DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, FIELD,

AND DEPOT MAINTENANCE MANUAL

SHOP SET,

AIRCRAFT MAINTENANCE,

SEMITRAILER MOUNTED,

SET C5, WELDING

HEADQUARTERS, DEPARTMENT OF THE ARMY

OCTOBER 1961

CHANGES

No. 1

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DEPARTMENT OF THIE ARMY
WASHINGTON, D. C., 7 September 1972

Operator, Organizational, Field,
and Depot Maintenance Manual

SHOP SET, AIRCRAFT MAINTENANCE, SEMITRAILER
MOUNTED, SET C-5, WELDING

TM 55-4920-214-15, 9 October 1961, is changed as follows:

Page 25. Paragraphs 51 and 52 are superseded as follows:

51. Purpose

This chapter furnishes the operator with information for preparation of the equipment comprising Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding, for shipment and limited storage.

52. Methods

The methods outlined herein for shipment and limited storage apply to the shop set as a unit. It is the responsibility of the operator to become familiar with the technical manuals for each item of equipment in order to adequately prepare the item of equipment for equipment and limited storage.

Page 26. Acid the following after the title of Section III:

(Refer to TM 750-244-1-4 for demolition instructions.)

Page 26. Paragraphs 55 through 58 are deleted.

By Order of the Secretary of the Army:

BRUCE PALMER, JR.
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Major General, United States Army
The Adjutant General

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., 9 October 1961

OPERATOR, ORGANIZATIONAL, FIELD, AND DEPOT MAINTENANCE MANUAL

SHOP SET, AIRCRAFT MAINTENANCE, SEMITRAILER MOUNTED,

SET C-5, WELDING

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

These instructions are published for the use of operating and maintenance personnel to whom the end item or equipment is assigned. They contain information on the operation, lubrication, detail preventive maintenance services, and maintenance of the equipment, its accessories and auxiliaries; also packing, preservation, storing, and shipping procedures.

2. References

a. Current Technical References. Appendix I list technical publications applicable to the equipment as noted in detailed instructions contained herein.

b. Maintenance Allocation.

(1) *Organizational maintenance allocation.* In general, the prescribed organizational maintenance responsibilities will apply in accordance with the extent of disassembly prescribed in the maintenance allocation charts (app. II), for the purpose of cleaning, lubricating, or replacing spare parts. In all cases where the nature of the repair, modification, or adjustment is beyond the scope or facilities of the using organization, the applicable supporting maintenance unit should be informed so that trained personnel with suitable tools and equipment may be provided or other instructions issued.

(2) *Field and depot maintenance allocation.* The publication herein of instructions for complete disassembly and repair is not to be construed as authority for the performance by field maintenance units of those functions which are the responsibilities of depots. The prescribed maintenance responsibilities will apply as reflected in the applicable manual for the item of equipment. Provisioning of parts listed in chapters 8 and 9 for the item will be made to field maintenance only when the emergency nature of the maintenance to be performed has been certified by a responsible officer of the requisitioning organization.

3. Forms, Records, and Reports

a. General. Responsibility for the proper execution of forms, records, and reports rests upon the commanding officers of all units maintaining this equipment. However, the value of accurate records must be appreciated fully by all persons responsible for their compilation, maintenance, and use. Records, reports, and authorized forms are normally utilized to indicate the type, quantity, and condition of material to be inspected, to be repaired, or to be used in repair. Properly executed forms convey authorization and serve as records for repair or replacement of material in the hands of troops and for delivery of material requiring further repair to shops, depots, etc. The forms, records, and reports establish the work required, the progress of the work required, the progress of the work within the shops, and the status of the material upon completion of its repair.

b. Authorized Forms. For a complete listing of forms, refer to current DA Pam 310-2.

c. Field Report of Accidents. The reports necessary to comply with the requirements of the Army Safety Program are prescribed in detail in the AR 385-series. These reports are required whenever accidents involving injury to personnel or damage to material occur.

d. Report of Unsatisfactory or Damaged Equipment or Materials. Any suggestions for improvement in design and maintenance of equipment and repair parts, safety and efficiency of operation, or pertaining to the application of prescribed lubricants and/or preserving materials, or technical inaccuracies noted in Department of the Army publications, will be reported as prescribed in AR 700-38, using DA Form 468 (Unsatisfactory Equipment Report) or DD Form 6, as prescribed in AR 700-58. Such suggestions are encouraged in order that other organizations may benefit. Do not report all failures that occur. Report only repeated failures or unsatisfactory design or material. However, reports will always be made when exceptionally costly equipment is involved. Refer also to AR 700-38 and the printed instructions on DA Form 468.

Section II. DESCRIPTION AND DATA

4. Description

a. General. Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding, consists of a semitrailer mounted van and necessary tools and equipment for an Army aviation field maintenance shop, operating in the field, performing the functions of a welding facility. The shop set contains three systems; electrical, pneumatic, and utility.

(1) *Electrical system.* Electrical power is supplied by an auxiliary source. An external power receptacle, designed to accommodate a plug attached to the auxiliary power cord, is mounted at the right rear corner of the van. The external power receptacle feeds directly to the electric control panel (fig. 4), which is provided to distribute the power source to the point of use. The electric control panel is mounted in the right rear exterior corner of the shop. The control panel contains 14 thermal-magnetic circuit breakers which serve as distribution centers for the current supplied to the equipment of the shop. A receptacle is provided to furnish current for small, electrically operated tools.

(2) *Pneumatic system, semitrailer mounted shop set.* Power for the pneumatic system is supplied from an external source. Air lines are in- stalled (figs. 9, 10, and 12), to the oil and water separator and regulators, and from the regulators to the ceiling outlets. The pneumatic system controls and instruments (fig. 5), are mounted as a unit. This unit contains an oil and water separator for collecting and draining off accumulated oil and water, a source pressure gage, two regulators for maintaining a steady operating pressure, two operating pressure gages, check units, and valves to control or disconnect the air pressure.

(3) *Utility system*. The utility system consists of one each, 1 3/4 by 30 by

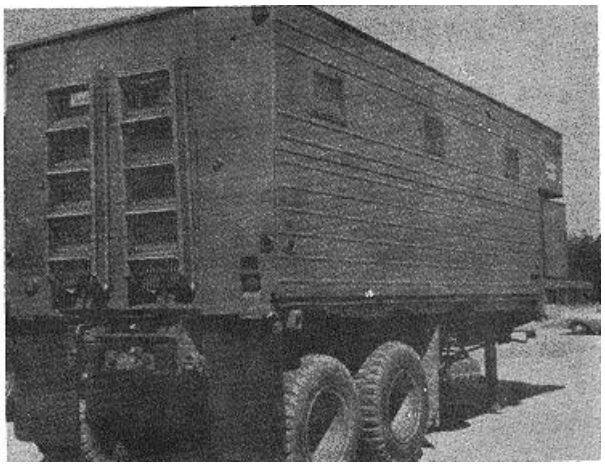


Figure 1. Shop Set, C-5, Welding.

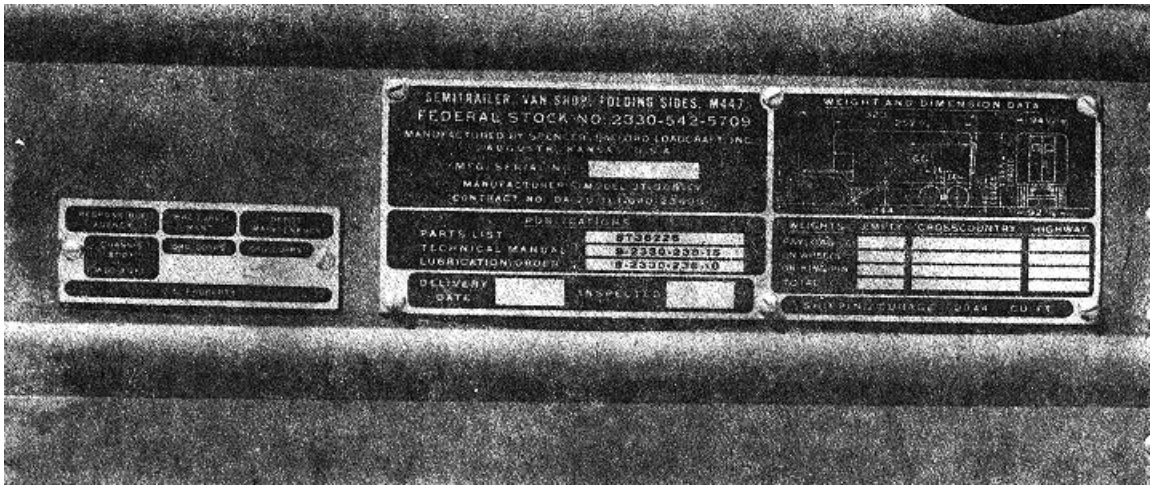


Figure 2. Identification plates, Shop Set, C-5.

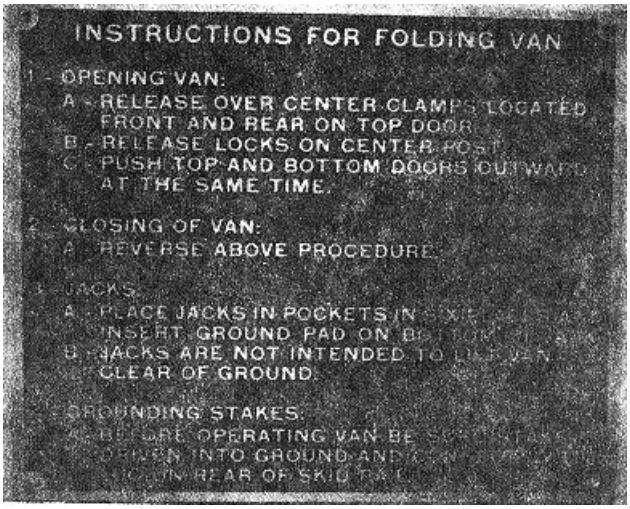


Figure 3. Instruction plate, Shop Set, C-5.

21 inch, maple bench top; one each, 1 3/4 by 30 by 42 inch, maple bench top; one each, 1 3/4 by 30 by 84 inch, maple bench top; one each, 33 by 28 by 42 inch, four-shelf storage cabinet; one each, 33 by 28 by 21 inch 10-drawer storage cabinet; and two each, 33 by 28 by 42 inch, 12-drawer storage cabinets. The maple bench tops are used as working surfaces and for mounting equipment. The cabinets are used for storing hand tools and small items of equipment (paras. 123-125).

b. Identification. Identification and instruction markings are listed in figures 1, 2, and 3.

c. List of Components. A list of the components is contained in SM 55-4-4920-S39.

d. Deviation in Models. This manual applies only to Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding, as defined in SM 55-4-4920-S39.

5. Tabulated Data

a. Organizational Maintenance Data.

Model C-5
Overall dimensions:
Overall length....319 in.
Overall width .....96 in.
Overall height....132 in. (loaded)
Height of chassis (loaded) .....40 1/2 in.
Overall width with sides folded out .166 1/2 in.
Volume.....2,288 cubic ft.
Total weight.....19,270 lb.

b. Field and Depot Maintenance Data.

(1) Electrical system:
Power source.....Auxiliary; generator or domestic.
Electrical power required.....120-volt, ac, single-phase, 60-cycle; 220-240-volt, ac, single-phase, 60-cycle; 220-440-volt ac, 3-phase, 60-cycle.

Electrical connection, shop. ..... External power receptacle, female.
Electrical connections, equipment. ..... Receptacles and circuit breakers.
Safety device and controls. ..... Thermal magnetic circuit breakers (fig. 4).

(2) Pneumatic system:
Power source. ..... External; compressor or storage tank.
Pneumatic power requirements. .5 CFM 75-150 psi working pressure.
Pneumatic connections, shop. ..... Quick-disconnect fitting (fig. 11).
Pneumatic connections, equipment. ..... Quick-disconnect fittings; air hose, and adapters.
Safety devices and controls. ..... Shutoff valve. Gages, Regulators, valves, check units, and drain cock (fig. 5).

(3) Utility system:
Type equipment. Storage cabinets, type I, type II and type III; bench tops, size A, C, and D.
Equipment function ..... Storage of shop equipment and hand-tools; working surface.
Equipment mounting. ..... Floor type and cabinet top.

CHAPTER 2

OPERATING INSTRUCTIONS (OPERATOR)

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. General

When a new or used shop set is received by the operator, it is the responsibility of the operator to determine whether the material has been properly prepared for service by the supplying organization and to be sure it is in condition to perform its functions. For this purpose, inspect all assemblies and parts to be sure they are properly assembled, secured, cleaned, adjusted, and lubricated. Refer to chapter 8 for location and mounting instructions of the equipment. Make a record of any malfunctions. Notify the responsible maintenance echelon of deficiencies for correction as quickly as possible.

7. Before Operation Service

Lubricate equipment in accordance with paragraphs 29 and 30.

Section II. CONTROLS AND INSTRUMENTS

8. General

This section describes, locates, illustrates, and furnishes the operator information pertaining to the various controls or instruments provided for the proper operation of the equipment. It is essential that the operator know how to perform every operation the equipment is capable of performing.

9. Electric Controls and Instruments

An electric control panel is located at the inside right rear door of the shop. This panel is equipped with circuit breakers and an identification list (fig. 4); additional circuits may be installed, when necessary, in the panel. A layout (wiring diagram) of the shop is shown in figure 8. An outside power receptacle is mounted at the right rear of the shop exterior.

Caution

Do not modify power receptacle or electrical cable.

10. Pneumatic Controls and Instruments

Pneumatic controls and instruments (fig. 5) are mounted in the upper left hand front corner of the shop interior. The controls and instruments include valves, regulators, separator, gages, and check units.

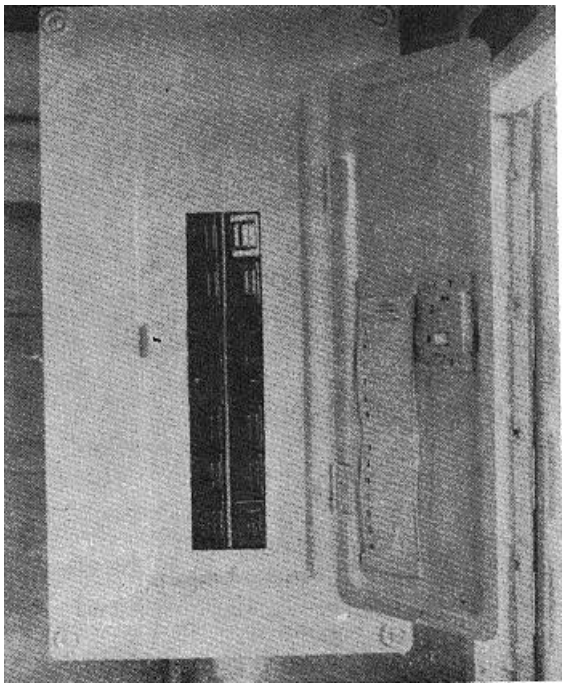


Figure 4. Electrical control panel and identification list.

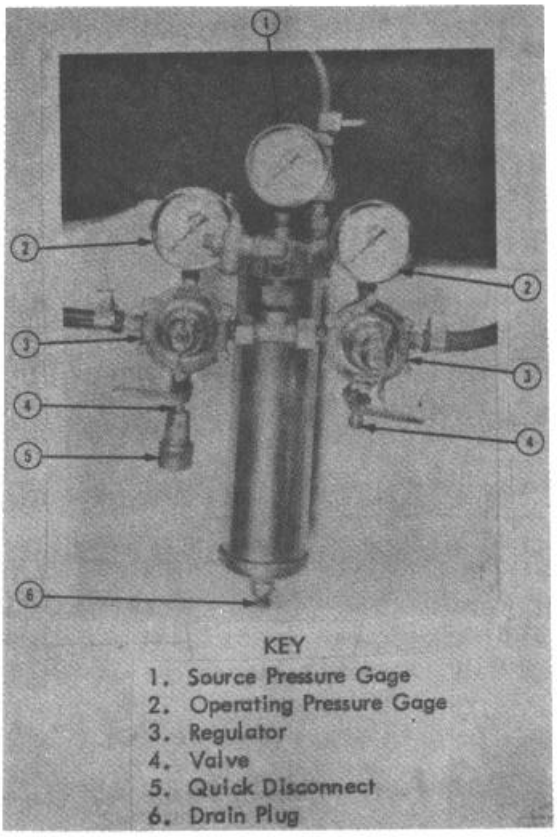


Figure 5. Pneumatic controls and instruments.

Section III. OPERATION UNDER USUAL CONDITIONS

11. General

Instructions in this section are published for the use of personnel responsible for the operation of this equipment. It is essential that the operator know how to perform every operation the equipment is capable of performing.

12. Preparation for Starting

a. Perform the "before-operation" daily services (paras. 31 and 34).

b. Assure that all equipment control switches are in the OFF position.

c. Connect power supply equipment.

Note

Check auxiliary power connections prior to starting equipment.

Warning

Use compressed air only for the purpose for which it is intended. Serious injuries to personnel can result from misuse.

d. The equipment comprising Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding (para. 4), is now ready for operation.

e. It is essential that the operator(s) be completely familiar with the technical manual for the equipment.

13. Shutdown of Shop Set

a. Shutdown instructions for the units comprising Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding, are contained in the individual manual issued for the individual items. It is essential that the operator understand these instructions.

b. Perform "after-operation" daily services.

14. Operating Details

a. General. These instructions provide the operator with necessary details for operation of the equipment in the shop set.

b. Electrical System.

(1) Ascertain that circuit breakers in electrical panel are in the ON position for circuits to be used.

(2) Check for loose connections, blown fuses, tripped circuit breakers, and frayed wire covers.

(3) Plug cords of equipment to be operated into receptacle provided.

c. Pneumatic System.

(1) Connect air line from auxiliary power source to adapter in shop (fig. 11).

(2) Allow sufficient time for buildup of source pressure in the tank and drain the oil and water separator (fig. 5).

(3) Close drain when water or oil cease to drain from separator.

(4) Adjust controls (fig. 5), to obtain an operating pressure of 75 psi.

(5) Check connections for leaks, security of fittings, and condition.

(6) Insert adapters attached to pneumatic equipment hose into receptacles provided.

15. Movement of Equipment

a. Perform "at halt" and "after-operation" daily service (table I).

b. Store all tools and equipment (fig. 6).

c. Secure tools or equipment too large for bin storage, with special fastenings provided (fig. 7).

d. Store cable or hose in locations provided.

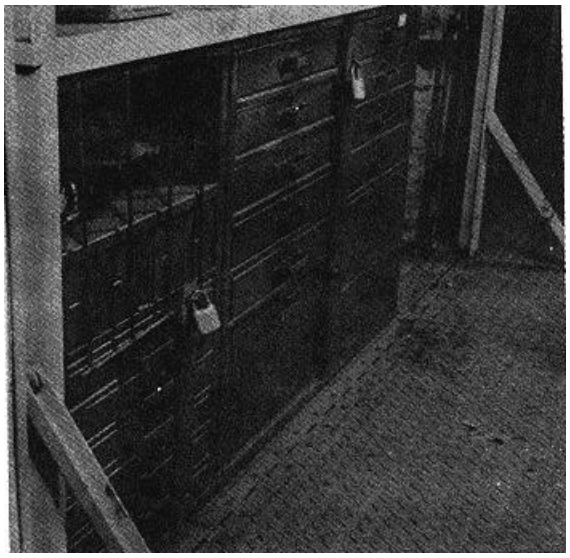


Figure 6. Security locking bars, open bin security fastenings; typical installation.

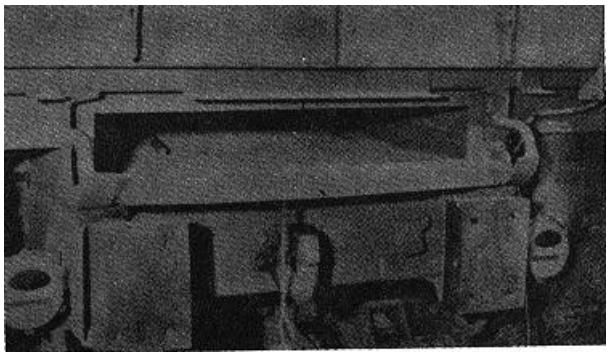


Figure 7. Jack stowage box.

Section IV. OPERATION OF ONE UNIT IN CONJUNCTION WITH ANOTHER ACCESSORY OR AUXILIARY

16. Maintenance and Operating Instructions

Maintenance and operating instructions for the auxiliary equipment to be used in conjunction with this shop set are listed in the separate technical manuals of the auxiliary equipment.

17. Auxiliary Connections

Connections are provided for auxiliary pneumatic and electrical hookups. The location, purpose, and description of these auxiliary outlets are described in paragraphs 70 through 72. Operating instructions for the auxiliary connections are contained in this chapter.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

18. General Conditions

a. In addition to the operating procedures described for usual conditions, special instructions of a technical nature for operating and servicing this equipment under unusual conditions are contained or referred to herein. In addition to the normal preventive maintenance service, special care in cleaning and lubrication must be observed where extremes of temperature, humidity, and terrain are present or anticipated. Proper cleaning, lubrication, and storage and handling of fuels and lubricants not only insure proper operation and functioning but also guard against excessive wear of the working parts and deterioration of materials.

Caution

It is imperative that the approved practices and precautions be followed. A detailed study of the specific technical manual is essential for use of this equipment under unusual conditions.

b. When recurrent failure of equipment results from subjection to extreme conditions, report the condition on DA Form 468.

19. Extreme-Cold Weather Conditions

a. General Problems. Extensive preparation of equipment for operation in extreme-cold weather is necessary. Generally, extreme cold will cause lubricants to thicken, batteries to freeze and various construction materials to become hard, brittle, and easily damaged or broken.

Caution

It is imperative that approved practices and precautions be followed. Refer to specific manuals applicable to the equipment. This must be considered an essential part of this manual, not merely an explanatory supplement to it.

b. Facts, Lubricants, and Antifreeze Compounds (Storage, Handling, and Use).

(1) The operation of equipment at arctic temperature will depend to a great extent upon the condition of the fuels, lubricants, and antifreeze compounds used in the equipment. Immediate effects of careless storage and handling or improper use of these materials are not always apparent, but any deviation from proper procedures may cause trouble when least expected.

(2) In arctic operations, contamination with moisture is a source of many difficulties. Moisture can be the result of snow getting into the product, condensation due to breathing of a partially filled container, or moisture condensed from warm air in a partially filled container when a product is brought outdoors from room temperature. Other impurities will also contaminate paints and lubricants so their usefulness is impaired.

20. Extreme-Cold Weather Operation

a. General.

(1) The operator must always be on the alert for indications of the effect of cold weather on the equipment.

(2) The operator must exercise caution when placing the equipment in operation after a shutdown. Thickened lubricants may cause failure of parts. Warm up motorized equipment thoroughly before operating, check source voltage of electrical equipment to ascertain that sufficient power is available to prevent motor burnouts.

(3) Constantly note instrument readings. If instrument readings consistently deviate from normal, stop the equipment and investigate cause.

b. At Stop.

(1) When halted for short shutdown periods, the equipment should be sheltered from the wind.

(2) When preparing equipment for shutdown periods, place control levers in the neutral position to prevent them from freezing in an engaged position. Freezing may occur when water is present due to condensation.

(3) Clean all equipment of ice and condensate as soon as possible after operation. If the canvas covers are not installed, be sure to protect all equipment against entrance of loose, drifting snow during the halt.

(4) Open drain cocks to remove liquid from water separators, inspect drain cocks for obstructions. Remove any foreign material or obstructions from drain cocks. Leave drain cocks in full open position while equipment is inoperative.

21. Operation in Extreme Hot Weather Conditions

a. General. Operation of the equipment in extreme hot weather conditions requires efficient cooling and proper lubrication. Halt the equipment for a cooling off period whenever necessary and conditions permit. Frequently inspect and service cooling systems and air filters. Check ventilators periodically for cracks and obstructions. Check lubricants for viscosity and lubricating ability.

b. At Stop.

(1) Do not leave equipment in the sun for long periods; place equipment under cover to protect it from the sun, sand, and dust when possible.

(2) Cover inactive equipment with tarpaulins if no other suitable shelter is available.

(3) Equipment inactive for long periods in hot humid weather is subject to rapid rusting and accumulation of fungi growth. Make frequent inspections and clean and lubricate to prevent excessive deterioration.

22. Operation in Extreme Wet Climate

Mud, water, and high humidity are enemies of the equipment in this shop set. Particular attention should be paid to formation of rust, mud scale, dirt buildup, and mildew. All equipment exposed to these conditions should be cleaned and oiled frequently in order to preserve the operating efficiency.

23. Operation in Snow and Ice

The precautions listed in paragraphs 19 and 20 apply to operating the equipment in snow and ice.

24. Operation in Salt Water Areas

Corrosion is the major problem presented by operation of the equipment in salt water areas. Particular attention should be given to application of corrosion preventive compounds, cleaning of equipment, storage, and touchup of painted areas. Remove all traces of salt water and salt water residue from the exterior of the shop by thoroughly washing the equipment with fresh water. After drying, apply a solution of 75 percent lubricating oil and 25 percent corrosion preventive compound, Military Specification MIIL-C-6529, type I, to all surfaces not protected by paint.

Caution

Do not allow this mixture to come in contact with rubber materials or parts which are exposed to direct flame.

Operating equipment including handtools, may be protected by an application to exterior surfaces of corrosion preventive compound, Military Specification MIL-C-16173, grade I.

25. Operation in Extreme Dust Conditions

Operation of the equipment under this condition necessitates the frequent inspection of unprotected surfaces. All lubricated surfaces should be cleaned periodically and the contaminated lubricant replaced with uncontaminated lubricant.

26. Operation at High Altitudes

Overheating of equipment and deviation in instrument readings constitute the major problems of operating equipment at high altitudes. Intake ducts, filters, and water supply must be checked at frequent intervals as a preventive measure for overheating.

Caution

Instruments not compensated for high altitude operation should be adjusted in accordance with instructions contained in specific technical manual by second echelon maintenance personnel.

CHAPTER 3

MAINTENANCE INSTRUCTIONS (OPERATOR)

Section I. SPECIAL ORGANIZATIONAL TOOLS AND EQUIPMENT

27. Special Tools and Equipment Which are Supplied With or Issued for Use With the Equipment

No special tools or equipment are required for operator maintenance of this shop set. Special tools and equipment required for operator maintenance of individual items of equipment are listed in the technical manual for the item.

28. On-Vehicle Material (OVM)

Lists of tools and parts attached to the equipment are listed in the technical manual for the specific item.

Section II. LUBRICATION

29. General

A lubrication order is issued for each item of equipment and is to be carried with it at all times. Lubrication orders prescribe approved lubrication procedures. The instructions contained therein are mandatory.

30. Detailed Lubrication Instructions

a. Care of Lubricants. When storing and handling lubricants, make certain the containers are clean and securely covered to prevent dirt, dust, or other foreign matter from entering. Be sure that the lubricant is clean before using. Keep lubrication equipment in a place where it will be safe from damage and free from dirt. Paragraphs 18 through 26 contain lubrication instructions for the protection of equipment under unusual conditions.

b. Cleaning. Clean all surfaces surrounding the points to be lubricated before applying the lubricant. Use an approved cleaning solvent to wash the surfaces. Wipe off all excess lubricant after lubricating.

c. Points of Application. The points of application are illustrated in the applicable lubrication order. Follow the detailed lubrication instructions illustrated beneath each lubrication point indicating procedures to be followed at each point. Apply the lubricant indicated on the lubrication order.

Section III. PREVENTIVE MAINTENANCE SERVICES

31. General

a. Responsibility and Intervals. The primary function of preventive maintenance is to prevent breakdowns and, therefore, the need for repair. Preventive maintenance services which are the responsibility of the operator will be performed before operation, during operation, at halt, ad after operation (table I).

b. Before-Operation Service. This is a brief service to ascertain that the equipment is ready for operation; it is essentially a check to determine if conditions affecting the equipments readiness have changed since the last after-operation service.

c. During-Operation Service. This service consists of the detection of unsatisfactory performance while the

equipment is in operation; the operator should be alert for any unusual noises, vibrations, or irregularities of performance.

d. At Halt Service. This service will consist of brief visual inspection of equipment for condition, security, and wear; the removal of foreign material from equipment; and the cleaning of equipment that might be damaged by allowing existing conditions to continue.

e. After-Operation Service. This service consists of investigating any deficiencies noted during operation and performing certain phase of the "before operation" service as noted in table I. It is the basic daily service for equipment and consists of correcting, insofar as possible, any operating deficiencies; in this manner, the equipment is prepared to operate upon short notice.

f. Inspection. The general inspection of each item is generally a check to see whether the item is in good condition, correctly assembled, secure, and not excessively sworn.

g. Definition of Terms. Terms used to describe the inspection requirements of this section are defined as follows:

(1) *Good condition.* This is usually an external inspection to determine whether the unit is damaged beyond serviceable limits. The term good condition is explained further by the following: Not bent nor twisted, not chafed nor burned, not broke nor cracked, not bare nor frayed, not dented nor collapsed, not torn nor cut, not deteriorated.

(2) *Correctly assembled.* This term refers to the inspection of a unit to see that it is in the normal assembled position. It is usually an external visual inspection.

(3) *Secure.* This is usually an external visual inspection or check by hand or wrench for looseness. Such an examination must include any brackets, lockwashers, locknuts, locking wires, or cotter pins used.

(4) *Excessively worn.* This inspection is to determine whether equipment is worn beyond serviceable limits or to a point likely to result in failure if the unit is not replaced before the next scheduled inspection.

32. Specific Procedures for Operator

Table I lists the specific procedure to be performed on the shop set by the operator in daily service. An "X" in a column indicates that the procedure opposite it should be performed during that part of the daily service in which it appears.

33. Cleaning

Any special cleaning instructions required for specific mechanisms or parts are contained in the technical manual for the equipment. General cleaning instructions are as follows:

a. Use drycleaning solvent to clean or "wash grease or oil from all metal parts.

b. A solution of one part grease-cleaning compound to four parts of drycleaning solvent may be used for dissolving grease and oil from the shop and equipment other than optical instruments. After cleaning, use cold water on exterior surfaces of the shop, to rinse off any solution which remains. Operating equipment and handtools, exclusive of optical instruments, may be wiped with a light lubricating oil.

c. When authorized to install new parts, remove any preservative materials, such as rust preventive compound, protective grease, etc.; prepare parts as required (oil seals, etc.); and for those parts requiring lubrication, apply the lubricant prescribed in lubrication order.

d. Nameplates, caution plates, and instruction plates made of steel rust very rapidly. When they are found to be in a rusted condition, they should be thoroughly cleaned and heavily coated with an application of clear lacquer.

34. General Precautions in Cleaning

a. Drycleaning solvent is flammable and should not be used near an open flame. Fire extinguishers should be provided when these materials are used. Use only in well-ventilated places.

b. Drycleaning solvent evaporates quickly and has a drying effect on the skin. If used without gloves, it

may cause cracks in the skin, and, in the case of some individuals, a mild irritation or inflammation.

c. Avoid getting petroleum products, such as dry cleaning solvent, mineral spirits paint thinner, engine fuels, or lubricants, on rubber parts as they will deteriorate the rubber.

d. The use of diesel fuel oil, gasoline, or benzene (benzol) for cleaning is prohibited.

Section IV. TROUBLESHOOTING

35. Use of Troubleshooting Section

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the shop set or any of its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposition the probable cause.

36. Procedure

To correct malfunctioning of equipment, the cause should be systematically isolated in accordance with instructions in the following paragraphs. If the correction of the malfunction is beyond the scope of the operators function, refer the discrepancy to the proper maintenance echelon for correction.

37. Electrical Equipment Operates at Slow or Reduced Speed

Probable cause	Possible remedy
Loose connectors	Tighten connectors.
Circuit breaker in OFF position.	Return breaker to ON position.
Cause beyond maintenance scope of operator.	Notify second maintenance echelon.

38. Electrical Equipment Stops During Operation

Probable cause	*Possible remedy*
Power cord of equipment not properly plugged into receptacle.	Remove plug from receptacle and reinsert fully into receptacle.
Equipment overheated.	Reduce operating speed; allow equipment to cool and restart.
Circuit breaker tripped to OFF position.	Reset circuit breaker to ON position; restart equipment.
Cause beyond maintenance scope of operator.	Notify second maintenance echelon.

39. Electrical Equipment Will Not Start

Probable cause	*Possible remedy*
Power cord of equipment not plugged into receptacle.	Insert plug of equipment cord into receptacle.
No power from auxiliary power source.	Check for power source operation; notify operator.
Circuit breakers in electrical panel in OFF position	Reset circuit breakers to ON position.
Safety disconnect switch open.	Close safety disconnect switch.
Cause beyond maintenance scope of operator	Notify second maintenance echelon.

40. Pneumatic Equipment Operates at Slow or Reduced Speed

Probable cause	Possible remedy
Power source not furnishing sufficient air pressure	Check pressure at regulator; allow source pressure to reach operational level;
Air pressure not properly regulated at water separator	Adjust pressure regulator to proper level (75 psi).
Loose connection at air hose quick-disconnect adapter	Reseat adapter.
Water in air.	Drain water separator.
Cause beyond maintenance scope of operator	Notify second maintenance echelon.

41. Pneumatic Equipment Stops During Operation

Probable cause	Possible remedy
Power source inoperative	Notify personnel responsible for power source.

Probable cause	*Possible -remedy*
Equipment overloaded	Reduce feed, pressure, or speed as necessary.
Air line disconnected	Connect air line.
Cause beyond maintenance scope of operator	Notify second maintenance echelon.

42. Pneumatic Equipment Will Not Start

Probable cause	*Possible remedy*
No air pressure-power source not connected	Connect power source.
Air pressure cut off at pressure regulator	Adjust pressure regulator to obtain pressure of 75 psi.
Air hose of equipment not properly connected to adapter	Remove air hose from supply at quick disconnect; clean adapter and reinstall hose.
Cause beyond maintenance scope of operator.	Notify second maintenance echelon.

43. Excessive Vibration of Equipment

Probable cause	*Possible remedy*
Loose mounting bolts	Tighten or replace bolts as necessary.
Equipment load improperly distributed	Readjust load.
Operating speed of equipment too high	Reduce speed in accordance with technical manual for equipment.
Equipment load too heavy.	Reduce load to recommended limits in accordance with technical manual for equipment.
Cause beyond maintenance scope of operator	Notify second maintenance echelon.

44. Excessive Noise

Probable cause	*Possible remedy*
Equipment receiving improper lubrication	Lubricate in accordance with paragraphs 29 and 30.
Equipment being used improperly	Use in accordance with recommendations in technical manual for equipment.
Cause beyond maintenance scope of operator.	Notify second maintenance echelon.

Section V. ELECTRICAL SYSTEM

45. General

The electrical system of Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding, is a 110-220-440-volt, single- and three-phase, ac system. Electrical power is supplied to the shop from an external source to an external power receptacle mounted at the right rear exterior corner of the shop. The external power receptacle feeds directly to the safety disconnect switch and then to the control panel. The electrical panel contains 14 thermal-magnetic circuit breakers for supplying power to the various circuits. The wiring diagram for Shop Set C-5 is contained in figure 8.

46. Electrical Wiring Installation

a. General. Operator maintenance of the wiring installation consists of service and adjustments.

b. Servicing. Keep electrical power cords clean and free of grease and oil. Do not allow rubber covered power cords to come in contact with cleaning solvents or paint thinners. Store detachable electric power cords in space provided when not in use. Wipe foreign materials from electrical receptacles before use or when exposed to wind, dust, rain, snow, or salt water.

c. Adjustments. Check all male electrical connectors for security and condition before use. Adjust or tighten terminals as necessary. Female electrical connectors and receptacles require few adjustments beyond the tightening of screws. Check all female electrical connectors and receptacles for security and condition before use.

Warning

Disconnect the power source at the external power receptacle prior to adjusting female electrical connectors or receptacles.

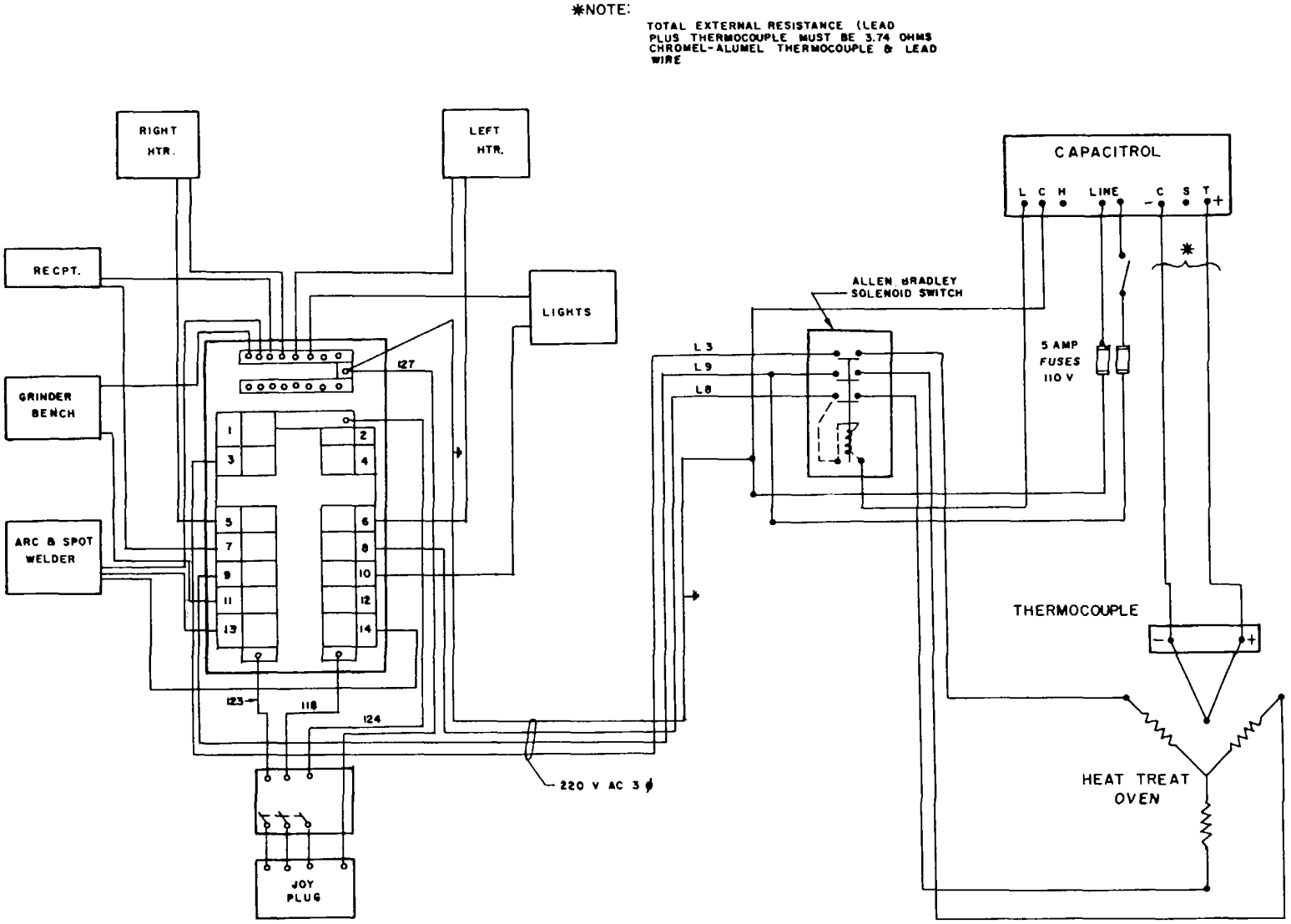


Figure 8. Wiring diagram Shop Set, C-5

Section VI. PNEUMATIC SYSTEM

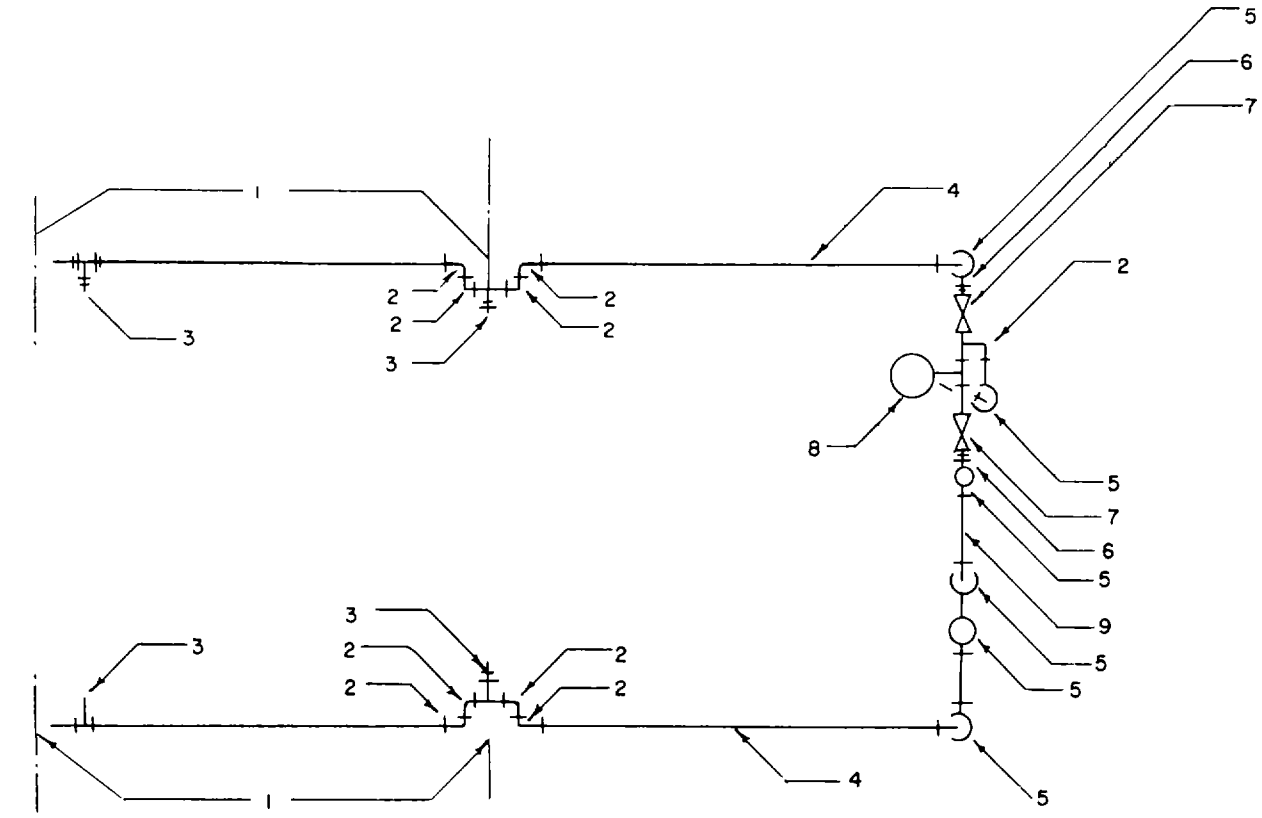
47. General

The pneumatic system consists of controls and instruments, lines, and connectors. Controls and instruments are shown in figure 5. Lines and connectors are shown in figures 9, 10, and 12.

48. Controls, Instruments, Lines and Connectors

a. General. Controls and instruments for the pneumatic system (fig. 5), consist of pressure gages, oil and water separator, regulators, and valves. Lines and connectors are steel, brass, or copper. The operator is responsible for service and adjustment of the controls, instruments, lines, and connectors.

b. Servicing. Keep instrument dial covers and cases clean; avoid the use of oily, gritty, or dirty wiping material for cleaning dial covers and cases. Normally, plain water and a clean rag will suffice for cleaning dial covers and cases. When heavy accumulation of mud,



LEGEND

ELL 90°		T	
ELL. 45°		T OUT DN.	
ELL TND. DN		PL.	
ELL. TND. DN.		GLV.	
ELL. UNION		ELL. ST. 90°	

1. VERTICAL POST
2. 1/4 IN. 90° GALV. STL. ELBOW
3. 1/4 IN. GALV. STL. TEE
4. 1/4 IN. GALV. STL. PIPE
5. 1/4 IN. GALV. STL. ELBOW
6. 1/4 IN. GALV. STL. UNION
7. 1/2 IN. COMB. GLOVE VALVE
8. OIL AND WATER SEPARATOR
9. 1/2 IN. GALV. STL. PIPE

Figure 9. Pneumatic system installation, top view.

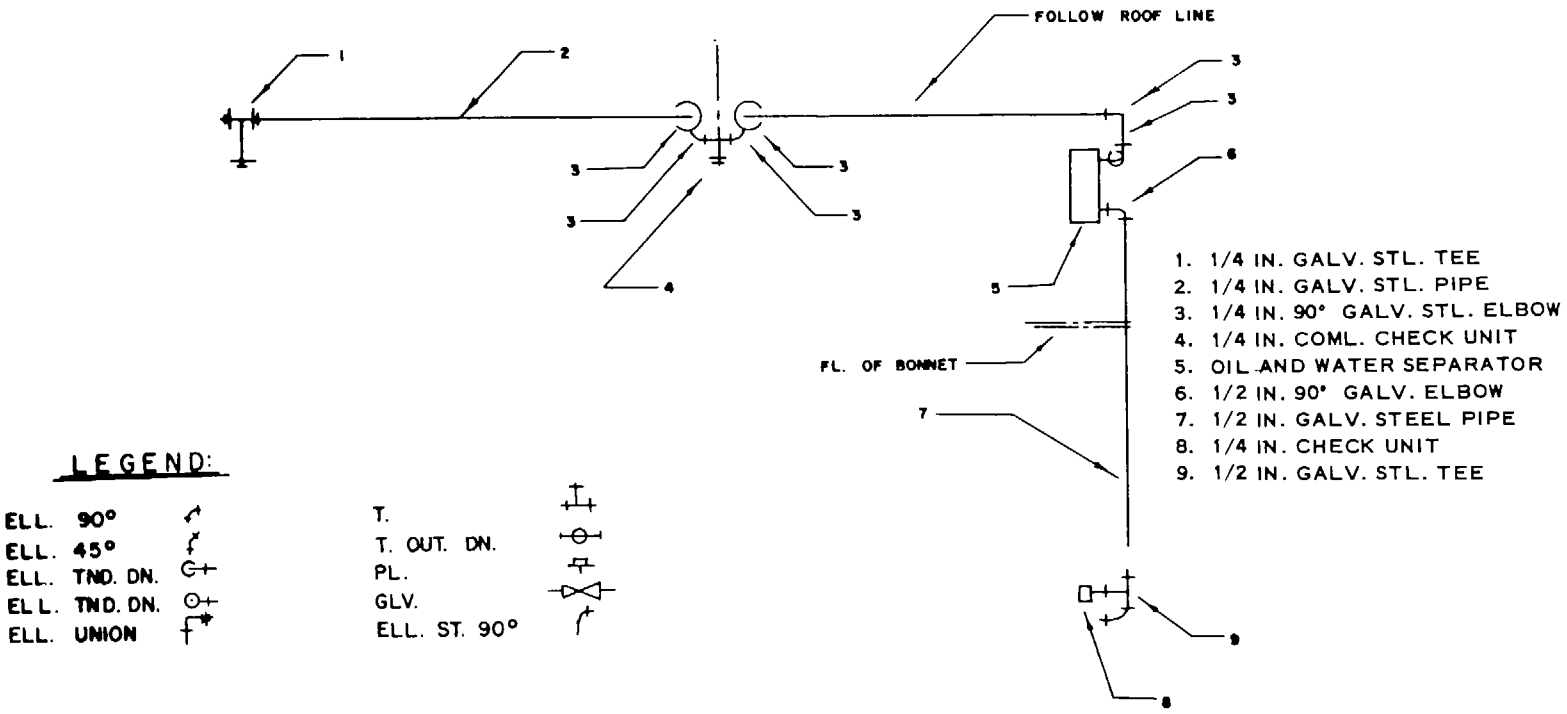
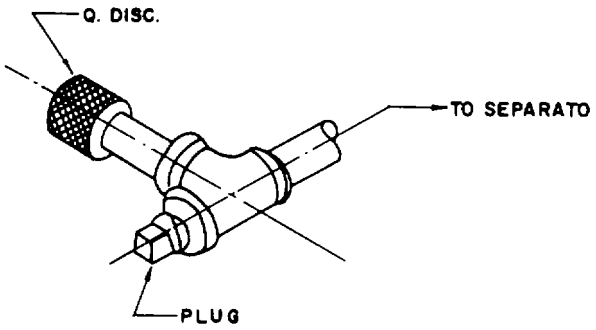


Figure 10. Air line layout, side view.



dirt, grime, grease, or other foreign materials are to be removed from dial covers and cases, use a solution of water and mild soap or detergent. Extreme cases may require the use of more active compounds for the removal of foreign materials. Wipe off all moisture after cleaning.

Caution

Use only approved cleaning compounds.

Figure 11. Quick disconnect fitting.

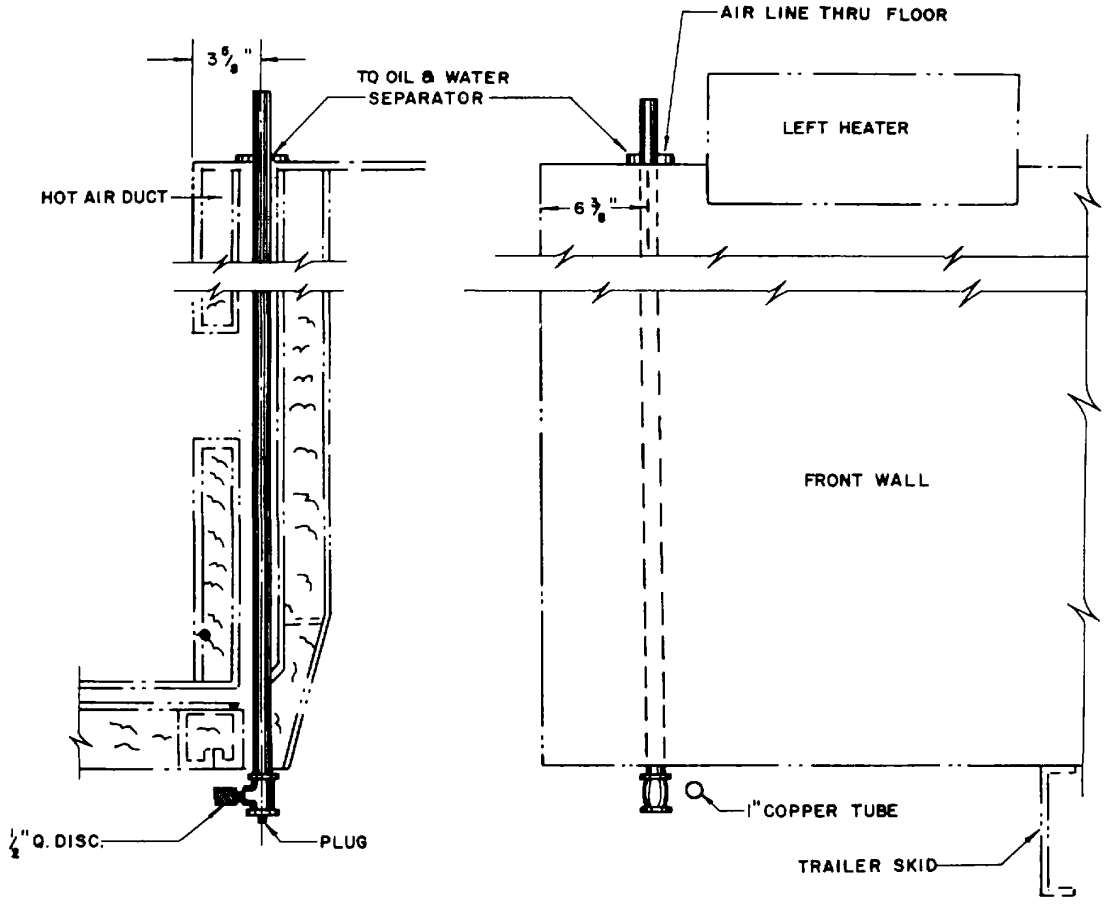


Figure 12. Air line layout, front view.

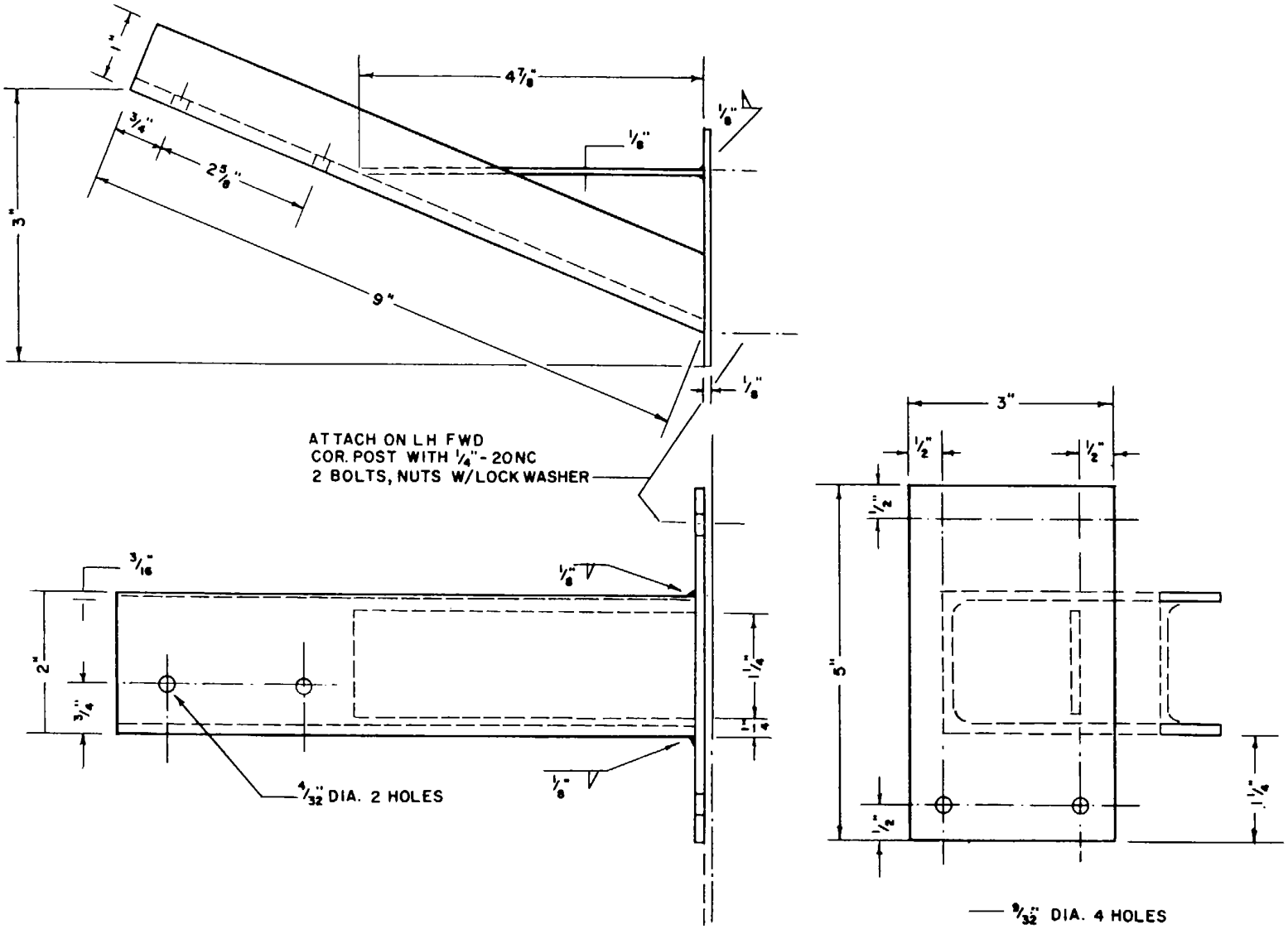


Figure 13. Separator mounting bracket.

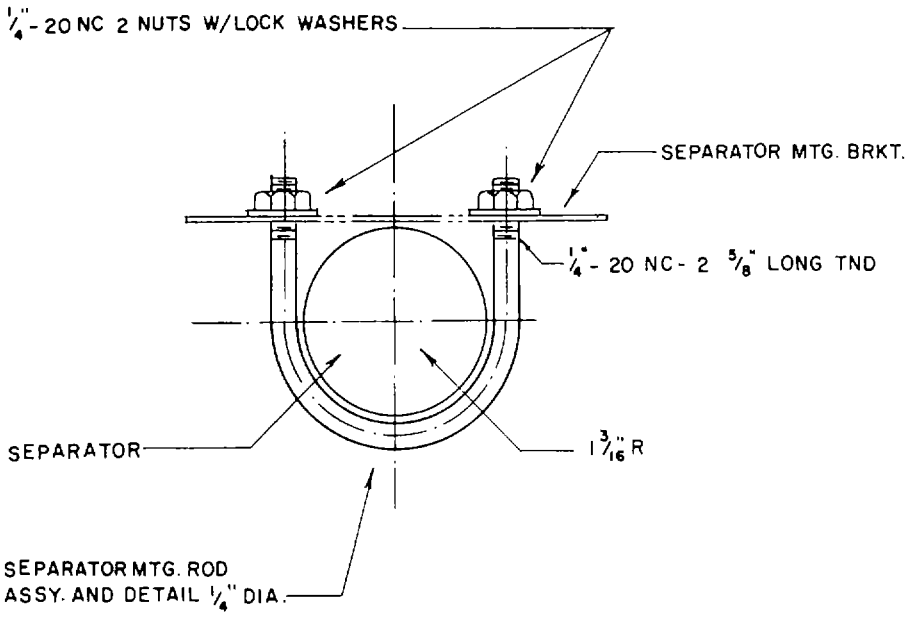


Figure 14. Separator mounting rod.

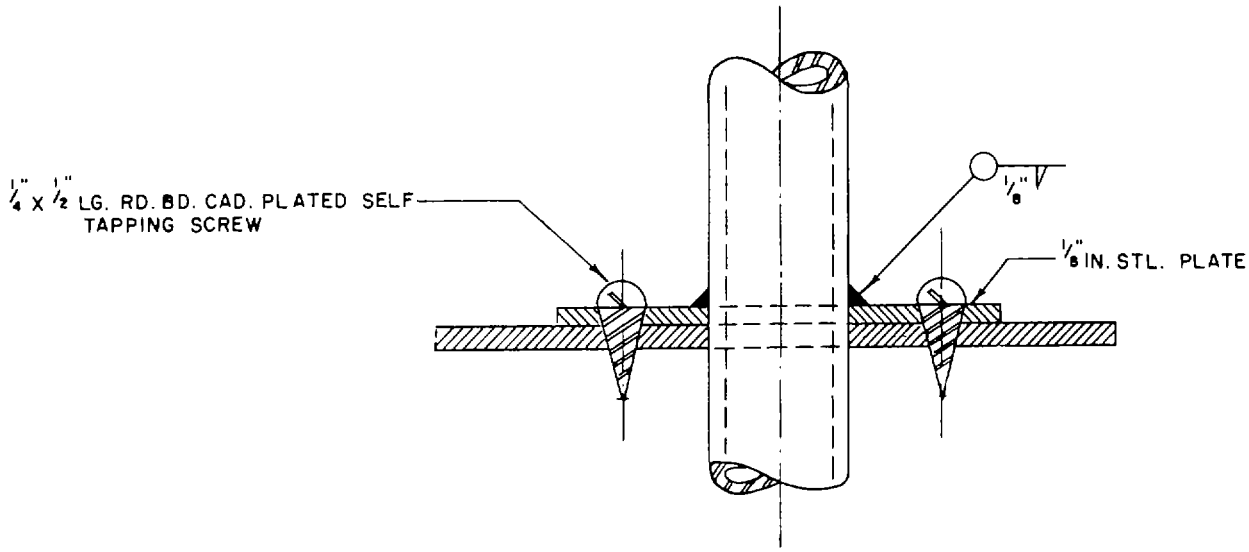


Figure 15. Air line mounting floor.

Follow the directions carefully when applying. Service the controls of the pneumatic system by removing oil, grit, grime, dirt, mud, grease, and other foreign materials before and after operation. Materials to be used in cleaning controls are the same as those used in cleaning instrument dials and cases. Service the lines and connectors by cleaning and lubricating.

c. Adjustments. Operator adjustment of instruments is accomplished by use of the controls provided. The operator should not attempt to make adjustments to any instrument except as can be made by use of the controls. Controls in the pneumatic system contain valves which are used to regulate the air pressure to the equipment being used and to drain the

system of condensate. Refer to paragraphs 8 through 10 for location, description, and purpose of controls. To regulate the supply of air from the source, open or close regulator as necessary. To adjust the supply of air to the equipment being used, turn regulator handle (fig. 5), in or out until operating pressure (75 psi) is obtained. Adjustments of lines and connectors consist of tightening connections.

Section VII. UTILITY SYSTEM

49. General

The utility system of Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding, consists of storage cabinets and bench tops. Layout of the utility system of the shop set is shown in figure 16.

50. Maintenance

a. General. Operator maintenance of the storage cabinets is limited to service and adjustments. Service will consist of cleaning, lubrication, and other preventive maintenance services (pars 31-34). Use a solution of water and mild soap or detergent for cleaning purposes under usual operating conditions. Cleaning under unusual operating conditions (par. 18-26), may require more active cleaning agents such as cleaning solvents. Care should be exercised in application and use of cleaning solvent so as not to damage the finish of the cabinets. Lubricate the cabinets at hinge points, on sliding surfaces, and at points of closing. Use a good grade of light lubricating oil; do not use more lubricant than is required to maintain normal operating conditions; wipe off excess lubricants with a clean, dry cloth. Adjustment of cabinets may be accomplished by the operator when disassembly is not required; generally this will consist of aligning hinges, slides, locking bars, and closing points.

Note

Adjustments should be made only when the operating efficiency of the cabinet will be impaired unless the misalignment is corrected.

b. Bench Tops. Operator maintenance of bench tops consists of cleaning and the application of wax or similar preservative. Foreign materials should be wiped from benches with a soft brush whenever there is an accumulation that could mar the surface. Stains, such as marking fluid, grease, oil, or ink, may be removed by washing the bench top with a solution of mild soap and water. Wipe the surface with a clean cloth to remove moisture after cleaning is completed. Apply wax or similar preservative when cleaning is of such a severe nature as to remove protective coating or when the protective coating is marred by scratches, nicks, gouges, or exposure to the elements.

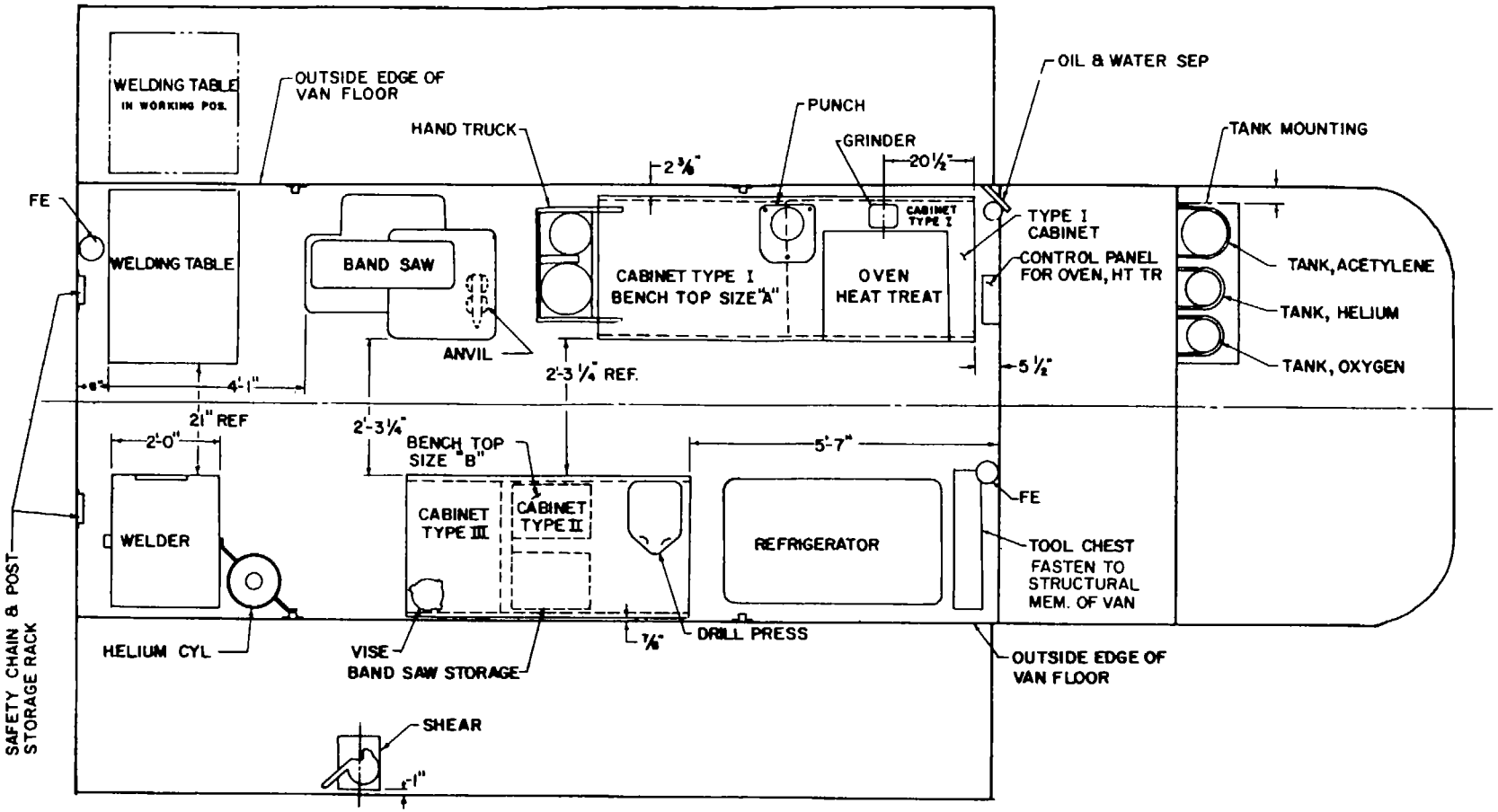


Figure 16. Floor plan layout, top view.

CHAPTER 4

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE (OPERATOR)

Section I. GENERAL

51. Purpose

This chapter furnishes the operator with information for preparation of the equipment comprising Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding, for shipment and limited storage. Instructions are also included for demolition of the shop set to prevent enemy use.

52. Methods

The methods outlined herein for shipment and limited storage apply to the shop set as a unit. It is the responsibility of the operator to become familiar with the technical manuals for each item of equipment in order to adequately prepare the item of equipment for shipment and limited storage. The methods outlined for demolition of equipment to prevent enemy use are intended as guide for the operator.

Section II. SHIPMENT AND LIMITED STORAGE

53. Shipment

The operator is responsible for the initial steps in preparing Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding, for shipment. These responsibilities consist of the following:

a. Perform "at halt" and "before-operations" daily services (table I).

b. Place tools and equipment in storage bins or drawers provided (figs. 6 and 7).

c. Store cables and hose in storage spaces provided.

54. Limited Storage

a. General. A shop set which is temporarily not in use will be placed in limited storage (not to exceed 6 months) when authorized by major commanders or heads of Department of the Army agencies. The responsibility for Transportation Corps mechanical equipment stored under such authorization will remain with the organization or activity to which issued. Equipment no longer required for accomplishment of the assigned mission will be returned to stock. When the shop set is placed in limited storage it will be preserved as specified. Equipment will not be blocked up and will be so spaced, where practicable, to provide independent access to each item.

Note

When equipment is to be stored for 30 days or less, clean and oil with light lubricating oil, Federal Specification VV-0-526.

b. Operator Responsibility. The operator of the equipment is responsible for certain phases of preparation for limited storage; normally these responsibilities will coincide with those listed in paragraph 7 (lubrication) and paragraph 53 (shipment). Technical manuals for individual items or equipment provide the operator with the necessary information required to accomplish limited storage of the equipment.

Section III. DEMOLITION TO PREVENT ENEMY USE

55. General

a. Destruction of the shop set, when subject to capture of abandonment in a combat zone, will be undertaken by the operator only when, in the judgment of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by, the army commander.

b. The information which follows is for guidance only. Certain of the procedures outlined require the use of explosives and incendiary grenades which normally may not be authorized items fore the using organization. The issue of these and related materials, and the condition under which destruction will be effected, are command decisions in each case, according to the tactical situation. Of the several means of destruction, those most generally applicable are—

(1) *Mechanical*. Requires axe, pick mattock, crowbar, or similar implement.

(2) *Burning.* Requires gasoline, oil, incendiary grenades, or other flammables.

(3) *Destruction by use of explosives*. Requires suitable explosives or ammunition.

(4) *Gunfire*. Includes artillery, machine-guns, rifles using rifle grenades, and launchers using antitank rockets. Under some circumstances, hand grenades may be used.

c. In general, destruction of essential parts, followed by burning will usually be sufficient to render the shop set useless. However, selection of the particular method of destruction requires imagination and resourcefulness in the utilization of the facilities at hand under the existing conditions. Time is usually critical.

d. If destruction to prevent enemy use is resorted to, the shop set must be so badly damaged, that it cannot be restored to a usable condition in the combat zone either by repair or cannibalization. Adequate destruction requires that all parts essential to the operation of the material, including essential spare parts, be destroyed or damaged beyond repair. However, when lack of time and personnel prevents destruction of all parts, priority is given to the destruction of those parts most difficult to replace. Equally important, the same essential parts must be destroyed on all like material so that the enemy cannot construct one complete unit from several damaged ones.

e. If destruction is directed, due consideration should be given to (1) and (2) below.

(1) Selection of a point of destruction that will cause greatest obstruction to enemy movement and also prevent hazard to friendly troops from fragments or rechocheting projectiles which may occur incidental to the destruction.

(2) Observance of appropriate safety precautions.

56. Destruction by Burning

a. Remove and empty probable fire extinguishers.

b. Using an ax, pick mattock, sledge or other heavy implement, smash all vital elements.

c. Puncture fuel tanks as near the bottom as possible collecting gasoline for use as outlined in *d* below.

d. Pour gasoline and oil in and over the entire equipment; ignite by using a gasoline soaked rope for a fuse. If gasoline and oil are not available, use incendiary grenades. Take cover.

Warning

Due consideration should be given to the highly flammable nature of gasoline and its vapor. Carelessness in its use may result in painful burns.

57. Destruction by Use of Explosives

a. Remove and empty portable fire extinguishers.

b. Prepare four charges (1 charge = 2 ea lb. blocks) of EXPLOSIVE, TNT. Place charges as follows:

(1) Place one charge of explosive on the front of the shop on the platform

forward of the storage compartment.

(2) Place one charge of explosive between the axles of the shop, at the approximate midpoint of the axles.

(3) Place one charge of explosive on the shop floor at the approximate center width of the shop and approximately 4 feet from forward wall.

(4) Place one charge of explosive on the shop floor at the approximate center width of the shop and approximately 6 feet from the rear wall.

c. Connect the four charges for simultaneous detonation with detonating cord. Provide for dual priming to minimize the possibility of a misfire. For priming, either a nonelectric blasting cap crimped to at least 5 feet of safety fuze (safety fuze burns at the rate of 1 foot in 30 to 45 seconds, test before using), an electric blasting cap and detonating cord may be used. If a nonelectric blasting cap and safety fuze are used, the fuse should be sufficiently long and so-positioned that it may be ignited from outside the shop set. Safety fuze, which contains black powder, and nonelectric blasting caps must be protected from moisture at all times. The safety fuze may be ignited by a fuze lighter or a match; the electric blasting cap requires a blasting machine or equivalent source of electricity.

Warning

Keep the blasting caps, detonating cord, and safety fuze separated from the charges until required for use.

d. Detonate the charges. If primed with nonelectric blasting cap and safety fuze, ignite and take cover. If primed with electric blasting cap, take cover before firing the charges.

Warning

The danger zone is approximately 250 yards; take cover without delay as an early explosion may result from incendiary fires.

58. Destruction by Gunfire

a. Remove and empty portable fire extinguishers.

b. Destroy the shop set by gunfire using artillery, machine guns, rifles using rifle grenades, or launchers using antitank rockets. Although one, well-placed, direct hit may render the shop set temporarily useless, several hits are usually required for complete destruction unless an intense fire is started, in which case the shop set may be considered destroyed.

Warning

Firing artillery at ranges of 500 yards or less should be from cover. Firing rifle grenades or antitank rockets should be from cover.

CHAPTER 5

OPERATING INSTRUCTIONS SECOND ECHELON)

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

59. General

Shop sets, when received, are to be unloaded, uncrated, depreserved, and inspected, be second echelon maintenance personnel.

60. Unloading and Uncrating New Equipment

a. Unloading. Remove shoring, blocks, tiedowns, and chocks before unloading equipment.

Warning: Remove nails and loose strapping from unloading area.

Caution: Lift only at hoisting points provided when equipment is to be unloaded from heights above ground level (TM 9-2330-23814). Do not allow equipment to be dropped while loading.

b. Uncrating. Unpack crated equipment as close as possible to the point of use; remove nails, straps, and OVM from equipment. Place equipment in position for use.

61. Depreservation

a. Observe all warning tags and instructional guides attached to the equipment.

b. Remove preservatives from exterior surfaces with solvent, Federal Specification P-S661.

c. Preservatives applied to interior surfaces need not be removed except for draining.

d. Examine equipment carefully to detect and remove tape, barrier material, and other packaging materials which may be placed over breathers, vents, and other openings. Particular attention should be given to detection and removal of paper between or under brushes of large electrical motors.

e. Components which are packed separately from the equipment will be installed as directed in chapter 8.

62. Inspection

Inspect all equipment for condition, correctness of assembly, security, and wear (Par. 3134).

Section II. CONTROLS AND INSTRUMENTS

63. General

This section describes, locates, illustrates, and furnishes second echelon maintenance personnel information pertaining to the various controls and instruments provided for operation of the equipment.

64. Description

Controls and instruments are provided to supply, regulate, and distribute the electrical or pneumatic power required to operate the shop. Detailed description, location, and illustrations are contained in paragraphs 8 through 10, 45 and 46.

Section III. OPERATION UNDER USUAL CONDITIONS

65. General

Instructions in this section are published for the use of second echelon maintenance personnel, responsible for the operation of this equipment. It is essential that the operator know how to perform every operation the equipment is capable of performing.

66. Preparations for Use of Equipment

a. Exterior.

(1) Install ground stake (fig. 17).

(2) Position chocks.

(3) Install the stabilizing jacks and adjust as necessary (fig. 18).

(4) Remove entrance ladders and position as shown in figure 19.

(5) Open rear doors (fig. 19).

b. Opening of Van. All van sides open from inside the van (figs. 20 and 21 and TM 9-2330-238-14).

(1) Release overcenter clamps, front and rear, at top of each door.

(2) Release locks on center post, two on each side (fig. 21 and TM 9-2330238-14).

(3) Push top and bottom doors outward at the same time (fig. 22).

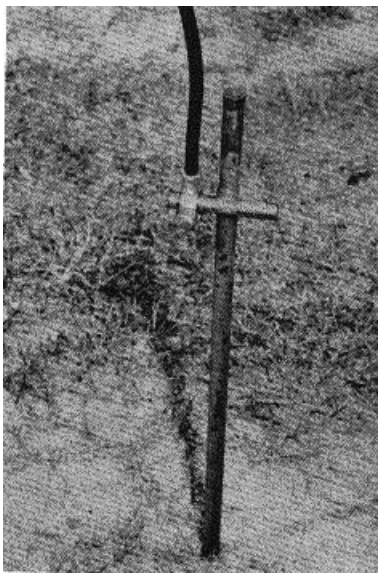


Figure 17. Installation of ground stake.

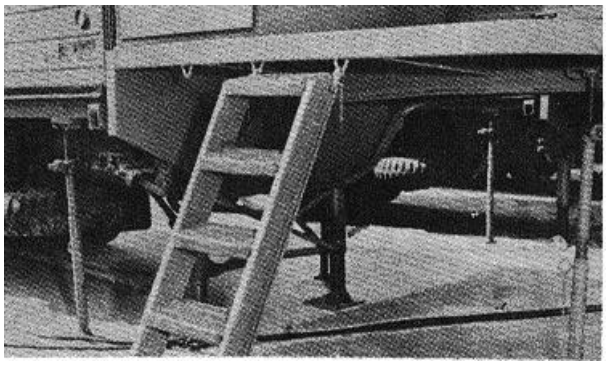


Figure 18. Installation and adjustment of stabilizing jacks; positioning front ladder.

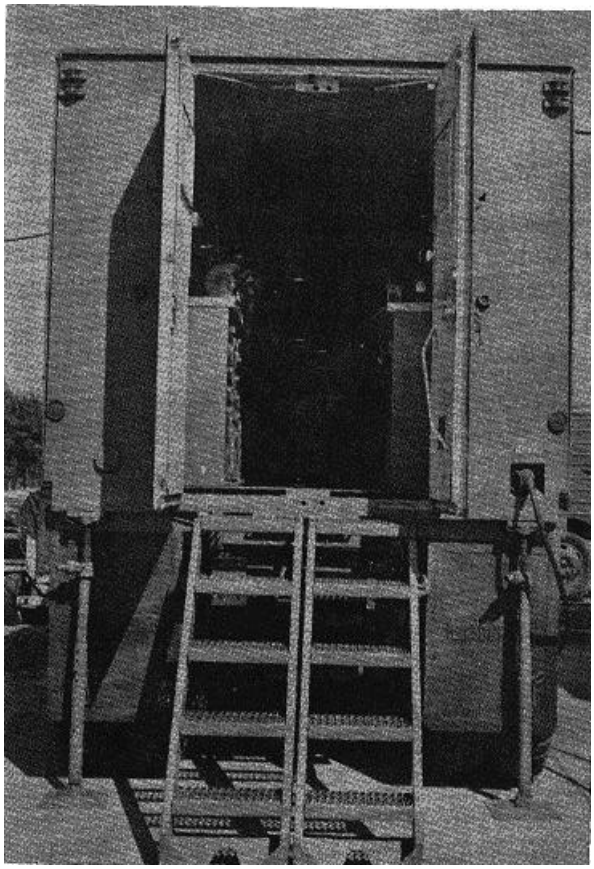


Figure 19. Positioning rear entrance ladders and opening rear doors.

Caution

Do not allow doors to fall free; assistance from outside is necessary.

(4) Install chain guard railing (fig. 23 and TM 9-2330-238-14.)

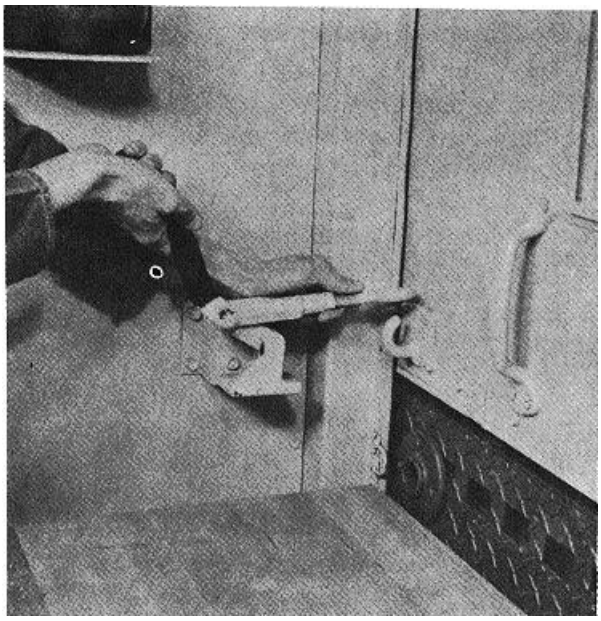


Figure 20. Opening folding shop sides, step I.

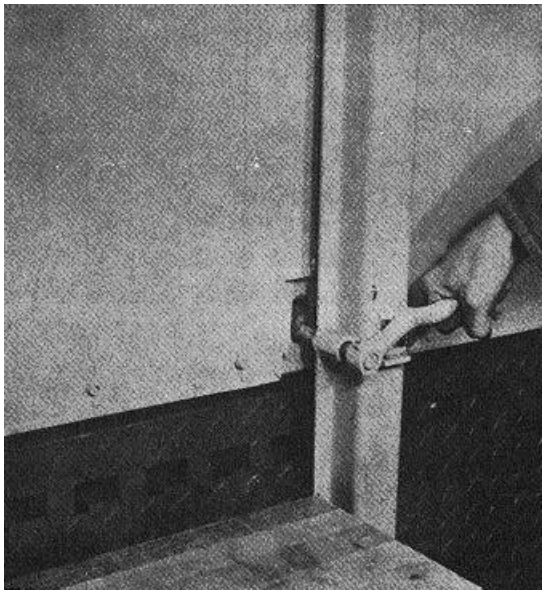


Figure 21. Opening folding shop sides, step II.

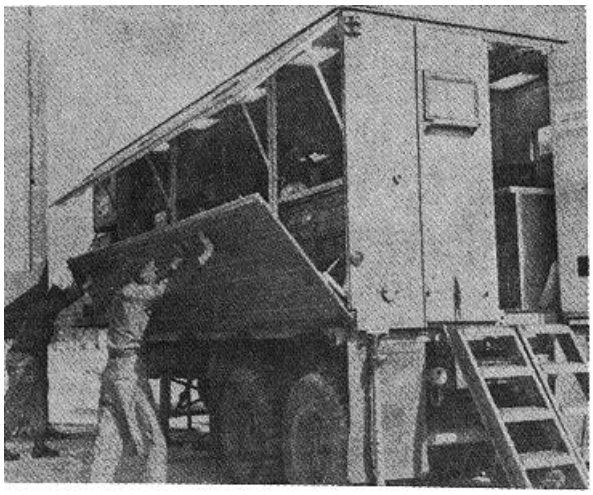


Figure 22. Opening folding shop sides, step III.

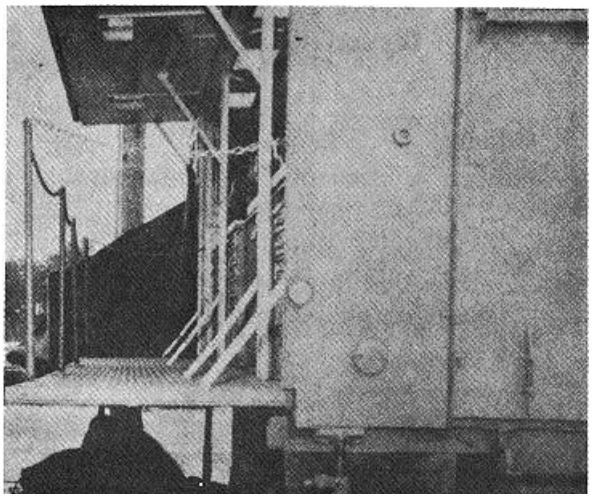


Figure 23. Chain guard railing installed.

67. Shutdown of Shop Set

a. Shutdown instructions for the units comprising Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding, are contained in the manuals issued for the individual items. It is essential that the operator understand these instructions.

b. Disconnect external power sources.

c. Close van sides and rear doors (fig. 1).

d. Remove and store entrance ladders (fig. 1).

e. Check security of chocks.

68. Operating Details

a. General. These instructions provide second echelon maintenance personnel with the necessary details for operation of the equipment comprising the shop set.

b. Electrical System-Auxiliary Power Operated.

(1) Inspect auxiliary power cord for breaks, security of connectors, and frayed cover material.

(2) Install auxiliary power cord from auxiliary power source to external power source to external power receptacle.

c. Pneumatic System-Auxiliary Power Operated.

(1) Inspect lines, fittings, and connectors for leaks and security.

(2) Install line from auxiliary power source to quick disconnect fitting (fig. 5).

(3) With auxiliary air supply connected, inspect lines, connections, fittings, controls, and instruments for leaks, security, and proper operation.

69. Movement of Equipment

a. Open van in accordance with instructions contained in paragraph 66.

b. Close rear doors and van sides (fig. 1).

c. Remove and stow entrance ladders (fig. 1).

d. Disconnect external power source.

e. Disconnect and stow bonding stake.

f. Remove chocks and secure in TRAVEL position.

Section IV. OPERATION OF ONE UNIT IN CONJUNCTION WITH ANOTHER ACCESSORY OR AUXILIARY

70. General

Auxiliary equipment may be operated in conjunction with Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding by use of an external power receptacle for electrical power and a quick disconnect for pneumatic power.

71. External Power Receptacle

The external power receptacle is mounted at the right rear corner of the van. This is a female receptacle, designed to connect with a male plug.

72. Quick Disconnect Fitting

The quick disconnect fitting (fig. 11), is designed to connect an external pneumatic power source to the pneumatic system of the shop. An oil and water separator is installed between the quick disconnect fitting and the shop air lines to trap water or oil in the air from the power source.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

73. General

This section contains information pertinent to second echelon maintenance operation under unusual conditions. Refer to paragraphs 18 through 26 for additional information. Report recurrent failure of equipment resulting from operation under unusual conditions on DA Form 468. Canvas sidewalls (fig. 24) are provided for operation in inclement weather.

74. Extreme Cold Weather Conditions

Special equipment is provided for the protection of equipment at temperatures below 0°F. Individual items of equipment should be protected in accordance with the technical manual the item. Refer to TM 9-2330-238-14, for specific information concerning the van.

75. Extreme Hot Weather Conditions

Inspect bearings and lubricants to insure proper operation of the equipment. Refer to paragraphs 18 and 21 for additional instructions regarding operation of equipment in extreme hot weather conditions.

76. Operation in Extreme Wet Climate

Inspect bearings and other lubricated surfaces for possible washing away of lubricants. These inspections should be made prior to starting and at halt of equipment. Additional precautionary instructions are listed in paragraphs 18 and 22.

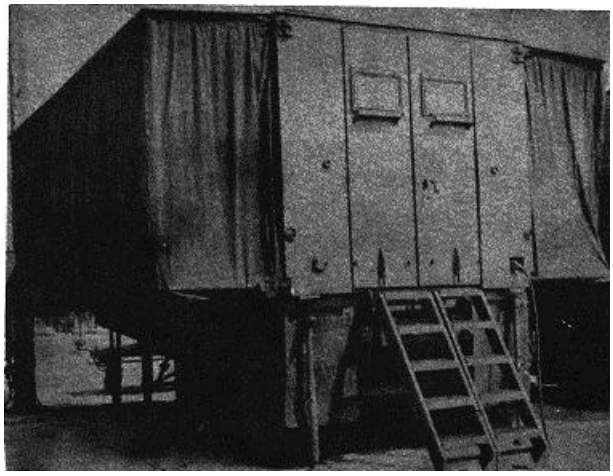


Figure 24. Canvas sidewalls installations.

77. Operation in Salt Water Areas

Wash exterior of shop with fresh water to remove salt water residue. Accomplish salt water residue removal as often as is necessary to keep equipment clean and to combat corrosion. Treat unprotected surfaces of tools and equipment which are in contact with salt water as directed in paragraphs 18 and 24.

78. Operation in Extreme Dust Conditions

Inspect machined surfaces, bearings, and lubricated surfaces for dust accumulation. Clean bearings and surfaces as directed in paragraphs 29 through 34.

79. Operation at High Altitudes

Inspect intake ducts, filters, cooling systems, and pneumatic equipment at frequent intervals to insure proper operation at high altitudes. Observe precautions listed in paragraphs 29 and 30, and in the technical manual for the item of equipment.

CHAPTER 6

MAINTENANCE INSTRUCTIONS (SECOND ECHELON)

Section I. SPECIAL ORGANIZATIONAL TOOLS AND EQUIPMENT

80. Tools and Equipment

No special tools or equipment are required by second echelon maintenance personnel to maintain the shop as a unit. Any special tools or equipment required for maintenance of individual items of equipment are listed in the technical manual for the item.

81. Repair Parts

Parts required by second echelon maintenance personnel for maintenance of the shop are listed in chapters 8 and 9.

Section II. LUBRICATION

82. General

This section provides second echelon main-lubricants by type required for each applications for the shop. Lubrication orders, listing lubricants by type required for each application, are prepared for each item of equipment and are illustrated in the technical manual for the item.

83. Special Lubrication Instructions

Refer to paragraphs 6, 7, 29 through 34, 65 through 69, 96, and 97 for detailed lubrication procedures for the shop.

Section III. PREVENTIVE MAINTENANCE SERVICE

84. General

Preventive maintenance is performed by organizational maintenance personnel at weekly and monthly intervals. The weekly intervals will be equivalent to a maximum of 60 hours of use. The monthly intervals will be equivalent to 4 weeks or a maximum of 240 hours of use, whichever occurs first. The preventive maintenance services to be performed at these regular intervals are listed and described in this section. The maintenance function appearing in the column opposite each service referred to in table II indicates that a report of the service should be made at the interval shown. These maintenance functions appear in the second column and the interval at which the service is to performed, appears in the fourth and fifth columns. The first column headed "Item Inspected" is provided for the information of the personnel performing the inspection. A listing in this column indicates that an inspection should be made of a list of items in accordance with the instructions given in the text opposite. The indicated items and instructions constitute minimum inspection requirements for the equipment.

85. Weekly and Monthly Preventive Maintenance Service

The services listed in table II, are minimum requirements and will be performed in accordance with the instructions therein.

Section IV. TROUBLESHOOTING

86. Use of Troubleshooting Section

This section contains troubleshooting information useful to second echelon personnel in diagnosing and correcting unsatisfactory operation or failure of the shop set or any of the components.

87. Procedure

Troubleshooting is a systematic isolation of defective components by means of an analysis of !he shop set trouble symptoms, testing to determine the defective component, and applying the remedies. To correct malfunctioning of equipment, the probable cause should be systematically isolated in accordance with instructions in paragraphs 88 through 95.

88. Electrical Equipment Operates at Slow or Reduced Speed

Probable cause	*Possible remedy*
Loose connectors	Tighten connectors.
Low voltage	Check incoming voltage.
Improper source of voltage..	Check source voltage for specified requirements.
Cause beyond repair scope of operator.	Notify supporting field maintenance unit.

89. Electrical Equipment Stops During Operation

Probable cause	*Possible remedy*
Power source disconnected	Check external power cable, cords, and circuit breakers.
Overheating of equipment	Check equipment for speed setting and voltage as necessary. Allow equipment to cool and restart.
Overloading	Adjust feed or speed of equipment as necessary.
Cause beyond repair scope of operator.	Notify supporting field maintenance unit.

90. Electrical Equipment Will Not Start

Probable cause	*Possible remedy*
Power cord disconnected	Check rear power outlet for proper installation of power cord from auxiliary power source.
One or more circuit breaker inoperative.	Check circuit breakers and replace as necessary.
Corroded prong or loose connection at power receptacle.	Clean prong and check connectors and plug for tightness.
Cause beyond repair scope of operator.	Notify supporting field maintenance unit.

91. Pneumatic Equipment Operates at Slow or Reduced Speed

Probable cause	*Possible remedy*
Low air pressure	Check air pressure gages, and regulators; adjust as necessary.
Leak in air line(s) or loose connector(s)	Check air pressure at equipment; retrace air line(s); check for leaks and loose connectors (s).
Cause beyond repair scope of operator.	Notify supporting field maintenance unit.

92. Pneumatic Equipment Stops During Operation

Probable cause	*Possible remedy*
Failure of source of power.	Check incoming auxiliary line for pressure.
Overloading.	Reduce feed, pressure on work, or speed as necessary.
Cause beyond repair scope of operator.	Notify supporting field maintenance unit.

93. Pneumatic Equipment Will Not Start

Probable cause	*Possible remedy*
Source of power disconnected.	Check connections at points of installation.
Faulty check valves.	Check air pressure at regulators; replace check valves as necessary.
Break in air hose of equipment.	Check air hose and replace as necessary.
Cause beyond repair scope of operator.	Notify supporting field maintenance unit.

94. Excessive Vibration of Equipment

Probable cause	*Possible remedy*
Loose mounting bolts.	Check mountings for security; tighten or replace bolts as necessary.
Equipment improperly loaded.	Reduce loads, readjust load, or reduce speed as necessary.
Cause beyond repair scope of operator.	Notify supporting field maintenance unit.

95. Excessive Noise

Probable cause	*Possible remedy*
Lack of lubrication.	Lubricate equipment in accordance with paragraphs 29 and 30.
Improper use of equipment.	Check specific manuals for use of equipment.
Cause beyond repair scope of operator.	Notify supporting field maintenance.

Section V. RADIO INTERFERENCE SUPPRESSION

96. Purpose

a. Radio interference suppression is the elimination or minimizing of the electrical disturbances which interfere with radio reception or disclose the location of the equipment to sensitive electrical detectors. Therefore, it is very important that equipment with, as well as equipment without radios be suppressed properly to prevent interference with radio reception of surrounding equipment, or disclosing locations.

b. Suppression in the equipment is accomplished by the use of resistor suppressors and capacitors. In addition, metal parts of the equipment are formed into a shield by use of braided bond straps and toothed washers, confining electrical disturbances so they cannot disturb receiving equipment.

97. Inspection

The operator of the equipment is responsible for the inspection of radio interference suppressors and the correction or reporting of any discrepancies discovered. Those sections of technical manuals which contain detailed instructions for radio interference suppression form a part of this manual. It is the responsibility of the operator to familiarize himself with these manuals and to perform the inspections listed therein.

Section VI. ELECTRICAL SYSTEM

98. General

A detailed description of the electrical system is contained in paragraphs 45 and 46.

99. Electrical Wiring Installation

a. General. The electrical wiring installation (fig. 8) is comprised of-

(1) Power cord for connecting generator or auxiliary power source to the external power receptacle of the shop.

(2) Conduit encased wires connecting the external power receptacle with the electric control panel.

(3) Wiring from the control panel to the various receptacles which supply current to the equipment to be operated.

b. Second Echelon Maintenance. Inspect and replace as necessary wiring, connectors, receptacles, and conduit in accordance with instructions in paragraphs 84 through 95 and appendix II.

Warning

Disconnect power source before servicing.

100. Electrical Switches and Circuit Breaker

a. General. Electrical switches and circuit breakers are installed in the electrical system (fig. 4) to allow individual control of circuits, distribute current, and as safety devices.

b. Second Echelon Maintenance. Inspect and replace switches 'or circuit breakers as necessary in accordance with instructions contained in paragraphs 84 through 95 and appendix II.

101. Lighting System

Inspect and replace inoperative lighting tubes or bulbs in accordance with instructions in paragraphs 84 through 95 and appendix II.

Note

For details of shop lighting system, refer to TM 9-2330-238-14.

102. Controls and Instruments

Controls and instruments (fig. 4), will be maintained by second echelon maintenance personnel to the extent authorized in appendix II and in accordance with instructions in paragraphs 84 through 95. Refer to paragraphs 63 and 64 for description, location, and illustration of controls and instruments.

Section VII. PNEUMATIC SYSTEM

103. General

A detailed description of the pneumatic system is contained in paragraphs 47 and 48.

104. Lines and Hose

Second echelon maintenance of air lines and air hose will consist of inspection and replacement of parts in accordance with paragraphs 84 through 95 and appendix II.

105. Controls and Instruments

Controls and instruments (fig. 5), will be maintenance personnel to the extent authorized in appendix II, and in accordance with instructions in paragraphs 84 through 95. Refer to paragraphs 63 and 64 for description, location, and illustration of controls and instruments.

Section VIII. UTILITY SYSTEM

106. Storage Cabinets and Bench Tops

Second echelon maintenance of storage cabinets and bench tops consists of inspections and replacement of parts as authorized by appendix II.

107. Inspection and Replacement

Inspect and replace parts in accordance with instructions in paragraphs 84 through 95. Refer to chapters 8 and 9 for replacement parts listing.

CHAPTER 7

SHIPMENT AND LIMITED STORAGE (SECOND ECHELON)

Section I. SHIPMENT WITHIN CONTINENTAL UNITED STATES

108. General

Before shipment of the shop set within the continental United States, perform the procedures for limited storage listed in paragraphs 116 through 122.

109. Preparation for Shipment

In addition to the instructions contained in paragraphs 53 and 54, perform the preparation listed in TM 9-2330-238-14.

110. Hoisting, Handling, and Loading

Refer to TM 9-2330-238-14.

111. Securing

Refer to TM 9-2330-238-14.

112. Methods of Transportation

Use flatcars boxcars, or vehicular transportation for transporting the shop set.

113. Shipping Documents

Prepare all Army shipping documents accompanying the shop set in accordance with instructions listed in the technical manual for the item of equipment.

Warning

The height and width of shop sets, when prepared for rail transportation, must not exceed the limitations indicated by the loading table in the applicable Army regulations. Local transportation officers must be consulted about limitations of the particular railroad lines to be used for the movements in order to avoid delays, dangerous conditions, or damage to equipment.

Section II. SHIPMENT OUTSIDE CONTINENTAL UNITED STATES

114. General

The procedures for shipment outside continental United States are essentially the same as those listed in paragraphs 108 through 113. Exceptions are in the methods of preparation for shipment; marine transportation will normally be used and the shop set will be secured in cargo holds or on decks of ships. Refer to TM 9-2330-238-14 for methods of securing, net handling, and boom procedures.

115. Preparation for Shipment

Waterproof the shop set, using methods outlined in TM 9-2330-23814, and in paragraphs 116 through 122. Refer to paragraphs 18 through 26 and 73 through 79 for basic procedures to be followed when the equipment is exposed to salt water. Additional requirements consists of spraying taped areas and adjacent surfaces of the van with strippable plastic material conforming to Military Specification MIL-B-12121, or Military Specification MIL-C-16555. The coating thickness should be uniform and 0.030 to 0.040 inch thick.

Section III. LIMITED STORAGE

116. Inspection Before Storage

Make a complete inspection of the shop set to determine its condition. Deficiencies will be corrected prior to placement of equipment in limited storage. Technical inspection will be performed on unboxed items.

117. Cleaning

Prior to application of any preservative or paint, thoroughly clean all surfaces. Scrub or wipe with a clean bristle brush or cloth soaked in cleaning solvent, When possible, subject the exterior surfaces of the shop to a stream of steam with or without added cleaning compound-followed by dry steam. Wire brush, buff, sand. or scrape if steam is not available. Immediately after cleaning, dry with compressed air or by use of a clean, dry wiping cloth.

Caution: Solvents are highly destructive to natural rubber and electrical insulation, and must not be used on these materials. Protect all electrical components during cleaning. Protest sensitive components from steam cleaning by sealing openings with pressure sensitive tape, Federal Specification PPP-T-60, or by disassemblying and removing components when protection cannot otherwise be accomplished.

118. Complete Lubrication

Refer to paragraphs 82 through 85.

119. Preservative Application

Coat precision machined surfaces with preservative conforming to Military Specification MIL-P-21260, grade 2, or with preservative conforming to Military Specification MIL-C-6259, type I, mixed with lubricating oil, in proportion of one part of preservative to three parts of lubricant.

120. Protection of Equipment Outside of Van

When equipment is stored outside or otherwise subjected to rain or dust, it will be protected by covering with barrier material, Military Specification MIL-B-121, grade A, in addition to the normal storage procedures outlined in the technical manual for the item.

121. Moisture Proofing

a. Hang one humidity indicator, MS-20003, inside a window in such a manner as to be visible from the outside.

b. Place 213 u nits of desiccant, Military Specification MIL-B-3464, inside the shop set.

Caution: Do not place desiccant in contact with finished surfaces of tools or equipment.

c. Close shop sides and rear doors.

Caution: Sides and one door should be closed and taped before desiccant is removed from air-tight containers and installed in van. It takes on moisture rapidly.

d. Seal all openings with tape, Federal Specification PPP-T-60.

122. Inspection of Equipment in Limited Storage

When equipment has been placed in limited storage, all scheduled preventive maintenance services, including inspection will be suspended and preventive maintenance will be performed as specified herein.

Note. Vans should not be opened for entry unless humidity indicator shows an unsafe condition. In that event, tape seals should be checked for leakage, desiccant replaced, and doors resealed.

a. Inspection Criteria. All equipment in limited storage will be inspected for any unusual conditions, such as damage, rusting, accumulation of water, pilferage, and leakage of lubricants and fuel.

b. Worksheet and Preventive Maintenance. DA Form 460 and DD Form 314 will be executed on each major item of the equipment when equipment is initially placed into limited storage and every 30 days thereafter. Required maintenance will be performed promptly to insure that equipment is mechanically sound and ready for immediate use.

CHAPTER 8

OPERATING INSTRUCTIONS (FIELD AND DEPOT MAINTENANCE

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

123. General

Shop sets, when received, are to be unloaded, uncrated, depreserved, and inspected by field and depot maintenance personnel.

124. Unloading and Uncrating New Equipment

a. Unloading. Remove shoring, blocks, tiedowns, and chocks before unloading equipment.

Warning

Remove nails and loose strapping from unloading area.

Caution: Lift only at hoisting points provided when equipment is to be unloaded from heights above ground level (TM 9-2330-23814).

b. Uncrating and Servicing New Equipment. Uncrating and servicing procedures will normally be those outlined in paragraphs 59 through 62. Additional information required for unloading specific items are contained in the technical manual for the item.

c. Depreservation. Procedures for depreservation of new equipment will normally be as outlined in paragraphs 59 through 62.

d. Removal of Compound and Devices. Remove corrosion preventive compounds, protective grease, or other coatings from new parts prior to installation. Prepare new parts by presoaking or by other methods as necessary. Lubrication of new parts will be as prescribed in the appropriate lubrication order.

125. Installation

a. Location of Handtools. Following is a typical alphabetical listing of the location of common tools and equipment in drawers and storage cabinets provided. Cutout sections, designed to fit and hold particular tools, may be inserted in drawers. This is to protect tools, to make finding them easier, and to hold them securely during transit. Drawers and open bins are numbered from 1 to 36 chronologically, from top to bottom in rows, counterclockwise around the interior of shop, starting at right rear.

Tool and Equipment Drawer Location
Semitrailer Mounted, C-5, Welding

Storage drawer NO.	Nomenclature	Total
32	Apron, Blacksmith's, Leather, Bib Type, Adjustable to all sizes	2
11	Blade, Hand Hacksaw, 33 points per in.	12
26	Book, Welding Encyclopedia	1
33	Brush, Acid Swabbing, Metal Handle	2
33	Brush, Wire Scratch, Steel Wire	2
33	Clap, "C," Light Service, 2 in.	8
33	Clamp, "C," Medium Service	2
10	Caliper, Slide, 3 in. lg.	1
27	Cleaner Set, Welding and Cutting Tips, 9 Cleaners in Case	1
32	Dresser, Abrasive Wheel, Hand	1
18	Drill, Hand, 0 to 1/4 in. cap	1
17	Drill Set, Twist Number Series, 1 to 60 size range	1
10	Dividers, Mechanics	1
32	Face Shield, Industrial Plastic	2

Tool and Equipment Drawer Location
Semitrailer Mounted, C-5, Welding - Continued

Storage drawer NO.	Nomenclature	Total
11	Frame, Hand, Hacksaw	1
32	Gloves, Cloth, Work Type, Asbestos With Leather Front Fingers.	1
27	Hammer, Hand, Blacksmiths 3 lb. nom. Head wt.	1
27	Hammer, Brush, Welder's	1
14	Heat Gun, Electric, Portable	1
25	Hose, Rubber, Acetylene, 25 ft. lg.	1
25	Hose, Rubber, Oxygen, 25 ft. lg.	1
25	Hose, Rubber, Acetylene, 12 1/2 ft. lg.	1
25	Hose, Rubber, Oxygen, 12 1/2 ft. lg	1
30	Regulator, Helium Pressure, W/Flow Meter, Linde Air R-503	1
30	Regulator, Argon Pressure, Linde Air R-502	1
30	Regulator, Pressure, Acetylene	1
30	Regulator, Pressure, Oxygen	1
37	Sander, Portable	1
16	Saw Set, Hole Mandrel and Saw	1
10	Square, Combination, 12 in.	1
27	Torch, Welding, Light Duty Welding and Lead Burning	1
27	Torch Outfit, Cutting & Welding	1
16	Wheel wire, Steel, 6 in. dia	2
16	Wrench, Box, Acetylene Tank valve key	1

b. Location of Mounted Equipment. In some instances, tools, equipment, or instruments are mounted on walls, floor, or benches of the shop. These items are either too large for cabinet storage, or their use makes cabinet storage impractical. Refer to figure 16 for floor plan of shop set.

c. Separator, Water and Oil. The water and oil separator is wall mounted as shown in figure 16. Fabrication and mounting of the components are shown in figures 13 and 14.

d. Tool Chest. The tool chest is located at the right front of the shop. The chest is bolted to the van frame to provide a permanent location.

e. Band Saw. The band saw is floor mounted (fig. 16). Method of installation will be determined at installation in order that the frame may be fastened to the structural members of the van.

f. Bench Mounted Equipment. The machinists vise, drill press, punch press, and bench grinder are bench mounted (fig. 16). Typical mounting methods are shown in figures 25 through 28.

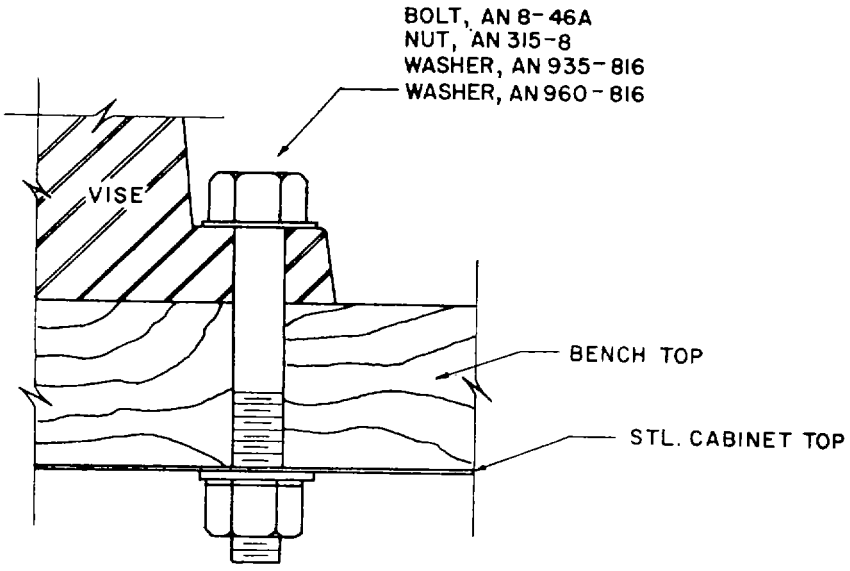


Figure 25. Typical bench mounting, machinist's vise.

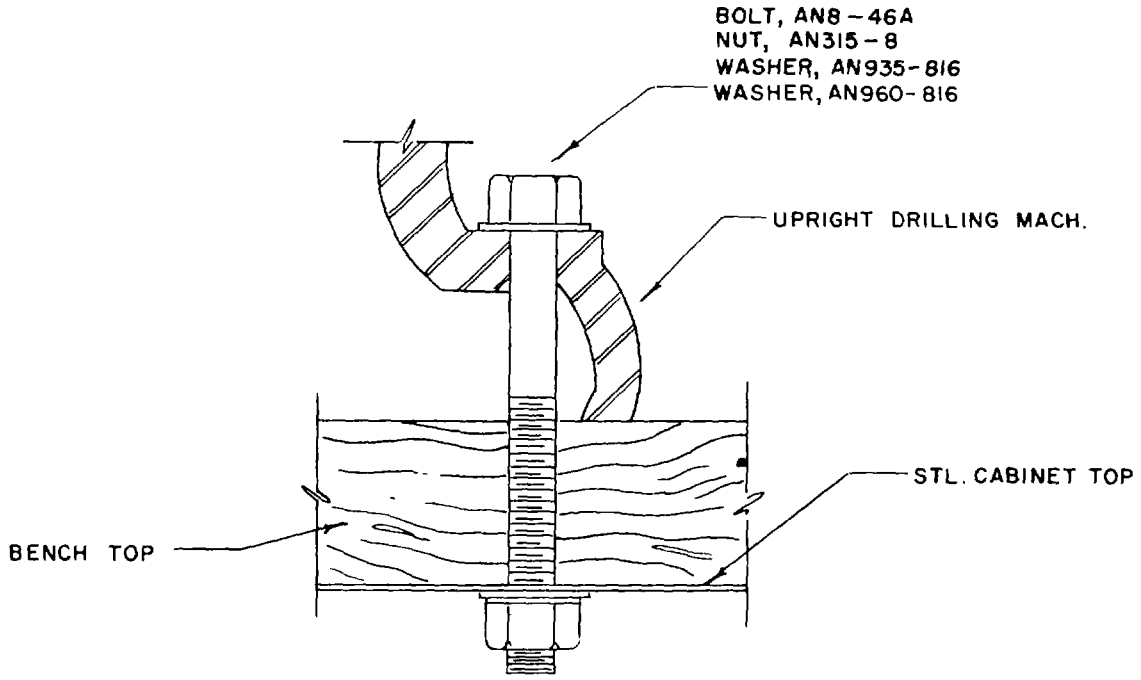


Figure 26. Typical bench mounting, upright drilling machine.

g. Welding Table, Modified. The welding table is stored at the left rear corner of the shop when not in use; the working location is on the bottom left folding shop side (fig. 16). Modification details are shown in figures 29 through 31.

h. Anvil. The anvil is stored at the left center of the shop (fig. 16). Mounting details are shown in figures 32 and 36. Straps and loops for securing other equipment are shown in figures 33 through 37.

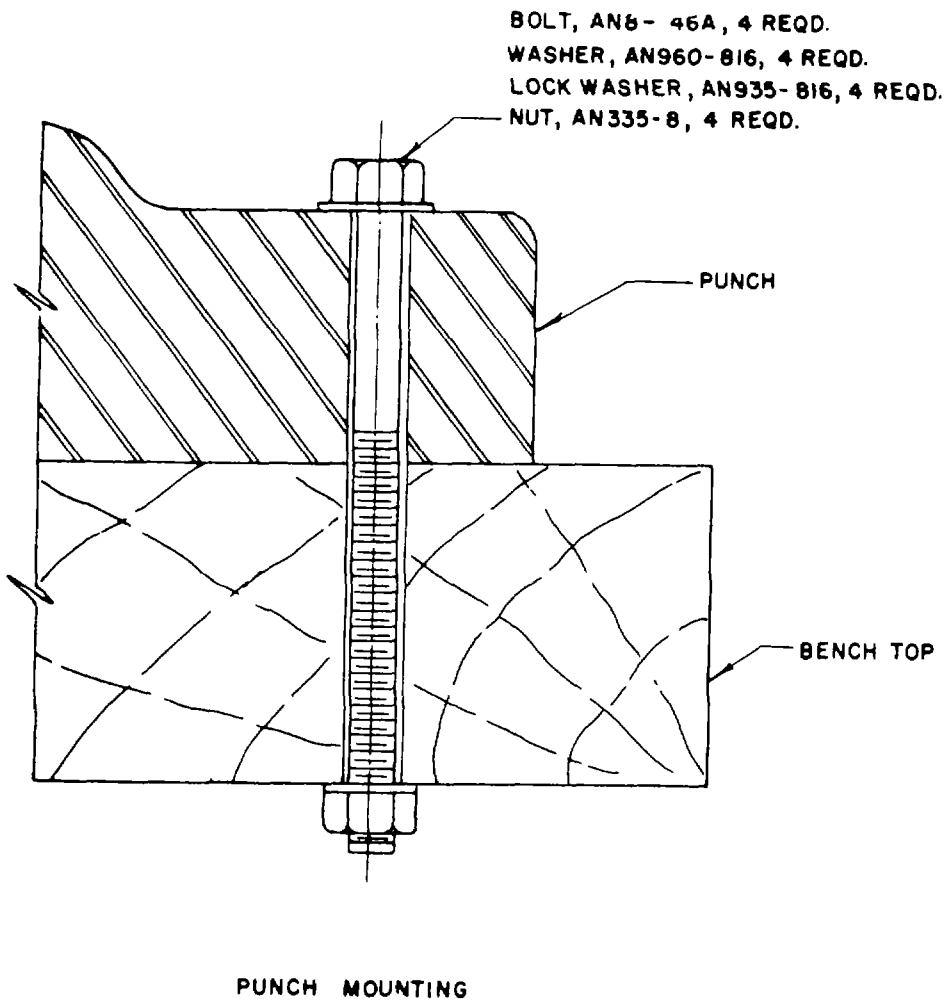


Figure 27. Typical bench mounting, punch press.

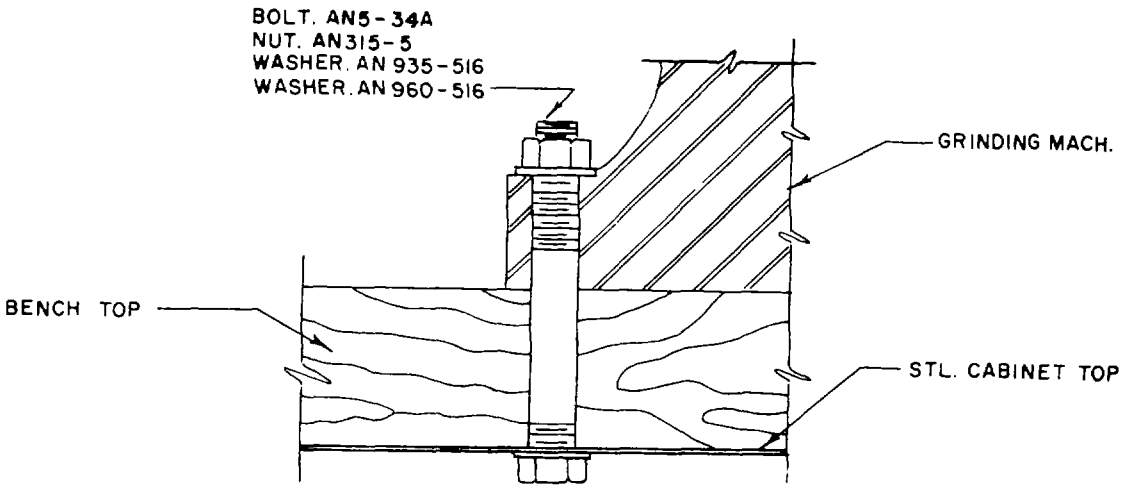
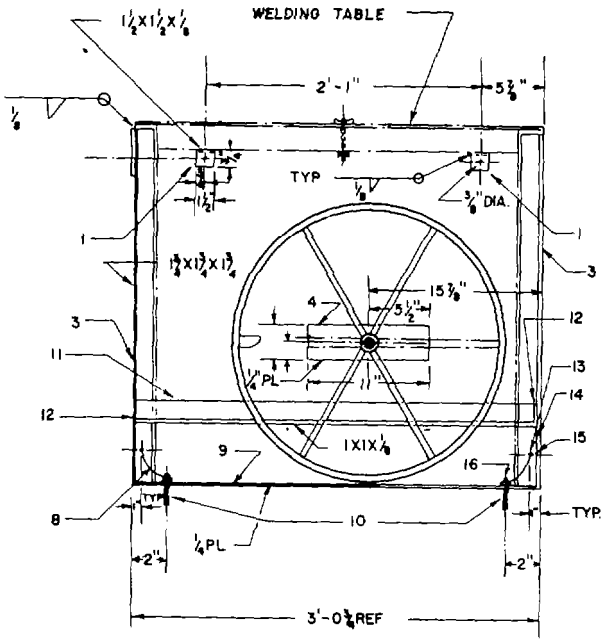
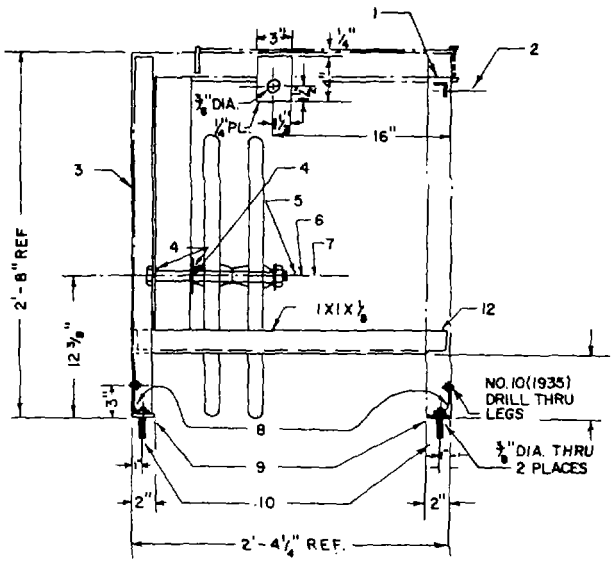


Figure 28. Typical bench mounting, utility grinding machine.



1. Mtg. angle clip, stl. 1 1/2 in. x 1 1/2 in. x 1/8 in.
2. Cart mtg. hook.
3. Rear lg. stl. angle, 1 3/4 in. x 3/16 in. x 1 3/4 in. x 2 ft. 7 1/2 in
4. Mtg. pl., stl., 3 in. x 1/4 in. x 11 in.
5. Bolt, hex head, 5/8 UNF–2, 12 in. lg.
6. Nut, hex, 5/8 in. UNF 2, AN 325–10.
7. Washer 5/8 in. ID., .063 in. thk., AN960–1016.
8. Sash chain, 5 in. lg. Fed Spec, RR–C–271 type II, class 3, size 8.
9. Bottom pl. stl. 2 in. x 1/4 in. x 2 ft. 4 in. lg.
10. Bolt, hex head, 3/8–16UNC–2, 2 in. lg., MS35307–66.
11. Back brace, stl. angle, 1 in. x 1/8 in. x 3 ft. 1 in. lg.
12. Side brace, stl. angle, 1 in. x 1 in. x 1/8 in. x 2 ft. 4 in. lg.
13. Screw, RH #10(.190 in.)–32NF2, 1/2 in lg. AN520–10–8
14. Nut, hex, #10(.190 in.)–32NF–2, AN345–10.
15. Washer, lock, spring #10 med. series AN935–10.
16. Screw, RH, #8(.164)–32NC–2, 1/2 in. lg. AN515–8–8.

Figure 29. Modified welding table, front view.



1. Mtg. angle clip, stl. 1 1/2 in. x 1 1/2 in. x 1/8 in.
2. Cart mtg. hook.
3. Rear lg. stl. angle, 1 3/4 in. x 3/16 in. x 1 3/4 in. x 2 ft. 7 1/2 in.
4. Mtg. pl., stl., 3 in. x 1/4 in. x 11 in.
5. Bolt, hex head, 5/8 UNF–2, 12 in. lg.
6. Nut, hex, 5/8 in. UNF 2, AN 325–10.
7. Washer 5/8 in. ID., .063 in. thk., AN960–1016.
8. Sash chain, 5 in. lg Fed Spec, RR–C–271 type II, class 3, size 8.
9. Bottom pl. stl. 2 in. x 1/4 in. x 2 ft. 4 in lg.
10. Bolt, hex head, 3/8–16UNC–2, 2 in. lg., MS35307–66.
11. (Not shown)
12. Side brace, stl. angle, 1 in. x 1 in. x 1/8 in. x 2 ft. 4 in. lg.

Figure 30. Modified welding table, side view.

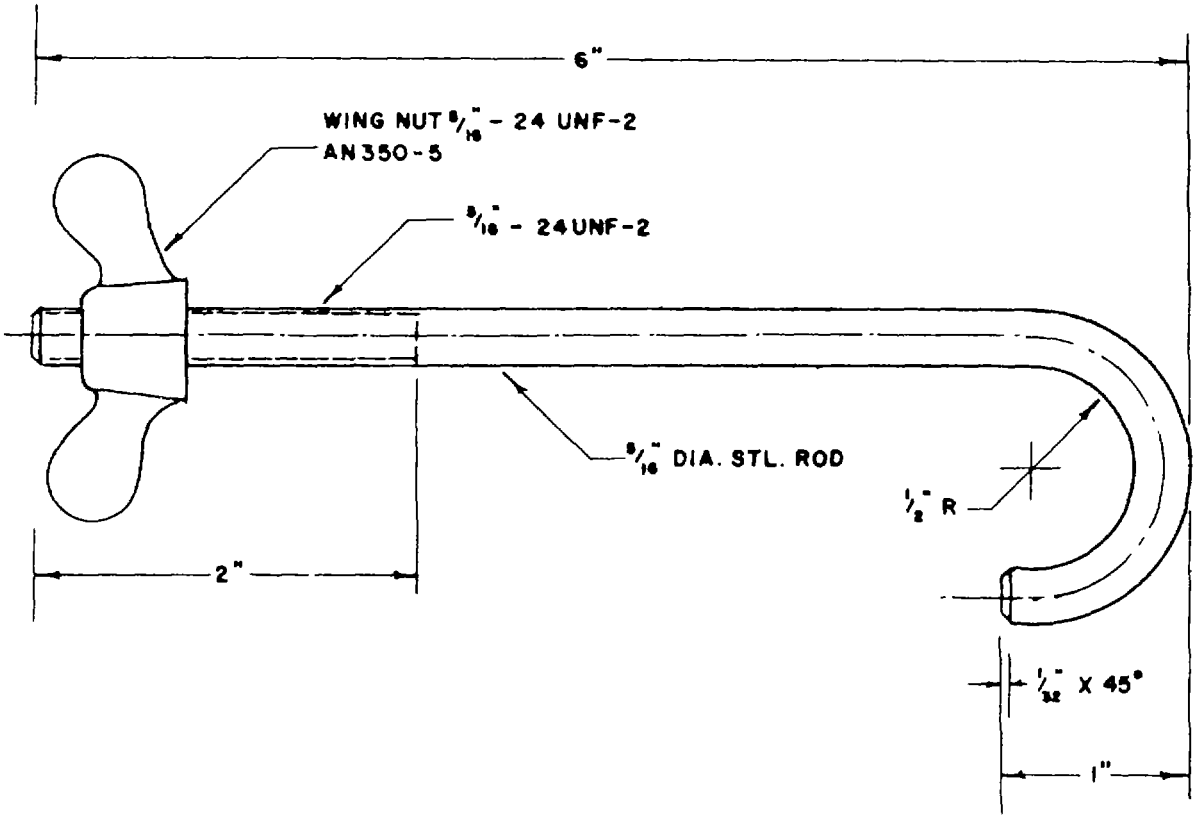


Figure 31. Cart mounting hook.

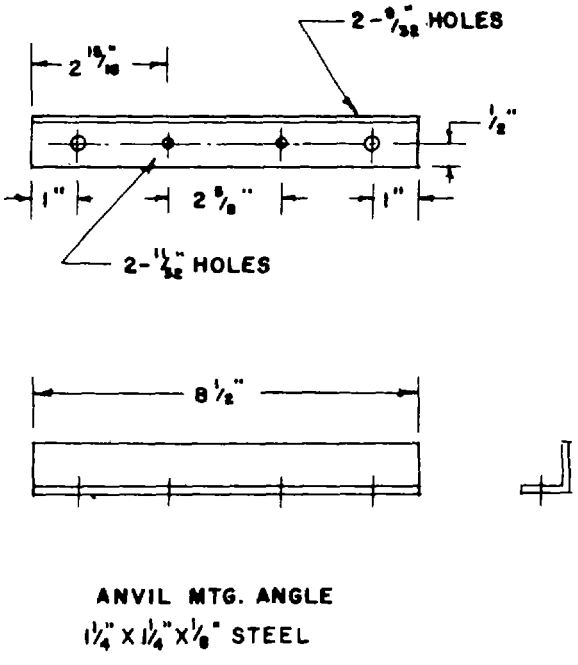


Figure 32. Anvil mounting angles.

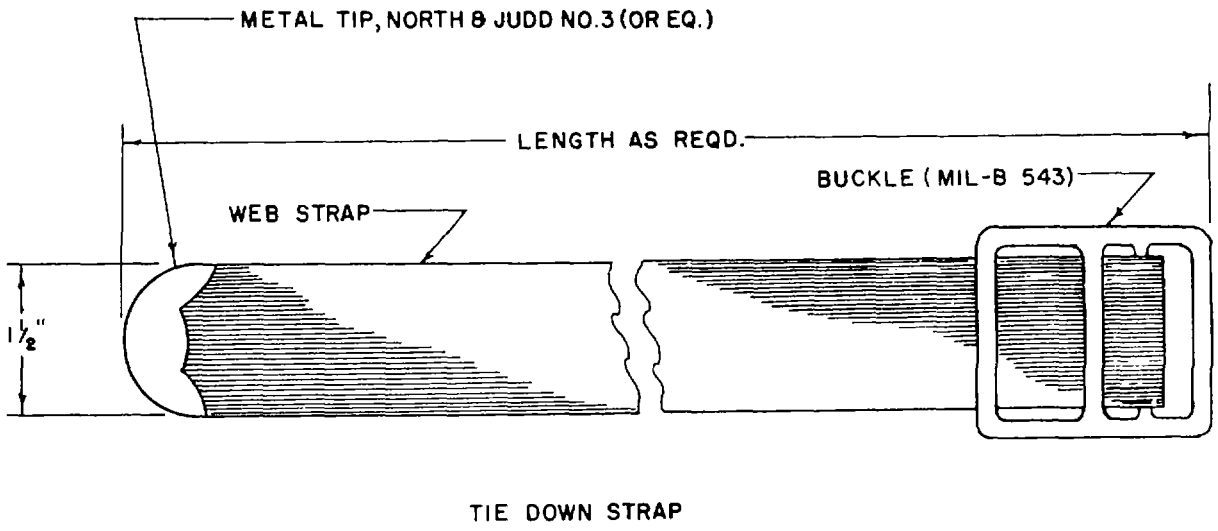


Figure 33. Strap continuous type.

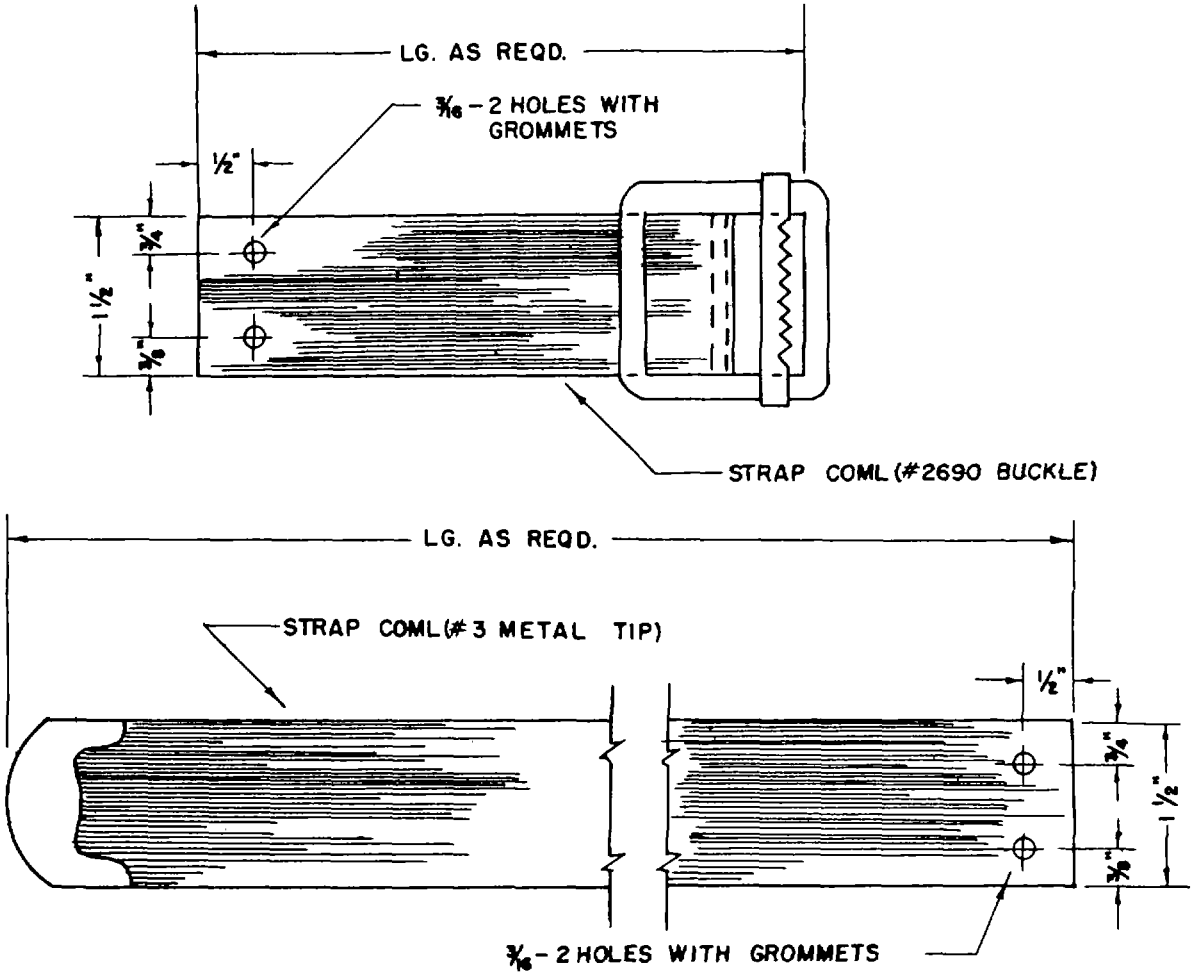


Figure 34. Strap, bolted type.

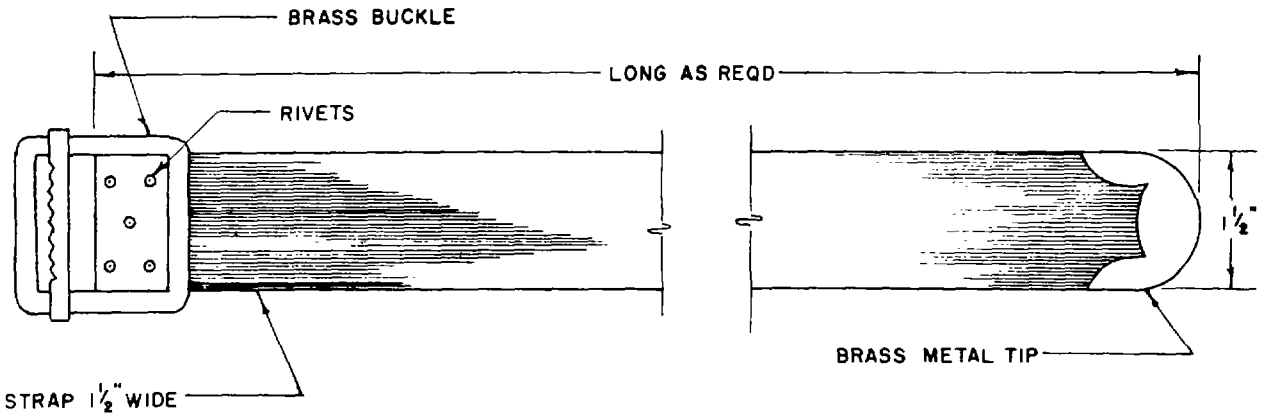


Figure 35. Strap, riveted type.

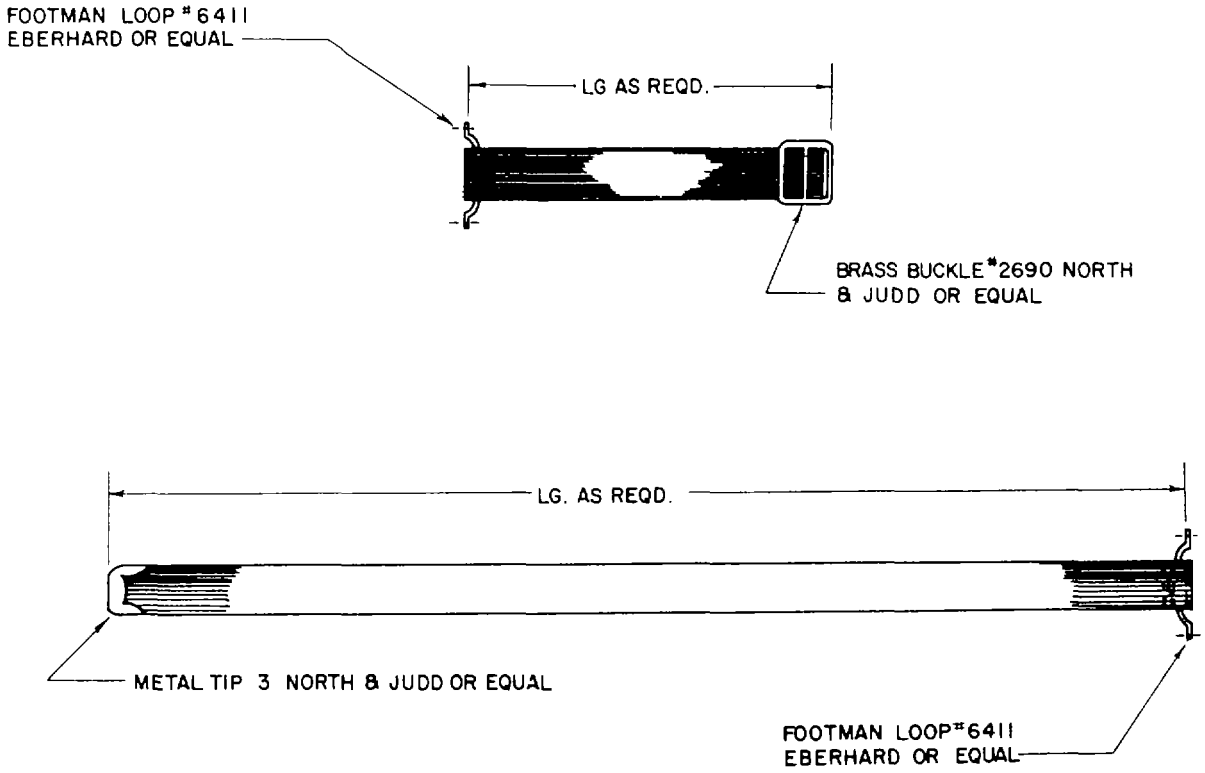


Figure 36. Strap, sewn type.

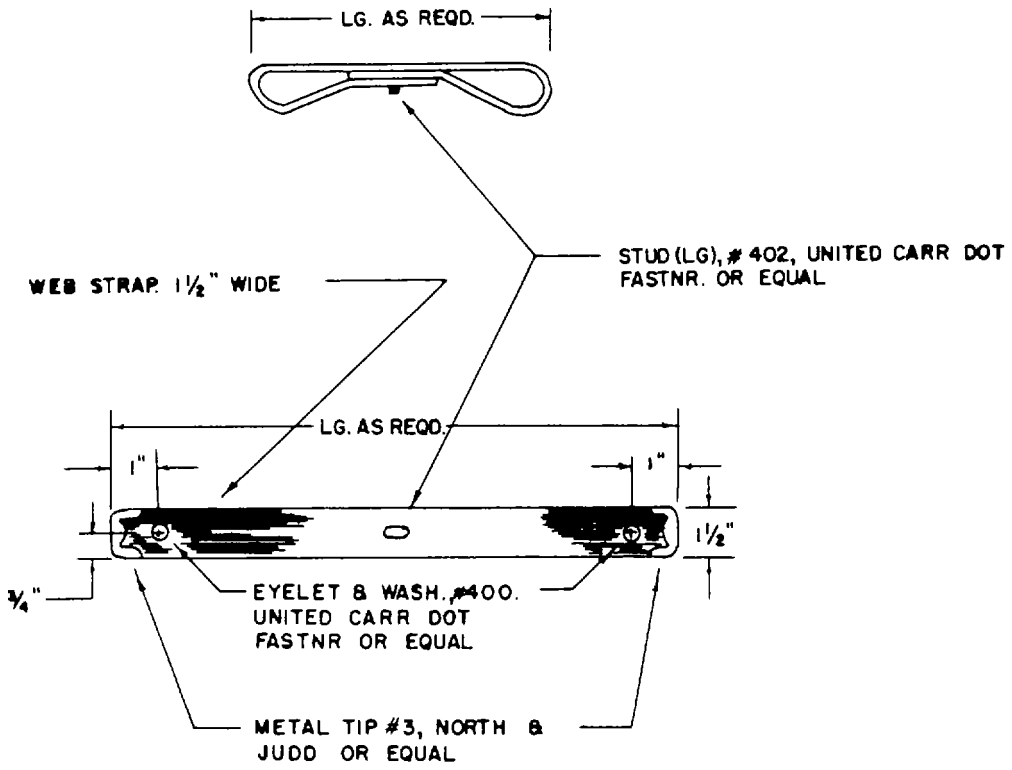


Figure 37. Strap, loop type.

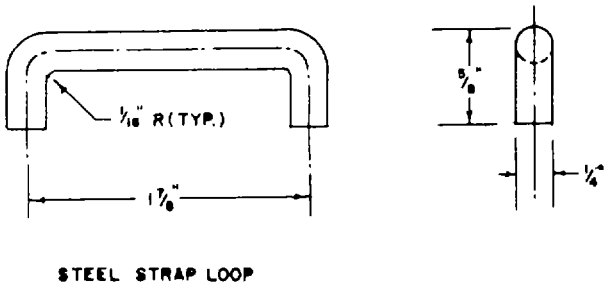


Figure 38. Strap loop.

i. Hand Truck, Modified. The hand truck is located at the left center of the shop (fig. 16). Modification details are shown in figure 39 through 43.

j. Tank Holders, Acetylene, Helium, and Oxygen. The tank holder is mounted on the left side of the forward platform of the shop (fig. 16). Details are shown in figure 44 through 50.

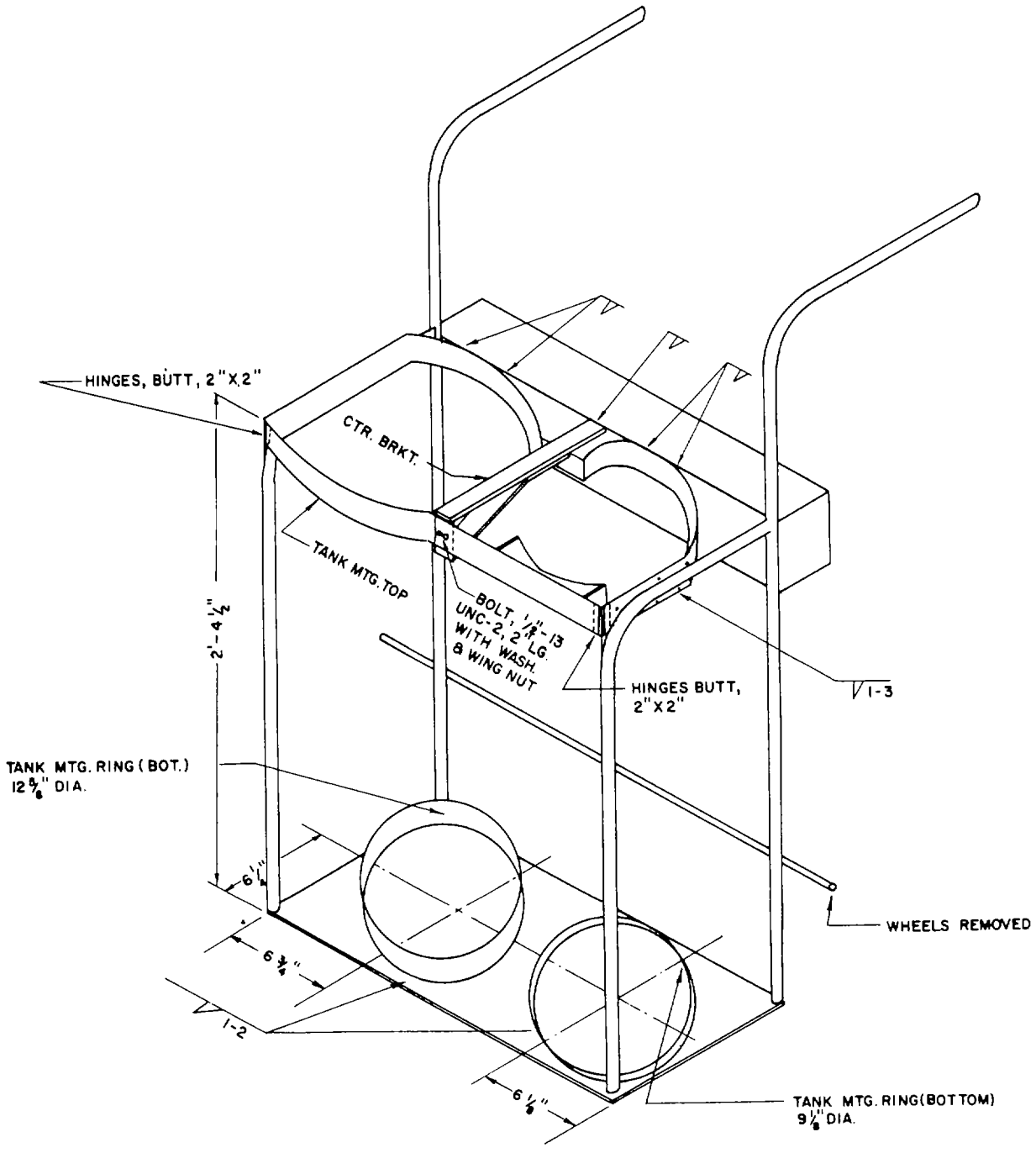


Figure 39. Modified hand truck assembly.

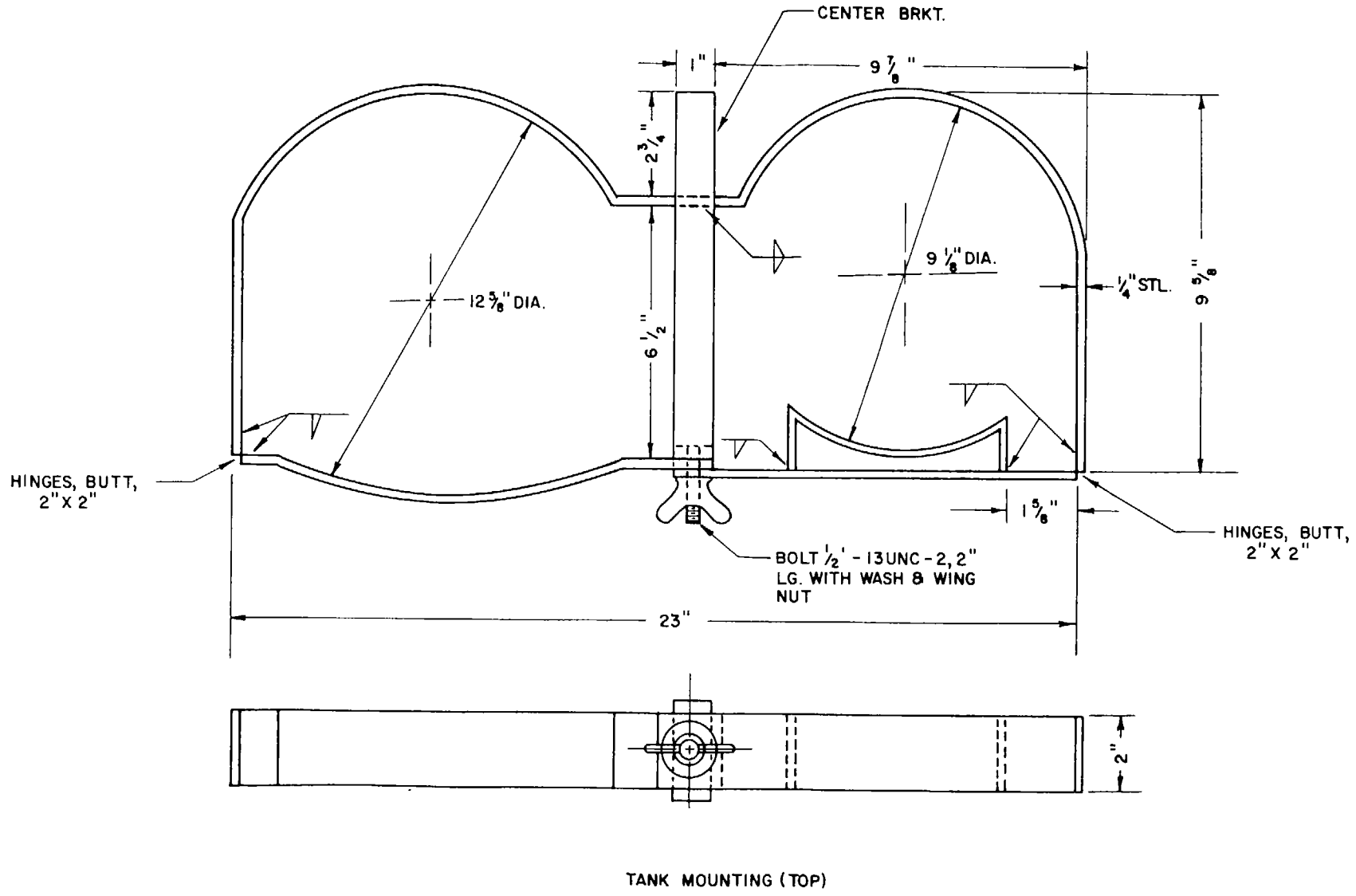


Figure 40. Tank mounting, modified hand truck assembly, top view.

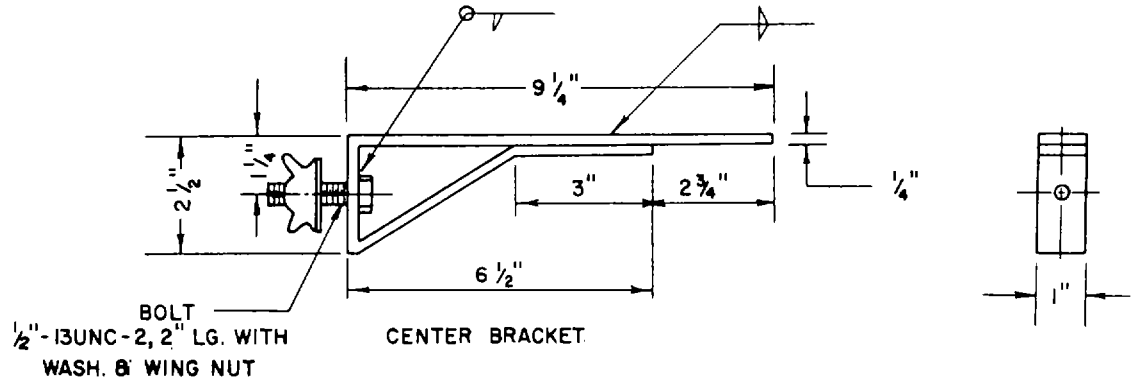


Figure 41. Center bracket, modified hand truck.

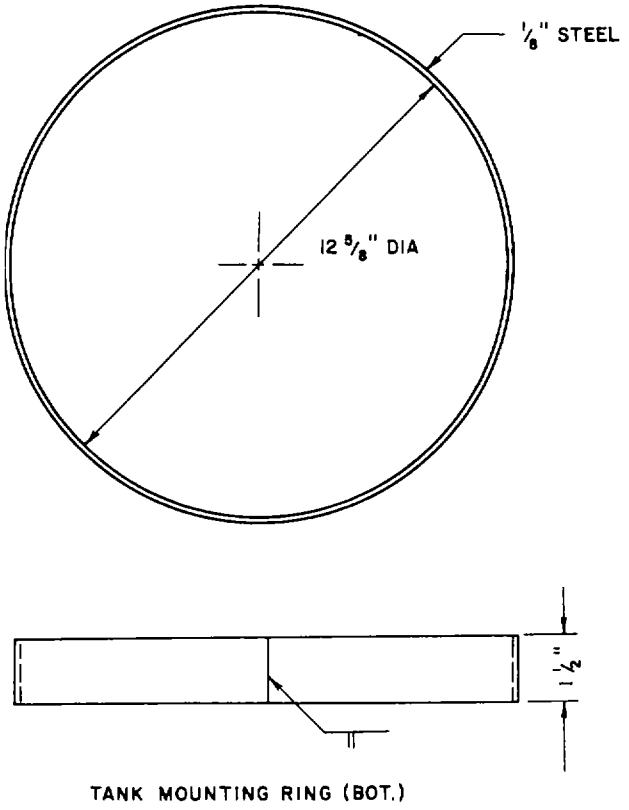


Figure 42. Tank mounting ring, bottom, 12 5/8 inch diameter.

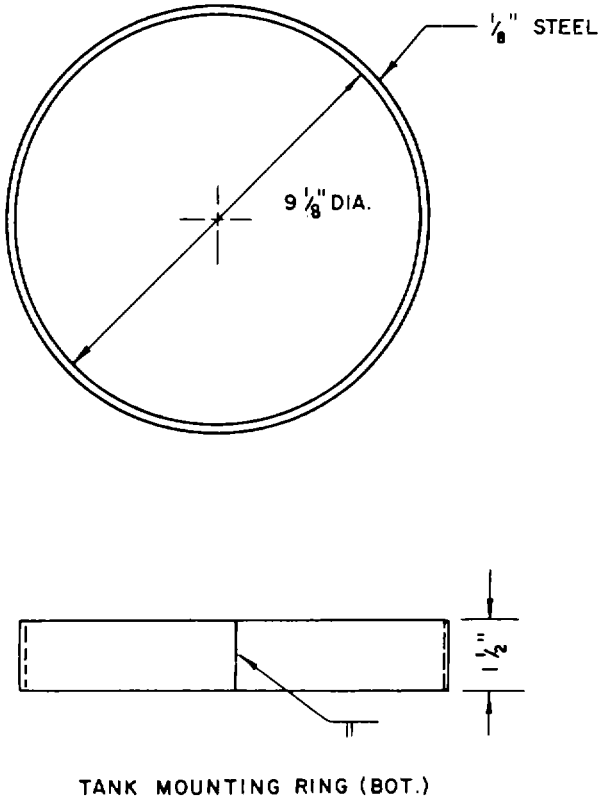
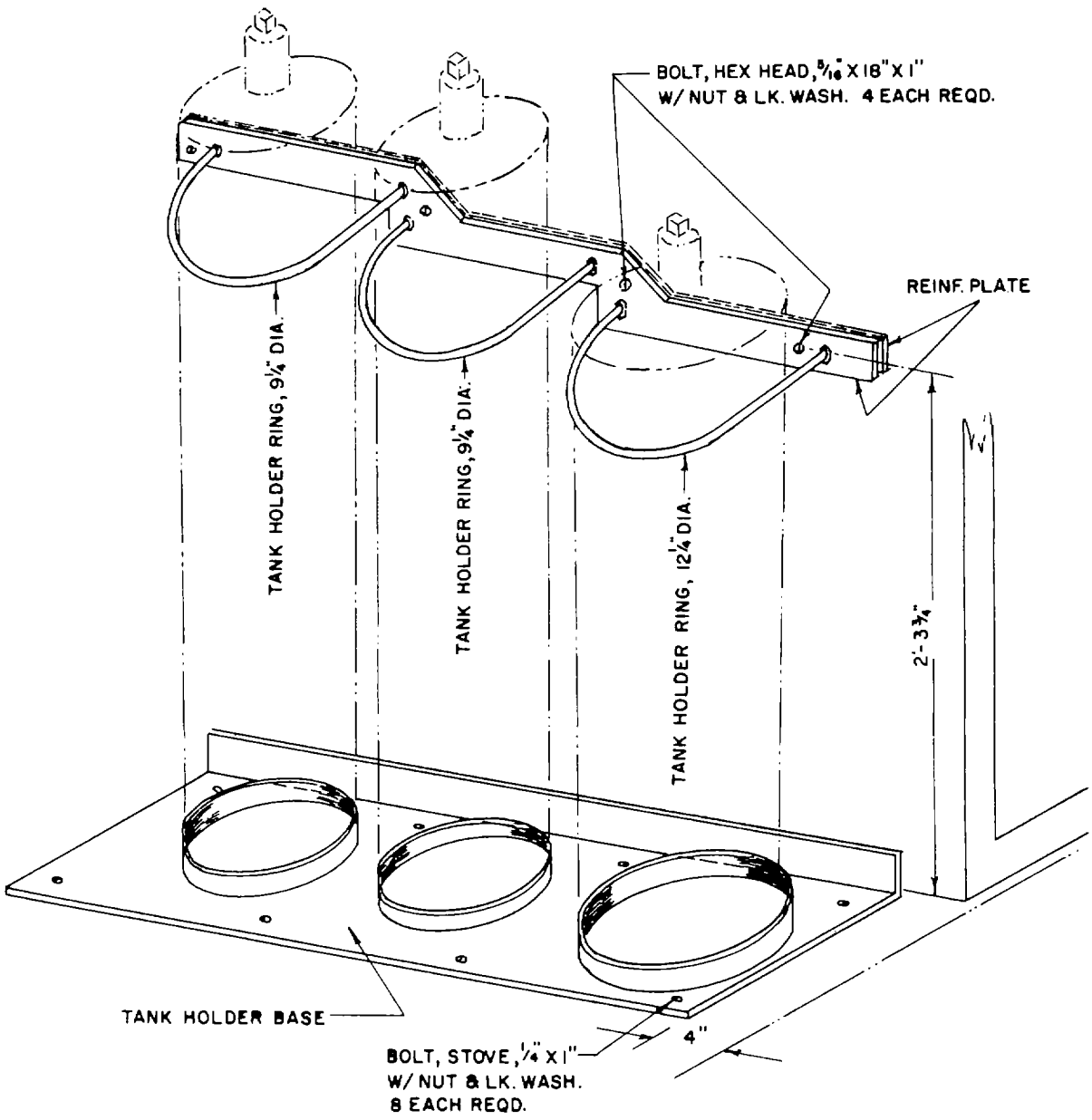


Figure 43. Tank mounting ring, bottom, 9 1/8 inch diameter.



TANK HOLDER ASSEMBLY & LOCATION

Figure 44. Tank holder assembly.

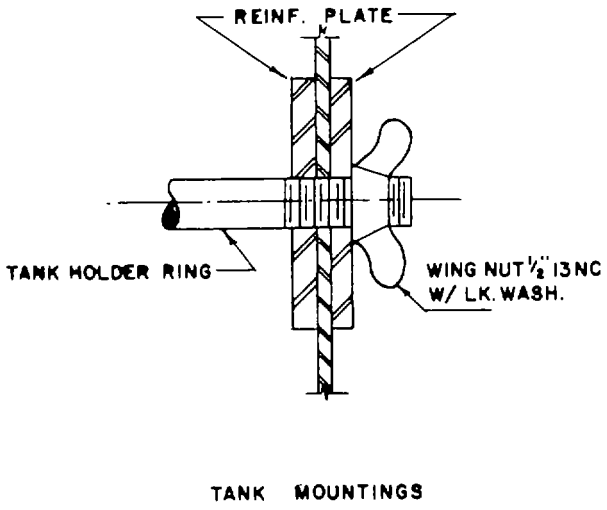


Figure 45. Tank mounting.

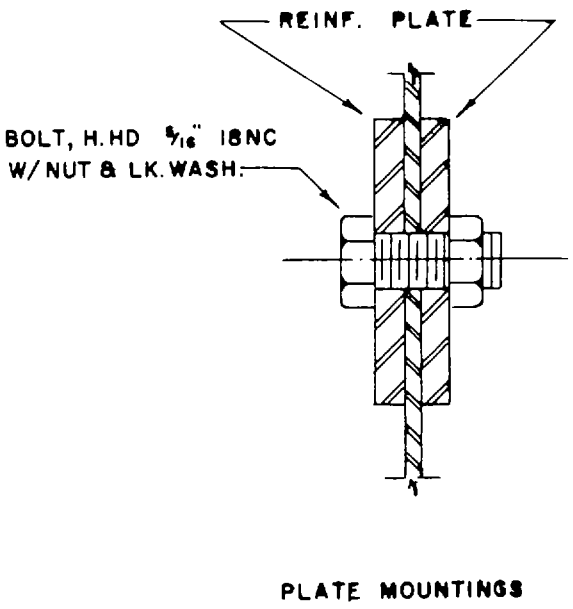
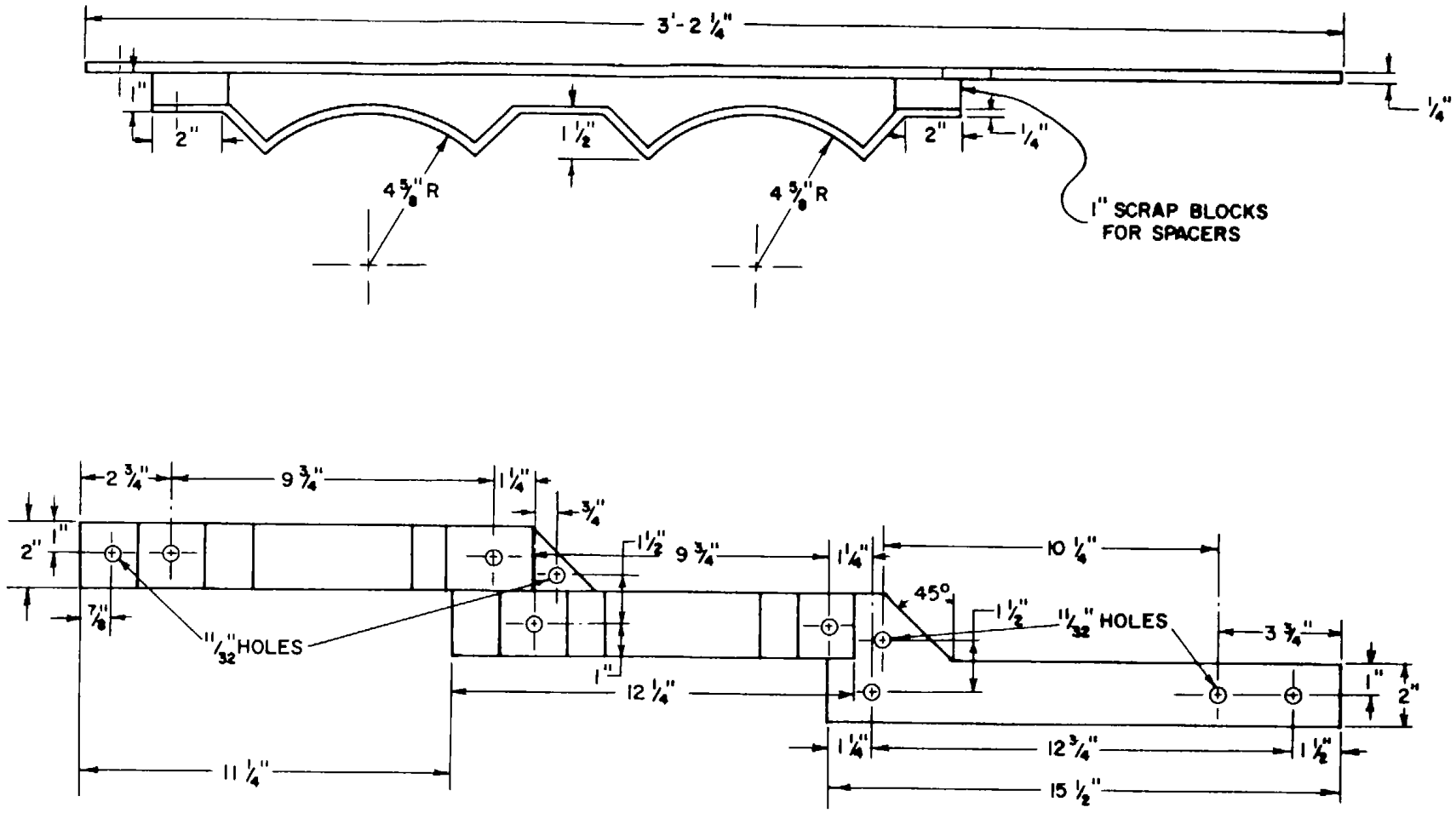


Figure 46. Plate mounting.



REINFORCEMENT PLATE 1/4" STEEL

Figure 47. Reinforcement plate.

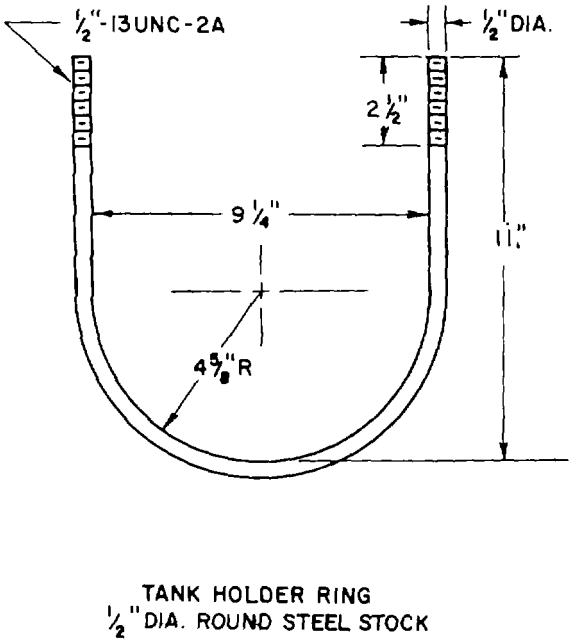


Figure 48. Tank holder ring, 9 1/4-inch diameter.

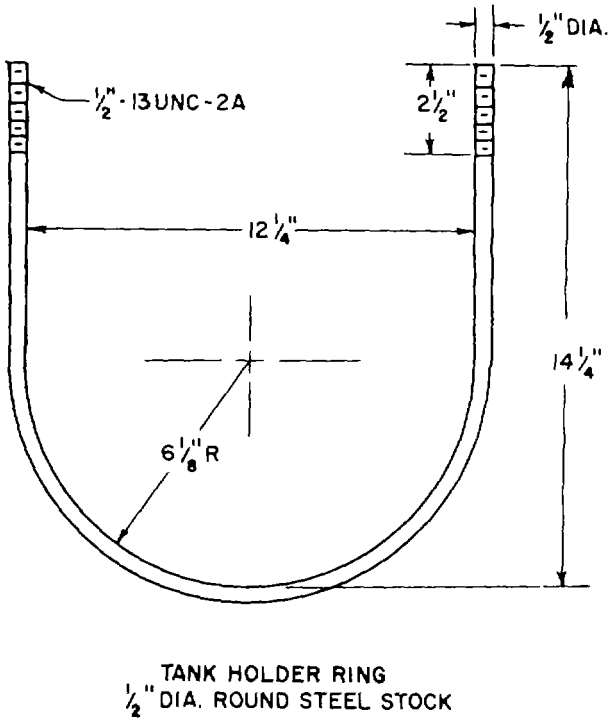


Figure 49. Tank holder ring, 12 1/4-inch diameter.

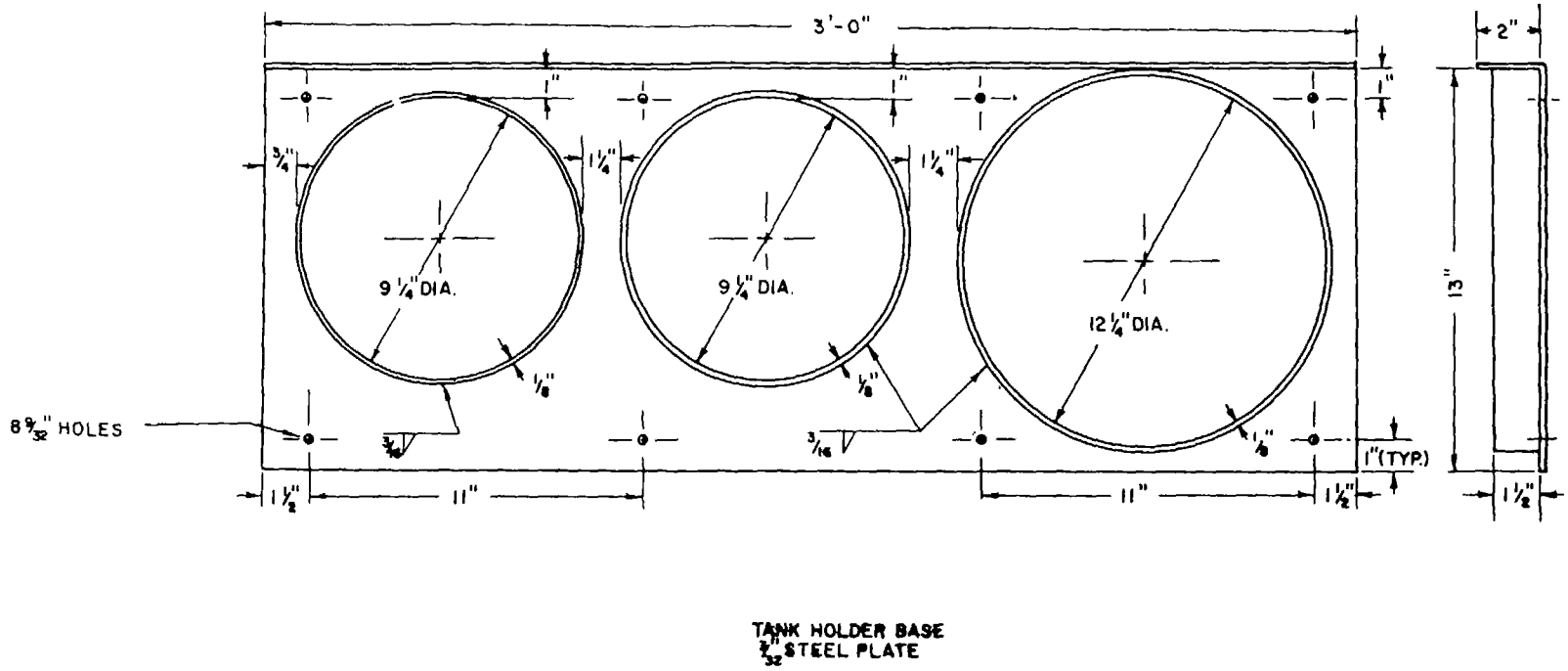
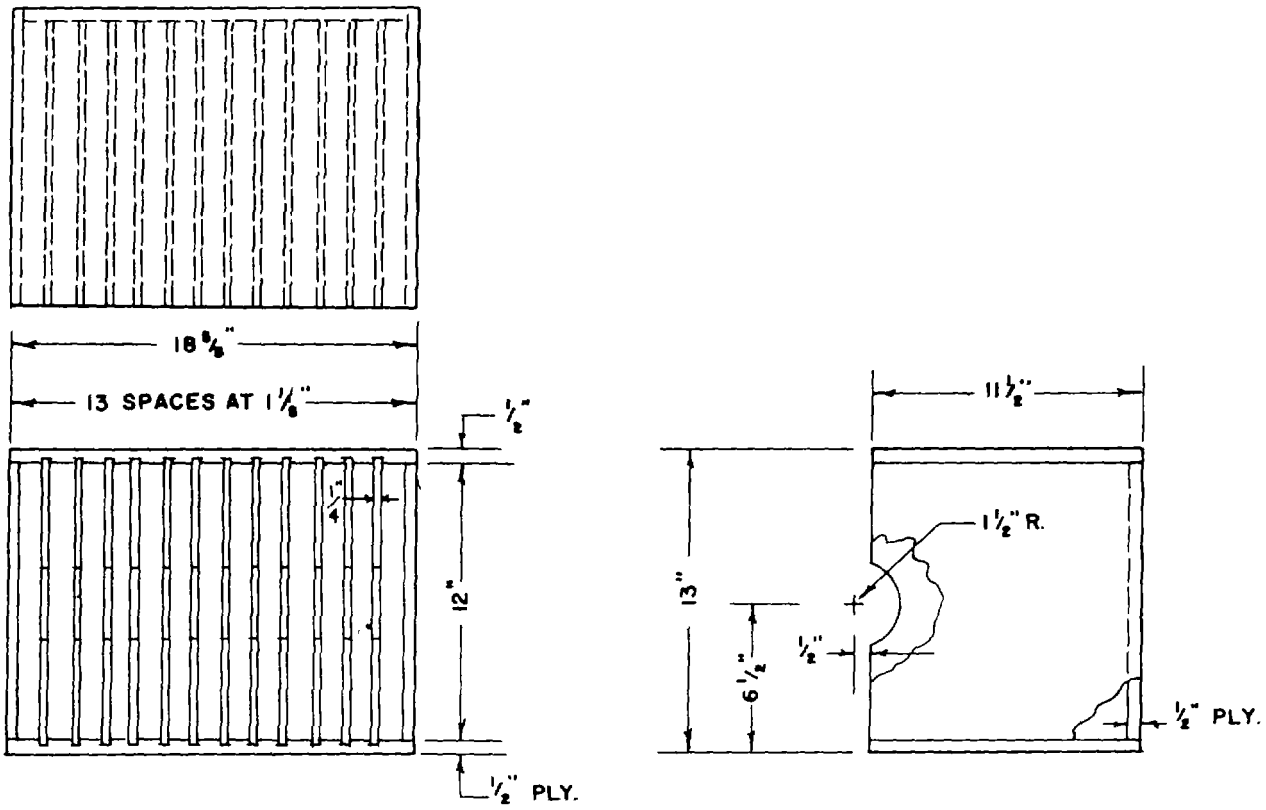


Figure 50. Tank holder base.



SAW STORAGE CABINET

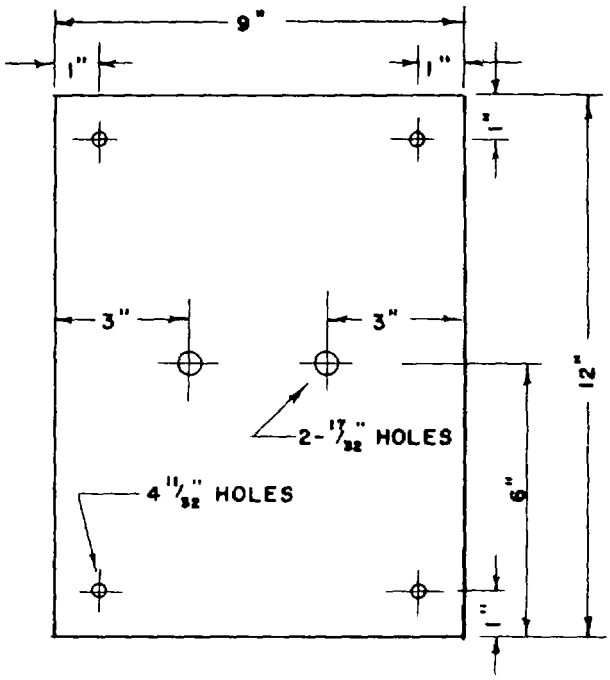
SAW STORAGE CABINET

Figure 51. Band saw storage cabinet.

k. Band Sail Storage Cabinet. The storage cabinet for the band saw is located at the right center of the shop (fig. 16). Details are shown in figure 51.

l. Shearing Machine. The shear is mounted on the rear of the right folding shop side (fig.16). Details are shown in figure 52.

m. Helium Cylinder. The helium cylinder is located at the right rear of the shop (fig. 16). Mounting details are shown in figures 53 through 55.



SHEARING MACH. MTG.
PLATE 1/2" STEEL

Figure 52. Shearing machine mounting plate.

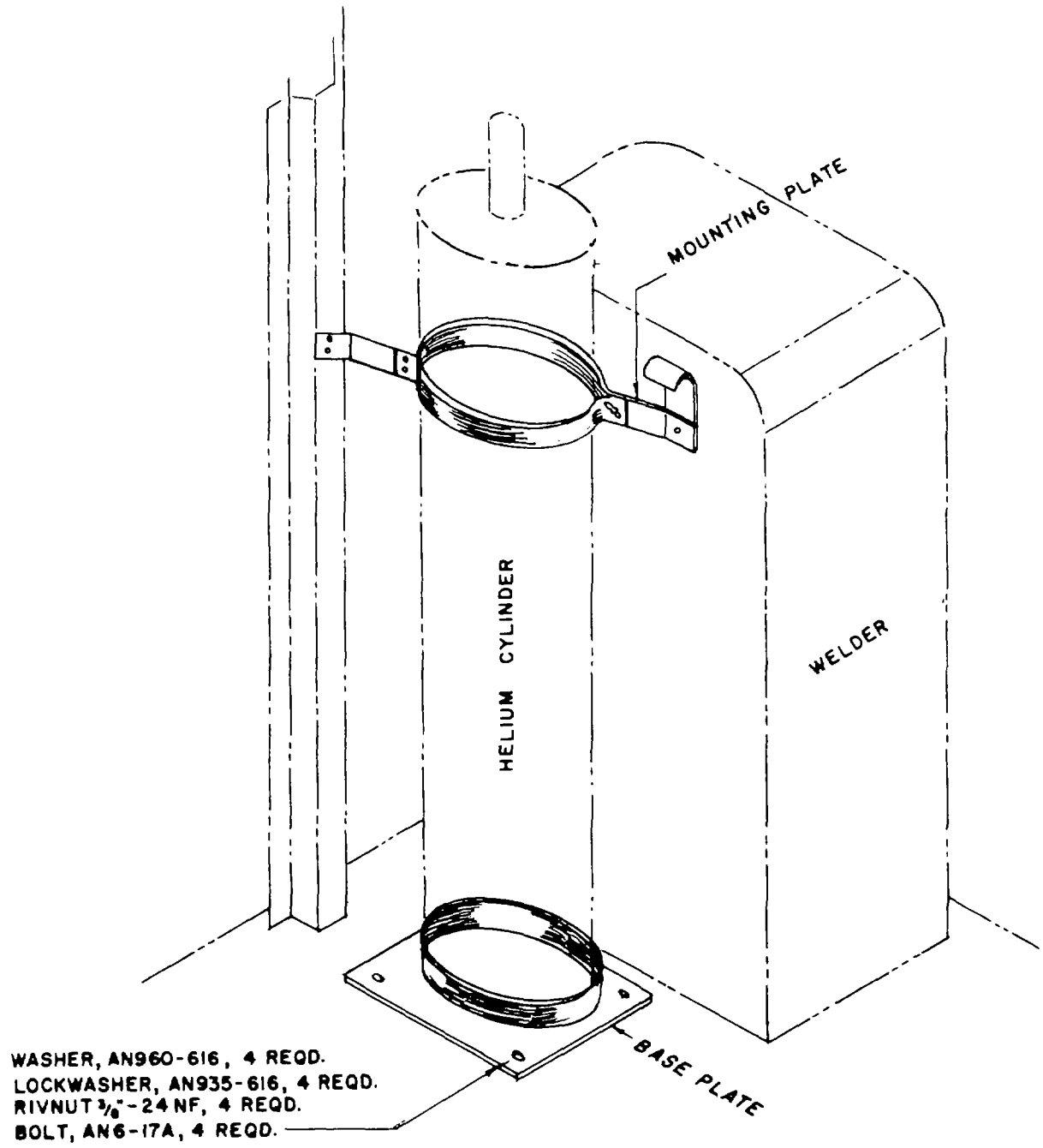
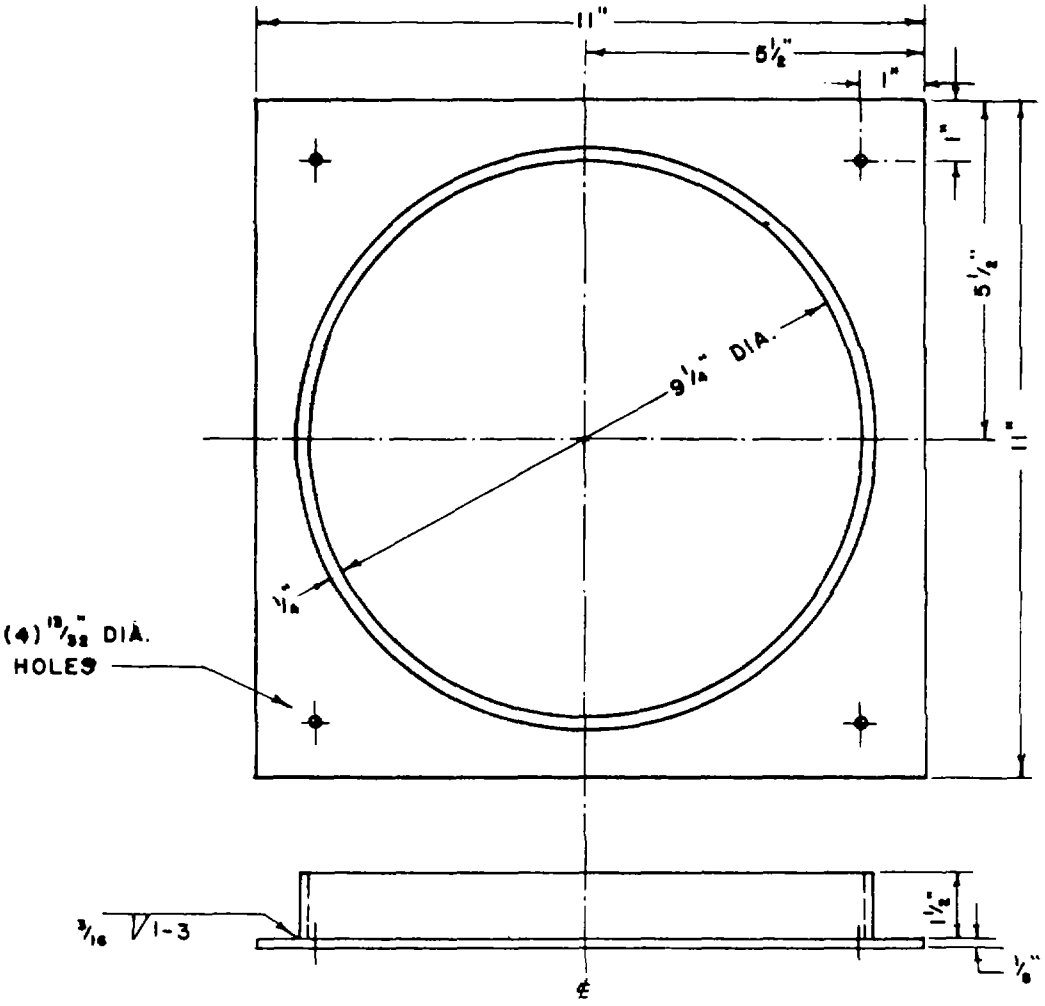


Figure 53. Cylinder mounting assembly.



BASE PLATE ⅛" THICK STEEL

Figure 54. Base plate.

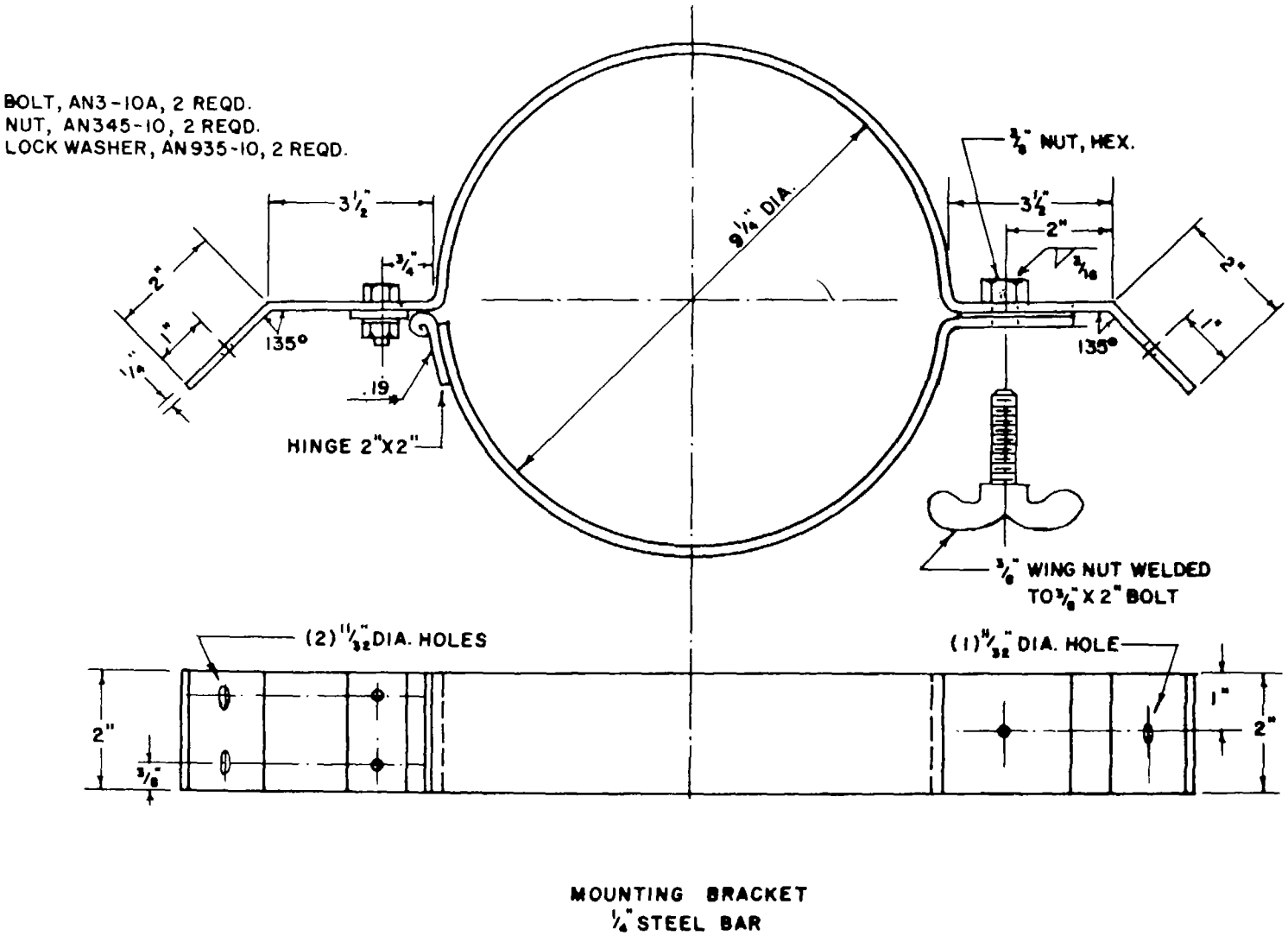


Figure 55. Mounting bracket.

n. Welder, Oven, and Refrigerator. These items are not mounted, but stored inside the shop (fig. 16).

o. Bench tops. Bench tops are mounted on the top of the storage cabinets. Lag screws are installed to mount the bench tops as shown in figure 56. Additional security of the bench tops is obtained when bench mounted equipment is installed as the mounting bolts for the equipment pass through the bench top and the top of the storage cabinet (figs. 25-28).

p. Cabinets, Storage. Storage cabinets are floor mounted and bolted together when adjacent. Typical mounting details are shown in figures 57 and 58.

q. Chain Guard Railing. Refer to TM 92330-238-14. The chain guard railing is in stalled on the outer edges of the folding shop doors when doors are in the down position. Installation of the chain guard railing is shown in TM 9-2330-238-14 and figure 23.

r. Ventilation. The shop is provided with adequate ventilation facilities for normal operating conditions. Ducts, vents, and ventilating equipment should be checked periodically for cracks, dents, obstructions, and functioning of equipment. When the equipment is operated in extreme hot weather, ventilation equipment should be inspected as often as practical to insure proper operation of the equipment and the operator's comfort. Details of ventilation facilities are shown in TM 9-2330-238-14.

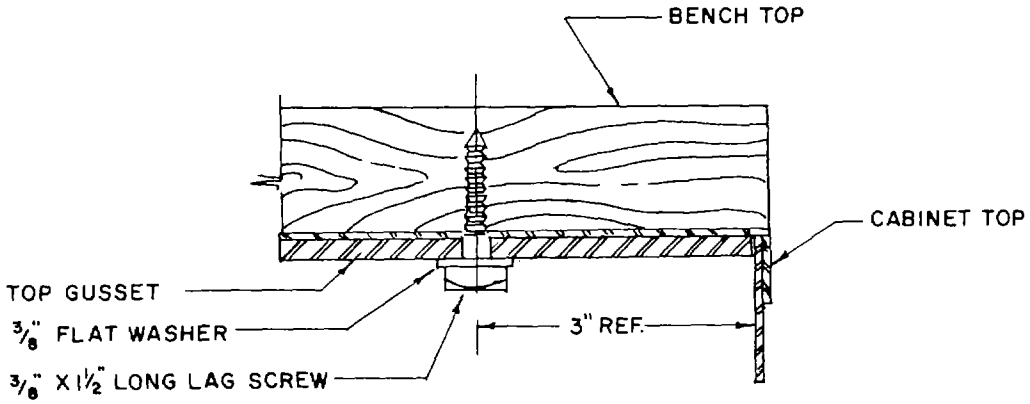


Figure 56. Bench top mounting, typical installation.

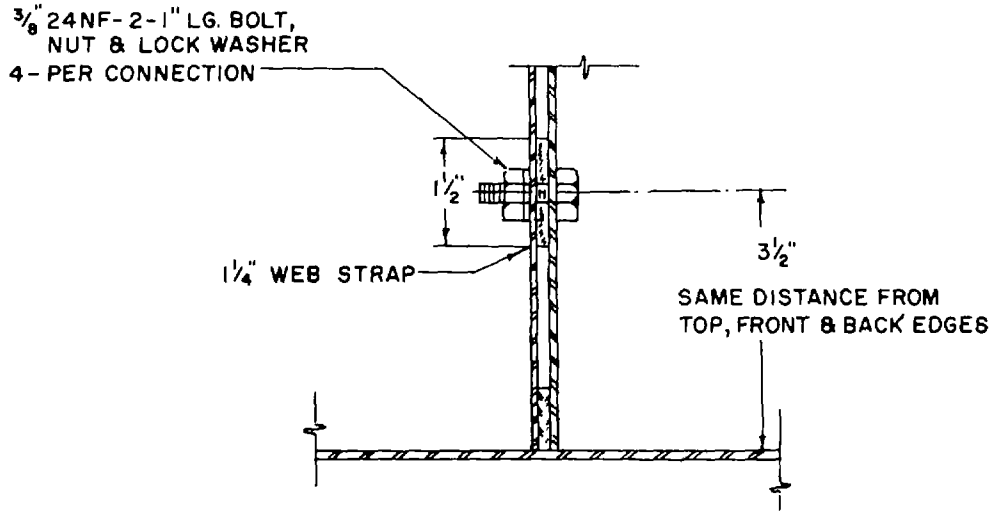


Figure 57. Mounting adjacent cabinets.

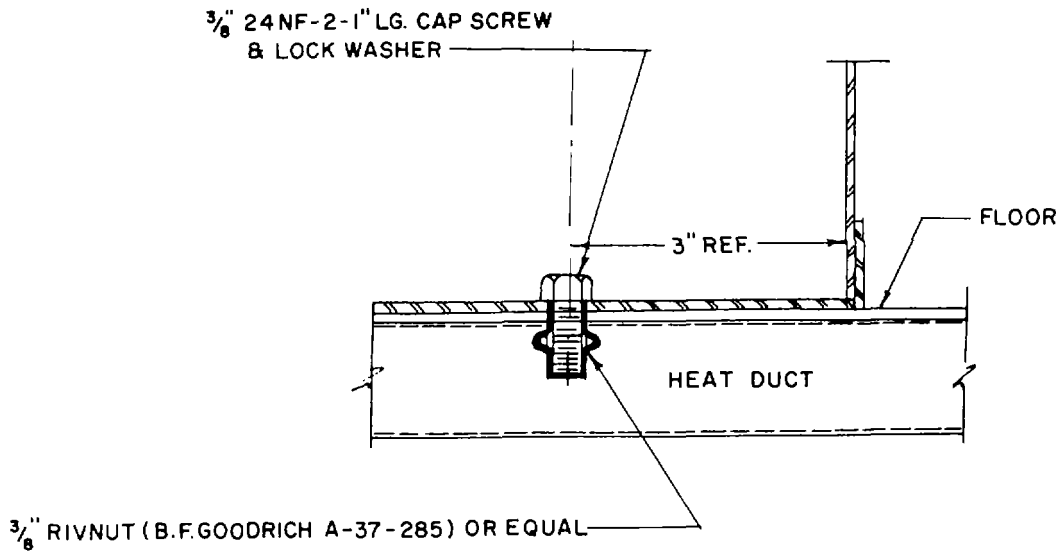


Figure 58. Cabinet mounting, floor.

Section II. CONTROLS AND INSTRUMENTS

126. General

This section describes, locates, illustrates, and furnishes the operator information pertaining to the various controls or instruments provided for the proper operation of the equipment.

127. Electric Controls and Instruments

Refer to paragraphs 8 through 10.

128. Pneumatic Controls and Instruments

Refer to paragraphs 8 through 10.

CHAPTER 9
MAINTENANCE INSTRUCTIONS (FIELD AND DEPOT MAINTENANCE)

Section I. SPECIAL FIELD AND DEPOT MAINTENANCE TOOLS AND EQUIPMENT

129. Special Tools and Equipment

Special tools or equipment are not required for field and depot maintenance of the shop set as a unit. Special tools and equipment required for field and depot maintenance of individual items of equipment are listed in the technical manual for the item.

130. Replacement or Repair Parts

Replacement or repair parts required for field and depot maintenance of the shop set are listed in chapter 8 and in this chapter.

Section II. LUBRICATION

131. Normal Lubrication Instructions

Lubrication instructions for the shop set are contained in the lubrication order for the item of equipment and in paragraphs 29, 30, 82, and 83.

132. Special Lubrication Instructions

Refer to paragraphs 18 through 26 and 73 through 79 for special lubrication requirements under unusual conditions.

Section III. PREVENTIVE MAINTENANCE SERVICE

133. General

Preventive maintenance services to be performed by field and depot maintenance personnel consists of lubrication, preservation, painting, anodizing, alodizing. and application of rust preventive compounds prior to shipment of an assembled shop set to the using organization.

134. Preventive Maintenance Service at Time of Major Repair

When a shop set is returned to field or depot maintenance for major repair, preventive maintenance services performed at time of shipment to the using organization should be repeated as necessary to insure the efficient operation of the shop in the field.

135. Cabinets, Storage, Type I, Type II, and Type III

a. Repair. Fabrication and assembly of components which may be required for repair and replacement are shown in figures 59 through 79. These components will be fabricated in accordance with these figures when required.

b. Disassembly. Disassemble in reverse order of assembly.

c. Inspection. Inspect cabinet for sticking drawers, bent or distorted panels, sharp edges, security of assembled details, condition, and wear. Repair or replace components as necessary.

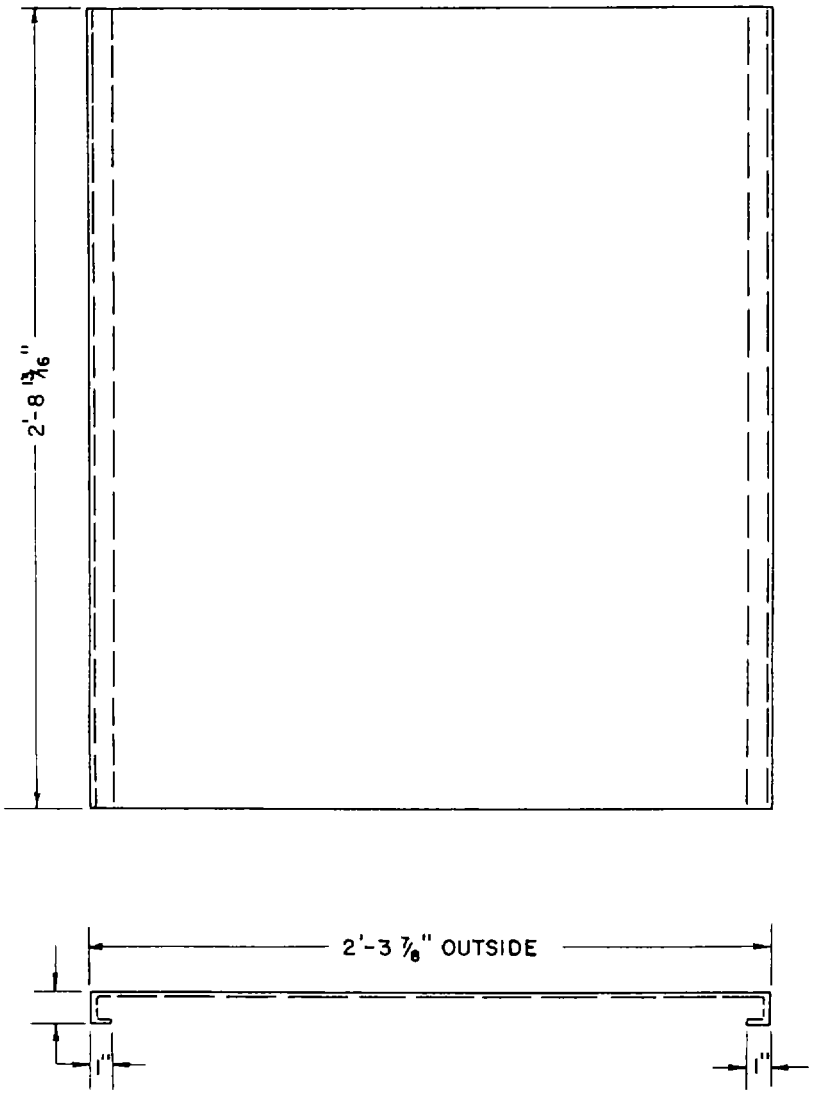


Figure 59. Typical cabinet side, type I.

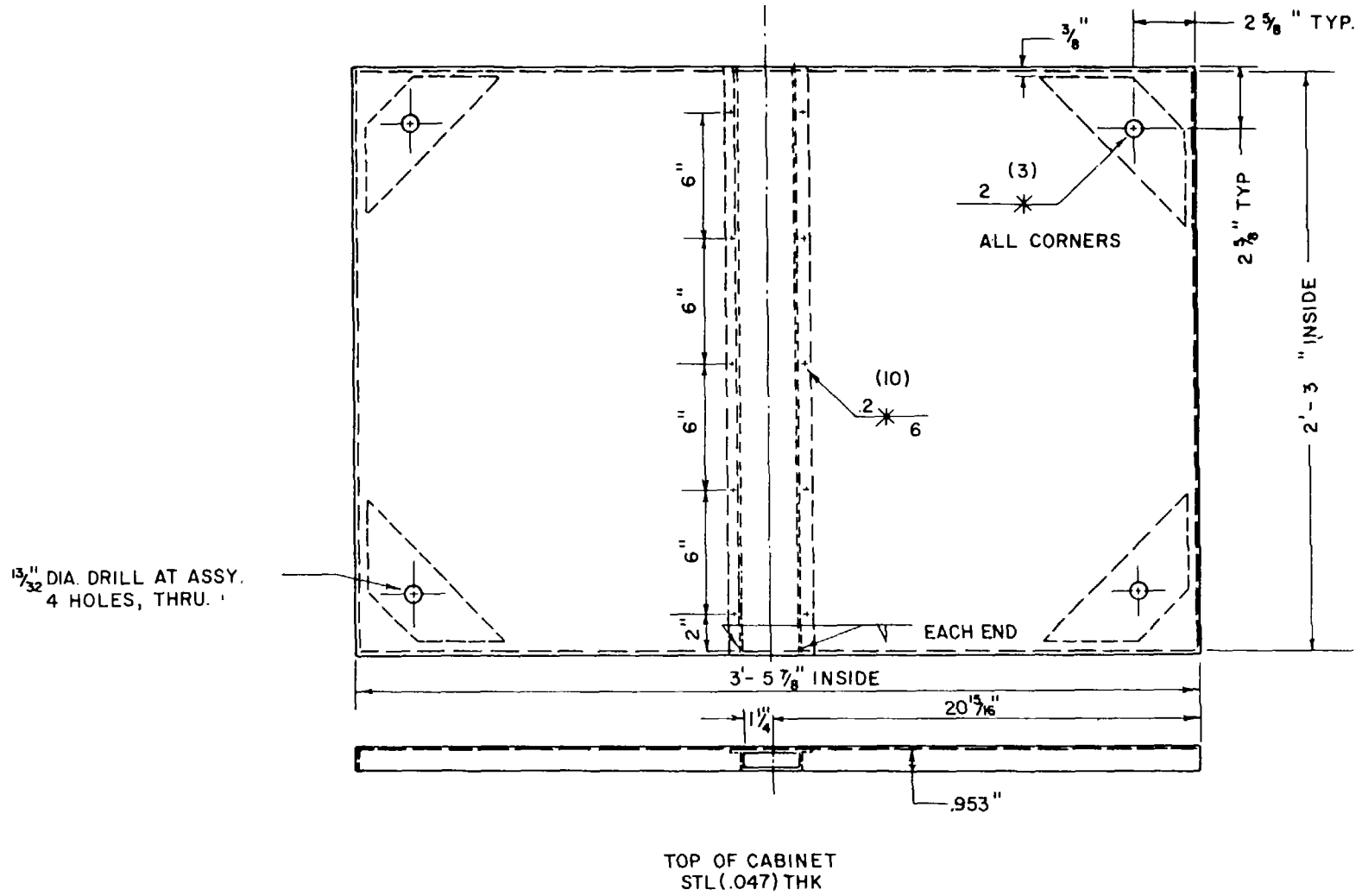


Figure 60. Typical cabinet top, type I.

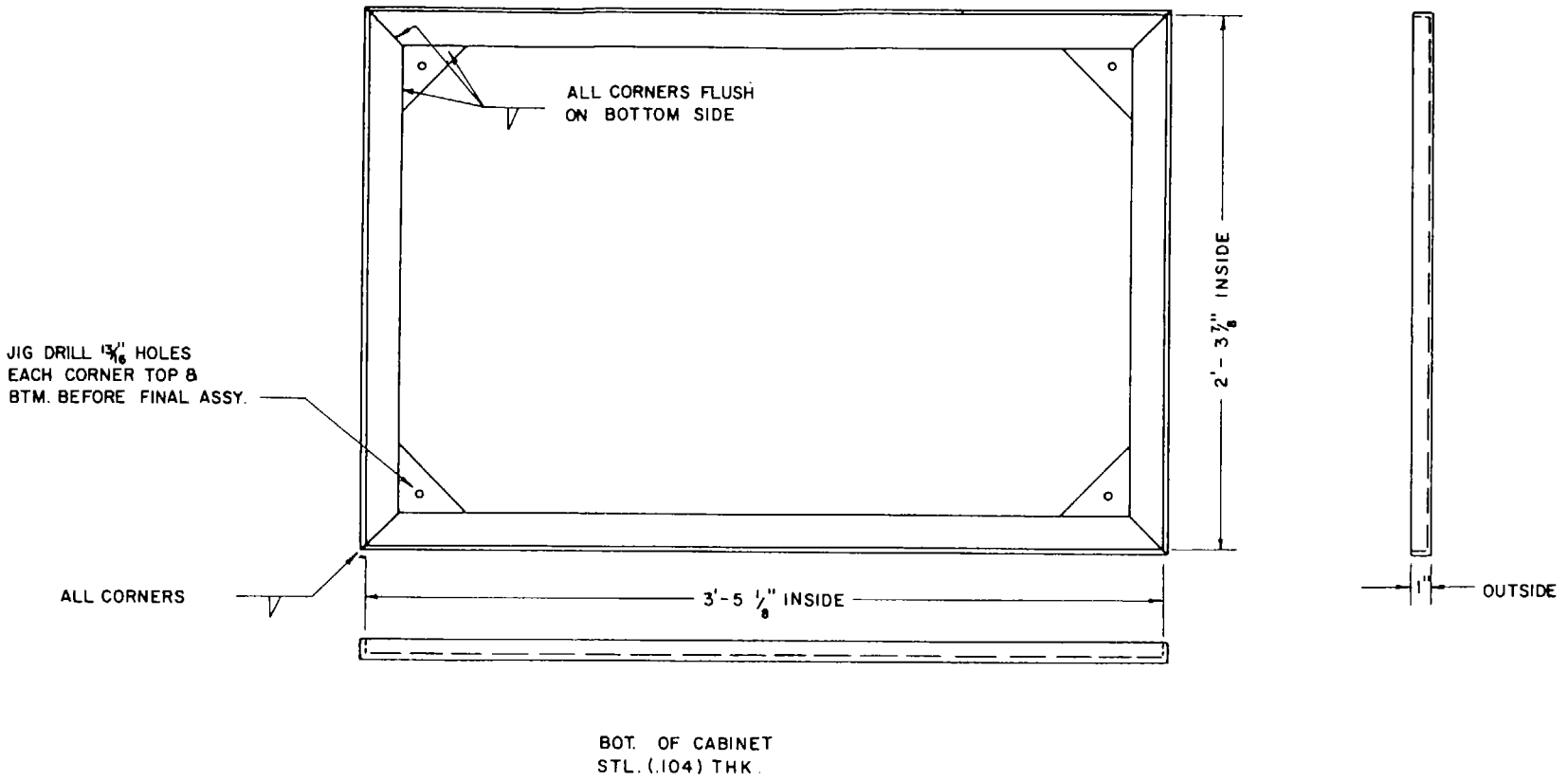


Figure 61. Typical cabinet bottom, type 1.

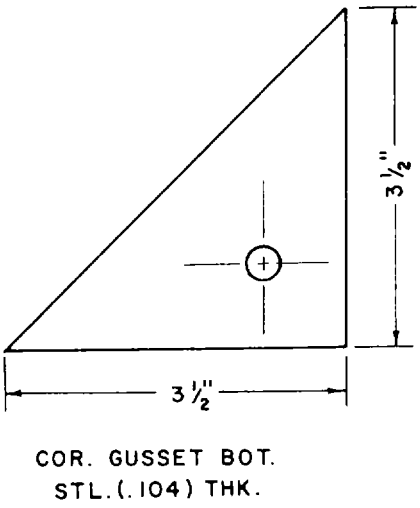


Figure 62. Typical cabinet bottom corner gusset, type I.

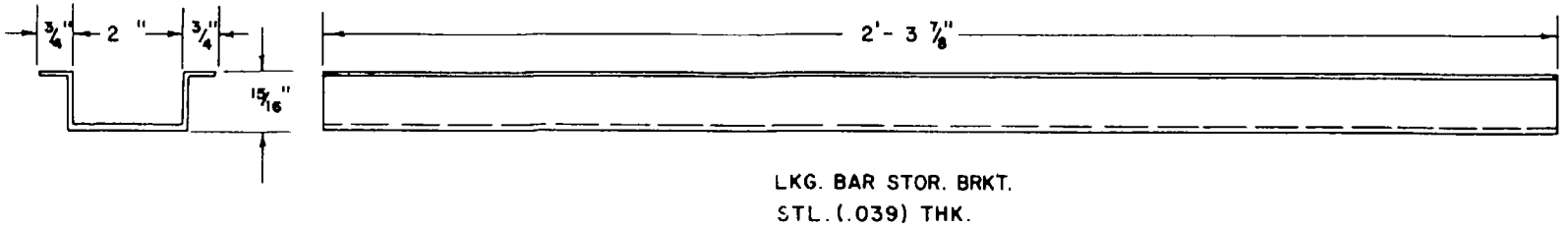


Figure 63. Typical locking bar storage bracket, type I.

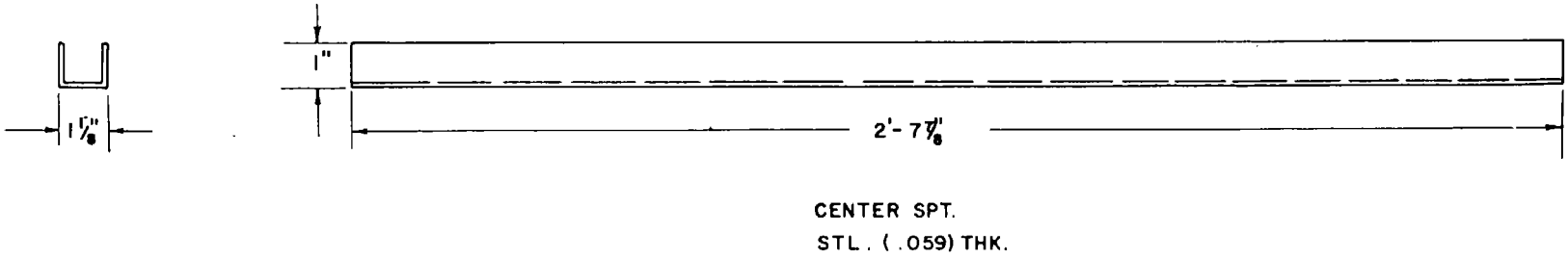


Figure 63. Typical cabinet support, type I.

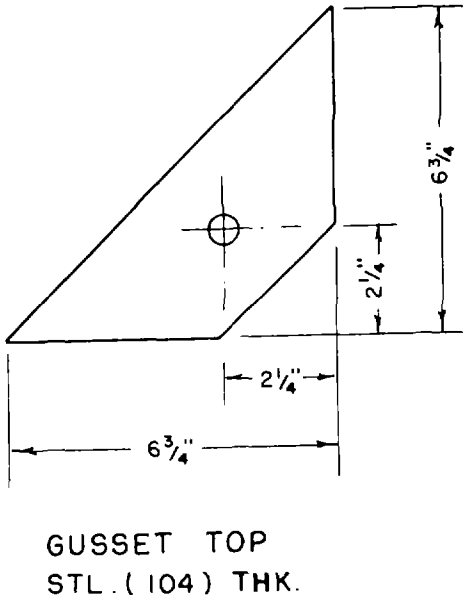
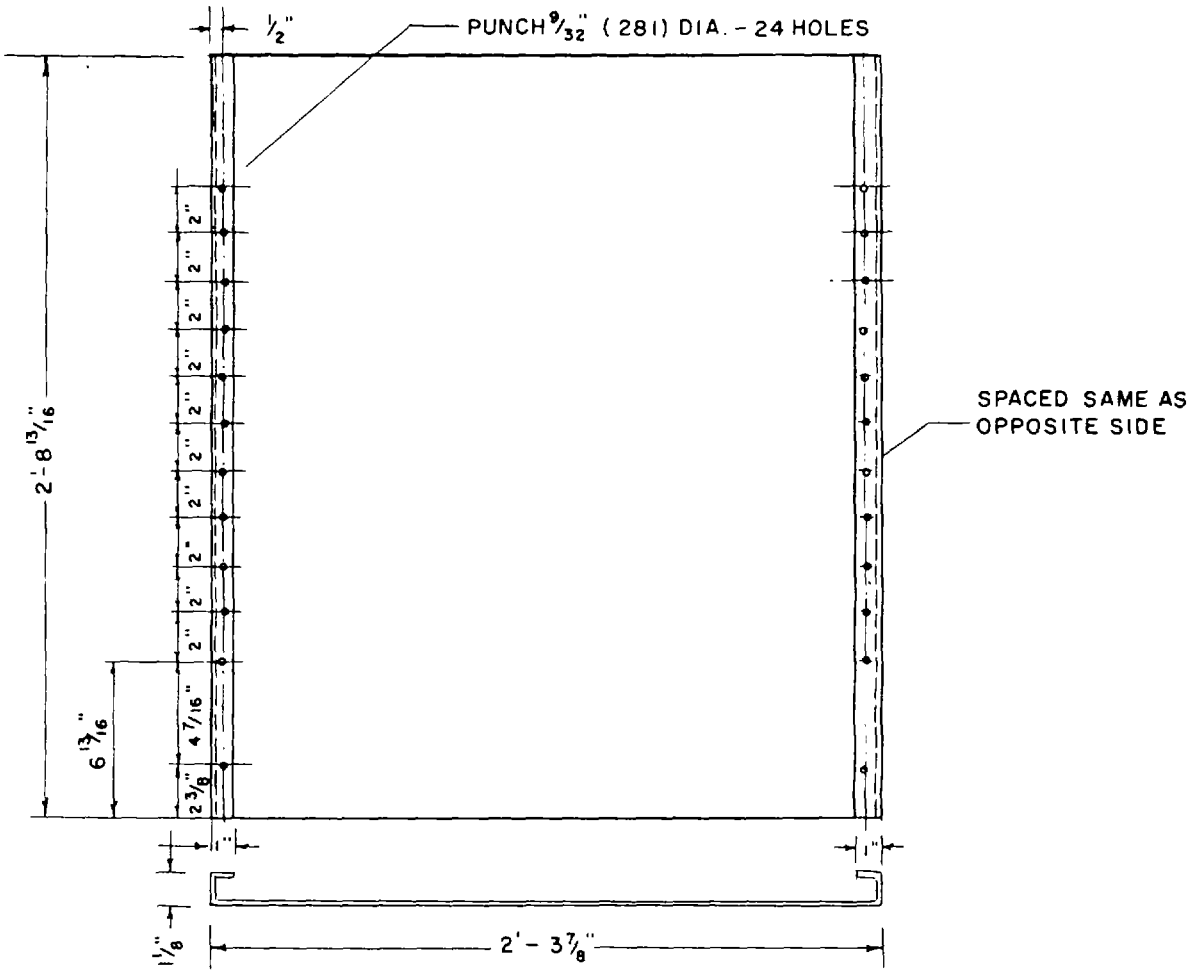
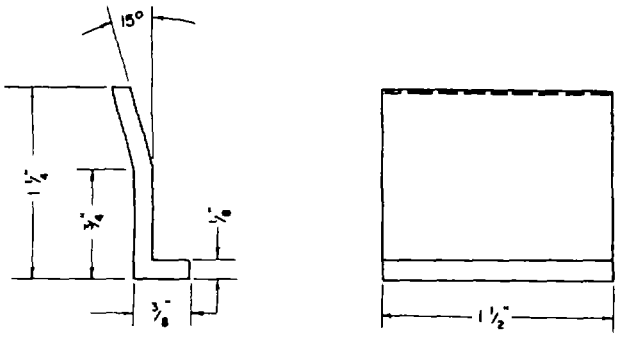


Figure 65. Typical cabinet top gusset, type I.



SIDE OF CABINET STL. (047) THK.

Figure 66. Typical cabinet side, type II



GUARD SUPPORT STL.

Figure 67. Typical guard support, type II.

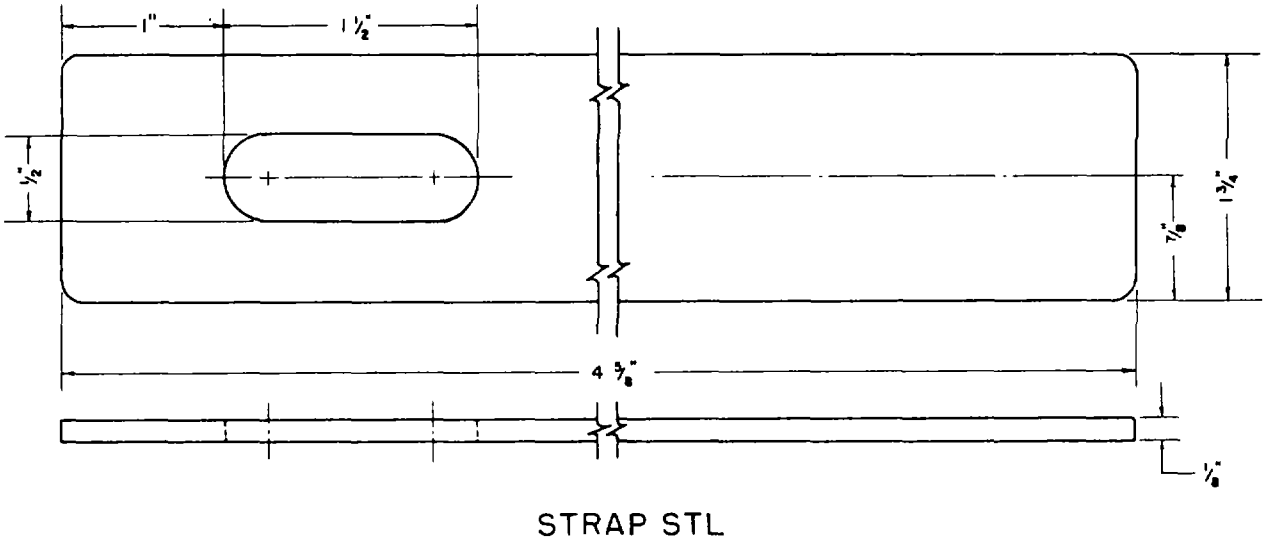


Figure 68. Typical cabinet steel strap, type II.

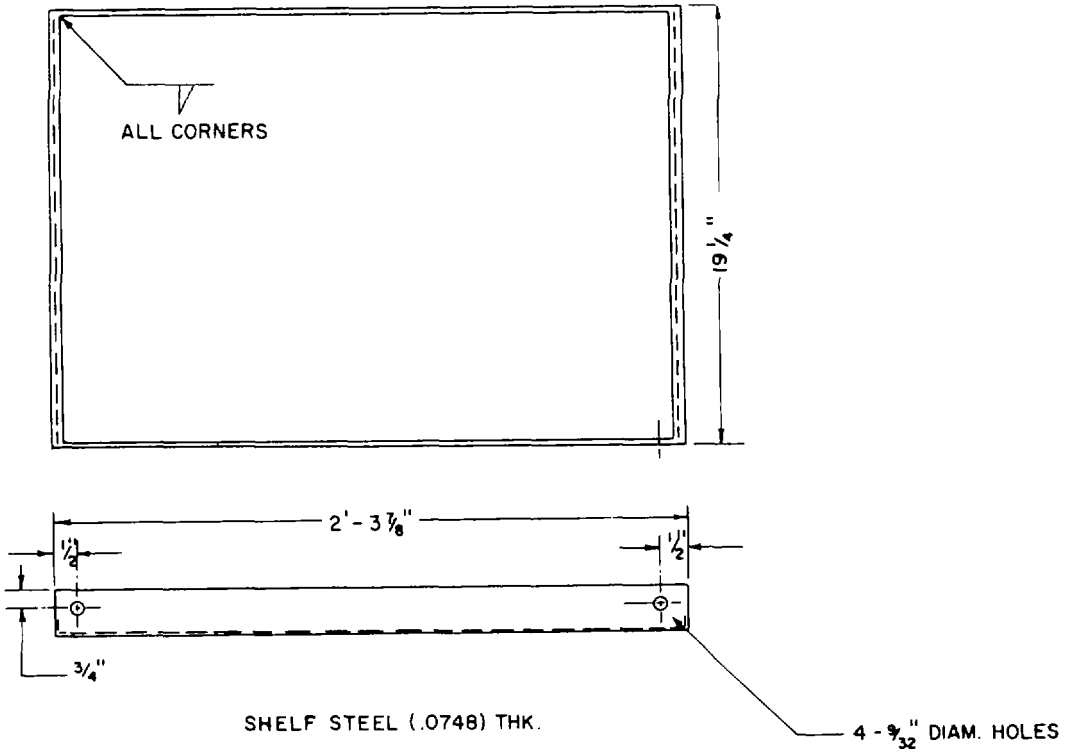


Figure 69. Typical cabinet steel shelf, type II, top view.

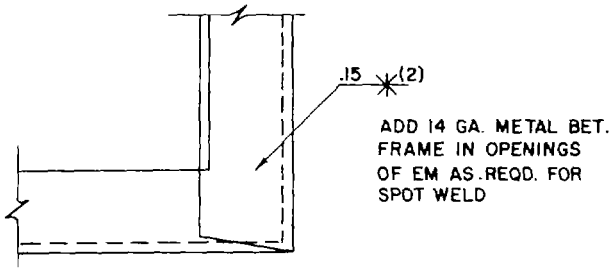


Figure 70. Typical cabinet steel shelf,

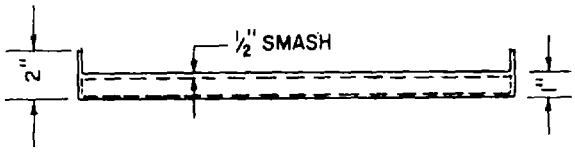
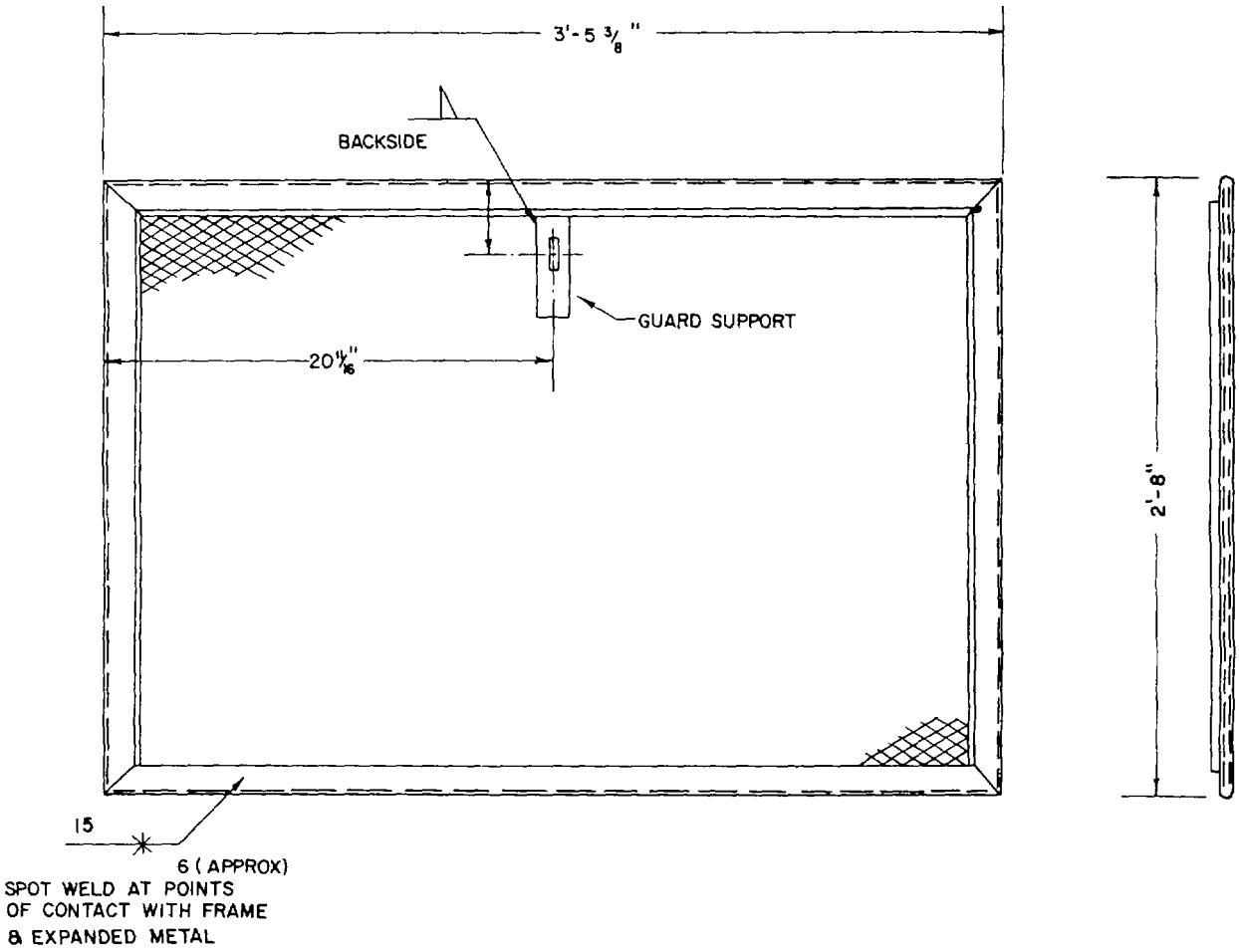


Figure 71. Typical cabinet steel shelf, end view.



GUARD OPEN BIN STOR.

Figure 72. Typical cabinet steel guard, type 1l.

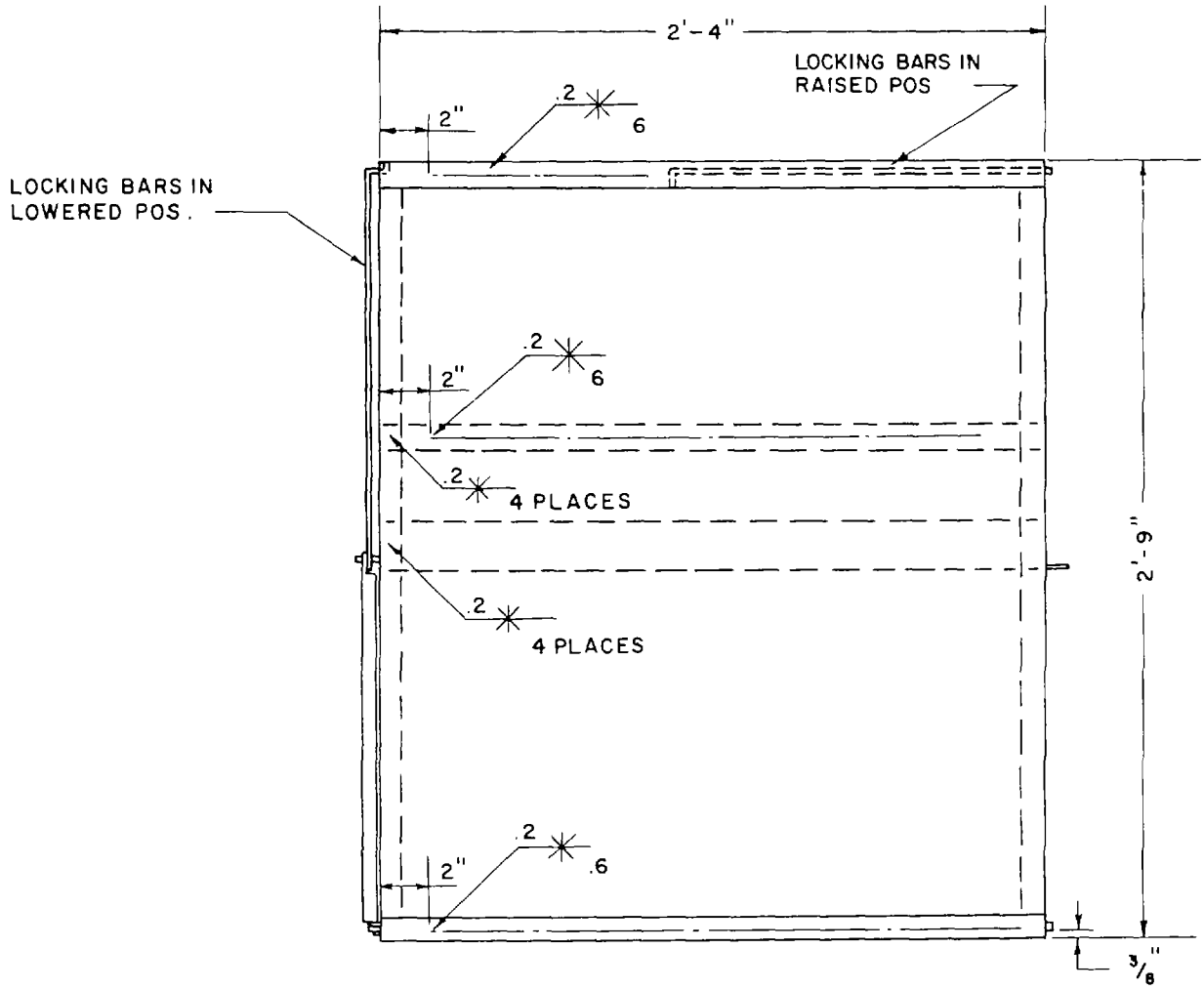


Figure 73. Typical cabinet side, type III.

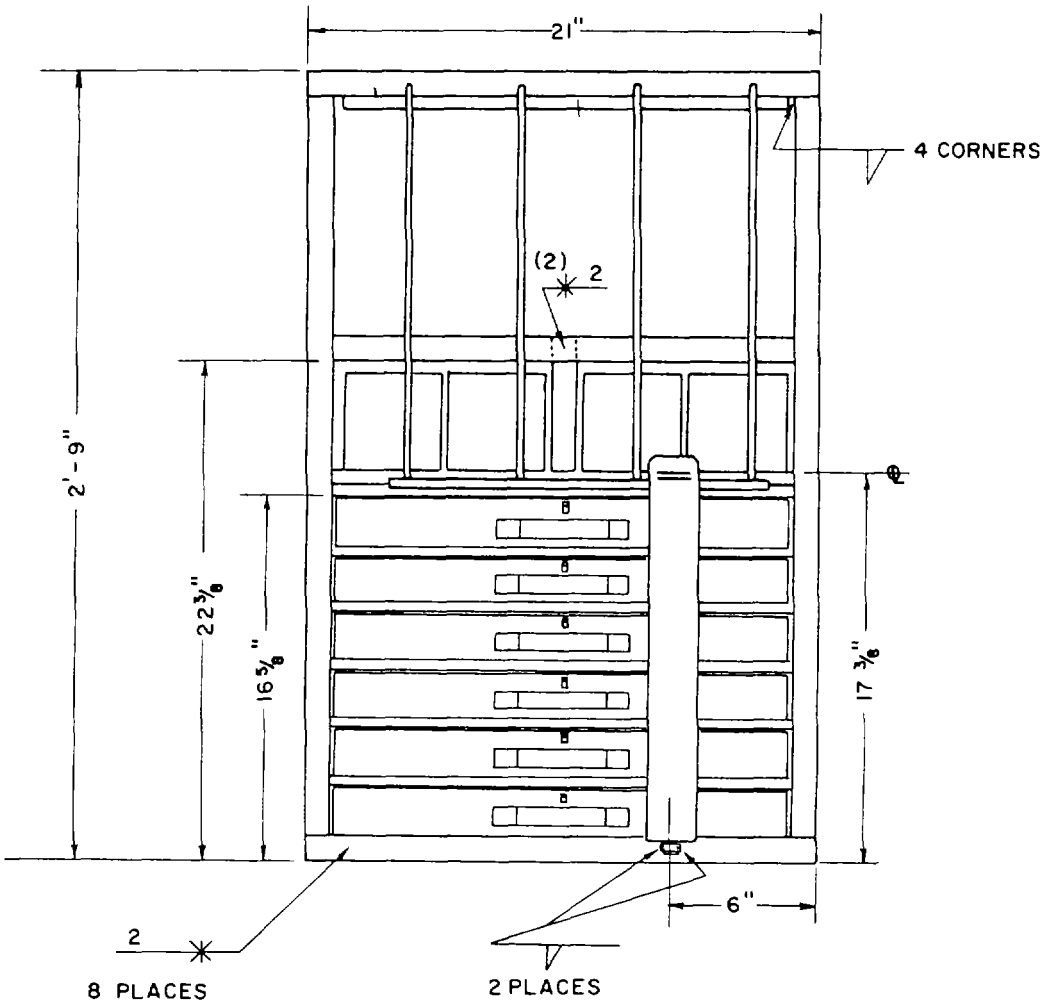


Figure 74. Front view, cabinet, type III.

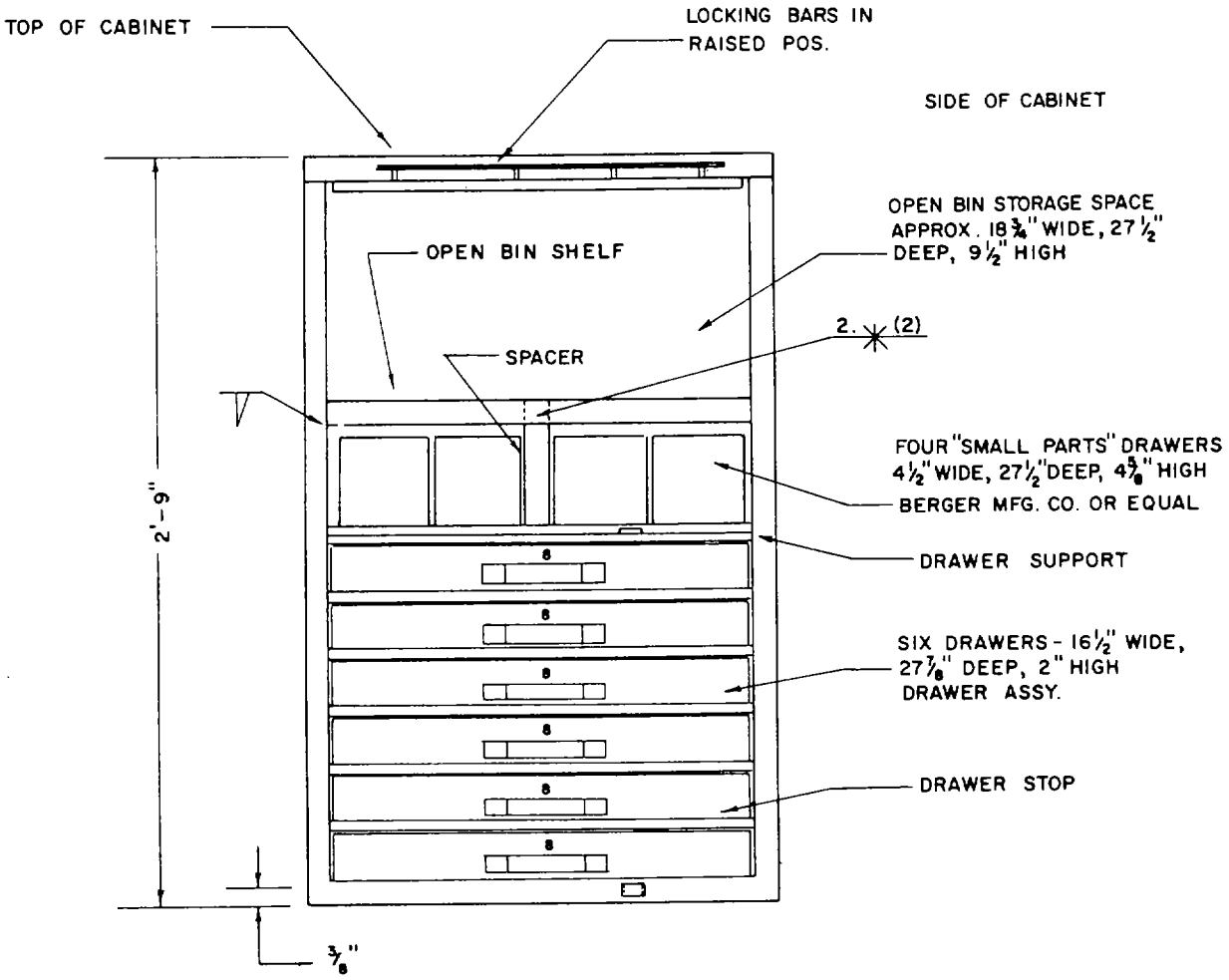


Figure 75. Rear view, cabinet, type III.

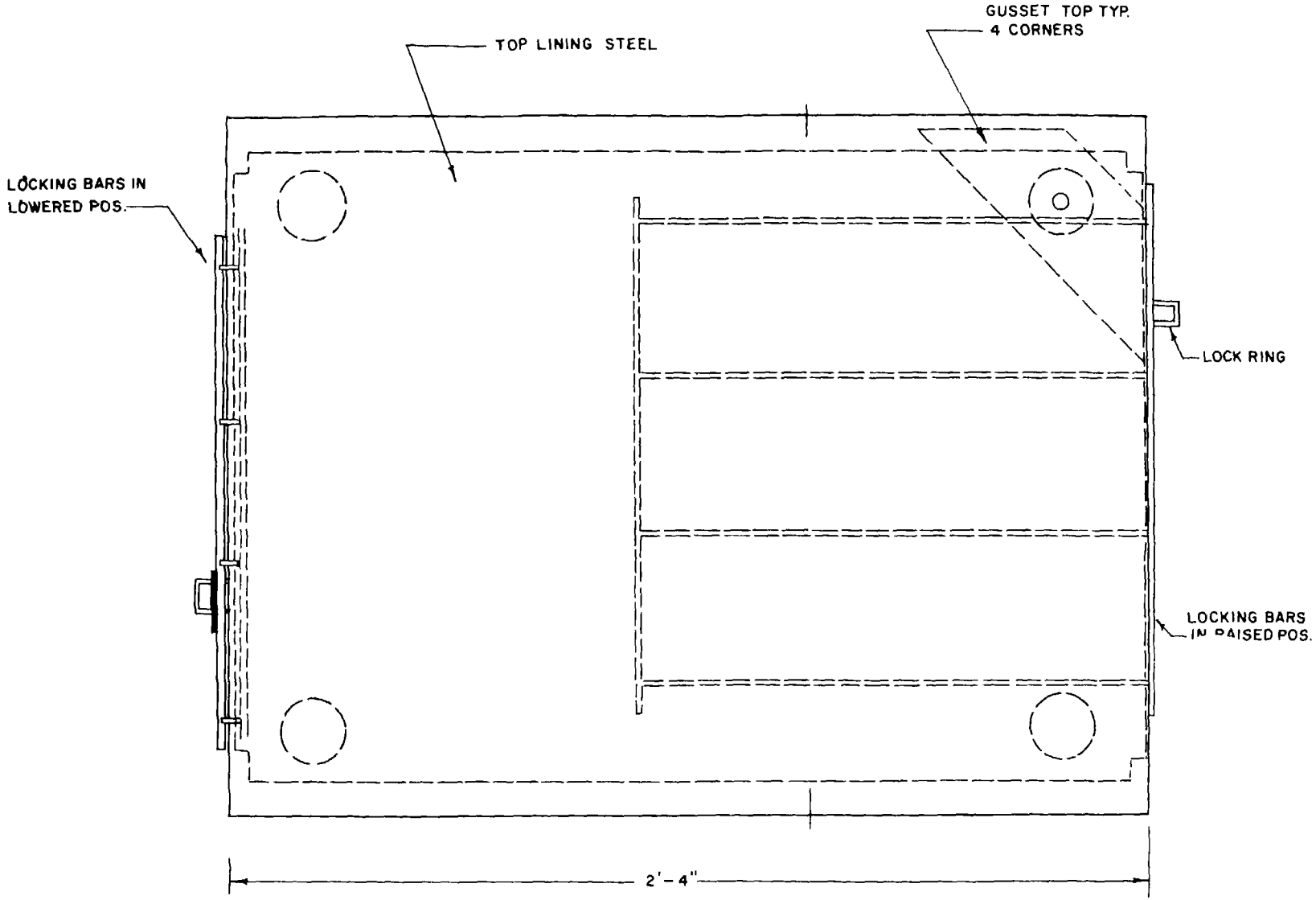


Figure 76. Top view, cabinet, type III.

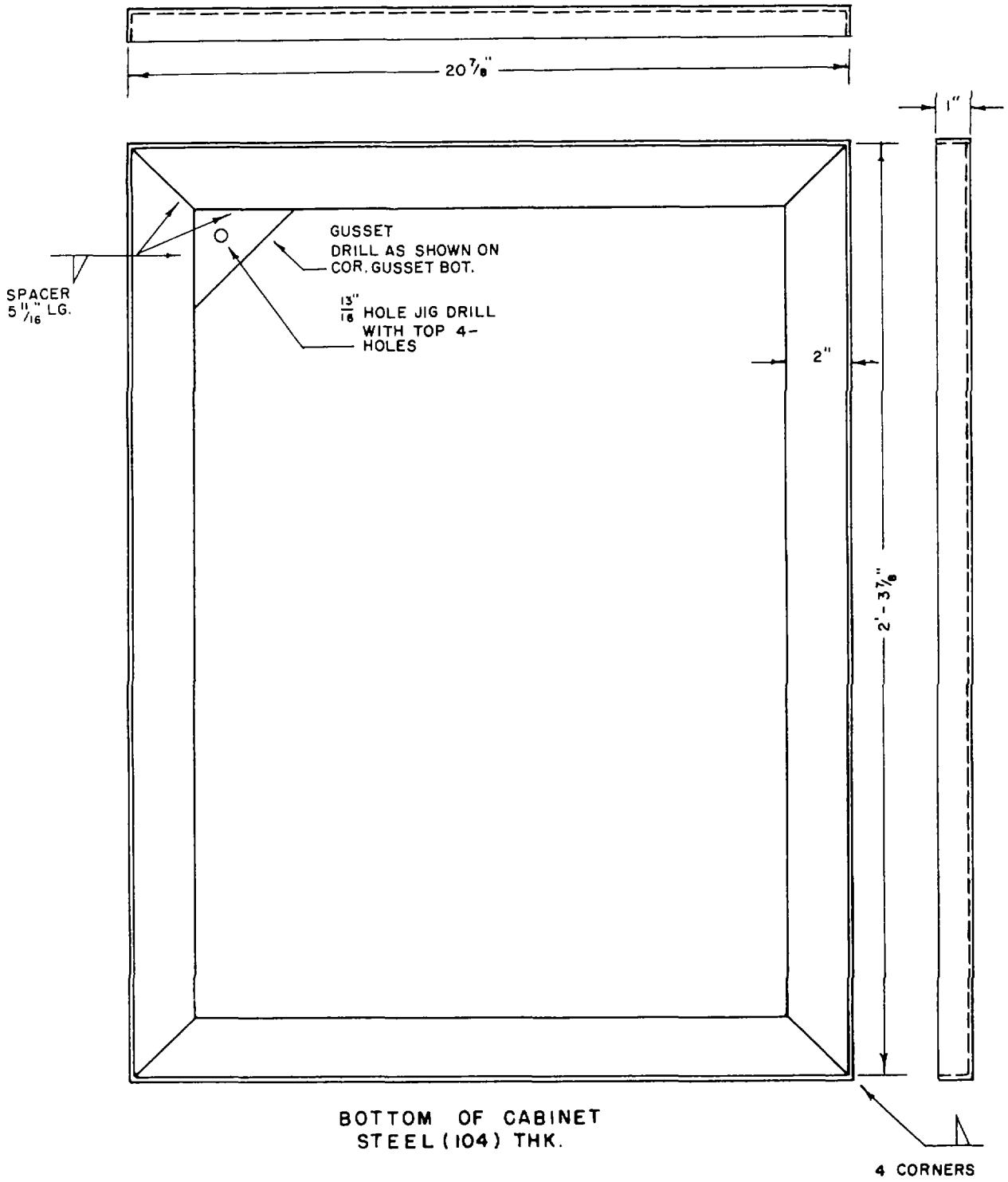


Figure 77. Bottom view cabinet, type III.

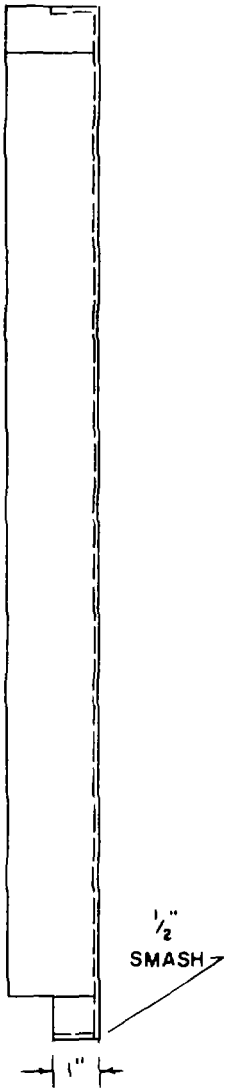


Figure 78. Open bin shelf, type III, front view.

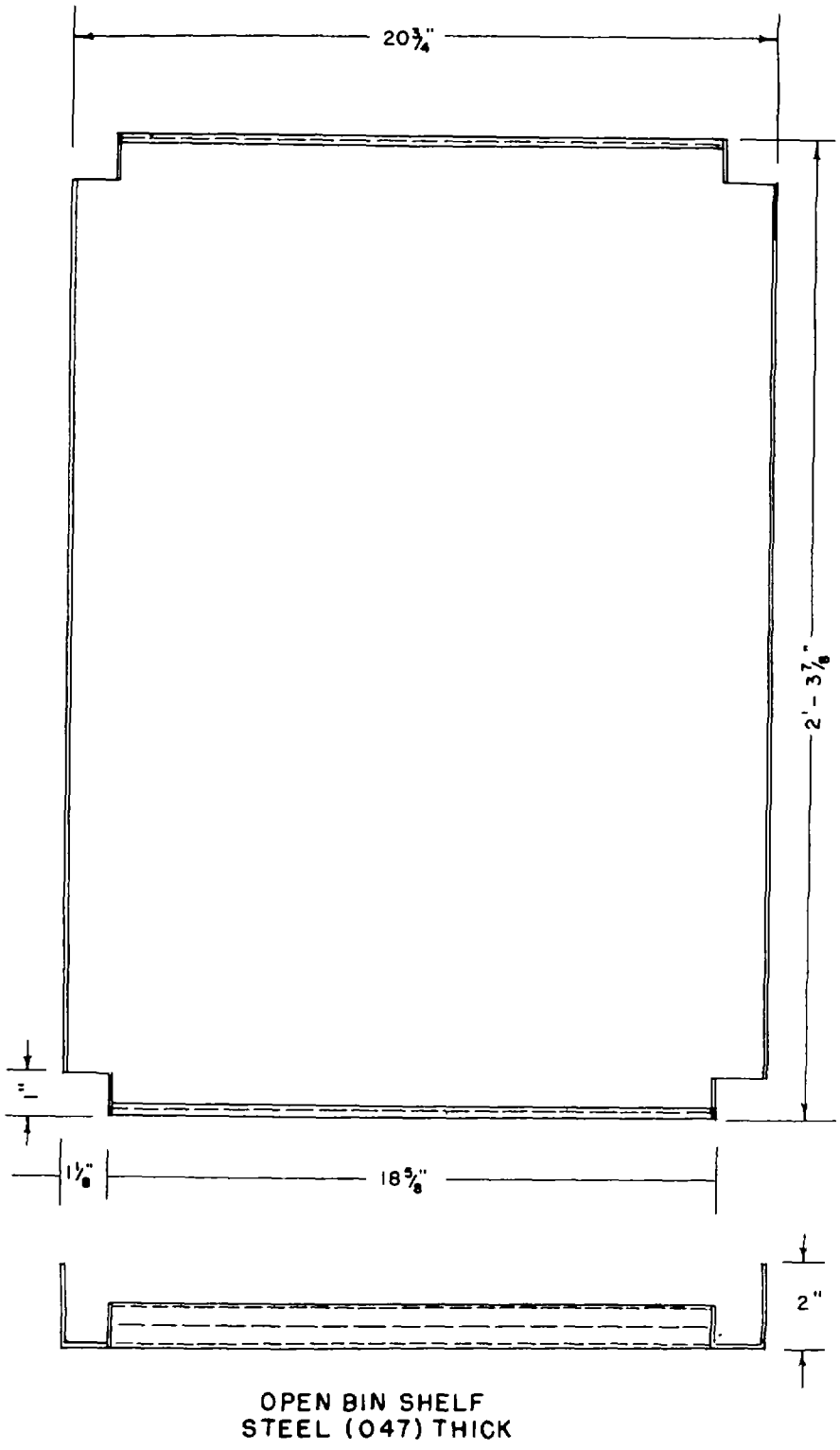


Figure 79. Open bin shelf, type 111, top and side view.

136. Bench Top, Size A, C, and D

a. Repair. Fabrication and assembly of components which may be required for repair and replacement will be an "as required" basis.

b. Inspection. Inspect for nicks, scratches, gouges, condition, and wear. Repair or replace as necessary.

Section IV. TROUBLESHOOTING

137. General

This section contains troubleshooting information useful to field and depot maintenance personnel in diagnosing and correcting unsatisfactory operation or failure of the shop set or any of its components.

138. Procedure

Troubleshooting is a systematic isolation of defective components by means of an analysis of the shop set trouble symptoms, testing, to determine the defective component, and applying the remedy. To correct malfunctioning of equipment, the probable cause should be systematically isolated in accordance with instructions in the following paragraphs.

139. Electrical Equipment Operates at Slow or Reduced Speed

Probable cause	*Possible remedy*
Internal break in conductor inside conduit.	Remove wire from conduit; splice or replace.
Improper grounding.	Inspect for corrosion at ground connections-repair or replace as necessary.
Contact points of circuit breaker dirty or corroded.	Clean points, reinstall circuit breaker.
Improper connections in control panel.	Check control panel; reposition leads (fig. 8).

141. Electrical Equipment Will Not Start

Probable cause	*Possible remedy*
External power receptacle inoperative.	Replace receptacle.
Power cord broken.	Repair or replace power cord.
Circuit breakers burned out.	Replace circuit breakers.
Safety disconnect switch contacts corroded.	Clean contacts.

142. Pneumatic Equipment Operates at Slow or Reduced Speed

Probable cause	*Possible remedy*
Partial stoppage in air lines or hose.	Remove obstruction from air line or hose.
Damaged air line	Replace air line. Controls stuck Repair or replace controls.

143. Pneumatic Equipment Stops During Operation

Probable cause	*Possible remedy*
Obstruction in air lines.	Remove obstruction.
Broken air lines.	Replace line.

144. Pneumatic Equipment Will Not Start

Probable cause	*Possible remedy*
Power source not functioning correctly.	Refer to power source technical manual for procedure.
Check valves inoperative	Repair or replace check valves.
Controls stuck.	Repair or replace controls.

145. Excessive Vibration of Equipment

Probable cause	Possible remedy
Broken mountings	Replace mountings.
Equipment improperly mounted.	Remount equipment correctly.

146. Excessive Noise

Probable cause	Possible remedy
Mounting not secure.	Reposition and secure mounts.
Equipment assembled improperly.	Reassembly equipment correctly.

Section V. ELECTRICAL SYSTEM

147. General

Refer to paragraphs 98 through 102 for a detailed description of the electrical system.

148. Electrical Wiring Installation

Field and depot maintenance personnel are responsible for performing tests and correcting discrepancies in the

electrical wiring system as authorized by appendix II. Refer to paragraphs 137 through 146 for procedures. Detailed description of electrical wiring system is listed in paragraphs 98 through 102 and figure 8.

149. Electrical Switches and Circuit Breakers

Refer to paragraphs 98 through 102 for description of circuit breakers and switches. Field and depot maintenance personnels responsibilities consist of testing or replacing switches and circuit breakers in accordance with appendix II. Refer to paragraphs 147 through 151 for procedures.

150. Lighting System

Refer to paragraphs 98 through 102 for a description of the lighting system. Field and depot maintenance personnel's responsibilities consist of testing or replacing defective components of the lighting system in accordance with Appendix II and TM9-2330-238-14.

151. Controls and Instruments

Field and depot maintenance of controls and instruments consist of mounting and testing in accordance with the applicable technical manual.

Section VI. PNEUMATIC SYSTEM

152. General

A description of the pneumatic system is contained in paragraphs 103 through 105.

153. Lines and Hose

Field and depot maintenance of air lines and hose consists of mounting testing repair, and replacement.

154. Controls and Instruments

Field and depot maintenance of controls and instruments consist of mounting and testing in accordance with the applicable technical manual.

Section VII. UTILITY SYSTEM

155. General

Field and depot maintenance responsibilities for the utility system are listed in paragraphs 103 through 146.

156. Parts List

Repair or replacement parts for the utility system are listed in figures 59 through 79.

Table I. Operator Daily Service

Intervals				
Before operation	During operation	At halt	After operation	Procedure
X		X	X	USUAL CON-DITIONS VISUAL inspection of equipment. Inspect for condition, security and wear.
			X	Cleaning of equipment. Wipe dirt, oil, rust, corrosion,

Table I. Operator Daily Service--Continued

Intervals				
Before operation	During operation	At halt	After operation	Procedure
				and debris from equipment. Refer to paragraphs 31 through 34, for cleaning instructions.
X	--	X	X	Operating units. Check all units for correct assembly and loose mounting. Adjust as necessary.
X	--	--	X	Power supplies. Check for loose power supply connections; check for frayed or cracked insulation.
				Operation. While equipment is operating, check for unusual sounds, vibrations, or malfunction.
	X	--	--	

Table I. Operator Daily Service-Continued

Intervals				
Before operation	During operation	At halt	After operation	Procedure
X	--	--	X	
X	X	X		Lubricate in accordance with paragraphs 29 and 30.
X	X	X		
X	--	X		UNIUSUAL CONDITIONS
				Extreme cold (par. 20).
			X	Extreme heat (par. 21).
				Extreme wet (par. 22).

Table 1. Operator Daily Service-Continued

Intervals				
Before operation	During operation	At halt	After operation	Procedure
				UNUSUAL
X	X	X	X	Snow and ice (par. 23).
X	--	X	X	Salt water (par. 24).
X	--	X	X	Dust (par. 25).
X	X	X	X	High altitude (par. 26).

Table II. Preventive Maintenance Services
1. Electrical System

Item Inspected	Inspect for	Service required	Interval weekly	Interval Monthly
WIRING AND POWER CORDS	Cracked protective covers	Wrap cracked areas with electrical tape or replace as required	X	
	Loose connections	Tighten screws, replace connections	X	
	Damaged plugs	Replace plugs	X	
Loose Wires		Return wire to proper position	X	
	Frayed wiring	Wrap with electrical tape or replace as required		X
	Deterioration	Remove deteriorated sections, splice and wrap with electrical tape		X
	Broken conductors	Splice; wrap splices with electrical tape	X	
CIRCUIT BREAKERS, SAFETY SWITCHES, RECEPTACLES.	Condition	Replace broken knobs, handles, covers, missing screws; etc.	X	
	Security	Tighten clamps, screws, knobs, and covers	X	
	Damage	Replace if major damage, repair minor damage		X
	Operation	Operate breakers, repair or replace as necessary. ...		
		Operate switches; repair or replace as necessary. Check receptacle with equipment cords plugged in; repair or replace inoperative receptacles.....	X	
LAMPS	Inoperative tubes and bulbs; inoperative starters.	Replace	X	
	Inoperative "ON", "OFF" switches	Replace	X	

Table II. Preventive Maintenance Services--Continued.
2. Pneumatic System

Item inspected	Inspect for	Services required	Intervals	
			Weekly	Monthly
Lines and hose	Leaks	Tighten or replace fittings, hose, or lines	X	
	Security	Tighten mounting clamps or install new clamps		X
	Damage	Repair or replace damaged sections		X
QUICK DISCONNECT FITTINGS.	Leaks	Replace seals, seats, or fittings as necessary	X	
	Ease of operation	Replace plugs		X
CONTROLS	Sticking and binding	Lubricate, repair or replace as necessary	X	
	Leaks	Replace packing rings	X	
	Damage	Repair or replace as necessary	X	
INSTRUMENTS.	Cracked dail covers	Replace		X
	Accuracy	Remove for repair or calibration	X	
	Damage	Repair or replace as necessary		X

Table II. Preventive Maintenance Services--Continued
3. Utility System

Item inspected	Inspect for	Services required	Intervals	
			Weekly	Monthly
STORAGE CABINET DRAWERS.	Sticking, binding and distortion	Lubricate (pars. 90 and 91), aline or straighten as necessary		X
STORAGE CABINET HINGE POINTS.	Alinement, ease of operation, and condition	Aline hinges, lubricate (pars. 82 and 83), or replace as necessary		X
STORAGE CABINET EXTERIORS.	Corrosion, rust chipped, or peeling paint	Remove corrosion and rust (par. 29 and 30), touch up or repaint as necessary		X
STORAGE CABINET LOCKING DEVICES.	Security, ease of operation, and alinement	Tighten bolts, re-aline, reposition, or replace as necessary		X
STORAGE CABINET MOUNTINGS.	Security	Tighten or replace mounting bolts as necessary		X

Table II. Prevention Maintenance Services--Continued.
3. Utility System--Continued

Item inspected	Inspect for	Services required	Intervals	
			Weekly	Monthly
BENCH TOP SURFACE.	Nicks, gouges, Scratches.....	Sand out, refinish (ch. 6).....		X
BENCH TOP MOUNTINGS.	Security	Tighten or replace screws or bolts as necessary.....		X

APPENDIX I
REFERENCES

1. Publication Indexes

Department of the Army pamphlets of the 310-series should be consulted frequently for the latest changes or revisions of references given in this appendix and new publications relating to the material covered in this manual.

2. Technical Manuals

TM 9-2330-238-14	Operators, Operation and Organizational and Field Maintenance Manual for Semitrailer, Van: Shop, 6-ton, 4-wheel, Folding Sides, M447.

3. Army Regulations

AR 700-38	Unsatisfactory Equipment Report.
AR 700-58	Report of Damaged Improper Shipment.
AR 750-6	Maintenance Planning, Allocation, and Coordination.
AR 385-series	Army Safety Policy.

4. Supply Manuals

SM 55-4-4920-S39	Shop Set, Aircraft Maintenance, Semitrailer Mounted, C-5, Welding.

5. Indexes and Forms

DA Pam 310-1	Index of Administrative Publications.
DA Pam 310-2	Index of Blank Forms.
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders and Modification Work Orders.
DA Pam 310-22	Index of Supply Manuals Transportation Corps.
DA Form 460	Preventive Maintenance Roster.
DA Form 468	Unsatisfactory Equipment Report.
DA Form 6	Report of Damaged or Improper Shipment.
DD Form 314	Preventive Maintenance Schedule and Record.

APPENDIX II
MAINTENANCE ALLOCATION

1. Purpose

The purpose of the maintenance allocation chart is to provide all activities with a description of maintenance functions to be performed at each echelon of maintenance.

2. Definitions of Terms

a. Service. To clean, to preserve, and to replenish fuel and lubricants.

b. Adjust. To regulate periodically to prevent malfunctions.

c. Inspect. To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

d. Test. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

e. Replace. To substitute serviceable assemblies, subassemblies, and parts for unserviceable components.

f. Repair. To restore to a serviceable condition by replacing unserviceable parts or by any other action required, utilizing tools, equipment, and skills available, to include welding, grinding, riveting, straighteninig, adjusting, etc.

g. Rebuild. To restore to a condition comparable to new by disassembling the item to determine the condition of each of its component parts and reassembling it using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

h. Minor Disassembly. That disassembly where only subassemblies are removed, not entire system, and replacement does not require alinement.

Maintenance Allocation Chart

Components and related operations	1st ech.	2d ech.	3d ech.	4th ech.	6th ech.	Spec. Tools Req'd	Remarks
ELECTRICAL							
CIRCUIT BREAKERS							
Service	X						
Adjust	X						
Inspect	X						
Test	--	X					
Replace	--	--	X*				
Repair	--	--	--	X			
Rebuild	--	--	--	--	X		
WIRING							
Service	X						
Test	--	X					only those items
Inspect	X						requiring minor
Replace	--	--	X*				disassembly.
Repair	--	--	X				
Rebuild	--	--	--	--	X		
PNEUMATIC							
AIR SUPPLY SYSTEM							
Service	X						
Adjust	X						
Inspect	X						
Test	--	X					
Replace	--	--	X*				
Repair	--	--	--	X			
Rebuild	--	--	--	--	X		
UTILITY							
CABINETS							
Service	X						
Adjust	X						
Inspect	X						
Replace	--	X					
Repair	--	--	X*				
Rebuild	--	--	--	X			

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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