S. S. Walley.

Canal and Railroad.

No. 4,304. Patented Dec. 11, 1845.

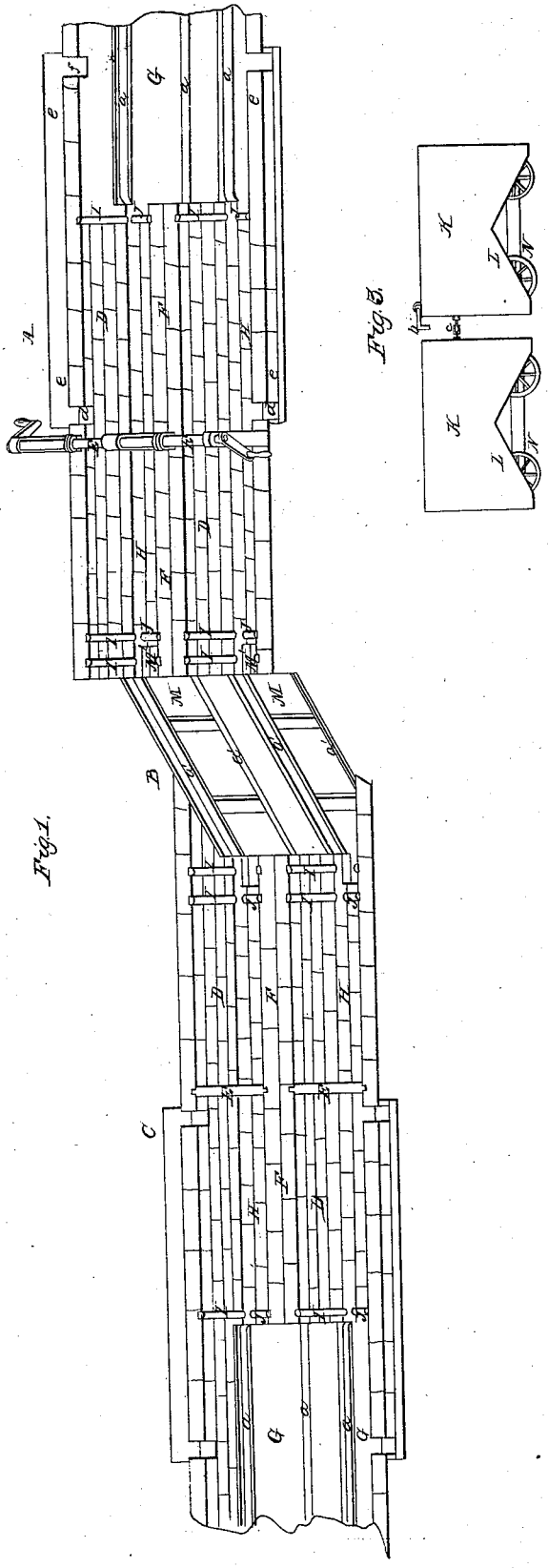
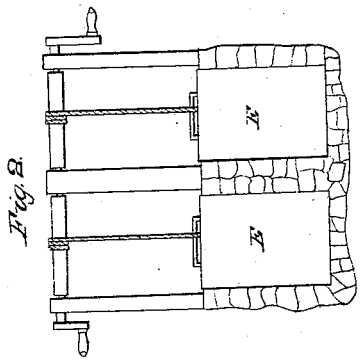


Fig. 1.

Fig. 2.



UNITED STATES PATENT OFFICE.

SAML. S. WALLEY, OF CHARLESTOWN TOWNSHIP, CHESTER COUNTY, PENNSYLVANIA.

COMBINING RAILROADS WITH CANALS.

Specification of Letters Patent No. 4,304, dated December 11, 1845.

To all whom it may concern:

Be it known that I, SAMUEL S. WALLEY, of Charlestown township, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements in the Manner of Combining Canals and Railroads for the Transportation of Goods; and I do hereby declare that the following is a full and exact description thereof.

In most situations where canals exist or where it is desired to establish them, one of the greatest difficulties to be encountered is the great waste of water in the transferring of boats from one level to another; so great is this difficulty in some situations that the delays incident to the want of water have caused such works to be nearly abandoned; and it has been proposed to discontinue their use as canals, by discharging the water from them and converting them into railroads.

My invention consists in the using of a canal whether already, or to be constructed, for the transportation of goods, by laying rails on its bottom, upon which water tight cars and a water tight locomotive engine may be made to run; and in so constructing the cars and locks, as to allow of the former being transferred from one level to another, along inclined planes in such manner as to occasion but little wastage of water.

The rails which are to be laid on the bottom of the canal may be of wood, or if it is preferred to protect them by bars of iron, such bars may be made unusually light, as the cars, or car-boats, as I will denominate them, being water tight will be buoyed up in the manner of boats, and will require to be so loaded as that they shall bear with no more force upon the rail than is sufficient to prevent their leaving the track. The locomotive engine will also be contained within a water tight case, and although for the purpose of drawing the train of car-boats it must press upon the rails with a degree of force greater than that which is necessary for the said car-boats, its pressure will be much inferior to that which is required for the drawing of railroad trains on land, as the whole will be constantly running on a dead level or nearly so. The car boats and the locomotive engine which I use are made with their side perfectly flat on the exterior, and parallel to each other; their ends also I usually make flat, so that they may be brought into close contact with each other and allow of but little water to remain between them. They are all to be precisely equal in width, as they are to fit into the lock-chambers water-tight, or nearly so. Their wheels are to elevate them but slightly above the bottom, as at this part as well as at their sides, they are to be as nearly as may be water tight.

The lock chambers at the termination of each reach of the canal should be about three times the length of the car boats, and at about the middle of this chamber there is to be a single lock gate. These gates I make to rise vertically by means of windlasses or other suitable devices, their edges being received within grooves, and sliding therein water tight. The outer ends of these lock chambers are to be connected by inclined planes along which the trains are to ascend and descend, they being governed in so doing by windlasses, or any of the various devices employed for that purpose. The lock chambers will, when thus divided by a lock gate, be about the length of a car-boat and a half, and when one of these is within the chamber it will operate as a closed lock gate preventing the passage of water, and the lock gate may therefore be opened to allow the train to pass.

To enable the locomotive, and the car-boats to fill the lock-chambers so as to exclude the passage of water, there are provided at the points of entrance into, and of exit from said lock chambers, elastic pads which extend from the bottom of the chamber to the full height of the car-boats, and which also extend across the bottom of the chambers excepting at the points where the wheels are to pass; these elastic pads may be confined in recesses prepared to receive them, and extend out so as to press against the sides and bottoms of the passing car boats. Instead of the elastic pads above named, I intend sometimes to use rollers covered with an elastic material, and which as I believe will operate better, as they will be subjected to less friction than the pads.

In the accompanying drawing, A, Figure 1, is the termination of the upper level of a canal, B, an inclined plane leading to C, the commencement of a lower level.

D, D, are the lock chambers, and E, E, the places of the sliding lock-gates. A front view of these gates is shown in Fig. 2. The chambers in this figure are represented as

double, there being supposed to be a double track on the bottom of the canal; and F F being the wall that divides the lock chambers from each other. This however, is not essential to the plan, and I shall therefore, describe the operation of a single train only.

G G is the bottom of the canal before entering the lock chambers.

H H are the bottoms of said chambers.

I, I, are the elastic cushions or rollers extending up the sides of the chambers, and J J those on the bottom.

a, *a*, are the rails on the bottom of the canal, and *a'* *a'* those on the inclined plane; these rails are not continued within the lock chambers the solid bottoms of these sustaining the wheels.

K K Fig. 3 are two boat-cars, or a boat-car and a locomotive. These as they pass along the canal are to be coupled together by hooks or otherwise so as to leave but little space between them for the containing of water; but when they are within the lock and are about to ascend, or descend the inclined plane they are to be coupled less closely; the hook *b* may then be loosened and the coupling chain *c* come into action. This is necessary to enable them to conform themselves to the angles formed by the bottoms of the lock chambers, and the inclined planes. The sides of the car-boats, and of the case containing the locomotive engine are also cut away, as at L L for the same purpose; as in passing the angle formed by the bottom of a higher level and the inclined plane leading to a lower, they could not otherwise rest upon their fore and hind wheels. This cutting away, however, need not be to a greater extent than the width of the wheels, as the inclined planes are left open at M M, and this opening is continued sufficiently far into the bottom of the lock chambers, as shown at M' M' to be out of the way of the bottoms of the vehicles.

I have represented lock gates and lock chambers in the lower as well as in the upper level, but in many cases and perhaps in all, these may be dispensed with, the side walls of the canal being continued until they meet the inclined plane.

The wheels N N of the cars extend no farther below the bottom of the car-boats than is necessary to enable them to run clear of the rails, so that when they enter within the lock chamber they shall nearly touch its bottom, and come into contact with the padding, or rollers, J J, on said bottom, there being a space in said padding for the passage of the wheels. In this part there will of course be some loss of water, nor is it, in fact, possible to construct such works without some wastage; but the manner in which I have organized the respective parts of my apparatus, is intended to render this waste as small as possible. I contemplate the adding of a gate, or of some similar device to the bottoms of the car-boats, which gates, when the cars are within the lock-chamber, may be made to bear against the bottoms of said chambers and effectually prevent the passing of water along said bottoms; but not having yet essayed the best manner of doing this, I leave it to take its place among such further improvements as I may hereafter think it necessary to secure by Letters Patent, after having carried my plan into practical operation.

The driving wheels of the locomotive must be so arranged as to prevent the passing of water from the canal into the case containing the engine; this may be effected by the aid of stuffing boxes surrounding the axle; or the axle may be entirely without the case, and the power of the engine be communicated to the driving wheels by gearing shafts and wheels over the fore end of the locomotive. This fore end may, if preferred, be made sharp in the manner of the bows of a boat, so as to decrease the resistance of the water.

I have spoken of the lock gates as being made to slide vertically, and this they may do either by being raised as described, or being allowed to descend into spaces below the lock chambers, formed for that purpose, in which case the buoyant action of the water will allow them to be managed with great facility. The thus causing them to ascend, or descend will undoubtedly be the best mode of constructing them; but they may be made to open and close in the ordinary way, but not without a more considerable expenditure of water than when made to operate vertically.

In entering the lock chambers the boat cars fit in between, and upon, the elastic cushions, or rollers, and before the gate is opened one entire car and the half of another will be made to occupy it. The cars thus situated arrest the passage of the greater part of the water and on opening the gate they may be passed successively through. The water which was contained in the lock chamber before the opening of the gate will be driven before the cars and this is allowed to escape through openings or channels *d d* left in the side walls of the chamber, and to pass along trenches *e e* and reënter the canal at *f f*.

Having thus fully described the manner in which I combine a rail way and canal for the purpose of transportation, what I claim therein as new and desire to secure by Letters Patent, is—

1. The combining of a rail-road and canal, by laying rails on the bottom of the canal, which is to be used, and the rails submerged, with its content of water, by the employment of a locomotive engine and of

car-boats, which, while their wheels are sustained upon the rails, are to be buoyed up by the water as set forth.

2. I claim the adapting of the car-boats and the lock chamber to each other, so that when the former are contained within the latter, they shall operate as lock gates by preventing, or nearly preventing the passage of water, thereby allowing the lock gates to be opened, and the train to pass through the lock with little loss of water upon the principle, and substantially in the manner herein described.

SAML. S. WALLEY.

Witnesses:
THOS. P. JONES,
EDWIN L. BRUNDAGE.