OPERATION AND MAINTENANCE INSTRUCTIONS

KANSAS CITY SOUTHERN RY. CO.

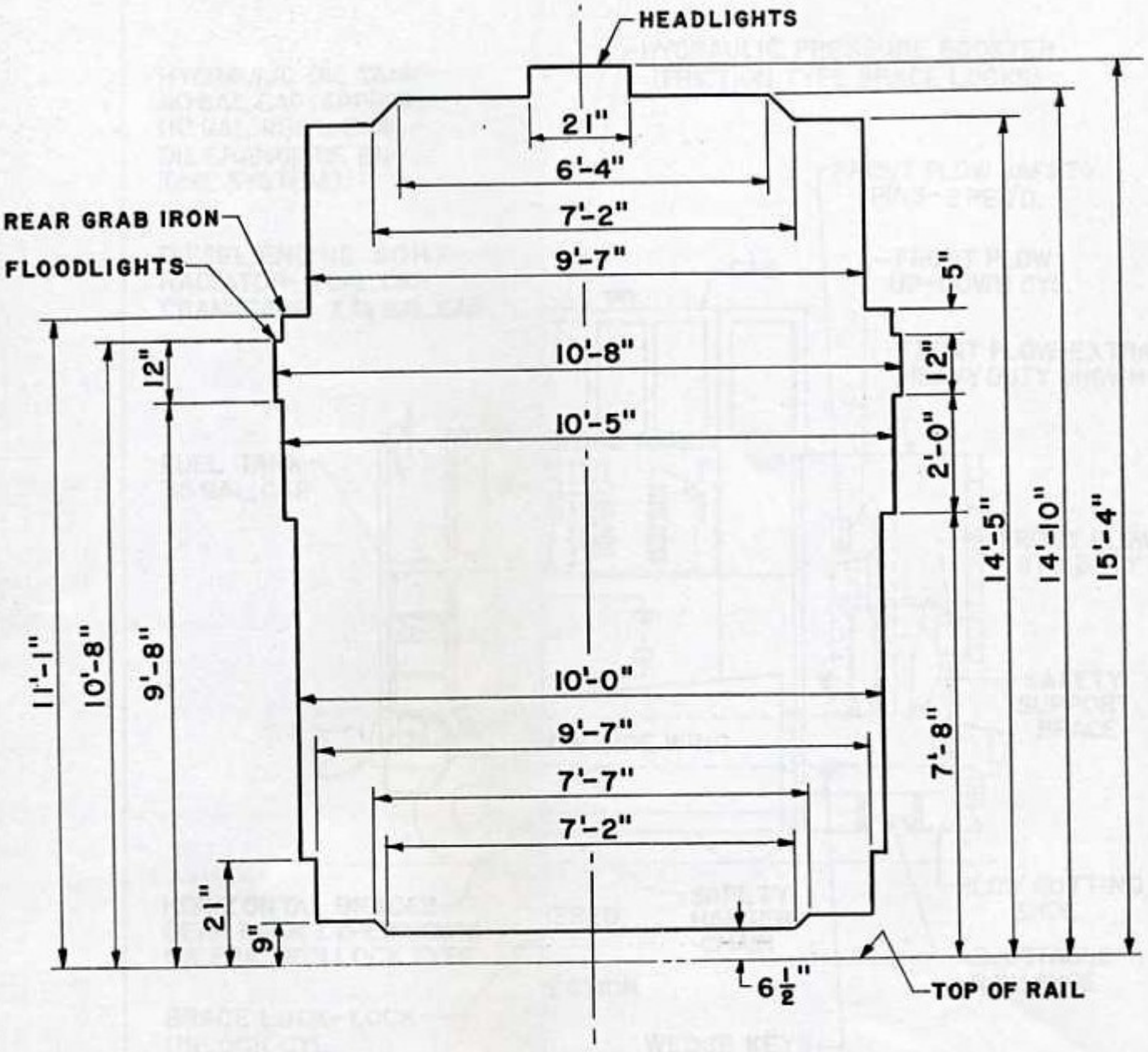
R.R. NO. KCS-097

MFRS. SERIAL NO. 1408

DESCRIPTION: MODEL 4-150

TYPE J HYD. SPREADER DITCHER

4-BRACE



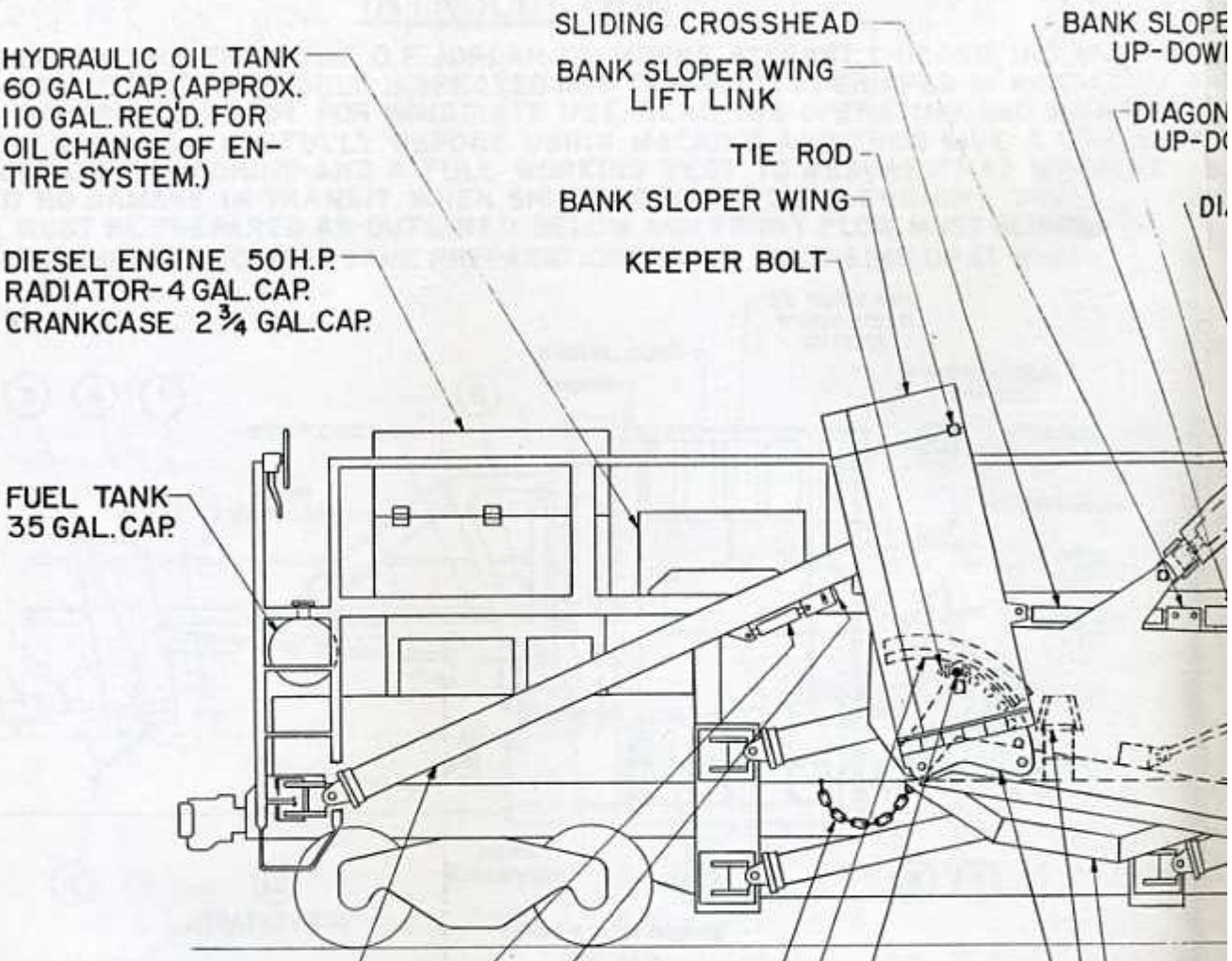
FOR SPREADER OR SPREADER-DITCHER WITH STANDARD FRONT PLOW & WITH HEADLIGHTS AND FLOODLIGHTS

MODEL 4-150 & 4-200

O. F. JORDAN CO., INC.
EAST CHICAGO, INDIANA

CLEARANCE DIAGRAM
(HYDRAULIC CAR)

DRAWING NO. 4121



NOTE: ADJUSTABLE BALLAST SECTION CAN BE PIVOTED TO DIFFERENT POSITIONS FOR SKELETONIZING TRACK, SHAPING BALLAST SHOULDER TO VARIOUS SLOPES AND TO AID IN SNOW SPREADING. WHEN PIVOTING FOR DIFFERENT POSITIONS FIRST APPLY CHAIN HOIST TO LIFTING LUG AND THEN REMOVE THE TWO HOLDING BOLTS, POSITION AND REPLACE BOLTS. WHEN BALLAST SECTION IS LOWERED TO ITS EXTREME DOWN POSITION ALWAYS APPLY BACK-UP BRACE PROVIDED FOR THIS PURPOSE. (LOCATED IN LUGGAGE RACK).

NO

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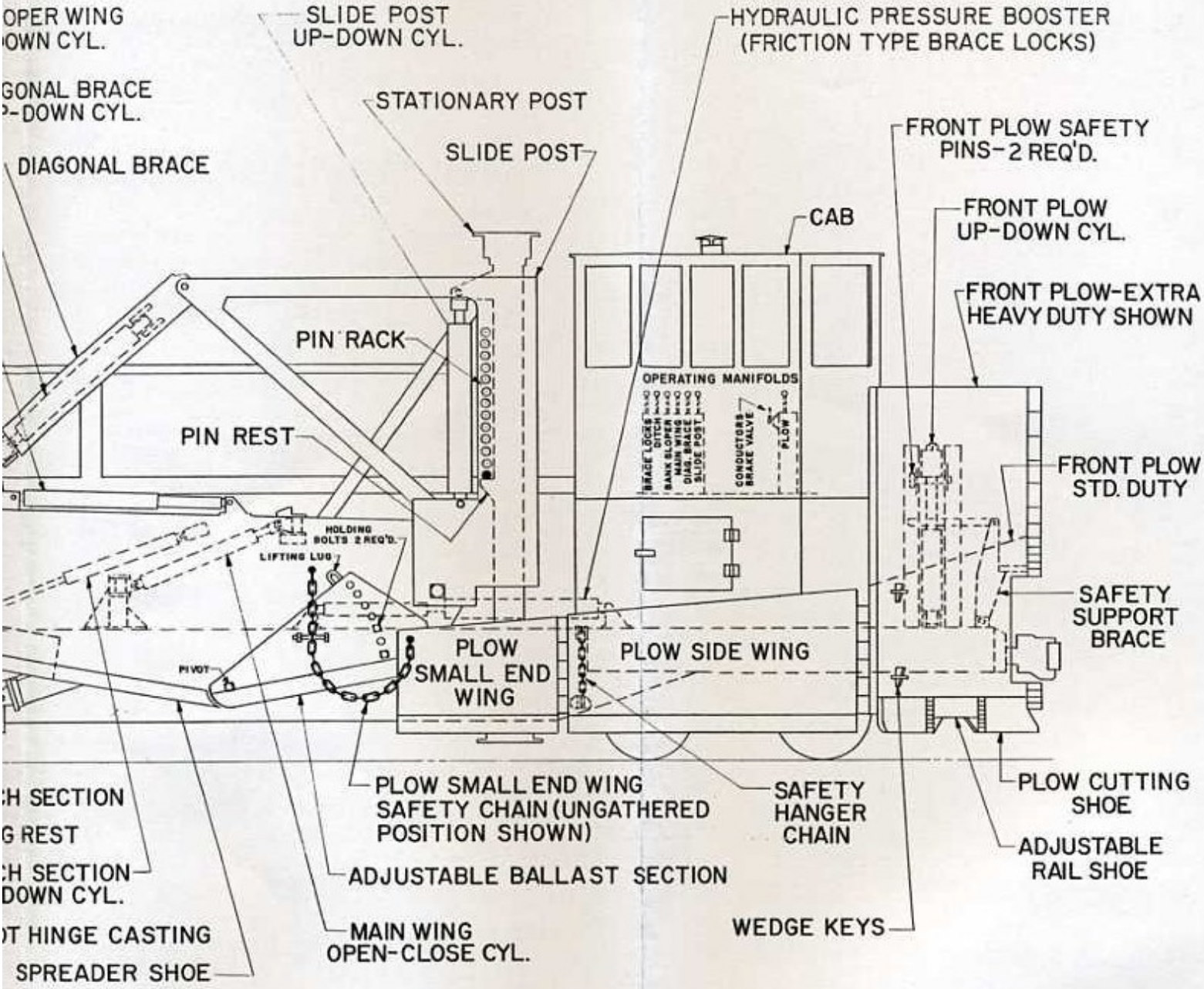


NOMENCLATURE
HYDRAULIC CAR

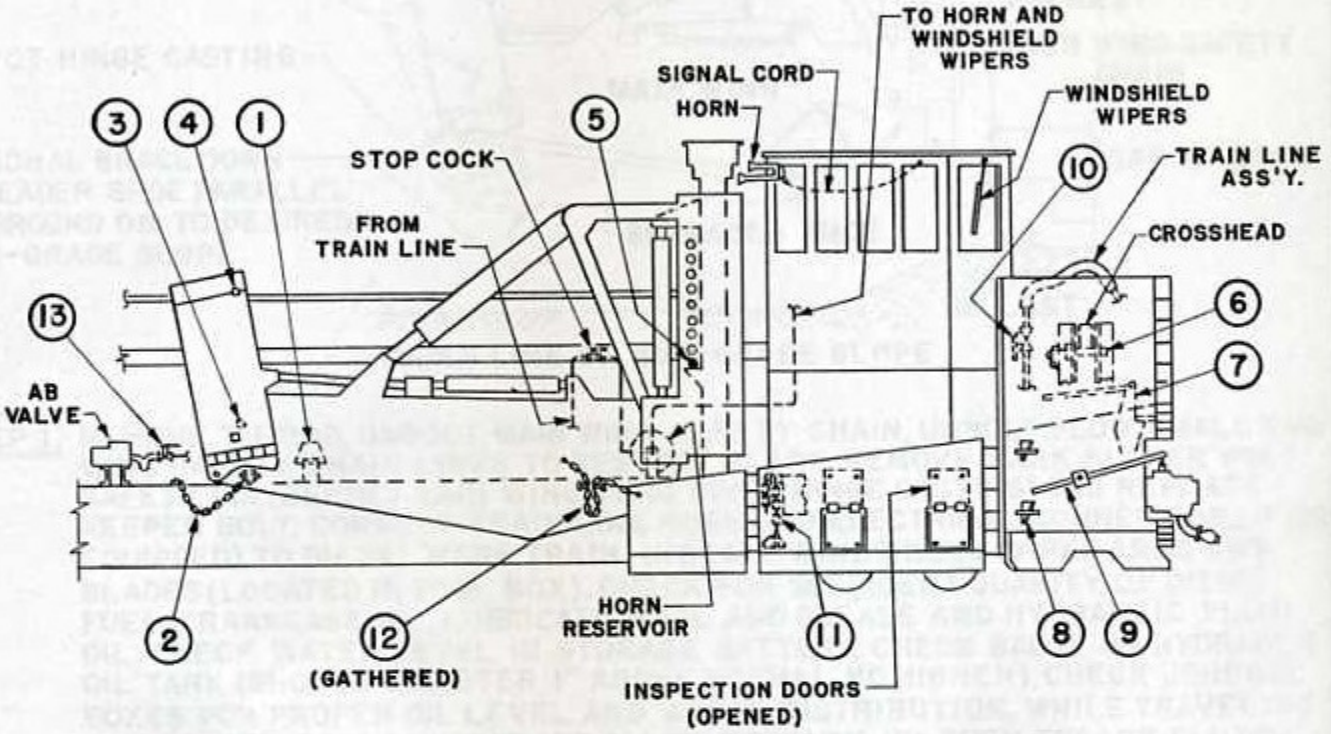
NOTE: WHEN OPERATING MANIFOLD VALVES ALWAYS ALLOW HANDLES TO RETURN TO NEUTRAL IMMEDIATELY WHEN DESIRED MOVEMENT IS COMPLETED. THIS AUTOMATICALLY LOCKS CYLINDERS. DO NOT MAINTAIN CYL. PRESSURE ON PINS, STOPS, ETC. THE MAIN WING OPEN-CLOSE CYL. DOES NOT HAVE THIS LOCKING FEATURE, IT IS ONLY FOR OPENING AND CLOSING WING AND NOT FOR ANY WORKING LOADS. BE EXTREMELY CAREFUL WHEN OPENING OR CLOSING WING WHEN NOT ON A LEVEL TRACK (BRACES UNLOCKED) AS WEIGHT OF WING WILL PULL CYLINDER OPEN OR CLOSED DEPENDING ON TRACK CONDITIONS.

PREPARATION OF A JORDAN FOR SHIPMENT

(HYDRAULIC CAR)

INTRODUCTION

PRIOR TO DEPARTURE FROM THE O.F. JORDAN CO. WORKS AT EAST CHICAGO, INDIANA EVERY MACHINE IS THOROUGHLY INSPECTED AND TESTED. IT IS SHIPPED IN PERFECT WORKING ORDER AND READY FOR IMMEDIATE USE. READ THE OPERATING AND MAINTENANCE INSTRUCTIONS CAREFULLY BEFORE USING MACHINE AND THEN GIVE A GENERAL INSPECTION OF MACHINE AND A FULL WORKING TEST TO ASSURE THAT MACHINE RECEIVED NO DAMAGE IN TRANSIT. WHEN SHIPPING IN REVENUE FREIGHT TRAIN MACHINE MUST BE PREPARED AS OUTLINED BELOW AND FRONT PLOW MUST ALWAYS BE FACING TOWARDS LOCOMOTIVE. SAME PREPARATIONS MADE FOR TIEING UP AT NIGHT.



PREPARATION

A. MAIN WING CLOSED AND ON WING REST (1). ADJUSTABLE BALLAST SECTION UP, DITCH SECTION UP, MAIN WING SAFETY CHAIN (2) ATTACHED, BANK SLOPER WING UP AND SAFETY PIN (3) AND TIE ROD (4) INSTALLED. SLIDE POST UP AND ADJUSTMENT PIN (5) IN BOTTOM HOLE OF PIN RACK AND RESTING ON PIN REST.

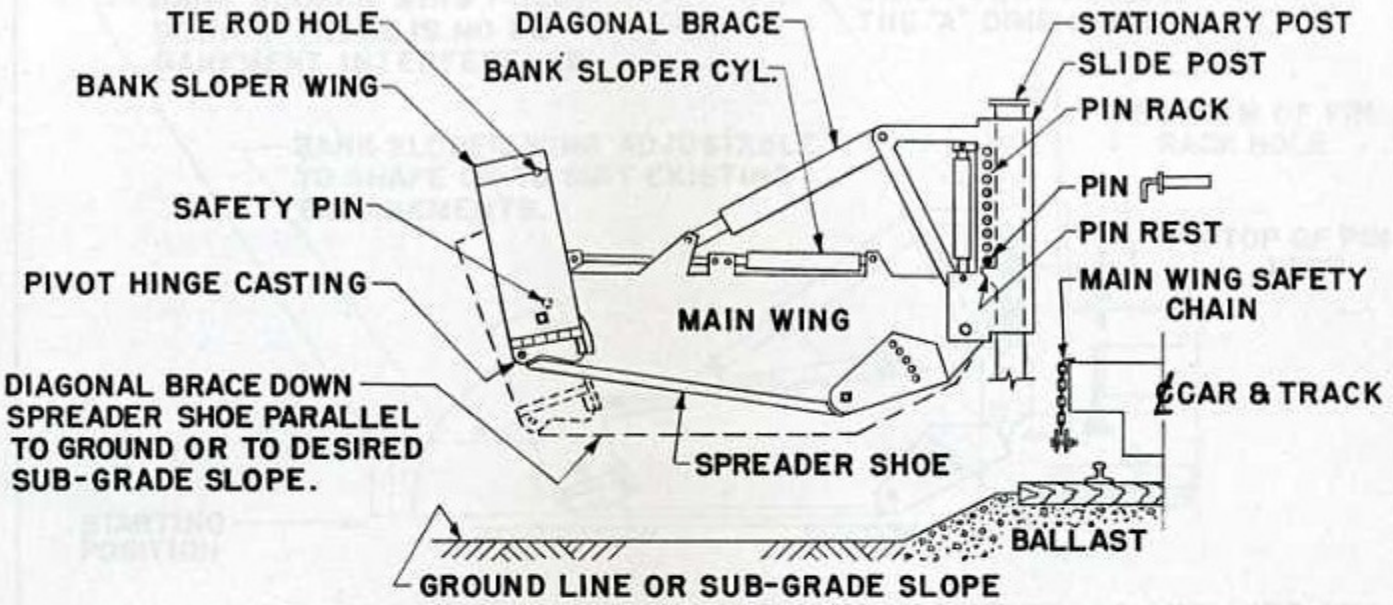
B. FRONT PLOW UP WITH CROSSHEAD RESTING ON THE RE-INSERTED TWO PINS (6) WITH THE SHORT CHAINS INTO THE TOP HOLES OF PLOW PIN RACK AND SAFETY SUPPORT BRACE (7) ENGAGED. FRONT PLOW WINGS SECURED WITH COTTERED WEDGE KEYS (8). COUPLER HOLE COVER PLATE REMOVED AND UNCOUPLING ROD (9) AND TRAIN LINE ASS'Y. RE-INSTALLED (THEN OPEN CUT OUT COCK (10)). INSPECTION DOORS FOR JOURNAL BOXES BOLTED IN OPEN POSITION (NOT ON EXTRA HEAVY DUTY PLOWS, PLOW SIDE WINGS MUST BE SWUNG OPEN IF NECESSARY). PLOW SIDE WING AND SMALL END WING EVEN WITH FRONT PLOW. PLOW SIDE WING SAFETY HANGER CHAIN (11) RE-HOOKED SO THAT THERE IS NO CHAIN SLACK. PLOW SMALL END WING SAFETY CHAIN (12) GATHERED TIGHTLY AND BOLTED.

C. AIR BRAKE CUT OUT COCK (13) OPENED. STOP COCK IN AIR LINE FROM TRAIN LINE TO HORN RESERVOIR CLOSED. PROPANE GAS TANK VALVES CLOSED. DIESEL ENGINE LOCKED UP. WINDSHIELD WIPERS REMOVED AND STORED IN CAB. CAB WINDOWS AND DOOR LOCKED.

NOTE: FOR ANY REFERENCE REFER TO CORRESPONDING OPERATION SHEETS OR NOMENCLATURE SHEET FOR ANY CLARIFICATION OF THE ABOVE.

OPERATION PROCEDURE

(ALWAYS TURN ON HEADLIGHTS WHEN WORKING)



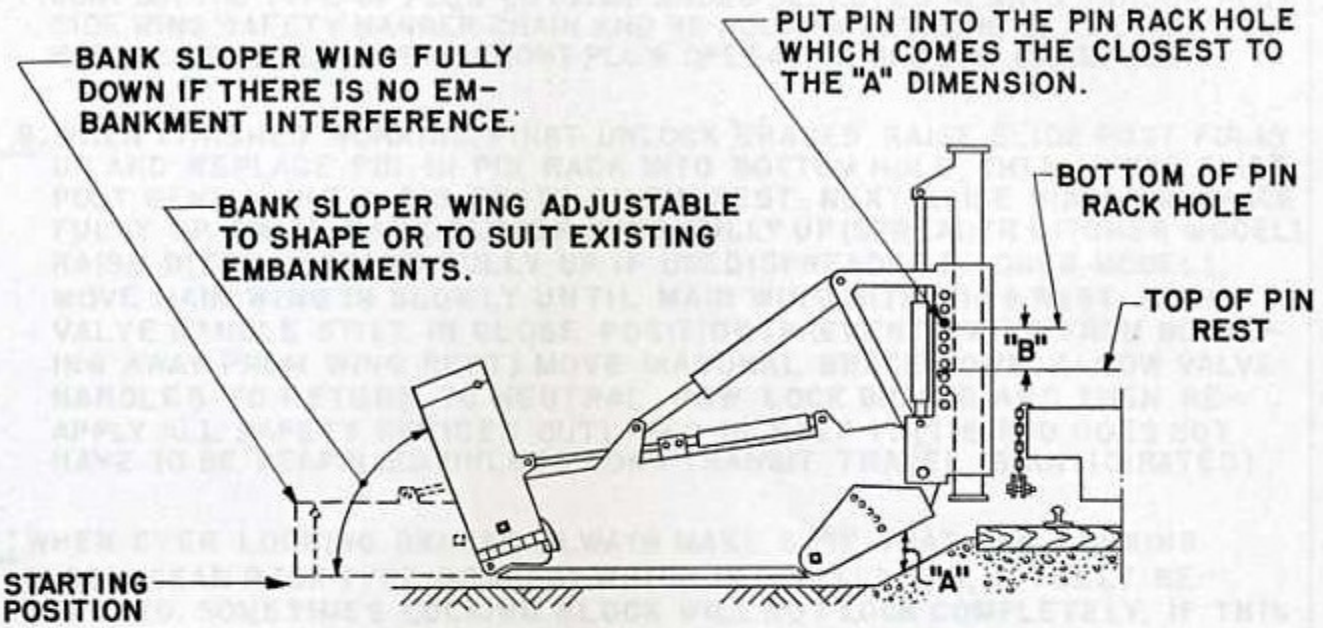
STEP 1: REMOVE TIE ROD, UNBOLT MAIN WING SAFETY CHAIN, UNBOLT PLOW SMALL END WING SAFETY CHAIN LINKS TO RESTORE SLACK, REMOVE BANK SLOPER WING SAFETY PIN (BEHIND MAIN WING THRU PIVOT HINGE CASTING) AND REPLACE KEEPER BOLT. CONNECT TRAIN LINE HOSE AND ELECTRICAL CONNECTION (IF SO EQUIPPED) TO DIESEL WORK TRAIN. INSTALL WINDSHIELD WIPER ARMS AND BLADES (LOCATED IN TOOL BOX). CHECK FOR SUFFICENT QUANITY OF DIESEL FUEL, CRANKCASE OIL, LUBRICATION OIL AND GREASE AND HYDRAULIC FLUID OIL. CHECK WATER LEVEL IN STORAGE BATTERY, CHECK GAUGE ON HYDRAULIC OIL TANK (SHOULD REGISTER 1" ABOVE NORMAL, NO HIGHER). CHECK JOURNAL BOXES FOR PROPER OIL LEVEL AND WASTE DISTRIBUTION. WHILE TRAVELING TO JOB SITE START ENGINE AND ALLOW TO WARM UP, THEN ENGAGE CLUTCH TO OPERATE HYDRAULIC PUMP AND ALLOW RESERVOIR OIL TO WARM UP.

STEP 2: AT JOB SITE UNLOCK BRACES. RAISE MAIN WING FROM WING REST BY MOVING DIAGONAL BRACE TO FULL UP POSITION. RAISE SLIDE POST UP SLIGHTLY TO REMOVE PIN FROM PIN RACK. OPEN MAIN WING FULLY OR TO ANY DESIRED ANGLE (25° MIN). DO NOT MOVE MAIN WING OPEN (OR WHEN CLOSING) TOO FAST. MOVE DIAGONAL BRACE DOWN UNTIL SPREADER SHOE IS PARALLEL TO THE GROUND LINE OR POSITIONED FOR A SUB-GRADE SLOPE.

STEP 3: LOWER SLIDE POST DOWN UNTIL SPREADER SHOE IS ALMOST TOUCHING THE GROUND. CHECK APPROXIMATE DISTANCE FROM THE SLOPE OF ADJUSTABLE BALLAST SECTION TO THE SLOPE OF BALLAST (DESIGNATED BY DISTANCE "A" IN THE FOLLOWING SKETCH). THIS DISTANCE "A" SHOULD LOCATE PIN REPLACEMENT INTO PIN RACK BY AN APPROXIMATE EQUAL DISTANCE FROM TOP OF PIN REST TO BOTTOM OF ONE OF THE PIN RACK HOLES (DESIGNATED BY DISTANCE "B" IN THE FOLLOWING SKETCH, "A" = "B"). DOWN MOVEMENT OF THE SLIDE POST WILL BRING PIN INTO CONTACT WITH PIN REST THUS STOPPING THE MAIN WING BEFORE THE ADJUSTABLE BALLAST SECTION CAN UNDERCUT OR TEAR UP THE PRESENT BALLAST. ALWAYS CHECK AGAINST UNDERCUTTING BALLAST WHEN CHANGING MAIN WING OPERATING ANGLE. FOR ADJUSTING BALLAST SECTION SEE NOTE ON NOMENCLATURE SHEET.

OPERATION PROCEDURE

(CONTINUED)



STEP 4: MAKE NECESSARY BANK SLOPER WING ADJUSTMENTS AS OUTLINED ON BANK SLOPER WING OPERATION SHEET. ALWAYS RAISE BANK SLOPER WING FULLY UP WHEN CLOSING MAIN WING AGAINST SIDE OF CAR.

STEP 5: NOW THAT WING IS POSITIONED FOR WORK, LOCK BRACES. SIGNAL WORK TRAIN TO ADVANCE. LOWER WING INTO GROUND AS CAR IS MOVING BY LOWERING SLIDE POST SLOWLY. IF CUT HAS BEEN TOO DEEP MATERIAL WILL BEGIN TO ROLL OVER TOP OF WING (CARRIER WING OPERATION WILL ALSO DO THIS). RAISE WING SLOWLY OUT OF MATERIAL BY RAISING SLIDE POST. BY MOVING SLIDE POST UP SLOWLY UNTIL MATERIAL DOES NOT ROLL OVER WING PREVENTS OVERLOADING AND POSSIBLE DAMAGE TO WING. WHEN RETURNING FOR ANOTHER PASS, AT END OF FIRST PASS RAISE WING OUT OF MATERIAL WITH SLIDE POST, SIGNAL WORK TRAIN TO BACK UP TO START OF CUT AND BEGIN 2ND. PASS BY LOWERING WING WITH SLIDE POST AS CAR ADVANCES. ONLY SLIDE POST CONTROL IS NECESSARY FOR OPERATION DURING PASSES.

NOTE: SLIDE POST IS ALWAYS USED FOR LOWERING WING INTO WORK AND RAISING OUT OF WORK. LIMIT TRAVEL OF SLIDE POST WHEN BRACES ARE LOCKED TO 1 FOOT BELOW AND 1 FOOT ABOVE STARTING POSITION (2 FOOT TOTAL). DO NOT USE DIAGONAL BRACE WHEN WING BRACES ARE LOCKED.

STEP 6: WHEN USING DITCH SECTION TO ESTABLISH A DRAINAGE DITCH WHILE SPREADING NEVER FORCE DITCH SECTION INTO GROUND WITH DITCH SECTION CYLINDER. FIRST RAISE WING AWAY FROM GROUND WITH SLIDE POST, THEN LOWER DITCH SECTION FULLY. BRING DITCH SECTION BACK UP SLIGHTLY TO RELIEVE PRESSURE OF CYLINDER FROM CYLINDER CONNECTION BOLT AT DITCH SECTION AND THEN PROCEED AS IN STEP 5 AFTER LOWERING WING TO GROUND. FOR BEST DITCHING RESULTS SPREAD SUB-GRADE FOR DESIRED SLOPE FIRST, THEN BEGIN DITCHING OPERATION.

STEP 7: WHEN USING FRONT PLOW REMEMBER THE ADJUSTABLE RAIL SHOES CAN BE POSITIONED AT 1" INCREMENTS SO THAT PLOW CUTTING SHOES MAY HAVE A FLANGING DEPTH FROM 5" TO 7" BELOW TOP OF RAIL DEPENDING ON

OPERATION PROCEDURE

(CONTINUED)

STEP 7 (CONT'D.): THE TYPE OF PLOW CUTTING SHOES SELECTED. ALWAYS UNHOOK PLOW SIDE WING SAFETY HANGER CHAIN AND RE-HOOK IN EXTREME SLACK POSITION BEFORE USING PLOW. READ FRONT PLOW OPERATION SHEETS CAREFULLY.

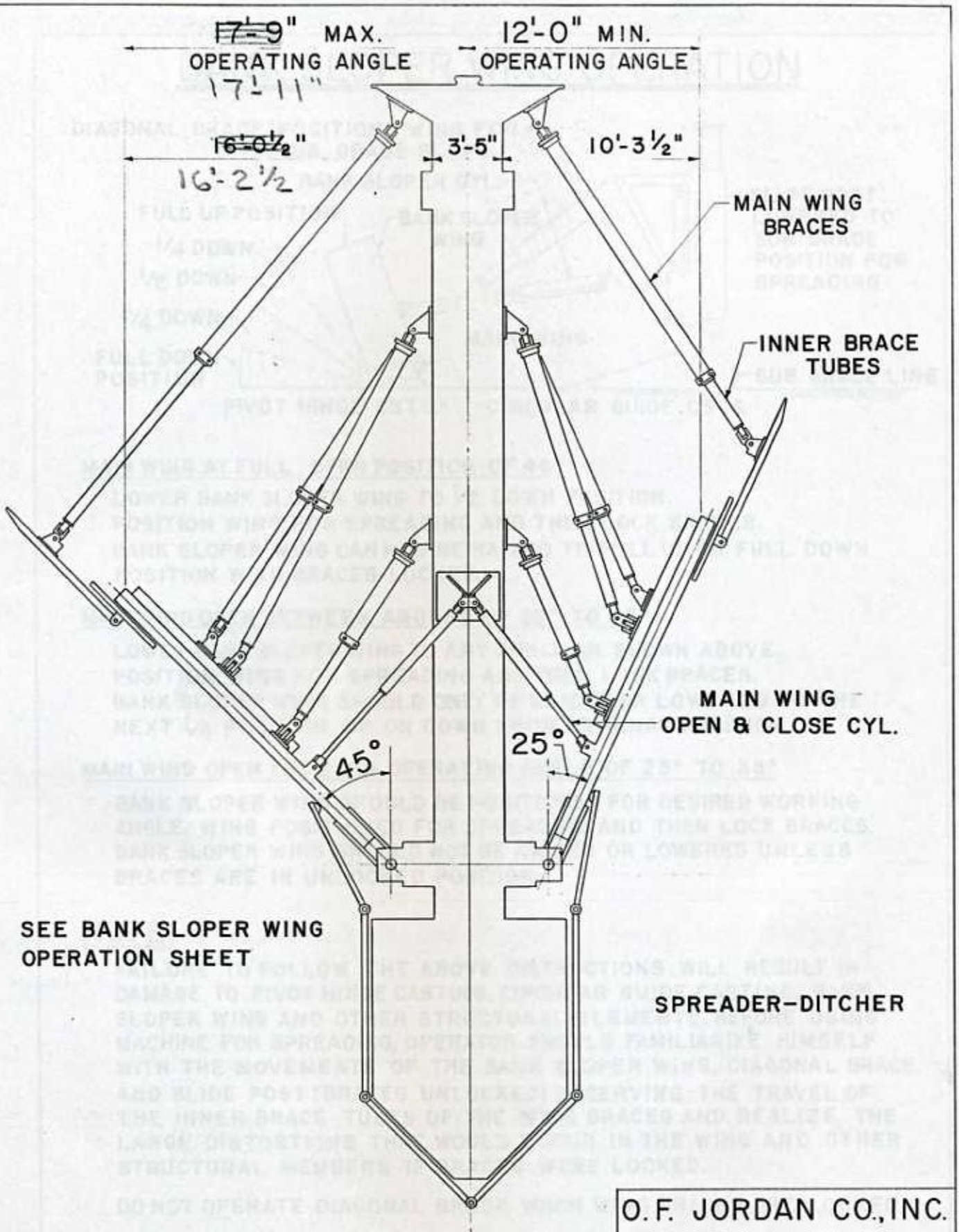
STEP 8: WHEN FINISHED WORKING, FIRST UNLOCK BRACES. RAISE SLIDE POST FULLY UP AND REPLACE PIN IN PIN RACK INTO BOTTOM HOLE, THEN LOWER SLIDE POST GENTLY UNTIL PIN RESTS ON PIN REST. NEXT RAISE DIAGONAL BRACE FULLY UP. RAISE BANK SLOPER WING FULLY UP (SPREADER DITCHER MODEL). RAISE DITCH SECTION FULLY UP IF USED (SPREADER DITCHER MODEL). MOVE MAIN WING IN SLOWLY UNTIL MAIN WING HITS WING REST. WITH VALVE HANDLE STILL IN CLOSE POSITION (PREVENTS WING FROM BOUNCING AWAY FROM WING REST) MOVE DIAGONAL BRACE DOWN. ALLOW VALVE HANDLES TO RETURN TO NEUTRAL. NOW LOCK BRACES AND THEN RE-APPLY ALL SAFETY DEVICES OUTLINED IN STEP 1. (TIE ROD DOES NOT HAVE TO BE REAPPLIED UNLESS LONG TRANSIT TRAVEL IS ANTICIPATED)

NOTE: WHEN EVER LOCKING BRACES ALWAYS MAKE SURE THAT THE LOCKING BLOCK (GEAR RACK TYPE BRACES) WHICH IS PAINTED RED, IS FULLY RETRACTED. SOMETIMES LOCKING BLOCK WILL NOT LOCK COMPLETELY, IF THIS HAPPENS MOVE THE MAIN WING OUT VERY SLIGHTLY OR IN VERY SLIGHTLY (BRACE LOCK HANDLE STILL HELD IN LOCKED POSITION) AND LOCK BLOCK WILL SNAP INTO PLACE. OPERATOR SHOULD FAMILIARIZE HIMSELF WITH THE POSITION OF THESE LOCKING BLOCKS WHEN THEY ARE IN COMPLETE LOCKED POSITION. RECOMMENDED GOOD PRACTICE PROCEDURE IS TO OCCASIONALLY MOVE THE BRACE LOCK VALVE HANDLE TO LOCK POSITION WHILE WORKING MACHINE TO INSURE POSITIVE LOCKING OF THE LOCK BLOCK AT ALL TIMES. CARS EQUIPPED WITH FRICTION TYPE BRACE LOCK REQUIRE A 4000 P.S.I. GAGE PRESSURE READING FOR COMPLETE LOCKING.

CARRIER WING FORM (SPREADER DITCHER MODELS) IS VERY USEFUL IN CARRYING DIRT AND WASTE MATERIAL FROM CUTS. IT IS BENEFICIAL IN DITCHING WHERE WASTE DIRT IS TAKEN OUT OF CUT AND LEVELED ALONG THE ADJACENT FILL. IT IS ALSO USED TO WIDEN THE SHOULDER AND STRENGTHEN THE SLOPE OF FILL AGAINST EROSION. OPERATION OF CONTROLS IS THE SAME AS FOR SPREADING BUT THE 12" LEAD ANGLE AS SHOWN ON THE CARRIER WING CONVERSION SHEETS MUST BE STRICTLY ADHERED TO OR MACHINE WILL BE DAMAGED. WHEN TRAVELING IN TRANSIT TO OR FROM JOB SITES ALWAYS CHECK ROAD CLEARANCES. BECAUSE OF THIS EXTRA CAR WIDTH WHEN CARRIER WING FORM IS FOLDED AGAINST SIDE OF CAR NEVER SHIP IN A REVENUE FREIGHT TRAIN.

READ NOTE ON NOMENCLATURE SHEET ABOUT THE MANIFOLD VALVES AND THE OPENING AND CLOSING OF THE MAIN WING WITH BRACES UNLOCKED. ALSO REFER TO DAILY MAINTENANCE PROCEDURE SHEETS.

CAREFUL READING OF ALL INSTRUCTION SHEETS ON OPERATION AND MAINTENANCE IS VERY IMPORTANT FOR SAFETY AND KEEPING THE JORDAN MACHINE OPERATING EFFICIENTLY AT ALL TIMES.

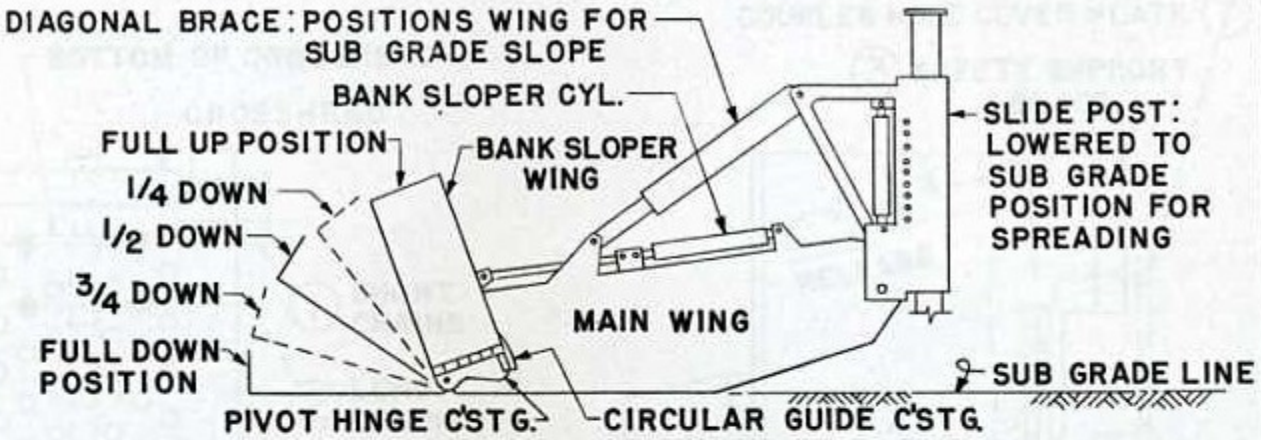


O. F. JORDAN CO., INC.
EAST CHICAGO, INDIANA

WING OPERATING ANGLES
(MAXIMUM & MINIMUM)
HYDRAULIC CAR LONG WING

DRAWING No. 3434-A

BANK SLOPER WING OPERATION



MAIN WING AT FULL OPEN POSITION OF 45°

LOWER BANK SLOPER WING TO 1/2 DOWN POSITION.
POSITION WING FOR SPREADING AND THEN LOCK BRACES.
BANK SLOPER WING CAN NOW BE RAISED TO FULL UP OR FULL DOWN POSITION WITH BRACES LOCKED.

MAIN WING OPEN BETWEEN ANGLES OF 35° TO 45°

LOWER BANK SLOPER WING TO ANY POSITION SHOWN ABOVE.
POSITION WING FOR SPREADING AND THEN LOCK BRACES.
BANK SLOPER WING SHOULD ONLY BE RAISED OR LOWERED TO THE NEXT 1/4 POSITION UP OR DOWN FROM ORIGINAL POSITION.

MAIN WING OPEN FROM MIN. OPERATING ANGLE OF 25° TO 35°

BANK SLOPER WING SHOULD BE POSITIONED FOR DESIRED WORKING ANGLE. WING POSITIONED FOR SPREADING AND THEN LOCK BRACES.
BANK SLOPER WING SHOULD NOT BE RAISED OR LOWERED UNLESS BRACES ARE IN UNLOCKED POSITION.

NOTE:

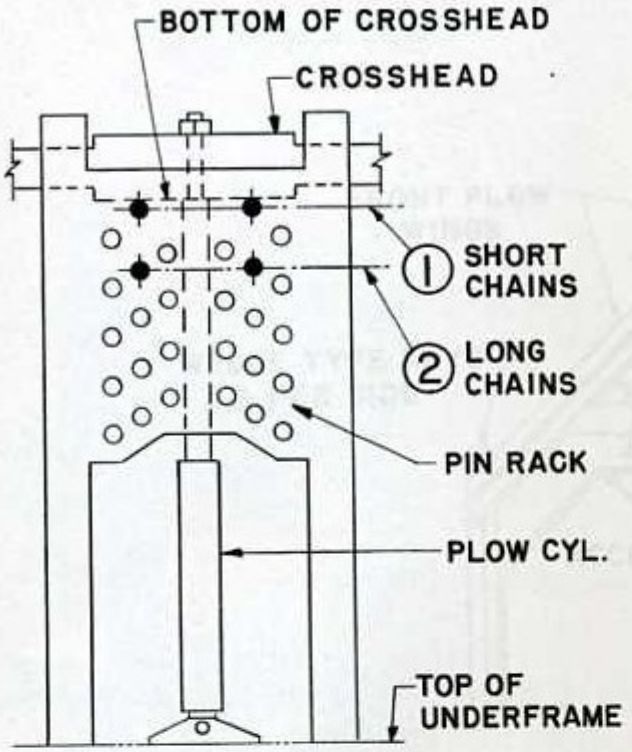
FAILURE TO FOLLOW THE ABOVE INSTRUCTIONS WILL RESULT IN DAMAGE TO PIVOT HINGE CASTING, CIRCULAR GUIDE CASTING, BANK SLOPER WING AND OTHER STRUCTURAL ELEMENTS. BEFORE USING MACHINE FOR SPREADING, OPERATOR SHOULD FAMILIARIZE HIMSELF WITH THE MOVEMENTS OF THE BANK SLOPER WING, DIAGONAL BRACE AND SLIDE POST (BRACES UNLOCKED) OBSERVING THE TRAVEL OF THE INNER BRACE TUBES OF THE WING BRACES AND REALIZE THE LARGE DISTORTIONS THAT WOULD OCCUR IN THE WING AND OTHER STRUCTURAL MEMBERS IF BRACES WERE LOCKED.

DO NOT OPERATE DIAGONAL BRACE WHEN WING BRACES ARE LOCKED.

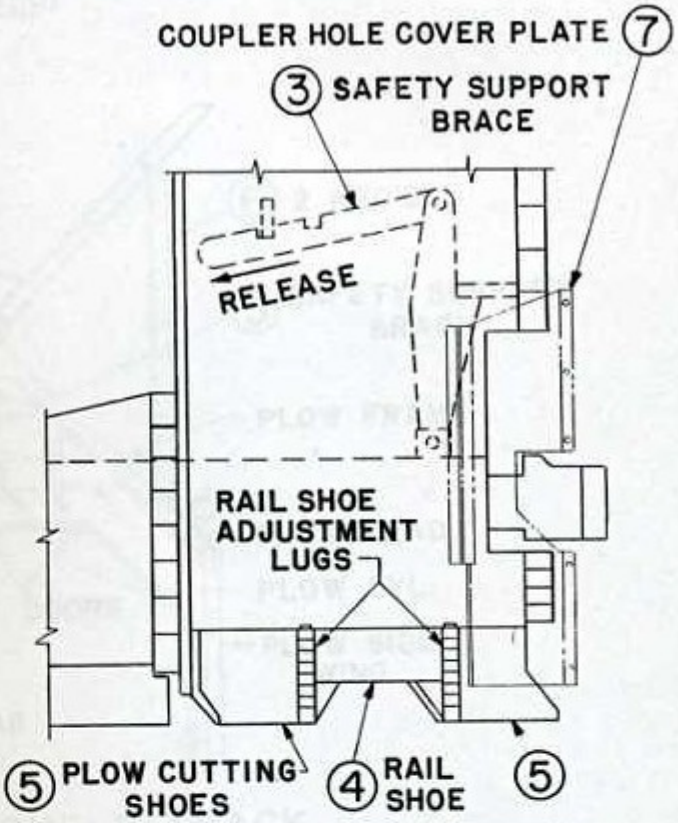
SLIDE POST USED FOR LOWERING WING INTO WORK AND RAISING OUT OF WORK. LIMIT TRAVEL OF SLIDE POST WHEN BRACES ARE LOCKED TO 1 FOOT BELOW AND 1 FOOT ABOVE STARTING POSITION (2 FT. TOTAL)

HYDRAULIC CAR

FRONT PLOW OPERATION



PLOW CYL. ARR'GT.



FRONT PLOW WING ARR'GT.

STEP 1: OPEN ACCESS DOORS IN CAB. MOVE PLOW UP TO FACILITATE REMOVAL OF TOP TWO PINS ①. REMOVE THE BOTTOM TWO PINS ②. RELEASE THE SAFETY SUPPORT BRACE ③.

STEP 2: MOVE PLOW DOWN UNTIL RAIL SHOES ④ BARELY TOUCH TOP OF RAIL. RE-INSERT THE TWO PINS ② THRU THE PIN RACK HOLES WHICH LINE UP WITH BOTTOM OF CROSSHEAD. NOW THAT THIS ADJUSTMENT IS MADE THE TWO PINS ② NEED NOT BE REMOVED AGAIN UNLESS DEPTH OF PLOW CUTTING SHOES ⑤ MUST BE CHANGED. TO CHANGE THIS DEPTH REMOVE PINS HOLDING RAIL SHOES ④ IN ADJUSTMENT LUGS AND MOVE RAIL SHOES DOWN UNTIL PROPER DEPTH BELOW RAIL OF PLOW CUTTING SHOES ⑤ IS REACHED. THEN RE-INSERT PINS ② INTO PROPER HOLES OF PIN RACK AS DETERMINED BY BOTTOM OF CROSSHEAD.

FRONT PLOW OPERATION

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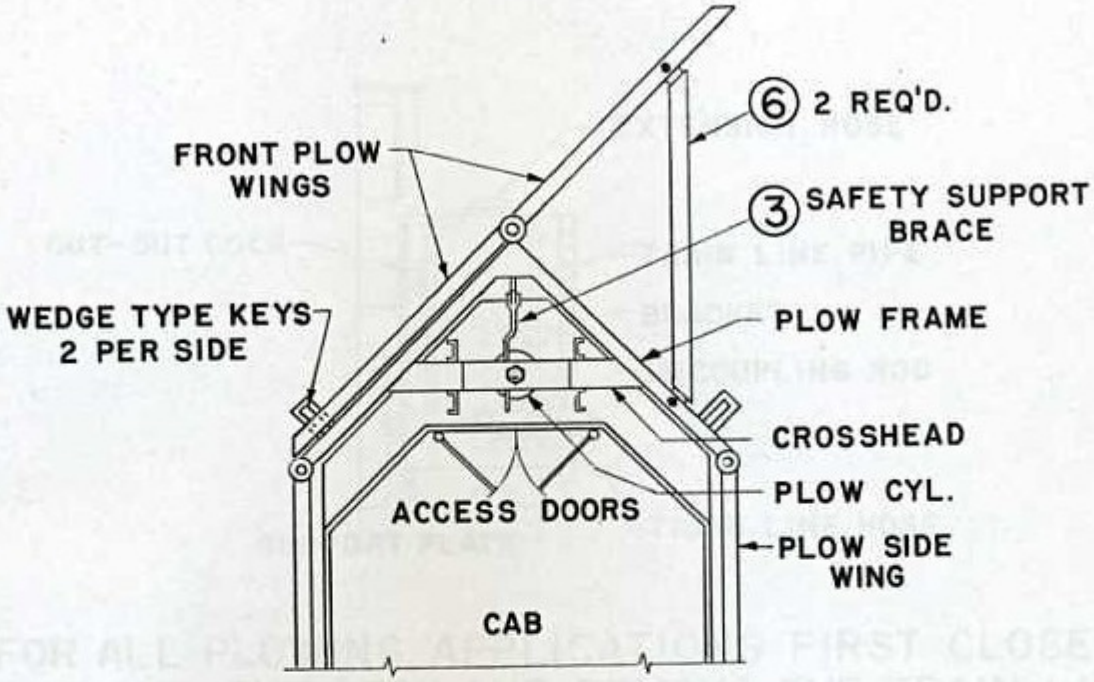

LEFT HAND DOUBLE TRACK
PLOWING POSITION SHOWN

STEP 3: FRONT PLOW WINGS MAY BE POSITIONED EITHER FOR L.H. OR R.H. DOUBLE TRACK PLOWING. REMOVE THE TWO WEDGE TYPE KEYS WHICH HOLD THE FRONT PLOW WINGS TO THE PLOW FRAME. SWING WING OPEN AND POSITION THE TWO HOLDING BRACES ⑥ (LOCATED IN LUGGAGE RACK) INTO THEIR PROPER BRACKETS.

NOTE: THE TWO PINS ① ARE USED ONLY TO HOLD FRONT PLOW IN FULL UP POSITION WHEN IN TRANSIT. THE SAFETY SUPPORT BRACE ③ MUST ALWAYS BE LOCKED INTO FRONT PLOW WHEN IN TRANSIT ALSO.

CAUTION: DO NOT HOLD PLOW CYL. IN FULL UP OR DOWN VALVE POSITION AGAINST PINS ① OR ② (PINS WILL BEND).

REMOVE UNCOUPLING ROD AND APPLY COUPLER HOLE COVER PLATE ⑦ WHEN PLOWING. NEVER COUPLE WHEN COVER PLATE IS APPLIED, REMOVE IT AND REAPPLY UNCOUPLING ROD.

FRONT PLOW OPERATION

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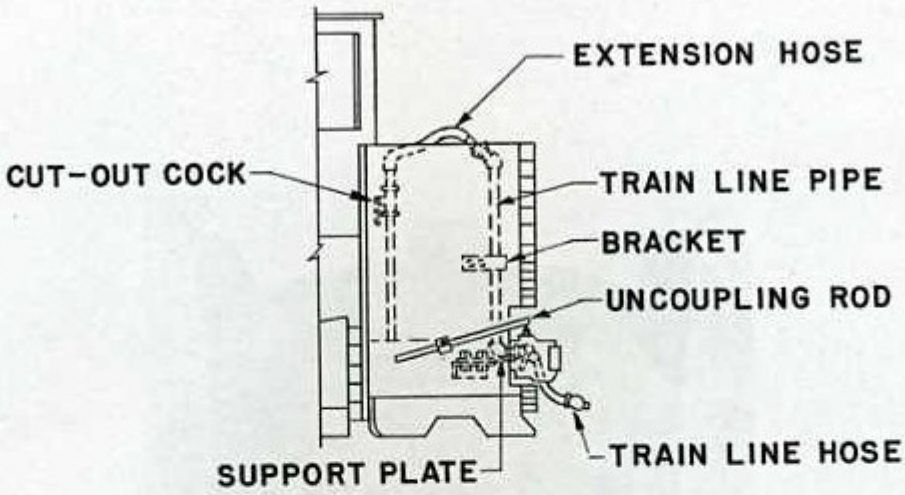


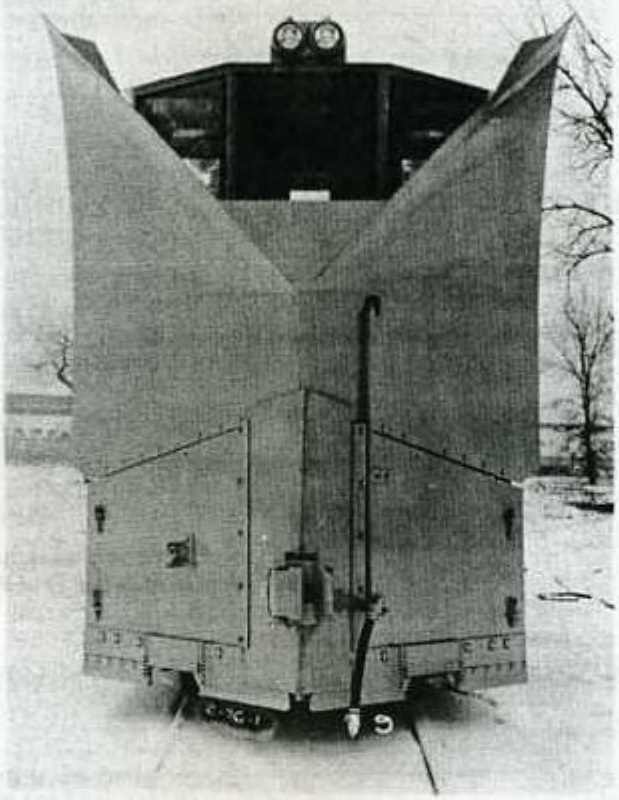
NOTE: FOR ALL PLOWING APPLICATIONS FIRST CLOSE THE CUT-OUT COCK AND REMOVE THE TRAIN LINE ASSEMBLY (CONSISTING OF TRAIN LINE HOSE, SUPPORT PLATE, BRACKET, TRAIN LINE PIPE AND EXTENSION HOSE) UP TO THE CUT-OUT COCK. THIS TRAIN LINE ASSEMBLY DOES NOT HAVE TO BE RE-APPLIED UNLESS THE FRONT END IS TO BE COUPLED TOGETHER WITH ANOTHER CAR OR IF ANY IN-TRAIN TRANSIT IS ANTICIPATED. THIS ALSO APPLIES TO THE UNCOUPLING ROD.

READ OPERATION PROCEDURE INSTRUCTIONS VERY CAREFULLY AND THE SHEET ON DIRECTION PLOWING WITH A JORDAN.

REMEMBER TO UNHOOK PLOW SIDE WING SAFETY HANGER CHAIN TO RESTORE ALL SLACK BEFORE OPERATING THE FRONT PLOW.

O. F. JORDAN COMPANY
East Chicago, Indiana

COUPLER HOLE COVER PLATE



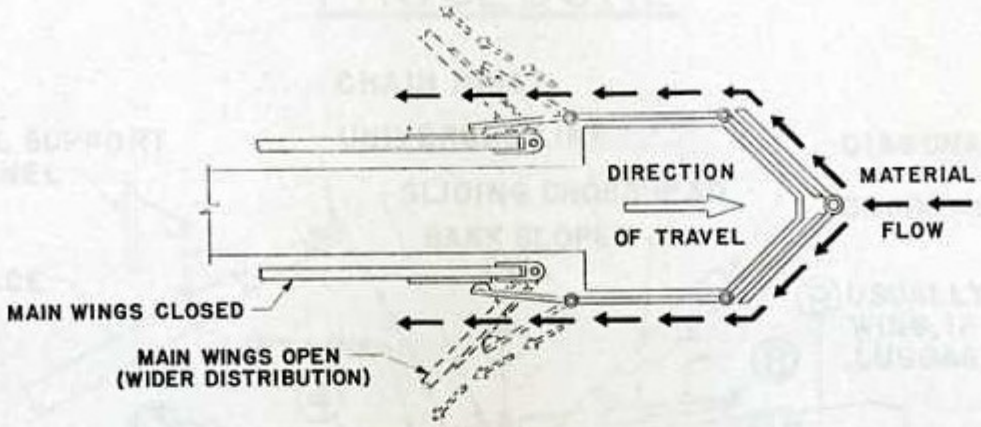
Two plates are mounted to retainer strips off the plow center. Each plate is notched to fit over half of the coupler shank. When installed, the two plates form a "V" at the apex of the front plow, fit over the coupler, and remain stationary while the plow is actuated vertically upward or downward.

In plowing any material, the cover plates prevent entry of material through the coupler hole, thus keeping the back side of the front plow as well as trucks free of foreign matter.

When not in use, the plates can be conveniently and easily detached from their position and stored on the deck of the frame.

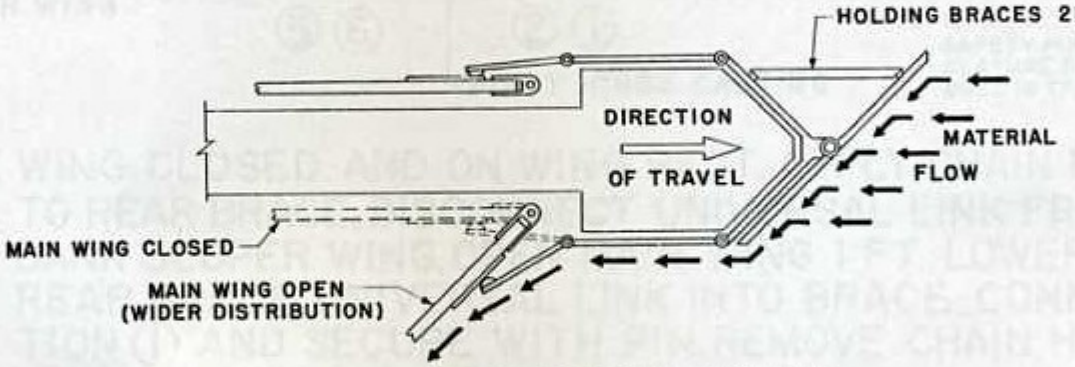
DIRECTION PLOWING WITH A JORDAN

NOTE: MAIN WINGS MAY BE EITHER OPENED OR CLOSED DURING ANY PLOWING OPERATION TO FACILITATE WIDER DISTRIBUTION OF MATERIAL FLOW.

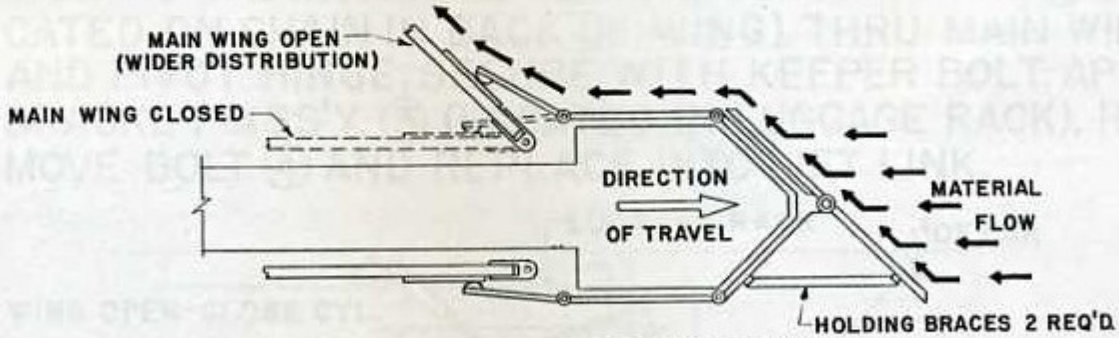


CENTER OR SINGLE TRACK PLOWING
(COUPLER HOLE COVER PLATE APPLIED)

NOTE: CENTER OR SINGLE TRACK PLOWING WITH THE V-NOSE OF A JORDAN FRONT PLOW SEPARATES MATERIAL AT CENTER AND DISTRIBUTES THE MATERIAL ALONG BOTH SIDES OF THE TRACK.



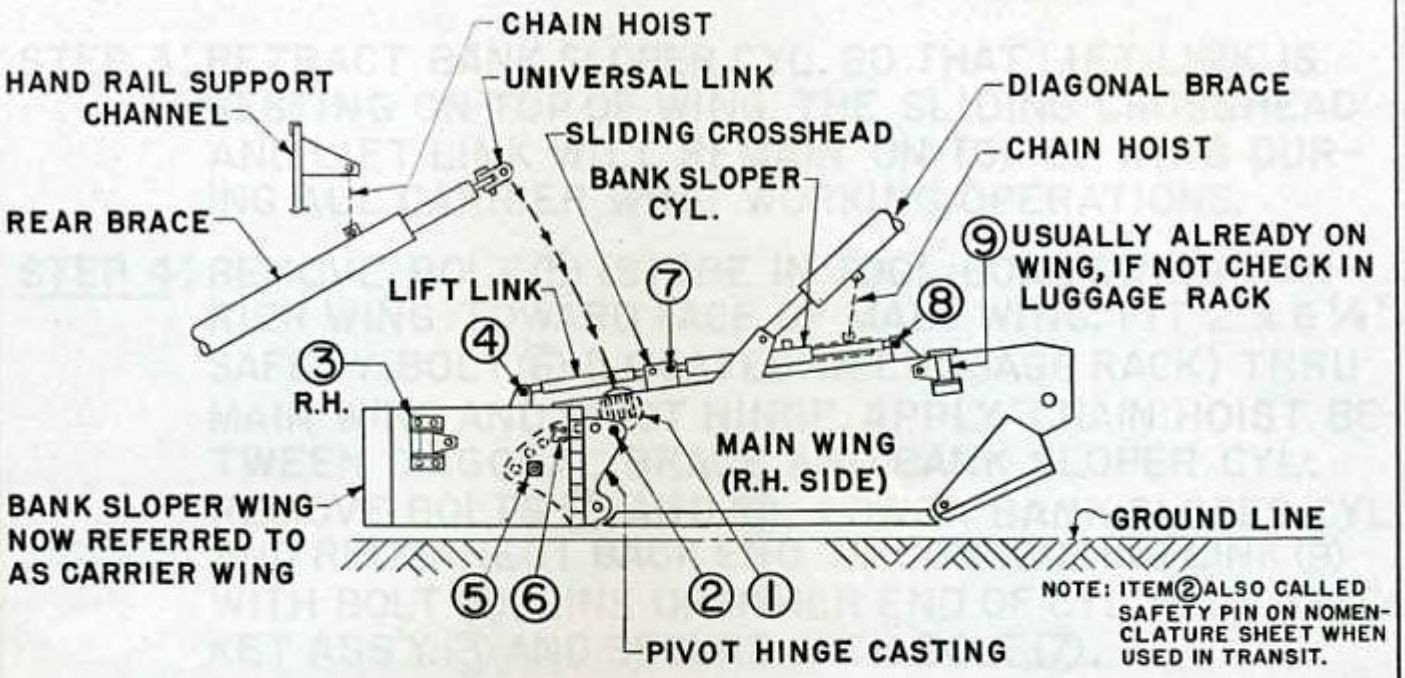
RIGHT HAND DOUBLE TRACK PLOWING
(COUPLER HOLE COVER PLATE REMOVED)



LEFT HAND DOUBLE TRACK PLOWING
(COUPLER HOLE COVER PLATE REMOVED)

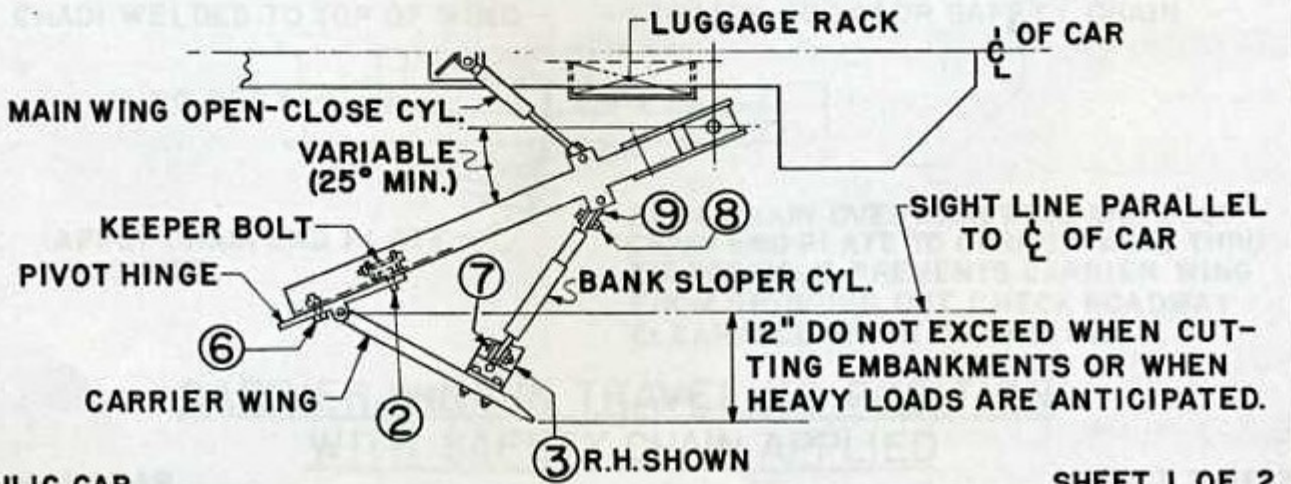
NOTE: RIGHT HAND OR LEFT HAND DOUBLE TRACK PLOWING IS USED WHERE SINGLE DIRECTION OF MATERIAL FLOW (EITHER TO RIGHT OR LEFT SIDE OF TRACK) IS DESIRED. INVALUABLE IN AREAS WHERE CUT SIDE AND OPEN SIDE ALTERNATE. SEE FRONT PLOW OPERATION SHEETS FOR CONVERSION DETAILS.

CARRIER WING CONVERSION PROCEDURE



STEP 1: WING CLOSED AND ON WING REST. APPLY CHAIN HOIST TO REAR BRACE, DISCONNECT UNIVERSAL LINK FROM BANK SLOPER WING, OPEN MAIN WING 1 FT. LOWER REAR BRACE UNIVERSAL LINK INTO BRACE CONNECTION ① AND SECURE WITH PIN. REMOVE CHAIN HOIST.

STEP 2: OPEN MAIN WING AND LOWER BANK SLOPER WING, POSITION AS SHOWN ABOVE NEAR GROUND. FIT PIN ② (LOCATED ON CHAIN IN BACK OF WING) THRU MAIN WING AND PIVOT HINGE, SECURE WITH KEEPER BOLT. APPLY BRACKET ASS'Y. ③ (LOCATED IN LUGGAGE RACK). REMOVE BOLT ④ AND REPLACE INTO LIFT LINK.



CARRIER WING CONVERSION PROCEDURE

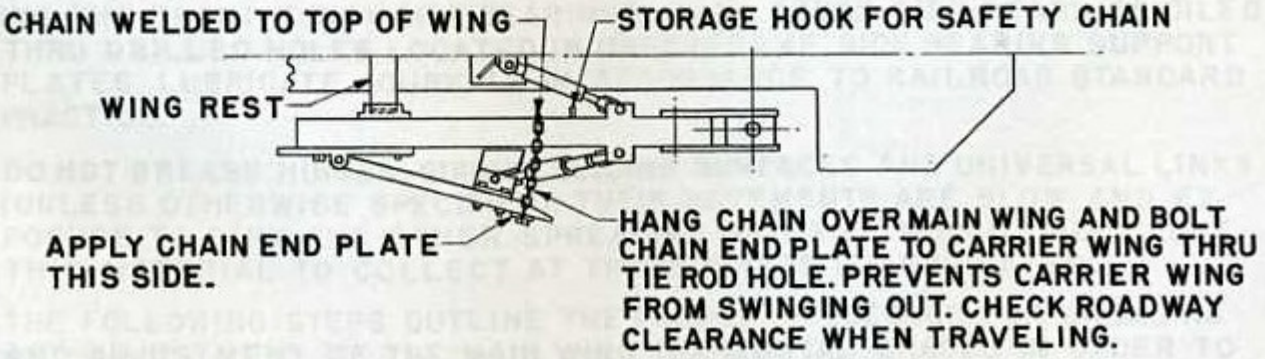
(CONTINUED)

STEP 3: RETRACT BANK SLOPER CYL. SO THAT LIFT LINK IS RESTING ON TOP OF WING. THE SLIDING CROSSHEAD AND LIFT LINK WILL REMAIN ON TOP OF WING DURING ALL CARRIER WING WORKING OPERATIONS.

STEP 4: REMOVE BOLT ⑤ (STORE IN TOOL BOX). SWING CARRIER WING TOWARD FACE OF MAIN WING. FIT 2" x 6 1/4" SAFETY BOLT ⑥ (LOCATED IN LUGGAGE RACK) THRU MAIN WING AND PIVOT HINGE. APPLY CHAIN HOIST BETWEEN DIAGONAL BRACE AND BANK SLOPER CYL. REMOVE BOLTS ⑦ AND ⑧. LOWER BANK SLOPER CYL. AND RECONNECT BACK END TO CONNECTING LINK ⑨ WITH BOLT ⑧. LINE UP OTHER END OF CYL. WITH BRACKET ASS'Y. ③ AND SECURE WITH BOLT ⑦.

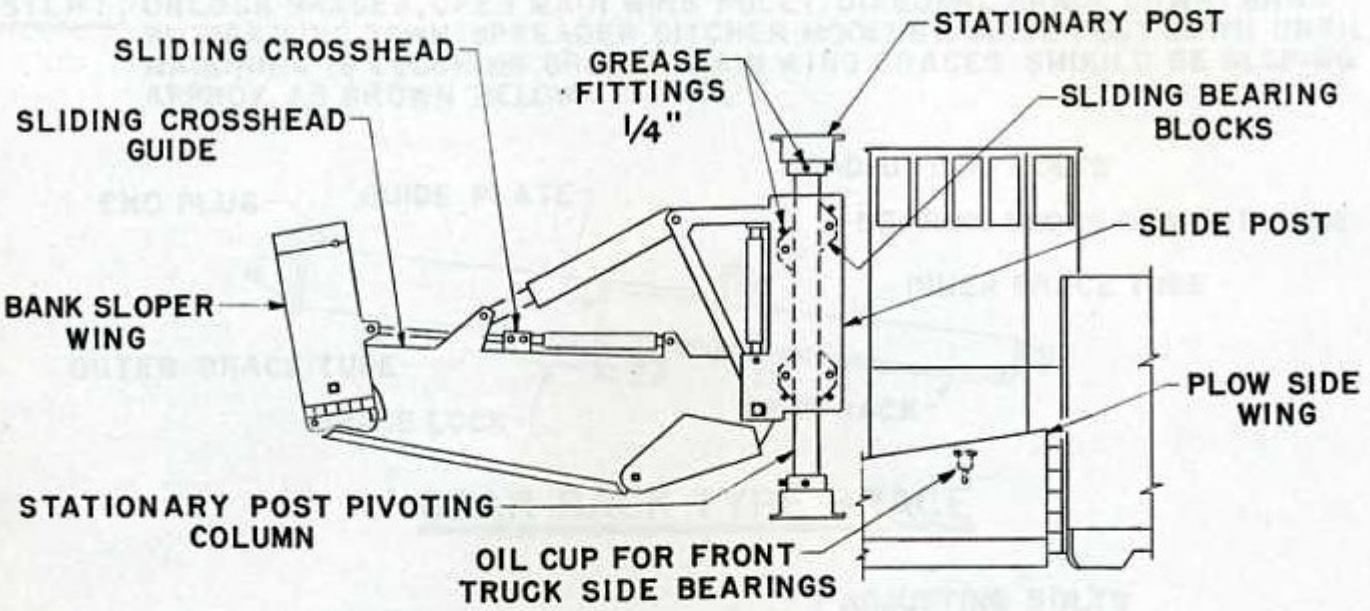
NOTE: CAREFUL ACTUATION OF ALL CYLINDERS MAY BE UTILIZED TO FACILITATE HOLE ALIGNMENT WHEN MAKING CONNECTIONS.

OPERATION: BRACES UNLOCKED. POSITION WING SAME AS FOR SPREADING, ADJUST CARRIER WING AS SHOWN IN THE ABOVE DIAGRAM. LOCK BRACES. AFTER WORKING A CUT, RAISE WING FROM WORK WITH SLIDE POST. MOVE BANK SLOPER CYL. IN AND OUT TO REMOVE MATERIAL THAT MAY COLLECT BETWEEN CARRIER WING AND MAIN WING, ALSO IN BANK SLOPER CYL. ROD HOUSING.



CARRIER WING IN TRAVELING POSITION WITH SAFETY CHAIN APPLIED

DAILY MAINTENANCE PROCEDURE



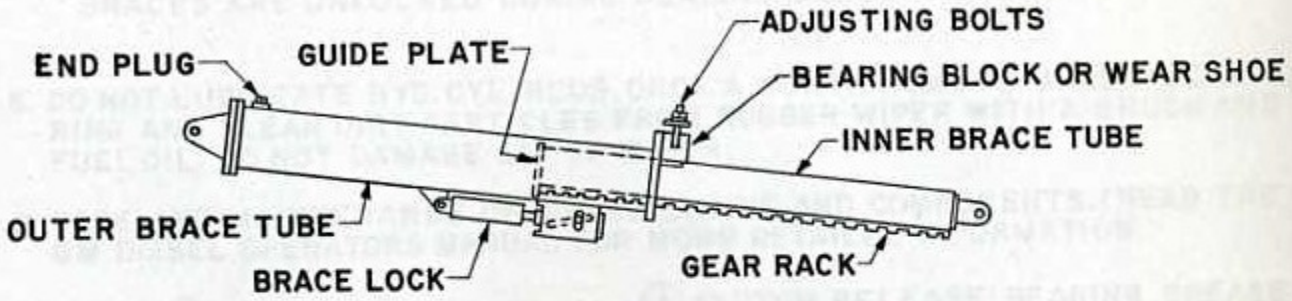
NOTE: USE CUP GREASE AND SAE 40 OIL OR EQUIVALENT (BELOW FREEZING USE THE SAE 40 OIL INSTEAD OF THE CUP GREASE).

1. TWO GREASE FITTINGS LOCATED AT TOP AND TWO AT BOTTOM OF STATIONARY POST. TOTAL OF 8 FOR BOTH SIDES OF CAR FOR STATIONARY POST PIVOTING COLUMN.
2. ONE GREASE FITTING PER SLIDING BEARING BLOCK. TOTAL OF 8 FOR FREE MOVEMENT OF SLIDE POST.
3. APPLY LIBERAL AMOUNTS OF GREASE WITH A BRUSH ON STATIONARY POST PIVOTING COLUMN WHERE EVIDENCE OF SCRAPING OR RUBBING CONTACT IS SHOWN. RAISE SLIDE POST FULLY UP TO GREASE BOTTOM PORTION OF STATIONARY POST AND LOWER FULLY DOWN TO GREASE THE UPPER PORTION.
4. DO NOT GREASE SLIDING CROSSHEAD GUIDE BUT KEEP GUIDE FREE OF DIRT AND OTHER MATERIALS TO FACILITATE UP AND DOWN MOVEMENT OF THE BANK SLOPER WING.
5. TWO OIL CUPS LOCATED BEHIND THE PLOW SIDE WINGS (1 PER SIDE) FOR OILING THE FRONT TRUCK SIDE BEARINGS. REAR TRUCK SIDE BEARINGS OILED THRU DRILLED HOLES LOCATED IN UNDERFRAME SIDE BEARING SUPPORT PLATES. LUBRICATE JOURNALS IN ACCORDANCE TO RAILROAD STANDARD PRACTICE.
6. DO NOT GREASE HINGES, GUIDES, SLIDING SURFACES AND UNIVERSAL LINKS (UNLESS OTHERWISE SPECIFIED). THEIR MOVEMENTS ARE SLOW AND EXPOSURE TO DIRT AND OTHER SPREADING MATERIAL WOULD ONLY CAUSE THIS MATERIAL TO COLLECT AT THESE POINTS IF LUBRICATED.
7. THE FOLLOWING STEPS OUTLINE THE PROPER PROCEDURE FOR GREASING AND ADJUSTMENT OF THE MAIN WING HORIZONTAL BRACES IN ORDER TO REDUCE VIBRATION AND INSURE PROPER LOCKING AND UNLOCKING OF THE BRACE LOCKS.

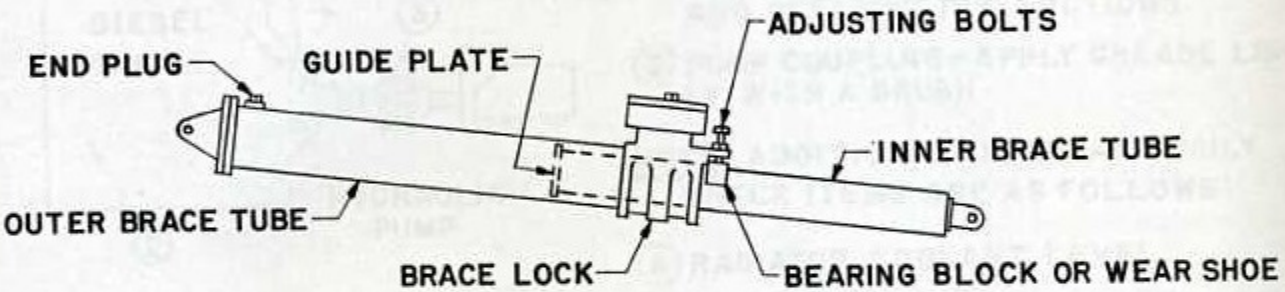
DAILY MAINTENANCE PROCEDURE

(CONTINUED)

STEP 1: UNLOCK BRACES, OPEN MAIN WING FULLY, DIAGONAL BRACE DOWN, BANK SLOPER WING DOWN (SPREADER DITCHER MODELS), SLIDE POST DOWN UNTIL MAIN WING IS TOUCHING GROUND. MAIN WING BRACES SHOULD BE SLOPING APPROX. AS SHOWN BELOW.



GEAR RACK TYPE BRACE



FRICTION LOCK TYPE BRACE

STEP 2: FOR GREASING, BRACES SHOULD SLOPE AS DESCRIBED IN STEP 1. REMOVE END PLUG AND POUR IN ONE CUP OF MELTED CUP GREASE FOR LUBRICATION OF THE INNER BRACE TUBE GUIDE PLATE. (THIS PROCEDURE IS DONE ONLY ONCE A WEEK UNLESS OTHERWISE NECESSARY).

STEP 3: APPLY GREASE WITH A BRUSH ALONG ENTIRE OUTSIDE AREA OF INNER BRACE TUBE SPECIFICALLY ALONG THE PORTION IN CONTACT WITH THE BEARING BLOCK, APPLY LIBERALLY IN THIS AREA. DO NOT ALLOW GREASE TO CONTACT THE GEAR RACK (KEEP FREE OF GREASE AT ALL TIMES).

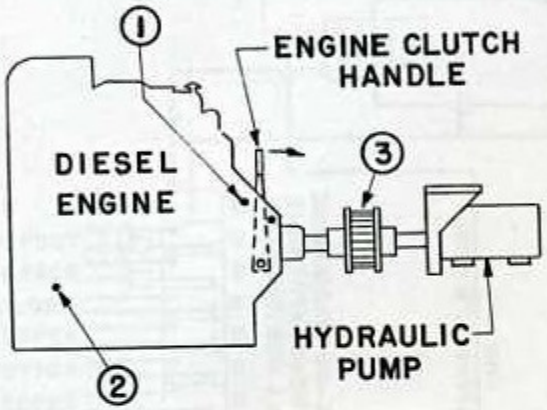
STEP 4: BEARING BLOCK SHOULD BE PROPERLY ADJUSTED FOR CORRECT BRACE ALIGNMENT TO INSURE POSITIVE BRACE LOCK OPERATION AND REDUCE EXCESSIVE BRACE VIBRATION. PROCEDE AS IN STEP 1 BUT OPEN WING TO APPROX. 25° AND POSITION UNTIL BRACES ARE HORIZONTAL AND LEVEL (WING MAY HAVE TO BE REPOSITIONED TO SUIT INDIVIDUAL BRACES FOR ON SOME CARS ALL BRACES CANNOT BE LEVELED TOGETHER). BEARING BLOCK IS THEN TIGHTENED FULLY DOWN WITH ADJUSTMENT BOLTS ON ALL LEVEL BRACES UNTIL INNER AND OUTER BRACE TUBES ARE IN LINE (NO VISIBLE SAGGING). NOW BACK OFF ON ADJUSTING BOLTS UNTIL SOME CLEARANCE IS REALIZED BETWEEN THE BEARING BLOCK AND THE INNER BRACE TUBE. NOW OPEN AND CLOSE MAIN WING NOTICING ANY VIBRATION OR SLUGGISH MOVEMENT. IF BRACES ARE NOT OPERATING PROPERLY THEN BEARING

DAILY MAINTENANCE PROCEDURE
(CONTINUED)

STEP 4 (CONTINUED): BLOCKS ARE EITHER TOO LOOSE OR TOO TIGHT. WHEN LEVELED BRACES HAVE BEEN ADJUSTED, REPOSITION MAIN WING TO LEVEL THE OTHER BRACES FOR ADJUSTMENT. DAILY VISUAL CHECK OF PROPER BRACE OPERATION WILL HELP KEEP MACHINE OPERATING EFFICIENTLY. (REMEMBER BRACES ARE UNLOCKED DURING BEARING BLOCK ADJUSTMENT).

8. DO NOT LUBRICATE HYD. CYL. RODS. ONCE A MONTH REMOVE BRASS SCRAPER RING AND CLEAN DIRT PARTICLES FROM RUBBER WIPER WITH A BRUSH AND FUEL OIL. DO NOT DAMAGE LIP OF WIPER.

9. CARE AND MAINTENANCE OF DIESEL ENGINE AND COMPONENTS. (READ THE GM DIESEL OPERATORS MANUAL FOR MORE DETAILED INFORMATION.



(1) CLUTCH RELEASE BEARING GREASE FITTING - GREASE EVERY 8 HOURS.

(2) GREASE FITTING - REFER TO OPERATORS MANUAL FOR OTHER LOCATIONS AND GREASING INSTRUCTIONS.

(3) PUMP COUPLING - APPLY GREASE LIGHTLY WITH A BRUSH.

NOTE: ADDITIONAL IMPORTANT DAILY CHECK ITEMS ARE AS FOLLOWS:

(A) RADIATOR COOLANT LEVEL.

(B) CRANKCASE OIL LEVEL.

(C) BATTERY WATER LEVEL.

(D) FUEL TANK LEVEL.

(E) HYDRAULIC OIL TANK - MAINTAIN "NORMAL" INDICATOR LEVEL.

(F) DRAIN 1/4 PINT FROM FUEL FILTER AND FUEL STRAINER TO REMOVE ANY WATER THAT HAS COLLECTED.

(G) AIR CLEANER AND FILTER.

(H) SEDIMENT SEPARATOR IN PUMP SUCTION LINE.

NOTE: CHANGE CRANKCASE OIL AFTER FIRST 100 HOURS OF OPERATION (REPLACE OIL FILTER ELEMENT ALSO).

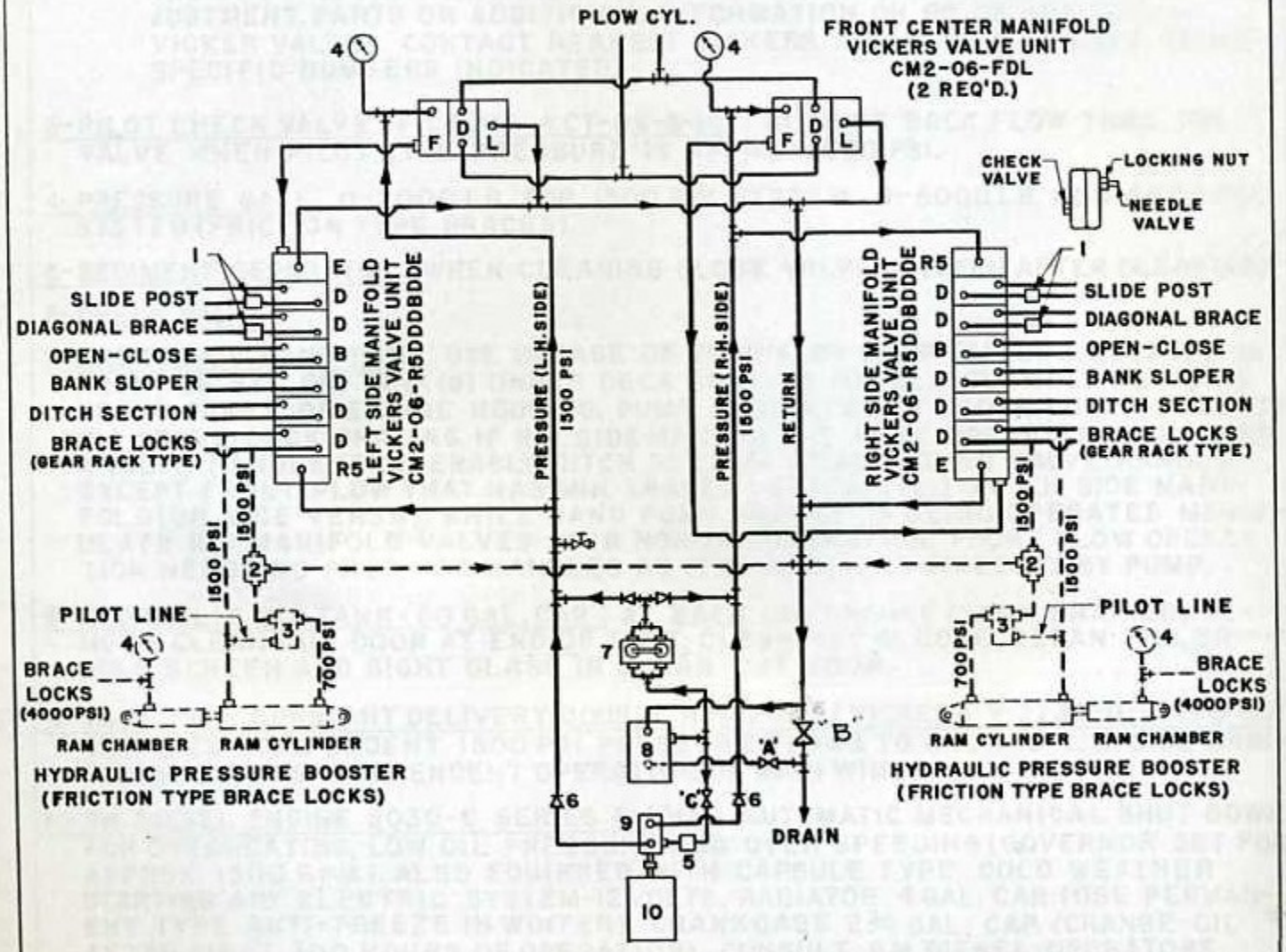
10. AFTER STARTING ENGINE ALLOW IT TO WARM UP UNTIL TEMPERATURE REACHES 160°F TO 185°F. THEN ENGAGE HYDRAULIC PUMP AND ALLOW HYDRAULIC OIL TO WARM UP. WHEN COLD, OIL PRESSURE GAGE IN CAB WILL REGISTER APPROX. 200 PSI (HIGHER AT LOW TEMPERATURES). ALLOW OIL TO CIRCULATE UNTIL PRESSURE DROPS TO APPROX. 80 PSI.

NOTE: READ HYDRAULIC SYSTEM OPERATION SHEETS.

HYDRAULIC SYSTEM OPERATION

INTRODUCTION:

HYDRAULIC SYSTEM IS A FLOW THRU TYPE (WHEN NOT OPERATING CONTROL VALVES) CONSTANTLY RECIRCULATING OIL THRU FRONT AND SIDE MANIFOLDS AND BACK TO HYD. TANK (8). THIS ALLOWS OIL TO WARM UP BEFORE OPERATING MACHINE (SEE DAILY MAINTENANCE SHEETS) AND ALSO REDUCES PUMP (9) WEAR. THE OIL IS CIRCULATED BY PUMP (9) WHICH PROVIDES INDEPENDENT PRESSURE FLOWS TO R.H. AND L.H. MANIFOLDS, BUT BOTH PRESSURE FLOWS GO DIRECTLY TO FRONT PLOW CYL. TO GIVE A MORE SMOOTHER AND RAPID OPERATION TO THE FRONT PLOW. ANY COMBINATION OF SIDE MANIFOLD VALVES CAN BE OPERATED TOGETHER ALTHOUGH SLOWER OPERATION OF CYLINDERS WILL BE APPARENT. SIDE MANIFOLDS WILL NOT OPERATE IF FRONT PLOW VALVE IS BEING USED.



1- FLOW CONTROL VALVE: IN THE RETURN FLOW LINE FOR LOWERING SLIDE POST AND DIAGONAL BRACE. ADJUSTMENT CAN BE MADE BY LOOSENING LOCKING NUT AND TURNING NEEDLE VALVE EITHER TO THE RIGHT (DECREASES FLOW) OR TO THE LEFT (INCREASES FLOW). IF OPERATION BECOMES ERRATIC, SHUT DOWN SYSTEM, REMOVE AND CLEAN NEEDLE VALVE AND BALL TYPE CHECK VALVE.

2- RELIEF VALVE (VICKERS CT-06-B-10): SET TO OPERATE AT 700 PSI. FOR ADJUSTMENT LOOSEN LOCKING JAM NUT ON VALVE WHEEL STEM (MAN IN CAB HOLDS BRACE LOCK HANDLE IN LOCK POSITION AND WATCHES THE 0-5000 LB. PRESSURE GAGE). TURN VALVE WHEEL VERY SLOWLY EITHER TO THE RIGHT (INCREASES

HYDRAULIC SYSTEM OPERATION

(CONTINUED)

PRESSURE) OR TO THE LEFT (DECREASES PRESSURE). MAN IN CAB WILL SIGNAL WHEN GAGE READS 4000 PSI. WHEN OPERATING FRICTION TYPE BRACE LOCKS IN THE LOCK POSITION IT IS IMPORTANT THAT THE 0-5000 LB. GAGE NEVER READS OVER 4000 PSI. IN ORDER TO AVOID HAZARDOUS CONDITIONS AND THE 0-2000 LB. GAGE TO READ 700 PSI. ASSURING THAT RELIEF VALVE IS OPERATING PROPERLY. IF PRESSURE CANNOT BE ADJUSTED UP TO 4000 PSI. AIR PURGING MAY BE NECESSARY OR RELIEF VALVE IS DEFECTIVE.

NOTE: RELIEF VALVE R5 IN R.H. AND L.H. SIDE MANIFOLDS IS SET AT FACTORY TO OPERATE AT 1500 PSI. IF ADJUSTMENT IS NECESSARY SHUT OFF ENGINE, DISENGAGE CLUTCH, OPERATE ALL VALVES TO RELIEVE TRAPPED PRESSURE, CLOSE VALVE 'A' AND OPEN VALVE 'B' SO OIL WILL DRAIN INTO A CLEAN 5 GAL. CONTAINER (OIL FROM RETURN LINE, NOT FROM TANK). FOR ADJUSTMENT, PARTS OR ADDITIONAL INFORMATION ON R5 OR ANY OTHER VICKER VALVES CONTACT NEAREST VICKERS INC., MOBILE HYD. DIV. USING SPECIFIC NUMBERS INDICATED.

3-PILOT CHECK VALVE (VICKERS 4 CT-06-A-10): ALLOWS BACK FLOW THRU THE VALVE WHEN PILOT LINE PRESSURE IS APPROX. 600 PSI.

4-PRESSURE GAGE: 0-2000 LB. FOR 1500 PSI. SYSTEM. 0-5000 LB. FOR 4000 PSI. SYSTEM (FRICTION TYPE BRACES).

5-SEDIMENT SEPARATOR: WHEN CLEANING CLOSE VALVE 'C' (OPEN AFTER CLEANING)

6-CHECK VALVES

7-EMERGENCY HAND PUMP: USE IN CASE OF ENGINE OR PUMP FAILURE. LOCATED IN FRONT OF HYD. OIL TANK (8) UNDER DECK GRATING. HANDLE CLAMPED TO INSIDE FRONT PANEL OF ENGINE HOUSING. PUMP PROTECTED BY LOOSE COVER PROJECTING ABOVE DECK GRATING. IF R.H. SIDE MANIFOLD IS TO BE OPERATED PROP OPEN A VALVE HANDLE (PREFERABLY DITCH SECTION OR ANY OTHER VALVE HANDLE EXCEPT FRONT PLOW THAT HAS MIN. TRAVEL LEFT IN CYL.) ON L.H. SIDE MANIFOLD (OR VICE VERSA). WHILE HAND PUMP HANDLE IS BEING OPERATED MANIPULATE R.H. MANIFOLD VALVES AS IN NORMAL OPERATION. FRONT PLOW OPERATION NEEDS NO PROP FOR HANDLES AS IT IS OPERATED DIRECTLY BY PUMP.

8-HYDRAULIC OIL TANK-60 GAL. CAP.: AT EACH OIL CHANGE (TANK DRAINED) REMOVE CLEAN OUT DOOR AT END OF TANK. CLEAN OUT SLUDGE, CLEAN FILLER HOLE SCREEN AND SIGHT GLASS IN CLEAN OUT DOOR.

9-VANE TYPE, CONSTANT DELIVERY, DOUBLE HYD. PUMP (VICKERS V-2234-11-11-1BB-20): SUPPLIES INDEPENDENT 1500 PSI. PRESSURE FLOWS TO R.H. AND L.H. SIDE MANIFOLDS. ALLOWS INDEPENDENT OPERATION OF MAIN WINGS.

10-GM DIESEL ENGINE 2030-C SERIES 71: HAS AUTOMATIC MECHANICAL SHUT DOWN FOR OVERHEATING, LOW OIL PRESSURE AND OVER SPEEDING (GOVERNOR SET FOR APPROX. 1500 RPM). ALSO EQUIPPED WITH CAPSULE TYPE COLD WEATHER STARTING AID. ELECTRIC SYSTEM-12 VOLTS. RADIATOR 4 GAL. CAP. (USE PERMANENT TYPE ANTI-FREEZE IN WINTER). CRANKCASE 2¾ GAL. CAP. (CHANGE OIL AFTER FIRST 100 HOURS OF OPERATION). CONSULT GM DIESEL OPERATORS MANUAL FOR PROPER DIESEL FUEL OIL AND LUBRICATING OIL SPECIFICATIONS.

NOTE: FOR ADDITIONAL COPIES OF GM DIESEL OPERATORS MANUAL OR PARTS BOOK WRITE GENERAL MOTORS CORP., DETROIT 28, MICH. (SPECIFY MODEL NO.)

OIL CHANGE PROCEDURE

INTRODUCTION: OIL SHOULD BE CHANGED AT LEAST TWICE A YEAR FOR SUMMER AND WINTER OPERATION AND TO KEEP SYSTEM FREE OF FOREIGN MATTER. FOR SEASONAL TEMP. CHANGES IT IS RECOMMENDED THAT FROM 0° TO -30°F USE

HYDRAULIC SYSTEM OPERATION

OIL CHANGE PROCEDURE

(CONTINUED)

MOBILOIL 5-W (USED ONLY IF TEMPERATURE NEVER EXCEEDS ZERO OR EXCESSIVE PUMP WEAR WILL RESULT). FROM 0° TO +50°F. USE MOBIL DELVAC OIL 910. FROM 50°F. TO 100°F. USE MOBIL DELVAC OIL 930. USE THESE TYPES OF INHIBITED OILS OR THEIR EQUIVALENT. THE FOLLOWING STEPS OUTLINE OIL CHANGE PROCEDURE.

STEP 1: LOCATE SPREADER ON A TRACK THAT HAS DEEP DITCHES ON BOTH SIDES SO THAT MAIN WINGS CAN BE LOWERED TO THEIR MAX. DEPTH. REMOVE ALL SAFETY DEVICES AND ADJUSTMENT PINS.

STEP 2: OPEN MAIN WING FULLY. RAISE TO THEIR FULL UP POSITION THE SLIDE POST, DIAGONAL BRACE, BANK SLOPER, DITCH SECTION AND FRONT PLOW (BRACES ARE IN UNLOCKED POSITION). DISENGAGE CLUTCH AND SHUT DOWN ENGINE.

STEP 3: CONNECT FURNISHED DRAIN HOSE TO DRAIN LINE OF HYD. OIL TANK. (TWO EMPTY 55 GAL. DRUMS REQ'D. FOR OIL DRAINAGE). OPEN VALVE 'A', DRAIN AND CLEAN TANK (ITEM 8 SHT. 2). REASSEMBLE TANK AND CLOSE VALVE 'A'. CLEAN ITEM 5 SHT. 2. FILL TANK WITH NEW OIL SLIGHTLY ABOVE NORMAL LEVEL. [redacted] VALVE 'B' SO THAT SYSTEM RETURN LINE WILL DRAIN INTO DRUM.
OPEN

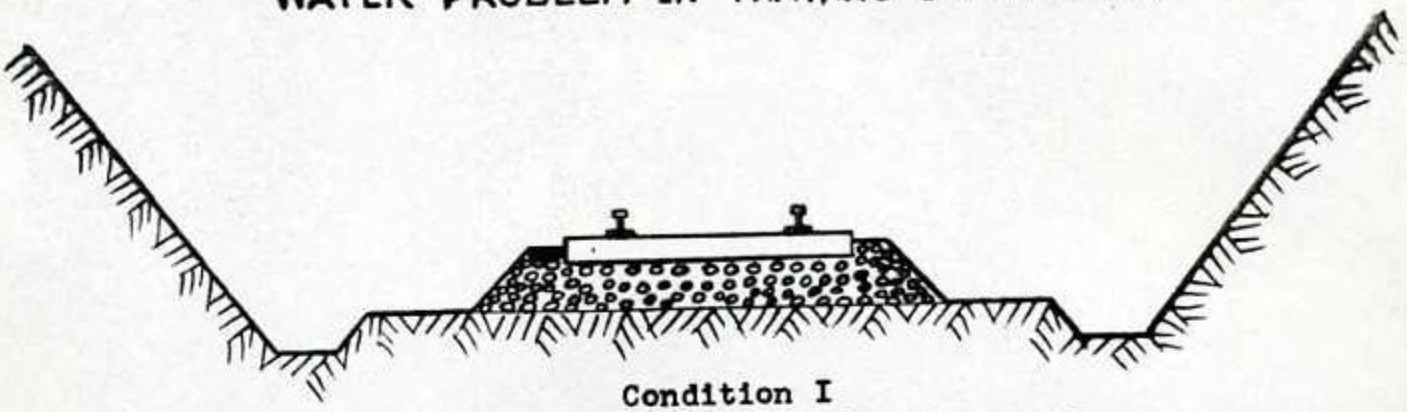
STEP 4: WITH ENGINE STILL OFF OPERATE CONTROLS AND LOWER FULLY THE DITCH SECTION, BANK SLOPER, DIAGONAL BRACE, SLIDE POST AND THEN THE FRONT PLOW. IF INDIVIDUAL WEIGHTS WILL NOT CAUSE SECTIONS TO LOWER ASSIST WITH A JACK ARRANGEMENT OR PRY'S. WHEN ALL SECTIONS ARE FULLY DOWN DISCONNECT OPEN-CLOSE CYLINDER AT WING AND MANUALLY PUSH IN ROD AND THEN PULL OUT AND RECONNECT TO WING (OPERATE CONTROL HANDLE TO DO THIS TO OPEN-CLOSE CYL.).

NOTE: NOT NECESSARY TO DRAIN BRACE LOCK CYLINDERS ON GEAR RACK TYPE BRACES AS LONG AS OIL CHANGE OF THE REST OF THE SYSTEM IS DONE TWICE A YEAR. FOR FRICTION TYPE BRACES FOLLOW AIR PURGE PROCEDURE AFTER EACH OIL CHANGE HAS BEEN COMPLETED.

CLOSE FOR
STEP 5: [redacted] VALVE 'B' [redacted] NORMAL OPERATING POSITION (MAKE SURE VALVE 'C' IS OPEN), REMOVE DRAIN HOSE AND DRAIN OIL DRUMS. START ENGINE AND ALLOW TO WARM UP. ENGAGE CLUTCH AND ALLOW OIL TO WARM UP. OPERATE INDIVIDUALLY ALL CONTROLS FULLY, NOTING NORMAL OIL LEVEL ON SIGHT GLASS OF TANK. AS OIL LEVEL APPROACHES THE LOW MARK FILL TANK WITH NEW OIL BACK TO NORMAL LEVEL. CONTINUE THIS PROCESS UNTIL OIL REMAINS CONSTANT AT NORMAL LEVEL MARK AND FOAM AND AIR BUBBLES AS OBSERVED IN SIGHT GLASS HAS SUBSIDED. MACHINE IS NOW READY FOR WORK OPERATION. IF MACHINE HAS FRICTION TYPE BRACES FOLLOW AIR PURGE PROCEDURE BEFORE USING MACHINE FOR WORK.

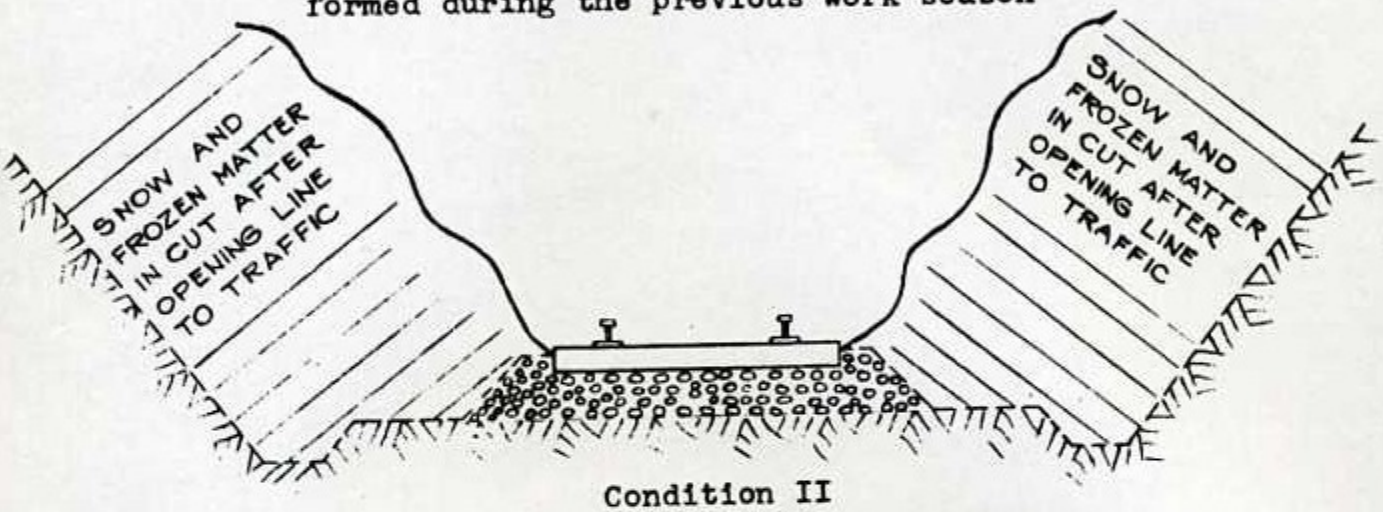
NOTE: ASSUMING PROPER OIL HAS BEEN USED AND OIL TANK FILLED TO PROPER LEVEL BUT EXCESSIVE FOAM (TRACE OF FOAM ON TOP OF OIL LEVEL IS NORMAL) AND CONTINUED AIR BUBBLES SHOW, DENOTES AIR LEAK IN SUCTION LINE OR IN OTHER PARTS OF SYSTEM, RELIEF VALVE (R5) SET TOO HIGH OR OPERATOR IS HOLDING CONTROL HANDLE IN OPERATING POSITION TOO LONG CAUSING PRESSURE TO BUILD UP AND BY-PASS THRU RELIEF VALVE DIRECTLY TO TANK (ALWAYS ALLOW CONTROL HANDLE TO RETURN TO NEUTRAL IMMEDIATELY AFTER DESIRED MOVEMENT IS REACHED). DAMAGE TO SYSTEM BY OVERHEATING WILL RESULT IF THESE SYMPTOMS ARE NOT CORRECTED. FOR MORE INFORMATION REQUEST BOOKLET "OPERATIONS AND CARE OF HYDRAULIC MACHINERY" FROM 'THE TEXAS COMPANY', 332 SOUTH MICHIGAN AVE., CHICAGO 4, ILLINOIS.

WATER PROBLEM IN THAWING SNOW CUTS



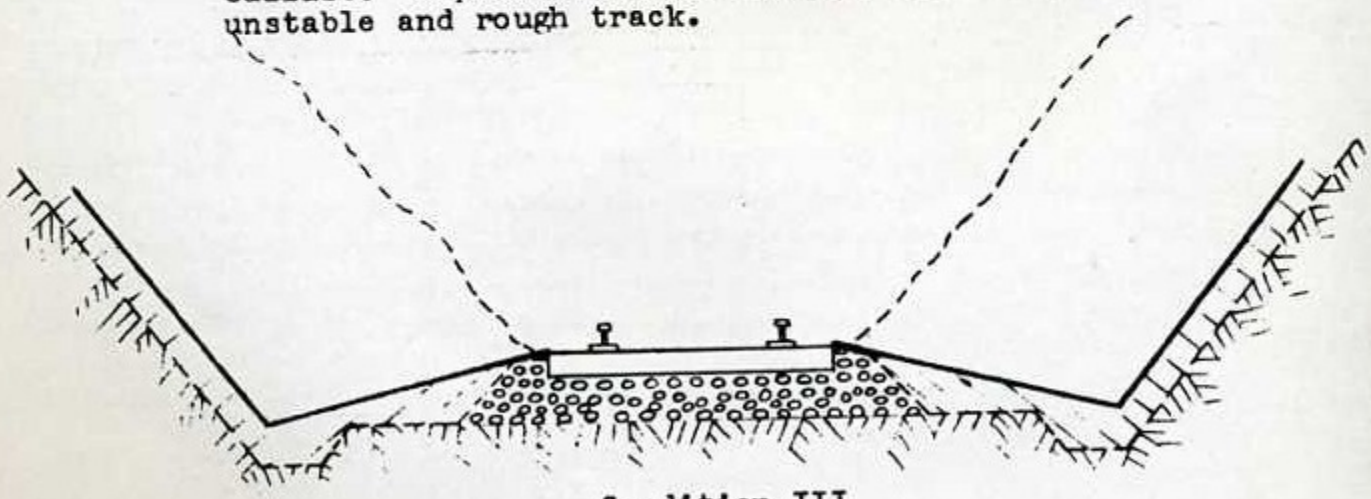
Condition I

It is assumed that the cut has been properly ditched and adequate surface ditches formed during the previous work season



Condition II

With warmer weather approaching, the snow will settle in cut. Colder night weather will cause surface crusting. Subsequent thawing causes water to flow toward the track area, entering ballast. Repetitive freezing here will create unstable and rough track.



Condition III

Using a JORDAN in spreader form with its bank sloper wing in elevated position, the snow can be plowed out of the cut and a "V" contour created as shown above. Water will drain along this channel, ultimately becoming the surface ditch. Most important, no water is permitted to overflow or enter the roadbed. The process is fast and saves many subsequent maintenance problems.