

Ramon Casanova (1892–1968) and the pulse jet engine

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IN OCTOBER 1944, RAMON CASANOVA DANÉS (1892–1968), who at the time was living in Barcelona, read an article in the British magazine *The Illustrated London News* about the V1 flying bombs that the German army had been using to attack London since June 13th of that same year. One of the bombs had

failed to explode, allowing its mechanism to be examined. Casanova, who in 1917 had patented a pulse jet engine, was surprised to realize that the pulse jet engine that powered the V1 was very similar to his own invention. Two years before, in 1942, he had worked for the French state-owned aircraft company *Société nationale des constructions aéronautiques du Midi* (SNCAM), in Toulouse. Although he had presented his

invention to his French colleagues and shown them documents related to it, he was unable to arouse their interest. But in 1944, after reading the magazine article, he became convinced that his invention, which he never imagined could be applied for the purposes of war, had inspired the construction of the German flying bombs. But, who was this man, Ramon Casanova?

Formative years

Ramon Casanova was born in Campdevànol, a Catalan village in the Pyrenees, in 1892. At the time, small villages had only primary schools, if any, such that for his further education he was sent to Blanes—by then a small city on the coast near Girona, and today a famous seaside resort on the Costa Brava. There he studied in a boarding school of the Marist



Fig. 1. Premises of La Hispano-Suiza in Ripoll (named Comforsa since 1987).

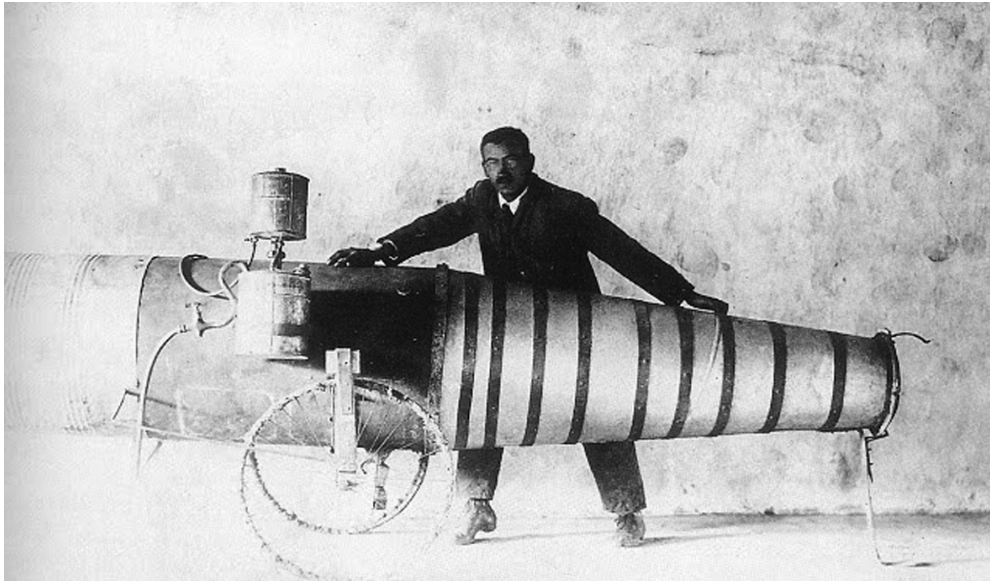


Fig. 2. Pulse jet invented by Ramon Casanova.

Brothers. In 1908, he started working at his family business, the metallurgic company La Farga (the “Foundry”) Casanova, which consisted of a small foundry. Some authors have described Casanova as an engineer, but he never received formal university training; rather, he acquired his engineering skills on the job, performing the various tasks carried out by other workmen at the forgery. He also read technical books, journals and magazines and took advantage of the knowledge accumulated during business trips to Barcelona, France, and the United Kingdom (UK).

Casanova’s innovative ideas and inventions—most of them related to founding and to the emerging automobile and aviation industries—were extraordinary, considering his lack of formal training and that he lived in a small village, far from the technological sophistication of large cities. He was still in his twenties when he invented an engine to fly without propellers. With his restless intelligence he constantly searched for solutions not only for industrial applications but even for use in the home; for example, the can opener he patented in 1943 became popular in Spain a few decades later.

While working for his family’s company, he introduced a metal stamping technology that made La Farga the first metallurgic company to produce stainless steel in Catalonia. For several years, La Farga was associated with Hispano-Suiza, a Spanish automotive and engineering firm based in Barcelona that produced luxury cars and airplane engines (Fig. 1). In the 1910s, La Farga moved its forgery section to Ripoll, a busy and historical city near Campdevàrol. Surely it was during that period that Casanova became fascinated with car and airplane engines.

Casanova, inventor of the pulse jet engine

In addition to his passion for reading to learn, Casanova liked to experiment. When, in 1917, he patented his *estatoreactor* (the pulse jet engine) he had already tested it at La Farga. He observed that the piston engine, which worked very well in cars, would not be effective for aircrafts. He thus began working to produce combustion in a cylinder, harnessing the expanding gases as the driving force to form a pulsating exhaust jet that would produce thrust intermittently. The cylinder in which the explosion took place was in fact a pulse jet.

In 1915, he built the first engine, suspending it from the roof of the factory during testing to assess the pulse jet’s power. After confirming in the factory that the engine worked, he was eager to test it under real-life conditions. To do so, Casanova installed the engine in his *cyclecar*, which he had also invented. The cyclecar allowed him to drive down steep slopes at full speed on roads with many curves. With the pulse jet engine mounted on the car he tried to produce, with the initial boost, the speed necessary to start the reactor (Fig. 2). However his attempts failed and the pulse jet did not work. He then decided to carry out another test: the pulse jet engine would be placed in a freight wagon that would be driven by a train. But he was unable to procure the financing to carry out the experiment and was forced to abandon the project.

Nonetheless Casanova recognized the need to patent his invention. The patent was “for the invention of explosion engines for all types of vehicles” (Fig. 3). He also published two articles, illustrated with drawings of the engine, in two



Fig. 3. Spanish patent (September 18, 1917) of the pulse jet engine invented by Ramon Casanova.



Fig. 4. Part of the page of *La Veu de Catalunya* (June 20, 1919), showing the engine draw. Note that the article was included in the sports section.

Catalan newspapers: *La Veu de Catalunya* (June 20, 1919) (Fig. 4), and *La Publicitat* (June 9, 1928).

A rich intellectual life

Apart from his interest in technology, Casanova was an intellectual who spoke French, English and Italian. His life was a paradigm of the cultural pursuits of his times. His father was passionate about music, while one of his sisters was a poet and another was a painter. Beginning in 1912, he contributed articles to newspapers and magazines. He also compiled several of his articles and notes, which later he gathered under the title *Motions and Emotions*. In 1918, he wrote a contribution for a conference of employer's organizations, but he refused to present it because he was requested to write it in Spanish instead of Catalan. Two years later he published it as a pamphlet titled *L'hora patronal* (The employer's time). Its topics were a constant theme throughout his life: the value of personal effort, the need for social justice, and the rejection of revolution as a means to achieve social improvements.

However, over the course of his life, his vision of society and the role of employers changed. He lost confidence in their organizations as the driving force of social change and sympathized with the ideas of socialism. He wrote about the need for equal rights, including for women. He understood the importance of education and sport and set up both a library and a soccer field for his workers.

Among his literary influences were the Catalan poets Joan Maragall, Jacint Verdaguer, and Josep Carner. He wrote about scientists, including Pasteur, Einstein, Fleming, Rostaing, and Lorenz, but also about Marx and Gandhi. In 1942, he wrote: "If things that are the closest to us are those that we know the least, why do we lack knowledge of the stars? [...] Things closer to us are more or less achieved, possessed, which means, known to us. Distant things, the more distant they are, the more attractive and preferred objects of effort and comprehension."

In 1936, the *Generalitat de Catalunya* (Autonomous Government of Catalonia) sent Casanova, along with a consultant from the Central Board of the *Compañía de los Caminos de Hierro del Norte de España* (a railway company founded in 1858 that later, in 1941, would be nationalized and integrated into RENFE, the Spanish state-owned rail transport company), to the UK, with the aim of buying machinery for the metallurgic industry. But they were prohibited by the British authorities from entering the country on the grounds that the UK had adopted the position of non-intervention in the Spanish Civil War (1936-1939). Casanova had always been a Catalan patriot. He was against Franco's *coup d'état* that led to the Spanish Civil War, and against Franco's army, which occupied Barcelona in January 27, 1939, and won the war in April 1, 1939. The possibility of staying in a more advanced European country must have contributed to Casanova's decision not to return to Catalonia, at least temporarily. During the Civil



Fig. 5. A reproduction of a V1 rocket, the first intercontinental missile, shown in the NASA's Marshall Space Flight Center, Huntsville, Alabama. Situated in what was then rural Alabama, Huntsville became home to the Operation Paperclip rocket scientists, mostly Germans, following World War II. NASA's Marshall Center has a space devoted to the pioneer work of Ramon Casanova. (© Michael Malone)

War, La Farga had been collectivized by its workers, and even though he was informed that the employees' committee had appointed him "director" of the factory, he refused to return. Instead, he went first to Tuchan, in Roussillon, southern France, where his in-laws lived, and later to Toulouse, where he worked at the aircraft factory SNCAM. However, when the Nazis finally occupied the south of France, in November 1942, Casanova chose to return to Catalonia. La Farga had in the meantime been taken over by the Spanish Ministry of Industry of Franco's Government and then sold to a private company. Nevertheless, Casanova's brother Josep Maria had started to re-establish the family business, under the slightly different name of Farga Casanova S.A., which soon again became a thriving metallurgic company.

In 1943, Casanova finally settled in Barcelona, where a section of Farga Casanova S.A. had been set up in one of the city's industrial quarters, Poble Nou. He continued to develop innovative ideas related to the company. His intellectual activities, however, could be shared only with his family and

a small circle of friends, because of the repression of Franco's regime, especially regarding Catalan culture. He died in Barcelona in 1968.

Late recognition... by NASA

Ramon Casanova was a maverick, but neither the villagers in Campdevànol and Ripoll, who used to call him "el boig de l'Hispano" (Hispano's fool, referring to the Hispano-Suiza car factory), nor the press, which made fun of him, understood the scope of his inventions. His talent was finally recognized when NASA's Marshall Space Flight Center, in Huntsville, Alabama (where most of the German rocket scientists, including Wernher von Braun [1912–1977], were initially secluded) honored him with a display of his engine and a brief biography highlighting his brilliant career and ingenuity (Fig. 5). A replica of Casanova's pulse jet engine is also on display at the Museum of Science and Technology of Catalonia in Terrassa, an industrial city near Barcelona. It was donated by his widow, along with relevant documents related to the invention.

Although several homages have been paid to Ramon Casanova and numerous articles have been written about him, he still awaits the recognition and appreciation that he deserves from his country and from his compatriots, Catalonia and the Catalans. ■

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