

TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL
TANK, STEEL, VERTICAL, BORED, KNOCKDOWN, SEALED OPENINGS,
STANDARD BOTTOM AND ROOF, GASOLINE, OIL, OR WATER

(TYPE I - POL AND POTABLE WATER

TYPE II - POL AND NON-POTABLE WATER)

100 BARREL CAPACITY, TYPE I, FSN 5430-263-6076
TYPE II, FSN 5430-139-3778
250 BARREL CAPACITY, TYPE I, FSN 5430-263-6080
TYPE II, FSN 5430-138-1823
500 BARREL CAPACITY, TYPE I, FSN 5430-263-6077
TYPE II, FSN 5430-138-1822
1,000 BARREL CAPACITY, TYPE I, FSN 5430-263-6078
TYPE II, FSN 5430-138-1821
3,000 BARREL CAPACITY, TYPE I, FSN 5430-263-6075
TYPE II, FSN 5430-138-1820
10,000 BARREL CAPACITY, TYPE I, 5430-255-6073
TYPE II, FSN 5430-138-1824

HEADQUARTERS, DEPARTMENTS OF THE ARMY AND AIR FORCE
MAY, 1974

This copy is a reprint which includes current
pages from Changes 1 through 4.

TECHNICAL MANUAL
 No 5-5430-209-12
 TECHNICAL ORDER
 No 36Y31-1-101

HEADQUARTERS
 DEPARTMENTS OF THE ARMY
 AND THE AIR FORCE
 WASHINGTON, D.C., 15 May 1974

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

TANK, STEEL, VERTICAL, BOLTED, KNOCKDOWN,
 SEALED OPENINGS, STANDARD BOTTOM, AND ROOF,
 GASOLINE, OIL OR WATER

(TYPE I-POL AND POTABLE WATER

TYPE II-POL AND NON-POTABLE WATER)

100	BARREL CAPACITY,	TYPE I, TYPE II,	FSN 5430-263-6076 FSN 5430-139-3778
250	BARREL CAPACITY,	TYPE I, TYPE II,	FSN 5430-263-6080 FSN 5430-138-1823
500	BARREL CAPACITY,	TYPE I, TYPE II,	FSN 5430-263-6077 FSN 5430-138-1822
1,000	BARREL CAPACITY,	TYPE I, TYPE II,	FSN 5430-263-6078 FSN 5430-138-1821
3,000	BARREL CAPACITY,	TYPE I, TYPE II,	FSN 5430-263-6075 FSN 543-138-1820
10,000	BARREL CAPACITY,	TYPE I, TYPE II,	FSN 5430-255-6073 FSN 5430-138-1824

			Paragraph	Page
CHAPTER 1.	INTRODUCTION			
Section I.	General		1-1-1-6	1-1
Section II.	Description and data.....		1-7-1-9	1-1
CHAPTER 2.	MAINTENANCE INSTRUCTIONS			
Section I.	Tank site and soil test.....		2-1,2-2	2-1
Section II.	Tank foundation		2-3,2-4	2-1
Section III.	Inspecting and servicing the equipment.....		2-5-2-6	2-5
Section IV.	Tank erection precautions		2-7-2-9	2-5

*This manual supersedes TM 5-5430-209-12/TO 36Y31-1-101, 12 November 1970.

			Paragraph	Page
CHAPTER	3	ERECTION INSTRUCTIONS FOR THE 100-BARREL CAPACITY TANK		
Section	I.	Assembly and installation of tank bottom.....	3-1-3-5	3-1
	II.	Assembly and installation of side staves.....	3-6--3-9	3-6
	III.	Assembly and installation of center support ladder	3-10-3-12	3-16
	IV.	Assembly and installation of tank deck	3-13-3-16	3-17
	V.	Assembly and installation of tank accessories	3-17-3-22	3-21
	VI.	Tank testing and final assembly	3-23-3-28	3-26
	VII.	Identification of component items	3-29,3-30	3-29
CHAPTER	4	ERECTION INSTRUCTIONS FOR THE 250-BARREL CAPACITY TANK		
Section	I.	Assembly and installation of tank bottom.....	4-1-4-7	4-1
	II.	Assembly and installation of side staves.....	4-8-4-11	4-6
	III.	Assembly and installation of center support ladder	4-12,4-13	4-6
	IV.	Assembly and installation of tank deck	4-14-4-17	4-9
	V.	Assembly and installation of tank accessories	4-18-4-22	4-10
	VI.	Tank testing and final assembly	4-23-4-27	4-11
	VII.	Identification of component items	4-28,4-29	4-11
CHAPTER	5	ERECTION INSTRUCTIONS FOR THE 500-BARREL CAPACITY TANK		
Section	I.	Assembly and installation of tank bottom.....	5-1-5-7	5-1
	II.	Assembly and installation of side staves.....	5-8-5-11	5-1
	III.	Assembly and installation of center support ladder	5-12,5-13	5-2
	IV.	Assembly and installation of tank deck	5-14-5-17	5-2
	V.	Assembly and installation of tank accessories	5-18-5-22	5-3
	VI.	Tank testing and final assembly	5-23--27	5-3
	VII.	Identification of component items	5-28,5-29	5-4
CHAPTER	6	ERECTION INSTRUCTIONS FOR THE 1000-BARREL CAPACITY TANK		
Section	I.	Assembly and installation of tank bottom.....	6-1--6-7	6-1
	II.	Assembly and installation of side staves.....	6-8--6-11	6-4
	III.	Assembly and installation of tank center support assembly.....	6-12,6-13	6-7
	IV.	Assembly and installation of tank deck	6-14,6-15	6-12
	V.	Assembly and installation of tank accessories	6-16-6-20	6-20
	VI.	Tank testing and final assembly	6-21-6-25	6-24
	VII.	Identification of component items	6-26,6-27	6-25
CHAPTER	7	ERECTION INSTRUCTIONS FOR THE 3000-BARREL CAPACITY TANK		
Section	I.	Assembly and installation of tank bottom.....	7-1-7-6	7-1
	II.	Assembly and installation of side staves.....	7-7,7-8	7-1
	III.	Assembly and installation of tank center support assembly.....	7-9,7-10	7-3
	IV.	Assembly and installation of tank deck	7-11-7-13	7-5
	V.	Assembly and installation of tank accessories	7-14-7-19	7-5
	VI.	Tank testing and final assembly	7-20-7-24	7-8
	VII.	Identification of component items	7-25,7-26	7-8
CHAPTER	8	ERECTION INSTRUCTIONS FOR THE 10,000-BARREL CAPACITY TANK		
Section	I.	Assembly and installation of tank bottom.....	8-1--8-8	8-1
	II.	Assembly and installation of side staves.....	8-9-8-14	8-12
	III.	Assembly and installation of tank center support	8-15,8-16	8-22
	IV.	Assembly and installation of tank deck	8-17,8-18	8-28
	V.	Assembly and installation of tank accessories	8-19-8-24	8-36
	VI.	Tank testing and final assembly	8-25-8-29	8-39
	VII.	Identification of component items	8-30,8-31	8-39
CHAPTER	9	MOVEMENT OF TANKS TO A NEW WORKSITE		
Section	I.	Dismantling for movement	9-1,9-2	9-1
	II.	Transporting tank components	9-3,9-4	9-2
	III.	Reinstallation after movement	9-5-9-7	9-2

			Paragraph	Page
CHAPTER	10.	TANK REPAIR AND CALIBRATION		
Section	I.	Normal repair procedures	10-1-10-3	10-1
	II.	Alternate method of bottom repair for 3000 and 10,000 barrel capacity tanks.....	10-4--10-6	10-1
	III.	Tank strapping and calibration	10-7-10-13	10-5
CHAPTER	11.	DEMOLITION TO PREVENT ENEMY USE.....	11-1-11-3	11-1
APPENDIX	A.	REFERENCES.....		A-1
INDEX		I-1

LIST OF ILLUSTRATIONS

Figure No	Title	Page
1-1	100-barrel or 250-barrel capacity steel tank	1-1
1-2	500-barrel capacity steel tank	1-2
1-3	1000-barrel capacity steel tank	1-3
1-4	3000 barrel capacity steel tank.....	1-4
1-5	10,000 barrel capacity steel tank.....	1-5
2-1	Sectional view of foundation	2-1
2-2	Checking grade of tank foundation	2-2
2-3	Concrete foundation ring.....	2-3
2-4	Typical firewall construction for fuel storage tanks.....	2-4
3-1	Bottom plates	3-2
3-2	Channels, bolts, and gaskets installed on bottom plates.....	3-3
3-3	Bottom plates installed	3-4
3-4	Ladder brace installed.....	3-5
3-5	Bolt replacement plug.....	3-5
3-6	Testing seam and bolts in tank bottom for leaks.....	3-6
3-7	Layout of staves around tank bottom	3-7
3-8	Stave chimes bent	3-8
3-9	Staves with gasket, channel, and bolts assembled	3-9
3-10	Raising and preparing outer edge of tank bottom	3-10
3-11	Installing first stave.....	3-11
3-12	Aligning staves	3-12
3-13	Driving bolt heads into channels	3-12
3-14	Installing last stave	3-13
3-15	Removing timber blocking	3-14
3-16	Applying sealing compound to bottom chimes of staves.....	3-15
3-17	Location of scaffold around top chime of staves.....	3-15
3-18	Dressed top chime of staves.....	3-16
3-19	Center support ladder assembled.....	3-17
3-20	Deck plates ready for installation	3-18
3-21	Deck plate components	3-18
3-22	Gin pole installed.....	3-19
3-23	First deck plate installed	3-20
3-24	Access ladder installed	3-21
3-25	Plug installed.....	3-22
3-26	One-piece flanged elbow installed on inside of tank.....	3-23
3-27	Water drawoff valve installed on outside of tank.....	3-23
3-28	Four-inch elbow installed	3-24
3-29	Four-inch cap installed.....	3-25
3-30	Bolt channels for clean out cover installed (10,000-barrel capacity tank)	3-26
3-31	Gaskets at clean out opening installed (10,000 barrel capacity tank)	3-27
3-32	Temporary partial cover for clean out opening (10,000-barrel capacity tank)	3-28
3-33	Placing the clean out cover (10,000 barrel capacity tank)	3-29
4-1	Installation of gasket, bolts, and channels on center bottom plate	4-1
4-2	Installation of bottom plates	4-2
4-3	Installing wedge gaskets before installation of last bottom plate	4-3
4-4	Checking bolt spacing at installation of last bottom plate.....	4-4
4-5	Adjusting installed bottom plates	4-5
4-6	Layout of staves around tank bottom	4-6
4-7	Center support ladder assembled.....	4-7
4-8	Center support ladder installed	4-8
4-9	Deck plate assembly.....	4-9
4-10	Installing last deck plate.....	4-10
5-1	Layout of staves around tank bottom	5-2
6-1	Center support base with channels, bolts and gasket installed.....	6-1
6-2	First bottom plate installed.....	6-2
6-3	Installation of bottom plates	6-3
6-4	Dressed vertical seam of stave	6-4
6-5	Preparing outer edge of tank bottom	6-5
6-6	Installing first stave.....	6-6
6-7	Installing last stave	6-7
6-8	Umbrella-type deck support assembled.....	6-8
6-9	Umbrella-type deck support prior to installation.....	6-9
6-10	Tank center support assembly installed	6-11
6-11	Deck rafter assembled	6-13

Figure No	Title	Page
6-12	Assembling special deck plate	6-14
6-13	Pressure vacuum valve installed	6-14
6-14	First deck plate installed	6-15
6-15	Inner end of deck plates dressed	6-17
6-16	Deck center sections and manhole dome	6-18
6-17	Dressing deck center section	6-18
6-18	Manhole dome and cover installed	6-19
6-19	Access ladder installed	6-21
6-20	Emergency vent installed	6-22
6-21	Water drawoff valve installed	6-23
6-22	Water drawoff valve elbow and nipple installed inside tank	6-24
7-1	Second-ring staves dressed and ready for installation	7-2
7-2	Hoisting second-ring stave	7-2
7-3	Tank center support installed	7-4
7-4	Access ladder and guard installed	7-6
8-1	Center support base	8-1
8-2	Installing channels, bolts, and gaskets on the center support base	8-1
8-3	Positioning the bolt retaining boards	8-2
8-4	Installation of first half of bottom adapter plate	8-2
8-5	Installation of second half of bottom adapter plate	8-3
8-6	Assembly of inner and outer bottom plates	8-4
8-7	Assembling bottom sections	8-5
8-8	Locating first bolt hole in joining seams	8-5
8-9	Placing strip and wedge gaskets	8-5
8-10	Stacking assembled bottom sections	8-6
8-11	Layout of assembled bottom sections	8-6
8-12	Installing first bottom section	8-7
8-13	Installing wedge gasket at lap seam of first bottom section	8-7
8-14	Installing first intermediate bottom section	8-8
8-15	Wedge gaskets installed at joining point of four plates	8-8
8-16	Installing wedge gaskets at installation of last bottom section	8-9
8-17	Checking bolt spacing at installation of last bottom section	8-9
8-18	Adjusting installed bottom sections	8-9
8-19	Lifting and supporting outer edge of installed bottom sections	8-10
8-20	Installing special gasket	8-11
8-21	Tightening bolts in tank bottom	8-11
8-22	Layout of first ring staves	8-12
8-23	Assembling gaskets, channels, and bolts	8-13
8-24	Raising and preparing outer edge of tank bottom	8-13
8-25	Installing first stave in first ring of tank	8-14
8-26	Locating radii and wedge gaskets at bottom chime	8-14
8-27	Locating radii gasket at top chime	8-14
8-28	Installing first intermediate stave	8-15
8-29	Bracing first stave and driving bolt heads into channels	8-16
8-30	Installing last stave	8-16
8-31	Dressed top chime of first ring staves	8-17
8-32	Hoisting first stave of second ring	8-18
8-33	Hoisting second stave of second ring	8-19
8-34	Attaching guy line to hold second ring staves	8-20
8-35	Driving second ring stave bolts into position	8-20
8-36	Hoisting last stave into position in second ring	8-21
8-37	Hoisting first stave of third ring	8-21
8-38	Installing third ring staves	8-22
8-39	Assembly of umbrella-type deck support	8-23
8-40	Erecting bottom center support	8-23
8-41	Erecting gin pole for installation of middle center support	8-24
8-42	Hoisting middle center support into position	8-24
8-43	Middle center support in final position	8-25
8-44	Bolting top center to middle center support	8-25

Figure No	Title	Page
8-45	Raising umbrella-type deck support	8-26
8-46	Umbrella-type deck support in place	8-27
8-47	Assembling inner and outer deck plates	8-28
8-48	Trussed rafter	8-29
8-49	Assembled trussed rafter	8-30
8-50	Rafter hanger installed.....	8-31
8-51	Adjusting height of center support.....	8-32
8-52	Raising first deck section	8-32
8-53	Installing deck sections.....	8-33
8-54	Installing special deck plates and fittings.....	8-34
8-55	Completed assembly of deck sections	8-35
8-56	Center deck plate and manhole dome installed	8-35
8-57	Ladder bottom section installed	8-37
8-58	Middle and top ladder sections installed.....	8-38
10-1	Installation of tie rods and reinforcement fabric	10-3
10-2	Caulking groove boards and concrete cap installed.....	10-4
10-3	Caulking installed	10-5
10-4	Tank measuring technique.....	10-6
11-1	Placement of demolition charges (100-, 250-, and 500-barrel tanks)	11-1
11-2	Placement of demolition charges (1000-, 3000-, and 10,000-barrel tanks).....	11-2

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual is for your use in erecting and maintaining the 100-, 250-, 500-, 1000-, 3000-, and 10,000-barrel capacity steel tanks. The manual includes information on transporting and handling tank components, preparation of tank foundations, assembly and disassembly of the tanks. A list of component items for each tank is placed at the end of the chapter on the appropriate tank. Essential tools, equipment, and supplies required for the erection of the tanks are listed in DA Supply Catalogs SC 518093-CL-EO1, Erection Outfit, High Bolted Storage Tanks (FSN 5180-566-5549); and SC 5180-97-CLEO3, Erection Outfit, Low Bolted Storage Tanks.

Kits required in the re-erection of the tanks are listed in SC 5420-30-IL.

1-2. Maintenance Forms and Records

Maintenance forms and records that you are required to use are explained in TM 38-750.

1-3. Reporting of Errors

You can improve this manual by calling attention to errors and by recommending improvements, using

DA Form 2028 (Recommended Changes to Publications), or by a letter, and mail directly to Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, St. Louis, Missouri 63120.

1-4. Equipment Serviceability Criteria (ESC)

This equipment is not covered by an ESC.

1-5. Destruction of Army Material to Prevent Enemy Use

Refer to TM 750-244-3 for information on the destruction of Army material to prevent its capture by the enemy. See Chapter 11 for additional information.

1-6. Administrative Storage

Refer to TM 740-90-1 for information on the administrative storage of equipment.

Section II. DESCRIPTION AND DATA

1-7. Description

a. *100-, 250-, and 500-Barrel Capacity Tanks.* The 100 and 250-barrel tanks (fig. 1-1) and the 500 barrel tank (fig. 1-2) are constructed of preformed and punched metal sections bolted together with 1/2 inch diameter bolts. They consist of assembled bottoms, one ring of assembled side staves, an assembled center support ladder aligned with a manhole, an assembled deck or roof, and an assembled access ladder.

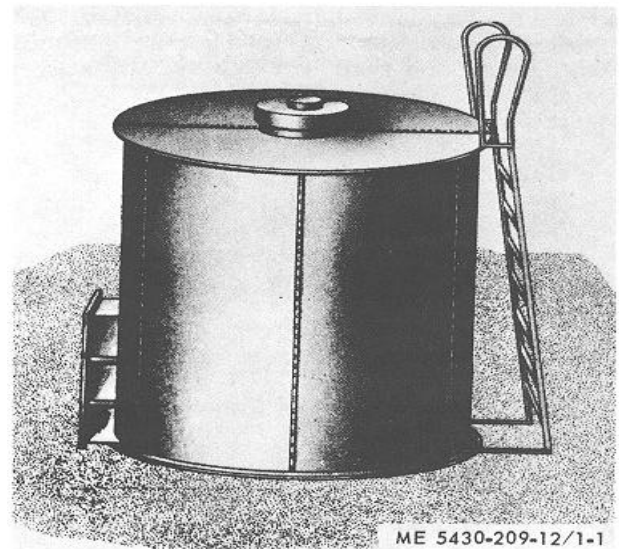


Figure 1-1. 100-barrel or 250-barrel capacity steel tank.

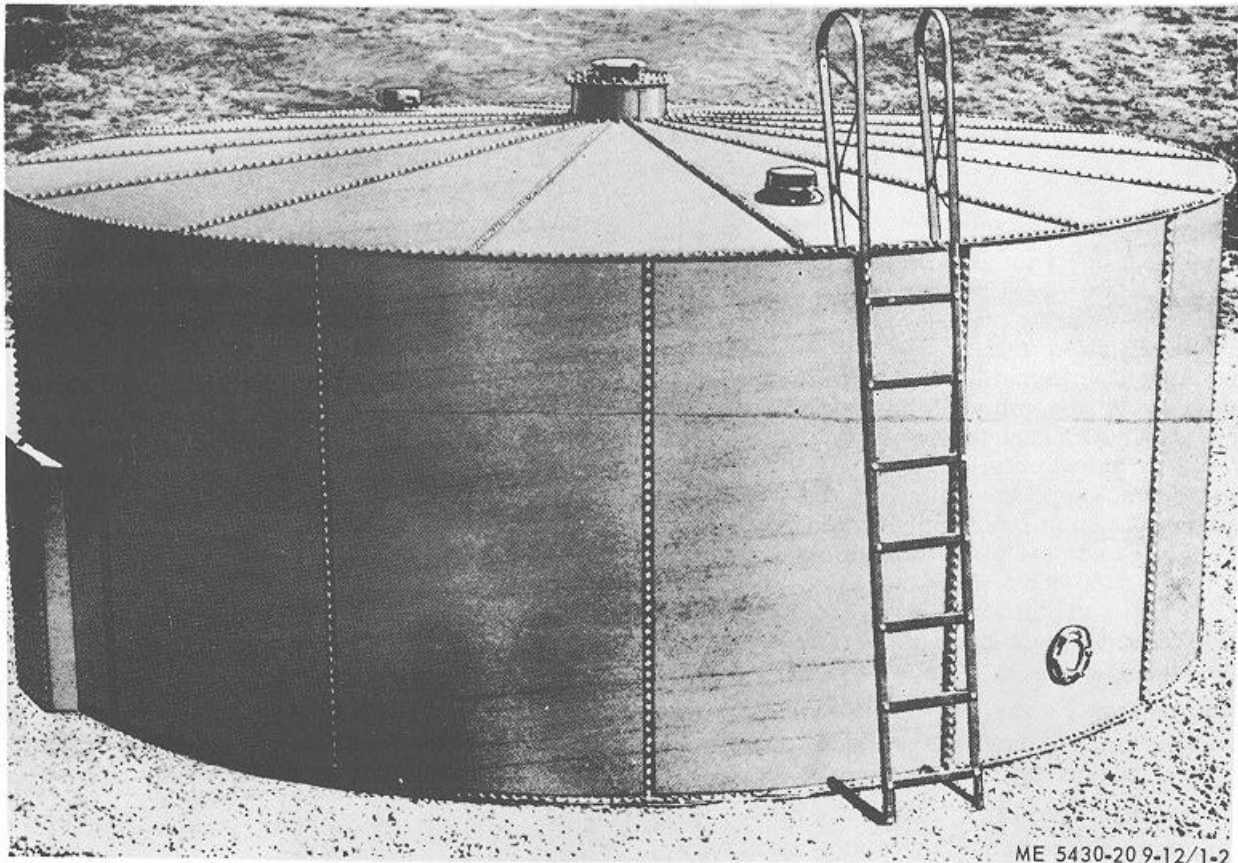
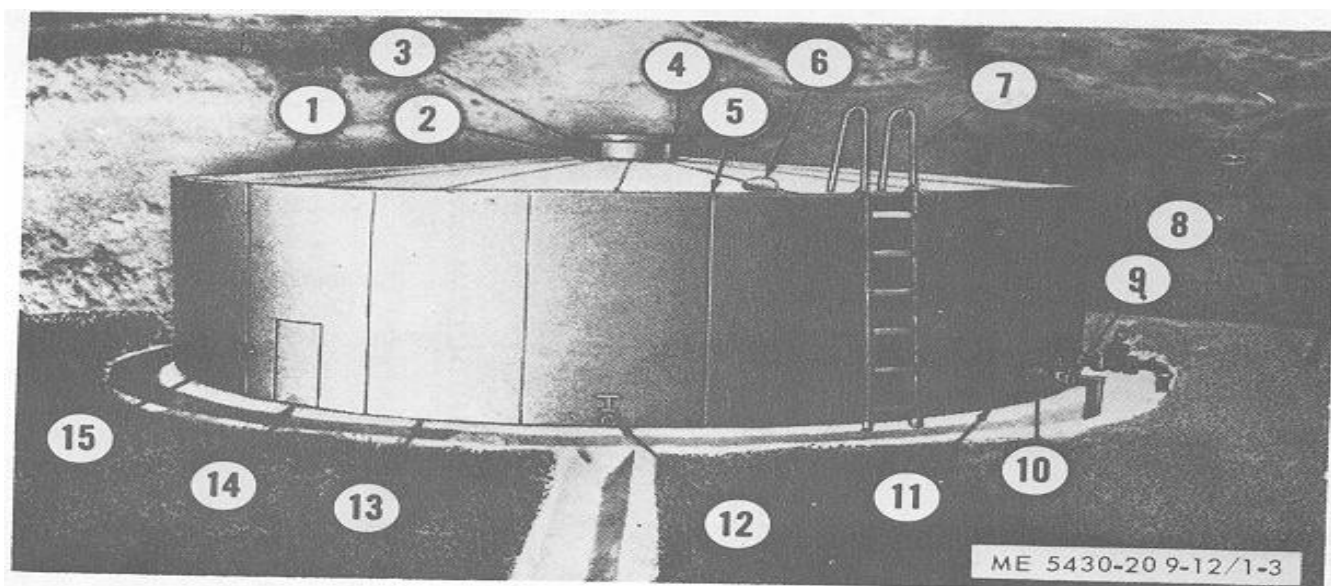


Figure 1-2. 500-barrel capacity steel tank.

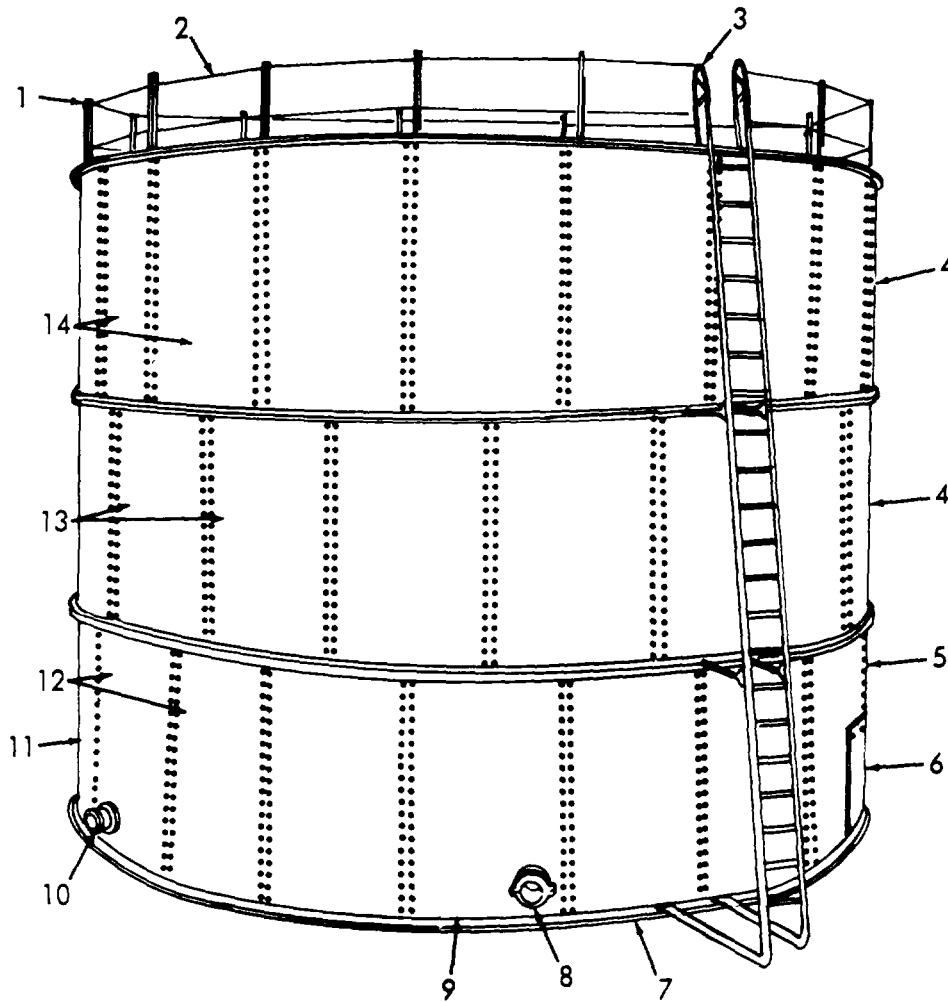
b. 1000 and 3000-Barrel Capacity Tanks. The 1000 and 3000-barrel tanks are constructed of preformed and punched metal sections bolted together with $\frac{1}{2}$ -inch diameter bolts. Both tanks have assembled bottoms. The 1000-barrel tank (fig. 1-3) has one ring of assembled side staves (8, 11, 13 and 15) while the 3000-barrel tank (fig. 1-4) has three

rings of assembled side staves (12, 13 and 14). Both tanks have an assembled umbrella type deck support, an assembled deck or roof with a manhole (3, fig. 1-3), and an assembled access ladder (3, fig. 1-4).



- | | |
|--------------------------|-------------------------------|
| 1. DECK PLATE | 9. EIGHT-INCH PIPE CONNECTION |
| 2. CENTER DECK SECTION | 10. SIX-INCH PIPE CONNECTION |
| 3. MANHOLE DOME | 11. SPECIAL SIDE STAVE |
| 4. EMERGENCY VENT | 12. TWO-INCH PIPE CONNECTION |
| 5. SPECIAL DECK PLATE | 13. REGULAR SIDE STAVE |
| 6. PRESSURE VACUUM VALVE | 14. CLEAN OUT COVER |
| 7. ACCESS LADDER | 15. SPECIAL SIDE STAVE |
| 8. SPECIAL SIDE STAVE | |

Figure 1-3. 1000-barrel capacity steel tank



ME 5430-209-12

- | | |
|-----------------------|-------------------------------|
| 1. GUARD WIRE SUPPORT | 8. EIGHT-INCH PIPE CONNECTION |
| 2. GUARD WIRE | 9. SPECIAL SIDE STAVE |
| 3. ACCESS LADDER | 10. SIX-INCH PIPE CONNECTION |
| 4. SIDE STAVE | 11. SPECIAL SIDE STAVE |
| 5. SPECIAL SIDE STAVE | 12. FIRST RING STAVES |
| 6. CLEAN OUT COVER | 13. SECOND RING STAVES |
| 7. REGULAR SIDE STAVE | 14. THIRD RING STAVES |

Figure 1-4. 3000-barrel capacity steel tank.

c. 10,000-Barrel Capacity Tank. The 10,000-barrel tank (fig. 1-5) is constructed of preformed and punched metal sections bolted together with 1/2-inch diameter

bolts. It consists of an assembled bottom, three rings of assembled side staves, and an assembled deck or roof.