

Improved Water Wheel.

The importance of a cheap and easily managed motive power cannot be exaggerated. Especially is this the case in rural districts, and in parts of the country remote from towns or villages. Here we will illustrate a simple but effectual water wheel, which is highly spoken of by those who have used it. A reference to the several views of this wheel will render our description plain. Fig. 1, represents the wheel and its case in perspective. The cover of the case, A, is made of two-inch oak plank, the top of the chute, B, is also of oak, two and a half inches thick, C, is the circumference of the chute and D the bottom of the same. The square wooden frame, E, is two inches larger than the diameter of the wheel, and is supported by four posts, F, one of them is placed under each corner of the frame. The shaft, G, of the wheel, seen in Fig. 2, rests on the hard wood step, H, this step is boiled in tallow, and is received by the casting, I. There is further, a ring, J, cast on the saddle provided with four set-screws, by which the step can be set properly. The timber, K, supports the whole fabric, step and wheel, and the buckets, L, are curved to suit the velocity of the current under which the wheel is to be run. Provision is made for replacing them when broken. The concave hub, M, is turned off on its periphery so that it fits closely to the top of the chute. The ring, o, is adjustable, being laid loosely on the bottom of the chute, so that it prevents the water from leaking out; this, it is stated, has never been obviated before by an iron wheel working in a

through the Scientific American Patent Agency. Further information can be had by addressing the inventor at York, Pa.

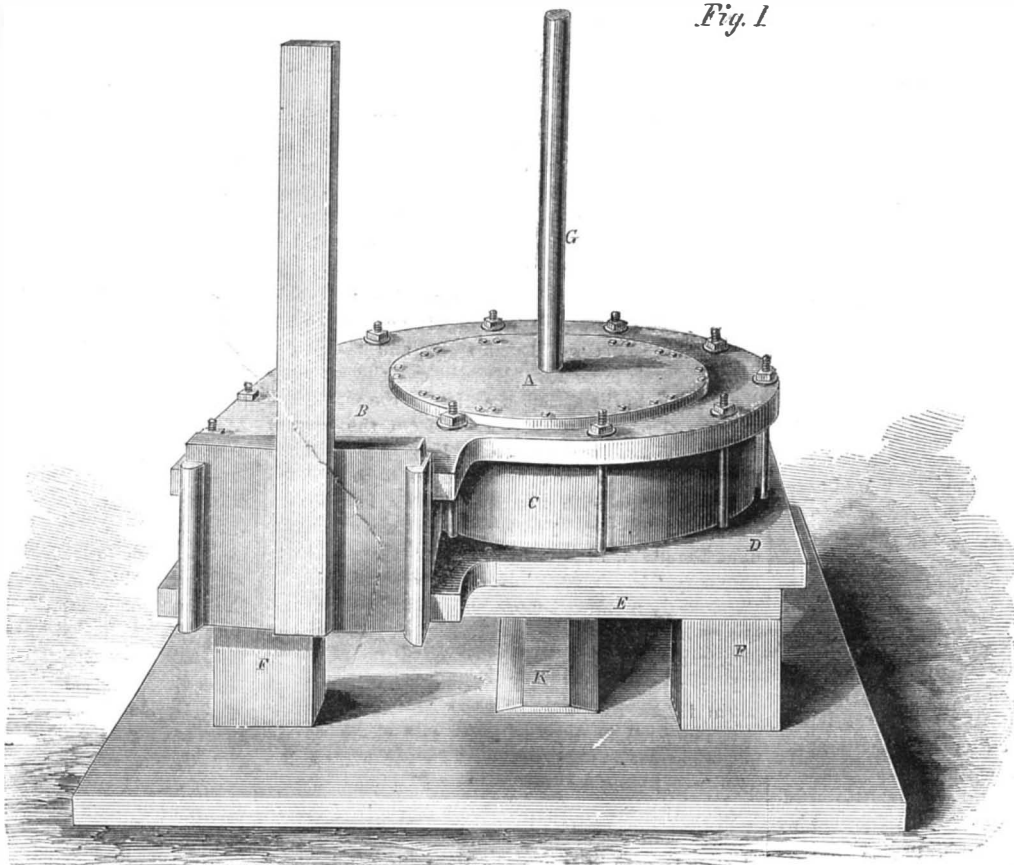
Repairing the "Great Eastern."

We notice a communication in the London *Engineer* of Jan. 16th, from a Mr. Young, C. E., in which he quotes the "Transactions of the Society of Arts for 1823," to prove that the device adopted by Renwick Bros., of this city, was identical with the one there described. This point being granted, how does

the barricade. There are two upright braces, C C attached to the truck, which strengthen the iron plate and render it more stable. The slotted legs, D, at the end of the truck, allow the handles of the same to be raised or lowered, as may be desired, thus varying the natural angle of the breastwork's inclination 45°, at the will of the soldier. The upright braces have thumb-screws, provided with long hooked ends, a, on which the sharp-shooter can place his weapon; the screws also fasten the ends of the braces to the plate. The appendages, E E, are supplied for the purpose of securing two or more sections of these defenses together; they have staples, b, which engage with similar fixtures upon the other plates, and prevent them from being forced apart from the outside. There is also a box, F, formed in the truck, which furnishes a convenient receptacle for hand grenades or other missiles thrown when in close action. These details comprise the main features of the portable breastwork.

Our artist has so fully depicted the uses to which this invention can be applied, that further comment is unnecessary. It may be well to add, however, that the breastwork is light, easily wheeled from place to place, and affords a shelter from inimical bullets; this will, we think, be highly appreciated by soldiers. The picket can thus defend himself from the unscrupulous foe, or infantry moving to attack other infantry can, by the aid of the portable breastwork, deliver their volleys at

close range. This breastwork is the invention of Mr. S. M. Sherman, of Plover, Wis. Further information can be had by addressing him at that place.



BURNHAM'S PATENT CENTRAL-DISCHARGE WATER WHEEL.

Fig. 2.

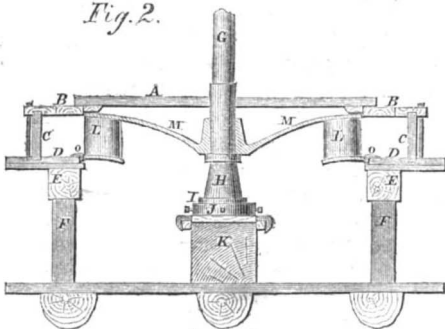
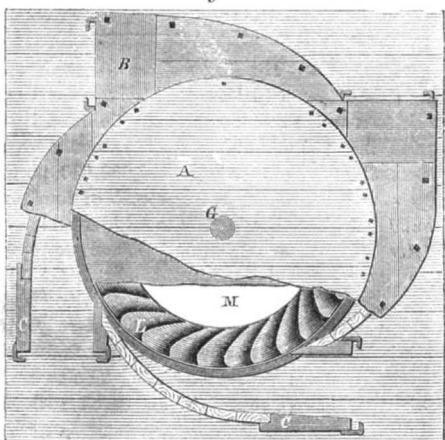


Fig. 3.

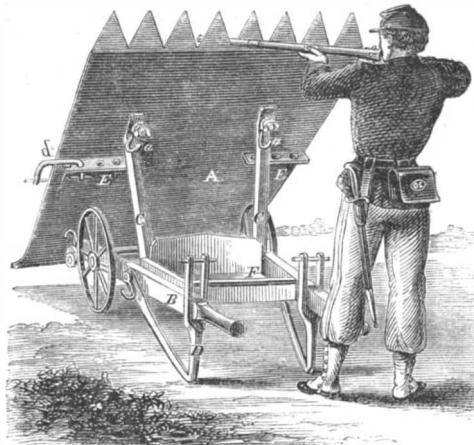


wooden curb. Fig. 3, represents the same wheel with four chutes; it can be made with either one or four, as parties may desire. This water wheel is the invention of N. F. Burnham, Variety Iron Works, York, Pa. A patent has been ordered to issue

that affect the question of the difficulties which were overcome and surmounted by the contractors here, the credit for which they are just as much entitled to as if the apparatus were novel or as if it were a thousand years old?

SHERMAN'S PORTABLE BREASTWORK.

The importance of protecting infantry in the field from the attacks of sharp-shooters or other soldiers detailed for special duty is acknowledged by all per-



sons familiar with military science. This end has been the study of many inventors. We illustrate a plan designed to afford such protection, which will be readily understood by referring to our description. It consists of an iron breastwork, A, mounted upon a truck, B. The top of the iron plate has a serrated edge, which is intended not only to prevent the breastwork from being scaled by the enemy, but also to furnish a protection for the head, and loopholes for the musket of the soldier or sharp-shooter behind

close range.

This breastwork is the invention of Mr. S. M. Sherman, of Plover, Wis. Further information can be had by addressing him at that place.

HOW FLINTS ARE FORMED.

The rounded nodules called "flints" are usually found in chalk beds, and are supposed to be organic remains transformed into chalcedonic quartz. Flint is nearly pure silicic acid, and at one time it was extensively used in the manufacture of pottery and glass, hence the common term "flint glass," in the production of which white sand has superseded it. It has been a subject of some wonder how flint, which is nearly pure silica, could be formed out of organic remains, such as the eggs of extinct creatures in chalk formations. This subject was lately brought before the London Chemical Society, when Dr. Church stated that the origin of flints could be traced to water holding silica in solution. During the percolation of such water through beds of chalk, the silica became separated and the carbonate of lime took its place in the water thus deprived of its silica. An interesting example of the deposition of silica in the form of chalcedony took place within a comparatively recent date, geologically speaking. About the year 1400 a basket of hen's eggs had been left in a chalk pit at Winchester, England, and this basket was lately found covered up with broken chalk. The organic matter and the shell of the eggs had entirely disappeared and their places occupied with the semi-transparent variety of silica—chalcedony. Silica was also deposited upon the willow twigs composing the basket, forming a crust of silica.

The higher the temperature to which steel to be hardened is raised, and the colder the fluid into which it is plunged, the harder and more brittle it becomes. In India glaziers never use a diamond to cut glass; they use steel points hardened as described.