IMPROVED SLATE IRON FOR CARRIAGE TOPS.

In covering the exposed portion of the bows of a top carriage it is necessary with the slat irons in common use to attach a mitt or cap at the bottom. This is only a manner of concealing an imperfectly finished job, which when the work is done by hand is usually avoided by good workmen. Carriage work, however, is now largely done by machinery, the leather stitching especially, and while straight work done on the machine is neater than the usual hand work it is not relied upon for such jobs as covering bow irons.

The engraving shows an improved bow iron which allows the slat or bow to be removed to receive its cover. In the engraving the two outside slats are covered. A represents one showing the side to which the iron is attached. B is partly in section, showing the screw by which the slat is attached to the pivoted end of the iron. The bows being fitted for the trimmer, he takes them, cuts out the covering, bastes it on the bow, then slips it off and runs it throughthe sewing machine.

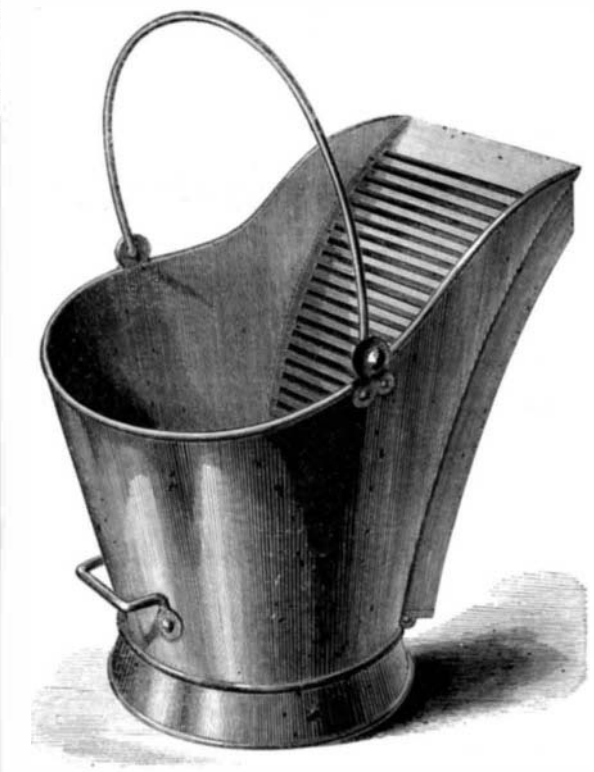
It is then drawn back on the bow and the bow screwed on the jointed part. The job when finished is perfect and has a very neat appearance, considered superior to that of those covered in the ordinary way. Every carriage maker or trimmer will easily understand the advantages of this method of covering. It was patented through the Scientific American Patent Agency, Oct. 30, 1866, and is said to give excellent satisfaction in use. Address for further information A. M. Decker, Glenn's Falls, N. Y.

The Employment of Acid in the Making of Sugar.

During the last three years acids have been largely employed in the manufacture of beet-root sugar in France, and within two years several sugar houses have been specially arranged for the acid process. M. Kessler Desvignes has recently communicated to the Paris Academy of Sciences the results of this new method. The defecating action of sulphuric acid on beet-root juice is well known. When acid of 66° is added to juice of ordinary density, an abundant precipitate is thrown down, and is continued by subsequent additions of acid until it reaches to 2½ millionth parts of the whole weight of the juice. Most of the acids produce the same effect in different doses, but the separation of the deposit is more or less complete in proportion to the energy of the acid. When heat is applied, the precipitate rises to the surface, and is easily got rid of by skimming. Such was the mode originally adopted when sugar was first made in France, but it had to be given up because the defecation was not complete, and also because it injured the crystallization of the sugar. M. Desvignes imagined, however, that it might be advantageously reintroduced with modifications, and having achieved considerable success, he thus explains his process:—1st. Acids employed at the ordinary temperature, even in large doses, do not affect the sugar, and therefore it is only necessary that they should be saturated by a base before heat is applied. 2nd. On the other hand, acids arrest viscous fermentation, and doubtless the effects of other ferments also; they act as powerful antiseptics, and thus prevent the formation of the glareous substance which seems to be one of the gravest causes of bad sugar making, and, on the other hand, they prevent the destruction of the sugar by the ferments with which it is brought into contact when the cells of the beet root have been broken by rasping; and this destruction, M. Desvignes believes, is far more rapid and more considerable than is generally believed. The antiseptic effect may be easily exhibited by taking pure juice and mixing it with other juice which has become glareous to the extent of 5 per cent, then separating it into two parts, and treating one of these with from 2½ to 3 thousandth parts of its weight of sulphuric acid at 66°. On the following day it will be found that the juice which has not been acidified will have become cloudy and viscous, while the other will remain clear, with the deposit caused by defecation at the bottom. M. Desvignes gives the details of his experiments with non-acidified glareous juice, proving the loss in sugar caused by the viscous change, and draws the conclusion that, contrary to generally accepted opinions, acids, instead of having an injurious effect on sugar in cold juice, preserve it, on the contrary, from the destructive effects of fermentation. The same experiments applied to beet-root juice kept for a longer time exhibit the same effects to a still more remarkable extent. 3rd. It is easy to prevent all danger or inconvenience by choice of acids; fluorhydric, hydrofluosilicic, and phosphoric acids, as well as many of their combinations—such as the fluosilicate of magnesia, which is easily obtained in a crystallized form—the fluosilicates of alumina and manganese, the biphosphates of lime, magnesia, or alumina; the phosphate of lime dissolved, or attacked by fluorhydric acid, hydrofluosilicic, hydrochloric, or nitric acid, never produce callosity, and may be used without the slightest ill effect, either as regards the workmen or the pulp. 4th. Defecation by acids is easily completed by the precipitation of certain substances more or less basal, such as magnesia, the silicates and aluminates of lime, the compounds of starchy matter with that base, the insoluble phosphates, the fluoride of magnesium, calcium, and aluminum, etc., and the above named acids easily bring about such deposition. It is only necessary to saturate them with lime, or to dissolve previously in the acidulated juice some of the bases which it is desired to precipitate. Thus a kind of analysis on a large scale is carried on in the manufacture, separating, in the first place, the insoluble organic acids by means of those which are added; and afterwards, the soluble acids with the neutral or basal compounds liable to form with the lime and magnesia compounds difficult of solution. One of the advantages claimed for the system in question is that of effecting very complete defecation with an excess of lime, so that the juice may be immediately evaporated and boiled without the necessity of using charcoal. Thus, we find in acids powerful antiseptics, possessing this advantage over lime—that they may be added to the pulp without danger to cattle, preserving the sugar against fermentation, and yielding in one operation, instead of two, perfectly defecated juice, which, by the addition of a simple solution of lime, yields as much crystallizable sugar as if it had been passed through charcoal.—*The Grocer.*

COMBINED COAL HOD AND ASH SIFTER.

Nothing can be neater or handier than the improved coal hod herewith illustrated. It is at once a receptacle for the fuel and ashes and a sifter of both. Its construction shows an eye to proportions as well as an object of utility. The hod is in the usual form, the discharging surface being perforated either with transverse slits arranged diagonally to retard the escape of the debris as may be desired. In front is a channel formed of a bent sheet of iron and having at the bottom a hinged door to let out the ashes or dust. It shows for itself



that it has great advantages over the ordinary hod and will recommend itself to all housewives. Its cost of construction cannot be much greater than that of the ordinary hod, while its advantages must be obvious.

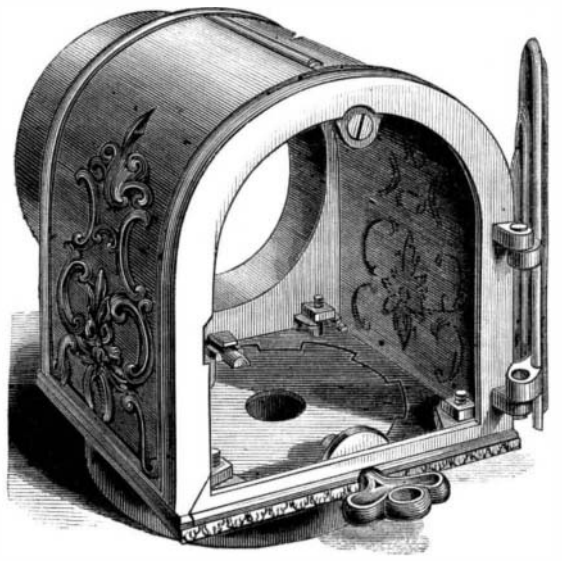
This hod is the subject of a patent issued in favor of Yateman and Mason, Washington, D. C., Jan. 15, 1867. For further particulars address Alexander & Mason, cor. 7th and F streets, Washington, D. C.

Philadelphia Butter.

The editor of the *Practical Farmer* has been investigating the source of the excellence of this celebrated product. He finds that with the model dairyman butter-making is a matter of business, and all the minutiæ receive his personal attention. The quality appears to depend on a number of very important though minute processes. Butter made from sweet cream will not keep well, and until the milk sours all the cream cannot be obtained, while if left longer rancidity ensues. A small quantity of sour milk is therefore put into each pan to hasten this process, unless the weather is such that the souring of the milk takes place within the thirty-six hours which are considered the proper time for the milk to stand before being skimmed. The skimming must be done exactly at the right time. The temperature, 62°, is regulated by a thermometer. The cream vessels are kept in water at a low temperature, and regularly twice a day are stirred thoroughly with a wooden spatula. At churning time these cream pots are plunged into a boiler of hot water, and stirred rapidly with a stick, till the temperature reaches 60°, when they are immediately emptied into the churn. When the butter begins to break a quantity of cold water is poured in, which tends to harden it and cause a more thorough separation of the buttermilk. This is then drawn off and more water thrown in, to wash out any still remaining. After working and seasoning, the butter is laid in water on a clean cloth for a couple of hours, when it is worked over again and finally prepared for market.

WILSON'S COMBINED FUNNEL ELBOW AND DAMPER.

In some parts of the country bituminous coal is largely used for cooking as well as for heating purposes. Much of the volatile constituents of this fuel is unconsumed, and being delayed in its escape to the outer air, is deposited in the funnel of the stove. With the ordinary stove-pipe no other remedy is possible except to take down the pipe at not unfrequent intervals and clean it. The lodgement of these particles of unconsumed carbon is generally in the horizontal portions of the pipe, especially where the upright joins. The device shown in the engraving is an ornamental elbow, easily accessible, by opening which the debris may be drawn or swept out.



The bottom and ends are of cast-iron, and the cover or upper part may be of the same substance or of sheet-iron as preferred. A flange at the bottom receives the vertical pipe, and a similar flange at one end of the contrivance, the horizontal length. Opposite this latter opening is a door, represented open in the engraving, by which the interior may be reached. A damper, either rotating, as shown in the engraving, or a slide, forms the bottom of the elbow. In either case it has an aperture sufficiently large when the damper is closed to allow the escape of deleterious gases into the chimney. The damper, which forms a plate or floor for the reception of the deposit is also useful as a damper, as by it the combustion of the fuel can be easily regulated and controlled.

These elbows are made of all sizes—fitted to all ordinary pipes—and are but slightly more costly than the ordinary funnel elbow. In addition this is ornamental as well as useful, and does away with the annoyance of new elbows where a change of residence becomes necessary. It can be hinged at the turn of the pipe to aid in the adjustment of the funnel, and is made in this style so as to suit all circumstances. Wilson and Wood, Wilmington, Del., are the proprietors of the patent, which was granted through the Scientific American Patent Agency, Dec. 11, 1866, and to them all communications should be addressed.

THE CANNON KING.

[Translated for the Scientific American from the Leipsic *Gartenlaube.*]

Just after the war between the two great German powers was over, the European as well as American journals entertained their readers with descriptions of the inventor of the Prussian needle gun and of the arm itself, and it seems only justice to give our readers a description of the immense manufactory of that man whose genius gave the Prussian artillery an arm of no less importance than that of the infantry. Mr. Alfred Krupp's far-famed establishment is in an exceedingly favorable situation, at the junction of three grand railways of western Germany, about two hours from Cologne, in the direction of Berlin. Here in Essen, Krupp inherited, as a boy of fourteen, a small workshop for manufacturing cutting engines. By ability, energy and good luck he enlarged his workshop gradually, so that in 1865 he manufactured, by the aid of 160 steam engines, 39 steam hammers, and 400 melting, glow and cement furnaces, no less than 1,000,000 cwt. of cast steel, one third for cannon and the rest in large bars for steam engines, axles, wheels, boilers, etc., etc.

Krupp's first steel cannon were cast in 1849 and offered to the chief German governments, but refused by them because they thought the article too novel and costly. The Viceroy of Egypt was the first who ordered them. (Our readers will remember that Mr. Dreyse's offer of his needle gun was also refused at first for a similar reason.) Since that time nearly all the great powers of the civilized world have ordered Krupp's cannon. Russia is going to alter her cannon to steel in her manufactory at Alexandroffsky, expressly erected for this purpose. Prussia buys steel cannon, which are cast at Essen and rifled at the fortress of Spandau: she has, however, her own system of breech loading, which is different from Mr. Krupp's. Belgium and some smaller states have accepted Krupp's system, or still partly use the Prussian arm. The Austrian and Dutch navies are partly supplied with steel cannon. The Italians have bought some six-inch breech-loading guns. Krupp's best customers, however, until lately, were the Turks,