Representing Techniques:
The Evolution of Technical Drawings in England (1750-1850)

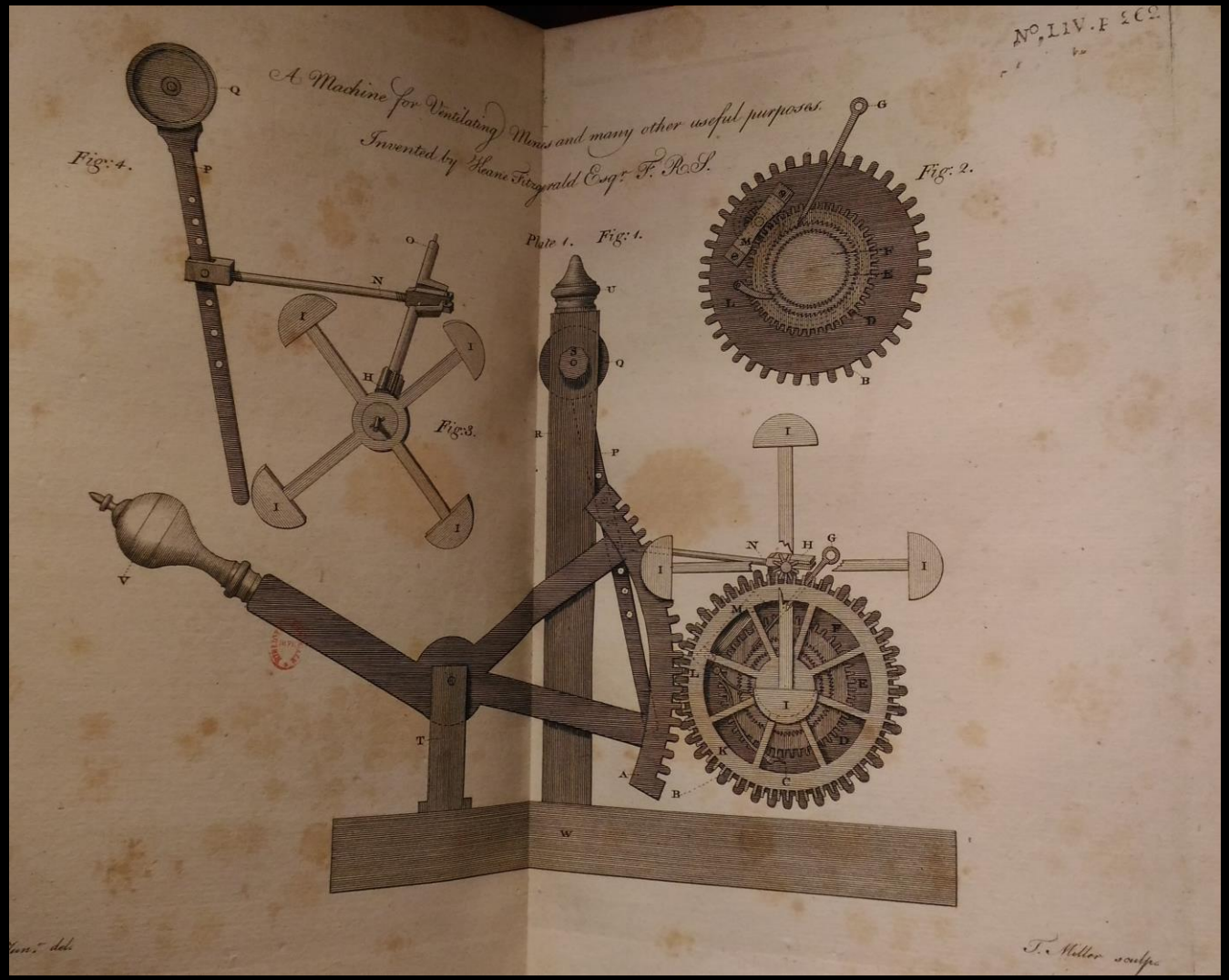
Yohann Guffroy
Yohann.guffroy@epfl.ch

Royal Society for Encouragement of Arts and Manufactures (RSA)

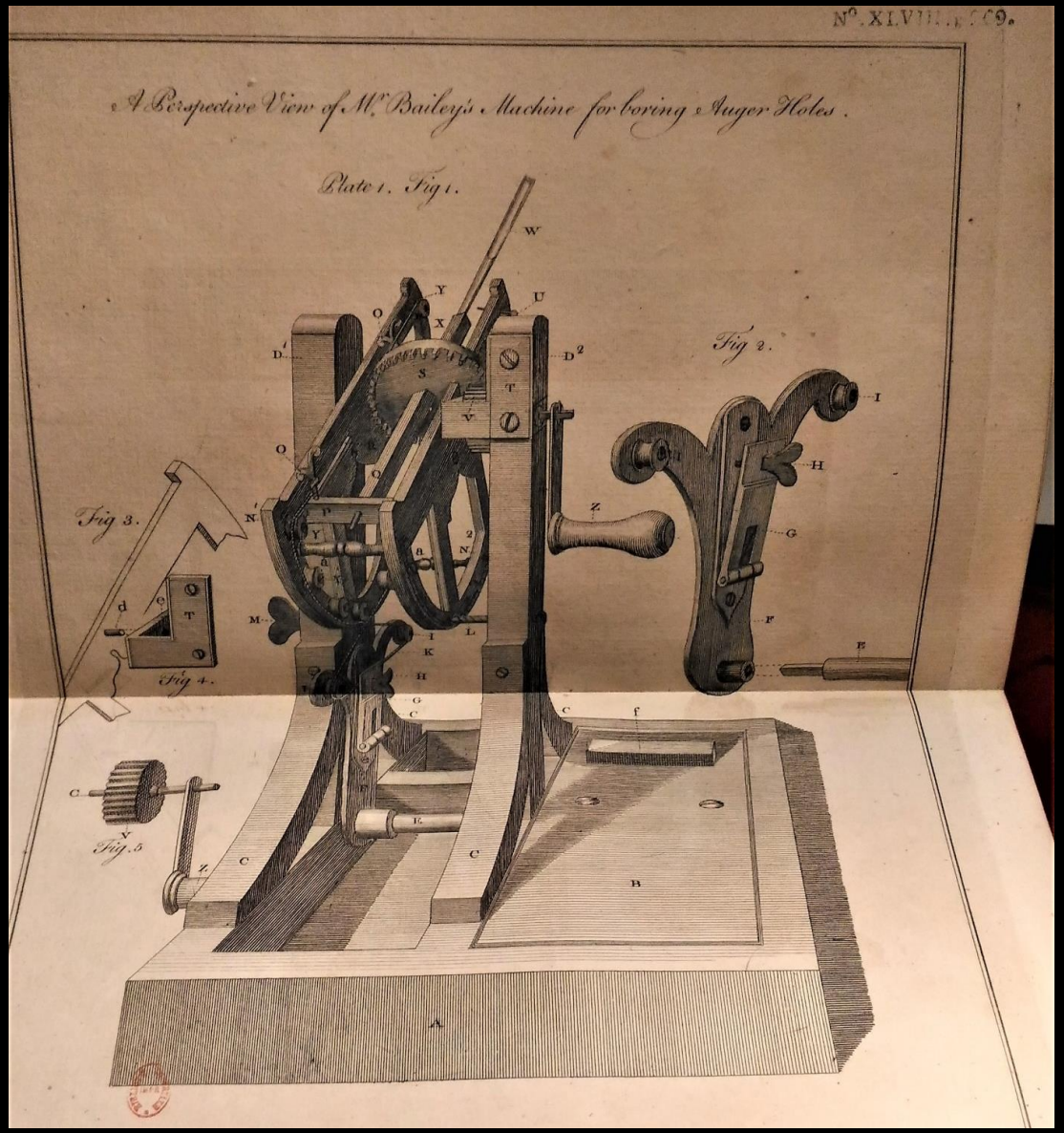
- 1754: Foundation
- 1759: Repository of machines
- 1772/1792: Bailey's Catalogues
- 1783-1851: Publication of the *Transactions*

William Shipley (1715-1803)

William Bailey, *The Advancement of Arts, Manufacutres, and Commerce or, Descriptions of the Useful Machines and Models contained in the Repository*, 1772

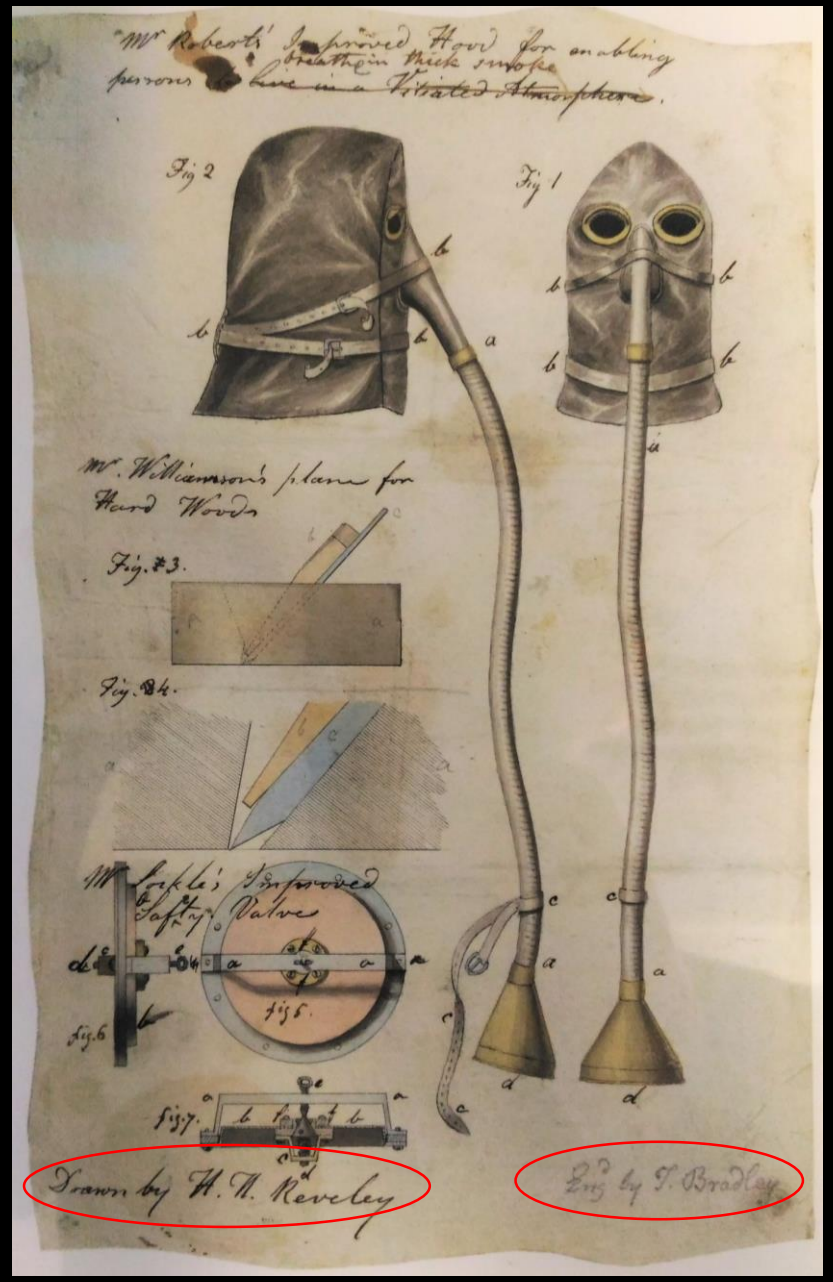


A machine for ventilating mines and many useful purposes – K. Fitzgerald

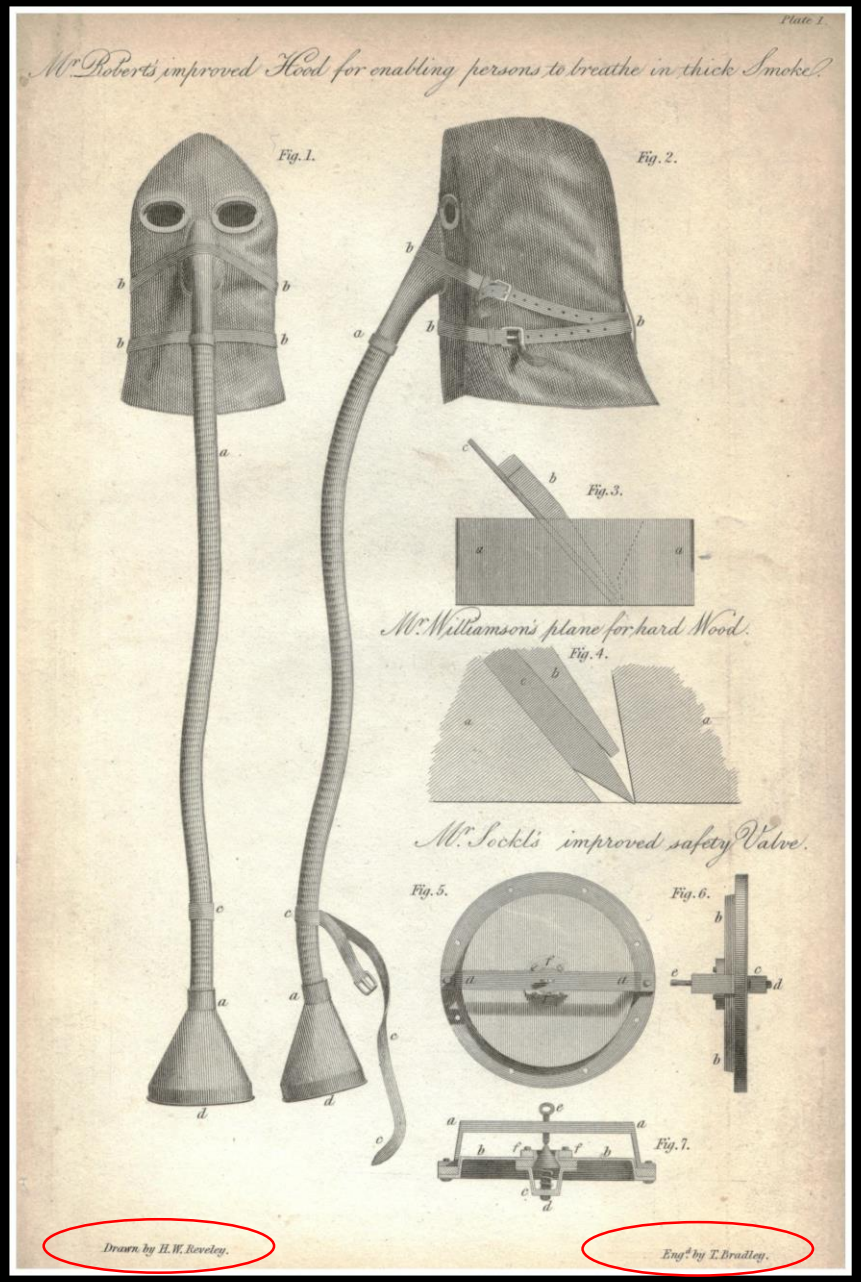


Machine for boring Auger Holes – Mr. Bailey

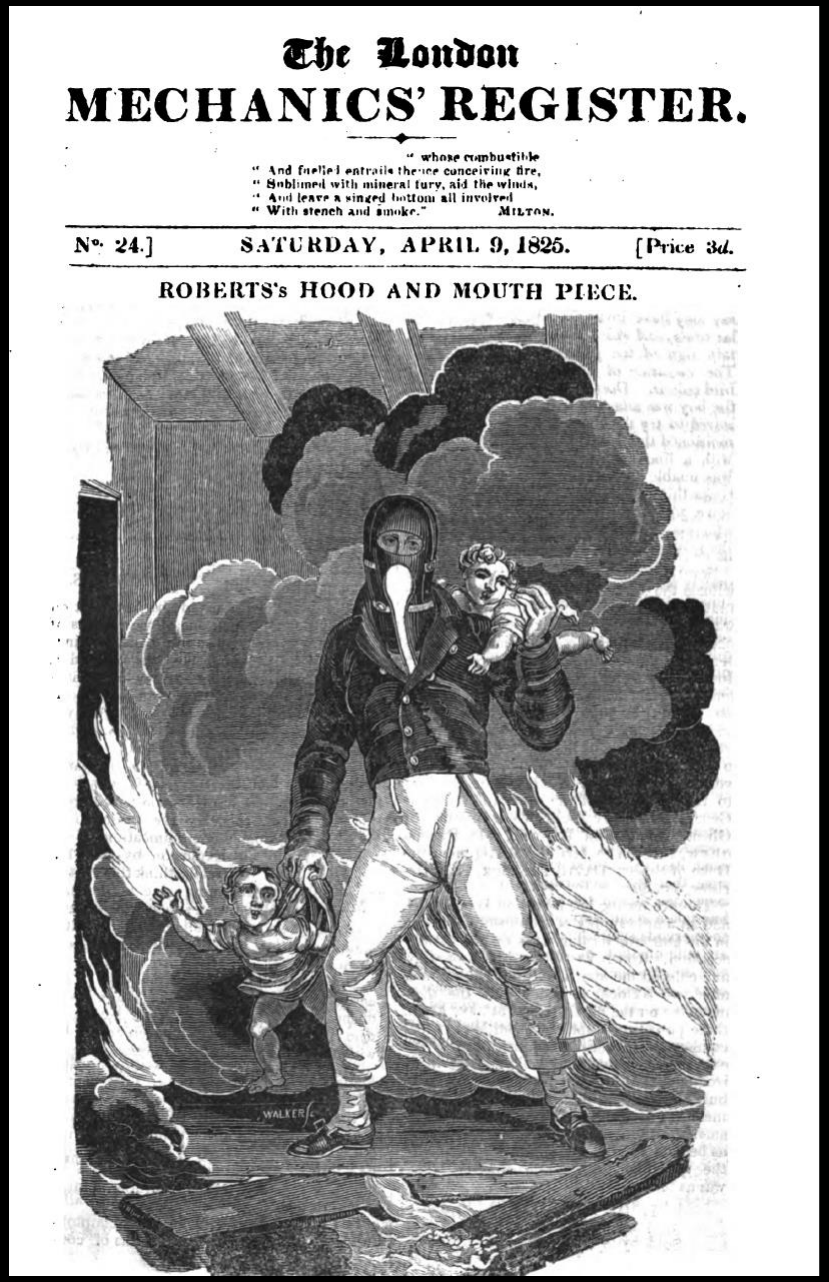
Mr. ROBERTS improved Hood for enabling persons to breath in thick smoke (1824)



Manuscript Transaction, vol. 105, 1824-1825 P1



Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce, Vol. 43 (1824), p. 312



The London Mechanics' Register, 09/04/1825, n°24

SECOND EXPERIMENT WITH ROBERTS'S NEW-INVENTED HOOD AND MOUTH PIECE, ON THE PREMISES OF THE LONDON MECHANICS' INSTITUTION.

We have this week the satisfaction of presenting to our readers a correct and spirited representation of the admirable invention of Mr. ROBERTS, illustrative of the beneficial results which may be confidently anticipated from its adoption, in those lamentable instances of conflagration which are of such frequent occurrence, particularly in populous and extensive cities. Hitherto, the absolute impossibility of breathing in the midst of dense volumes of smoke, has occasioned the destruction of much valuable property, and of many still more valuable lives, which might have been preserved by means of some simple contrivance to enable individuals to resist, even for a few minutes, the suffocating influence of the noxious vapours. This desirable object is completely accomplished by Roberts's valuable apparatus, and we are happy to add, that every trial of its utility confirms our favorable opinion of its merits.

Several gentlemen who were unable to witness the former experiment, having intimated a wish for its repetition, Saturday last was appointed for that purpose, upon which occasion a number of scientific individuals attended in the unfinished lecture room of the Institution, among whom we observed the learned President, with his son, WM. LLOYD BIRKBECK, Esq. (to whose kindness we are indebted for the drawing from which our Engraving is taken) and his brother WM. BIRKBECK, Esq. Mr. OGG, who recently delivered an able course of lectures on Geology to the Members of the Institution, Major General OGG, Professor VAN BREDA, of Ghent, Sir PETER LAURIE, Mr. PETTIGREW, surgeon to His Royal Highness the Duke of Sussex, DAVID POLLOCK, Esq. barrister, &c. &c.

The fire having been previously prepared, and an ample supply of combustibles placed in the temporary room used on the former occasion, ROBERTS put on his apparatus, and entered the apartment at eight minutes after two o'clock, at which time the thermometer on the outside stood at 54°. About three pounds of sulphur, in addition to other combustibles, were consumed during the experiment, the sulphur being placed in an iron pan, to prevent it from escaping combustion by falling to the floor of the apartment. The density of the cloud of noxious smoke, and the heat of the room increased as before, till the temperature indicated by the thermometers fixed in different places was as follows :—

At the ceiling	158
In the center	101
Near the floor	68

The heat of the apartment was not quite so intense as on the former occasion, but the vapour appeared to be more insufferably noisome. One of the workmen entered the room upon his hands and knees during the experiment, but on attempting to raise his head higher than about a foot from the ground, the suffocating sensation compelled him to quit the chamber with precipitation, after remaining there only two or three minutes. Roberts in the mean time traversed the room in an erect posture, supplied the fire with additional combustibles, and occasionally ascended the ladder, without feeling any inconvenience, except from the heat; and after having been enveloped in the Stygian atmosphere exactly thirty-nine minutes, and afforded to every spectator a satisfactory demonstration of the efficacy of his invention, he quitted the apartment at thirteen minutes before three o'clock, and disencumbered himself of his apparatus in one of the lower rooms of the Institution. Mr. Pettigrew here examined his pulse, which was at 160, but subsided to 114 in about twenty minutes, and soon afterwards resumed its ordinary motion.

Roberts had been supplied with several bottles filled with mercury, in order that he might empty them in the room at stated periods, and preserve their gaseous contents for subsequent chemical examination. Three of these bottles were accordingly examined by Mr. Pepys, and it is a remarkable circumstance that they all appeared to be full of atmospheric air; as no mercury rose into them when opened beneath that metal, which, from the expanded state of the atmosphere of the apartment, must have been the case, if the bottles had been perfectly stopped. The air taken from the middle of the room, as to elevation, appeared to contain the largest quantity of *carbonic acid*, and the smallest quantity of *oxygen*; the following being the result of Mr. Pepys' very accurate analysis of that portion:—

Middle of the room	2 carbonic acid.
	18 oxigen.
	80 azote.
	100

In the course of the present week, Roberts has exhibited his apparatus to the Lords of the Admiralty, to whom he was introduced by JOHN BARROW, Esq. the Secretary, in consequence of a letter kindly written to that Gentleman by Dr. BIRKBECK. Their Lordships, we understand, were greatly surprised at the simplicity of its construction, and much interested by the unadorned description of its operation given by the inventor. Sir SAMUEL HOOD, as well as other Gentlemen, expressed a very favourable opinion of its merits.

The first experiment in Southampton-buildings has been noticed in terms of considerable approbation in the *Journal des Debats*; and as we feel a strong conviction of the great utility of the apparatus, we sincerely hope that the introduction of the unassuming inventor to the LONDON MECHANICS' INSTITUTION, will be the means of procuring efficient patronage to his invention, and ultimately secure for him that remuneration to which his native talents, unassisted by the advantages of education, have justly entitled him.

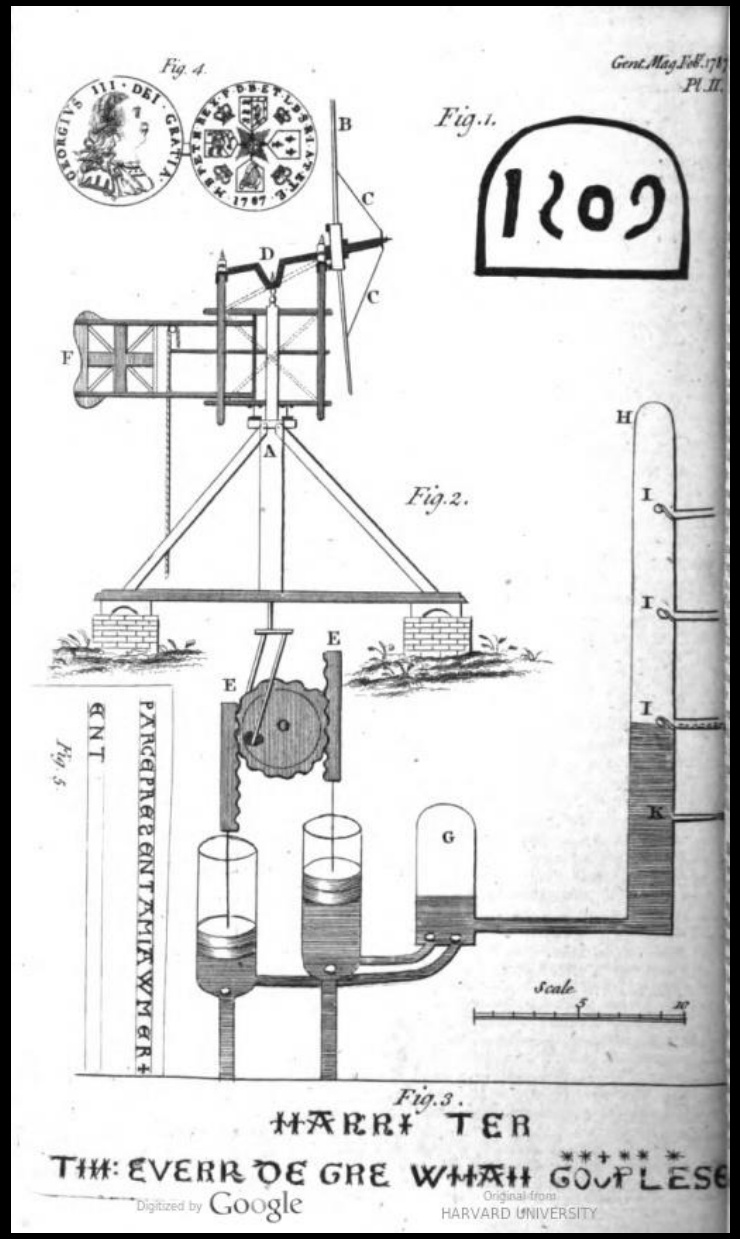
« The first experiment in Southampton buildings has been notices in terms of considerable approbation in the *Journal des Débats*; […] »

2 AVRIL 1825. JOURNAL DES DÉBATS SAMEDI.
POLITIQUES ET LITTÉRAIRES.
On s'abonne rue des Prêtres Saint-Germain-l'Auxerrois, n° 17.
Prix : 18 fr. pour trois mois. 36 fr. pour six mois. 72 fr. pour l'année.

offrande à M. Huard Delamarre, notaire, rue Richepanse, n° 3.

— Un mineur anglais, nommé Roberts, vient d'inventer un appareil destiné à couvrir la tête d'un homme et à lui permettre de respirer et de travailler pendant un temps assez long, au milieu d'une atmosphère de fumée capable de suffoquer. Cet appareil consiste en une sorte de coiffe de cuir qui se serre autour du cou au moyen de courroies et de boucles. Vis-à-vis des yeux se trouve un verre qui permet à l'opérateur de voir, et en face de la bouche une espèce de trompe en cuir, de trois ou quatre pieds de long, qui se termine par un entonnoir, contenant une éponge imbibée d'eau et fermée par un morceau de drap. Cet appareil n'est pas entièrement de l'invention de Roberts, car les doreurs se servent d'une coiffe absolument semblable pour s'empêcher de respirer des portions du mercure qu'ils emploient à leurs travaux. La différence consiste en ce que la trompe des doreurs leur transmet de l'air pur venant de l'extérieur, tandis que Roberts bouche l'extrémité de l'entonnoir et se préserve des effluves nuisibles par la filtration qu'éprouve l'air en passant à travers l'éponge mouillée. Roberts a fait dernièrement l'expérience de son appareil en présence du docteur Birkbeck, président de la société des artisans de Londres et de plusieurs autres personnes versées dans les sciences. Il est resté plus d'une demi-heure dans une petite salle qu'on avoit remplie de fumée en y brûlant du souffre et des copeaux de bois mouillés, et n'en est sorti que sur l'invitation des spectateurs. Une chandelle qu'on avoit allumée dans la salle s'éteignit au bout de quelques minutes, et un thermomètre placé près de la fenêtre, ne tarda pas à s'élever à son maximum de 1115° (36° de Réaumur). Roberts avoit été muni, non d'après son desir (car il avoit une entière confiance dans son appareil), mais d'après celui des spectateurs, d'une clochette qu'il devoit sonner en cas de danger. La clochette sonna plusieurs fois, mais ce fut pour demander de quoi alimenter le feu et augmenter la fumée et la chaleur. Roberts est sorti de son antre enfumé aussi bien portant et aussi frais qu'il y étoit entré.

B. Merriman, New Description of a new Machine for raising Water and Wind

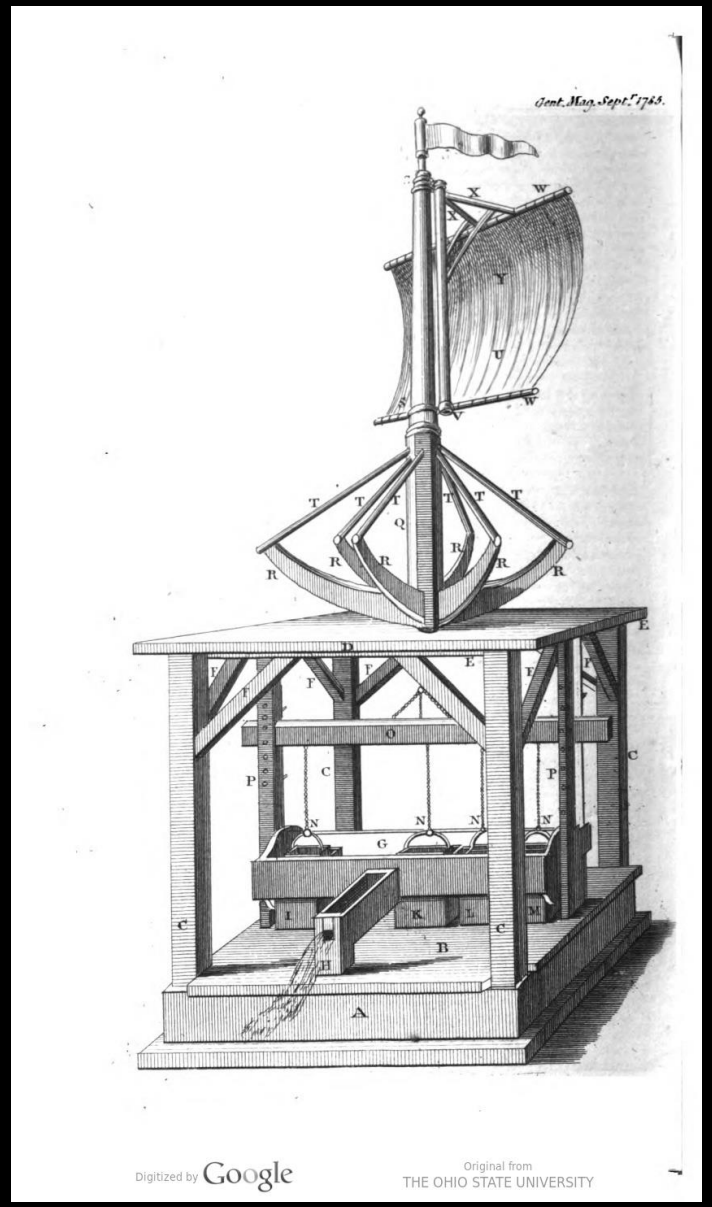


The Gentleman's magazine, v.57, pt. 1, 1787

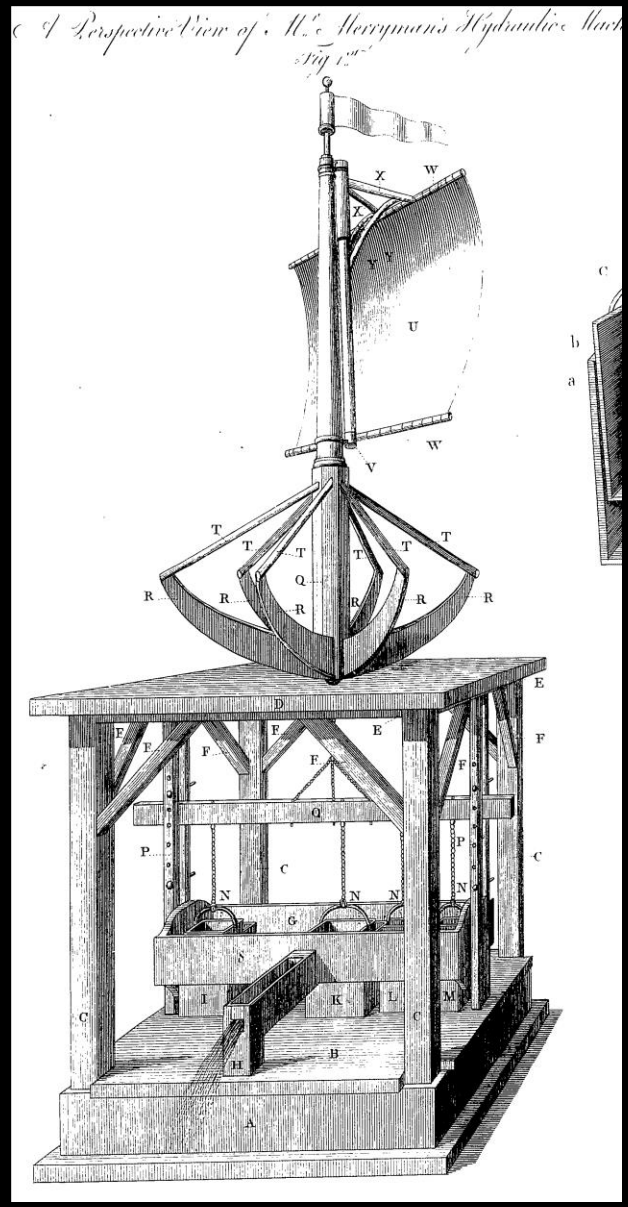
I present to the public, through the channel of your very useful Magazine, a plan of a machine for raising water by wind, which, I flatter myself, will be found to contain a very considerable improvement in the use and application of the mechanic powers

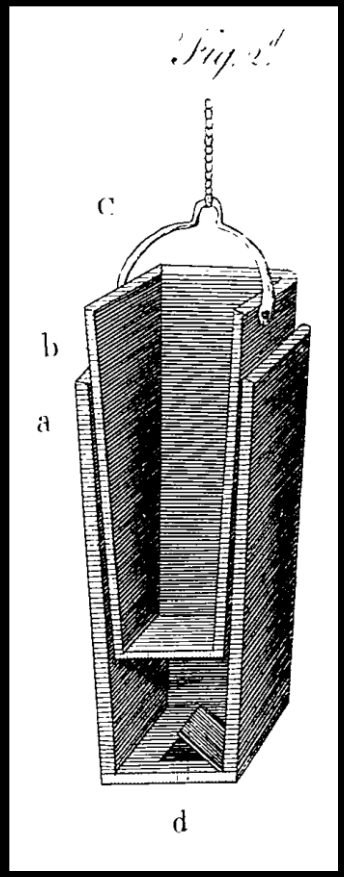
In your Magazines for September and October, 1785, I described some of the properties of the machine which I am desirous to recommend.
[…]
I was not however discouraged, but anxiously wished to have my plan realized, and its efficacy demonstrated; yet not being in a situation to erect such machine, and employ it in any useful work, I applied to the Society for the encouragement of Arts, Manufactures, &c. and presented a drawing of my design, with a description of the properties and principles of the intended machine. It met the approbation of the committee on mechanics, who behaved with much civility and politeness toward me, though (as it was afterwards signified to me by letter from the secretary) "it is not customary for the society to contribute toward the erecting machines or any purpose whatever; but, it should hereafter compleat a machine on the construction of the drawing, the society will give it every due degree of consideration."

Merriman’s Hydraulic Machine



The Gentleman’s magazine, v. 55, pt., 1785

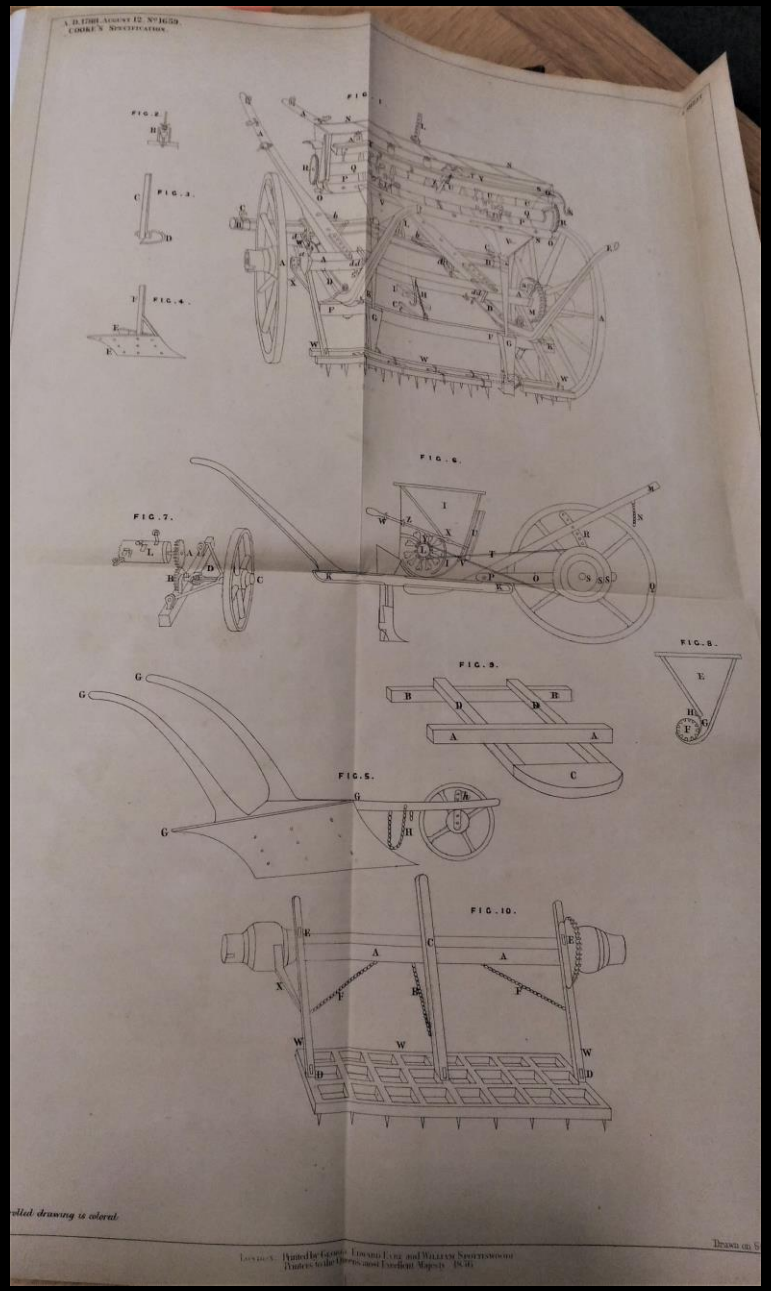




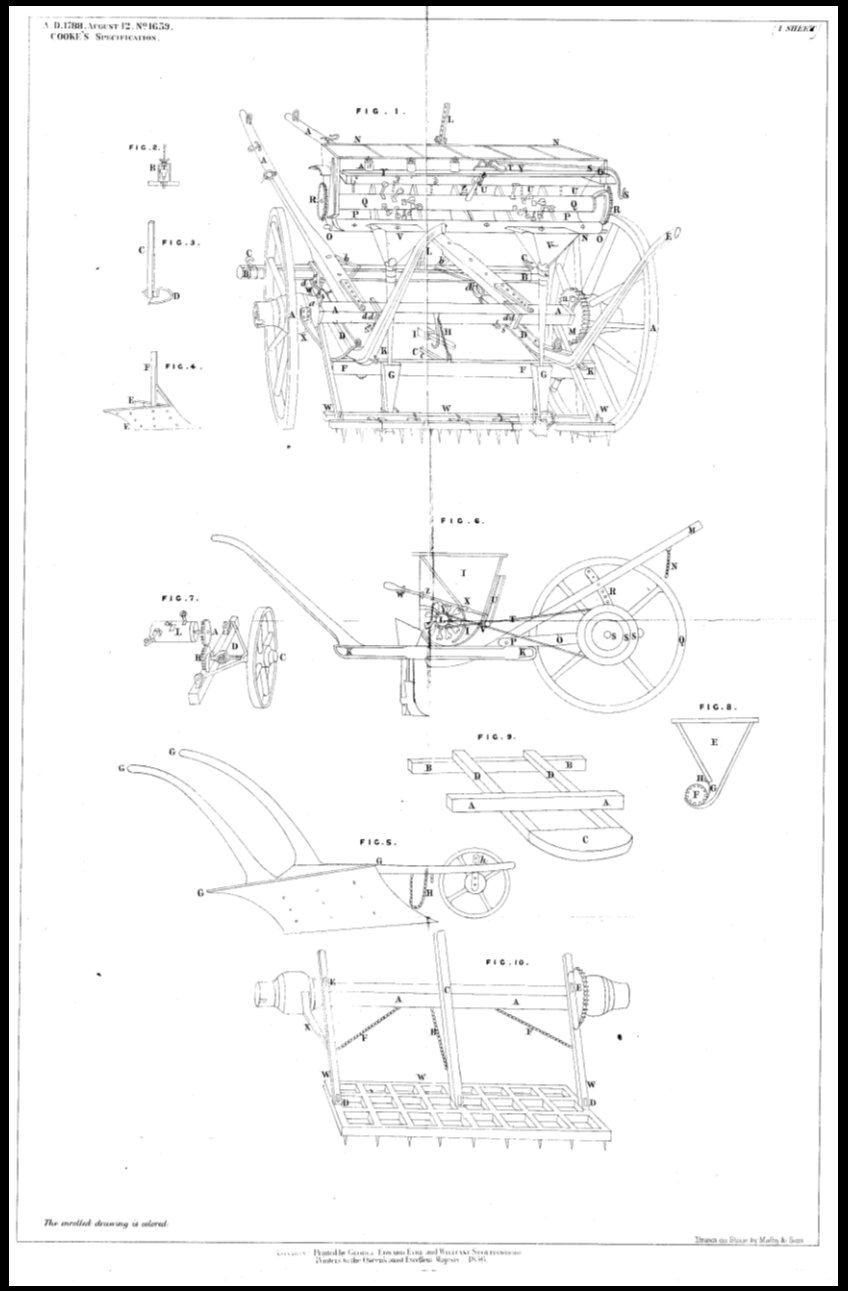
William Bailey, *The Advancement of Arts, Manufacutres,* 1772

Mr. Cooke's drill machine (1788)

Roll C73/18, - The National Archives

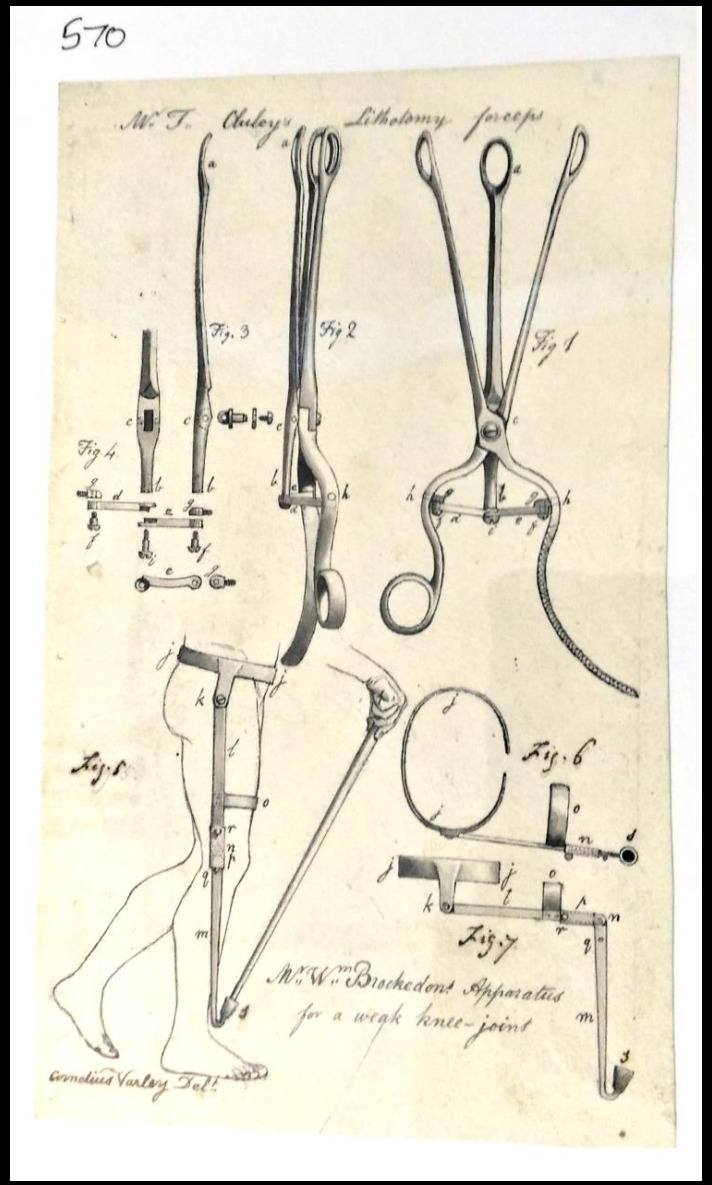


Specification 1788-08-12 Cooke 1659 - British Library

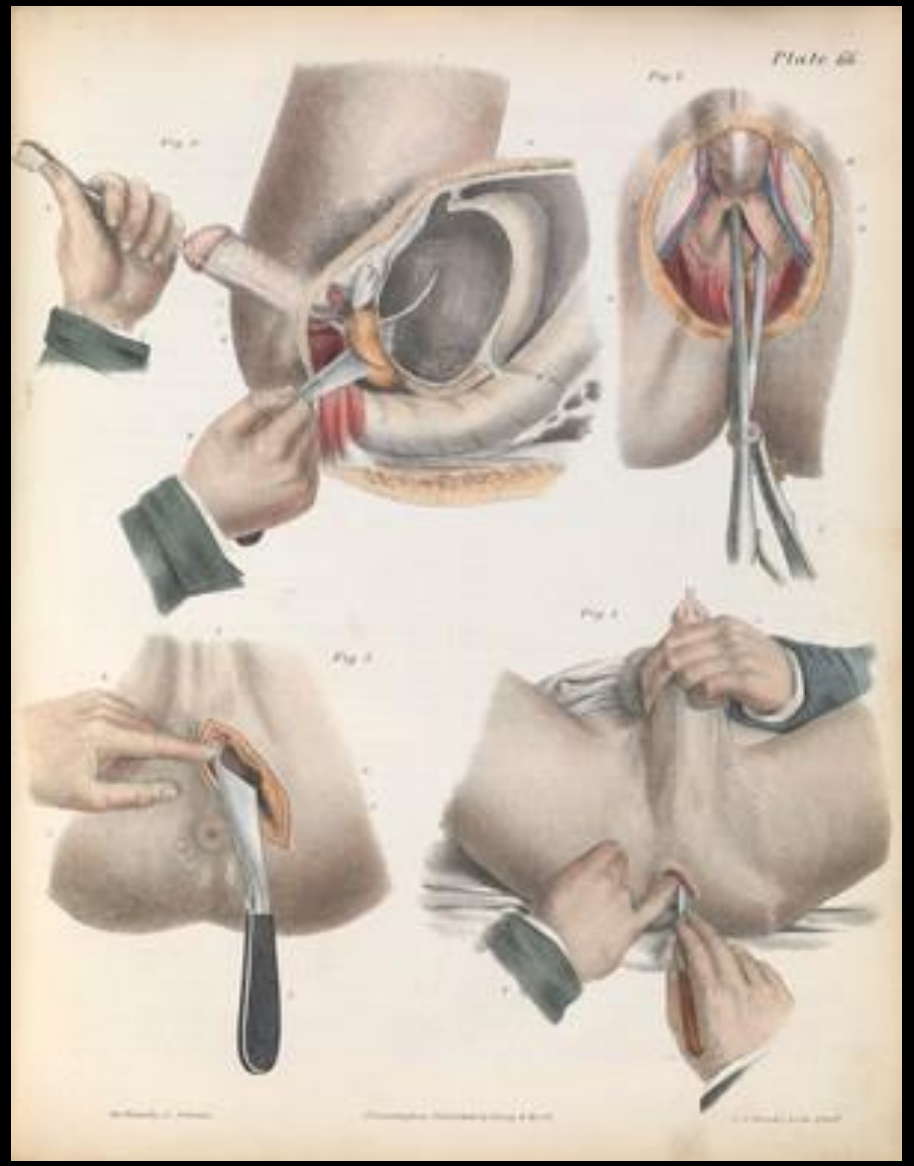


Specification 1788-08-12 Cooke 1659 - British Library (digitized)

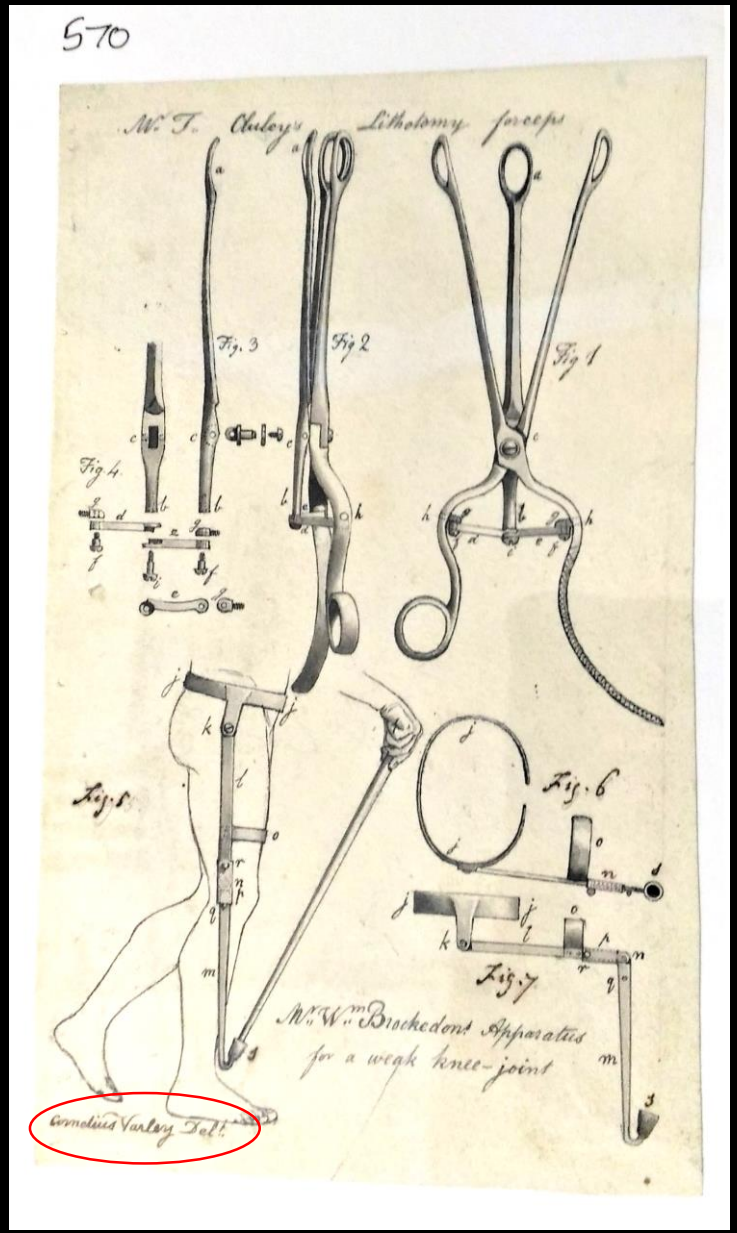
Lithotomy forceps



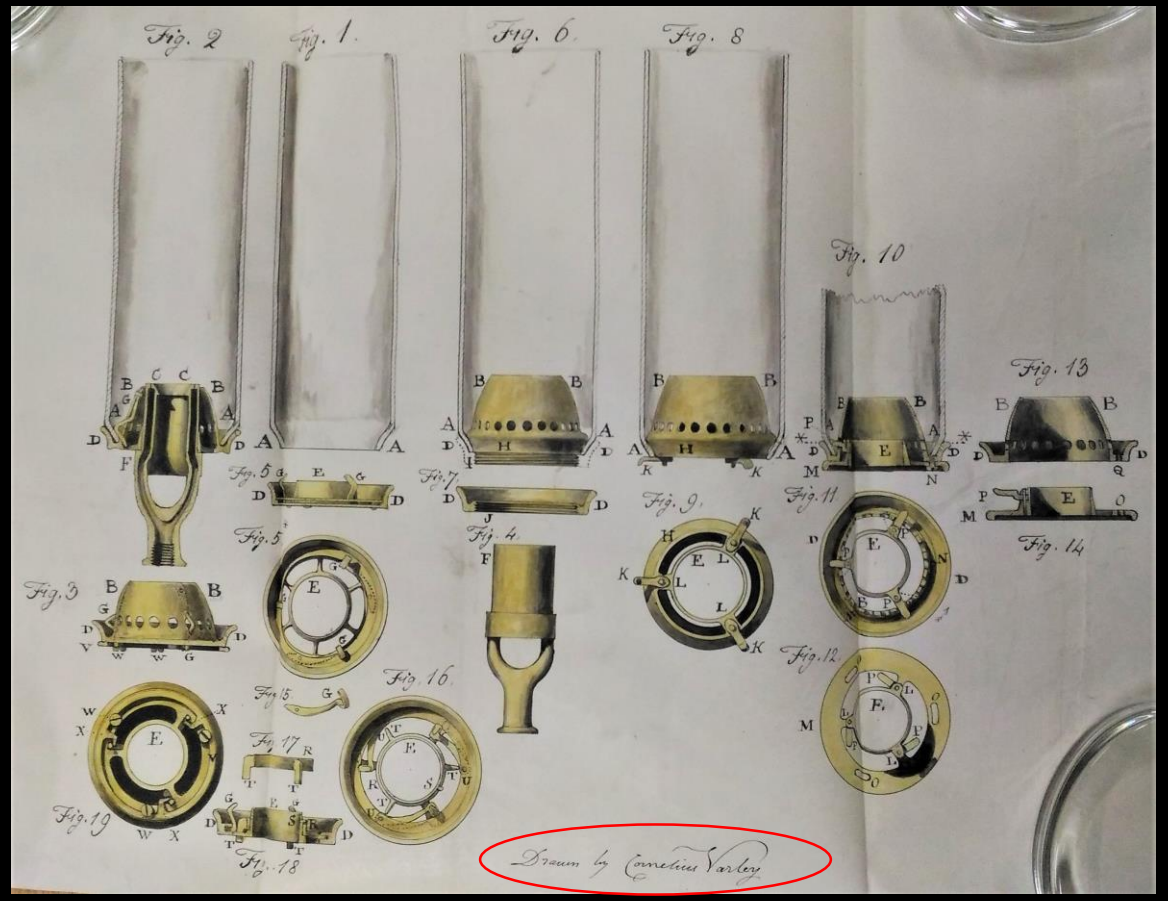
« W. J. Clyley's Lithotomy forceps »
« W. Brockedon's Apparatus for a weak knee-joint »
Manuscript Transactions, vol. 106 1824-1825 P2 – RSA



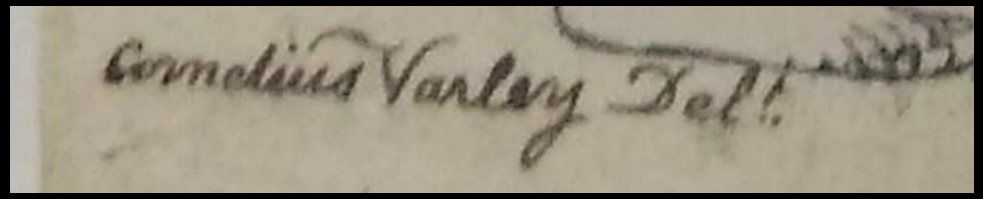
Claude Bernard*, Précis iconographique de médecine opératoire et d'anatomie chirurgicale,* plate XLVI, 1847

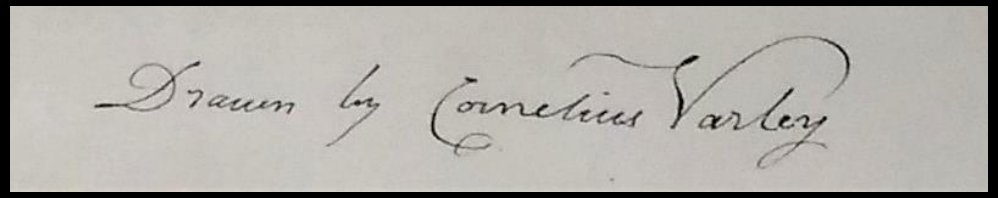


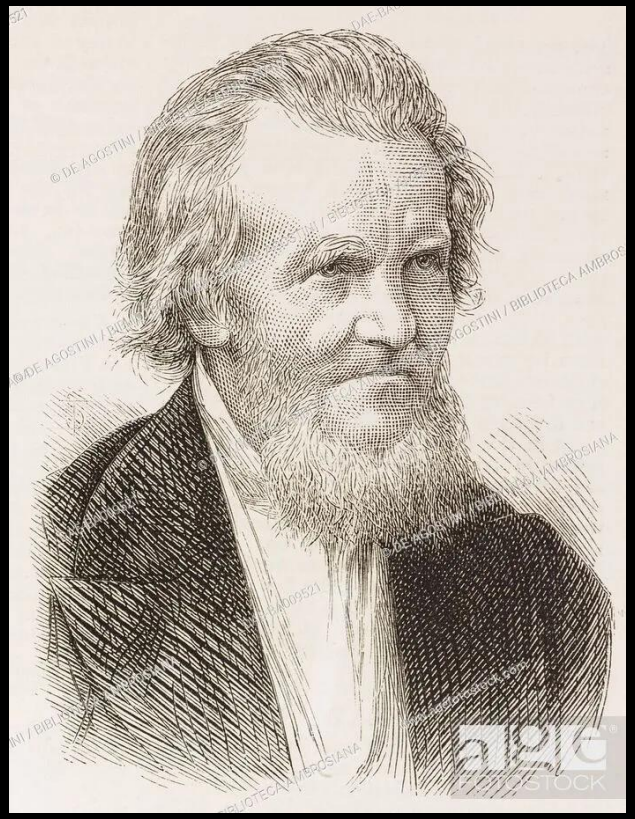
« W. J. Clyley's Lithotomy forceps »
« W. Brockedon's Apparatus for a weak knee-joint »
Manuscript Transactions, vol. 106 1824-1825 P2 – RSA



« Improvements in the construction of the Glass holders and Glass chimnies of Gas burners », Roll C210-189 – The National Archives (1839)

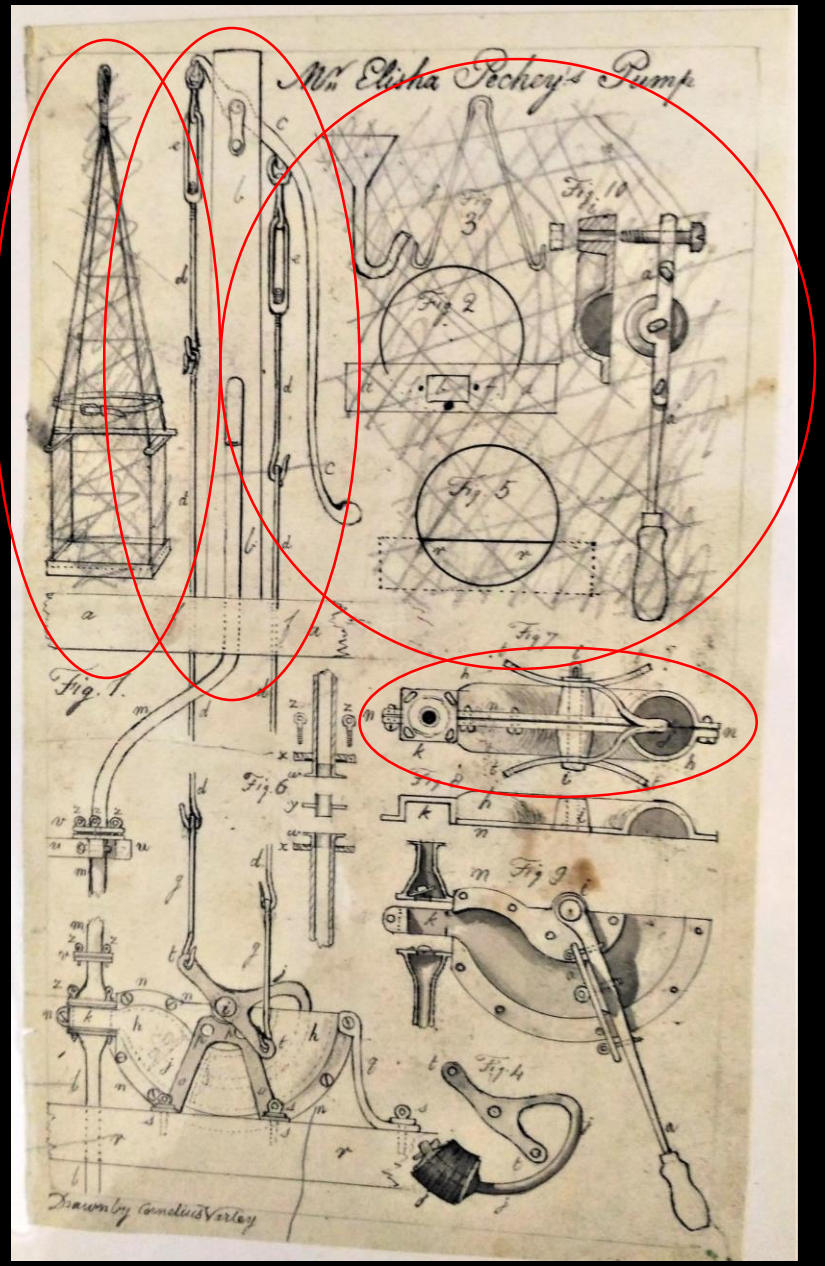




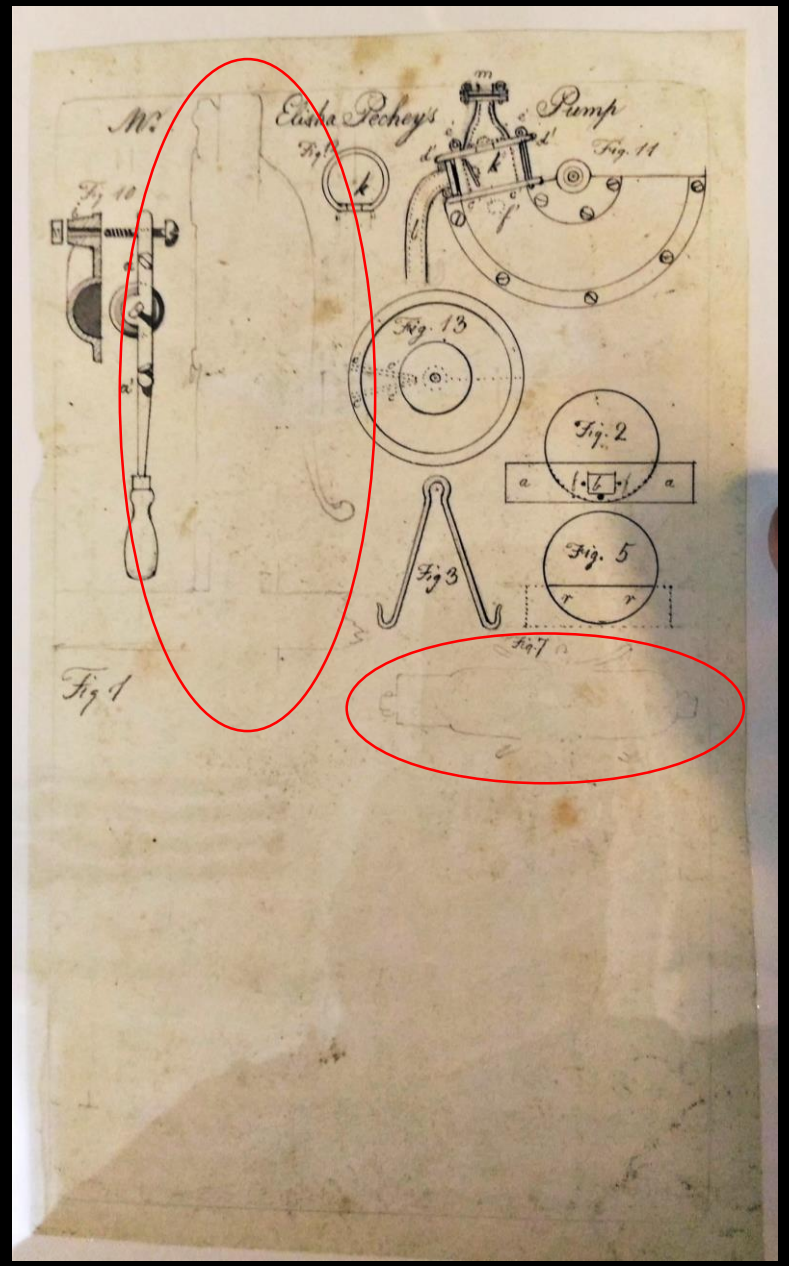


Portrait of Cornelius Varley (1781-1873), English painter, illustration from the magazine *The Illustrated London News*, volume LXIII, October 25, 1873 – ageofstock

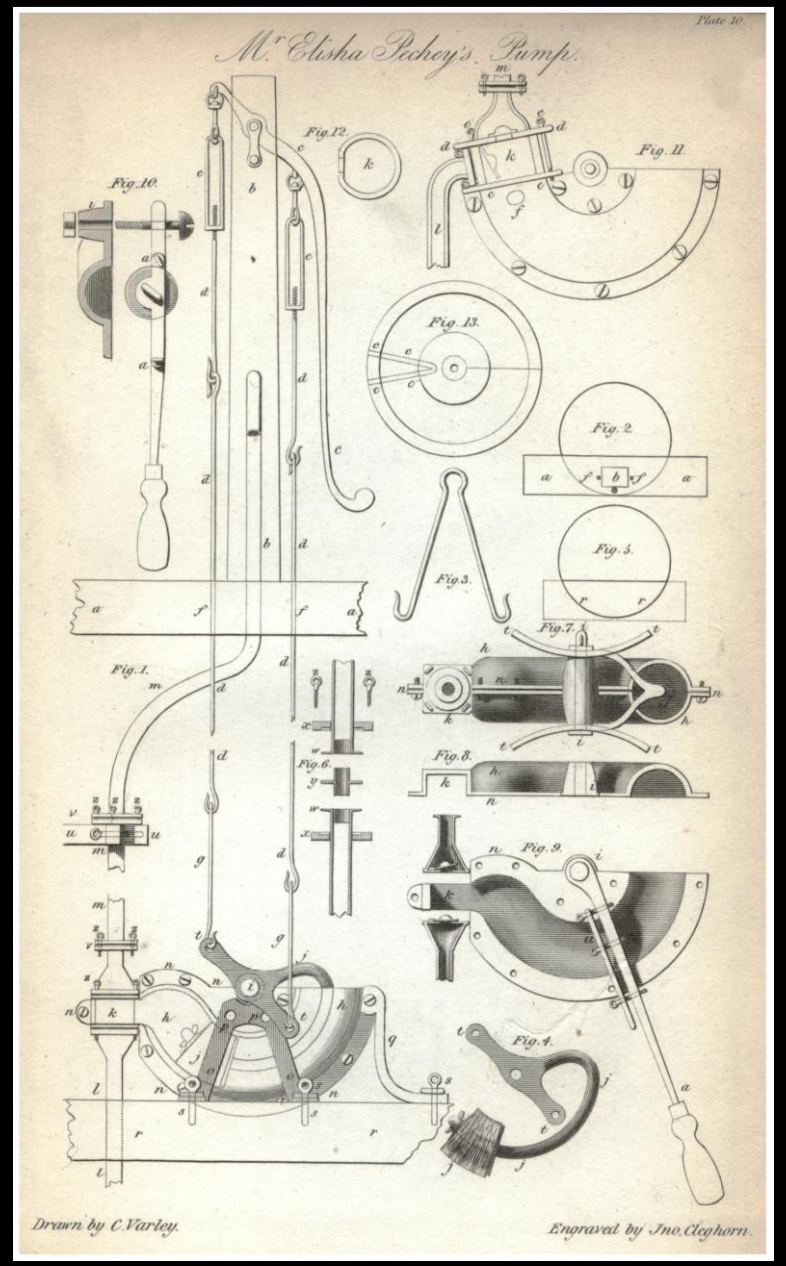
Mr. Elisha Peckey's Pump 1825



Manuscript Transactions, vol. 106 1824-1825 P2 – Royal Society of Arts



Manuscript Transactions, vol. 106 1824-1825 P2 – Royal Society of Arts



Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce, Vol. 43 (1824), p. 312

Three take away messages (©EPFL)

1. Ô technical drawings, where are you?

2. What kind of bridges can I establish between different typologies?

3. Think about the ontological statut of a drawing