Clutch play from groovy discs, page 22

MACHINE DESIGN

MARCH 9, 2006
www.machinedesign.com
A Penton Publication



When fittings can't fail, page 82

Mechanical man looks like a Swiss watch inside, page 106

How to be smart about simulating fluids, page 112

Embedded controls double as PLCs, page 116

X prize spin-off: Rocket racers, page 124

RoHS-friendly chromium? Yes, there is such a thing, page 130

Periodicals
USPS 100 Approved Poly

The Six million dollar ... Doll?

A fabulous automaton, "The Bird Trainer," relies on interior spring-driven cogs and gears for motivation.

Patrick Mahoney
Associate Editor



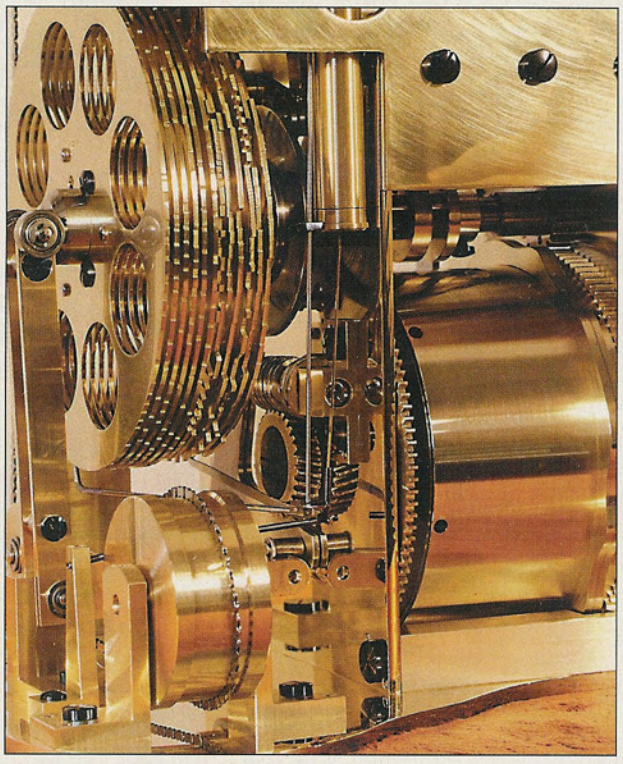
Around 2,340 gilt or polished-steel parts bring the Bird Trainer to life.

The world's most expensive doll won't be found on a shelf at Toys-R-Us. In fact, the only place you're likely to see *L'Oiseleur* (The Bird Trainer) — a 4-ft-tall figure of a young man carrying a sword, holding a flute, and dressed in embroidered Renaissance garb — is in the Swiss workshop of his creator. French-born Christian Bailly, the genius behind The Bird Trainer and an expert on automata, has written two books on the subject.

We've all seen dolls that blink, cry, wet themselves, walk, and talk, but The Bird Trainer takes the meaning of "doll" to a whole new level. Dressed in silk, satin, and velvet, with skin of painted porcelain, and glass eyes, The Bird Trainer lifts a flute to his mouth and blows the "Marche des Rois" by Georges Bizet. His fingers play the instrument while his eyes dart back and forth. Of course none of this happens until he's been wound with a golden key.

And if that's not enough, a bird perched on the Trainer's shoulder and another in his hand sing along. The tiny birds open and close their beaks, turn their heads, and flap their wings. (*No, they don't fly but then we're only talking 6 million bucks here.*) Each bird has 62 parts and moves in time with the flute's tune.

There's no motor or electrical power source. Spring-driven cogs and gears hidden within the graceful body drive all the actions. In all, the device has 2,340 gilt or polished-steel parts. The asking price for this one-of-a-kind collectible: $6,250,000. (For comparison, the record price for a doll is $230,000.)



A close-up of the automaton's spring-driven cogs and gears.



The Bird Trainer, a 4-ft-tall automaton, comes complete with sword (only the hilt is visible in photo), flute, pair of singing birds, and embroidered Renaissance garb. Asking price: $6,250,000.

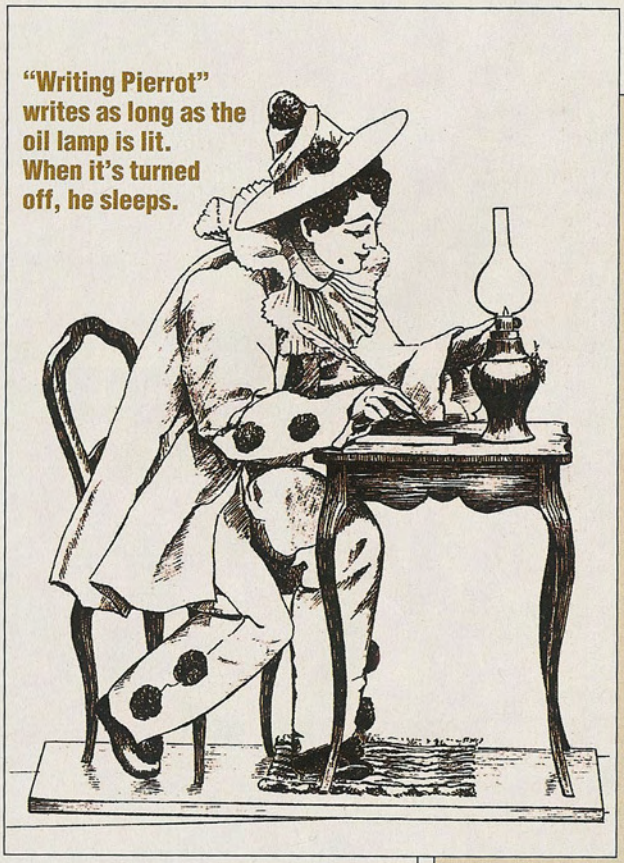
The Bird Trainer came to life in the Swiss workshop of Bailly's company, named for Jacob Frisard, a renowned automata-maker of the late 18th and early 19th century. Twelve craftsmen spent a total of 15,000 hr creating the elaborate device. The piece weighs 122 lb, including the jade and mother-of-pearl pedestal.

The original budget was a paltry $400,000, but costs for precious materials, dressmakers, sculptors, jewelers, wigmakers, and other specialists spiraled out of control. To raise the money, Bailly sold more than a hundred 19th century automatons he'd collected over 40 years. Now, he's looking for one good buyer.

Bailly learned to refurbish automata mechanics in the early 1970s by taking them apart to see how they worked. Today, he repairs them for collectors around the world.

The Bird Trainer was moved only once from Bailly's Sainte-Croix, Switzerland, workshop. It was exhibited at the Baselworld watch and jewelry show last May.

Bailly hasn't cut any corners, using only the finest materials and expert craftsmen. The work was done in the painstaking tradition of the 18th century, and the Trainer's creator won't part with it cheap. Many automatons are made to order, but Bailly only creates one if he likes the buyer. Some notable (and apparently likeable) patrons are Dustin Hoffman, Steven Spielberg, and David Copperfield.



"Writing Pierrot" writes as long as the oil lamp is lit. When it's turned off, he sleeps.

Automata was recently exhibited for the first time in Hong Kong and China. The exhibit included "Writing Pierrot," who appears to write as long as an oil lamp is lit. When the lamp is turned off he sleeps, and when he wakes he moves his hand to turn it on.

Another Bailly creation, "An Acrobat Clown," joined the private exhibition. The 90-cm clown balances in a headstand on two chairs, first lifting one chair and then the other.

It's not hard to understand our fascination with these elaborate humanlike mechanisms. They not only provide a glance backward in time but offer a glimpse into ourselves. **MD**

WE WANT YOUR FEEDBACK

Did you find this information interesting? Circle 704

Automata's origins

The *Encyclopedia of the Nineteenth Century* defines "automaton" as "a machine which has the form of an organized being and contains within itself a mechanism capable of creating movement and simulating life." And in his book, *Automata: The Golden Age 1848-1947* (1987), Christian Bailly describes the automaton as "a work of art in which sculpture, music, costume, and mechanics all play a part." But unlike other machines, automatons incite the imagination and inspire admiration.

In ancient Egypt, priests would secretly manipulate articulated statues of the gods to make them seem to move and speak. During the Greco-Roman period, automata that relied on simple principles of physics, such as the movement of fluids and air pressure, became popular.

Automata, in the form of cathedral clocks, flourished in Europe during the fourteenth century. Figures of men, called "Jacquemarts," and animals chronicled the passage of the hours by their mechanical gestures. Some of the finest examples are the cathedral clock of San Marco in Venice, the astronomical clock in Strasbourg, and the clock of Dijon. In the Renaissance pleasure-garden of Philippe, duke of Artois, hydraulics animated birds perched in the trees and powered mechanical musicians.

The 18th century heralded the arrival of a new, more sophisticated kind of automaton — the android. Androids are automatons in human form that perform humanlike functions by means of hidden springs, gears, etc. These devices could, so to speak, write, draw, or play a musical instrument. Some could even "speak" a few words. The planning and building of a single model might take several years. Each component was produced by hand, and costs were prohibitive. The android captured the imagination of the time because people saw it as symbolic of the triumph of reason over ignorance.

The Industrial Revolution of the 19th century was a boon for automata. The use of machines reduced the time necessary for making the devices, which resulted in lower prices. The automaton became the perfect drawing-room accessory. The Marais district of Paris is where automaton-making — a combination of various forms of craftsmanship and clockwork mechanisms — sprang up.

These mechanical devices can be divided into several categories. *Tableaux animés* are pictures containing moving elements. Organs containing automata are another kind. These are real instruments whose music is accompanied by the gestures of mechanical figures. Mechanical toys are still another category, though the line between mechanical toy and automaton is difficult to discern.

But of all these devices, the automaton is the most sophisticated. The extent of the automaton's complexity is only exceeded by its aesthetically pleasing appearance. Each step of the process, from design to the final touches, is done with the greatest care and attention to detail.

The velvet-draped Victorian drawing room may have been replaced by the family room with its big-screen TV, surround sound, and DVD player, but in certain exclusive circles, the automaton appears to be alive and well.