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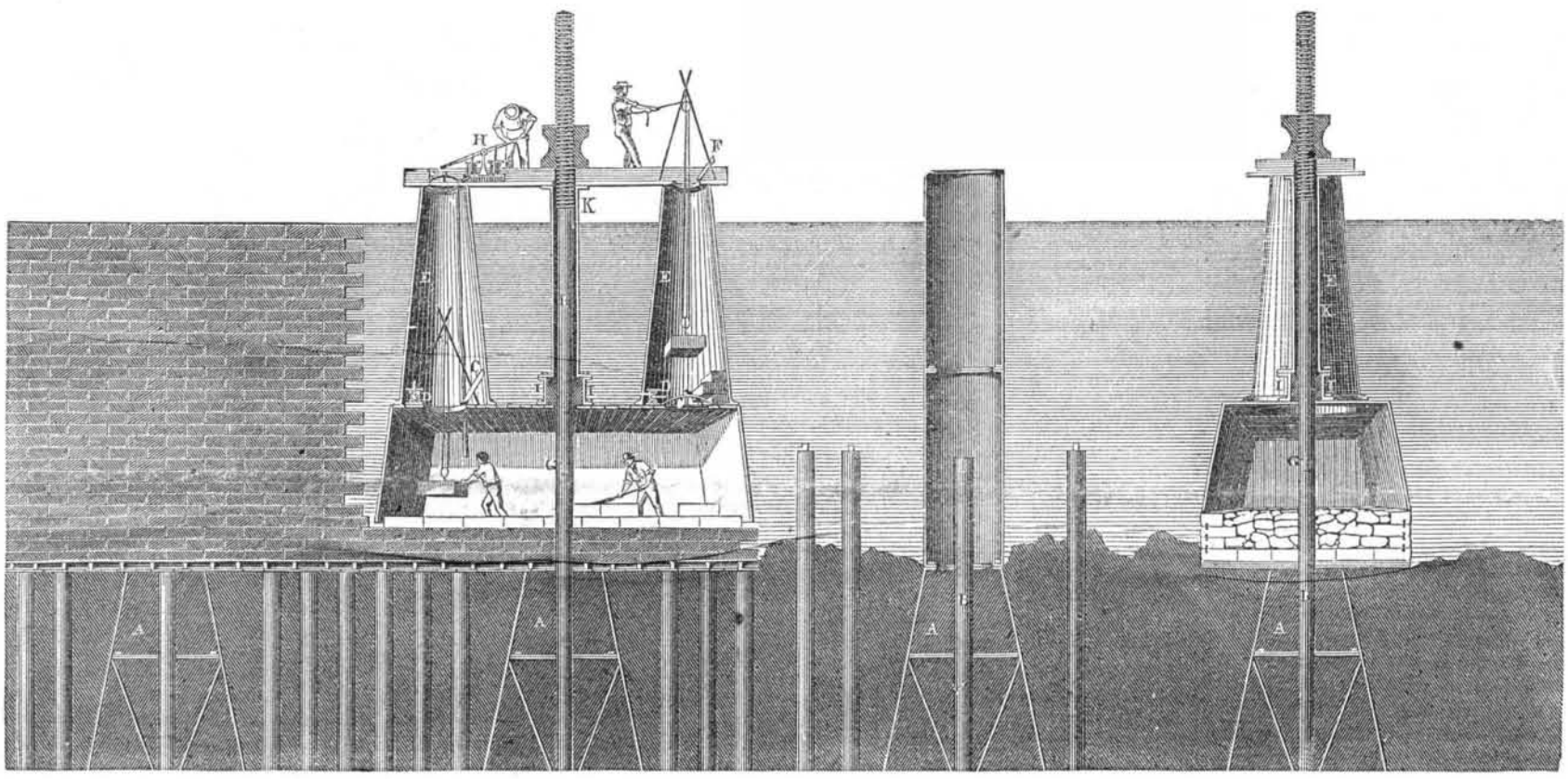
IMPROVEMENT IN SUBMARINE FOUNDATIONS.

This new improvement in the method of constructing Submarine Foundations, is the invention of Charles Pontez, who is at present residing in this city, the owner of the patent for Dr. Potts' process of sinking hollow piles. Hydraulic engineering is the most difficult branch of the engineering art, and presents more practical trouble to the engineering profession than any other. Numerous plans have been devised for working beneath the surface of the water, but only the diving bell, and the coffer dam have stood the test of practical utility. More recently, the method of sinking large cast-iron cylinders, by Potts' Pneumatic Process, which was described on page 161, Vol. 5 Scientific American, is now being used in several works in the United States. Although iron cylinders, ten feet in diameter, have been sunk into the ground many feet below the surface of the water, and which answer admirably as piers for the support of bridges, yet a continuous and unbroken wall cannot so be made, as there must necessarily be some space between the cylinders. It is now proposed to make the iron cylinder subservient to a method of constructing a continuous wall of masonry under water, with almost the same facility and with much greater economy than by the use of coffer dams; the plan has also the advantage of being applicable to localities which will not admit of the construction of coffer dams.

In the illustrations, figure 1 shows a large iron cylinder sunk beneath the bottom of the water. A A A represent a series of these cylinders placed exactly twenty feet apart, and

Figure 2. **Figure 1.** **Figure 3.**



which have already been built on. Figure 2 presents a longitudinal section of an immerser coffer, with its shafts or entrances, and the guide post in the centre. Figure 3 shows a transverse section of the same. Suppose it is required to construct a continuous wall ten feet thick, and in water twenty feet deep; the operation would be commenced by sinking a cast-iron cylinder, 5 or 6 feet in diameter at its base, to a depth sufficient to secure its stability; it is then cleared of the soil within it. In the centre, at its base, is secured an upright iron post, which reaches a few feet above the level of the bottom of the water outside; the post has at its upper end a socket which permits of its being lengthened. The cylinder is now filled with concrete to increase its density, and more fully to secure the upright in its place, so that whatever force may be applied, it cannot be drawn without dragging up with it the cylinder with its contents, and dislodging the superincumbent soil. Fig. 1 shows the cylinder and guide, B. That part of the cylinder above the level of the bottom is now detached, as shown in figure 2. The immersive coffer with its guide post, prevents its rising when immersed. This coffer may be made 20 feet long at its open end, and 6 feet high. Its width may be regulated by the required thickness of the masonry; in its top are two air tight doors, C C, and two taps, D D; these open into the two shafts or ways, E E, each forming a distinct entrance to the coffer, they are elliptical in shape and are larger at their bases than at their tops, which extend above the surface of the water when the coffer is immersed. The doors, F F, at the top of the shaft, are also air-tight; immediately in the centre of the coffer is a small hollow cylinder, K, open at the top, having a stuffing box, I, at its base where it is connected with the coffer. Through this the guide-post, B, passes. To secure the coffer in its position, it is floated immediately over the sunken cylinder, the guide-post, B, being passed through it, and securely screwed at the joint, G. The coffer is made to sink by loading it or by filling with water by turning the taps, D D. The coffer is then secured to the guide-post at the platform, so that it cannot rise without dragging with it the guide-post and its connections. If the coffer has been filled with water to sink it, the taps are then closed and the water is expelled by forcing in air by means of the pumps, H. Materials are lowered and ingress and egress are obtained to the coffer by the following means:—one of the shafts is filled with materials, into this the men descend and close the upper door, F; the air in the coffer below is of a density proportionate to the depth of water, and its sudden reduction, by opening the lower door, C, would cause the coffer partly to fill; this is obviated by opening the tap, D, at the same time the pumps support the density of the air in the coffer until it is equalized. The door is now opened, and the men descend to work. Whenever it is necessary to have a fresh supply of materials by a like process, the contents of the other shaft are deposited, and so alternately one shaft is open for the reception of materials, while the contents of the other are being delivered below; and the work proceeds and the courses of masonry are laid dry

When more space is required the coffer is allowed to rise a space along the guide-post, and so gradually the works continues, course by course, until the surface is reached, and the coffer floats. A small opening has been left in the masonry, around the guide-post, which is now withdrawn by unscrewing it at the joint, G. The coffer is now floated to the next sunken cylinder, which is distant from its predecessor exactly the length of the coffer; the same operation is repeated, and the joints in the masonry, at each twenty feet, are made under the edge of the coffer.

This arrangement for building under the water differs essentially in the details from the diving bell. To cause the diving bell to sink, it must in itself or by the addition of weight be specifically heavier than a volume of water of equal bulk; to enable it to reach the surface it must be divested of a portion of its weight, or a power applied to it greater than the weight which caused it to sink, and on account of its great weight it must necessarily be circumscribed in size. One reason why operating with it is so expensive, is, that it requires the attendance of nine men, while only two can be operating on the work. The immersive coffer can be raised, lowered, or retained at any desired point—the means of controlling it forming a part of the structure itself.

It is obvious that this is an arrangement perfectly practicable, at least in situations where the depth of water does not exceed 30 feet; it now becomes a question as to the advantage it offers of convenience and economy. The cost of the immersive coffer would not greatly exceed the cost of constructing a section of a coffer dam enclosing an equal area but it would serve the purpose of any number of such sections.

In a week or two we shall publish an engraving, showing Mr. Pontez's application of his invention to the building of Dock Warehouses—a very important subject. On that occasion we shall make further remarks on this method of Hydraulic Engineering. Measures have been taken to secure a patent. Mr. Pontez's office is at 34 Liberty street, this city.

Scoundrelism on Railroads.

Some devils in human shape, on the evening of the 6th inst., embedded one end of an iron rail two feet deep on the Hudson River Railroad, near Bloomingdale, for the purpose of striking the locomotive, in order to break it, and kill every one that might be struck. The rail projected above the track in a slanting direction, to be struck by the engine coming down. The locomotive struck it at full speed and was completely disabled, but fortunately no person was hurt. The person guilty of such an act is unfit to crawl abroad on the face of the earth, State Prison for life is too good for him.

We learn by the Pottsville, Pa., Mining Register, that the Reading Railroad, has recently placed upon the road two large coal burning locomotives built after Mr. Mullholland's improvement, and one good working plan connected with them is, they carry an extra water tank each, to save some stoppages for water. This is a hint worthy the attention of some other roads.