Historie matematiky a informatiky

Výpočetní technika ve 2. polovině 19. století

•Evropský sociální fond
•Investujeme do vaší budoucnosti

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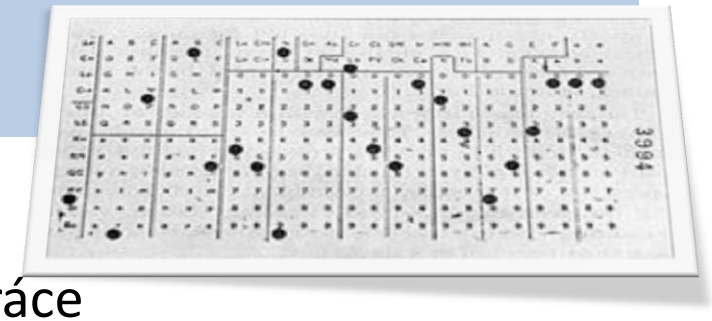
Herman Hollerith, 2. pol. 19. stol.

- Je považován za otce moderních automatických výpočtů.
- Pracoval v roce 1880 na sčítání lidu Spojených států a uvědomil si potřebu mechanizace zpracování zpráv a tabelování výsledků, jak rostla imigrace do Spojených států.
- Zvítězil v soutěži pro sčítání lidu v roce 1890. Jeho návrh byl založen na zpracování děrných štítků a Jacquardově tkacím stroji.
- Založil společnost Computing-Tabulating-Recording Company (CTR), která později změnila jméno v roce 1924 na IBM.

Herman Hollerith 2



Hollerithova vlastní slova z disertační práce

“An Electric Tabulating System,” 1889:

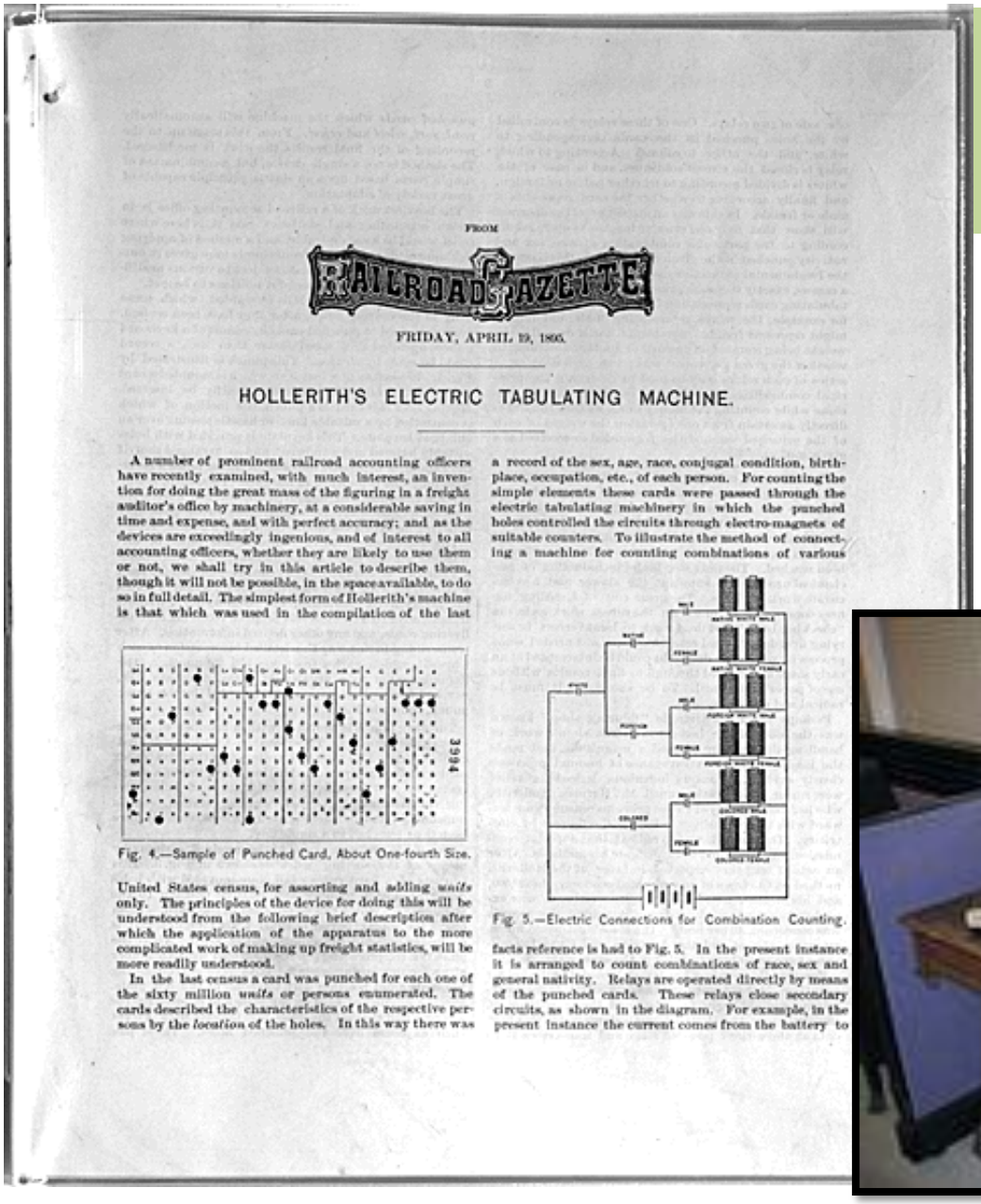
“Few, who have not come directly in contact with a census office, can form any adequate idea of the labor involved in the compilation of a census of 50,000,000 persons, as was the case in the last census, or of over 62,000,000, as will be the case in the census to be taken in June, 1890…

Although our population is constantly increasing, and although at each census more complicated combinations and greater detail are required in the various compilations, still, up to the present time, substantially the original method of compilation has been employed; that of making tally-marks in small squares and then adding and counting such tally-marks.

While engaged in work upon the tenth census, the writer's attention was called to the methods employed in the tabulation of population statistics and the enormous expense involved. These methods were at the time described as "barbarous…”

Some machine ought to be devised for the purpose of facilitating such tabulations.”

Popis stroje



FROM

RAILROAD GAZETTE

FRIDAY, APRIL 19, 1895.

HOLLERITH'S ELECTRIC TABULATING MACHINE.

A number of prominent railroad accounting officers have recently examined, with much interest, an invention for doing the great mass of the figuring in a freight auditor's office by machinery, at a considerable saving in time and expense, and with perfect accuracy; and as the devices are exceedingly ingenious, and of interest to all accounting officers, whether they are likely to use them or not, we shall try in this article to describe them, though it will not be possible, in the space available, to do so in full detail. The simplest form of Hollerith's machine is that which was used in the compilation of the last United States census, for assorting and adding *units* only. The principles of the device for doing this will be understood from the following brief description after which the application of the apparatus to the more complicated work of making up freight statistics, will be more readily understood.

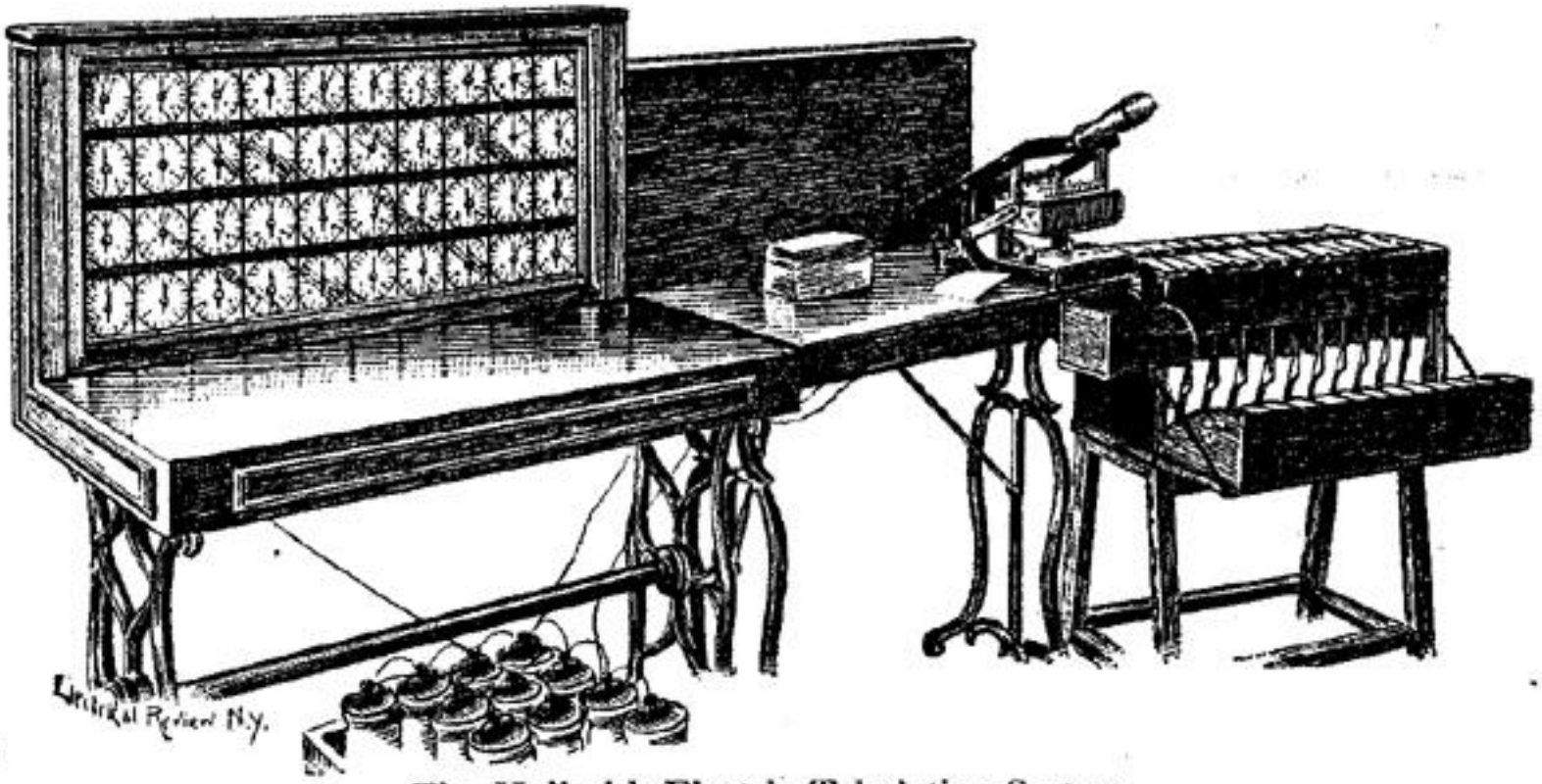
In the last census a card was punched for each one of the sixty million *units* or persons enumerated. The cards described the characteristics of the respective persons by the *location* of the holes. In this way there was a record of the sex, age, race, conjugal condition, birthplace, occupation, etc., of each person. For counting the simple elements these cards were passed through the electric tabulating machinery in which the punched holes controlled the circuits through electro-magnets of suitable counters. To illustrate the method of connecting a machine for counting combinations of various facts reference is had to Fig. 5. In the present instance it is arranged to count combinations of race, sex and general nativity. Relays are operated directly by means of the punched cards. These relays close secondary circuits, as shown in the diagram. For example, in the present instance the current comes from the battery to

Fig. 4.—Sample of Punched Card, About One-fourth Size.

Fig. 5.—Electric Connections for Combination Counting.

Hollerithův stroj

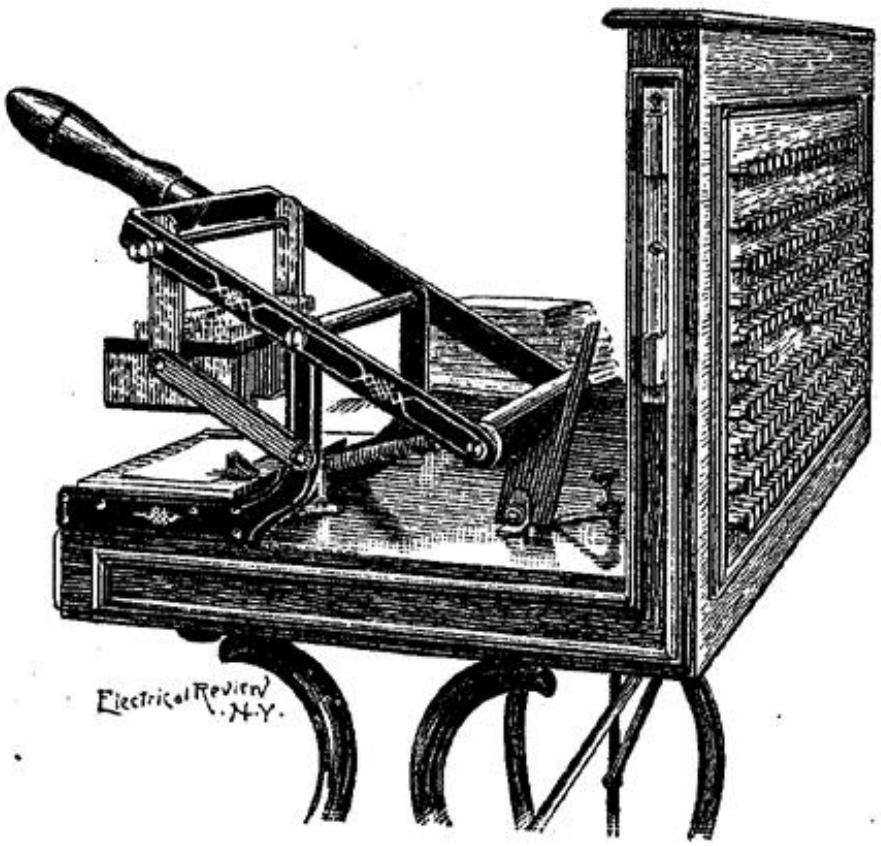
FIG. 2.



The Hollerith Electric Tabulating System.

Děrovač

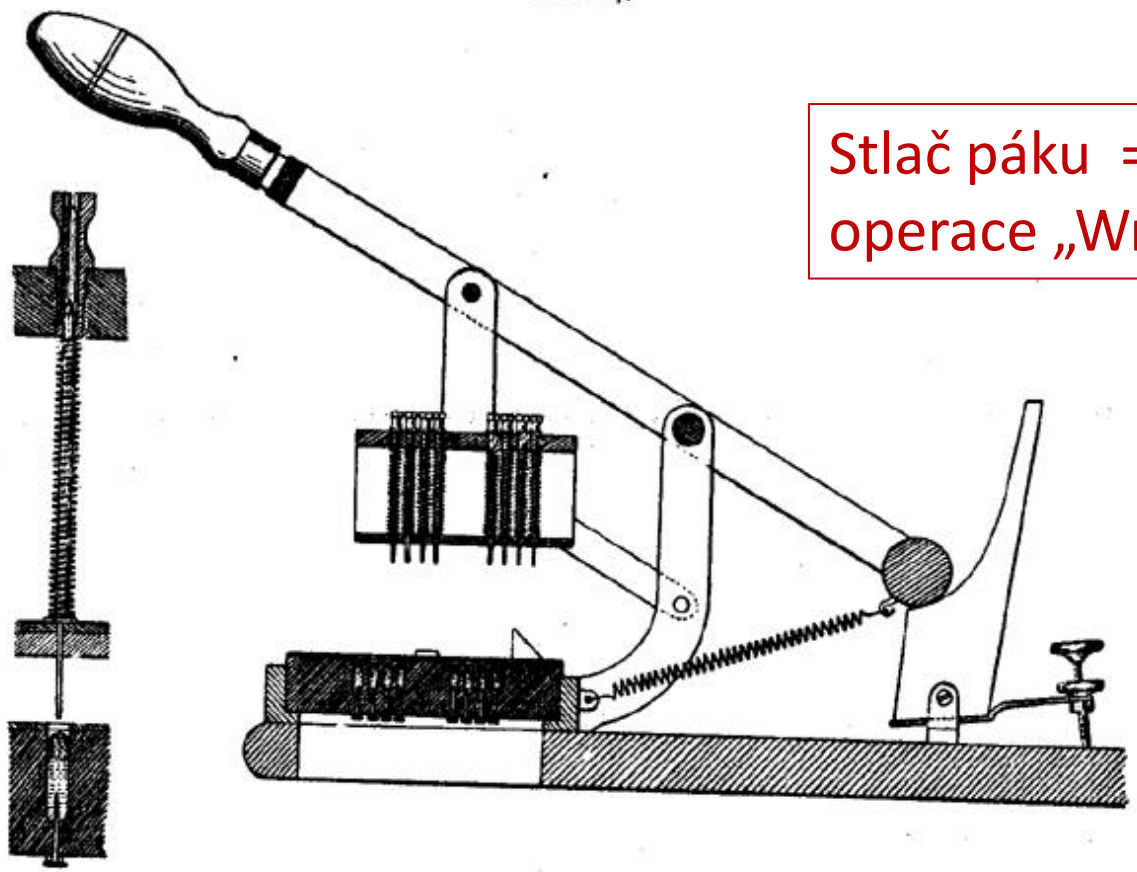
FIG. 3.



The Press.

Děrovací stroj

FIG. 4.

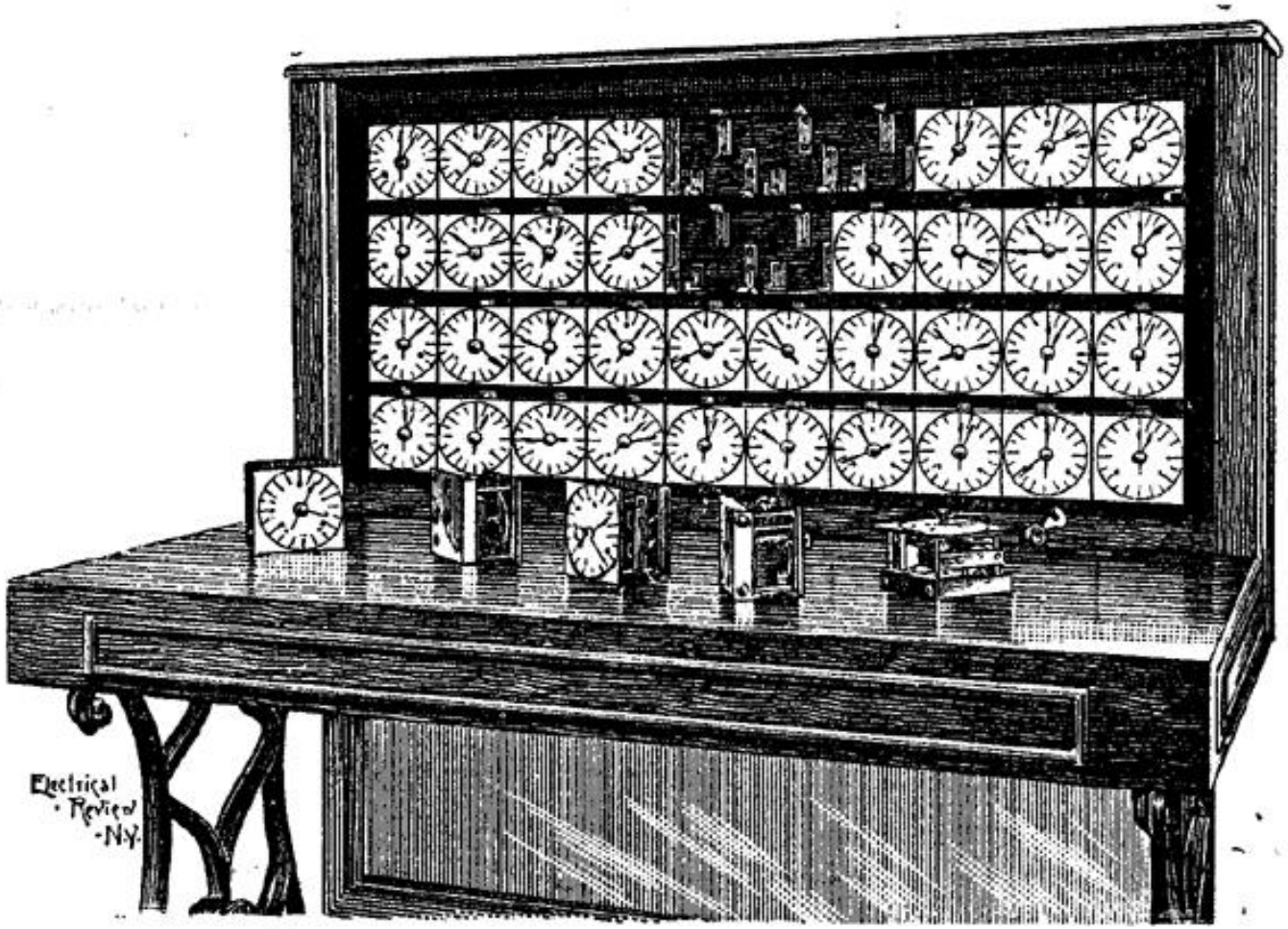


Sections of Pin and Press.

Stlač páku = operace „Write“

Výpočetní modul

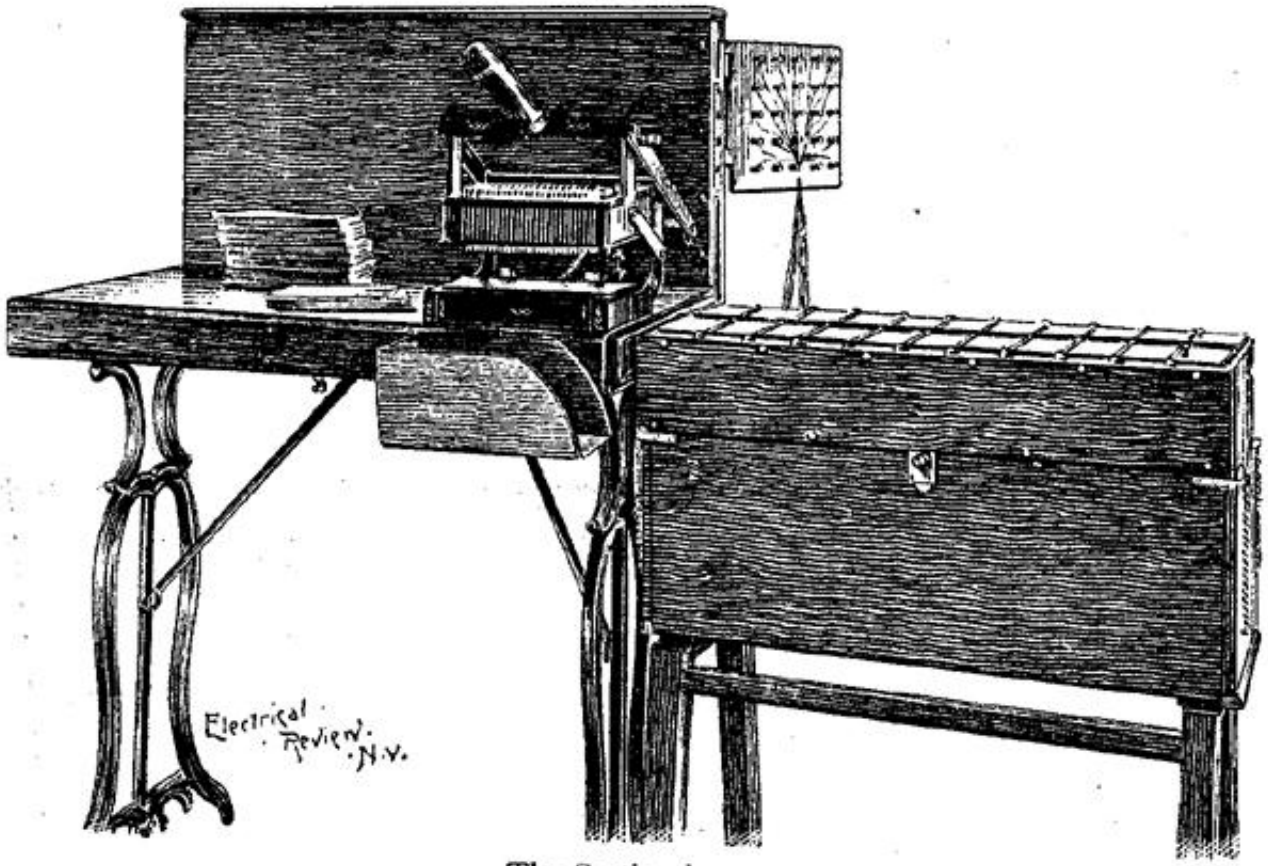
FIG. 5.



The Counters.

Roztřiďovací stroj

FIG. 6.



The Sorting-box.

Na diagramu je vidět elektromagnety

FIG. 7.

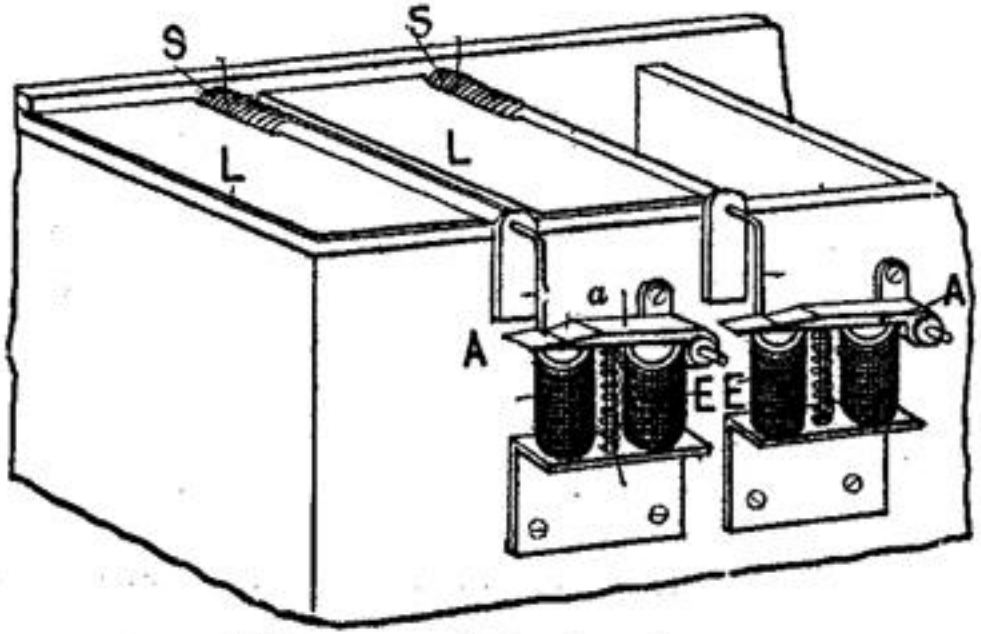


Diagram of Sorting-box.

Obvod pro výpočty

FIG. 8.

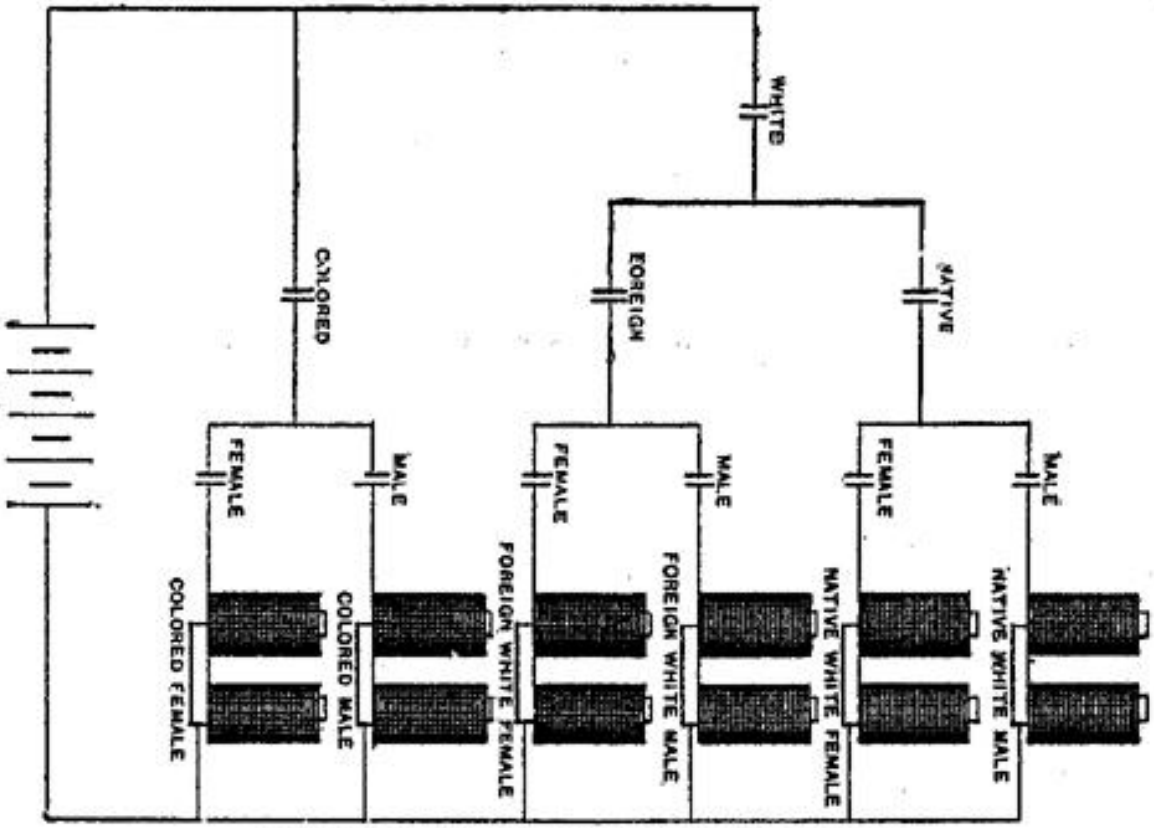
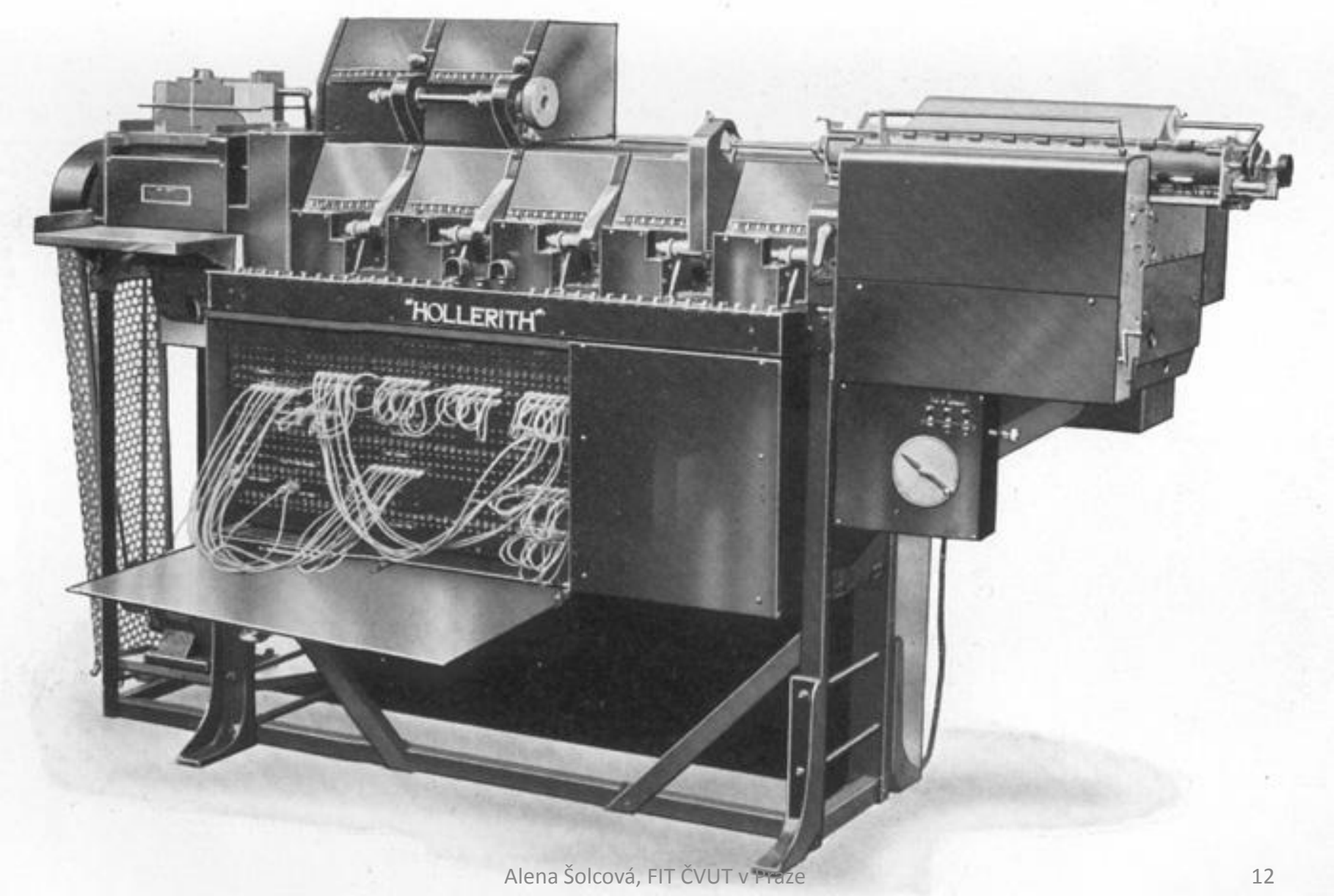
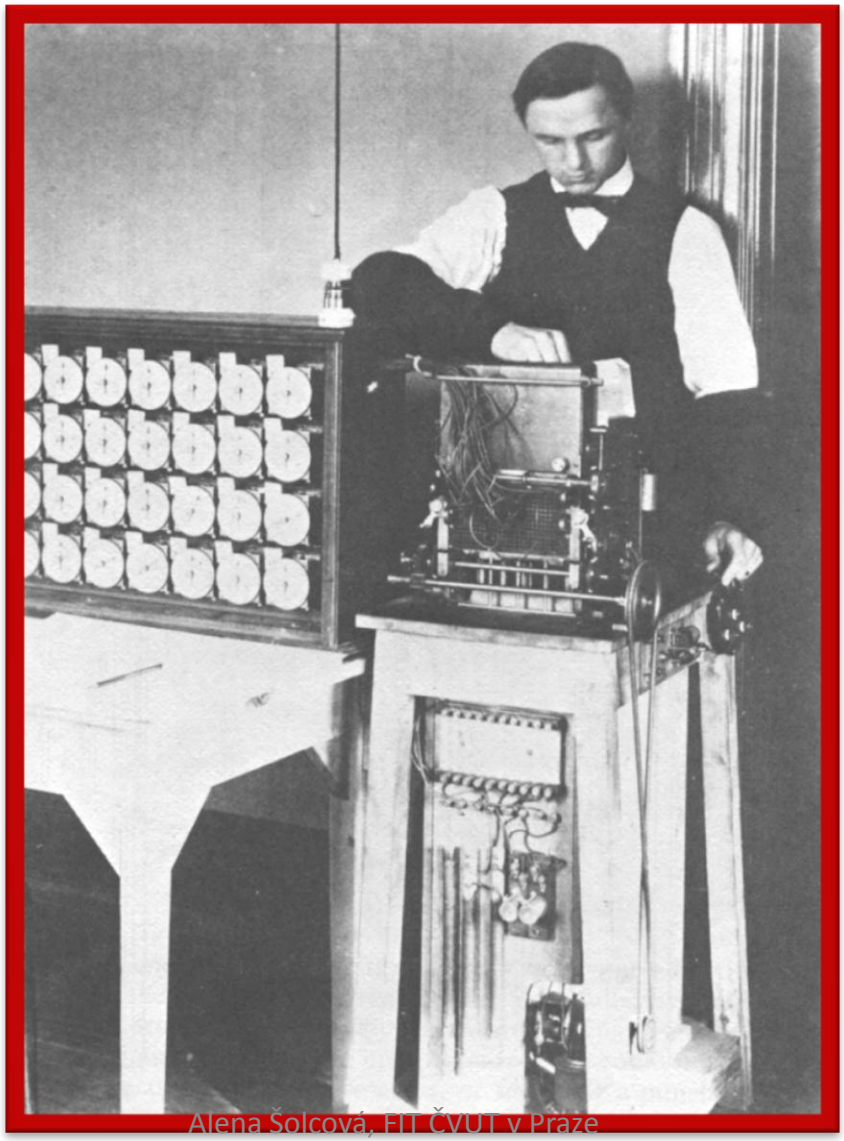


Diagram for Combination Counting.

Jako živý – jen počítat!



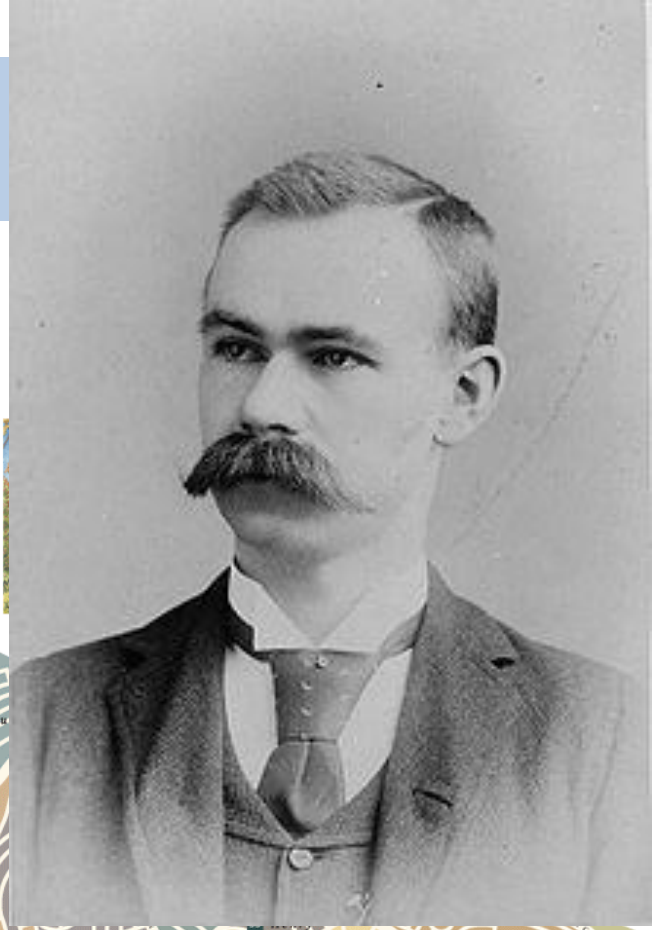
Při práci



Herman Hollerith 3

- Zkrátil osm let výpočtů na 1 rok a ušetřil 5. 10^6 $.

Žil v letech 1860 -1929. Syn prof. Georga Holleritha. Studoval na báňské škole.



THE RENWICK CHAPEL

Poznámky k matematice 19. století

- 1812 – 1821 - Gauss, Bolzano, Cauchy – základy teorie konvergence řad
- 1812 – Pierre S. Laplace, 1827 – Simon Poisson – důkazy prvních limitních vět v teorii pravděpodobnosti
- 1820 – 1824 – Ch. Babbage – práce na počítacím stroji – funkcionální rovnice
- 1816 – W. Bessel – Besselovy funkce
- 1828 – August F. Moebius – *„Barycentrický kalkul“*
- 1828 – Niels Abel - Abelovo kriterium pro konvergenci řady, řešení rovnice 5. stupně
- 1830 – 1832 – Galois – teorie grup
- 1832 – Janos Bolyai – neekleidovská geometrie *„Appendix“*
- 1833 – 1834 – W. R. Hamilton – rozvoj variačního počtu, kvaterniony
- 1844 – Grassmann – *„Ausdehnugslehre“* – lineární algebra

Poznámky k matematice 19. století - 2

- 1858 – Arthur Cayley – teorie matic
- 1869 – Karl Weierstrass – teorie funkcí komplexní proměnné
- 1872 – Sophus Lie - Lieovy grupy – spojitost a algebra
- 1873 – Charles Hermite – transcendentnost čísla e
- 1874 – Georg Cantor – nespočetnost množiny reálných čísel
- 1883 – 1887 – Georg Cantor – vznik teorie množin
- 1890 – Giusseppe Peano – axiomy přirozených čísel
- 1899 – David Hilbert *„Základy geometrie“*, souvislost mezi algebrou a geometrii