How to build your own

Gas-Powered Snow-Trac

—with 25-m.p.h. scat

YOU'RE in for a new kind of thrill if you've never plowed through powdery snow or flashed along shimmering ice at 25 to 30 m.p.h. Snow karting, a new wrinkle in winter sports, combines all the excitement of sledding or tobogganing with the added fun of breezing uphill as well as down under the galloping surge of a little gas-eating one-lunger.

Commercial snow crawlers range from $500 to over $1,000. You can build this one yourself for about $200 starting from scratch, or for as little as $150 if you already have an engine.

The Snow-Trac combines a rugged crawler-type drive for dig-in power with a pair of pivoted skis at the front to give fast, precise, automotive-type steering. The 7½-hp. engine used here gives hair-raising speeds up to 30 m.p.h., but is not a necessity. You can get plenty of action from more modest engines of four to six hp.

What about parts? Except for a few items, all parts shown here are standard fittings available from mail-order houses

CONTINUED

There's room for two aboard this rugged, compact power sled. Riders straddle center crawler track, giving the sled motorcycle-like stability. Engine mounts behind cowl.

FREEHAND CURVE AT FRONT

35¼"

16⅜"

SEAT

COWL EDGING, 1" PINE

2"

3½"

BEVEL EDGES TO FIT

SLOT FOR DRIVE BELT

CHAIN GUARD, 2"-WIDE ALUMINUM STRIP

SALSBURY TRANSMISSION

6¾" × 30⅜"

FRONT BULKHEAD 8" × 14⅞"

EXHAUST PIPE

JACKSHAFT

¼" PLYWOOD COWL

ENGINE-MOUNT CLEATS

4" BOGEY WHEEL (4 REQ.)

ENGINE DECK 14⅞" × 49½"

SLIDING BEARING BLOCK

4" × 14⅞"

58"

7⅝"

COWL-SIDE DETAIL (2 REQ.)

5¼"

1/8" × ¾" STEEL RUNNER

FOOT BOARD (2 REQ.)

2⅛"

10" R.

22" R.

28½"

BLOCK TO SLIDE FREELY

1/8" × ¾" ALUMINUM STRIP

2"

2½"

2⅝"

1⅛"

2⅝"

2" HOLE

1/8" STEEL STRIPS SCREWED TO BOTH SIDES OF CUTOUT TO FORM FLANGES

8¾"

1" HOLES

REAR BEARING DETAIL

FREEHAND CURVE

21 3/16"

SIDE GUARD (2 REQ.)

3½"

11¾"

20¾"

8½"

CURVE TO MATCH SIDE FRAME

72½"

21 9/16"

22" R.

39½"

13½"

5"

1½"

3½"

2" HOLE

2"

3½"

23 9/16"

FREEHAND CURVE

3½"

14⅜"

50¼"

10½"

3½"

6¾"

CUT OUT

4¾"

½" DR.

1⅛"

3½"

13" R.

16⅛" R.

3⅛" R.

2" HOLE

1⅛" HOLE

2⅛"

19 5/16"

2⅛"

¼"

1⅜" R

24¼"

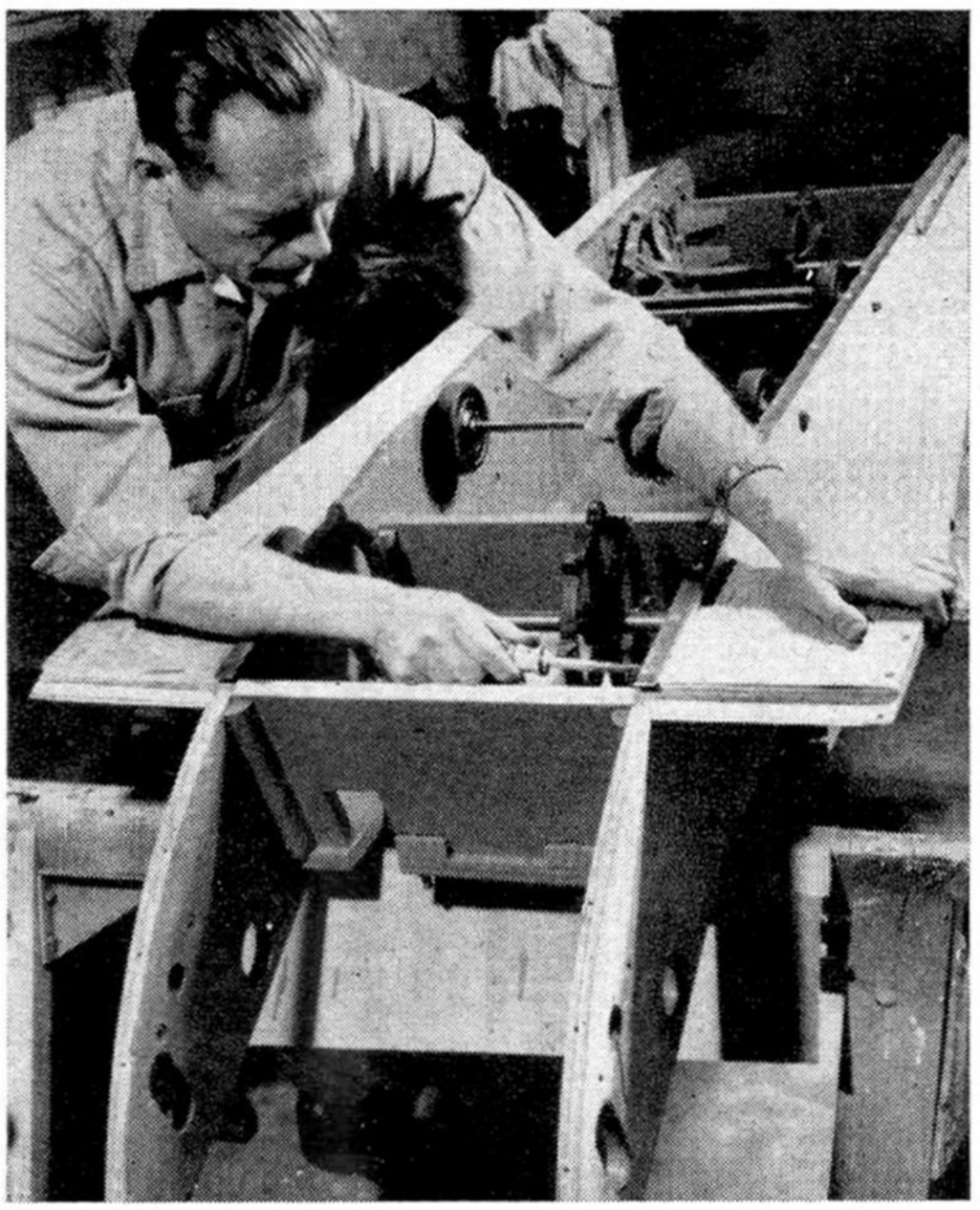
13"

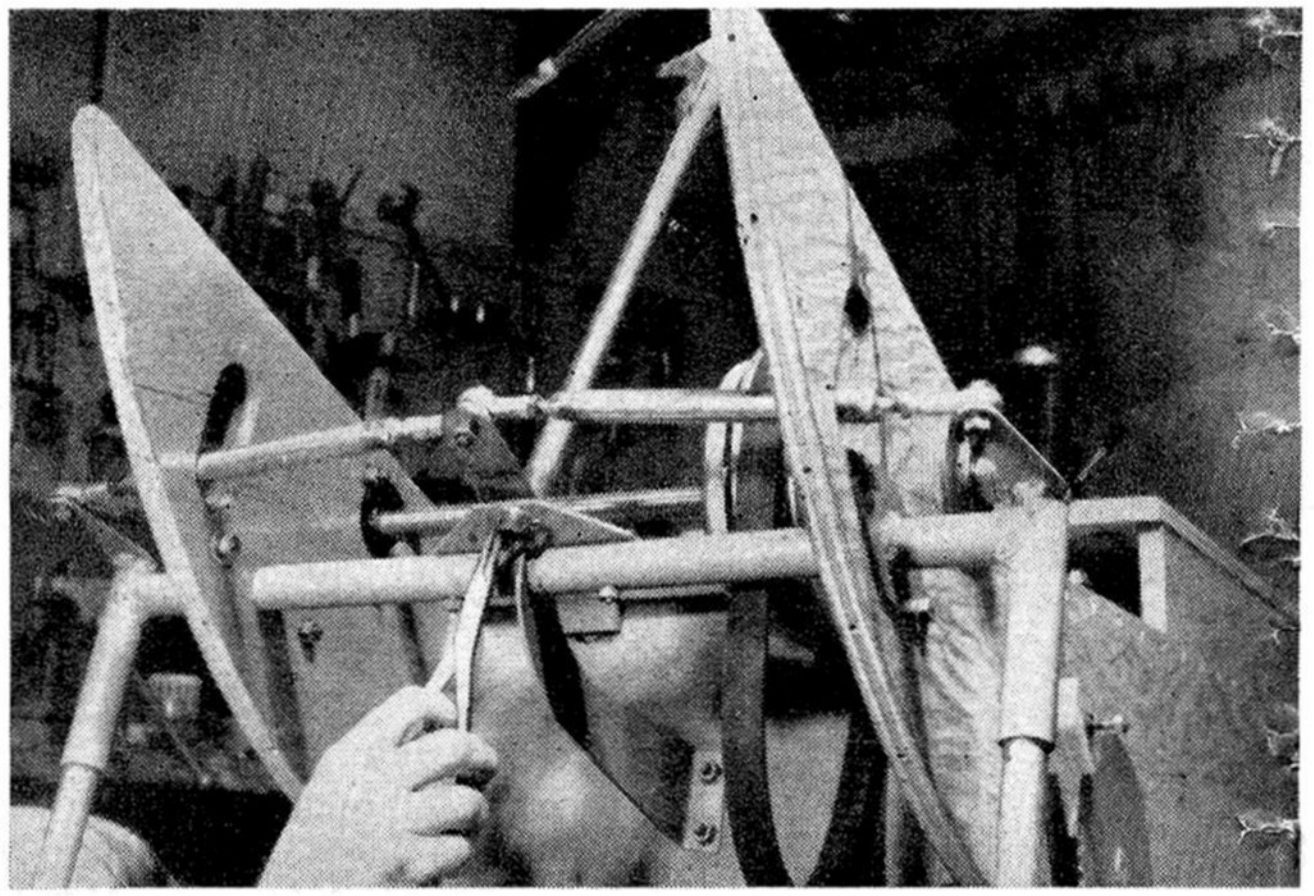
15⅞"

41¼"

FRAME SIDE (2 REQ.)

ALL FRAME PARTS 3/4" EXT. PLYWOOD EXCEPT FRONT COWL AND COWL EDGING



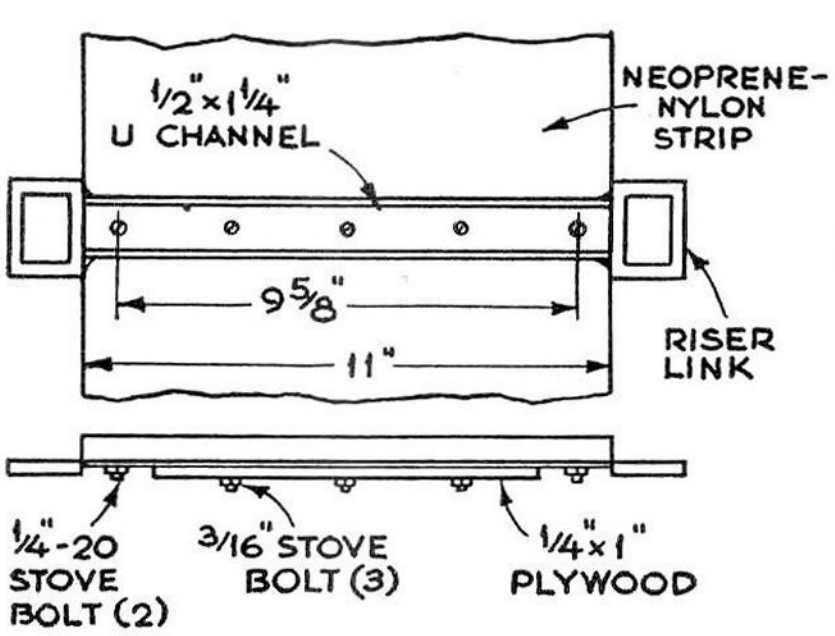


Automotive-type steering gives the Snow-Trac good control on turns. A crank arm on the central steering shaft is linked by tie rods to similar crank arms on the ski struts so that all parts move together. Note at left how the footrest boards are screwed to the side frames from the inside and are notched at the front ends to receive the curved-plywood cowl piece.

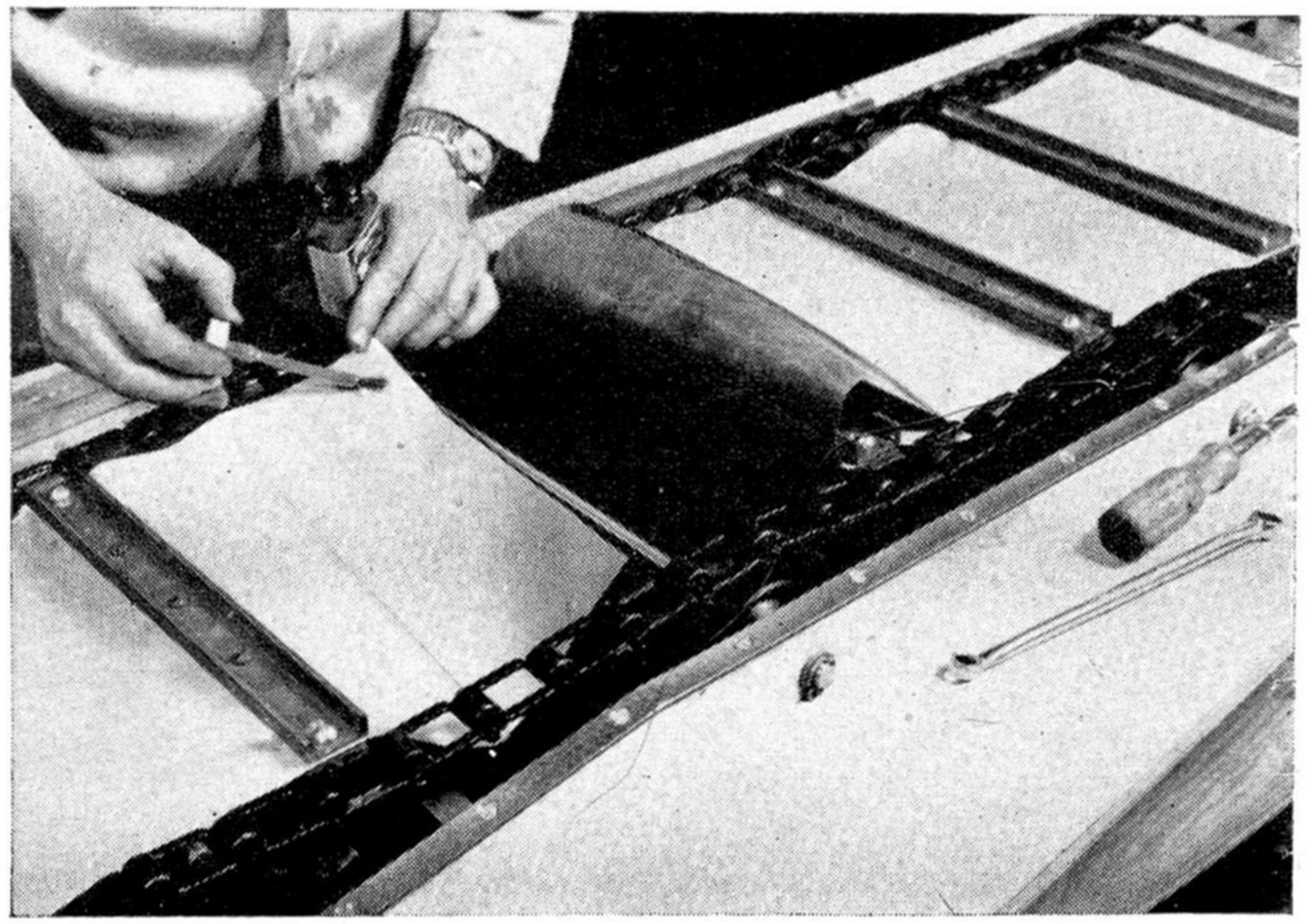
and kart-supply centers. The only parts you may have to hunt a bit for are the four large sprockets that carry the crawler track. These are sold by farm-equipment dealers. We chose a 9″ size, but their exact diameter isn't critical. Just be sure you get four of the same type and size. Suggested sources for these and other less-common parts are listed at the end of this article.

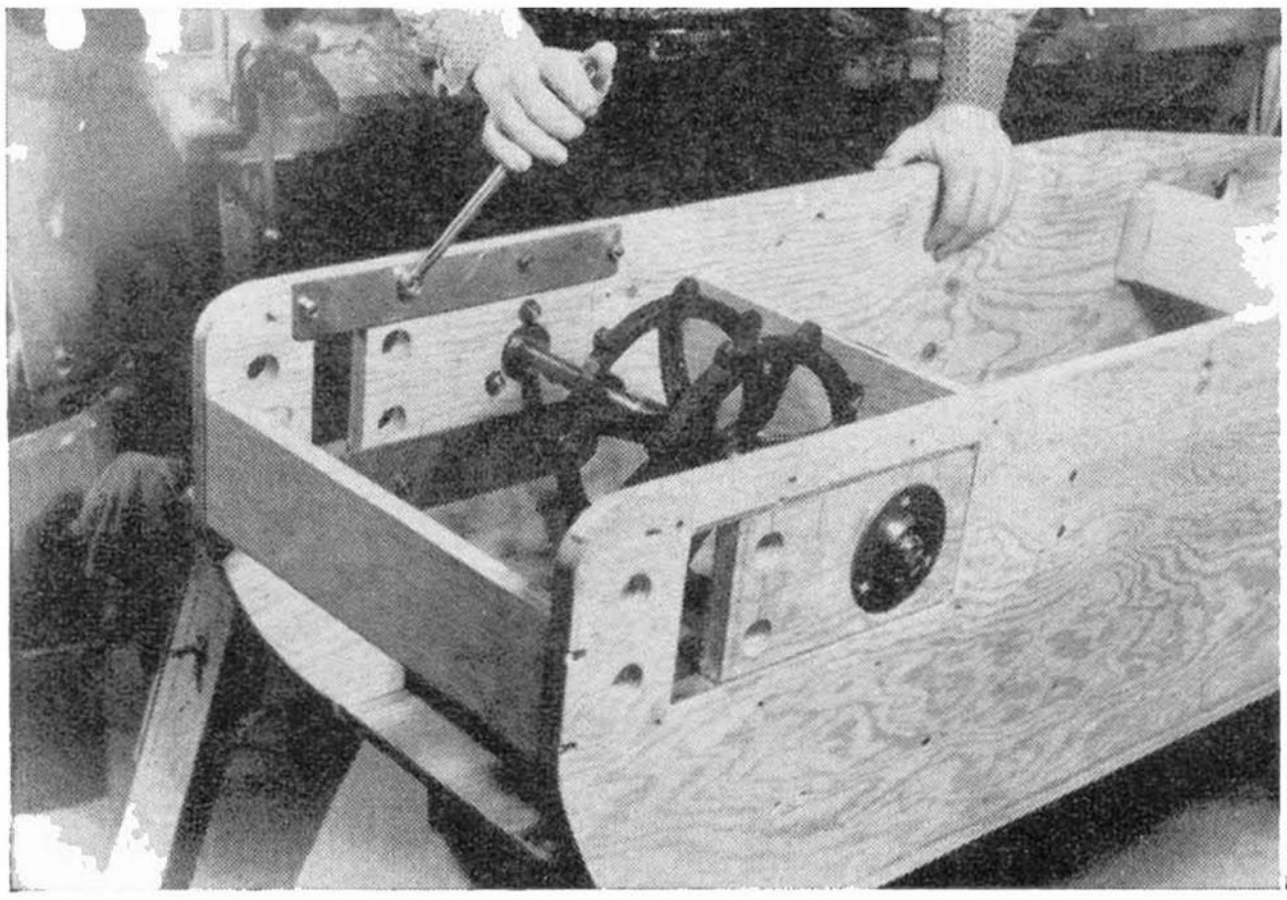
Most of the sprockets you'll find are designed to take standard No. 55 conveyor chain, sold by mail-order houses like Sears, Roebuck. You'll need 18′ of this. You'll also have to make one small alteration on the chain to adapt it to the crawler track.

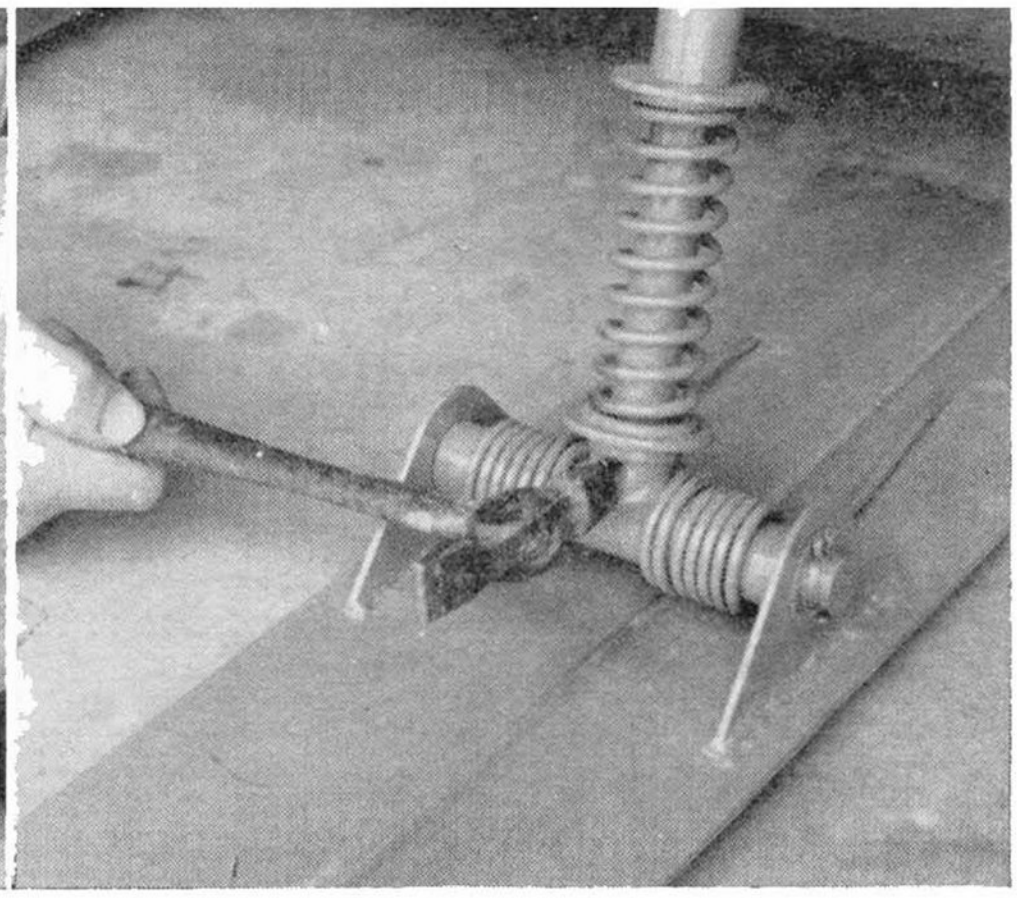
To attach the crawler's traction-giving crossbars to the chain, you'll need to add "risers." These are bracketlike fittings that hook into the chain in place of the regular connecting links. They come in both left- and right-hand types and sell for about nine cents a link. Get enough of both rights and lefts to space



Crawler track consists of a continuous strip of neoprene-impregnated nylon belting running between U-channel crossbars. The belting is clamped to the crossbars with bolts and back-up strips of ¼″ plywood, as shown above. For added strength, coat the joints with waterproof cement.

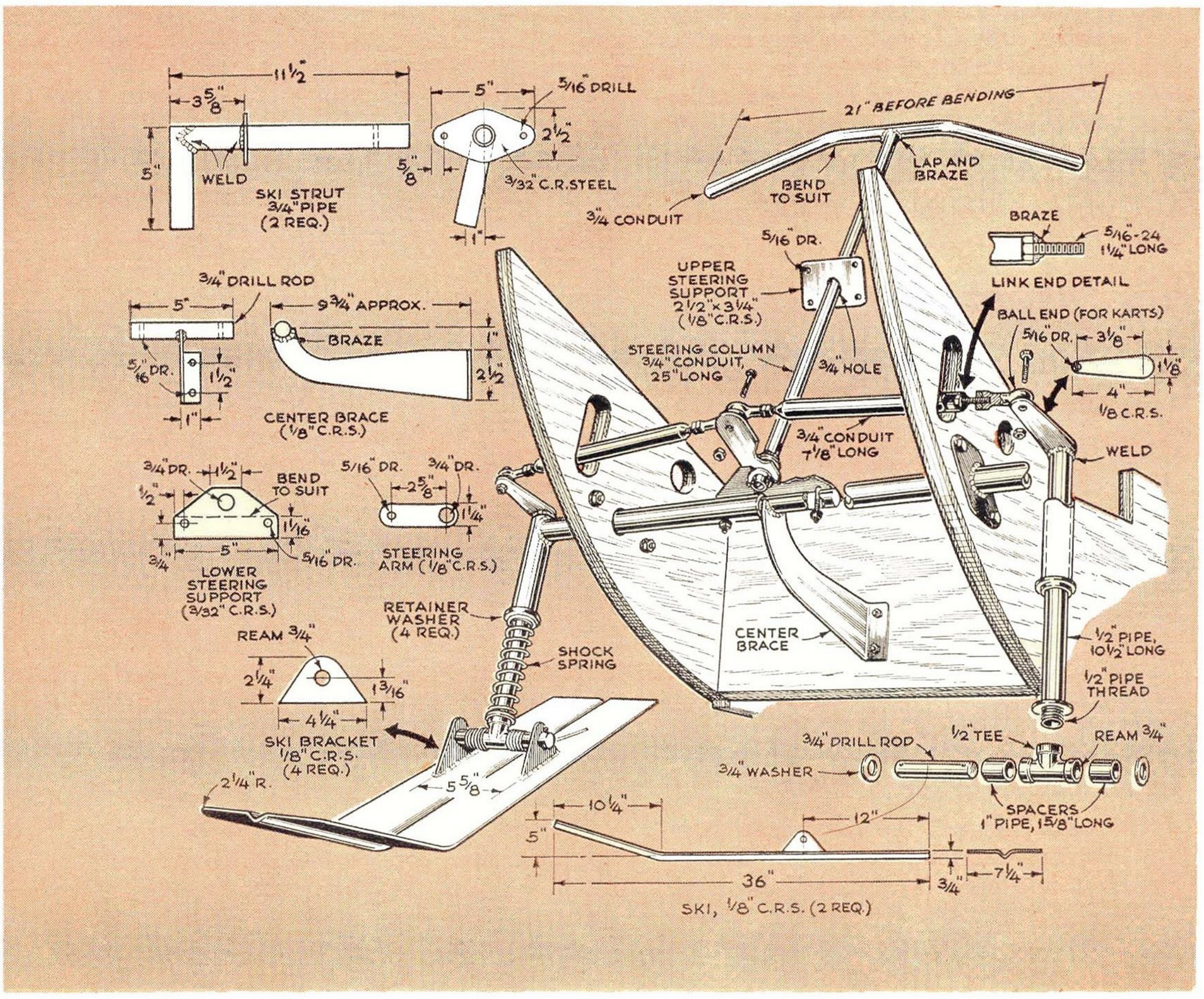






Rear sprocket bearings mount in sliding plywood blocks so they can be adjusted to stretch the crawler track taut. The blocks are held in place by strips of ⅛"-thick steel screwed along the edges of the cutouts in the sides to form retaining flanges. Shock cord is looped through holes in the blocks and holes in the sides to pull the crawler track up tight.

Coil springs slipped over the lower half of the telescoping ski struts act like airplane-type shock absorbers. Crosswise springs—actually hay-rake tines—keep ski tips pointed up so they don't dig in. To prevent skis from twisting on the threaded pipe-tee pivots, locking pins are tapped through drilled holes after skis have been aligned straight ahead.



your crossbars about 8″ apart. It's easy to add the risers to the chain by simply tapping out the regular connecting pins and inserting the riser pins in their place. The crossbars are then bolted to the risers.

Two pairs of bogey wheels are spaced in between the large sprockets to support the crawler track at the middle. These are about 4″ in diameter, can be either small sprockets or smooth-rimmed wheels of the type commonly sold by hardware stores. They serve merely as idler guides and don't have to engage the drive chain. They turn freely on ½″ axles held in the side frames with washers and cotter pins.

Laying out the drive train. Once you have your crawler sprockets and chain, the easiest way to work out the correct axle spacing is to make a full-size mock-up using a piece of scrap lumber. The axles are ¾″ drill-rod steel, so bore one ¾″ hole in the board to represent the front-axle position. Now mount the sprocket and axle in this hole and stretch out the chain to locate the rear-axle position. If the holes in your sprockets aren't exactly ¾″, either ream them out or bush them down to match the ¾″ axles.

Now, using the mock-up as a template, mark the axle locations on the two ¾″-plywood side frames that form the Snow-Trac's backbone. Clamp the frames together and drill all holes through both at the same time to insure accurate alignment. No matter what size sprockets you use, mount them so that the crawler track runs about 1½″ below the edges of the side frames.

All plywood used in the framing should be of exterior or marine grade for good resistance to weathering. The bottom edges of the main side frames are protected from wear by strips of ⅛″-by-¾″ steel strap screwed on to form runners.

Note that you cut oversize holes for the axles and engine jackshaft. These form pockets to hold six ¾″ Fafnir type RA Flangette ball bearings (No. RAO12NPPB). These bearings are inexpensive, yet are rugged and self-aligning so they forgive minor inaccuracies in construction.

Since it's impossible to space the crawler sprockets perfectly, the rear sprocket bearings are held in floating mounts that can be adjusted to put proper tension on the crawler chain after the assembly is complete. These mounts slide in slots in the frame's sides to vary the rear axle's position. The crawler chain is pulled up taut by sliding these bearing blocks as far as they'll go toward the rear and lashing them to the frame with shock cord.

Making the crawler. This is a strip of tough neoprene-impregnated nylon available at shops that make awnings and boat covers. Ordinary canvas or industrial belting could be used, but nylon is much stronger and costs only a few dollars.

The nylon runs between ½″-by-1¼″ U-channel crossbars, forming a continuous belt. There's no need to stretch the material taut. Leaving it slightly loose creates pockets between the crossbars that give good flotation on top of the snow and resist punctures from sharp objects.

Rigging the steering gear. The ski mounts are made up of telescoping sections of ½″ and ¾″ pipe that allow each ski to swivel on its own axis, like the wheels of a car. The upper ¾″ sections must be reamed out slightly to allow the lower ½″ sections to slide freely inside them. The ski supports are connected to the steering column through crank arms and tie rods exactly like car wheels. The ball-bearing tie-rod ends are standard kart parts.

The forward rake of the ski struts is important as it causes the skis to track and caster properly on turns, again like car wheels. The bikelike steering handlebars are bent and welded from pipe or conduit. You can have the whole works—handlebars and ski mounts—stuck together at a local welding shop for a few dollars.

You can experiment with many kinds of skis, even wood ones, but the sheet-metal type shown here is simple and rugged. The V-shaped center ridge can be crimped in with a bending brake at a metal shop. The upward flare at the front of the skis can be bent at any garage that has a hydraulic arbor press. A length of 1″ shafting is placed across the skis at the desired point to serve as a fulcrum to bend against.

Coil springs slipped over the telescoping ski struts cushion the skis and give them a knee action. They should be strong enough to support the weight of the machine fully loaded, yet compress enough to let the crawler track make firm contact with the snow. Those shown here are big valve springs available at auto shops.

The skis are also sprung at their fore-and-aft pivot points. The springs here keep

forcing the rear ends of the skis downward so the fronts ride up instead of digging into the snow. You can bend them yourself from spring steel or use hay-rake tines, which happen to be perfectly shaped for the purpose and can be bought from farm-equipment dealers.

The axle pivots are ordinary ½″ pipe tees threaded onto the ski struts. To keep them from turning on the threads, align the skis straight ahead and then drill through the tees and the struts for locking pins. Use $\frac{3}{16}$″ roll pins.

Trial assembly. Although it takes a bit more time, you'll find it best to pin everything together temporarily with screws and bolts before applying glue. This gives you a chance to check fits and running clearances before things get critical. When everything is working smoothly, reassemble the parts with waterproof glue.

The curved front cowl could be heavy sheet metal, but we chose plywood for more dent-free rigidity although it's harder to bend. Soak it well on both sides and fasten the lower edge first. Then tie a rope around the upper end and gradually pull it taut to spring the end into place as you drive in the screws, working upward.

Installing the power. The 7.5-hp. Clinton engine mounts just behind the front cowl where it's protected from icy winds and can be reached easily from your seat to make adjustments. For smooth starts and hill-climbing power, you'll need some means of gearing down the engine to about 3:1 to reduce the speed of the track.

We splurged a bit here and selected a No. 500 Salsbury Automatic Torque Converter. This provides a ratio of 3:1 at start-up, then gradually eases up to 1:1 as the machine gains speed. It does this by automatically varying the sizes of the V-belt pulleys on the engine and jackshaft as the load changes. Although it costs about $60, it makes a slick transmission and is well worth the expense.

There are two other less expensive possibilities, however. You can use step pulleys and belt tighteners to change your drive ratios manually. Or you can settle on a fixed pulley ratio of 2:1 and plan to do a little pushing with your feet to get the machine going. A fixed ratio of 3:1 would solve the starting problem but give you modest running speeds.

The drive from the jackshaft down to the crawler axle is by chain and sprocket, both stock kart parts. The small sprocket on the jackshaft is 1½″ in diameter, and the large one on the crawler axle is 7¼″. No. 35 chain runs between them.

For a handy throttle, try a Briggs and Stratton No. 290568 rigged with a length of Bowden wire from a power-mower shop.

Don't pin the crawler sprockets to the axles until you've completed the crawler track. This way, you can slip the track over the sprockets and use it as a guide to get them properly spaced. Unless you're using axles with keyways, simply spot the sprockets at the correct locations and drill through their hubs for locking pins.

You'll need to pipe the engine's exhaust out the rear to get rid of fumes. This is done with a length of 1″ conduit bent to form a tailpipe that runs down under the seat. A standard conduit-to-pipe thread adapter makes it easy to attach the pipe to the engine's exhaust port.

Driving the Snow-Trac is a breeze, but take it easy on sharp turns. Excessive side thrust will shuck the tread off any crawler, so avoid broadside skids.

Where to buy the parts. All of the Snow-Trac's critical parts can be obtained from the following sources:

Fafnir bearings for crawler and jackshaft: Bearings, Inc., 4801 W. Center St., Milwaukee, Wis. Order Flangette type No. RAO12NPPB.

Bogey wheels: Neilson Wheel Co., 1603 N. 27th St., Milwaukee, Wis. Order four No. W 4521 wheels. Same company can also supply chain and sprockets for the jackshaft-to-crawler drive.

Crawler sprockets: 14 tooth, No. 868, available at Sears, Roebuck stores as replacement parts for No. 242.80351 David Bradley elevator. (Has 1″ bore, requiring ¾″ bushing.) Or 17 tooth, No. 8325E for No. 917 David Bradley spreader.

Crawler chain: No. 55 agricultural chain available on order from Sears, Roebuck farm catalogue or Sears stores.

Neoprene-nylon fabric: Allied Canvas Products Co., 725-729 S. 1st. St., Milwaukee, Wis. (about $4).

Hay tines for ski springs: No. R-15080 side rake teeth available from International Harvester dealers.

Salsbury No. 500 torque converter drive: Salsbury Corp., 1010 E. 62nd St., Los Angeles. ■ ■