

XIV. *A Description of a Clepsydra or Water-Clock, by the Hon. Charles Hamilton, Esq;*

See TAB. III. * *Fig. 1.* this Machine in Perspective.

Read April 24.
17456.

AN open Canal *ee*, is supplied with a constant and equal Stream by the Siphon *d*; and has at each End *ff*, open Pipes, of exactly equal Bores, which deliver the Water that runs along the Canal *e*, alternately into the Vessels *g 1, g 2*, in such a Quantity as to raise the Water from the Mouth of the *Tantalus, s*, to the Top of the *Tantalus t*, exactly in an Hour. The Canal *ee*, is equally poised by the two Pipes *f 1, f 2*, upon a Centre *r*; the Ends of the Canal, *e*, are raised alternately, as the Cups *zz*, are depressed, to which they are connected by Lines running over the Pulleys *ll*. The Cups, *zz*, are fixed at each End of the Balance *mm*, which moves up and down upon its Centre *v*.

n 1, n 2, The Edges of two Wheels or Pulleys, moving different Ways alternately, and so fitted to the Cylinder *o* (by oblique Teeth both in the Cavity of the Wheel, and upon the Cylinder; which, when the Wheel *n* moves one Way [*i. e.* in the Direction of the Minute-Hand], meet the Teeth of the Cylinder, and carry the Cylinder with it; and, when *n* moves the contrary Way, slip over those of the Cylinder, the Teeth no more meeting, but receding from each other; or it may be done by Catches or Locks, which require a longer Description), one or other of these Wheels, *nn*, continually moves *o* in
the

* *N. B.* The Letters of Reference answer to all the 3 Figures; some being seen in one, that do not come in Sight in the others. C. M.

the same Direction, with an equal and uninterrupted Motion: For the Contrivance is such, that the Instant one ceases to act, the other begins, and so on.

A fine Chain goes twice round each Wheel, having at one End a Weight, x , always out of Water, which equiponderates with y at the other End, when kept floating at the Surface of the Water in the Vessel g , which y must always be. The two Cups $z z$, one at each End of the Balance mm , keep it in *Equilibrio*, till one of them is forced down by the Weight and Impulse of the Water, which it receives from the *Tantalus s t i*: Each of these Cups $z z$, has likewise a *Tantalus* of its own $h h$, which empties it after the Water has done running from g , and leaves the two Cups again in *Equilibrio*; q is a Drain to carry off the Water.

Fig. 2.

The Front of the Clepsydra

Represents the Dial-Plate, with the Hour and Minute-Hands, the Weight and Float belonging to $n z$. The Front of the *Tantalus* in $g z$, marked $s t i$, of which s the Mouth is 18 Inches above the Bottom of the Vessel g , and 18 Inches below the Top of the *Tantalus t*. i is the issuing Leg of the *Tantalus*, which discharges the Water out of the Vessel g into the Cup z , as soon as it runs over the Top t , till the Water sinks as low as s .

Fig. 3.

The Profile of the Clepsydra.

T A B.

The Plan of the Clepsydra to its full Dimension.

The Case *uu* incloses the whole Machine, except the Cistern that supplies the Siphon *d*, which may be placed at any Distance from it, as is most convenient, provided the issuing Leg *d*, of the Siphon is lengthened out so as to give a constant Stream into the Canal *e*. This Case *uu* supports the *Axis* of the Cylinder *o* behind, and the Dial-Plate *pp* before; in the Centre of which turns the *Axis* *o*, with the Index *k* at its Extremity, being the Minute-Hand. The Hours may be described by two common Wheels, as in ordinary Clock-work. For cheap Work, Chains passing round Pulleys would do instead of Wheels with Teeth.

The Motion of the Clepsydra is effected in the following Manner :

The short Leg of the Siphon *d* is placed in a Cistern, with its Mouth something below the Mouth of the Waste-Pipe; which Cistern is supplied with a constant Stream, rather more than runs out at the Siphon *d*; which Overplus going off at the Waste-Pipe, the Water always remains at the same Height in the Cistern, and yet always delivers a constant and equal Flow into the Canal *ee*; consequently, there is not the least Intermision. As the End of the Canal *e*, fixed to the Pipe *f* 1, is in the Figure the lowest, the Water runs all thro' the Pipe *f* 1, into the Vessel *g* 1, till it runs over the Top of the *Tantalus* *t*; when it immediately runs out at *i* into the Cup *z*,

at the End of the Balance m , and forces it down, the Balance m moving on its Centre v . When one Side of m is brought down, the String which connects it to f 1, running over the Pulley l , raises the End f 1, of the Canal e , (which turns upon its Centre r ,) higher than f 2; consequently, all the Water which constantly runs thro' the Siphon d , instantly runs thro' f 2 into g 2, till the same Operation is performed in that Vessel, and so on alternately.

As the Height the Water rises in g in an Hour, *viz.* from s to t , is equal to the Circumference of n , the Float y rising that Height along with the Water, lets the Weight x act upon the Pulley n , which carries with it the Cylinder o ; and, giving a Revolution, makes the Index k describe an Hour upon the Dial-Plate. This Revolution is performed by the Pulley n 1; the next is to be by n 2, whilst n 1 goes back, as the Water in g 1 runs out thro' the *Tantalus*; for y must follow the Water, as its Weight increases out of Water.

The *Axis* o always keeps moving the same Way; the Index k describes the Minutes; the *Tantalus's* must be wider than the Siphon d , that the Vessels g g may be sure to be empty as low as s , before the Water returns to them.

Fig. 3. p. 172.

Fig. 1. p. 171.

Fig. 2. p. 172.







