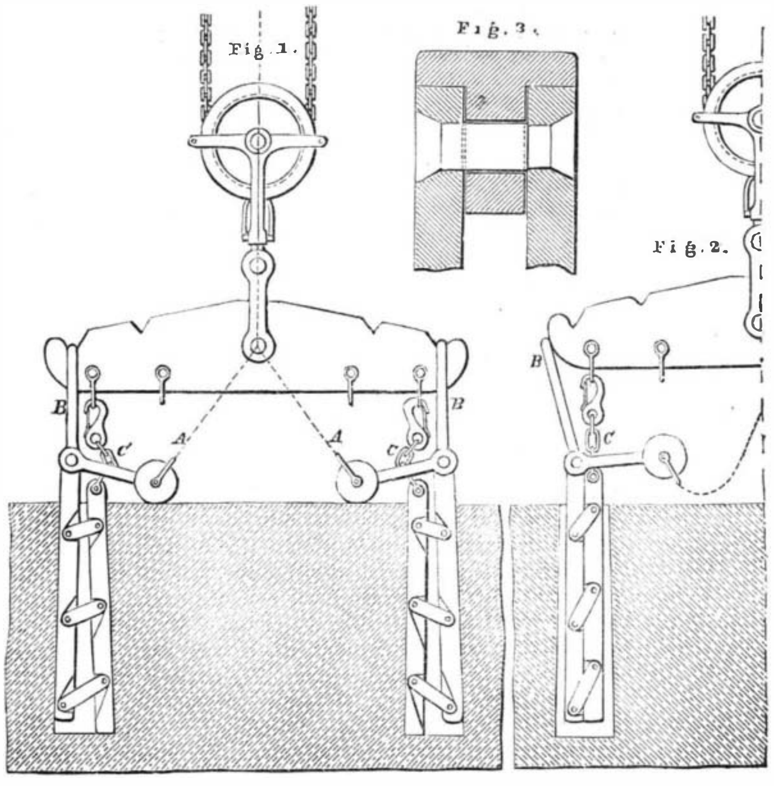
IMPROVED LEWIS.

At the present time it is no uncommon thing to use, in the formation of breakwaters, piers, and other similar structures, blocks weighing from twenty to thirty tuns each, and it is found that, with suitable plant and machinery, masses of this weight can be moved readily and safely.

The ordinary lewises, by which large concrete and artificial blocks have hitherto been lifted and deposited, consist of a pair of round bars with a T end on each, and a ring at the top to receive the hook or shackle of the setting crane or traveler, suitable holes, with boxes and pieces of hard wood at the lower ends, being formed in the blocks for the reception of the bars. When a block has been lowered, say for subaqueous work, divers are required to turn these T bars around, and to draw them out of the holes preparatory to their being lifted up with the slack chain of the crane or traveler. For heavy blocks the weights of these bars must of necessity be great, and the process of turning and lifting them by divers consequently expensive. It is the object of the lewis which we herewith illustrate, and which has been invented by William Matthews, of England, to provide for disengaging from above water, so that, when no longer required, the lewises shall free themselves and be drawn out of the holes in the blocks by means of the setting machine, and lifted with the slack chain to the surface.

The holes, instead of being parallel as in the ordinary cases, are made dovetailed; they are formed in the blocks by means of core pieces. The apparatus consists of two lewises, each formed of two wrought iron square bars linked so as to open in a dovetail shape. At the top of one bar of each lewis there is a shackle which is passed over the hook of the beam, the other bar being attached to the underside of the beam by means of a short piece of chain and a spring hook. Fig. 1 shows the lewis in the act of lowering a block; when the block has been set and adjusted, the beam is lowered from three to six inches, and the bridle rope, A A, drawn up from the top upon which the shackles, B B, are thrown over so as to clear the ends of the beam; the apparatus is then lifted by means of the setting machine, and, as the chains, C C, are tightened, the lewises fold and come clear out of the holes in the block.



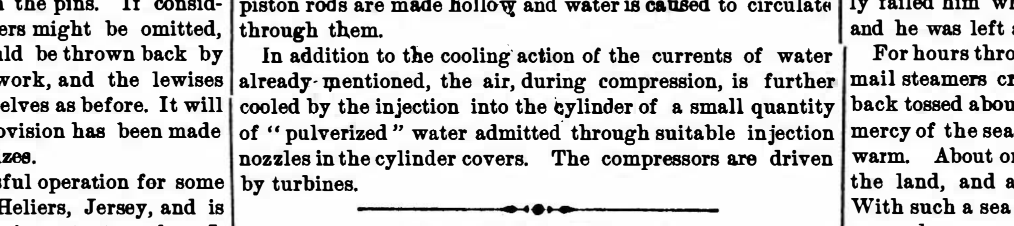
MATTHEWS' DISENGAGING LEWIS.

Fig. 2 shows the lewises when disengaged and in the act of being lifted. Fig. 3 shows the construction of the bars and links, from which it will be seen that the bars of the ends of the latter have a solid bearing against rounded recesses in the former, so as to avoid strain on the pins. If considered desirable, the disengaging levers might be omitted, in which case the shackles, B B, would be thrown back by the divers employed in setting the work, and the lewises would then disengage and free themselves as before. It will be seen from the illustration that provision has been made for dealing with blocks of different sizes.

The apparatus has been in successful operation for some months on the new harbor of St. Heliers, Jersey, and is about to be introduced on many other important works. It is claimed for the invention that it effects a saving of an expensive description of labor, namely, divers' work.

A NEW STEAM LAUNCH.

Mr. George Baird, an engineer residing at St. Petersburgh, Russia, has recently constructed a high speed boat, which has proved a remarkable success. Her outer shell is entirely constructed of Muntz metal, an alloy of great durability, much used in Europe for sheathing wooden vessels and for axle bearings, etc. At a recent trial, against one of Messrs. Thornycroft's fast boats, the Mab was victorious, accomplishing 19 miles per hour. The Mab is 48 feet long at the load line, and has 6 feet 6 inches beam and 3 feet 6 inches depth of hold, while her mean draft is 1 foot 9 inches. She is fitted with a beautifully made pair of compound engines, driving a screw 2 feet 9 inches in diameter and 3 feet 4 inches in pitch. During the trials the engines made an average speed of 593 revolutions per minute, working with steam at 100 lbs. per square inch in the boiler. The general arrangement of this very successful boat, says *Engineering*, will be better explained by reference to our engravings than by any verbal description.



THE STEAM LAUNCH MAB.

Fig. 3

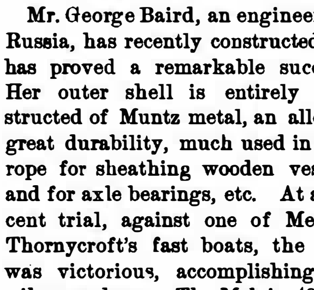
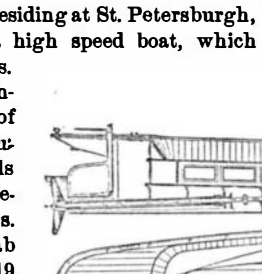


Fig. 4



St. Gothard Tunnel Air Compressors.

In the case of the St. Gothard Tunnel, dry compressors are employed for furnishing the necessary supply of compressed air, these compressors being constructed on the system of M. Colladon, of Geneva. The sets of compressors employed at the two ends of the tunnel are alike in general construction, but differ somewhat in dimensions and in some points of detail, as well as in the arrangement of the driving machinery. The compressors at Airolo have been constructed in three groups, each consisting of three compressors.

The three compressors in each group have each a cylinder 18·11 inches in diameter and 17·72 inches stroke, and they are driven so as to have a mean piston speed of about 265 feet per minute. The pistons are coupled by connecting rods to a three-throw crankshaft, this shaft having its three cranks set at an angle of 120° with each other. The arrangement of bedplate, main bearings, crosshead guides, etc., is neat and substantial.

The leading feature in the Colladon system of air compressors consists in the arrangements made for the efficient cooling not only of the barrel of the cylinder, but also of the piston and piston rod. The cylinder is enveloped in a jacket through which water is made to circulate. The piston and piston rods are made hollow and water is caused to circulate through them.

In addition to the cooling action of the currents of water already mentioned, the air, during compression, is further cooled by the injection into the cylinder of a small quantity of "pulverized" water admitted through suitable injection nozzles in the cylinder covers. The compressors are driven by turbines.

New Life-Preserving Dress.

For some time past Captain Boyton has used this dress with wonderful success at Atlantic City, N. J., where he held the post of Captain of the Camden and Atlantic Life Guards, a corps of gallant men whose business it is to save life at dangerous sea-bathing places.

It is simply a dress composed of the best india rubber, made in five distinct airtight compartments, namely, one for each leg, one at the back, another in front, and the fifth for the head. Each of these is inflated by means of a tube long enough to reach to the wearer's mouth when the dress is on. The dress is made in two pieces, the lower part being like a loose pair of trowsers ending in a pair of waterproof socks. At the waist is a broad steel hoop or band, which has a groove cut in it into which the other part of the dress exactly fits, rendering the whole suit perfectly watertight. Strong suspenders fixed to this hoop pass over the shoulders and retain the lower portion of the dress in its proper place.

The upper part of the dress is made similar to a jacket with a head piece attached. In order to allow of the face being uncovered and yet to be quite watertight, an elastic padding of india rubber fits round the face, which presses (closely enough to keep out the water, but not unpleasantly) round the face and head, when the chamber at the back is inflated. When this part of the dress is put on, it is fitted round the waist hoop, and, being strained tightly, the whole dress is quite impervious to water or even damp, not by any means the least important of its advantages, as many, perhaps more people are drowned owing to the benumbing effects of cold as from the actual incapacity of swimming. So simple is the adjustment that the entire dress can be put on and thoroughly inflated in a few minutes by any one who has had a little previous practice. Being made in so many different air chambers, there is no danger should one or more parts get injured, as the chamber at the back of the head alone is sufficient to float the heaviest man. The total weight of the dress is about 15 lbs.

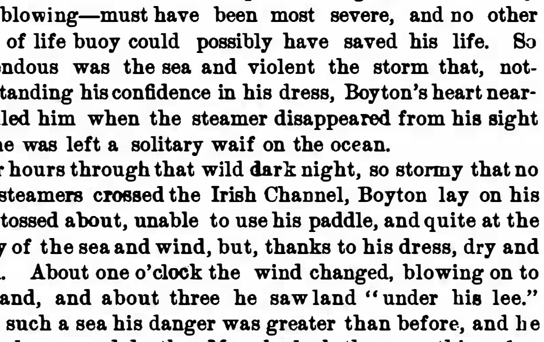
On the 10th of October, 1874, in accordance with his previous public announcements in our city papers, Captain Boyton left New York in the National steamship Queen, intending to go overboard when about 250 miles distant from America and return to the coast at the nearest point he could reach. However, when he came on deck in his curious dress and told Captain Bragg that he was going back to America, asking him at the same time to "slow" the ship so as to let him get into the ocean comfortably, he was very properly ordered to go below, and was told that if he attempted to leave the steamer he would be put in irons. Greatly disappointed, he was compelled to remove his dress and remain on board content. But on the night of the 20th of October, at half past nine o'clock, when about two and a half miles distant from Cape Clear, the southern extremity of Ireland, he left the steamer, having obtained the reluctant consent of Captain Bragg. His departure is thus described in the London *Examiner* by a passenger: "A loud cheer greeted him as he plunged into the waves, which were then heavy, as the breeze at the time amounted to half a gale. 'All right, captain,' he shouted, 'go on!' as the ship left him behind. The captain gave orders to go ahead, full speed, and in a moment the daring adventurer was lost to sight."

He had taken with him, in his waterproof and airtight sack or traveling bag, food and water sufficient for three days, besides other articles, such as a compass, lantern, signal rockets, bowie knife, axe, American flag, and his indispensable paddle. His intention was to make for Baltimore, distant about seven miles, but owing to the roughness of the weather he was driven as far as Frefaska Bight, some miles east and south of Baltimore, after having been seven hours on the water and having traveled about thirty miles. His trials on that night—a night which will be long remembered on account of the numerous shipwrecks which took place during it, and the heavy gale blowing—must have been most severe, and no other form of life buoy could possibly have saved his life. So tremendous was the sea and violent the storm that, notwithstanding his confidence in his dress, Boyton's heart nearly failed him when the steamer disappeared from his sight and he was left a solitary waif on the ocean.

For hours through that wild dark night, so stormy that no mail steamers crossed the Irish Channel, Boyton lay on his back tossed about, unable to use his paddle, and quite at the mercy of the sea and wind, but, thanks to his dress, dry and warm. About one o'clock the wind changed, blowing on to the land, and about three he saw land "under his lee." With such a sea his danger was greater than before, and he narrowly escaped death. More by luck than anything else, however, he got ashore safely and made his way to the coastguard station. Since then he has exhibited his apparatus in many places in England, proving how thoroughly adapted it is to its purpose.—*Hunt's Yachting Magazine.*

A THREE-WHEELED OMNIBUS.

The upper figure in our illustration shows the elevation, and the lower figure the plan, of a three-wheeled omnibus, which is claimed to secure economy in cost and draft, as well as comfort for riders, by reason of the four side entrances, and one step in from the road, and a staircase behind on to the roof seats. On some routes such vehicles might supplement the present rolling traffic of our public streets. Dispensing with an under carriage and one wheel must prove a material economy; the triadic bearing of the wheels on the ground would favor the draft. The bulk of the weight, being on the large wheels and partly suspended beneath the axle, would also tend to diminish draft as well as enable a



wider and lighter body to be used than in an ordinary omnibus, the total weight of which ranges from 20 to 24 cwt. for 26 passengers; for the same number of passengers, a three-wheeled omnibus might be made to weigh from 14 to 16 cwt.

The obvious simplicity of construction makes any technical detailed statement unnecessary, beyond saying that the hind wheel turns round freely in an upright axle box, fitted with a coil spring round the spindle.—*Carriage Builders' Gazette.*