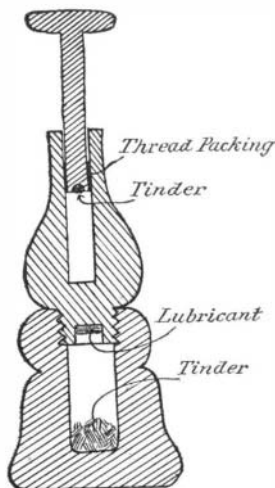




PRIMITIVE FIRE-MAKING MACHINE.

BY CAPT. JOHN G. MAC KIZER.

Some time ago the SCIENTIFIC AMERICAN published an article describing primitive methods of making fire. The accompanying sketch shows, in section, a fire-



making machine which I obtained from a native in the Lobo Mountains, Batangas, P. I., and which embodies a different principle from any described in the article.

To operate it, the machine is held in the left hand, and the piston, loaded with tinder and inserted far enough in the well to insure a straight entrance, is struck home and quickly withdrawn. Some skill is required to accomplish this rapidly enough to get the spark to the air before it is extinguished. It is made of caraboa horn. The tinder is scrapings from the interior of bamboo, and the lubricant is tallow.

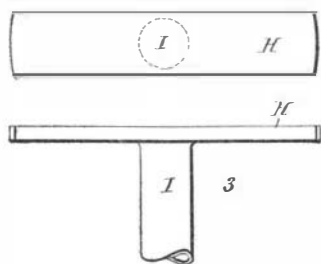
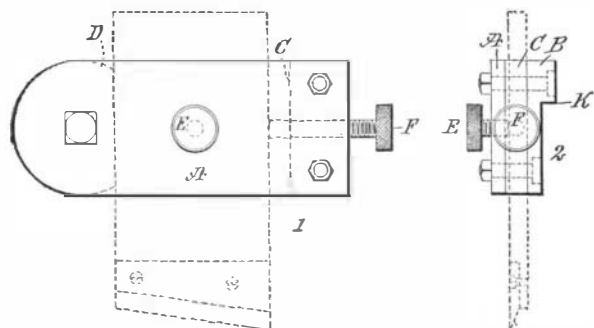
After some difficulty I induced the native, who was of the lowest type, to show me how he could make fire without his machine. Taking a large section of dry bamboo, he split off a piece about three inches wide and eighteen inches long, and cut a trough across it near one end. This trough he carefully deepened until at its middle point it just broke through. On another piece he cut a row of notches on one edge. Then scraping a quantity of fuzz from the interior of the bamboo, he pressed a bit of it through the small hole at the bottom of the trough, and laid the piece concave side down on a pile of tinder. He held this piece down with his knee, and with both hands sawed rapidly in the trough with the other piece. In a few seconds the tinder began to smoke, when he lifted the bamboo and blew the spark into a blaze. I then tried it with equal success, but have been unable to get just the right touch to pieces that I have prepared myself.

HOLDER FOR GRINDERS.

BY O. D. CARTER.

A very simple device for holding dies and other work of similar shape while grinding on small emery wheels may be made as shown in the sketch.

Between the top plate A and bottom plate B are two blocks, C and D, of sufficient thickness to allow the work to pass freely between A and B. The block C has a knurled screw passing through it, which firmly holds the work against the block D. The latter is



HOLDER FOR GRINDERS.

formed of a circular piece and may be clamped at any desired angle by means of a nut.

The knurled screw E holds the work against the lower plate. All bolt heads are sunk flush with the bottom plate. H is a suitable rest for the above clamp. Its shank I is turned to take the place of the ordinary rest of a small emery wheel. By raising or lowering

the rest, the required clearance is obtained. When the grinding is finished, the edge of the rest engages the shoulder K of the lower plate B, thus making it certain that each piece will be ground at the same angle and length.

TOOLS FOR THE WORKSHOP.—II.

BY I. G. BAYLEY.

(Continued from the issue of April 24th.)

A COMBINATION PLANING AND SHOOTING BOARD.

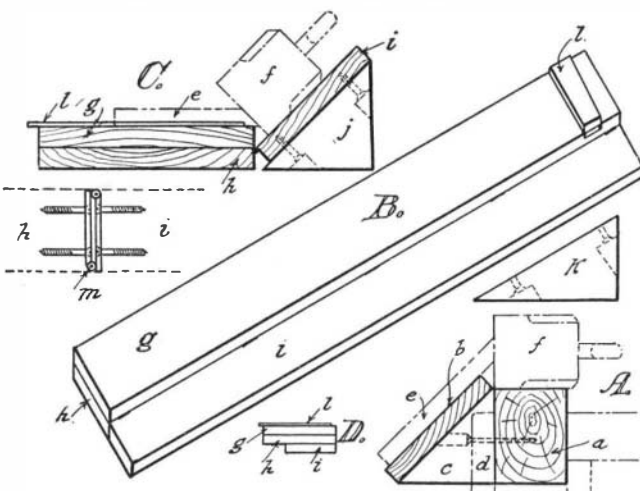
It is sometimes necessary to put a long straight or bevel edge upon a board; and while this can be done by the aid of the try square or bevel square, the board being held in the vise, the accuracy of the work depends largely upon the skill of the mechanic, and requires much practice. For the amateur, and even the professional, a board such as shown in the accompanying illustration is desirable.

All that is necessary for planing square edges only is a board about 9 inches wide, secured to one underneath, 15 inches in width, each 1/8 of an inch thick, and as long as the bench. The boards must be planed perfectly true, the working edge in particular, and a stop of some kind should be furnished at one end.

Sometimes it is necessary to plane a long miter edge on a board, in which case an ordinary shooting board, such as described, will not do.

One arrangement of shooting board for long miter joints is shown in the cross-sectional view A, in which a is a length of 3 by 4-inch timber, to which is secured a board b, at an angle of 45 degrees, by means of triangular blocks c, spaced about 2 feet apart, commencing near the ends. One end of the shooting board is held in the vise d, the other end resting upon pegs in the apron of the bench. The board e, whose edge is to be planed, is clamped to the board b, and the plane f shot along the 3 by 4-inch piece a.

At B is shown another scheme, where two 9-inch boards, g and h, are secured together by means of screws, driven in from the underside of the lower board h, which in turn is hinged to a board i, in the same plane, 6 inches wide. By means of blocks, j or k, secured to the board i, bevel or miter edges of 45, 60,



COMBINATION PLANING AND SHOOTING BOARD.

and 30 degrees can be planed along the edge of any board e, as detailed at C. A wedge stop l, of hard wood, is furnished at the far end of the plank g, several being made of various thicknesses, to suit the work in hand.

Before using the board, the workbench should be swept down, and it is very necessary to have it level.

Ordinary hinges for holding together the boards h and i, are perhaps best, being steadier; but for convenience when the board is out of use, if the double swing hinges m are used, the 6-inch board i can be folded under the others, as shown at D, the blocks of course having first been removed.

Care must be taken to place the hinges a trifle below the surface, or the edge of the plane will wear over them, as it is shot from one end of the board to the other.

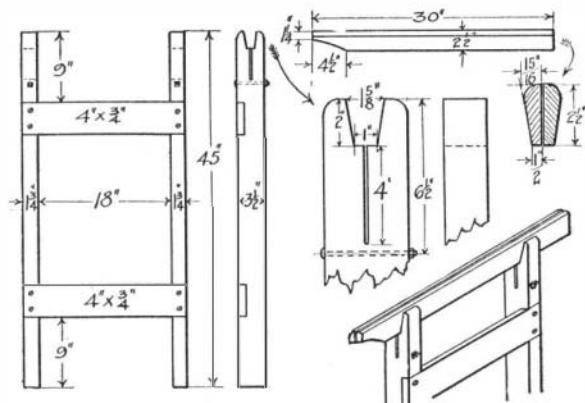
THE SAW CLAMP.

The majority of saw clamps on the market are either secured to the workbench by means of a thumbscrew clamp or other adjustment, or they are held in the vise—an arrangement having several bad features, which are overcome by the clamp here described. With this clamp it is unnecessary to take out the saw, or unscrew the vise, when changing off to file the other edge of the teeth. Instead, the clamp and framework is turned around bodily. It can be moved from place to place, to a good light, or wherever most convenient, since it is not dependent upon a vise or bench for its support. The clamp being longer than the width of the vise, takes a better grip upon the saw; and the simplicity of clamping it (without the usual adjustment by means of a screw or pin) recommends it.

The framework may be made of light wood; the 4 by 3/4-inch pieces being let in flush with the face of the 1 1/4 by 3 1/2-inch side bars, to stiffen it. To prevent the 4-inch slot for the saw splitting down when the

clamps are driven in, a bolt is put through, as indicated, 6 1/2 inches from the top.

The clamps should be hard wood, 30 inches long, shaped out as detailed. The 4 1/2-inch recess, to allow for the saw handle, should be cut when the two clamps are together, since this makes them right and left handed. When making the two clamps, the taper should be obtained before the edges are rounded off, as shown in broken lines.



CONVENIENT CLAMP FOR SAWS.

The lower right-hand corner sketch shows the clamp in the framework without the saw. When necessary to set a saw, it is dropped in the 4-inch deep slot, teeth up, the two clamps wedged into place on each side of it being driven home with a mallet or hammer.

(To be continued.)

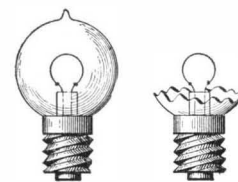
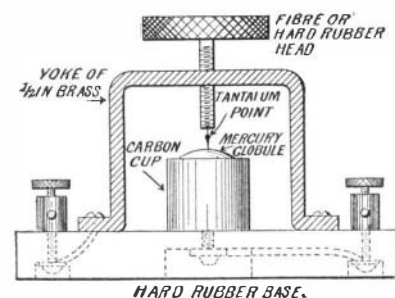
A TANTALUM DETECTOR.

BY ALFRED P. MORGAN.

A detector for wireless telegraphy has recently been devised, which makes use of a tantalum wire or filament in contact with a globule of mercury. While this detector is not so sensitive as the electrolytic or silicon type, and will not respond as well to very faint signals, it more than makes up for this when used for detecting signals of ordinary strength. It will then give tones several times as loud as either of the two types mentioned, and does not require the use of high-resistance telephone receivers. Its normal resistance is about 1,500 ohms, which drops as low as 250 to 270 when struck by oscillations. The construction of such a detector is quite simple and well within the ability of the amateur. The first operation is to secure the tantalum wire. This may be taken from a tantalum lamp of the battery type. A deep scratch is made in the glass all the way around the base of the globe by means of a small three-cornered file moistened with turpentine and camphor. A second scratch is made from the base to the tip on both sides. A light tap will then break the globe in two. Do this carefully lest you break the filament.

Cut the filament off within about 1/16 of an inch from where it is joined to the platinum or iron wires. This can best be done with the points of a small pair of scissors. Then break the small glass stub which holds the wires in place, so as to secure the tantalum with about 1/4 inch of wire fastened to it.

A screw in which to fasten it so as to permit of adjustment may be taken from the carbon of an old dry cell. A fiber or hard-rubber washer will make a good head for the screw. Bore a 1/16-inch hole in the end of the screw. Make it about 1/8 of an inch deep.



HOME-MADE TANTALUM DETECTOR.

Place the end of the wire opposite the tantalum point in this hole, and pack tinfoil around it with the head of a sewing needle, or if preferred fasten it to the screw by means of a small drop of solder.

The cup is best made from a piece of carbon rod. Remove the rod from an old dry cell, and saw off a piece about an inch long from the end containing the brass connecting cap. Then trim off all the rough edges of the carbon with a coarse file. A hole 1/2 inch in diameter and 1/4 inch deep should be bored in the