IMPROVED RAILROAD HAND BRAKE.

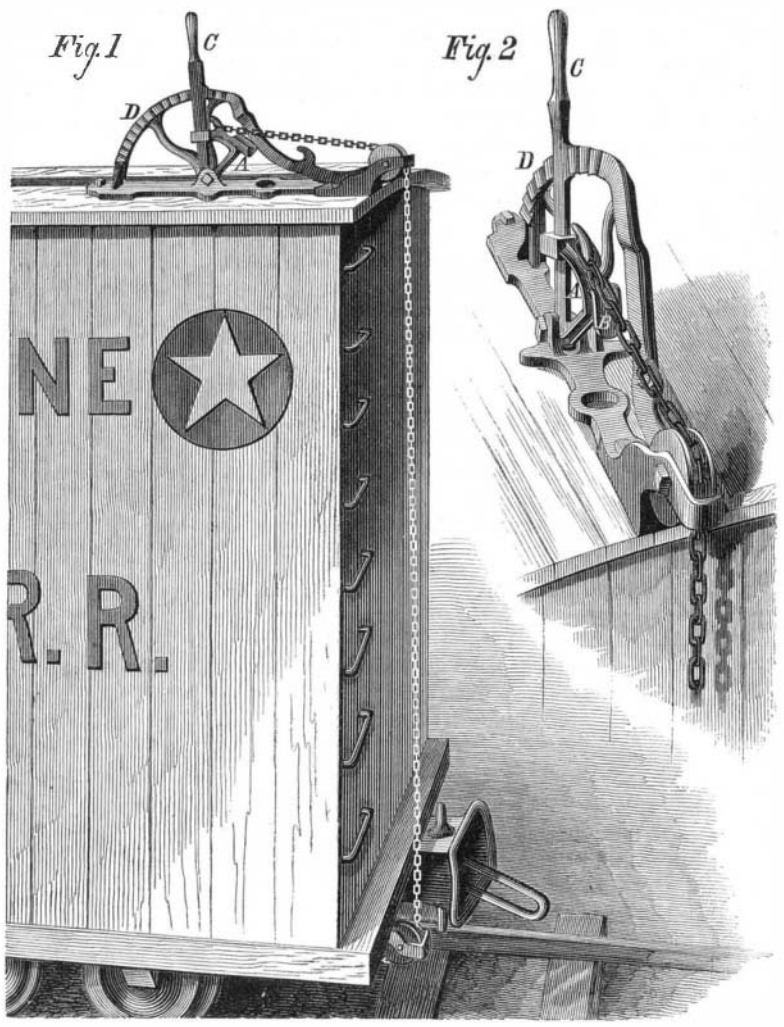
We illustrate herewith an improved form of railway hand brake, which, it is claimed, saves fully two thirds in distance run and time occupied while setting brakes. It is also stated to be much safer in use than the ordinary "twist up" arrangement, as it is placed from three and a half to four feet from the end of the car roof, so that, in case of accident, there is less danger of the brakeman being thrown between the train.

The device is quite simple, and consists of a bed plate, to which is pivoted, in lugs, a segment, A. On the latter is formed a hook, to which the brake chain is attached, and also a fork, B, for guiding the same. C is a wrought iron lever, connected with the segment and provided with a steel lip to engage in the teeth of the rack, D. The brake chain passes from the hook on the segment over a pulley, journaled in suitable bearings cast with the bed plate, and thence down under another pulley, secured as shown under the car, and so to the brakes. The arrangement on the roof of the car is, secured by but two bolts; and having merely a single motion, can necessarily be quickly operated.

The inventor informs us that on the occasion of a competitive trial between his device and the ordinary brake, which took place on the Little Miami railroad, while the latter stopped four cars and an engine in 1,130 feet, actual measurement, his invention performed the same operation within 425 feet, thus gaining 705 feet; and this although the cars in both cases were of the same weight and running as nearly as possible at the same speed.

From our engraving, giving two perspective views of the apparatus, and also showing how it is applied, a clear idea of its construction will be obtained. It appears strong and durable, and, according to the inventor, is not expensive.

Patented by Mr. W. S. Foster, of Foster's Crossings, Warren county, Ohio, who may be addressed for further particulars.



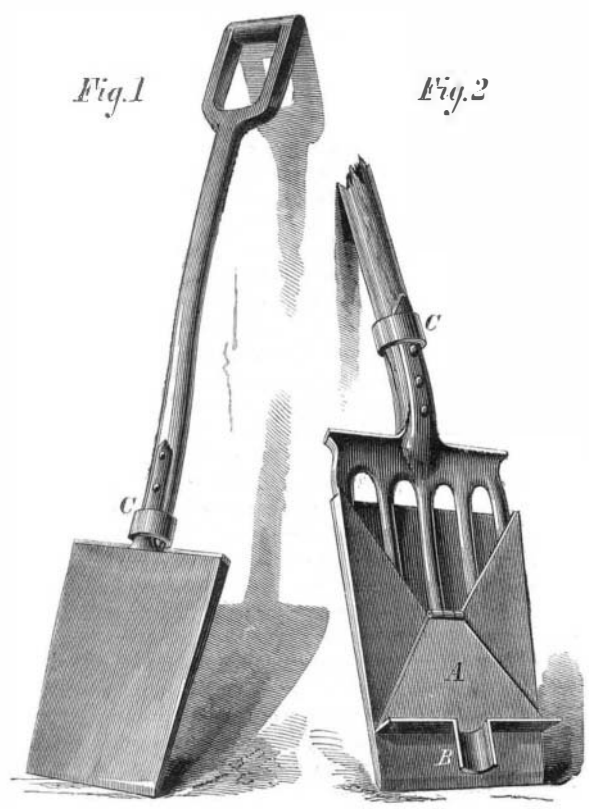
FOSTER'S RAILROAD HAND BRAKE.

To Prevent Burrs from Heating.

Says a correspondent in *Leffel's Mechanical News*, writing on the above subject: Dress from center to circumference, leaving no bosom. Draw a line across the center, each way, dividing a four feet burr into 16 squares or divisions, and other sizes more or less, in the same proportion, with all straight furrows. Let the draft be one half the diameter of the rock. Lay off the lands and furrows one quarter inch each, observing to dress smooth. Sink the furrow at the eye one quarter inch deep for corn, and run out to three sixteenths at the periphery; for wheat, three sixteenths at the eye and one eighth at the periphery. When thus finished, crack the lands in straight lines, square with the draft of cross lines, so as to make lines face in the runner and bed direct. This will never heat.

COMBINED SPADE AND FORK.

Our illustration represents an ingenious arrangement for adapting a fork for use as a spade in a speedy and convenient



manner. The fork may be of any ordinary pattern and the device, consisting of a sheath of corresponding form, is made to slip over the tines.

In our engravings, Fig. 1 shows the attachment partially in place. From the back is cut a triangular piece, A, which is hinged at its lower angle to the main portion. The same has a right-angled flange formed on its upper edge, which, when the fork is inserted, forms the top of the sheath. B is a projection on the triangular piece made semicircular so as to fit around the handle of the fork.

When the sheath is slipped entirely over the fork, a ring or sleeve, C, on the handle is brought down so as to surround the projection, B, and thus firmly hold the attachment in place. The sheath is made of sheet metal and, when affixed, forms the spade, as shown in Fig. 2. The plan is novel and economical, as the appliance can necessarily be obtained at a much less cost than an entire spade.

Patented July 15, 1873. For further particulars address the inventor, Mr. Heber Stone, Galveston, Texas, or care of W. S. Pierce & Co., 63 and 65 Stone street, New York city.

The Geographical Distribution of Mineral Oils.

M. J. Girard says, in *La Nature*, in relation to the above subject, that sources of bitumen have been known from antiquity. Those of the Euphrates, of Judea, the naphtha deposits of Bakou on the Caspian Sea, and the asphaltum of the Dead Sea, have existed from the earliest times. At Bakou, the inflammable gas or vapor of naphtha often produced remarkable phenomena, believed by the inhabitants to be supernatural and hence made an object of worship. A temple consecrated to fire was once erected there; but on its ruins, a paraffin factory now stands.

There is a certain relation between the mud volcanoes of Sicily and the Crimea and the sources of natural oil, as the emission of gas, surely indicating inflammable substances within is very common at times of eruption of the former.

Bituminous deposits are found in the mountains of the Caucasus, in South America, and especially in China, where the inhabitants utilize the gas flowing from the wells for domestic purposes. Before the discovery of the Pennsylvania petroleum, the sources of Burmah furnished the material in sufficient quantity to warrant exportation. There are important deposits of mineral oil at Pegon, and emissions of gas are observed at Chittagong and are locally known as the burning fountains of Bramah. In Assam, wells have been sunk for the extraction of oil, and recently petroliferous regions have been discovered in the south of India, in Australia and in Sumatra.

These mineral products are found all over the globe, though in the greatest quantities in the basins of large rivers, like the Indus, Euphrates, St. Lawrence, Mississippi, Colorado and many of the streams of California and Mexico; and also near lakes and inland seas. Pure and mixed oil has also been discovered in the islands of the Mediterranean, in the Grecian Archipelago, and in Ceylon.

Incrustation of Water Pipes.

The Boston fire insurance companies are now calling attention to the condition of the water pipes in that city. It seems that the water supply is greatly diminished by the incrustation formed on the inside of the iron pipes by the action of the water, so that a three inch pipe that has been laid ten years becomes reduced to two inches, those of four inches to three, and the six inch mains reduced to five and four inches. A pipe was recently taken up in Howard street through which one could not see, though water flowed slowly: and a pipe of three inch bore was taken up in Beacon street, filled up solid with rust. Here is a chance, says the Boston *Advertiser*, for an inventor to discover some coating to render iron pipes proof against the action of water. In the suburbs cement pipes are used, but it said that they are hardly strong enough to bear the pressure of the Cochituate water.—*New York Times.*

A Chemical Remedy for the Potato Disease.

Professor Alexander S. Wilson, in a communication to the *Chemical News*, states that he has made analyses of the tubers of diseased potatoes, and finds in the ashes a marked deficiency in the salts of magnesia and lime. In the ash of the healthy tuber from 5 to 10 per cent of magnesia salts are usually found, and over 5 per cent of lime. But in the ashes of diseased tubers, although the proper quantities of other minerals were found, the percentage of magnesia was only from 1 per cent up to 3·94 per cent, and of lime only 1·77 per cent.

With these considerations before us, I think, says Professor Wilson, that we are justified in appealing to chemical science—to solve the problem as to the prevention of the disease—to suggest not a substance that will destroy the enemy, for this is next to impossible, but to give the plant such nourishment that will enable it to resist the adverse circumstances in which it is placed, as well as the attacks of its own peculiar enemies.

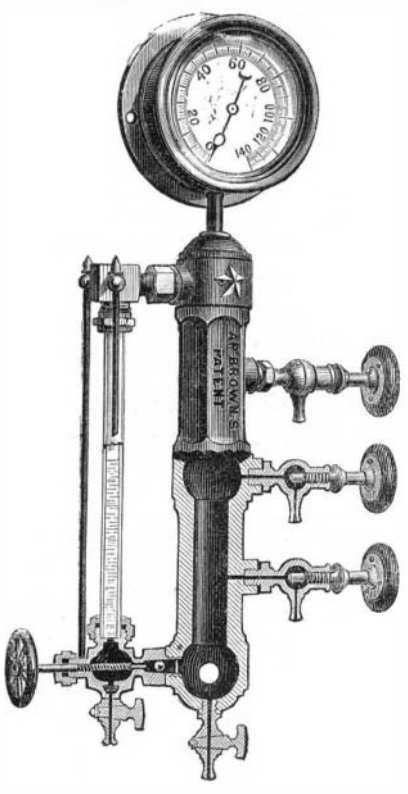
Some years ago, Professor Thorpe found, from the analyses of diseased and healthy orange trees, that, in the former, the amounts of lime and magnesia are deficient; the same thing, we have seen, is the case in the diseased potato plant.

It has lately been shown by Dr. Crace Calvert, that lime is one of the few substances which we know that are capable of altogether preventing the development of fungi in organic solutions. He does not give any experiments relating to the action of caustic magnesia on fungi, but doubtless its action will be found to be similar.

Here, then, is a curious and, at the same time, significant fact: Diseased potatoes are deficient in lime salts: lime prevents the development of fungi. May not the development of fungi in the vessels of plants be furthered by this deficiency? The circumstances are such as scarcely to leave room for doubt. So far, then, theory and practice agree; lime has been found by experience to be useful in preventing the disease, and I cannot doubt that magnesia, if tried, will be found to have a similar effect.

COMBINED WATER AND PRESSURE GAGE.

The inventor of the device of which we herewith give an illustration has combined the glass tube water gage, the try cocks, and the pressure gage in one neat and compact arrangement, which is claimed to be far cheaper than the separate articles: The boiler need be punctured in two places instead of six; the pressure gage is placed right before the eyes of the engineers, boiler tenders, or other workmen; and the gage glass is specially arranged to prevent, by a most ingenious contrivance, accidents from broken glass tubes. The three try cocks are opened by compression, and are self-closing, being fitted with spiral springs. In each of the horizontal passages at the top and bottom of the glass tube is a valve, consisting of a ball of solid material. This is so placed that, if the tube be broken the pressures of water and steam in the tube no longer balancing each other, the ball is instantly driven into its seat, closing the orifice, preventing the escape of hot water and steam and the scalding of the bystanders, as well as the loss of power from the boiler. The engineer can then, without danger or waste of time, put in another glass; and by slightly pressing in the piston, on the bottom at the left, the ball is driven from its seat, and water rushes into the upright tube,



the pressure of which drives the ball in the upper part away, and equilibrium in the gage is restored.

By the valuable safety improvement, and by bringing together the various parts, frequently distributed about a boiler to the great inconvenience of the attendants, the inventor, Mr. A. P. Brown, claims that he has effected an important improvement in boiler engineering. For further particulars address T. Holland, 8 Gold street, New York city.