C. H. Earle.

Draw Bridge.

No. 18,196. Patented Sept. 15, 1857.

Fig. 2.

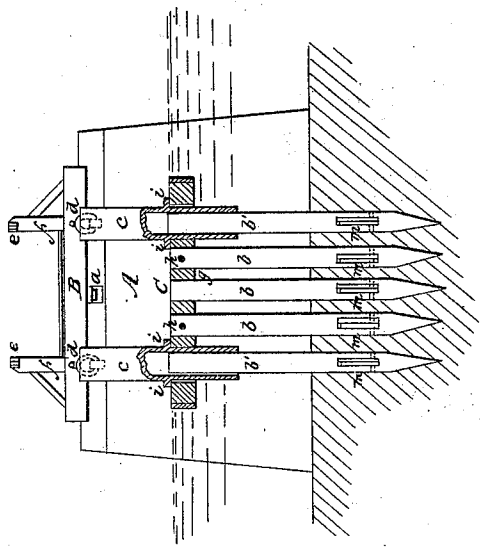


Fig. 4.

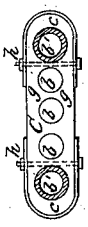


Fig. 1.

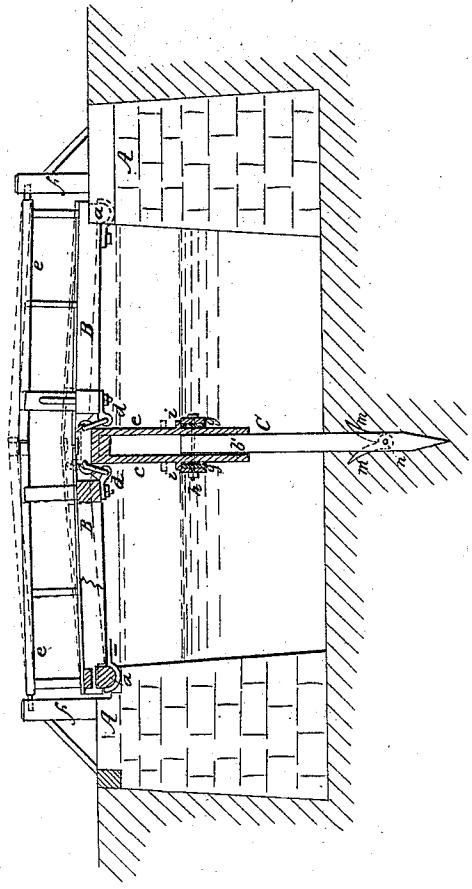
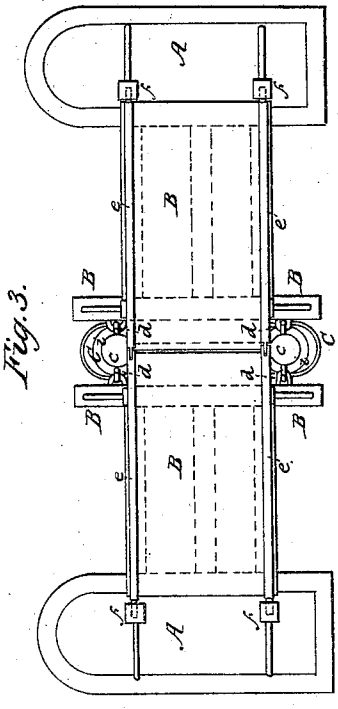


Fig. 3.



UNITED STATES PATENT OFFICE.

CHARLES H. EARLE, OF GREEN BAY, WISCONSIN.

BRIDGE.

Specification of Letters Patent No. 18,196, dated September 15, 1857.

To all whom it may concern:

Be it known that I, CHARLES H. EARLE, of Green Bay, in the county of Brown and State of Wisconsin, have invented a new and useful Improvement in the Construction of Bridges; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal elevation, partly in section, of a bridge constructed according to my invention. Fig. 2 is a transverse section of the same, at the center of the pier. Fig. 3 is a plan of the same. Fig. 4 is a plan of a pier.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to the construction of bridges in such a manner that all the parts except the abutment and piers shall be self-adjusting in such a manner as to be capable of yielding to the upward pressure produced by, an accumulation of ice around the pier or piers or by a freshet and by allowing themselves to be lifted to a considerable extent and of falling back again into their places as soon as the water falls, thus obviating all danger of being carried away by ice or floods.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

The bridge represented has only a single pier, as a bridge of that construction serves sufficiently well to illustrate my invention, which is applicable to bridges with any number of piers. A, A, are two abutments of masonry built on the banks of a river or stream in the usual manner. B, B, is the bridge framed in any suitable manner of timber in two parts, each of which parts is attached by a knuckle joint *a*, or by a hinge, to one of the piers A, A, and stretches halfway across the river, where it is supported on the pier C. The pier C is constructed of piles *b*, *b*, *b′*, *b′*, driven into the bed of the river in a line or lines parallel with the direction of the stream, two of the said piles *b′*, *b′*, or more, if required, at the ends of the piers, being fitted with caps, *c*, *c*, which are capable of sliding up and down upon them and these caps supporting the ends of the two parts B, B, of the bridge which are suspended from them by means of short chains or rings, and eye bolts, as shown at *d*, *d*, in Figs. 1, 2 and 3. By this mode of supporting the ends of the parts B, B, combined with the knuckle connections of the said parts with the abutments A, A, the bridge is left free to rise at the center, in the manner illustrated in red outline, in Fig. 1, when ice collects around the pier or the water from other causes rises high enough to lift it, and is free to descend again to its proper bearings on the pier when the water descends again. The floor of the bridge is made with a lap at the junction of the parts B, B, to prevent any opening there when the bridge rises. The rails *e*, *e*, of the bridge are tenoned and mortised together over the junction of the parts B, B, with a long tenon and mortise, and are also tenoned into mortises in fixed posts *f*, *f*, on the abutments, said tenons being long enough, and the mortises deep enough, to prevent the tenons drawing out as the bridge rises and falls, and preventing any lateral displacement of the parts while providing for their necessary longitudinal movement.

The piers are built in the following manner: All the piles are driven except those *b′*, *b′*, at the ends which are to receive the caps *c*, *c*, and their tops are brought to a level, a little below low water mark, and their tops are clamped together by horizontal timbers *g*, *g*, placed along their sides and bolted together through iron plates or bands outside the said timbers by bolts, *h*, *h*, the timbers *g*, *g*, being left projecting far enough for the end piles *b′*, *b′*, to be driven between them; and the end piles *b′*, *b′*, are driven after the timbers *g*, *g*, are bolted in place, the tops of the latter piles being left level with the tops of *b*, *b*. The cap pieces *c*, *c*, may be made of timber, or cast iron, and are fitted to slide easily up and down in the piles *b′*, *b′*, and between the timbers *g*, *g*, and are provided with fixed collars or shoulders, *i*, *i*, to rest on the timbers *g*, *g*, when the bridge is down in its place at low water and thus support the bridge on the pier.

When it is desirable to make the bridge in three or more sections B, B, two or more piers of the same kind are provided, and the sections next the shore are jointed to the abutments, and supported on caps fitted to the piers, as described, and the other or others supported each on caps fitted to two piers.

When, from the nature of the bed of the

river, as, for instance, when it is of rock, it is impracticable to drive piles, I propose to arrange piles in boxes, which I sink in their places by filling with stones, etc., and fit the caps *c*, *c*, in the manner substantially as above described.

When the weight of the sections of the bridge is not sufficient to bring down the caps to their bearing, boxes filled with stone may be suspended from them to increase their weight sufficiently.

I propose to use in the construction of the piers, piles with fangs, *m*, *m*, of iron, shown in Fig. 1, fitted to mortises in the piles, and secured by a pivot, *n*, passing through them and the piles, and so formed as to offer no resistance to the driving of the pile but as to spread apart with any tendency to draw the pile and thus offer great resistance to any drawing tendency.

I do not claim making a bridge in sections, nor do I claim the attachment of sections of bridges to their abutments, by knuckle joints or hinges, as I am aware that draw bridges have been constructed with such attachments.

What I claim as my invention and desire to secure by Letters Patent, is:

The supporting of those ends of the several sections B, B, of the bridge which are not connected directly with the abutments, by attaching them to cap pieces *c*, or their equivalents, fitted to rise and descend on piers, in combination with the attachment of the sections next the abutments, with knuckles or hinges; whereby the bridge is rendered self-adjusting, and prevented being carried away by accumulations of ice floods or other causes leading to lift the bridge from its place.

CHARLES H. EARLE.

Witnesses:

CHAS. H. KIES,

CHRISTIAN C. FROMMEYER.