

Glazba iz kutije

*Izbor iz repertoara
mehaničkih glazbenih
automata Ivana
Gerersdorfera*

Music out of a Box

*A selection from the
repertoire of the
mechanical musical
automata of Ivan
Gerersdorfer*



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Zagreb City Museum, 2010
BIEM / HDS 001



1. Glazbena kutija s likom sove	1:20
2. Glazbena kutija »Wiener Spieldose«	2:44
Glazbena kutija sa zvonima:	
3. <i>Tannhäuser</i> , Marsch (Richard Wagner)	0:36
4. <i>Rheinländer</i> , Polka (Johann Strauss)	0:39
5. <i>Feuerfunken</i> , Walzer (Johann Strauss)	0:39
6. <i>Der erste Kuß</i> , Schottisch (Meyer)	0:40
Glazbena kutija sa zvoncem, bubnjićem i kastanjetama:	
7. <i>Les roses</i>	0:47
8. <i>La belle Hélène</i> (Jacques Offenbach)	0:51
9. Nepoznata	0:54
10. <i>La Muette de Portici</i> (Daniel-François-Esprit Auber)	0:59
Glazbena kutija »Harfenexpression«:	
11. <i>La mascotte</i> , Valse (Edmond Audran)	1:13
12. <i>Boccaccio</i> , Trio (Franz von Suppé)	1:14
13. <i>Rosen aus dem Süden</i> (Johann Strauss)	1:21
Glazbena kutija s izmjenjivim valjcima:	
14. <i>Rosen aus dem Süden</i> (Johann Strauss)	0:45
15. Nepoznata	0:46
Euphonion:	
16. Nepoznata	1:57
17. <i>Nase Marjana</i> , Cseh polka	1:56
18. Automatske orgulje	1:14
19. Automatske orgulje u uri	0:51
20. Automatska citra	1:04
21. Ariston: <i>Der Feldprediger</i> , Cadrille (Karl Millöcker)	1:03
22. Herophon: <i>Mandolinata</i>	0:41
23. Orkestrion Hupfeld: <i>La Paloma</i> (Sebastian Yradier)	1:30
24. Orkestrion: <i>Dunavski valovi</i> (Ion Ivanovici)	1:38
25. Herophon: <i>An der schönen blauen Donau</i> (Johann Strauss)	0:49



Phonola:

- | | |
|--|------|
| 26. <i>Rondo capriccioso</i> (Felix Mendelssohn-Bartholdy),
umjetnička vrpca s izvedbom Maxa von Pauera | 6:34 |
| 27. <i>Erotikon</i> (Edvard Grieg), umjetnička vrpca s izvedbom Edvarda Griega | 3:48 |
| 28. Orkestrion: <i>Polka i barkarola</i> | 1:27 |

Herophon:

- | | |
|--|------|
| 29. <i>Hrvatska polka</i> (Pavao Štoos) | 0:34 |
| 30. <i>Oj Hrvati, oj junaci</i> | 0:38 |
| 31. <i>Još ni jedan Zagorec</i> | 0:36 |
| 32. <i>Još Hrvatska</i> (Ferdo Livadić) | 0:36 |
| 33. Orkestrion: <i>Lijepa naša</i> (Josip Runjanin) | 1:35 |
| 34. <i>Nikola Šubić Zrinski</i> (Ivan Zajc – Ivo Muhvić), Glasba Bojnog zrakoplovstva
pod ravnanjem kapelnika Stjeha, gramofonska ploča u izdanju Elektrotona | 2:39 |

Ukupno trajanje: 46:40

Automati:

- Glazbena kutija s likom sove, Švicarska, kraj 19. st., MGZ 5756
Glazbena kutija »Wiener Spieldose«, Beč, sred. 19. st., MGZ 5755
Glazbena kutija sa zvonima, Švicarska, sred. 19. st., MGZ 5757
Glazbena kutija sa zvoncem, bubnjićem i kastanjetama, Ženeva, oko 1870., MGZ 5759
Glazbena kutija »Harfenexpression«, Mermod Frères, Švicarska, druga pol. 19. st., MGZ 5758
Glazbena kutija s izmjenjivim valjcima, Mermod Frères, Švicarska, kraj 19. st., MGZ 5760
Euphonion, Leipziger Musikwerke Euphonika, Njemačka, kraj 19. st., MGZ 5765
Automatske orgulje, Beč, 1814., MGZ 5750
Automatske orgulje u uri, Njemačka, sred. 19. st., MGZ 5752
Automatska citra, Njemačka, prva pol. 20. st., MGZ 5766
Ariston, Neue Leipziger Musikwerke, Njemačka, kraj 19. st., MGZ 5764
Herophon, Berliner Musikinstrumenten-Fabrik, Njemačka, druga pol. 19. st., MGZ 5763
Orkestrion, Ludwig Hupfeld, Leipzig, poč. 20. st., MGZ 5762
Orkestrion, Austrija, oko 1900. god., MGZ 5844
Phonola, Ludwig Hupfeld, Leipzig, poč. 20. st., MGZ 6356
Gramofon, Berlin?, poč. 20. st., MGZ 5771



*Pitam se je li ijedan drugi izum, u tako kratko vrijeme,
ispunio toliko mnogo srca radošću kao izum mehaničke
glazbe.*

*Robert H. Schauffler,
The Joyous Mission of
Mechanical Music, 1914.*

Mehanička glazba

Mehanički glazbeni automat ili automatofon instrument je koji proizvodi zvuk iz programiranog mehaničkog izvora, bez sudjelovanja čovjeka (pokretan satnim mehanizmom ili energijom vjetra, vode, elektromotora) ili uz njegovu asistenciju (okretanjem ručice ili upravljanjem pneumatskim sustavom).

Čovjek je oduvijek težio zvučnoj harmoniji. Pjevanje i sviranje nije mu bilo dovoljno pa je poželio stvoriti instrumente koji će sami svirati kako bi on samo uživao u glazbi. Prvi takav instrument bila je eolska harfa – rezonantna kutija sa žicama različite debljine i napetosti koje na vjetru vibriraju. Antička Grčka, Egipat, Bliski istok, Kina i Indija poznavali su mehaničku glazbu. U 13. st. Europa upoznaje kineske automate. Od 16. st. europski graditelji usavršavaju različita tehnička rješenja mehanizacije glazbe, primjenjujući i modificirajući konstrukciju satnog mehanizma.

Svaki automat sastoji se od četiri dijela: jednog ili više glazbenih elemenata (ugodeni čelični češalj, svirale, žice, udaraljke, zvonce), glazbenog programa (drveni ili metalni valjak s klinovima, perforirana kartonska ili metalna ploča, perforirana papirna vrpca), mehaničkog sučelja između prvog i drugog dijela (sustav poluga ili tipki) te izvora energije koji pokreće automat. Prema ovoj definiciji fonograf (izum Thomasa A. Ediso-

na iz 1877.) i gramofon (izum Emila Berlinera iz 1887.) ne pripadaju obitelji mehaničkih glazbenih automata iako su iz nje proistekli.

Poput računala, i automati imaju svoj sklopovski (“hardverski”) i programski (“softverski”) dio te je za njihovu izgradnju potrebno znanje iz dviju disciplina: tehnologije konstrukcije automata (znanje mehaničara, urara, graditelja instrumenta, “hardveraša”) i tehnologije programiranja glazbe, tj. rekodiranja notnog zapisa u shematizirani raspored klinova na valjku ili rupica na ploči, odnosno vrpci (znanje akustičara, “programera”, “softveraša”).

Prve glazbene kutije, najpopularniji tip automata za kućnu uporabu, proizvod su urarskoga umijeća. Najraniji glazbeni sat, koji se može sa sigurnošću datirati, potječe iz 1772. godine, a konstruirao ga je francuski urar Michael Joseph Ransonet (1705. – 1778.). Godine 1796. ženevski urar Antoine Favre (1734. – 1820.) patentirao je džepni glazbeni sat koji je izvodio melodiju pomoću ugođenih zubaca čeličnoga češlja kao registra tonova, valjka s klinovima koji rotacijom pobuđuju zupce češlja na vibraciju te pogona na oprugu koji okreće valjak. To je osnovni princip glazbene kutije. Uskoro se pojavljuju slični mehanizmi ugrađeni u sobne sato-ve ili posebne kutije. Favreov izum označio je poče-



tak “zlatnog doba” mehaničke glazbe koje će potrajati kroz čitavo 19. st. Od sredine 19. st. u glazbene kutije ugrađuju se, pored češlja, i drugi zvučni elementi (zvonca, bubnjići, kastanjete) kako bi se postigla raznolikost glazbenoga izraza. U drugoj polovini 19. st. razvijaju se konstrukcije koje su omogućile promjenu glazbenoga programa pomoću izmjenjivih valjaka.

Ideja da se skupocjeni metalni valjak zamijeni jeftinijom perforiranom pločom od kartona ili metala, a čelični češalj sviralama na jezičac, rezultirala je procvatom industrije pristupačnih automata za kućnu uporabu (*herophon, ariston, euphonion*). Ploča kao nosač glazbenog programa gotovo je istodoban izum Ellisa Parra u Londonu i Paula Lochmanna u Leipzigu (1866.), a njena široka primjena počinje 1890. godine kad se u središte proizvodnje glazbenih kutija premješta iz Švicarske u Leipzig. Industrija mehaničke glazbe mogla je od tada ažurno pratiti i glazbene novitete.



Krajem 18. st. počinju i pokušaji zamjene čitavog orkestra jednim glazbenim automatom. Jedan od najranijih automata ovoga tipa izgradio je Johann Georg Strasser modificirajući tehničko rješenje orgulja. Naziv “orkestrion” skovao je 1789. godine Georg Joseph Vogler (1749.

– 1814.). Tijekom 19. i ranog 20. stoljeća, orkestrionom se nazivaju svi kompleksni mehanički automati koji izvide glazbu zabilježenu na valjcima s klinovima ili perforiranim vrpcama, zamjenjujući pritom, kako i sam naziv kaže, čitav orkestar. Orkestrioni su mogli izvoditi klasični i popularni repertoar gotovo do savršenstva. Mnoge gostionice, pa tako i zagrebačke, imale su orkestrion: da bi čuli glazbu, gosti su u njega ubacivali novčić.

U 19. stoljeću, vijeku općeg tehnološkog napretka, automatizirani su gotovo svi instrumenti (primjerice, automatske orgulje, automatska citra), a zahvaljujući izmjenjivim nosačima glazbenog programa, repertoar se stalno širio. Vrlo su popularni bili automati za sviranje glasovira, koji su omogućili upoznavanje svijeta glazbe i kvalitetnu izvedbu glasovirskih kompozicija te glasovirskih obrada orguljaških, komornih, orkestralnih i opernih djela svima koji nisu ovladali pijanističkim umijećem. Prvi takav automat – *pianolu* – patentirala je 1900. godine tvrtka Aeolian iz New Yorka. Kao odgovor na američki izum, njemačka tvrtka Ludwig Hupfeld iz Leipziga predstavila je 1902. god. prvi europski automat za sviranje glasovira na pneumatski pogon – *phonolu* – koja se postavlja ispred glasovira kako bi njene udaraljke bile u dodiru s klavijaturom glasovira. U *phonolu* se umeće valjak s perforiranom papirnom vrpcom koja nosi glazbeni zapis.

Upravljajući pedalama i ručicama *phonole*, izvođač okreće valjak dovo-deći u dodir udaraljke *phonole* s tipkama glasovira. Umjetničke vrpce za *phonolu* idejno su i tehničko rješenje tvrtke Hupfeld (1905.) kojim je omogućeno bilježenje pijanističke izvedbe na specijalno prilagođenom glasoviru, spojenom s uređajem za ucrtavanje položaja budućih perforacija na vrpci (melografof). Na taj način dobivena vrpca služila je kao matrica za proizvodnju perforiranih vrpca, čija je reprodukcija vrlo bliska izvornoj umjetničkoj izvedbi. Za razliku od umjetničke, matrica za tvorničku vrpцу nastaje prijepisom notnog zapisa u shematizirani raspored perforacija.

Glazbeni automat promovirao je opću ideju tehnološkog napretka u kojemu strojevi zamjenjuju rad ruku. Mnogi su osporavali vrijednost stroja u umjetnosti, dok su drugi isticali kako su zapravo sva glazbala ujedno i mehanički instrumenti. Veliki skladatelji





MGZ 5771

nisu se libili skladati za automate (Händel, Haydn, Mozart, Beethoven, Stravinski i dr.). U 19. i prvim desetljećima 20. st. automat je distribuirao i popularizirao glazbeno stvaralaštvo, razvijajući se od ekskluzivnog elementa mobilijara imućnih slojeva do pristupačnog uređaja za reprodukciju glazbe u prosječnom domu ili javnom prostoru. Nakon izuma fonografa, koji je prvi put u povijesti omogućio snimanje i reprodukciju ljudskoga glasa, a potom i gramofona, proizvodnja automata drastično pada krajem tridesetih godina 20. st. Danas oni više nisu dio naše svakodnevice kao što su bili prije samo nekoliko naraštaja. Mogu se susresti u muzejima ili privatnim zbirkama. Muzikolozi se rijetko bave fenomenom mehaničke glazbe, o njemu uglavnom pišu kolekcionari i tehnofili.

Ivan Gerersdorfer i njegova zbirka mehaničkih glazbenih automata

Ivan Gerersdorfer (Zagreb, 1927. – Zagreb, 1993.), urarski majstor, kolekcionar, restaurator satova i mehaničkih glazbenih automata, sin je Vere Meid Gerersdorfer, rođ. Freudreich (1889. – 1955.) i Ive Gerersdorfera (1897. – 1953.), tvorničara šešira. Odrastao je uz tri sestre u gornjogradskoj palači Jelačić (Magdalenić-Drašković), u Demetrovoj 7. Majka je bila družbenica Anke Jelačić, kćerke grofa Đure Jelačića Bužimskog, pa je s njom često posjećivao Nove dvore i provodio vrijeme u knjižnici, razvijajući zarana svestrano zanimanje za kulturno-povijesne teme.

Glazbena kutija s likom sove bila je prvi glazbeni automat koji je Ivan Gerersdorfer čuo u ranom djetinjstvu: “Zanimalo me je kako ta kutija svira, a nije gramofon, pa mi je otac kupio



prosjački vergl. Iz ljubavi prema muzičkim automatima izučio sam urarski zanat jer akustičar tih naprava je nešto između urara i klavir-majstora. I sâm sam pravio malene muzičke automate i stavljao ih u satove, a svu ušteđevinu trošio na kupovinu čudesno lijepih mehanizama. No, svi automati koje sam kupio bili su neispravni, pa sam ih popravljao, što mi je prčinjavalo velik užitak. Neopisivo sam sretan kada muzički automat nakon pedesetak godina šutnje zasniva u mojim rukama. Tog trenutka točno znam odakle potječe i koliko ima godina jer repertoar je rodni list svakog automata... Cijeli dan provodim uz svoje automate. Oni trebaju gotovo svakodnevnu njegu...”



Gerersdorfer je sakupio zbirku automata iz “zlatnog doba” mehaničke glazbe (1814. – 1914.). Tipološki su u njoj zastupljeni gotovo svi tehnički modeli automata za kućnu i javnu uporabu. Automati potječu iz glasovitih središta industrije mehaničke glazbe u Austriji, Njemačkoj, Švicarskoj, Češkoj, Italiji i Sjedinjenim Američkim Državama. Zbirka sadrži više od dvije stotine perforiranih vrpca za *phonolu* (od toga oko polovine čine umjetničke vrpce), nekoliko desetaka ploča za *herophon*, metalne ploče za *ariston* i *euphonion*, voštane valjke za fonograf te gramofonske ploče. Posebno su vrijedne umjetničke vrpce za *phonolu* s izvedbama znamenitih pijanista i skladatelja te ploče za *herophon* sa zapisima hrvatskih skladbi.

Većinu automata Gerersdorfer je nabavio nakon Drugoga svjetskog rata kad su mnogi prodavali svoj mobilijar, sobne satove i glazbene automate zbog osiromašenja i preseljenja u manje stanove. Najviše ga je zaokupljao materijal koji se mogao skupiti u nas, a

nije bio u funkcionalnom stanju. Automate je uglavnom nabavljao u Zagrebu i nije mu bilo teško zaviriti u gotovo svaki podrum i tavan na Gornjem gradu: “Znate da sam moral postat i stolar i mehaničar i graditelj orgulja. Sve sam sâm delal.”

Godine 1960. otvorio je vrata stana i svoju zbirku učinio dostupnom građanima. U dnevnom tisku rijetko bi osvanuo kakav napis o “bizarnoj zbirci” u stanu-muzeju, u kojem Ivan Gerersdorfer živi za svoje automate i dijeli staru palaču u Demetrovoj 7 s dječjim vrtićem “Tatjana Marinić”.

Kao predani kustos svoje zbirke, priredio je dvije tematske izložbe o povijesti razvoja mehanizacije glazbe i tehnike zapisivanja zvuka (Muzej za umjetnost i obrt, 1963., Muzej grada Zagreba, 1977.). Godine 1973. organizirao je u Muzeju grada Zagreba ciklus *Koncerti sa starih ploča* s predavanjima i slušanjima snimaka hrvatskih scenskih umjetnika, glumaca i pjevača, sačuvanih na gramofonskim pločama, snimljenim u Zagrebu u prvim desetljećima 20. st. Objavio je kraće tekstove u katalozima izložaba i stručnoj periodici. Po svojoj uzornoj zbirci i velikoj stručnosti bio je poznat i izvan granica tadašnje države. Ostavio je neobjavljeni rukopis *Fenomen mehaničkog glazbenog automata u općoj kulturnoj revoluciji*.

Zbirku je poklonio gradu Zagrebu 22. lipnja 1977. godine. Prilog ugovoru bio je katalog *Kabinet muzičkih automata*, koji su 1970. objavili tadašnji Regionalni zavod za zaštitu spomenika kulture i Udružena samoupravna interesna zajednica (USIZ) kulture grada Zagreba. U njemu su kataloški obrađena 22 donirana automata. Darovatelj se obvezao za života zbirku čuvati, održavati i prezentirati javnosti, a grad Zagreb dao je na doživotno korištenje jednu sobu u “društvenom vlasništvu”, neposredno povezanu s četverosobnim stanom darovatelja. Zbirka je bila izložena u dvije sobe. Naknadno je Gerersdorfer proširio donaciju s još šest automata.

Odlukom Gradskog poglavarstva od 18. travnja 1994. godine Zbirka je predana na upravljanje Muzeju grada Zagreba. Od godine 1998. izložena je u stalnom postavu



Muzeja, a 2008. digitalizirana i prezentirana na internetu (www.mgz.hr). Projekt digitalizacije dovršen je 2010. postavljanjem multimedijskog kioska u stalnom postavu Zbirke te izdavanjem ovog nosača zvuka, kojim smo nastojali dati reprezentativni presjek kroz glazbeni repertoar Zbirke, s posebnim naglaskom na isječak iz hrvatske zvučne baštine, imajući na umu pitanje: postoji li glazba ako nije dostupna svima? Digitalizacijom “glazbe iz kutije” povezujeemo svoje muzejsko poslanje u 21. stoljeću s “radosnom misijom” mehanizacije glazbe u 19. i ranom 20. stoljeću, dajući tako i doprinos očuvanju nematerijalne baštine.

Maja Šojat-Bikić

1. Music box with owl figure	1:20
2. Wiener Spieldose music box	2:44
Music box with bells:	
3. <i>Tannhäuser</i> , March (Richard Wagner)	0:36
4. <i>Rheinländer</i> , Polka (Johann Strauss)	0:39
5. <i>Feuerfunken</i> , Waltz (Johann Strauss)	0:39
6. <i>Der erste Kuß</i> , Scotch (Meyer)	0:40
Music box with bell, drum and castanets:	
7. <i>Les roses</i>	0:47
8. <i>La belle Hélène</i> (Jacques Offenbach)	0:51
9. Unknown	0:54
10. <i>La Muette de Portici</i> (Daniel-François-Esprit Auber)	0:59
»Harp expression« music box	
11. <i>La mascotte</i> , Waltz (Edmond Audran)	1:13
12. <i>Boccaccio</i> , Trio (Franz von Suppé)	1:14
13. <i>Roses from the South</i> (Johann Strauss)	1:21
Music box with exchangeable cylinders:	
14. <i>Roses from the South</i> (Johann Strauss)	0:45
15. Unknown	0:46
Euphonion:	
16. Unknown	1:57
17. <i>Our Mariana</i> , Czech polka	1:56
18. Automatic organ	1:14
19. Automatic organ in a clock	0:51
20. Automatic zither	1:04
21. Ariston: <i>Der Feldprediger</i> , Quadrille (Karl Millöcker)	1:03
22. Herophon: <i>Mandolinata</i>	0:41
23. Hupfeld Orchestra: <i>La Paloma</i> (Sebastian Yradier)	1:30
24. Orchestra: <i>Danubian Waves</i> , Waltz (Ion Ivanovici)	1:38
25. Herophon: <i>Blue Danube</i> , Waltz (Johann Strauss)	0:49



Phonola:

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| 26. <i>Rondo capriccioso</i> (Felix Mendelssohn-Bartholdy), hand played roll with performance by Max von Pauer | 6:34 |
| 27. <i>Eroticon</i> (Edvard Grieg), hand played roll with performance by Edvard Grieg | 3:48 |
| 28. Orchestrion: <i>Polka and barcarolle</i> | 1:27 |

Herophon:

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|---|------|
| 29. <i>Croatian Polka</i> (Pavao Štoos) | 0:34 |
| 30. <i>Oh Croats, Oh Heroes</i> | 0:38 |
| 31. <i>Still no man of Zagorje</i> | 0:36 |
| 32. <i>Still Croatia</i> (Ferdo Livadić) | 0:36 |
| 33. Orchestrion: <i>Our Beautiful Country</i> (Josip Runjanin) | 1:35 |
| 34. <i>Nikola Šubić Zrinski</i> (Ivan Zajc – Ivo Muhvić), Band of the Air Force conducted by Kapellmeister Stjeh, gramophone record issued by Elekroton | 2:39 |

Total length: 46:40

The automata:

- Music box with owl figure, Switzerland, end of the 19th century, MGZ 5756
Wiener Spieldose music box, Vienna, mid-19th century, MGZ 5755
Music box with bells, Switzerland, mid-19th century, MGZ 5757
Music box with bell, drum and castanets, Geneva, ca 1870, MGZ 5759
»Harp expression« music box, Mermod Frères, Switzerland, second half of 19th century, MGZ 5758
Music box with exchangeable cylinders, Mermod Frères, Switzerland, end of 19th century, MGZ 5760
Euphonion, Leipziger Musikwerke Euphonika, Germany, end of 19th century, MGZ 5765
Automatic organ, Vienna, 1814, MGZ 5750
Automatic organ in a clock, Germany, mid-19th century, MGZ 5752
Automatic zither, Germany, first half of 20th century, MGZ 5766
Ariston, Neue Leipziger Musikwerke, Germany, end of 19th century, MGZ 5764
Herophon, Berliner Musikinstrumenten-Fabrik, Germany, second half of 19th century, MGZ 5763
Orchestrion, Ludwig Hupfeld, Leipzig, beginning of 20th century, MGZ 5762
Orchestrion, Austria, about 1900, MGZ 5844
Phonola, Ludwig Hupfeld, Leipzig, beginning of 20th century, MGZ 6356
Gramophone, Berlin?, beginning of 20th century, MGZ 5771



I wonder if any other invention has ever, in such a brief time, made so many joyful hearts as the invention of mechanical music.

*Robert H. Schauffler,
The Joyous Mission of Mechanical Music, 1914*

Mechanical Music

The mechanical musical automaton, or *automatophone* is an instrument that produces sound from a programmed mechanical source without the participation of a person (driven by clockwork or wind or water energy, or an electric motor) or with someone's assistance (turning a handle or running a pneumatic system).

Humankind has always sought harmony in sound. Singing and playing did not quite suffice, and people desired to create instruments that would play by themselves so that they could just enjoy the music. The first such instrument was the Aeolian harp, a resonating box with strings of various thicknesses and tensions that vibrated in the wind. Ancient Greece, Egypt, the Near East, China and India were acquainted with mechanical music. In the 13th century, Europeans became familiar with Chinese automatic instruments. From the 16th century, builders perfected various technical approaches to the mechanisation of music, applying and modifying clockwork mechanisms.

Every automatic instrument consists of four parts: one or more musical elements (a tuned steel comb, pipes, strings, percussion instruments, bells), a music storage medium (a wooden or metal cylinder with pins, perforated cardboard or metal plate, perforated paper roll), a mechanical interface between first and second part (a system of levers or keys) and a source of energy that drives the instrument. According to this definition the

phonograph (invented by Thomas A. Edison in 1877) and the gramophone (an 1887 invention of Emil Berliner) do not belong to the family of mechanical musical automata although they did spring from it.

Like computers, automatophones, too, have their hardware and programme or software parts, and a knowledge of two disciplines is required for their construction: of the technology of the construction of the automata (the knowledge of a mechanic, a clockmaker, an instrument builder, the hardware specialist) and the technology of music programming, i.e. the re-coding of the notation into a systematised arrangement of pins on a cylinder or perforations on a disk or roll (the knowledge of the acoustician, the programmer or software expert).

The first music boxes, the most popular type of automaton for household use, were the product of the art of the clockmaker. The earliest musical clock that can be dated with any certainty comes from 1772, and was constructed by the French clockmaker Michael Joseph Ransonet (1705-1778). In 1796 the Genevan clockmaker Antoine Favre (1734-1820) patented a pocket musical watch that performed a melody with the help of the tuned tines of a steel comb as register for tones, a cylinder with pins that when rotated made the tines vibrate, and a spring-driven mechanism that moved the cylinder. This is the basic principle of the music box. Soon similar mechanisms appeared built into clocks or special boxes. Favre's invention



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marked the beginning of the golden age of mechanical music, which was to last the whole of the 19th century. From the mid-19th century other sound elements were built into the music boxes in addition to combs: bells, drums and castanets, in order to attain some diversity in the musical expression. In the second half of the 19th century constructions were developed that enabled the music programme to be changed with the help of exchangeable cylinders.

The idea of replacing an expensive metal cylinder with a cheaper perforated disk of cardboard or metal and steel combs by reed instruments resulted in the flourishing of an industry of reasonably priced automata for household use (herophon, ariston, euphonion). The disk as music storage medium was invented practically simultaneously by Ellis Parr in London and Paul Lochmann in Leipzig (1866) and it began to be widely employed in 1890, when the centre of production of music boxes moved from Switzerland to Leipzig. From then on the mechanical music industry was able to keep up to date with novelties in music.

At the end of the 18th century came the first attempts to simulate whole orchestras with musical automata. One of the earliest automata of this type was built by Johann Georg Strasser, modifying the technical approach of the organ. The term orchestrion had been coined in 1789 by George Joseph Vogler (1749-1814). During the 19th and early 20th century, all complex mechanical automata that performed music recorded on cylinders with pins or perforated rolls were called orchestrions, standing in, as the name itself suggests, for a whole orchestra. Orchestrions were capable of performing classical and popular repertoires practically to the point of perfection. Many taverns, including in Zagreb, had orchestrions; to hear the music, the guests only had to put a coin in the slot.

In the 19th century, age of overall technological advances, almost all the instruments were automatised (for example, automatic organs, automatic zithers) and thanks to the exchangeable music data storage systems, the repertoire was constantly being expanded.



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Automata for the playing of the piano were very popular, enabling familiarity with the world of music and the quality performance of piano compositions as well as the piano arrangement of organ, chamber, orchestral and operatic works to all those who had never mastered the art of actually playing a keyboard instrument. The first such automatic instrument, the pianola, was patented in 1900 by the Aeolian Company of New York. As response to the American invention, in 1902 the German firm Ludwig Hupfeld of Leipzig presented the first European piano player with a pneumatic drive, the phonola, which was put in front of an actual piano so that its levers were touching the piano's keyboard. A cylinder with perforated paper roll that contained the music data was put into the phonola. By moving pedals and handles of the phonola, the performer would move the cylinder, bringing the levers of the phonola into contact with the keys of the piano's keyboard. Hand played rolls for the phonola were the intellectual and engineering solution of the Hupfeld company (1905) that enabled the recording of a piano performance on a specially adapted piano that was linked to a device for drawing the positions of the future perforations on the roll (a melograph). In this way the roll ob-

tained was used as a master for the production of perforated rolls the reproduction of which was extremely close to the original hand played performance. Unlike the hand played master, the master for a factory made or arranged roll was created by the transcription of the notation into a schematised arrangement of perforations.

The musical automaton promoted the general idea of technological advance in which machines would replace handwork. Many contested the value of the machine in art, while others pointed out that all musical instruments were also mechanical. Great artists did not hesitate to compose for automata (Handel, Haydn, Mozart, Beethoven, Stravinsky and others). In the 19th and in the first decades of the 20th century the automatic instrument distributed and popularised creative work in music, developing from an exclusive element of furniture of the wealthy classes to an affordable device for the reproduction of music in the average home or in public space. After the invention of the phonograph, which for the first time enabled the recording and reproduction of the human voice, and then of the gramophone, the production of automata fell drastically during the 1930s. Today they are no longer part of our everyday life, the way they were just a few generations ago. They can be met with in museums or private collections. Musicologists very seldom deal with the phenomenon of mechanical music, and it is largely collectors and technophiles who write of it.

Ivan Gerersdorfer and his collection of mechanical musical automata

Ivan Gerersdorfer (Zagreb, 1927 – Zagreb, 1993), clockmaker, collector and restorer of clocks and mechanical musical automata, was the son of Vera Meid Gerersdorfer, née Freudenreich (1889-1955) and Ivo Gerersdorfer (1897-1953), who owned a hatter's. He grew up with three sisters in the Upper Town Jelačić (Magdalenić-Drašković) Mansion in Demetrova 7. His mother was the companion of Anka Jelačić, daughter of Count

Gjuro Jelačić Bužimski, and he often visited Novi Dvori (the home of the heirs of Josip Jelačić) and spent time in the library, very early on developing a wide-ranging interest in themes from cultural history.

A music box with a figure of an owl was the first musical automaton that Ivan Gerersdorfer heard in his early childhood: “I was interested in how this box played, and it was not a gramophone, and my father bought me a beggar’s barrel organ. It was from love for musical automata that I learned the clockmaker’s craft, for the acoustician of these devices is a bit between a clock maker and a piano maker. I myself made little musical automata and put them in clocks, and spent all my savings on the purchase of these marvellously beautiful mechanisms. But all the automata that I bought were out of order, and I repaired them, which was a great pleasure for me. I am indescribably happy when a musical automaton, after fifty years of silence, starts to play in my hands. At that moment I know exactly where it came from and how old it is, for the repertoire is the birth certificate of every automaton... I spend the whole of the day with my musical automata. They need almost every-day care.”

Gerersdorfer assembled a collection of automata from the golden age of mechanical music (1814-1914). In typological terms, it holds almost all the technical models of automata for house and public use. Automata derive from famed centres of the mechanical music industry, in Austria, Germany, Switzerland, Bohemia, Italy and the USA. The collection holds more than two hundred perforated phonola rolls (of this about a half consists of hand



played rolls), several dozen disks for the herophon, metal disks for the ariston and euphonion, wax cylinders for the phonograph, and gramophone disks. The hand played rolls for the phonola with performances by famed pianists and composers together with herophon disks with registrations of Croatian compositions are of particularly great value.

Gerersdorfer procured most of the automata after World War II, when many people were selling their furniture, clocks and musical automata because they had fallen on hard times and had to move into smaller flats. He was most interested in material that could be collected in the country and that was not in working order. On the whole he picked up his automata in Zagreb, and it was not hard for him to peer into almost every cellar and attic in the Upper Town. "You know, I had to become carpenter and mechanic and organ builder. I did it all."

In 1960 he opened the door of his dwelling and made his collection accessible to the citizens. In the daily press there would be the occasional article about the "bizarre collection" in the museum of a flat in which Ivan Gerersdorfer lived with his automata, sharing the old mansion in Demetrova 7 with the Tatjana Marinić Kindergarten.



As dedicated curator of his own collection, he put on two thematic exhibitions about the history of the development of the mechanisation of music and the technology of sound recording (Museum of Arts and Crafts, 1963; Zagreb City Museum, 1977). In 1973 he organised the cycle *Concerts from Old Records* in Zagreb City Museum, with lectures, and performances of recordings of Croatian actors and singers preserved on gramophone records, recorded in Zagreb in the first decades of the 20th century. He

published short texts in exhibition catalogues and specialised periodicals. He was known even outside the borders of the state as it was then because of his exemplary collection and his great expertise. He left an unpublished manuscript called *The Phenomenon of the Mechanical Musical Automaton in the Universal Cultural Revolution*.

On June 22, 1977, he donated the collection to the city of Zagreb. An annex to the contract was a catalogue of the *Cabinet of Musical Automata* which was published in 1970 by the then Regional Institute for the Protection of Monuments of Culture and the Associated Self-Managing Interest Union for Culture of the city of Zagreb. Twenty two of the donated automata are treated in the catalogue. The donor bound himself to look after the collection during his lifetime, to maintain and present it to the public, and the city of Zagreb gave him the lifetime use of one “socially owned” room immediately connected with the four-roomed flat of the donor. The collection was exhibited in two rooms. Subsequently, Gerersdorfer expanded the donation by six more automata.

A decision of the municipal authority of April 18, 1994, confided the collection to the management of Zagreb City Museum. Since 1998 it has been on show in the Museum’s permanent display; in 2008 it was digitalised and shown on the Internet at www.mgz.hr. The digitalisation project was completed in 2010 when a multimedia kiosk was set up in the permanent display of the Collection and when this disk was issued, in an endeavour to provide a cross-section of the musical repertoire of the Collection, with a special emphasis on the section from the Croatian sound heritage, bearing in mind the question: does music exist if it is not accessible to all? With the digitalisation of the “music out of a box” we correlate our museum mission in the 21st century with the “joyful mission” of the mechanisation of music in the 19th and early 20th century, thus making a contribution to the preservation of the intangible heritage.

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