FUGITIVE EMISSIONS JOURNAL

COVER STORY

CRANE

Innovation is About Differentiation — Celebrating the 165th Anniversary of Crane

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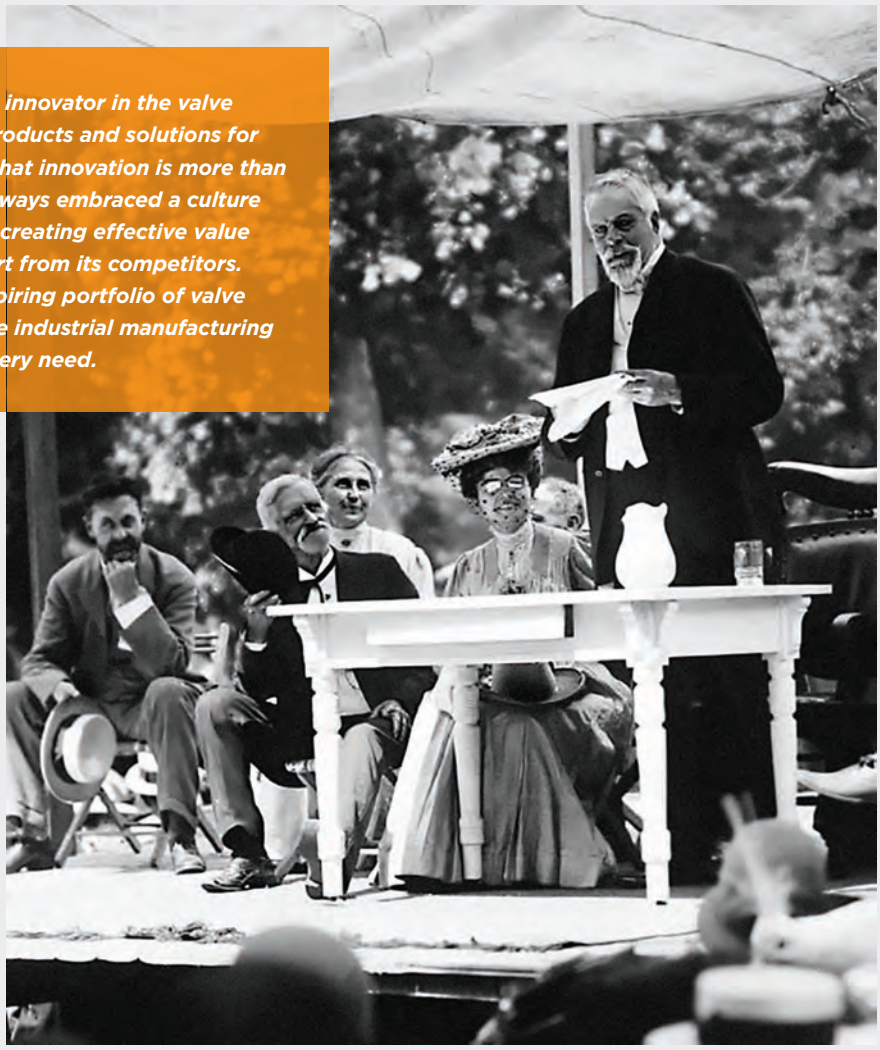
INNOVATION IS ABOUT DIFFERENTIATION –

Since its inception, Crane has been an innovator in the valve space, consistently developing new products and solutions for the transfer of fluids. Understanding that innovation is more than introducing an invention, Crane has always embraced a culture of differentiation that centers around creating effective value propositions that set its products apart from its competitors. Today, Crane has amassed an awe-inspiring portfolio of valve products that spans the breadth of the industrial manufacturing space with products developed for every need.

By Aneta Stephens, Crane ChemPharma & Energy



On July 6, 1905, sixteen trains of ten cars each carried the Company's employees, their families, and their picnic baskets to Northwestern Park (sixteen miles from Chicago on the banks of the Des Plaines River) to celebrate the Company's Fifty-Year Jubilee. Richard Teller Crane was a man ahead of his time, who, that day, talked about the values that bound them all together and about his profound happiness at being there with his employees to commemorate their company's fifty years of growth since its founding as a one-man brass and bell foundry.

To truly appreciate the scope of Crane's offering today, one must first understand the multi-generation history of the valve.

Intrinsic to Valve History

While Crane's valves date back to the mid-1800s, the first valves were actually developed during the Roman Empire. It was used as part of intricate canal systems to transfer water from rivers and fountains to ancient villages and cities, enabling better access to drinking water and improved farming. While the earliest documented valve was the plug valve, evidence shows primitive versions of what we know today as diaphragm valves which were used for controlling bath water, check valves for controlling wastewater, and even butterfly valves.

Bronze was the material of choice, as it could be welded to the bronze and lead pipes that were used in the canal systems of the day. It remained the go-to metal for valve designs until the Renaissance period when everything changed and more sophisticated valves were introduced, making way for new processes like irrigation, hydraulics, and even advanced canal systems.

However, it was during the Industrial Revolution that the valve itself experienced a renaissance of its own. In fact, the valve is what made that period possible. When Thomas Newcomen invented his steam engine in 1712, he introduced an advanced valve that could regulate steam in high pressure environments, making way for a modern era of effective valve use across industries that would continue for the next hundred years.

In walks Crane Co., a newly founded brass and bell foundry that introduced its first valve made only of brass in 1858, just three years after opening its doors in Chicago, Illinois. In 1876, Crane obtained its first valve patent for a steam valve, solidifying its place as a leading valve manufacturer; it was known as one of the "Big Five," each recognized for its various globe valve designs. These valves were created specifically for use in steam plants. As steam plants were the major manufacturing process of the 1880s, Crane expanded its manufacturing process to develop a complete line of gate, globe and check valves, making sure to differentiate them from those of the other major valve manufacturers.

As manufacturing processes evolved over the next 50 years, new valve types were introduced. Varying industries, applications and processes required valves that could stand

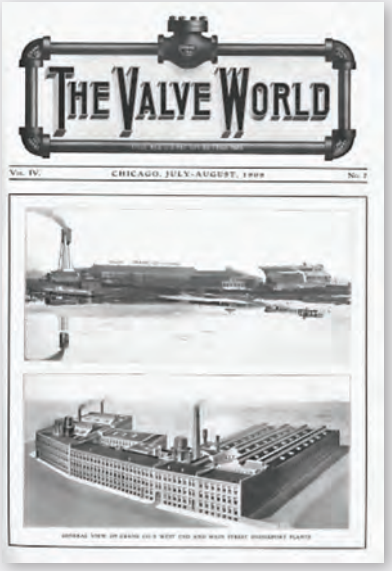
Celebrating the 165th Anniversary of **Crane**

up to higher temperatures and more demanding environments. It was in the early 1900s that the steel valve made its debut, replacing cast iron valves in steam power plants. Crane was the first manufacturer to install a steel foundry in its integrated valve plant to keep up with demand, enabling the company to offer higher quality products at lower prices, an innovation in its own right.

Valve Evolution

Lubricated plug valves were invented during World War I to overcome the shortcomings of previous plug valve designs, like leakage and sticking. Shortly thereafter, halfway around the world, war veteran P.K. Saunders was working as an engineering draftsman for a coal mine in South Africa when he invented the very first diaphragm and pinch valve to stop and open flow in order to prevent compressed air leakage. This invention, which came in 1928, changed the trajectory of the industry and led to the creation of what is known today as the Crane Saunders® brand of products.

During World War II, navy shipbuilding created a significant need for valves and Crane was there to answer the call, increasing steel valve output capacity fourfold to twenty-five thousand tons annually. In 1945, the company was a pioneer in the production of valves, utilizing steel alloys of various chromium, nickel and molybdenum components to meet new requirements for corrosion resistance and high-temperature structural stability.



Following the war, there was a rise in refining, chemical and petrochemical applications, as a result of 410ss and Stellite becoming standard materials and the introduction of the pressure seal valve, for which Crane received the first patent. The company's rigorous approaches to metallurgical science and material testing became the model for the valve and fitting industry. In 1912, Crane built its 160-acre factory, switching wholly to electricity for power, the first and most modern factory of its time.

Advancements in Teflon

Teflon was invented in 1938 by DuPont scientists. It was used as a sealing and lubricating material, opening the door for resilient seated ball valve construction and the eventual production of lined pipe by Resistoflex® in the 1950s. At the same time ball valves began to be equipped with Teflon seats, which led to a diversification of the ball valve across a number of manufacturing industries and processes.

Around this time, Crane introduced a revolutionary tool that would be used for generations. Its Flow of Fluids handbook, Technical Paper 410 was introduced and became the quintessential guide to understanding the flow of fluids through valves, pipes and fittings.

Sleeved plug valves eventually began to replace lubricated plug valves, but they were typically more expensive than gate, globe and check valves. As a solution to this pain point, Xomox® offered an innovative program where operators could purchase trial valves at cost. The resulting success led to increased demand and competition in the space.

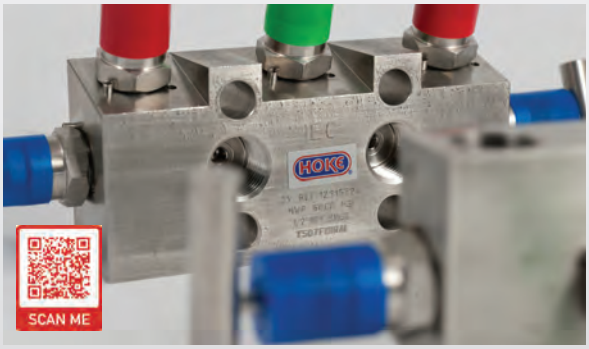
Shortly after the success of the sleeved plug valves came the financial crisis of the 1970s, when companies began looking for innovative solutions at lower costs and that was when the high-performance butterfly valve was developed (HPBV). Whereas previous butterfly valve designs had metal-to-metal seats, the modern HPBV instead used synthetic rubbers making it easier to actuate and less expensive to produce, which expanded its use into new applications.

Comprehensive Product Development

The development of theTP-410 as an educational resource for the industry, the strong ethical standards of excellence and service, and the consistent and meaningful product introductions such as the Xomox®XLB lined ball valves, Crane®FKX 9000 triple offset valves, Xomox®XP3 and XP4D sleeved plug valves, Krombach®KFO ball valves, Pacific®CSV gate, globe and check valves, Saunders®I-VUE

CONTINUOUS INNOVATION **TO SERVE YOU BETTER**

New Instrumentation & Sampling (I&S) capabilities



HOKE®, GYROLOK®, GO REGULATOR®, DOPAK® and TEXAS SAMPLING® share a long history of innovation. Founded in 1926, the DOPAK® brand offers a broad portfolio of sampling systems, valves and fittings for industrial environments. Hoke® began manufacturing small gas flow control valves for jeweler's torches in 1925, laying the foundation for a leading global fluid control products company. In the early 1960's, HOKE introduced a line of tube and pipe fittings branded as GYROLOK®. With a patented design, GYROLOK® fittings offer innovative advantages and benefits that are unmatched in the industry. The addition of instrumentation, regulators and sampling systems complements Crane's existing product offering, supporting our aim to provide a comprehensive portfolio of products that can solve our Customers' needs across the demanding chemical, oil & gas, refining, industrial and power applications.

XOMOX® XP3 | HF4D | SR - The first sleeved plug valve able to withstand four (4) thermal cycles with ZERO packing adjustments meets ISO 15848-1 BH CO3 392°F/200°C SSA 0

- Innovative stem seal design permits best in class FUGITIVE EMISSIONS CONTROL.
- Live-loaded design optimizes sealing performance (self-adjusted) and extended service life with ZERO PACKING ADJUSTMENTS through thermal cycling.
- Maintenance and cavity-free - no costly lubrication, no sticking, and no contamination of process media.

and M-VUE sensors, and Westlock®EPIC 2 transmitters to name a few; are what makeup Crane and contribute to the advancement of the industry.

Today, Crane's comprehensive portfolio spans every available valve type, and the company has developed a reputation for supporting the complete business through a range of products and service offerings. When it comes to innovation, Crane understands that what counts is differentiation…offering products and services that set it apart from the competition. Its willingness to embrace change over the decades has been an advantage that directly benefits its customers and there is an excitement about what the future may bring.

All Images courtesy of Crane.

Views & opinions expressed may not reflect those of Fugitive Emissions Journal.

RESISTOFLEX 14" - 48" - Large Diameter Plastic-Lined Pipe with superior lining technology that outperforms others with ZERO CORROSION rate up to 300˚F.

In high volume process flow applications, requiring large diameter piping, designers have limited options for corrosion resistance. Compared to others, the Resistoflex® 14"– 48" range of plastic-lined pipe and fittings is an economical choice in corrosive and erosion applications and helps to prevent scale build up. Melt processable resins such as ETFE (ethylene tetrafluoroethylene), PP (polypropylene), and HDPE (high-density polyethylene), in conjunction with rotational lining, have allowed Resistoflex® a new freedom in producing lined steel piping products with custom or complex dimensions and features. Superior to other lining and coating solutions, robust and economical vs. expensive alloys.

CRANE®FKX9000 Triple Offset Valve permits UNPRECEDENTED 50,000+ Cycles with Zero Leakage

An innovative Seat Angle Design and Stellite hard-faced valve body seat deliver a longer seal life and improved abrasion resistance, even after extensive cycling. Designed to eliminate wedging or binding of the disc, and lower the operating torque, the Crane FKX 9000 can REDUCE TOTAL COST OF OWNERSHIP BY UP TO 50%. The Stem Seal Design permits superior FUGITIVE EMISSIONS CONTROL (ISO 15848, Class BH) under recurrent thermal cycling, and reduces down time. Unlike position-seated ball, butterfly or plug valves, the TORQUE-SEATED Crane FKX 9000 self-adjusts to evenly distribute seal compression. A floating seal ring and wide seal ring supporting gasket yield a better seal to eliminate binding and to enhance performance. The precision machined metal seat and seal ring deliver reliable and bidirectional shutoff in high-temperature, high-pressure and severe service applications among others. The right-angle conical seat design facilitates an almost FRICTIONLESS IN-LINE SEALING.