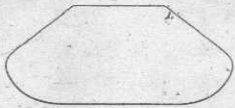


Kemtron GP-20 CRAFTED IN BRASS

I. GENERAL INSTRUCTIONS

1. ON CAST PARTS REMOVE ALL SPRUES & FLASH, FILE TO SMOOTH FINISH.
2. ETCHED PARTS SHOULD BE FINISHED TO BEAD LINES AND CHECKED FOR FIT AT EACH ASSEMBLY.



3515 FUEL TANK END CONTOUR.

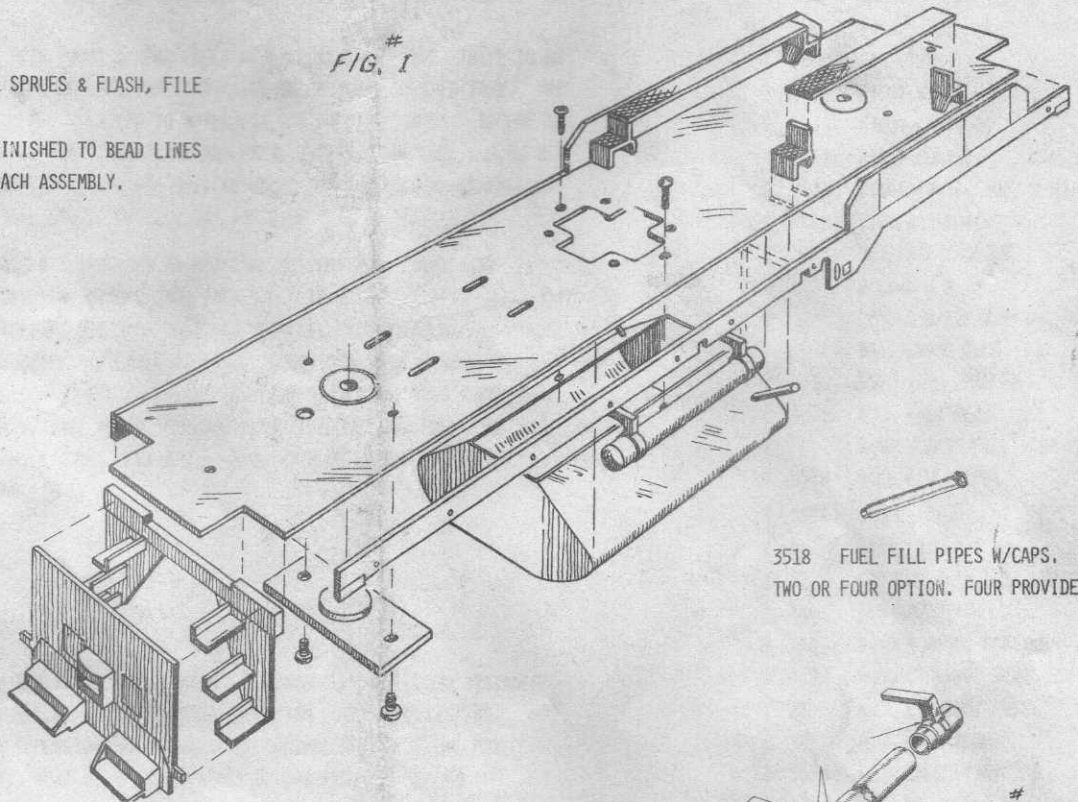
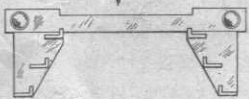


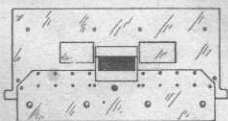
FIG. 1

3518 FUEL FILL PIPES W/CAPS. TWO OR FOUR OPTION. FOUR PROVIDED.

3509 PILOT STEP CASTINGS USE .025 FILLER HERE.



3510 PILOT CASTINGS DRILL FOUR HOLES INDICATED.



3511 & 3512 PILOT FOOTBOARDS NOTE, L.H. & R.H. POSITION

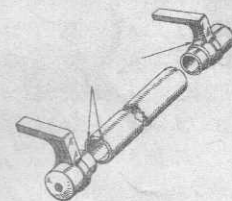
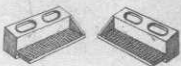


FIG. 5

3520 AIR TANK ASSEMBLY. NOTCH TUBING AS INDICATED.

II. MAIN FRAME

1. FLOOR PLATE HAS BEEN CUT, DRILLED & TAPPED FOR KEMTRON DRIVE SYSTEM. IF ANY OTHER DRIVE IS TO BE INSTALLED, MODIFY FLOOR PLATE BEFORE PROCEEDING. DEBURR & SMOOTH ALL EDGES, OPENINGS & DRILLED HOLES.
2. DRILL TEN # 55 (.052) HOLES FOR HANDRAIL STANCHIONS IN FRAME SIDE (L.H. & R.H.).
3. SOLDER FRAME SIDES TO FLOOR PLATE (NARROW SECTION OF FRAME SIDES ARE ADJACENT TO ELONGATED MOTOR MOUNT SLOTS IN FLOOR PLATES) SEE FIGURE 1. TO ASSURE FRAME FLATNESS, FINISH SOLDERING IN SMALL SECTIONS.
4. SOLDER CAB STEPS TO CAB PLATFORMS (L.H. & R.H.) SOLDER STEP/PLATFORM TO FLOOR PLATE & FRAME SIDE ASSEMBLY.
NOTE IN FIGURE 1. - THAT LEFT STEP/PLATFORM IS LONGER THAN RIGHT STEP/PLATFORM. TO LOCATE STEP/PLATFORMS, PLACE R.H. REAR STEP (LOWER VERTICAL SECTION OF STEP) FLUSH WITH VERTICAL RISE OF THE R.H. RAISED (BATTERY BOX) SECTION OF FRAME SIDE. TO LOCATE LEFT STEP/PLATFORM, FRONT L.H. STEP LINES WITH R.H. FRONT STEP.
5. FIT PILOT STEPS TO FRAME ASSEMBLY. IF NECESSARY, ADD A 1 13/32" LONG X .100 WIDE X .025 THICK BRASS STRIP BETWEEN CROSS BRACE OF PILOT STEPS & FLOOR PLATE, BOTH ENDS. SOLDER COMPLETE.
6. DRILL FOUR HOLES IN FRONT & REAR PILOT CASTING FOR COUPLER LIFT BAR BRACKETS.

7. CONSIDER DRILLING AND/OR MODIFICATION AT THIS TIME FOR YOUR SELECTION OF COUPLER AND/OR POCKET INSTALLATION TO THE FRONT & REAR PILOTS.
8. SOLDER FRONT & REAR PILOT CASTING TO PILOT STEPS AND FRAME ASSEMBLY.
9. SOLDER L.H. & R.H. FOOTBOARDS TO FRONT & REAR PILOTS AS INDICATED IN FIGURE I.
10. ASSEMBLE L.H. & R.H. AIR TANK ENDS WITH 1/4" DIA. BRASS TUBING, NOTCHING TUBING FOR SNUG FIT ON TANK ENDS AS INDICATED IN FIGURE 5. NOTE THAT SHORTER TANK ENDS (L.H. & R.H.) INSTALL FORWARD & LONGER TANK ENDS INSTALL TO THE REAR. SOLDER BOTH L.H. & R.H. TANK ASSEMBLIES TO FLOOR PLATE WITH TANK SUPPORT BANDS FITTING INTO FRAME SIDE NOTCHES PROVIDED AS PER FIGURE I.
11. SOLDER FUEL TANK ENDS FLUSH WITH FRONT & REAR EDGES OF FUEL TANK WRAPPER. THERE IS AN ETCHED LINE ENCIRCLING THE TANK WRAPPER THAT INDICATES AN OPTIONAL DIVIDED TANK. THIS LINE WILL SERVE AS THE FORE & AFT LOCATION TO DRILL FOR THE HOLDING SCREWS. SECURE THE TOP OPENING OF THE FUEL TANK TO THE FLOOR PLATE AND EVENLY BETWEEN THE L.H. & R.H. AIR TANKS, AS INDICATED IN FIGURE I, THE TWO PRE-DRILLED HOLES FOR THE HOLDING SCREWS LINE UP WITH THE ETCHED DIVIDED TANK LINE; DRILL & TAP FOR 2-56.

FOOTNOTE: FUEL TANK WITH THIS KIT PROVIDES AN OPTIONAL DESIGNATION - DUAL TANK - 1150 GAL. OIL AND 1200 GAL. BOILER WATER -OR- SINGLE 2350 GAL. OIL. IF USED AS SINGLE TANK, SPOT DRILL L.H. & R.H. HOLES IN FORWARD SIDES OF TANK FOR TWO FUEL FILL PIPES AS PER FIGURE I. IF USED AS A DUAL TANK, SPOT DRILL SIMILAR L.H. & R.H. LOCATIONS IN REAR SIDES OF TANK AND ADD TWO ADDITIONAL FUEL FILL PIPES, FILING OUT A FILL PIPE ARCHED NOTCH IN BOTH FRAME SIDES TO POSITION FUEL FILL PIPES THE SAME AS THE FORWARD PIPES. (FOUR 3518 FUEL FILL PIPES WITH CAPS PROVIDED FOR OPTIONAL SELECTION). FOR A L.H. SIDE VIEW OUTLINING THE FUEL FILL PIPES IN THE FRAME SIDE, SEE FIGURE 3.

III. SUPERSTRUCTURE

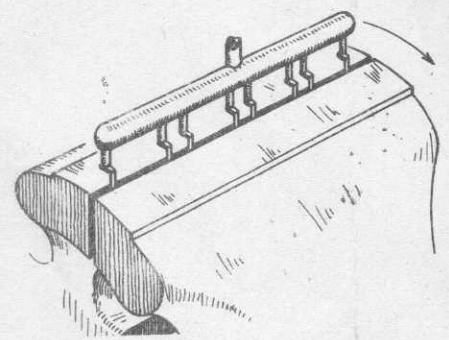
1. CAB ASSEMBLY. STARTING WITH CAB FRONT, (SEE FIGURE 6) CAREFULLY DIMENSION DISTANCE FROM INSIDE TOP SURFACE OF THE L.H. & R.H. WINDOWS TO BOTTOM SURFACE OF CASTING, REMOVING MATERIAL UNTIL BOTH DIMENSIONS ARE EQUAL. BE CAREFUL NOT TO REMOVE ANY MORE MATERIAL THAN NECESSARY. NEXT SQUARE BOTH SIDES OF CAB FRONT AT 90° TO THE BOTTOM SURFACE.
2. PREPARE CAB BACK IN THE SAME MANNER & AFTER SQUAREING SIDES WITH BOTTOM SURFACE, CHECK & IF NECESSARY, REMOVE MATERIAL TO MAINTAIN IDENTICAL OVERALL WIDTH OF BOTH CAB FRONT AND CAB BACK.
3. CAB SIDES. SMOOTH & FLAT THE TOP EDGE SURFACES, NEXT SQUARE ALL FRONT AND BACK EDGE SURFACES 90° TO THE TOP EDGE SURFACES.
4. CHECK ELEVATIONS & FIT CAB SIDES TO CAB FRONT. POSITION AND FIT CAB ROOF; CAREFULLY REMOVE MATERIAL FROM CAB ROOF OVERHANG TO MAINTAIN CORRECT WINDOW & ROOF LINE ELEVATIONS.
5. SECURE & INSIDE SOLDER CAB SIDES TO CAB FRONT. SECURE & INSIDE SOLDER CAB ROOF TO CAB FRONT & SIDES. SECURE & INSIDE SOLDER CAB BACK TO CAB SIDES & ROOF.
6. POSITION, FIT & SOLDER NUMBER BOARD CASTING ABOVE CAB FRONT WINDSHIELD.
7. POSITION CAB ASSEMBLY ON CAB STEP/PLATFORMS, LOCATING EQUALLY FORE & AFT IN LINE WITH LARGE BATTERY BOX DOORS OUTLINED ON BOTH FRAME SIDES. NEXT REMOVE EXCESS MATERIAL FROM CAB SIDES & CAB BACK UNTIL CAB ASSEMBLY SEATS SQUARELY ON CAB STEP/PLATFORMS AND 90° TO THE FRAME FLOOR PLATE SURFACE.
8. TEMPORARILY SECURE THE CAB ASSEMBLY TO THIS LOCATION
9. POSITION REAR HOOD UNIT WRAPPER AGAINST CAB BACK. THE TOP ROUNDED CORNERS SHOULD NOT PROTRUDE ABOVE ROOF LINE; AND IF NECESSARY REMOVE MATERIAL FROM BOTTOM SURFACES OF HOOD UNIT WRAPPER. CHECK ALIGNMENT AND PREPARE HOOD UNIT WRAPPER FOR PROPER FIT TO CAB BACK AND REAR NOSE CASTING.
10. POSITION FRONT LOW HOOD UNIT WRAPPER AGAINST CAB FRONT AND UNDER WINDSHIELD BEAD; & IF NECESSARY REMOVE MATERIAL FROM BOTTOM SURFACES OF HOOD UNIT WRAPPER. CHECK ALIGNMENT AND PREPARE HOOD UNIT WRAPPER FOR PROPER FIT TO CAB FRONT & FRONT NOSE CASTING.
11. CHECK ALL CAB, REAR HOOD UNIT AND FRAME ALIGNMENTS AND TACK SOLDER HOOD UNIT TO CAB BACK. DO NOT SOLDER NOSE CASTING AT THIS TIME.
12. TACK SOLDER FRONT LOW HOOD UNIT WRAPPER TO CAB FRONT IN THE SAME MANNER. DO NOT SOLDER FRONT NOSE CASTING AT THIS TIME.

- PARTS LIST FOR "0" GP-20
KIT 3500 (LESS GEARED DRIVE & MOTOR)
- | | | |
|----|------|---|
| 1 | 3503 | FRAME FLOOR PLATE |
| 1 | 3504 | FRAME SIDE, L.H., ETCHING |
| 1 | 3505 | FRAME SIDE, R.H., ETCHING |
| 1 | 3506 | SAFETY TREAD ETCHING
13/32" X 3 1/8" X .040 |
| 1 | 3507 | SAFETY TREAD ETCHING
13/32" X 2 5/8" X .040 |
| 4 | 3508 | CAB STEPS |
| 2 | 3509 | PILOT STEPS |
| 2 | 3510 | PILOT CASTINGS |
| 2 | 3511 | PILOT FOOTBOARDS, L.H. |
| 2 | 3512 | PILOT FOOTBOARDS, R.H. |
| 8 | 3513 | LIFT BAR BRACKETS |
| 1 | 3520 | SET, AIR TANK ENDS,
2 LONG & 2 SHORT
PCS. 2 9/32" X 1/4"
DIA. BRASS TUBE |
| 1 | 3514 | FUEL TANK WRAPPER |
| 2 | 3515 | FUEL TANK ENDS |
| 2 | | 2-56 X 1/2" FILLISTER HD. |
| 4 | 3518 | FUEL FILL PIPES |
| 1 | 3521 | CAB FRONT |
| 2 | 49 | CAB SIDES |
| 1 | 82 | CAB END (CAB BACK, GP-20) |
| 1 | 50 | CAB ROOF |
| 1 | 3522 | NUMBER BOARD CASTING |
| 1 | 3523 | HOOD ETCHING, REAR |
| 1 | 3524 | HOOD ETCHING, FRONT |
| 1 | 46 | HOOD END, REAR |
| 1 | 3525 | HOOD END, FRONT |
| 2 | 47 | SAND HATCHES |
| 1 | 63 | DUAL HEADLIGHT |
| 7 | 3526 | GRAB IRONS |
| 1 | 3527 | GRAB IRON |
| 1 | | PC. 2" X 1/4" X .062 |
| 6 | | 2-56 X 1/4 RD. HD. |
| 1 | 3528 | FAN GUARD PLATE |
| 1 | 3529 | FAN GUARD PLATE |
| 1 | 2351 | DYNAMIC BRAKE
CENTER HOUSING |
| 2 | 2352 | DYNAMIC BRAKE
SIDE VENTS |
| 4 | 3530 | DYNAMIC BRAKE
SIDE VENT TAPERS |
| 1 | 3531 | GENERATOR VENT DOORS, L.H. |
| 1 | 3532 | GENERATOR VENT DOORS, R.H. |
| 2 | 3533 | VENT DOOR SPACERS |
| 2 | 3534 | INTAKE & SHUTTER GRILLS |
| 2 | 3535 | INTAKE & SHUTTER GRILLS |
| 2 | 3519 | FAN GUARDS (442) |
| 1 | 57 | FAN GUARD |
| 1 | 3536 | EXHAUST STACK |
| 1 | 3516 | BELL ASSEMBLY |
| 8 | 659 | LIFT RINGS |
| 1 | 3517 | 3 CHIME HORN ASSEM. |
| 28 | 3537 | HANDRAIL STANCHIONS |
| 5 | 486 | .025 X 12" BRASS WIRE |
| 2 | 3538 | INSULATED BOLSTERS |
| 1 | 60 | PR. '0' TRUCKS. |

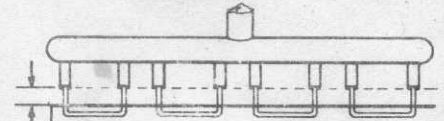
13. NOSE CASTINGS. STEP #1 - REMOVE EXCESS MATERIAL FROM THE BASE OF REAR & FRONT NOSE CASTINGS, MAINTAINING TOP & SIDE WRAPPER TO NOSE CASTING FIT, BOTH ENDS.
STEP # 2 - DETAIL BOTH NOSE CASTINGS BEFORE SOLDERING TO HOOD UNITS. DRILL HOLES FOR MARKER LIGHTS, HEADLIGHTS, GRAB IRONS & HOLES FOR SAND-HATCHES INDICATED BY DIMPLE IN THE TOP OF BOTH NOSE CASTINGS. FORM THE GRAB IRON AS PER FIGURE # 7. SOLDER THESE AND DETAILS COMPLETE TO NOSE CASTINGS.
14. SOLDER NOSE CASTINGS TO HOOD UNITS, CHECKING ALIGNMENT & SUPERSTRUCTURE FLATNESS TO FRAME FLOOR PLATE. WHEN SATISFIED, COMPLETE SOLDERING IN ALL AREAS WHERE JOINTS WERE TACK SOLDERED.
15. FABRICATE TWO SQUARES OR ANGLES AS SHOWN UNDER REAR NOSE CASTING IN FIGURE # 2 AND SOLDER INSIDE BOTTOM EDGE OF BOTH NOSE CASTINGS. MOUNT SUPERSTRUCTURE ON FRAME & TRANSFER HOLE LOCATIONS TO SQUARES OR ANGLES; DRILL & TAP FOR 2-56 RD. HD. BRASS SCREWS.

FIG. 7

1. Place grab irons in a vise to bend "Dog Leg".



2. Use strips to gauge thickness for spacing.



Bend 1, high hood, spaced .073. Bend 6, high hood end spaced .090.

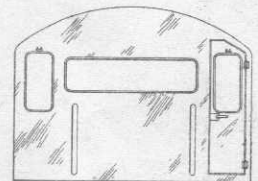
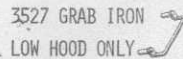


FIG. 6



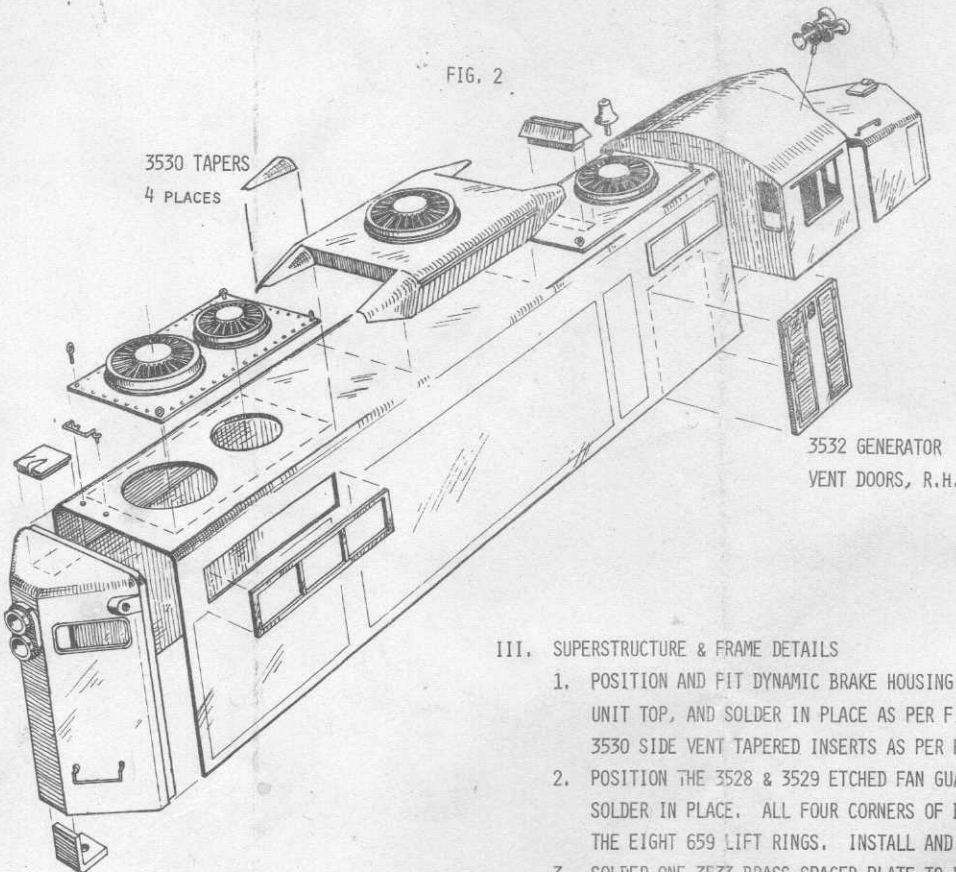
3536 STACK



3527 GRAB IRON

LOW HOOD ONLY

FIG. 2



3530 TAPERS
4 PLACES

3532 GENERATOR
VENT DOORS, R.H.



3526 GRAB IRONS



3522 NUMBER BOARD

III. SUPERSTRUCTURE & FRAME DETAILS

1. POSITION AND FIT DYNAMIC BRAKE HOUSING SIDE VENTS AND CENTER HOUSING TO CONFORM TO HOOD UNIT TOP, AND SOLDER IN PLACE AS PER FIGURES # 2 & # 3. NEXT POSITION AND FIT THE FOUR 3530 SIDE VENT TAPERED INSERTS AS PER FIGURE # 2.
2. POSITION THE 3528 & 3529 ETCHED FAN GUARD PLATES ON HOOD UNIT AS PER FIGURE # 2 AND SOLDER IN PLACE. ALL FOUR CORNERS OF BOTH PLATES ARE ETCHED TO LOCATE AND DRILL FOR THE EIGHT 659 LIFT RINGS. INSTALL AND SOLDER LIFT RINGS FROM INSIDE HOOD UNIT.
3. SOLDER ONE 3533 BRASS SPACER PLATE TO BACK OF THE 3532 VENTED DOORS PLATE FOR REQUIRED PROTOTYPICAL THICKNESS. NEXT SOLDER PLATES TO THE R.H. SIDE OF THE HOOD UNIT AS PER FIGURE # 2. FOR PROPER LOCATION, THE LOWER FRONT EDGE WILL REST AGAINST THE CAB STEP. SOLDER TO HOOD UNIT SIDE ONLY.
4. VENTED DOORS PLATE 3531 ALSO REQUIRES ONE 3533 BRASS SPACER PLATE. SOLDER PLATES TO L.H. SIDE OF HOOD UNIT AS PER FIGURE # 4. NOTE THAT PLATE MUST BE FILED ON FORWARD EDGE TO NEST AROUND CAB STEP AND STEP/PLATFORM IN ORDER TO MAINTAIN FORE & AFT DIMENSIONS SIMILAR TO R.H. SIDE.
5. POSITION THE TWO 3519 AND ONE 57 FAN GUARDS & SOLDER IN PLACE AS PER FIGURE # 2.
6. FIT AND SOLDER THE TWO 3534 AND TWO 3535 INTAKE & SHUTTER GRILLS ON LEFT AND RIGHT SIDES OF HOOD UNIT AS PER FIGURE # 2.
7. ASSEMBLE THE 3516 BELL ASSEMBLY, DRILL HOLE FOR SAME ETCHED IN THE 3529 FAN GUARD PLATE, INSTALL AND SOLDER IN PLACE.
8. POSITION 3536 EXHAUST STACK OVER ETCHED STACK BEAD ON 3529 FAN GUARD PLATE AND SOLDER IN PLACE.
9. DRILL TWO ETCHED HOLES IN TOP REAR OF HOOD UNIT AS PER FIGURE # 2 & INSTALL THE 3526 GRAB IRON PREFORMED BY OPERATIONS AS PER FIGURE # 7.



3535 GRILL



3534 GRILL

10FT 2 1/2 IN.
OVER HAND RAILS
10FT 0 IN.
OVER UNDERFRAME

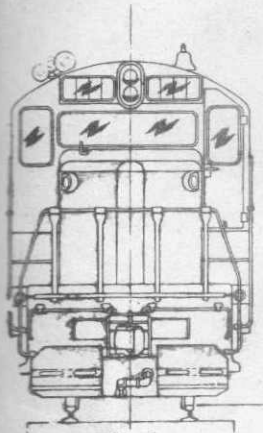


FIG. 8

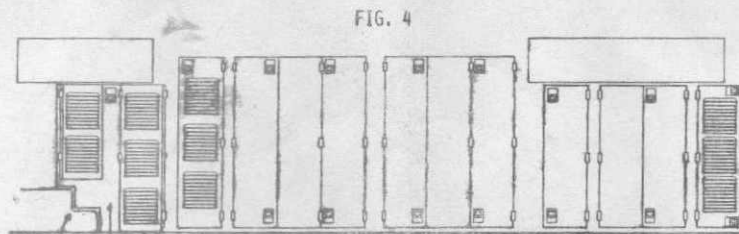


FIG. 4

3531 GENERATOR
VENT DOORS, L.H.
NOTE CAB STEP &
STEP/PLATFORM OUTLINE

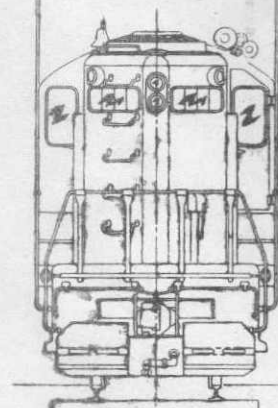
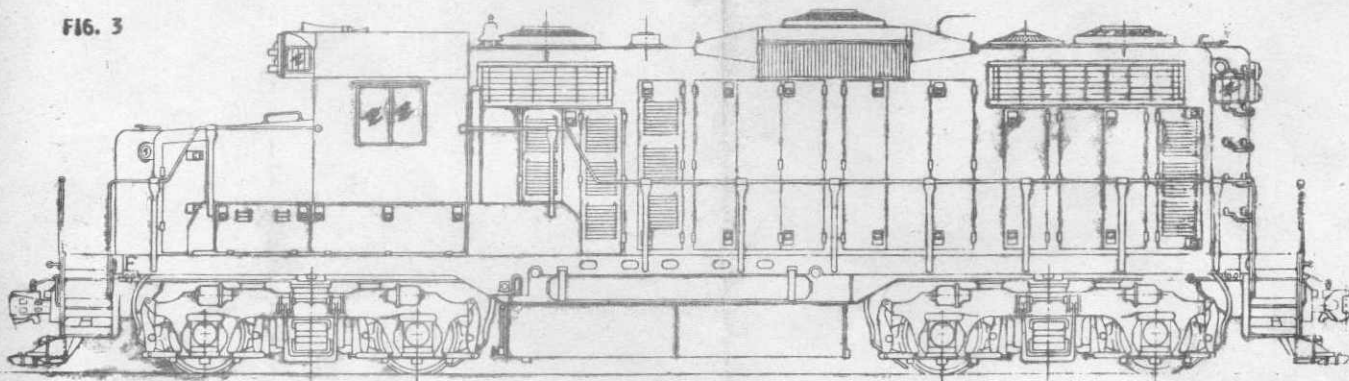
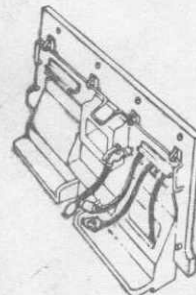


FIG. 9

FIG. 3

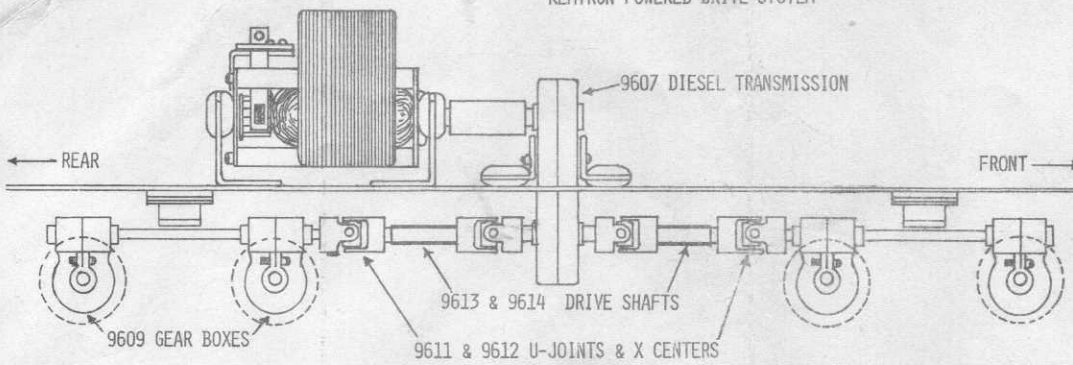


10. DRILL TWO ETCHED HOLES IN R.H. TOP SIDE OF FRONT LOW HOOD UNIT AND INSTALL THE 3527 GRAB IRON AS PER FIGURE # 2.
11. ASSEMBLE THE 3517 THREE CHIME HORN ASSEMBLY & INSTALL IN CAB ROOF. SELECT LOCATION BY VISUAL DIMENSIONING & ELEVATIONS AS PER FIGURES # 2, # 3, # 8, & # 9.
12. INSTALL THE FOUR 3513 COUPLER LIFT BAR BRACKETS IN FRONT & REAR PILOTS. FORM COUPLER LIFT BARS AS PER FIGURES # 8, & # 9 AND SOLDER COMPLETE.
13. RUN A # 71 (.026) DRILL THRU THE TWENTY-EIGHT 3537 HANDRAIL STANCHIONS; FIT TEN IN PRE-DRILLED HOLES IN EACH LEFT & RIGHT FRAME SIDES. RUN THE # 71 DRILL THRU HANDRAIL HOLES CORED IN CAB SIDES. (TWO PER SIDE) DETERMINE BY FIGURES # 3, # 8, & # 9 WHERE TO DRILL # 71 IN FRONT AND REAR PILOT STEP CASTING FOR HANDRAIL WIRE, LEFT & RIGHT SIDES. PREFORM HANDRAILS, FEED THRU ALL HANDRAIL STANCHIONS & SOLDER IN PLACE. DO NOT SOLDER HANDRAIL WIRE INTO CAB SIDES.
14. FEED HANDRAIL WIRE THRU FOUR STANCHIONS & CHECK THE ELEVATION OF FRONT & REAR HANDRAIL BY SIMILAR HEIGHT OF SIDE HANDRAILS; DETERMINING LOCATION OF THE FOUR # 52 HOLES FOR STANCHIONS IN FRONT & REAR PILOT CASTINGS. DETERMINE BY FIGURES # 3, # 8, & # 9 WHERE TO DRILL TWO # 71 (.026) FOR HANDRAIL WIRE IN FRONT & REAR PILOTS. FEED WIRE THRU STANCHIONS, PRE-FORM, INSTALL WIRE & STANCHIONS IN FRONT & REAR PILOTS AND SOLDER IN PLACE.
15. INSTALL THE TWO 3538 INSULATED BOLSTERS IN FRAME FLOOR PLATE WITH FOUR 2-56 X 1/4" RD. HD. SCREWS AS PER FIGURE # 1.
16. CAREFULLY FILE AND FIT THE SIDEFAMES AND TRUCK BOLSTERS ON THE TRUCKS. THE INSULATED WHEELS GO TO THE LEFT SIDE OF THE TRUCKS AND A BRASS PIN GOES THRU THE BODY BOLSTER DOWN THRU THE TRUCK BOLSTER AND A SNAP RING WASHER FITS INTO A GROOVE AROUND THE PIN TO HOLD THE TRUCKS SECURE.
17. KIT CONSTRUCTION IS NOW COMPLETED AS A NON-POWERED UNIT, EXCEPT FOR YOUR SELECTION OF COUPLER AND/OR COUPLER POCKET PLUS ADDITIONAL PARTS AVAILABLE IN THE EVENT YOU MAY WISH TO SUPER DETAIL YOUR DIESEL.



Kentron

KENTRON POWERED DRIVE SYSTEM



1. STUDY THE DRAWING: NOTE POWER IS TRANSMITTED FROM MOTOR VIA A PLASTIC TUBE COUPLING TO THE TRANSMISSION DRIVE SHAFTS THAT ARE MADE UP OF TELESCOPING SQ. TUBE & BRASS ROD WITH PLASTIC UNIVERSAL JOINTS AT EACH END FOR DRIVE POWER TO BOTH TRUCKS.
2. REMOVE THE FOUR MOUNTING SCREWS FURNISHED WITH THE 9607 TRANSMISSION: TAKE TWO HALVES OF THE 9611 U-JOINTS WITH THE LARGEST ROUND HOLE & PRESS EACH HALF ON LOWER TRANSMISSION DRIVE SHAFTS, FORE & AFT.
3. FEED TRANSMISSION UP THRU FLOOR PLATE & INSTALL THE TWO 9604 TRANSMISSION MOUNTS USING THE FOUR SCREWS PREVIOUSLY REMOVED. TIGHTEN SCREWS AT THE BOTTOM OF THE MOUNT SLOTS.
4. INSTALL FOUR OF THE 9605 RUBBER GROMMETS IN THE BASE SLOTS OF THE MOUNTS. REMOVE THE FOUR FLAT WASHERS FROM THE # 42 INSULATED WASHER SETS, USING WITH FOUR 2-56 X 3/8" RD. HD. SCREWS & FOUR 2-56 HEX NUTS TO SECURE TRANSMISSION TO FRAME FLOOR PLATE. DO NOT TIGHTEN YET.
5. INSTALL FOUR RUBBER GROMMETS IN THE TWO 9603 MOTOR MOUNTS. DRILL THE FOUR REMAINING #42 INSULATED WASHERS (WITH MOLDED-IN SHOULDER) WITH A # 34 DRILL (.111) & USING FOUR 4-40 X 5/16" RD. HD. SCREWS WITH THE WASHERS, SECURE MOUNTS TO EACH END OF MOTOR. DO NOT TIGHTEN YET
6. CUT PLASTIC TUBING 1" IN LENGTH & FORCE ON MOTOR & TRANSMISSION SHAFTS; FASTEN MOTOR TO FRAME FLOOR PLATE USING FOUR 2-56 X 1/8" RD. HD. SCREWS THRU THE FOUR ELONGATED SLOTS, ALIGN MOTOR, TRANSMISSION AND PLASTIC TUBING AND TIGHTEN ALL SCREWS TO THE ENTIRE ASSEMBLY SECURELY.
7. INSTALL THE TWO 9602 INSULATED BODY BOLSTERS TO FRAME FLOOR PLATE WITH FOUR 2-56 X 1/4" RD. HD. SCREWS.
8. DIS-ASSEMBLE BOTH 9608 TRUCKS & UN-SCREW THE WHEELS FROM ALL FOUR AXLES. NEXT, SLIDE OPEN THE BRASS TOPS OF THE FOUR 9609 GEAR BOXES & REMOVE CONTENTS COMPRISED OF WORM, WORM GEAR, TWO LARGE PLASTIC WASHERS & THREE SMALLER PLASTIC WASHERS.
9. PRESS ALL FOUR WORM GEARS ON THE FOUR AXLES WITH AXLE SERRATIONS COVERED EQUALLY. NEXT, REMOVE THE TWO SCREWS HOLDING THE TWO HALVES OF THE GEAR BOXES & SEPARATE. EXTREME CAUTION!!! DO NOT MIX GEAR-BOX HALVES. EACH GEAR BOX HAS BEEN LINE-REAMED AS A UNIT.
10. YOU ARE NOW READY FOR CRITICAL ASSEMBLY OF ALL THE COMPONENTS, AND A FEW MAJOR DETAILS OUTLINED IN ADVANCE WILL RESULT IN EXCELLENT PERFORMANCE & ELIMINATE RE-DOING INCORRECT PROCEDURES.
 - A. EACH TRUCK WILL HAVE THE LONGER SECTION OF THE GEAR BOXES FACING INWARD TO THE TRUCK BOLSTER.
 - B. THE FORWARD TRUCK WILL HAVE THE TWO INSULATED WHEELS ON THE LEFT SIDE. THE REAR TRUCK WILL HAVE THE TWO INSULATED WHEELS ON THE RIGHT SIDE.
11. (FOR EACH AXLE) PLACE LARGE PLASTIC WASHER ON EACH SIDE OF WORM GEAR, NEXT; EACH HALF OF GEAR BOX & TIGHTEN SECURELY WITH THE TWO GEAR BOX SCREWS. NEXT; THREAD ON ALL WHEELS SECURELY. (REMEMBER INBOARD GEAR BOXES & INSULATED WHEEL SIDES.)

- | | | |
|---|------|----------------------------|
| 1 | 9612 | U-JOINT X CENTER (4PCS) |
| 2 | 9613 | DRIVE SHAFT (SQ.TUBE) |
| 2 | 9614 | DRIVE SHAFT (SQ. ROD) |
| 2 | | SOLDER LUGS |
| 2 | | 1-72 X 1/8" RD. HD. SCREWS |
| 1 | | HOOK-UP WIRE |

- | | | |
|---|------|--|
| | 9600 | DIESEL POWER UNIT "SCALE" |
| 2 | 9602 | BODY BOLSTERS |
| 6 | | 4-40 X 5/16" RD. HD. SCREWS. |
| 1 | | PC. 5/32" RD. BRASS TUBING, 1" LENGTH |
| 2 | | .250 O.D. X .156 I.D. X .020 THK. FIBER WASHERS |
| 2 | | .225 O.D. X 5/32" I.D. X 1/4" LENGTH BRASS SPRINGS |
| 2 | 9603 | MOTOR MOUNTS |
| 2 | 9604 | TRANSMISSION MOUNTS |
| 8 | 9605 | RUBBER GROMMETS |
| 4 | 42 | INSULATED WASHER SETS. |
| 4 | | 2-56 X 1/8" R.D. H.D. SCREWS |
| 4 | | 2-56 X 3/8" R.D. H.D. SCREWS |
| 4 | | 2-56 HEX NUTS |
| 1 | 9606 | MOTOR |
| 1 | 9607 | TRANSMISSION |
| 1 | | 1" LENGTH PLASTIC TUBING |
| 1 | 9608 | PAIR TRUCKS |
| 4 | 9609 | GEAR BOXES |
| 2 | 9610 | 3 1/2" X 3 MMX WORM SHAFTS |
| 2 | 9611 | U-JOINT SETS (4 PCS. EA.) |

12. ASSEMBLE BOTH TRUCKS. (WHEELS, BOLSTERS & SIDEFAMES).
13. CHECK THE TWO 9610 WORM SHAFTS FOR 3 3/8" TO 3 1/2" LENGTH, & IF NECESSARY, CORRECT & SMOOTH BOTH ENDS OF SHAFTS.
14. TAKE TWO HALVES OF THE 9611 U-JOINTS WITH THE SMALLER ROUND HOLE & PRESS ON ONE END OF BOTH WORM SHAFTS.
15. CHECK THE DRAWING & NOTE FORWARD TRUCK TO RIGHT SIDE. NEXT, FEED OPEN END OF WORM SHAFT INTO BUSHING OF THE REAR GEAR BOX OF THE FRONT TRUCK. AS YOU ENTER THRU THE BUSHING, FOLLOW THIS PROCEDURE ON SHAFT: ONE SMALL PLASTIC WASHER, WORM WITH SET SCREW TO RIGHT & THEN TWO SMALL PLASTIC WASHERS. PROCEED TO NEXT GEAR BOX & ADD AFTER ENTERING BUSHING: TWO SMALL PLASTIC WASHERS, WORM WITH SET SCREW TO LEFT & ONE SMALL PLASTIC WASHER.
16. WITH TRUCK ON A GOOD FLAT SURFACE, ROTATE SHAFT FOR BIND CHECK, THEN ROTATE WORMS UP & TIGHTEN BOTH WORM SET SCREWS ALLOWING 1/16" CLEARANCE FROM U-JOINT HALF TO GEAR BOX SURFACE.
17. SLIDE BRASS GEAR BOX COVER PLATE OVER TOP OF BOTH GEAR BOXES.
18. TAKING THE SECOND WORM SHAFT, REVERSE THE PROCEDURE AND COMPLETE ASSEMBLY OF REAR TRUCK IDENTICAL TO FRONT TRUCK.
19. TAKE TWO HALVES OF THE 9611 U-JOINTS WITH THE SMALLER SQUARE HOLE & PRESS ON ONE END OF BOTH 9614 SQUARE ROD DRIVE SHAFTS.
20. TAKE REMAINING TWO HALVES OF 9611 U-JOINTS WITH THE LARGER SQUARE HOLE & PRESS ON ONE END OF BOTH 9613 SQ. TUBE DRIVE SHAFTS.
21. CUT ALL FOUR SHAFTS TO PROTRUDE 5/8" BEYOND U-JOINT HALF & FINISH ENDS FOR A SMOOTH SLIDE OF SQUARE ROD IN SQUARE TUBE.
22. ASSEMBLE U-JOINTS. SPREAD U-JOINTS JAWS & INSERT 9612 X CENTER TO EACH U-JOINT ASSEMBLY. SQUARE ROD ASSEMBLIES TO TRUCKS & SQUARE TUBE ASSEMBLIES TO TRANSMISSION.
23. SLIDE DRIVE SHAFTS TOGETHER AND POSITION TRUCKS UNDER INSULATED BOLSTERS WITH TRUCK BOLSTER KING PIN THREADED HOLD SHOWING. FROM TOP, IN EACH INSULATED BOLSTER RECESS PLACE THE FOLLOWING: ONE .250 X .156 FIBER WASHER & ONE .225 X 5/32" X 1/4" BRASS SPRING. CUT THE 5/32" RD. BRASS TUBING INTO TWO 1/4" LONG PIECES & PLACE INSIDE EACH BRASS SPRING; FASTENING ENTIRE ASSEMBLY WITH ONE 4-40 X 5/16" RD. HD. SCREW IN EACH BOLSTER.
24. USE TWO 1-72 X 1/8" RD. HD. SCREWS TO SECURE THE SOLDER LUGS TO EACH TRUCK BOLSTER.
25. WIRE EACH MOTOR BRUSH TO SOLDER LUGS ON SEPARATE TRUCKS & TEST RUN. REVERSE WIRES IF WRONG POLARITY.

NOTE:

THE GP-20 USES A SAGAMI/NWSL CAN TYPE MOTOR, INSTEAD OF, THE OPEN FRAME MOTOR SHOWN IN DRAWING. THIS MOTOR IS VERY QUIET AND HAS TREMENDOUS TORQUE (CONNECT 12V D.C. TO IT AND TRY STALLING THE MOTOR BY GRABBING THE SHAFT WITH YOUR FINGERS). INSTEAD OF STEPS 5 & 6 ON THE DRIVE INSTRUCTIONS, THIS MOTOR IS SCREWED DIRECTLY TO THE MAIN FRAME BY TWO 4-40 SCREWS. THE TWO BRONZE BUSHINGS GO BETWEEN THE FRAME AND THE MOTOR AS SPACERS.