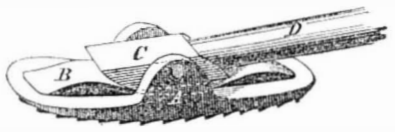
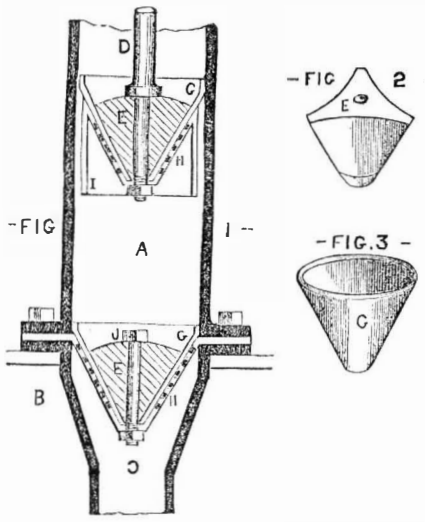
boiler. This plan effects an important economy in fuel, for the whole heat of the exhaust steam is imparted to the feed water, while the water of the boiler is used over and over. The invention is not claimed as a substitute for the condenser in the larger kinds of engines. It is particularly applicable to steam pumps or pumping engines, for feeding boilers and other purposes, and when applied to boiler feeders it condenses every particle of the steam used to drive the pump, and returns it to the boiler, giving the whole of its caloric to the feed water.

Improved Peg Cutter—By Samuel R. Jones, of York, Penn.—This improvment is illustrated in the annexed cut. It consists in the application of a wave-shaped spring, B, to the



top of an ordinary peg cutter, A. The handle is shown at D, terminating in a double lever end, C, which is pivoted to the cutter as shown. The spring causes the cutter to lay flat or closely hug the surface of leather to which it is applied, no matter what the position of the handle may be, so that all parts of the inside of a boot or shoe, toe and heel included, can be cleaned out with perfect facility. The inventor is also enabled to adopt the rasp form of teeth on the cutter, which is superior to the saw shape or grooves. This contrivance reduces the pegs and elevations caused by awl holes, simultaneously, leaving the inside of the boot free and smooth for the foot.

Improvement in Pumps—By Joseph Weis, of Bordentown, N. J.—This invention consists in a peculiar form of valve, whereby all hinging and flapping is done away with, and greater durability, with other advantages, secured.



In our engraving, A is a portion of the barrel of the pump, C the suction pipe. I is a light cylindrical piece of metal, somewhat less in diameter than the bore of the pump, to this cylinder is secured a perforated metal cone, H, inside which is placed a cone-shaped piece, G, of leather, gutta percha, india rubber, felt, or other similar substance, fig. 3. The cone, G, is so arranged that its upper edge shall fit the bore of the barrel, A; inside the cone is placed a three-winged wedge, E, fig. 2, and through this wedge is bolted the end of the pump rod, D, in such a manner as to secure the cylinder, I, perforated cone, H, elastic cone, G, and wedge, E, together. The above forms the bucket of the pump. The valve is constructed in nearly a similar manner, the perforated cone being secured between the flange of the barrel and that of the suction pipe, and the wedge and elastic cone attached to the perforated cone by an ordinary bolt.

On the descent of the bucket, the water in the barrel passes through the perforations in the cone, H, and through the circular space between the barrel and cylinder, I, causing the elastic cone, G, to collapse into the spaces between the wings of the block, E, and allowing a free passage for the water to the upper portion of the barrel. Immediately on the bucket being raised, however, the elastic cone instantly recovers itself, and pressing against the sides of the barrel, prevents the return of the water, and at the same time becomes a bucket of the most efficient kind. The action of the elastic cone in the lower valve is similar to that of the upper bucket. The above invention is applicable to every description of pump, either for common lifting purposes, or for forcing against the heaviest head of water.

Tongueing and Grooving Machine.—By B. J. Barber, of Ballston Spa, N. Y.—This improvement is designed for the tongueing and grooving of lumber of irregular widths. At present, in order to tongue and groove boards by machinery it is necessary to reduce them all to the same width. If a board is wider at one end than at the other it must be cut to an equal width throughout. In sawing logs into boards there is always a good deal of waste in trimming the timber down to the right dimensions. The present invention consists in making the feed table of the machine adjustable, so that it will rise or fall, according to the form of the stuff to be tongued. This permits the feeding in and working of boards that are larger at one end than at the other, with perfect facility. In western countries and localities where every foot of lumber saved is an object gained, this improvement will prove of much value.

Improvement in Looms.—By Elijah Hall, of Rochester, N. Y.—This invention consists in certain means by which the reed is secured rigidly in the lay at the time of beating up the filling, and also during the whole time that should be occupied by the flight of the shuttle; but from the time when the shuttle should have entered the shuttle box till the lay has nearly arrived at the end of its forward movement, the reed is liberated to such an extent that it will afterwards liberate itself entirely and swing back if the shuttle should be obstructed or fail to pass entirely through the warp. All injury to the cloth, which would otherwise occur, is entirely prevented. This improvement is designed to take the place of the protector in common looms, and to enable the loom to work faster than at present.

Recent Foreign Inventions.

Improved Process of Engraving.—The following described process is condensed from a description in the London *Mechanic's Magazine.* The inventor, M. G. Devincenzi, of London, has devoted himself for several years to the art of producing engraved surfaces for printing and embossing, and has taken out two patents. The process has been submitted to a committee of Becquerel, Chevreul, and Seguier, eminent men of the Academy of Sciences, Paris, who have reported on it favorably.

The metal best adapted for this kind of engraving is zinc. It is employed in thin plates which are ground with sifted sand, and the design is made on it with ink and the lithographic crayon. The design being executed, the plate is prepared as if it were to be used for lithographic drawing. For this purpose it is steeped for a minute in a decoction of nutgalls, washed with pure water, and covered with a weak solution of gum arabic. The plate is then moistened with a sponge, the design is effaced with turpentine, and a lithographic cylinder covered with a varnish is rolled over it. The varnish accurately covers all lines made by the designer. The varnish should have the following qualities:—1. Of not injuring the design. 2. Of adhering strongly to the plate. 3. Of not being attacked by the chemical agents employed for engraving.

The varnish well known as "Brunswick black," mixed with essence of lavender, is preferable to all others. This varnish is composed of asphalte, boiled linseed oil, litharge, and turpentine. When the varnish is dry, the zinc plate is put in communication with a copper plate at the distance of 05 of an inch, after which they are steeped in a solution of sulphate of copper marking 15 degrees; a voltaic pair is thus formed; the sulphuric acid resulting from the decomposition of the sulphate of copper dissolves all the parts of the zinc which are not covered. More or less depth is given to the engraving, according to the kind of design. Crayon designs are generally engraved in four or five minutes, and those with the pen in six or seven minutes. Sulphate of copper does not produce any alteration in the most delicate drawings, and does not act on the varnish.

This method of engraving may be applied to all the other processes, by means of which a design may be reproduced, such as to draw on paper and afterwards transfer the designs to plates. The impressions of lithographic stones, copper, and steel plates, may be transferred. By this method it will not be difficult to transfer from an old impression on to metallic plates, and thus obtain other stereotypes of old books.

Regulating Safety Valves and Dampers of Steam Boilers—S. Smith, of London, patentee. The nature of this invention consists in having the steam in the boiler press on one surface of a column in a bent tube, which is fixed at one end to the boiler. The other end of the bent pipe is attached to a pressure gauge consisting of a hollow chamber, which is divided by a flexible partition or diaphragm of thin steel, above which a stem is placed, the upper end of which, when it is raised beyond a certain point, acts on the lever of the safety valve and lifts it, and in like manner, either by a cord or wire, the pressure gauge gives motion to the damper, so as to close it more and more as the pressure of the steam in the boiler acts more on the diaphragm of the pressure gauge, which diaphragm is resisted externally by a coiled spring.

The Cotton Culture of Europe, Africa, and America.

In the kingdom of Naples and the islands of Sicily abont 4,2000,000 pounds of cotton are raised annually, and it is said that attempts are about to be made by a Mr. Clegg, from England, to cultivate it more extensively in Sicily. The consumption of cotton in Great Britain amounts to about 915,200,000 pounds annually, most of which is obtained from America. Various attempts have been made by Manchester merchants to obtain an adequate supply from India, but hitherto, all these efforts have failed of success. The French government has also endeavored to make Algeria a cotton-growing country; they, also, have failed of success. The Hon. Wm. Elliott, of South Carolina, Commissioner to the Paris Exhibition, paid great attention to the Algerian cotton culture, and made a report to Governor Adams on the subject. In commenting upon this report the Charleston *Mercury* says:—

"It has been our duty, in the course of the last twelve years, to examine more than one project for supplanting the cotton of the Southern States in the markets of Europe. It is remarkable that all these projects have proceeded on one fundamental idea, that if cotton of a given quality can be produced in any region, then the product of the United States can be dispensed with. On this idea, twenty years of experiment and failure have signalized the desire of British manufacturers to escape their dependence on American cultivators.

Their premises were wrong. Cotton can be produced everywhere in the warm regions of the world. But it can be produced *profitably* only where the soil, climate, and organization of labor give to its cultivation peculiar advantages. Hence we have always attached but little consequence to what are called "successful experiments" in cotton culture.

Among these experiments the most systematic and formidable are those of the French Government, the most intelligent government in the world in directing scientific and economical experiments, in which it has been engaged for fourteen years in stimulating the culture of cotton in Algeria. They started with the advantage of all the experience of the United States in their possession. They obtained our most choice seeds, and our most perfect modes of culture. With this knowledge they commenced the growth of cotton in Algeria. They have stimulated it by not only the smile of government favor, but by enormous premiums. On these terms they have succeeded in forcing a very considerable product of cotton in Algeria.

But the actual price at which Algerian cotton is furnished to the French manufacturers is a sufficient commentary on this long, favorable, and anxious experiment. Orleans cotton is furnished at the price of 45 cts. per lb., and fine Sea Island at $1·30. This is the present state of the competition between the United States and Algeria."

This price is four times higher than that of American cotton. Algerian cotton thus far, therefore, has been an expensive experiment.

A Great Steamship.

The new steamer *Persia*, which recently arrived at this port, as noticed by us last week, is the largest mail steamship at present afloat, being 60 feet longer than the famous *Great Britain.* She is the first iron ship built by the Cunard Co. Line for a Royal Mail packet. The rule which was in force a few years ago, by the British Government, against the use of iron steamers, has been abrogated. She is of tremendous length, being 390 feet from figure-head to traffail, and 360 feet in the water. Her extreme breadth across paddle boxes is 71 feet; hull 45 feet; depth 32 feet. Her paddle wheels are no less than 40 feet in diameter, the greatest of any steamship in service, but two feet less than those designed for the *Vanderbilt* (now getting in her machinery at the Allaire Works.) The *Persia* was built from stem to stern, and completed throughout, at the engineering works of Robert Napier, in Glasgow, Scotland. She was launched on the 3rd of July last, and made her trial trip on the 8th of last month. Her registered tunnage is 3,500 tuns, but she is over 5,400 tuns burden. Her hull is of immense strength; the iron plates of her bottom are nearly an inch thick; and her ribs are ten inches deep, with double angle irons at their outer and inner edges.—She is built on the life-boat principle, being divided into seven water-tight compartments.

Her engines are of the old side lever kind (walking beams working upward,) the same as are employed on all the Cunard steamers. The steam cylinders are 8 feet 4 inches in diameter; the stroke of piston is 10 feet. There are eight tubular boilers fired amid-ships from 40 furnaces; and she has also two Donkey engines, for feeding them. The engines are stated to be of 1200 horse power; but her engineers use the divisor 44,000 lbs. to estimate a horse power.

The decorations of the great saloon are rich especially in very beautiful paintings in the panneling, executed by D. McCalman, Glasgow, on polished slate—an art of the same nature as fresco painting—which we would like to see introduced into our country.

(For the Scientific American.)

Corn Stalk Cutter.

Your correspondent "Farmer" asks for a Corn Stalk Cutter, simple in construction, durable, and effective. We have in use a home-made one of our own invention, which would, no doubt, meet his wishes. With a two-horse power we can cut and grind in one day corn fodder sufficient for our stock of thirty-five cows, for at least two weeks. The corn stalks, after the process, are reduced almost to the fineness of chaff, and the cattle eat the whole of the products when mixed with three quarts of meal each per diem, and they keep in good condition with no other food.

Our machine consists of a wooden wheel (iron would be preferable) three feet in diameter, with two knives attached to the side, equi-distant from each other, and terminating at the rim. The fodder is fed to the machine at right angles to the face of the wheel, but below a horizontal line from the shaft, so that the knives cut with a drawing motion, thereby requiring less power. The cut fodder falls into a funnel-shaped box, at the lower end of which is a wooden cylinder set with teeth projecting 1-4 of an inch, and revolving as near as possible to a steel plate, firmly fixed parallel to the cylinder; this cylinder is driven from a pulley on the end of the shaft of the wheel above. The fodder as it comes from the cutter is thus rasped into small pieces, and even the outside of the stalk is rendered soft and digestible.

If such a machine is patentable, perhaps we might make the fortune out of it that "Farmer" predicts, for it certainly does better work than any machine for the like purpose we have been able to obtain, and we have tried several kinds, all of which were unsatisfactory.

"Farmer" is welcome to make a machine from our pattern, the cost of which was about $15, and if well made we will guarantee he will be perfectly satisfied. There will be no danger of its getting out of "kilter," and the tallest kind of corn that grows in the We st can be "chawed up" quite as readily as the "suckers" that grow in these parts.

M. & C. Painter.

Owing's Mills, Md., Jan. 26, 1855