

IMPROVED AMALGAMATING APPARATUS.

The improved apparatus illustrated herewith is for separating gold from sand and other impurities by means of a suction blast. A represents a reciprocating screen, on which the gold-bearing sand is placed. The bottom of the screen is inclined in opposite direction to the perforated part, and conveys the material into a hopper, B, of the upright suction tube, C, from where it passes through an aperture, a, into the lower part of the same to be acted upon directly by a suction blast from below, the blast being created by a suction fan, D. The air enters through the open bottom end of the suction tube, which is made with inclined steps, b, that produce the gradual widening of the tube toward the top end. These steps serve to throw the sand, dirt, or other substances that slide down at the side of the tube back into the current of air, to be acted upon and carried in upward direction. The heavier gold particles drop down into a suitable receptacle below the bottom opening of the suction tube, while the lighter ones pass with the sand along the semicircular top part of the tube, and over the partition wall into the downward extending tube, C', that conveys the sand, in connection with a steeply inclined bottom, to a series of amalgamating pans, E, that are filled with quicksilver, and placed so closely together that the total width of the narrow spaces or interstices between the pans is equal to the width of the entrance opening of the suction tube. The gold-bearing sand is thus carried with considerable power through the spaces between the pans, the fine gold particles being absorbed by the passage in close proximity, and the affinity to the quicksilver.

A central tapering partition, E', divides the current and conveys the sand sidewise through the side ducts, F, to the center of the suction fan, from where the same is thrown by centrifugal power on a curved and tangential fluted pan, G, at the bottom of the fan casing. The remaining particles of gold are amalgamated in their course through the apparatus, the heavier ones being dropped in the suction tube, while the lighter ones are amalgamated in the pans, and the remaining ones, that are mechanically carried along, in the fluted pan at the mouth of the fan casing.

This machine was patented through the Scientific American Patent Agency, July 4, 1876, by Mr. Thomas W. Irwin, of Port Madison, Wash. Ter.

NEW LAMPWICK TRIMMERS.

Mr. John Bannih, of Hempstead, N. Y. has patented (July 4, 1876) through the Scientific American Patent Agency, a novel improvement in lamp wick trimmers, which is represented in the accompanying engraving.

The shear cutters, A, are contrived to cut alike and at the same time from both edges of the wick to the center, whereby the wick is trimmed better and more uniformly than when cut across from one edge to the other. The cutters, which are curved for trimming the wick in form for an oval burner, are extended down at the ends a suitable distance below the point of cutting, and pivoted together at both ends, B, and also to a supporting ring, C, that rests on the burner some distance below the top for a steadying support, and for a gage to govern the height of the cutting above the top of the burner. The levers for working the cutters are pivoted to the standard, E, mounted on the ring, C, and are connected to the cutters at the center between the pivots, B. The edges of the cutters are shaped in the form of two sides of a triangle, the apex of which is at the center of the cutters lengthwise, thus enabling them to shear-cut the wick from its edges to its center.

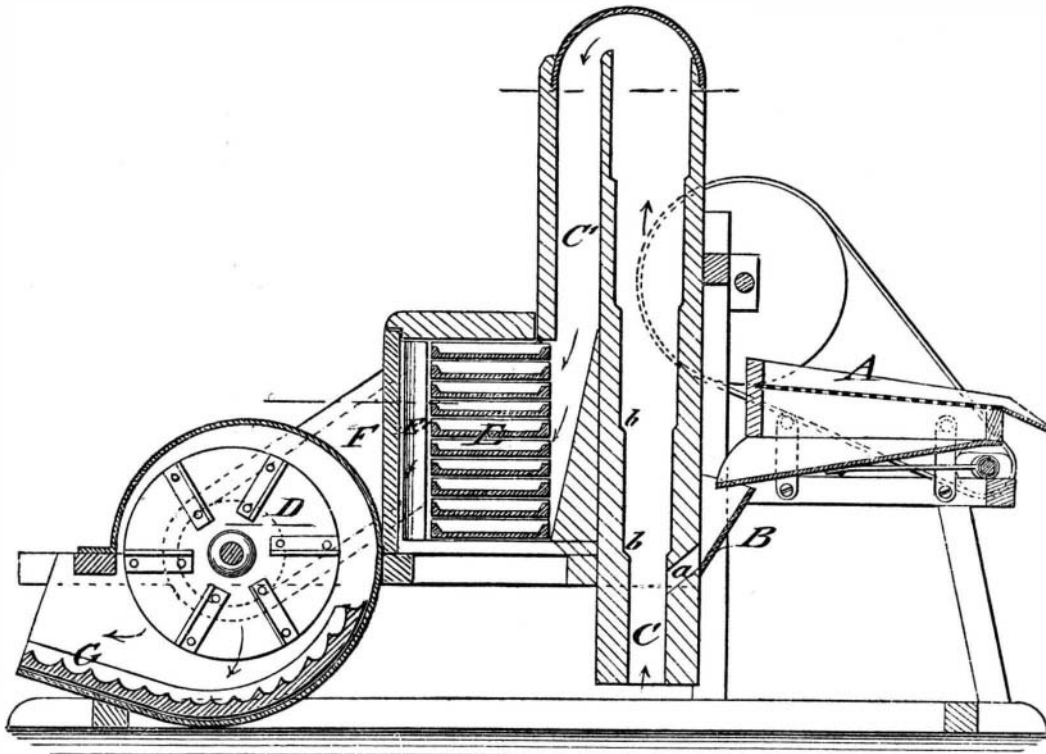
A NEW EGG HOLDER.

The annexed engraving represents a simple egg holder, devised by Mr. Henri Guilbeault, of New York city, and to him patented through the Scientific American Patent Agency, July 4, 1876. It consists of a cup, B, of suitable form, with a ring, D, and spring tongs, A. The parts are combined, as shown, in such manner that an egg placed in the cup may be securely held by bringing the ring down upon the egg by sliding a double button, C, which connects the jaws of the tongs, through slots made in them for that purpose. The egg is thus held while it is being eaten from the shell.

A New Chicago Rolling Mill.

The Joseph H. Brown Iron and Steel Company, of Chicago, are nearly ready to begin operations in their merchant mill. All finishing trains, except the 22 inch beam mill, are ready to operate, except making steam connections. The puddling and

heating furnaces are ready to work and the boilers in place. The bar mill and 9 inch train are in position, as well as the top and bottom mill. They are building a blast furnace 18 feet by 80 feet. This will be, when completed, one of the most complete establishments in the West. It has six double puddling furnaces (Siemens) with a daily capacity of eight tons each on double turn; two scrap furnaces (Siemens) with a capacity of 20 tons each per day; and five Siemens' heating furnaces, 32 gas producers, a 22 inch beam mill to roll 90 feet long; 16 inch bar, with six stands of rolls; 9 inch guide; 20 inch top and bottom mill; 20 inch muck train. all these



IRVIN'S AMALGAMATING APPARATUS.

are three high. There are sixteen 40-inch boilers, with 40 3-inch flues in each. They also have drawings for a complete Bessemer plant.—*Iron Age.*

Purifying Carbon Disulphide.

Recent chemical investigations seem to have included the whole range of photographic materials, and, in addition to those already named, we find our notes call attention to a mode of purifying the most useful material for dissolving india rubber—carbon disulphide. In the state most commonly presented, it possesses such an intensely foetid odor as to make its use unbearable; the new process promises a product in a very pure condition. The method of purification consists in mixing fuming nitric acid with a sample of the disulphide distilled off palm oil, and then adding distilled water, filtering, and distilling between 50° and 60°. A peculiar violet compound produced at one part of the pro-

thinks that this will soon tell on the main bar; and in fact the pilots say its effect is already so marked that they can take over the main bar any vessel drawing twenty feet of water. If this be the case, the work on the jetties has already accomplished much more for the South Pass than many years of laborious and expensive dredging have been able to do for the Southwest Pass.—*Philadelphia Ledger.*

The Resources of Animals.

Animals, even of the least important species, sometimes resort to shifts and expedients, to defend and support their existence, so curious as to astonish even those observers who are most familiar with their habits. The little gossamer spider, having no wings, still finds its home in the upper air. Weaving a tiny kite of web and flying it aloft by unwinding a thin kite string from its spinneret, it finally fastens the lower end to a twig, and climbs fearlessly up the filament, till at last it sits far above the earth and catches midges upon its floating raft in the air. This little forager has been found sailing in the air nearly a mile high by balloonists!

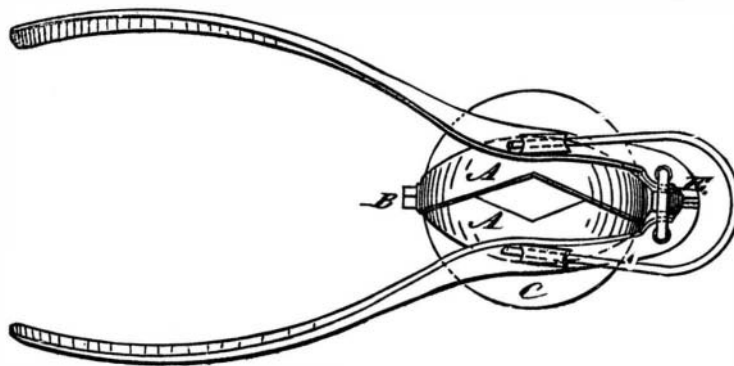
The male spider has usually a very poor show for liberty or even for life. Small and lean, weak and cowardly, a mere speck by the side of his big blushing sweetheart, she generally catches him when he first comes courting, spears him with her fierce mandibles, gnaws the quivering flesh off his bones, and flings his polished skeleton into the sewer. She is heartless and ferocious—a coquette and a warrior. Woman's rights are carried to an extreme. The husband is not allowed to vote or to govern his own family. Before his brood of 1,000 children have climbed merrily upon their mother's back, she has generally made a breakfast off him, and his bones bleach in the back yard.

Then there is the hermit crab, the pugnacious crustacean that can seldom succeed in preserving its own life at all except by finding the shell of some large snail or whelk to crawl into. Having a bulky and soft abdomen, it is peculiarly vulnerable to attack from predacious fishes and crabs, and its only safety is in covering its salient extremity. If it finds an eligible snail shell empty, it immediately takes possession by backing its exposed body in and fastening the shell on by the posterior hooks, leaving its head and legs outside. Then it drags the shell around till it is outgrown, when it seeks another. If it finds none unoccupied it frequently kills a living snail, eats him, and unceremoniously takes possession of his house. Or it attacks a tenant crab, the winner of the combat retaining the premises. The loss of an eye or a claw is by no means a mortal injury, or even a permanent crippling, as the mutilation heals, and the eye or limb reappears as good as ever.

Speaking of crustaceans, did you ever see a long or soft-shell clam in his native wilds? Do you know what that exposed proboscis is which you call the neck? It is a double-acting muscular pump, with two pipes and valves, through one of which salt water is drawn and through the other expelled. It drenches the gills, which retain as food any bit of nutriment that may float in, when the filtered water is passed out through the other valve. And that dark lump in the clam, which you have often rejected, madam, as the stomach, is not the receptacle of food at all, but merely an excellent enlarged liver, which epicures might, without torturing the humble bivalve, make into a *paté de foie gras*.

Most animals that are in danger from predacious foes are of a natural tint, resembling the hues of the earth or trees upon which they live. Partridges, quails, and other sand and heath birds are brown, like their dwelling place, and the color serves to conceal and protect them. Some butterflies and locusts are exactly the shape of the leaves of the tree upon which they cling, so that they are not visible in their true character. Where a hundred have settled you cannot see one, only the leaves clinging to the branches and swaying in the wind. Not only the color of the leaves is imitated, but the venation, to the most minute particular; and it is only when you strike the bush with a stick that the "leaves" rise and flutter away. Some of these leaf insects, as they are called, change their colors with the season of the year—green in spring, brighter in summer, and brown in autumn, like the true leaf. Even the imperfections of the leaves are mimicked—those characteristic markings and erasions of the leaf which result from the attacks of minute insects. The decay or dying leaves is so imitated that, as Mr. Wallace remarks, "it is impossible to avoid thinking, at first sight, that the butterflies themselves have been attacked by real fungi!"

In the turbulent brooks of Connecticut, and probably of other States, is found an ingenious little insect, that the rural people know as a bundle-bug, an inch or two long, which protects itself

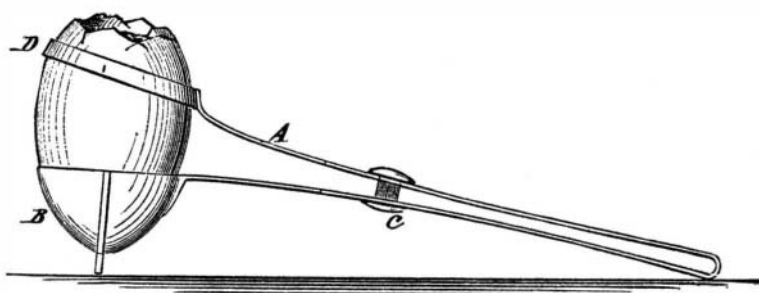


BANNIHR'S LAMPWICK TRIMMER.

cess has been traced to the iodine well known to be almost always contained in commercial nitric acid.

The Jetties.

The progress of work on the Mississippi River jetties has gone so far that Captain Eads was recently enabled to close up Grand Bayou, a channel that has heretofore drawn off about one third of the water of the South Pass. The closing of this bayou so increased the current through the Pass that in less than two days the channel was deepened more than a foot through the greatly increased scour. Captain Eads



GUILBEAULT'S EGG HOLDER.