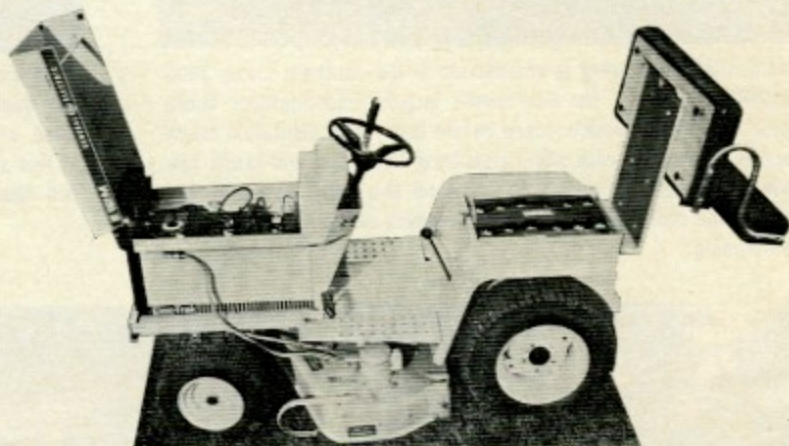


F&G takes a look at ELECTRIC TRACTOR POWER

By Bill Davidson

No longer a thing of the future, electric tractors for home gardening, mowing and other jobs are a reality today--a quiet, clean, powerful reality.



General Electric's Elec-Trak E12M garden tractor powered by six 6-volt rechargeable batteries. Accessories with independent motors plug into the tractor's 36-volt power pack. Only tools built for the 36-volt system can be used.

One ride convinces you that electric tractor power is for real, and is here to stay. The quiet way the tractor moves without the customary noise, exhaust fumes and vibration impresses you. The roominess, cleanliness and smoothness make you feel as if you are maneuvering your favorite living room chair around the garden. But, the real proof comes when you put the tractor to work.

The tractor tested for six months last year at Flower and Garden Demonstrations, General Electric's ELEC-TRAK E12M, has the horsepower rating of a conventional gasoline-fueled 12 horsepower garden tractor. This is where the similarity ends. All you do to start to work is unplug the recharging cord, lower the hood, get on and quietly drive off. To refuel, just plug the recharger back into an ordinary 115-volt electrical outlet and set it. Under normal conditions a full charge is nearly reached after five hours. An overnight charge puts the tractor in full fuel condition.

You can expect to mow two to three acres with a 42-inch rotary mower on one charge (approximately one acre per hour at five to seven cents per acre), and plow up to four hours. You can do light hauling and running about for ten days without charging the batteries and still have power. However, it is recommended you keep the recharger plugged in when not working to assure full power when needed.

More than a tractor, this machine is a mobile power source. Electrical tools with individual motors plug into the tractor's 36-volt power plant, allowing it to do a wide variety of jobs. You can saw wood with the electric chain saw for up to 4½ hours and operate a hedge trimmer or lawn edger 12 to 16 hours on a charge. Job conditions affect power drain.

Any time you are stopped (over 10 minutes, such as for lunch) near an electrical outlet, it helps to extend the tractor's operating time on heavy drawing jobs by plugging it in.

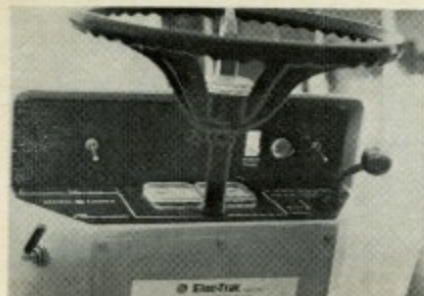
Gauges on the panel tell you the amount of fuel you have available as you work and at what rate you are using it. This gives you a chance to operate at the most efficient output on a job by selecting the appropriate gear.

Operating the E12M tractor is a matter of turning on the key, selecting a gear, of which there are three, and moving the speed control lever

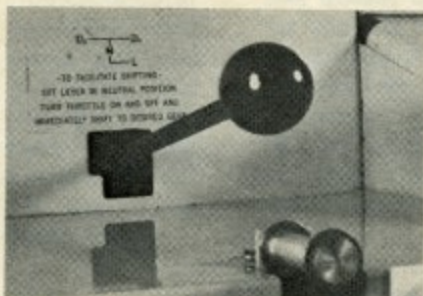
forward, or back for reverse. There are three forward speeds and two reverse in each of the three gears. Be alert and ready to go when you move the speed control lever out of neutral because the high torque of the electric motor gives positive power from the start. You may want to depress the brake slightly in close quarters. Instructions for operating are simple, and essential ones are posted under the tractor hood for easy reference when ready to plug in for recharge.

Several safety switches are built in to protect against accidents. These include a drive power cut off when the brake pedal is fully depressed, a complete power shut-off when you leave the seat (either by stepping off or falling off), an emergency switch that disconnects all electric power, circuit breakers that switch power off automatically on extra heavy loads and neutral start. Any time the power is cut or turned off, the speed control lever must be returned to neutral before

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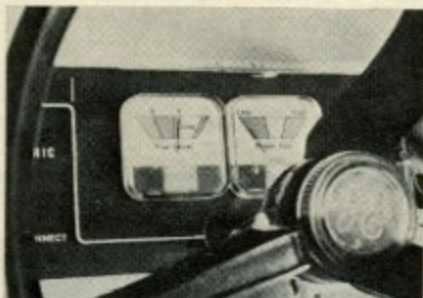
Tractor control panel with switches and gauges. Just below the panel at left is the power disconnect switch. Others, from left, are PTO switch, fuel level and power use gauges with dash light above them, power pulse switch, key switch, light switch and speed control.



You have a choice of three speed ranges for both forward and reverse. This selector lever below the seat is shown in D₁ range, the one most used for ordinary work. For uphill or tough jobs, put it in L (low), and for high speed transporting, use D₂ where top speed is six mph.



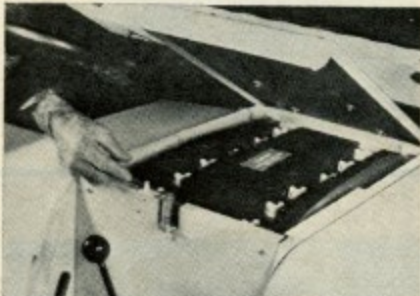
The speed control lever on the panel (shown here positioned for reverse) controls forward and backward movement regardless of speed selector setting (photo at left). By pushing it forward from the horizontal neutral slot, you can obtain three speeds in each of the ranges. Pull it back and you get two speeds in reverse.



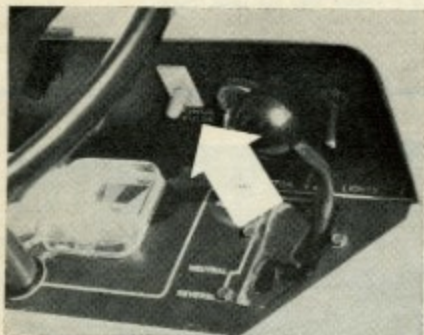
Two gauges on the front panel show how much "fuel" (battery power) you have and how fast you are using it. The power use gauge lets you select the most efficient gear for the job to save fuel. Usually if a completely discharged power pack is allowed to recover for about 15 minutes you can get back to the storage stall outlet.



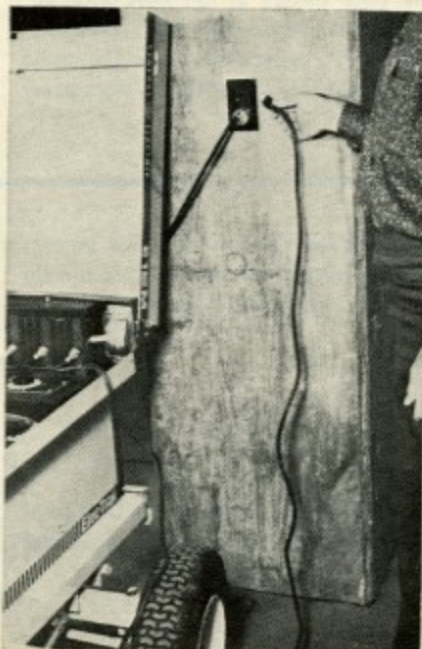
This foot pedal on the left side of the tractor acts as a brake when partially depressed, and when fully depressed, cuts off electrical power. Tractor movement stops. To start again, release brake and return speed control lever to neutral. The brake can be locked for parking. The brake is a disc-type on the transaxle.



If no one is in the driver's seat, the tractor will not go. A spring raises the seat and opens a safety switch cutting off power. This also happens should you be jarred by a bump or raise up slightly to look back. PTO switch must be turned off and speed control lever returned to neutral to start again.

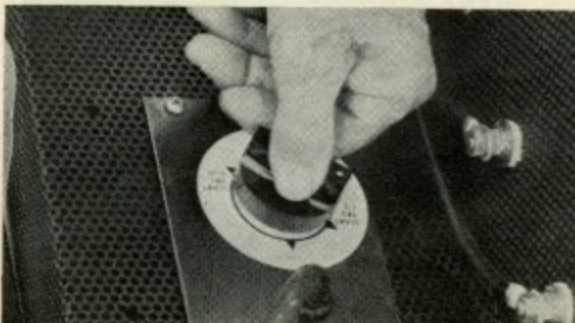


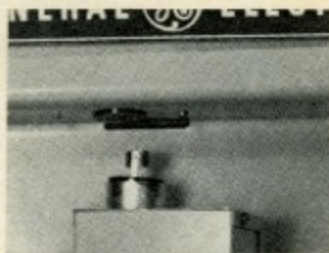
A push on the power pulse switch on the control panel gives a power surge in tough spots. This helps out in going up steep hills or when working attachments slow down from overload. The surge regains forward motion and prevents the need to shift to lower gear.



Plug the recharger cord into any ordinary 115-volt household electrical outlet to recharge batteries.

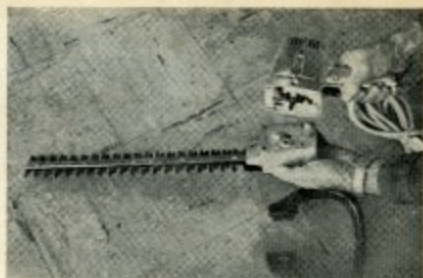
Set built-in charger switch under hood at appropriate setting (depends on battery age). Switch turns itself off when full charge is reached. Two lead-acid batteries are under front hood, and four under seat.





LEFT: Hand powered tools and small accessory motors such as this chain saw plug into the two-prong, twist lock accessory receptacle on the left side of the tractor behind the larger PTO outlet.

Interchangeable power handle operates hedge trimmer blade (shown here), drill bit and grass shear. Small power handle shaft extends into the gear drive of the attachments.

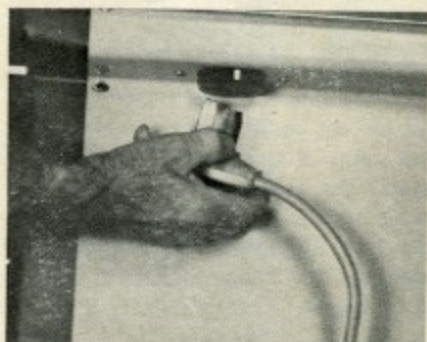
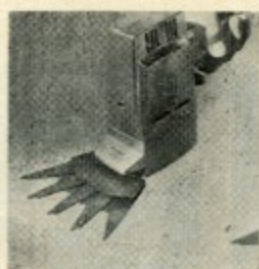


LEFT: Chain saw gives constant power quiet enough for inside work. It has a 20-foot cord and a trigger-type on and off switch.

BELOW: Six-inch grass trimmer that is operated by the power handle held on by three screws.



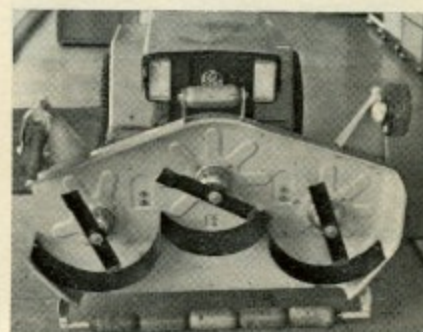
ABOVE: Brushes on this lawn sweeper operate by an independent motor plugged into the accessory receptacle.



The PTO outlet located on the left side of the tractor takes the heavy three-prong plug-in used by the larger motors on such accessories as rotary mower, snow thrower and yard vacuum.



The three motors of the three-blade 42" mid-mounted mower draw their power from the one PTO outlet shown here. The blades stop in less than three seconds when power is cut off.



Front-mounted mower cuts grass before tractor rolls over it, and flips up for easy cleaning, blade changing and sharpening. Each blade has its own motor.



LEFT: The rear tail gate slides out for easy dumping on this cart made of steel. It holds a capacity load of 1,000 pounds.

RIGHT: The double seat converts the tractor into a personnel carrier for a ride around the garden or on the golf course.



ELECTRIC TRACTOR ACCESSORIES

ACCESSORY	HOW OPERATE ON TRACTOR				COMMENTS
	PTO plug in	Recep- tacle plug in	Hitch	Mount	
Rotary mower (mid- and front-mount)	✓			✓	The E12M ELEC-TRAK has a 42" mid-mount rotary mower which is maneuverable with tight cutting radius. Each of the three blades is powered by its own motor, which takes up considerable room that could be used for higher lift. Cutting height controlled by lever lift. Choice of rear or side discharge. Rear mower rollers prevent scalping. Mower runs at full speed regardless of tractor speed.
Gang mowers: Front				✓	Two mounted on front and one pulled cuts 56". Electric front lift raises front mowers.
Rear			✓		Three-gang reel mower cuts 57". Universal hitches allow attachment of up to five-gang reel.
Snow thrower	✓			✓	Has direct chain-drive from its own high torque motor, independent of tractor speed. Raise up and down with lever lift on E12M ELEC-TRAK. Discharge chute rotates 270 degrees from tractor seat. Clears 42" path.
Rototiller	✓			✓	Tills 30" width. Rear mounted and requires electric rear lift. Tills up to 20,000 square feet at four inches deep on one charge, according to manufacturer.
Snow blade: Straight				✓	Regular snow/dozer blade 48" wide. Angle and height controlled from driver's seat.
V-plow				✓	V-plow clears 48" path. Mounts on front, and moves snow both ways.
Vacuum	✓		✓		Vacuum may be pushed by hand and powered by the tractor's batteries, or pulled behind tractor; blows into cart with bag. Cleans 30" path. Anti-scalp design.
Lawn sweeper		✓	✓		Sweeper brush powered by own constant speed motor as it is pulled by the tractor. The 31" brushes clean area wider than mower's discharge chute. Rear dump.
Plow				✓	Uses standard 10" moldboard plow with sleeve hitch that is an extra item.
Disc			✓		Pull-type standard garden tractor disc—single cut or double.
Row crop cultivator				✓	Adjustable for rows from 6" to 42" wide. Seven reversible shovels and gauge wheels. Requires sleeve hitch.
Tool bar				✓	Blade-type rear-mounted bar that can be used for light grading, back-filling, finish grading, seedbed preparation, etc.
Dump cart			✓		Sturdy dump cart hauls 12-cubic foot 1,000 pound load. Bed measures 4'x3'x1'. Has stake pockets for adding side extensions. Spring-loaded dump trip locks self and operates from driver's seat by rope.
Lawn roller			✓		Standard roller, 36" wide, weighs about 600 pounds filled with water.
Roller aerator/ cultivator			✓		Standard spike roller 36" wide. Attaches to tractor's pin hitch.
Rotary broom	✓			✓	Four-foot rotary broom powered by separate electric motor. Cleans gravel, leaves and light snow.
Chain saw		✓			Quiet running 13" bar chain saw with plunger-type oiler. Twenty-foot cord allows working in area where tractor is moved, but limited for use in trees. Extension cord not recommended.
Hand cultivator/ weeder		✓			Nine pound hand cultivator with long handle. Tills an area 5" wide. Good for working in beds.
Edger		✓			Standard-built lawn edger/trimmer that operates on the tractor's 36-volt power source instead of the 115-volt home outlet.
Grass trimmer		✓			Grass trimmer head for interchangeable power handle. Cuts six-inch swath and good for trimming around trees, rocks, along stone walls and under fences.
Hedge trimmer		✓			Double-edge 15" steel blades operated by power handle. Has straight or circular handle.
Electric rake	✓				Clears three-foot swath of grass, thatch, leaves and discharges to side in neat windrow.

Convenient and leisure accessories: wide seat, snow cab, lights, electric rear lift, tractor and mower covers, electric horn, radio bracket, rear weight/tool box, tire chains, canopy top, golf bag holder, DC arc welder, inverter, front platform lift, plug-in kits, drill bit attachment for power handle, and heavy-duty batteries that give 25 per cent more working capacity.

Electric Tractor

Continued from page 32

starting again. The same is true with the major accessories plugged into the tractor's power take off (PTO) outlet; the separate PTO mower switch must be turned off and turned back on to operate. Rear wheels are reversible to widen the tread for greater stability. A disc brake operated by the foot brake pedal allows you to slow down or work in tight spots. The brake can be set with a latch on the pedal.

The electric motors are permanently lubricated and there are no clutches, idler pulleys or mower bearings to grease. Grease fittings on the front steering should be serviced twice a year or every 100 operating hours. What few linkages and bearings there are should be oiled with No. 30 machine oil.

A short belt connects the drive motor with the axle assembly (trans-axle). This should be kept clean and tight for best performance.

Batteries take little care other than maintaining the water level in them with city tap water or water of low to average mineral content. The Owner's Use and Care Manual provided with the ELEC-TRAK shows plainly how to operate and care for the tractor.

The tractor should be stored in a cool, dry weather-protected area or under a special cover. Directions suggest you leave the charger plugged in during storage and re-set the charger starting switch once a month. Full charge should be maintained in temperatures below 32 degrees.

General Electric makes six models of ELEC-TRAKS, ranging in sizes from eight to 16 horsepower. All have the built-in battery charger and six 6-volt batteries. The manufacturer estimates the batteries to last at least five years. These batteries are not interchangeable with automobile batteries. Tractor retail prices range from \$795 to \$1,675. The manufacturer claims that these prices are competitive with those of like-rated gasoline tractors. The long list of tool accessories being made by G-E to use with this unit indicates that the maker is confident of a wide acceptance.

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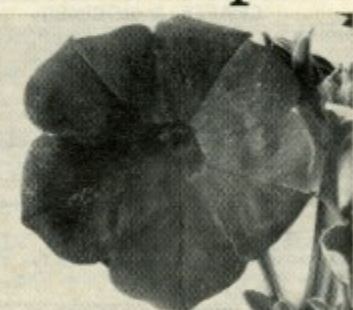
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