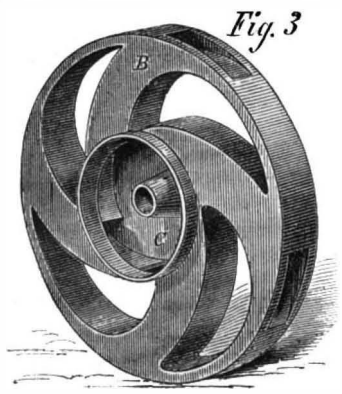
Improved Patent Rotary Pump.

Few implements or machines have been devised which have been subjected to so many modifications as the pump. There was a time when rotary pumps, on whatever plan constructed, were unpopular. The prejudice is, however, fast disappearing before the unanswerable logic of facts. Rotary pumps are made which cannot be surpassed for efficiency and durability by any reciprocating pump. The machine under consideration is of that class of pumps known as centrifugal pumps, receiving the water at the center, forcing it to the circumference, and raising it to the point desired by centrifugal action.

The scroll or shell, A, is of cast iron, made in halves, and bolted together in the usual manner. Inside is a piston, B, Fig. 3, consisting of a wheel with curved radial arms, the curve being opposed to the direction of rotation. These arms are cored, or cast hollow, opening on the periphery, and communicating with a central chamber, C. This piston

Fig. 3



is mounted on a shaft, D, with suitable bearings, and, on the upright form of the pump, having a gland, or stuffing box, E. It will be noticed that the walls of the chamber, C, project. This projection fits in a corresponding recess on that side of the shell where the water enters, so that none of the water can get between the piston and the outside of the case; it must follow the passages through the arms and be discharged at F. The rim of the piston, B, serves the same purpose, as it fits the interior circumference of the case and prevents the escape of the water from the piston to the inside of the case. This insures a freedom from undue friction and prevents the churning of the water. The combination of these two devices, it is claimed, gives this pump a great superiority over others of similar principle. This pump is equally effective, worked either vertically or horizontally.

It was patented July 25, 1865, by Geo. W. Heald and L. D. Sisco. For additional particulars address Heald, Sisco & Co., manufacturers, Baldwinsville, N. Y.

Fig. 1

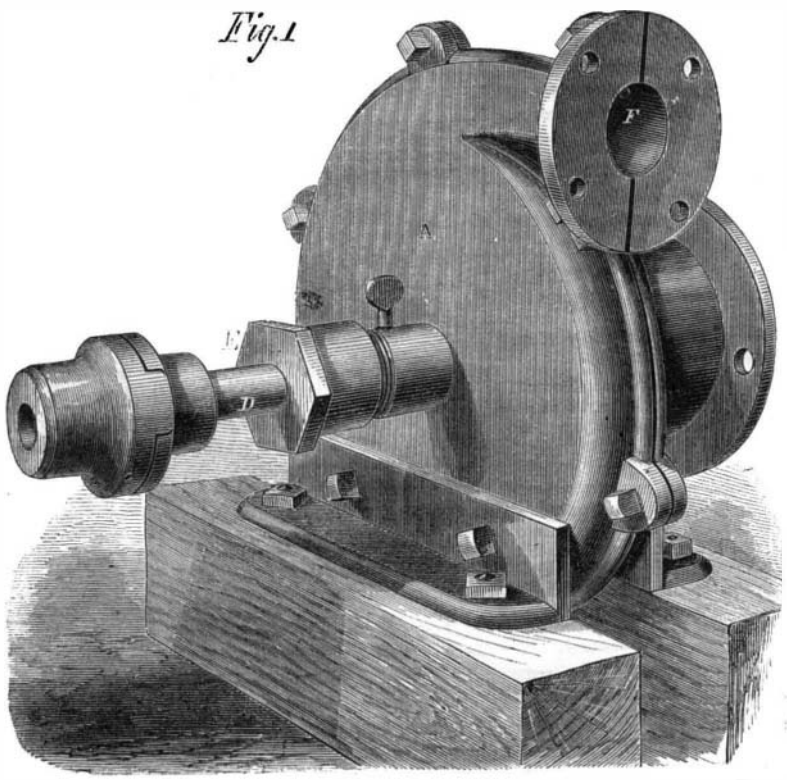
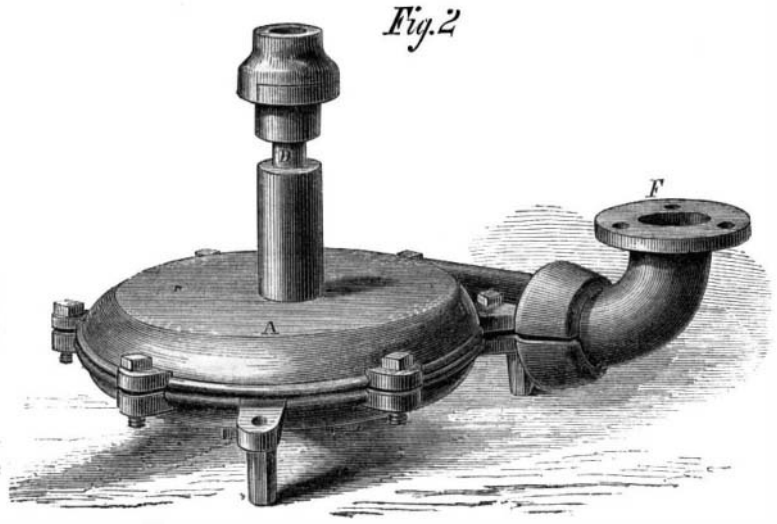


Fig. 2



HEALD & SISCO'S ROTARY PUMP.

ENGLISH AND AMERICAN GUNS.

The Shoeburyness experiments, with the nine-inch Woolwich rifle and the Palliser chilled bolt, seem to have operated as a soothing salve to the wounded pride of our English cousius, when, by a personal examination of the *Miantonomoh* and her armament, they were forced to give a reluctant assent to our superiority in the manufacture of naval guns and ships. This assent was given, not in so many words of acknowledgment, but by a general demand on their Government for monitors and large guns.

It cannot be successfully disputed, as we stated in our issue of the 20th Oct., that the results of the Shoeburyness experiments were remarkable. That a bolt of chilled iron, fired from a nine-inch rifle, should penetrate a target of eight inches of solid rolled iron, backed by eighteen inches of teak and a thin inner skin of plate, when the projectile weighed but 254 pounds and was impelled by only 43 pounds of powder, is a reason for gratulation. But it affords no adequate reason for belittling the performances of the fifteen-inch smooth-bore, or the twelve-inch rifle of the American pattern.

That this is the *animus* of an article in the *Engineer* of Oct. 12th, is apparent. We have no disposition to follow the editor of that journal in his four-column attempt to prove the inferiority of American ordnance, but simply to draw attention to some of his admissions. While doubting the actual existence of 20-inch guns, and repudiating the idea that they can bear a charge of 140 pounds of powder, the editor intimates the expediency of constructing 15 and 20-inch rifled wrought-iron guns. This sounds queerly with the following from the same article:—

"We believe that, at this moment, *the nine-inch English rifle is the most powerful weapon in the world*; but it would be folly to attempt to maintain that it will retain this supremacy for any lengthened period; and it is much better that we should try our 'prentice hands at making fifteen-inch guns in time of peace, rather than have their construction forced upon us in time of war."

According to a carefully-prepared table in the same article, the *Engineer* demonstrates, to its own satisfaction, that the American fifteen-inch smooth-bore cast-iron gun is inferior to the English rifled wrought-iron piece, yet the comparative results of the Fortress Monroe and Shoeburyness experiments, on which the article is based, appear to be insufficient to allay well-grounded apprehensions.

The *Engineer* further says: "It must not be forgotten that the nine-inch (English) shot is rifled, while the fifteen-inch shot (American) is spherical, and, therefore, in traversing a given distance the velocity of the American projectile, and consequently its efficiency, will be greatly reduced, as compared with those of the rifled bolt, because the sphere offers most surface to the resistance of the air. It may be assumed with safety, that the velocity of the spherical shot will be reduced one-tenth in traversing the first 500 yards after leaving the gun, while that of the rifled projectile will not be appreciably diminished in accomplishing the same distance."

The conditions of the test, then—which the *Engineer* seems determined to make it—are very unequal in these respects. But there are other important considerations to be noted before a comparative test can be deduced from the two experiments. In the case of the Fortress Monroe trial, the object sought was to ascertain the power of granite walls to resist heavy shot, and the desirability of protecting them with iron plating. The Shoeburyness experiments were to ascertain the resisting force of the plated broadsides of ships. In the first case the distance fired was 350 yards; in the latter only 200 yards, and a rifled gun was used for the latter, while the parallel is sought to be drawn between that and the smooth-bore used in the former.

The composition as well as the form of the shot is another important element. In the Fortress Monroe tests the shot was of ordinary cast iron; in the Shoeburyness trial of hardened steel and the Palliser chilled iron, which, so far, seems to be the best material for penetrating qualities as yet used. This last fact, as we intimated in the SCIENTIFIC AMERICAN of the 27th Oct., is the evident cause of the success of those experiments, rather than the description of gun from which the shot were fired.

The most significant comment, however, on the criticism of the *Engineer* in addition to its own recommendation to copy our example in constructing fifteen and twenty-inch guns, is the following from *Ryland's Iron Trade Report* of Oct. 6th:—

"Government has ordered one of the fifteen-inch Rodman guns, with improved carriage, shot, and powder, from the United States. This is a great step in the right direction. It would be obviously premature and even dangerous to come to an absolute decision on the question of guns and projectiles while we are still so completely in the dark as to the merits of the American system. The gun is likely to arrive in this country in six or seven weeks. It is strange the late Government never thought of so practical a mode of settling the question between British and American ordnance."

Photo-Medallions.

This is a new way of producing portraits in relief or medallion style, in plaster, resembling marble sculpture. A photographic print is first made upon wax, clay, or other suitable material, and then, by mechanical means, an intaglio is sunk, from which plaster casts—forming beautiful, accurate likenesses in relief—are produced at a comparatively small expense. Mr. G. G. Rockwood, of 839 Broadway, New York, one of our most enterprising photographic artists, has shown us some fine examples of the "Photo-Medallion."