

# “Vibrogel” Box

Doug Miller

In July 2021, I wrote about my friend’s grandfather who worked for Hercules Powder Company at its plant in Carthage, Missouri, from 1936 until he retired in 1973.<sup>1</sup> Among other things, the article describes the process for manufacturing dynamite and the various “houses” where the work of making nitroglycerine and turning it into sticks of dynamite occurred. It also describes a catastrophic explosion that occurred at the plant in 1966 associated with the production of “Vibrogel,” a proprietary explosive, consisting of a stable combination of nitrocellulose and nitroglycerine that was used by the petroleum industry in exploring for oil. Shells of Vibrogel were dropped into bore holes, and when set off, the resulting vibrations from the explosions were measured with seismographs. My friend’s grandfather was away from the plant on the day the explosion occurred, arriving home, which was not far away from the plant, just in time to hear the explosion as he opened his front door.

Over his career, John McCann, my friend’s grandfather, held a series of positions of increasing responsibility at the plant. At one point early in his career, he worked in the Box Factory, where boxes were made for storing and shipping finished product. Recently, my friend, Tom McCann, sent me a text message telling me that had something for me and asked whether he could stop by to drop it off. Tom and I worked together for years in the Legal Department of the Central Arizona Project. Both of us are retired now. When Tom arrived, I discovered that he had brought two wonderful things for me, a wooden box for Vibrogel explosive and a company hat for the Hercules plant at Carthage. Both are like new.



The box measures 16 inches long, 12  $\frac{3}{4}$  inches wide, and ten inches high. The box ends are  $\frac{1}{2}$  inch thick. The sides and bottom are  $\frac{1}{4}$  inch thick. The box looks like it’s made of rough-cut pine. The sides, ends, and bottom are made of tongue-in-groove panels, stapled at the joints. The sides and bottom are neatly secured to the box ends with nails.

<sup>1</sup> <https://www.eurekamagazine.net/MillerHercules.pdf>, accessed June 26, 2022.

The Hercules hat that Tom and his father gave me is typical of other company hats most of us have seen. It has an adjustable hat band at the back. It is dark blue, nicely made of a durable fabric, and has the later Hercules logo and the name of the Carthage, Missouri, plant on the patch in the front.



Tom told me that his father, Wayne McCann, a chemist by training, who was the most important source of information for my article about the Hercules Plant at Carthage, was cleaning out some things and he and Tom wanted me to have the box and the hat.

Collectors of dynamite boxes will note some differences between the boxes in their collections and the box pictured above. Perhaps most important is the lack of box joints found on many factory-made dynamite boxes. My box has butt joints and is nailed at the seams. It also has handle recesses that are nicely milled into the ends. I believe these are original to the box ends. I have found other examples on the internet. When I asked Tom whether the box came from his grandfather (I wasn't sure at the time), Tom asked his father, Wayne, who told him the full story of the box.

“My grandfather was foreman of the box factory there in Carthage at one point. He made that box himself out of scraps that he brought home. My dad was just a kid then, so probably late 1930s. They had some venison or other meat that relatives had given them but no place for it in their ice box. John made that box to fit in the window of their pantry (it was winter evidently) to keep the meat cold. The box stuck outside [the window] and he made some pieces to fit around it to cover the rest of the window opening. My grandmother rigged a piece of cloth to hang over the open side that faced indoors. It was like a supplemental fridge box.


“It was a small rental house they lived in and my dad says he slept in the pantry, so he slept under that window box. So it's not an official Hercules box, but is made from actual components. That also explains the nail construction. (I think the regular boxes may have been dovetail.)”

To me, this story makes the box all the more valuable. It's the story of a young couple of modest means making do with what they had while the husband worked full time in an essential and dangerous industry, manufacturing products of great value to the rest of the country. While the nails may not be typical of many factory-made dynamite boxes, they look like they might be factory original. Again, I have found other examples on the internet.

Vibrogel was and is an important commercial explosive used widely in oil exploration. It is still made by Dyno-Nobel, a successor to Hercules, and "has been in use in the geophysical industry for more than 80 years," according to this Dyno-Nobel technical data sheet.<sup>2</sup>

## VIBROGEL®

**Seismic Extra Gelatin Nitroglycerin Dynamite**



**Product Description**  
VIBROGEL is a high density, high velocity, high energy gelatin dynamite available in either a plastic or paper tube shell that has been in use in the geophysical industry for more than 80 years. VIBROGEL produces a sharp pulse of seismic energy and detonates completely at high velocity.


USE CAUTION WHEN SLEEP TIME IS ANTICIPATED

A loaded hole that is not shot immediately after the detonator tests positive with a ShotPoint Tracker™ or other testing device could fail for reasons beyond the control of the drill crew and product manufacturer. Reasons for failure could include but are not limited to geologic shifting, lightning, vandalism, farmer or animal interference.

**Application Recommendations**

- **NEVER** use Dyno Nobel seismic explosive products and/or components with explosive products and/or components made by other manufacturers.
- **ALWAYS** use the Dyno Nobel high strength seismic detonator for optimum results.
- Recommended temperature range is -40°C to 65°C (-40°F to 150°F). VIBROGEL is unaffected by extremely low temperatures but detonators produce less energy below -40°C (-40°F).
- VIBROGEL is not recommended for extended wet hole use / sleep time. Please contact your Dyno Nobel Representative for additional details.

**Technical Information**



Properties

SDS #1019

<b>Energy<sup>a</sup></b> (cal/g)	1,250
<b>Gas Volume<sup>a</sup></b> (moles/kg)	26
<b>Velocity<sup>a</sup></b> (m/sec)	6,100
(ft/sec)	20,000
<b>Detonation Pressure<sup>b</sup></b> (Kbars)	133
<b>Density</b> (g/cc)	1.43
<b>Water Resistance</b>	Limited


\*All Dyno Nobel Inc. energy and gas volume values are calculated using PRODET™, the computer code developed by Dyno Nobel Inc. for its exclusive use. Other computer codes may give different values.  
<sup>a</sup>Unconfined 57 mm diameter x 2 kg charge.

IMPORTANT!

Ignoring these warnings may result in injury or death!


- **ALWAYS** exercise extreme caution when approaching a shothole that has not vented. Venting gases after detonation are common. BLOWOUTS CAN INJURE OR KILL.
- **NEVER** attempt to alter the product by cutting, sawing or disassembly of the package.
- **NEVER** drop load explosive into a borehole.
- **NEVER** attempt to dislodge explosives by pushing with a drill stem.
- **ALWAYS** shunt electric detonators and/or the blast circuit after testing and keep shunted until connected to blasting machine.
- **NEVER** unshunt electric detonators prior to use except to test with blasting galvanometer.
- **ALWAYS** ask if you don't know before proceeding.

**Hazardous Shipping Description**  
Explosive, Blasting, Type A 1.1D UN 0081 II



S-02-08-18-15

See Product Disclaimer on page 2.



Groundbreaking Performance™

In 1975, the Picatinny Arsenal, in its multi-volume publication, *Encyclopedia of Explosives and Related Materials*, wrote:


The practice of seismic exploration required explosives with reliable performance after exposure to high water pressures for long periods of time, and so the *Vibrogel* seismic gelatins were developed. . . . In the late 30's and early 40's blasting caps for seismic use were developed which enabled the user to determine to within a few tenths of milliseconds the instant of detonation by monitoring the cap circuit. These caps were named *Vibrocaps*. Dynamite packaging improvements also followed. Long lengths of thick paper cartridges were developed to enable them to be threaded or screwed together to improve loading into the borehole. This was Hercules patented *Spiralok*.<sup>3</sup>

<sup>2</sup><https://www.dynonobel.com/~media/Files/Dyno/ResourceHub/Technical%20Information/North%20America/Seismic/Vibrogel.pdf>, accessed 6/27/22.

Gelatin explosives created by combining nitroglycerine and nitrocellulose are soluble in organic solvents, like acetone, but insoluble in water. This 1945 advertisement extolled the virtues of Vibrogel and its related blasting components, Vibrocaps and Spiralok, for use in seismic exploration.<sup>4</sup> Note that individual cartridges could be connected to one another with the Spiralok design.


# ALL THREE DEVELOPED

## SPECIALLY FOR SEISMIC EXPLORATION . . .

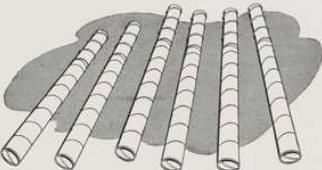


Scores of geophysical crews have improved the accuracy of their records, and saved time, too, by using this superior combination of Hercules blasting aids specially designed for geophysical prospecting.

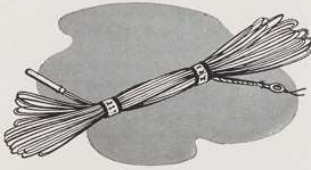
**SPIRALOK** — the time-saving cartridge assembly  
Hercules Vibrogel explosives are furnished in the patented Spiralok cartridges — the spirally threaded containers that permit quick, easy assembly of a rigid, continuous column of explosives. The Spiralok assembly is strong, easy to handle, goes together with a few twists of the wrist, and gives double-walled protection useful under severe conditions.



**VIBROGELS**—for uniform, accurate results  
From the Vibrogels you may choose the right type of explosive for the various conditions encountered in seismic exploration.



**VIBROCAP**—the no-lag electric blasting cap  
Time-break errors are completely eliminated with Hercules Vibrocaps. In no case does the bridge wire fuse before the cap detonates. Tests show that throughout the range of practical firing currents, there is no induction lag, not even one-hundred-thousandth of a second. We shall gladly furnish you with further details or price information.



**HERCULES POWDER COMPANY**  
INCORPORATED  
935 King Street, Wilmington 99, Delaware

*HERCULES*

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**VIBROGELS\***  
—special explosives for seismic work

**SPIRALOK\***  
—the superior cartridge for seismic work

**VIBROCAPS\***  
—the no-lag seismic primer

\*Reg. U.S. Pat. Off. by Hercules Powder Company XO-53

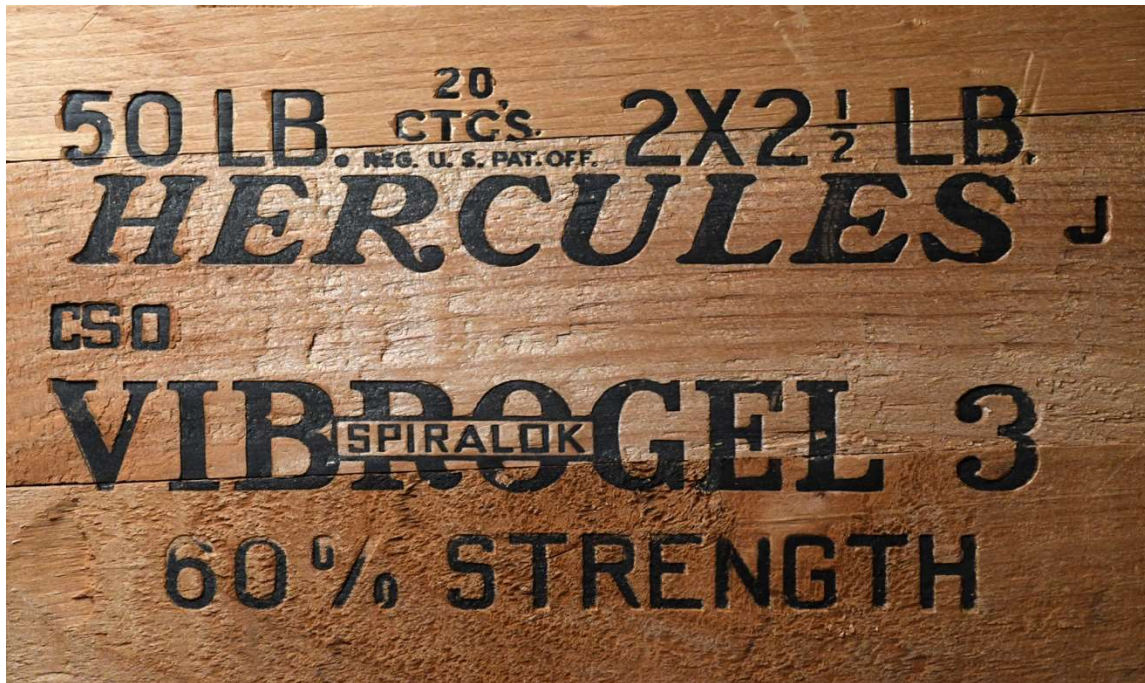
This advertisement appears in the July 2, 1945, issue of OIL WEEKLY; August, 1945, issue of A. A. P. G. BULLETIN; the October, 1945, issue of GEOPHYSICS; and the Nov.-Dec., 1945, issue of THE EXPLOSIVES ENGINEER.

PRINTED IN U. S. A.

<sup>4</sup> Basil T. Federoff & Oliver E. Sheffield, "Hercules Incorporated," in *Encyclopedia of Explosives and Related Items* (Picatinny Arsenal, Dover, New Jersey, 1975) H66.

<sup>4</sup> Hercules Incorporated. "All Three Developed Specially for Seismic Exploration..." 1945 Hercules Advertisements, 1945. Records of Hercules Incorporated, Volume 1945. Science History Institute. Philadelphia. <https://digital.sciencehistory.org/works/707958363>.

Cartridges of Vibrogel came in several different sizes. These were described on the box that contained them. This is the box-end of my box.



This box held 20 Vibrogel cartridges, each of which weighed 2 ½ pounds and was 2 inches in diameter. Described as “Vibrogel 3,” the strength of each cartridge was equivalent to straight dynamite containing 60% nitroglycerine.

Thanks again to my friend, Tom McCann, his father, Wayne McCann, and his grandfather, John McCann, for these wonderful artifacts from the explosives industry.