Robert Allen. Mr. Allen purchased the rig from the Rescue Remembrance Project, which had owned the truck since 2011. It was on exhibit in San Diego when Firefighter Allen, an officer in the Remembrance Project, purchased it and donated it to the Hall of Flame Museum. The truck is one of the most significant pieces in the museum's collection because of its role in responding to the attack on the World Trade Center on September 11, 2001. The truck is a 1996 HME/Saulsbury, one of five identical rigs purchased by the FDNY in 1996—one for each of the city's five boroughs. This rig was assigned to Rescue Company 4 in Queens.

On the morning of September 11, 2001, Rescue 4 responded to the attack on the World Trade Center, arriving two blocks east of the South Tower, at 195 Broadway. The truck carried eight firefighters to the South Tower: five regular crew members plus three firefighters detailed from Squad 288, Rescue Company 5, and Ladder Company 136. Rescue 4's captain, Brian Hickey, was detailed to Rescue 3 and went to the Trade Center on Rescue 3. Captain Hickey, as well as all eight of the firefighters who responded in Rescue 4, were killed in action while rescuing victims from the South Tower. The crew members were Lt. Kevin Dowdell and firefighters Terrence P. Farrell, William J. Mahoney, Peter A. Nelson, Darrell V. Pearsall, Peter Brennan (detailed from Squad 288), Alan Tarasiewics (detailed from Rescue 5), and Michael J. Curley (detailed from Ladder 136).

343 FDNY firefighters, one volunteer firefighter, 23 NYPD officers, and 37 Port Authority officers died in the collapse of the World Trade Center towers. A total of 2,819 people died in the collapse.

Ninety-eight FDNY vehicles were destroyed, including Rescue 1 and 2; Rescues 3 and 5 were heavily damaged. Rescue 4 was moderately damaged and returned to service after about a month of repairs. Rescues 3 and 5 returned to service within a year.

Rescue 4 remained in service until 2011, when it, together with Rescues 3 and 5, were scrapped. At this point, a group of Chicago-area firefighters organized a foundation, called the Remembrance Rescue Project, to purchase Rescue 4, restore it, and drive it around the United States to honor the firefighters of New York City. The rig's cab doors had been removed, and were replaced with the doors from Rescue 3, which was beyond salvage. Later in 2011 the Project purchased Rescue 5 from the scrapyard, as well. The Project trucked the two vehicles to the Chicago area, where they were both restored to original condition. Between 2012 and 2018, the vehicles were driven to dozens of venues where they were placed on display.

The Hall of Flame has an extensive exhibit which honors the firefighters and police officers who died on 9/11 and hosts annual memorial ceremonies. Rescue 4 compliments these exhibits in a very powerful way. On the exterior of the rig are the names of the Rescue 4 and Rescue 3 crews, as well as the names of other members of Rescue 4 who have died in the line of duty.

Seagrave Pumper P-Series. 1973

Founded by ladder builder Frederic Seagrave in 1881, the Seagrave Corporation would go on to be the largest continuous builder of fire apparatus in the United States. The first complete apparatus they manufactured would be horse-drawn ladder and chemical wagons and towers, before entering the motorized fire apparatus market in 1907. In 1908, Seagrave exhibited their complete line of aerial ladder trucks, pumpers, and chemical cars at the convention of the International Association of Fire Engineers in Columbus, Ohio, then home to the Seagrave factory.

Through the first half of the 20th century, the Seagrave Corporation acquired many of their suppliers and eventually had control over most of the major components used in the building of their apparatus. In the 1930s, Seagrave introduced the canopy cab and in 1936 the city of Detroit purchased the first Seagrave Safety Sedan cab—where the canopy cab extended over the entire body length of the apparatus for the first fully enclosed apparatus in the United States. Starting in 1959, Seagrave would join American La France and Crown in offering a cab-forward option with the introduction of their K-series for their engine and aerial ladder apparatus. In the early 1960s, the FWD Corporation acquired Seagrave and, by 1963, manufacturing operations were moving to Clintonville, Wisconsin.

This 1973 Seagrave pumper from the city of Benson, Arizona represents Seagrave's second-generation entry into the increasingly competitive cab-forward market of American fire apparatus. This cab configuration and related frame was designated the P-series by Seagrave and served as the chassis to build many pumpers and aerial ladder trucks, in addition to specialized apparatus from 1969 to 1982. It is powered by a Detroit Diesel 6V71 with a five-speed manual transmission and rated at pumping at least 1250-gallons of water per minute.

Today, Seagrave offers a full line of custom pumpers, aerial ladders, and elevating platforms, including the venerable Baker Aerialscope, in addition to several specialized apparatus built to satisfy unique orders. Many fire departments from coast to coast, including those of New York City, Washington, D.C., and Los Angeles, have been long-time Seagrave customers.

This apparatus is one of several that rotate through Gallery 3 during the year and may not always be on display.

Intl. Harvester Loadstar 1700. 1968

In the business from 1902 to 1985, Illinois-based International Harvester was a major manufacturer of tractors and other heavy equipment, including fire trucks. This truck, equipped with a front-mounted Barton-American pump, was acquired by Chief Edwin Whalen of Limestone Fire Protection District in 1968, for use fighting both structural and brush fires in the small community of Kankakee County, south of Chicago.

The four-wheel drive vehicle has off-road capabilities, for rolling across ditches and into open fields to fight fires. Though the rig's pump mount was damaged on its maiden voyage—fighting a brush fire at a quarry—it racked up a long and celebrated history during its more than 20 years with Limestone, culminating in 1991 with its participation in a Phillips Petroleum pipeline fire, in which it pumped more than two million gallons of water over more than three straight days.

That same year Limestone sold the rig to the town of Plainville, in southwestern Indiana. In 2017 it was re-acquired by Limestone firefighter Mike Whalen (Edwin's grandson), who restored it with his sone Luke fore use as a parade vehicle; they donated it to the Hall of Flame in 2020

This apparatus is one of several that rotate through Gallery 3 during the year and may not always be on display.

Van Pelt/Diamond-T Pumper. 1957
Founded in 1925 in Oakdale, California by P.E. Van Pelt, a former executive with Dodge Brothers Motor Company, Van Pelt was, for a time in the 1940s, the most popular manufacturer of fire trucks in the western U.S. Constructing their apparatus on chassis built by other companies, they began using their own custom chassis around 1960. This truck was one of two built for the City of Mesa, Arizona in 1957. Constructed on a Diamond-T chassis, it originally came equipped with a Hall-Scott gasoline engine; Mesa replaced this with a diesel engine in 1982. It also had a pump which could supply water at a rate of 1200gpm. Affectionately known as the "Red Rat" because of the appearance of its majestic front end, the truck was with Mesa until 1987 (the year that Van Pelt went out of business), after which it spent a few years as an associate vehicle in the Meadview, Arizona fire department, then became part of a private collection in Carmel, California. This collector donated it to the Hall of Flame Museum in 2018.

Maxim/Pierce Snorkel Fire Pumper. 1971
Developed in the late '60s, "snorkels," hydraulically-lifted articulated aerial booms supplied by pipes running to a basket at the top, were an advancement on the less flexible "water towers" used since the 1880s (see exhibit 43 in Gallery 2). This 75-foot snorkel—made by the Middleborough, Massachusetts-based firm Maxim, in collaboration with Appleton-Wisconsin-based firm Pierce—was commissioned by the fire department of Munster, Indiana, who kept it in service until 2002. Thereafter it spent several years with the Riverdale, Illinois fire department, who later donated it to the Hall of Flame.

American La France Century-series Triple Combination. 1977
This handsome engine was built for the fire department of South Elgin, Illinois. The model was typically armed with a two-stage centrifugal pump capable of delivering 1500-gallons of water per minute, with a tank capacity of 500-gallons, and was driven by a 350 horse-power Detroit Diesel engine and Allison four-speed automatic transmission. The "Worthington" markings refer not to a location or department, but to Michael Worthington of St. Charles, Illinois, a Motorola executive and volunteer firefighter who, as a friend of Phoenix Fire Chief Alan Brunacini, has close ties to the Arizona Fire Service. Mr. Worthington obtained the South Elgin rig after its active service and extensively restored and re-equipped it to its current top-notch condition. After Mr. Worthington passed away in 2015, his wife Ann and children donated the rig to the Hall of Flame. It has become a favorite in Phoenix-area parades and other public events.

First Line Fire Engines

Motorized fire engines have evolved in four basic stages since their introduction around 1910. Between 1915 and 1925 about a dozen makers provided first line rigs with centrifugal, piston, or rotary pumps rated at about 750gpm, with large custom built gasoline engines, hard rubber tires, chain drive, minimal brakes, and a small water or chemical tank.

From 1925 until 1940, a first-class fire engine featured pneumatic tires, shaft drive, a 1,000-gpm centrifugal or rotary pump, a large V-12, V-8, straight 8- or 6-cylinder gasoline engine with manual transmission, a 200-gallon water tank, and hydraulic or vacuum assisted brakes on all wheels. Firemen rode on the running boards or rear step.

After World War II, American La France introduced the cab-forward pumper with seating for four firefighters, a 1,250-gpm pump, a 500-gallon water tank, a large V-12 engine, a deck gun for high volume output at major fires, and radio transmission capabilities. Competitors matched and, in some cases, improved on these features.

The present era began around 1965 with the switch to very large diesel engines and automatic transmissions, air power brakes, 1,500 to 2,000-gpm centrifugal pumps, 500 to 1,000-gallon water tanks, closed cabs with seating for up to six firefighters, air conditioning, and advanced radio communication systems—many of which are connected to computer assisted dispatch systems. Today's makers use commercial engines, transmissions and pumps with custom chassis, hose beds and cabs. Since about 1990, many pumpers have been equipped with compressed air foam systems for use on structural fires. These systems are most efficient at putting out fires and use much less water, drastically reducing water damage. Compressed Air Foam also works well in rural areas where there are often no hydrants.

Second-Line Rigs

Many towns could not afford to purchase first-line engines for fire departments, or their water supplies and structure at risk did not justify a large engine. During the period 1915-1925, many towns bought “chemical cars” equipped with one to six chemical tanks like those in use since the 1870s. These rigs were useful for quick attack, but of no value at a serious blaze. To address this need, several makers equipped Ford, Chevrolet, REO, or similar chassis with a 350 to 500-gpm pump, a few hundred feet of hose, and a chemical or booster tank. This was a big step up from a chemical engine.

During the 1930s even large cities could not afford first-line rigs. Manufacturers responded by turning out capable engines on Ford, Chevrolet, Diamond T, Dodge, and similar 1 ½ ton chassis with 500 to 750-gpm pumps, a medium-sized motor, and an 80 to 150-gallon water tank. These rigs were used until well into the post-World War II era; a few are still in use, or at least in reserve, to this day.

Engines built today on commercial Ford, International, GMC, or similar chassis are only second-line compared to the awesome capabilities of modern first-line engines. They typically have a 1,000-gpm pump, a 500-gallon water tank, storage for thousands of feet of hose, and dozens of specialized tools. The modern American fire service, from small volunteer companies to large municipal departments, has the finest fire engines in the world.

Alarm Systems

America’s earliest alarm systems used the rattles and bells of night watchmen to alert townspeople. As cities grew, bell and lantern systems (such as Philadelphia’s famous Liberty Bell) were installed in public buildings. During the 1840s, several inventors began to sell systems based on the newly invented telegraph. After the Civil War, these systems, mostly sold by the Gamewell Company of Newton Upper Falls, Massachusetts, became widely popular in American towns and cities. The system was fully developed by about 1900 and served unchallenged until the 1950s. Telegraph systems were extremely reliable, but they were costly to install and intimidating for many citizens to operate. People preferred to call in fires on the telephone.

By the 1960s, fire departments began o install telephone systems capable of handling many calls, and radio systems were also installed to communicate with individual firehouses and with fire officers at the scene of a fire. Computers and advanced telephony devices made it possible to install computer assisted dispatch (CAD) systems using a universal number—911.

Today’s alarm systems, like the Phoenix Fire Department’s state-of-the-art facility, allow dispatchers to send equipment, provide emergency medical advice, and control many firefighting teams in an extremely efficient manner. Despite these advances, however, several departments have kept their reliable, independently powered telegraph systems in use as reserves in the event of power or telephone failure.

64. Ahrens Fox "Quad". 1930.

This rig was built for the village of River Forest, Illinois. Fox called it a "Quad" because it had four capabilities: a large 1,000-gpm pump; a 100-gallon water storage tank and small diameter “booster” hose for quick attack; over 200 linear feet of ground ladders; and storage for over 1000 feet of large diameter hose. Standard fire engines were typically "Triples" – they lacked the ability to carry more than a pair of small ladders. Quads supposedly filled the need for an aerial ladder truck, being able to attack the fire with its pump and to provide ladders for rescue and ventilation. In practice quads proved to be good pumpers but mediocre to poor ladder trucks. This "Quad" served River Forest well until the 1960s, when the town donated the piece to the Hall of Flame. Since the 1970s the Quad has carried the directors of the Fiesta Bowl in its annual parade through downtown Phoenix. It was restored to its original condition in 1993 by Don Hale.

65. American La France Type 31 Aerial. 1919.

Asa La France patented the design for this "spring assist" aerial in 1903. Originally built to be pulled by horses, the design was adapted to motorized tractors and was manufactured until about 1940. Because of its long wheelbase, it is steered from both the front and rear. The “tiller man” turns his wheel in the opposite direction of the truck’s driver, providing impressive mobility for such a large vehicle. Many modern aerial trucks still employ tiller men. It uses two large helical springs to elevate the ladder to the vertical position. Every action after that is performed by hand.

At a fire the “tiller man” removes his steering wheel and places it to the side. He then stands on the end of the ladder as it is lifted skyward by the expanding springs. The rig’s crew then turns the cranks to extend the ladder to its 75 foot length and rotate it on its turntable. The tiller man is now in position to enter a burning building to search for victims or to rescue people waiting by windows. He might also climb from the ladder onto a roof to chop a hole and “ventilate” the fire, allowing smoke and hot air to escape. In other cases the tiller man would connect a length of 2 ½ inch hose to the “ladder pipe” mounted at the aerial’s tip. He could then play as much as 250 gallons of water per minute onto a fire. This rig was built for the town of Danville, Illinois. It could make rescues in buildings up to six stories high. It also saw service in Cairo, Illinois until about 1960. It was restored in 1986 by Don Hale.

66. Ford / Pirsch Fire Engine. 1935.

Rural communities purchased rigs like this for use by their fire departments. Built by the Pirsch Fire Apparatus Company on a Ford chassis with the famous “flat head” V-8 engine, with a hose bed, booster tank and pump , the rig was both capable and affordable. It could be repaired at any Ford dealership and could easily be driven by anybody who could drive an automobile. Its 500-gpm rotary pump, 600 feet of large diameter hose, and 100 feet of booster hose for quick attack was about one half of the capabilities of a first-line American La France or Seagrave but was adequate for most fires.

During the Great Depression many large departments bought rigs like this to supplement their large engines, which were too expensive to replace. Similar rigs were built by all manufacturers on a wide variety of chassis by Studebaker, Chevrolet, Dodge, International, REO, Brockway, and other truck makers. This rig served the town of Slinger, Wisconsin from 1935 until the early 1960s, when it was donated to the Hall of Flame by the Slinger Fire Department. It was restored by Don Hale in 2002.

67. Seagrave V-12 Model 900 Engine. 1947.

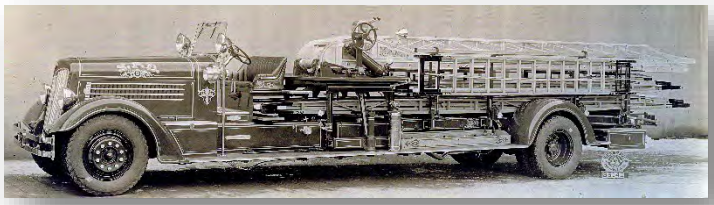
In 1932 Seagrave introduced a V-12 engine to replace its T head straight six-cylinder engines that dated from the teens. V-12's were then at the cutting edge in engine design for both aircraft and high-performance autos. This engine was designed to generate about 250 horsepower at about 2,500 rpm. Bore is 4.5 inches and stroke is a square 4.75 inches. Its piston displacement is 906.5 cubic inches. Compression ratio is 5.54 to one. Its overhead camshaft allowed for short valves. The engine has ports on either side that allow the valves to be removed without removing the heads. This is an important feature, since the valves were often coated with carbon from the poor-quality gasoline of the day and had to be replaced. The two heads were interchangeable and could be removed without affecting cam timing or disturbing the cam shaft. The new design also made it much easier to build a block that would contain cylinders and a crank shaft in a single massive casting, providing access for precision valve timing by removing the heads. This design also made for a much more rigid engine. Earlier engines relied on cast piston housings called jugs that were expensive to manufacture. This engine retained its pistons in the engine block, again providing more strength and more precision in setting the pistons. The V-12 also had a sophisticated dual carbure- tion system that added power, although the engine generally used a gallon of fuel for every two or three miles. Its weight of about 2,400 pounds is substantial, providing great strength. Like all first-class fire engines, it uses dual ignition, in this case two distributors. Distributors and magnetos were also common. Seagrave's rival, American La France, also developed a V-12. Both companies made the engines until well into the 1960's, when they were replaced by diesel engines. This engine came from a junked 1947 Seagrave fire engine. It was donated to the museum by a local collector and reconditioned by Hall of Flame volunteer George Batche. It is very similar to the engine in No. 65, a 1938 Seagrave "Junior" aerial truck.

68. Pirsch "All-Power" Aerial. 1937.

The Pirsch Fire Apparatus Company of Kenosha, Wisconsin was one of America's premier builders of fire equipment. Together with Mack, Pirsch introduced in 1931 the first aerial truck to use hydraulic and mechanical power to raise, extend, and turn its aerial ladder. Until its introduction, aerial trucks used the "spring assist" design (see No. 61) or relied on an unwieldy system built around compressed air or water pressure from a hydrant. The introduction of hydraulic pumps to lift the aerial into position was one of the most important innovations in firefighting technology. The modern American fire service uses hydraulic pumps to power its aerial ladders, tower ladders, squirt units, outriggers, searchlight towers, and a wide variety of other devices. This truck, built in 1937 for Pirsch's home town, uses a mixture of hydraulic and mechanical equipment to operate its 85 foot ladder. Its ladder is made from single lengths of clear grained Douglas Fir from the forests of western Oregon. Wood of this quality was very difficult to obtain, but was critical to the strength and durability of the ladder. Steel rods spanning vertical posts provide a truss to provide additional strength and rigidity. The "stick" and its truss can be compared to a bridge that is raised into the air instead of spanning a stream or gulley. Like many aerials, this one also has a "Ladder Pipe" mounted at the ladder's tip to play water on a fire. The paint and decorations are original. It is rare for a piece of apparatus to survive in such excellent condition after 30 years of active service in a large town in a cold, wet area where road salt is used.

69. Seagrave "Junior" Aerial. 1938.

The town of Staunton, Virginia maintained this rig in its original condition. It was a very advanced design —America's first entirely hydraulically powered aerial with a metal ladder and hydraulic outriggers. It also had Seagrave's powerful 250 horse- power V-12 engine. It's 80-gallon booster tank with a small pump gave it some quick response capability at a fire. Like the 1937 Pirsch aerial, this rig has survived with its original paint and decoration. The only refurbishment by the Hall of Flame was the reupholstery of its driver/officer seat.



Ford F750 Buggy. 2004. Granite Mountain Hotshots

The United States operates over 100 Interagency Hotshot Crews to supplement Smokejumper, Helitack, engine crews, and Type II wildland firefighter crews dispatched to wildland fires, under the supervision of an incident commander and their staff. Hotshot crews were first established in the late 1940s in Southern California and were so called because their worked on the hottest part of wildfires.

This vehicle was purchased by the Prescott Arizona Fire Department to carry ten members of its Granite Mountain Hotshot Crew. An identical "buggy" carried the remaining ten members. The crew traveled all over the United States to fight wildland fires.

In the summer of 2013, the Granite Mountain Hotshots responded to a fire near the small town of Yarnell, a few miles from the crew's homebase of Prescott, Arizona. While battling the fire, it blew up into a major conflagration. Nineteen of the twenty crewmembers died in the fire.

After the tragedy, the Granite Mountain Hotshots were disbanded and the two buggies were purchased by an anonymous donor and given to the Los Angeles County Fire Museum in Bellflower, California. The Los Angeles County Fire Museum has generously placed one of the buggies on loan to the Hall of Flame Museum of Firefighting. Visit our Wildland Firefighting gallery for more information on the Granite Mountain Hotshot crew.

Fire Safety Exhibit

The north end of Gallery 4 is the location of our "Safety House" play area for children. The inside of a house structure features depictions of various fire hazards for children (and their guardians) to identify. In 2021, the area was redesigned—in partnership with the Arizona Burn Foundation—showcasing the ABF's "Milo & Moxie: Smart Safety Rangers" program for burn prevention (Milo is a corgi and Moxie is a hummingbird; together they learn about burn safety). The area is designed to be both educational and fun; it includes toys, puzzles, child-sized turnout gear, standees with cut-out faces, and vintage fire steamer, the front of a fire truck-turned into a desk, and a short pole down which aspiring firefighters can slide.

Safety House Tips & Info

Below, we have identified several safety hazards, as well as a few good safety tips. Here are a few of the most important points in the exhibit:

Sprinklers

✓ If you are planning to buy a new house, in- sist that the house have sprinklers. They add $2,000—$3,000 to the price of a new house. Your fire insurance premium savings will recoup this expense in a few years.

✓ Consider retrofitting your house with sprinklers. The cost is two to three times that of initial installation, but the payoff is that no one has ever died in a residential fire where the house had functioning sprinklers.

Water damage from sprinklers is vastly less than fire or smoke damage. Also, only a sprinkler adjacent to the fire area will go into alarm. Many people erroneously think that a fire will automatically set off every sprinkler in a home.

Stove Safety

- Turn the handles of pots and pans in from the edge of the stove. Other- wise, children might reach up and pull a pot with scalding water or grease onto themselves.
- Extinguish cooking fires by turning off the heat and placing a cover on the pot or pan; sprinkling with salt or baking soda is a less desirable but effective technique

NEVER POUR WATER OR FLOUR ON A STOVE FIRE—IT WILL MAKE THE FIRE WORSE

✓ Purchase an ABC multi-purpose dry chemical fire extinguisher (cost about $10) and store it where you can get it without reaching over a stove fire.

9-1-1

- If a kitchen fire is large, or if there is a fire in any other part of the house, don't use the extinguisher.
- Don't stay in the house— the smoke will render you unconscious. Most fire fatalities are from smoke inhalation, not burns.
- Don't go back into the house to rescue a pet—the chances are the pet left the house long before the fire became serious.

✓ Get everyone out of the house and call 9-1-1 from a neighbor's house or from a cell phone.

✓ After dialing 9-1-1, tell the operator the nature of the emergency, address and your name. Stay on the line until told by the operator to disconnect.

✓ Before there is a fire, establish an outside meeting place for all family members, outside of the house—a mailbox, fire hydrant, or telephone pole work well.

Home Escape Drills

✓ Make an escape plan for all rooms in the house. There should be two exits from every room. Practice the plan with your entire family

Smoke Detectors

✓ Buy battery powered units and install them on each floor near bedrooms (they cost about $10 each).

✓ Test them frequently and keep them free of dust.

✓ Change the batteries every year. Replace them every 8- 10 years or as recommended by the manufacturer.

CO Detectors

✓ If you use natural gas for heat or appliances, buy and install a carbon monoxide detector. They cost about $40.

✓ If your detector goes into alarm, leave the house at once and call 9-1-1 from a neighbor's house. The fire department will be able to find the problem, and a contractor will make the necessary repairs.

Poorly vented gas appliances or furnaces generate carbon monoxide. The gas has no odor and is deadly. Dozens of people die each year from CO poisoning.

Electrical Hazards

- Switches and outlets without covers (the ones in this exhibit are all inert dummies)
- space heater too close to wall or furniture
- lamps with empty sockets
- frayed or overloaded power cord
- appliances too close to a sink
- No safety covers in electrical outlets.

✓ Child proofing kits are available in most hardware stores for very reasonable prices ($10-20). Please buy one and install it in your home

Safety Ladders

✓ Buy them at local fire equipment supply companies or at stores such as Walmart and Target.. They cost about $40. Keep them in upper story bedrooms.

A Structural Firefighter in 1990

This mannequin is dressed in a typical set of "turnouts" for the period of 1980 to present. The modern firefighter now has the equipment to survive in temperatures well over 500 degrees Fahrenheit for a considerable period, temperatures of over 1,000 degrees for brief periods, and atmospheres with no oxygen and/or deadly gases. With good fortune, the modern firefighter can survive a flashover or backdraft.

The trousers and coat are made of fire-resistant Nomex and lined with insulating materials that resist heat. The reinforced boots have steel toes and can resist very high temperatures and a wide range of corrosive chemicals. The gloves can thwart very high heat and flame. The Nomex hood gives protection to ears, face, and neck. The plastic helmet can resist very high temperatures and will protect the head from the impact of very heavy objects. The helmet mask shields the face from heat and flame.

The Self-Contained Breathing Apparatus (SCBA) supplies a firefighter with air for 15 to 30 minutes, depending on the firefighter's physical conditioning, training, and level of exertion. A personal alert safety system (PASS) device sends an alarm if a firefighter does not move for more than 30 seconds. Beneath the turnouts, the firefighter wears clothes made with natural fibers that will not melt in high heat. The equipment weighs about 40 pounds and puts the firefighter at risk from heat exhaustion, but greatly reduces the risk of injury or death from heat or flame. Almost every American firefighter now fight fires with this equipment.

Fire Hydrants

During the 17th and 18th centuries several cities in Europe installed wooden pipes beneath their streets supplied with water from aqueducts or steam pumps. At a fire, the pipe was uncovered and drilled with an augur. Water flowed into a portable canvas tub and was either connected to a fire engine or used to supply buckets. After the fire, the hole would be plugged, and the pipe would be re-covered; thus, the creation of the term "fire plug." Soon firefighters carried standpipes which could be screwed into a wooden pipe. The standpipe had a spigot which could be used to provide water to buckets or a fire engine.

In 1800 in Philadelphia, a system of wooden pipes were laid and connected to a steam pump drawing water from the Schuylkill River. City engineers installed a series of standpipes with spigots controlled by valves. A wooden barrel-like structure was placed around the standpipe to protect and insulate it. And the fire hydrant was born.

By the 1840s, standpipes had evolved to cast iron or bronze hydrants like those in use today. The hydrants were connected to cast iron water pipes several feet below ground. At this level was a valve that was opened by a wrench atop the hydrant. Water under pressure flowed into one or more discharge ports, which were connected to fire hoses or hoses connected to fire engines. The system has changed little down to the present day.

The hydrant and water pipe in this exhibit was built in St. Louis, Missouri in the 1880s.

FRC Pressure Governor Demonstration Panel

Since the early 1990's, electronic pressure governors have been used extensively on fire apparatus for controlling engine speed and associated pump pressure to facilitate accurate and consistent discharge line pressure.

How They Work

The pressure governor receives a signal from a pressure transducer mounted on the discharge side of the pump. As the transducer senses a change in pressure, the pressure governor sends a signal to the engine ECU to increase or decrease engine speed to maintain the desired discharge pressure.

Fire Research Corporation, based in Neconset, New York, used this panel to demonstrate their "Infiniti Pro" and "Tankvision" systems for fire engine pressure control at trade shows before donating it to the Hall of Flame Museum. The colorful lighted display makes it a fun, interactive addition to our Kid's Area.

Thunderbird Desk

This desk, made from the cab of an E-One and the front bumper of a Pierce truck, were donated to the Hall of Flame Museum by the owner of the Thunderbird Fire and Safety Equipment Corp. Fred Nachman. After being painstakingly re-assembled by Hall of Flame docent Bob Bombiadi, this desk was moved into the Kid's Area in Gallery 4 where, newly equipped with improved seating, it is already being "driven" by young visitors to many imaginary fires.

The Kid's Area also includes a small theater where fire safety videos are shown throughout the day. This area is also utilized during school fieldtrips.

Arm Patches.

During the Civil War the Union Army introduced arm patches with the emblems of its corps and divisions. The Army continues this tradition to this day. Returning World War II veterans introduced this practice to their fire departments. Almost 8,000 patches are on display here.

Visitors are invited to utilize the patch database, located at the junction where galleries 1-4 meet, to determine if their hometown patch is part of our collection. If you are unable to find your department's patch, we encourage you to send us one. The museum receives approximately 500 new patches every year.

Aerial Trucks

As buildings became taller, firemen had an increasingly difficult time making rescues with ground ladders. By 1880, they were using unwieldy extension ladders over 70 feet in length, that weighed close to 500 pounds. In 1882, a San Francisco fireman names Hayes began to sell a wagon equipped with a mechanically raised ladder. Firemen like his "aerial truck" and a number of other makers patented their own versions (see No. 24 in Gallery I for an example of a Babcock "aerial"). But these heavy, manually-cranked aerials were hard to get into action. Two innovations changed this situation.

Motorized tractors could pull the aerials, and hydraulic pumping systems made it possible to raise and extend ladders up to 150 feet in length. Firemen also attached powerful nozzles to the aerial ladders, allowing them to use their rigs like water towers. Many modern "tower ladders" work like aerials but replace the ladder with a large platform equipped with huge nozzles. The platforms make it much easier to rescue victims from windows and fire escapes and can pump enormous quantities of water from well above most fires.

The Maltese Cross

Most American fire departments use the Maltese Cross as a logo on badges and shoulder patches. The reason for its adoption is somewhat of a mystery. A variety of badges went into use in American fire departments beginning in Boston in the 1830s. Most of these badge designs looked like miniature helmet front pieces. In 1865, the newly organized professional fire department of New York City introduced a cap badge based on a variety of the Maltese Cross. This design had been used as a logo by several corps of the Union Army during the Civil War. It is likely that a New York fire officer or commission with a background in the Union Army introduced this variant of the Maltese Cross as a part of a campaign to organize the department on semi-military lines—the new department used uniforms that closely resembled U.S. Army uniforms, as well as a military organization and rank structure: companies, battalions, divisions, lieutenants, captains, and the like. In 1870 the department settled on the version of the Maltese Cross that is used to the present-day. By 1900 most departments had adopted one of the Maltese Cross variants as their standard badges.

There is little evidence to show that the fireman's Maltese Cross was adopted to honor the Knights of Saint John, a religious order of knights organized in the 12th century, which fought in the Holy Land and once controlled the island of Rhodes, and late the island of Malta. The knights organized some of the world's earliest hospitals, in addition to their military activities, and to this day the order operates ambulance services in Europe. The Knights were not firefighters.

1930 Brush Truck
The Los Angeles Country Forestry Department led the nation in design of wildfire fighting equipment in the 1920s and 1930s. Faced with the task of battling brush fires in Los Angeles County, the department designed and built its own brush trucks and tankers.

This rig was built in 1930, based on a design by C.H. Reinmuller, the Assistant Fire Warden of Los Angeles County. It has an advanced transmission that allows multiple front and rear speeds, a powerful engine, and a small pump that allows pump and roll operations. In addition to its six-to-eight-man crew, it carried 600-gallons of water, thousands of feet of hose, and a wide variety of equipment. The Moreland Truck Company of Burbank California was the builder.

Moreland was one of the top builders of trucks until the Great Depression, when it fell into bankruptcy. Cowboy actor and singer Gene Autry saved the rig from destruction and donated it to the Hall of Flame. Don Hale restored it to its 1938 configuration.

1921 Chemical Car
Horse-drawn chemical wagons gave way to motorized “chemical cars” as early as 1911. The gasoline engines of the day lacked the power to drive a fire pump. When such motors became available around 1915, they were too expensive for many city budgets. Fire departments bought motorized equipment in the same way that they bought horse-drawn apparatus—lightweight chemical cars to replace the wagons, and heavy motorized pumpers to replace the old steam fire engines.

This rig was built in 1921 for the volunteer fire department of Lookout Mountain, Tennessee. American La France, a builder of the first-line apparatus, produced this rig on light commercial chassis called the Torpedo, which was built by the Brockway Truck Company. The rig was dubbed the LaFrance Brockway Torpedo. It carries three 35-gallon chemical tanks; when the chemical tank is turned upside down, acid, water, and sodium bicarbonate mic to create a huge seltzer bottle.

The car worked well on brush fires, where a quick response with over one hundred gallons of water could often do the job. It also worked well at structural fires as a quick response rig. It remained in service at Lookout Mountain, and later Opa Locka, Florida, until about 1945. Don Hale restored the Torpedo here at the Hall of Flame in 1985.

Lookout Cabins

The cabin in this exhibit is a replica of an L-6 Forest Service lookout tower. It is eight feet on a side, with room for a fire finder and a desk. Sometimes there was also a folding cot and a small stove. About one hundred L-6s were built; more common was the larger L-4, which was twelve feet on a side. All lookouts had a fire finder and a communication device to the ranger station—usually a telephone, but portable radios were also popular from the 1940s onward.

L-4s and L-6s were prefabricated by a city-based builder and moved in sections by mule train to the site. Crews of Forest Service workers, usually CCC "enrollees," built the wooden towers from locally felled trees and then re-assembled the "cab" atop the tower. Towers varied from a few feet to over one hundred feet in height. Some cabs were nestled onto promontories with no need for platforms.

The panorama behind the cabin is patterned after the view from the Diamon Point Lookout in Arizona's Tonto National Forest, a few miles east of Payson, Arizona, on the Mogollon Rim. Diamond Point is manned every summer.

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The photos and information for this section of the exhibit on lookouts comes from historian Ray Kresek's outstanding Fire Lookouts of the Northwest. Ray, a retired Spokane, Washington firefighter, has spent his life visiting lookouts throughout the Northwest United States, and gathering information about them. His book includes the locations of thousands of lookouts, photos, and stories about the men and women who built and operated the system

Smokejumpers

The U.S. Forest Service realized early on that the airplane was the only way to effectively control fire in the millions of roadless acres of forest that spread over the American West. Initially they partnered with the Army Air Service but, by the 1930s, the Forest Service was chartering aircraft owned by private companies to search for fires and drop supplies onto fire camps. In 1935, a Utah forester experimented with dropping smoke chasers onto fires. In 1939, the Forest Service hired a civilian parachute company to drop their most experienced parachutists into the Chelan National Forest in Washington state. Over 50 jumps were made into the forest, and the experiment was declared a success.

In 1940, two smokejumper bases were built near the Chelan National Forest and near the Lolo National Forest, about 50 miles from Missoula, Montana. Two crews of smoke chasers were trained to drop from aircraft leased from a local flying company and several successful jumps were made.

During World War II smokejumpers were recruited from the ranks of conscientious objectors. Several hundred were trained and fought several fires. Following the war, the smokejumper program continued to grow. About a dozen bases were built and staffed during the fire season. Almost all were in the states with large tracts of remote backcountry: Washington, Oregon, Idaho, and Montana. A few bases were built in California, Nevada, Colorado, and New Mexico, and two bases were built in Alaska.

Today there are approximately 450 smokejumpers under the control of the Forest Service and the Bureau of Land Management. All but a few are hired only for the fire season of about five months. Jumpers are flown to fires in remote backcountry in teams from 2 to 15. After knocking down the fire, they pack their jumpsuits, parachutes, and tools and hike back to the nearest road where they can be picked up by vehicle, or to a clearing where they can be recovered by helicopter. These hikes can be the worst part of smoke jumping since a typical hike out pack usually weighs over 199 pounds.

Smokejumpers specialize in early attacks on small fires in remote country with the potential to explode into large fires. Crews from 2 to 6 jumpers are commonly used. On large “project” fires, jumpers organize themselves into squads of firefighters like Hotshots.

The equipment for this mannequin was donated by the Smokejumper base in Missoula, Montana.

The jumpsuit is made of a rugged, woven synthetic fabric, heavily padded in the shoulders, spine, seat, crotch, and knees, with large pockets on either lower leg. These pockets contain a packout bag and a 50 foot long let-down rope which the jumper can use to lower himself should his chute become tangled in a tree.

The headgear is adapted from a motorcycle helmet, with a steel mesh faceguard to ward off twigs. Like Hotshots, Smokejumpers buy their own boots. This pair, donated by Nick’s Boots of Spokane, Washington, are a model that is popular with smokejumpers.

Smokejumpers have two chutes. The chute on the mannequin’s back is the primary chute. It is deployed automatically when the static line, which is attached to the plane, becomes taut and releases the primary from its pack. Should the primary chute fail, the jumper can pull the ripcord on his reserve chute, which is attached to his chest.

Smokejumpers also jump with a small pack that contains essentials such as a first aid kit, food, extra socks, and the like. Jumpers carry approximately 70 pounds of equipment and clothing when they leave the aircraft; tools and other heavy equipment are dropped separately.

Hotshots

During the 1930s the Civilian Conservation Corps used its thousands of "enrollees: to fight wildland fires when they weren't building roads, hiking trails, and other public works projects in the nationally-owned lands. Foresters were impressed by the ability of the CCC crews to build fire lines, but they were concerned that over 40 of the young men were killed while fighting wildland fires.

Foresters organized 40-man crews of CCC men, trained them, and sent them to fires all over the west. The crews called themselves hotshots and developed high esprit from their special status. World War II brought an end to these crews, but in 1947 twenty-man "hotshot" crews were organized and trained in California. In 1961, the Forest Service organized several hotshot crews into Interregional Fire Suppression Crews. The Interregional Crews could be deployed anywhere in the United States as complete units, with all necessary tools and equipment, in their own vehicles.

During an average fire season, a crew of hotshots can travel over 20,000 miles in their buggies or on-air transports to fires from Florida to Alaska. Today there are eighty-seven Hotshot crews in the United States, spread around Forest Service, Park Service, and the Bureau of Land Management headquarters, operating throughout the nation, but mostly in the western United States. They consist of two eight-person squads per crew, with two squad bosses, a superintendent, and a superintendent's assistant. Sometimes they employ three five-person squads.

Hotshots travel in transporters and a lead truck. They are self-sufficient, carrying with them all the equipment necessary to go into action. Sometimes they travel to distant fires by chartered aircraft while their vehicles drive to the fire site.

Incident commanders place Hotshot crews at the most critical parts of the fire, where they can use their tactical skills to dig the most effective lines, set backfires, or knock down trees and shrubs with the greatest speed. Most sawyer work at fires is left to Hotshot crews.

Hotshots carry customized backpacks and wear distinctive helmets to emphasize their status as elite firefighters, but they generally wear the same uniforms as those worn by other firefighters. Most have years of experience and training and have learned how to organize and lead groups. Consequently, many incident commanders come from Hotshot ranks.

The uniform and equipment displayed on this mannequin were donated to the Hall of Flame Museum from a Payson, Arizona Hotshot, Tonto National Forest crew member

Hotshot Mannequin

While all other gear is issued to hotshots, the most important item—their boots—must be purchased by each firefighter. The pair seen on this mannequin were donated by Nick's Boots of Spokane, Washington, a premier maker of custom boots. Average cost is $400.

The boots are almost indestructible and provide tremendous arch and ankle support. They do not have steel toes, which would retain too much heat. The lightweight Nomex shirt and pants are flame resistant and worn over cotton underwear. The helmet is strong but lightweight. Gloves, eye protections, and a filter mask are other essential protective equipment.

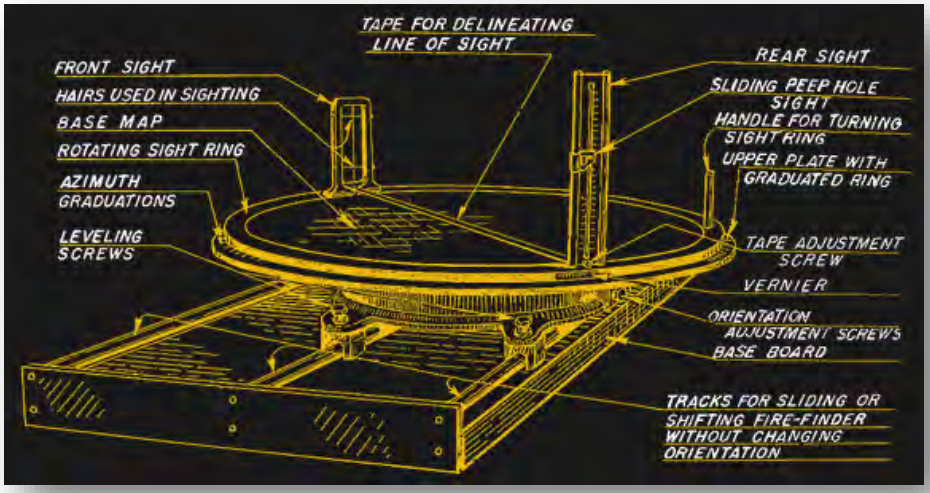
Portable radios, with a range of several miles, are standard equipment on hotshot crews. It is used to communicate with the fire commander and crew members. The radio chest pack often holds a compass, maps, and incident action plan.

Hotshots wear their equipment while fighting a fire, so efficient pack design is a must. The pack holds their fire shelter, food for several days, water, extra socks, a first aid kit, a headlamp, spare batteries, and perhaps a cannister of fuel for the saw team. Shovels and chain saws are the most common tool for hotshot crews, as much of the tree cutting on fires is done by hotshot crews who are trained and certified at this tricky and dangerous procedure.

Membership into the Interagency Hotshot crews does not come easily, and crew members take great pride in their units. All crews have their distinctive insignia or logo, and some have their helmets painted in crew colors.

Fire Finders

The first lookouts used “Koch Boards” to locate fires. Designed by a staff member of the Forest Service Headquarters in Missoula, Montana, it was a crude map board with two slotted upright pieces of tin. The lookout oriented his map to match his location, sighted through the uprights to the fire location, and used a compass to determine the bearing to the fire. He would then pack and hike out to the fire on this bearing.



In 1911 a Forest Service engineer named William B. Osborne designed an elegant device patterned after an engineer’s transit, which was easier to set up and much more accurate than the Koch Board. It was first used in 1914 on the Larch Mountain lookout near Mount Hood, Oregon. Its 1934 model is used in almost all the nation’s remaining lookouts.

The fire finder in the lookout replica in this gallery was designed in 1928 by Jim Bosworth, the fire control officer of the Forest Service ranger station in Sand Point, Idaho. It is similar to the Osborne but is larger and heavier. These are not good features, since the fire finders were disassembled and carried out of the lookout cabins at the end of each fire season. The Bosworth was only used un the Forest Service region One lookouts in Idaho, Washington, and Montana.

We obtained this fire finder from the Historical Museum at Fort Missoula. This fine museum has preserved a lookout cabin and exhibits it on the grounds in Missoula, Montana.

Wildland Fire Aircraft

As early as 1909 forest managers recognized the possible usefulness of aircraft in spotting fires in the backcountry. In 1915, Wisconsin foresters experimented with a flyer boat to spot fires. In 1919 the U.S. Forest Service requested that they Army Air Service provide planes and pilots for use with Forest Service observers in the forests of California, Oregon, and Washington. The Army, looking for a mission in the austere environment of military funding following the Armistice of World War I, eagerly provided several aircraft such as the De Havilland bombers pictures at the right patrolling the backcountry of Washington. The program was successful, but funding eventually dried up and, after 1928, the Forest Service began contracting with civilian flying companies for observation aircraft.

During the 1930s the Forest Service used a variety of aircraft to drop messages and supplies to fire crews and experimented with a variety of devices to drop water or chemicals on fires. In the late ‘30s, the Smokejumper program developed from Forest Service experiments and the experience of Russian smokejumpers, who had been jumping fires since the early ‘30s.

Following World War II, the Smokejumper program grew rapidly, and the Forest Service worked with the military to adapt surplus military aircraft and helicopters to attack fires by dropping canisters filled with water—like the principle of dropping napalm tanks. While effective on fires in light fuels, results were not good in high fire load areas like the Northwest.

In 1956, the fire officer of the Mendocino National Forest in California contracted with a flyer company with experience in crop dusting to develop a method to drop water onto fires in a free fall method…like crop dusting. Success with small planes led the Forest Service to acquire surplus Navy torpedo bombers to drop larger quantities of water, as well as water mixed with sodium calcium borate, a chemical fire retardant. Private companies purchased a wide variety of military surplus aircraft and fitted them with tanks and a variety of dispersal devices that let their pilots drop water or retardant with considerable accuracy and in carefully metered amounts. The California Department of Forestry and Fire Protection added a fleet of surplus Navy, Marine, and Air Force aircraft in addition to hiring commercial tankers.

Today about 200 contract tankers are available for use in the fire season, in addition to tankers owned by government entities.

During the 1950s the Forest Service and the California Department of Forestry developed a variety of helicopter-based fire control programs. Initially, helicopters delivered small fire crews, like smokejumpers, to attack backcountry fires. These “Heli-tack” crews initially jumped from as high as 20 feet from helicopters hovering over a fire, a technique that led to unacceptable rates of injury. During the ‘70s, Heli-tack crews began rappelling down ropes to the fire, a technique developed by the military during the Vietnam War. Today there are several hundred Heli-tack crews staffed by the Forest Service and the Bureau of Land Management, as well as many state firefighting agencies.

As helicopters grew in size and capability the 1970s, they could carry several thousand pounds of water or retardant. Private companies purchased military surplus helicopters in every size, from medium-capacity Hueys to huge Flying Cranes and Chinooks. They carried water or retardant in internal tanks or in externally-carried buckets. Helicopters can base themselves close to a fire, refill from nearby lakes or rivers, and deliver men and supplies as well as water. Their lower speeds allow them to drop water with precision, and they can often fly in smoke and haze that would ground larger fixed-wing tankers.

Smokey the Bear

The U.S. Forest Service's vigilant bear in the ranger cap, shovel and "pair of dungarees" was developed in the 1940s by several artists, including Harry Rossoll, Rudy Wendelin and Albert Stahle. Smokey the Bear, later rebranded as simply "Smokey Bear," became one of the most recognizable and beloved marketing icons in American culture, familiar not only from fire safety posters and other safety materials but from films, comic books, toys, songs recorded by performers ranging from Eddy Arnold to Gene Autry, and a 1966 Rankin/Bass animated special, narrated by James Cagney. He was even celebrated in 1969 by the Smokey the Bear Sutra, by "beat" poet Gary Snyder. The style of ranger cap he wears became so associated with the character that "Smokey" became a slang term for State Police officers who wear similar hats. Protected from commercial exploitation by the U.S. Congress through the Smokey Bear Act in May of 1952, the character is administered by the USDA Forest Service, the National Association of State Foresters and the Ad Council. In 2001 his familiar catchphrase "Remember…Only YOU can prevent forest fires" was changed to "Only you can prevent wildfires," in acknowledgment of wildland fires that take place in desert, prairie and other non-forest areas.

There was also a "real" Smokey, an American black bear orphaned and injured during the Capitan Gap Fire in New Mexico in May of 1950. Rescued by a wildland firefighting crew and originally named "Hotfoot Teddy," the bear was eventually chosen as the official Smokey, and lived at the National Zoo in Washington, D.C. until 1976.