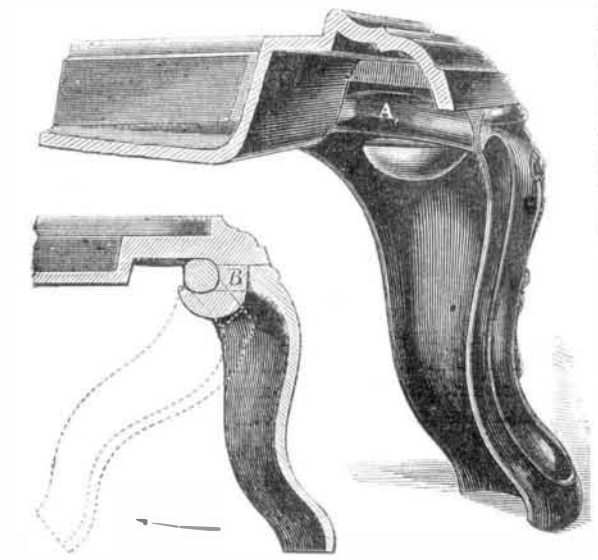
IMPROVED SELF-LOCKING STOVE LEG.

A letter from one of our correspondents, published some time since in this journal, called attention to the unsafe character of the method of dovetailing stove legs. This letter called forth several others, which recounted accidents and narrow escapes from accidents resulting from the loosening of stove legs and the spilling of charges of burning coals, kettles of hot water, etc., whereby injuries of a severe character were in some instances received.

Several improvements in methods of fastening stove legs were suggested by the correspondence referred to, one of which is illustrated herewith. Two views are given, one being a perspective view and the other a sectional view.

It will be seen that the stove plate has cast thereon a stout hook instead of the usual dovetail. The hook fits into an eye in the upper part of the stove leg. That part of the eye marked A in the figure, is straight and has its vertical diameter longer than its horizontal diameter. To insert the hook or to take out the leg it is necessary to place the leg in the



position shown in dotted outline in the sectional detail. This requires the raising of the stove bodily from the floor an inch and one half or two inches. In no other way can the leg be loosened. So long as the stove rests upon it, it cannot be moved in any direction.

The hook on the plate is easily cast, the pattern being separated on the dotted line of division marked B. The body of the plate is first drawn, with the upper part of the hook, and the point of the hook is then picked out of the sand without trouble. We see no objection to this mode of constructing and attaching stove legs, while it affords ample security against the class of accidents above spoken of, without additional cost in the manufacture.

Patented Oct. 4, 1870. Address, for rights or other information, S. E. Chubbuck & Sons, 971 Tremont st., Boston, Mass.

GUN COTTON.

Gun cotton is soluble in wood alcohol; one liter dissolves eighty grammes, but the solution is liable to change, owing to the production of formic acid.

The insolubility of gun cotton in nearly all liquids suggests its use for filtering sulphuric acid, chromic acid, permanganate of potash, caustic lye, solution of chloride of zinc, aqua regia, etc., and it is much employed for that purpose.

The Austrian method of making gun cotton for military purposes is as follows:

Cotton thread is twisted into yarn and then immersed for a few minutes in nitric acid, afterwards completely washed in water, wrung out, and dried at 129° Fah., and finally treated with a mixture of nitric acid of 1·52 specific gravity, and sulphuric acid of 1·14 specific gravity. Equal parts of these acids are taken and left to stand twenty-four hours after mixture, and the yarn is then introduced and left for forty-eight hours; it is then thoroughly washed in running water, immersed once more in potash soluble glass, and finally dried for use.

Gun cotton is now made into ropes for storage, and kept under water. When an order is received at the manufactory, a few hours suffice to dry it ready for transportation.

It has been found that by making the ropes with many air channels through the mass, the cotton explodes almost instantaneously, and is as violent in action as the fulminates. Charges for guns are now made into two parts—an exterior composed of cotton of loose texture, the ignition of which starts the ball, and an interior of denser material, which supplies the gas for accelerating the speed of the ball. The result is great gain in initial velocity.

Barnwell and Rollason's patent for new and peculiar products of gun cotton claims that rags can be employed instead of cotton. They make collodion in the usual way; to this is now added any of the pure animal or vegetable oils, and a new liquid is formed, to be used as a cement. Gums and resins afford a cement which may be rolled out into sheets and formed into cups, fancy boxes, etc. Oxide of copper imparts a green color, chloride of lime renders it uninflammable. It is recommended for dentists' and jewelers' use. The collodion oil can also be used as a varnish. Gun cotton reduced to a powder and mixed with niter and saltpeter, as a substitute for charcoal, makes a superior gunpowder.

J. Scott Russell says in his report, read in 1863, before the Mechanical Section of the British Association, that Baron von Lenk, of the Austrian Artillery, has discovered the means of giving gun cotton any velocity of explosion that is required by merely varying the mechanical arrangements under which it is used. Gun cotton in his hands has any speed of explosion from one foot per second to one foot in ·001 of a second. The instantaneous explosion of a large quantity of gun cotton is made use of when it is required to produce destructive effects on the surrounding material. The slow combustion is made use of when it is required to produce manageable power, as in the case of gunnery. It is plain, therefore, that if we can explode a large mass instantaneously, we get out of the gases so exploded the greatest possible power, because all the gas is generated before motion commences, and this is the condition of maximum effect. It is found that eleven pounds of gun cotton compressed into one cubic foot produces greater force than fifty to sixty pounds of gunpowder occupying the same space.

Gun cotton is used for artillery in the form of thread or spun yarn. In this simple form it will conduct combustion slowly in the open air, at a rate of not more than one foot per second. Some of the advantages claimed for this kind of gun cotton are:

CONVEYANCE AND STORAGE.—One pound of gun cotton produces the effect exceeding three pounds of gunpowder in artillery; this offers an advantage in transportation. It may become damp, and even perfectly wet, without injury, and can therefore be easily stored.

PRACTICAL USE IN ARTILLERY.—Gun cotton keeps the gun clean and requires less windage, and therefore performs much better in continuous firing; it also does not heat the gun as gunpowder does. There is less smoke, no poisonous gases, and the men suffer less inconvenience in firing. There is smaller recoil, greater velocity, and less weight of gun can be employed.

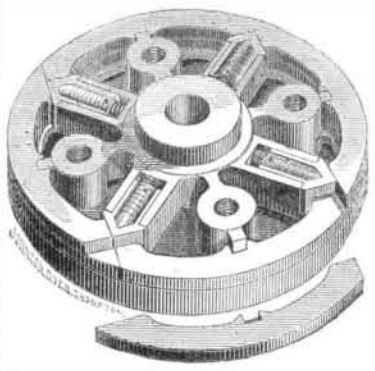
EXPLOSION OF SHELLS.—Shells are exploded into more than double the number of pieces, in consequence of the expansion of the steam and gases when the gun cotton is confined very closely in very small spaces. It is also a peculiarity that the stronger and thicker the shell the smaller and more numerous the fragments into which it is broken.

MINING USES.—Gun cotton is highly commended for this purpose, and is stronger than gunpowder, weight for weight, in the proportion of three to one in artillery, and six to one in solid rock. It is used for blasting in the form of a hollow rope, and after a little experience its splitting power can be regulated at pleasure.

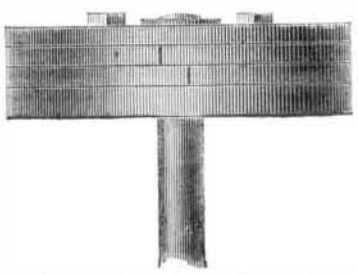
MILITARY AND SUBMARINE EXPLOSIONS.—It is a well-known fact that a bag of gunpowder nailed on the gates of a city will blow them open. A bag of gun cotton exploded in the same way produces no effect. The gun cotton must be confined; in a bag it is harmless; exploded in a box it will shatter the gates to atoms. According to actual experiments made in England, a small square box containing twenty-five pounds of gun cotton, simply thrown against the palisades of a fortification, will open a passage for troops, while three times the quantity of gunpowder would produce no effect whatever, except to blacken the piles. Explosions of gun cotton under water were found to be equally effective. A more detailed account of the uses of gun cotton and collodion must be reserved for a future communication.—*Prof. Joy in Journal of Applied Chemistry*

CHUBBUCK'S PATENT PISTON AND PACKING.

The engravings accompanying this article show the construction of an improved piston and packing which have met with great acceptance for stationary and marine engines, and which possess the merits of simplicity and delicacy of action in a high degree.



The parts are all accessible for inspection, the weight is supported independently of the packing, the packing automatically adjusts itself to any slight taper there may chance to be in the bore of large cylinders, or any want of truth in the bore consequent upon strain, springing, or other causes; and and this self-adjustment is efficiently performed, even after the piston has been much worn by long use, while with minimum friction the join its thoroughly packed. The engravings so plainly show the construction of this piston and packing that a very brief description will suffice to make it clearly understood. The rings (two in number) are placed between two solid disks. The rings, instead of being continuous, are, after being turned true, cut into four segments, as shown, the cuttings being diagonal, as shown, and in an opposite direction, on one ring, from that of the other, so that when placed in position they shall break joints.



The method of cutting the rings leaves wedge-shaped recesses where the ends of the segments meet when placed in position, and into which the ends of radially expanding wedges are thrust by coiled springs acting in radial lines from the hub of a spider, as distinctly shown in the engraving. The expanding wedges run in guides, as also shown, and by their action on the segments of the ring, cause them to continually press gently outward against the sides of the cylinder, and thus taking up the inevitable wear, to keep the integrity of the steam joint unimpaired without excessive friction.

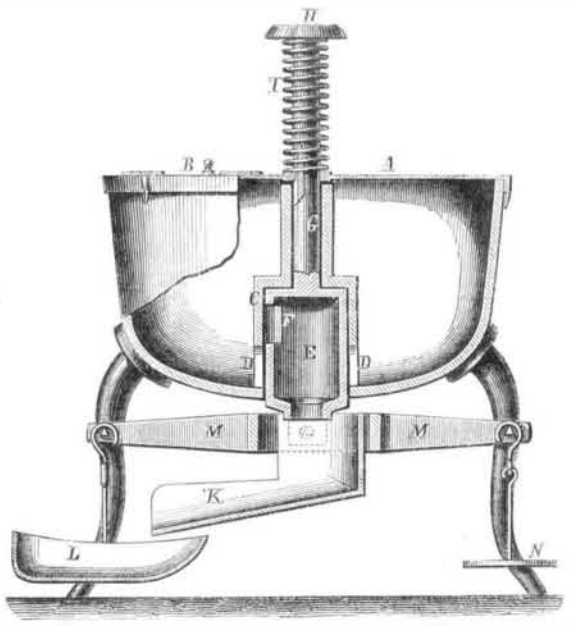
The device is also adapted to use as water packing in pumps, etc.

Patented February 28, 1868. Address for further information S. E. Chubbuck & Sons, 971 Tremont street, Boston Mass.

BOOTON'S SHOT CASE AND DISTRIBUTER.

The object of this device is to supply to retail dealers a convenient case for holding the various sizes of shot, and also an apparatus whereby they can be conveniently weighed out in parcels as desired.

The body of the case is a metallic vessel, shaped like a kettle, and supported on suitable legs. Vertical partitions extending radially from the center to the shell of the case



divide the space into as many chambers as the number of different sizes of shot desired to be kept therein.

A circular cover, A, having a hinged door, B, formed therein, through which the shot are put into the case, extends over and closes the top of the body of the case.

From the bottom of the body rises a hollow cylinder, C, which cylinder communicates with the several chambers by apertures, D. Within the cylinder, C, is still another hollow cylinder, E, having an aperture, F, formed in it, and from the top of which rises a shaft, G, terminated by a knob, H. The lower part of the cylinder, E, protrudes through an aperture formed in the bottom of the case, and is held from falling by a coiled spring, I, which surrounds the upper part of the shaft, G, and expands between a collar attached to the center of the cover, A, and the knob, H. A feather is formed in the side of the shaft, G, which engages with the collar in the center of the cover, and turns the shaft, G, and the cylinder, E, about on their vertical axis, whenever the cover is turned; so that the cover and the cylinder, E, always occupy the same positions relative to each other.

The cover, A, being turned so as to bring the aperture, F, over one of the apertures, D, the hand placed upon the knob, H, presses down the shaft, G, and the cylinder, E, so that the aperture, F, is brought down over one of the apertures, D, and communication with the exterior of the case is established with the chamber inside the case to which the aperture, D, belongs. The shot in that particular chamber, then flow out into the cylinder, E, and thence into the chute, K, and thence down into the pan, L, of a balance, M; a suitable weight having been placed on pan, N, the hand releases the knob, H, as soon as the weight of the shot in L counterpoises the weight on N, and the coiled spring instantly raising the cylinder, E, into the position shown in the engraving, stops the flow. By raising the hand as the proper weight is approximated, the flow may be graduated so as to make it as small as may be desired, and to prevent any more flowing into the pan than will just turn the balance. An index, O, is attached to the cover, which, in connection with a suitable graduation in the side of the case, renders the turning of the cover to the proper number easy and certain.

Patented, through the Scientific American Patent Agency, January 3, 1871, by Sinclair Booton, whom address for rights and further information, care T. D. Johnston, San Antonio, Texas.

Iron Around Peach Trees.

At a recent meeting of the American Institute Farmers Club, Mr. Wagner, who lives on Long Island Sound, about fifty miles east of New York, exhibited some pruning from his orchard to illustrate the effect of putting iron around trees. He took an old place with twenty trees in the orchard, full of dead limbs, with yellow leaves, and the crotches oozing thick gum. He gave the earth a good top dressing of iron, breaking up old plows and scattering the fragments. The effect has been marvelous. The trees have renewed their youth, and now look strong and thrifty. The bark is tight and leaves are green, and the borer has disappeared. He thinks the slag of iron furnaces, ground up and spread on orchards will prove a very valuable fertilizer for fruit trees of all kinds.

EACH of the scientific periods of time, except the century, simultaneously close with the year 1870, viz.: the decade year, month, week, day, hour, minute, and second.