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The Johansson blocks: Guns, cohesion, and market disruption

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In 1898, Carl Evard Johansson, a rifle maker based at a factory based in Eskilstuna, Sweden, filed for a patent for Gauge Block Sets for Precision Measurements. "The invention was as simple as it was powerful. Instead of relying on thousands of different mechanical gauges, as was the practice in the small arm industry, he introduced a set of only 102 accurately polished blocks. Such blocks, which became known as "Johansson blocks," could be combined to yield approximately 20,000 different measurements of accuracy adequate to the demanding task of high precision rifle manufacturing. What Johansson had not anticipated was that lapping flat metal surfaces so finely as was needed would have led the blocks to interact with such mysteriously strong forces that they could be later separated only with extreme effort. This probably accidental discovery, which occurred a couple of years later, led to a technological revolution. These measurement devices, still manufactured today, make a surprising appearance in the Feynman's Lectures on Physics as a demonstration of intermolecular forces that can only be explained by means of quantum mechanics. In this paper, we examine the history, physics, and market trajectory of the Johansson block industry –possibly the first example of a product enabled by the existence of dispersion forces.

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