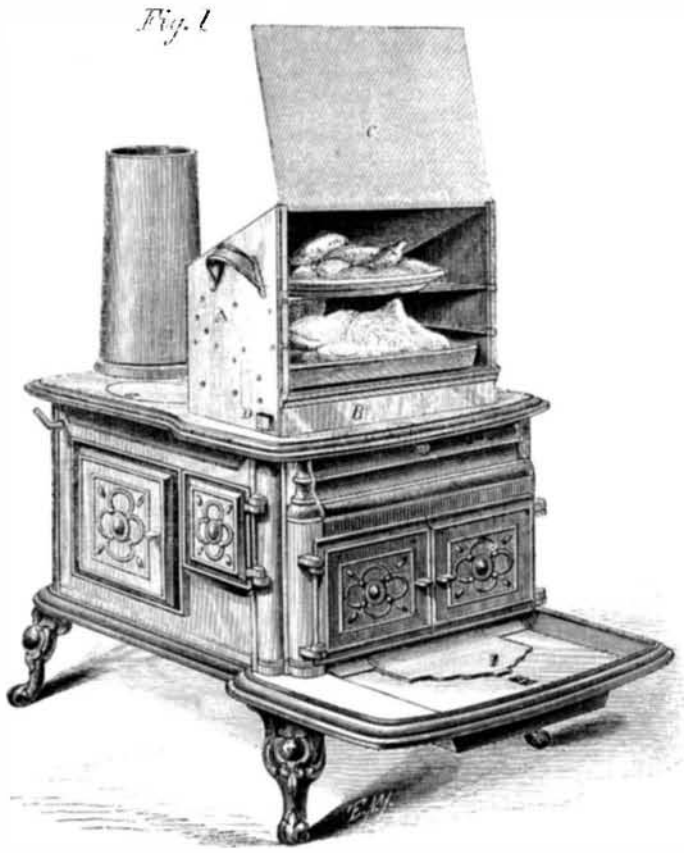
Improved Combination of Steamer and Roaster.

Many of our readers remember the old "tin kitchen" or "Dutch oven," and later the reflecting "Yankee baker," the later of which cooked food by the aid of a small cylinder holding a little charcoal. The Dutch oven, however, cooked the food by the reflected heat from an open fire. One of the purposes of the implement shown in the engravings is this latter; the other is to steam or heat food already cooked, or to bake, stew, or roast without losing any of the aroma of the edibles.

It is seen at A, both figures, and is made of tin or other sheet metal. The bottom compartment, B, is a reservoir for water, and the rest of the box holds shelves or racks for sustaining dishes of meat, vegetables, etc. The front is closed by a sliding door, C. In Fig. 1 it is set on a cooking stove, the front covers being removed and their openings covered by the bottom of the steamer. Fig. 2 shows it set upon legs the ends of which are held by staples or straps, D. In this form it is convenient for standing before an open fire, as a grate or Franklin stove, for roasting purposes. In this position the door, C, is removed from the front and introduced into the chest on inclined snugs, so that it will form with the top a double incline, reflecting the heat from both surfaces. As a steamer the door, C, closes the front and the reservoir is filled with water. The backward incline of the top prevents any condensed steam from falling on the food, but conducts it back to the reservoir.

Fig. 1



The inventor says that it bakes light bread without any hard crust, cooks green corn and other vegetables, fruits, etc., without robbing them of their flavors and without the possibility of burning or scorching them. Cakes, puddings, custards, and pastry of all kinds are cooked safely and evenly and sauces, even in glass dishes, may be prepared in this apparatus without injury to the dish. As a roaster it is superior to the old-fashioned Dutch oven.

It was patented through the Scientific American Patent Agency by Israel Forman, Fairmont, W. Va., who will dispose of the entire right on favorable terms. Address as above.

Coal Cutting by Machinery.

Mr. Sturgeon, of Burnley, East Lancashire, England, has constructed a machine for mining or cutting coal, a description of which we condense from the London *Colliery Guardian*: In general appearance Mr. Sturgeon's machine, which is self-acting, resembles a mortar, carried in trunnions, by means of which it can be adapted to any dip of the seam. The engine which gives motion to the machine is worked by compressed air, and consists of a small cylinder about seven inches in diameter, in which a piston works with a backward and forward motion, as in a steam hammer. The piston gives motion to an angularly-vibrating "cutter," working upon a center or fulcrum, and carried upon the machine. In its general form the "cutter" resembles a heavy pick. Its length of stroke is 36 inch. Hitherto it has been a defect in these machines that when cutting coal of unequal hardness, or in which pyrites or other solid matter are prevalent, the cutter has been prevented from penetrating to its depth and the work left very irregular and incomplete.

In Mr. Sturgeon's machine this is obviated by a very simple contrivance which causes the cutter to repeat its blows in the same place until the obstruction has been either cut through or dragged forth from the strata, and when at length the full length of the stroke is attained, the machine is advanced to make a fresh cut. The "cutter" having gone the length of its stroke, it would be almost impossible to withdraw it from the coal by a direct backward motion, and hence Mr. Sturgeon has applied a self-acting arrangement to his machine which gives the point to the "cutter," at the end of its forward strokes, a slight retrograde motion, thus enabling it to disentangle itself, and also to return without friction against the strata The machine will enter a seam of eighteen inches in thickness. Including the "cutter," it only occupies a place three feet square, and its total weight is only seven to eight cwt.

As already stated, the machine is worked by compressed air. The air is condensed outside the pit, by a suitable air pump, into a receiver, from which it is conveyed to the machine in the workings by an india-rubber pipe, and the machine may thus be moved about from one part of the workings to another without being cut off from the motive power. The compressed air, when liberated by the action of the piston, proves most beneficial. The cutter, coming with great force upon the stones imbedded in the strata, is apt to "strike fire," which, in fiery seams, would of course be attended with much danger. By a well-known law of gases, however, compressed air when suddenly allowed to expand, produces great depression of temperature, and Mr. Sturgeon has availed himself of this law to prevent the firing of splinters while his machine is at work. A pipe leading from the exhaust port meets another pipe leading from a small water vessel carried on the machine. The mouths of these two pipes meet at right angles, and the suction caused by the velocity at which the exhaust air makes its escape over the orifice of the water pipe causes to be drawn up a small quantity of water, which on mixing with the cold air current is dashed into spray. This is directed towards the "cutter," and the groove it is forming, and has the combined effect of keeping the "cutter" cool, of reducing the temperature in the groove, preventing the accumulation of gas and the ignition of splinters, and also serving to keep down the dust. The production of cold air by this method may also materially affect the supply of coal from our coal fields.

It is commonly known that the deeper we descend into the bowels of the earth the higher the temperature becomes. Extensive seams of coal lie at a depth so profound as to be utterly beyond reach with present appliances, owing to the heat which is known to prevail at these depths, and the cost of raising the coal. But by the use of coal-cutting machines an abundance of fresh air, of very low temperature, might not only be thrown into the workings, but would be ejected at those points where it would be most required, and hence vast tracts of coal field might be made available, and that, too, at a moderate cost. There is another peculiarity about Mr. Sturgeon's machine which we ought not to pass over. Hitherto only one operation has been performed by coal-cutting machines—under cutting in long lengths—but Mr. Sturgeon's machine will do the necessary work in tunneling and in pillar and stall cutting.

FORMAN'S COMBINED STEAMER AND HEAT REFLECTOR.

TABER'S IMPROVED SINK TRAP.

The object of the device shown in the accompanying engraving is to provide a safeguard against the rising of impure and deleterious gases from sinks, cesspools, and water closets, and to prevent the evaporation of liquids under certain circumstances. It is evidently excellently well adapted to this purpose, as it is simple and acts wholly without springs or other auxiliary contrivances, being entire in itself.

Fig. 1 Fig. 2

It is composed of a ferrule or ring with a broad projecting flange, A, to rest on the sink bottom or the top of the pipe, and secured in the usual manner. To the barrel of this ferrule are pivoted two half funnels by rivets at B. These project down into the pipe and when empty close by their own weight as in Fig. 1; but when liquids are passing through from the top they are forced apart as in Fig. 2. When closed, the longitudinal joint is air and water tight, wholly preventing the rise and escape of unpleasant and noxious effluvia. The flange of the ferrule may be constructed to stand at an angle with its barrel without disturbing the action of the two half funnels. These may be made in three parts if desired, the only objection being the formation of another air-tight joint. It may be used to admit volatile liquids to any vessel but prevent their escape by evaporation.

It was patented April 2, 1867, through the Scientific American Patent Agency, by John E. Taber, of Fall River, Mass., who will reply to all inquiries relative to the sale of rights, etc.

Collodionized Paper for Transfers.

Those who desire may transfer to ivory, enamel, porcelain, or a sheet of gold or silver paper, the collodion on which the positive image is obtained in the pressure-frame, and detached from the paper which has served to hold it.

The whole method consists in pouring on a porcelain paper, the enamel which is composed of a salt of alabaster, a very thick collodion sensitized with chloride of silver. Chloride of strontium and nitrate of silver, dissolved beforehand and in equal proportions, the former in alcohol, the latter in distilled water, in the proportions of 2 p. c., and poured, with subsequent agitation, into a very thick plain collodion, give perfect results. Any chloride soluble in alcohol may be employed. The tone of the print varies, according to the chlorides, between red and violet.

Fig. 2

It is necessary, in order to collodionize the paper, to cut the sheet into quarters, and to transform a fourth part of a sheet into a basin by turning up the edges to the level of half a centimeter. The paper is then placed on glass, which is held in the left hand, while with the right, in the first instance, ether is spread over the paper, and after the excess is poured off the collodion is poured, without waiting, precisely in the way as a *cliché* is made.

At the end of a quarter of an hour the sheet is dry, and can be used for printing positives. The collodion will not keep, and loses its properties in twenty-four hours, but the paper thus prepared continues fit for use after six days. The yellow tinge which disfigures it subsequently disappears.

The proof leaves the frame with a poppy red color, very bright, and passes to a violet, then to black in the following toning bath:—

Water	1,000 gr.
Hydrosulphite of soda	125 "
Chloride of soda	60 "
Chloride of gold	1 "

It is toned and fixed at the same time; this result is obtained in ten minutes.

The proof is afterward washed in a basinfull of water, and the collodion, detaching itself, floats on the surface. If care has been taken to varnish the four corners of the proof, the transfer is easier. In this case the image never leaves the sheet of paper which bears it. The operator now lays it face downward, upon a sheet of glass, a little larger than the paper, and presses it in close contact; removes the paper and washes carefully the image, now soiled by the alabaster salt, with a little wet cotton. This operation is not attended with any danger to the proof, the collodion being stronger than would be supposed.

Finally, it is washed with plenty of water under the tap and allowed to drain for a few seconds For transferring the collodion, which is now on a sheet of glass (and where, if a transparency be desired, it can be allowed to remain), the following mixture is passed over the surface with a soft brush:—

Water	1,000 gr.
Gelatin	10 "
Arrowroot or gum	5 "

A sheet of gold or silver paper is then applied over the collodion, avoiding creases. If it is intended to make a porcelain *carte*, place over the image a square of enameled paper. The air bubbles must be got rid of and the whole removed. It is well to mount the proof while it is damp, and to roll it after it is dry.

All these operations are simple and easy, and, commercially speaking, quite as many can be produced as by the ordinary processes. The proofs are unalterable, for the paper which sustains them has not passed through any bath, and the collodion which forms the proofs has been subjected to sufficient washings. By employing a more fluid collodion the image adheres to the porcelain paper. The transfer is no longer necessary. The same result is obtained by coating Rive paper in a dish with the following mixture, which should be warm:—

Water	1,000 gr.
Gelatin	5 "
Arrowroot	10 "
Sugar candy	20 "

The brilliance is not equal to that obtained with the porcelain paper, though the proofs are exquisitely fine and delicate, and the ordinary papers do not give the details of the *cliché* so perfectly.—*M. Geymet, in Bulletin Belge.*