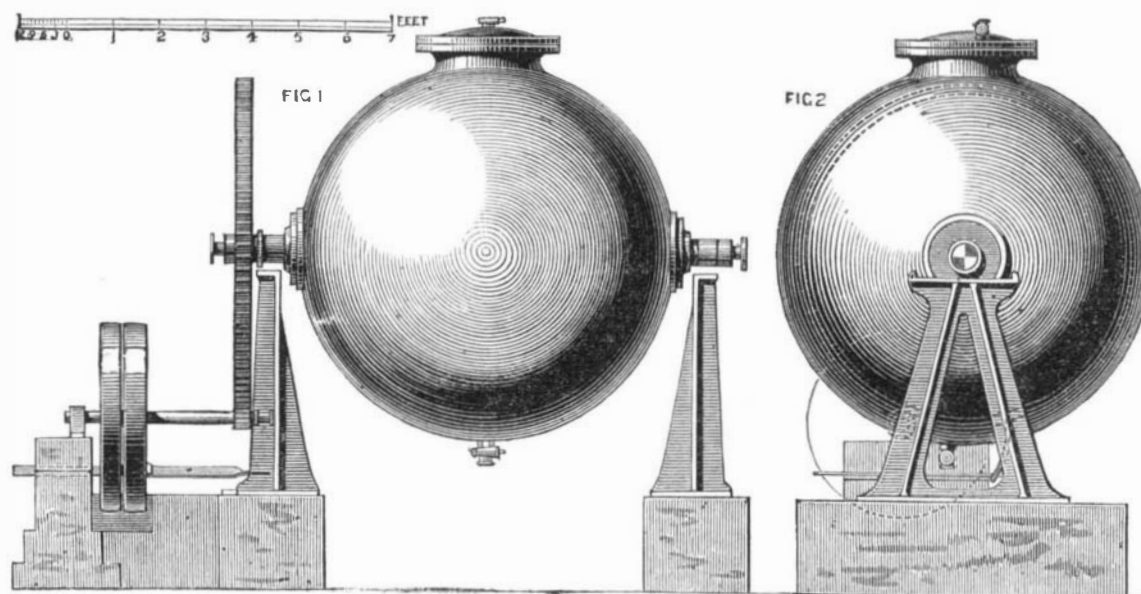


IMPROVED ROTARY RAG BOILER.

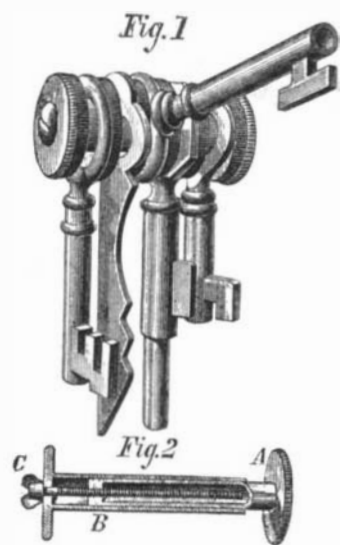
The rotary boiler, for paper stuff and similar materials, which we herewith illustrate, is the design of Messrs. Bryan Donkin & Co., of London, England. It consists simply of a spherical wrought iron vessel 8 feet in diameter, mounted on a pair of trunnions, both of which are made hollow for the purpose of admitting steam, while one of them carries a spur wheel, through which motion is communicated to the boiler. Inside the boiler are strainers to take off the dirt, and lifters which serve to agitate the rags as the boiler revolves. The flanges of the trunnions and the boiler are faced in the lathe, so that a good joint may be made with red lead simply. Owing to its spherical form, the boiler of course offers twice the resistance to rupture which would be possessed by a cylindrical boiler of the same diameter, and made of the same thickness of plates, while the spherical shape has also the advantage of being self-delivering, the rags falling out as the boiler revolves without the cover on. The gearing by which the boiler is driven is proportioned so that the vessel makes $1\frac{1}{2}$ revolutions per minute, with the shaft carrying the belt pulleys running at $17\frac{1}{2}$ revolutions. Altogether the boiler stands about 11 feet 6 inches high from the floor line to the top of the manhole, and in practice it is mounted so that it may be filled through an opening in the floor overhead.



DONKIN'S RAG BOILER.

COLEMAN'S KEY HOLDER.

The annexed engraving represents a simple little device designed for holding keys in a bunch, and intended as a substitute for the ordinary key ring. It consists of a central core or shaft made in two hollow portions, A and B, Fig. 2. Part A enters part B, and a solid portion at the extremity of the former receives the screw-threaded stem, C, which holds the two sections together. Upon the core the keys are placed, and disks of leather or other pliable material are interposed between them, as shown in Fig. 1. The bunch is retained



in place by bringing the two parts, A and B, together by means of the screw, caps on the end preventing the keys from slipping off.

The advantages claimed for this device are that all jingling of the keys is prevented, the latter are held more tightly and in more compact shape, a better leverage is afforded for turning any key in its lock, and the bunch does not hang down, and thus scratch against the polished surface of furniture.

Patented through the Scientific American Patent Agency, July 20, 1875. For further particulars address the inventor, Mr. F. W. Coleman, Rodney, Jefferson county, Miss.

Mysterious Boiler Explosions.

There was a time when people thought that boiler explosions were caused by lightning. Later, this theory was modified, and it was said that electricity was an active agency in boiler explosions, and to this day the latter theory is entertained by many. There has always been a desire to surround these accidents with mystery; to devise some theory that men of ordinary intelligence cannot comprehend. The promulgators of these theories have a fancy for surrounding themselves with an atmosphere of superior intelligence, somewhat akin to the alchemists and astrologers of old. They use unfamiliar technical terms and derivative words, when plain Saxon would be much more to the point, and this they call scientific. When a boiler explodes, people desire to know what was the cause. If they are entertained with theories of suspension or repulsion, when portions of the boiler were found corroded almost to the thinness of paper, they might very properly say "that's too thin." And if, upon careful examination, it was pretty definitely ascertained that the boiler let go at the weak or thin point, any

theory founded upon suspension or repulsion would be likely to have little weight with people familiar with steam boilers.

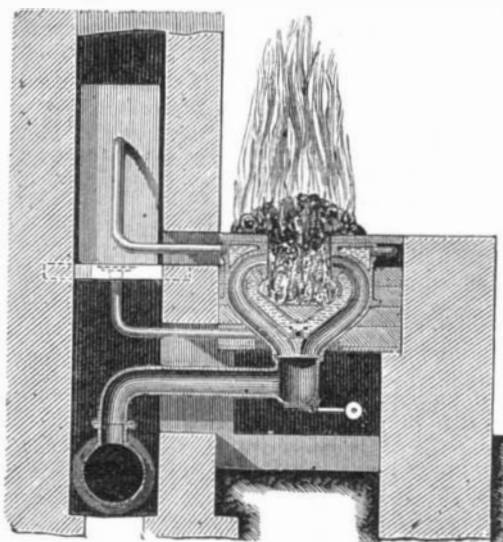
It is well known that any piece of machinery in which there is a weak point must be handled with great care. It must not be overloaded, but the load or strain must be adapted to the weak point. The theory that the strength of any structure is measured by its weakest point is as true of boilers as of any thing else; and when a boiler has a decidedly weak point, it should not be used except at a very low pressure. A safer way would be to repair at once, and thus approximately restore the boiler to its original strength.

A boiler may be corroded in places difficult to discover unless a thorough examination is made when the boiler is cold, and the owner may not know that the pressure which he is using is close up to the ability of the metal, at its weakest point. Under these latter conditions, it will be readily seen that a little excess of pressure only will be required to pass the limit of safety. The weak spot gives out, and damage to a greater or less extent occurs.

A weak spot in a boiler or any other device, does not improve by use; and when a machine breaks down at a point which is ascertained to have been weak for a long time, no one is impressed with the necessity of going into a long discussion to show that mysterious agencies were suddenly brought to bear upon the weak point, causing the break. The fact is the point of fracture was unable to sustain the load imposed upon it. It did its very best, but when the load was not lessened, yet the deterioration of metal continually went on, a time came when, from inability to hold on longer, the machine broke down. Is there any mystery about it? Is there any mystery about the fact that a boiler 6½ feet in diameter, running at a pressure of 75 lbs. to the square inch, with one of the sheets corroded to the thinness of paper, exploded, doing serious damage? We think not, and we further think all efforts to surround such cases with mystery worthy only of those who have soared so high into the regions of theory that they are reluctant to step down before, and into the presence of, facts and common sense. Boilers should be periodically inspected with much care, so that any indications of weakness may be discovered before it is too late. There are few, if any, defects that careful external and internal examination, with chisel and hammer, will not discover; and we would advise all boiler owners to secure the services of some competent man to examine their boilers carefully at least once a year.—J. M. Allen, President of Hartford Steam Boiler Inspection and Insurance Company.

SEEL AND SHAW'S TWEER FOR SMITH'S USE.

We annex an engraving of a tweer for smith's use, in which the blast is divided into two jets, led respectively to opposite sides of the fire. The tweer is branched for the before-mentioned purpose, and is protected by a water casing, which



can have a branch pipe cast on it for connecting it with the water tank; but the usual method of supplying the water is as shown in our engraving. This is a convenient arrangement, and is well adapted for quickly raising an intense heat.

Patented by Ephraim Seel and Thomas Shaw, of Greenfield, England.

Increasing the Solubility and Disinfecting Power of Salicylic Acid.

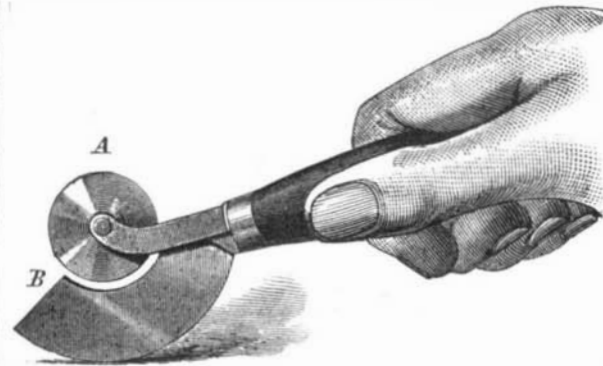
One of the disadvantages attendant upon the use of this long known, but recently introduced, tasteless, and harmless disinfectant has been its very slight solubility in water. The phosphate of soda increases its solubility somewhat, but it has been reserved for a chemist with the euphonious name of Rozsnyay to discover a better means than this. The salt employed by this chemist is one which itself possesses a certain antiseptic power, and this increases the power which the mixture has of retarding putrefaction. This salt is sulphite of soda. If one part of salicylic acid and two parts of sulphite of soda are dissolved cold in 50 parts of water, the solution will be perfectly clear. The solution does not irritate an open wound in the slightest, and its disinfectant power is so great that, while a certain quantity of milk, to which had been added a solution of salicylic acid prepared with phosphate of soda, curdled in five days at ordinary temperature (66° Fah.), another portion of milk, to which was added a solution of salicylic acid prepared with sulphite of soda, remained fluid for two weeks.

Rozsnyay recommends one part salicylic acid and one or two parts sulphite of soda dissolved in from fifty to one hundred parts of water, for general use.

BRECHBIEL'S CIGAR WRAPPER KNIFE.

The invention illustrated in the annexed engraving consists in a combination of two cutting blades secured in a handle, each blade performing a separate office in cutting out the wrappers of cigars. A is a circular knife, which cuts the leaf into the necessary semicircular shape without tearing, an accident likely to happen when the tobacco is dry and the fibers large and hard. From between the bifurcated shank of blade, A, projects the curved blade, B. This serves to shape the leaf in order to form the tip of the cigar, and possesses the same advantages for this employment as the circular knife for its particular purpose.

The tool ordinarily used somewhat resembles a shoemaker's knife. It requires skill in its manipulation, and must be kept constantly keen in order to do its work properly,



the present device requires sharpening but seldom, and it is in many respects a convenient and handy implement.

Patented May 4, 1875. For further particulars relative to sale of patent, address the inventor, Mr. John E. Brechbiel, Highland Falls, Orange county, N. Y.

Another Bridge between New York and Brooklyn.

By an act of the State Legislature of New York, a second bridge over the East River, between New York and Brooklyn, was, some time ago, duly authorized. No such expensive and difficult undertaking as the great suspension bridge now in progress, is required in this new enterprise.

The new bridge is to extend from 78th street, New York, to Lockwood street and Graham avenue on the opposite shore. The East River, at this point, is divided into two comparatively small streams, by the long narrow strip of land which occupies the center of the river, known as Blackwall's Island. The central piers will rest on this island. The greatest span of the great suspension bridge near Fulton street is 1,600 feet; but the widest span of the new bridge will be less than half of that distance. The total length of the bridge and approaches will be two miles. The largest spans are 715, 600, 367, 320, and 300 feet respectively. The section comprises a double track, a carriage way, and two foot ways. The trussed girder system of construction is talked of.

Back Numbers for the Current Year.

We would state, in answer to numerous inquiries whether all the numbers of the SCIENTIFIC AMERICAN can be had for the year 1875, that they can be furnished from January to the present time, in sheets, or in volumes of 416 pages, bound, up to July 1. The price for the bound volume is \$3; in sheets, from January to July, by mail, \$1.60. New subscribers can have all the back numbers if they wish. But, unless requested otherwise, all subscriptions will be commenced at time of receiving the order.