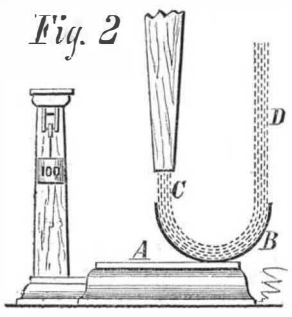
IMPROVED TURBINE WATER WHEEL.

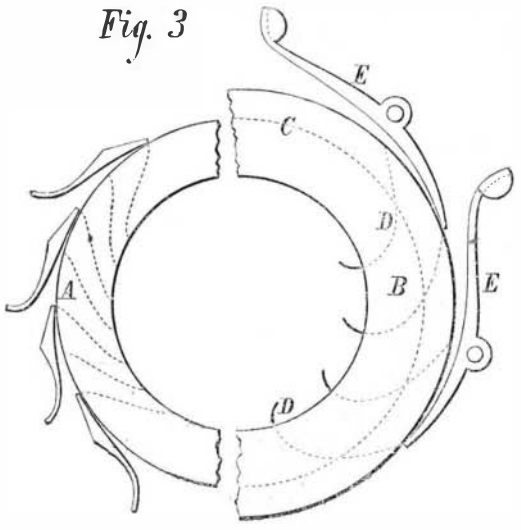
The principal point of improvement, in the turbine wheel represented in the accompanying engravings, consists in the peculiar shaping of the buckets, through which, it is claimed, the maximum power of the water supply is utilized. The idea of this construction, the inventor (Mr. James Craik, of Chateaugay, N. Y.) states, was developed by first causing a column of water to descend perpendicularly upon a horizontal scale platform, and balancing its effect by weights. For the level plate, a curved one was then substituted, of such a shape that the descending column, entering at one end, was deflected around the bottom and returned upward at the opposite side. It was then found that, in order to balance the direct impulse of the falling column, together with the reactive force of the ascending stream, double the weight previously employed was required, and that the curve was a semicircle. This will be rendered clearer by Fig. 2, in which A is the horizontal

Fig. 2



platform, B the curved plate, and C and D the falling and rising columns of water. The conditions, however, thus determined are modified through the motion of the point to which the power is applied. Thus, if a wheel could remain stationary and still transmit the impulse, the semicircle would be the proper curve for its buckets; but such not being the case, the wheel rotating, it is evident that centrifugal force affects the water, so that the bucket must be set to counteract the tendency of the fluid to flow toward the circumference.

Fig. 3



The inventor proceeds further to state that, in some well known turbines, the direction of the water must be deflected inward against this centrifugal tendency, a force augmented by the motion of the wheel. This deflection increases the action of the water against the point of the chute, but diminishes that in the inward direction, through the bucket by which the wheel is driven. The force due to deflecting and returning the column of water is thus thrown against the point of the chute, instead of being applied within and against the bucket; and as the action of the column is more intense at this point of reversion than in any other part of its revolution, it is considered evident that a portion of its power is not communicated to the wheel.

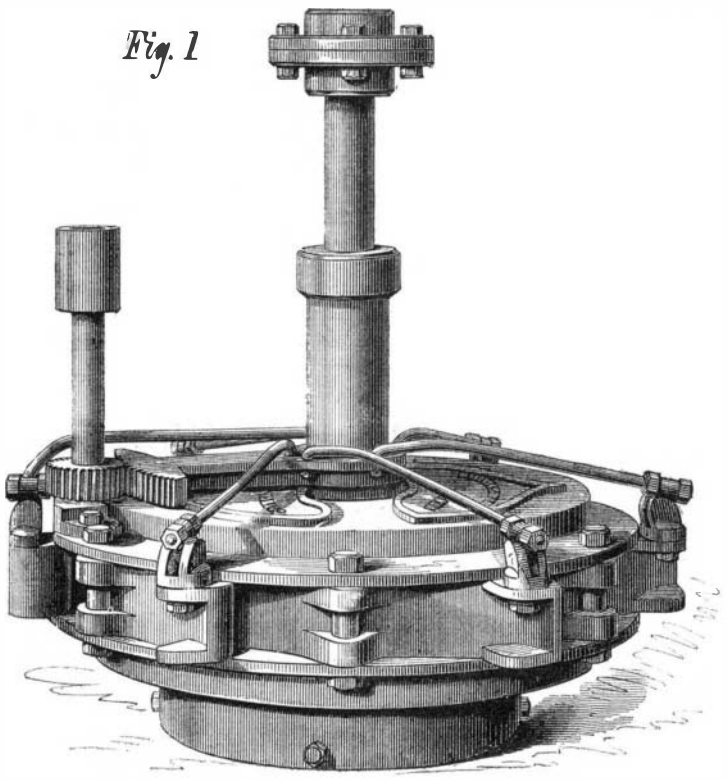
In the sectional plan, Fig. 2, are shown diagrams of the ordinary turbine and the Craik wheel, the side, A, representing the former, and B the latter. C is the line of rotation, D the buckets, and E the chutes. From this illustration, the difference in construction will be at once noted; while the amount of loss in the starting power of the wheel can be theoretically computed. In practice, however, the element of centrifugal force complicates the problem; so that from the reports of public trials, perhaps, the best judgment of the efficiency of the device can be formed. Fig. 1 gives a general perspective view, from which other points in the construction of the invention will be understood.

For further particulars regarding sale of wheels, etc., address Whittlesey, Meigs, and Co., Malone, N. Y.

The Sand Club.

This is a weapon used by rowdies and criminals in San Francisco, resembling in principle the sand bag used by the same sort of scoundrels in New York. The sand club is formed by filling an eel skin with sand. When this instrument was first brought into use, the authorities were greatly puzzled by deaths, apparently from violence, yet no marks could be found on the outside of the body. A burglar was finally captured with a sand club in his possession, made out of an eel skin stuffed with sand. Being closely questioned, he explained its use. When the victim is struck, for instance, on the head, he drops insensible, and soon dies from congestion of the brain. Often the skull suffers no injury from the stroke; and if the person struck recovers sensibility, he gradually relapses into a condition of idiocy. Sometimes a man struck in the body will be knocked down by the peculiar force of the blow, and feel no immediate results from it. In a few weeks, however, the flesh will begin to mortify under the line of the blow, and rot down to the bone.

Fig. 1



CRAIK'S IMPROVED TURBINE WATER WHEEL.

THE HYDRAULIC PROPELLER.—A NOVEL MODE OF MARINE PROPULSION.

Some years ago a gun boat in the English navy, the Water Witch, was fitted with machinery which propelled the vessel by drawing in water and then forcibly ejecting it through tubes arranged in her sides. The experiment was, in a measure, successful, although we have heard nothing concerning the ship for some time past. The present invention is based on a somewhat similar idea, in so far as it drives the craft by the reaction of water ejected from the hull; but instead of employing mechanism to obtain the supply, it relies on the rolling of the ship, or dash of the waves, to fill the tanks, and thus produce a sufficient head to generate a forcible discharge.

As the plan, in its entirety, is quite novel, and, in the opinion of the inventor, practicable, we leave that gentleman to explain his idea in his own words, premising, however, that, in our engravings, Fig. 1 shows the general application of the device to a vessel, and Fig. 2 a section of the ship with the arrangements represented in detail.

"For a vessel of 36 feet beam, 30 feet depth of hold, and 400 feet long," says the inventor, "I make tanks or penstocks (A, Fig. 2) on each side, for the whole length of the ship, these tanks to be 16 feet high, 8 feet above and 8 feet below the water line when loaded, to be 5 feet wide fore and aft, and 3 feet wide from the vessel outwards or across beam. In the top of these tanks are holes 6 inches in diameter, and as close as they can be conveniently made, to admit water (whenever, through rolling, or pitching, or high seas, the outside water may be over the tanks). Valves, B, one foot square, are arranged near the water line, opening inwards, for the purpose of admitting water whenever the outside water is above that inside; and there is an opening, C, at the bottom of each tank, shaped so as to discharge aft, and 6 by 12 inches in the opening.

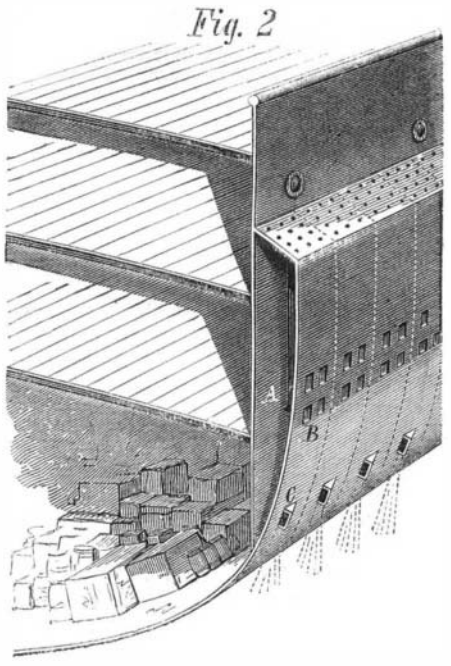
"A ship so fitted will, from the rolling or pitching, or from the dash of the waves, receive water into the tanks when submerged, or whenever (from any of the causes previously mentioned) the water within the tanks is lower than the water outside. And whenever the hollow of the waves is being passed, or the roll or pitch is upward, and the water in the tanks is above the water outside, then the re-action, consequent upon the discharge from the outlets at the bottom of the tanks, will propel the vessel forward.

"The discharge outlet may be made to close by pressure from without, or it may be drawn up by rods attached and leading to the deck, or made to reverse the action; the valves also may be manipulated by rods, if necessary; but it is thought that fixed outlets and plain valves will answer best."

The inventor also suggests a plan for similarly utilizing the pitching of a ship, by arranging two tanks, one at either end: "Valves in the bottom admit water into either tank when down; and when the tank is up, valves will let it discharge into a tube on the bottom of the vessel; said tube discharges both tanks at the stern or each at its own extremity of the ship, or, for the sake of the greater head of water, each at its opposite end."

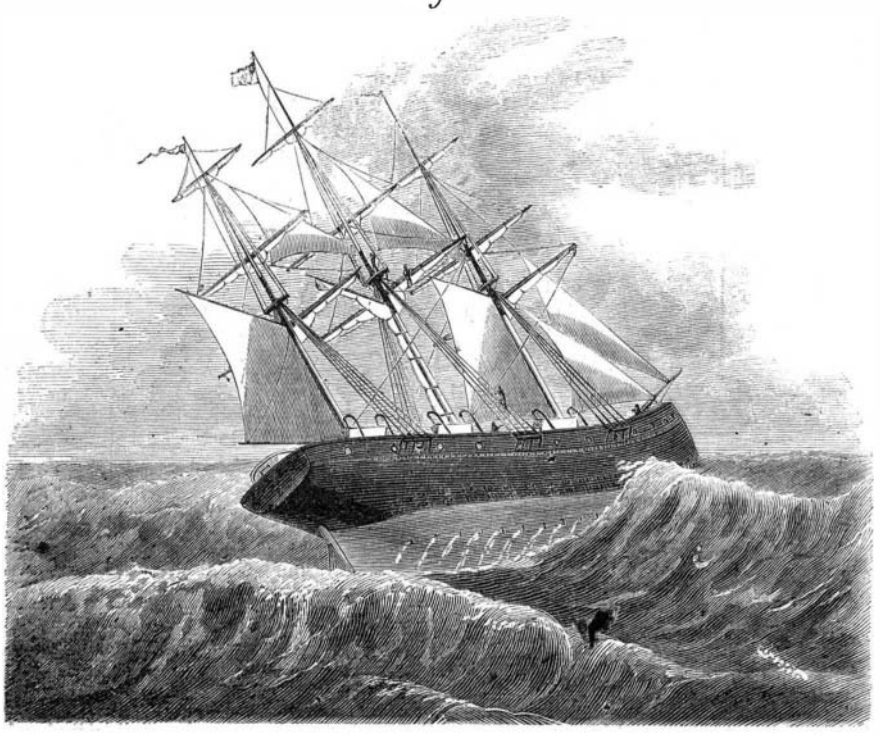
We are informed that it is especially desired to explain the principle of this device (which, it is believed, is susceptible of more improved application than the especial arrangement above alluded to), although the inventor is of opinion that the latter would fulfil the necessary requirements.

Fig. 2



An application for a patent is pending by Mr. Henry R. A Boys, of Barrie, Ontario Canada, by addressing whom further particulars may be obtained.

Fig. 1.



BOYS' HYDRAULIC PROPELLER.

Sir Francis Ronalds, F.R.S.

Sir Francis Ronalds, formerly Director of the Observatory at Kew, died recently in England, aged 85 years. To him has been ascribed the invention of the electric telegraph, as it remains on record that, nearly sixty years ago, he devised an efficient instrument of that kind, which he described in a pamphlet published in 1823. The *Philosophical Magazine* thus describes his first success:

"In the summer of 1816 he undertook to prove the practicability of telegraphic communication, at great distances, by transmitting a certain number of electric shocks, for an arranged signal, through insulated wires of considerable length. He laid his wire in glass tubes surrounded by wooden troughs lined with pitch, which were placed in a covered ditch, 525 feet long and 4 feet deep, dug in his garden at Hammersmith. He also suspended eight miles of wire, by silk cords, from two wooden frames erected on his lawn, so that the wire passed to and fro many hundred times, well insulated at each point of attachment, and forming one continuous line, kept separate from contact with other parts. Both these kinds of apparatus served equally to show the instantaneous transmission of the