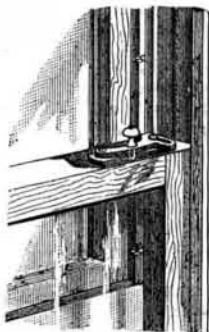


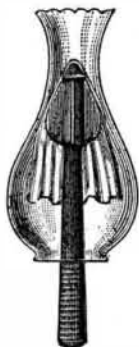
RECENT INVENTIONS.
Improved Sash Fastener.

Messrs. Emanuel and Henry S. Ensungen, of Bloomington, Ill., have recently patented a very simple and effective window fastener. This fastener consists of a latch pivoted to a plate which is attached to the upper rail of the lower sash. This latch swings in a horizontal plane, its motion being limited by a stud projecting from the plate through a slot in the latch. There is in the plate a socket into which the lower end of the thumb bit enters to lock the latch, the latch being so arranged at its pivot as to press the projecting end of the thumb bit into the socket in the plate. A notched bar is secured to the parting stop, and a similar notched bar is fastened to the upper sash alongside the parting stop, so that the latch may engage with either of them and thus secure either the upper or lower sash in any desired position.



Lamp Chimney Cleaner.

A very simple device for cleaning lamp chimneys is shown in the engraving. It consists of a stick slit twice at right angles and provided with two plates bent at right angles and inserted in the slits. The whole is then clamped by a ring driven on the conical end of the stick. The handle is ridged as shown in the cut. In use a cloth or piece of wash leather or paper is wrapped around the plates, and the cleaner is inserted in the chimney and moved about. If chimneys of small diameter are to be cleaned, a cloth or piece of paper is wrapped around the ridged part, and that end of the cleaner is employed. This invention has been patented by Mr. A. Sahlstrom, of Stockholm, Wisconsin.



Well Bucket.

Those who have looked sadly into the old-fashioned well and watched the oaken bucket dancing mockingly on top of the water and refusing to turn itself over and sink and be filled, will gladly receive any apparatus tending to improve that state of affairs. The bucket herewith illustrated has a stamped sheet iron bottom of a downwardly concave form with a cylindrical collar, in which the body of the bucket is fitted. In the center of the bottom is a hole closed by a disk of iron having a slotted shank secured by a post on which the shank is free to play. On the under side is a leather or rubber cushion that insures a tight fit. Projecting from the center of the under side of the disk is a stem which forces the valve open when it strikes the bottom of the well. This invention has been patented by Mr. John Bruyny, of Fort Scott, Kansas.



Cornstalk Fodder.

Cornstalks form excellent fodder for cattle, but owing to the difficulty of transportation much of this valuable material is either burned up or allowed to rot. Mr. Frank M. Bacon, of Plainfield, N. J., has patented an invention relating to the bale of cornstalks as a new article of manufacture. The stalks are in a crushed condition, and of lengths corresponding to the measurement of the bale in one direction, and are laid parallel so as to make the bale compact. In this form the stalks weigh no more than the same bulk of hay, are easily handled, and can be baled when needed. The bale is pressed and secured by ropes or wires. A machine for crushing the cornstalks, and cutting and baling them, has been devised by the same gentleman.



Fast Time.

Probably the fastest train in America is the afternoon express on the Canada Atlantic Railway, which leaves Coteau Station at 5:35 and reaches Ottawa, distant 78.4 miles, at 7:09, having made one stop of three minutes at Alexandria. This is almost exactly fifty miles an hour. The fastest train in the world is probably the "Flying Dutchman," which runs without stopping from London to Bristol, a distance of 118 1/4 miles, in just two hours—a rate of 59 1/2 miles an hour.

[NEW YORK SUN]

Home Made Water Filters.

Pure water hardly exists in nature; it is insipid, and not adapted for drinking purposes. In speaking, therefore, of pure drinking water I shall use the term in a relative sense, indicating fitness. All I claim for water fit for drinking purposes is that it is free from everything of ascertained or suspected power to induce ill health, or which is unpleasant to the senses and the imagination.

All the eight water companies of London employ some system of filtration. The usual plan is to build a series of tunnels with bricks without mortar; these are covered with a layer of fine gravel two feet thick, then a stratum of fine gravel and coarse sand, and lastly a layer of two feet of fine sand. The water is first pumped into a reservoir, and after a time, for the subsidence of the coarser impurities, the water flows through the filter beds, which are slightly lower.

During the last summer I have been making experiments with simple filtering materials, and also talked the matter over with Prof. Cassamager, chemist to Messrs. Havemeyer's sugar refinery. Prof. Cassamager having to filter such a difficult material as sugar, I considered him an expert in all processes of filtration, and I asked him to arrange what he considered the cheapest and most simple form for filtering water. At his laboratory he showed me a method which he had arranged, which is, perhaps, the most simple that can be devised to give fair results.

This simple filter is made as follows: Procure an ordinary wood pail and bore a number of holes the size of a five cent piece all over the bottom. Next prepare a fine muslin bag, a little larger than the bottom of the pail, and about one inch in height. The bag is now filled with clean, well washed sand and placed in the pail. Water is next poured in, and the edges of the bag should be pressed against the sides of the pail. We put such a filter to very severe tests by mixing a dry sienna color in a gallon of water, and, passing through, the color was so fine as to be an impalpable powder, rendering the water a deep chocolate color. On pouring this mixture on to the filter pad and collecting the water, it was found free of all coloring matter. This was a very satisfactory test for such a simple appliance, and I cannot too strongly recommend it in cases where a more complicated arrangement cannot be substituted. The finest and cleanest sand is desirable. Sand purchased at glass manufactories should be obtained.

The above described filter at its best is but a good strainer, and will arrest the suspended particles. But in a modern filter more perfect work is required, and another effect produced, in order that water containing objectionable matter in solution should be rendered fit for drinking purposes. Many persons when they see a water quite clear seem to imagine that it must be in a good state for drinking. They should remember, however, that many substances which entirely dissolve in water do not diminish its clearness. Hence a clear, bright water may, despite its clearness, be charged with a poison or substances more or less injurious to health; such, for instance, as soluble animal matter.

To make a perfect filter, which should have the double action of arresting the finest suspended matter and removing the matters held in solution, and the whole to cost but little and capable of being made by any housewife, has been the object of my study for many months, and, after many experiments and testing various substances in many combinations, I suggest the following plan, which I find gives very perfect results, and will cost a couple of dollars.

Purchase a common galvanized iron pail, which costs fifty cents. Take it to a tinshop and have a hole cut in the center of the bottom about the size of a five cent piece, and direct them to solder around it a piece of tin about three-fourths of an inch deep, to form a spout to direct the flow of water downward in a uniform direction. Obtain about two quarts of small stones at a store in Maiden Lane where material for roofing is sold; after a good washing, place about two inches of these at bottom of pail to form a drain.

On this place a partition of horse hair cloth or Canton flannel cut to size of pail. On this place a layer of animal charcoal, sold at the wholesale chemists' in William Street as boneblack at about ten cents a pound. Select this about the size of gunpowder grains, and not in powder. This layer should be three or four inches. A second partition having been placed, add three inches of sand, as clean and as fine as possible. Those within reach of glassmakers should purchase the sand there, as it is only with that quality of sand that the best results can be obtained. On this place another partition, and add more fine stones or shingle—say for two or three inches. This serves as a weight to keep the upper partition in place.

Your filter is now complete, but not ready for use. However careful you may have been in washing the material, a residue of dust will remain, and this has to be gradually washed through. For this purpose pass as much water as possible through the filter during the first day without using it. The next day it will be ready for use, and, if my directions have been complied with, filtered water will be always at command, not only freed from all suspended substances, but from color due to matter held in solution having been removed. I found that the yellowish color of Croton water, which is very difficult to remove, was entirely absent in water passed through my filter. To test this, water must be filled up in a large white porcelain basin. In this manner the color of Croton water is plainly visible in contrast with the white china.

The filtering material, which is cheap enough, and particularly the partitions, should also be renewed at intervals, the time depending on the period of year and the nature and amount of the impurities.

For the benefit of those desirous of filtering water on a large scale with sand filtering beds, I would state that there should be one and a half yards of filtering area for each 1,000 gallons per day. For effective work the descent of the water should not exceed six inches per hour. The term "self-cleansing," applied to some filters on the market, may be correct in a limited sense, but no reliance should be placed on such filters, and none used which cannot be readily taken apart and thoroughly cleansed.

I have often noticed wood charcoal used in filters. The best authorities, however, claim that this material, when powdered, acts merely in a mechanical manner as a strainer, and that charcoal obtained from animal matter alone appears to possess the power of removing matters held in solution in water.

There is one filtering material which is little known in this country which has all the properties of animal charcoal, and is said to give higher results. This is magnetic carbide, discovered by Spencer, many years ago, and consists of protoxide of iron in chemical combination with carbon. It is considered that the purifying effect is produced by its power of attracting oxygen to its surface without the latter being acted on, the oxygen thus attracted being changed to ozone, by which the organic matter in the water is consumed.

There can be no doubt of the value of this filtering material, which is much used in Europe, and in some cases on a large scale, to purify the water of cities.

Its manufacture is very simple, as it is obtained by roasting hematite iron ore with granulated charcoal for twelve to sixteen hours at a dull red heat, and used in a granular form. Another form for making this material is to heat the hematite (red oxide of iron) with sawdust in a close vessel. The product is magnetic, and never loses its activity until the pores are choked up. I have endeavored to make the magnetic carbide by the second formula, but the result was not satisfactory on account of the hematite having only a small percentage of iron, giving a material similar to broken brick, whereas, if pure hematite is used, the result should be a brilliant black substance.

The Water Company of Southport, England, formed their filtering beds of this material, and I understand that after years of use it is still giving satisfaction.

Prof. C. F. Chandler, on one occasion, observed that "pure water is hardly second to pure air as a life-giving and life-protecting agent, and is the most potent servant the sanitary authorities can call to their aid."

I trust the home made filter here described may soon be found in every home, for a water supply loaded with a mass of filth and poisonous contaminations should be rejected without hesitation until cleansed from impurities by a good filter.

JOHN MICHELS.

Testing Gold Sands.

As a general proposition, says the *Mining and Scientific Press*, the results of assays of gold ore are not as satisfactory or reliable as those made for silver. The ordinary fire assay for gold, especially if the ore be of low grade, cannot be relied on. Very great care has to be exercised in the selection of the sample in the first place, and the amount of gold is so minute that only delicate manipulation will properly save and weigh it. The finest of balances with nice adjustment are required; and, altogether, when the whole is considered, miners of experience would rather judge from the results of "horning," or panning out a good liberal sample of ore properly pulverized. They can tell by the "colors" about what the ore will yield at the mill. In assaying gold ore by the blowpipe, the results depend greatly on the operator's skill and his judgment in the selection of samples.

In assaying the gold sand of the rivers, streams, and sea beaches of this coast (California) some difficulty is met with. It contains a great amount of specular and titanite iron, and is called "black sand" by the miners. Platinum and iridium are often found in the same sand. Mr. George Attwood, in his "Blowpipe Assaying," gives a convenient method of testing these sands:

"Take 100 to 1,000 grains and attack with *aqua regia* in a flask; cool for about thirty minutes or more; dilute with water and filter. If gold is present, it will now be held in solution in the filtrate. Remove the filter and evaporate the filtrate to dryness; then add a little hydrochloric acid and redissolve the dry salt in warm water; add to the solution so formed protosulphate of iron, which will throw down the gold in the form of a fine, dark precipitate. This precipitate is seldom pure, being mixed with oxides of iron, and must now be dried in the filter paper, and both burned over the lamp in a porcelain dish. Then mix the dried precipitate with three times its weight of lead; fuse, scorify, and cupel. In case platinum, iridium, etc., are found associated with the gold, an extra amount of pure silver should be added before cupellation, and the gold button will be found pure."

Consumption an Infectious Disease.

The Wisconsin State Medical Society, during its recent annual session, passed a resolution virtually declaring consumption to be an infectious disease, and urging the necessity of the proper isolation and disinfection of those suffering from it.