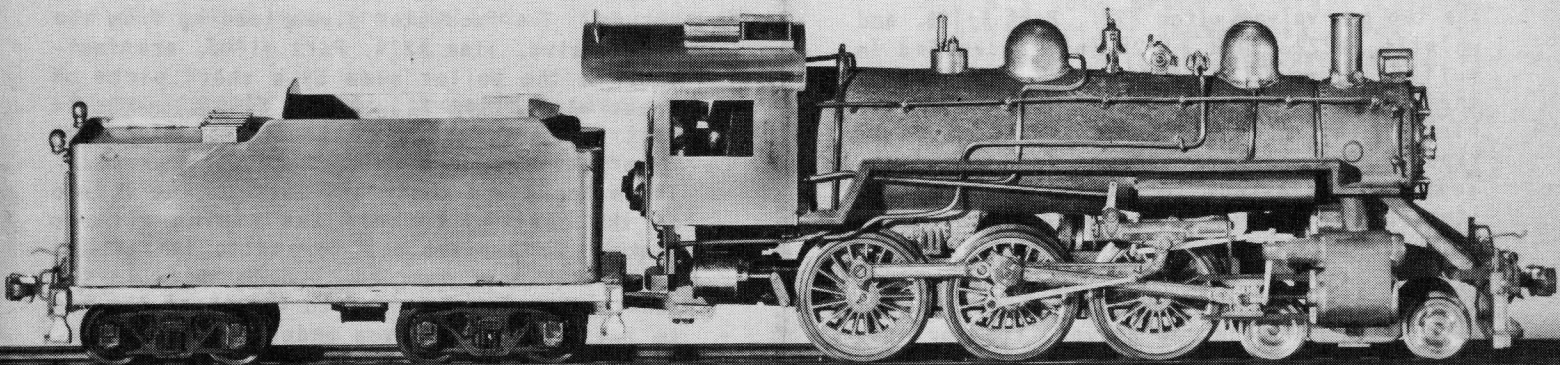
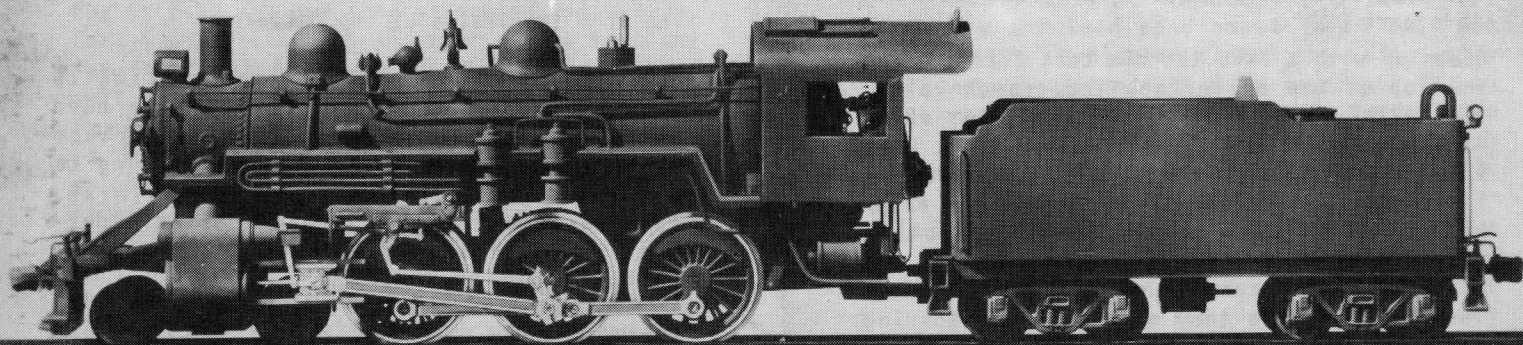


ALL NATION LINE

O-GAGE B&O TEN WHEELER BOILER ASSEMBLY INSTRUCTIONS SECTION II



BOILER CASTING, item #201, Part #1602. File off the parting lines and gates. Then clean up the diecasting fittings and check fit of domes and smoke stack base, etc. to the boiler. File the boiler contour to bring the parts in line. For example, if the top of the boiler is higher on one side, the stack base would be tilted. Therefore, the boiler casting must be filed to make a smooth, round surface for seating the base.

Boiler surface finishing can be cut to a minimum by filing off only the surface grains. The filler, to be applied later, will cover the tiny pit marks that cannot be easily filed.

The next step is to cut out the boiler drilling templates which are included with this section. Check to make sure that template matches up properly on boiler casting. Several mounting holes have already been drilled in the boiler casting so these will provide an additional aide in lining up the drilling template. The templates can be held in place

with rubber cement or scotch tape. Be sure to center punch all holes before drilling. You will be amply repaid for doing a careful and accurate drilling job on the boiler.

SMOKE BOX FRONT, item #236, Part #1092: The 3/16" stanchions, item #235, Part #1643, are mounted in the holes, 3 in the top and 3 in the bottom, with the wire, item #243. See the photograph of the model. If the stanchions do not fit tightly, the shanks may be squeezed to flatten slightly, or they may be riveted at the back of the casting. The wire must be bent to the proper curve, and the excess wire clipped off after the posts are seated. Screw the smoke box front to the bracket, item #212, Part #1618, with screw, item #237, Part #1229. The smoke box front hinges should be on the right as you look at it from the front as shown on the assembly drawing section AA. The top hole of bracket, item #212, Part #1618, should line up with the stack hole in the boiler so that when stack is mounted it holds the assembly in place. Before permanently mounting the as-

sembly, the headlight, item #209, Part #1599, must be screwed to the boiler with screw, item #227, Part #C1255. (See Section AA).

SAND DOME, item #213, Part #1080, is mounted with screw, item #229, Part #C1502. The mounting hole in the sand dome must first be tapped with a #5-40 tap. Drilling a large hole (approx. 1/4") in the under side of the boiler casting directly beneath the sand dome mounting screw will greatly facilitate mounting this part.

Clean up with a file the die cast fittings for the top of the boiler casting, check valve, item #214, Part #1601, generator, item #215, Part #1600, and bell bracket, item #216, Part #1082. The bell, item #217, Part #1083 is fastened to bell bracket with screw item #218, Part #C-1050. The bell assembly and other parts can now be mounted and checked for alignment. Then remove them and hold for final assembly, because they may be damaged during other operations.

STEAM DOME, item #219, Part #1081, is attached by screw, item #229, Part #C1502. The mounting hole in this part must also be tapped #5-40.

The two pop valves, item #221, Part #1126, and whistle, #222, Part #1125, are assembled in muffler, item #220, Part #1127, by driving them into the holes provided in the muffler. Flatten the shanks with a file to a slight taper to secure a nice tight fit. This assembly then fastens to the boiler by screw, item #227, Part #C1255. Remove the assembly until the boiler is ready for final finish.

NOTE: Remember to replace the screws in the back of each fitting to prevent loss or misplacement during the subsequent operations.

STEAM PIPE BUSHINGS, item #223, Part #1029, are driven into holes in the boiler as shown in the drawing section DD.

CAB, item #202. The front and rear cab bulkheads must first be soldered to the cab body. Holding these pieces in a vise or by some similar means will facilitate this operation, and assure a nice assembly. Install the smoke deflector, item #206, Part #1603D. Tabs are mounted in slots in the cab roof and bent to give rear slant to deflector. Solder in place.

CAB HATCHES, with rails, item #207, part #1604 are delicate castings. Handle carefully. Screw them to the cab roof with item #202, Part #C1250. Now form the grab rails and solder to the cab. Fit the cab to boiler by filing the flange around the boiler to fit the front bulkhead of the cab. Now screw the cab to the boiler, using 3 screws, item #233, Part #C1500.

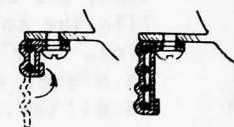
BODY ASSEMBLY: Check to fit the mechanism so that front mounting screw, item #232, Part #C1515, and the 2 rear screws, item #233 and Part #C1500, can be screwed in place without binding. Any misalignment can be corrected by

filing the boiler. This may occur at the fire box where it touches the frame, or at a point where it fits the saddle of the cylinders. After fitting, the remainder of the boiler fittings and piping may be applied.

AIR COMPRESSORS, item #224, Part #1032 are mounted by screws, item #247, Part #C1253. Some dexterity with a small screw driver will be necessary to start the screws, and by using long nosed pliers they may be tightened, entering from the inside of the boiler.

PREPARATION OF THE BOILER for painting is done after the various fittings have been fitted, installed and removed. All these parts should be taken off when the casting is in preparation for the undercoat finish. (See paragraph on painting). Boiler undercoat paint should be applied before piping is installed.

PIPING: Apply the heavy piping first. There are no fixed rules for model locomotive piping, other than to follow the plans and pictures. The technique for bending and fitting the piping wire is one of bending as sharply as possible but keeping uniform radii on the curves. The feedwater pipes leading from the check valve, item #214, Part #1601, are fastened to the boiler side by a short piece of brass wire, item #234, Part #1903. This is bent in a form of a hook to fit the pipe, and inserted through a hole in the boiler side. These hooks are then bent over on the inside of the casting to hold the piping wire in place. Sand pipes are formed to fit around the boiler and inserted through holes in the running board. Then cut to length at the top to fit into the grooves under the sand dome. Piping wires which lead down under the cab can be securely fastened to each other at points where they cross one another by a spot of solder at that point. Small piping is formed by wire, item #234, Part #1903. Air pipe cooling loops on the left side should be formed and fitted into the pipe hanger bracket, item #245, Part #1649 A and B. They are fastened by screw, item #208, Part #C1250. When the pipes have been formed and fitted into the hangers and clamped, the bottom tab can then be clinched up as shown in the sketches.



AIR TANKS: are mounted as shown in the drawings. The short tank, item #226, Part #1609, is mounted on the left side by screw, item #231, Part #1256, behind the pipe hangers. The long tank, item #225, Part #1608, is mounted on the right side by screw, item #231, Part #C1256.

The pipe hanger assembly is used on the right side at the rear. Only one hanger is necessary at this point to hold the single air pipe. Cut off the excess hanger corrugations as shown in the sketch for less than the full number of four pipes.

HAND RAILS: Cut pieces of wire, item #234, Part #1903, a little longer than the boiler. Thread on five short stanchions, item #235, Part #1643, and one long stanchion, item #234, Part #1642. Start at the rear of the loco and tap the first stanchion in lightly. The rear part of the hand rail uses the short stanchions. The stanchions must drive in with a close fit. If loose, squeeze a flat on the shank to slightly enlarge it. If the hole is too small, file the stanchion shank to a small taper at the tip. Then drive in place. Proceed forward, driving one stanchion at a time and keep the wire straight. When all posts are seated, the wire is straightened further by pulling from front or rear and the stanchions lined up by tapping to produce a straight rail throughout its length. Trim the wire at the front, and at the rear so that it may butt against the cab. The hand rails on the side of the smoke box are applied in the same manner.

OTHER BOILER FITTINGS: are now mounted permanently. Mount the headlight before the smoke stack is screwed to the angle brace which holds the smoke box front.

PAINTING: Poor painting frequently ruins the appearance of the best models; here are some tips:

- (1) Remove the boiler fittings and file the entire boiler lightly with a FINE file to knock off the highest parts of the grain. Sharpen the edges of running boards.
- (2) Clean well in gasoline or carbon tetrachloride to remove all oil and grease.
- (3) Brush, or preferably, spray a fairly heavy coat of automotive primer, let dry and then sand smooth with 8/0 "wet or dry" finishing sandpaper, using water as a lubricant; this is important if you want a smooth, even finish. Sand filler until it assumes a dull polished appearance.
- (4) Now add all boiler fittings except the bell, pops, hand rail stanchions and hand rails, and spray primer one coat over all, and rub down with rubbing compound.
- (5) You now are ready to spray the color coat, and remember two or three thin coats are better than one heavy one. Use a good grade of black lacquer, preferably a semi-gloss black, permitting it to dry between each coat. (The Hobby House, 610 Huron Road. Cleveland 15, Ohio has a fine locomotive lacquer.) If you want more gloss, just rub down lightly with automobile rubbing compound.

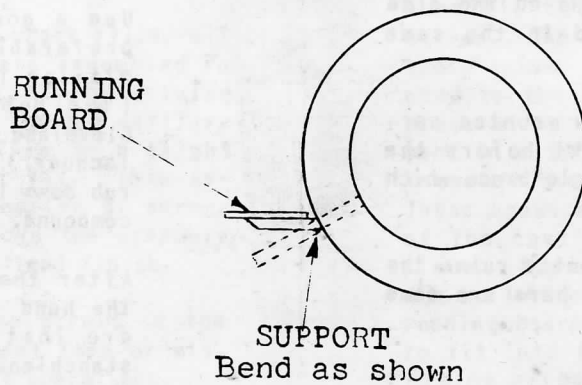
After the final finish is completed, the hand rails, bell, whistle and pops are installed. The hand rails and stanchions are painted by hand, or left shiny brass if you prefer.

Tools Required:

Files - 6" & 8" flat mill bastard
Hand drill, electric drill, or drill press
Tap wrench
Taps - #2-56, #5-40
Drills - #64, #53, #51, #48, #42, #28, 1/4"
Center punch
Soldering iron - 100-200 watts. Soldering fluid & wire solder
Hammer (machinists) 2 oz. & 8 oz.
Pliers - Needle nose, diagonal side cutters, tweezers

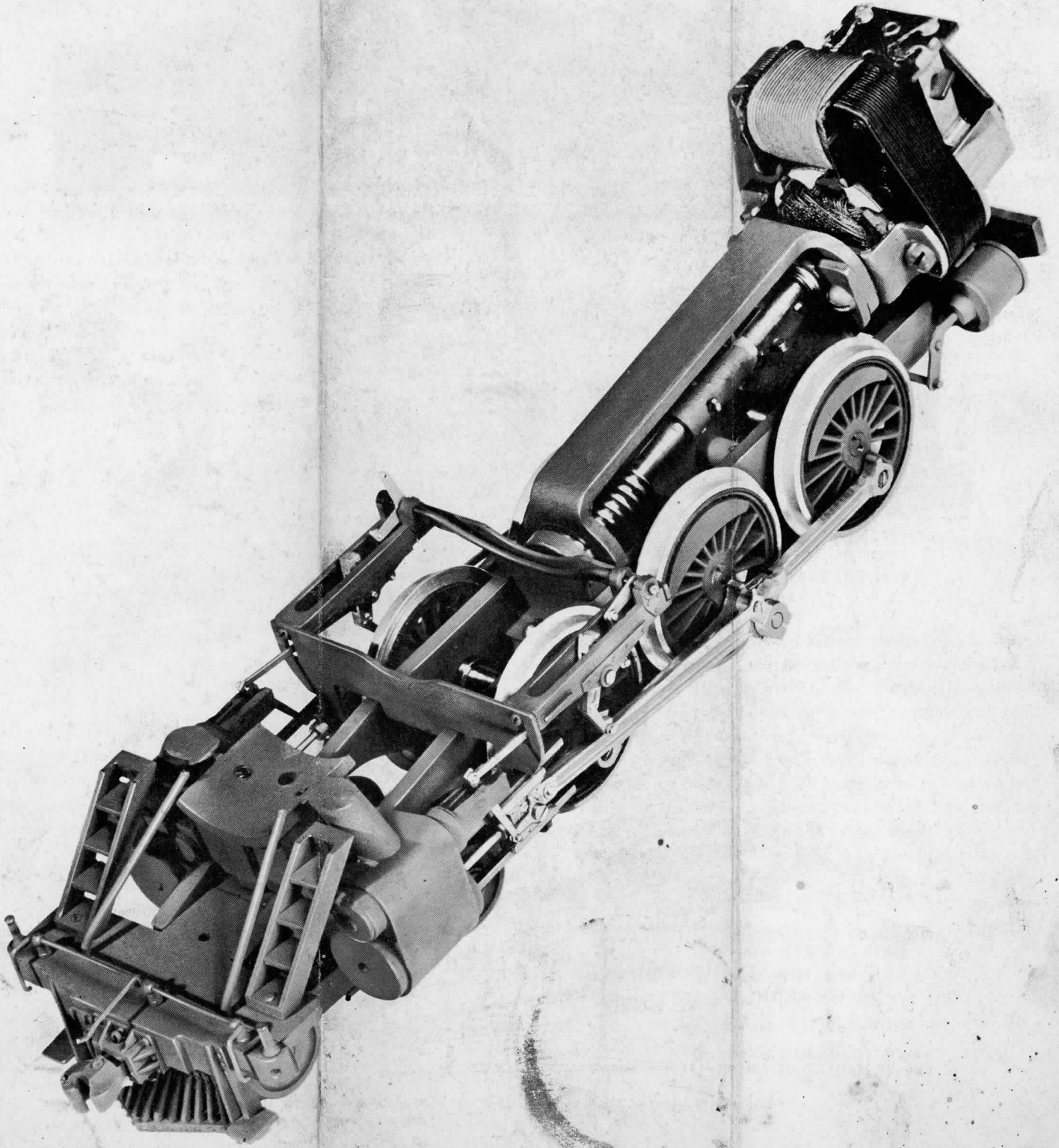
RUNNING BOARD, AIR TANK AND
COMPRESSOR MOUNTING

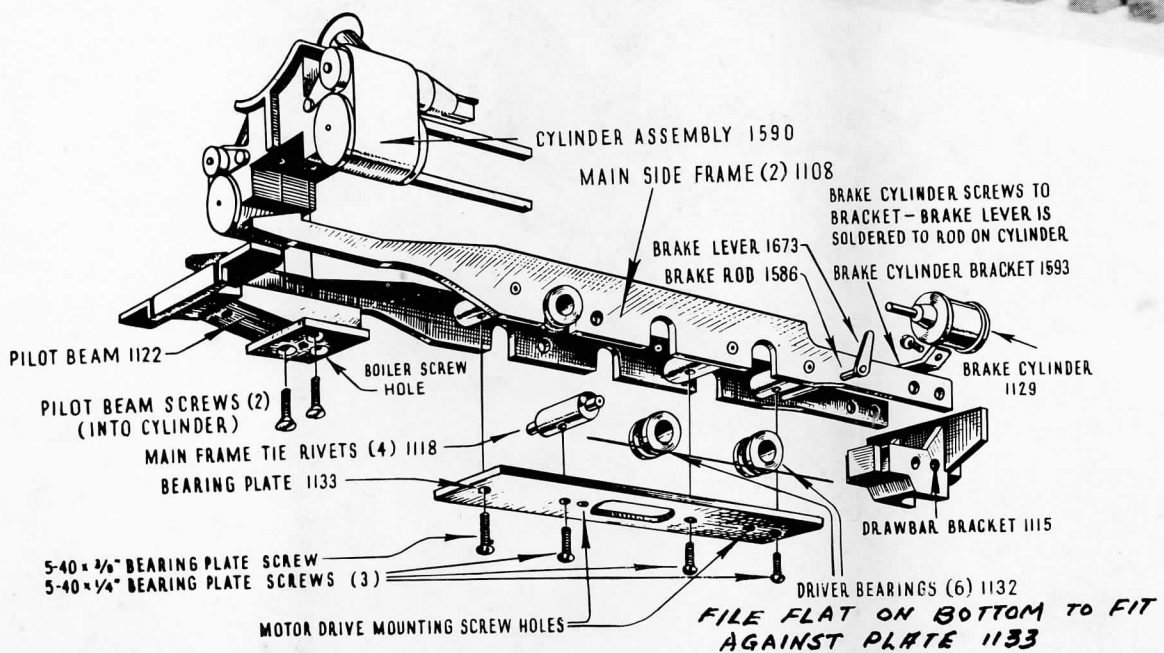
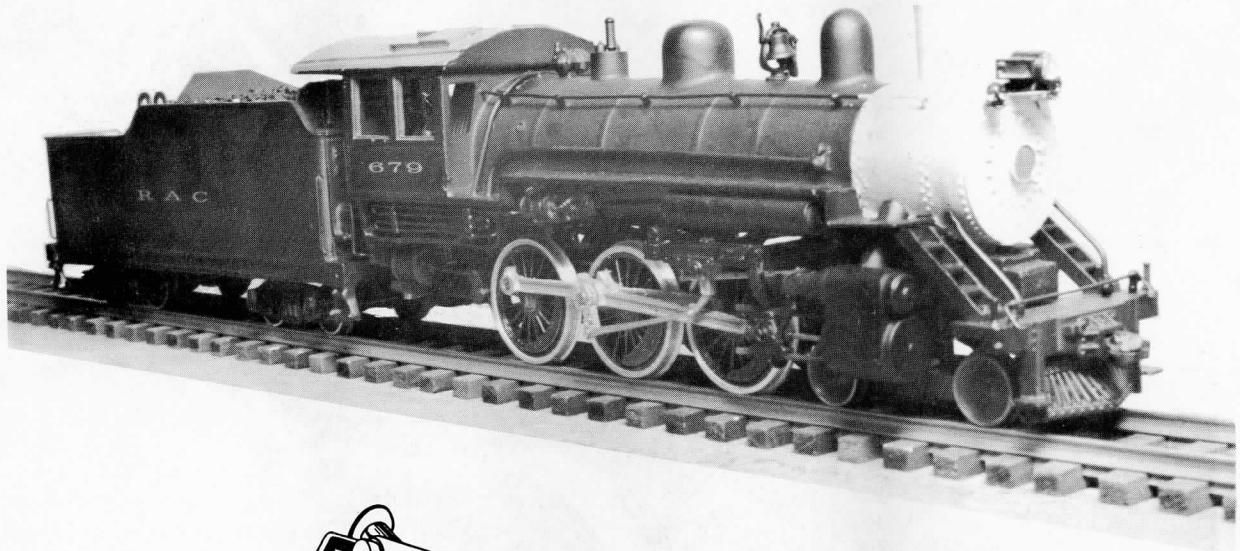
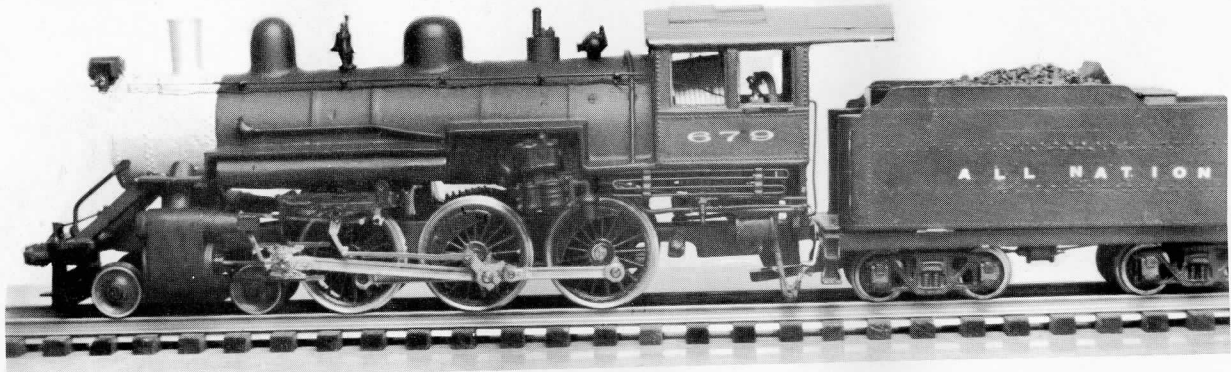
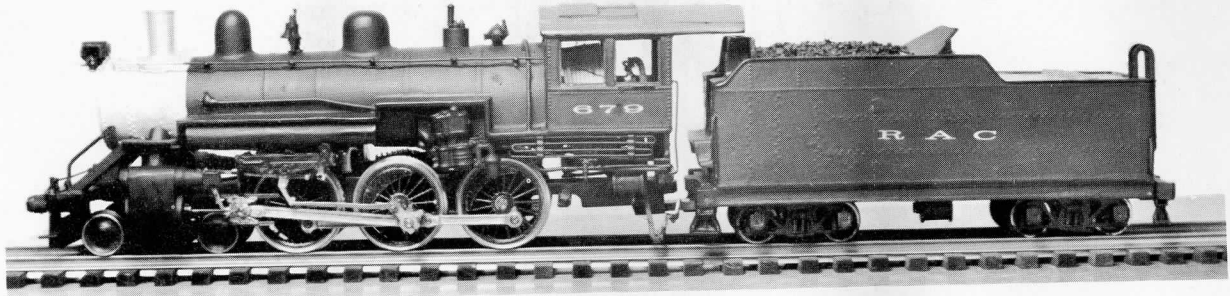
Drill centermarked locations on lower portion of boiler with a #53 drill. Cut off eight pieces, 1" long, from 1/16 brass rod. File a slight taper about 1/8" long on one end of each rod. Place tapered ends of rods in holes and carefully tap in with a small hammer until tight. Carefully bend the rods until horizontal. Cut running boards as per drawing from .032 x 1/2 x 6" (material supplied.) Lay boards on supports. Trim supports off 1/16" from outer edge of board and chamfer ends. Cut notch in running board for the compressor and or pumps and in both for clearance at cylinder pipes. Lay boards on supports using small clamps to hold in alignment and solder in place. Install air tank brackets on tanks and sweat solder to boards then solder to boards then solder air compressor in place.



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Manufacturer and Distributor "O" Scale Model Railroads
23 W 546 ST. CHARLES ROAD
WHEATON, ILLINOIS 60187
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ALL-NATION LINE
O-SCALE TEN WHEELER
MECHANISM ASSEMBLY INSTRUCTIONS





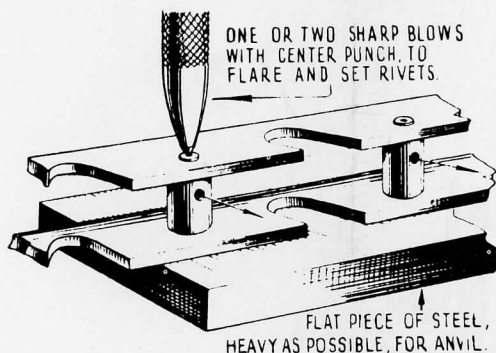
Read Carefully:

- (1) All working parts have been machined and with the exception of small clean up jobs for flash and finish they are ready for assembly.
- (2) **Caution!** This is a hobbyists' construction kit. In the interests of economy a good deal of the drilling and tapping has been left to the constructor. MOST MODEL RAILROADERS not only can but prefer to drill and tap a hole. If you can't - DON'T BUY THIS KIT!

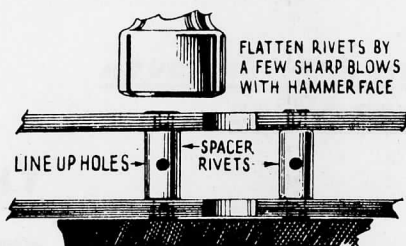
- (3) Read the instructions carefully and study the diagrams and pictures before attempting to assemble this kit. The final results obtained will more than compensate for the few extra minutes required to thoroughly digest the instructions.
- (4) **Guarantee:** All parts defective in manufacture will be replaced without charge provided the part is sent for exchange to the factory together with the kit packing slip. DO NOT SHIP YOUR LOCOMOTIVE to the factory for inspection or repairs. It will be returned Express collect.

MECHANISM ASSEMBLY INSTRUCTIONS

THE MAIN FRAME of the locomotive is formed by riveting together the two stamped brass side frames, Part No. 1108 with four main frame rivets, Part No. 1118. Put them together by hand and screw the assembly together with the bearing plate, Part No. 1133. This will line up all the holes in the rivets as the screws are put in them. The procedure for the riveting assembly is shown in the drawings. Use the center punch ground as shown in the sketch. Upset the rivet ends with a sharp rap of your hammer. Turn the

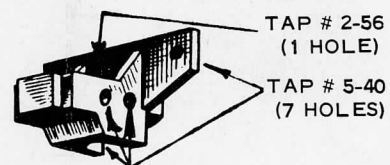


assembly over and repeat on the opposite side. Then pean the rivet over with the flat face of the hammer as illustrated. It is not necessary that the rivets be flush with the side because a clearance is allowed for the wheels. Remove the bearing cover plate.



The Draw Bar Bracket, Part No. 1115 is attached with screws, Part No. C1506, after holes in bracket have been tapped. See sketch for tapping information.

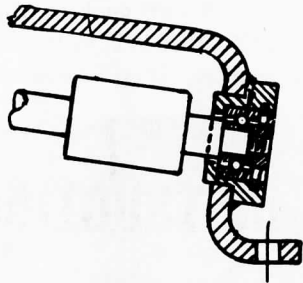
NOTE: When using our new "C" Boiler it is necessary to mount the Drawbar Bracket, No. 1115 in its farthest back position, the front hole in the bracket with the rear hole in the frames. The "Open" holes can be filled with putty. Also the longer 3/8" motor spacers and screws are used to locate the motor back in the cab for clearance.



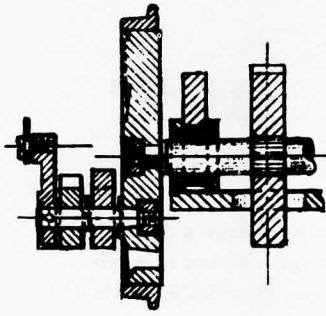
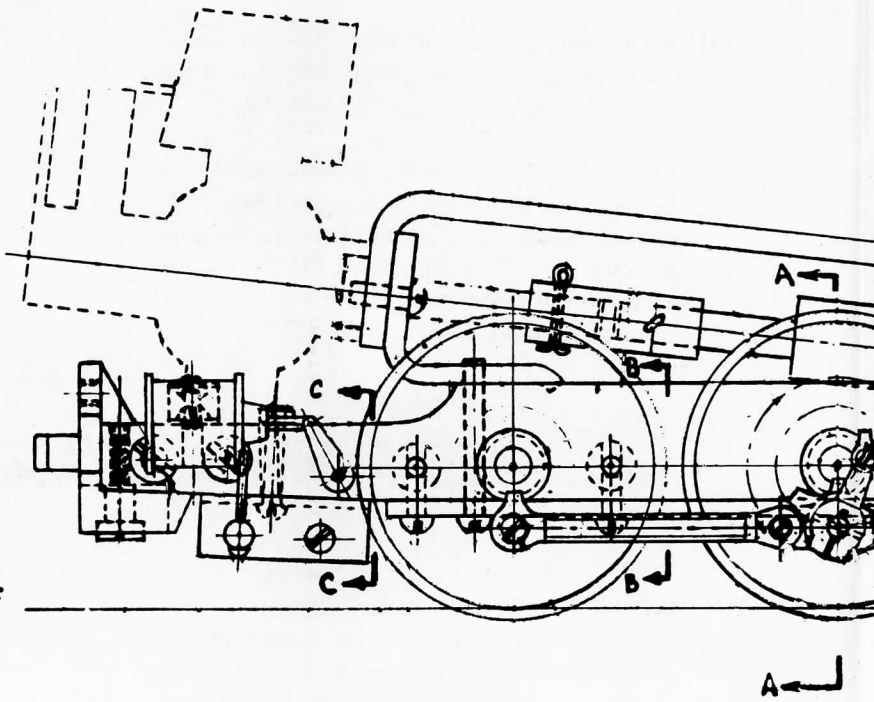
DRAWBAR BRACKET 1115

DRIVE WHEELS: Take the light weight driver uninsulated, Part No. 1580, shove the axle into the back of the driver hub and the flat of the axle. If necessary, tap the wheel gently with a hammer to start, but do not damage the threads on the axles. Grind or file a small slot in the blade of a small screw driver to fit the special driver nuts. After the axle is started in, screw on the driver nut, item No. 39, Part No. 1278. This will draw the driver on firmly against the shoulder. Now place two bearings, file bearings FLAT as shown, Part No. 1132, on the axle and attach the other driver, uninsulated, Part No. 1581, in the same manner. Repeat this process with the forward drivers.

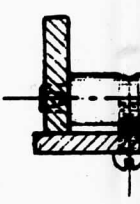
MAIN DRIVER: Insert the main crank pin, Part No. 1531, into the tapered hole on the front of the uninsulated wheel, Part No. 1579. Run the nut, Part No.



DETAIL "A" - WORM DRIVE
BEARING ASSEMBLY

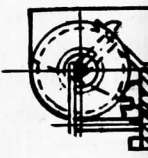
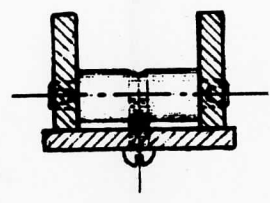
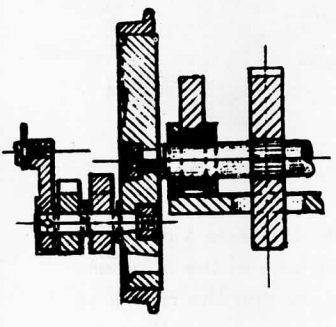
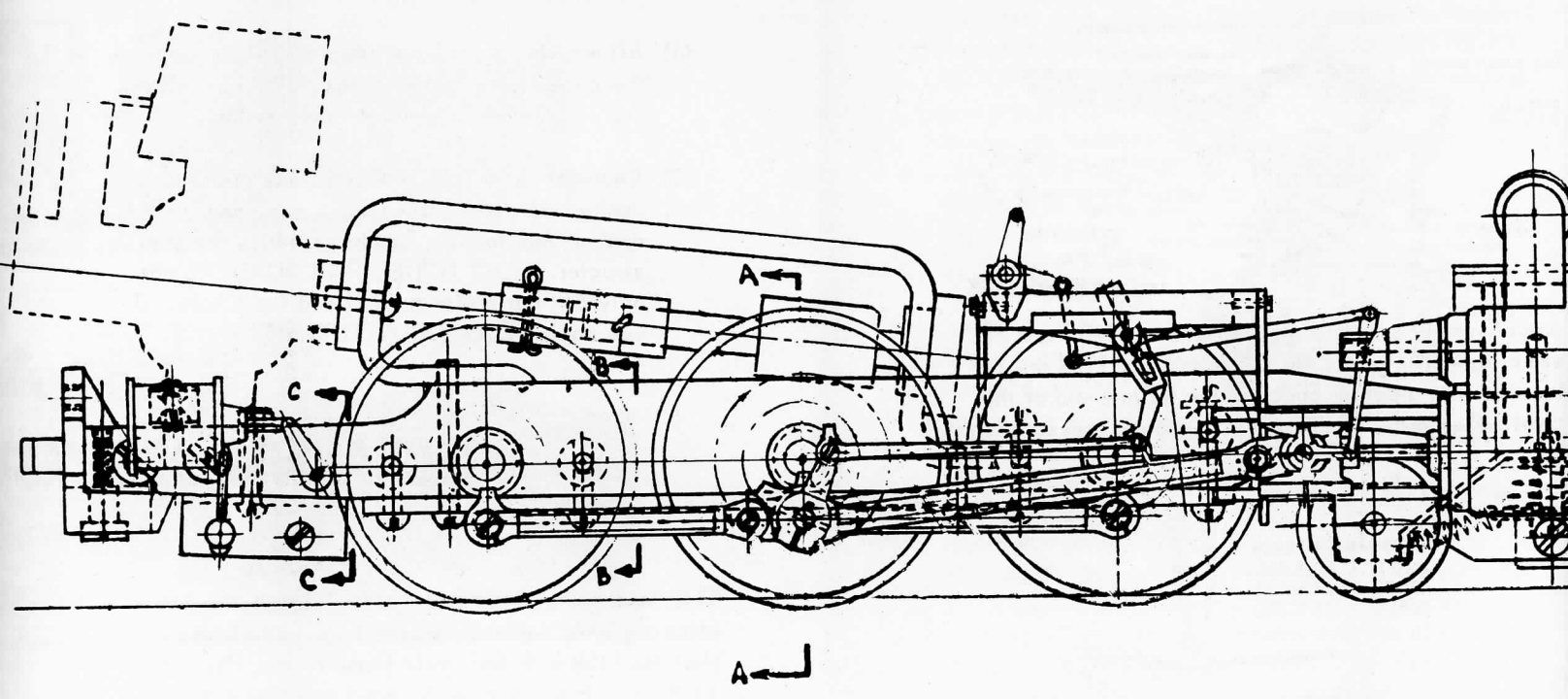


(HALF) SECTION A-A THROUGH
MAIN DRIVER & RODS



SECTION B-B
MAIN FRAME

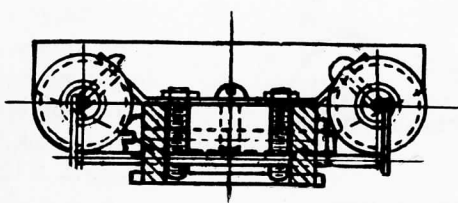
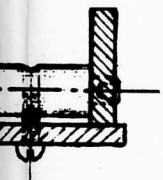
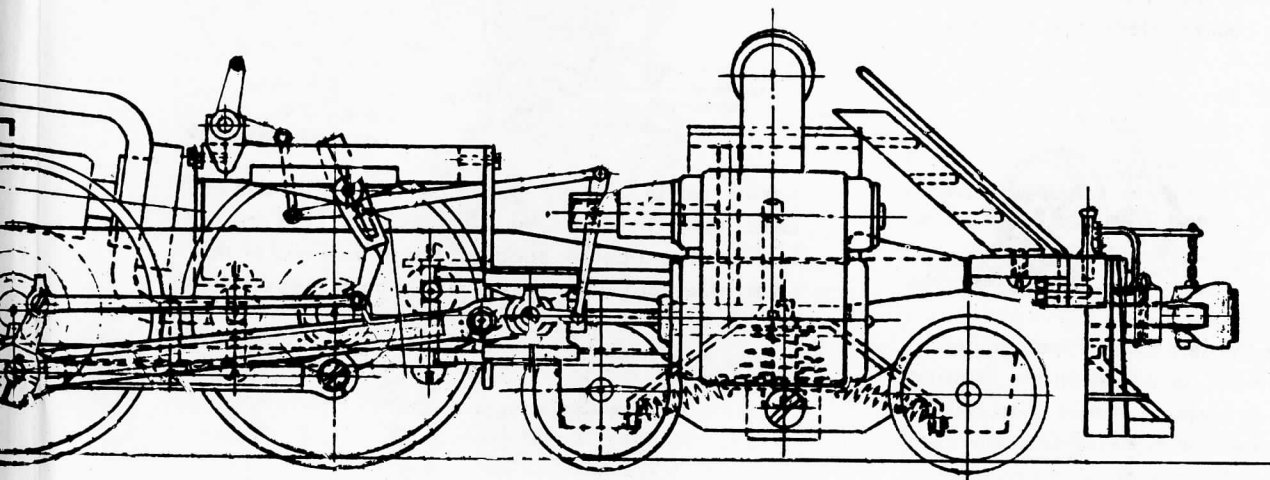
THE
ALL-NATIO
P.O. BOX 145, DE
A DIVISION OF THE ALL-NAT



SECTION B-B THROUGH
MAIN FRAME AT TIE

HALF SECTION A-A THROUGH
MAIN DRIVER & RODS

THE
***A*LL-NATION LINE**
 P.O. BOX 145, DES PLAINES, ILL.
 A DIVISION OF THE ALL-NATION HOBBY SHOP

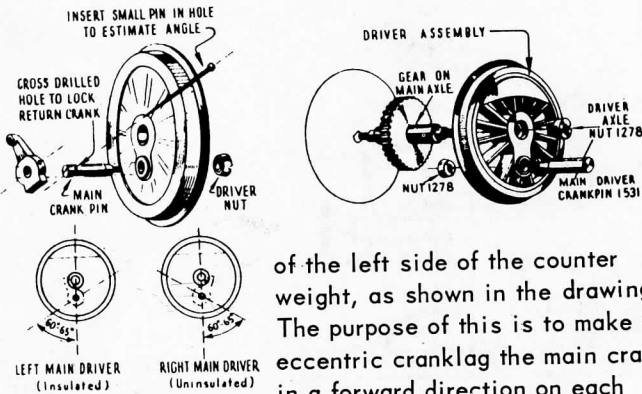


B-B THROUGH
FRAME AT TIE

ION LINE

DES PLAINES, ILL.
INATION HOBBY SHOP

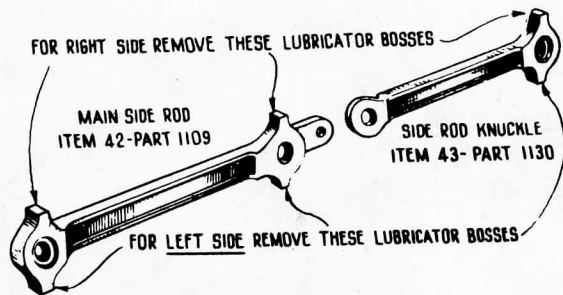
1278, on the pin from the back loosely. Now line up the hole in the crank pin so that when a straight pin is put through the hole, it would point clockwise down from the right side of the counter weight; then tighten the nut. See drawing for this operation. Repeat the process for the left side on the other insulated wheel, with the pin point down counter clockwise from the tip



of the left side of the counter weight, as shown in the drawing. The purpose of this is to make the eccentric cranklag the main crank in a forward direction on each side of the locomotive to properly

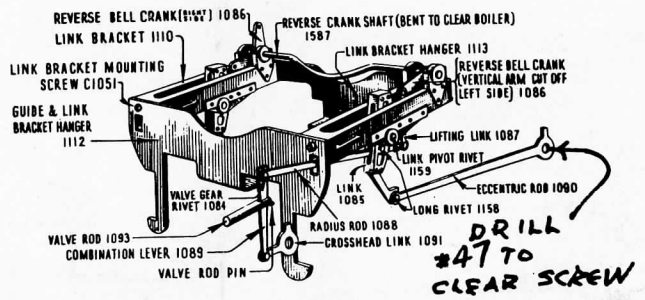
time the valve motion. Put a driver bearing on each end of the geared axle and mount the drivers in the same way as the other drivers were done. Now drop the three pairs of drivers in the frame, insulated wheels on left side of the loco, with the bearings in place in the slots. Put the cover plate on and set the screws.

SIDE RODS: These are assembled as shown on drawing No. 1564-A-the knuckle rod to the rear. File off the lubricator bosses to make left and right assemblies. (See sketches). The lubricators point up.

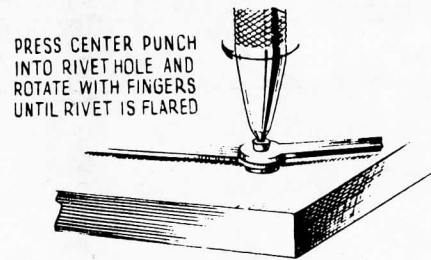


Make doubly sure you have a right and left pair, and do not make a pair of lefts or a pair of rights. Attach the rods to the wheels with the crank pins, Part No. 1057. The mechanism should now roll freely if all the steps have been followed correctly.

VALVE GEAR ASSEMBLY: Assemble the links in sections as follows: the radius rods No. 1088, link No. 1085, lifting link No. 1087, reverse valve crank No. 1086, and the eccentric rod No. 1090 are made in

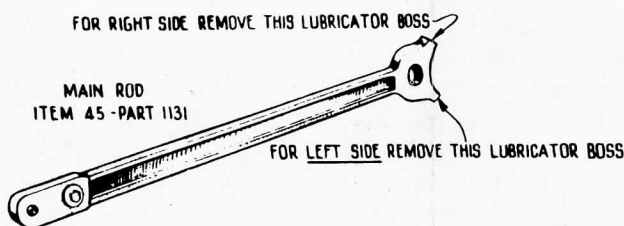
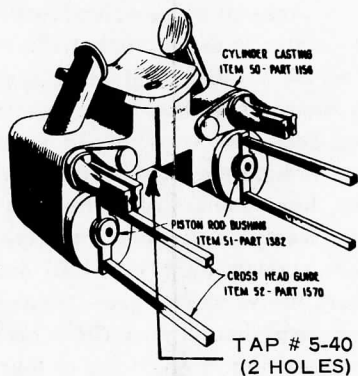


one assembly. Rivet to make right and left hand assemblies. The rivets No. 1084 and No. 1158 are set by inserting a center punch in the hollow end of the rivet. (See drawing). Exert just enough pressure with



your fingers in a circular motion, swiveling the center punch around to slightly flare the rivet. A HAMMER IS UNNECESSARY and very likely to spoil the rivet. DO NOT USE IT. Next assemble the right and left hand assembly of the valve rod No. 1093 and combination lever No. 1089 with the crosshead link No. 1091. The valve rod pin, is driven through the rod and cut off at each end. The ends are filed flush with the valve rod to slide into the cylinder valve guide freely. Assemble the valve gear frame consisting of guide and link bracket hanger (front), Part No. 1112, link bracket hanger (rear), Part No. 1113, and the two link brackets, Part No. 1110 with the 4 screws, Part No. C1051, as shown in the drawing. Form the reverse shaft, Part No. 1587 from the 1/16" brass wire, and insert in the link brackets as shown. Next, insert the radius rod No. 1088 through the hole in the hanger No. 1112, and then rivet the radius rod No. 1088 to the combination lever No. 1089. Then insert the link pivot rivet No. 1159 on each side and set the rivet in the same way as the smaller rivets. The reverse shaft can be pushed from one side to the other to enter the reverse bell crank lever No. 1086. On the left side, the top arm of the reverse bell crank, No. 1086, should be cut off. The assembly is then ready to be mounted on top of the locomotive frame, using screws, Part No. C1500, which thread into the frame rivets.

CYLINDERS, No. 1156: First tap the two holes on the under side of the cylinder casting with a No. 5-40 tap as indicated. Insert the piston rod bushing, Part No. 1382, in the holes and tap in with a hammer. The crosshead guides, Part No. 1570, should be carefully driven into the square holes of the back of the back of the cylinder. Now screw the piston rods, Part No. 1383, in the crossheads, Part No. 1111. Slip the crosshead in the guides with the piston rod in its bushings. The crosshead must slide freely. If any binding is noted, check the guides for alignment. Now work the valve rod into the cylinder guide and the crosshead piston rod into the cylindered bushing. Clamp on the cylinder with the pilot beam casting, Part No. 1152, as shown in the general exploded drawing of the frame assembly.



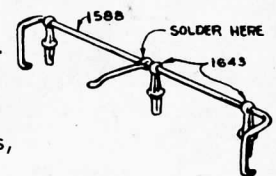
MAIN RODS: These are filed to remove the lower lubricator bosses to make RIGHT and LEFT hand rods. (See drawing) Put washer, Part No. C1806, over the main crank pin, Part No. 1531, and place the rod on the crank, lubricator boss pointing up. Connect the small end of the main rod to the crosshead, Part No. 1111, with the crosshead link, Part No. 1091, under the head of the crosshead pin screw, Part No. 1058.

RETURN CRANKS. (Eccentric), Part No. 1056. Place the eccentric on the main crank pin over the main rods. Tap it in place until the pin holes line up as shown in the drawings. Drive the No. 20 x 3/8 es-cutcheon pin, Part No. C2011, all the way in. A common straight pin will also do the trick. The cranks point about 20 degrees (see drawing for proper align-

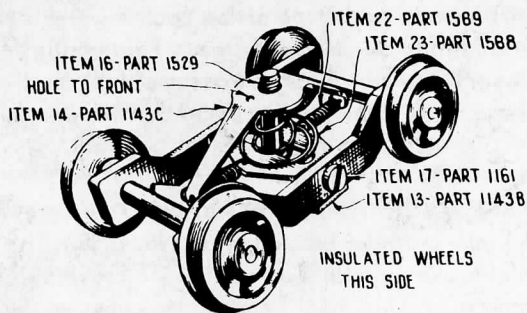
ment) forward to the top of the counterweight, when the side rods are on the bottom. This applies to both sides. If the cranks do not assume this position, reset the main crank pins to secure it.

BRAKE CYLINDERS, Part No. 1129, are screwed to the brake cylinder bracket, Part No. 1539. The latest model brake cylinders do not have a brake cylinder piston rod. This must be made by sweat soldering a piece of the 1/16" brass rod into the 1/16" hole provided. This should project 1/4" from the cylinder. Attach to the main frame as shown in assembly drawing section CC with screw, Part No. 1259. The crank arm, is cut from a bell crank, Part No. 1086 to make a single arm. The small end must be pinned or soldered to the brake cylinder piston rod. The other end is attached to the brake shaft, Part No. 1586. This is cut 1-1/4" long, from the 1/16" diameter brass rod. It goes through the frame as shown on the general assembly drawing.

PILOT: Part No. 1079. The coupler lifting rod assembly on top of the pilot is clearly shown in the photographs of the mechanism and the forward view of the locomotive, as well as this sketch showing construction. Thread the three stanchions, Part No. 1643, on to the wire to shape as shown. Drive the stanchions into the three holes provided in top of the pilot. The flag stanchions, Part No. 1035, are driven into the holes in the ends of the beam. If these driven pins don't fit snugly, flatten the shank slightly with a pair of pliers and a snug fit will result. Insert the front coupler (short one), Part No. 1592-B, into the pocket and fasten with cotter pin, Part No. C2002. Next, cut the boiler bracers, from 1/16" brass rod. These are clearly shown in the photograph of the mechanism. Make them long so they can later be cut to fit against the boiler. Insert the ends in the grooves in the pilot beam as you screw the pilot to the pilot beam. If they're not tight, file off the face of the pilot beam, Part No. 1122, to secure clamping action by the pilot when tightened by the screws, Part No. C1253. These go into the pilot from the back side of the pilot beam.



ENGINE STEPS, Part No. 1572: Clean up and screw to pilot beam with Part No. C1252 screws, from the under side of the beam platform.



PILOT TRUCK No. 1162

PILOT TRUCK, Part No. 1161: Assembly is obvious as shown by the drawing. Note that the 1/16" hole in the centering bracket, Part No. 1143C, is forward, with the insulated wheels on the left side. Mount the assembled truck with the center pivot screw, Part No. 1529, in the hold provided in the pilot beam. The 1/16" hole in the centering bracket locks over the boss on the under side of the pilot beam to prevent turning. The truck must be removed at the time the boiler is attached and subsequently replaced.

WORM DRIVE MECHANISM: Insert the worm shaft, Part No. 1638, into the ball bearing of bracket, Part No. 1565, and lock with a driver nut, Part No. 1278. Place the drive coupling, Part No. 1228, on worm shaft and insert cotter pin, Part No. C2001, through hole in coupling and shaft. Tighten, bend, and cut off cotter pin. Assemble the motor bracket, Part No. 1556, and the motor to drive bracket, Part No. 1565, with screws, Part No. C1605. Add motor spacers (2). The motor bracket has slotted holes to allow adjustment of worm and gear after assembly to mechanism. Insert cotter pin through the motor shaft and coupling slot. Tighten, bend and cut off cotter pin. The motor should turn freely. Assemble the drive unit to the mechanism with screws, Part No. C1507 and Part No. 1502, to mesh the worm and gear. When motor is turned, worm and gear should have slight backlash or clearance. If the meshing is too tight, or loose, unfasten screws, and raise or lower to provide free movement.

This completes the mechanism, which is now ready for the boiler.

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