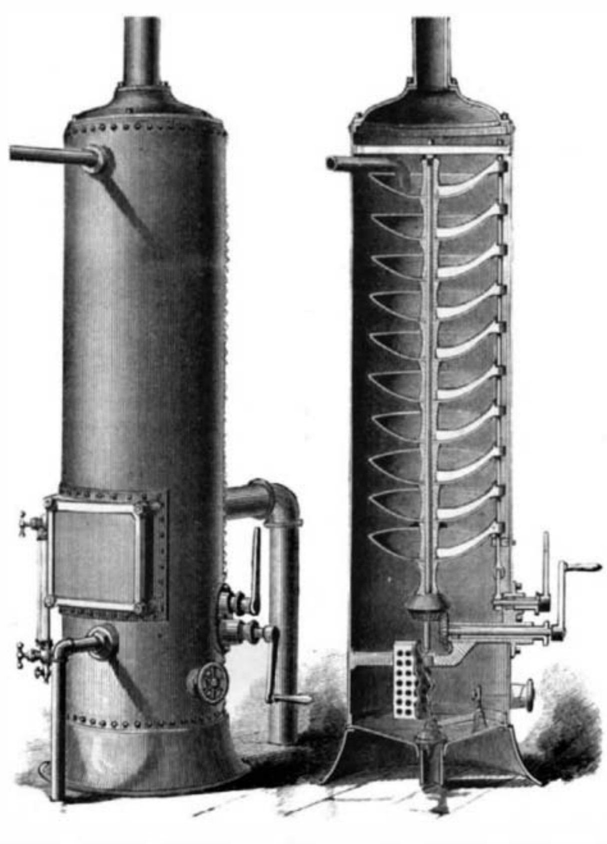
NEW FEED WATER HEATER AND LIME EXTRACTOR.

Many ingenious devices for heating the feed water in its passage to the boiler—a few acting as lime extractors—have been manufactured and sold for years; and while a few of them act apparently well as heaters, fewer succeed as lime extractors, and they all fail in most cases to extract enough of the impurities to prevent incrustation; even where the boilers have the most careful cleaning and attention, the great majority of heaters, mostly expensive pipe arrangements, only suffice to make the water moderately warm. The main fault in the lime extractors is generally that they lack heating and depositing surface, and have no provision whatever for extracting the lighter or finer impurities, which defy filtration, and which once incrusted in a boiler adhere firmly, making a very hard scale, which is almost impossible to remove without injury to the boiler.

Another great disadvantage in working one of the old style of lime extracting heaters is that too much time is required in the operation of cleaning them. Any lime extracting heater should be cleaned often and well, to insure the best results. The engraving shows a heater and purifier, which besides providing a new principle for extracting impurities both of the lighter and heavier quality, provides an apparatus for cleaning that performs its work perfectly in a few minutes, and while the engine is running.

The exhaust steam from the engine enters at the back of the heater, about one-third of the way up, and passes out at the top. The water is conveyed into the heater at the top by a pipe leading from the tank, having a suitable stop cock for its regulation; on entering the heater, the water is carried downward into the top bowl, and flowing over the edge follows the under surface to about the center, before dropping into the next bowl. In like manner the water passes downward over each bowl in the series, to the reservoir below, from which it may be drawn off by a pump. It will be easily seen that the water in its downward passage is continually brought into direct contact with the ascending current of heat and steam, thus heating the water to the highest degree attainable without back pressure. As the water becomes heated to the boiling point directly after it enters the heater, the lime, magnesia, clay, mud, iron, sulphur, silica, sand, etc., are set free, and deposited on the bowls; the heavier matter settles mostly on the inside, while the lighter impurities cling to the under sides of the bowls or receivers.



HOPPES' FEED WATER HEATER AND LIME EXTRACTOR.

The heater is easily cleaned in a very few minutes, even while the engine is running, by opening the valve in the bottom and rotating the bowls by means of the crank; ~~this will scrape the sediment loose from the interior~~ of the bowls; the scrapers are then raised up by means of the lever, and the bowls rotated as before, thus scraping the adhering material from their under sides; the scrapers are then brought to a central position, and the bowls revolved rapidly, thus throwing the water and sediment out of the bowls by centrifugal action into the reservoir below, from which it is carried off by the waste pipe at the bottom. The water is then admitted and the bowls filled, when they are rinsed by the same process. This operation is repeated until only clear water comes from the waste pipe.

Further information in regard to this useful invention may be obtained by addressing the inventor, Mr. John J. Hoppes, Springfield, Ohio.

Tracing Contagion.

A number of cases in the same herd, owned by a farmer at Salem, N. J., having died very suddenly, the veterinary surgeon submitted a specimen of the blood from the last victim to Professor Leidy for microscopical examination. The animal was apparently well on one evening, and was milked as usual; it died the next morning. The cause was not clear, but was suspected to be the result of anthrax or splenic fever. A post-mortem examination was made the following day; and the abdominal viscera were found much congested, especially the spleen, which was gorged with blood. The specimen of blood from the spleen was examined and found to be teeming with bacteria of the form known as *Bacillus anthrax*, which is now viewed by most competent authorities as the cause of anthrax. The bacilli were actually more numerous than the blood corpuscles, which appeared unchanged.

This case shows that milk is forwarded to market drawn from cows which are within a few hours of their death from splenic fever. Such milk can hardly be wholesome, and doubtless contains the bacilli capable of giving contagion.

Let us hope that the fat from the carcasses of such animals is not sent to the nearest oleomargarine manufactory, as this substance is rendered only at a temperature under 120°, by the patent which is now supreme. We need not state that the thermal death point of bacilli is far above such a temperature, and we leave our readers to draw their own conclusions respecting the results when such uncooked animal produce is used as an article of diet.—*Medical Record.*

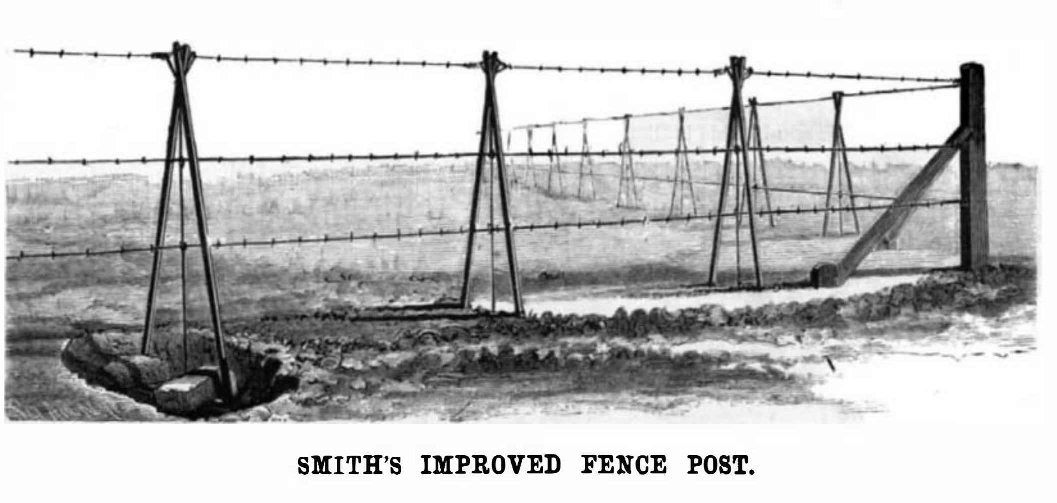
Hot Water Cure for Sickly Plants.

The *Florist* asks: Has any one tried hot water as a restorative for sickly plants? and then proceeds to say that M. Willermoz some time since related that plants in pots may be restored to health by means of hot water; ill health, he maintains, ensues from acid substances in the soil, which, being absorbed by the roots, act as poison. The small roots wither and cease to act, and the upper and younger shoots consequently turn yellow, or become spotted, indicative of their morbid state. In such cases the usual remedy is to transplant into fresh soil, in clean pots with good drainage, and this often with the best results. But his experience of several years has proved the unfailing efficacy of the simpler treatment, which consists in watering abundautly with hot water at a temperature of about 145° Fah., having previously stirred the soil of the pots so far as may be done without injury to the roots. Water is then given until it runs freely from the pots. In his experiments the water at first came out clear, afterward it was sensibly tinged with brown, and gave an appreciable acid reaction. After this thorough washing, the pots were kept warm, and the plants very soon made new roots, immediately followed by vigorous growth.

IMPROVED FENCE POST.

The annexed engraving shows a very simple and inexpensive post for wire fences. It is made of $\frac{7}{16}$ round iron, each post requiring about twelve feet of the rod, which is bent up in the form of an isosceles triangle, with the upper ends crossed and notched to receive each other, or they may be welded.

The base of the post, which is about two feet wide, rests upon two stones or bricks, one at each end, and is anchored by a stone or brick placed above the rod near the angles. The post is planted about one foot in the ground, and a galvanized wire attached to the center of the base and secured to the top of the post. This wire is wound around the horizontal wires, and holds them rigidly in position. This wire also serves to bind the top wire of the fence, which rests in the fork at the top of the post. The lower end of the post is galvanized to prevent rust, and the upper end is painted or coated with coal tar. Of course the entire post may be galvanized if desired. This post, used in connection with the ordinary fence wire, makes a very strong and durable fence at a comparatively slight cost.



SMITH'S IMPROVED FENCE POST.

Further particulars in regard to this invention may be obtained by addressing the patentee, Mr. A. B. Smith, Box 283, Abilene, Kan.

Substitute for Hydrogen in the Lime Light.

The rapidly increasing use of the lantern in schools, public lectures, and exhibitions has led to a number of experiments to reduce the cost of the lime light. In point of power and general usefulness nothing better, except electricity, has been found than the combination of hydrogen and oxygen in a single frame thrown against a piece of lime. In a few large cities the gases are easily obtained in commercial quantities, stored in iron tanks, ready for use, and at comparatively low prices.

The tanks are troublesome to carry, and in smaller towns the gases must be made on the spot as required, and this involves expensive and troublesome apparatus. Every effort has been made to find a substitute for one of the gases. Street gas, alcohol, and other things have been tried in place of the hydrogen, but with a decided loss of light. Common ether has been tried several times, but has been considered too dangerous. More recently an apparatus for saturating the oxygen with the vapor of ether has been devised, that appears to remove all danger of explosion and to give an excellent light.

The apparatus consists of two strong brass cylinders, placed side by side upon a wooden support. These are open at one end, and have brass nipples at the opposite ends for receiving the gas tubes. In each tube is placed a cylinder or roll of loose fabric, like flannel, having a small hole in the middle. These rolls fill the cylinders completely, fitting tight, and leaving only the small passage for the gas through the center of the material. Common photographic ether may then be poured into the cylinders till the wick-like filling is completely saturated, and then the excess of liquid is poured off and put back in its bottle. Two rubber caps, joined together by a short tube, are then fitted over the ends of the cylinders, and to one of the nipples is fitted the gas tube from the oxygen holder or tank, and to the other a tube leading to the burner.

The oxygen for the burner is supplied by a third pipe. To use the light the oxygen is first turned through the cylinders, entering the rear of one and passing, by means of the short tube, to the next, and so on to the light. On its passage enough vapor is absorbed from the wicking to give a good flame at the jet, and when the oxygen jet is added to it, a light is obtained that, as far as observation goes, is quite as good as the ordinary lime light. The striking back of the flame, and consequent explosion of the ether gas, when the gas is suddenly shut off, is said to occur but rarely, and with proper care it need never happen. However, to prevent all serious results of such an explosion, the rubber caps and tube joining the two cylinders are put on very lightly, and if there is an explosion the caps will be blown off before any dangerous pressure is reached.

The invention has the merit of saving all the trouble of making or carrying hydrogen, as the whole apparatus can be carried in the hand, while ether can be obtained anywhere. One filling of the cylinders will last about ninety minutes, and a quart of ether will give a light for five hours.—*Century Magazine for March.*

The Combustion of Air in Coal Gas.

In a lecture experiment exhibited recently before the Newcastle upon Tyne Chemical Society, Mr. J. T. Dunn, M.Sc., said: There is nothing very new in this form of the apparatus, save that it is handier than most forms in use and does not require any reservoir of air. It consists of an ordinary Argand chimney mounted on a stand of convenient height. The upper end of the glass is covered by a cap of wire gauze, in the center of which a hole of about four or five mm. diameter has been punched. The lower end is fitted with a cork pierced with a hole in the center, through which passes a glass tube level with the cork beneath, and projecting twenty or thirty mm. above its upper surface into the lamp glass; this tube preferably ends in a wide jet of rolled platinum foil. Two other holes in the cork, symmetrically placed on either side the center, through which pass short tubes joined by a T-piece and India-rubber tube to the gas supply, serve to feed the apparatus with coal gas. The gas is turned on and lighted above the gauze. A narrow glass tube is pushed up through the open tube in the cork and through the hole in the middle of the gauze into the coal gas flame. On gently blowing through this narrow tube (which for convenience should have a flexible India-rubber tube attached to it), the breath catches fire at the coal gas flame, and the tube may then be gently withdrawn, when its little flame ignites the air entering the apparatus by the short open tube. The draught of the flame furnishes quite enough air to burn; and the apparatus, once lighted, will continue to act as long as the supply of coal gas is kept up. The best air flame is got by diminishing the gas supply to the lowest point consistent with the continued existence of the air flame.

GERMANY produced in 1881, 2,914,009 tons of pig iron, 560,222 tons of castings, 1,421,792 tons of wrought iron and steel, and 894,425 tons of cast steel.