

Lawn sweeper from an old hand mower

By MANLY BANISTER

You've gone to power for your weekly grass-cutting chore?

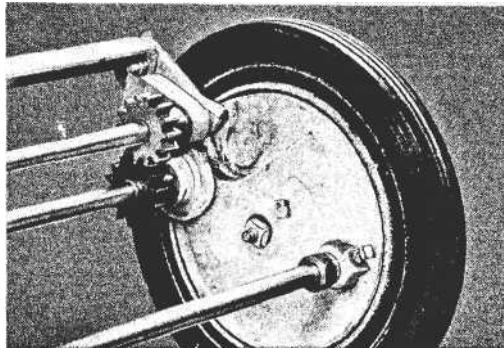
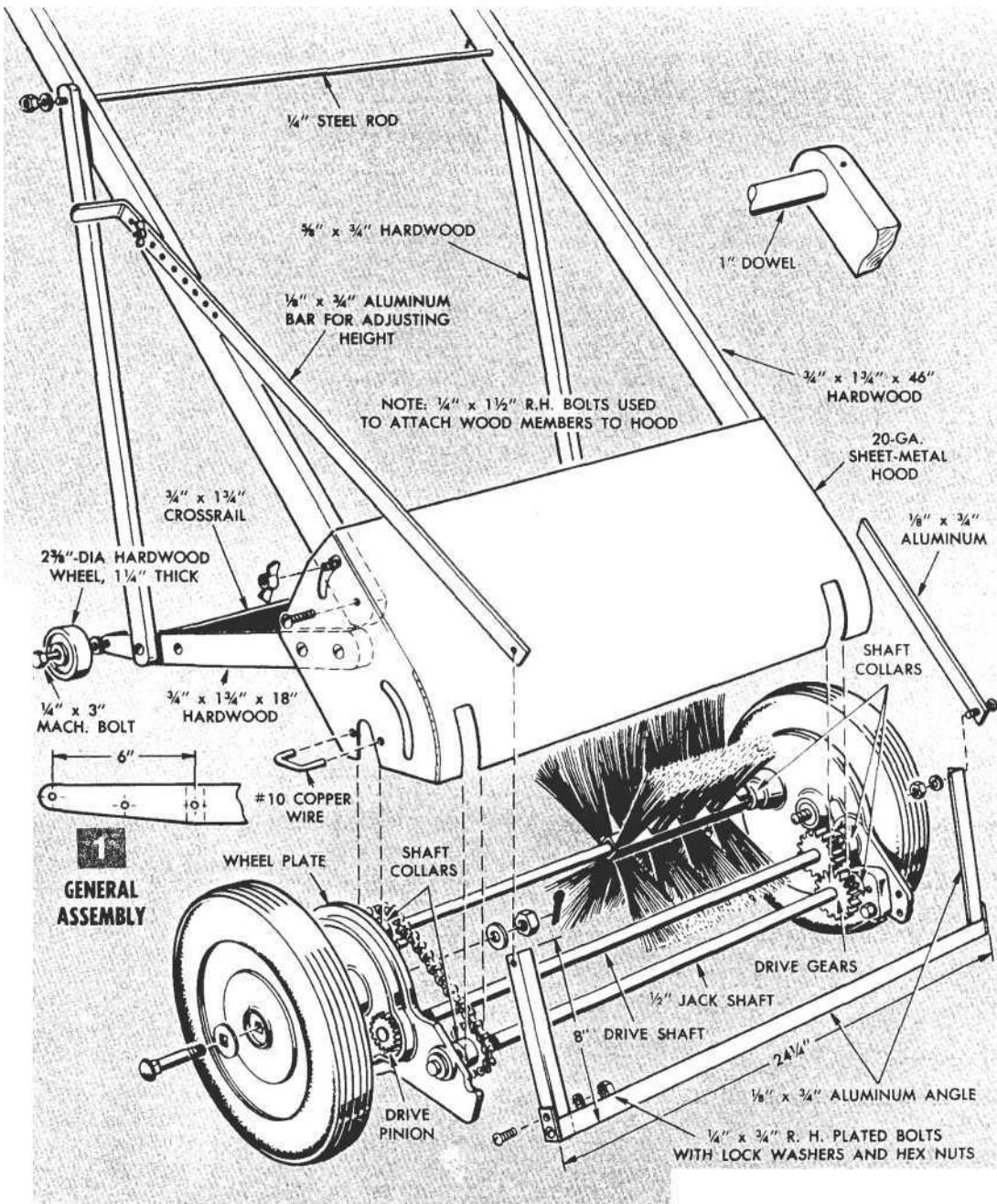
Don't throw away your push-type machine until you've considered this practical use for some of its parts



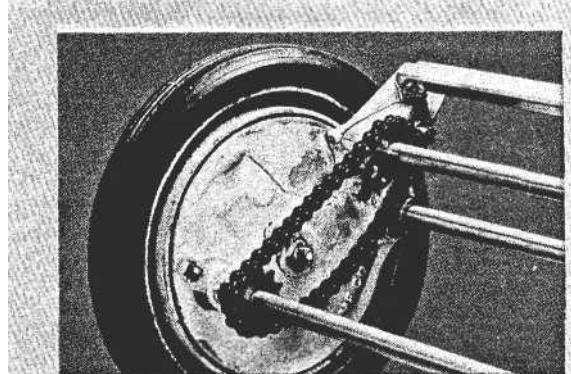
• MAYBE YOU hadn't thought of it, but the parts from the old hand mower you've been ready to toss out since you bought a new power mower can be used to make an excellent lawn sweeper. You dismantle the mower and throw away everything but the wheels, wheel plates (in older hand mowers these are castings), the

pinions and clutch pins and the bolts and retainers that hold the wheels on the spindles, and in some cases the reel bearings. Clean these parts thoroughly in a solvent to remove accumulations of grime and lubricant.

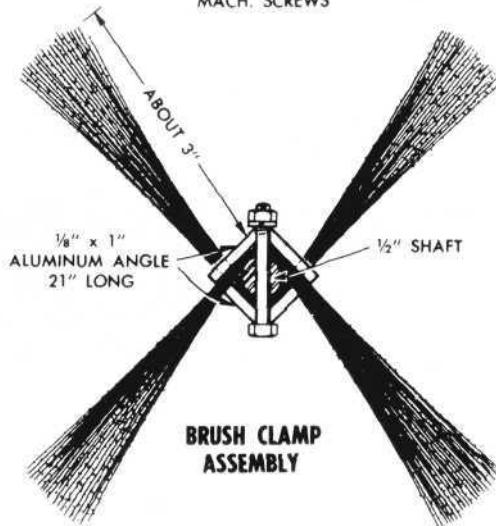
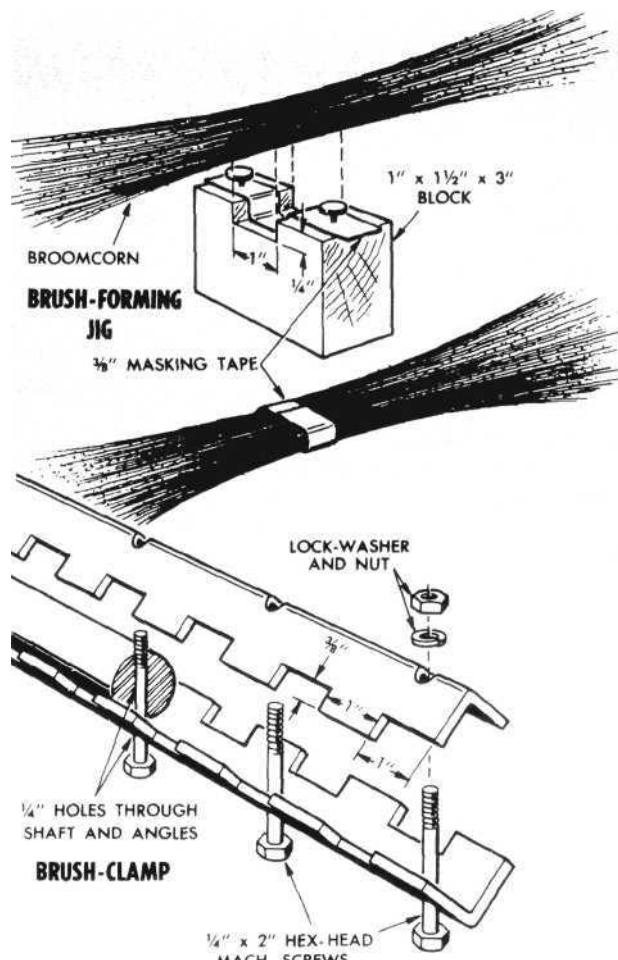
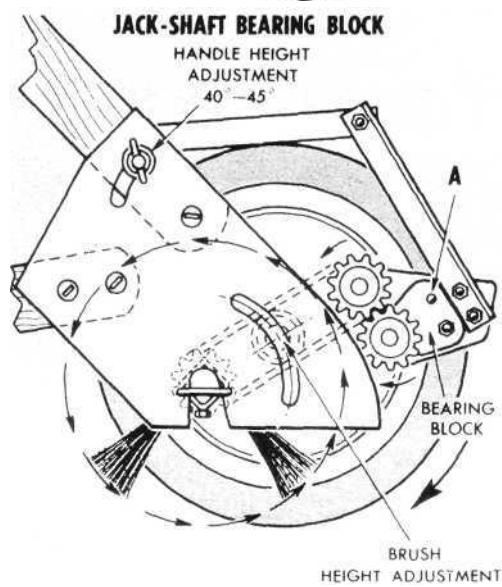
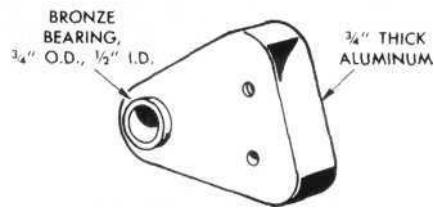
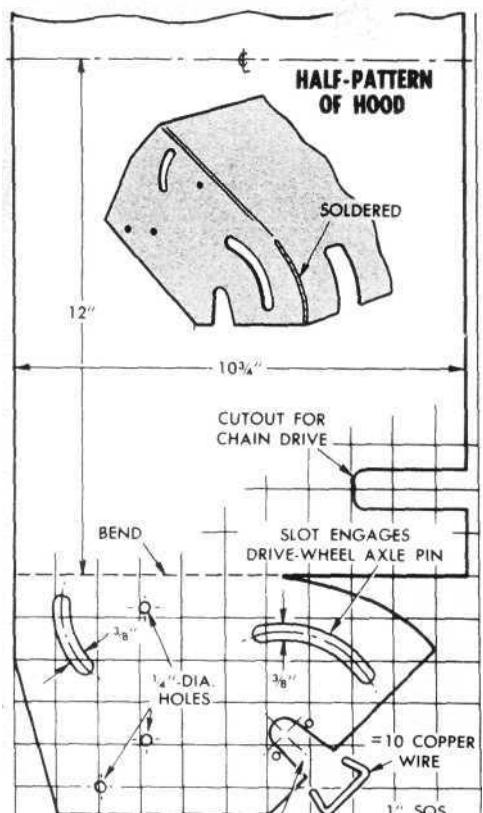
The brush which picks up leaves and trash must run in a direction opposite to that of the grass-cutting reel. This is accomplished by reversing the normal position of the wheel plates and driving the brush through spur gears and a roller chain as in Figs. 1 and 3. The former detail of the assembly and the photos show how the mower is altered and reassembled with a new drive shaft, a jackshaft, to give the brush shaft a reverse rotation to the direction of travel. The

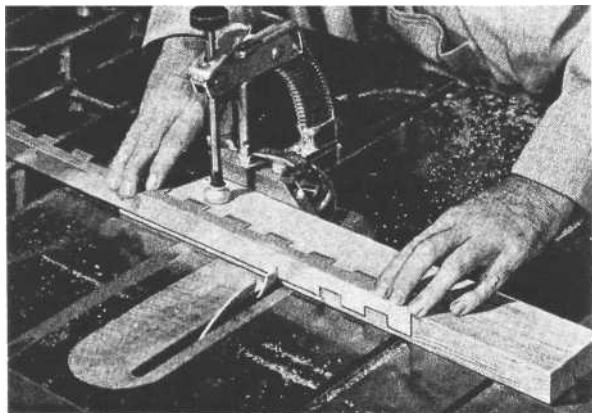


The original wheel, with wheel plate and spur gears, brush shaft, jackshaft and drive shaft



On the opposite wheel, the roller-chain drive to the brush shaft reverses brush rotation

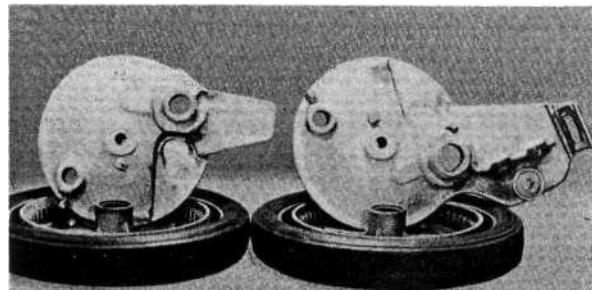




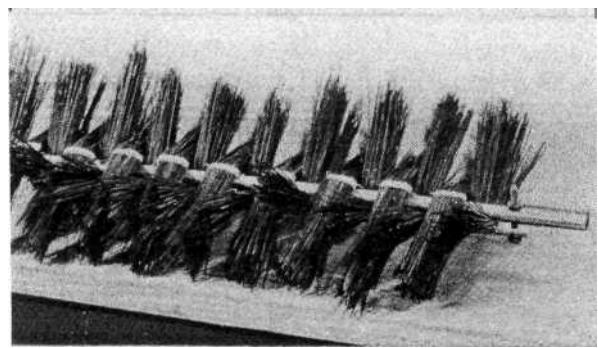
Aluminum angles that hold the brush sections in place are notched on a table saw. Note the backing strip



Broomstraws are bundled in a jig, then taped and sewed. Keep the bundles as uniform as possible



From the mower, only the wheels, wheel plates, pinions, clutch pins, bolts and retainers are used



A partially assembled brush with all bundles in place ready for the second angle forming the complete hub

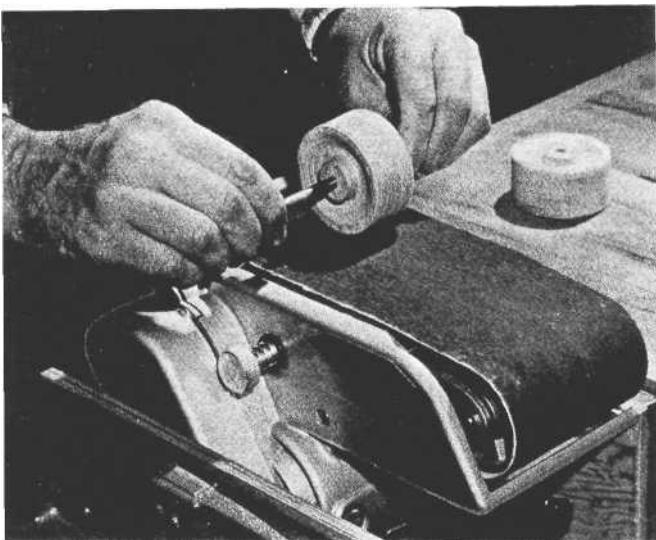
bosses on the wheel plates which normally take the ends of the shrub bar are utilized as seats for bronze sleeve bearings in which the brush shaft rotates.

Now, from the mower you use you will have to determine the diameter of the drive shaft and the brush shaft. Of course, these are longer than the originals, that is, if the original mower was, say, a 16-in. cut, you can open it out to 24 in. or slightly more in sweeper width, and the 18-in. mower in proportion. The jackshaft can be 1/2 in. diameter as in Fig. 1. But the diameters of the other two shafts will be governed by the size of the sleeve bushings you can seat (by reaming) in the shrub-bar bosses and also by what size bushings can be seated in the drive-shaft bores. On some old mowers the reel is carried on self-aligning ball bearings and it may be that these can be utilized in the conversion. The clutch mechanism of the mower is retained; only the shaft is replaced by a longer one.

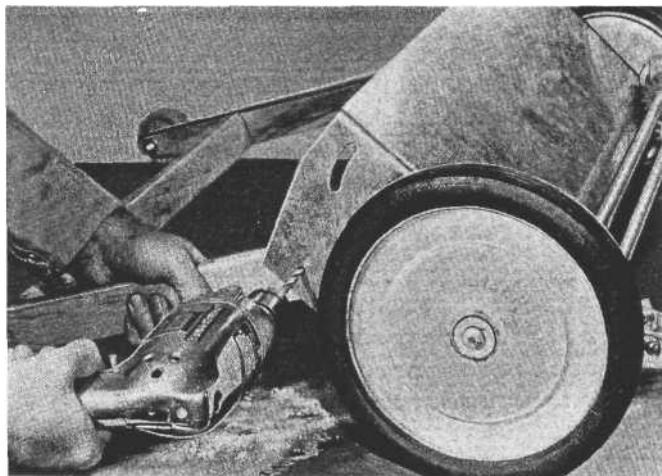
Note closely in Fig. 1, the photos below Fig. 1,

and also the detail A, Fig. 3, that the jackshaft is carried in pivoting bearing blocks. In the first stage of the assembly these blocks are attached with only one bolt through the mower plates. This permits you to adjust the spur gears for proper running clearance. Once this has been determined—with all parts in position in a trial assembly—the blocks and plates are drilled and tapped for small capscrews, labeled A in Fig. 3. The spur gears were taken from an old mower, the clutch collars, or hubs, machined flush and the body of each drilled between adjacent teeth and tapped for a hollow setscrew. Normally, these gears are 1-1/2 to 1-3/4 in. in diameter, an average being 1% in. Of course, any pair of spur gears near these sizes can be used. Chain sprockets are 3/8-in pitch, 1-5/8 in. total diameter and have 11 teeth.

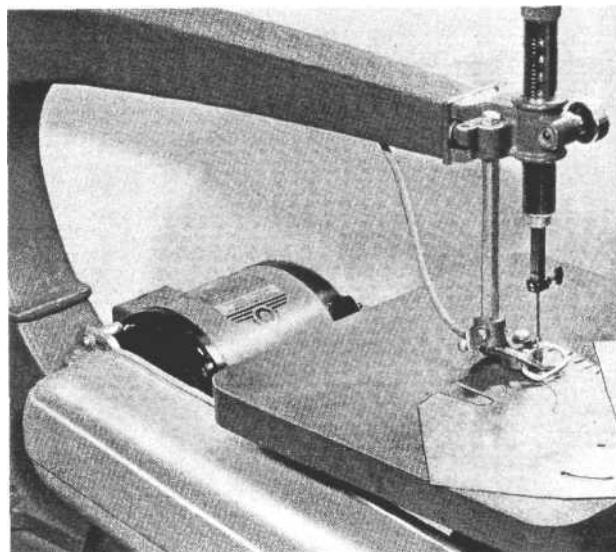
Next you make the hood, or brush housing. Fig. 2 shows the development of half of the hood from a center line and indicates where and how to bend the metal to obtain the necessary shape;



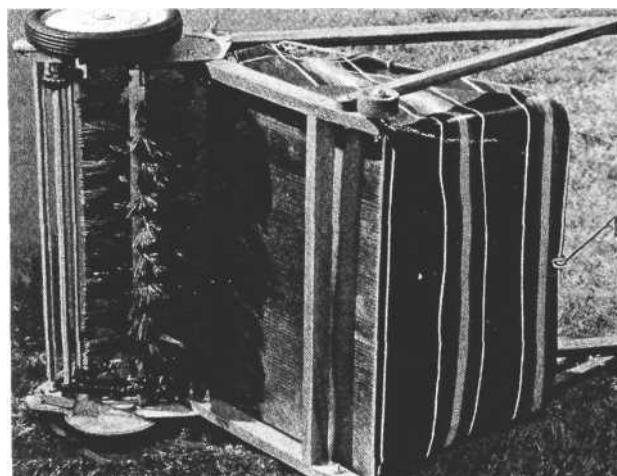
True up the dolly, or trailer, wheel treads on belt sander. Use hex-head machine bolts as wheel spindles



Hold wood parts against sheet-metal parts and drill through both. This locates holes accurately



Much of the work of cutting out the hood can be done on a jigsaw with a metal-cutting blade



An under view of the finished sweeper shows the dolly that supports the hopper and push bar

mowers differ in construction, so before you make the cuts and slots indicated, run a check on all parts of the assembly, just to make sure you get them properly located. Don't solder, slot, cut or drill holes until you're sure of location. Note the relationship of parts in Fig. 3, also the positions they assume when the unit is in operation. Compare also with the pulled-apart detail, Fig. 1. You might also correlate these views with the photo of the finished sweeper. The adjusting bar, Fig. 1, raises and lowers the brush, the assembly pivoting on the wheel retaining pin. In some mowers this is a bolt and

in this case the hex nut can be replaced with a wingnut which is more easily loosened when adjustment is made. Note also in Fig. 3 that when assembled, the tips of the four-section brush are trimmed so that they just clear the hood. The clearance can be $1/16$ to $1/8$ in. but no more for leaf sweeping. For some mowers you may have to make a full-size drawing of one wheel and wheel plate in order to determine the locations of the bearing and axle center. By projecting the shape of the hood on the drawing you can then determine the clearance needed for gears, bearing bosses and locations of the brush shaft and wheel-spindle slots.

The length of the brush is determined by the

distance between the wheel plates (unit assembled) less the space on the brush shaft required for the two shaft collars and the sprocket. For leaf sweeping and ordinary lawn grooming, regular broom straws will do for the brush sections. If there's a broom factory near you, then your supply problem is solved. If not, the straws from a couple of old brooms will do. To make the individual brushes you first make a jig, Fig. 4. Then clamp the jig in a vise, lay a 3-in. length of 3/8-in. tape across the groove and thumbtack the ends. Then make uniform bundles of broomstraws by pressing them tightly into the groove as in the photo and taping them tightly together as indicated. Sew each bundle of broomstraws along the center line of the tape, using a heavy linen thread and a back-stitch. The purpose of taping is to hold the bundle in shape for sewing; the sewing holds it in shape until it can be clamped in the hub.

how to make brush hub

The brush hub, or holder, is made as in Figs. 5 and 6. Notches are cut in both webs of each of the two aluminum angles, each notch 3/8 in. deep and offset 1 in. Notching can be done on a table saw as in the photo on page 1613. Place the angles over the brush shaft (it should be removed from the assembly, of course) and drill 1/4-in. holes through both angles and the shaft for hex-head bolts, the holes equally spaced.

Bundles of broomstraw won't take the bend required without breaking, so you coat them lightly with No. 10 motor oil and place them in the kitchen-range oven at about 250 degrees for an hour or so. The heat drives the oil into the straws, making the bundles sufficiently flexible to take the bend. Hex-head machine bolts, 1/4 x 2 in., are about the right length to draw the brush assembly tight, but in the first step in assembly you'll need two longer 1/4-in. bolts at the ends of the steel angles so you can draw the angles down sufficiently to permit use of one shorter bolt at the center of the assembly. Once the shorter 2-in. bolt is in place and drawn down, the two longer bolts at the ends can be removed and the 2-in. bolts substituted.

The brush is a little tricky to assemble but perhaps the best way to go about it is to attach the end of one angle loosely to the shaft with one of the longer bolts. Then support the ends of the shaft on blocks (or wooden V-blocks) and place one row of brush bundles, pulling each one under the shaft and pressing into the notches in the angle. Lay the alternate bundles on top

of the shaft and the assembly will appear as in the lower right-hand photo on page 1613. Now, place the second angle, insert the bolts at the ends and draw down the nuts just enough to permit inserting a shorter bolt at the center. Draw this bolt down but not so tightly that the angles are bent. Now, insert the shorter bolts each way from the center (you'll have to drill through the broomstraws blocking the holes) and draw the bolts tight by stages until the brush bundles assume the form shown in Fig. 6. Replace the unit in the assembly.

height adjustment

Now back to Fig. 1. The aluminum angle bar you see across the front of the pulled-apart unit is fitted with uprights of the same material. The lower ends of these are bolted to the ends of the wheel plates and the upper ends are joined to a locking bar on the left side (looked at from the rear) and to an adjusting bar on the right. The end of the locking bar is simply clamped under the washer on the handle-adjustment bolt, or it can be slotted 5/16x 2-1/2 in. The upper end of the adjusting bar is bent at right angles to form a handle and is drilled just below the handle with spaced 1/4-in. holes for a bolt and wingnut.

This arrangement provides for height adjustment of the brush.

The handle bars, handle-bar supports and the trailing members which carry the dolly wheels are cut from hardwood such as oak. The handle-bars are cut 46 to 48 in. long, ends are rounded and the corners are softened by sanding. The push bar is a 1-in. dowel, and a 1/4-in. steel tie rod, threaded at both ends, joins the supports to the handlebars. A crossrail, or spreader, joins the trailing members. The dolly wheels are turned from hardwood. Machine bolts, with washers to protect the wooden hubs, serve as spindles. As detailed the push bar is about average height. It will not raise or lower. If you wish it to raise or lower then slot the upper ends of the handlebar supports so that the push bar can be adjusted to any desired height.

And that's it, except that the grass catcher pictured in use with the unit on page 1610 is inadequate for leaf sweeping. You'll need to make a much larger fabric hopper for leaf gathering. Attach the leading edge to the forward ends of the trailing bars with wire hooks and screw eyes.