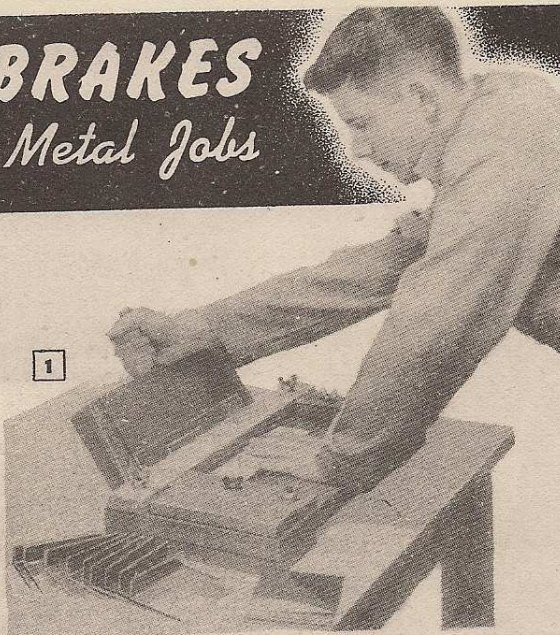


BENDING BRAKES for Your Sheet-Metal Jobs

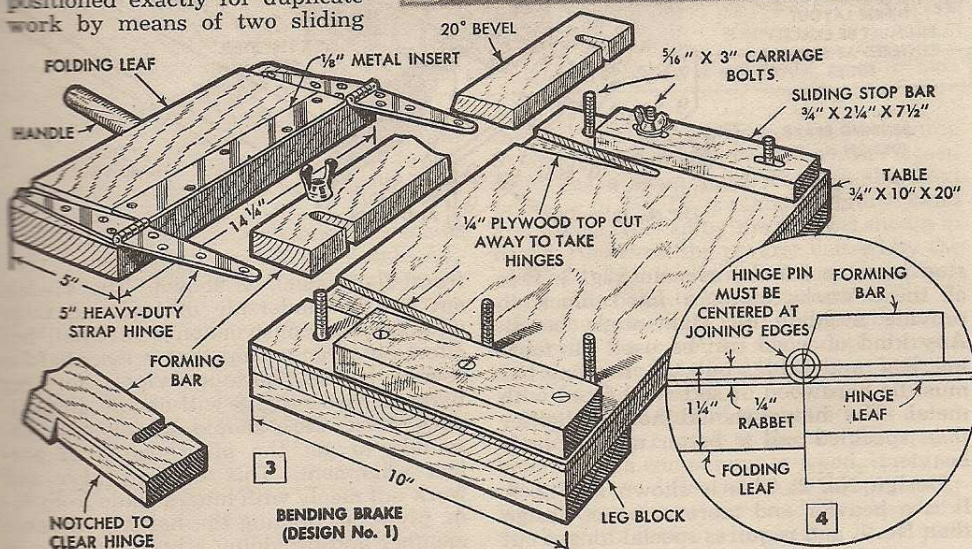
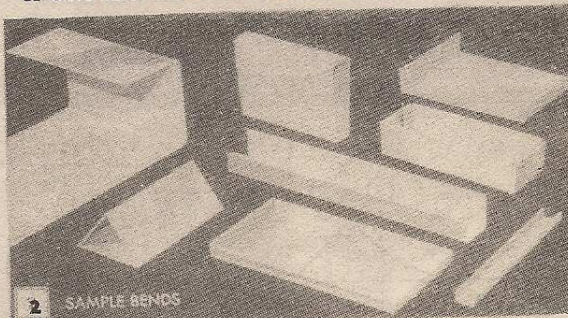
By Sam Brown

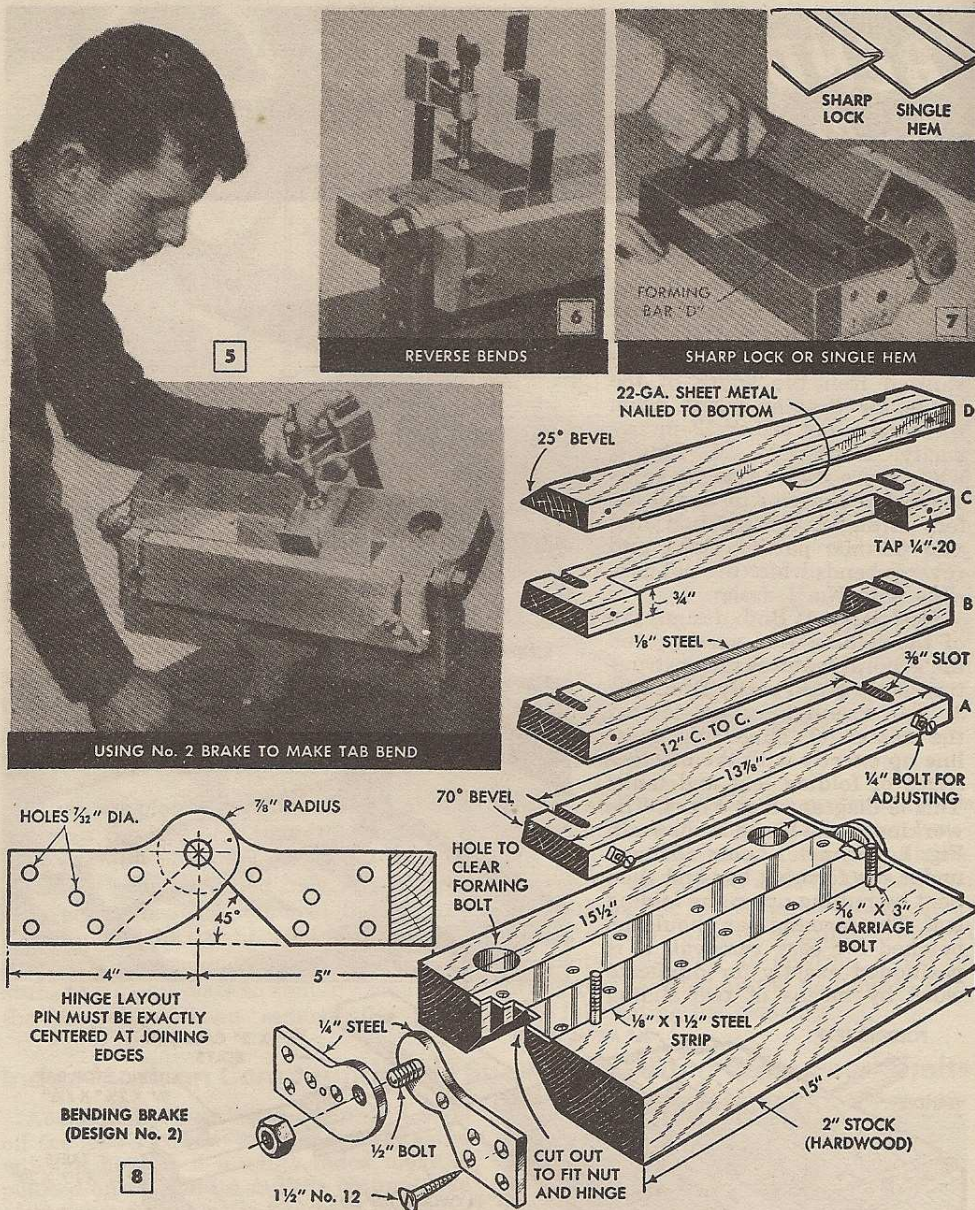
THESE bending brakes will simplify sheet-metal fabrication. Two designs are described, both capable of bending 24-ga. galvanized iron the width of the brake, or heavier metal when the bend is not at full 12-in. capacity. Design No. 2, Fig. 8, while more difficult to make, is somewhat superior in that it offers stronger construction and also permits partial (tab) and reverse bends which are not possible with No. 1 design.

Design No. 1: Both designs are of the folding-leaf variety, and the general features of construction are grasped easily from Fig. 3. The essential feature is that the center of hinge pin must line up exactly with the meeting edges of folding leaf and table. This is diagrammed in Fig. 4. The working of the brake is shown in Fig. 1, the metal being clamped under the forming bar and then bent by pulling up on the folding leaf. The forming bar should be notched for easy removal. It is positioned exactly for duplicate work by means of two sliding



BENDING METAL TILE—ONE OF MANY JOBS POSSIBLE WITH BRAKE

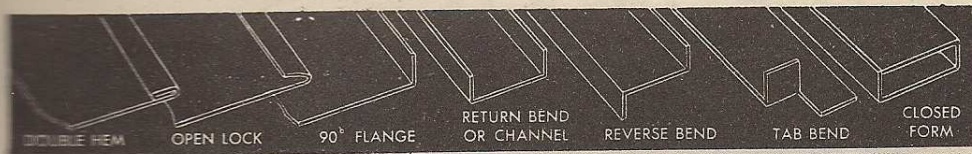




stop bars, as can be seen in Fig. 3. One of these works along a fixed block to provide a guide for right-angle bends. Any kind of wood can be used for folding leaf and table, but the forming bar must be hardwood or softwood faced with metal. The hinge should not be lighter than specified and is better made a little heavier.

Design No. 2: This is shown in Fig. 8. It is a heavier and more compact design than No. 1, and requires special hinges cut

from $\frac{1}{4}$ -in. steel, as shown. The 45-deg. cut on the underside of leaf and table weakens the construction somewhat, but offers an arrangement that is essential for reverse bends. The four styles of forming bars shown in Fig. 8 will handle all ordinary work. Care should be taken in assembly to get the pivot points in perfect alignment. This design also will work out nicely with hinges made from $\frac{3}{4}$ -in. plywood, pinning the bolt to the table member and providing a brass bushing in



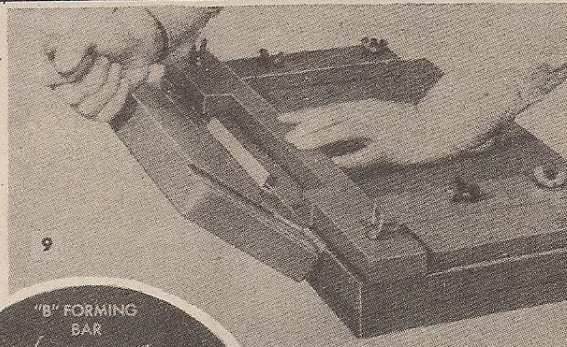
the other member to prevent excessive wear and loose action.

Tab and reverse bends: Tab and reverse bends are worked on No. 2 brake by mounting the brake on edge in a vise and folding the leaf all the way back. A block of wood is clamped to the folding leaf and becomes the forming member. Fig. 5 shows the operation on a tab bend; Fig. 6 shows the same setup for reverse bends. Neither can be done on the No. 1 brake.

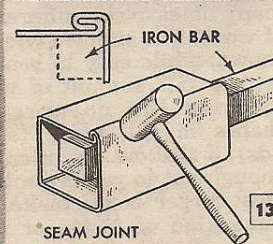
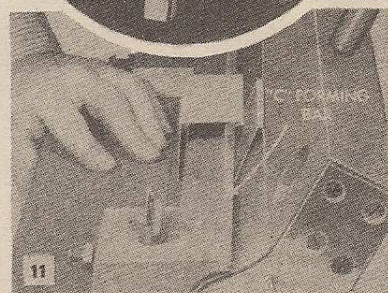
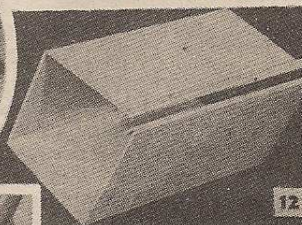
Standard operations:

The sharp lock, Fig. 7, is made by using the brake in a normal position with a style-D forming bar. This bend is used frequently for fastening two pieces of metal together. If the bend is at full capacity (12 in. long), it is best to form it to a flange with the stronger A or B bar and then complete the lock with the sharp-edge D bar. The single sharp lock when pressed tightly together in a vise or by hammering becomes the single hem or bend, as shown. If the single bend is hemmed again, it makes a double hem. At full capacity on a narrow hem less than $\frac{1}{4}$ in. wide, this bend offers the ultimate strength and accuracy test for your brake—a poorly made brake will fail in this double-hem operation.

Large return bends or channels are made with the standard forming bar (style A), and offer no difficulties. Smaller channels are made with the B bar, which permits working as small as $\frac{1}{8}$ -in. cross section. This operation is shown in Fig. 9. The B bar is used also for bending small closed forms, as shown in Fig. 10. As can be seen, the brake does not fully close the form on the final bend, but it is close enough so that a little springing by hand will complete it. Style-C bar offers another way of working small closed forms, as shown in Fig. 11. Complete closure is possible with



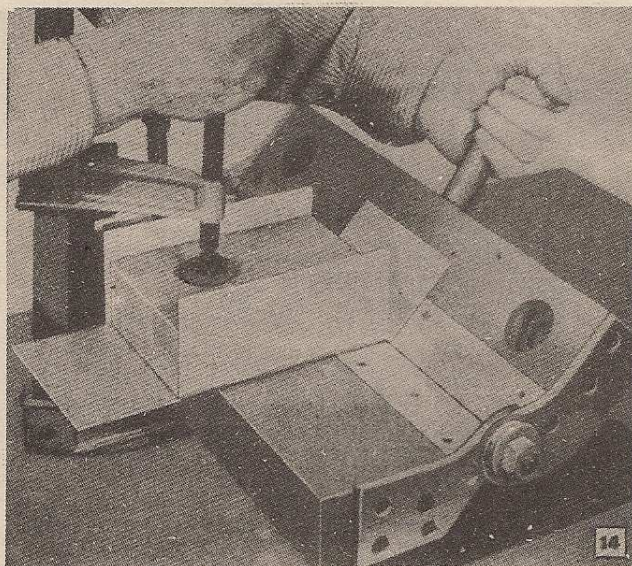
MAKING A CHANNEL WITH STYLE "B" FORMING BAR



SEAM JOINTS ON SMALL CLOSED FORMS CAN BE MADE WITH "B" OR "C" BARS

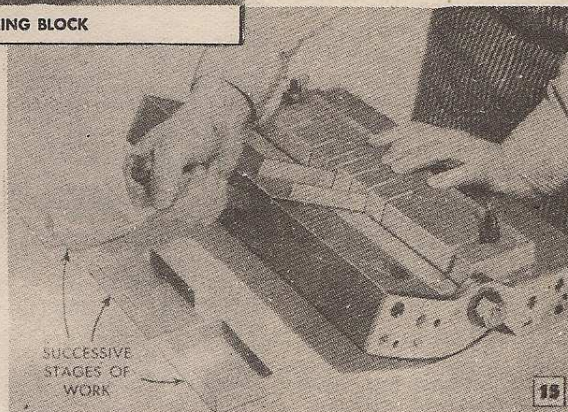
this bar, but the work must be resprung to remove it from the bar. When the closed form has a seam joint, Fig. 12, the final bend, as in Fig. 11, is really a reverse bend and is best worked by the method shown in Fig. 5. However, the reverse caused by the narrow flange is slight and does not materially affect the bending operation. Fig. 13 shows how the seam joint is closed by hammering. This is not an easy joint to make and should be practiced before you attempt it on finished work.

Box bends: One of the most used forms of sheet-metal work is the simple square box. Like its companion in wood, it can be made a dozen different ways. Simplest way is to cut out the corners and then bend the work over a forming block, Fig. 14. or over



MAKING A BOX WITH USE OF FORMING BLOCK

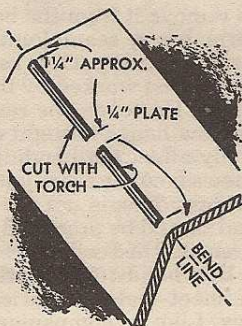
a special style-A forming bar, Fig. 15. For the latter operation, the forming bar has notches cut to accommodate the flanges previously turned up. The notches (saw kerfs) do not affect the bend, and one bar can be notched many times to suit different sizes of work. The simple style of box shown, while easy to bend, presents a fair amount of work in soldering the corners. Some shapes in this style (such as lids), if shallow, are often strong enough not to require soldering. Most larger boxes make use of some kind of inside or outside



BOX MADE WITH USE OF NOTCHED "A" BAR

Slots Cut Through Steel Plate Aid in Bending It

A piece of $\frac{1}{4}$ -in. steel plate can be bent in a vise with comparative ease and without the usual equipment, if it is first slotted along the bend line with a torch. Leave about $1\frac{1}{4}$ in. of material between the slots and at the ends. Should it be necessary to strengthen the plate after bending, fill the channels formed by the slots with welding rod.



Adjustable Wooden Hold-Down

To hold work flat while being surfaced with a drill-press shaping tool, an adjustable wooden hold-down bolted to the fence will assure smooth, even cutting with no danger of gouging the work. The hold-down, which is made from a length of 2 by 4-in. stock or similar material, is recessed in the center to fit around the cutterhead, and near each end for bolts inserted through slots that allow adjustment of the hold-down. The lower edge is rubbed with paraffin to permit work to slide freely.

