AN IMPROVED OIL CAN HOLDER.

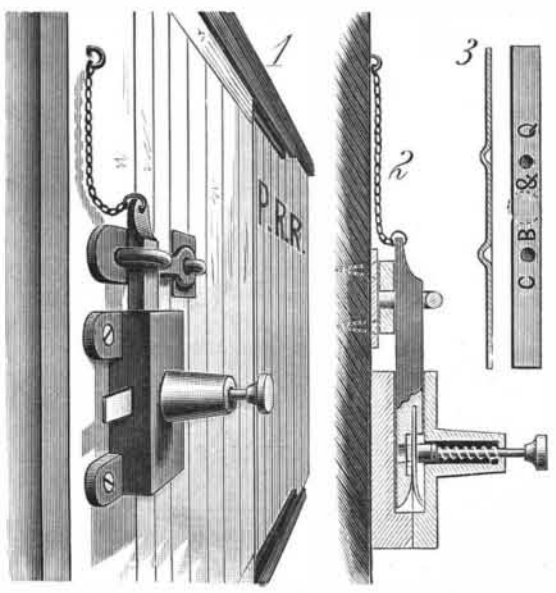
A device to facilitate the lubricating of machinery, where the parts are not ordinarily within reach or easily accessible, is shown in the accompanying illustration, and has been patented by Mr. Edgar G. Bruner, of West Point, Neb. The device consists of a cup

BRUNER'S OIL CAN HOLDER.

of suitable size and shape to hold an oil can, and provided with an elongated handle, and rods for holding and adjusting the cup in the desired position, the cup having retaining springs in its interior for holding the oil can in place when the cup is canted or even completely reversed. The handle is attached to the cup by a yoke, and a rod secured to the bottom of the cup affords bearings for another yoke secured to a slide bar which passes through staples in the handle. Another slide rod, passing through staples in the handle, is connected to the cup by an eye at the rear of its rim, and by the aid of these rods, which have free lateral play along the handle, the cup can readily be tilted and held in any position desired.

AN IMPROVED SEAL LOCK.

A seal lock which may be operated without the use of pinchers or pliers, adapted to receive a sealing strip, and especially designed for use on freight car doors, is shown in the accompanying illustrations, and has been patented by Frank W. Richey and Sumner M. Robbins, of Armstrong, Wyandotte County, Kansas. The end of the locking bolt which enters the lock case is provided with a spring tongue, the extreme end of which is bent outward, while the extreme end of the bolt proper, opposite the end of this spring tongue, is cut away, as shown in the sectional view, Fig. 2. Just back of this cut-away end of the bolt is a shoulder, so that there is a space behind this shoulder between the tongue and the bolt, in which the sealing strip rests, there being also an aperture in the spring tongue to register with another aperture in the recess in the bolt. A plunger



RICHEY AND ROBBINS' SEAL LOCK.

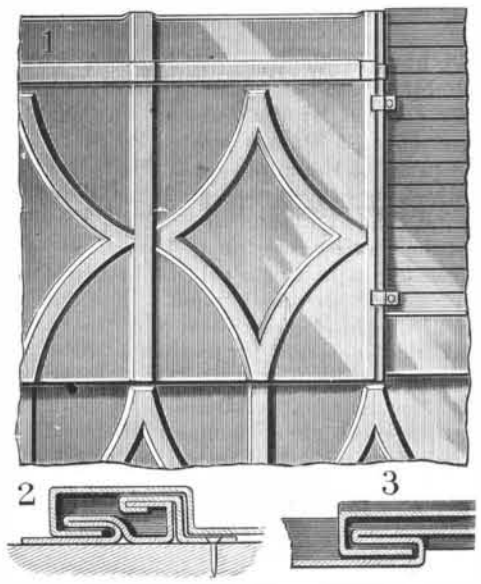
with a punch point is mounted in a housing that extends outwardly from the lock case, and is held in normal position by a spring coiled about the plunger stem. The seals consist of strips of metal in which are formed projections, as shown in Fig. 3, in side and front views. Before the insertion of the bolt, one of these sealing strips is passed through the lock case, and so adjusted that its projections will be upon either side of the bolt cavity. Then, as the bolt is forced inward, the plunger being held back, the sealing strip will be borne upon by either the out-turned edge of the spring tongue or by the cut-away end of the bolt, and will enter the space back of the shoulder in the bolt, when the plunger is permitted to enter and rest in the slot in the spring tongue, and the lock is sealed. The sealing strip cannot be drawn out of the lock case, owing to the formation of its projections on either side of the bolt, nor can the bolt be withdrawn, as its shoulder would strike against the sealing strip. To open the car door, a slight tap is made upon the outer end of the plunger, when its punch point is forced inward and severs the sealing strip, as indicated in dotted lines in Fig. 3, after which the ends of the severed strip may be removed from the lock case and the bolt withdrawn.

Wood Fibers Capable of Being Spun.

Boards as free from knots as possible, of any desired width, and about ⅜ of an inch thick, are cut in a direction parallel with the fiber, preferably from pine or fir wood or from the softer part of larch, and are boiled in a solution of sulphurous acid or a bisulphite, whereby the disintegration of the wood is effected. No chopping is required, and before boiling the wood is steamed at 212° Fah. for a long time. After boiling the mass is partly dried on a wooden frame and then passed through rollers having "deep ribs" in the direction of their length, the projections on one roller fitting in the corrugations of the other, whereby the fibers will be separated from each other, and may be combed in an apparatus similar to that for combing flax, etc.—*By Alex. Mitscherlich, Freiburg.*

AN IMPROVED METALLIC SHINGLE.

A metallic shingle which is easily applied to the roofs or sides of buildings, which is storm proof and cannot be easily stripped off by winds, while being inexpensive and durable, is shown in the accompanying illustration, and has been patented by Mr. Henry Smeeton,



SMEETON'S METALLIC SHINGLE.

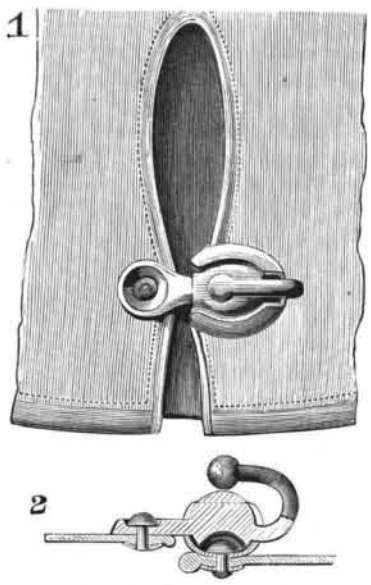
of Ottawa, Ill. It is made of a single piece of metal so bent and doubled at its edges as to form locking joints on all four of its sides, Figs. 2 and 3 showing sections of the vertical and horizontal joints. The faces of the shingles may be made flat or plain, although shown with a raised diamond-shaped design, and they may be trampled upon without injury or starting joints or seams, as they are not nailed through at the side edges, but held by clips, and will yield somewhat to expansion and contraction. In laying the first course on a roof, the center of the overlapped top portion of each shingle is secured to the roofing boards by a nail, and its right hand side by one or more clips, this side then affording a lip for hooking the left-hand side of the next shingle to it, and so on for the course, the first shingle at the left-hand side having been fastened at the edge in any proper way. Dependence may be placed entirely on the clips to hold the shingles to the roofing boards, but the use of clips at the sides and a nail on the top is preferred.

Keep the Traps Filled.

A medical correspondent, writing to the daily press, calls attention to the risks to householders resulting from the evaporation of water from traps, occurring during a period when the house is unoccupied, and states that it has fallen to his lot to see more than one outbreak of sore throat, which he believes is caused by this circumstance. It may be hoped that the usual house cleaning, which necessitates the occupation of the house immediately before the return of its owners, is for them a safeguard; but the subject is well worth the attention of householders, in the interest of caretakers as well as of themselves, and the careful charging of traps and the thorough ventilation of houses are necessary wherever they have been left uninhabited during any period of time.

AN IMPROVED GLOVE FASTENER.

A simple and efficient fastener for gloves, by which they may be easily and quickly fastened and unfastened, and which can be readily applied to the glove, is shown in the accompanying illustration, and has been patented by Mr. George Geary, of Johnstown, N. Y. A spring socket is attached to one side of the slit of the glove, and an arm attached to the glove at the opposite side of the slit is provided with a ball adapted to fit in the spring socket. The latter is a concave metal plate, with ears which are also concave and incline toward



GEARY'S GLOVE FASTENER.

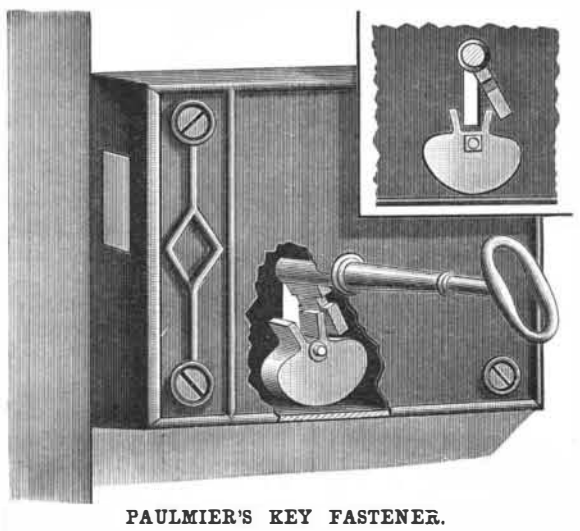
each other, there being a notch in the side adjoining the slit and another notch in the opposite side, together with a central hole by which the socket is secured to the glove by a rivet. The arm carrying the ball adapted to fit into the spring socket is turned over the top and made into a knob, for convenience in springing the ball into the socket and removing it in fastening and unfastening gloves.

Products from Essence of Birch Bark.

E. Mourlot, Paris, obtains from essence of birch bark, by rectification, an essential oil, which possesses among other properties that of being fatal to "insect life," and an electrically insulating tarry substance. These two products are so treated and combined with other substances as to produce an anti-oxidizing material and an insulating substance capable of the same applications as ebonite. Among the other ingredients employed, in addition to the products from the essence of birch bark, are caoutchouc, sulphur, chalk, talc, litharge, antimony sulphide, kaolin, zinc white, and red ocher.

A DEVICE TO RETAIN KEYS IN LOCKS.

A simple attachment within a lock case, which prevents the key, when left in the lock, from working or being thrown out, is shown in the accompanying illustration, and has been patented by Mr. Stephen H. Paulmier, of Madison, N. J. It consists of a movable guard, in the form of a pendent weight, pivoted within the lock case directly below the key hole, the guard having two upwardly extending arms or wings, between which the bit of the key passes when entering the lock. This guard, when the key is not in the lock, naturally adjusts itself, according to its center of gravity, so that the arms or wings will stand at either side of the keyhole, and the key is freely ad-



PAULMIER'S KEY FASTENER.

mitted; but when the key has been turned sufficiently to pass these wings, as in throwing the bolt, and is allowed to come to rest, the guards prevent it from turning down, so that its bit will lie in the line of the key hole, as frequently occurs in the shutting or slamming of doors, although it can be so turned by hand with perfect facility when desired. This guard can be readily attached to almost any lock, and does not necessitate any special construction of the key.

The Millers' and Bakers' International Exhibition at Milan, Italy, 1887.

This exhibition was opened by the King of Italy, on May 19; its object being the improvement of corn grinding, bread making, and baking; and with some considerable amount of elasticity, the committee has confined the exhibits to such machinery and articles as may be in some way connected with one or other of these trades.

The milling industry in Italy employs about 170,000 horse power, of which only about 15,000 would be water power, and about 70,000 hands are engaged in it. Up to 1883 about 600 pairs of rolling cylinders were in use, but since then a great addition has been made to them. The small mills are gradually disappearing.

The exhibition occupies a space of about 26 acres, of which six are built over, the remainder being laid out in gardens. The exhibition is considered a financial success.

The total number of exhibitors is 386, of whom four-tenths are from abroad, principally from Germany; about 20 are from England, about 30 from Switzerland, and 15 from France.

The gallery of machinery in motion, in which mills, complete with all the necessary machinery for wheat cleaning and grinding on the gradual process system, are being exhibited at actual work, is interesting.

The wheat cleaning and flour dressing and elevating machinery are principally copies of English and American machines, but they are well made. Messrs. Ganz, from Budapest, who have a branch house in Milan, are large exhibitors of their roller mills, of which they informed me they had sold some 15,000 in all parts; about 800 only in Italy.

The motive power is supplied to the mills at work by two horizontal compound condensing engines of 100 horse power each, fitted with the automatic expansion and instantaneous cut-off valves.

There are four ovens kept in continuous work baking bread and biscuits; but the only one apparently using mechanical means in connection with the oven is by Signor Candelo, which has a revolving iron plate of about 10 feet diameter, turned by hand by means of gearing, the bread being placed upon this plate, and the heat communicated by flues to both above and below the plate; 4,500 pounds of bread can be baked in this oven in 24 hours, with a consumption of about 220 pounds of coal. The other ovens differ from each other simply in the manner of diffusing the heat.

The committee, with a view of making this department practically instructive, has arranged with the different benefit societies of bakers, in various parts of Italy, to send a certain number of selected workmen to visit the exhibition and make experiments extending over say a week; making bread, and using alternately the different systems of machines and ovens, so that on returning to their homes they can speak with authority as to the advantages of the mechanical over the hand process of making bread, which is still generally in use in Italy.

In the grounds of the exhibition there are several pavilions. One pavilion is devoted to rice cleaning machinery, exhibited by Signor Giuseppe Locarni, of Vercelli, who, by making this his specialty, has arrived at a certain perfection. The machinery is shown at work, and includes the whole process of cleaning, brightening, and pearling the rice.

There is a very interesting pavilion devoted to electric lighting machinery. There are 28 exhibitors in this class, of whom 14 are Italian, 6 English, 3 German, 3 Swiss, and 2 French.

Another pavilion contains the seven large boilers for supplying steam to the different engines. Five of these boilers were constructed in Italy, one is from England, and one from Germany. Forming part of this exhibition, but under the control of a committee appointed by the government, there is an annex of machines entered for the international prize competition of grain driers. The premiums offered by the government amount to £200 sterling for the machines that will most rapidly and economically dry Indian corn and rice, so as not to injure their food, storing, or seed properties.

Indian corn, when ground and converted into polento, forms the principal item of the laborer's food in North Italy, and as this is often harvested at a time of the year when dry weather cannot be depended upon, it is stored in a damp state, producing mouldy or damaged flour; and it is the large consumption of this among the peasants which produces the disease called "pellagra," and which nearly decimates them in North Italy.—*From Consul Whitmore's Report.*

THE *Blacksmith and Wheelwright* says that a very good way to anneal a small piece of tool steel is to heat it up in a forge as slowly as possible, and then take two fire boards and lay the hot steel between them and screw them up in a vise. As the steel is hot, it sinks into the pieces of wood and is firmly embedded in an almost air-tight charcoal bed, and when taken out cold will be found to be nice and soft. To repeat this will make it as soft as could be wished.

Detection of Counterfeits by Photography.

Photography has long been considered the faithful confederate and trusty ally of counterfeiters and forgers, but it cannot be looked upon in that light any longer, as M. Gobert, of the Banque de France, has succeeded in converting this art into a most efficient detective agent. His process consists of taking a greatly magnified photograph of the suspected coin or document, on which any erasure or defect can then easily be detected. An interesting example of the success which can be obtained in this way is given in *La Nature*, from which we abstract the following account: Some time ago a check for 1,106 francs, drawn in favor of a Mr. Rochu, was presented for payment at a Parisian bank, and was to all appearance perfectly genuine, the signature being undoubtedly correct, and no erasures or alterations in the amount could be detected. The suspicions of the bank manager were, however, aroused, and the check was forwarded to M. Gobert for examination, who made a photographic reproduction of it as explained above. It was then discovered that the check had originally been drawn in favor of a Mr. Suller, and for 110 francs, the name and amount being easily readable under the new writing. Probably equally good results could have been obtained by chemical means, but photography has the advantage of not injuring the fabric of the check. False coins are detected in much the same way, an enlarged photograph of both a genuine coin and the suspected one being made, and the two then compared.

Chemical Substitution.

Dumas, in 1834, by his law of substitution threw light upon a whole series of singular and unexplained phenomena by showing that an exchange can take place between the constituent atoms in a molecule. Laurent indeed went farther, and assumed that a chlorine atom, for example, took up the position vacated by an atom of hydrogen and played the part of its displaced rival, so that the chemical and physical properties of the substitution product were thought to remain substantially the same as those of the original body. A singular story is connected with this discovery. At a soiree in the Tuileries in the time of Charles X. the guests were almost suffocated by acrid vapors which were evidently emitted by the burning wax candles, and the great chemist Dumas was called in to examine into the cause of the annoyance. He found that the wax of which the candles were made had been bleached by chlorine, that a replacement of some of the hydrogen atoms of the wax by chlorine had occurred, and that the suffocating vapors consisted of hydrochloric acid given off during the combustion. The wax was as white and as odorless as before, and the fact of the substitution of chlorine for hydrogen could only be recognized when the candles were destroyed by burning. This incident induced Dumas to investigate more closely this class of phenomena, and the results of this investigation are embodied in his law of substitution.

The Landes and Dunes of Gascony.

When Major F. Bailey, R.E., last year visited Gascony for the purpose of examining the pines of the country, he also paid special attention to the construction of the works for their protection against the sand, which, unless proper precautions were taken to prevent its advance, would have overwhelmed them, and we again acknowledge our indebtedness to his able description of these.

The dunes are formed by the combined action of the mud and sea. Each ebb tide leaves a quantity of sand, a portion of which dries before it is covered by the next flow, and it is then liable to be blown away by the wind. Thus sand hills or dunes are formed, which rise sometimes to a height of from 200 to 250 feet, the line of their crests being generally perpendicular to the direction of the prevailing wind.

The sand hills themselves are kept moving slowly landward by the wind, which drives the upper layer of sand from the gently sloping outer face up to the summit, whence it falls down the steep slope on the landward side, and thus the dunes are rolled inland by slow degrees. The average annual rate of the advance of sand is said to be about fourteen feet per year.

As the source of the evil lies at the sea beach, and since, as regards the dunes already formed, the movement at any particular time is confined to the sand then at the surface, if this sand can be fixed during the time necessary to make a crop of herbs, shrubs, and young trees to be raised upon it, the movement of the entire mass will have been arrested.

The works for this purpose are commenced as follows: At a distance of about 165 yards from high water mark, a wattled fence forty inches high is erected. This seems to arrest the sand which is heaped up on the seaward side, a portion of it filtering through the wattles. After a time the fence is overtopped, and the sand, blown up the outer fence, forms a steep slope on the other side. A second wattled fence is then erected about 6½ feet behind the first, and the space between the two becoming filled up, and a mound rising over it, the sand which falls over stands at a high angle against the reverse side of the second wattle.

In the center of the mound a palisade of plank, forty inches above and twenty inches below ground, is erected, these planks, which are seven and eight inches wide and 115 inches thick, being placed three-quarters of an inch apart. When the sand drifts up against them, a portion falls through at intervals, thus affording support on the other side, and when they have become nearly covered, they are raised about two feet out of the ground by means of a hand lever and chains. This is repeated from time to time until the carrier has attained a height of about twenty-five feet, when a third wattle fence is constructed, at a distance of from five to six and a half feet behind the inner slope, and the top of the barrier is strengthened by means of a line of small fagots, which are half buried vertically in the sand. The fagots, each of which weighs about forty-five pounds, are placed at distances of four and a half feet from center to center.

During the time that elapses before the last fence is overtopped the palisade is not raised, so that the width of the base is increased and the top becomes broader and rounded. When the palisade, which is now moved back a short distance, is overtopped, it is raised as before, an additional wattle being placed in the rear of the work; and the building up of the mound by the action of the wind is continued in this manner until it has attained its maximum height of from forty to forty-five feet, when its breadth is allowed to increase, until it stands on a base about 330 feet broad. The foot of the outer slope is then about 100 feet distant from high water mark, the top being at least 165 feet broad and the slopes standing at thirty-five or forty degrees.

This result is usually attained in from fifteen to eighteen years. The surface of the mound is consolidated by faggots twelve to fourteen inches in circumference and fourteen to sixteen inches apart, buried vertically to a depth of sixteen inches in the sand and projecting eight to sixteen inches above the ground. It is also sown with *gourbet* (*Arundo arenaria*), about thirteen pounds of seed being used to the acre.

An artificial dune, constructed in the manner above described, now extends along the coast for a distance of 125 miles, from the Gironde to the Adour.

As soon as the further importation of sand over the country has been arrested by the palisade, a mixture, consisting of eleven pounds of pine seed, seven pounds of broom seed, and five pounds of gourbet per acre, is then sown on it broadcast, a palisade being erected at its inner limits, so as to prevent the seed from becoming buried under sand carried over it by land breezes. This structure is moved back as the work progresses, so as to serve for the protection of other belts. The seeds are covered with branches and brushwood, laid like tiles, with their butt ends toward the sea, and kept down by means of sand thrown upon them. The cost of the entire work is said to be about forty dollars per acre.—*Lumber Trade Jour.*

Wrought Iron Chains without Welds.

Rolling out iron chains from the solid bar without welding is one of the recent mechanical operations that have attracted attention. The principle of forming the rollers and the process of rolling out a chain is similar in some respects to the method employed in casting the links and having them come out together in a chain from a mould. In the latter operation the flask is made to part equally in four ways, and the chain moulded while the links are separated so as to divide the spaces equally between them, giving as little clearance as possible, which will not change their appearance perceptibly. The flask is divided, the chain removed, and one is cast in the mould. Similarly, a piece of chain is swedged out of a bar of iron in an analogous manner by means of four converging dies. To produce a continuous chain in this way the dies are made continuous by having them formed on the circumference of four rollers, arranged with the dies distributed in equal divisions, and the rollers driven by gear wheels, so that the four parts of a link will meet accurately in place. Proper clearance is given to the dies, so as to allow the material to leave the matrix freely as the roll revolves. As the blank is carried forward between the rollers, the dies partially press or swedge out the links at right angles to each other, breaking the fin or feather edge that is left on the inside of the links, which, after a thorough shuffling in a tumble barrel, come out highly finished and polished for the market.

COFFEE acts upon the brain as a stimulant, inciting it to increased activity and producing sleeplessness; hence it is of great value as an antidote to narcotic poisons. It is also supposed to prevent too rapid waste in the tissues of the body, and in that way enables it to support life on less food. These effects are due to the volatile oil and also to a peculiar crystallizable nitrogenous principle, termed caffeine. The leaves of the plant likewise contain the same principle, and the inhabitants of the island of Sumatra prefer an infusion of the leaves to that of the berries. Its essential qualities are also greatly changed, the heat causing the development of the volatile oil and peculiar acid which gives aroma and flavor.