J. White,

Canal;

No. 1,155, Patented May 17, 1839.

Fig: 1

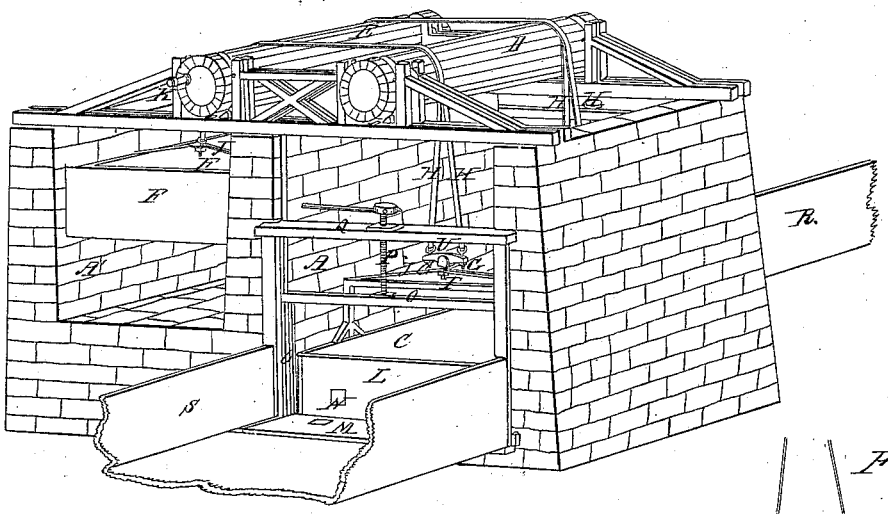

Fig: 4

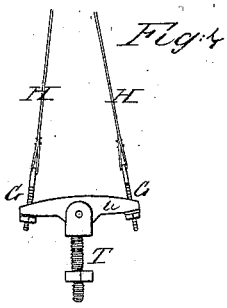

Fig: 3

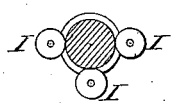

Fig: 2

UNITED STATES PATENT OFFICE.

JOSIAH WHITE, OF PHILADELPHIA, PENNSYLVANIA.

BALANCE-LOCK FOR CANALS.

Specification of Letters Patent No. 1,155, dated May 17, 1839.

To all whom it may concern:

Be it known that I, JOSIAH WHITE, of the city of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in the Manner of Constructing that Kind of Canal-Lock Denominated the "Balance Lock," Which is Employed for the Purpose of Conveying Canal-Boats from One Level to Another; and I do hereby declare that the following is a full and exact description thereof.

At the place designated for the formation of the lock I construct two chambers or lock pits, standing parallel to each other, as shown at A, A′, Figure 1, in the accompanying drawing, which is a perspective view of said structure, Fig. 2, being a vertical section through the lock longitudinally. One of these chambers at least must have its floor B, Fig. 2, at a sufficient depth below the surface of the lower water level to admit of the passage, in and out, of a boat with its load. In the drawing, the two chambers are not represented as of the same size and depth, one of them, A′, as there shown, being only used to contain the apparatus which is to counterpoise the weight of the boat, the caisson and the water in which the boat floats, in the chamber A; they may, however, be both of the same size in all respects, so as to constitute a double lift lock, one boat, with its caisson, &c., being made a counterpoise for another. In my description, I shall, in general, suppose the structure to be in the form represented in the drawing.

C and F are two boxes or caissons, adapted to the respective chambers, A and A′. The caisson C is to be such size as will adapt it to the boats used on the canal, and the caisson or rather balance box F is to contain stone or any other article of weight sufficient to counterpoise the load to be raised.

D and E are two large drums over which the straps or bands of iron or steel are to pass, by which the caisson and balance box are to be suspended. The substitution of the drums D and E for the shafts, and wheels or pulleys heretofore employed in balance locks, constitutes an important feature of my invention. The drums may be made either of wood or of iron or of the two in combination; they must be sufficiently large and stiff to prevent all danger of their yielding in any way, and I prefer to make them so large in diameter as that in lifting their load they shall not make more than one revolution, as, for example, should the lift be one of forty or forty five feet, the drums may be from fourteen to sixteen feet in diameter, more or less. They are not to have gudgeons, but are to be sustained and to turn on friction wheels or rollers, I, I, received within a groove, or between flanches, formed on the drums; this device is shown separately in Fig. 3. As represented in the drawing, these drums are formed of logs put together stave fashion; the whole must, of course, be connected together by means of strong bolts, or in some other permanent manner.

To suspend the caissons chains may be employed as has been heretofore done in balance locks, but my improvement in the means of suspension consists in substituting for chains, strong bands of rolled sheet iron or steeel H, H, H, which pass over the drums, and are attached at one end firmly to them, and at the other to the caissons, by means of screws and nuts, as shown at G, G, G, G, and represented separately in Fig. 4. The bands H, H, I generally use double, one band lying on the other as they pass over the drum, and to secure their equal tension, the screws G G are made to pass, respectively, through opposite ends of the vibrating lever U. Strong iron bands or bars J J are affixed to, and extend over, the caissons, and to these are attached the suspending bands, by means of the screw T. In the drawing, the suspending apparatus is represented as applied in two places only, but it is to be understood that they, and their appendages, are to be as numerous as may be deemed necessary.

At the ends of the caisson or caissons is a gate L, closing its extremities when raised, and hung so as to fall inward for the admission or the exit of a boat.

R represents the upper and S the lower level of the canal, from one to the other of which the boat is to be raised or lowered. Each of these levels is furnished at its termination with a gate M M, hung so as to fall from the lock or caisson and resembling the gates used in the weigh locks of the Pennsylvania and other canals. These latter gates I call pool gates; they should be made as tight as possible, to prevent leakage into the chambers. Where economy in the use of water is not a point of importance, the lower pool gate may be dispensed with,

and where two caissons are used to raise and lower boats, a portion of water may be let out from the ascending, in order to sink the descending caisson. Another mode of procedure, where water is sufficiently abundant, will be to double the depth of the descending caisson, so as to receive a sufficient quantity of water from the upper level to sink it completely in the lower level; and, in all cases, room enough should be allowed in the descending caisson to pass into it an extra quantity of water from above, to compensate for the buoyancy caused by leakage into the chamber. The caisson gates and the pool gates are each furnished with a wicket gate N, N, to admit water between the two, so as to equalize the pressure on both sides of these gates, and allow them to open readily.

The improvement which I have made in the construction of the pool gates consists in placing them in a sliding frame, which may be raised, or lowered, by means of a screw or screws, so as to adjust the gates to the varying height of the water in the respective levels.

O, O, are the frames which carry the pool gates at their lower ends; these frames run in grooves to which they are closely fitted, at each extremity of the chamber. They are regulated by a screw, or screws, P, passing through a cross-head Q.

To regulate and arrest the motion of the caissons, as may be necessary, I employ a hydraulic brake, made on the same principle with those used on the Philadelphia and Columbia railroad plane.

K is a crank pin upon one of the drums which receives a pitman, connected with the piston of the brake. To secure the caissons in place when adjusted to the proper level, holdfasts, or other analogous devices, are employed, as in other lift locks.

The water in the caisson chambers may, if necessary, be discharged therefrom by pumps or buckets, worked by any adequate power, but where it can be discharged through a trunk into a lower level, this course will, in all cases, be preferred.

In describing this balance lock, with a view to the making known my improvements, I have included many parts of which I do not claim to be the inventor, but which have heretofore been employed in balance or other locks. The mode of using this balance lock is also similar to that of others, and need not, therefore, be particularly described, as it is well known to all competent engineers, but

I claim as new and ask Letters Patent for the following improvements.

1. I claim the employment of drums, without gudgeons, and sustained on friction wheels, or rollers, in the manner set forth, and as a substitute for the shafts and wheels, or pulleys, heretofore employed over the chambers of balance locks.

2. I claim the manner of employing bands of rolled iron or steel, instead of chains, by which to suspend the caissons, or boxes, as above described.

3. I claim the attaching the ends of the double band of iron, or steel, to a vibrating lever, for the purpose of giving an equal tension to such bands, the same being constructed and operating substantially, in the manner, or on the principle, above made known.

4. I also claim the hanging of the pool gates in movable frames sliding in grooves, and adjusted by screws, for the purpose of adapting the said gates to the varying height of the water in the respective levels, as described.

JOSIAH WHITE.

Witnesses:
JNO. J. WHITE,
JOHN BURNS.