

**ARGONAUT MINE FIRE**  
**Jackson, Amador County, California**  
**By H. Mason Coggin**

Forty-seven miners were killed in the August 1922 fire at the Argonaut Mine in Jackson, Amador County, California. The Argonaut, a gold quartz mine in the Mother Lode District of California, employed about one hundred sixty five underground miners at the time of the disaster. The mine was developed and worked through an inclined (fifty-seven degree) shaft that followed the dip of the vein for forty-nine hundred feet. The three compartment shaft was heavily timbered. Two compartments were used for skipping ore and hoisting; a manway in the third compartment contained a ladderway, a compressed-air line, pump column, high-voltage electric cable, electric light wires, signal and telephone lines. Levels were developed on one-hundred-fifty foot intervals throughout the mine. Ventilation was provided by an updraft shaft to the eight-hundred level and a series of offset raises to the forty-nine hundred. Manways connected the bottom level to the surface through these interconnecting drifts and raises and the shaft. Ventilation was ensured by a forty-thousand cubic feet per non-reversing

exhaust fan at the top of the ventilation shaft. Wooden doors and brattices directed the air flow down the Argonaut shaft, through the lower levels and the ventilation shaft. The doors and brattices were adjusted to balance the air flow and provide uniform ventilation throughout the mine.

About eleven o'clock on the evening shift, the shift boss and two skip tenders noticed smoke on the forty-two hundred foot level in the Argonaut shaft and realized there was a fire in the shaft above them. They had themselves hoisted to the station on the three-thousand foot level and found two timber sets burning on the shafts hangingwall just below the station. One man remained to observe conditions while the other two were hoisted through the fire to the two-thousand foot level, where they telephoned the hoisting engineer and reported the fire. They rode to the surface to gather fire fighting equipment and return to the fire. Soon after they arrived on the surface, the mine telephone, signal system and lights went out of order. Forty-seven men in the workings below were cut off without communications to warn them of the

fire or a second means of escape.

Smoke soon started coming from the ventilation shaft and backed up the main shaft as the hot air began rising. Men equipped with self contained oxygen breathing apparatus entered the skip and attempted to extinguish the fire. The exhaust fan at the ventilation shaft could not be reversed and this would have been useless without a means of changing the ventilation in the lower levels so that fresh air could be circulated through them and up the Argonaut Shaft. Reversal of the air flow would have been short circuited by the normally closed air doors above the three-thousand that would have been forced open by the reversal. Trying to reach the trapped workers through the ventilation shaft would have required four to five hours to climb down the shaft and back up through the raises. Since the self contained breathing apparatus was good for about two hours this would have been suicide for the rescuers.

The fire fighters were able to control the fire in the shaft by using high-pressure water and hoses and kept it from extending up shaft. They also installed an airtight bulkhead on the twenty-three hundred level of the Argonaut thus smothering the fire. From this level, they were able to re-

open a connection between the Argonaut and the adjoining Kennedy Mine by driving some eighty feet of new drift and catching up several caves. Twenty-one days of arduous labor were required before the rescue crews could reach the forty-two hundred foot level of the Argonaut mine.

Forty-six bodies were recovered from the forty-three-hundred-fifty foot level where the miners had built a double bulkhead from mine waste, boards and clothing to provide

**“Trying to reach the trapped workers through the ventilation shaft...”**

a fresh air chamber. In spite of their best efforts the bulkhead had failed to affect a seal and toxic gases had penetrated into their chamber. The men had died a few hours after the start of the fire. Another body was later reclaimed below the forty-three-hundred-fifty.

Three possible causes for the fire were advanced:

(1) Electricity, (2) Arson and (3) Smoking.

Most of the investigators blamed the fire on a short circuit in the twenty-three hundred-volt power line in the manway compartment. The



skip tender later testified that he had observed the fire spreading from the location of the wiring.

The point of origin was near a cast-iron junction box where the armor and outer insulation from the power cord were removed to allow the cable to enter the box. On the day before the fire, a set of shaft timber just below the three-thousand station was replaced. The old timber was temporarily stored in the manway sets. Throwing or stacking the old

**“The rapid spread of the fire in the heavy timber and a set of footprints...”**

timber against a cable may have pulled the cable out of the junction box and caused the short circuit. This short circuit could have ignited the old timber. Some arcing was in evidence around the junction box to support this theory of the fire.

The power cable was a three conductor armored cable. Each conductor was insulated with rubber and cotton fabric. The cable was intern encased in a lead tubing and the tubing was encased in wire armor. The whole cable was protected from moisture by a covering of tarred hemp.

The arson theory was advanced because a previous fire in the mine had proven to be arson. The rapid spread of the fire in the heavy timber and a set of footprints in the drainage tunnel below the collar contributed to these suspicions. The practicality of anyone climbing three-thousand feet up the manway without discovery however, was considered unlikely. It was also pointed out that more accessible places were available and could have caused more damage to the mine.

The following procedures were advanced to prevent similar loss in mine fires.

1. Workers in the mine should be warned immediately. (This was eventually done through a stench system attached to the compressed air supply. The installation of the stench system was almost uniformly adopted by all of the major operating underground mines in the 1940's and became law with MESA and MSHA).

2. An attempt should have been made to hoist the workers. (This was not practical since the shaft was engulfed in fire and the hoist signals were lost. It would have been better to provide reversing fans and install hoists connecting the lower levels to the surface where the workers could be hoisted to fresh air and safety.

This second exit is now required by law).

3. The underground doors that could be reached should have been opened to short-circuit the air up the ventilation shaft and keep the toxic gases from the lower levels. (A mine emergency plan should have been developed very early in the life of the mine and updated on a regular basis).

4. All major mine fans should be reversible (This was adopted as a requirement in most metal mines shortly after this disaster).

5. Ventilation or air doors should be so hung and arranged as to permit air to be reversed without short-circuiting.

6. Stoppage of the exhaust fan would have allowed the Argonaut to updraft from the effects of the shaft fire and draw fresh air through the workings by natural ventilation. The workers on the lower levels could have climbed to safety through the ventilation shaft.

7. Timbered shafts should be fireproofed or fire-protected. (This was adopted by most mines shortly after this fire and most of the older wooden shafts were equipped with a sprinkler system. The use of concrete to line shafts was developed and perfected in the 1930's and has been in common practice ever since. Mines

have adopted their own electrical specifications and practices exceeding the requirements of the National Electric Code. Electrical cable specification have changed since these early days and today's mine cables will not support combustion).

8. Every mine should have an organization for preventing and controlling fires, good fire-fighting equipment and a large water supply immediately available. (Helmet crews and fire bugs were adopted at most mines during the 1930's and became law in most states that had a State Mine inspector. MSHA now requires all mines to have a mine emergency team or belong to a mine emergency association within two hours of the mine).

This is the second in a series of articles about mine disasters from the files of the Bureau of Mines. The fire in this article is described in the Bureau of Mines, Miners' Circular 55, Fires, Gases and Ventilation in Metal Mines, Metal-Mine Accident-Prevent Course Section 5. The U.S. Bureau of Mines was killed off by the Clinton-Gore Administration in 1995.





## The Helmet Men

Tortured and seared in a fierce rush of flames,  
Mangled and torn by the death-dealing blast,  
Changed till their mothers could not tell their names;  
Even the rescuers shrink back aghast.

Level and heading are horror-filled shambles,  
Peopled with corpses that glaringly grin;  
This, what the helmet man finds in his rambles,  
Hideous goal that he risks life to win.

Staggering, stumbling, smoke-blinded and chancing  
The cave from above or the black depths below,  
While the brain-pressure tightens till death-lights are dancing,  
Into the tangle and wreckage they go.

Not for the glory their names gain in story,  
Not for reward that is motivated by greed,  
Delve they in depth-traps, where horror grows hoary,  
“Tis love of humanity urges the deed.

God bless them all! They are men whom the nation  
Should garland with tributes from tongue and from pen—  
Give them honor as heroes, above wealth or station—  
In a class all their own are these brave helmet men.

By F.E. Vaughn, **The Spirit of Leadville in Verse**,  
December 17, 1913.