Improved Portable Steam Engine.

We illustrate, in the accompanying engraving, R. Tozer's portable steam engine, to which gold medals were awarded by the South Carolina Agricultural and Mechanical Society, and which embraces in its design many features of merit that well adapt it to the uses to which portable engines are generally applied.

The cylinder is cast in the center of the steam dome, thus avoiding the use of an induction pipe. A hole is cut in the top of the boiler, which admits steam to the dome, the live steam being thus made to entirely surround the cylinder and steam chest, keeping the cylinder hot and preventing condensation therein.

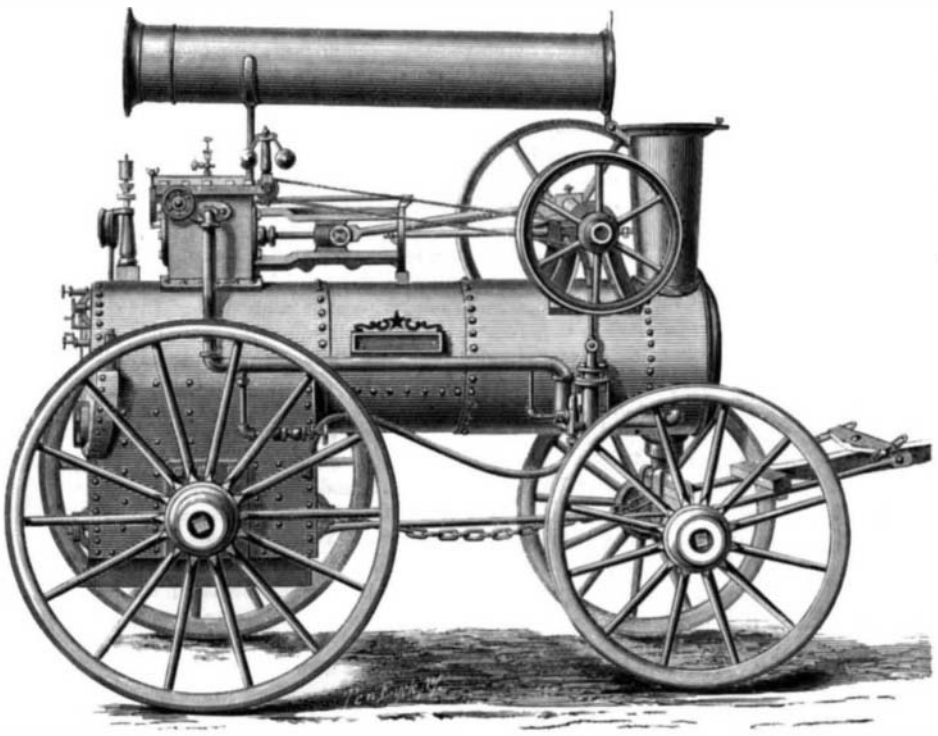
A valve on the side of the steam chest admits the steam to the cylinder, and a plain cover covers both dome and steam chest.

The guides are cast in front of the dome, and bored out with the cylinder.

All parts of the engine are easily accessible, and it is very neat and compact in appearance.

It is stated to operate with great economy, and, having a long connecting rod, it works very easily in its guides.

The engine was designed by R. Tozer, of Columbia, S. C., who manufactures engines of this class, of from four to twenty horse power, and from whom further information may be obtained.



TOZER'S PORTABLE STEAM ENGINE.

Novel Use for Worthless Safes.

The Chicago *Tribune* suggests the erection, in that city, upon the Ball Grounds, of an immense monument to the memory of a number of worthless institutions, late of that city, among which are the various fire insurance companies that proved good for nothing in the hour of trial, the fire-proof safe builders, whose wares failed at the critical moment, the police and fire departments, so sadly deficient in the time of need, etc. Says our cotemporary:

"All over the burnt district the prostrate forms of hundreds of conquered safes are lying, where, having faithfully performed their duties as worthless guardians of property, their ungrateful owners have abandoned them to ignominy. The idea of building a monument from them is novel and unique—more so, perhaps, than the monument itself will be, but we must not grumble at appearances. Henceforth the whole duty of our citizens will be to build every structure cheaply, fireproof, and without regard to appearance. Now, as these safes are utterly worthless—as they always were, only their gulled owners did not know it—the monument will be the cheapest possible. As they have already been subjected to a fierce heat, and have been thoroughly burnt to rubbish, there is little fear that they will burn again. It is true they are of all sizes, patterns, and qualities of badness, and makers and owners will all have a proprietary interest in the struct .re."

A REMARKABLE BOY MECHANIC.

We have on our table a complete working model of a horizontal steam engine with tubular boiler of the locomotive type, separate from the boiler, the workmanship of which would do credit to an experienced mechanic. Every part is stated to have been made by Master C. T. Mason (at the age of fourteen years), of Sumter, S. C. Nothing is omitted, even a miniature steam gage being supplied. Master Mason will, if he continues to progress, be a master mechanic at an age when boys in general have scarcely an idea beyond tops and marbles. He will please accept our thanks for sending his engine for our inspection, and our predictions that, if he lives, he will occupy a distinguished place among the engineers of this country. Few men could beat the execution displayed in his working miniature engine, which, in its details, indicates a knowledge of steam and the laws of its action most remarkable in such a youth. Let Master Mason apply himself diligently to the study of mathematics, mechanics, and drawing, and there can be no doubt of his future. We may add that this young mechanic received a silver medal as a first premium on this model, from the Agricultural and Mechanical Society of South Carolina at its fair of 1869.

Merriam and Dietrick's Lime Kiln.

This invention has for its object to furnish an improved lime kiln, simple in construction, conveniently operated and controlled, and effective in operation, and which will allow the lime to be drawn off as burned, and from the front, side, or rear parts of the flue as may be desired; and it consists in the construction and combination of the various parts of the kiln, as hereinafter more fully described.

The lower part or draw of this kiln, which is built of stone, is about ten feet long, four feet wide, and four feet high. An inclined grate or rack is placed in the rear part of the draw to receive the lime as it falls from the flue. Two heavy plates of cast iron are made with openings in their centers, and placed above the draw and one above the other, at such a distance apart as to receive between them sliding grates or bottoms. The space between these plates is left open at the front and rear, to allow the sliding bottoms to be slid out in front or rear, and one at a time or together, to draw the lime from any desired part of the stack. Sliding dampers are secured to the sliding bottoms in such a way that they may be moved laterally, to partially or wholly enable the draft to be regulated and the fire to be controlled, as may be desired. The stack is of brick, about twenty-four feet high and has a door, in the lower part at the front, through which the lime may be drawn. Either coke or coal may be used in the kiln as fuel, but coke is preferred, as being better and cheaper.

In charging the kiln, about a quarter of a cord of dry wood is put upon the bottom, upon which is placed a layer, about one foot thick, of limestone, then a layer about three inches thick of coal, and similar layers of stone and coal alternately until the flue is filled. The fire is then applied to the wood, and, after being lighted about twenty-four hours, will have burned about ten or twelve feet above the bottom, which becomes cool. As fast as the lime is burned, it is removed and alternate layers of coal and stone added, so that the kiln may be kept burning continuously.

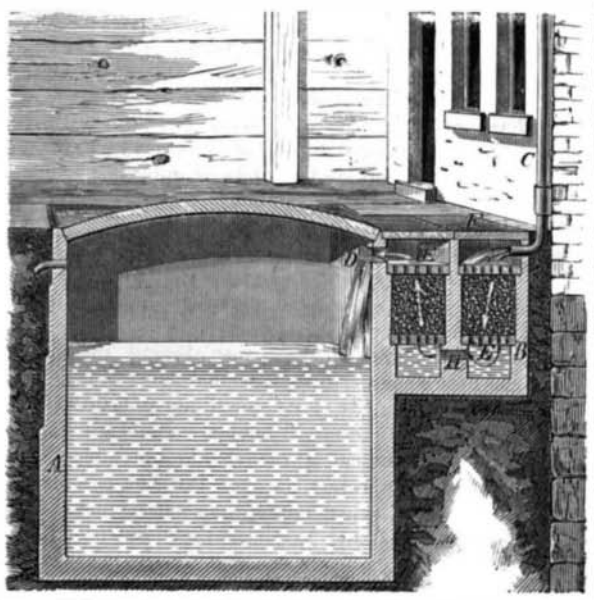
This kiln is the invention of John Q. Merriam and Abram J. Dietrick, of Fort Scott, Kansas

SIMONSON'S IMPROVED FILTERING CISTERN.

Mr. John Q. Simonson, of Graniteville, Staten Island, is the inventor of the improved filtering cistern illustrated in the accompanying engraving.

He claims, as the advantage secured by his invention, that by its use, a perfect substitute for wells is obtained at less cost, while supplying purer water.

The filter is a double one, so that the water is really filtered twice before passing into the cistern for use. It has, we are informed, been on trial for more than three years, preventing any dirt or sediment from being deposited in the cistern. It being an outside attachment, it is easily cleaned out by any ordinary laboring man, and can be quickly re-arranged for use without disturbing the water in the cistern.



The parts, lettered for reference in the engraving, are as follows:

The walls of the cistern are represented at A, the walls of the filter at B, the spout leading from the roof at C, and the exit from the filter to the cistern at D.

Perforated tiles, E, rest upon offsets in the walls of the filter, as shown. The lower tiles are placed sufficiently above the bottom to form chambers, shown separated by a middle partition, these chambers communicating with each other by openings, H. Similar chambers, which do not communicate with each other, are formed above the upper tiles.

The filtering material is placed in the two filtering chambers between the upper and lower tiles, which chambers are also separated by the middle partition.

This filtering material may be one fifth gravel and four fifths charcoal, or it may be all charcoal, or any suitable material preferred.

The flow of the water, as indicated by the arrows, is first into one upper chamber, where it falls upon the perforated tile, which breaks the stream into many small ones, thence it passes slowly down through the filtering material into one of the lower chambers, and from this into the other lower chamber through the openings, H, thence slowly upward through the second filtering chamber into the upper chamber nearest the cistern, out of which it passes into the cistern, purified and ready for use.

In passing slowly through the lower chambers of the filter, the water flows from one to the other through the apertures, H, as described; but as these apertures are at considerable distance from the bottom, there are formed pockets on each side of the middle wall, which serve to collect and retain materials that escape the action of the first filter. The lightest will be retained in the second of these chambers, in which the water ascends with a very slow and gentle movement.

The invention was patented Sept. 10, 1871. For further particulars address Benedict Brothers, 171 Broadway, New York.

The Artificial Volcano.

Dr. Fred. V. Hochstetter furnishes an interesting account of a phenomenon occurring during one of the phases of a manufacturing operation, which is, as he claims, a complete duplicate, upon a miniature scale, of a volcanic eruption, and which serves, at the same time, to confirm the modern views concerning the process of an eruption; according to which the lava is not simply in a molten condition, but is reduced to the state of liquidity by the action of superheated water vapor under great pressure.

The phenomenon referred to occurs in the operation of separating the sulphur from the residual products obtained in the manufacture of soda by Leblanc's process. The sulphur obtained from these residues, in order to free it from the gypsum or sulphate of lime mixed with it, is melted in a suitable apparatus, with steam under a pressure of from 2—3 atmospheres. The gypsum remains suspended in the water, and the fused sulphur is from time to time run off into wooden troughs or forms, the temperature of the fluid mass being about 122° C. (251·6° F.) Almost instantly after the pouring, a crust of solid sulphur is formed on the surface of the mass. Dotted over this surface, however, the orifices are left, from which the liquid beneath is forced up. At intervals a jet of sulphur bubbles out, and cooling, forms around the orifice a slight prominence; the repeated eruptions accumulate material about it, until a miniature volcanic cone is formed, with its crater well defined.

The cause of this curious phenomenon is found in the fact that the sulphur, in its fused condition in the steam chamber, takes up and retains a certain quantity of water; and this absorbed water, it appears, is given out gradually in the in the form of steam, as the sulphur solidifies. The slowly liberated steam, accumulating pressure beneath the crust of sulphur, forces, at regular intervals, an outlet at the vents, carrying with it in its passage the molten material to form the solid cone.

QUINNIPIAC DAM.

The town of Wallingford, Conn., by the almost unanimous voice of its voters, has pledged its co-operation with the community of that place, in the erection of a large dam across the Quinnipiac river, in Wallingford. A three hundred horse power will thus be formed, adding materially, it is believed, to the prosperity of the town.

The Wallingford Community is an association comprising about forty-five members, whose religion and social practices are similar to those of the Oneida (N. Y.) Community. At the discussion of the project in town meeting at Wallingford, while all admitted the material benefits to be derived from the establishment of the water power, objection was made to its consummation on moral grounds. It was alleged that the men and women composing the community were simply a parcel of whoremongers and harlots, to associate with whom, in building the dam, would be a disgrace to the town; and it was asked, now that the Government was endeavoring to extirpate polygamy from Utah, why should not Wallingford rather discourage than encourage the existence in their midst of an association of persons like the Wallingford Community?

This view was promptly rejected by the majority, as having no bearing on the subjects in which the town was most interested, namely, the construction of a large dam across the Quinnipiac, and the consequent increase of manufacturing facilities in that vicinity.

The practical difference between the Wallingford, Oneida, Shaker, and other communist associations and the Mormons, appears to be that the latter live in open, flagrant violation of the laws of the land, while the former are law abiding, faithful people, who somehow or other manage to improve and increase the material wealth of the districts around them. But if their private morals are worse than their neighbors, we hope the home missionaries will not neglect them.

GREAT powers and natural gifts do not bring privileges to their possessors so much as they bring duties.