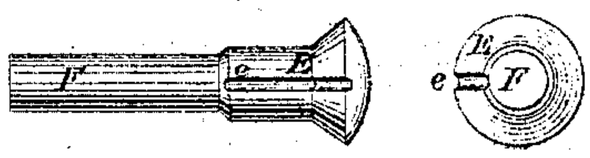
J. ABBOTT.

Iron Fronts for Stone Piers.

No. 138,222. Patented April 29, 1873.



Figs. 6.

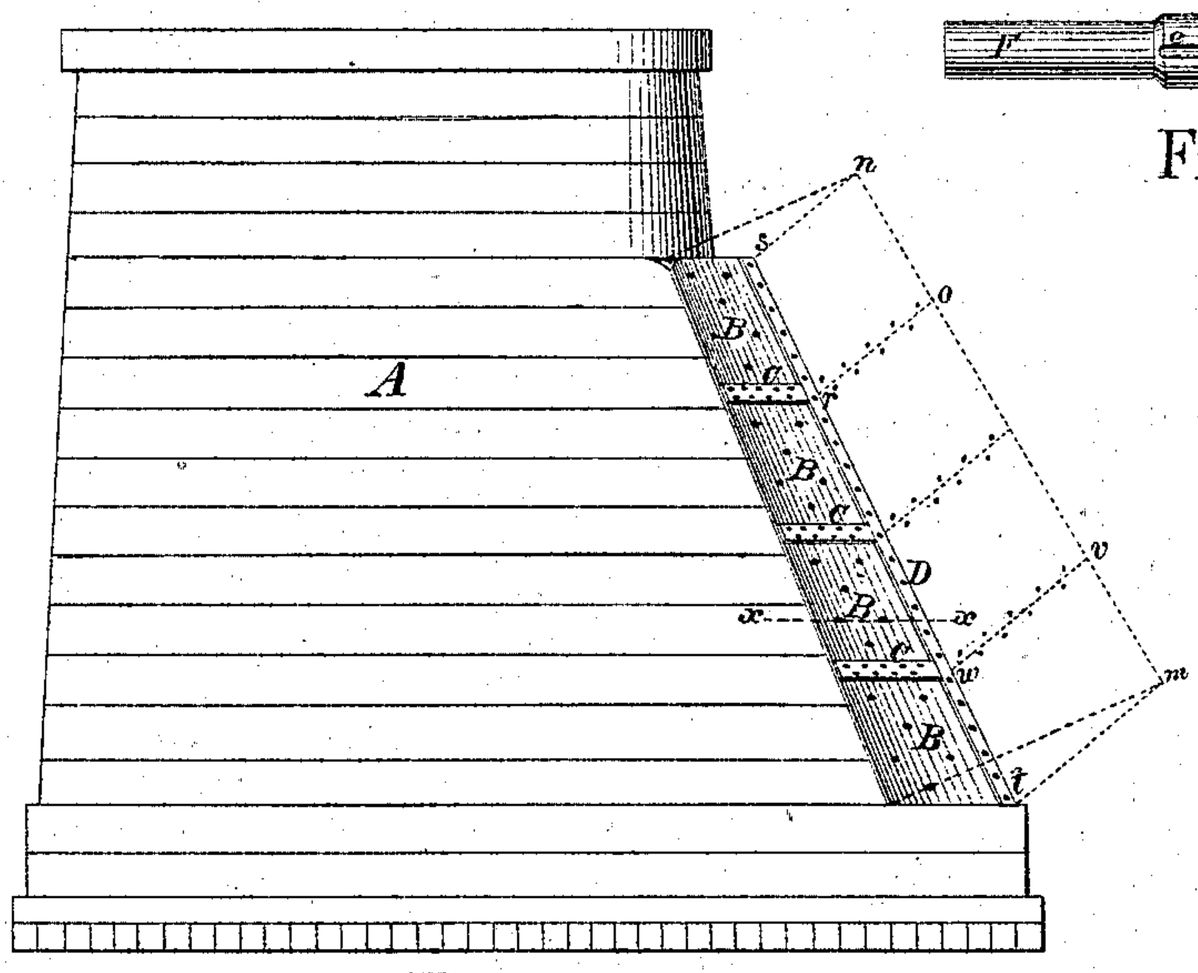


Fig. 1.

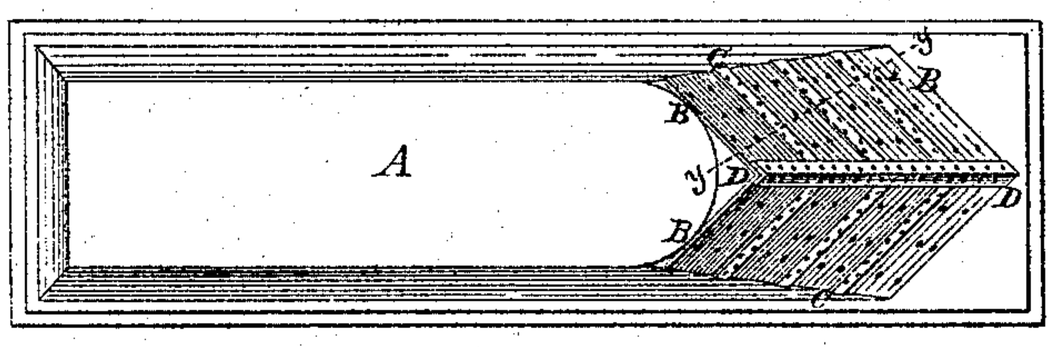


Fig. 2.

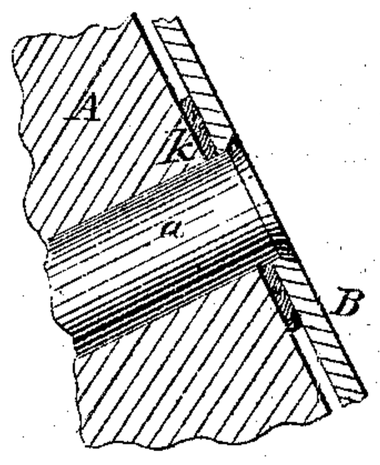


Fig. 5.

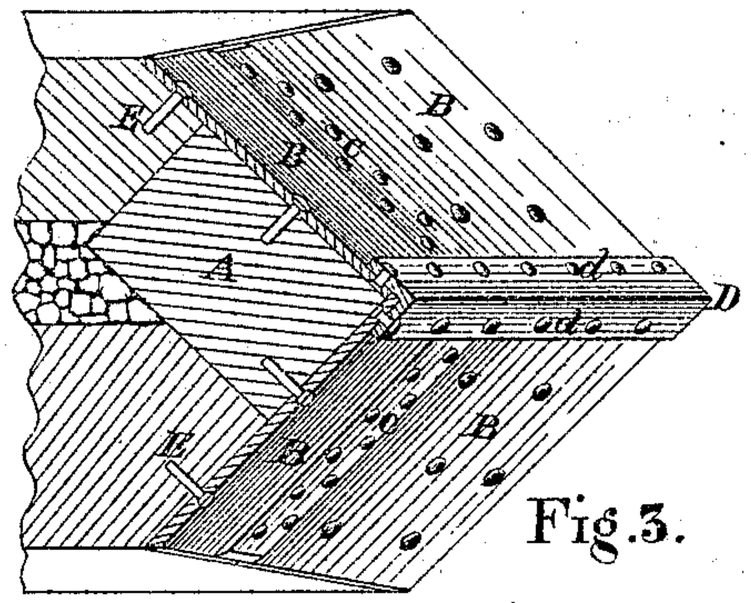


Fig. 3.

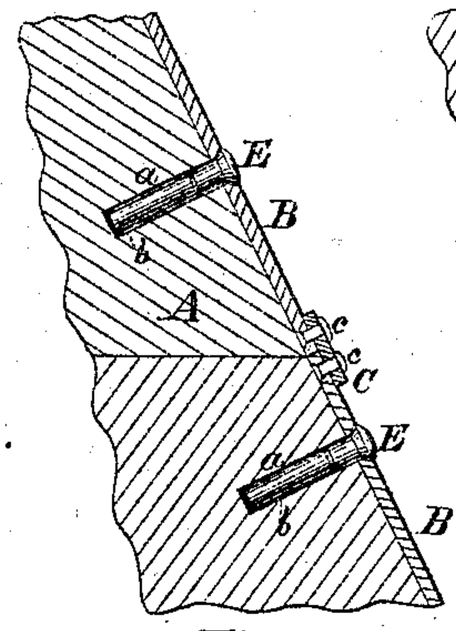


Fig. 4.

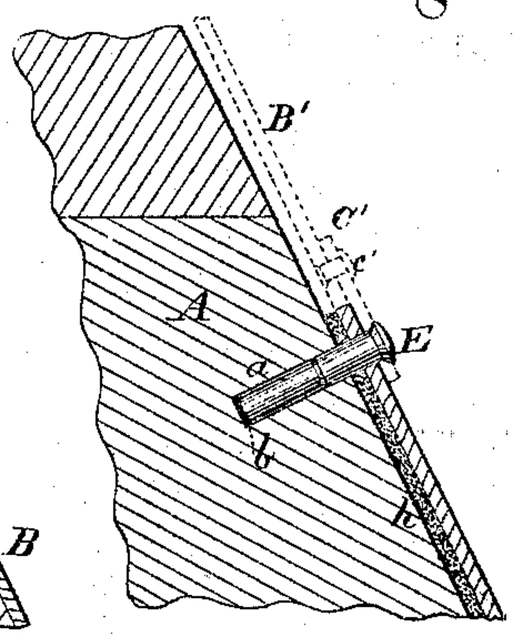


Fig. 7.

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JOB ABBOTT, OF CANTON, OHIO.

IMPROVEMENT IN IRON FRONTS FOR STONE PIERS.

Specification forming part of Letters Patent No. **138,222**, dated April 29, 1873; application filed March 10, 1873.

To all whom it may concern:

Be it known that I, JOB ABBOTT, of Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Iron Fronts for Stone Piers; and that the following is a full, clear, and exact specification thereof which will enable others skilled in the art to make and use the said invention.

In the construction of stone piers of softer sandstones and limestones, found through the Western and Middle States, serious difficulty has been experienced in making the piers of proper strength, with a moderate amount of masonry, to withstand the action of floating ice, drift, and rafts, during periods of high water—the repeated striking of these floating materials against the pier-nose, while moving with considerable velocity, acting to crush the stone on the front edge of the nose, and to break and tear out the corner-stone at the rear angles of the nose, thus gradually demolishing the pier, this result being mainly due to the low crushing strength of the stone at the front edge of the nose, and to the want of strength in the corner-stone of the breaker to resist the crushing and wrenching force of material striking the faces of the nose, and sliding along said faces around the rear corner of the nose to the side of the pier.

My invention is designed to obviate these difficulties in the use of stone of low crushing strength for the construction of bridge-masonry; and to this end it consists in the combination, with the pier-nose, of an iron front, constructed of plate-iron of sufficient size to cover both faces of the pier-nose, and with a heavy angle-bar at its front edge, said iron front being placed over the pier-nose and secured at different points over both faces thereof by dowels run through the iron front and secured in holes in the pier-nose, and the heavy iron angle-bar at the front edge serving to prevent the ice or drift from crushing the front edge of the nose, while the side plates of the iron front act to prevent the faces of the nose-stone from being broken, and also serve as ties to hold together the dowels embedded in the nose-stone, and thus prevent any of the corner-stone of the pier-nose from being torn out, thus completely protecting the pier against the destructive action of floating ice and material, hereinbefore explained. Said invention also consists in the construction of an iron-pier front with a heavy angle-bar at its front edge, and with the plates composing the sides thereof so formed that the battens or splice-plates uniting said side plates shall lie in horizontal positions when the front is placed on the pier-nose, thereby avoiding the danger of floating material catching on said battens while moving along the faces of the front to the sides of the pier; also, in the construction of a dowel-bolt with the body thereof enlarged near the head, and with a groove in said head and enlargement, thereby allowing of the introduction of the dowel-bolt into a hole in the pier-nose drilled through a hole in the iron front after said front has been placed on the pier-nose, and of the securing of the dowel-bolt in such position by pouring in melted lead or equivalent material; also, in the use of a plastic filling of clay or equivalent material immediately around the dowel-hole, and between the iron front and pier-nose, whereby any wasting of the melted lead or equivalent material used for securing the dowel in the pier-nose is prevented; also, in the use of a cement-filling, between the pier-nose and iron front, in cases where either the face of the pier-nose or the iron front have such irregularities as to prevent them fitting closely together, said filling being poured in a liquid form between the iron front and pier-nose after the iron front has been placed in position, and serving, when "set," to form a solid bearing for the iron front on all parts of the pier-nose—these several features of detail serving to facilitate the application of my iron front to any kind of pier-nose where such application would be desirable.

In the accompanying drawing, Figure 1 is an elevation of a pier provided with my improved iron front; Fig. 2, a plan of the same; Fig. 3, an enlarged section of a portion of the same taken through the line X X in Fig. 1; Fig. 4, an enlarged section of a portion of the same taken through the line Y Y in Fig. 2. Fig. 5 is an enlarged section through a dowel-hole, showing the mode of inserting the plastic filling between the iron front and pier-nose.

Figs. 6 are side and rear views of the dowel-bolt. Fig. 7 is an enlarged section, showing the mode of introducing the cement-filling between the iron front and pier-nose.

A is a stone pier of ordinary form, having its nose made with faces nearly at right angles to each other, and with a steel front edge. B C D is the iron pier front, composed of the heavy rolled angle-bar D, to which are secured the front edges of the plates B B by means of rivets *d d*, as shown in Fig. 3. The battens or splice-plates C C are placed over the joints between the plates B B, and are secured to said plates by rivets *c c;* the ends of said battens C abutting against the angle-bar D, and the rivets *c* and *d* being countersunk on the under side, in order to allow the plates B to come down fairly onto the faces of the pier-nose. It is evident that the plates B could be made of any desired form, so that when the iron front was placed on the pier-nose, the battens C might be in various inclined positions; but, in order to secure a horizontal position of said battens on the pier, I develop the face of the pier-front by the plan ordinarily used in descriptive geometry, of turning said face around the edge of the nose until it is parallel to plane of projection, when its elevation, denoted by dotted lines *m n s t* in Fig. 1, will be the exact form of the nose-face. Then I divide this face by lines W *v r o* drawn parallel to the lower edge *m t* into parts of the desired width for the plates composing the sides of the iron front and thus obtain patterns *n o r s m v w t* for the different plates required to form the sides of the front, when it will be seen that the plates can be readily reduced to the proper form simply by shearing the edges *m v w t* to the proper bevel; and it will also be seen that this form of plate will bring the battens C into the horizontal position shown in drawing, which is the most desirable position for them. Countersunk dowel-holes are drilled in the plates B before the front is riveted up, and after said front is placed on the nose holes *a* are drilled in the pier-nose directly below the dowel-holes in the plates B, said holes being of about the same size as the dowel-holes in the front plates, and being made with the common stone-drill in the ordinary manner. The dowel-bolts E are made with a beveled head to fit in the countersunk holes in the plates B, and the upper part of the body F is enlarged, as shown, to fit closely in the holes in the plates B, while the small diameter of its lower end secures its ready admission in the hole *a* in the pier-nose. The groove *e* is formed in the head and enlargement of the dowel E, as shown in Fig. 6, and when said dowel is placed in the pier-front this groove *e* is brought on the upper side, from which it will be seen that the dowel can be then secured in the pier-nose by pouring melted lead or other fusible material in the groove *e*, along which it would run into the hole *a* and form the filling *b*, by which the dowel would be firmly held in the pier-nose. In order to prevent the melted filling *b* from running down between the front plates B and pier-nose A, which would seldom fit closely enough together to prevent such leakage, I take soft clay, putty, or other plastic material, and before the dowel E is inserted I put a ring of this plastic material between the plate B and nose A, as shown in Fig. 5, simply by taking a portion of said plastic substance on the end of the finger and pressing it onto and into the space between the plate B and nose A in the dowel-hole, thus forming a ring, K, of said filling around said dowel-hole, when the dowel can be inserted and the metal filling *b* poured in without danger of leakage. When the faces of the pier-nose or plates of the iron front are very uneven a solid bearing between the front and nose may be obtained by using the cement filling *h*, shown in Fig. 7, which should be reduced to about the consistency of cream and poured in between the plate B and nose A after the iron front is placed in position and secured by one or more dowels, the sides and lower edge of the front being sealed up with plastic cement to prevent the fluid cement from running out. When this filling *h* has "set" it will form a solid filling between the front and pier-nose, and give the iron front the proper support against the pier-nose to enable it to resist the blows from floating material.

When the pier is of considerable height, and the cement filling *h* is required, it is advisable to put on only a part of the whole height of the iron front; then to put in the filling between that part; then put on another part and put in filling as before, as there is then less danger of the filling not penetrating all parts of the space between the iron front and pier-nose.

In this last-named case the batten C′ can be secured by rivets *c′* to the upper plate B′, shown by dotted lines in Fig. 7, and the dowels E can run through both the batten C′ and plate B, so as to avoid any necessity of riveting the batten C′ and the plate B after the plate B has been placed on the nose.

Having thus fully described my invention, I do not claim as new the use of iron bars to protect the front edge or angles of a pier-nose; nor the use of bars on the faces of said nose to bind the stones thereof together, as these features have been before shown; but

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

1. The combination, with the pier-nose of a stone pier, of an iron front having a heavy angle-bar at its front edge and plate-iron sides of sufficient size to cover the faces of the pier-nose, said iron front being secured by dowels to the pier-nose at points scattered over both faces thereof, substantially as and for the purpose specified.

2. An iron front for stone pier-noses having a heavy angle-bar at its front edge and with the plates forming the sides thereof, so formed as that the battens uniting said plates shall

lie in horizontal position when the front is placed on the pier, substantially as and for the purpose specified.

3. A dowel-bolt for iron pier-fronts having an enlargement at the upper part of the body thereof and a groove along the said enlargement and the head, substantially as and for the purpose specified.

4. The combination, with the front plate B and pier-nose A, of a plastic filling, K, inserted between the plate B and nose A around the dowel-hole *a*, substantially and for the purpose specified.

5. The combination, with the nose of a stone pier and an iron front therefor, of a cement filling introduced in a fluid form between said front and nose, substantially as and for the purpose specified.

As evidence of the foregoing specification and claims witness my hand this 6th day of March, A. D. 1873.

JOB ABBOTT.

Witnesses:
GEO. W. RAFF,
JAMES F. TWERDY.