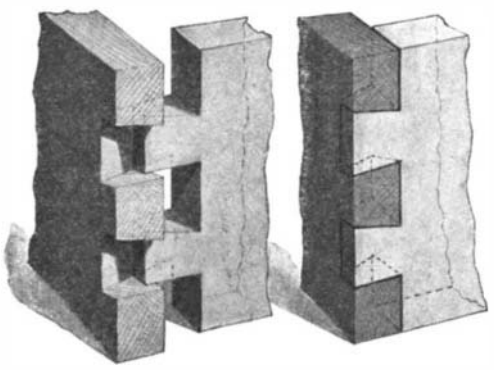
Handy Man's Workshop

The Editor of Handy Man's Workshop will be glad to receive any hints for this department and pay for them if available.

THE EVOLUTION OF THE DOVETAILED BOX.

BY CHARLES CHRISTADORO.

The accompanying engraving illustrates a self-locking double dovetail which cannot be pulled off in either direction. On one of the pieces the tenons are chamfered at the inside while the grooves on the other piece are formed with a correspondingly chamfered inner wall. The corners are joined not by forcing one side piece at right angles to the other, but by placing the side pieces within the ends of the end pieces and then bringing the corner joints into place by moving the side pieces diagonally outward. A box thus constructed cannot pull apart without first crushing in the sides, as this is the only direction in which the tenons of the side pieces may be moved out of engagement with those of the end pieces.



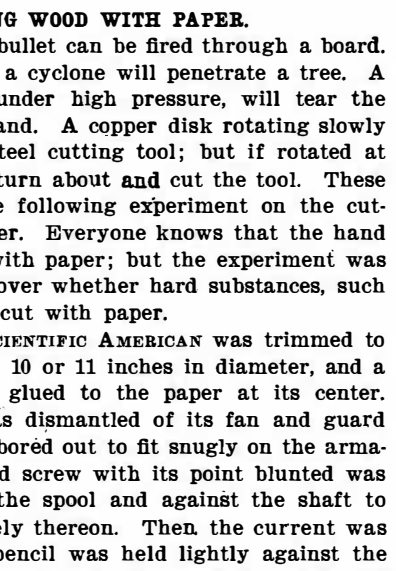
THE SELF-LOCKING DOVETAIL JOINT.

CUTTING WOOD WITH PAPER.

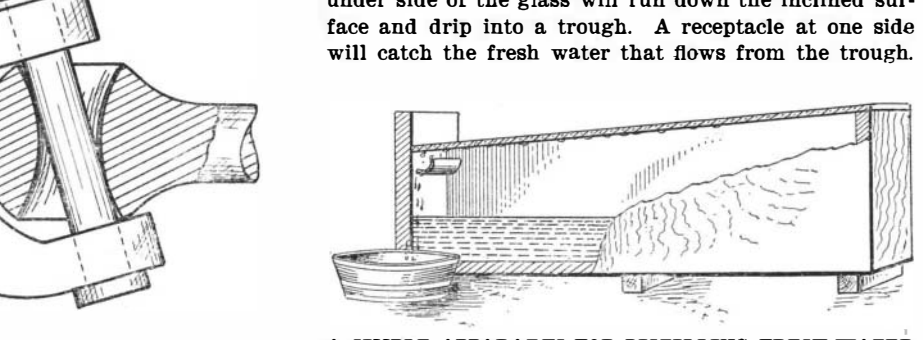
A tallow candle bullet can be fired through a board. A straw driven by a cyclone will penetrate a tree. A stream of water, under high pressure, will tear the skin off a man's hand. A copper disk rotating slowly can be cut by a steel cutting tool; but if rotated at high speed it will turn about and cut the tool. These facts suggested the following experiment on the cutting ability of paper. Everyone knows that the hand can be badly cut with paper; but the experiment was undertaken to discover whether hard substances, such as wood, could be cut with paper.

A page of the SCIENTIFIC AMERICAN was trimmed to the form of a disk, 10 or 11 inches in diameter, and a wooden spool was glued to the paper at its center. An electric fan was dismantled of its fan and guard and the spool was bored out to fit snugly on the armature shaft. A wood screw with its point blunted was threaded through the spool and against the shaft to fix the disk securely thereon. Then the current was turned on and a pencil was held lightly against the edge of the spinning paper. Although the paper bit into the wood the centrifugal force was not sufficient to hold the paper rigid, and instead of making a clean cut it scratched the wood as if by a file. The fan was making about 2,000 revolutions per minute, but the speed should have been doubled for so thin a paper. Better results were obtained by pasting the paper on a disk of cardboard of smaller diameter, so that the edge of the paper projected half an inch over the periphery of the cardboard. With this a clean cut was made into the wood of the pencil.

But the best cutter was made out of a sheet of three-ply Bristol board, the kind on which drawings for the Patent Office are commonly prepared. With this stiff paper the pencil was cut into very quickly, and the cut was exceedingly fine and clean. When the lead of the pencil was reached, the progress of the cutter was much slower because the graphite acted as a lubricant. Neither the paper nor the Bristol board showed any material wear with use. The photograph shows the Bristol-board cutter making a cut, while in the foreground is a pencil which has been cut in two by the paper.



CUTTING A PENCIL WITH A DISK OF BRISTOL BOARD.

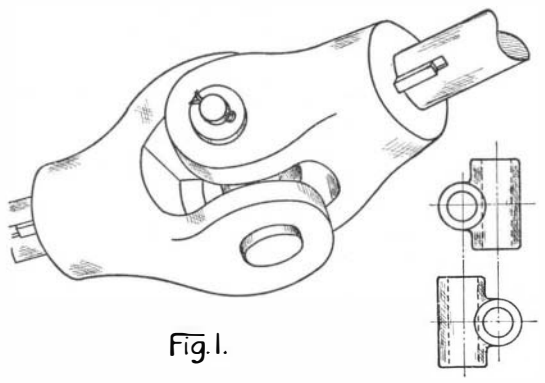


THE SCIENTIFIC AMERICAN AS A CUTTING TOOL.

A UNIVERSAL JOINT OF SIMPLE DESIGN.

Most universal joints on the market have at least a dozen different parts. One which has a big sale at present has no fewer than seventeen distinct parts, not including the shafts or feather keys for adjustment.

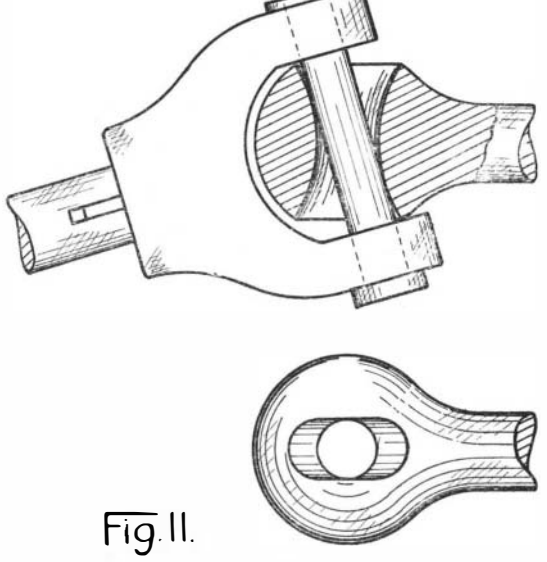
The universal joint illustrated in Fig. 1, which was designed on account of the high price asked by some of the standard makers, and which has given every satisfaction for the rough purpose for which it was intended, has but two jaws, two pins, and one washer or distance piece, shown in plan and elevation on the right.



A TWO-PIN UNIVERSAL JOINT.

It will be noticed, however, that this design is imperfect, in that the two pins, which cross each other at right angles, are not in the same plane. To improve upon this, and also to reduce still more the number of parts, the writer designed a joint as shown in Fig. 2. A model was made and so far it seemed successful.

The model was shown to a well-known engineer, who, while commending the idea of reducing the number of parts, pointed out the bad features of the design, in having a round pin wearing on a flat surface.



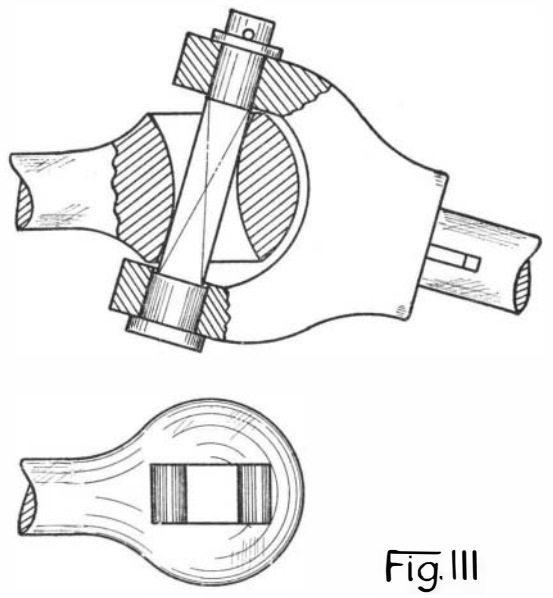
UNIVERSAL JOINT WITH ROUND PIN AND SLOT.

The writer tried to rectify this by having a square slotted hole instead of a round one, and a square shaft or pin with a round hole through, for the main pin. This he found would require so much fitting that the cost would bring it up to the standard price.

In Fig. 3 a design is shown which has not been put to a practical test, but is open to criticism. The slotted round hole shown in design, Fig. 2, has been changed to a slotted square hole.

One end of the pin in diameter is the same as the diagonal of the square body. The other end of the pin is the same in diameter as the side of the square.

There is no reason, however, why the square body of the pin could not be continued to the end, and fitted into a collar or bushing, the inside hole of which being a square tight fit, and the outside a loose round fit, to enable it to revolve, as the other end of the pin.



THE SQUARE PIN UNIVERSAL JOINT.

HOW TO OBTAIN FRESH WATER FROM SEA WATER.

A common method of getting salt from sea water is to place the liquid in shallow vats, and expose it to the sun until the water is evaporated. Someone has suggested that the same process of separation be used to get fresh water out of the sea water. Cover the vat with a pane of glass which is tilted slightly. The radiant heat of the sun passing through the glass will evaporate the water, and the vapor condensing on the under side of the glass will run down the inclined surface and drip into a trough. A receptacle at one side will catch the fresh water that flows from the trough.

A SIMPLE APPARATUS FOR DISTILLING FRESH WATER FROM SEA WATER.

The condensation may be expedited by pouring water over the glass. The glass will thus be chilled without interfering with the passage of the sun's rays into the vat.

Waterproof Matches.

BY JAMES BAILEY.

Perhaps some of your readers would be interested to know that I have found a simple, inexpensive way to waterproof matches. Into some melted paraffine (care being taken that it was as cool as possible) I dipped a few ordinary parlor matches. After withdrawing them and allowing them to cool it was found that they scratched almost as easily as before being coated with the wax. Several were held under water for six or seven hours and all of them lighted as easily as before immersion. When the match is scratched the paraffine is first rubbed off and the match lights in the usual way.

Matches treated as above would be very useful on camping or canoeing trips, as they do not absorb moisture. Since more rubbing is required to light them than the ordinary match, it would be practically impossible to set them on fire by accidentally dropping.