

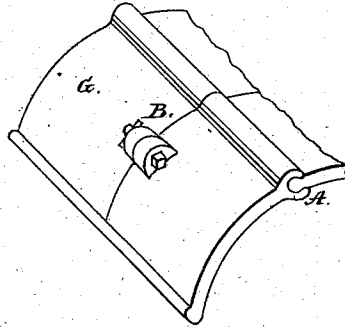
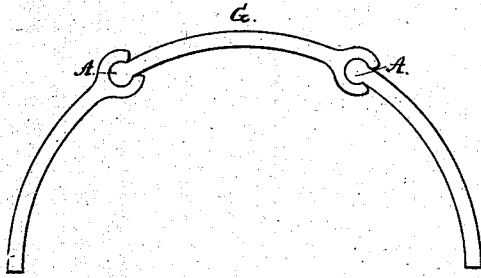
*L. Dodge,  
Tunnel.*

*No. 103,028.*

*Patented May 17, 1870.*

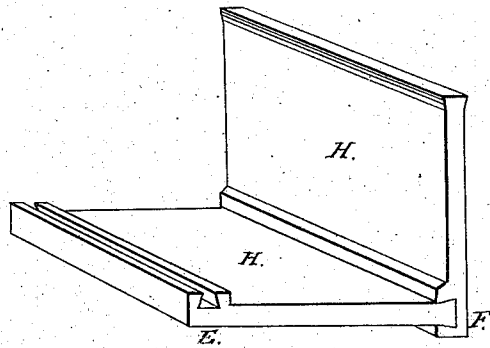
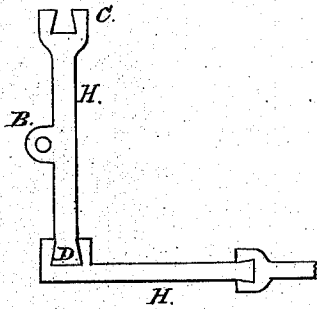
*Fig. 1.*

*Fig. 2.*



*Fig. 3.*

*Fig. 4.*



*Witnesses:  
C. H. Poole  
Henry T. Mygale*

*Inventor:  
Lewis Dodge  
by his atty  
J. B. Dane*

# United States Patent Office.

LEWIS DODGE, OF CHICAGO, ILLINOIS.

Letters Patent No. 103,028, dated May 17, 1870; antedated May 14, 1870.

## IMPROVEMENT IN THE CONSTRUCTION OF TUNNELS AND DAMS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, LEWIS DODGE, of the city of Chicago, Cook county, State of Illinois, have invented certain new and useful Improvements in the construction of Tunnels, Dams, Dykes, Piers, Levees, and other submarine structures; and I hereby declare that the following is a true and correct description thereof, reference being had to the accompanying drawings and the letters of reference marked thereon, which form a part of the specification.

The nature of my invention consists in having iron plates, curved or flat, joined and secured at the edges, by means of rounds and grooves, or by dovetails, and bolted together at the ends through ears made thereon, as the basis upon which to construct said tunnels, dams, &c.

Figure 1 represents my horizontal plates in a curved form, to be used for tunnels and arches, the plates being connected at the edges by means of rounds and grooves, as seen at A.

Figure 2, B represents the ears on two adjoining plates, for connecting them together.

Figure 3 represents my iron plates for dams, dykes, &c., fastened by means of dovetail joints.

Figure 4 is a perspective view of iron plates, to be used for the angles of structures.

To enable others skilled in the art to construct and erect my invention, I will proceed to describe the same in all its parts and combinations.

For constructing tunnels under a water-course, I make a coffer-dam, in the usual manner, by a series of piles and planking, having sufficient space between the lines to be filled with material for artificial stone or any other covering, and extending sufficiently deep into hard bottom to protect against caving in when the excavations for the tunnel-work have been made.

I use the same formation for levees, docks, piers, &c., using iron piling, when necessary, for greater strength, and to prevent ground-burrowing animals, such as muskrats, &c., from penetrating through the embankments, and for erecting walls to prevent an overflow of water on low lands from sea or river, enabling natural evaporation to make it dry land.

The iron plates for tunnels and arches are made with a round or bead on one edge, and a hollow or groove on the other, as shown in fig. 1, so that the round, being slid into the hollow, as shown more clearly in fig. 2, they are held firmly in place, and cannot be separated after they have been bolted through the ears B in fig. 2.

For dams, dykes, levees, &c., I use flat plates, as shown in figs. 3 and 4. I join the plates by dovetail-joints, as shown, extend them in line, or, where necessary, form angles with them, bolting them through ears B, the same as I do my curved plates.

For extending in line, the dovetails are made on the edges, as shown by C and D in fig. 3, and for forming angles, they are made on the edge and side, as shown at E and F in fig. 4.

By means of the rounds or beads and hollows or grooves and dovetail-joints, I obviate all use of bolts, and prevent all springing or separating of the plates. On the plates for tunnels and arches, the round and hollow allow of increase or decrease of the length of the arc, always desirable, without endangering the strength of the structure. As each plate has the round on one edge and the hollow on the other, they may be used in any place with equal success. As the ends of the various plates are held together by bolts through ears cast or made thereon, any one section may be removed at will.

To facilitate the placing of the plates for arches or tunnels, I construct a centering, of the required size of the arch or tunnel, mounted on wheels, and also on jack-screws. I raise this centering to the proper height, and place the plates on it. When the plates have been laid and bolted, I lower the centering by means of the jack-screws, and run it along for another section, then elevate it and proceed as before.

Over my iron work I lay a course of artificial stone, well pressed down, in sacks or bags. I cover this with dirt and stone, well puddled and tamped, and over this a layer of plank, like the planking of a vessel, and cover this with asphaltum, or pine or coal-tar. I put the ends of my timbers, to which I bolt my plank, sufficiently deep in the bed of the river, that anchors dragging cannot catch the edge of the planking.

For dams, dykes, &c., I use my flat plates as piles, uniting the sections as above, standing the end of one section upon that of another.

The area inclosed by my iron piling I fill in with material for artificial stone put down in sacks, and then tamp it. I thus make a solid stone work, with a front without cracks for cement to work out.

Having thus fully described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

The iron plates G and H, with round or groove joints A and the dovetail joints C D E F, and the ears B, constructed, arranged, and combined as and for the purpose hereinbefore set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEWIS DODGE.

Witnesses:

DANIEL L. BOONE,  
HENRY C. PAYNE.