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Improved Air-Pump.

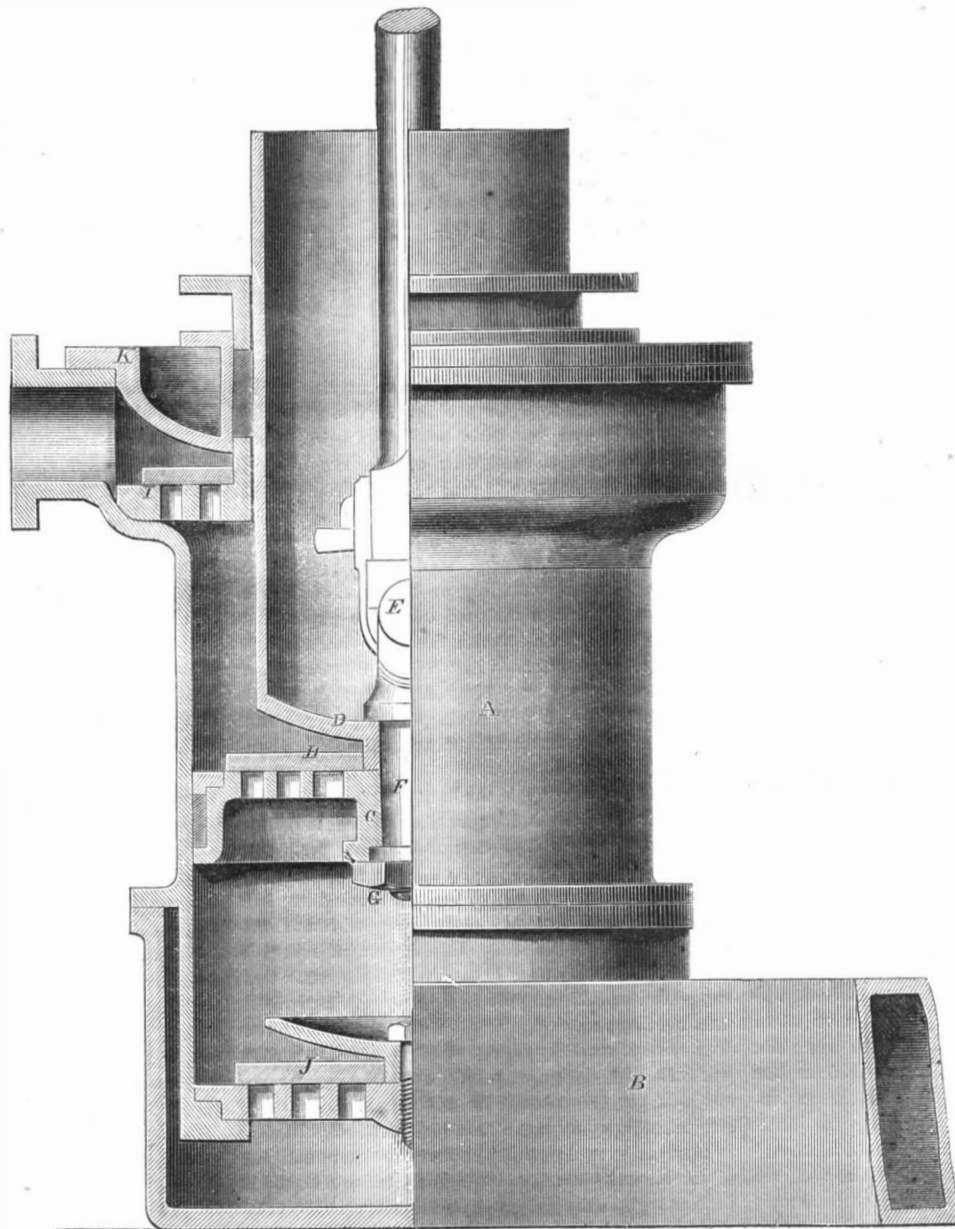
Quick-working steam engines, when running at high speeds, are liable to shock and jar, from the rapid opening and closing of the valves and pistons that are brought into contact with water. The air-pumps especially, when the engines are of the condensing variety, have a heavy load to overcome; it is desirable to obviate the evil alluded to, as far as possible, by easing the bucket of the source of a portion of its labor. We herewith illustrate a device for this purpose. The pump barrel, A, sets upon and descends into the channel way, B, to which it is bolted. In this barrel the bucket, C, attached to the trunk, D, works. The spade-handle bearing, E, to which the connecting rod is attached, is a continuation of the pin, F, which goes through both the trunk and bucket and is there secured by the nut, G. The bucket has a series of radial openings or grates disposed about its center, which constitute the seat for the valve, H. A similar grating and valve may be seen at, I, there is also a foot valve shown at, J. The operation of this pump and its valves is as follows. When the condensed water flows into the channel-way, the motion of the bucket and its trunk causes the foot valve to rise and admit the hot water; as the bucket descends, its valves also raise and upon the return stroke close and carry the load with it. Now when the engine works rapidly, if no yielding surface was interposed between the water and the air-pump covers, K, the latter

THE INVENTOR OF IRON-CLAD VESSELS.

On the 22d ult., Senator Cowan, of Pennsylvania, presented a petition in the Senate from A. Stewart and others, asking for a pension to the widow of Thomas Gregg; it being claimed that he was the

Totten, in 1841. It was stated in the document proposing the construction of such a vessel for the defense of New York, that plates of iron four inches in thickness were equal to five feet four inches of oak in resisting a ball at point-blank distance; and with the guns then in use it was supposed that none of their shot could penetrate a vessel clad with such armor. In 1843, a contract was formed between our Government and Messrs. Stevens for the construction of such a floating battery, and \$500,000 was furnished by Government and expended on the battery now at Hoboken.

During the Crimean war in 1855 it was found that wooden steam frigates were totally useless in attacking granite case-mated forts defended by big guns firing shells. An application of Stevens's invention was suggested, and several iron-clad gunboats were then built for the French and English navies. A few of these were employed at the siege of Kinburn and were decidedly successful. This led the Emperor of France to extend the application of iron plates to one of his large frigates—*La Gloire*—which was completed three years ago, and was the first regular iron-clad war ship ever built. Since then several have been constructed for the French and English navies—the American invention having thus been first carried into practical use in Europe. The first American iron-clad boats were those that were built for the Western rivers in the winter of 1861 and 1862, and which have been very serviceable on several occasions. The next was the *Monitor*, and now we have a considerable fleet of



VIAL'S PATENT AIR PUMP.

would be subjected to a series of severe shocks; these shocks distribute their force through all parts of the machinery and tax its endurance greatly. To obviate this the inventor employs the valve, I, which by rising as the water meets it, eases the blow and permits the water to overflow into the hot well, or out-board discharge, without further delay. This attachment would seem to add very materially to the effective action of the pump and to subtract very much from the concussion and consequently the jar of the machinery and liability to carry away important parts of the engine. This invention was patented Sept. 9, 1862, by John Vial, and for further information address him at Cleveland (west side), Ohio.

original inventor and patentee of iron-clad vessels. This is a new phase of this subject, and a brief history of the invention, according to the information we possess, will therefore be of some public interest just now. It is generally admitted by European engineers that although iron-clad gunboats were first brought practically into use during the Crimean war, the late Robert L. Stevens and E. A. Stevens, of Hoboken, N. Y., were the inventors of them. Vessels protected with angulated iron plates were proposed by them as early as 1816, and for coast and harbor defense a description of such vessels was afterward submitted to a Government board, consisting of Commodores Stewart and Perry and Colonels Thair and

iron-clads in commission and a large number more in the course of construction. The *Ironsides*, built at Philadelphia, and the *Roanoke*, which is now being completed in this city, are the only iron-clad frigates belonging to our navy that may be justly called "sea-boats"—all the other iron-clads are floating coast batteries and river boats. We will now refer to the claims of Thomas Gregg. An illustrated description of his iron-clad vessel was given on page 352, Vol. VI (new series), of the *SCIENTIFIC AMERICAN*. It is there stated that specifications and drawings of his iron-clad boat were filed in the Patent Office 48 years ago—1815—which ante-dates the claims of Messrs. Stevens's invention by one year.