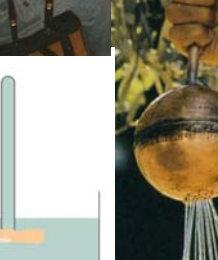
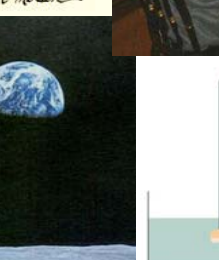
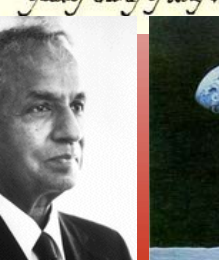
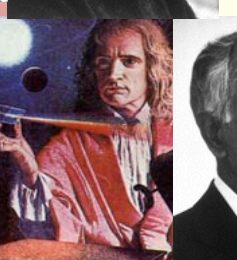
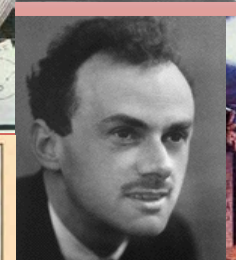
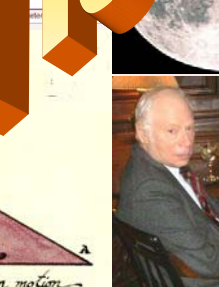
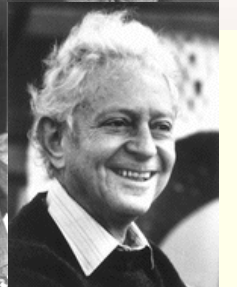
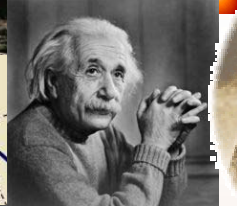
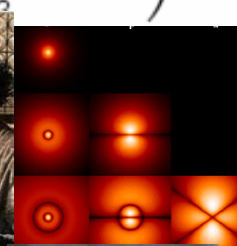
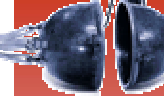
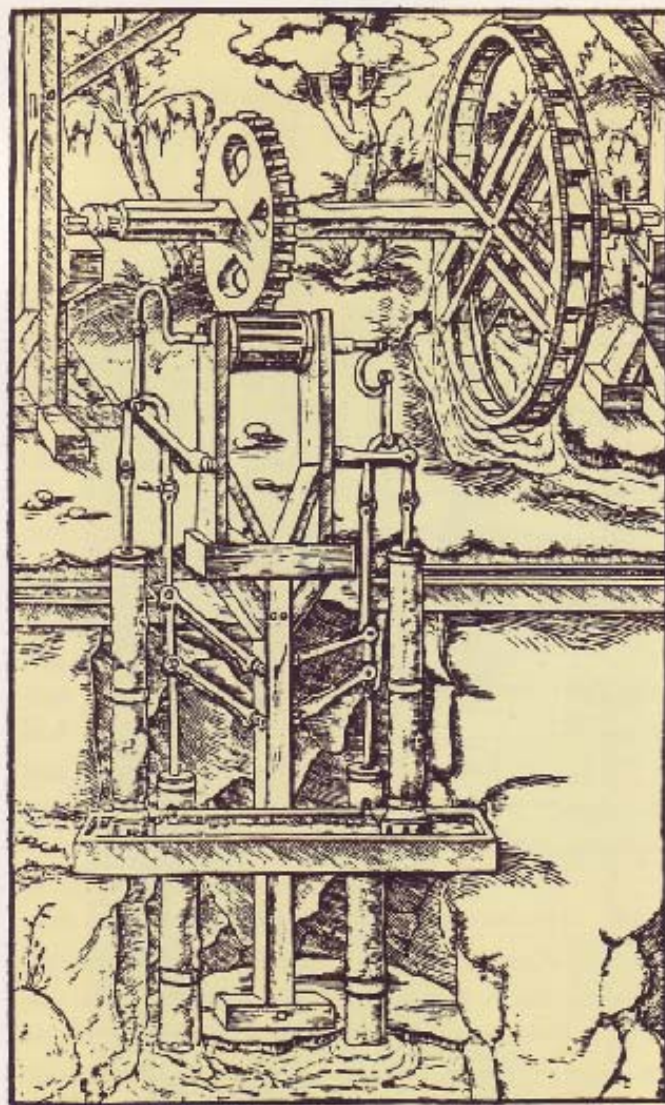




$$\left(\sigma_{\alpha\omega\omega\omega\omega\omega} + \sum_{j=1}^2 \sigma^j b^j c \right) \phi(x, t) = \rho \frac{\partial f}{\partial t} (x, t)$$

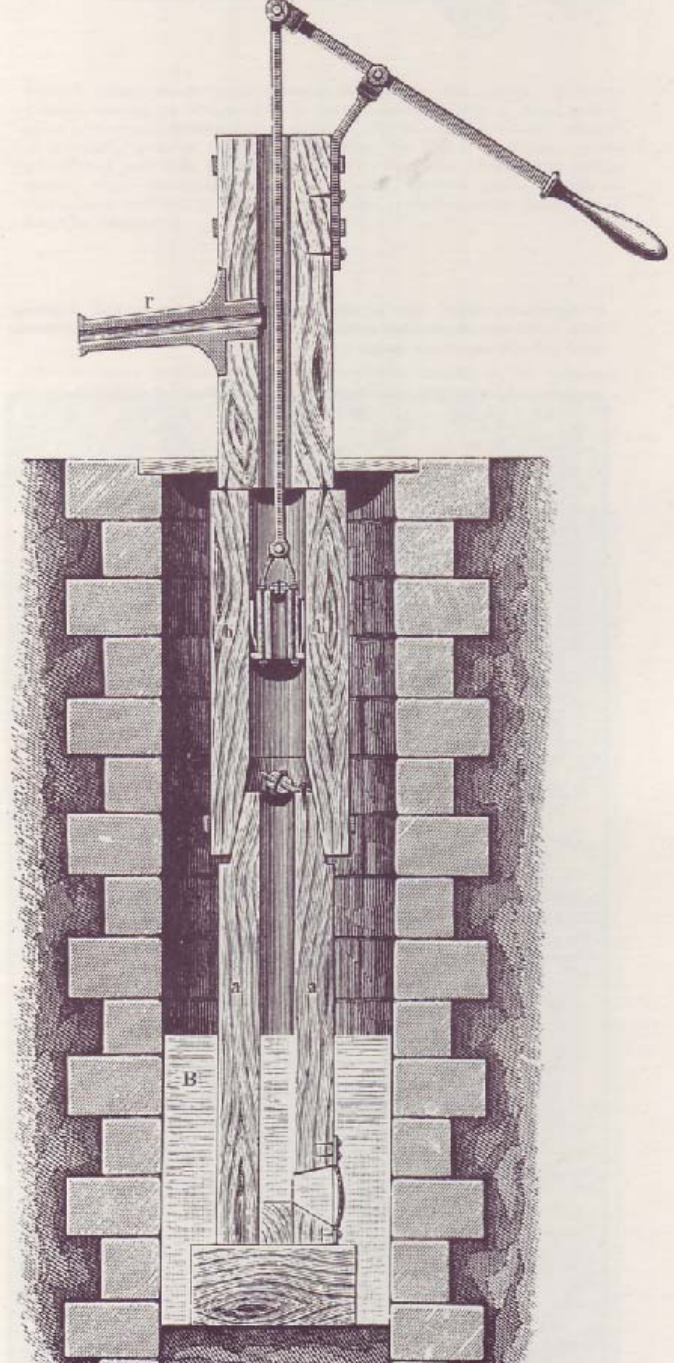
NOVI VIJEK 17. i 18. st.



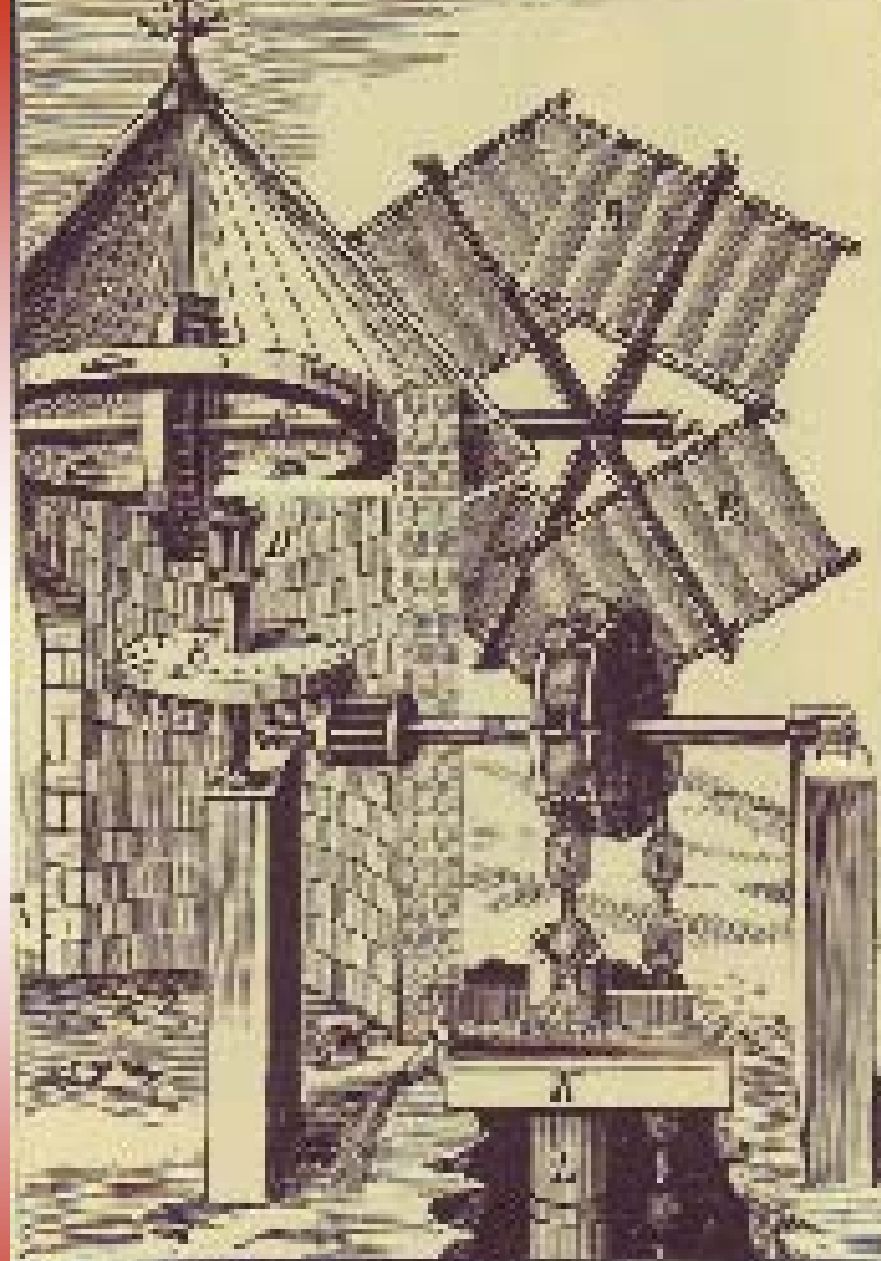


Drvorez iz Agricoline knjige *De re metallica* 1556.g.
Kotač na vodu pokreće mehanizam za crpljenje vode iz rudnika

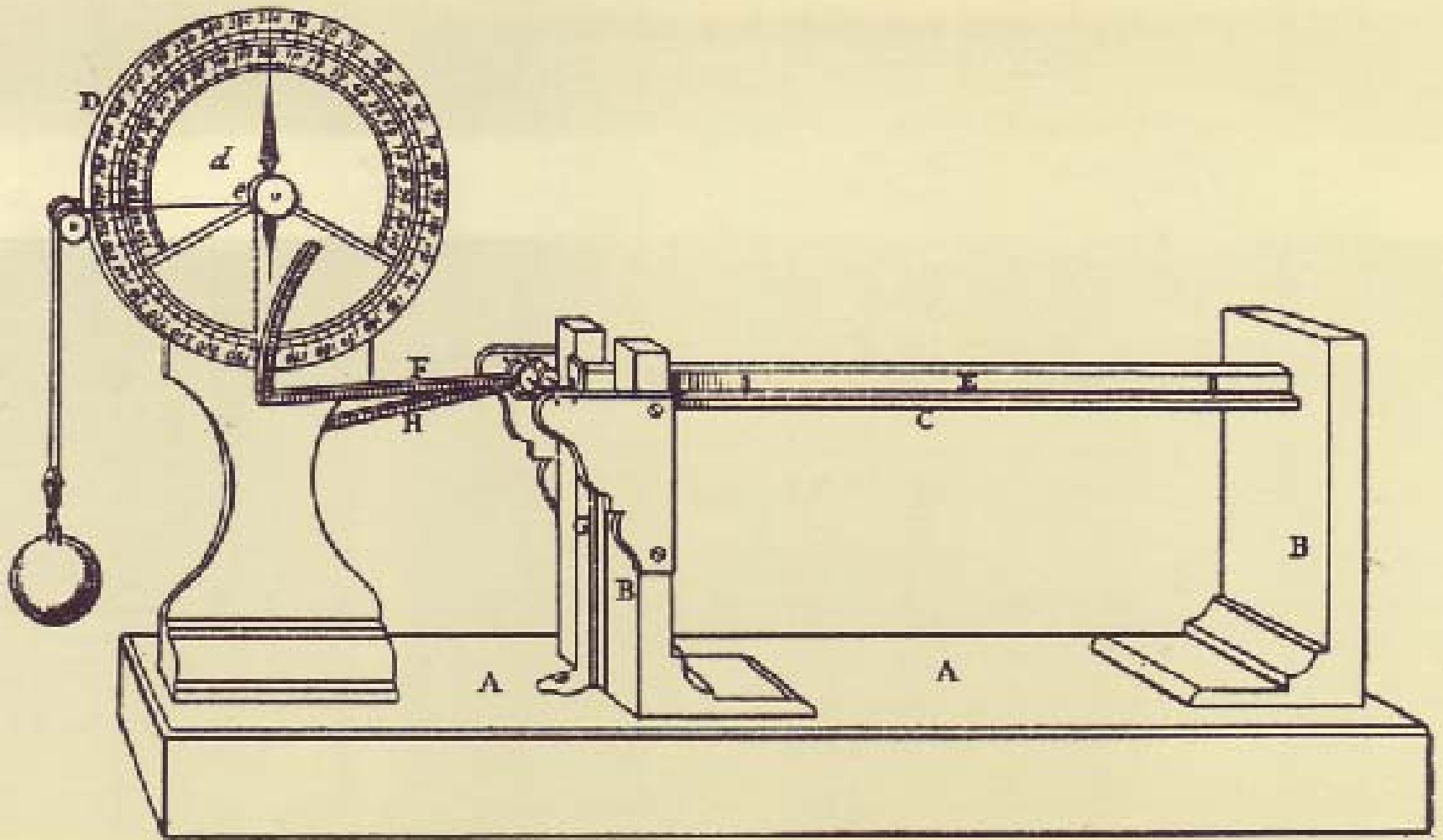
Princip rada sisaljke
na ručni pogon 16.st.



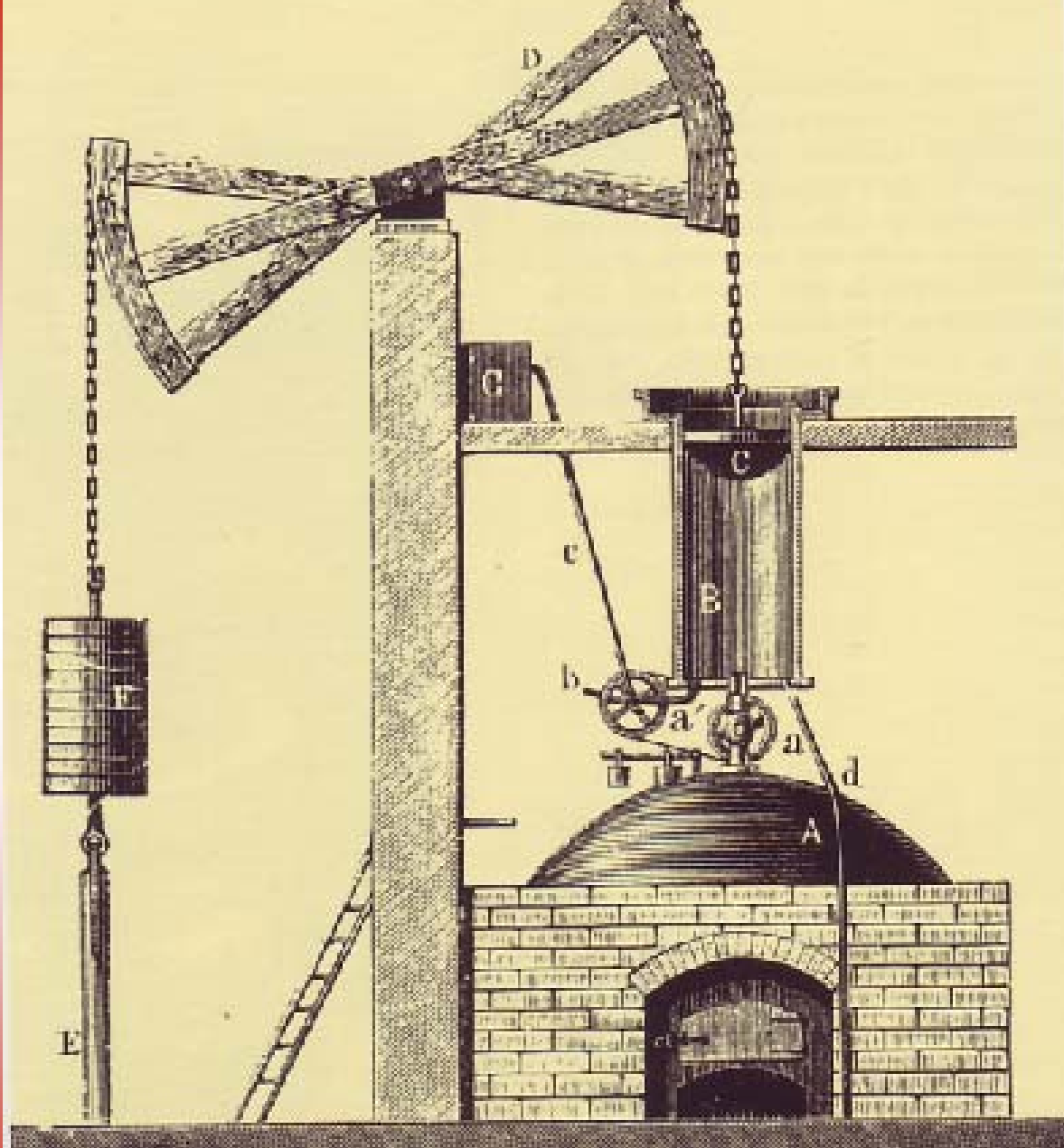
Vjetrenjača iz 17.st
Nizozemska



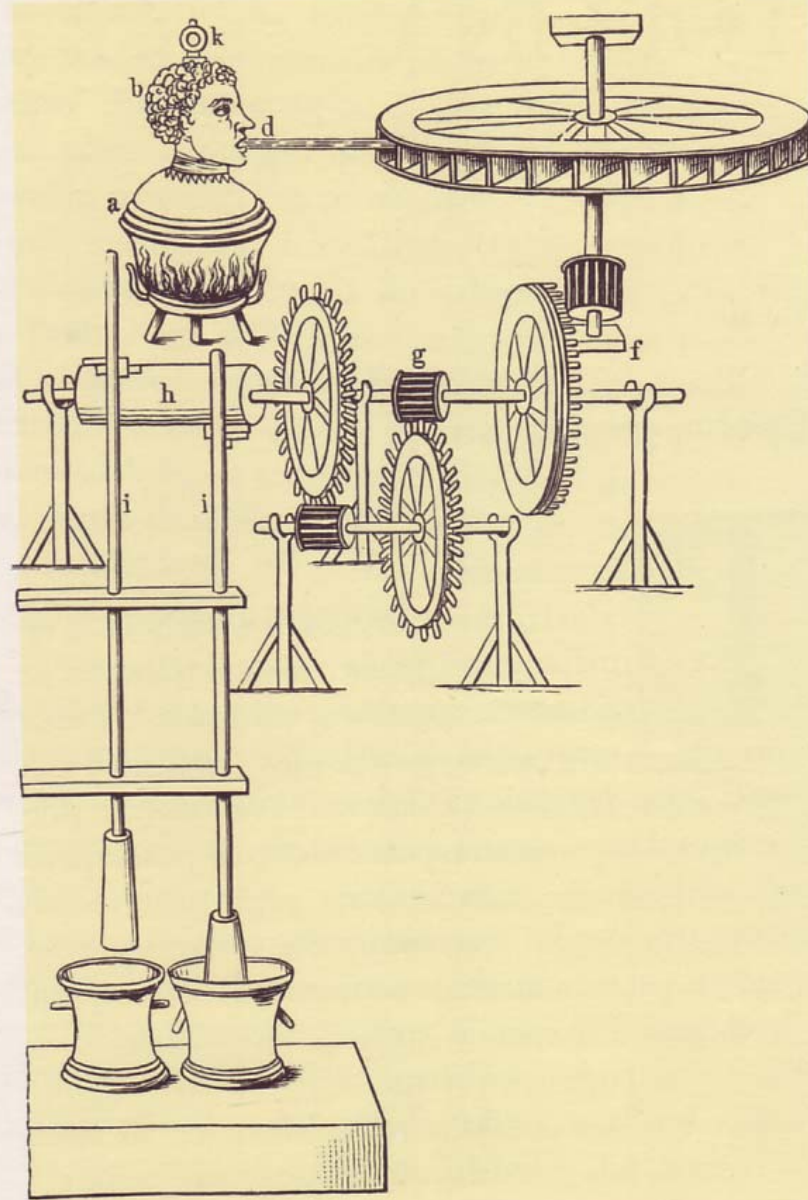
U pokretanje vjetrenjače potrebno je vrijeme da se podigne i uspostavi položaj. Kada se vjetrenjača pokrene, ona može raditi nekoliko dana.



Ellicottov aparat za mjerenje toplinskog rastezanja, 1736

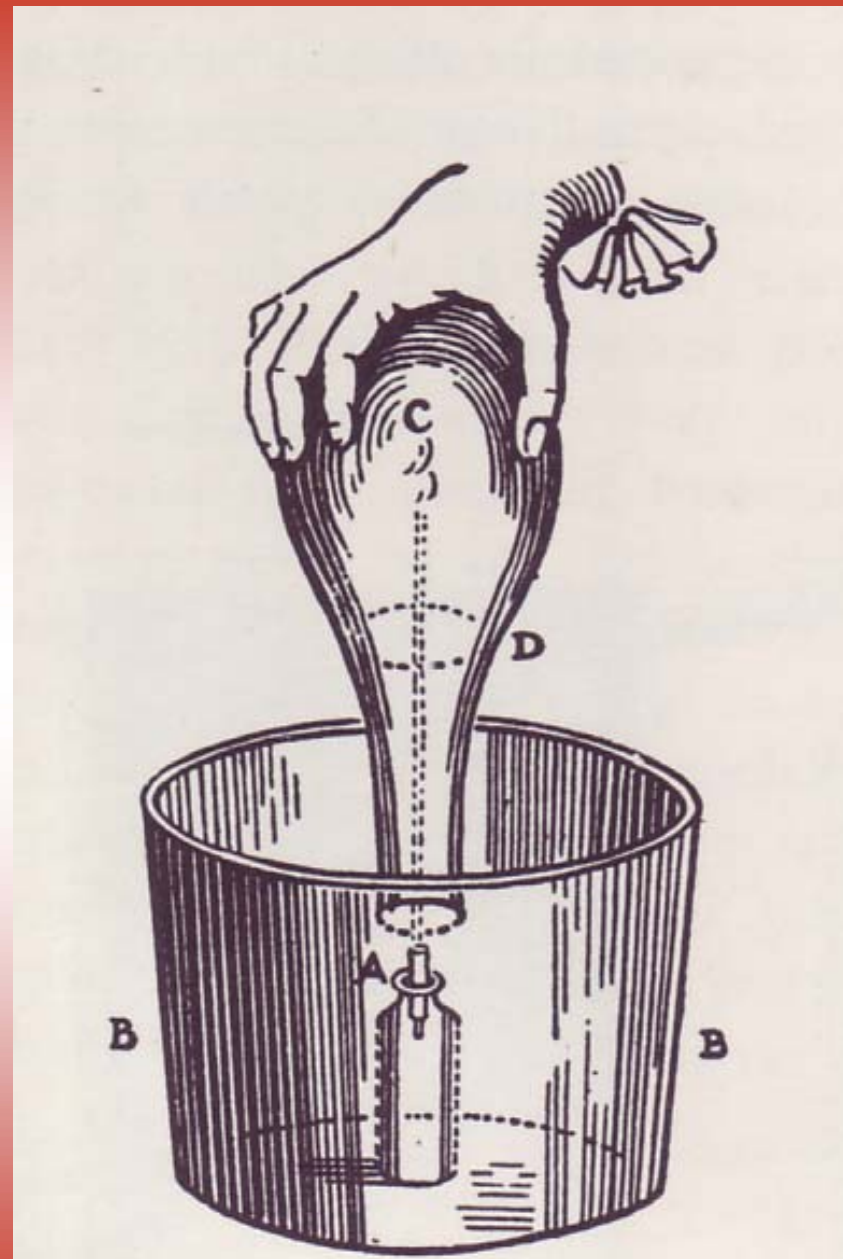


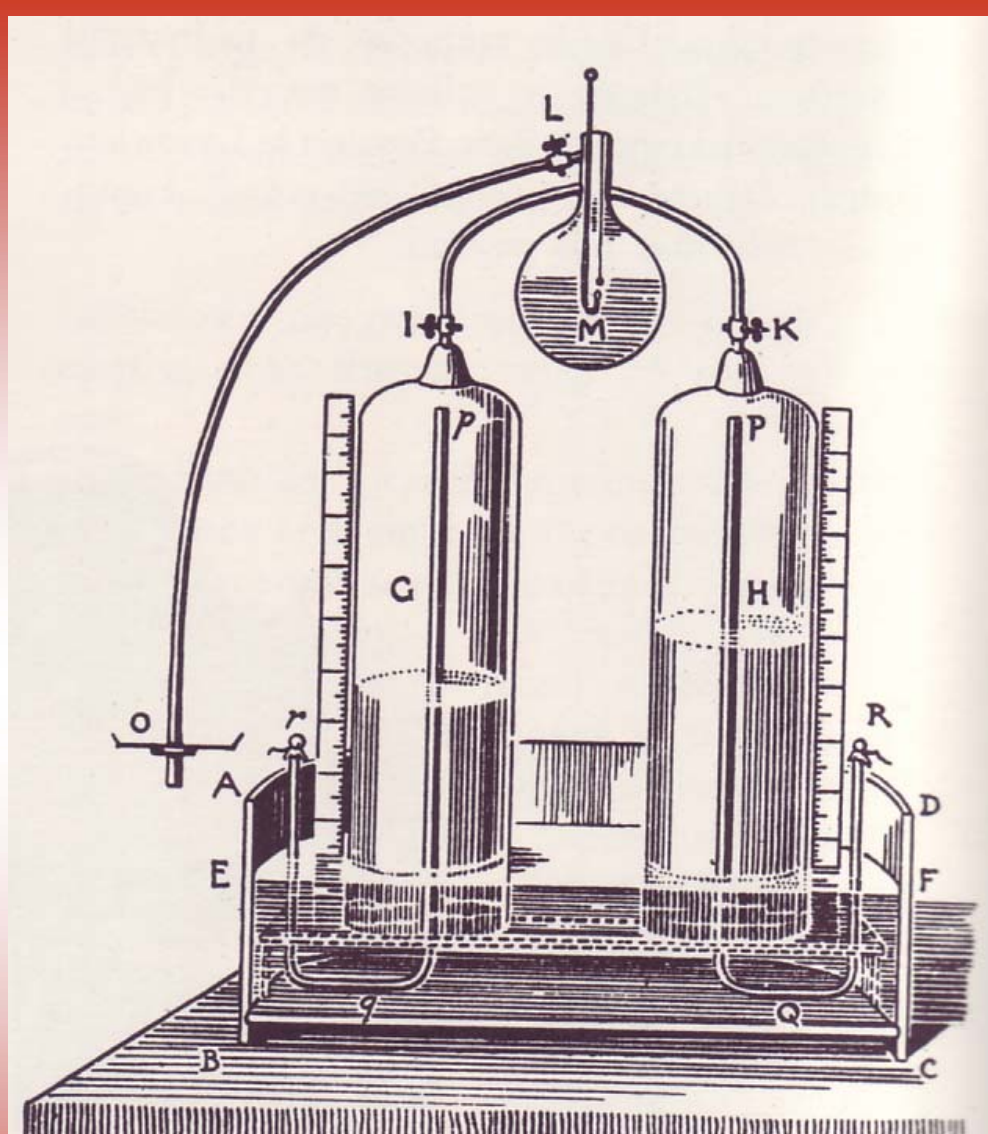
Newcomenov parni stroj, 17-18.st.



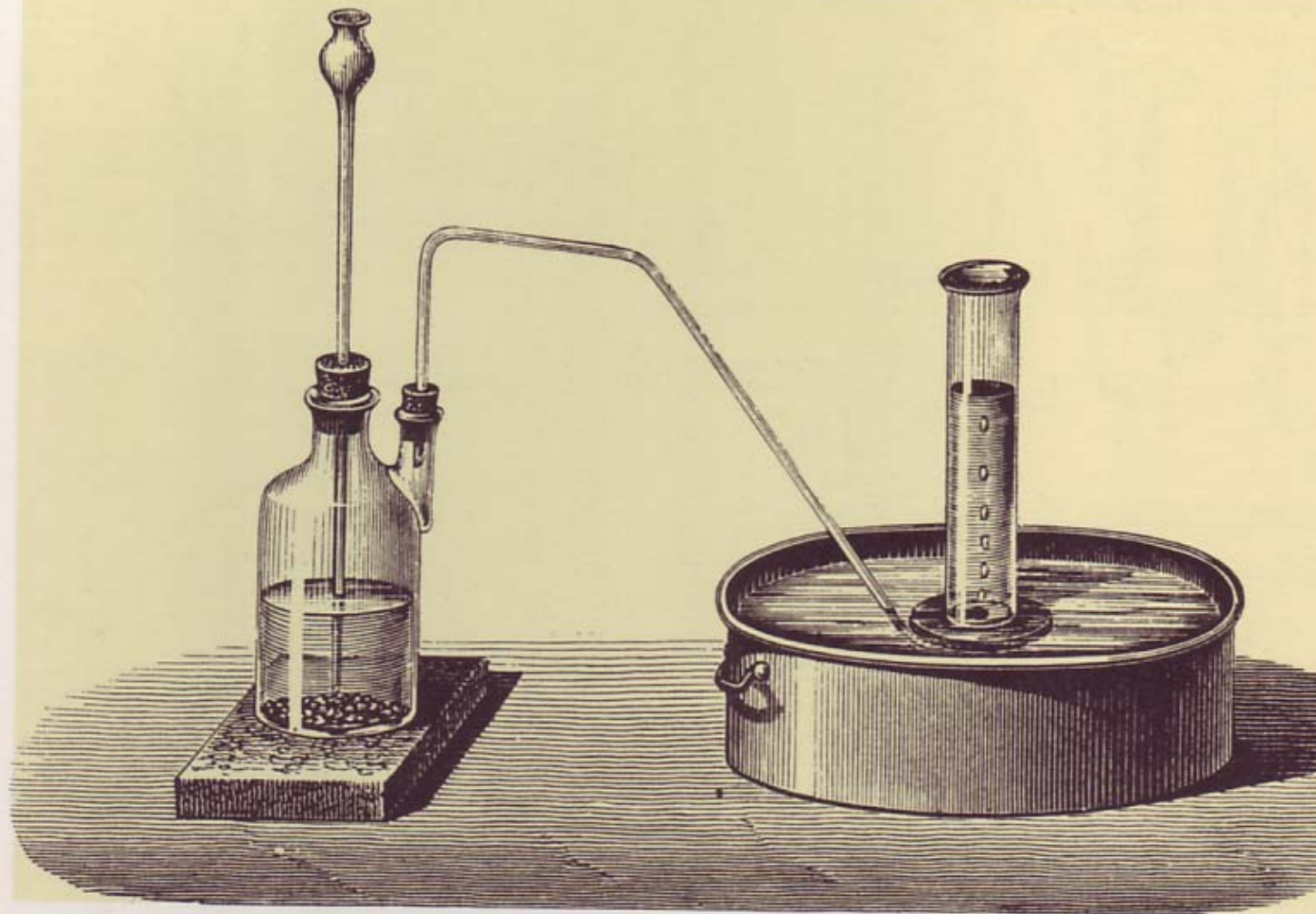
Pretvaranje toplinske energije u mehanički rad
Giovanni Branca konstruirao je mlin na paru 1629

Schelleova naprava za
gorenje vodika u zraku
1777.

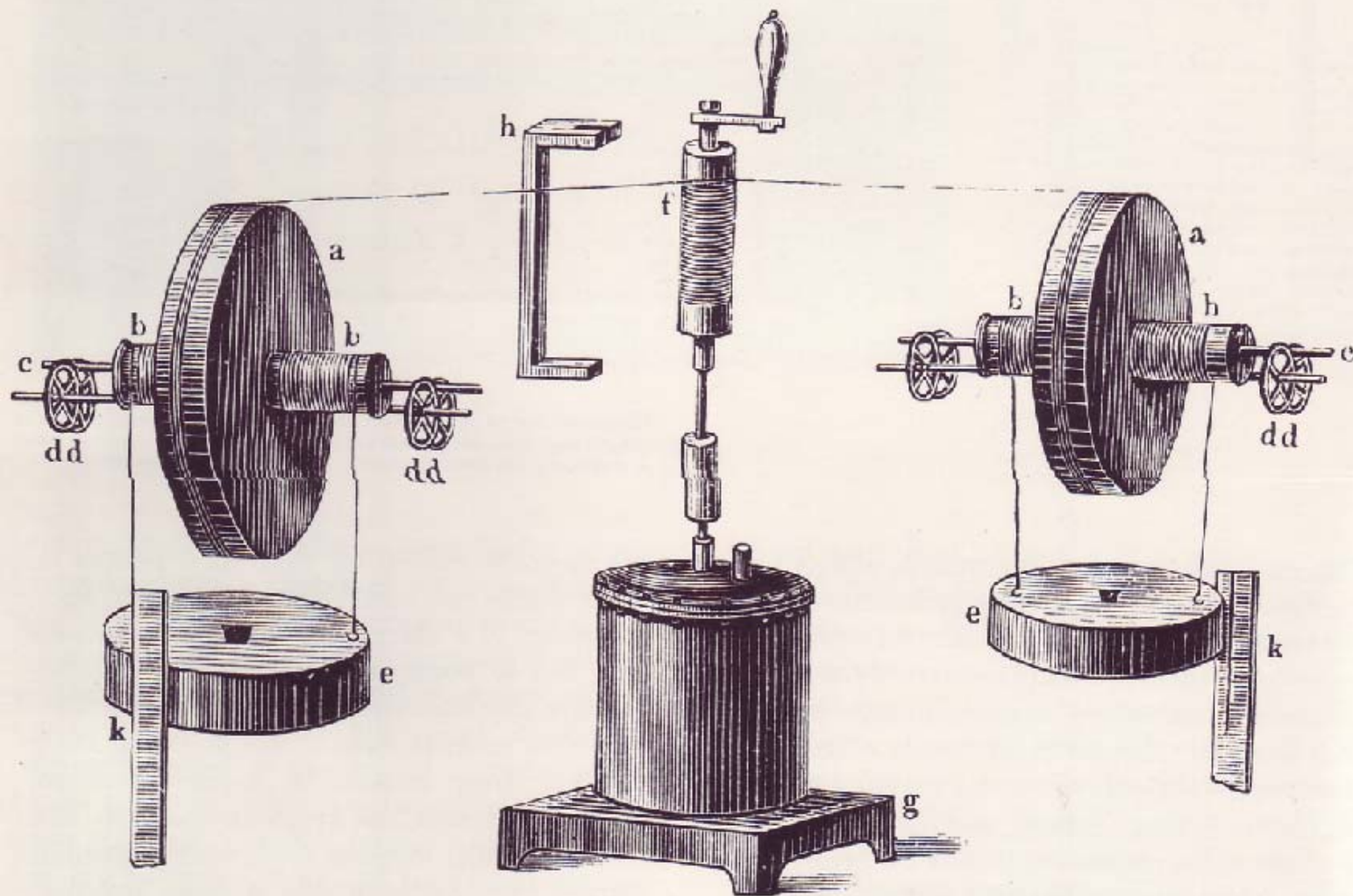




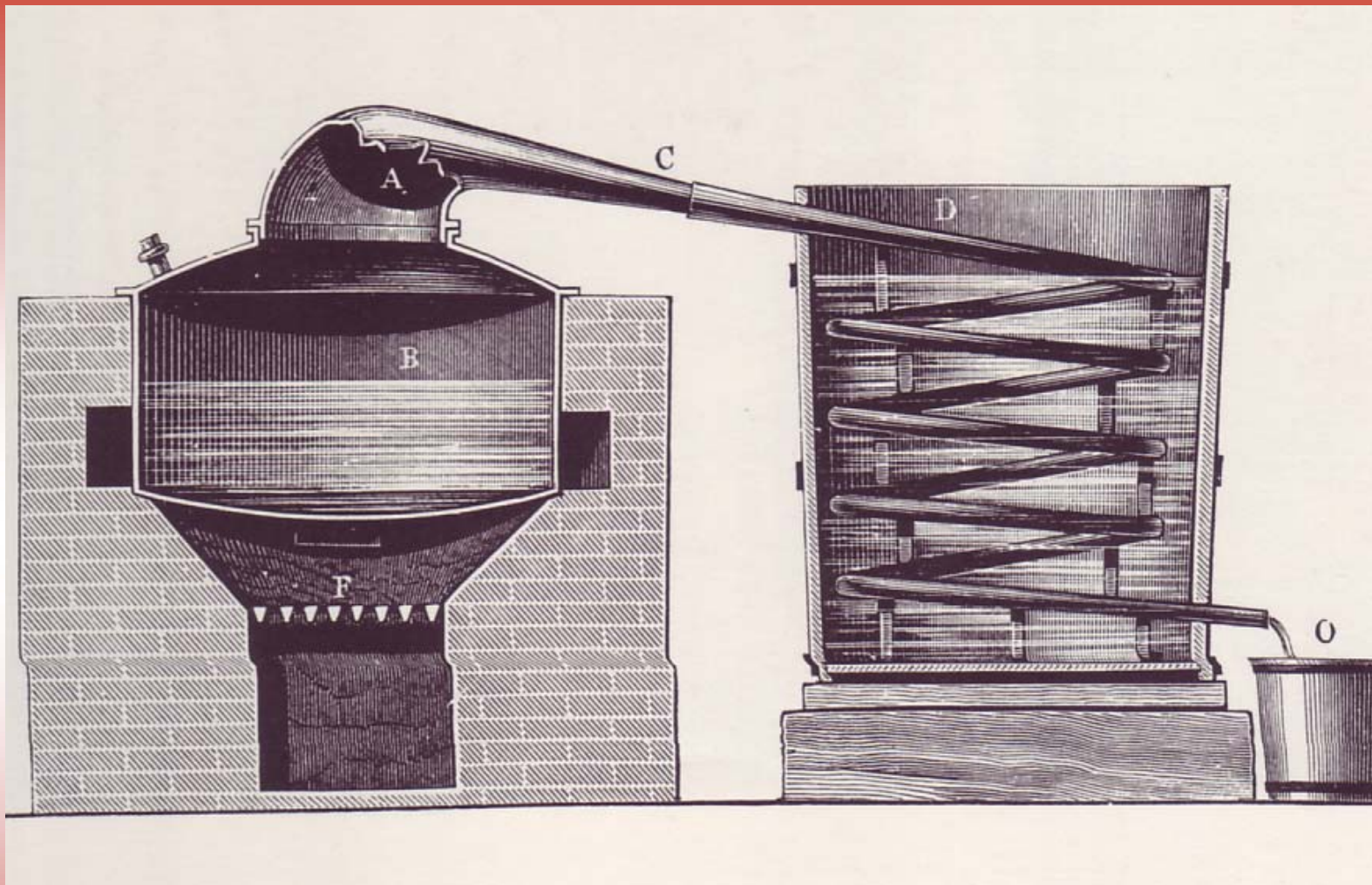
Mongeova naprava za sintezu vode 1783. Izmjerene količine vodika i kisika dovode se u evakuiranu staklenu kuglu. U kugli eksplozivno reagiraju, a proizvedena količina vode zatim se izmjeri.



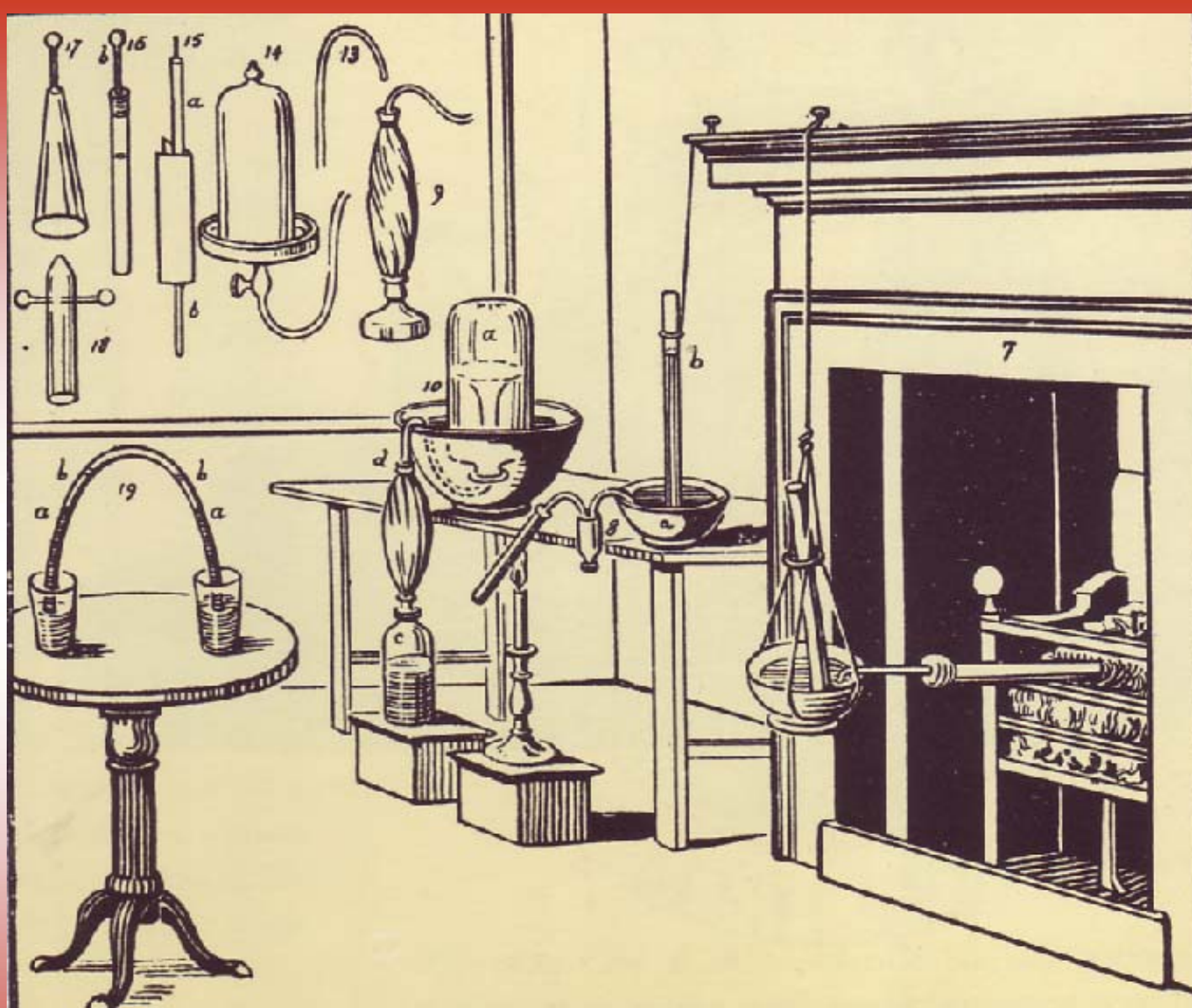
Lavoisier je dokazao da je voda spoj vodika i kisika.
Njegov aparat za proizvodnju vodika



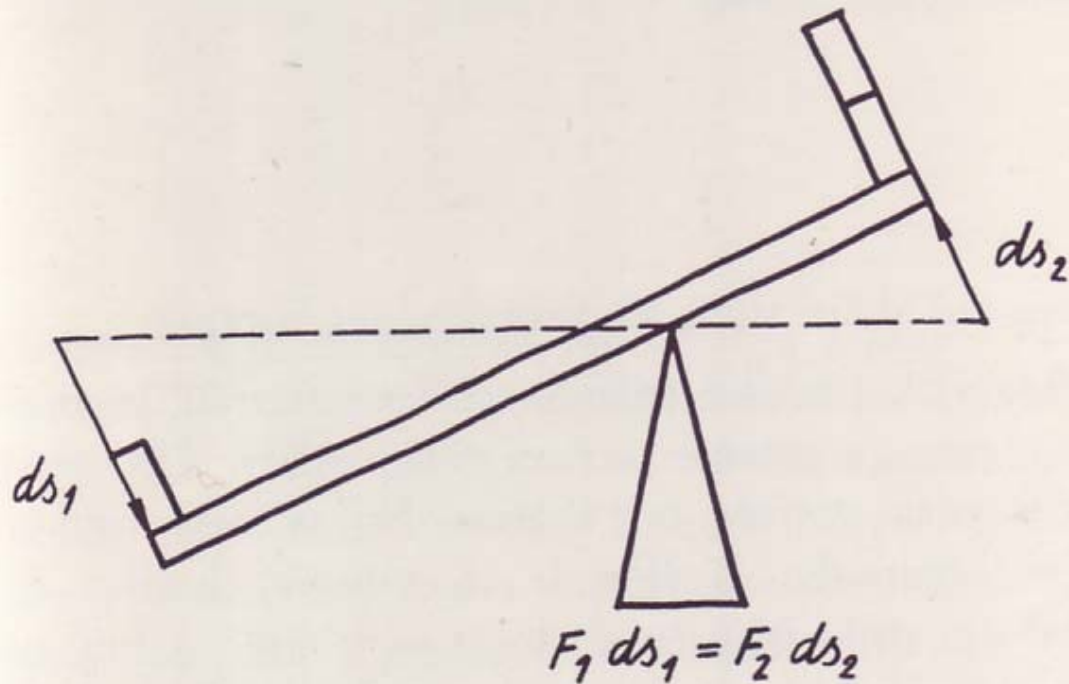
Uređaj kojim je J.Joule 1843. ispitivao uzajamno pretvaranje topline u rad.Uteg pada, okreće mješalicu uronjenu u živu koja se trenjem ugrije.



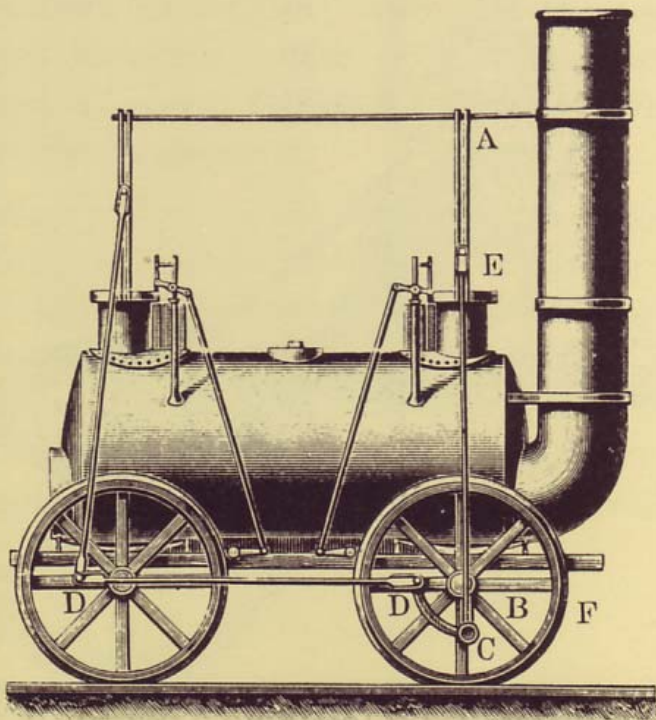
Aparat za destilaciju



Priestleyjev kemijski laboratorij, 18.st.
Otkrio kisik i dokazao da u niemu tijela gore

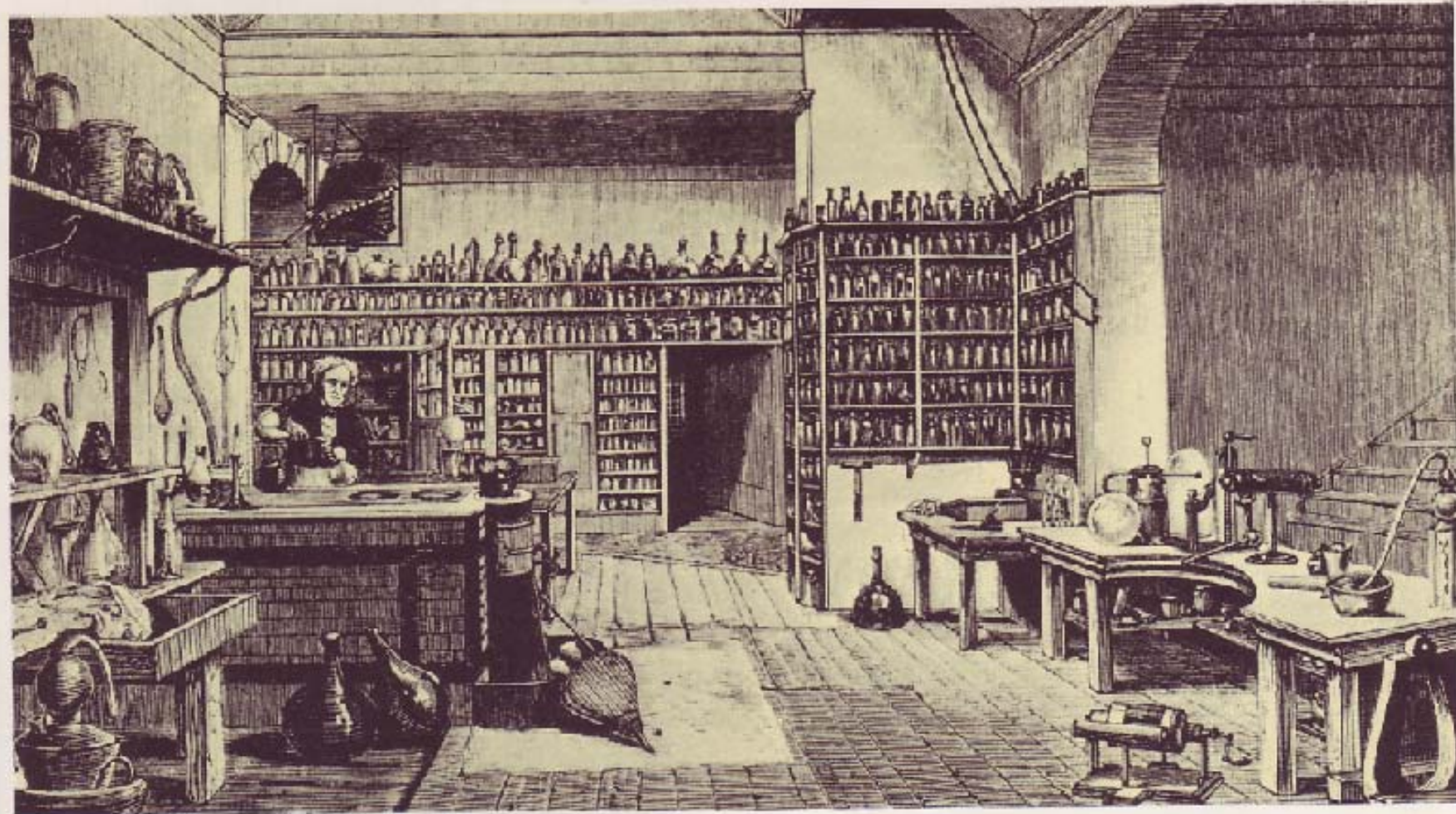


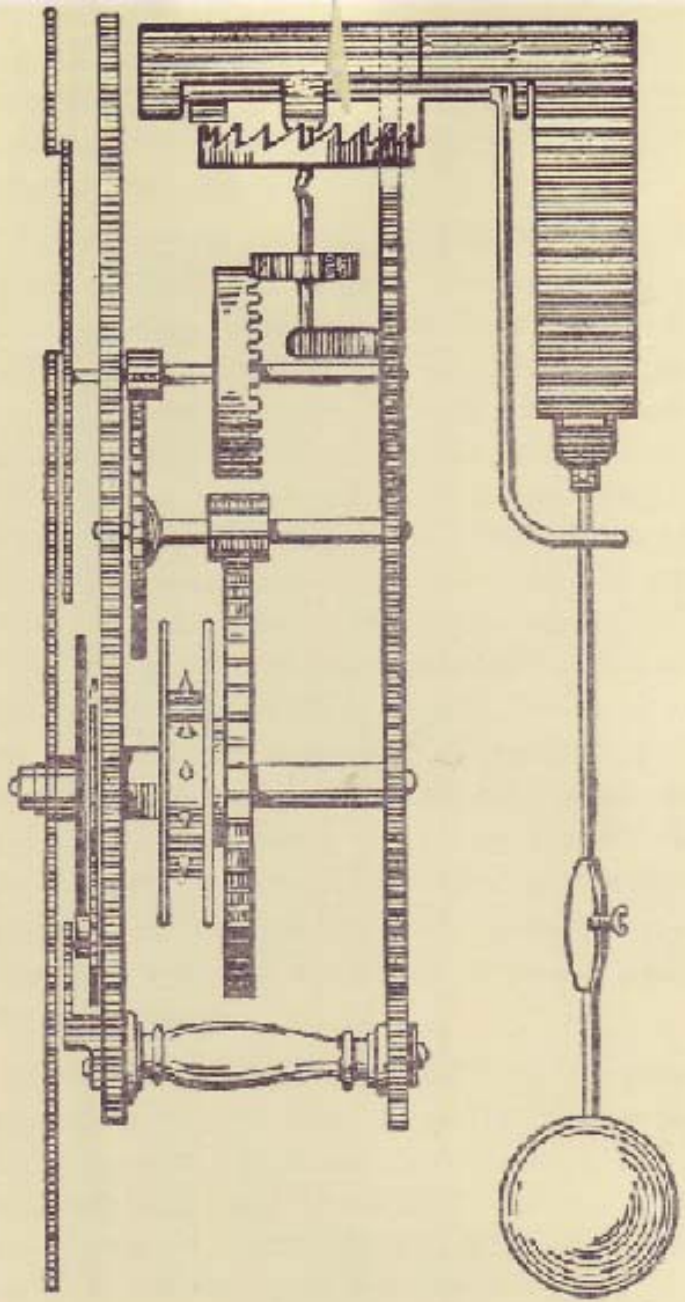
Primjećuje se da na poluzi lakši teret može dignuti teži, ali se zato lakši teret spusti dublje nego što se teži dignu u vis, tako da je umnožak tereta i puta na objema stranama jednak ili matematički izraženo $l_1 ds_1 = l_2 ds_2$. Načelu virtualnih pomaka približio se već Jordanus u 13. st., a općenito će to formulirati Johann Bernoulli 1717. Umnožak sile i infinitesimalnog puta shvaćen je kao rad. Dakle, sistem je u ravnoteži ako se pri zamišljenim, mogućim pomacima, ne dobiva ni ne gubi rad. Važna je pri tome samo projekcija sile na virtualni put, kao što je pronašao Stevin pri sličnom problemu ravnoteže na kosini.

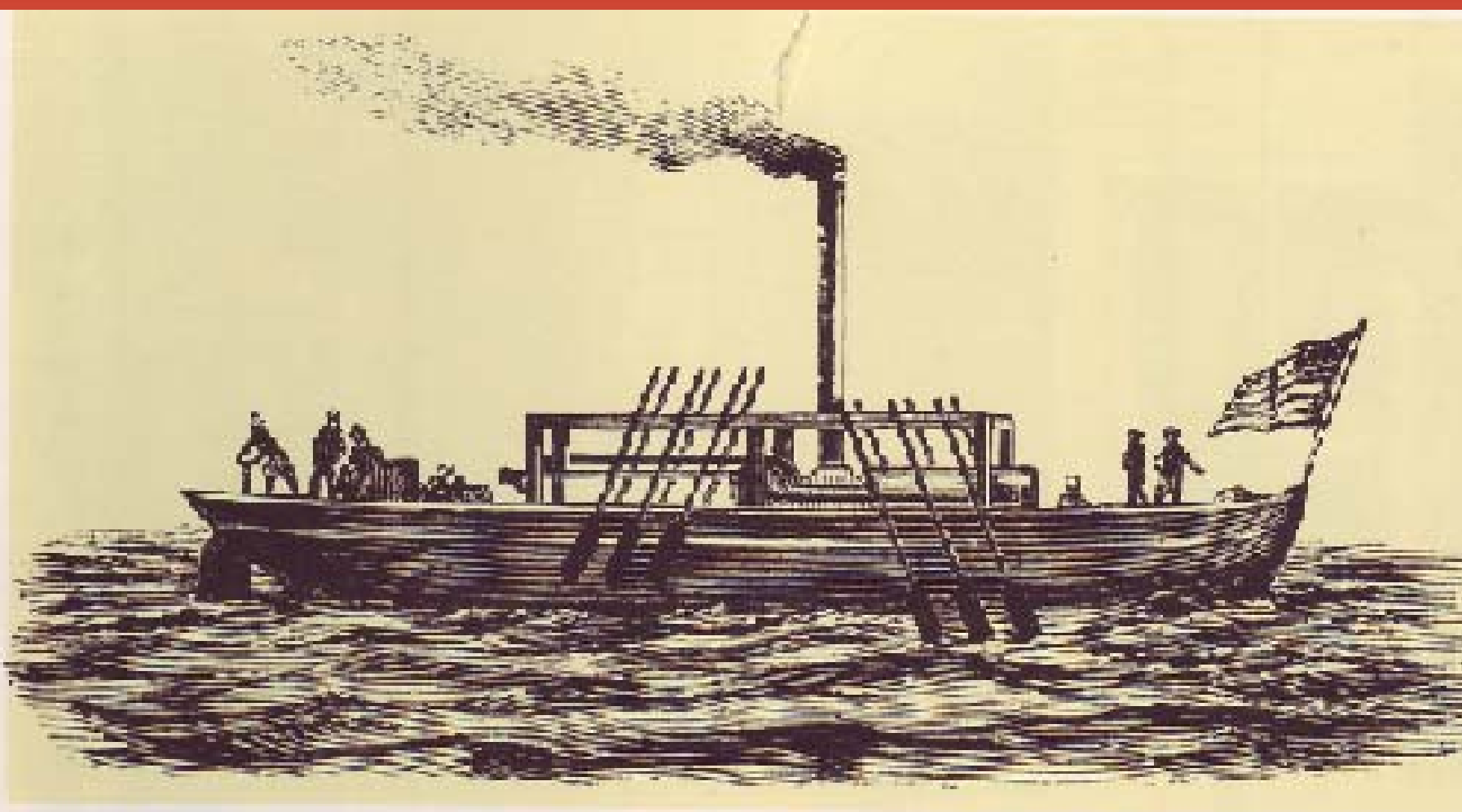


Veliki dan u povijesti modernog društva bio je kada je Fulton 1807. u Americi pustio parobrod u more. Uskoro zatim konstruirao je George Stephenson upotrebljivu lokomotivu na parni pogon. Na slici Stephensonova lokomotiva iz 1825.

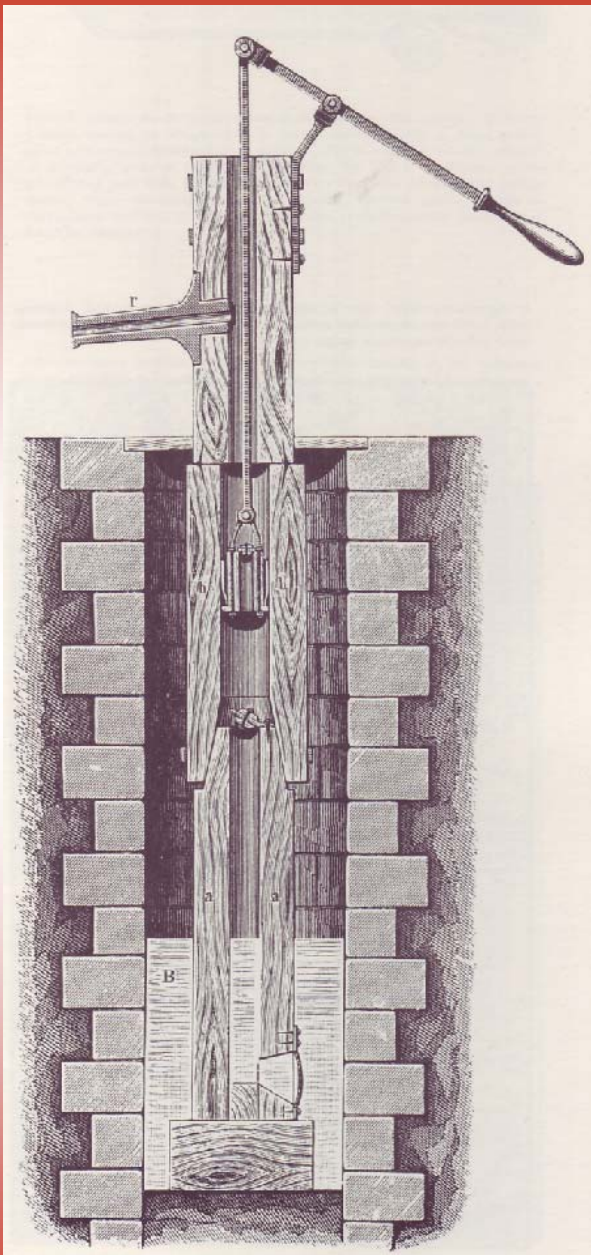
Gravura Faradayeva laboratorija.

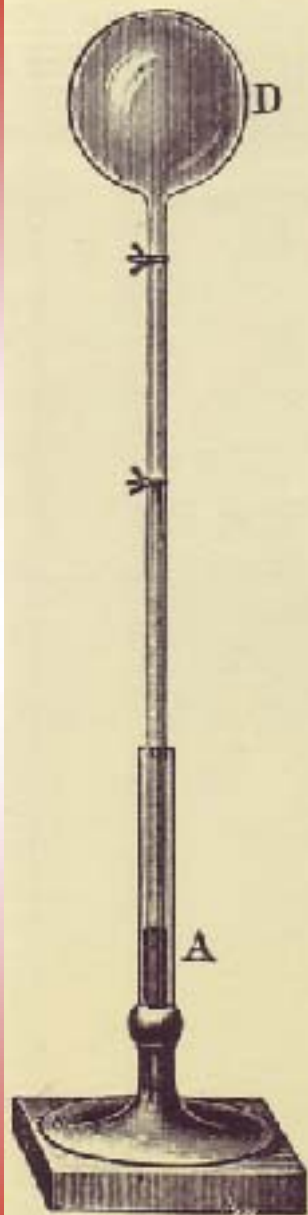


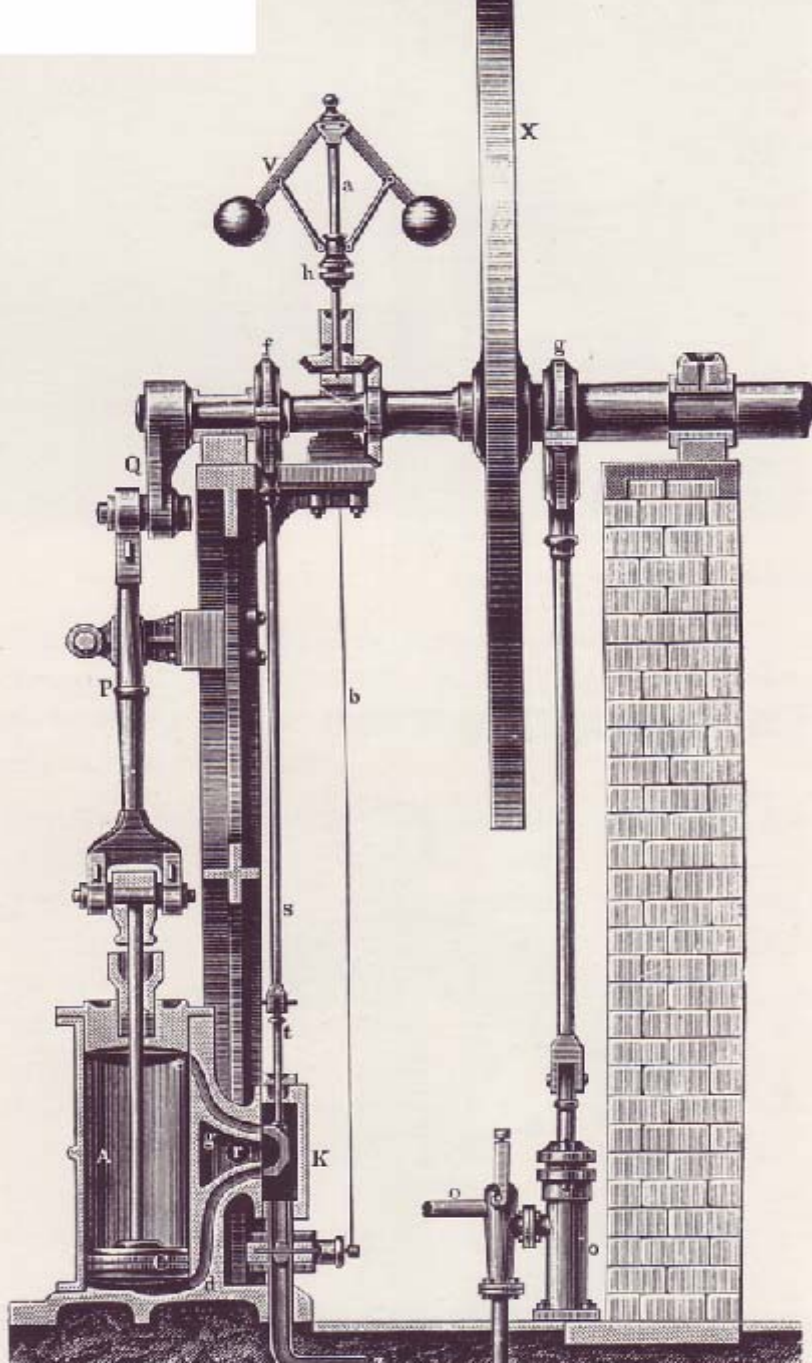


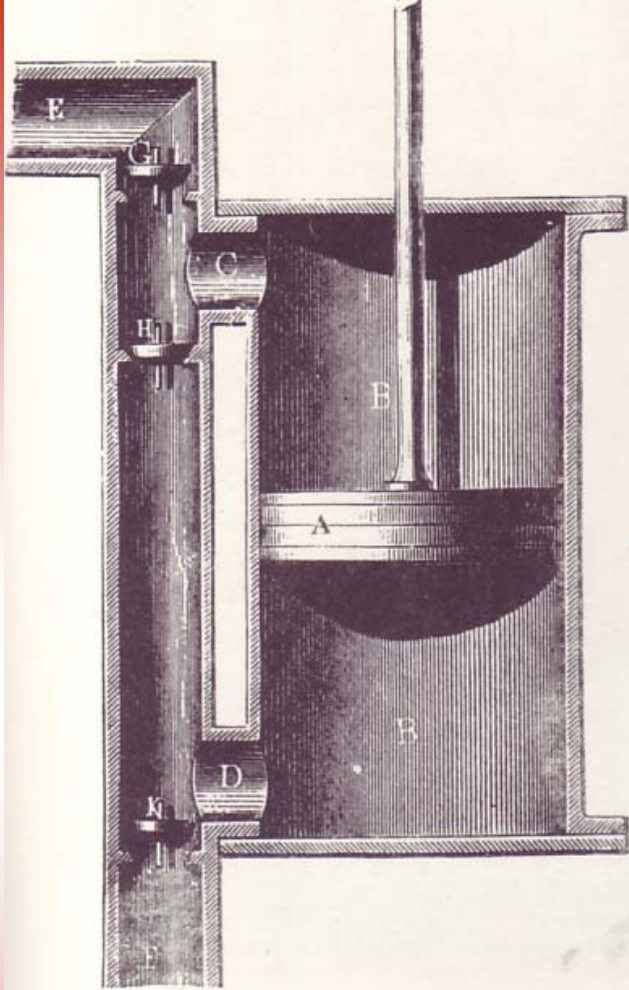


Para a nau que percorre o grande oceano não há um sistema mais seguro e rápido do que o da vaporização. No dia 10 de janeiro de 1860, no porto de Lisboa, foi lançada a nau "Albatroz", construída pelo engenheiro Daniel Bernoulli, com o objetivo de estabelecer uma linha regular de navegação entre Lisboa e o Brasil. A nau tinha um comprimento de 100 metros e uma velocidade média de 10 nós por hora. Foi a primeira nau a utilizar o sistema de vaporização para propulsão.





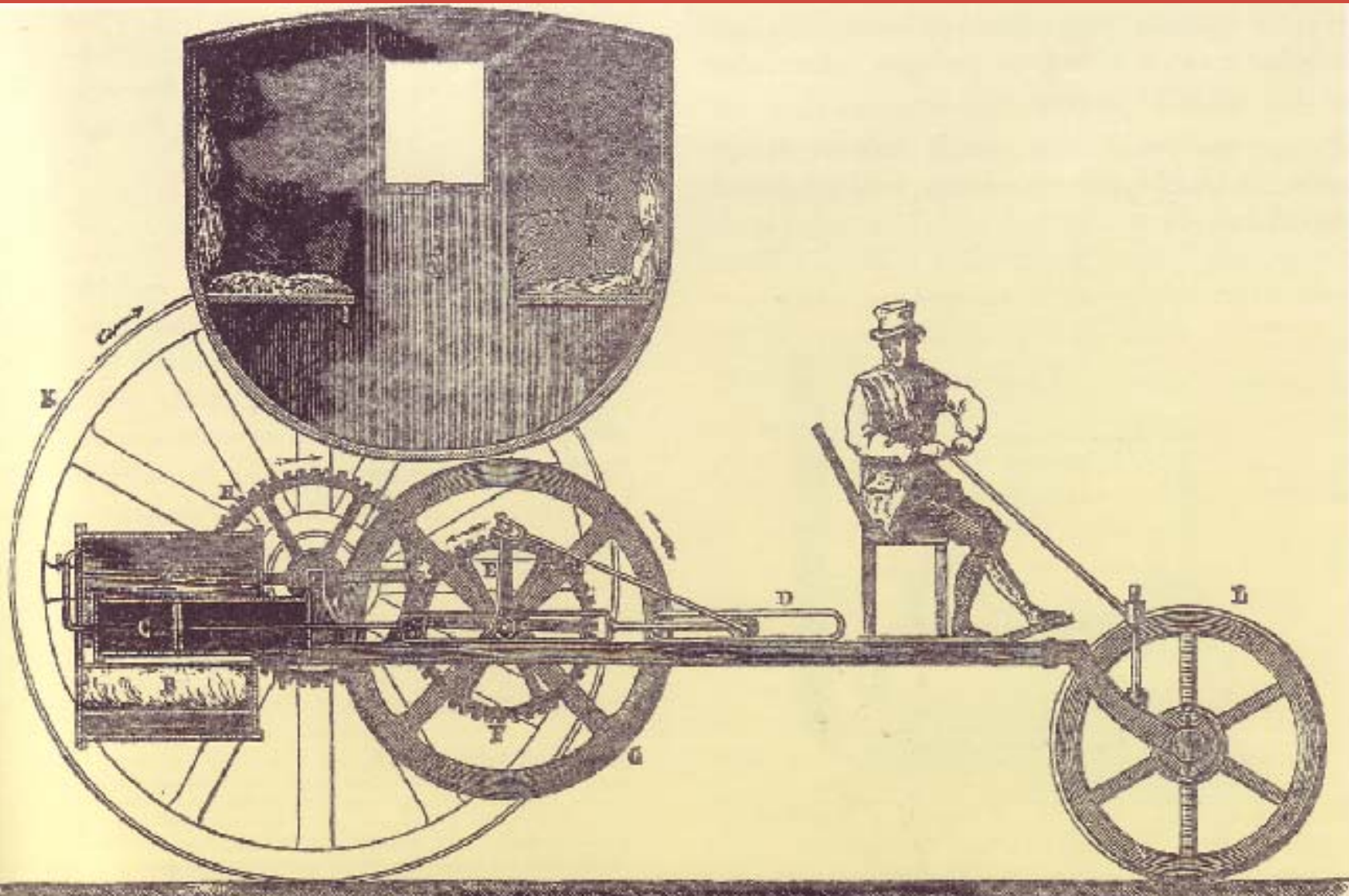


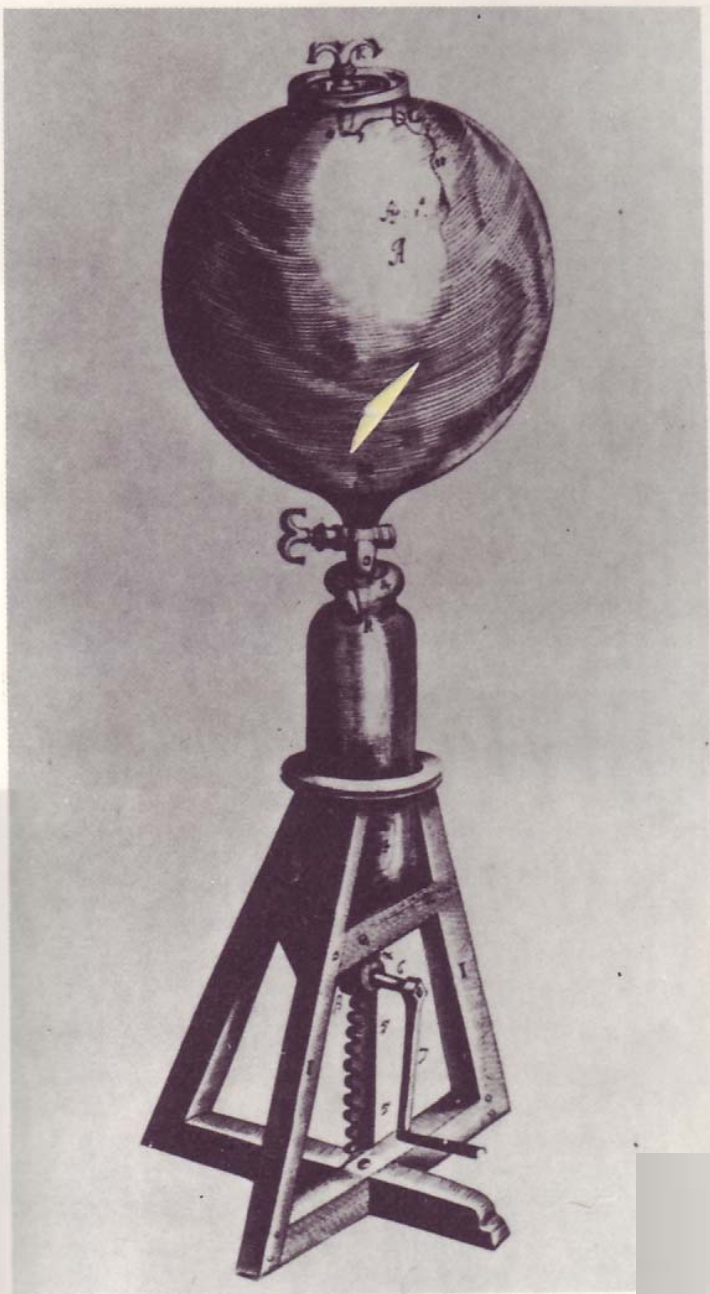


Veoma zagrijana para odvodi se u cijevi do pomičnog čepa. Šireći se velikim pritiskom para pokrene čep, i preko njega polugu koja se pomakne naprijed. Genijalna je bila Wattova misao da pomoću prikladnog uređaja privede paru čas s jedne, čas s druge strane čepa u cijevi i da tako izazove periodično pomicanje čepa naprijed-natrag. Kako para struji, tako se periodički pomiče čep i poluga koja okreće osovinu teškog kotača zamašnjaka. Jednoliko okretanje zamašnjaka prenosi se preko remena na osovinu stroja



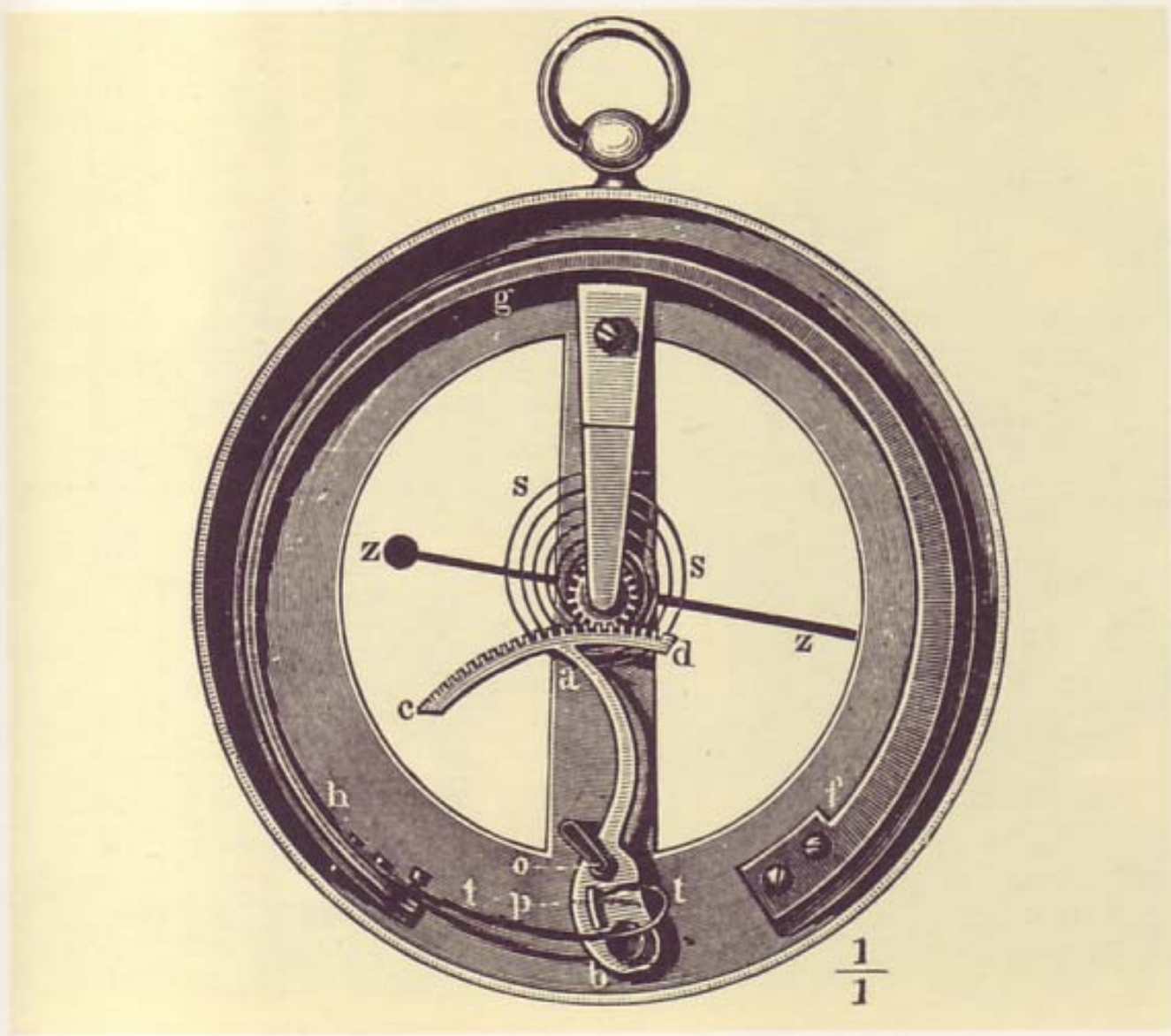
Cugnotova parna kola u Parizu 1770. Pogonska snaga na paru uvodila se postepeno. Strojeve nisu odmah preuređivali za novu pogonsku snagu. To su u početku bili stari strojevi, samo što je ljudsku ruku zamijenila snaga pare. Ručicu kakvog starog kovačkog mijeha ili mlina sada je pokretao parni stroj.





Boyleova prva zračna pumpa.

Jorgensenov metalni termometar, osnovan na toplinskom rastezanju dvaju različitih metala (bakra i čelika).



Bregnetov precizni termometar od plemenitih metala.

