a a a a is a mahogany box about 18 inches sq. & 6 inch deep, the boards 11/2 inch thick, open at tops.

a b a are steel bars resting at a with their edge a upon a curv’d steel support, & resting b on a steel chain represented at x y.

c d e is a steel-yard lying over the bars a a diagonally as shewn at f g h. the upper end of the chain x y is suspended on the edge d or g of the steel-yard, its fulcrum is a a on an erect support at f from the bottom of the box, the other end of the steel-yard at e or h rests on the hole in the bar h c. which is suspended on another steel-yard as seen in the drawing.

w, w, w, w. are steel points rising half an inch above the bars & made to receive steel hollows which support like four feet, a board or stage on which the person to be weigh’d stands.

These points are two inches distant from the fulcrum at a, a, a, a, & four eight inches distant from the points b, b, which rest on the chains y, & the edge at d, or g, is four times as distant from its’ the point of that steelyard as from its fulcrum at c, or f, hence the weight of a person plac’d on the stage upon the four points w, w, & c, is diminish’d sixteen times upon the steel-yard m, n.

This second lever m, n, has two weights one of an ounce & the other of ten ounces each of which represents pounds, & as it is design’d that these shall be 30 divisions of equal distance of one side the fulcrum o, to the distance on the other side, these weights shall weigh together 330 lbs.
Lock for navigation

Let a wooden box be constructed so large as to receive a loaded boat. Let the box be join’d the end of the upper canal and the boat be admitted and the doors of admission secured again, then the box with the boat in it, being balanced on wheels, or levers is let down and becomes part of the inferiour lock.

*a-a-a* are chains fix’d at wheels which are balanced on the other side. When the boat comes from the upper canal, the end of which is previously join’d to the end of the box by spunge, & compress’d to it by a weight, or a wedge, the door *w-w* falls inwards, & the door *h-h* into the lock, & admits the boat. Holes with slides as *m-m* will also be necessary to open before the large valves *w-w* & *h-h* will fall.

When the water box & boat are depress’d to the lower canal similar valves & sliders, & a spunge joining each of these takes place, to let the boat out of the box into the lower canal.
Nothing is to be overcome but the vis inertia & friction as the water box is always the same weight whether the boat is in it or not, since the boat whether full or empty will detrude with as much water as its’ own weight.

Perhaps levers like fire engine beams would be preferable to wheels? Perhaps the best balance would be another trough full of water, as they might both of them be let dry if necessary occasionally.
steam wheel
see p. 102

Redburn July 13 1781

\(a\ b\) is a valve to keep the pipe always full between stroke & stroke
\(a\ d\) admits water from below the wheel, & permits the steam to creepe upwards by the same hole
The above I executed in tin Nov 1. 1787. their snuffers are held very well, & pressing down the sconces a b permits the candle ends to be take burnt out

I design to make one of many joints like a draw-out telescope, so that a candle may be raised or push at pleasure

telecope=candlestick
**a b** is a floating valve of cork and sponge over it in a brass box with a wire to keep it upright, hence the vessel at x is kept full to be emptied occasionally. When the cover w is shut down it opens the cork at f g, & when the person leaves the room, the opening the door is to close the cock again.

**h i** is a ballance the end h feat to close the orifice, & i to ballance it. h should be made of lead cover’d with leather (or without) viz a sheet of lead on (wood, or) on iron.

The pan should be made of part of a large florence oil-jar, with a hole in the side & bottom.