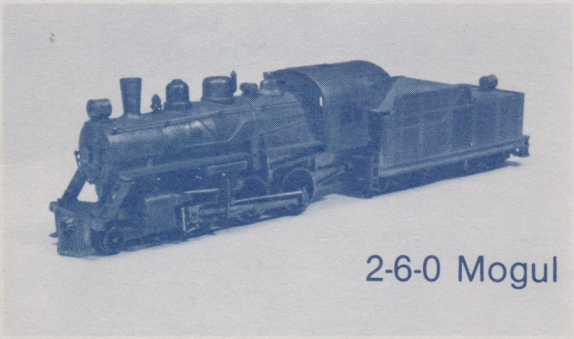
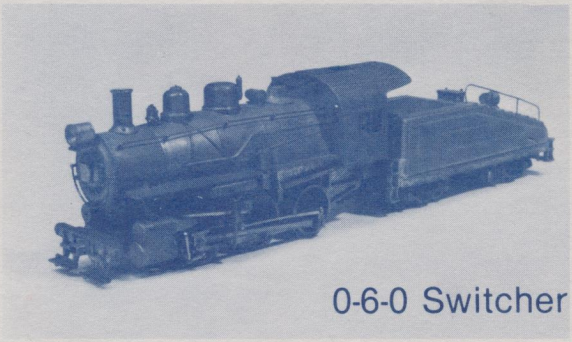
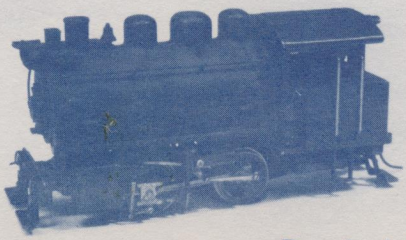
Instruction Book for REX S Gauge Engine Kits



2-6-0 Mogul



0-6-0 Switcher



Dockside

PREFACE

THE CASE FOR S-GAGE

You may wonder why we built this model in a minority gage rather than go into a gage more popular or potentially profitable. 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 over a reasonable period of time. For instance the prototype wheel tire is 5½" wide. NMRA standards for S-GAGE specify a width of ⅛, or 8 scale inches, which we think looks pretty clumsy. Some of the smaller gages use dimensions which are still further out of scale and their wheels look even more clumsy and bulky.

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 maintance 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.

S-GAGE has several good scale track and scale car manufacturers. Another advantage is A.C. Gilbert's American Flyer Equipment made to 3/16 scale. Although produced in tinplate, American Flyer products are well made, close to scale and look good with scale conversion wheels and couplers.

It is your good old red, white and blue American privilege to agree, or disagree with all, or any of these statements. 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.

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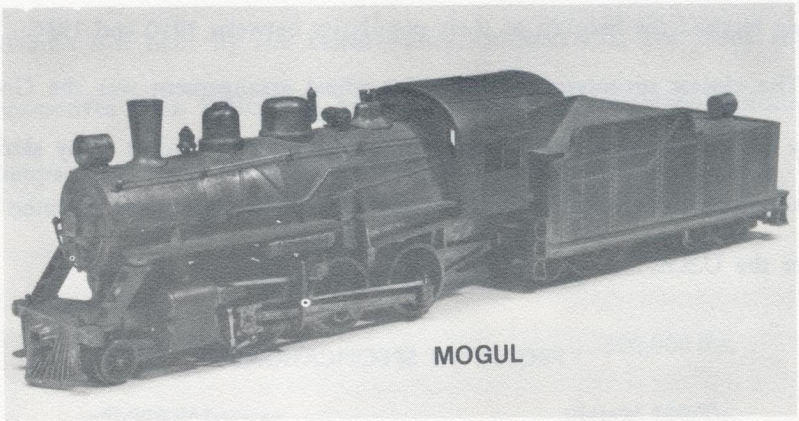
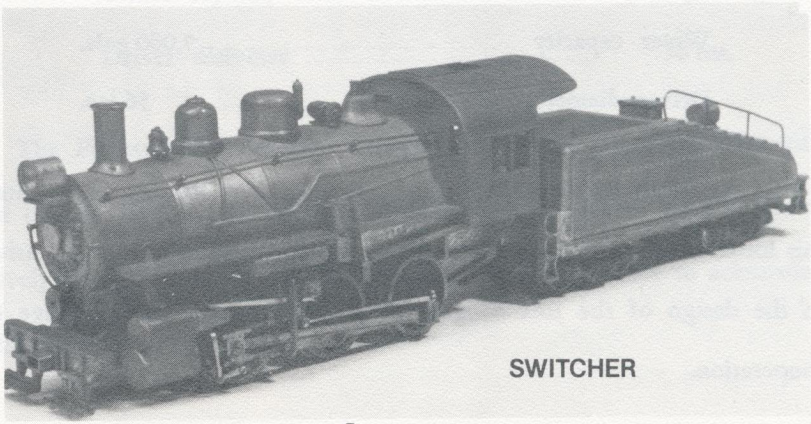


MOGUL



SWITCHER

The 2-6-0 Mogul

INTRODUCTION

The Rex Mogul is a free lance passenger or light freight locomotive designed from several prototypes, most of which have long been scrapped. They reached the heighth of their popularity between 1910 and 1930.

The closest prototype of this 2-6-0 wheel arrangement was the Green Bay & Western built by the American Locomotive Co., but many similar locomotives built both by Baldwin and American were quite common all over the U.S.A.

PROTOTYPE SPECIFICATIONS

Total weight	139,000 lbs.
Tractive power	25,000 lbs.
Water capacity	5,000 gals.
Driver diameter	56 ins.

The American Locomotive Company furnished us erecting blueprints of this locomotive and similar locomotives, which prints were used extensively in the design of the Rex Mogul. It is a pleasure to acknowledge this cooperation.

The 0-6-0 Switcher

INTRODUCTION

The Rex Switcher is a free lance switching locomotive designed from several prototypes, most of which have been scrapped. They reached the heighth of their popularity between 1910 and 1930.

The closest prototype of this 0-6-0 wheel arrangement was the Pennsylvania B-6 built by the Pennsylvania Railroad Co., but many similar locomotives were built both by the American and Baldwin Locomotive Companies. These also were quite common in the U.S.A.

PROTOTYPE SPECIFICATIONS

Total weight	308,000 lbs.
Tractive power	36,000 lbs.
Water capacity	4,000 gals.
Driver diameter	56 ins.

The Pennsylvania Railroad Company furnished us erection blueprints of this locomotive and similar locomotives, which prints were used extensively in the design of the Rex Switcher. It is a pleasure to acknowledge this cooperation.

1. UNPACK AND CHECK PARTS

Before proceeding with the various steps of assembly we ask that you unpack the parts and check them against the list. If anything appears to be missing or damaged please contact us. Extra parts may be ordered. Next read the instructions thoroughly, 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 IN FRONT OF YOU AT ALL TIMES AND REFER TO IT EACH STEP.

2. PREPARE CASTINGS

The kit contains many zinc castings which have exceptional detail and accuracy. Before removing the flash and burrs from these castings we suggest 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. The dies were made by Culp Die Co. of Philadelphia, Pa. and the castings were by the Canton Die Casting Co. of Canton, Ohio and it is a pleasure to pass on to these companies the credit they so justly deserve.

Any PART NEEDING STRAIGHTENING, *APPLY HEAT* OR PUT IN *HOT WATER,* THIS WILL PREVENT BREAKAGE OF PART.

3. ASSEMBLE DRIVERS, SIDE RODS AND ENGINE TRUCK IN FRAME

These wheel assemblies are pressed and quartered on the axles at the factory and no adjustment is required by the modeler.

Fit #201 front wheel axle and gear assembly into bearing slot in the 313 frame so that it turns freely. Fit #150A centerbearing block over

#203 axle and wheel assembly and into center square slot in frame and see that it turns freely. Then fit rear bearing over the axle of the #202 rear wheel assembly so that it turns freely. Then fit the bearing blocks into the square slots of the #313 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 firemen side with the locomotive facing forward. With the frame upside down assemble the #315 cover plate to the frame with the two #145 screws. Be careful not to file too much off the top projections of the cover plate where it contacts the front axle and the rear bearing blocks or you will have a sloppy mechanism assembly. Place the #306L side rod over the rear wheel crank pin and fasten them to the front and middle wheel with the #132 shoulder screws. Repeat same for right side.

Make sure that everything works freely and that the assembly can be pushed effortlessly by the hand back and forth on the track.

The #180 front wheel and axle assembly should be placed in the bearing slot of the #220 engine truck and held in position with a #145 screw. The axle must be free to turn in the bearing slot. The screw is used merely to keep it in place. The front truck assembly is then fastened to the frame with #188 shoulder screw which also acts as a retaining screw for the #315 coverplate. On the front engine truck the #186 spring should be slipped in place over the lug provided for it in the #220 engine truck frame.

4. MAKE SUB-ASSEMBLY OF CYLINDER AND CROSSHEAD GUIDES

The four #176 crosshead guides should next be pressed into the #191 cylinder. 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.

5. MAKE SUB-ASSEMBLY OF CROSSHEAD AND MAIN ROD

Next make up main rod and crosshead sub-assemblies as follows: fasten #305L main rod to the #121 left hand crosshead and piston rod with the #132 shoulder screw. Fasten the other #305R rod to the #120 right hand crosshead with shoulder screw. On the front end, where the main rod fits into the crosshead, it should fit loosely on the shoulder when the screw is snugly fastened through the rod into the crosshead. The crosshead should slide freely 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.

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

You are now ready to fasten the previously made sub-assemblies to the frame. With two #168 screws and two #251 nuts fasten the sub-assembly of the #191 cylinder (with its fitted crosshead guides) to the #313 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 10. Now place the cross- and main rod sub-assembly 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 the outside of the previously assembled side rods, and fasten to the crankpin with the eccentric crank and O-80 flathead screw in valve gear kit. Assemble part #148 guide hanger to #313 frame with #145 screw. The rear end of the crosshead guides should just come flush with the back of the guide hanger. Again try the fit of the crosshead in the crosshead guides and adjust until they have a FREE SLIDING FIT. The mechanical assembly should roll 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 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 needle. Put the small hole terminal end of the pickup wire through the hole on the back end of the frame. Slide the insulating tubing on the wire first then thread through the hole. It will be fastened to the left hand motor terminal.

7. ASSEMBLE MOTOR AND TRY OUT MECHANISM.

Solder #103 worm to #117 motor shaft. Set worm about 1/16 from end of shaft and solder. Set motor and worm on a block of wood and test run to make sure motor runs freely and quietly. Oil wick on pully end of motor and on back end of armature. Use toothpick and light oil. Force #126 grommet in front motor mounting hole in top of #313 frame. The grommet acts as a cushion mounting for the motor, also provides a means to tighten or loosen the worm and gear fit. Place rubber washer #134 between part #304 rear mounting lug of the motor and the top of the #313 locomotive frame and fasten rear of motor in place with #127 flat head screw. Put a #133 washer through the clearance hole in cover plate over the bottom of the front motor grommet and fasten front of the motor with #145A screw. Check the fit of the worm and gear until it will 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 one terminal on the pickup wire to the left hand motor terminal with the #197 screw. If motor terminal is not tapped, the terminal may be soldered in place. The contact lug on top of motor should be on the other or right hand terminal post in the illustration. Again make sure no bind occurs in any of the moving parts. With the mechanism upside down touch the left hand drivers and the pickup wire with your 12-volt D.C. power leads. The mechanism should now run freely. If any bind or noise should occur at this time it will probably be due to:

(1) Faulty gear adjustment, which can be eliminated with a screw driver by loosening the front and rear motor screws until proper adjustment is secured.

(2) Crosshead 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 upside down you are now ready to run the motor in for half hour or so in this position. 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 manufacturers' recommendation is maximum current on intermittant duty 1.0 amps; and the current at the recommended speed of 10,000 rpm is 0.9 amps.

8. ASSEMBLE ACCESSORY CASTINGS TO FRAME AND BOILER.

The two air #178 reservoirs (one on each side) are pushed in place on the boiler underneath the running board. The #123 bell, #138 air compresser, #140 generator, #177 number plate and #223 headlight are assembled into the holes provided for them and cemented in place. The various accessories can be assembled in any sequence, as long as they do not interfere with each other.

9. ASSEMBLE HANDRAIL AND POSTS

The #323 and #169 hand rail wire should be inserted through the holes in the #135 hand rail posts before the posts are pressed into 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 in their holes tightly enough they can be held in place with a drop of metal cement. If tight, ream hole with a #66 drill.

10. ASSEMBLE BOILER AND CAB TO FRAME.

Fit the #310 cab into the slots provided at rear of boiler. Fasten with one #145 screw. The rear of the boiler fits over the platform on the frame and is fastened in place with two #145 screws. The front of boiler sets down on the cylinder saddle and is held in place with two #168 screws which pass through the frame and cylinder saddle into the holes in the boiler. These holes are threaded. The two #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 be tightened after the #168 screws are in place. If #168 screws appear too long, file off a little and round the ends.

11. 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. There is no one set of standards to follow in finishing a model, though there are several methods. Through personal experience you have established your own procedure. Many of the model railroad paints will do a very satisfactory job if the directions are closely followed.

12. TENDER ASSEMBLY

Fasten the #328A footboard and bolster to rear of tender body with two #182 screws. Next fasten the #309 tender floor to the #307 tender body with four #145 screws. Assemble rear light #223 in the holes provided for it.

Assemble two #319 tender trucks to the tender floor with two #198 shoulder screws. Coil spring #198A is supplied for better pickup. The insulated wheels should be on the right hand side. Fasten the two #236 tank hatches to the top side of tender where holes are provided for them. Turn locomotive and tender upside down and fasten draw bar #320 to tender with #198 screw; then to like position on locomotive. Fasten #321 locomotive lead wire to tender pickup wire, then to one of the front screws #145 holding tender frame to tender body.

13. TESTING AND RUNNING

Now put the locomotive and tender on the track and run it in. 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" gauge.

14. SUPERDETAILING REX LOCOS

On the front of the locomotive and on the back of the tender there is much room for additional detail such as coupler release rods and handrails. We can supply these parts if you care to order them from us. Additional piping anywhere around the boiler of the locomotive or on the underframe of tender could be made up of .025 wire and bent to suit the purpose for which it is intended. Additional holes are also supplied in the bottom of the tender frame for mounting air reservoirs, air brake cylinders, and air valves. These parts and ideas were added after exploded assembly drawings were made. They are not shown, but with normal amount of ingenuity by the model maker they may be added or left off if you so desire.

Upon request we can quote price for any stage of completion you wish on any Rex locomotive.

PARTS FOR
REX 2-6-0 MOGUL & 0-6-0 SWITCHER

Part No.	Number Needed	
103	1	Worm gear, single thread, 56p
117	1	Pittman, motor DC71A
120	1	Crosshead & piston rod RH
121	1	Crosshead & piston rod LH
123	1	Bell & bracket
126	1	Grommet, rubber
127	1	Screw #4-40x3/8 flathead
132	6	Shoulder screw for side and main rods
133	1	Washer #2 S.A.E. 3/32 I.D.x1/40.D.x.020
134	1	Washer, rubber rear motor mount
135	13	Handrail posts
138	1	Air compressor, single
140	1	Generator
145	7	Screws #2-56 x 1/4 rd.hd.
145A	1	Screw #2-56 x 3/8 rd.hd. front motor mount
148	1	Guide hanger
150	1	rear bearing
150A	1	Middle bearing
156	1	Comb. speed nut and box wrench
158	1	Nut #4-40 hex
168	2	Screw #2-56 x 3/4 flat head
169	1	Handrail, boiler front
173	2	Front steps
176	4	Cross head guides, sq. brass
177	1	Number plate
178	2	Air reservoirs
180	1	Wheels & axle Ass. engine truck-scale
182	2	Screws #2-56 x 3/16 rd. hd.
186	1	Spring, engine lead truck
188	1	Shoulder screw, truck pivot and cover plate
191	1	Cylinder & boiler saddle
197	3	Screw #O-80 x 3/32 rd. hd.
201	1	Driver, gear & axle assem. front-scale

Part No.	Number Needed	
202	1	Drivers, crankpin & axle assem. rear-scale
203	1	Drivers & axle assem. intermediate-scale
220	1	Engine truck frame
223	1	Headlight
225	1	Pilot & bolster
251	2	Hex-nut #2-56
304	1	Rear motor mount
305L	1	Main rod
305R	1	Main rod
306L	1	Side rod
306R	1	Side rod
310	1	Cab
312	1	Boiler
313	1	Frame
315	1	Cover plate
321	1	Tender to motor lead wire
323	2	Handrail, boiler
321A	1	Insulating stock, lead wire

0-6-0

*182A	2	Pilot screws #2-56 x 1/8
*311	1	Boiler
*328	1	Footboard & bolster
*223AF	1	Headlight
*182	1	Headlight screw #2-56 x 3/16

As an accommodation to those who might otherwise find it impossible to purchase the complete kit, we are offering Mogul and Switcher Kits in three sections.

MOGUL KITS

401	Tender Kit
402	Boiler Assembly
403	Frame and mechanism

SWITCHER KITS

411	Tender kit
412	Boiler assembly
413	Frame and mechanism

TENDER PARTS

Part No.	Number Needed	
145	4	Screw #2-56 x 1/4 rd. hd.
182	2	Screw #2-56 x 3/16 rd. hd.
198	4	Screw, shoulder, rd. hd.
223	1	Back up light
236	2	Water filler cap
307	1	Tender body-road type
309	1	Tender floor
319	1	Tender truck assem. kit
320	1	Tender to loco draw bar
328A	1	Footboard & bolster
198A	2	Truck bolster spring
*223AB	1	Back up light
*308	1	Tender body - slope back
272	1	Air brake cylinder

Rex Valve Gear for Mogul & Switcher

249	4	Rivets
252	1	Link L.H.
253	1	Link R.H.
257	2	Screw #O-80 x 3/16 Hex Hd.
259	2	Screw #O-80 x 3/16 flat hd.
260	2	Eccentric crank
265	2	Combination lever
266	2	Crosshead link
267	2	Eccentric rod
268	8	Shoulder screws
327	2	Radius rod

ADDITIONAL NOTES

It might be desirable to some modelers to mount pilot on Switcher closer to steam chest. Cut apron off frame and square end with file. Then cut section with two mounting holes in it off apron. Attach two #O-80 x 1/4 flat head screws to frame, making sure it is square and level. Now mount pilot in normal manner.

Any Rex locomotive parts can be ordered for scratch building or replacement. Order any additional parts needed directly from us.

Extra instruction booklets may be obtained for $ .30 ea.

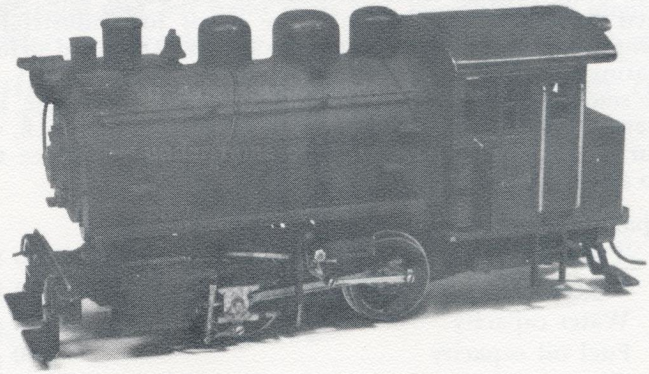
We reserve the right to make model changes and adjust prices without notice.

Assembling & Operating

Information

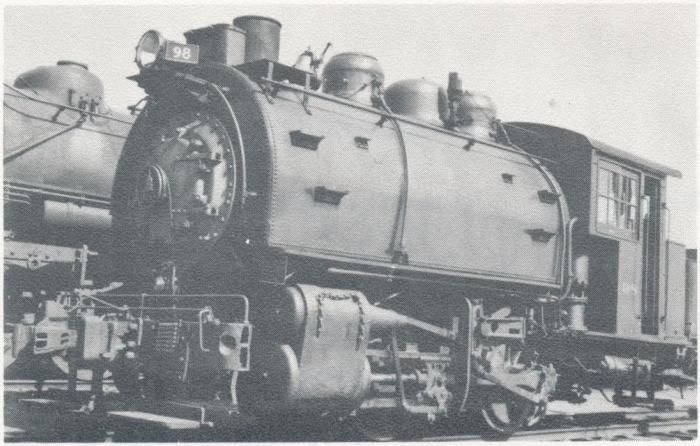
for

Rex "S" Gage Dockside Kit



BALTIMORE AND OHIO

Dockside C-16 Switcher



1.

INTRODUCTION

We think you might be interested in knowing something about the history of the B & O prototype, Class C-16.

Baldwin built four of these locomotives for the B & O in 1912, who operated them out of the Mt. Clare shops for industrial and light switching work around the Baltimore Docks. Designed principally for negotiating sharp curves and steep grades, they are oil burners to reduce smoke, fire hazard, ash handling, etc. While the locomotives will handle fifteen loaded cars on a straight level track, the grades and curves on which they are required to operate reduce the normal load to about six cars.

Principal specifications are as follows:

Total weight	120,000 lbs.
Tractive power	27,600 lbs.
Water capacity	2,000 gals.
Fuel oil capacity	650 gals.
Driver diameter	48 inches

There is a photograph of the prototype on the front cover.

We appreciate the cooperation given by the Baltimore and Ohio people in making it possible to produce this model. Messrs. Larry Sagle and M. T. King were especially helpful.

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 multilated 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. There are two fits on the mechanism assembly about which we would like to caution you. These are:

1. The fit of the cylinder saddle over and into the slot provided for it in the front of the frame. This should be snug.

2. The crossheads, guides and rod assemblies. These assemblies should be loose in operation, even though the crosshead guides themselves should be a press fit into the square holes provided for them in the cylinders.

The right and left hand sides of this locomotive are almost identical as far as the mechanism and running gear is concerned. The tank and cab vary only as the prototype does, and the accessory fittings are different on the right and left hand sides. The photographs of the model that appear were taken from the right hand side, and the exploded assembly drawings were taken from the left hand side on which the insulated wheels go.

Where the right and left hand parts and assemblies are 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.

Small soldering iron. (Soldering operations required do not show and are fastening operations only on the gear and lead-in wire.)

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 thirty zinc die 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.

Your filing comes in two categories:

1. Removing die cast flash, cleaning and smoothing the castings so they will present a neat appearance.
2. Filing surfaces for fitting purposes. Under this category of fit-filing come the crossheads and guides, cylinder saddle seat, the axle bearings in the frame, and the fit of the boiler front into the body.

At these points where fits should be maintained you will not be required to establish any dimensions, as this has already been done in the dies, but merely make sure that no fins, lumps or projections occur where the parts fit each other.

In addition to filing and scraping, you may want to do a final finishing job with steel wool on some of the parts. However, be very careful not to get any particles of steel wool, or other filings into or around the motor anywhere as the motor magnet will pick them up and deposit them in some inaccessible places where they will cause a lot of trouble.

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. Do not feel that you must stick strictly to flat black paint. The loco we have working in our coach yard is painted dark green with the running gear and wheel rims left in the natural metal finish, and it looks real sharp.

In addition to the cleaning of the castings, and the bench assembly with standard hand tools, you are required to solder the lead-in wire at the pickup and motor connection, and the worm gear on the motor shaft. A neat assembly and proper electrical connections cannot be obtained any other way.

5.

ASSEMBLE WHEEL, AXLE AND BEARING UNITS INTO FRAME WITH COVER PLATE AND SIDE RODS

These wheel assemblies are permanently insulated, bonded and quartered at the factory and no other adjustment is required by the modeler.

Fit #116 front wheel axle and gear assembly into the bearing slot in the #115 frame, so that it turns freely and has about .010 lateral play. Fit #150 rear bearing block over the axle of the #112 rear wheel assembly so that it turns freely and has about .010 lateral play. Then fit the #150 rear bearing block into the square slot of the #115 frame. It should rock up and down from the center about 1/64", 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. You should be readily able to see the insulating material between the tire and wheel on the left hand side – or you can check them with your test wires.

With the frame up-side-down assemble #149 cover plate to the frame with the two #145 screws. Be careful not to file too much off the top projections of the cover plate where it contacts the front axle and the 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. MAKE SURE THAT EVERYTHING WORKS FREELY and that the assembly can be pushed effortlessly by hand back and forth on the track. 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.

6.

MAKE SUB-ASSEMBLY OF CYLINDER AND CROSSHEAD GUIDES

The four #124 crosshead guides should next be pressed into the #102 cylinder. The location lugs on the crosshead guides should point down in the upper position, and up in the lower position.

In filing these guides to fit the square holes you will get a freer fitting crosshead assembly if you file the upper ones on top, and the lower ones on the bottom. Only a few thousandths of an inch of filing is necessary to insure a proper fit and you should be able to press them in by hand until the location lug is about 1/16" away from the cylinder. They should be lightly tapped in the rest of the way. 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 insured. 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) #142 main rod to the #121 left hand crosshead and piston rod with #132 shoulder screw. Fasten the other #142 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 (1) #145 screw fasten the sub-assembly of the #102 cylinder (with its fitted crosshead guides) to the frame.

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, made of brass, so be careful not to screw them up so tightly that the heads twist off.

Assemble part #148 guide hanger to #115 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 if necessary file the crossheads 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.

MAKE PICKUP AND CONNECTING LEAD WIRE SUB-ASSEMBLY AND FASTEN TO FRAME

Solder one end of the #129 connecting lead wire to the center loop of the #125 pickup spring. It will be easier if you push the rayon insulator sleeve on the wire pickup back about ¼" so that the wire is bare, then twist the strands of wire up into a unit so that no loose strands will later touch the frame and cause a short circuit. Tin the parts lightly and use a minimum of solder so that the solder joint will not later short against the frame. After the soldering job is completed pull the insulator sleeve back over the soldered joint and put a drop of nail

polish or insulator cement on the joint. This will prevent the rayon insulation from fraying, and will also help prevent a short circuit when the pickup assembly is fastened to the frame.

Press #126 rubber grommet in the large loop of the #125 pickup spring. Fasten this sub-assembly to the frame with #127 screw, and #154 washer. Tighten the screw so that it flattens the grommet out to about 1/8" thick. In addition to giving you a good tight fit this will give you a neat looking job and prevent any drag or interference with the track work. 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 loose end of the pickup wire through the clearance hole on the right hand side of the frame. The loose wire will later be soldered 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 brass flanges on the inside of the left hand wheels. Make sure that the ends of the pickup spring do not project past the wheel insulation and touch the die cast wheel, or you will get a short circuit. Bend up the end of the pickup spring a little so that the sharp ends do not run on the wheel flanges. THIS ADJUSTMENT MUST BE DONE CORRECTLY. If the contact is too loose, or does not have sufficient bearing on the flange 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, and also a light braking action which will be objectionable. Make sure during the operation that no lubricating oil or grease gets between the pickup spring and wheel flange and insulates the contact.

10.

ASSEMBLE MOTOR WITH PICKUP SPRING, AND TRY OUT MECHANISM ASSEMBLY

Solder #103 brass worm on the end of the #117 motor shaft so that the front end of the motor shaft comes even with the front end of the worm. Set the motor 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 frame. This can be pushed into place with a blunt instrument or a large screw driver. 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 frame and fasten 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 solder the pickup wire to the left hand motor terminal. The contact lug on the top of the motor should be on the other or right hand terminal 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, and make sure it runs 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. Or

2. Cross head or side 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.

The motor should not at this time draw more than .5 amps at 12-volts. The scale speed at 12-volts should be 65 miles per hour, or about 88 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.

11.

ASSEMBLE ACCESSORY CASTINGS TO FRAME AND BODY

The #122 left hand air tank and the #137 right hand air tank and tool box should next be fastened to the frame and are to be held in place with #147 Tinnerman speed units.

The #123 bell, #138 air compressor, #139 backup light, #140 generator and #144 fuel tank filler are fastened to the cab and body with Tinnerman speed nuts.

Where these various accessory castings have two round studs cast on them the long stud is the stem for the speed nut, and the short stud acts as a locater. These speed nuts can be pushed on by hand as shown in the illustration, 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.

If it is necessary to remove the speed nut you should take a thin object such as a knife blade, and bend up one side of the speed nut

so that it will slide off the stud easily without digging in. If the same speed nut is to be used again for fastening, the bent up end must be pushed back to its former position before it is used.

There are several other good methods of holding these accessory castings to the frame and body. The speed nut 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 an 0-80 die.

Another method of fastening these accessory castings is with metal cement, or nail polish. 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 #141 whistle is to press lightly into the hole in the projection on the steam dome. The two cab steps #153 should be fitted snugly into the slots provided for them in the frame platform. They are held in place by the fit of the cab over the platform.

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

12.

ASSEMBLE HAND RAILS AND POSTS

The #136 hand rail wire should be inserted through the holes in the #135 hand rail posts before the posts are pressed in place. This prevents distorting the hole, and also assures that the holes in the posts will line up properly so that the rail can assume its proper position.

These little hand rail posts are made to scale. They are fragile and cannot be abused.

If the posts do not seem to fit tightly enough, they can be held in place with a drop of metal cement, or nail polish.

13.

ASSEMBLE BODY TO FRAME

The front of the body is held in position by its fit over the boiler front, and the rear by its fit over the frame platform. It is fastened with two #145 screws thru the rear platform into the cab.

Make sure that no lumps or flash exists either on the outside of the boiler front, or the inside of the body where they fit, because no other means is provided for holding these parts together at the front. If they are too tight they will not go together. If they are too loose they will rattle and cause noise. Should this occur you can put another screw down thru the stack into the boiler.

Before fastening the body 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. For the same reason no couplers are provided, although location holes for them have been drilled in the front and rear coupler pockets.

Painting and striping can follow your own imagination. A nice little touch is to put gilt, or aluminum paint around the edges of the running boards and steps and to paint the cab window frames with a dark red, or a natural wood color.

For safety purposes the front and rear bolsters can be given diagonal stripes of yellow.

15.

SUMMARY

If you have followed these instructions you now have a good looking, fine performing little locomotive with more detail than is available on any other commercial model in any gage.

You will note that on the front of the body, and round the cab doors we have also provided center punch marks so that you can apply your own front hand rails and cab hand rails if you so desire. Brackets, holes, valve slide surfaces, etc., are provided for the addition of a valve gear. This valve gear will be available in a separate kit.

The locomotive as you get it should perform as well as its prototype, but we know that some of you are going to want to weight it down so that it will pull more cars. The best place to put this weight, if you feel that you have to do it, is inside the boiler front in part #102.

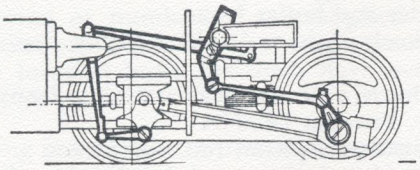
The motor manufacturer's recommendation is maximum allowable current on intermittent duty 1.0 amps; and the current at the recommended operating speed of 10,000 rpm is 0.9 amps.

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.

PARTS FOR
REX S-GAGE DOCKSIDE SWITCHER

Part #	Number Needed	NAME — DESCRIPTION
101	1	Cab and body
102	1	Cylinder and boiler front
112	1	48" wheels, c'pin and axle assembly, rear
115	1	Frame
116	1	48" wheels, axle and gear assembly, front
117	1	Motor, Pittman DC-71A
120	1	Crosshead and piston rod, right hand
121	1	Crosshead and piston rod, left hand
122	1	Airtank, left hand
123	1	Bell and bracket
124	4	Crosshead guides
125	1	Pickup spring
126	2	Grommet, rubber
127	2	Screw #4-40 x 3/8 fl. hd.
129	1	Wire, conductor pickup to motor
130	2	Screw, #0-80 x 1/4 hex head
131	2	Crankpin
132	4	Shoulder screw, side rod and main rod
133	1	Washer, #2 SAE 3/32 ID x 1/4 OD x .020
134	1	Washer, rubber rear motor mount
135	8	Handrail post
136	2	Handrail wire
137	1	Air tank and tool box
138	1	Air compressor, single
139	1	Backup light and bracket
140	1	Generator
141	1	Whistle
142	2	Main rod
143	2	Side rod
144	1	Tank filler
145	7	Screw #2-56 x 1/4 rd. hd.
146	2	Washer #0 S.A.E. — Crankpin
147	7	Speednut, Tinnerman #C-872-012-1
148	1	Guide hanger
149	1	Coverplate
150	1	Rear bearing
153	2	Cab step
154	1	Washer 3/16 ID x 5/16 OD x .020
156	1	Comb. Speed nut pusher and box wrench

Other REX S-Gage Products



VALVE GEAR KITS

SWITCHER — DOCKSIDE

MOGUL — 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 realisticly 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.