DEPARTMENT OF THE ARMY
TECHNICAL MANUAL

TM 9-8242

DEPARTMENT OF THE AIR
FORCE TECHNICAL ORDER

TO 36A9-7-7-1

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# OPERATION ORGANIZATIONAL MAINTENANCE, AND ORDNANCE FIELD AND DEPOT MAINTENANCE

# 10-TON 4-WHEEL FLAT BED TRAILER M345

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*DEPARTMENTS OF THE ARMY AND THE AIR FORCE*

*DECEMBER 1957*

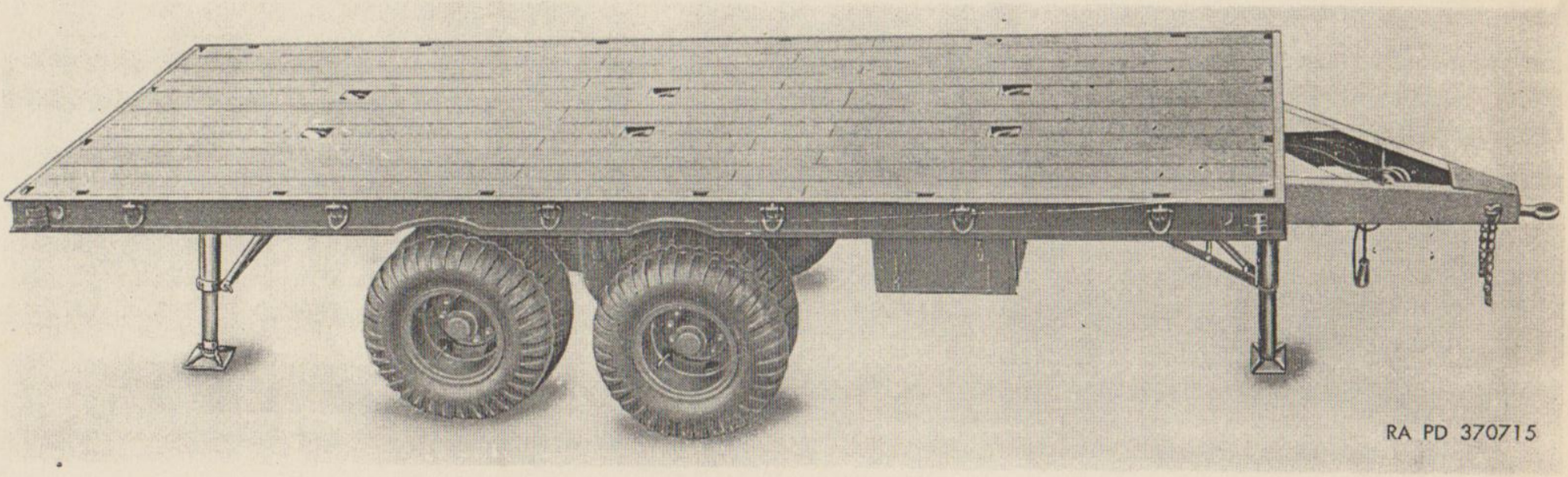



*Figure 3. Top view of flat bed trailer M345.*

## Section II. DESCRIPTION AND DATA

### 4. 10-Ton 4-Wheel Flat Bed Trailer M345

*a.* The 10-ton 4-wheel flat bed trailer M345 (figs. 1, 2, and 3) is designed for transportation of heavy duty equipment up to 10-ton rated payload. Towing facilities on the trailer enable it to be towed by any vehicle of sufficient tonnage equipped with a pintle hook and air supply.

***Caution:*** This vehicle exceeds the dimension limitations in regard to vehicle width by 2 inches to those permitted under AR 700–2300–1. Advance planning will be required in the selection of routes because of clearances involved.

*b.* The trailer is designed to be towed over surfaced roads with loads up to 26,000 pounds at speeds up to 55 mph, and over unimproved roads, trails, and open rolling terrain with loads up to 20,000 pounds at speeds up to 30 mph. It is designed to ford hard bottom water crossings to the depth which is capable of being forded by the towing vehicle.

*c.* The trailer frame is constructed of structural and pressed steel and steel castings. Component members of the frame assembly are reinforced and welded to provide maximum strength. Deck planking is made of processed hardwood and is bolted to the frame.

*d.* The front and rear axles, spring assembly, and axle trunnion form a tandem unit. Each spring is secured to the axle trunnion by a spring saddle. Spring ends are encased in shackle box castings welded to the axles. The frame is attached to the tandem unit by the axle trunnion pedestal, secured on the axle trunnion with journals and cap screws. Foot-type landing legs (retractable supports) support the front and rear of the trailer when it is not coupled to the towing vehicle.

*e.* The flat bed trailer has an air-over-hydraulic brake system controlled from the towing vehicle. Chock blocks are provided to keep the vehicle from rolling when parked. These blocks are chained to the vehicle to prevent loss. When not in use they are carried in brackets welded above the spring saddles, one on each side of the vehicle.

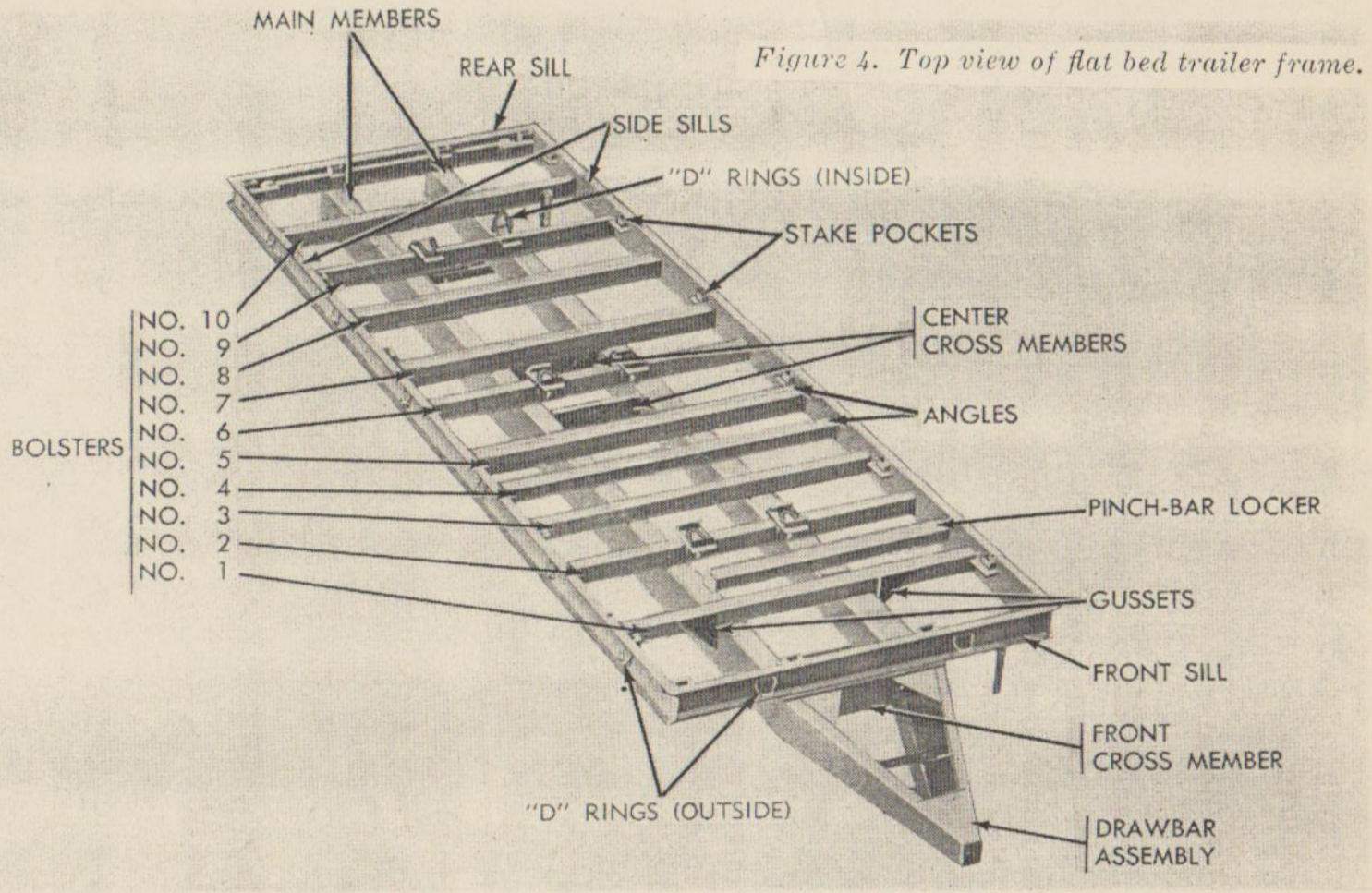



*Figure 4. Top view of flat bed trailer frame.*

**5. Frame**
(fig. 4)

*a.* The frame consists of two main longitudinal members reinforced by one cross member at the front (beneath the front sill); two cross members at the rear center (beneath the sixth and seventh bolsters); ten bolsters (numbered from front to rear); front, side, and rear sills, drawbar assembly; angles and gussets, all welded into a single unit.

*b.* The axle trunnion pedestal is welded to the two main longitudinal members and the two cross members, beneath the sixth and seventh bolsters. The pedestal is machined and welded to exact dimensions to accommodate the axle trunnion, by which the frame and all its members are attached to the running gear.

*c.* Six stake pockets are welded along the inside of the left and right sills. Four stake pockets are welded along the inside of the front and rear sills. Two D-ring brackets with attached deck D-rings are welded to the top of the second, sixth, and ninth bolsters. The hardwood flooring of the deck assembly is recessed to provide access to the D-rings and stake pockets. The deck D-rings are primarily used for lashing and lifting purposes. Additional D-ring brackets and D-rings are welded to the outside of the four sills; two in front, two in the rear, and six on each side. These D-rings are used for lashing purposes. The rear sill is drilled to accommodate taillights. These taillights are mounted on brackets which are welded inside the rear sill.

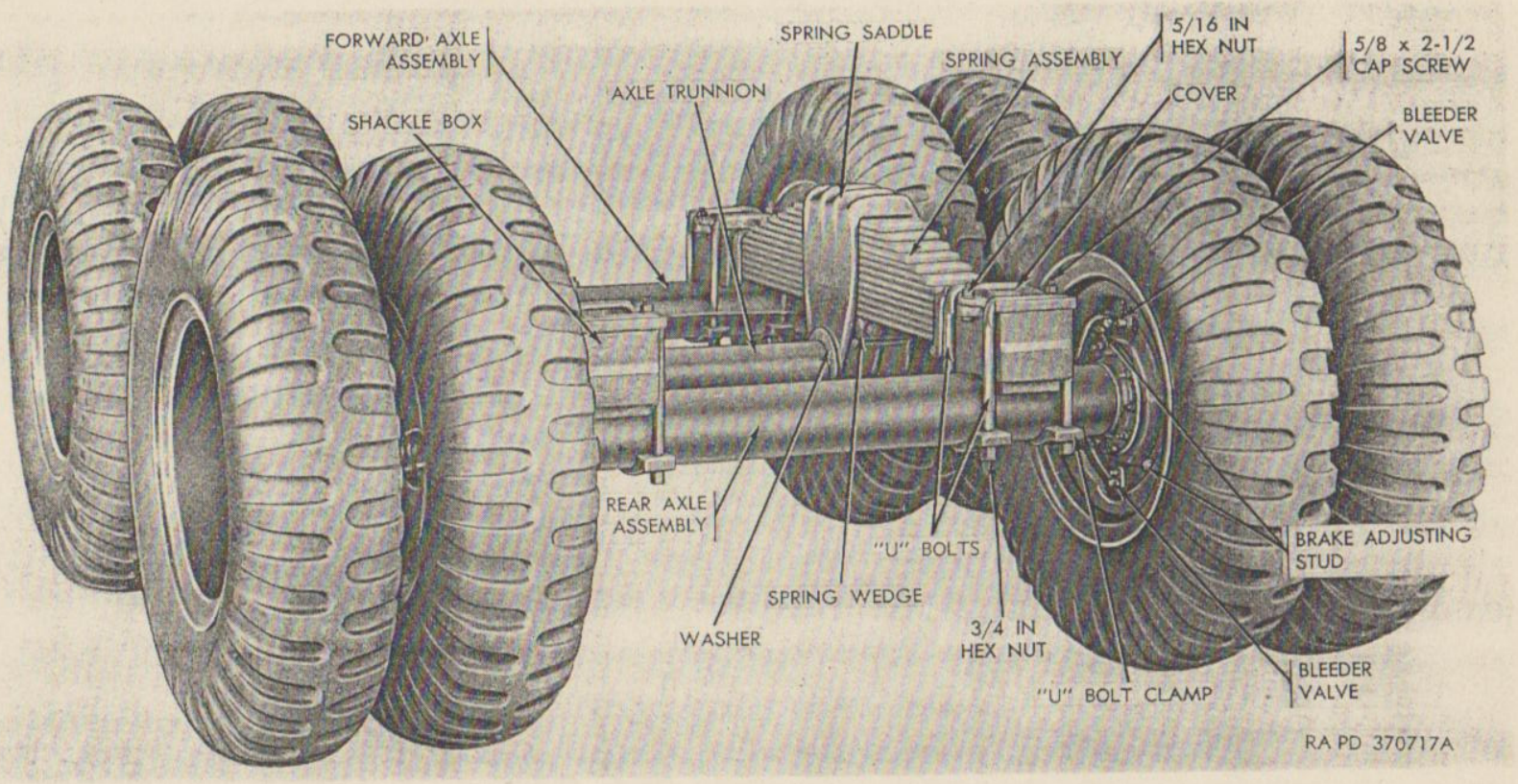



*Figure 5. Suspension, axles, and wheels.*

## 6. Suspension and Axles
(fig. 5)

*a.* The trailer is suspended on two axles which are attached to the ends of two semielliptic springs mounted with the arch up. The springs, with their longest leaves downward, are mounted in cast iron shackle boxes which are welded to the axles.

*b.* Each spring assembly has 13 leaves. The five long leaves (bottom) are the main leaves, and the eight graduated leaves are auxiliary leaves. The spring assembly is held together in the center with a ½-inch hex-head bolt. At the sixth leaf, tom, and sides with rubber linings. The ends of each spring are the spring assembly is secured at each end with a spring clip. The ends of the bottom leaf are bent down to fit into a slot in the shackle box. Each shackle box is lined at the top, bot- secured to the axle by shackle box covers and clamps. The spring assembly is held firmly in the spring saddle by two wedges at the bottom of the spring assembly. These wedges keep the axles alined, and must be tightened occasionally to keep the axles in alinement. Th spring saddle is secured to the axle trunnion and is provided with bushings which receive lubrication from the lubrication fitting provided in the ends of the axle trunnion.

*c.* Axles are tubular type with forged steel ends (spindles), electrically welded to form an integral unit. The axles are secured in proper relation to each other (*b* above) and form the tandem suspension for the trailer frame.

## 7. Brake System
(fig. 6)

*a. General.* When the braking system of the trailer is properly connected to the service braking system of the towing vehicle, the service brake pedal on the towing vehicle operates the brakes on both vehicles.

*b. Type of Brakes.* Trailer brakes are of the air-over-hydraulic type. Air pressure is used to actuate the hydraulic brake system, applying the brakes automatically when pressure is applied at the towing vehicle brake pedal.

*c. Units of the Trailer Brake System.* The brake system consists of two intervehicular air hose (one service air line, one emergency air line); two intervehicular air hose couplings; one dummy coupling bracket for each intervehicular air hose coupling when not in use; two service air line tubes, two emergency air line tubes; one air filter for each line; one air reservoir; one relay-emergency valve; one air tube connecting the air reservoir to the relay-emergency valve; one air chamber and master hydraulic cylinder for each axle; one air tube connecting the relay-emergency valve to each air chamber; one hydraulic hose from each master hydraulic cylinder to each axle tee fitting; one hydraulic tube from the axle tee fitting to each of the four wheels; two hydraulic wheel cylinders for each wheel; one tube connecting the two hydraulic wheel cylinders on each wheel; and the necessary fittings for connecting the hose and tubes.

*d. Compressed Air Supply on the Towing Vehicle.* To produce and maintain a constant supply of compressed air to actuate the trailer brake system, the towing vehicle is equipped

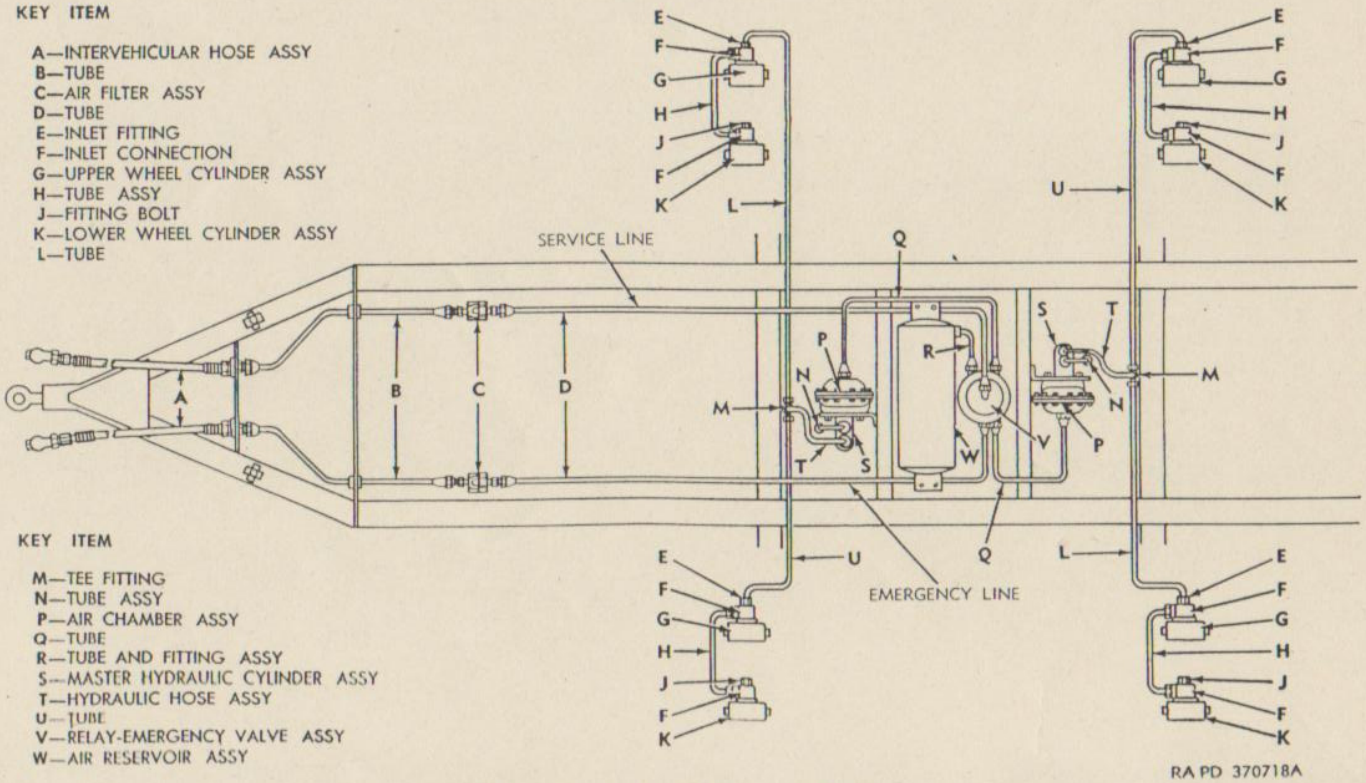



*Figure 6. Brake system—schematic.*

with an air compressor driven by the power plant. The towing vehicle is further equipped with reservoirs which store a supply of compressed air; a governor for controlling the compression of air, and air gage for showing the pressure of the air in the system; a safety valve to insure against excessive pressure; shutoff cocks to open or close the air supply to the trailer; air hose and couplings which convey compressed air to the brake system of the trailer.

*Note.* Although these units are located on the towing vehicle, all must operate effectively to insure proper performance of the trailer brakes.

*g. Brake Air Hose Couplings* (fig. 7). Two brake air hose couplings are mounted on the drawbar of the trailer. When the brake air hose couplings on the towing vehicle are connected to the trailer couplings, the brakes on the trailer may be actuated by the brake controls on the towing vehicle.

*h. Dummy Coupling Brackets* (fig. 7). Two dummy coupling brackets, welded to the drawbar frame, are provided to prevent the entry of dirt and moisture into the brake system. The brake air hose couplings must be fitted to these dummy coupling brackets when they are not connected to the towing vehicle.

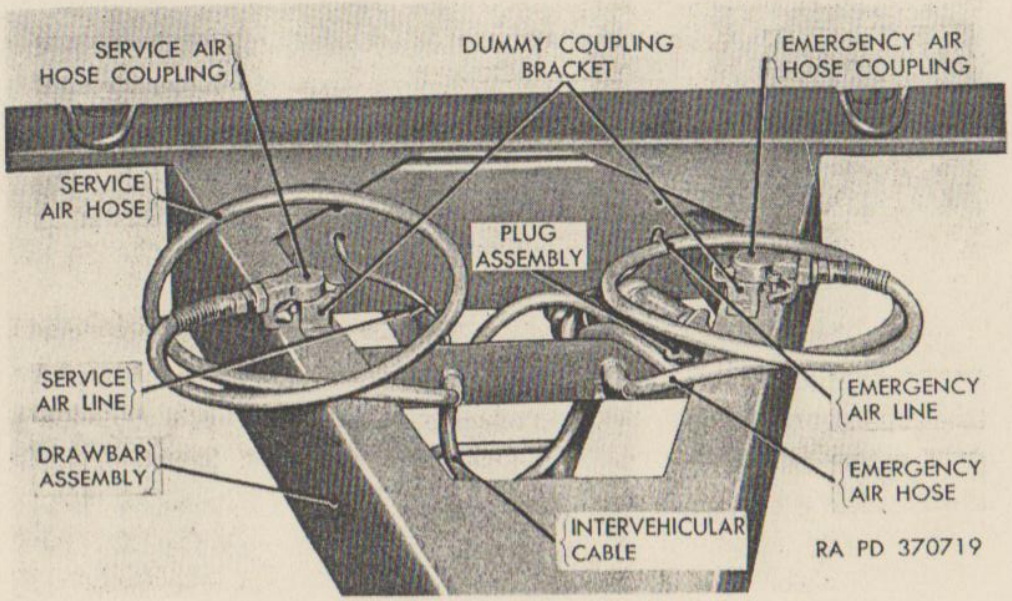



*Figure 7. Hose couplings, dummy coupling brackets, intervehicular cable, and plug assembly.*

*j. Brake Air Chambers* (figs. 6, 9, 10, and 41). Each of two brake air chambers is mounted on a bracket which is secured to a frame cross member, one at the front and one at the rear of the axle trunnion pedestal. They convert air pressure into mechanical motion to operate the master hydraulic cylinders.

*k. Master Hydraulic Cylinders* (figs. 6, 9, and 10). Each of the two master hydraulic cylinders is mounted on the same bracket as the air chamber (*j* above) and in direct line with the air chamber. The cylinder converts brake air chamber push rod movement into hydraulic pressure which applies the brakes.

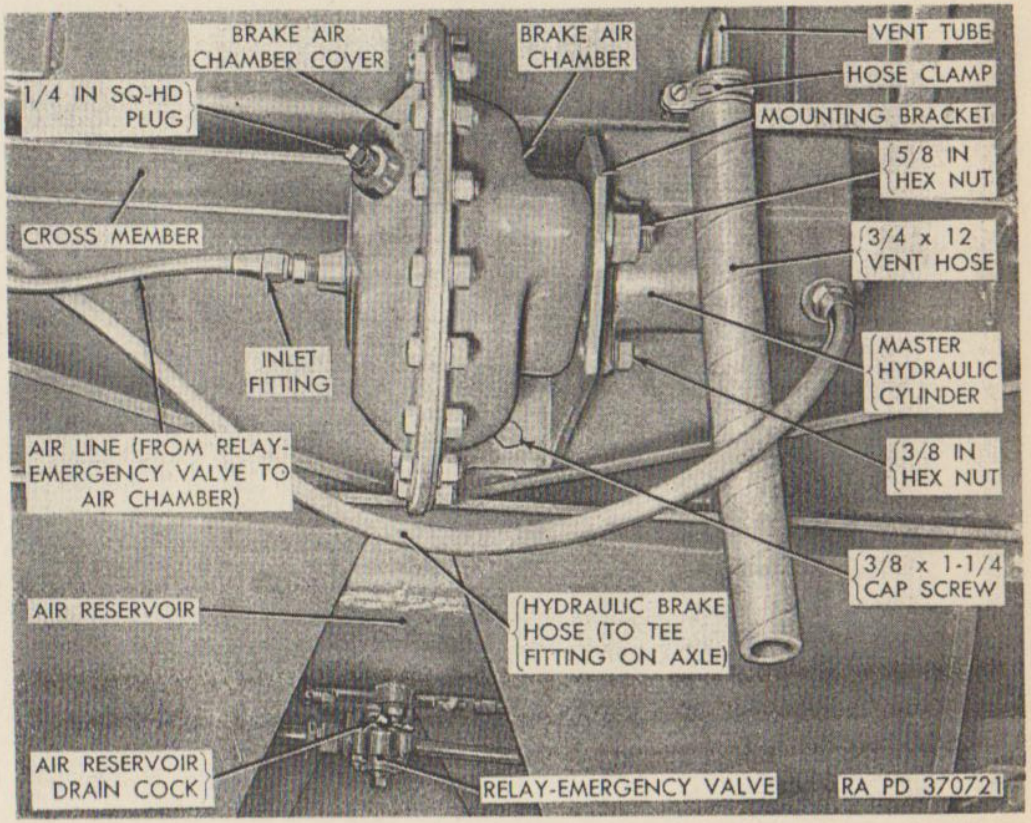



*Figure 9. Brake air chamber and master hydraulic cylinder—rear.*

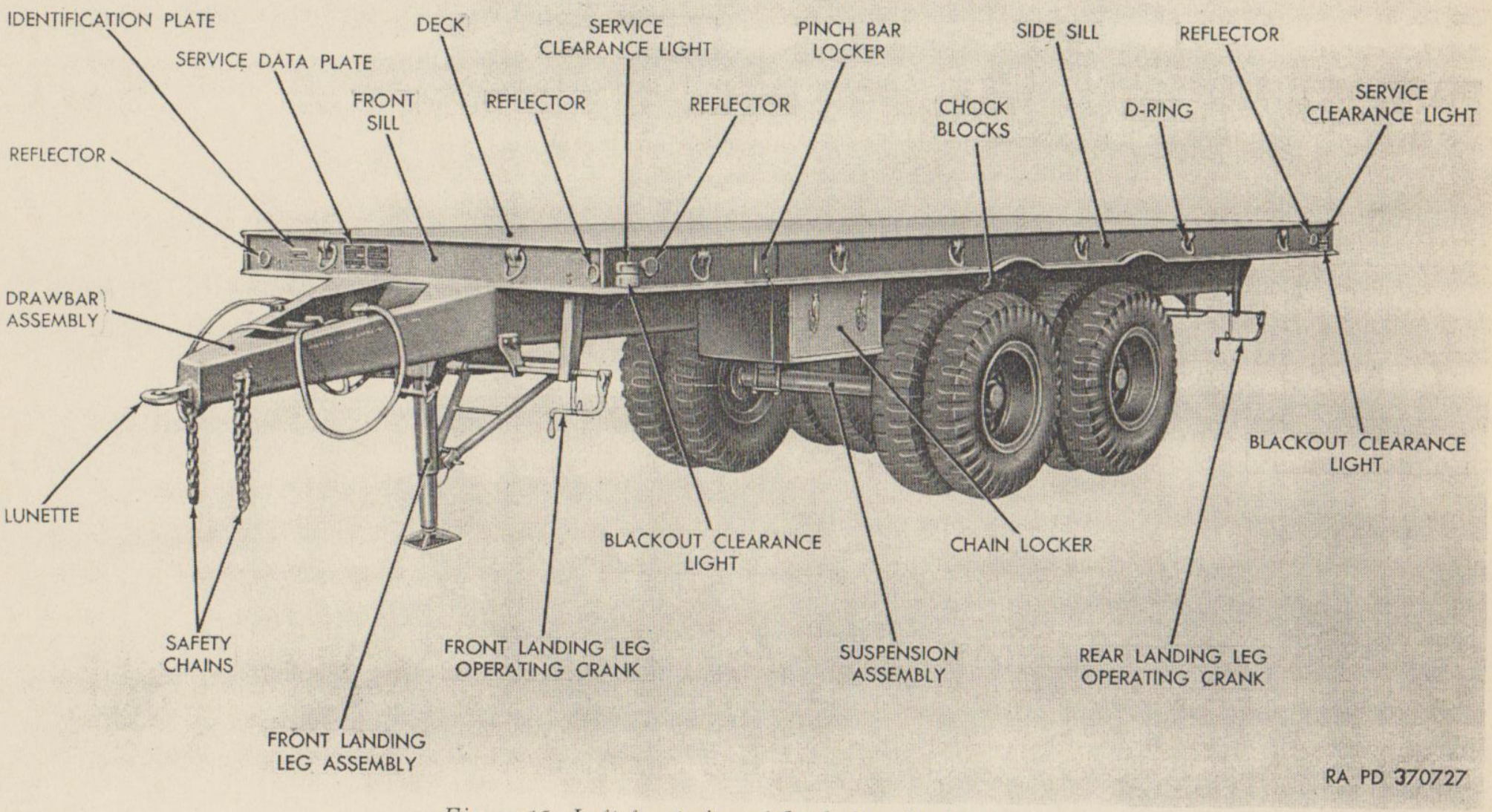



*Figure 15. Left-front view of flat bed trailer M345.*

## 10. Chain and Pinch Bar Lockers
(fig. 15)

*a. Chain Locker.*

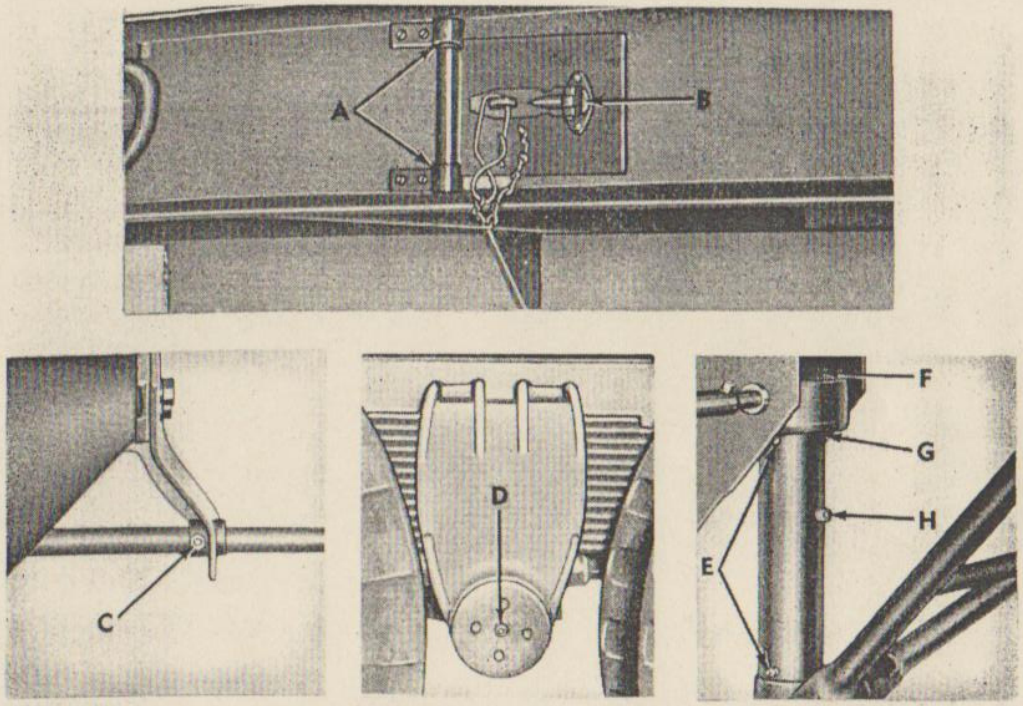
(1) *General.* The trailer is equipped with two chain lockers; one on each side of the trailer. Each chain locker is bolted to the third and fourth bolster members and is provided with a door. Each door is hinged at the bottom with two cast brass hinges and provided with two latches which are bolted to the door. Each latch is held in closed position by a clip attached to a chain that is welded to the door.

(2) *Contents.* The equipment, part of which is stored in each chain locker, consists of eight 10-foot lashing chains, eight spring-load binders, one wheel nut wrench, one wheel nut wrench handle, and one air chuck.

*b. Pinchbar Locker.*

(1) *General.* The pinchbar locker is located on the left side sill of the trailer, between the second and third bolster members. The locker is equipped with a hinged door and latch. The latch is held in closed position with a clip, attached to a chain that is welded to the door.

(2) *Contents.* The equipment in the pinchbar locker consists of two 60-inch pin point crowbars.



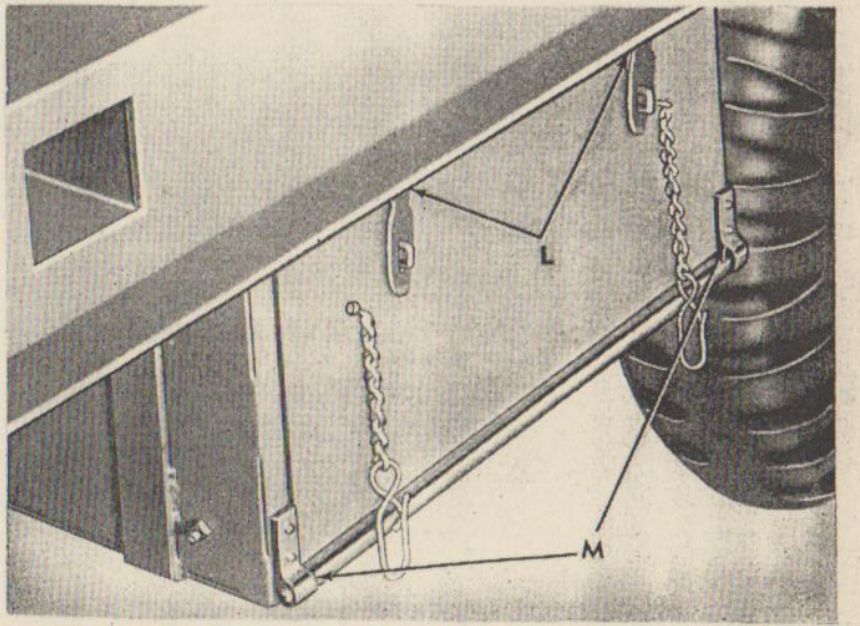




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*Figure 23. Localized lubrication points.*

## 11. Landing Legs

*Note.* The key letters shown below in parentheses refer to figure 16.

*a.* The trailer is equipped at the front and rear with a swing-mounted, crank-type, adjustable landing leg assembly. They are used to support the trailer when not coupled to the towing vehicle, and to raise or lower the trailer when preparing to couple to, or uncouple from, the towing vehicle. When the trailer is coupled to the towing vehicle, the landing leg assemblies are folded under the frame in a horizontal position, and each secured with a locking pin (P) and clip assembly (X) to a bracket which is welded to the frame. A landing leg brace (N) prevents each landing leg assembly from tipping when in the lowered position. The brace is secured to the landing leg bearing with the same locking pin (P) which holds the landing leg assemblies in the horizontal position.

*b.* The inner leg assembly (Q) telescopes into the outer leg assembly (T). Each inner leg assembly is equipped with a ball-joint square foot (R) for better contact with the ground.

*c.* The telescoping inner leg assembly is raised and lowered by a jackscrew which rotates in a fixed nut in the inner leg.

*d.* The top of the outer leg assembly contains the two bevel gears through which the leg is operated. By turning operating crank (AA), the operating shaft bevel gear rotates the jackscrew bevel gear which raises or lowers the inner leg. The crank is hinged to the operating arm (Y) and held in a crank holder (E) when not in use.

A—AMBER REFLECTOR
B—"D" RING
C—PINCH BAR LOCKER DOOR
D—OPERATING ARM SUPPORT
E—CRANK HOLDER
F—SUPPORT ASSY
G—COUPLING
H—LANDING LEG BRACKET
J—1-1/16 FLAT WASHER
K—LANDING LEG BRACE BRACKET
L—LANDING LEG BRACE SHAFT
M—CLIP ASSY
N—LANDING LEG BRACE
P—LANDING LEG LOCKING PIN
Q—INNER LEG ASSY
R—FOOT
S—GREASE FITTING
T—OUTER LEG ASSY
U—1/8 IN SQ-HD PIPE PLUG
V—GREASE FITTING
W—CLIP ASSY
X—CLIP ASSY
Y—OPERATING ARM
Z—PLUG ASSY
AA—OPERATING CRANK
BB—SAFETY CHAIN
CC—AMBER BLACKOUT CLEARANCE LIGHT
DD—AMBER SERVICE CLEARANCE LIGHT

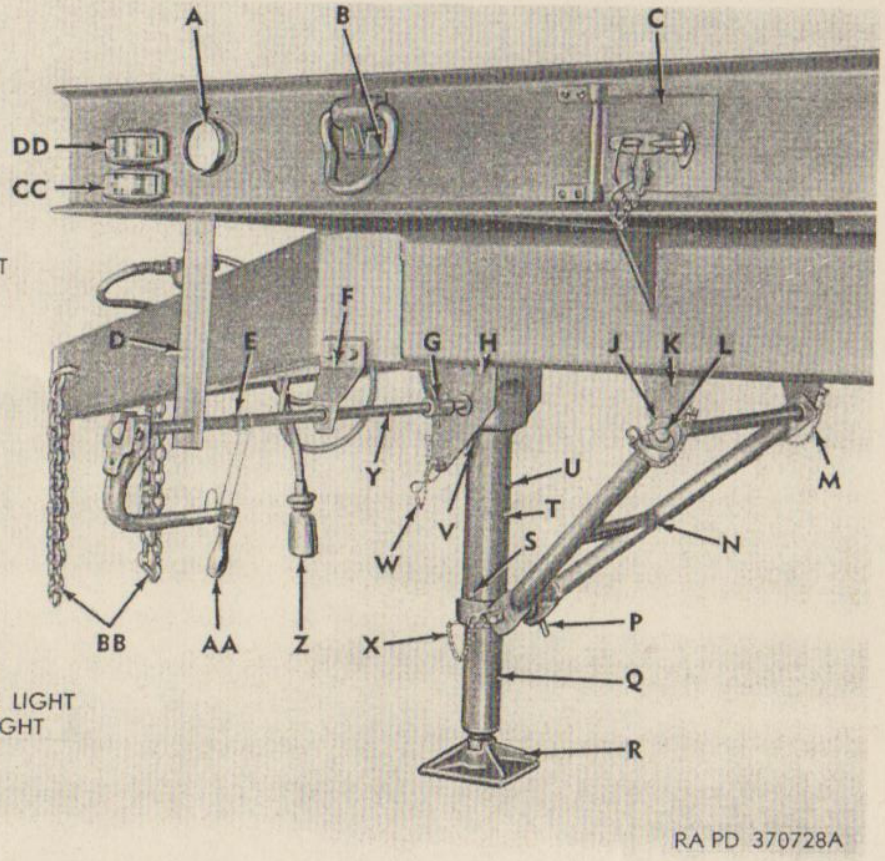


*Figure 16. Front landing leg.*

*m. Trailer Air Reservoir* (figs. 6 and 9). The air reservoir is a metal tank mounted on two brackets welded inside the axle trunnion pedestal. It is connected by a tube to the relay-emergency valve which is mounted on the reservoir. The reservoir provides a supply of air on the trailer for applying the trailer brakes. It is equipped with a drain cock for draining accumulations of moisture and for releasing air pressure in the trailer brake system if brakes lock.

*n. Relay-Emergency Valve.*

*Note.* The key letters noted in parentheses are in figure 11.

The relay-emergency valve, mounted on the trailer air reservoir, directly controls the service brakes on the trailer. The valve speeds brake action by releasing air from the reservoir in the trailer directly to the brake air chambers. This eliminates the loss of time that would result if sufficient air to operate the brakes had to travel from the reservoir on the towing vehicle to the trailer brake air chambers. In addition, this valve controls the flow of air to and from the trailer air reservoir and automatically applies the brakes in the event that the trailer breaks away from the towing vehicle or there is a serious leak in the emergency air line.

*o. Service Air Line* (figs. 6 and 7). The service air line on the trailer extends from the air hose coupling (tagged SERVICE) on the right side of the trailer drawbar, along the right inside of the main frame member to the air filter. From the air filter, the service air line extends to an elbow in the top of the relay-emergency valve. Its purpose is to transmit changes in air pressure which cause this valve to function. The changes in pressure result from brake pedal application on the towing vehicle.

*p. Emergency Air Line* (figs. 6 and 7). The emergency air line on the trailer extends from its air hose coupling (tagged EMERGENCY), along the left inside of the main frame member of the trailer to the air filter. From the air filter, the emergency air line extends to a fitting near the bottom of the relay-emergency valve. It transmits compressed air to fill the trailer air reservoir and to maintain the proper air pressure, under the control of the relay-emergency valve, to apply the brakes on the trailer.

*r. Chock Blocks* (fig. 13). One chock block on either side of the trailer is provided to hold the trailer stationary when parked on an incline or when it is to be coupled or uncoupled. The chock blocks are made up of triangular blocks of wood bolted together, and are chained to the main frame members above the spring saddle. The length of the chain permits each chock block to be used in front of the forward wheels, or behind the rear wheels. Each chock block and chain is stowed in a bracket when not in use.

## 9. Wheels and Tires
(fig. 13)

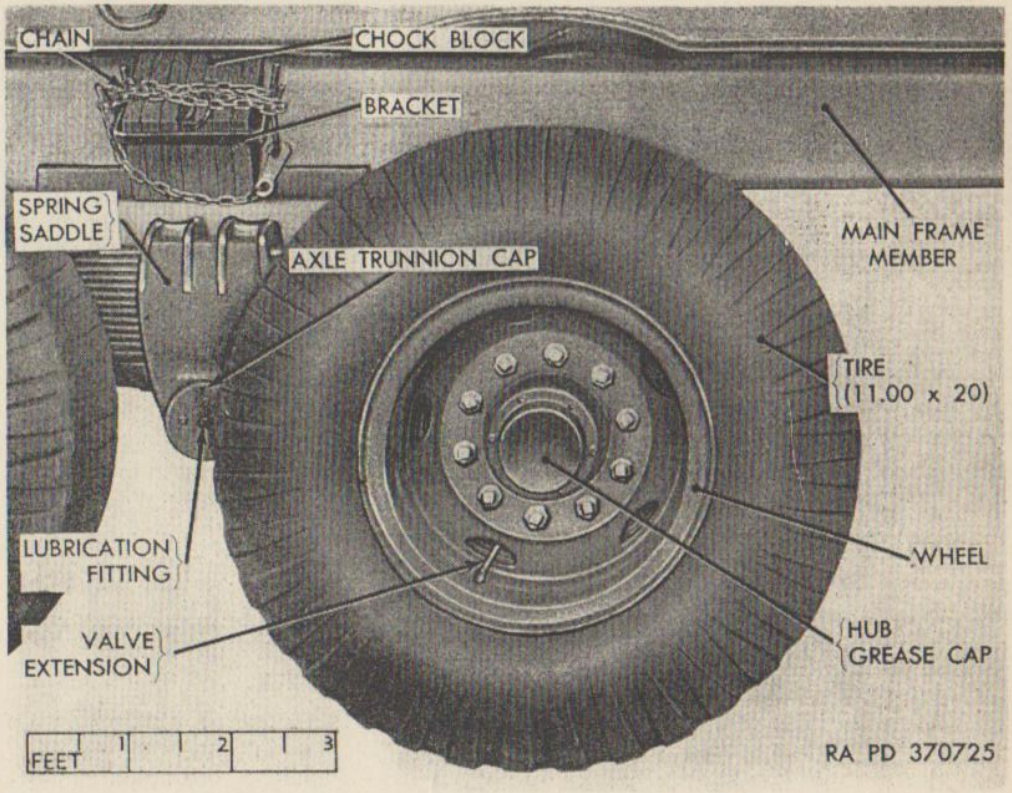


*Figure 13. Wheel and chock block.*

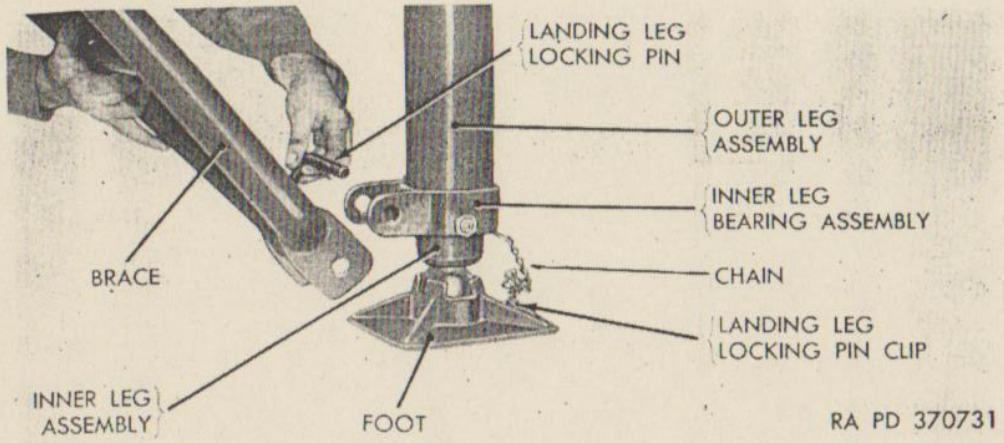


*Figure 20. Installing landing leg locking pin.*

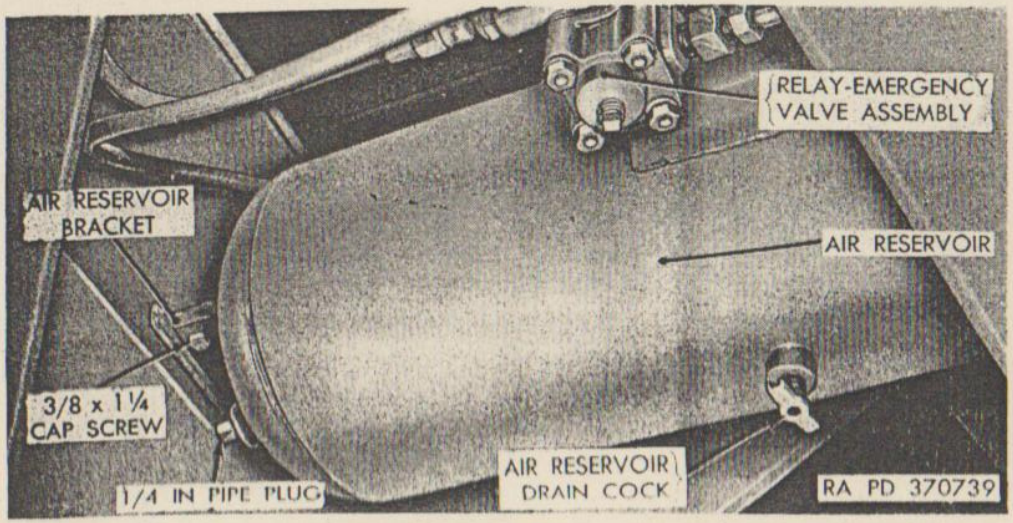


*Figure 33. Relay emergency valve and air reservoir.*

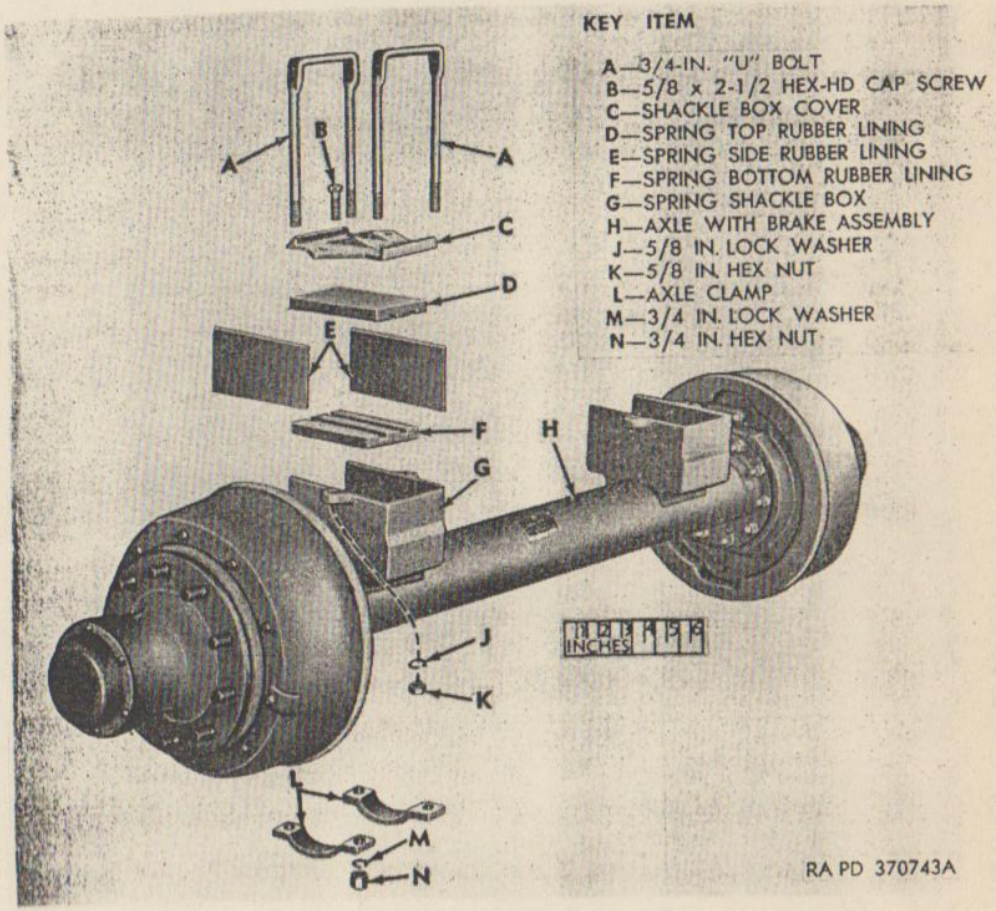


*Figure 32. Axle and brake assembly and related parts—partially exploded view.*

## 12. Electrical System

*a.* Lights on the trailer are controlled by the light switch on the instrument board of the towing vehicle through the receptacle on the rear of the towing vehicle and the intervehicular cable, junction box ~~(fig. 17)~~, and wiring harness on the trailer. The system is protected by a circuit breaker on the towing vehicle. Lights with the same purpose, e.g., blackout stop lights on both vehicles, are on the same circuit and operate simultaneously on towing vehicle and trailer.

*c.* The trailer is equipped with a blackout tail and stop light (G, fig. 18) on the right rear, a service tail and stop and blackout tail light (H, fig. 18) on the left rear. The trailer is further equipped with: an amber blackout clearance light (bottom) (fig. 15 and C, fig. 18), and a top amber service clearance light (B, fig. 18) at each front corner; a bottom red blackout clearance light (F, fig. 18) and a top red service clearance light (E, fig. 18) at each rear corner.

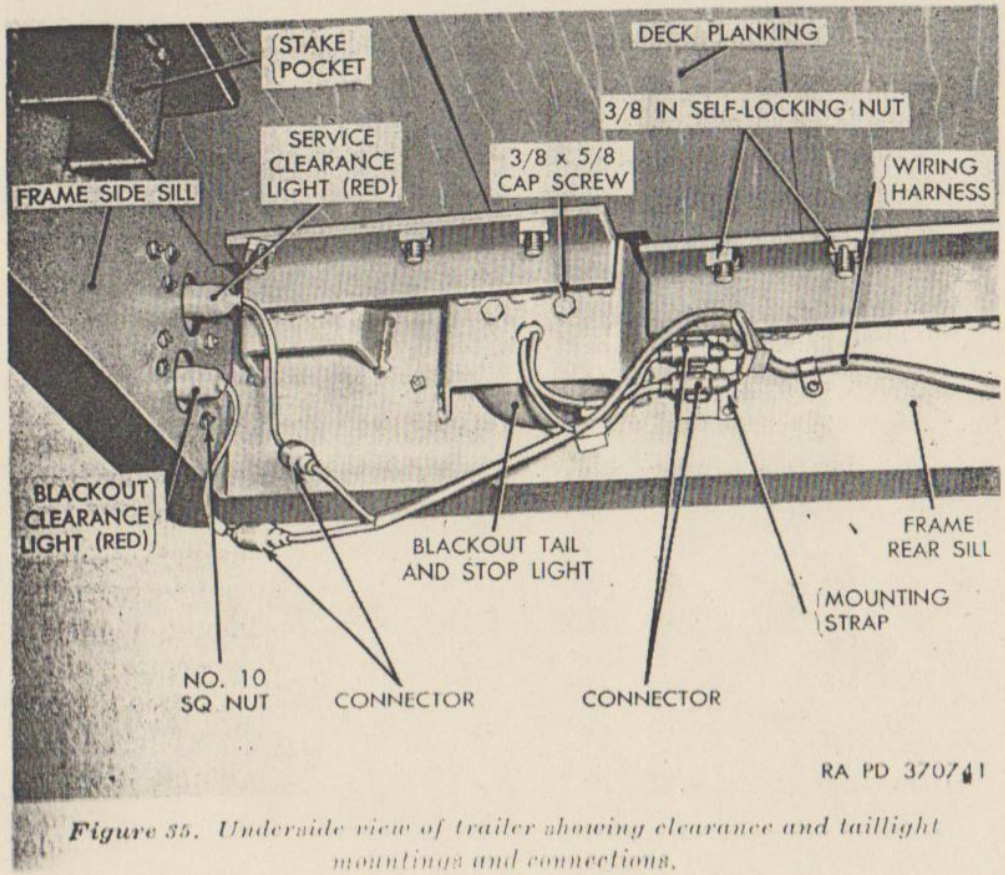


***Figure 35.*** *Underside view of trailer showing clearance and taillight mountings and connections.*

## 13. Identification and Service Data Plates

*a. Service Data Plate* (fig. 19). The service data plate for the 10-ton 4-wheel flat bed trailer M345 is located on the right side of the trailer front sill. The service data plate shows the ordnance stock number, manufacturer's name and serial number, model designation, contract number, weight and dimension data, shipping cubage, publications pertaining to the vehicle, delivery date, and inspector's initials.

*b. Identification Plate* (fig. 19).

## 14. Tabulated Data

*a. 10-Ton 4-Wheel Platform Trailer M345.*

| | |
|---|---|
| Dimensions overall: | |
| Height (loaded, back of trailer) | 4 ft 6½ in |
| Height (loaded, at lunette) | 2 ft 5 in |
| Length | 27 ft 9 in |
| Width | 8 ft 2 in |
| Lunette location (to front sill of trailer) | 4 ft 6 in |
| Towing vehicle | any vehicle of sufficient tonnage equipped with pinlehok and air supply |
| Track (tread-center-to-center of tires) | 6 ft |
| Weights: | |
| Payload: | |
| Cross country (30 mph) | 20,000 lb |
| Highway (55 mph) | 26,000 lb |
| On wheels: | |
| Empty | 10,431 lb |
| Cross country (30 mph) | 29,432 lb |
| Highway (55 mph) | 35,132 lb |
| On lunette: | |
| Empty | 829 lb |
| Cross country (30 mph) | 1,828 lb |
| Highway (55 mph) | 2,128 lb |
| Shipping cubage | 1,065 cu ft |

*b. Axles.*

| | |
|---|---|
| Diameter | 5½ in |
| Manufacturer | Visioneering Co |
| Number | 2 |
| Spindle (diameter) | 3½ in |
| Type | tubular |
| Center-to-center | 4 ft 4 in |
| Front axle to axle trunnion (center-to-center) | 2 ft 2 in |
| Rear axle to axle trunnion (center-to-center) | 2 ft 2 in |

*c. Axle Trunnion.*

| | |
|---|---|
| Diameter | 3⅝ in |
| Number | 1 |
| Type | Cold-rolled |
| Length | 3 ft 4⅝ in |

*d. Springs.*

| | |
|---|---|
| Hardness | Brinell 388 to 444 |
| Number of leaves | 13 |
| Type | semielliptic |
| Width | 5 in |

*e. Brakes.*

| | |
|---|---|
| Actuation | air-over-hydraulic |

*f. Wheels.*

| | |
|---|---|
| Diameter of stud circle | 11¼ in |
| Manufacturer | The Budd Co |
| Number of studs | 10 |
| Rim size | 20 x 7.5 |
| Tire retention and removal | split retaining ring |
| Type | dual, military disk |
| Wheel bearings (type) | tapered roller |

*g. Tires.*

| | |
|---|---|
| Number | 8 |
| Number of plies | 12 |
| Size | 11.00 x 20 |
| Tire inflation: | |
| Cross-country driving | 35 psi |
| Highway driving | 50 psi |
| Snow, mud, and sand driving | 15 psi |
| Maximum | 70 psi |
| Type | NDCC Military |

*h. Landing Legs.*

| | |
|---|---|
| Manufacturer | Homan & Co., Inc |
| Number | 2 |
| Operation | handcrank |
| Type | vertical, one leg with foot at each end of trailer |

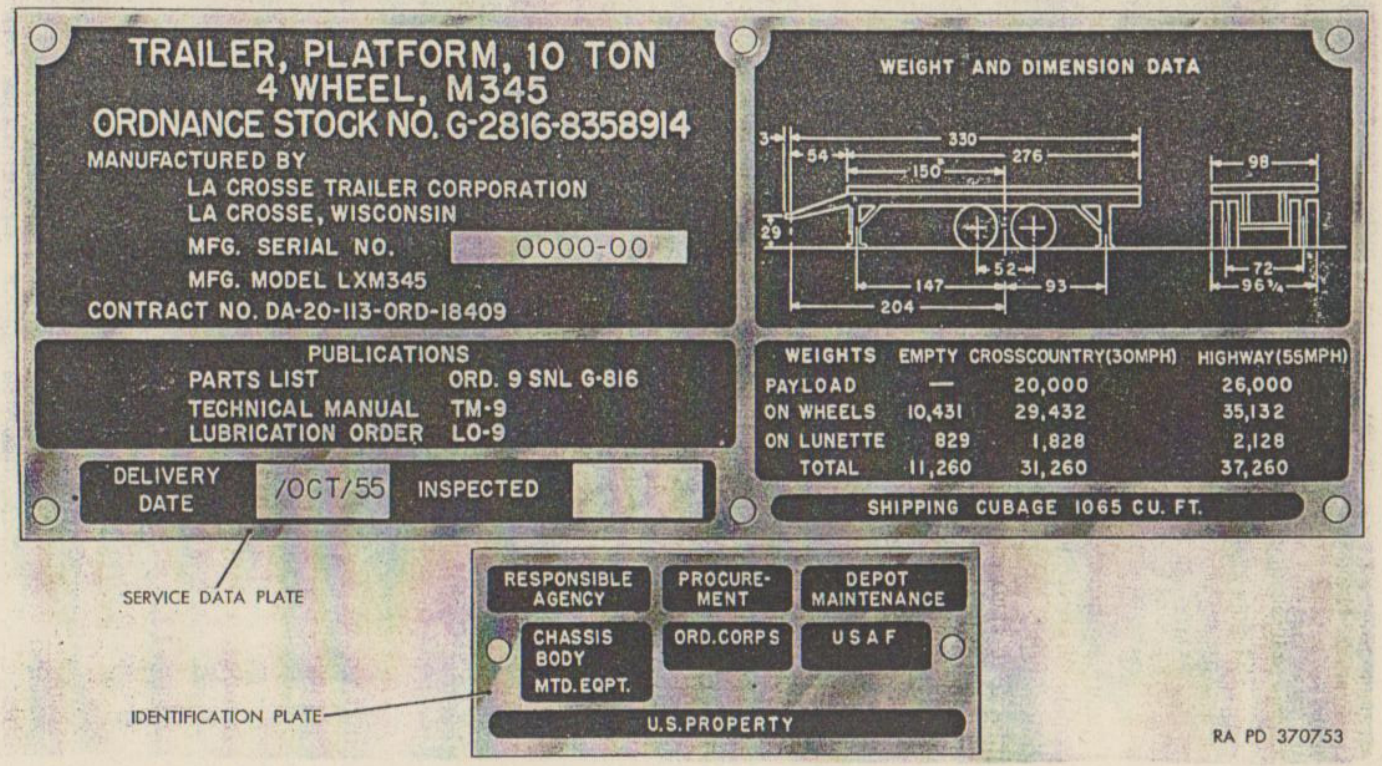


*Figure 19. Trailer identification and service data plates.*