

By Jack Horton

ORIGINALLY, I built this little machine as a child's de luxe toy; after a few runs on it I realized it was a novel but practical form of transportation.

It will do 15 mph and the range is around 20 miles. I have driven my Electrobike as much as 11 continuous miles—enough to show that it could be useful for errands and would be great for an afternoon's fun.

Acceleration is smooth and fast, the motor is quiet and the ride is vibrationless. Overnight charging with a \$10 trickle charger keeps the battery up for about 7 cents per charge. A good battery treated this way will last more than a year. A bonus: the trickle charger has many other uses. I often use mine for small electroplating jobs.

What you need. Use a good six-volt golf-cart battery—but make it a good one, not a cheap 74-hour type or a 12-volt job. The cells of a 12-volt battery are too small to give you a good cruising range. Any trickle charger of four-to-six amps rating will do.

Use standard five-inch go-kart wheels with *ball* bearings and three-inch tires. Do not use wheels with sleeve bearings; if your wheels do not roll freely your motor will use current needlessly. Use a 5/8-in. axle.

Don't use a bicycle chain for the drive. It won't stand up under this treatment. Use a No. 35 roller chain and sprockets. A V-belt could be used but performance would suffer.

The bicycle frame I used was a 20-inch job and it took lots of body English to find room for all the parts. A 24-inch bike frame would be ideal.

Exact dimensions are determined by the size of the components you pick up. Wheels and battery should be on hand when you

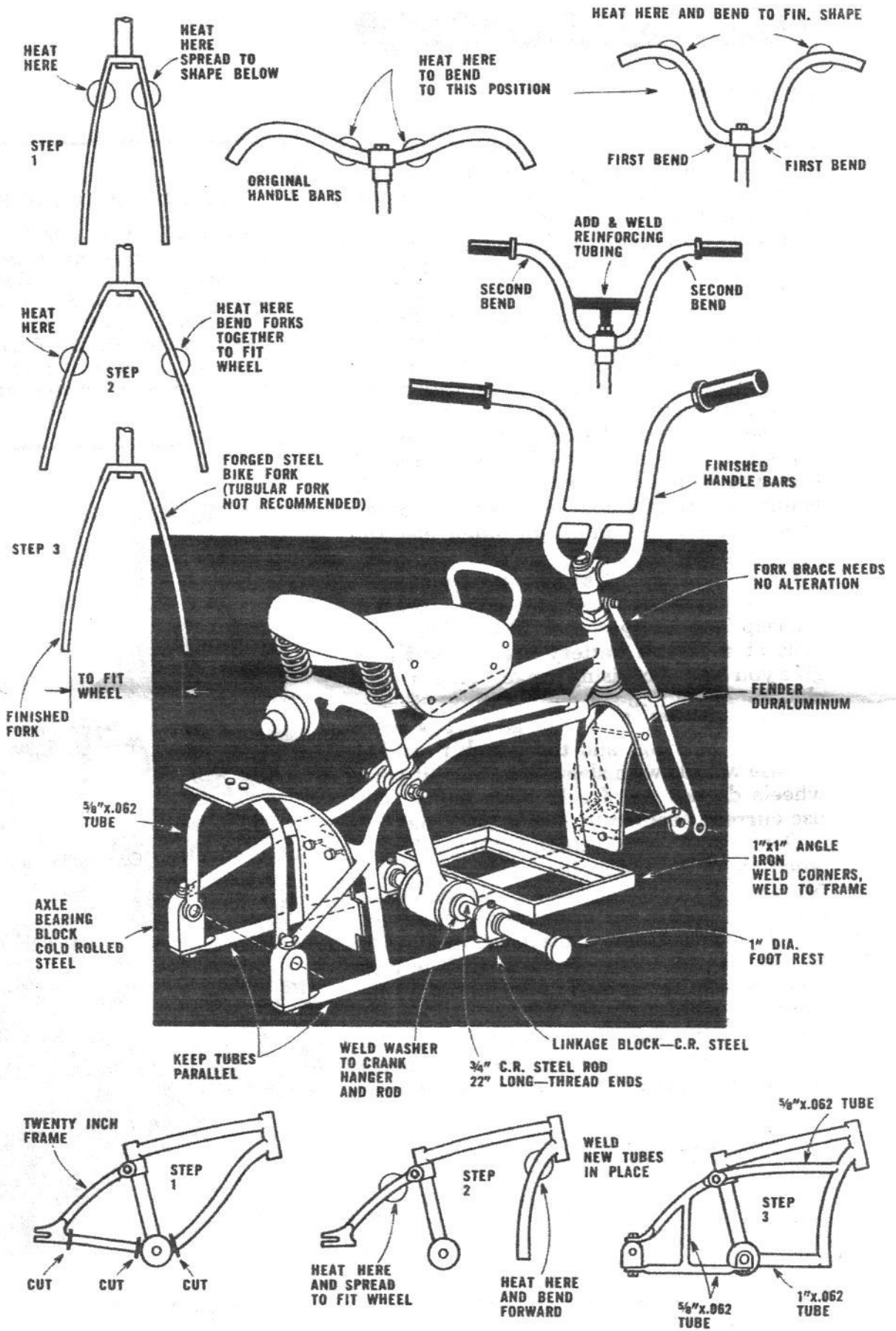
Build this **Electric Scooter**

Forty bucks' worth of bike, car and motor parts will give you a scooter for errands or an afternoon's fun.

PLANS AVAILABLE

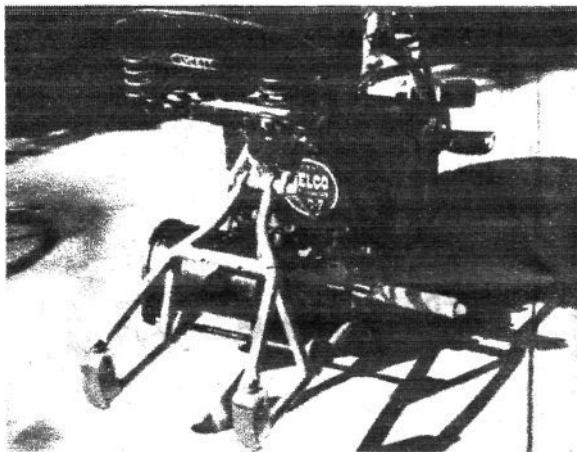
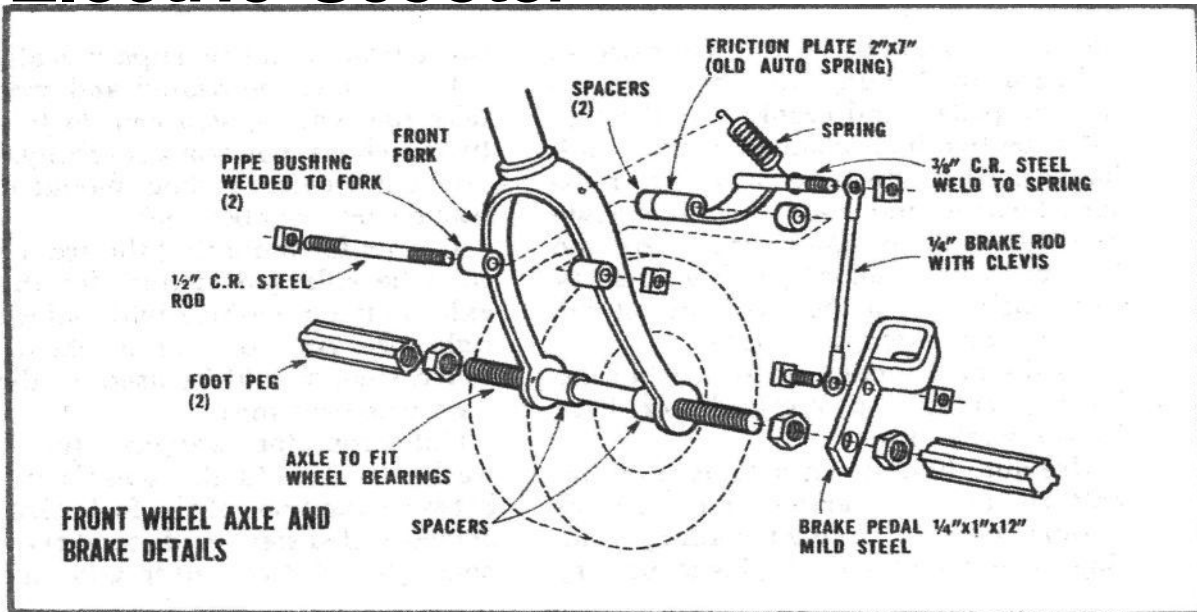
Large-scale plans of MI's Electrobike are available from the **Mechanix Illustrated Plans Dept., Fawcett Bldg., Greenwich, Conn. 06830.** When ordering please ask for **Plan No. ES-5-64, Electrobike;** enclose \$3 in check or money order.



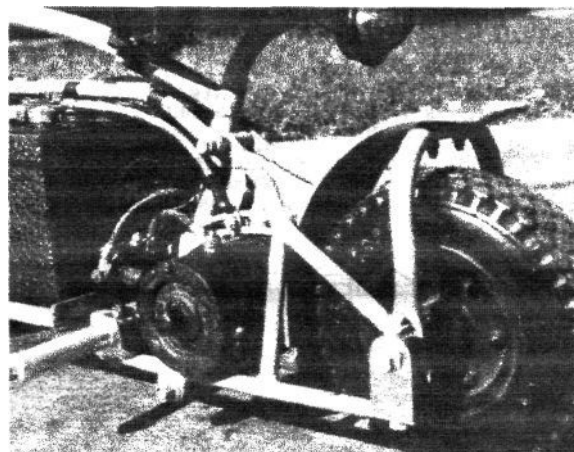


DETAILS OF FRAME, FORK AND HANDLE BARS

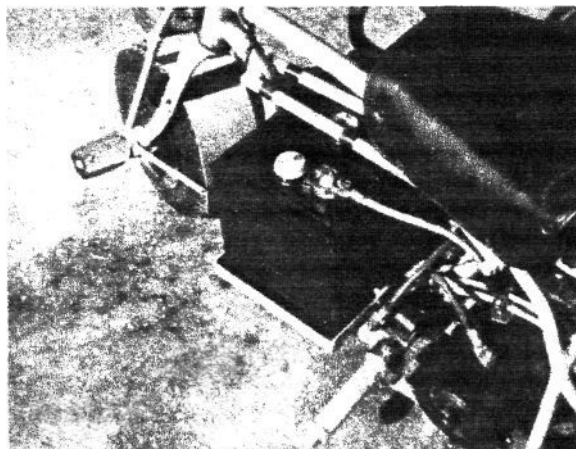
Electric Scooter



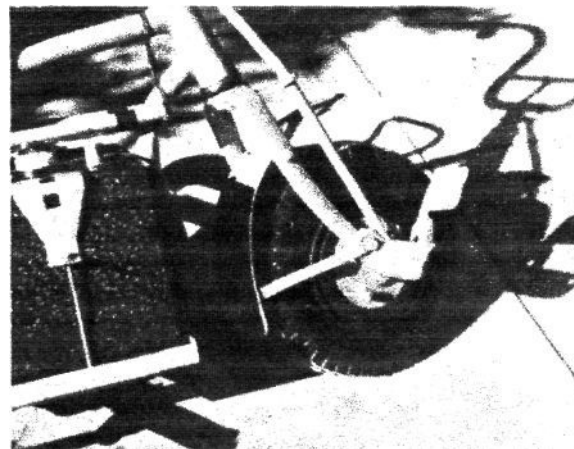
FRAME with battery' motor and seat installed. Rear fork is spread, reinforced.



WHEELS are go-kart jobs. Sleeve-bearing types would not perform satisfactorily here..



NOTE FOOT PEG on front wheel foot rest behind battery. Regular bike seat is used.



BRAKE is a standard go-kart type clamped on front fork with a pedal on the brake arm.

begin so you can fit them to your frame.

Begin by cleaning the frame and removing pedals and crank. Cut through the tube two inches ahead of the crank hanger. Heat the tube near the front-fork bearing and bend the tube down and forward to make room for the battery. Cut a length of high-quality steel tube to join the two ends of the cut tube and weld it in place.

To the new section of tube, weld the battery carrier—a rectangle of light 1x1-in. angle iron.

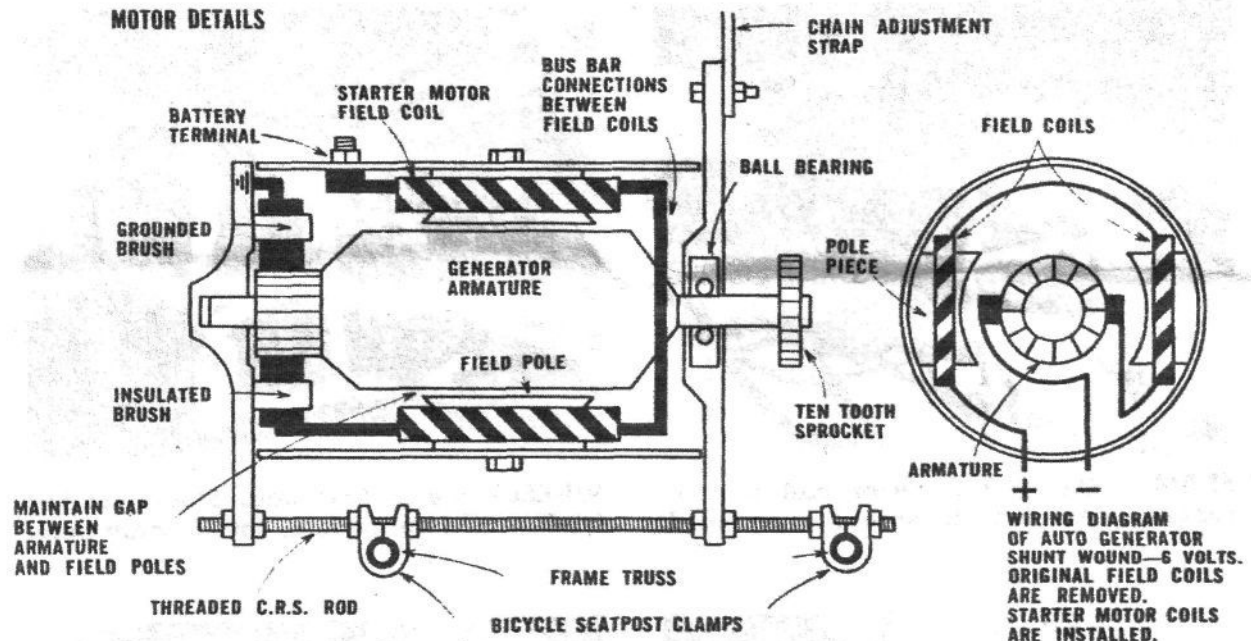
Use auto hold-down bolts to hold the battery in the carrier and aircraft battery caps to prevent spilling fluid. Snazzy but optional: a plastic battery

cover from a marine supply dealer.

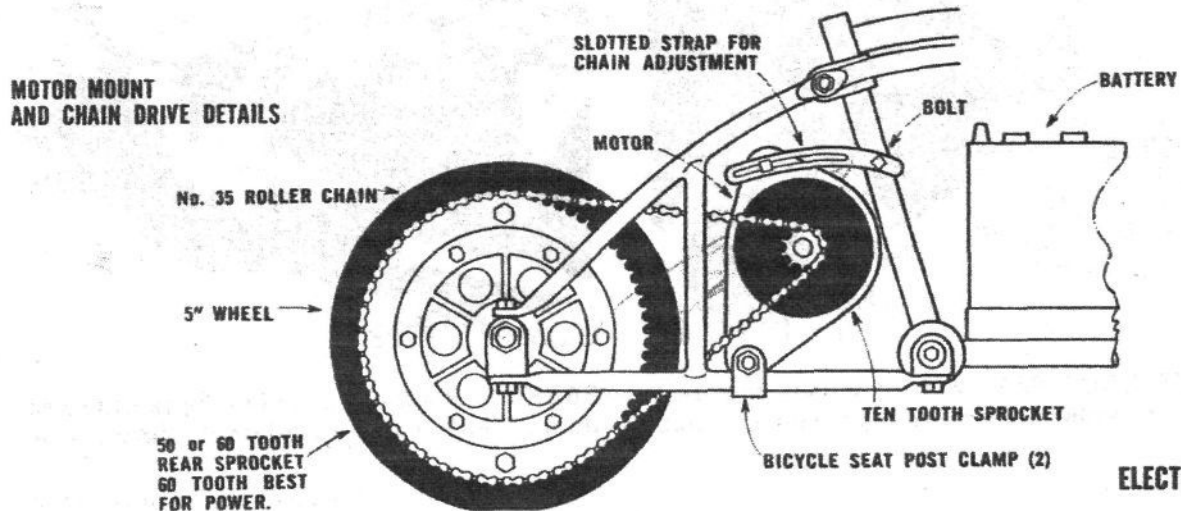
Forks must be heated and spread to take the wheels; you can do this with two torches if you work carefully. If you aren't a welder a shop should do the framework for about \$7.

If slots for mounting the front wheel can't be enlarged enough for the new axle, weld on washers with holes of the right size. Axle-bearing blocks of cold-rolled steel should be used on the rear fork (see drawing).

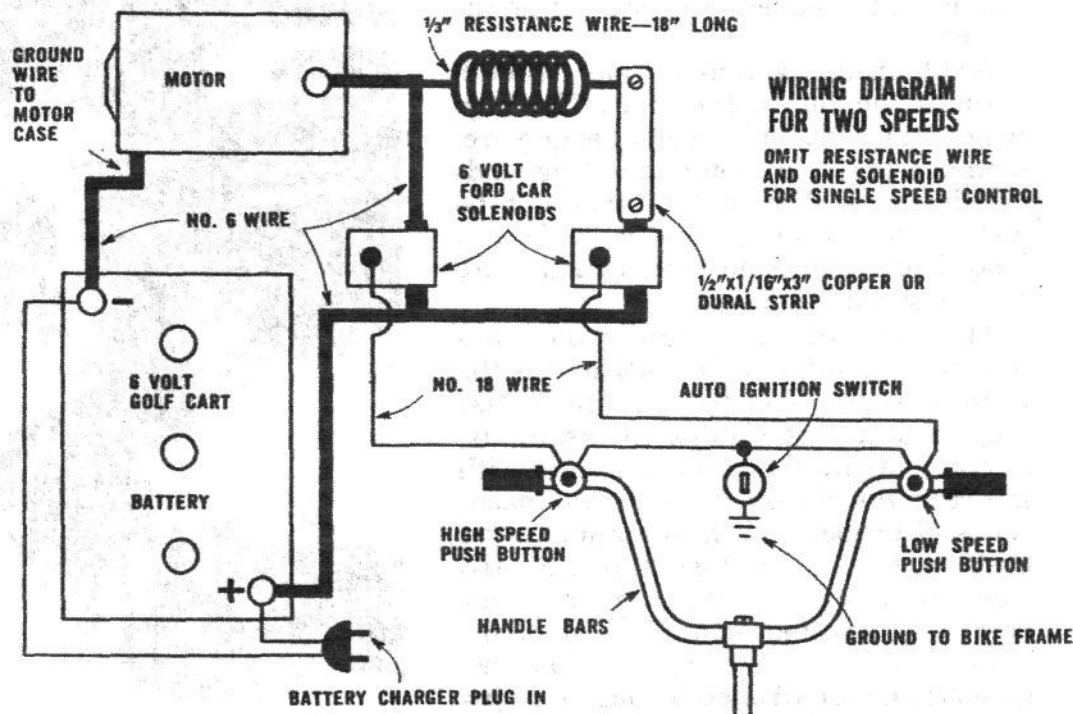
Cut iron-pipe spacers (or heavy washers) to hold the wheels in place between the tines of the fork. Use axles of cold-rolled steel made to fit the wheel bearings and threaded to take nuts and



NOTE: THREADED ROD PERMITS ALIGNMENT OF MOTOR WITH REAR WHEEL SPROCKET.



Electric Scooter



jam nuts. Mount the wheels and line them up with a straightedge so they track properly.

Bend the handlebars, as shown in the drawings, to accommodate grown-up knees. Use a standard bike seat; no fitting is required. Foot pegs are mounted on front axle and foot rests in the sprocket hanger.

Use a drive sprocket of about 60 teeth. Through it drill three equally-spaced holes to match the wheel bolts of your wheels. *This work must be done accurately if the sprocket is to run true.* Use three spacers on long wheel bolts to hold the sprocket far enough from the wheel for chain clearance.

Use a standard go-kart brake on the front wheel; simply mount a pedal on the brake arm and clamp the brake assembly to the fork.

Fenders are optional. I happened to have a sheet of heavy Duralumin lying around and I shaped the fenders from this. They are mounted like bike fenders.

The motor should have high torque and low current consumption. *Don't use*

an auto starter motor. The motor I made for the Electrobike has a maximum draw of 60 amps in a stalled condition.

To make one like it get a two-brush, shunt-wound, six-volt auto generator from an auto wrecking yard; also two field coils from a six-volt starter motor found on Chevy Sixes. Conversion consists of replacing the generator field coils with the Chevy starter coils and rewiring for series operation.

Disassemble and clean the generator. Make sure all parts are in working condition. Remove and discard the field coils but save the two retaining slugs or pole pieces. Grind or hack-saw these pole pieces so the starter coils will slide on them snugly. Install new fields in the case and tighten securely. The motor is now wired for series operation.

The current flows from the insulated terminal through the first field coil in a clockwise direction, through the second field in a counter-clockwise direction to the insulated brush, through the armature, grounded brush and ground. Current *must* flow through the field coils in opposite directions. Use bus bar to make

field connections. Flatten a copper tube and use it instead of bus bar if you wish. *Solder* all connections and assemble motor.

Next, install a ten- or eleven-tooth sprocket on the motor shaft. The key-way is already cut. When testing, remember that the motor speed depends on the load. The motor must not be allowed to run light—that is, without a load. Don't run it on your bench more than a second or two.

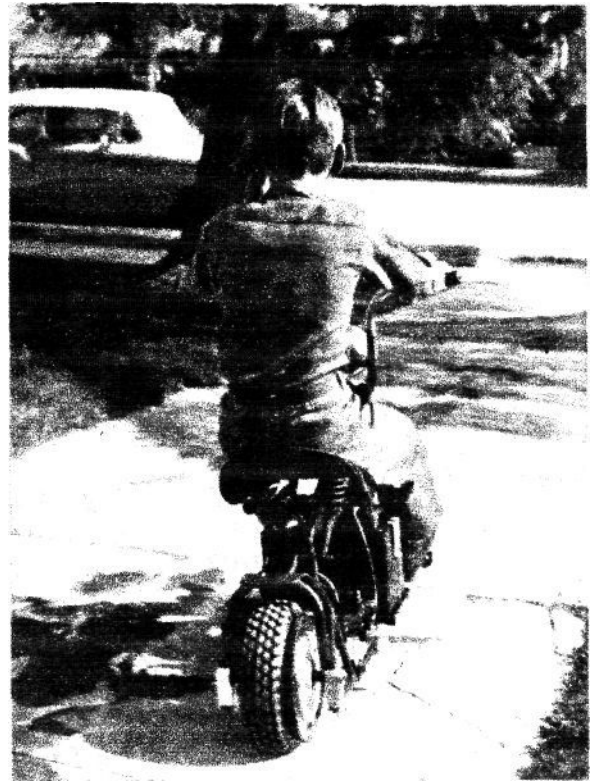
The case of your new motor has mounting flanges, so installation in the frame is simple (see the drawings). Use bicycle seat-post clamps to install the motor. Line up the motor sprocket with the rear wheel sprocket and cut spacer tubes of proper length to maintain this position. Chain is adjusted by a slotted steel strap connecting motor and seat-post tube. Slotted strap is a standard auto part. The Electrobike has two speeds and is controlled by push buttons located on the handle bars. The wiring diagram shows the hookup. A single speed is all right, however, since file speed can be controlled by on-and-off operation of the button.

For a single speed, simply omit one solenoid and the resistance. The length of the resistance wire for the two-speed job is a cut-and-try proposition. Start with 18 inches of 1/8-in. resistance wire. Form in a coil and connect as shown in the diagram. Cut off an inch or two at a time until the desired low speed is reached. You'd best shield this coil because it becomes red hot in operation.

The solenoids are six-volt Ford parts. The push buttons are two-terminal clamp-on type and, like all the electrical parts, can be bought at an auto parts store.

Be sure to include a locking switch in the circuit as indicated in the wiring diagram; otherwise, some helpful citizen can be counted on to push the buttons and send the parked scooter on its riderless way. A key-lock ignition switch works fine.

Drill and tap the frame at any convenient location and mount the solenoids, using small screws or bolts. This also applies to the lock switch. The push buttons are located atop the handle bars



RIDE is smooth, motor quiet: top speed is 15 mph—a reasonable pace for a young rider. To soup up the rig one might install another motor, supply power to both wheels.

under your thumb. Drill a pair of holes in the handle bars and run the wires inside the bars.

With a little patient shopping around for parts and making the most of materials you should be able to build this Electrobike for around \$40, including a good set of kart wheels—essential for satisfactory operation. Auto junkyards and parts stores will have nearly everything you need. For things you can't find locally, try the classified auto and motorcycle ads in MI. Ocelot Engineering, 950 Kendall Drive, San Bernardino, Calif., can also supply anything you may need.

Which brings us around to the paint job. The original Electrobike. was finished in bright orange enamel and with black wheels, seat and motor. Whatever colors you choose for yours, do a good job. Electrobike can be a sharp-looking rig. When the kids get it out for a run around the block Dad will be in line for his turn at the fun. Wanna bet? •