A NEW SYSTEM OF PETROLEUM STORAGE.

Fires in petroleum tanks are accidents of common occurrence, and the loss therefrom yearly aggregates heavy sums. Leakage and evaporation are other sources of waste, which aid in reducing the profits gained between producer and consumer, or which, in other words, tend to increase the price which the latter pays for the commodity. It has been evident for some time that some better system of storage than that of keeping the oil in huge tanks is required; and this need M. Donny aims to supply in the improved system which we illustrate herewith. The oil may be stored either in bulk or in barrels, without, it is claimed, being subject to loss by evaporation or leakage, while it is thoroughly protected against the danger of fire.

M. Donny's project comprises two distinct parts. One is destined to receive petroleum directly from the pipes or from vessels in bulk; the other, to afford proper receptacles after the oil is in casks. The system of bulk storage is represented in plan and in horizontal section on the lower part, left side, of Fig. 1: and Figs. 4 and 6 respectively show the longitudinal and transverse sections of the reservoirs, *i*, on the lines, K L and E F. It is proposed to employ cement cisterns, vaulted and covered with earth. These may be constructed either above or below the surface. If made in earth naturally damp, they will preserve the oil and remain perfectly staunch; but if built on the surface, in order to prevent leakage it will be necessary to keep the masonry constantly moist. To this end in the outer walls a series of channels designed to receive water are made. The oil taken from the ship by means of the pump, *o*, is received in a small collecting reservoir, *n*, whence it is directed by metallic canals. *m*, with the different cisterns. In order to remove the petroleum from these receptacles, if the latter are under ground, pumps are used; if above ground, simple draw-off cocks, *k*, *l*, are all that are required.

The storage arrangements for petroleum in barrels are represented in plan in the upper part of Fig. 1. Figs. 2 and 3 show longitudinal and transverse sections on the lines, A B and C D, in Fig. 1, and Figs. 5, 7, 8, 9, and 10 exhibit the principal details of the system. The magazines, *d*, are of masonry, arched and covered with earth. They are long, but quite narrow, resembling tunnels, and are closed by a double system of doors which will be described further on. The floor is formed of two inclined planes extending in the direction of the axis of the magazine to a trench, *e*, which extends the entire length. To the right of the doors is a sidewalk, 8 inches high, so that the bottom of the magazine becomes a kind of vat, emptying into the trench which, by the subterranean conduit, *u*, communicates with a large cistern, *g*. The doors are represented in elevation in Fig. 7 and in section in Fig. 8. Each door is double; the first is of light sheet iron and adjoins the masonry; the second, of the same material, moves in a large groove in the masonry, and automatically replaces the first door when the same is lifted. The cistern, *g*, may be emptied by fixed pumps; and it communicates with the air by chimneys, *h*, in which are wire gauze screens or thick layers of gravel. Figs. 9 and 10 show the details of construction of the air seal; *a*, Fig. 1, is the entrance to the building; at *b* are offices, etc.; *c* is the courtyard; *p* the discharging point; at *q* are cranes; *r* is a railway; and *s* is a turntable.

M. Donny thinks that this arrangement reduces danger by fire to a minimum. At the moment of conflagration, two cases may occur. The atmosphere of the magazine may be charged with inflammable vapors. In such case an explosion will first take place, which will blow out the two light doors which close the entrances of the magazine, and the fire will rapidly attack the barrels. But as soon as the first doors are blown away, the second doors fall down in their places; and thus, the air supply being cut off, the fire is smothered. Should no explosion take place, then the first set of doors will be uninjured and will cut off the air. Should the doors, however, be out of order, then the oil on its receptacles, being destroyed, will run into the middle trench, and be conducted immediately off to the underground cistern; while the flames will be unable to spread thereto because of the air seal. The oil which supplies food for the flames being rapidly removed, it only remains to block up the door openings with earth to smother the fire. We have selected these engravings from the (Belgian) *Bulletin du Musée.*

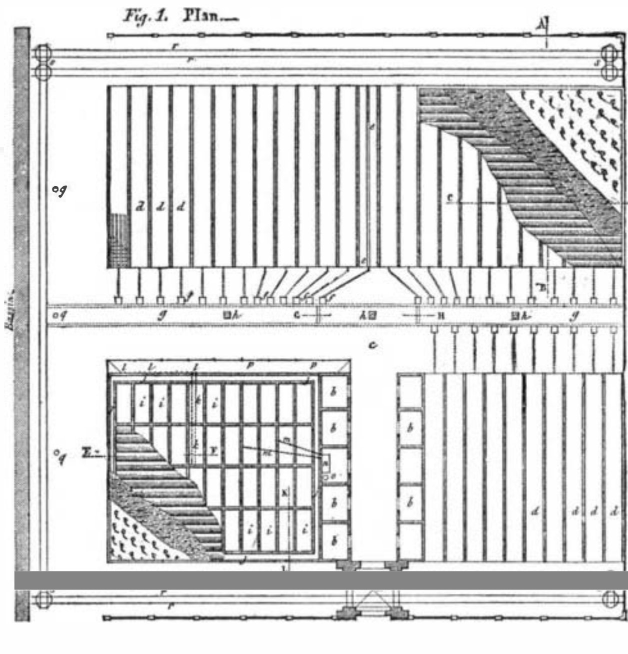


Fig. 2.

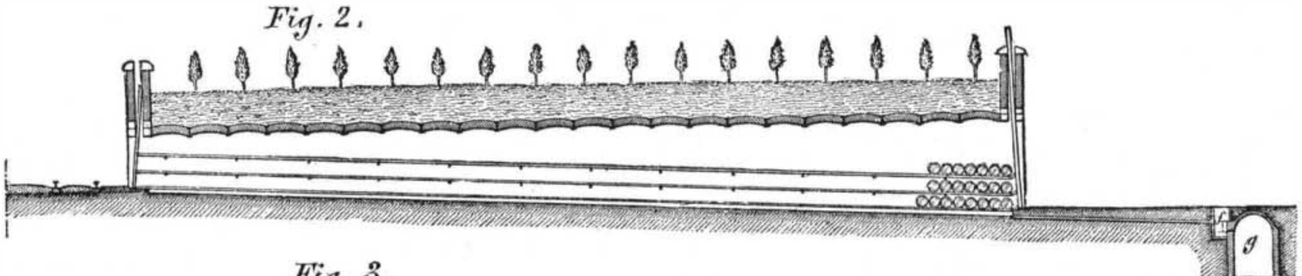


Fig. 3.

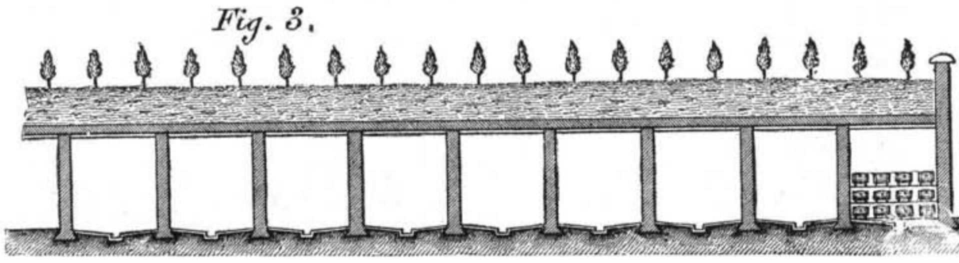


Fig. 6.

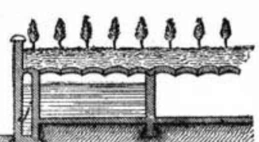


Fig. 5.

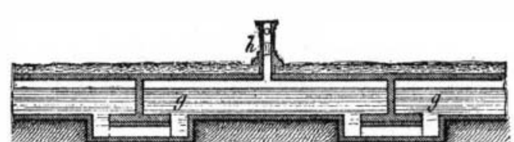


Fig. 4.

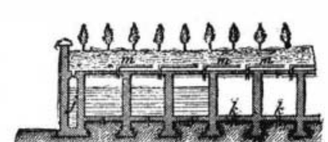


Fig. 7.

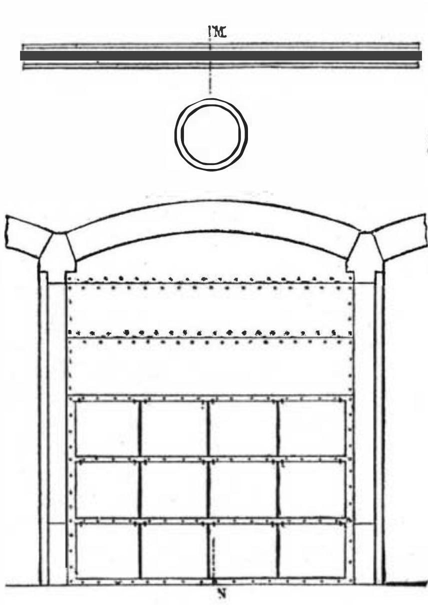


Fig. 8.

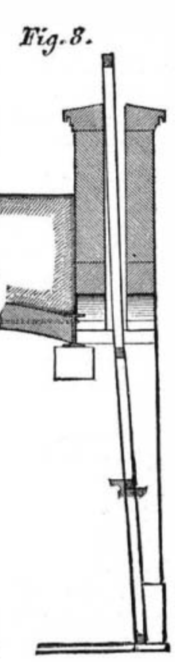


Fig. 9.

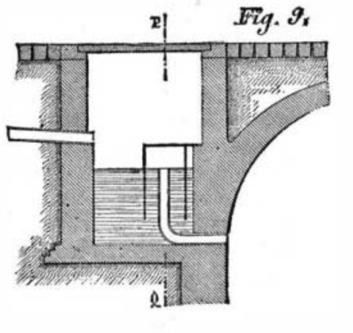
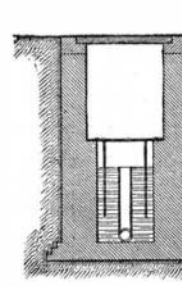


Fig. 10.



DONNY'S SYSTEM OF STORING PETROLEUM.

Barff's Method for the Preservation of Iron.

With regard to Professor Barff's paper, as to the prevention of iron and steel corrosion, a correspondent writes to the London *Times:*

"Without in any way desiring to detract from Professor Barff's merits as a discoverer of the process, and without wishing to depreciate whatever of practical value the invention may possess, I wish to point out two things which occur to me, namely, that Professor Barff has only re-discovered that which was known long since (and which, to my mind, should have been understood by every practical chemist), and that the principle is inapplicable in the case of iron to be used for constructive purposes, to which it is proposed to apply it.

"With regard to the first point, I may mention that, in the year 1861, I was engaged in investigating the merits of various apparatus for superheating steam in connection with the steam engine. In the course of my investigation I had brought before me one invention in which the patentees—Messrs. Parson and Pilgrim—passed the steam from the boilers to the engine through a coil of iron pipe placed in the boiler furnace. In support of the claims of the inventors for perfect safety in the process I had three reports, which are now before me. These reports are in print, and the first is from Dr. A. S. Taylor, Professor of Chemistry in Guy's Hospital, and Examiner in Chemistry to the University of London: it is dated April 26, 1859. After pointing out the absence of all danger in thus treating steam, Dr. Taylor observes that steam passed over iron heated to redness is decomposed, and that the oxygen is fixed by the iron while the hydrogen is liberated, the surface of the iron being rapidly covered with a fixed and impermeable layer of the magnetic oxide of iron which arrests the chemical action. The second report is dated the 28th of April, 1859, and is from Mr. W. T. Brande, F.R.S., who, after expressing an opinion upon the safety of the invention, states that the effect of high temperatures would be to cause a superficial layer of oxide of iron to line the interior of the heated pipes and to prevent the further decomposition of water. The third report is dated 'Royal Institution, 19th May, 1859,' and attached to it is the revered signature of Professor Faraday, who was consulted by the Board of Trade in the matter. After likewise testifying to the safety of the process propounded, Faraday observes that if the tubes were overheated 'a slow oxidation of the iron might continue to go on within.' From these three reports, however, it is very clear that the method of coating iron with a protective skin of oxide by means of steam was known in the year 1859, and that in Professor Barff's system we only have a re-discovery of an ascertained fact.

"Upon my second point I would observe that however well the process may be suited for pots, pans, and waterpipes, as suggested in the first lecture—and this requires practical proof—it is, to my mind, quite unsuitable for iron and steel for constructive purposes. For the latter uses these metals are required to be of the highest possible character and to stand certain definite tests, and this on leaving the manufacturers' hands. To my mind, it would most seriously alter the character of the metal for the worse were it to be submitted to such a process as Professor Barff's, and a grave element of danger would at once present itself. It would, moreover, be impossible to deal with large compound iron structures such as bridge girders, roof principals, and the like, as a whole, and he would be a bold engineer who would tamper with the component parts of such structures individually in the manner required for the method of preservation suggested. The best preservative of iron under these and most conditions is good reliable paint, having an iron oxide base, and, until it has been practically demonstrated to the contrary, I shall continue to consider such a process as is suggested as a dangerous and delusive innovation and not an improvement."

Bank of England Notes.

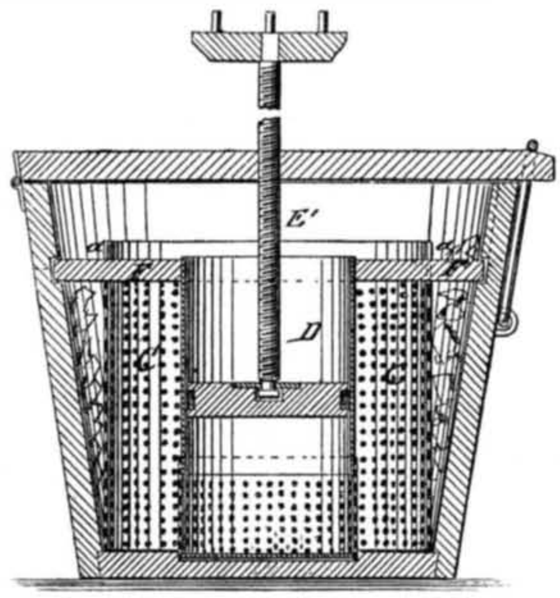
Few of the persons who handle Bank of England notes ever think of the amount of labor and ingenuity that is expended on their production. These notes are made from pure white linen cuttings only, never from rags that have been worn. They have been manufactured for nearly 200 years at the same spot—Laverstoke, in Hampshire, and by the same family, the Portals, who are descended from some French Protestant refugees. So carefully is the paper prepared that even the number of dips into the pulp made by each workman is registered on a dial by machinery, and the sheets are carefully counted and booked to each person through whose hands they pass. The printing is done by a most curious process in Mr. Coe's department within the bank building. There is an elaborate arrangement for securing that no note shall be exactly like any other in existence. Consequently there never was a duplicate of a Bank of England note, except by forgery. According to the *City Press*, the stock of paid notes for seven years is about 94,000,000 in number, and they fill 18,000 boxes, which, if placed side by side, would reach three miles. The notes, placed in a pile would be eight miles high; or, if joined end to end, would form a ribbon 15,000 miles long; their superficial extent is more than that of Hyde Park; their original value was over $15,000,000,000, and their weight over 112 tons.

Value of the Eucalyptus.

We learn from the *Meteorological Magazine* that, at the Easter *réunion* at the Sorbonne, some information was given by Dr. de Pietra Santra, a delegate from the Climatological Society of Algiers, as to the results of an investigation made in Algeria to ascertain the importance and value of the *eucalyptus globulus* in relation to public health. It appears that reports were received from fifty localities where the aggregate number of blue gum trees is nearly one million, and from these reports the following conclusions have been drawn: (1) It is incontestably proved that the eucalyptus possesses sanitary influence; for (2) wherever it has been cultivated intermittent fever has considerably decreased both in intensity and in frequency; and (3) marshy and uncultivated lands have thus been rendered healthy and quite transformed. Similar results have been obtained in Corsica, where it is computed that at the end of the present year there will be upwards of 600,000 plants of eucalyptus in full growth.

A NEW MECHANICAL BUTTER-WORKER.

Mr. Charles A. Sands, of Burlington, Kan., has patented through the Scientific American Patent Agency, May 1, 1877, the improved butter-working apparatus represented herewith.



In the tub is a cylindrical perforated screen, C, that forms with the tub an ice chamber. A follower is raised or lowered by the screw, E', in an interior cylinder, D, by a top handwheel. The lower part of the cylinder D is perforated, for the purpose of forcing the butter from the interior through the perforations into the space between screen and cylinder.

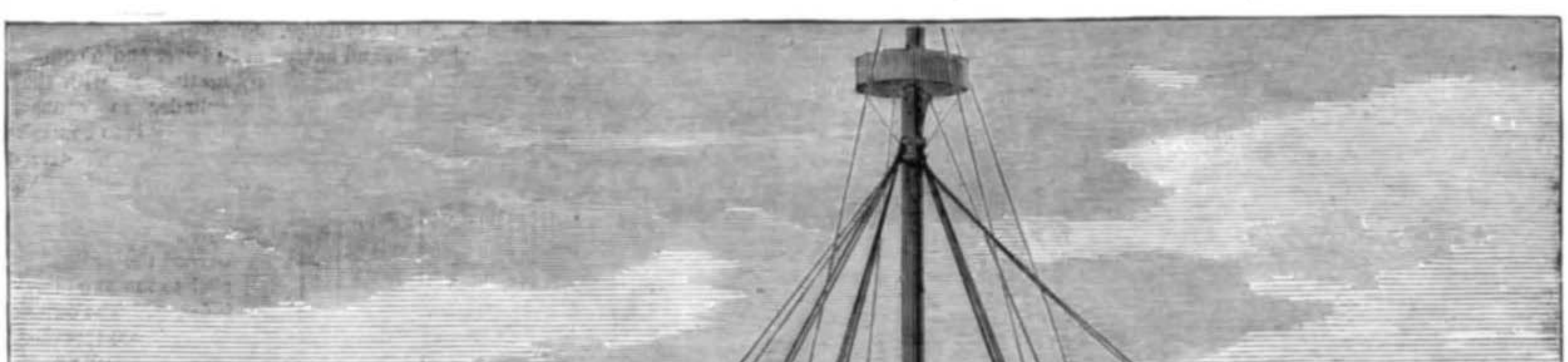
When the tub is used for work it is filled with water, which is cooled by the ice placed between screen and tub. The cold water rises to the same level in the interior cylinder as in the outer screen, the butter being placed into the cylinder and forced down by the action of the follower, lowered by the handwheel of the screw shaft. The butter then rises in finely separated condition, vermicelli-like, through the cold water in the space between the cylinder and screen to the surface of the same, when the same process may be repeated, if necessary, to separate the buttermilk entirely from the butter, which is at the same time kept cool for salting. The finely divided condition of the butter exposes the same thoroughly to the washing action of the water, so that the milk is quickly and effectively separated.

Zymotic Diseases.

Sir Thomas Watson has published a paper on zymotic diseases, in which he contends, in opposition to Dr. Murchison, that the development of the whole group, including small pox, chicken pox, typhus fever, typhoid or enteric fever, scarlet fever, the plague, measles, whooping cough, and mumps, is due solely to contagion. He would adopt, therefore, for the abolition of these diseases a process analogous to that which proved so successful in staying the cattle plague of 1865 in Great Britain. Of course he does not advocate the killing of the victims of contagia, according to act of Parliament or of Congress. Human beings cannot be stamped out like cattle, suffering from however grievous a contagium. But he would have the State exercise such powers as will insure, first, the immediate isolation of a person affected; second, the thorough disinfection of his body, clothes, furniture, and place of isolation, and, third, vigilant and effectual measures to prevent the importation of his disease from abroad, and to strangle it should it by mischance return. All this contagia-exterminating process implies, as Sir Thomas perceives, an acquaintance, on the part of the physicians to be employed by the commonwealth, with what he describes as the "science of State medicine," as well as an increase of taxation. But the freedom of nations from a class of diseases which may at any moment, and in localities where the sanitary arrangements are otherwise as good as they can be, send thousands to premature graves, is surely a worthy object of civilized society.

Professor Esmarch on Cancer.

In a recent lecture, this eminent surgeon spoke upon the treatment of cancer. A large number of drawings were exhibited, showing the various cases that had been met with during the course of Dr. Esmarch's professional career. He advised that cancers of the tongue, and also most of the malignant growths, wherever occurring, should be treated by means of arsenic and iodide of potassium, internally and externally, before proceeding to an operation. The speaker had frequently seen cancer originating upon a syphilitic basis, and often where the syphilis had remained latent for a long period—from twenty to forty years. The lecture closed by an appeal to each member to collect all the material in his power, and so see if it were not possible, by a division of labor, to arrive at some definite conclusions on the question of malignant neoplasms.



A BRITISH MAN-OF-WAR PROTECTED AGAINST TORPEDOES BY NETTINGS.—(See page 3.)