

$\frac{3}{4}$ " seamless brass tubes, and is provided with steam and water gauges, whistle, etc. Engine is upright, with reverse link motion, having a cylinder 2 inch bore by 3 inch stroke; runs at about 200 per minute, under a pressure of 100 pounds in boiler. Propeller is 16 inches, 3 blades on a 1 in. shaft, coupled to engine with universal joint. The pump takes water from outside or the bilge box, and will throw into boiler or over side of boat. Total weight of boiler, engine and shaft, wheel, etc., 400 pounds. About three scuttles of coal are used in 10 hours' steaming. On still water I get a speed of 5 to 6 miles an hour, or with the tide about 8. The total cost of the boat was less than \$230, including machinery, etc.

Yours very truly,
FRED. F. SMITH.
Bridgeton, N. J., October.

Curious Facts Concerning the Cochineal Insect in the Canary Islands.

To the Editor of the Scientific American:

It is well known that these islands are the great producing market for the insect dye cochineal, giving perhaps seven-eighths of the earth's product. Therefore it naturally falls under one's notice both in its cultivation and its preparation for market. The birth is brought about by placing the madres (mothers) in a kind of hot house, and spreading them out thinly on shallow wooden boxes. The insect, as it thus appears, may be likened to a grain of wheat just taken from a pool of dirty water, as it is about that size and shape, but of a dark lead color. It has neither head, legs, nor arms, and shows no signs of life. Yet after being in the warm room a short time they begin to give forth their young.

These, to the inexperienced eye, seem to be little white specks, as devoid of life as the mother. On close examination, however, they are found to be endowed with life and activity, and have their head and arms or legs as well formed and distinct as other insects.

The mother continues to give birth for some days. Some insects are said to give as many as 800 young ones, but they invariably die when they have brought forth their progeny.

The young ones are taken to the cactus plant (which is at once their home and their sustenance) on cotton cloths, to which they adhere when the cloths are spread over the shallow boxes. These cloths are sometimes covered in a few moments, so rapidly does the parent give birth, and some one has to be with them constantly for removing the full cloths and replacing fresh ones. The cloths seem to be covered with a white powder, but the cochineal grower knows that they are the basis of his yearly earnings, and has them sent out at once to the cactus, to which the cloths are fastened by a small thorn which grows on the same plant.

Once attached to the plant the insect forsakes the cloth, and adheres to (or burrows slightly in) the plant. It soon becomes stationary, begins to grow, and assumes the characteristics of its parent, that is, loses all signs of animation, drops all its members, and becomes a part and parcel, as one may say, of the plant.

It seems to "shuffle off its mortal coil," and appears as inert and inanimate as the cactus. Notwithstanding this apparent lifelessness, they are as sensible to heat and cold as other insects. Every year the proprietor suffers more or less loss from the extreme heat sometimes felt here. This heat comes from the great Sahara Desert, and causes death to the insects by asphyxia. Early in July there were a few days of this weather, which, it is said, destroyed at least one third of the crop. I can readily believe this, as the insects had just been "planted," or put upon the cactus; and the younger they are the more sensitive they seem to these changes of the weather. They are, however, liable to loss this way as long as 30 or 40 days after being placed on the plant, and when near to maturity.

The heat kills or stops growth, the insect dies, and drops from the cactus on receiving the slightest touch of wind or other weather. The most remarkable point concerning this specimen of the animal world is, that the foregoing *only refers to the females*, as the male is a creature entirely distinct in its form and habits and mode of life.

The males are very scarce in comparison with the number of females, some assert in the proportion of one to one hundred thousand. The male has wings and flies from plant to plant, with a body like an ant. These visits from plant to plant give for their result the operation I described at the beginning of this article, that is, the hatching of the young insect.

Now the scientific questions that arise in my mind are: 1. What kind of life is this of the female, after being placed on the plant? Is it a semi-animal, semi-vegetable life?

2. Is there any other example in nature where the proportion of the female in numbers is so much greater than the male, and where their form, habits, and life are so distinct?

3. Is there any other insect that gives direct from the body (without eggs) such great numbers of young?

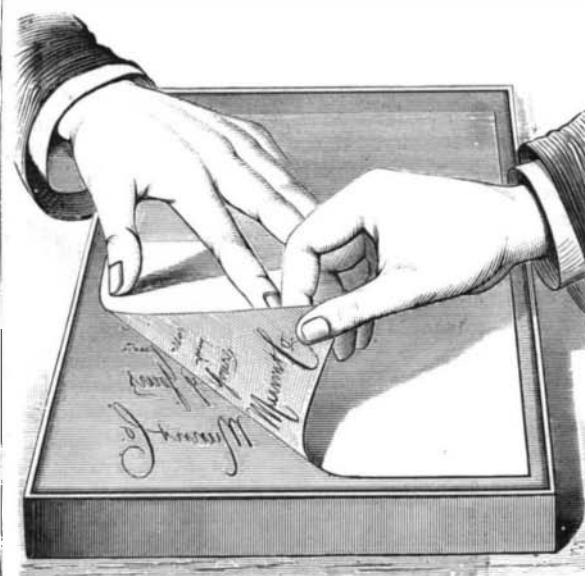
Santa Cruz de Teneriffe, Canary Islands, Oct., 1879.
H. B. M.

ANY fibrous material can be stuck to metal, whether iron or other metal, by an amalgam composed of good glue dissolved in hot vinegar with one third of its volume of white pine pitch, also hot. This composition, it is said, will give a sure and certain result.

HOW TO WORK THE NEW COPYING PROCESS.

This process consists in transferring to a pad or tablet, composed essentially of a gelatinized solution of glue in glycerine, writings made on paper with a strong solution of one of the aniline dyes—violet or blue being generally preferred—and from this obtaining duplicate copies of the original by simply pressing sheets of paper on the transfer. The *modus operandi* of the copying is given briefly as follows:

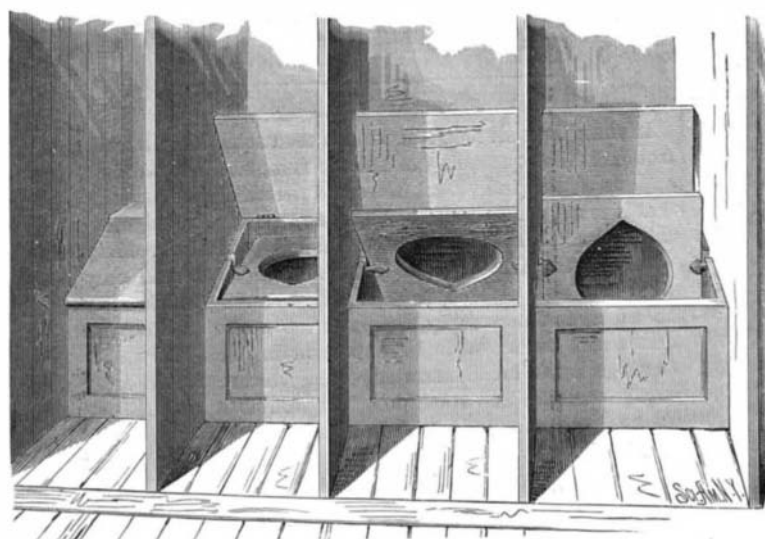
Write with a steel pen on ordinary writing paper; allow to dry; press the writing gently upon the tablet, allow it to remain a minute, when the greater part of the ink will have been transferred to the gelatinous surface, and as soon as the paper has been removed the tablet is ready to take impres-



NEW COPYING PAD.

sions from. Place ordinary writing paper upon the charged tablet, smoothing over with the hand, and immediately remove the sheet, which will be found to bear a correct copy of the original writing; repeat with other sheets until the transferred ink becomes exhausted. Immediately after, wash the tablet with water and a sponge, let it dry, and it is ready again for use.

With a tablet and ink prepared according to the following fifty good copies from one transfer have been obtained, and doubtless with care it would afford twice this number. The proportions for the pad or tablet are: Gelatine, 1 ounce; glycerine, $6\frac{1}{4}$ fluid ounces. Cooper's gelatine and pure concentrated glycerine answer very well. Soak the gelatine over night in cold water, and in the morning pour off the water and add the swelled gelatine to the glycerine heated to about 200° Fah. over a salt-water bath. Continue the heating for several hours to expel as much of the water as possible, then pour the clear solution into a shallow pan or on a piece of cardboard placed on a level table and having its edge turned up about $\frac{1}{8}$ inch all around to retain the mixture, and let it remain for six hours or more, protected from dust. Rub over the surface a sponge slightly moistened with



PARK'S IMPROVED CABINET SEAT.

water, and let it nearly dry before making the first transfer. The ink is prepared by dissolving 1 ounce of aniline violet or blue (2 R B to 3 B) in 7 fluid ounces of hot water, and, on cooling, adding 1 ounce of wine spirit with $\frac{1}{4}$ ounce of glycerine, a few drops of ether, and a drop of carbolic acid. Keep the ink in a well stoppered bottle.

IMPROVED CABINET SEAT.

The accompanying engraving represents an improved privy seat recently patented by Mr. Edwin R. Parks, of Copper Falls Mine, Mich., and intended more particularly for school privies and those of passenger depots, railway cars, boats, hotels, and other public places.

The invention consists in a seat made alike on both sides, and pivoted at opposite edges, so that it may be turned over or reversed. The engraving shows the seat in several positions, so that its construction may be readily understood without further description.

MISCELLANEOUS INVENTIONS.

Mr. Henry R. Robbins, of Baltimore, Md., has invented an improvement in fare boxes for street cars. It consists of an inclined conduit arranged between the back of the seat and the side of the car, and having depositing throats of different lengths extending upwardly from it between the windows, the conduit having a receiving box at its lower end, where it may be inspected by the driver.

Mr. William H. Russell, of Sedalia, Mo., has patented an improved vapor burner designed for burning gasoline and other light hydrocarbons for illuminating and heating purposes. The characteristic features of this invention are a double set of horizontal curved deflecting plates, a rotary cut-off located between the two sets of plates, and opening and closing communication with an internal tube, and a surmounting generator or globular chamber located above the plates in the flame space.

An improvement in dies for forming metallic horse collar frames has been patented by Mr. Ebenezer Fisher, of Kincardine, Ontario, Canada. This invention relates to an improvement in the dies for forming metal plates into the shape required to adapt them to form the sides of a horse collar; also to an improved metal collar or collar frame, the product of the dies.

In putting up pills which are prepared with an adhesive substance or composed of deliquescent material, it has been customary to place in the box with the same a dry harmless powder of some kind, which prevents the pills from sticking to each other or to the sides of the box. This powder frequently cakes in the bottom of the box, and always in removing a pill it is impossible to avoid taking up some of the powder with the pill. Mr. Norman V. Randolph, of Richmond, Va., has patented a device designed to avoid these objections. It consists in a box with a perforated diaphragm which divides the box into two compartments, into one of which the pills are inserted, and into the other the powder may be shaken and separated from the pills when they are to be handled or removed.

Mr. Theodore L. Wiswell, of Olathe, Kan., has patented an improved harness buckle, to which straps can be conveniently and securely attached without doubling or looping and sewing in the usual way. The buckle is composed of an apertured plate, a loop and tongue. The looped ends of the apertured plate are turned outward, so that the strap may be readily inserted in the buckle.

An improved faucet has been patented by Mr. John P. Mern, of New York City. The object of this invention is to provide for basins, tubs, sinks, etc., a faucet that cannot leak, even under great pressure, and that cannot accidentally be turned the wrong way and left running when its mouth is not over the basin or tub.

Mr. Charles P. Rood, of La Fargeville, N. Y., has invented a mattress adapted for use on shipboard, and constructed so that it may be used as a life-preserving raft when required for such purpose; and the invention consists in the combination, with a mattress of usual character, of watertight cells or compartments, that render the mattresses buoyant in water, and fit them for use as a raft singly or by connecting a number of them together.

A simple and effective refrigerator for cooling and preserving meats, etc., has been patented by Mr. Frederic Wolf, of Quincy, Ill. It consists essentially of a wooden refrigerating box, with a glazed cover and front, fixed between two higher ice boxes that open into it, so that the cold air from them shall descend into it.

Mr. Thomas Leach, of Taunton, Mass., has patented an improved stand for ice pitchers, which consists chiefly in a stand having an elevated support for the tilting pitcher, which stand is constructed with an opening in its surface, and a subjacent drawer adapted to catch the drip from the pitcher. The invention also consists in forming the handle for the drawer in such a shape as to make it either a support for the goblet or a receptacle into which the waste water from the goblet may be poured, and whence it passes into the drawer.

An improvement in napkins and analogous articles, patented by Mrs. Elizabeth W. M. Cameron, of Brooklyn, N. Y., consists in providing napkins, handkerchiefs, table covers, and similar articles with embroidered or printed fancy borders, which are made separately or of separate pieces, and attached to the edges of the body of the napkin or other article by a hem-stitch.

Mr. Max Rubin, of New York city, has patented an improved fan of the kind that may be opened into circular form. It is so constructed that it may be closed into the space between the parts of the handle, and may be held securely in place both when opened and when closed.

An improvement in razors and knives has been patented by Mr. Nelson B. Slayton, of Rochester, N. Y. The object of this invention is to furnish razors which may be shut up and carried in the pocket without the necessity of putting them in cases.

A device for tightening wheel tires by raising or spreading the fellyes so that washers may be inserted between the ends of the spokes and the felly or between the parts of the felly itself, has been patented by Mr. John A. Cooléy, of Savanna, Ill.