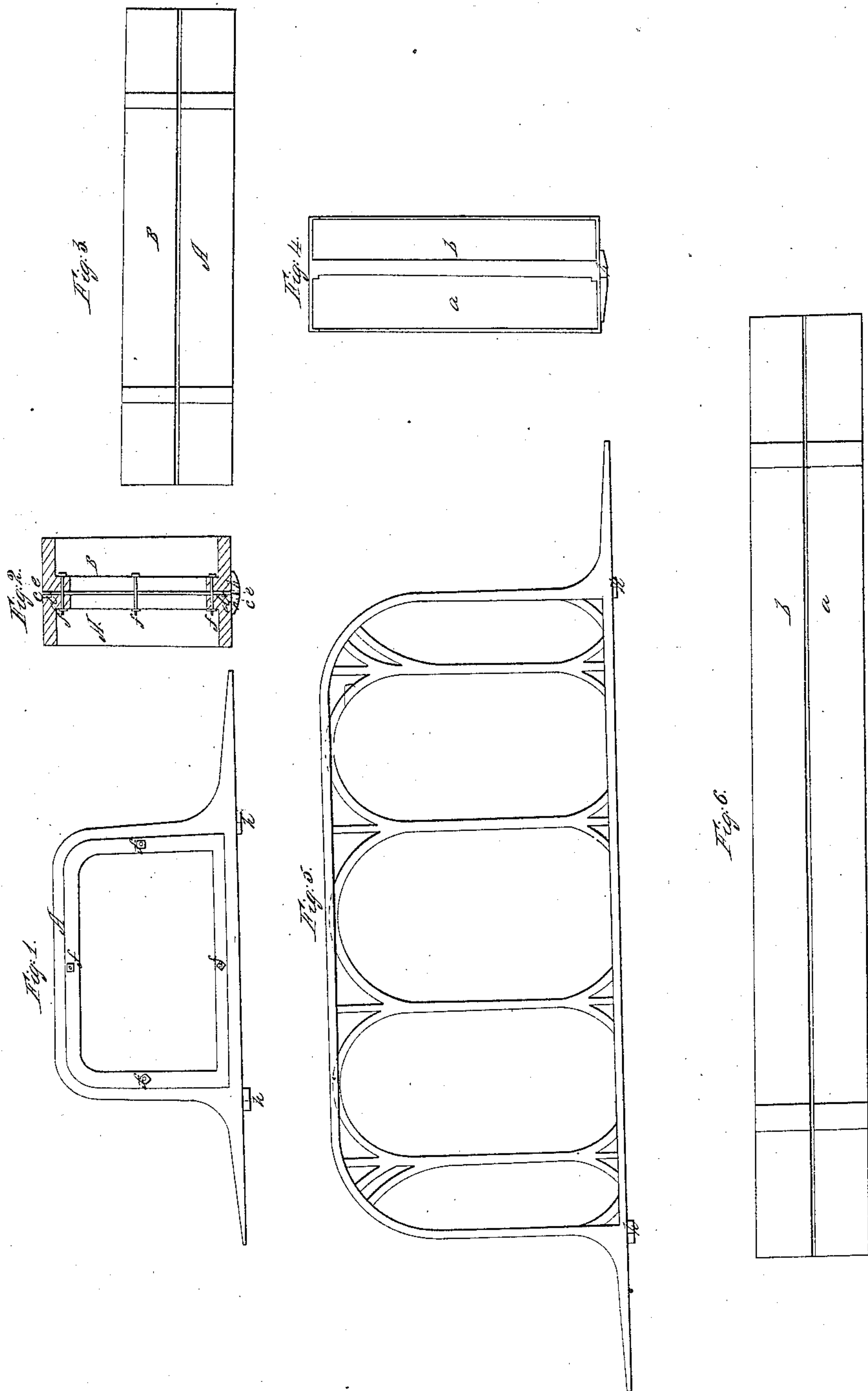


J. R. Miller.

Submarine Tunnel.

N^o 9,899.

Patented Aug. 2, 1853.



UNITED STATES PATENT OFFICE.

JOS. R. MILLER, OF JERSEY CITY, NEW JERSEY.

SUBMARINE TUNNEL.

Specification forming part of Letters Patent No. 9,899, dated August 2, 1853; Reissued March 12, 1867, No. 2,504.

To all whom it may concern:

Be it known that I, JOSEPH R. MILLER, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Submarine Avenue or Carriage-Way, which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1, is a transverse section of the avenue, showing two sections bolted together. Fig. 2, is a longitudinal section of this portion of the road way. Fig. 3, is a top view. Fig. 4, is a sectional view of a single section. Fig. 5, is a section of another form of avenue. Fig. 6, is a top view of the same.

Similar letters refer to corresponding parts in the several figures.

The nature of my invention and improvement consists in casting my sub-marine road-way in separate sections each of a peculiar form and all of corresponding size and shape, so that when they are placed upon the bed of the river (previously graded) and bolted together and the joints carefully packed and the whole structure securely anchored by weight of stone or other heavy substance placed upon the horizontal flanges of the sections and the water drawn from the interior by suitable engines a dry way will be formed beneath the surface of the river from one side to the other without the trouble, expense, and danger of tunneling or bridging.

The submarine avenue is constructed principally of cast iron, of dimensions both in height and width to suit the purposes for which it may be required. It may be constructed for one or two railways. Carriage and foot ways may be added, or it may be constructed for carriage and foot ways without the railways. The object of this avenue is to effect crossing through navigable or other water without tunneling below the bed of the river or interfering with navigation. To effect this the bottom of the river or other water must be graded to a depth sufficient for the superstructure to rest upon, leaving a sufficient depth of water above for the purposes of navigation, and not reduce the area of water so much as to prevent the necessary flow. The castings must be made in sections A, B each section forming a part of the entire avenue, and may vary in length according to the weight of each lineal foot, and make them as large as can be conven-

iently handled. In one end of each section there will be a groove *c*, which will be partly filled with india rubber packing *d* and on the other end a tongue *e* to fit said groove. The sections will then be drawn together by bolts *f* through the flanges, which will cause the tongue to press upon the india rubber and make a water tight joint. In order to form the grades at the end of the avenue a few sections will be diminished in length from bottom to top, which should be continued until the proper grade is obtained. The whole will be secured permanently in its place by placing a sufficient quantity of stone or other weighty material upon the flanges or wings that extend from the sides resting on the bed of the river. When it is all put together and the water pumped out the joints may be packed with metallic packing. To facilitate the work of fitting the sections together, there will be jogs *h* cast on the bottom, as shown in the model, of length sufficient to reach from the edge of one section beyond the edge of the adjacent section, to guide the new section and hold the bolt holes and other corresponding parts opposite to each other until the joints are closed.

Having thus described my invention, what I claim as my invention and desire to secure by Letters Patent, is,

Constructing submarine avenues by casting them in short manageable sections, sinking each successively to its place and uniting their ends successively by means of flanges, bolts and packing substantially as described, when these are combined with a lip or lips at the end of each section to insure the bolt holes and other corresponding parts to come and rest opposite to each other as each succeeding section is sunk to its place, and when the structure is made to rest upon a graded bottom as the work progresses, and is held thereto by superimcumbent weight when completed.

I do not claim any one or any number of the elements above specified, except in combination with all the others, nor when used for any other purpose than that specified.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

J. R. MILLER.

Witnesses:

WM. P. ELLIOT,
ARTHUR C. WATKINS.