

AUTOMATIC WATER STILL.

The illustration represents an automatic water still for the use of druggists, chemical laboratories, etc. The lower vessel is the boiler, the middle one the condenser tank, the upper one a supply tank. The boiler and supply tank are closed, except for the attached pipes, etc.; the condenser tank has a loose cover.

Of the four pipes shown, A is the steam and condensed water tube, coiled, as shown, in the condenser tank full of

**HERRICK'S AUTOMATIC WATER STILL.**

water, and delivering distilled water at A'; B is a pipe leading from the water level in the boiler to the top of the supply tank; C, a pipe, with cock, leading from the bottom of supply tank to the bottom of condenser tank; and D, a pipe leading from top of the condenser tank to bottom of boiler.

E is an opening, with airtight stopper, for filling supply tank, and F a cock to draw off hot water from boiler.

The supply tank and condenser tank being filled with water (through E, and the open top of condenser tank), E and the cock in C both closed, and the boiler empty, the cock in C is opened. Air has free access through A and B to the top of the supply tank; it therefore enters, and water flows out of supply tank into condenser tank through C. This displaces the water in the upper part of condenser tank, which flows through D into the boiler. This action continues till the water has risen in the boiler above the lower opening of B, thus cutting off the supply of air to condenser tank, and so the flow of water. Heat is then applied to the boiler in any convenient way, boiling soon begins, steam passes off through A and is condensed therein, and delivered as distilled water at A'.

When by evaporation the water level in the boiler is lowered so as to uncover the lower opening of B, the air again enters the supply tank through A and B, water flows through C, and the water at the top of the condenser tank, now heated by condensing the steam, passes over into the boiler till the lower opening of B is again closed. This action continues at intervals so long as water remains in the supply tank.

The advantages of this still are, that it is extremely simple, and always ready for use, upon simply filling, and heating; requires no setting up, no adjusting of tubes to a water supply for condensing. It requires very little heat, beginning to boil very soon after heat is applied, and utilizes waste heat as the process goes on. In the ordinary still the whole mass of water must be heated before steam is obtained; in this only a stratum less than an inch deep, which is replenished by hot water as it boils away, not stopping the boiling. It is entirely automatic; no attention is necessary from the time heat is applied till the supply tank is empty, or the water in the condenser tank all boiling hot. The supply tank can be refilled, if desired, without interrupting the boiling.

Hot water can be drawn from the boiler without interrupting the boiling, and with the result of increasing the amount of distilled water yielded. It is cheap; its first cost being much less than that of a still doing the same work, and the heat required being less, the cost of running is proportionately reduced. The size shown in cut, with boiler, etc., 6 inches in diameter, is the ordinary druggist's and phy-

sician's size, and will yield a quart of distilled water with no attention, and any required amount more by refilling the supply tank, and drawing off hot water from the boiler. Larger sizes are made for other uses. We are informed that a still with condenser tank 14 inches in diameter, and 14 inches high, has for six months furnished distilled water and hot water in abundance for from 10 to 17 students, in the laboratory of Iowa College, under the charge of the inventor.

The same principle, with slight modification, may be used for distilling other liquids.

This invention has been patented by W. H. Herrick, of Elizabethtown, N. Y.

Extent of the Natural Gas Supply.

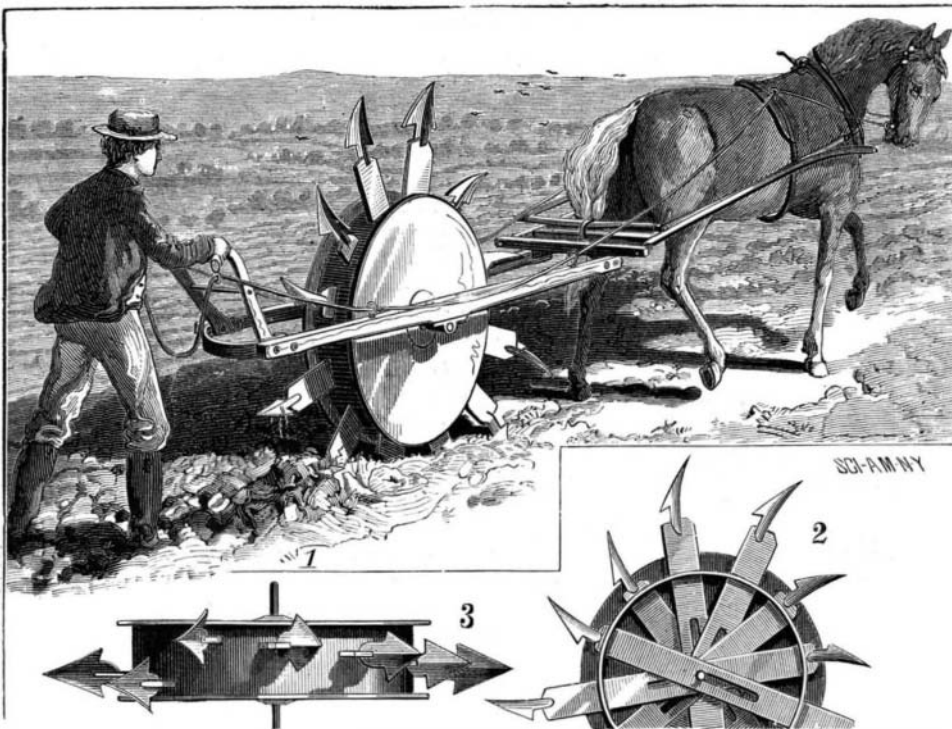
The great interest in the number of light and fuel companies led a reporter of a Pittsburg paper to have a talk with Mr. Asa P. Wilson, a gentleman who has had extended experience in drilling wells for oil and gas, and has a thorough knowledge of all the localities in the country in which gas especially can be found. He has made a study of the subject, and the result of his operations is that the gas territory is comparatively limited in extent, but Pittsburg lies near the belt where the greatest and most lasting flow of gas may be obtained.

Mr. Wilson, in describing the territory in which the greatest flow of gas may be obtained, says that it will be found within a belt extending from a point on Lake Ontario in a direct line to West Warren County, Pa., thence directly to Rochester, Pa., down through Steubenville, Wheeling, W. Va., Parkersburg, W. Va., to Boone County, W. Va., this line forming the northwestern boundary. A similar line running about eighty miles east, starting from Lake Ontario and ending after the Great Kanawha River is crossed, will embrace the area of the most productive gas territory. A continuation of this belt, but much narrowed, through Kentucky and Tennessee into Alabama will produce in many places large flows of gas. Sections of Wisconsin, Michigan, and Illinois are also likely to produce remunerative gas wells.

The points where the heaviest flows of gas may be expected, Mr. Wilson says, are Butler, Armstrong, Westmoreland, Greene, and Washington Counties, Pennsylvania; Brooke, Ohio, Marshall, Wetzell, and Monongalia Counties, West Virginia; and Belmont County, Ohio. "In such quantities can the gas be obtained in these sections," said Mr. Wilson, "that they are destined to be the great manufacturing districts of the country, especially in the iron and glass industries. But all along the belt, as experience is gained, I think that good and remunerative gas wells will be found with lasting flow."—*The Coal Trade Journal*.

IMPROVED ROTARY PLOW.

The novel rotary plow shown in the engraving might perhaps more properly be called a spader, as it imitates hand spading more nearly than it does plowing. It loosens and turns the soil in a very effective way, and, it is claimed, with less power than is ordinarily consumed in plowing. The plow has a heavy rotary drum carrying plowshares, and mounted in a suitable frame guided by handles, and drawn forward by horses in the usual manner. The drum is pro-

**BETANCOURT'S ROTARY PLOW.**

vided with a series of diametrical slots or mortises, in which are placed as many plow standards, each capable of sliding longitudinally through the drum and carrying at each end a plow. As the plow is drawn forward, the points enter the soil in succession, and remain there until the limit of the end motion of the standards is reached. At the same time they are tipped in the soil very much after the manner of hand spading. The plows may be made in various forms and several of them may be arranged side by side, forming gangs, which would accomplish a great amount of work with the application of a suitable amount of power. This

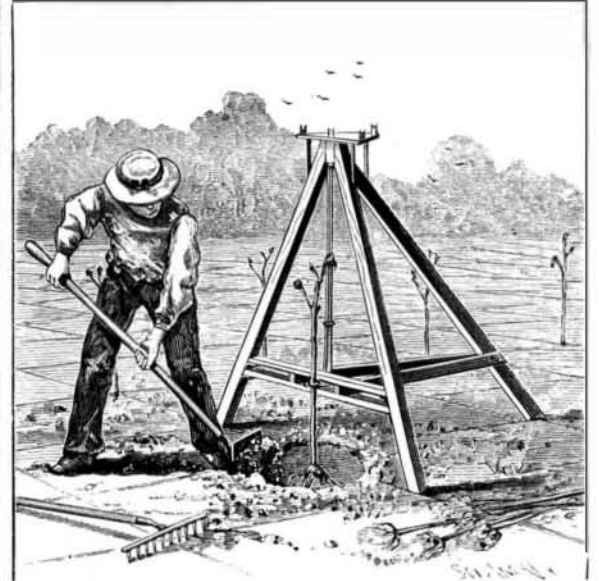
plow could be very readily operated by steam either by means of the wire rope system or by traction engines.

Figs. 2 and 3 of the engraving are enlarged detailed views of parts of the plow.

Further information in regard to this invention may be obtained by referring to our advertising columns, or addressing the patentee, Dr. G. A. Betancourt, care of Inventors' Institute, Cooper Union, New York city.

TREE PLANTER.

The engraving shows a novel device for holding trees at the proper elevation and in a vertical position while being planted. The planter has three inclined bars secured to

**GAIRAUD'S TREE PLANTER.**

each other at their upper ends, and connected by parallel and brace bars, forming a tripod, and provided with hanging springs having their lower ends bent forward and provided with claws, for suspending a tree in exactly the required position. To the upper end of the three inclined bars is attached a table provided with four sights, by which the planter can be adjusted from stakes at the sides of the field.

This invention has been patented by Mr. Louis Gairaud, of Santa Clara, Cal.

Bursting of a Steamboat Boiler.

The Hudson River way boat, Riverdale, plying between New York city and Haverstraw on the Hudson, with stoppages at intermediate points, was sunk by the bursting of a boiler on the afternoon of August 28. Four persons were known to have been killed and six injured, but the mortality list may be extended with the ascertained results of the wounded who were rescued, and the dead who may have gone down with the steamer.

It appears, from the statements of survivors, that the catastrophe was presaged by an unusual escape of steam through one of the deck gratings, but was followed almost immediately by an outburst that was accompanied by a dull roar, but not loud enough to disturb workmen on a pier not more than six hundred feet away.

But Inspector Dey, who ought to be good authority, says that this was not a burst on account of imperfect or worn out boiler plates, but an explosion because of the red heating of the boiler over the fire box by reason of the absence of water, and the pumping in of water on the surfaces of the red hot plates. Inspector Dey says that "under these circumstances it isn't a question of strength, for this is a power that upheaves mountains. How the water in the boiler should have been so greatly reduced without the knowledge of the engineer, of course I cannot say. The water gauge is not an infallible index; it may have become clogged, or it is possible even that for some reason it had been turned off without the engineer knowing it. The engineer certainly was deceived about the water in the boiler. No one familiar with steamboats will entertain the slightest doubt about the cause of the explosion."

Of course with such authority with positive opinions, it would be folly to assume any other hypothesis until the wreck is raised and an examination made of her boilers.

The New Money Order System.

The new postal money order notes, authorized under the law of the late Congress, will be ready for delivery at every money order post office September 3. They cover the transmission of all sums in dollars, and in fractions thereof, from a fraction of a dollar to five dollars.