

How an Iron Lung Works

By Richard Daggett

I just got off the phone with a sixth grade student. The student was assigned to do a history project and chose polio as his topic. This was one of many similar phone calls or letters I get every year. I promised to send the student some general information about polio and asked if he had any specific questions. I could tell he had already done some homework. He asked, "What's an iron lung?"

I attempted to explain what an iron lung does and how it works, but I'm not sure I made it clear over the phone. I told him I'd include an explanation in the information packet I was sending him. As I was preparing his packet I realized that there are many people, including adults, who don't know what an iron lung is, or at least how it works. I'm guessing this includes many polio survivors. This brief summary is an attempt to remedy this situation.

An iron lung is a mechanical device that enables a person to breathe when normal muscle control has been lost or the work of breathing exceeds the person's ability. The iron lung is often referred to as a tank respirator because of its shape, but is properly identified as a negative pressure respirator.

A person who needs an iron lung is placed on a bed that is attached to the front end of a cylindrical steel chamber. An opening provides space for the patient's



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An exterior bellows increases and decreases the air pressure within the chamber. As the pressure is lowered the chest cavity expands, trying to fill this partial vacuum. When the pressure is increased the chest cavity contracts. This expansion and contraction mimic the physiology of normal breathing as air is inhaled and exhaled.

Harvard medical researchers Philip Drinker and Louis Agassiz Shaw invented the first modern and practical iron lung respirator in 1927. The inventors used an iron box and two vacuum cleaners to build their prototype. The first iron lung was installed at Bellevue Hospital in New York City, and the first people to use it were polio patients with paralysis of the breathing muscles. Later John Emerson simplified Philip Drinker's invention and reduced the manufacturing costs.

Thousands of iron lungs were used during the great polio epidemics. A few are still used by polio survivors and others. They are no longer manufactured and spare parts are unavailable.

To some the iron lung brings back painful memories. To others it is a reminder of a time when the nation rallied to care for those with a devastating illness.

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