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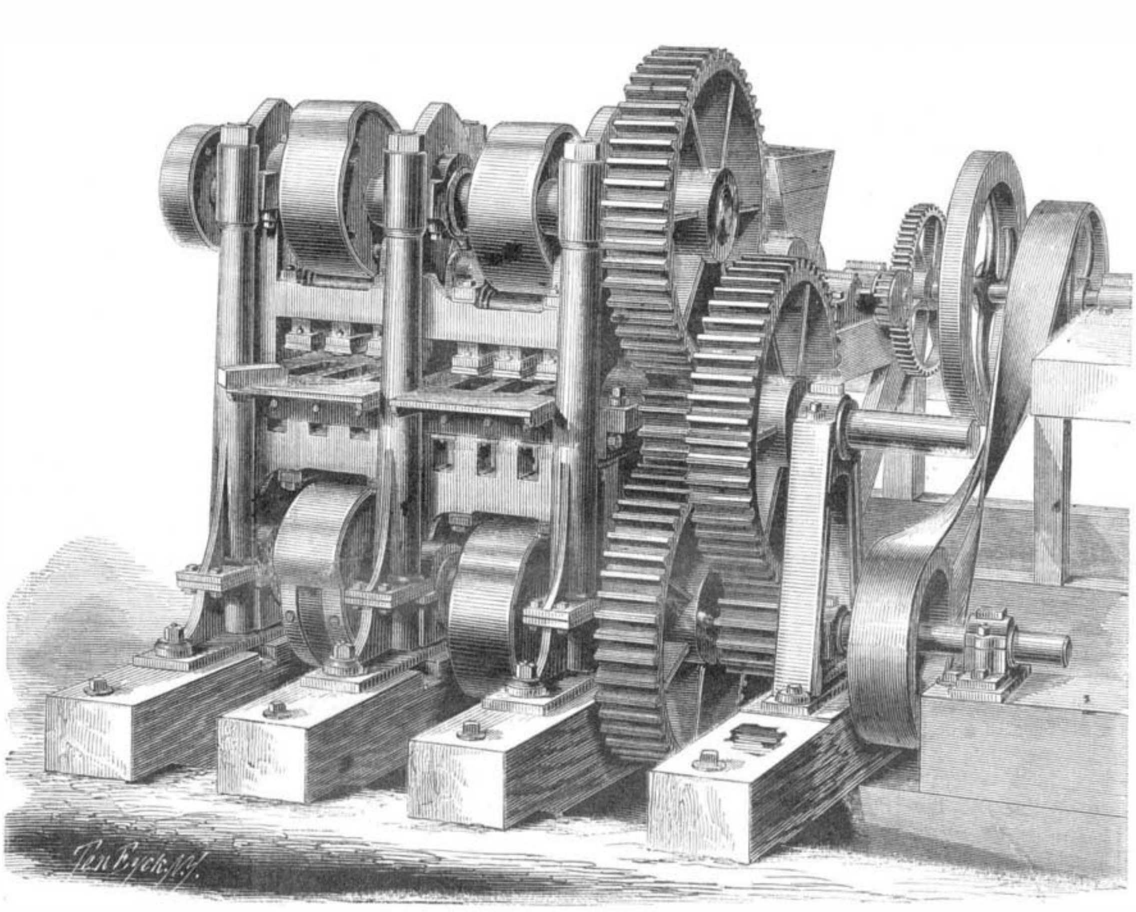
Improved Machine For Pressing Bricks.

One of the obstacles in the way of forming and burning bricks so that they shall possess a perfectly smooth surface with well-defined edges is the presence of atmospheric air in the clay, which in burning expands and finds its way through the material to the surface, producing blow holes and cracks. The machine represented in the accompanying engraving is constructed with a special view to overcome these obstacles to the production of a perfect article. It is invented by a practical brick maker of over thirty years experience, and the result of fifteen years experiments. It was patented through the Scientific American Patent Agency, May 14, 1867.

The machine is wholly of iron, with the exception of the foundation on which it rests. The uprights which support the machinery are hollow cast-iron columns held in position by means of wrought-iron bolts passing through them, and strongly braced by flanges acting as buttresses between the base and columns. There are two heavy shafts, one directly over the other, driven by means of pinions and gears as seen in the engraving. Two sets of molds, of three bricks each, are used, working alternately, the main pressure coming on three bricks only, at one time, the machine making six bricks at each revolution of the shafts. Each shaft drives a series of plungers worked by cams, the peripheries of which force the plungers against the clay in the molds, and grooves extending around the cams following the contour of the face, draw the plungers back from contact with the clay. The upper plungers are formed with convex faces and the lower ones with level faces. The upper portion of the molds is beveled or flaring, so that this part is wider than the remainder. In operation the upper plungers are forced by their cams down upon the clay in the molds, the lower plungers remaining stationary and forming a bed for the compressed material. The lower plungers then rise against the clay, the upper ones also rising, until the clay has reached that portion of the molds where the bevel of their sides begin, when the upper plungers again descend with a gradual movement, the clay being subjected to pressure on both top and bottom, the convex surfaces of the upper plungers acting upon the central portion of the clay so that the air in the clay will be forced outward, where the flaring sides of the molds allow it to escape.



CROFOOT BRICK MACHINE.

There is a device, working automatically, which carries the clay from the hopper to the molds, which is not shown in the engraving. It works in harmony with the plungers, as all the connections of the machine are perfectly absolute, their being neither spring, weight or other adventitious or unreliable device employed. The clay is taken from the bank and without any seasoning or preparation passed through the pulverizer, thence directly to the molds. All the bricks are face and front bricks equal to the best Philadelphia facing bricks. The inventor in a letter says:—" We have burned a kiln of brick made by the machine and every one who sees them is surprised that so smooth, solid, and nice a brick can be made from so coarse a material as the Chicago clay; they not having a crack or even a check, and resembling in their finish enameled ware. The bricks are taken directly from the machine to the kiln, as when they leave the machine they are perfectly hard."

Orders and other communications relative to the machine should be addressed to the Crofoot Brick Machine Co., 229 Lake street, Chicago, Ill.

The American Tube Well.

Probably no invention of the present day is causing among scientific men so much attention as is this exceedingly simple and yet most efficient apparatus for obtaining, in almost all situations, pure water at a small outlay. It consists of nothing more than an iron tube perforated with holes at the lower end, and shod with a steel point, which enables it readily to penetrate the hardest soil. This tube is driven into the ground vertically by means of repeated blows given by a hollow monkey working on the tube as a guide. These blows are received upon a strong clamp firmly gripping the tube near the ground, the clamp being from time to time raised as the tube descends into the earth. The process of driving is continued until it is ascertained, by means of a plumb lowered into the tube, that a water bearing stratum has been reached. A pump is then attached to the tube, and the water obtained; at first the water pumped up comes thick and dirty, but after a while it comes clearer and clearer until that is perfectly pure which remains. It is evident that, apart from the simplicity of the tube-well system, its great advantage is in the purity of the water obtained. In no ordinary dug well is it possible to prevent surface water and land drainage from mixing with the purer water springing from the bottom; indeed, it is very questionable if in any case an open well is more than a cesspool in which the drainage from all the surrounding soil is collected. The unhealthy character of many localities may fairly be traced to the deleterious nature of the water supply arising from this cause, and it must always be a matter of vital importance to obtain water cut off from these impurities, and if possible drawn direct from the natural source. This the patent tube-well system most completely effects, for the tube driven into the ground seals up the well from all surface drainage; indeed, if the sinkers come to water inferior in quality or quantity, they may drive through that into a lower and better stratum, and completely exclude the upper water; and then, as they pump, the smaller particles of soil pass through the perforations into the well and are drawn up, leaving behind a bed of gravel and small stones, which forms a natural reservoir and filter to each well, and insure the purity of the water subsequently pumped up. This invention is known and appreciated by the Americans, who, in 1860, employed it in the Northern army to supply their troops with water all through the campaigns. It is of more recent introduction into this country, but is already beginning to be adopted by all those who value the purity of water. The government, after testing it practically at Aldershot, have sent a special brigade and a number of wells with the Abysinnian expedition. The Emperor of the French has had several wells sunk under his own personal supervision, with most decided success, both at Buchy and near Paris, and has ordered a number for the use of the army and school of agriculture.—*London Mechanics' Magazine.*

Improvements in Automatic Telegraphy.

Since the 11th September, 1867, the directors of the telegraphic lines have made use, in the service between Paris and Lyons, of a new system of rapid transmission invented by MM. Chaudassaignes and Lambrigot, telegraph clerks. This telegraph acts automatically, transmitting the dispatches between the two towns at the rate of 120 or 180 dispatches per hour by a single conducting wire, a velocity three times as great as that obtained by other systems, and capable of being augmented proportionately to the diameter of the wire. The transmissions are made by a band of [illegible]c paper on which the signals composing the dispatch [illegible] traced in insulating ink. The reproduction is obtained on a band of unsized paper, the center portion of which is impregnated with a chemical liquor necessary for the formation of the characters existing on the metallic band. In order to obtain regularity of execution in the different operations, such as the composition, transmission, and reception, they pass through several hands according to the requirements.

One instrument in communication with the line is composed of—1. A clock-work movement. 2. A double roller which sets at work either the metallic or the chemically prepared paper. 3. A ringing apparatus for calling the attention of the correspondent. 4. A "Morse" manipulator of ordinary construction for the exchange of the conventional signs necessary for setting in movement or stopping the rollers. The clock-work movement is set at work by a weight easily wound up by means of a pedal; it serves to maintain the rollers in movement. Near the roller round which the metallic band passes, is a point which represents the extremity of a conducting wire. The roller communicates with the electric pile. When the band is drawn into movement by the rotation of the roller, the point is placed sometimes on one of the metallic parts of the band, and sometimes on the written parts of the dispatch where the isolating ink is, so that the conducting wire marks the message by the alternate passage, and breaking of the current. Near the roller, on which is coiled the unsized paper, is placed a cup filled with a solution of nitrate of ammonia and ferrocyanide of potassium. In the middle of this cup is a small roller which dips into the liquid in its lower portion, and the upper portion of which rises a little higher than the edges of the basin and supports the band of unsized paper which, drawn by the rotation of the two rollers, turns the small dipping roller and becomes impregnated with the solution.

A point of iron representing, like that of the metallic band, the extremity of the conducting wire, leans, slightly inclined, resting by its own weight u[illegible]he damp paper band, and i[illegible]munication with the earth. [illegible]oltaic current decomposes t[illegible] portion, and leaves a colore[illegible]which [illegible]sents the signals of the dispatch. Th[illegible]ing of th[illegible] apparatus is entirely mechanical. The [illegible]ission and the reception [illegible] the dispatches take place automatically; one clerk superin[illegible]s the machine. In order to compose the dispatches into [illegible]entional signals on the metallic band, [illegible]r instru[illegible]en [illegible] the compositor, is employed, similar [illegible]of Mors[illegible]als of which are employed. The band of metallic pap[illegible] itself is raised by a lever so as to touch a thick [illegible]ed with a resinous preparation in fusion, which coo[illegible]ly as soon as it is applied to the metallic band. One c[illegible]n prepare alone 35 to 40 dispatches per hour; the telegraphic staff acquainted with the Morse apparatus can, without any study, compose dispatches. For the service between Paris and Lyons three compositors suffice completely for the transmissions. The dispatches reproduced on a band of chemically prepared paper are handed over to other clerks, who translate them for the printed dispatches distributed to the public.

The result is that two composing clerks, two translating clerks, and a superintendent of the machines of reception and transmission, do as much work by aid of a single conducting wire as six clerks with three wires by the ordinary telegraphic system. A composing apparatus furnished with electro-magnets has been established on a line from London to Paris. When the employé in London wishes to transmit a telegram to Paris for the Lyons line, the only line in which this rapid service is installed, he manipulates as for the ordinary transmissions of the Morse apparatus; the letters or conventional signs are printed on a metallic band, and a few seconds afterwards are transmitted to the chemically prepared paper. Thus we have before us a great improvement in modern telegraphy. Up to the 11th September last the service of the Ly[illegible]ne was carried on by aid of two or three Hughes' ap[illegible]us; each apparatus occupies two clerks and three batter[illegible]y the new system five clerks do all the service with one line only. The new system works admirably and without a single hitch, and we can affirm that the invention of MM. Chaudassaignes and Lambrigot is destined to render great service to the telegraphic service. The economy of installation, and the saving effected in the number of clerks, the maintenance, wear and tear, etc., are marvellous.—*Chemical News.*

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

SUB-AQUEOUS AND OTHER TUNNELS.

[Continued from page 18.]

PLAN FOR A COMBINED WOOD, CEMENT AND CAST IRON TUNNEL.

This projector presented plans for four different sizes of tunnels, with variations of the form in each, from which the company was to choose. One plan was for a tunnel having a mean diameter of about 11 feet. The sides were to be on a curve of 12 feet diameter, the bottom on a curve of 10 feet, and the top 7 feet diameter. Another was to be 16 feet in diameter, and another 9 feet, both having varying curves. Lastly, a plain tube of 9 feet diameter was shown. The material and method of construction was the same for all.

The body of each tunnel was to be composed of segmental plates of cast iron, with projecting flanges at their four edges, turned outward, by which flanges the plates were to be fastened together with nuts and screws.

Outside the cast iron tunnel thus formed, a body of cement or hard-rammed clay, five or six inches thick, was to be laid, and the whole was to be inclosed in a casing of wooden planks.

The method of laying was to excavate under the bed of the river. For this purpose, where there were quick-sands, a shield was proposed having a face of upright bars, forming a grating, with separations of an inch and a half. It was supposed that the sand in front of the shield could be picked down into the tunnel through the bars, without danger to the workmen from too sudden an influx.

PLAN FOR A WROUGHT IRON TUNNEL, STRENGTHENED WITH CAST IRON RIBS.

This project was for a tunnel 27 feet in diameter. The cast iron ribs were to be one foot apart, three inches broad and four and a half inches thick, scarfed at each end, the scarfs two feet long and overlapping each other, fastened with seven bolts passing through the scarfs and through the wrought iron tunnel plates. Each rib was to be composed of sixteen pieces.

The wrought iron plates were to be rebated at the edges, two and a half feet long, the joints of one row to be opposite the middle of the plates next adjoining.

PLANS FOR DOUBLE TUNNELS, IN BRICK, ALSO IN CAST IRON.

These were projected by W. Murdoch, of Paisley. One plan was for a double tunnel in brick—that is to say, tunnels, one upon the other, of elliptical form, 27 inches thick. Another plan was for a two-story tunnel made of flanged plates of cast iron, secured together with bolts, the joints of the plates calked with lead. The division consisted of an iron floor, secured to the sides, which were straight, the bottom flat and the roof arched. Another form for the division or floor consisted in having shelves cast on the sides of the iron plates, which supported a floor in the form of a brick arch.

Another plan was for two brick tunnels, side by side, the roof supported centrally on arches. In a similar cast iron tunnel the roof was to be centrally supported on pillars. Another plan [illegible] to make a single tunnel for the greater part of the d[illegible] with short double tunnels at intervals of 200 or 30[illegible]s, for the passage of teams.

PLAN FO[illegible]LL BRICK TUNNEL, AND PECULIAR METHOD OF LAYING IT IN THE RIVER.

We c[illegible] to a novel plan for laying down a brick [illegible] nel, which was proposed by Charles Wyatt and John Isaac Hawkins. This plan attracted great atten[illegible]on, and seems to have been at one time the favorite ch[illegible] of the Thames Archway Company. Some of the par[illegible] interested in the company went so far as to lay dow[illegible]ual section of a tunnel in the Thames river, fo[illegible]ose of pu[illegible]m-onstrating the practi[illegible] cheapness of the plan. It is a tunnel of about [illegible] size as this that is now proposed to be laid un[illegible] river between New York and Brooklyn. We shall [illegible] describe the method and then give some account of the laying of the experimental section:

Width of the Thames river at high water,	847 feet.
Ditto at low water......................	649 feet.
Greatest depth at high water............	38 feet 7 inches.
Ditto at low water......................	16 feet 9 inches.

It is proposed to make a brick tunnel, of a cylindrical form, 10 feet 9 inches in diameter outside, and 8 feet 6 inches inside, leaving 13½ inches, or one brick and a half, for the thickness of the wall. The tunnel to be built in lengths of 50 feet each, and floated over the required situation, where they are to be sunk into a trench prepared for their reception, and afterwards covered over with earth even with the bottom of the river.

The particulars of the operation are detailed as follows:

1. In a dock communicating at pleasure with the river, build a cylinder with bricks laid in Roman cement, 50 feet in length.

2. Let the ends of the cylinder be formed into steps and other projections, to keep it even with the other cylinders to which it is to be joined.

3. Close the opening at each end with an hemispherical wall, and in the upper part of the cylin[illegible] about 6 or 7 feet from one end, fix a cast iron tube, of 6 in[illegible] bore, having a conical plug ground into it. To the lower end of this tube screw or bolt another tube, 8 feet 3 inches long, and on the upper end screw or bolt a pump, of rather larger diameter, reaching at least 46 feet perpendicularly above the cylinder.

4. At 6 or 7 feet from the other end of the cylinder, insert a piece of iron, into which screw a mast, standing parallel with and reaching the same height as the pump, being also of the same diameter. Both these must be supported by braces, screwed into pieces of iron fixed in the brickwork. The axes of the pump, mast, and cylinder, must be all in the same vertical plane.

5. At the distance of 12½ feet from the ends, let into the upper part of the brickwork two iron hooks, strong enough to suspend, in water, the cylinder with its appendages. These hooks may be supported by iron hoops inclosing the cylinder.

6. Fix a cock in one end of the cylinder, near the bottom, having a lever worked by a connecting rod 40 feet long.

7. A man hole, secured by a strong iron plate, should be left at the top of the cylinder, in case it may be found necessary to examine the inside.

8. Put inside the cylinder, for ballast, paving-stones enough to form a pavement 5½ feet wide, and a sufficient quantity of pig or other iron, to make it float with the masts upright.

9. Admit water into the dock to float the cylinder; shift the ballast till it floats upright; secure the manhole, and force the cylinder under water, where it should be kept for some time. When the work proves to be water-tight, take down the pump and masts, with their braces, observing to mark them so that they may be put up again in the same situations.

10. While the cylinder is under preparation, dig, in the deepest part of the river, and in the line where the tunnel is to be laid, a trench deep enough for the cylinder to lie in, with its upper part about 6 feet below the bed of the river.

11. Form a scaffold for letting down the cylinders, provide six bases of cast iron, having spikes at the under sides, somewhat like a harrow, to keep them from sliding along the bed of the river; each base having three sockets, to receive as many balls, armed with ferrules, into which common scaffold poles are fixed.

12. Lash together the three poles so that they stand perpendicular to the plane of the base.

13. Fix, by means of the poles, three of the bases in a line on each side, near the edge of the trench, 16 feet apart.

14. Lay, across a barge, a platform, containing two windlasses, of the double-barreled kind, 25 feet asunder, each 10 feet long; the larger diameter 2 feet, and the smaller 20 inches; moor the barge over the trench, untie the three poles belonging to each base, and tie them to those of the adjoining bases and to the platform, so that they form supports and braces for it.

15. To counteract the specific levity of the scaffold, load the bases with pigs of iron, let down by ropes, the ends of which may be made fast to the scaffold.

16. Put a rope of at least 2 inches diameter on each wind lass, to suspend the cylinder by, and a pulley on each rope.

17. A steel spring should be laid under each axis of the windlasses, to indicate, by the degree of flexure, what force is at any time exerted on the ropes, by which means it will be easy to guard against overstraining them.

18. The cylinder may be guided in any lateral direction, by small ropes fastened to the scaffold, and acting on the suspending ropes at a distance below the windlasses.

19. Thus much being prepared, tow the cylinder over its destined situation, within the scaffolding; attach the pulleys of the windlasses to the suspending hooks, and erect the pump and mast in their places; turn the cock so as to let in as much water as will give to the whole a small degree of specific gravity more than water; ease it down gradually by the windlasses, until it arrive at its proper place, which will be known by the tops of the pump and masts being in a line with fixed points on the shore.

20. Throw in earth to surround the cylinder, and when it is properly bedded let in water equal to the weight of the pump, masts and braces, and after drawing the pump bucket, and forcing the conical plug into its place, the whole of these may be taken away, after which the cylinder may be covered with earth taken from the next excavation, even with the bottom of the river, except the ends, which must be guarded till the next lengths are down.

21. Remove the scaffolding to a new situation for putting down the next length, which will be proceeded with in the same manner as the first, taking care that the ends of the cylinders be made to fit each other and brought into contact; but should this not be perfectly effected, the surrounding earth will form a sufficient barrier to the water, until it can be stopped from the inside.

LAYING THE SECTIONS.

A brief statement of the progress of an experiment made for the purpose of ascertaining the practicability of constructing cylinders of brick-work, and of depositing them through the water, on a given spot in the bed of the River Thames, at Rotherhithe, with a view to the formation of a tunnel for foot passengers under the river, from shore to shore. This experiment was begun in October, 1810, and finished in June, 1811, by John I. Hawkins, engineer:

Two cylinders, 25 feet long, 11 feet 3 inches external, and 9 feet internal diameter, were built of bricks laid in Roman cement; the ends of these cylinders were closed with spherical bulk heads of the same materials; a hole 20 inches in diameter secured by an iron plate was left in each bulk head, and in the top of the cylinder; a pipe was fixed in the top of each cylinder, reaching nearly to the bottom, and a pump 25 feet long fitted to the upper end of it; an air pipe was also made to screw over a hole left for the purpose; a cock of 3 inches bore was placed in one end of each cylinder; masts for sight [illegible]les, 22 feet long and graduated, were erected on the en[illegible] the cylinders, and braced from the sides.

These cylinders were built in a barge, and launched into the water by sinking the barge; they floated about two feet out of water.

An excavation was made in the bed of the river near to low water mark, by the means commonly used for taking up ballast.

A stage was erected over the excavation, consisting of a platform 28 feet by 12, supported on six upright legs, and kept steady by twelve very oblique braces, formed of scaffold poles and spars from five to nine inches diameter; these poles and spars were pointed and loaded with iron to overcome their buoyancy, and sunk into the ground by the weight of the platform, which was 33 feet above the bottom of the excavation and always out of the water at high tides; on the platform were two windlasses of the double-barreled kind.

The stage, which by reason of its numerous braces might have borne a great shock, was nevertheless defended from the shipping by two hexagonal sets of floating booms, one set within the other, but so detached that the outer booms might be torn away by ships running against them without injuring the inner; each boom consisted of three Quebec spars of about 12 inches diameter, lashed together, and from 35 to 45 feet in length; the inner booms were held by four anchors with single chains, and two anchors with double chains, the anchors being from about 500 to 700 weight each; the outer tier of booms was fastened to the inner by slight ropes.

In case the anchors should yield, the booms were hindered from pressing against the stage by six piles from 10 to 14 inches in diameter, and 45 feet long, pointed and loaded with iron, and forced into the ground by their own weight; and braced by other smaller oblique piles from 6 to 9 inches in diameter.

The hull of an old vessel of 160 tuns was moored above the booms, with two anchors ahead and one astern; and a 70-tun lighter below, with two anchors.

The object of this mode of defense was to check, by a succession and an accumulation of resistance, the force of any vessel, before it could reach the stage, and it proved effectual; for although the outworks were much and repeatedly injured by the shipping, the anchors being often dragged and booms torn away, yet the stage remained nearly four months in the most dangerous part of the river, without sustaining any damage from the shipping, except the breaking off four or five feet of the small ends of two scaffold poles.

The stage being defended, one of the cylinders was floated under it, the ropes of the windlasses fastened to two hooks on the top of the brick-work, the pump fixed upon the pipe communicating with the inside, the air pipe screwed on, the masts or indices erected and braced, and, at high water it was sunk by letting water in through the cock, and deposited in the excavation at such a depth that the upper part might be seen at low water, where it was kept suspended while gravel was thrown down and rammed under the bottom to support it. The rammers were fifty feet long, and a little heavier than water.

The stage was then removed 25 feet nearer the shore, the legs and braces singly, by means of an anchor-boat, and the platform with its windlasses, &c., all together at high water, upon four large buoys; after which the second cylinder was suspended from the windlasses in the same manner as the first. At high water the cylinder was let down to its proper depth, and moved laterally by means of ropes, until the ends of both cylinders were in contact, and their axes in the same vertical plane, a half hoop of iron which projected over the end of this cylinder rested on the top of the one before laid down, but the inshore or south end was higher by three inches, than was intended.

These facts were ascertained by the tops of the four masts on the ends of the cylinders, which were at that time three feet out of water.

In this situation gravel was thrown down and rammed under the middle and north end of the cylinder; two strong poles, pointed and shod with iron, were driven down by the east side of the cylinder, and their tops secured to the platform, to prevent the cylinders being removed by the strength of the ensuing ebb tide, before a sufficient bank of earth could be thrown down to keep it stationary.

The excavation had been made deep enough, but the inshore end of the cylinder grounding on the bank at low water the day before the operation of adjusting took place, brought so much earth down to the bottom as to prevent that end of the cylinder being lowered again as deep as it should have been by three inches; this earth might have been removed again in two or three tides, as it had been before, but under the apprehension of being ordered by the port committee to take the works out of the river, I determined to conclude the experiment without regard to that three inches, since the only inconvenience was, a space of one inch and a half between the ends of the cylinders at the lower side, although they were in contact at the upper; and no doubt was entertained of keeping the water from passing through this space in any quantity that should hinder the calking of the joint from the inside.

At the succeeding low water, the cylinders were found to be exactly in the situation indicated by the masts at high water, after which the joint was covered with a mixture of mud and gravel, but owing to the want of a sufficient bank of earth at the sides, it laid but a few inches thick on the top, and this sliding off at low water, wanted that compactness which was necessary completely to stanch the joint; the influx of water, however, through the joint, was scarcely eleven gallons a minute, when the water in the river stood three feet higher than that within the cylinders.

These were the principal features of the experiment. The