



The Grand Narrative of the History of Computing

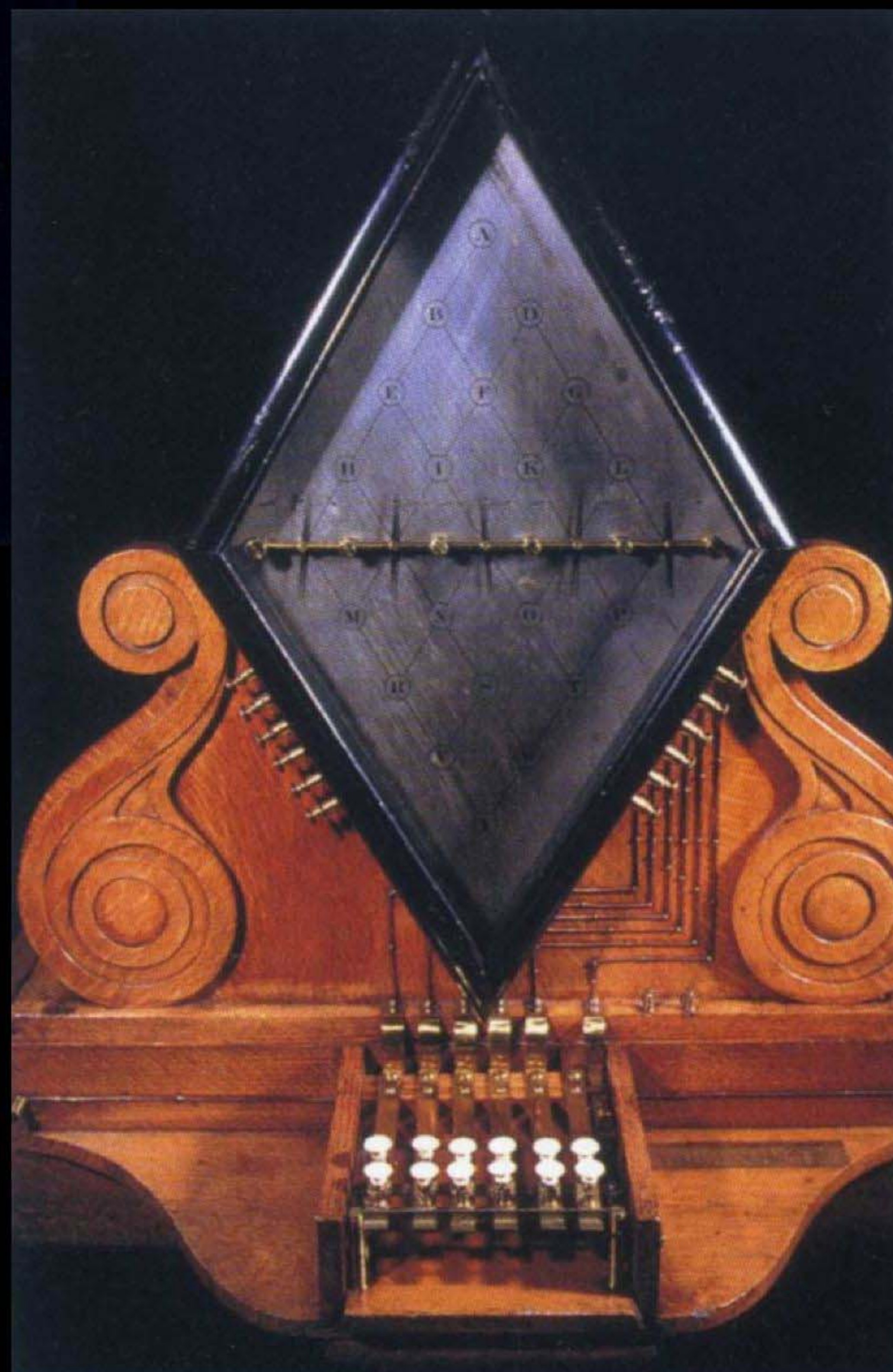
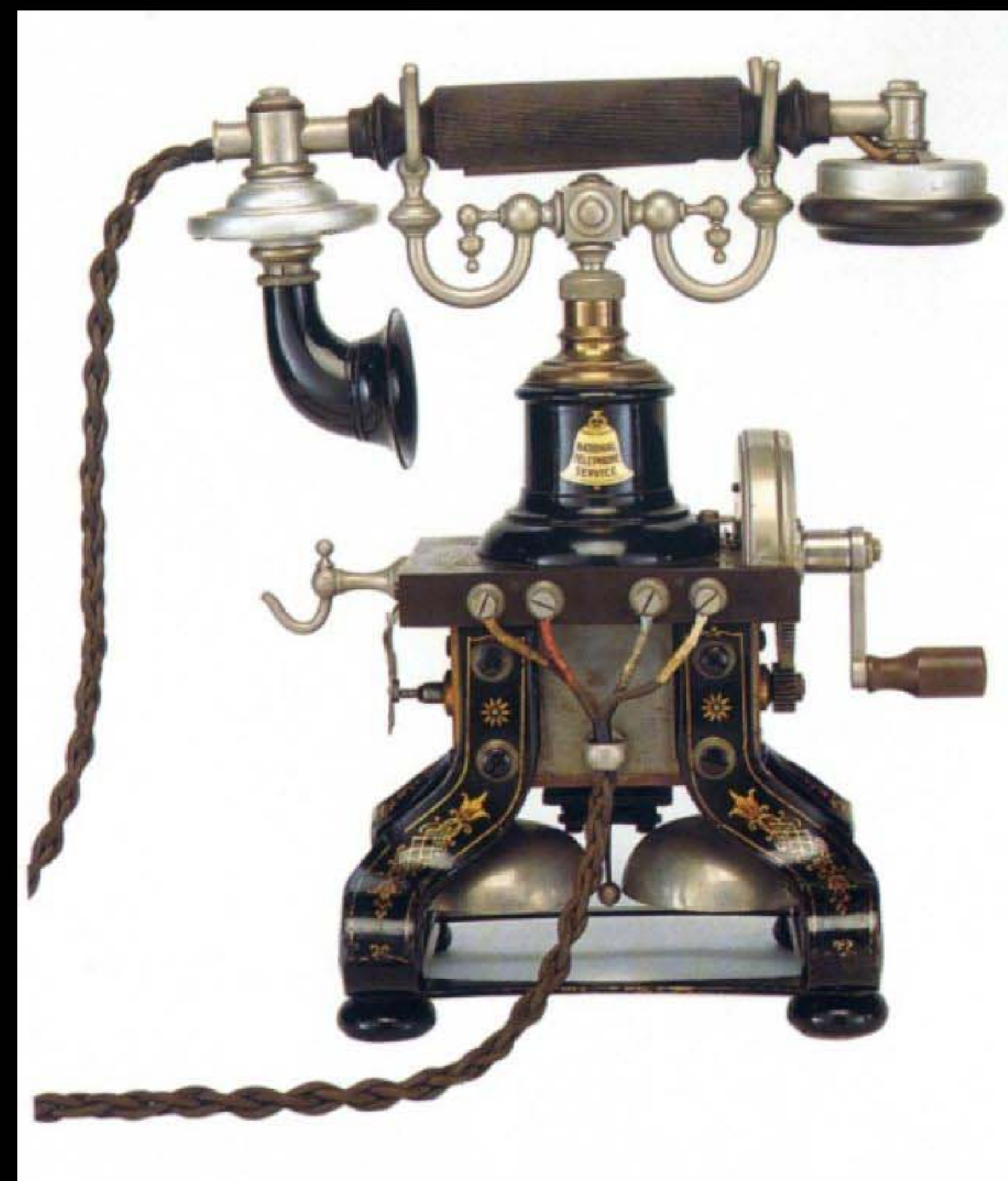
Gresham College

31 October 2013

Doron Swade



Russian Schotty



Some Core Ideas

- Mechanical process
- Digital logic
- Algorithm
- Systems architecture
- Software and universality
- Internal stored program

Some Core Ideas

- Mechanical process
- **Digital logic**
- Algorithm
- Systems architecture
- Software and universality
- Internal stored program

Some Core Ideas

- Mechanical process
- Digital logic
- **Algorithm**
- Systems architecture
- Software and universality
- Internal stored program

Some Core Ideas

- Mechanical process
- Digital logic
- Algorithm
- **Systems architecture**
- Software and universality
- Internal stored program

Some Core Ideas

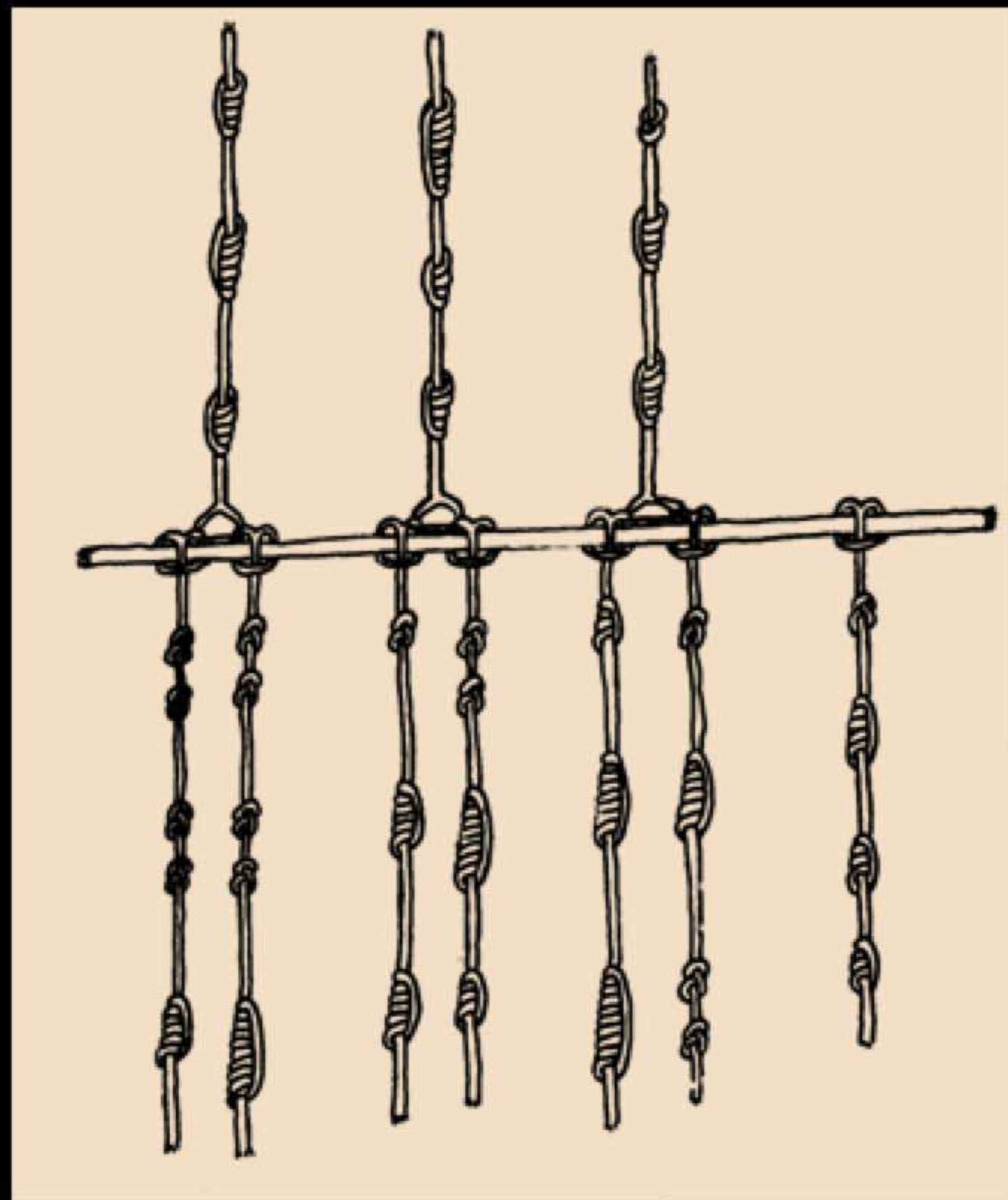
- Mechanical process
- Digital logic
- Algorithm
- Systems architecture
- **Software and universality**
- Internal stored program

Some Core Ideas

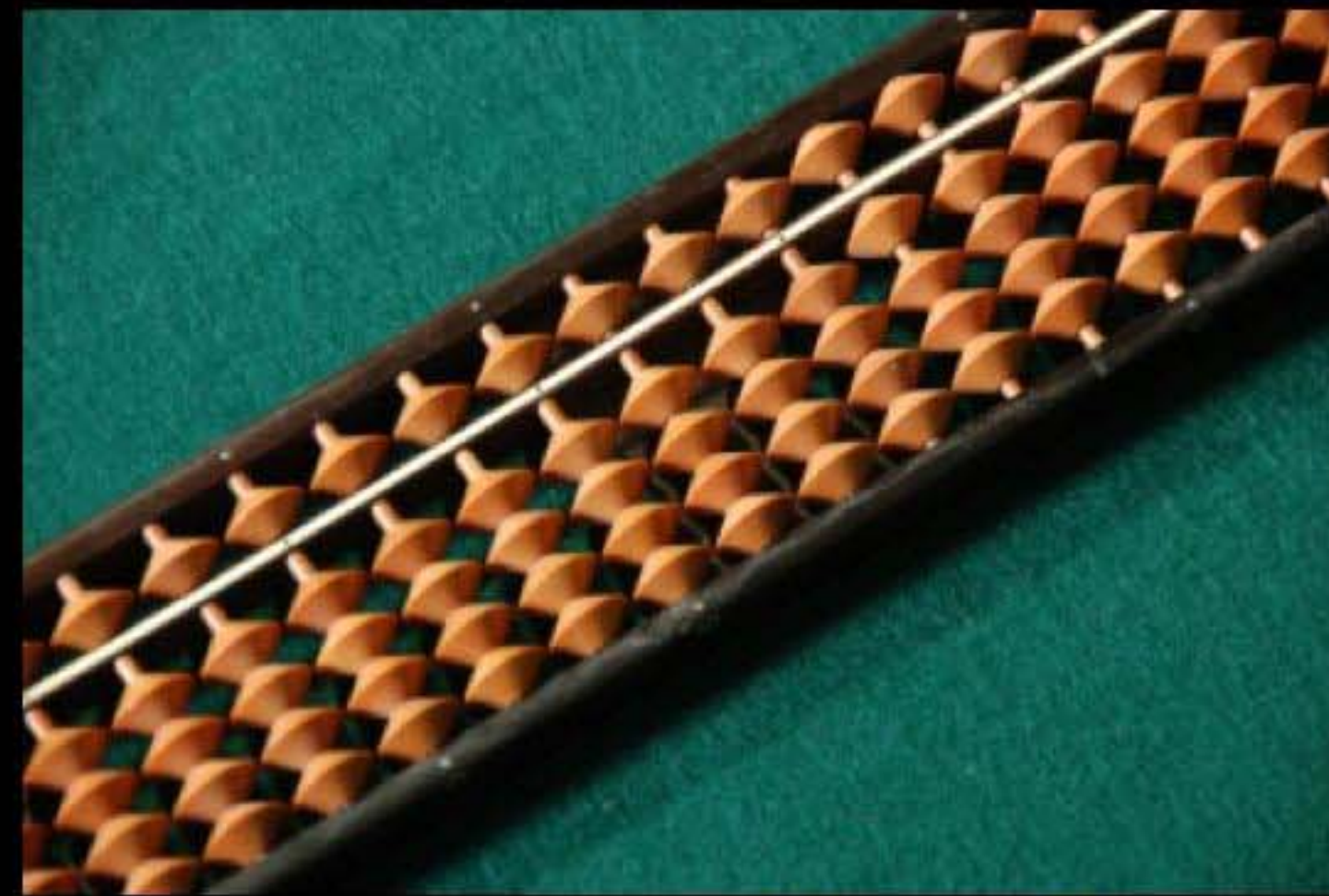
- Mechanical process
- Digital logic
- Algorithm
- Systems architecture
- Software and universality
- **Internal stored program**



Charles Babbage (1791-1871), by Claudet, 1847-51



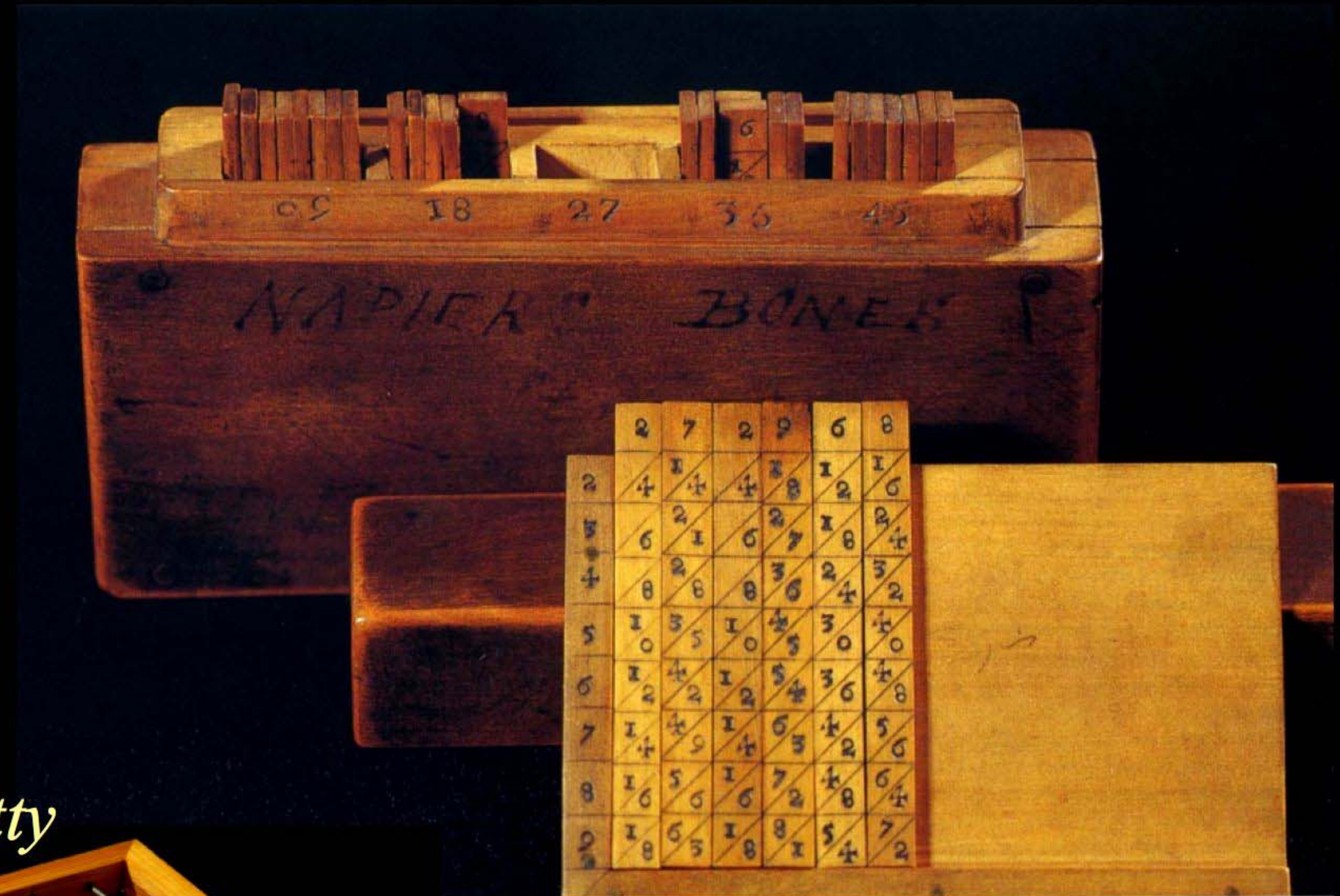
Quipu



Soroban



Tally Stick, 19-C



Napier's Bones, c. 1690

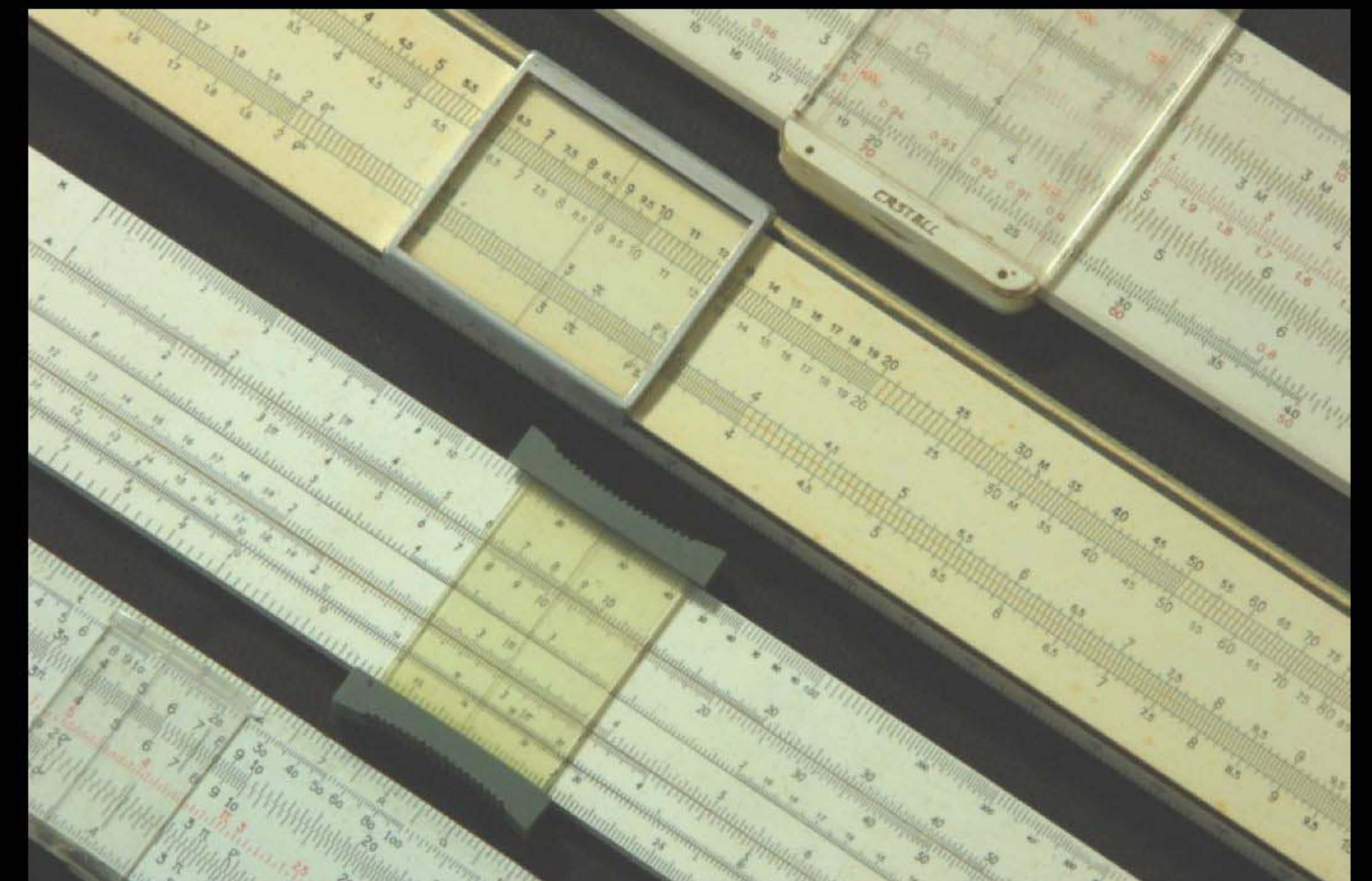


Schotty

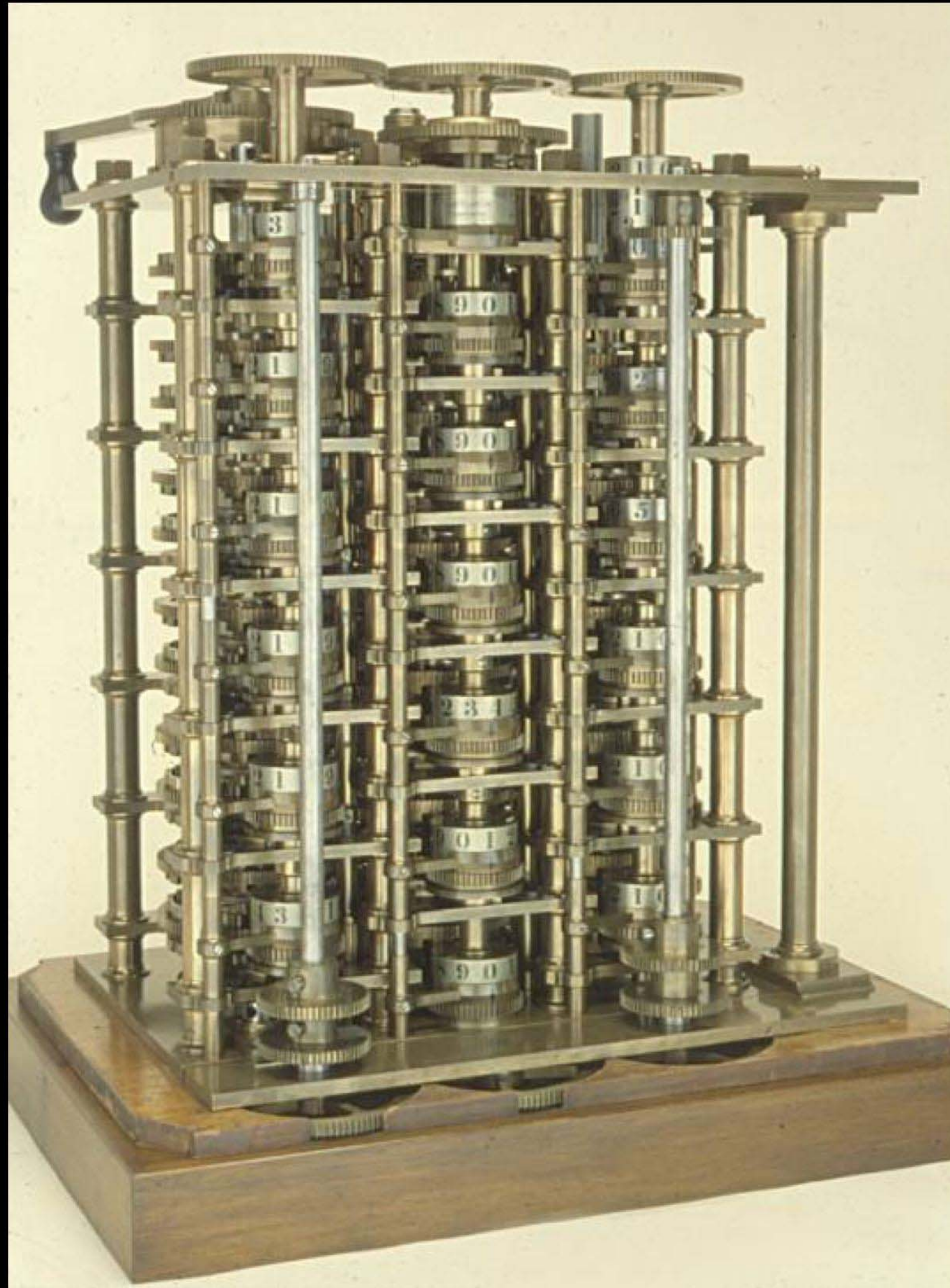
Logarithmorum vulgarium.

N.	Log.	N.	Log.	N.	Log.	N.	Log.
667	2. 824 1258 339	734	2. 865 6960 599	801	2. 903 6325 161	867	2.
668	2. 824 7764 625	735	2. 866 2873 391	802	2. 904 1743 683	868	2.
669	2. 825 4261 178	736	2. 866 8778 143	803	2. 904 7155 453	869	2.
670	2. 826 0748 027	737	2. 867 4674 879	804	2. 905 2560 487	870	2.
671	2. 826 7225 202	738	2. 868 0563 618	805	2. 905 7958 804	871	2.
672	2. 827 3692 731	739	2. 868 6444 384	806	2. 906 3350 418	872	2.
673	2. 828 0150 642	740	2. 869 2317 197	807	2. 906 8735 347	873	2.
674	2. 828 6598 965	741	2. 869 8182 080	808	2. 907 4113 608	874	2.
675	2. 829 3037 728	742	2. 870 4039 053	809	2. 907 9485 216	875	2.
676	2. 829 9466 959	743	2. 870 9888 138	810	2. 908 4850 189	876	2.
677	2. 830 5886 687	744	2. 871 5729 355	811	2. 909 0208 542	877	2.
678	2. 831 2296 939	745	2. 872 1562 727	812	2. 909 5560 292	878	2.
679	2. 831 8697 743	746	2. 872 7388 275	813	2. 910 0905 456	879	2.
680	2. 832 5089 127	747	2. 873 3206 018	814	2. 910 6244 049	880	2.
681	2. 833 1471 119	748	2. 873 9015 979	815	2. 911 1576 087	881	2.
682	2. 833 7843 747	749	2. 874 4818 177	816	2. 911 6901 588	882	2.

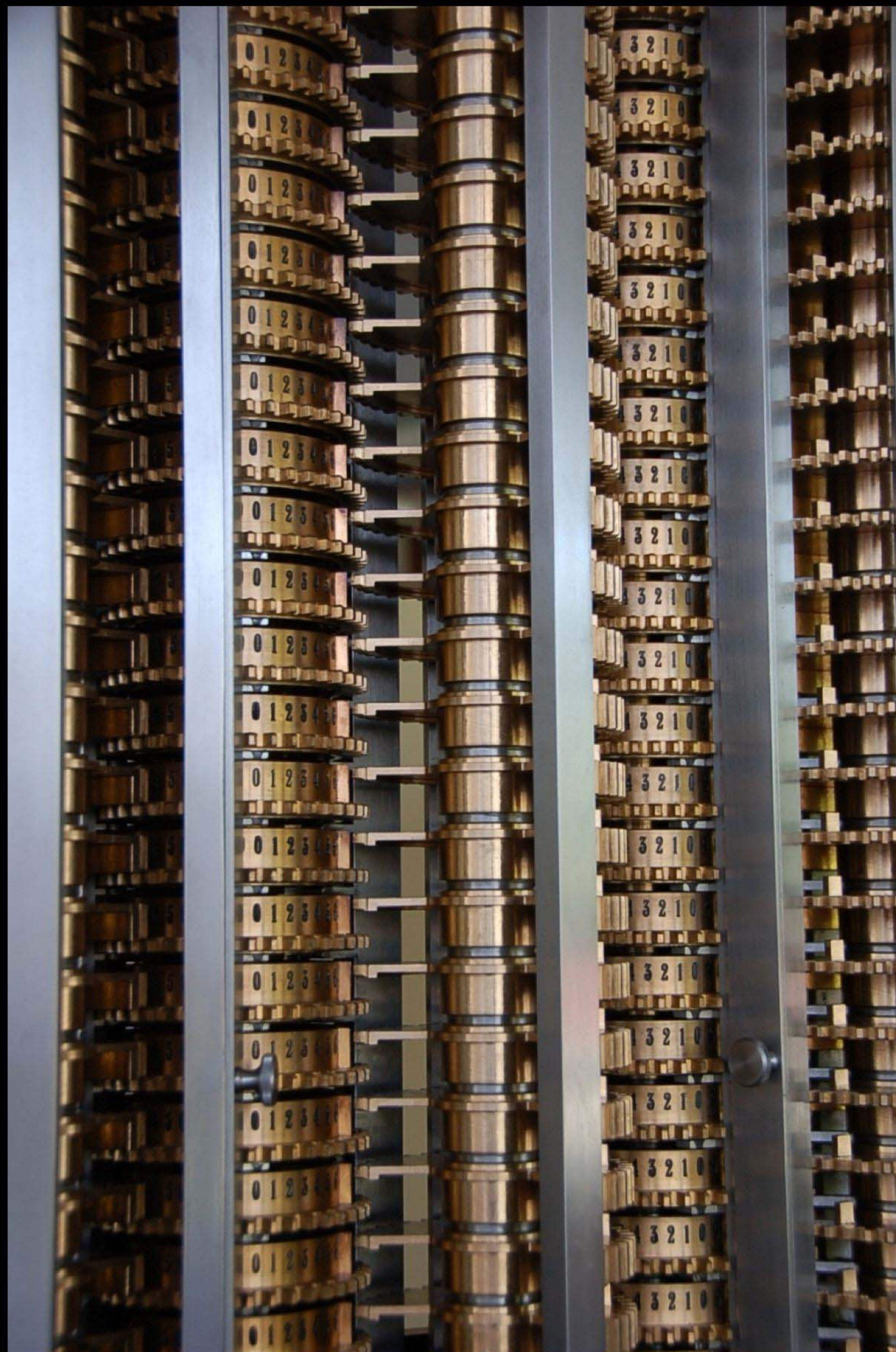
Logarithms, 1794



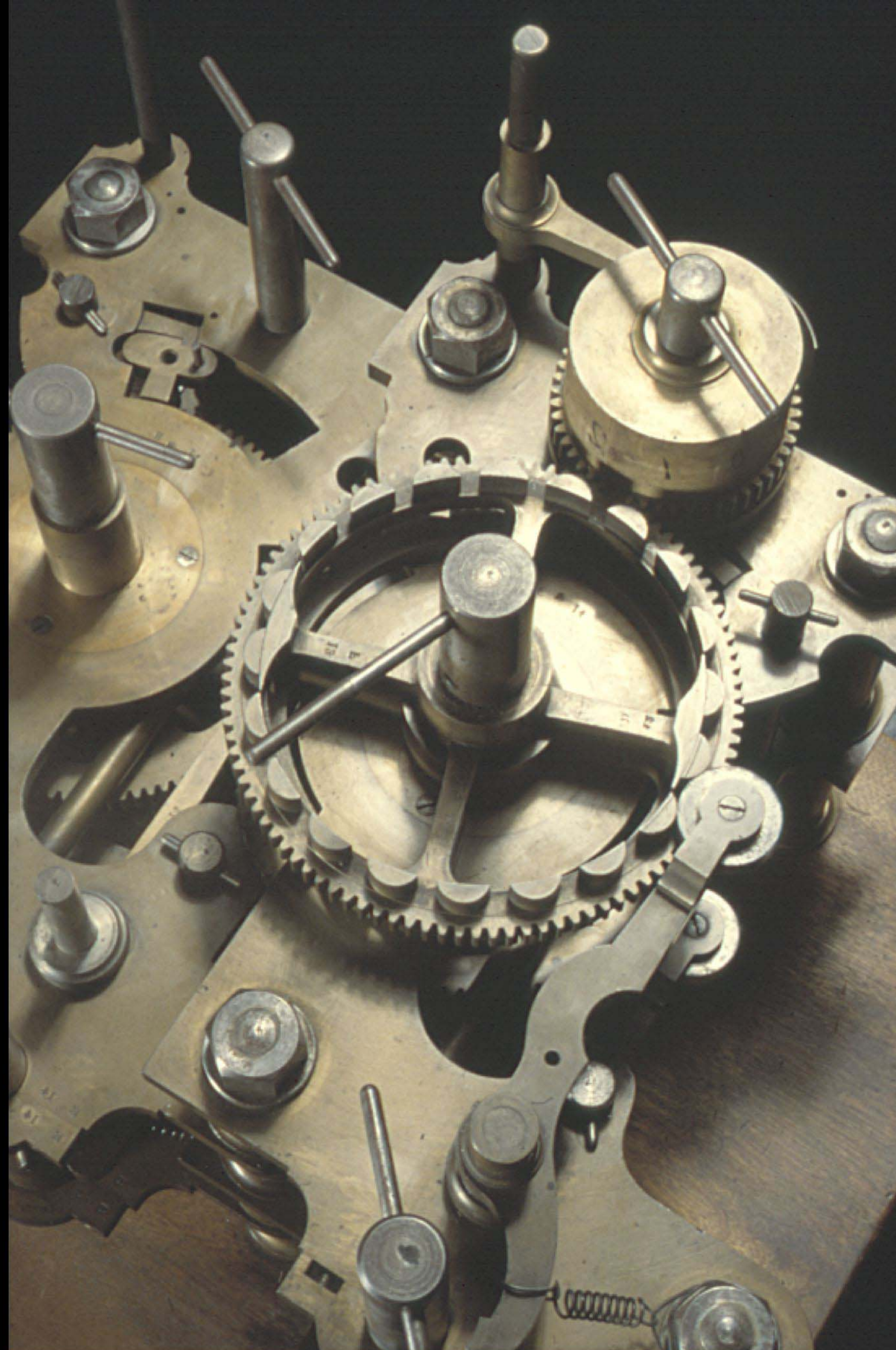
Slide Rules



Difference Engine No. 1, 1832

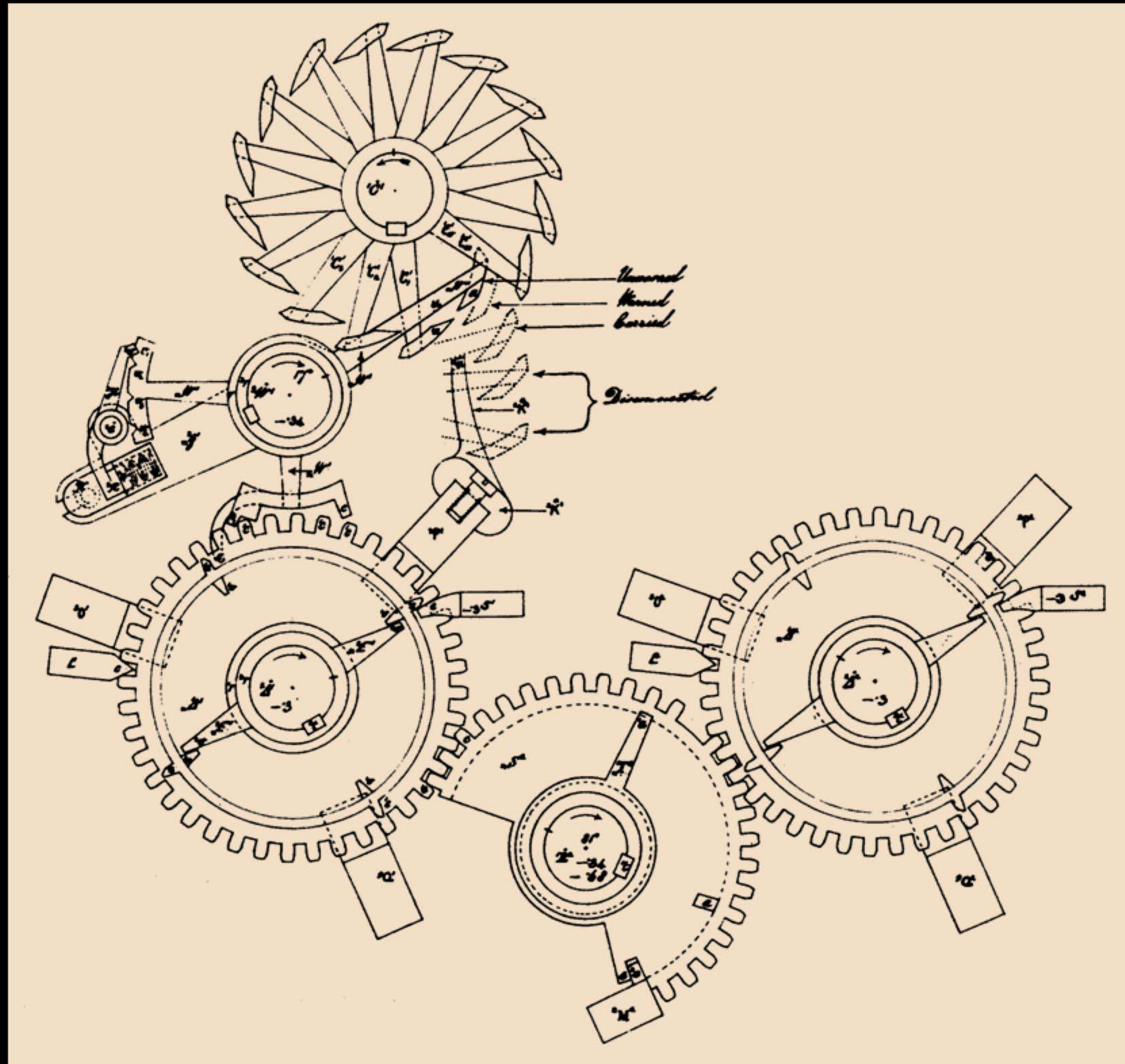


Difference Engine No. 2: Figure Wheel Columns

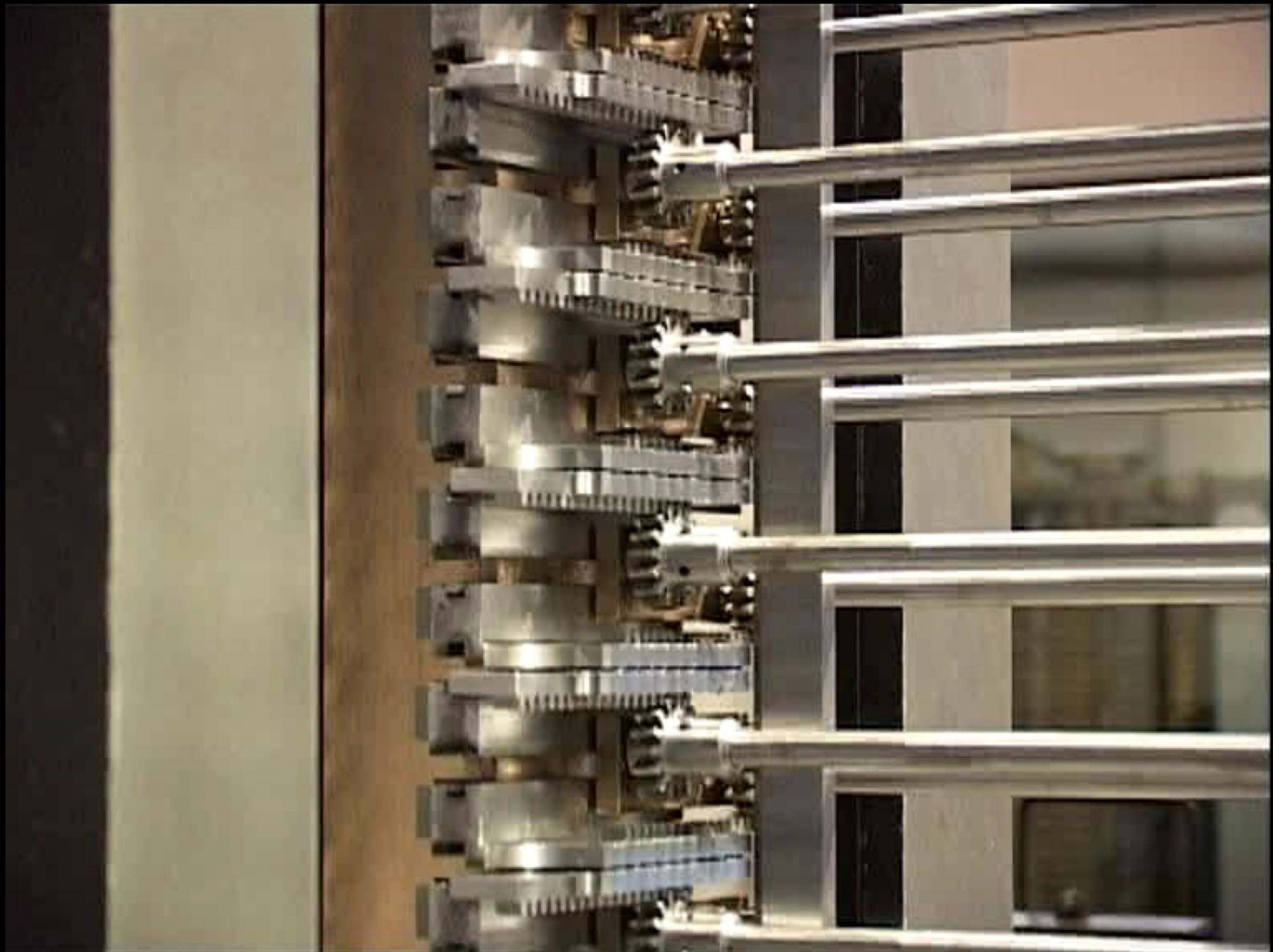


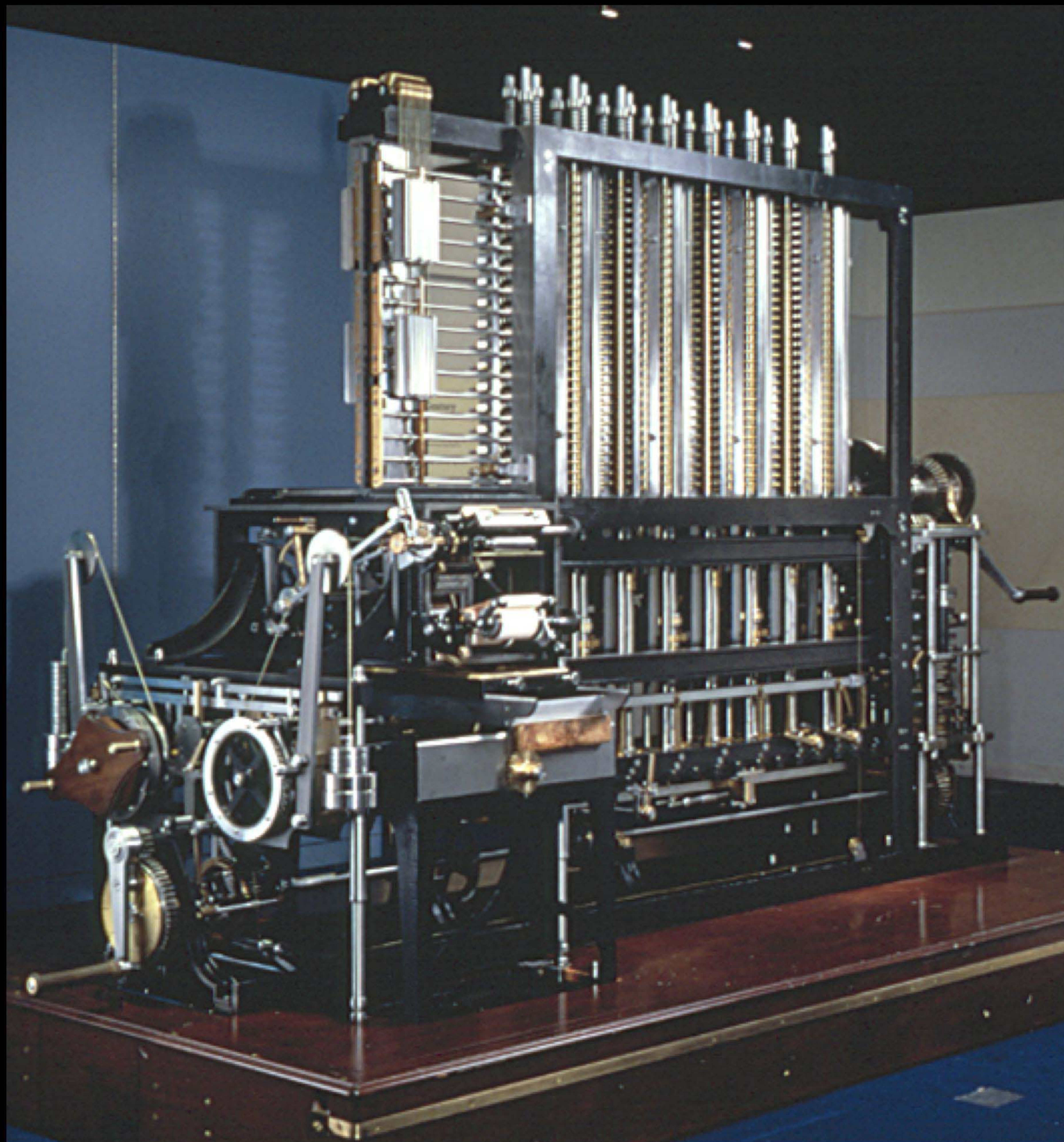


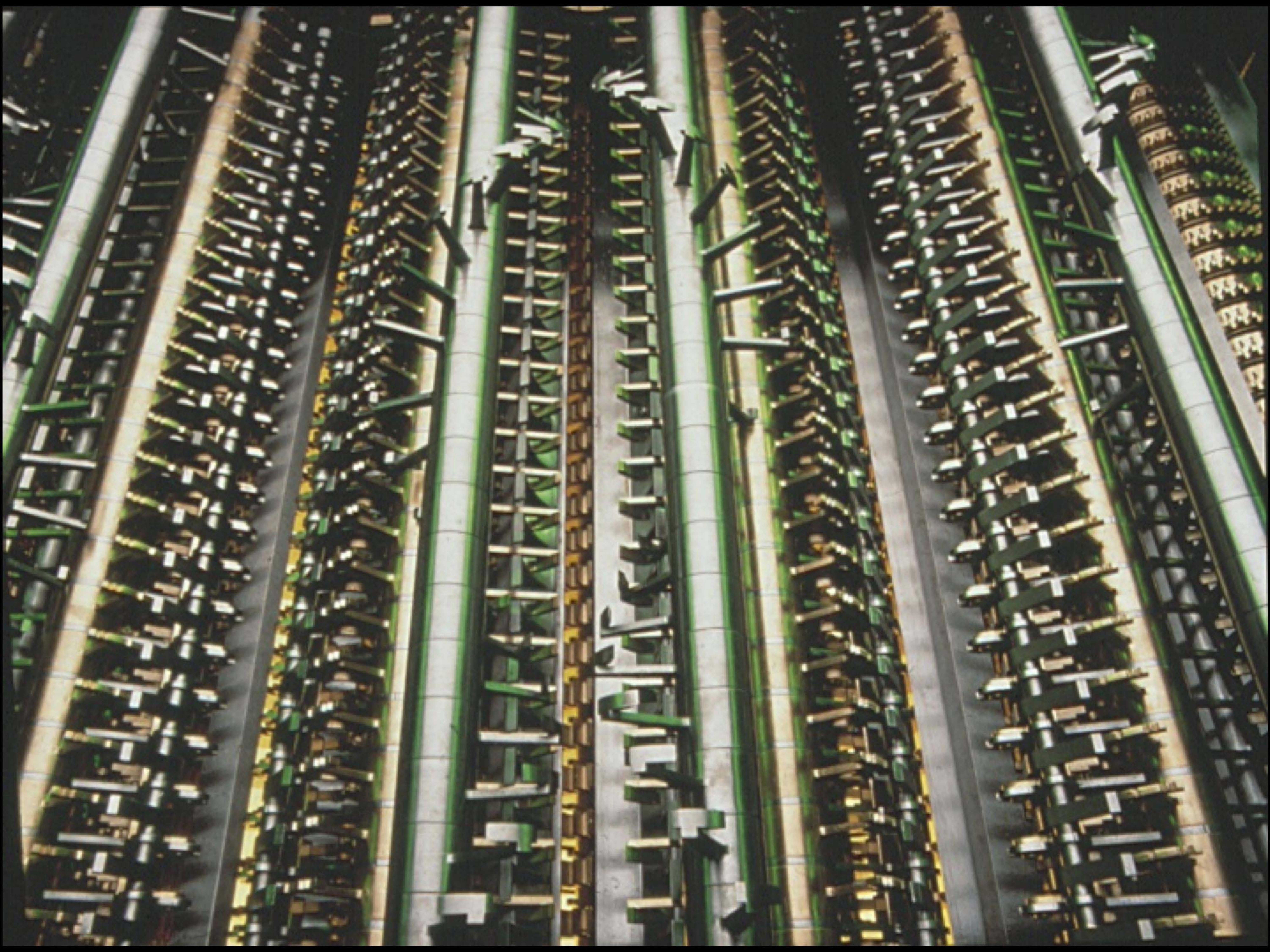
Calculating Wheels, DE1

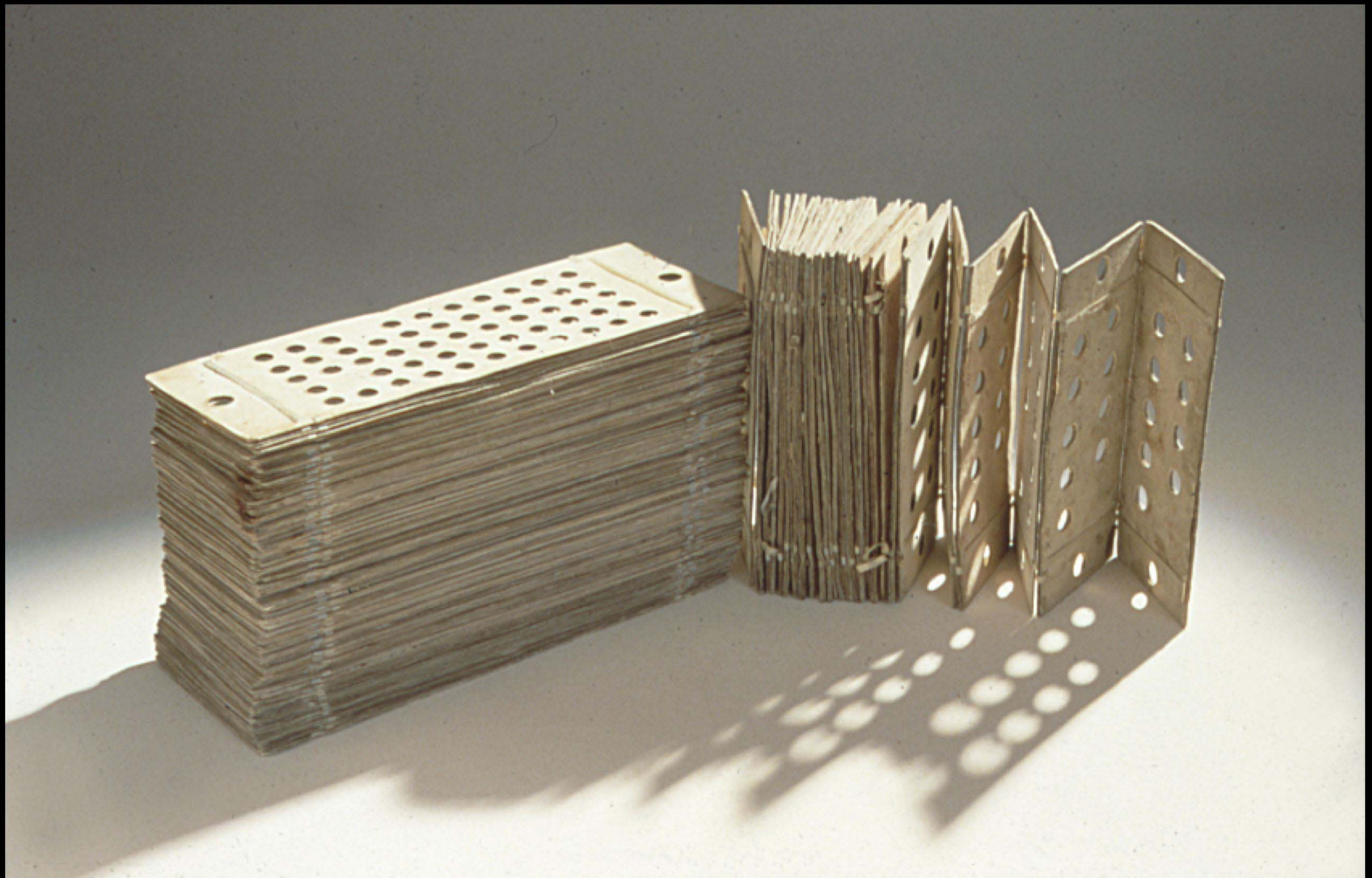


Difference Engine No. 2, Addition and Carriage, c. 1847

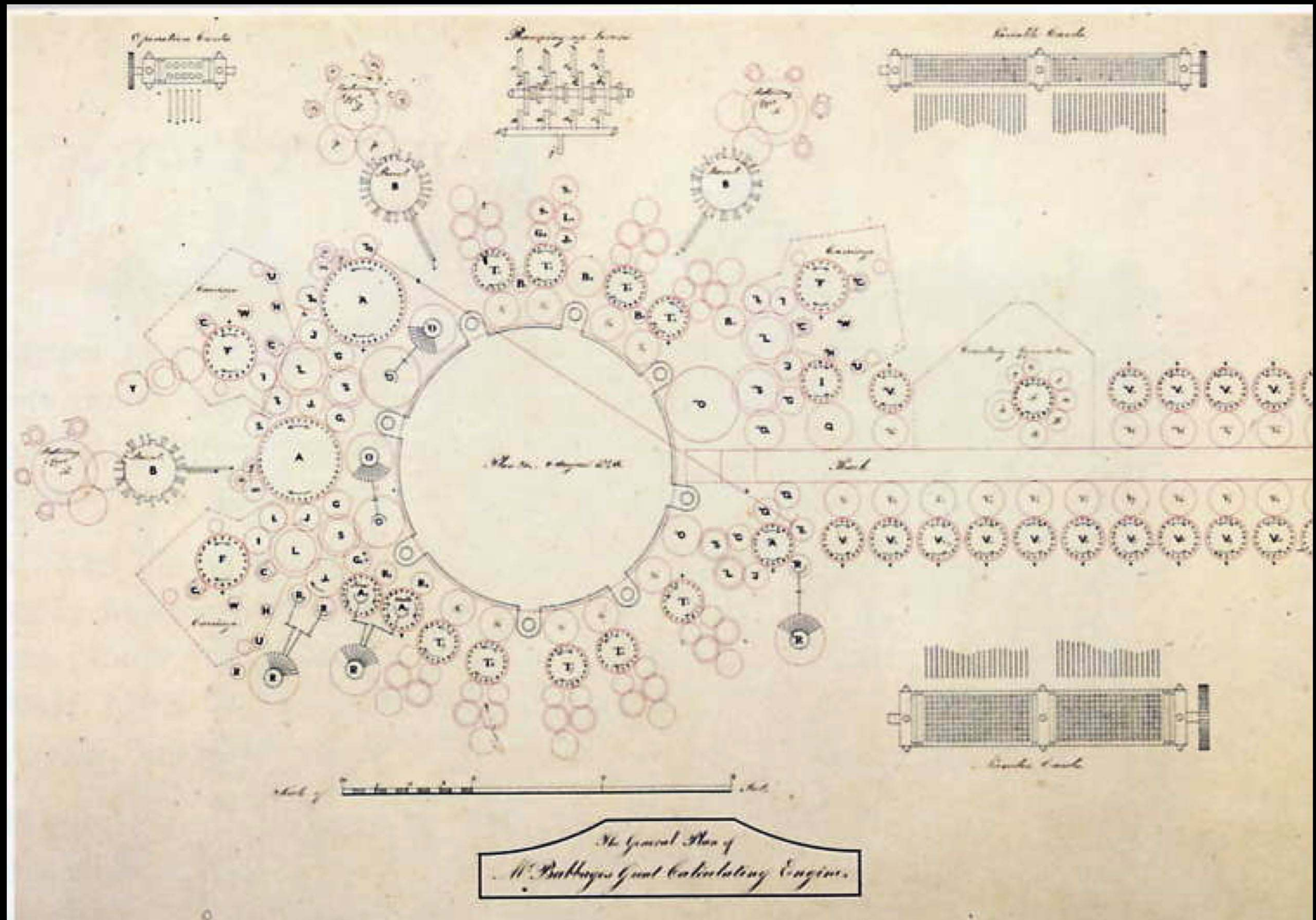




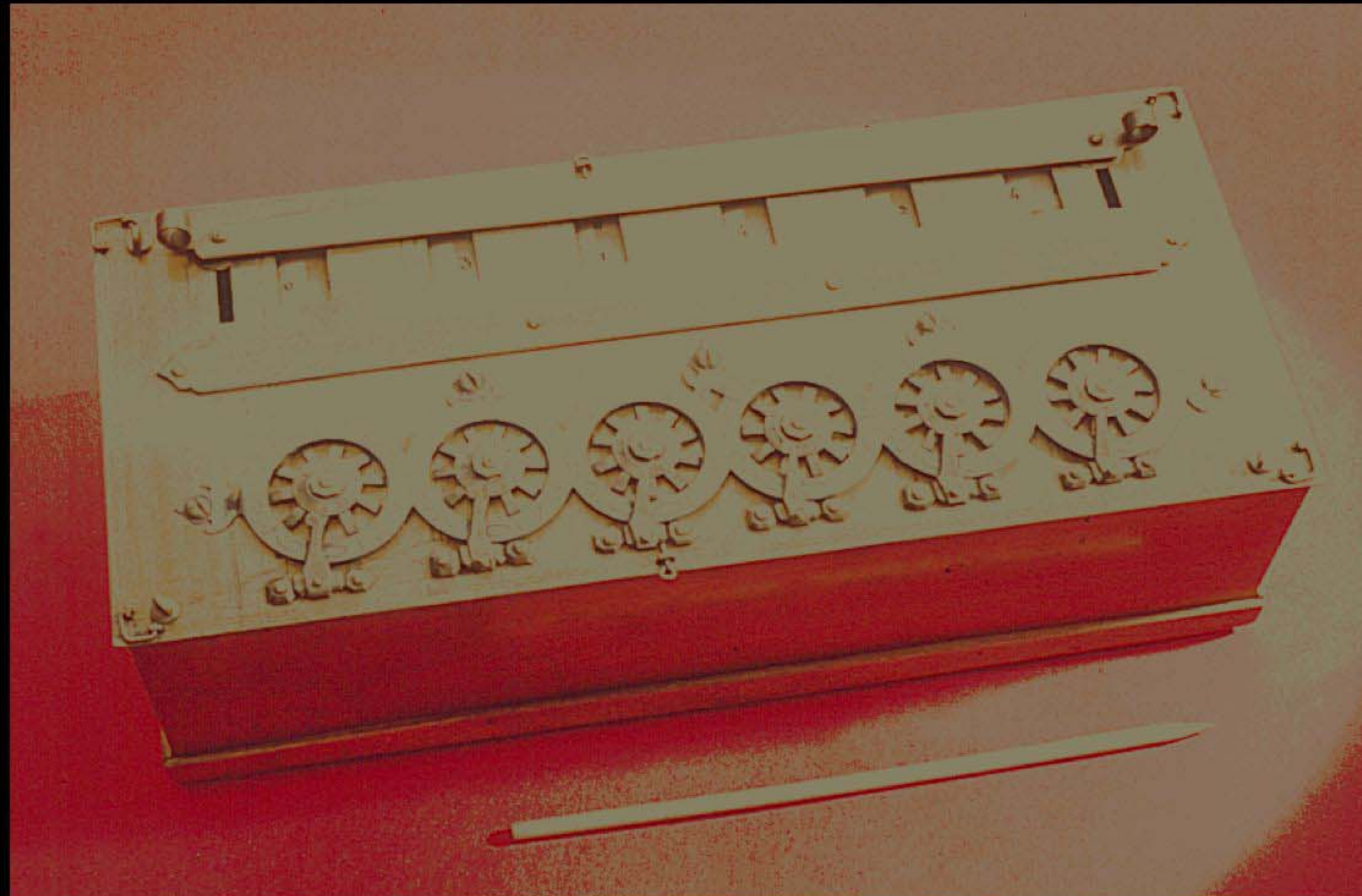




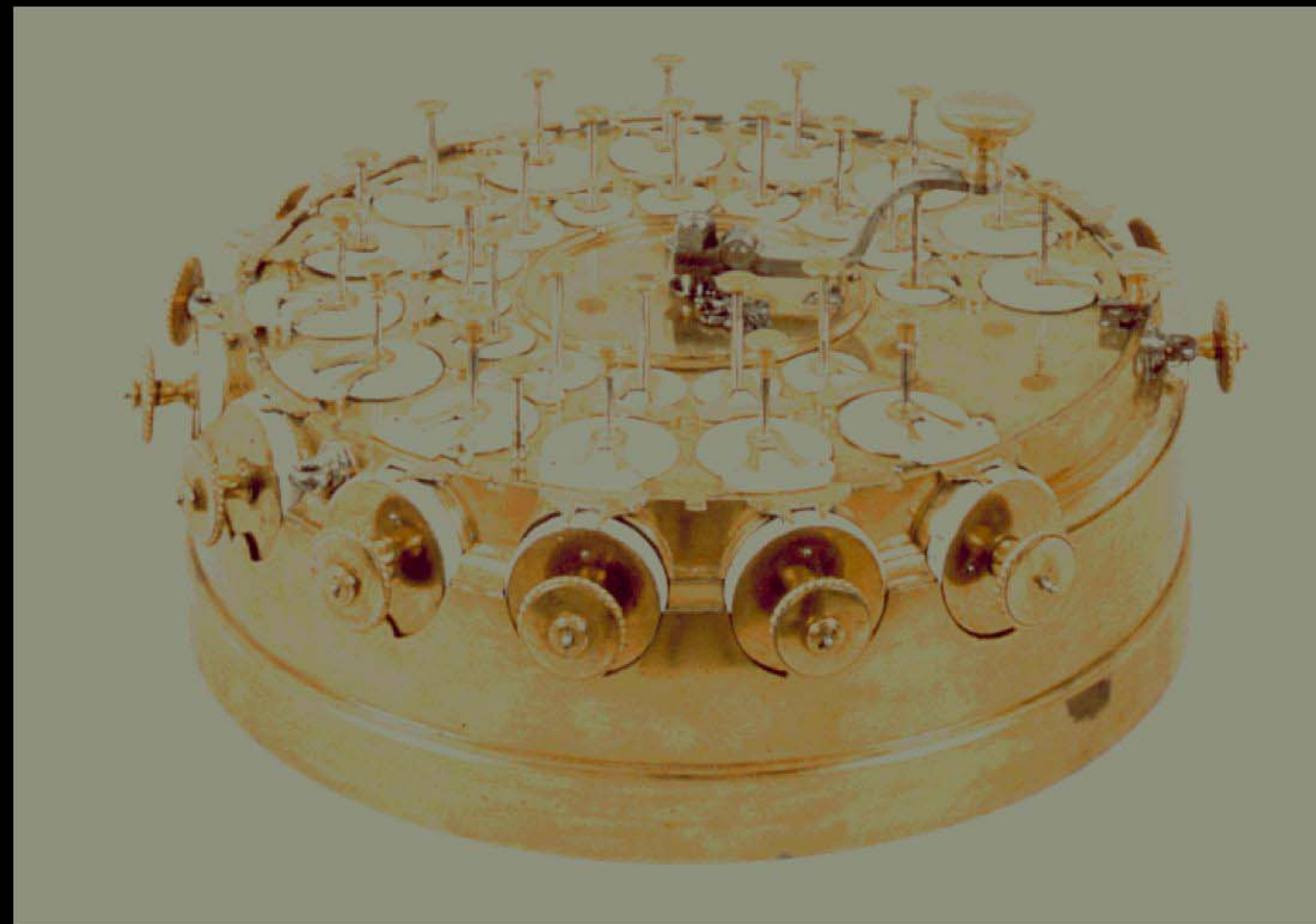
Punched Cards for Analytical Engine



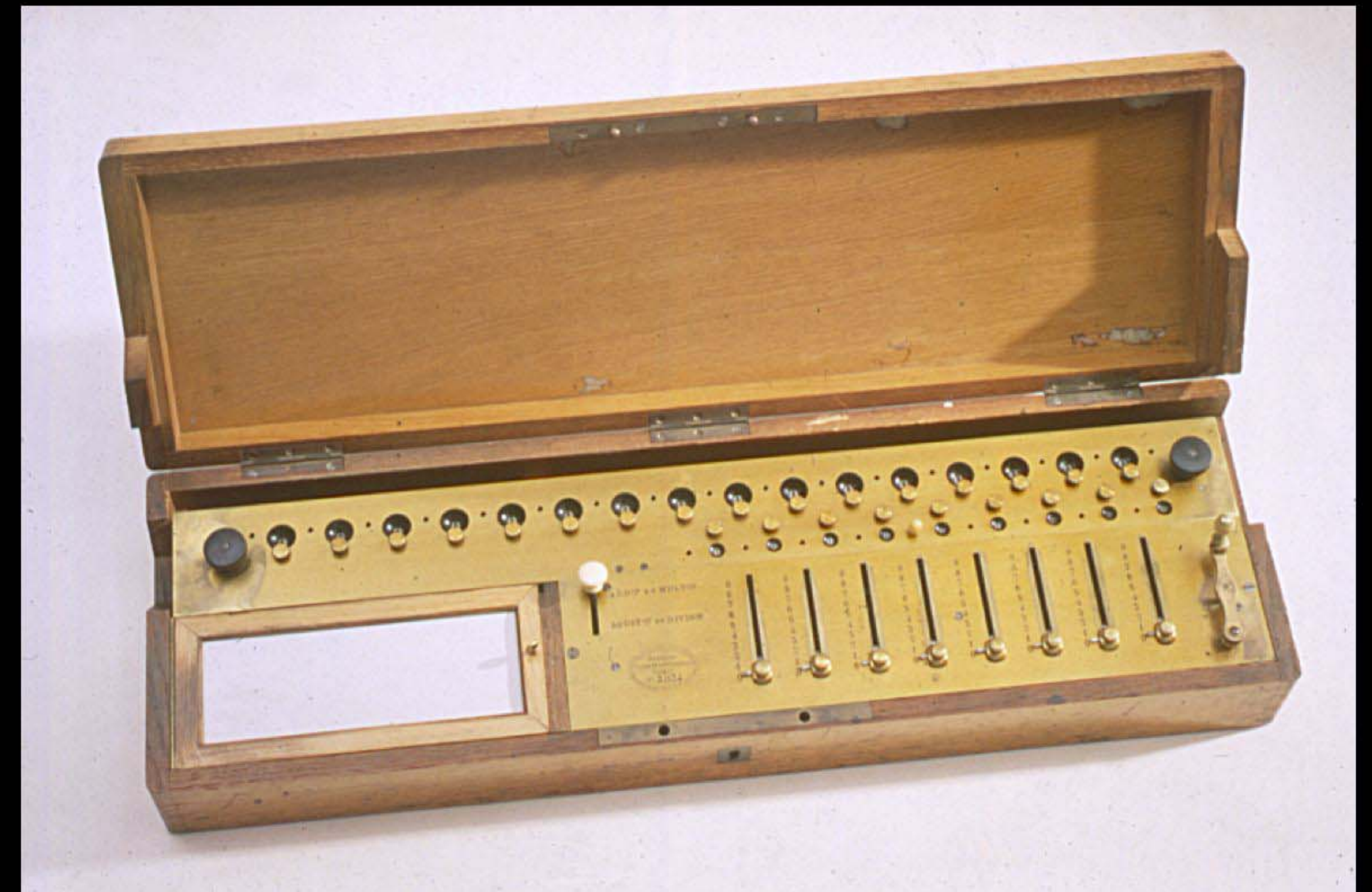
Analytical Engine, Plan 25, 1840



'Pascaline ', 1642



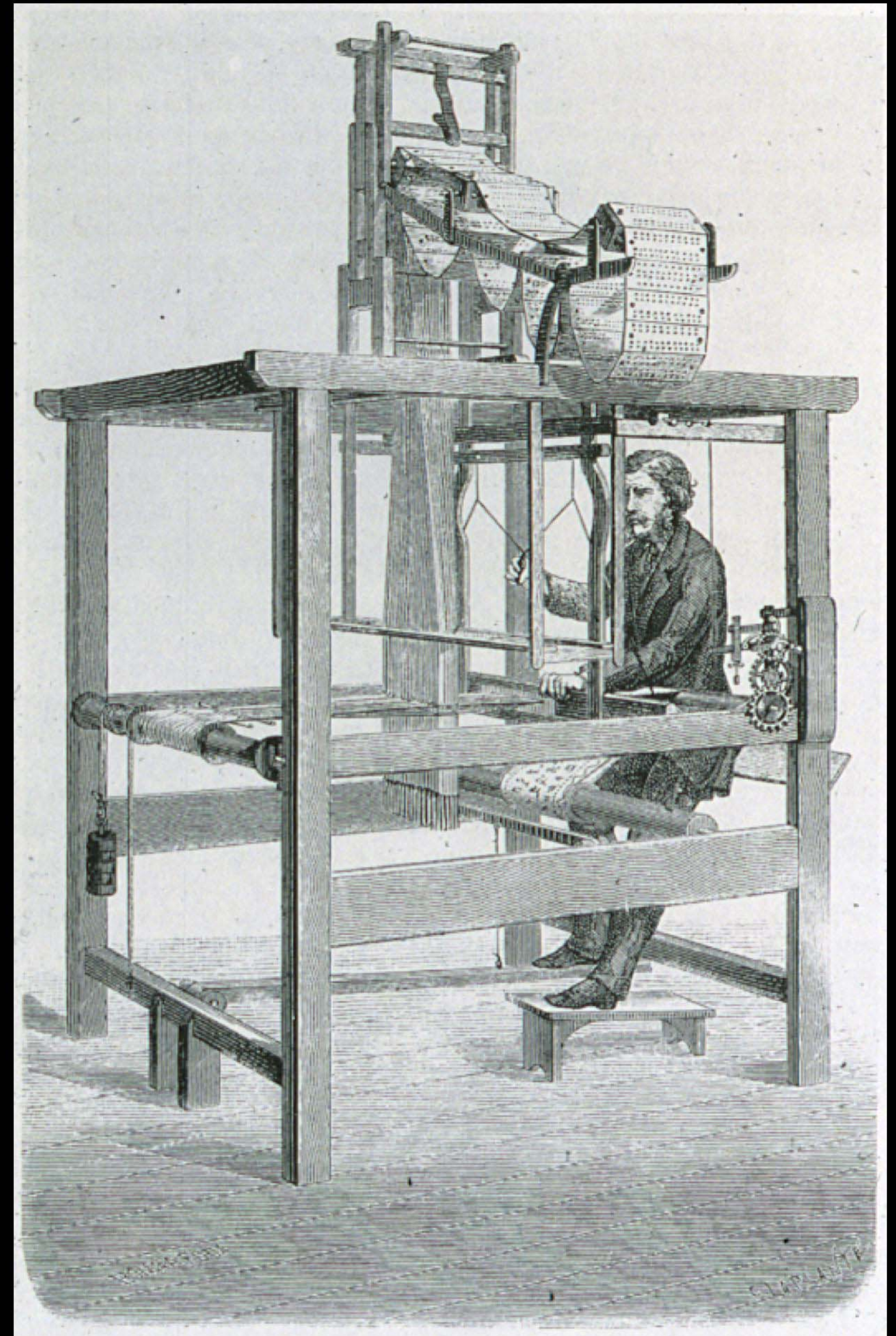
Johann Muller's Universal Calculator, 1784



Thomas de Colmar Arithmometer



Portrait of J. M. Jacquard , c. 1839

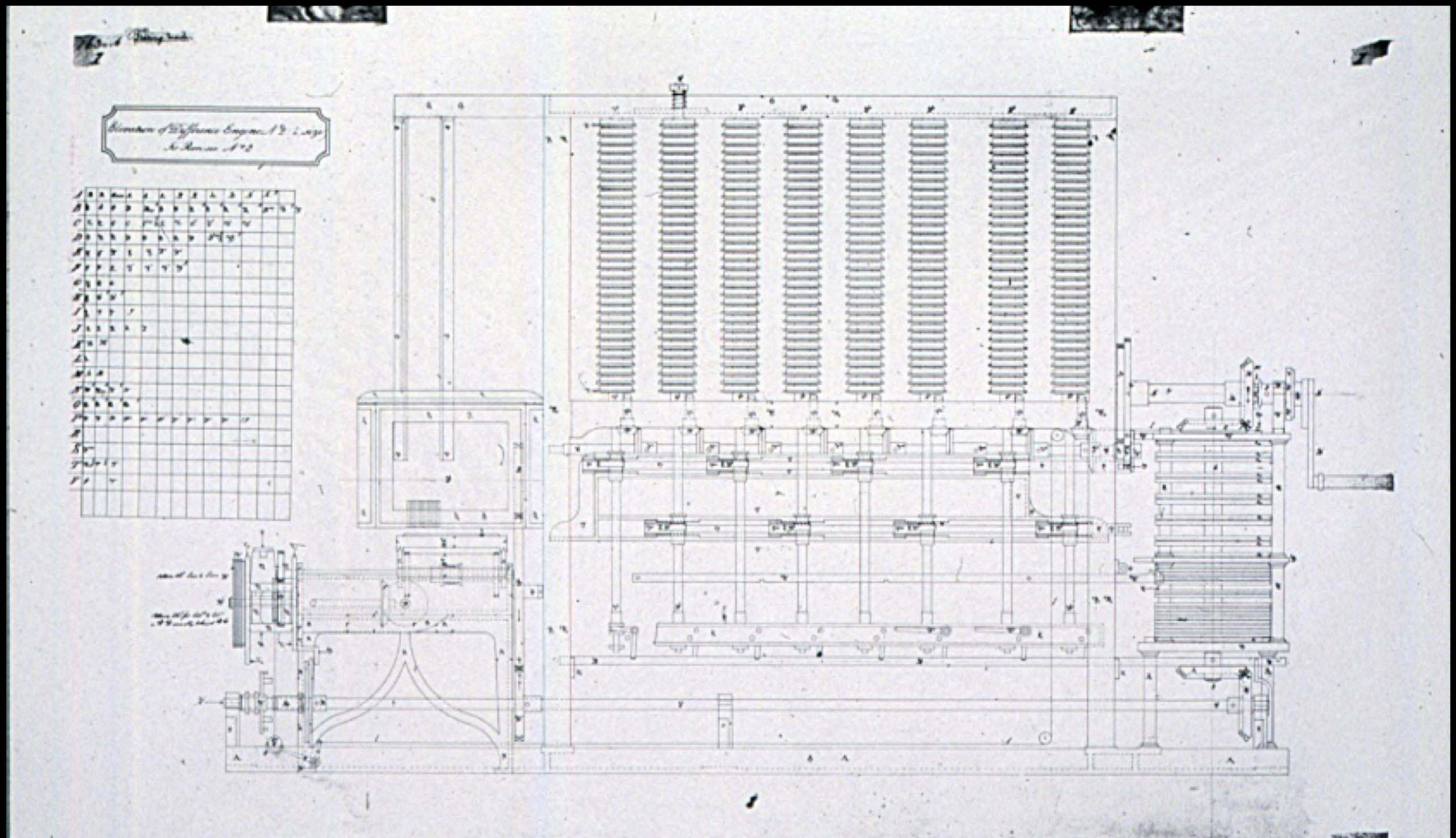


Jacquard Loom

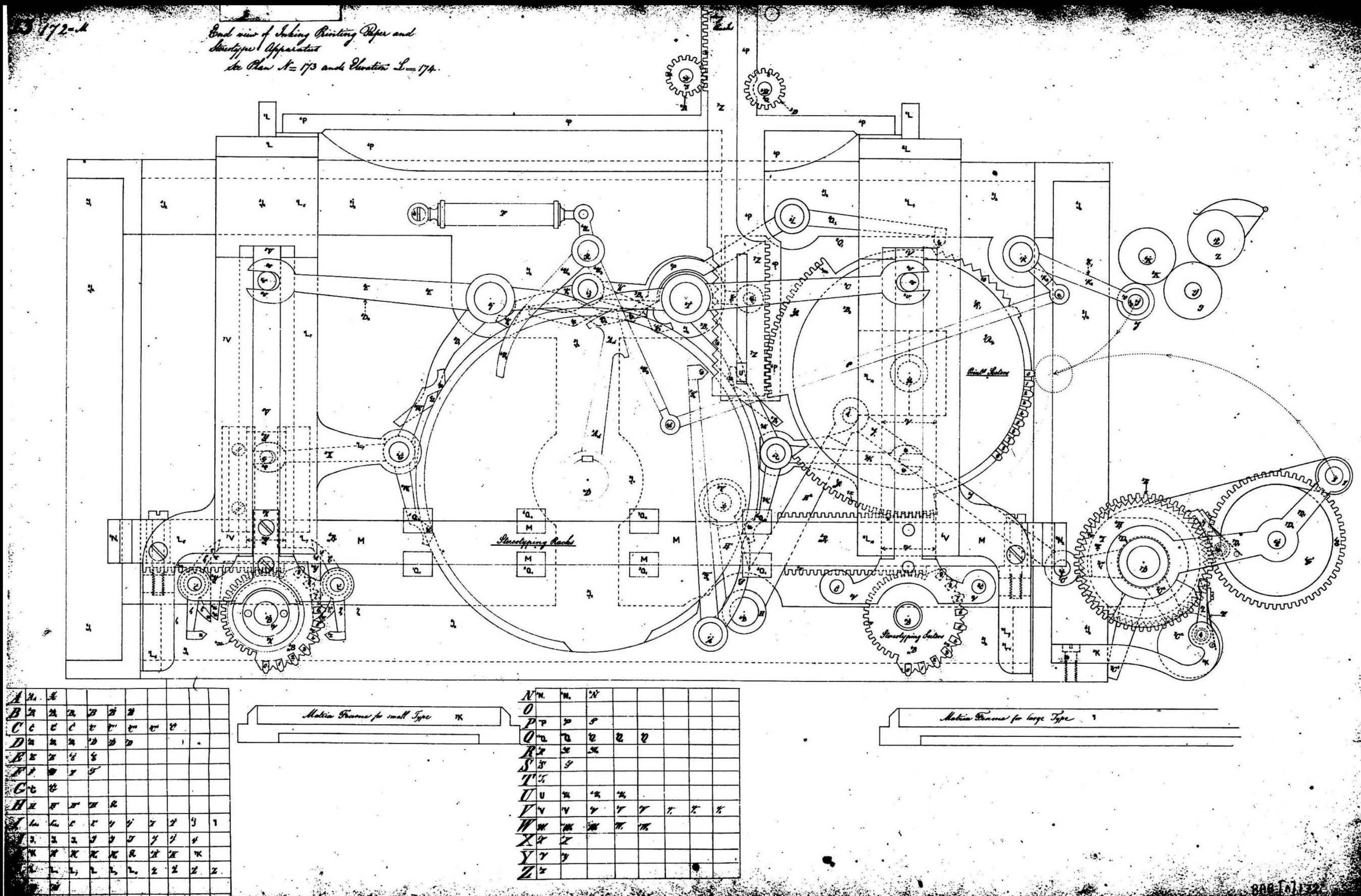


Ada Lovelace, by A. E. Chalon, 1838

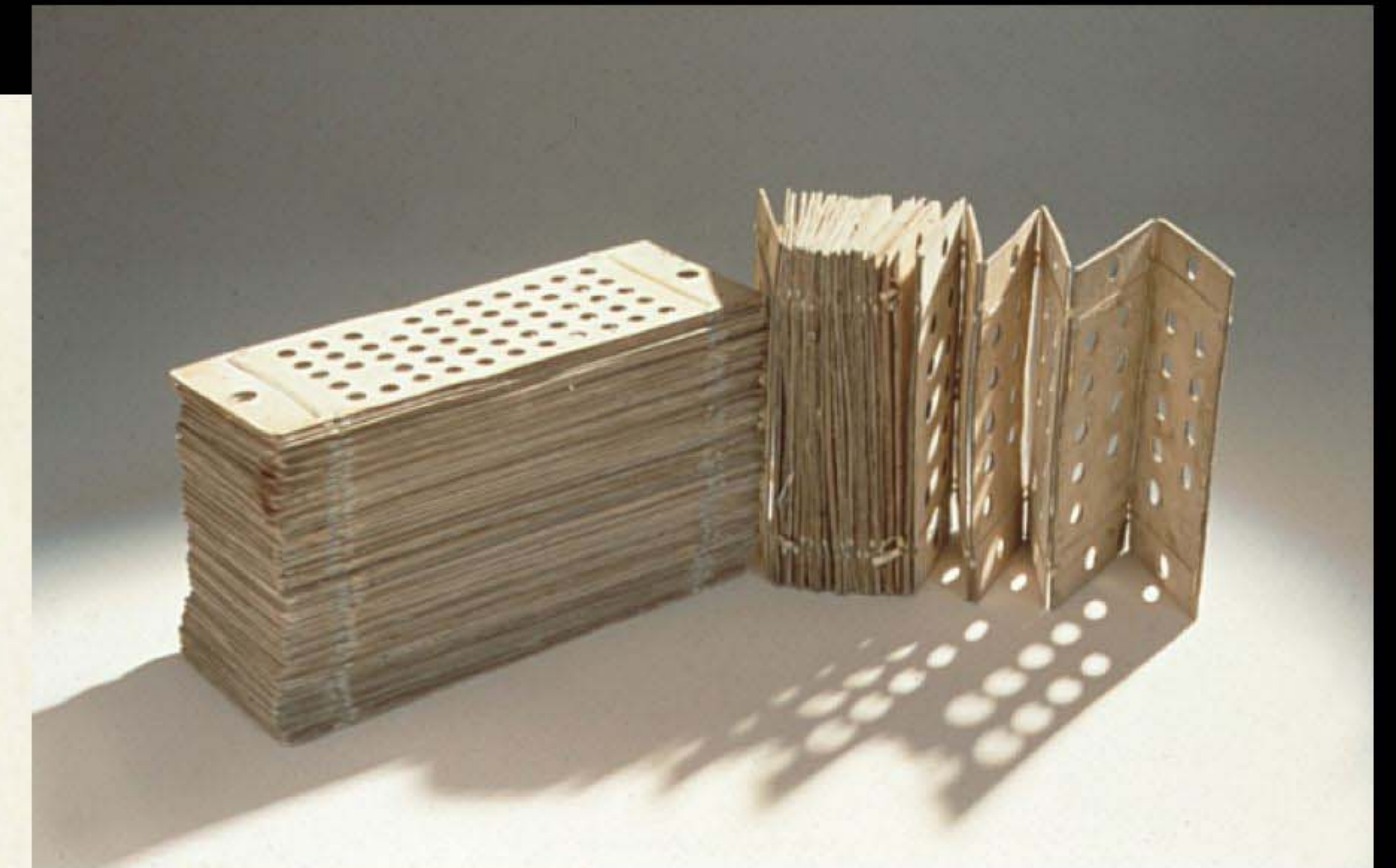
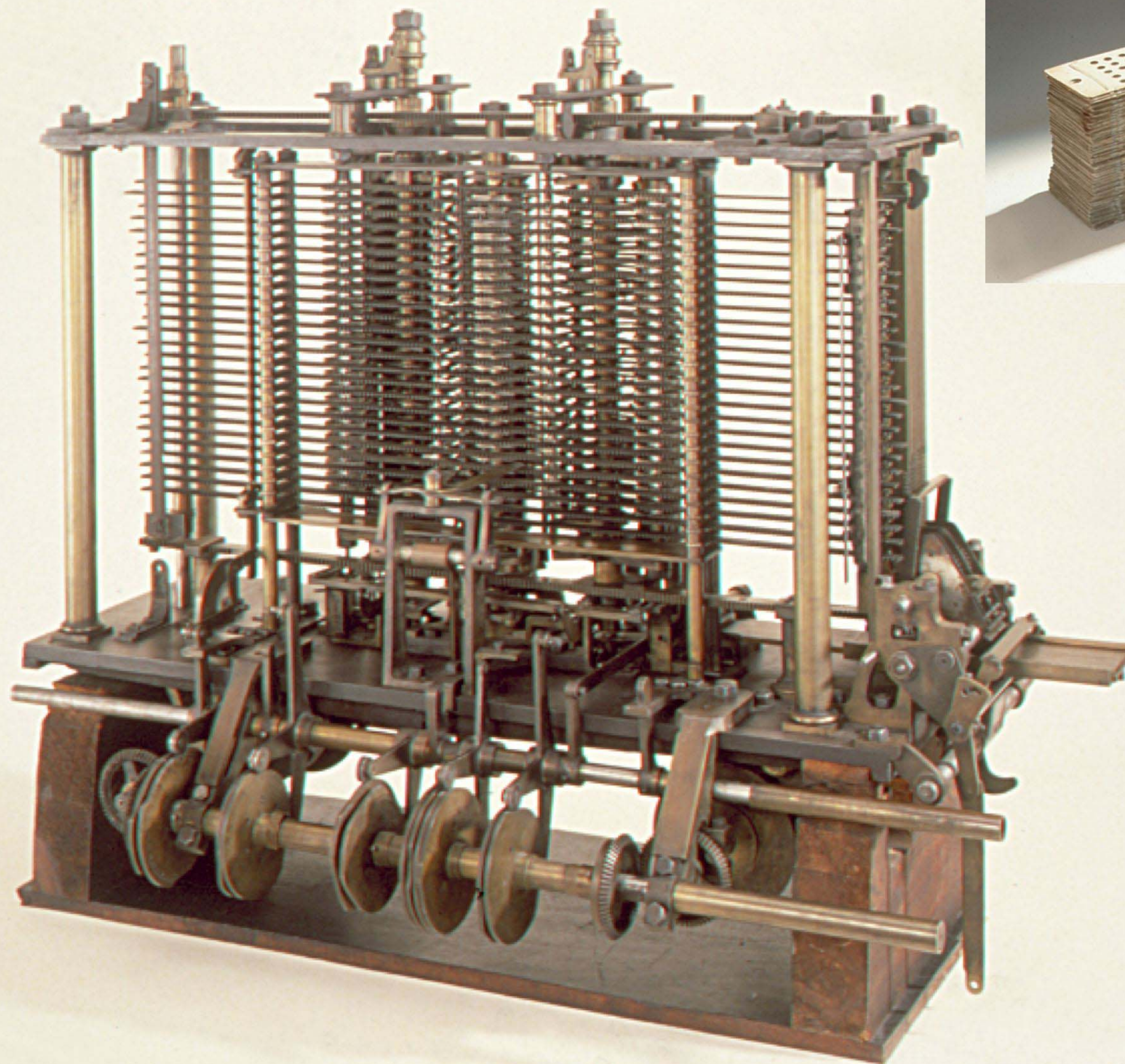
END

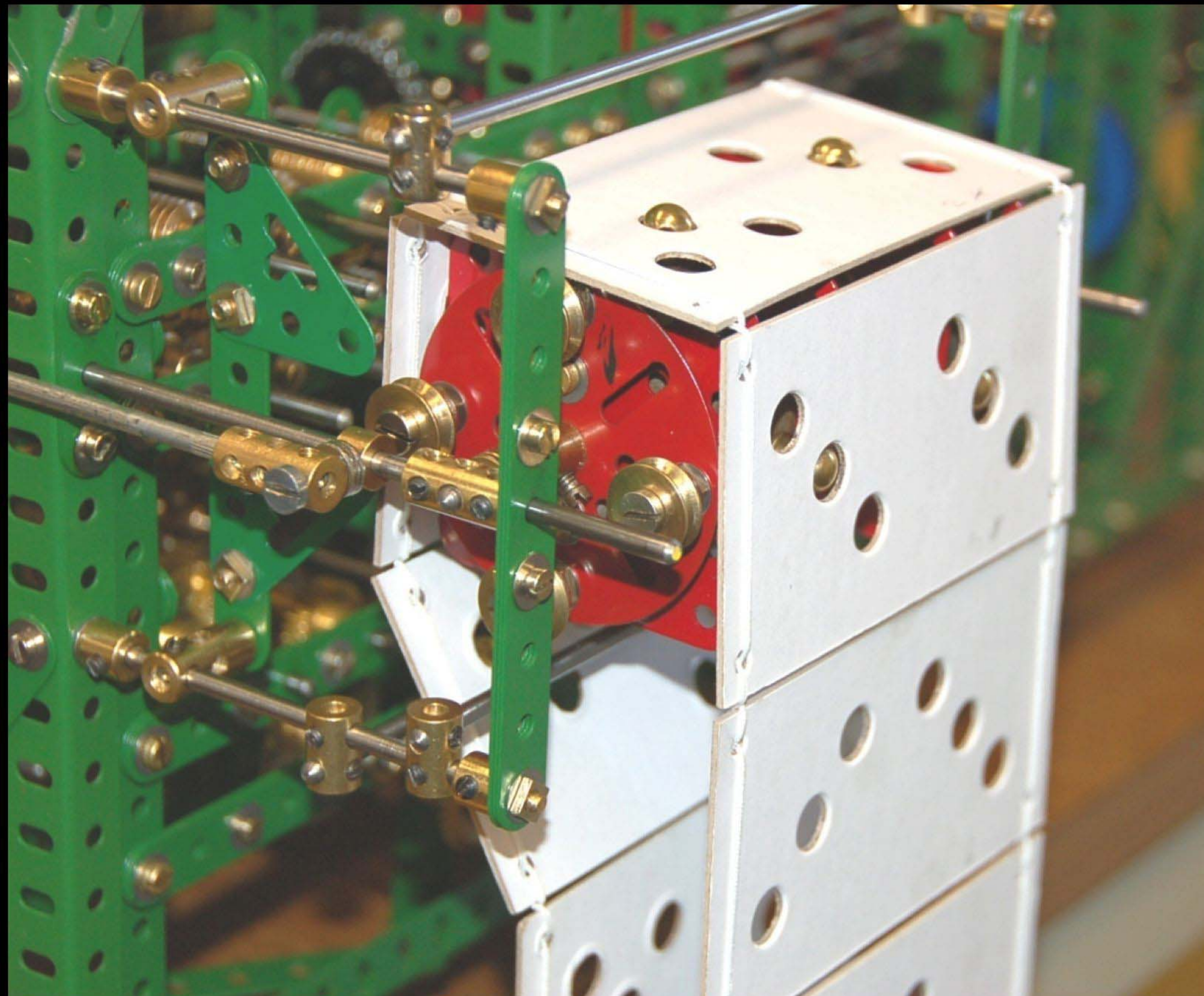


Difference Engine No. 2, Elevation, c. 1847



Inking, Printing and Stereotyping Apparatus: Elevation



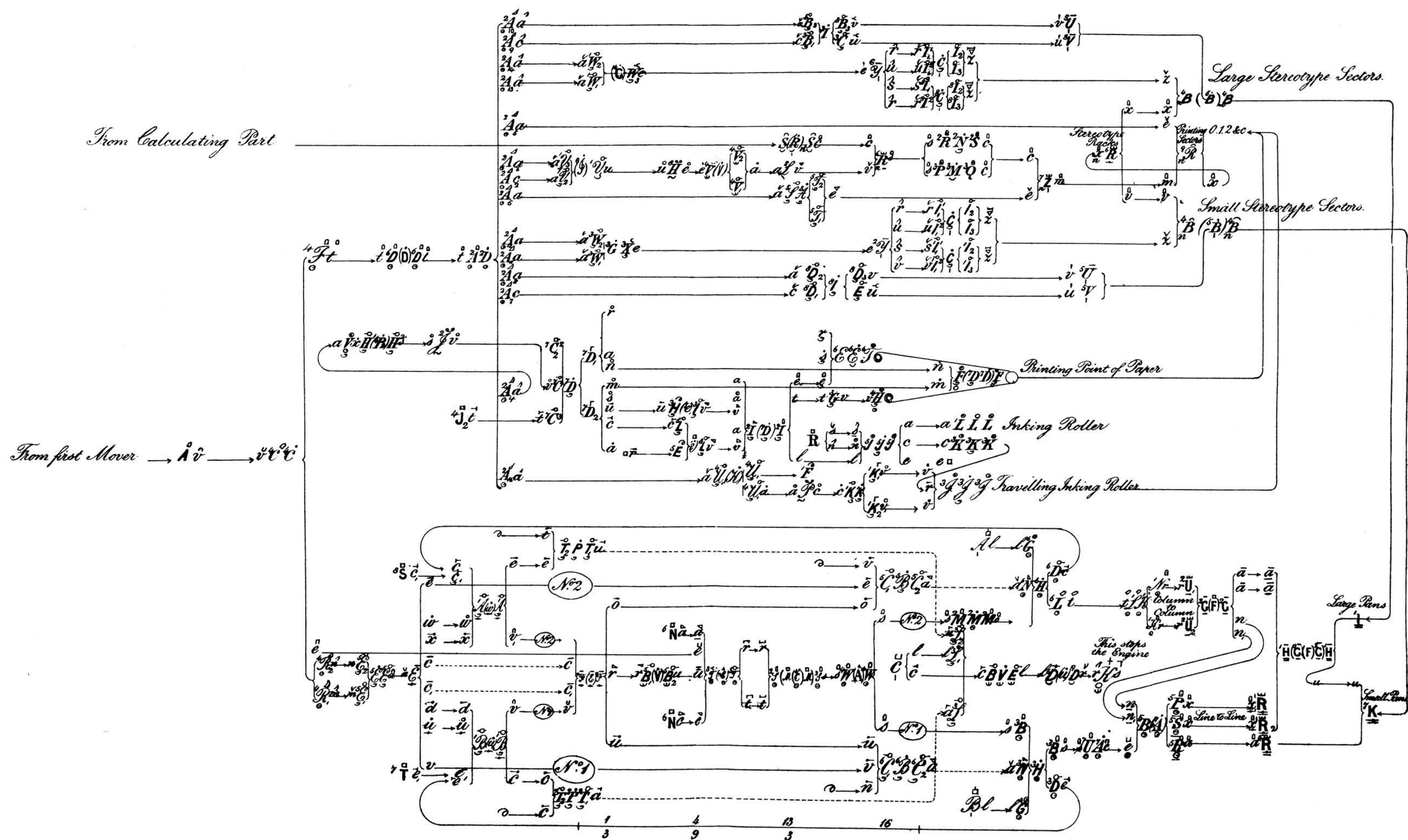


Analytical Engine Card Reader, Meccano by Tim Robinson

p'

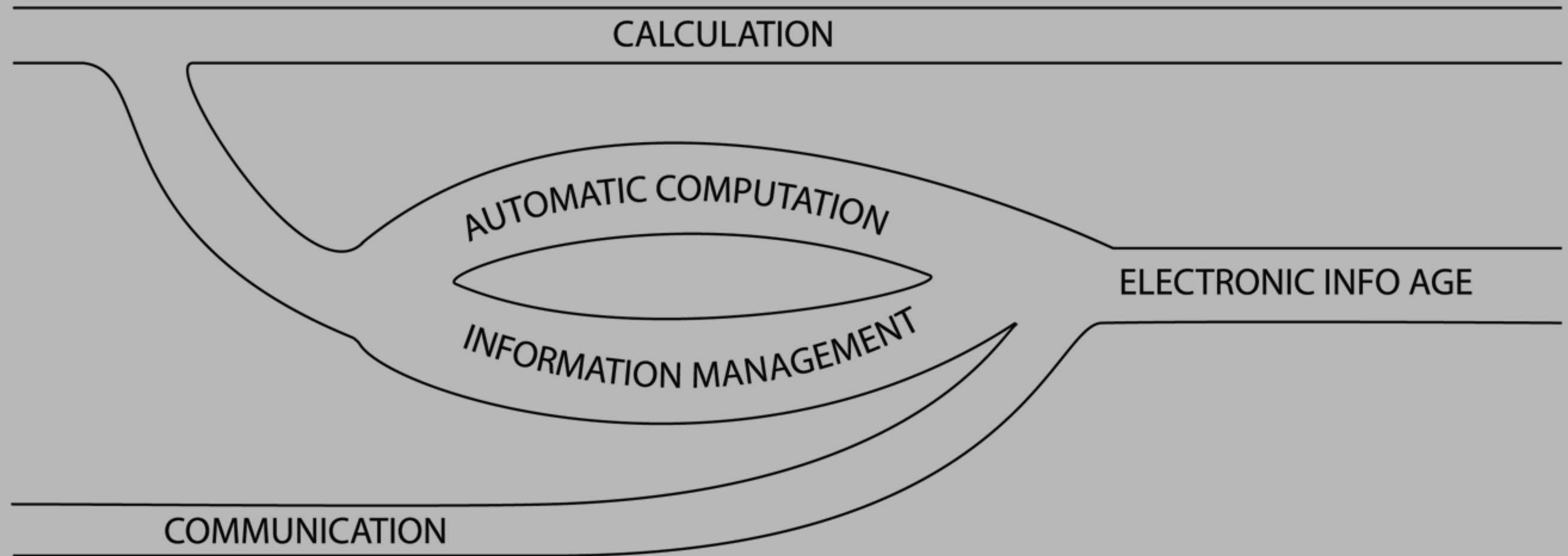
A	$\dot{A}$	$\ddot{A}$			
B	$\dot{B}$				
C	$\dot{C}$	$\dot{C}_{2,3}$	$\dot{C}_2$		
D	$\dot{D}$	$\dot{D}^2$	$\dot{D}^1$	$\dot{D}^2$	
E	$\dot{E}$				
F	$\dot{F}$				
G	$\dot{G}$	$\dot{G}^1$			
H	$\dot{H}$				
K	$\dot{K}$	$\dot{K}$	$\dot{K}$	$\dot{K}$	$\dot{K}$
L	$\dot{L}$	$\dot{L}^2$	$\dot{L}^1$		
M	$\dot{M}$				
N	$\dot{N}$	$\dot{N}$			
O	$\dot{O}$	$\dot{O}$	$\dot{O}^2$		
P	$\dot{P}$	$\dot{P}^1$	$\dot{P}^2$	$\dot{P}^1$	
Q	$\dot{Q}$	$\dot{Q}$	$\dot{Q}^2$		
R	$\dot{R}^2$	$\dot{R}$			
S	$\dot{S}$	$\dot{S}^2$	$\dot{S}^2$	$\dot{S}^2$	
T	$\dot{T}^2$	$\dot{T}^2$	$\dot{T}^2$		
W	$\dot{W}$	$\dot{W}^1$	$\dot{W}^2$		

Mechanical Notation, DE2 (BAB A 171)

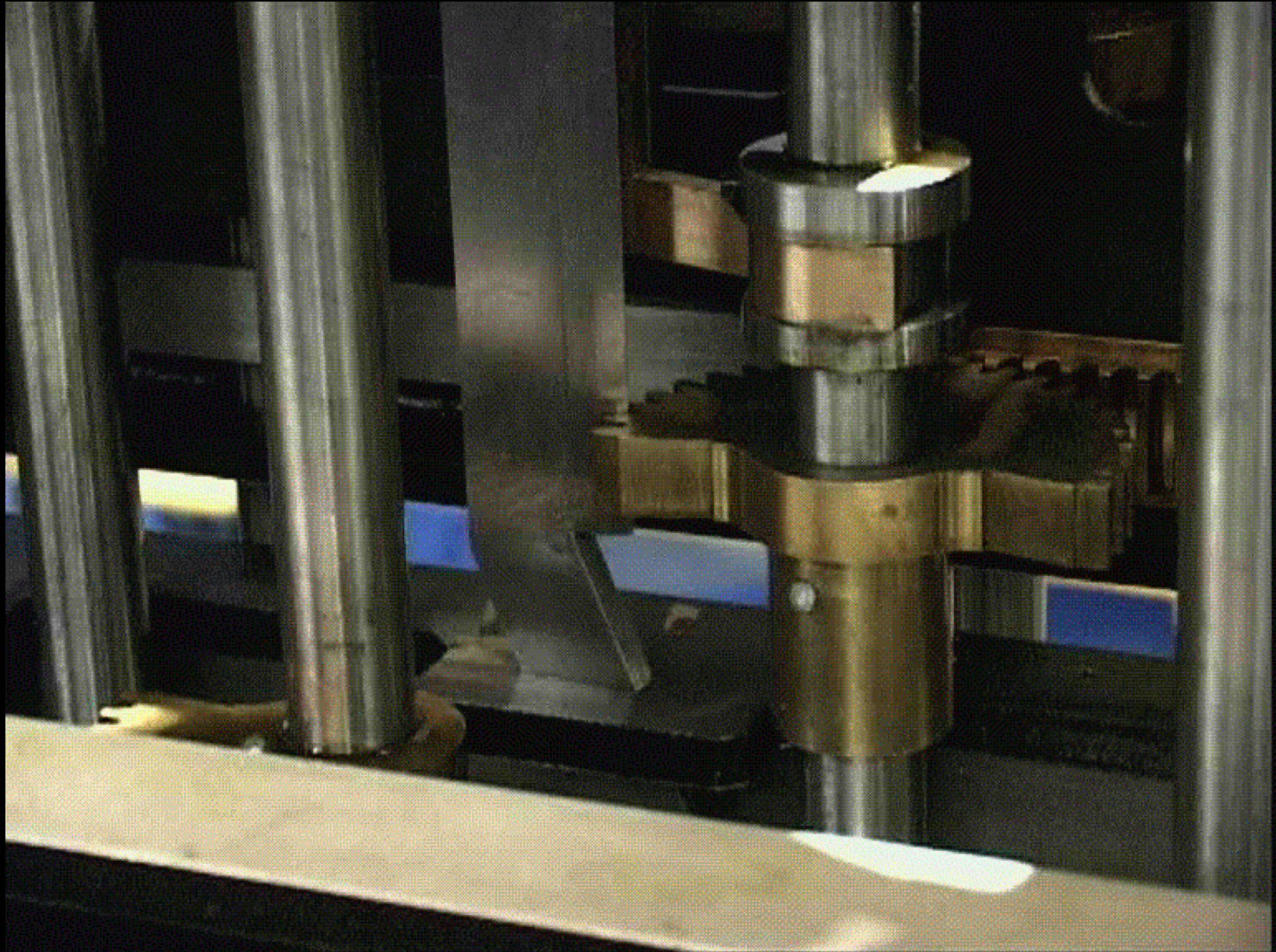


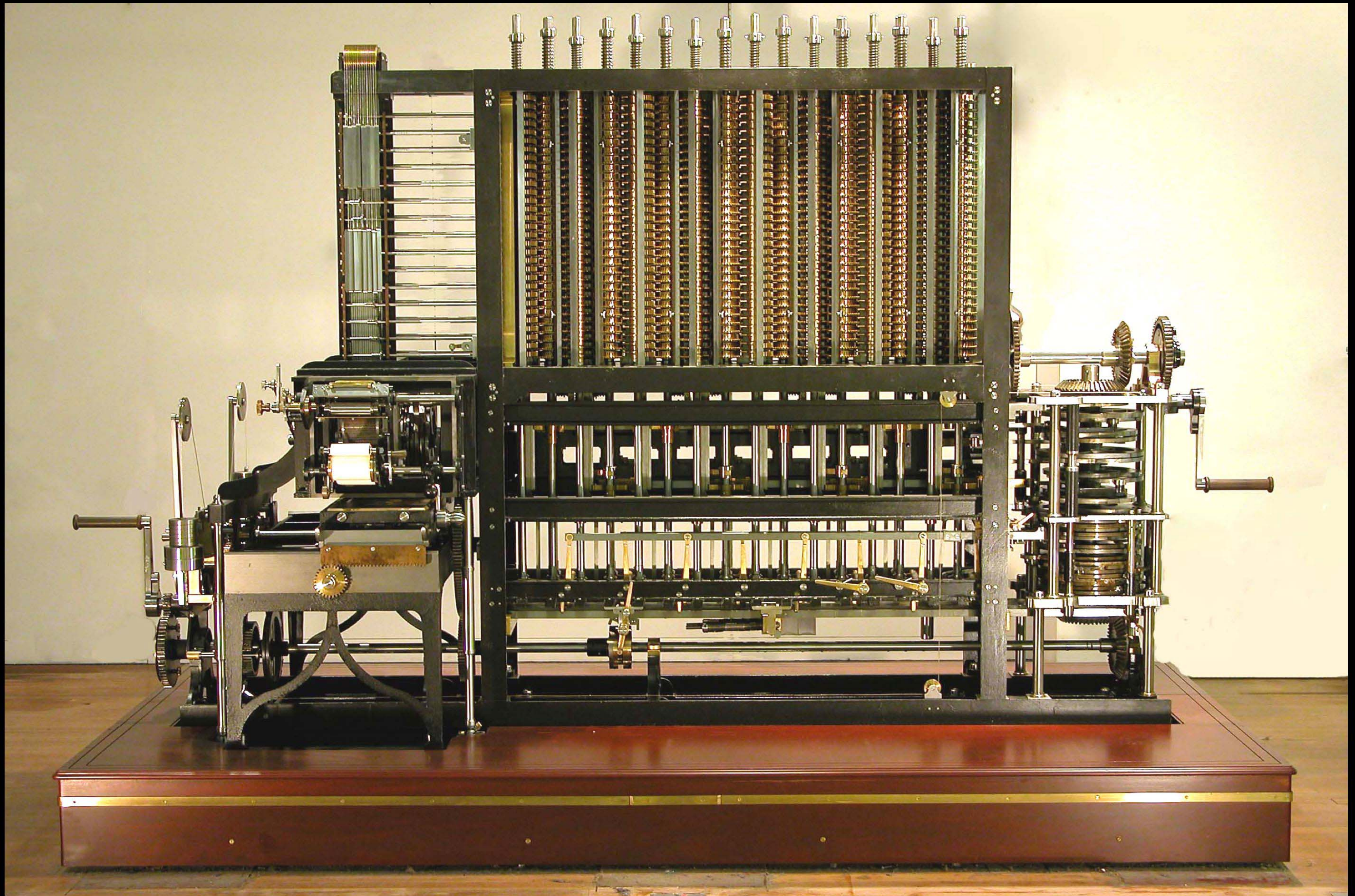
Babbage's Mechanical Notation

'RIVER DIAGRAM'

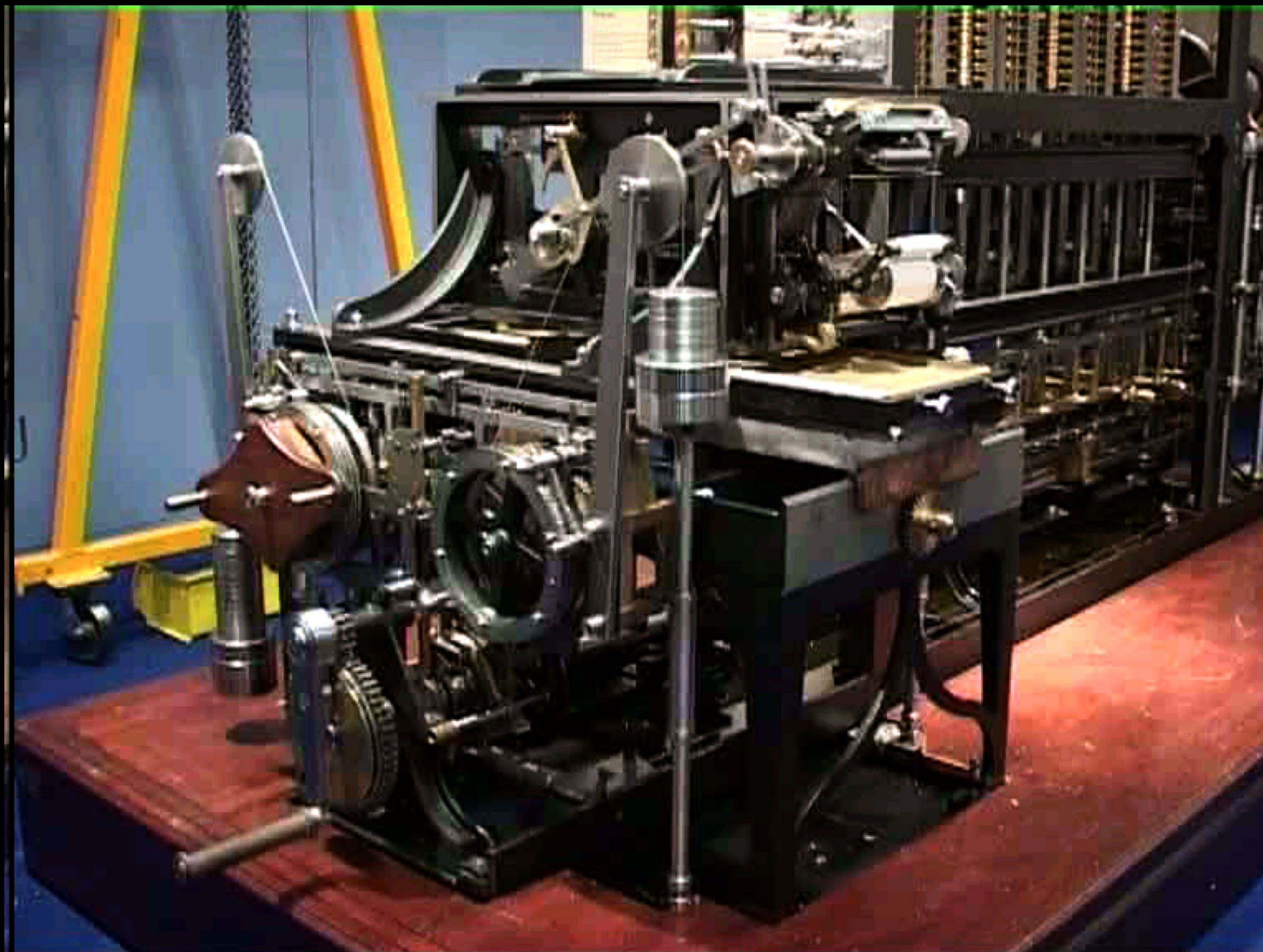


PRE HISTORY	BABBAGE	HOLLERITH	ELECTRIC TUBES	SEMI-CONDUCTOR	PC
MECHANICAL	ELECTROMECHANICAL			ELECTRONIC	

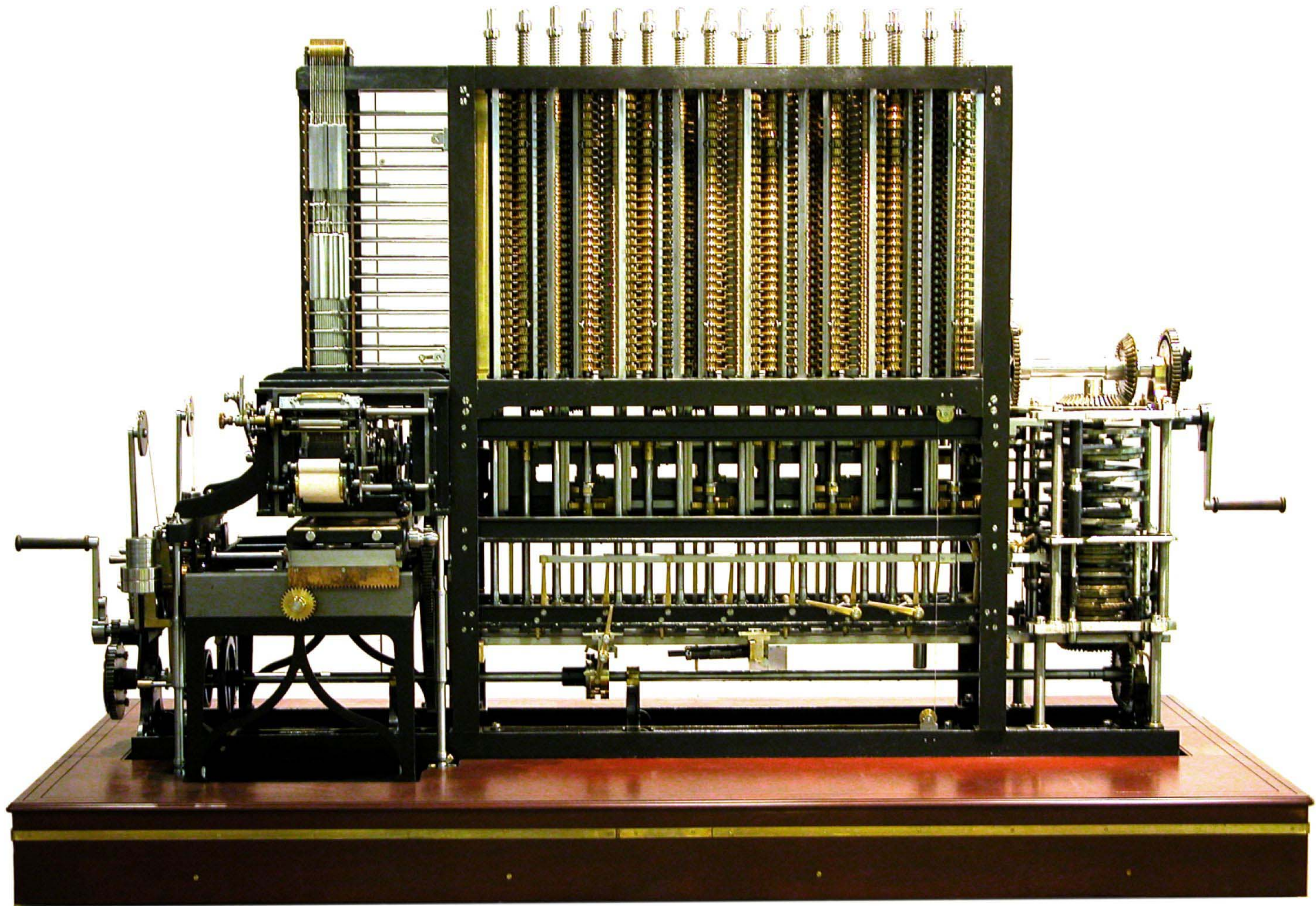




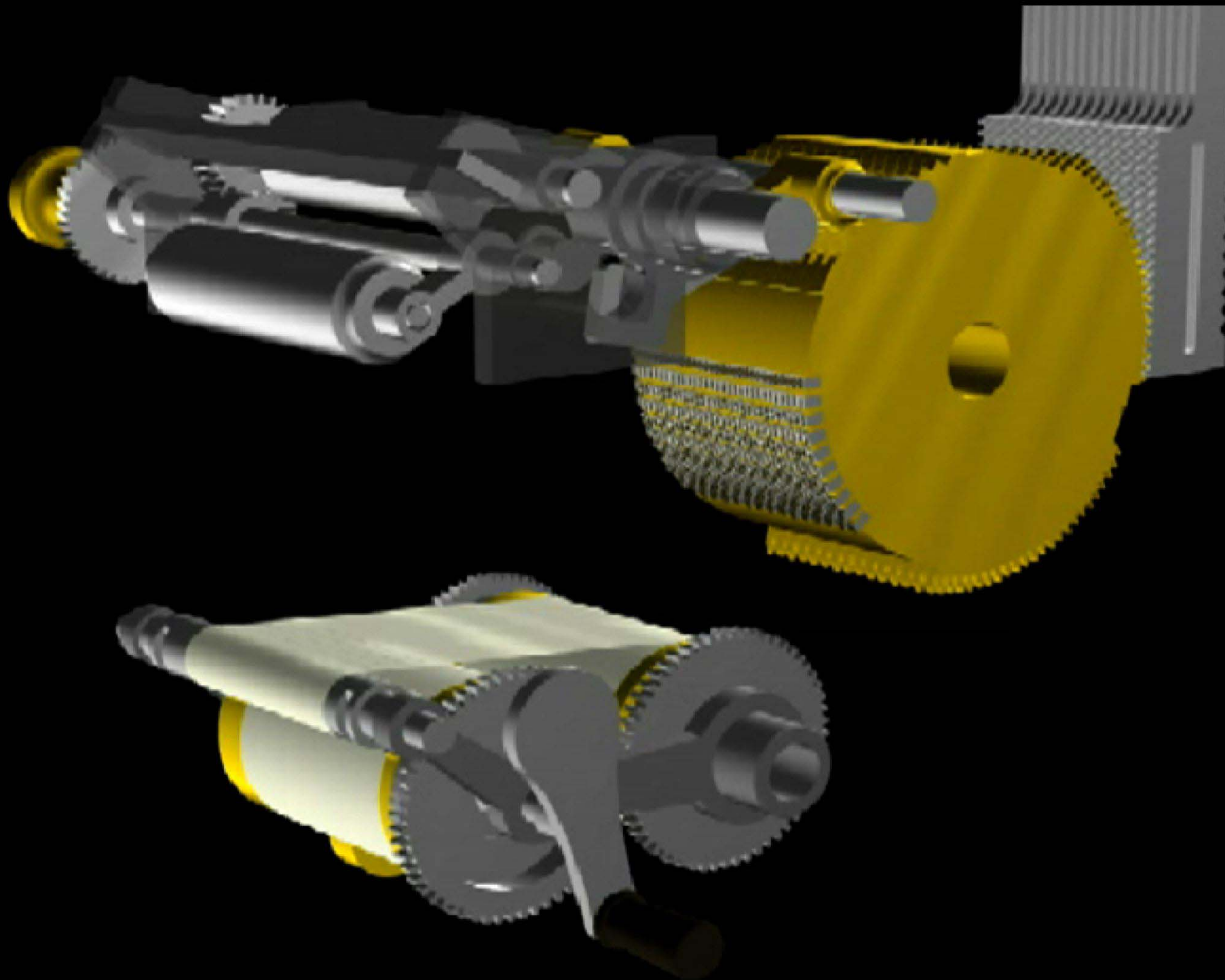
Doron Swade



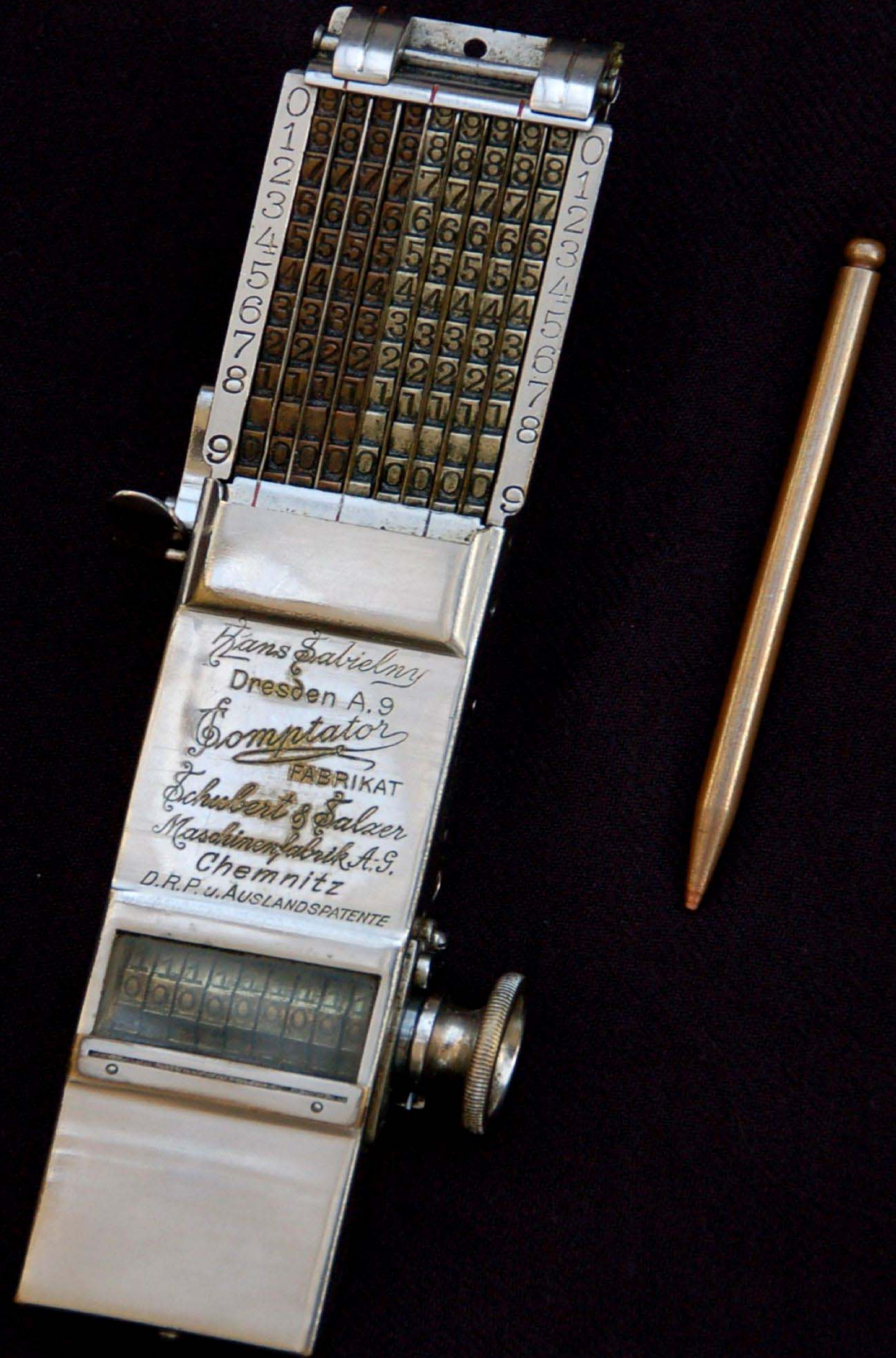
Doron Swade



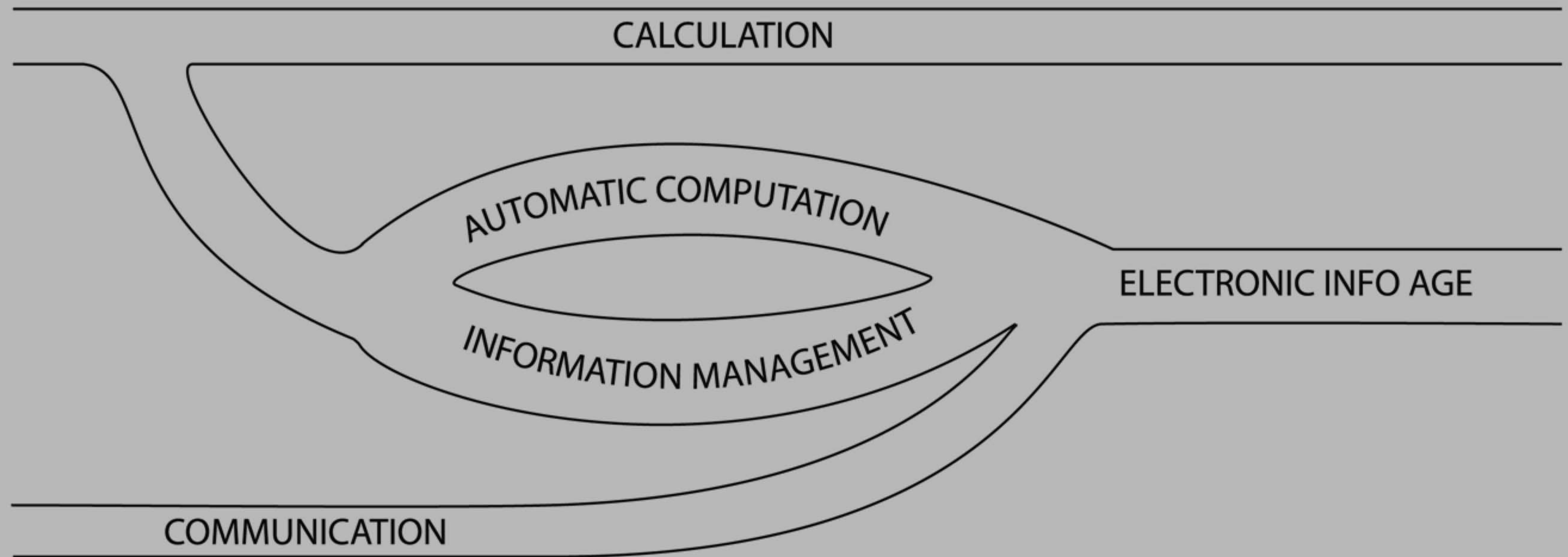
Difference Engine No. 2, London 2005



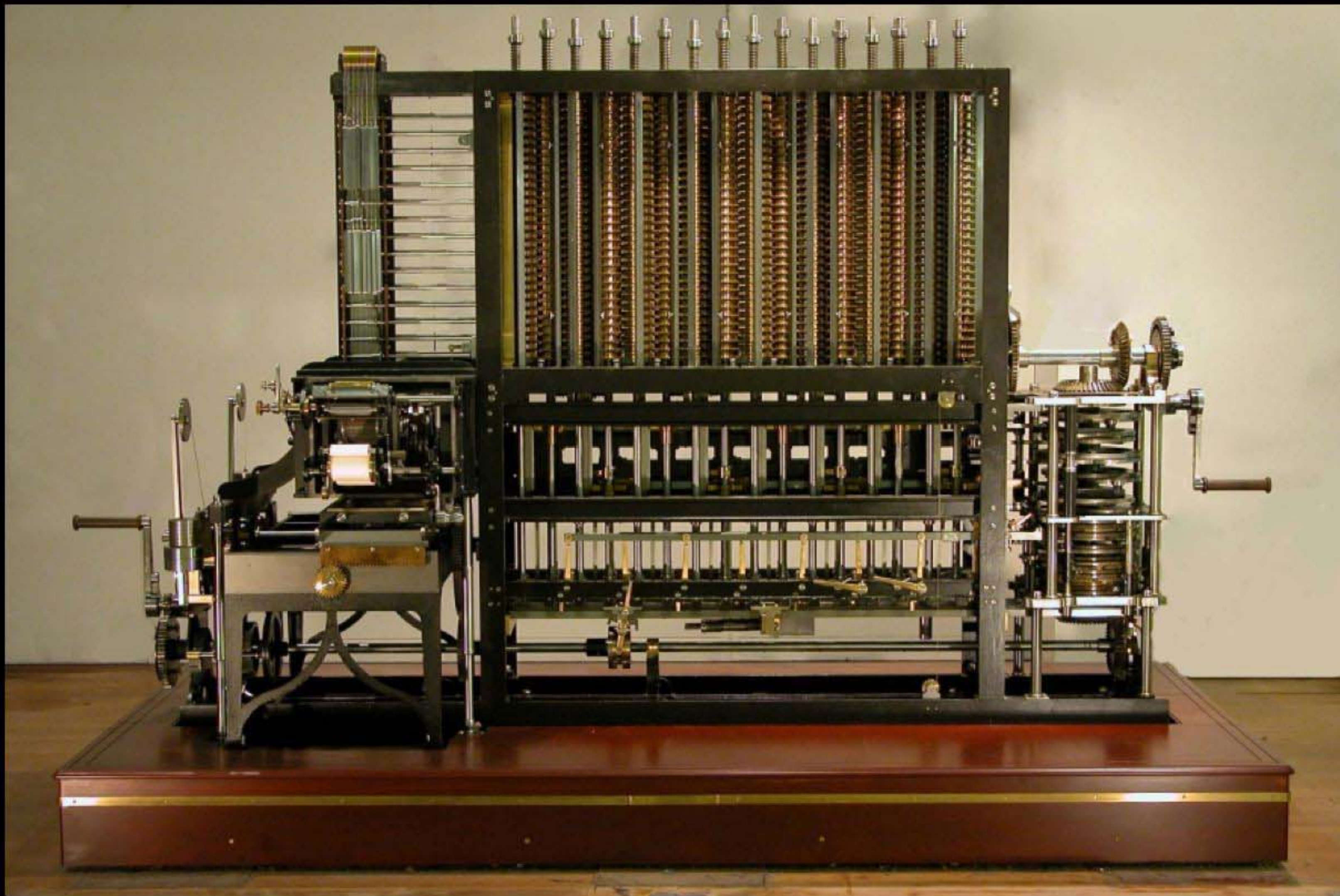
*'Comptator' Chain Adder,
1910*



'RIVER DIAGRAM'



PRE HISTORY	BABBAGE	HOLLERITH	ELECTRIC TUBES	SEMI-CONDUCTOR	PC
MECHANICAL		ELECTROMECHANICAL		ELECTRONIC	



Babbage's DE2, designed 1847-9



Hollerith Tabulator and Sorter

SCIENTIFIC AMERICAN

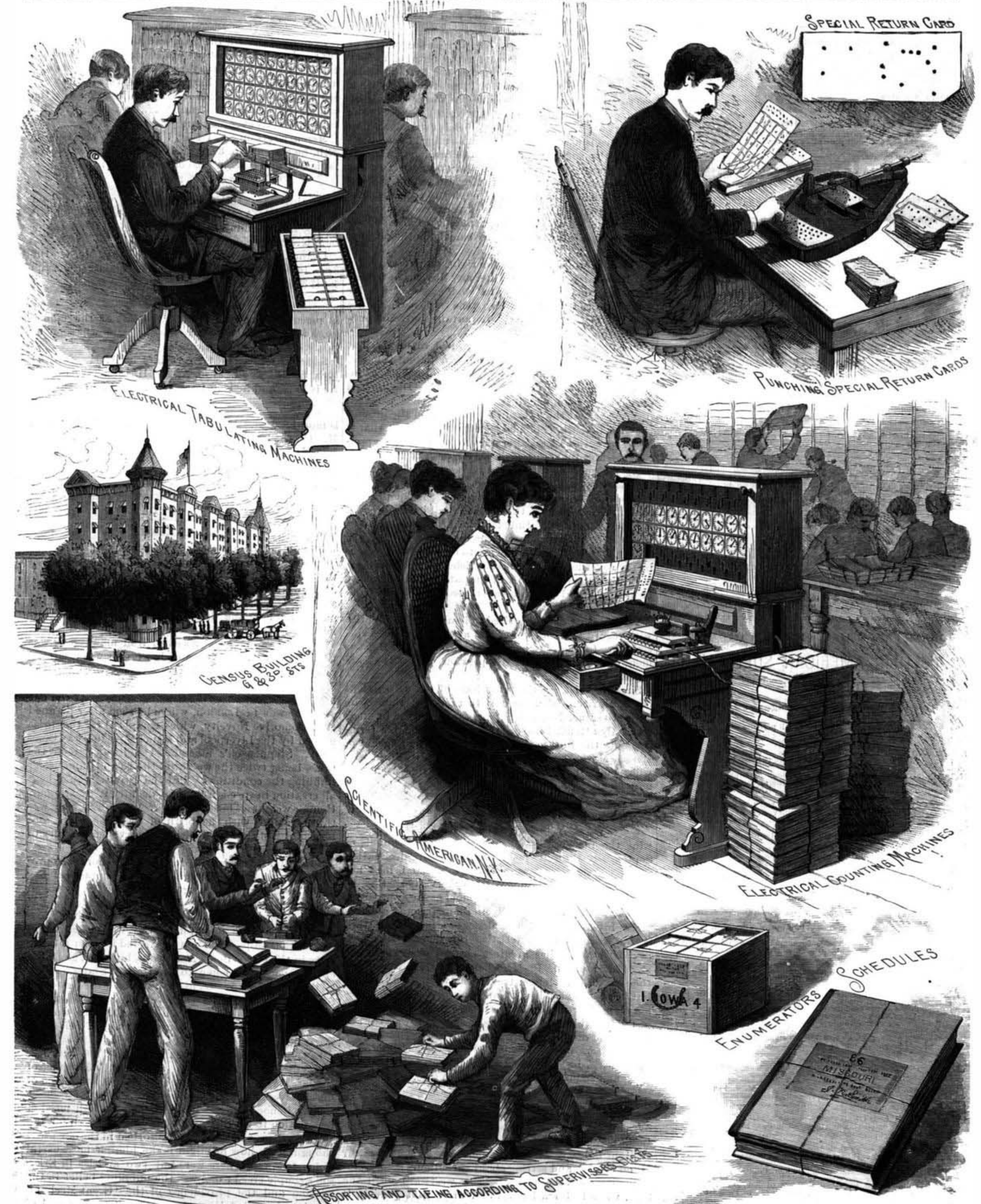
[Entered at the Post Office of New York, N. Y., as Second Class Matter. Copyrighted, 1890, by Munn & Co.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LXIII. - No. 9.
ESTABLISHED 1845.

NEW YORK, AUGUST 30, 1890.

\$3.00 A YEAR.
WEEKLY.

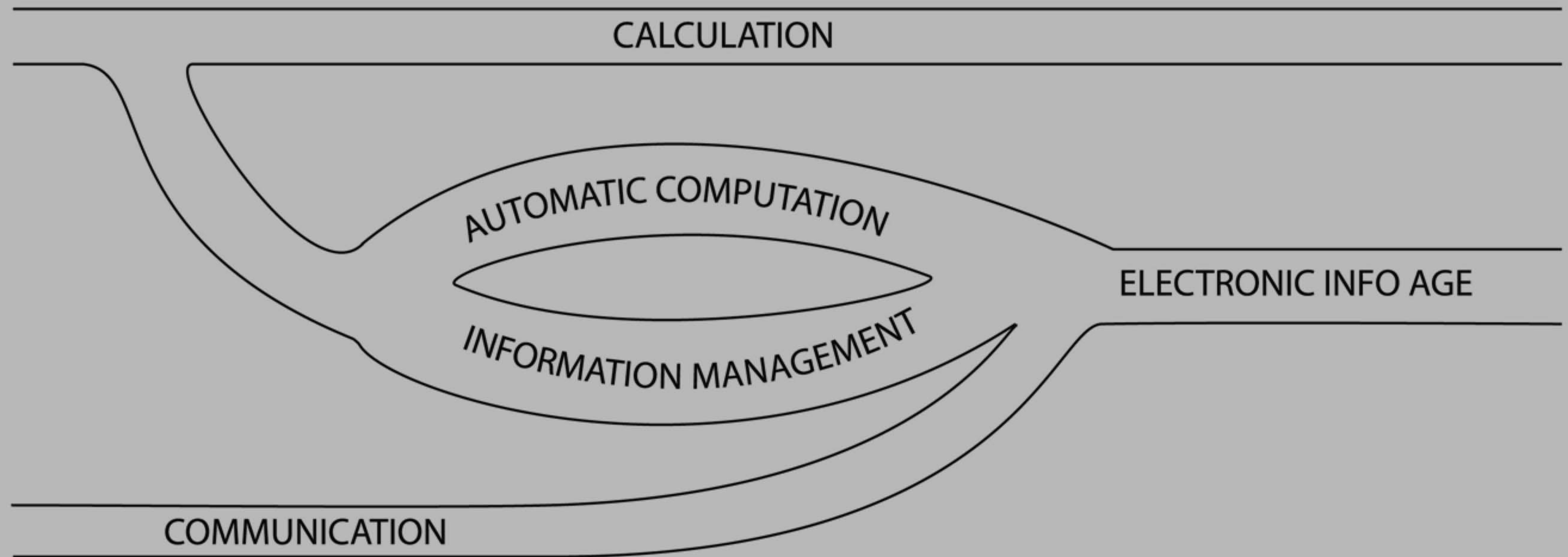


THE NEW CENSUS OF THE UNITED STATES—THE ELECTRICAL ENUMERATING MECHANISM.—[See page 133.]

© 1890 SCIENTIFIC AMERICAN, INC.

Scientific American, Aug. 30 1890

'RIVER DIAGRAM'



PRE HISTORY	BABBAGE	HOLLERITH	ELECTRIC TUBES	SEMI-CONDUCTOR	PC
-------------	---------	-----------	----------------	----------------	----

MECHANICAL	ELECTROMECHANICAL	ELECTRONIC
------------	-------------------	------------



Curta Calculator, 1948 -