

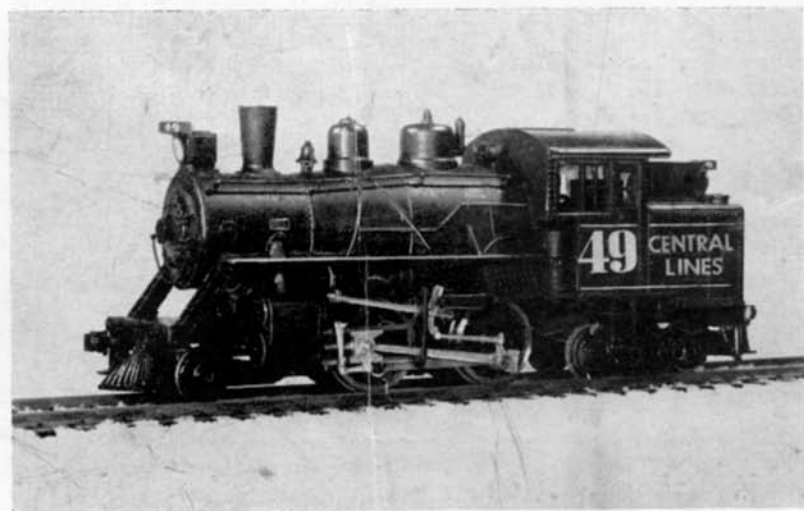
Assembling & Operating

Information

for

MODEL NUMBERS 3 & 4

*Rex "S" Gage Suburban
Locomotive Kits*



2-4-4-T

Double End Suburban

Locomotive

S

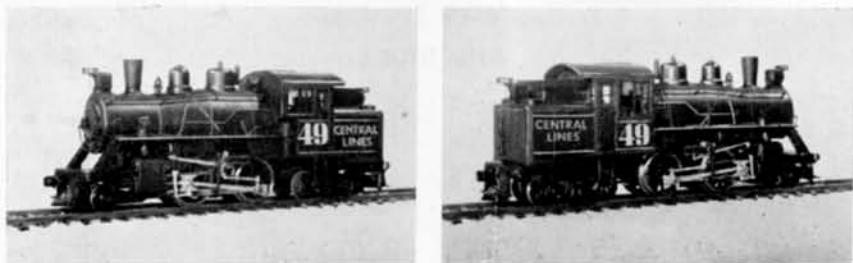
**ASSEMBLY SEQUENCE
AND INDEX**

1. Introduction.
2. Unpack and Check Parts.
3. Tools Required.
4. Prepare Castings.
5. Assemble Drivers, Side Rods and Engine Truck in Frame.
6. Make Sub-Assembly of Cylinder and Crosshead Guides.
7. Make Sub-Assembly of Cross Heads and Main Rods.
8. Assemble Cylinder and Crosshead Guide Unit and Crosshead and Main Rod Unit in Place.
9. Wiring Hookup.
10. Assemble Motor and Try Out Mechanism.
11. Assemble Accessory Castings to Frame and Boiler.
12. Assemble Hand Rails and Posts.
13. Assemble Boiler and Cab to Frame.
14. Finish Paint and Letter.
15. Summary.
16. The Case for S-Gage.
17. Price List - Parts.

REX ENGINEERING & MFG. CO.

263 BRIGGS BLDG.
BIRMINGHAM, MICH.

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SUBURBAN LOCOMOTIVE KIT
MODEL #3 — SCALE
MODEL #4 — TINPLATE

1.

INTRODUCTION

The REX Suburban is a free lance passenger locomotive designed from several prototypes, most of which have long since been scrapped. Suburban tankers, once a common sight on United States lines are now nearly extinct. They reached the height of their popularity between 1910 and 1930. At last report both the Boston & Albany and the Central Railroad of New Jersey still had a few in service.

They are ideal for model railroad work and look good running in either direction. Like its prototype the REX was designed to work from point to point in areas where no reversing facilities exist. A run around track is all that is required to get good realistic operation. In actual prototype work, the locomotive would take its string of loaded passenger cars from the metropolitan area to the residential area in the evening, usually with the head end leading. When the suburban terminus was reached the locomotive would uncouple from the train, move forward, switch back on a parallel passing track, switch over to the original track and couple up to the other end of the train, rear end leading, and take the same train and same people back to the city in the morning. Sometimes this operation was repeated several times a day.

This maneuver is a very thrilling and realistic operation on a model pike. The suburban locomotive is also at home on any sort of industrial, branch line or work train service.

The closest prototype of this 2-4-1 T wheel arrangement was the New York Central Class DI-A #49 built by American Locomotive Company. It ran in and around the New York City district.

Total Weight	143,000 lbs.
Tractive Power	13,500 lbs.
Water Capacity	1,800 gals.

Coal Capacity	3½ tons
Driver Diameter	57 inches

American Locomotive Company furnished us erection blueprints of this locomotive, (their model 439-S-7140) and similar locomotives, which prints were extensively used in the design of the REX Suburban. It is a pleasure to acknowledge this cooperation.

SCALE OR TINPLATE

The Rex S-Gage locomotives were so designed that they may be operated on either scale or tinplate track with different wheels for each. As you will note in the exploded drawing, all wheel assemblies are interchangeable from scale to tinplate and vice-versa. It is a very simple matter to convert from one to another. At present our motors will run on DC current only.

A good description of scale vs. tinplate and converting one to the other is given in the Nimco Catalog & Handbook published by Nixon Model Company, Box 8, Southampton, Pennsylvania. This catalog also contains a complete listing of everything available in S-Gage.

2.

UNPACK AND CHECK PARTS

Before proceeding with the detailed steps we ask that you unpack the various parts and check them against the accompanying parts list. If anything appears to be missing, or mutilated please contact the source from which you obtained the kit. Extra screws and fasteners are supplied. Next, read the instructions through, identify the various parts, and familiarize yourself with the sequence in which you are going to need them for assembly.

Where the right and left hand parts and assemblies are almost identical and the text refers to one side only, it applies, of course, to both sides.

KEEP THE EXPLODED VIEW DRAWING IN FRONT OF YOU AT ALL TIMES AND REFER TO IT EACH STEP.

3.

TOOLS REQUIRED

- Screw driver for #2 and #4 screws.
- Thin nosed pliers, or heavy tweezers.
- 3-Cornered scraper, or sharp knife for removing casting fins.

Small flat, half-round and round files for cleaning and smoothing castings.

A cradle made of wood blocks, or some other support that will hold the frame and mechanism in an up-side-down position while working on it and testing it.

Combination speed nut pusher and box wrench for 0-80 hex head screws — (furnished in kit).

4.

PREPARE CASTINGS

The kit contains many zinc castings which have exceptional detail and accuracy. Before removing the flashes and burrs from these castings we suggest that you familiarize yourself with them from the drawings and photographs, so that you will not remove any of the fine rivets and other details that it took our expert die makers many hours to build into the kit for you. All the castings and dies for them were made by Culp Brothers Manufacturing Company in Philadelphia and it is a pleasure to pass on to them the credit they so justly deserve.

After you have finished your preparation work on the castings you may want to put one coat of paint on them at this time. Any parts you paint must be thoroughly cleaned and free from oil and moisture of all kinds before any paint is applied.

5.

ASSEMBLE DRIVERS, SIDE RODS AND ENGINE TRUCK IN FRAME

These wheel assemblies are permanently insulated, bonded and quartered at the factory and no other adjustment is required by the modeler. Fit #201 (scale) or #245 (tinplate) front wheel axle and gear assembly into the bearing slot in the #192 frame, so that it turns freely. Fit #150 rear bearing block over the axle of the #202 (scale) or #246 (tinplate) rear wheel assembly so that it turns freely. Then fit the #150 rear bearing block into the square slot of the #192 locomotive frame. It should rock up and down from the center, but fit snugly front to back and side to side. This establishes the equalizing feature. The insulated wheels go on the left, or fireman's side with the locomotive facing forward.

With the frame up-side-down assemble #149 cover plate to the frame with the two #188 screws. Be careful not to file too much off the top projections of the cover plate where it contacts the front axle and rear bearing block or you will have a sloppy mechanism assembly. Place the

#143 side rods over the crankpin on the rear wheel, and fasten them to the front wheel with #132 shoulder screws. After assembly on the proper side the bottom lubrication bosses at each end should be filed off the #143 side rods so they will present a more realistic appearance.

MAKE SURE THAT EVERYTHING WORKS FREELY and that the assembly can be pushed effortlessly by hand back and forth on the track.

The #180 (scale) or #248 (tinplate) front wheel and axle assembly should be placed in the bearing slot of the #220 front engine truck and held in position with #145 screw. The axle must be free to turn in the bearing slot. The screw is used merely to keep it in place.

The #195 (scale) or #254 (tinplate) tender truck assembly should be fastened to the #185 radius bar with #198 shoulder screw. Make sure that the truck bolster is free to pivot on the radius bar when the screw is tightened. Both front and rear truck assemblies are then fastened to the frame with #188 shoulder screws which also act as retaining screws for the #149 cover plate. On the front engine truck the #186 spring should be slipped in place over the lug provided for it on the #220 engine truck frame.

6.

MAKE SUB-ASSEMBLY OF CYLINDER AND CROSSHEAD GUIDES

The four #176 crosshead guides should next be pressed into the #191 cylinder. Should they fit too loose and drop all the way in by hand, you can lightly peen, or stake them so that a proper fit can be assured. There is no other mechanical means for holding these crosshead guides in place, and they **MUST FIT TIGHTLY** enough so that they will not come loose in operation.

7.

MAKE SUB-ASSEMBLY OF CROSS HEADS AND MAIN RODS

Next make up the main rod and crosshead sub-assemblies as follows: Fasten (1) #224 main rod to the #121 left hand crosshead and piston rod with #132 shoulder screw. Fasten the other #224 rod to the #120 righthand crosshead with #132 shoulder screw. On the front end, where the main rod fits into the crosshead, it should pivot loosely on the shoulder screw when the screw is snugly fastened through the rod into the crosshead. The crossheads should slide easily back and forth on the outside of the guides with the main rod retainer lugs on the inside of the guides.

If all these parts are not PERFECTLY FREE TO MOVE they will cause trouble later on.

8.

ASSEMBLE CYLINDER AND CROSSHEAD GUIDE UNIT AND CROSSHEAD AND MAIN ROD UNIT IN PLACE

You are now ready to fasten the previously made sub-assemblies to the frame.

With (2) #168 screws and (2) #251 nuts fasten the sub-assembly of the #191 cylinder (with its fitted crosshead guides) to the #192 frame. This is a temporary assembly. When the boiler is later fastened to the frame and cylinder remove and discard the two nuts and complete the assembly as described in Section 13.

Now place the crosshead and main rod sub-assemblies in position. Slide the crosshead into its final position between the crosshead guides with the piston rod in the center hole of the cylinder. Then put the main rod over the crankpin in the rear wheel and on the outside of the previously assembled side rods, and fasten to the crankpin with #146 washer and #130 screw. These screws are 0-80, so be careful not to screw them up so tightly that the heads twist off.

Assemble part #148 guide hanger to #192 frame with (1) #145 screw. The rear end of the crosshead guides should just come flush with the back of the guide hanger, and should drop into the little slots provided for them in the guide hanger. Again try the fit of the crossheads in the crosshead guides and adjust until they have a FREE SLIDING FIT.

The mechanical assembly should now roll freely along the track with no interference of any kind. Do not attempt to apply power, either by dragging or pushing the assembly, until all interference has been removed and the mechanism ROLLS FREE AND LOOSE. Use a few drops of light clock oil on all moving parts. A minimum of oil should be used and applied with a toothpick or a needle. If you can see oil you have too much and the surplus should be wiped off.

9.

WIRING HOOKUP

Press #126 rubber grommet in the large loop of the #179 pickup spring assembly. Fasten this sub-assembly to the #192 locomotive frame with #127 screw, and #154 washer. Tighten the screw so that it flattens the grommet out to about $\frac{1}{8}$ " thick. Make sure that the pickup spring and

none of the bare parts of the connecting wire touch the frame or mechanism at any place. Put the terminal end of the pickup wire through the clearance hole on the right hand side of the frame. It will later be fastened to the left hand motor terminal.

Now take a pair of needle nosed pliers, or tweezers, and adjust the two ends of the pickup spring so that they contact the flanges on the inside of the left hand wheels.

THIS ADJUSTMENT MUST BE DONE CORRECTLY. If the contact is too loose, it may work away from the flange and the motor will not run. If it is too tight you will get excessive wear on the wheel flange and pickup spring.

10.

ASSEMBLE MOTOR AND TRY OUT MECHANISM

Set the #250 motor and worm assembly on a block and run test leads to make sure that the motor runs freely and quietly.

Force #126 rubber grommet in the front motor mounting hole in the top of the #192 frame. The grommet acts as a cushion mounting for the motor, and also provides a means to tighten, or loosen the worm and gear fit. Place #134 rubber mounting washer between rear mounting lug of the motor and the top of the #192 locomotive frame and fasten rear of motor in place with #127 screw. Put a #133 washer through the clearance hole in the cover plate over the bottom of the front motor grommet and fasten front of motor with #145 screw. Check the fit of the worm and gear until it will just move with a minimum of play. Alternately tighten the front and rear motor mounting screws carefully, checking the gear mesh and fit BY ROTATING THE MOTOR ARMATURE BY HAND. Lubricate the gears and all moving parts with a few drops of light oil.

Now fasten the terminal on the pickup wire to the left hand motor terminal with #197 screw. If motor terminal post is not tapped, the terminal may be soldered in place. The contact lug on the top of the motor should be on the other or right hand terminal post as shown in the illustration.

Again make sure no bind occurs in any of the moving parts. With the mechanism up-side-down touch the right and left hand wheels with your 12-volt DC power leads. The mechanism should now run freely. If any bind or excessive noise occurs at this time it will probably be due to:

1. Faulty gear adjustment which can be eliminated with the screw driver by either loosening or tightening the front and rear motor mounting screws until proper adjustment is secured.

2. Cross head or rod bind. This latter difficulty, however, should have been eliminated if all steps listed previously have been followed.

When everything runs freely with the mechanism up-side-down you are then ready to run the motor in for half an hour or so in this position. Then put the mechanism on the track and let it go. Do not apply current in excess of 12 volts DC.

The motor should not at this time draw more than .5 amps at 12 volts. The scale speed at 12 volts should be 75 miles per hour, or about 103 feet per minute in "S" Gage.

The armature of a permanent magnet motor should never be removed, even for a short while. Motors magnetized after assembly will be weakened instantly by armature removal.

The motor manufacturer's recommendation is maximum allowable current on intermittent duty 1.0 amps; and the current at the recommended operating speed of 10,000 rpm is 0.9 amps.

11.

ASSEMBLE ACCESSORY CASTINGS TO FRAME AND BOILER

The (2) #178 air reservoirs (one on each side) are pushed in place on the boiler underneath the running board. The #123 bell, #138 air compressor, #223 front and rear lights, #140 generator, #177 number plate, and (2) #236 tank filler caps, are assembled into the holes provided for them and may be held in place with #147 Tinnerman speed nuts. These speed nuts can be pushed on by hand, but it would facilitate the assembly to use the tubular end of box wrench pt. #156 as a pusher. Make sure that the end of the long stud is rounded off before you try to push the speed nut on.

There are several other good methods of holding these accessory castings to the frame and body. The accessory studs have been designed so that they are the correct outside diameter for #0-80 threads. In case you prefer to use nuts and lock washers instead of the speed nuts it will be necessary to thread the long studs with a #0-80 die.

Another method of fastening these accessory castings is with metal cement, or glue. Locate the castings in the proper holes and let the bonding agent fill up the space and harden in place. Should you happen to break off any of the studs on these accessories, holes can be drilled and tapped where the studs were and they can be held on with screws.

The various accessories can be assembled in almost any sequence you care to, as long as they do not interfere with each other.

The #151 couplers are assembled in pockets of the #225 pilot and held

in place with #152 escutcheon pins which should be bent over on bottom. This pilot and coupler sub-assembly is now fastened to the frame with #182 screws.

12.

ASSEMBLE HAND RAILS AND POSTS

The #167 and #169 hand rail wires should be inserted through the holes in the #135 hand rail posts before the posts are pressed in place. This prevents distorting the holes in the posts while they are being pressed in. These little hand rail posts are made to scale. They are fragile and cannot be abused. If the posts do not seem to fit their holes tightly enough they can be held in place with a drop of metal cement.

13.

ASSEMBLE BOILER AND CAB TO FRAME

The rear of the cab and boiler fits over the platform on the frame and is fastened in place with (2) #145 screws. The front of the boiler sets down on the cylinder saddle and is held in place with (2) #168 screws which pass through the frame and cylinder saddle and are threaded into the holes in the boiler. The (2) #173 front steps should be loosely fastened to the locomotive frame with #197 screws. When the boiler is set in place it will locate the top of the steps in position. The #197 screws can then be tightened after the #168 screws are in place. Before fastening the cab in place to the frame put the (2) #153 cab steps in their proper slots where they should be held snugly by the fit of the cab over the frame platform.

14.

FINISH PAINT AND LETTER

No decals for lettering or numbering are supplied because you will probably want to use your own.

In our opinion the painting and lettering are the final touches and can either make a model outstanding or do it a great injustice. With a little patience and time you will be well rewarded.

There is no one set of standards to follow in finishing a model, though there are several methods. Through personal experience you have probably established your own procedure.

Most any of the numerous model railroad paints will do a very satisfac-

tory job if the directions are closely followed.

Again we might mention the Nimco catalog which gives complete instruction as well as a list of paints.

15.

SUMMARY

You will note that around the cab doors we have also provided center punch marks so that you can apply your own hand rails if you so desire. Brackets, holes, valve slide surfaces, etc., are provided for the addition of the Rex Model 20 Suburban Valve Gear which is available in a separate kit. Provision for still more detail such as flag holder, marker lite, brakes, and additional piping has been considered and allowed for.

We designed this kit principally to satisfy the man who buys and uses it. Obviously if we knew how to make it better we would have done so. However we have probably missed the boat somewhere along the line — in your opinion at least. We have tried to make it easy for you to tell us about it on the enclosed card.

We reserve the right to make model changes and adjust prices without notice.

16.

THE CASE FOR S-GAGE

There will always be a place in model railroading for all existing gages, and probably some more we have not yet seen. Those of you who require more detail and operating realism than is possible in S-GAGE should work in a larger gage. Those who are interested in collecting and having a large amount of equipment in a small space and not so much interested in detail and good operation should work in a smaller gage.

We think S-GAGE is a happy medium, and it was selected after years of model railroading experience in both larger and smaller gages for the following principal reasons:

1. The smaller gages (with which we have no quarrel), do not permit sufficient detail to satisfy the exacting modeler.
2. Adhering to prototype dimensions in smaller gages using parts made of commercial materials, would make them too fragile for continuous operation.
3. Track gages and rails made to scale smaller than 1/64 to the inch (which is S-GAGE), warp and change under adverse climate and temperature conditions so that more maintenance

work is required to keep the layout in good mechanical and electrical operating condition than is required in S-GAGE.

4. Larger Gages (with which we have no quarrel), usually take up too much space for the average model railroader.
5. Working with S-GAGE, which is 3/16 to the foot, or 1/64 size, each inch on the prototype becomes 1/64" on the model. It is a very easy matter to convert prototype dimensions to scale with standard measuring and designing tools. Accuracy can be easily maintained without the loss of detail.
6. Any recent 3/16 scale American Flyer Locomotives or cars are made to proper prototype size and design. They can be economically converted to run with REX or other S-Gage scale products. Inversely REX or other S-Gage scale products can be converted to run on American Flyer track with American Flyer Rolling Stock.

We are asking that you put your comments in general, as well as answers to the various questions, on the enclosed card and send it back to us. Many thanks for your cooperation.

17.

REX SUBURBAN LOCOMOTIVE

PRICE LIST — PARTS

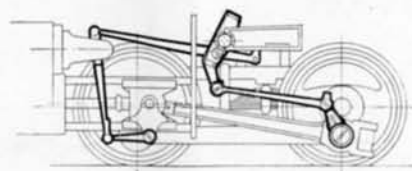
Part No.	Number Needed	NAME — DESCRIPTION	Price Each
120	1	Crosshead and Piston Rod, Right Hand	\$.50
121	1	Crosshead and Piston Rod, Left Hand.....	.50
123	1	Bell and Bracket .....	.50
126	2	Grommet, Rubber .....	.15
127	2	Screw #4-40 x 3/8 flat head .....	.05
130	2	Screw #0-80 x 1/4 Hex head .....	.05
132	4	Shoulder Screw, side rod and main rod .....	.10
133	1	Washer, #2 S.A.E. 3/32 I.D. x 1/4 O.D. x .020 .....	.05
134	1	Washer, Rubber rear motor mount .....	.05
135	14	Hand Rail Post .....	.10
138	1	Air Compressor, Single .....	.45
140	1	Generator .....	.40
143	2	Side Rod .....	.40
145	9	Screw, #2-56 x 1/4 Round Head .....	.05
146	2	Washer, #0 S.A.E. — Crankpin .....	.05
147	7	Speednut — Tinnerman #C-872-012-1 .....	.05
148	1	Guide Hanger .....	.85
149	1	Cover Plate .....	.60

Part No.	Number Needed	NAME — DESCRIPTION	Price Each
150	1	Rear Bearing .....	.35
151	2	Coupler .....	.10
152	2	Pin, Escutcheon .....	.05
153	2	Cab Step .....	.20
154	1	Washer, 3/16 I.D. x 5/16 O.D. x .020 .....	.05
156	1	Comb. Speed Nut Pusher and Box Wrench .....	.65
167	2	Hand Rail — Boiler .....	.10
168	2	Screw, #2-56 x 3/4 Fl. Hd. ....	.10
169	1	Hand Rail, Boiler Front .....	.10
173	2	Front Step .....	.50
176	4	Crosshead Guides .....	.10
177	1	Number Plate .....	.30
178	2	Air Reservoir .....	.30
179	1	Pickup Spring, Wire and Terminal Assembly .....	.40
180	1	Wheels and Axle Assembly — Engine Truck — Scale .....	.45
182	4	Screw, #2-56 x 3/16 Rd. Hd. ....	.10
184	1	Tender Coal Bunker .....	.40
185	1	Radius Bar — Tender Truck .....	.20
186	1	Spring — Engine Truck .....	.10
188	2	Shoulder Screw — Truck Pivots and Cover Plate .....	.10
190	1	Boiler and Cab	9.00
191	1	Cylinder and Boiler Saddle	2.50
192	1	Frame — Loco	8.00
195	1	Tender Truck Assembly — Scale	1.75
197	3	Screw, #0-80 x 3/32 Fil. Hd. ....	.10
198	1	Shoulder Screw — Tender Truck to Radius Bar .....	.10
201	1	Drivers, Gear and Axle Assembly — Front — Scale ..	3.75
202	1	Drivers, Crankpin and Axle Assembly — Rear — Scale ..	3.25
220	1	Engine Truck Frame .....	.50
223	2	Headlite .....	.50
224	2	Main Rod .....	.50
225	2	Pilot and Bolster	1.00
236	2	Water Tank Filler Caps .....	.30
245	1	Drivers, Gear and Axle Assembly, Front — Tinplate ..	3.70
246	1	Drivers, Crankpin, & Axle Assembly — Rear — Tinplate ..	3.20
248	1	Wheels and Axle Assembly — Engine Truck — Tinplate ..	.40
250	1	Motor and Worm Assembly	7.50
251	2	Hex Hd. Nut, #2-56 .....	.05
254	1	Tender Truck Assembly — Tinplate	1.70

If you require replacement parts try your model shop first as our minimum order charge is \$3.00 plus postage.

When ordering please state name, part number, and price.

Other REX S-Gage Products



VALVE GEAR KIT

MODEL 5 — DOCKSIDE

MODEL 20 — SUBURBAN

S-Gage has reason to be proud of the new REX Valve Gear. It has castings where the prototype has them. Bolts, screws and rivets realistically placed where they belong. Operates like the real thing. Exact realism that will fascinate and delight any "Scale Hound." Riveted sub-assemblies can be taken on and off the locomotive by a novice in a few minutes with screws from each side.



DOCKSIDE LOCOMOTIVE KIT

MODEL #1 — SCALE

MODEL #2 — TINPLATE

REX Dockside locomotive accurately scaled to Baltimore and Ohio prototype prints. The precise fit of all parts make it easy for the novice to build, and it's wealth of detail and trouble free operation satisfy the most exacting craftsman.

This locomotive is considered a must for your S-Gage Model pike.

It will operate without trouble on sharp radius curves, and turnouts, bad track and grades where nothing else will run. Looks good on short trains as well as on yard switching and dockside assignments for which the prototype was designed.

N.M. R. A. standards throughout.

Prices on request.

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CARL F. NEWTON PRINTING R.O. MICHIGAN