TM5-9138

WAR DEPARTMENT

MAINTENANCE MANUAL AND PARTS CATALOG

SWEEPER, ROTARY BROOM, TRAILER. MOUNTED, TRACTION POWERED, TWO WAY SWEEPING, MODEL TU-WAY

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILL.

JULY 12, 1943

TM5-9138

WAR DEPARTMENT

TM5-9138, Maintenance Manual and Parts Catalog Sweeper, Rotary Broom, Trailer. Mounted, Traction Powered, Two Way Sweeping, Model Tu-Way, published by The Frank G. Hough Co., is furnished for the information and guidance of all concerned.

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G. C. MARSHALL,
Chief of Staff.

Official:

J. A. ULIO,
Major General,
The Adjutant General.

Combined

OPERATOR'S MANUAL
MAINTENANCE MANUAL

and

SPARE PARTS CATALOG

for

SWEEPER, ROTARY BROOM, TRAILER
MOUNTED, TRACTION POWERED,
TWO WAY SWEEPING,
MODEL TU-WAY.

and

Brush Filling Machine

Manufactured for

CORPS OF ENGINEERS

by

THE FRANK G. HOUGH CO.

Libertyville, Illinois

This Book Covers

War Dept. Purchase Orders—

C-4014	**Serial Nos. TTS-196 THRU TTS-245**
	TTS-310 THRU TTS-459
DE-3460-627-43	**Serial Nos. TTS-249 THRU TTS-301**

OPERATING AND MAINTENANCE INSTRUCTIONS AND SPARE PARTS CATALOG

SWEEPER, TU-WAY, TRACTION DRIVEN TYPE

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SWEEPER, TU-WAY, TRACTION DRIVEN TYPE

Fig. 1
Sweeper, Tu-Way, Traction Driven Type

FOREWORD

This sweeper is designed to do dry sweeping on roads, runways, and aprons with a minimum of effort and time.

The forward travel is produced by some type of prime mover with a rear drawbar attachment.

The power to revolve the brush is produced by traction on both rear wheels. The rotation of the wheels delivers the power through two differentials into the rear axle.

A chain and sprocket drive connects the rear axle to a gearbox. The power is transmitted from the rear axle through the chain and sprocket drive into the gearbox.

A three speed transmission is fixed to the gearbox and carries the power from the gearbox through the transmission to a universal joint assembly.

The universal joint assembly transmits the power to a countershaft which in turn delivers the power to the brush causing the rotation.

The sweeper will sweep a path either to the right or left. The brush is adjustable for ground pressure which permits even sweeping. The brush is raised or lowered by a hydraulic lift.

A travel lock arrangement permits the transporting of the sweeper from one location to another.

SAFETY RULES

For your safety and to prevent damage to the sweeper, the following safety rules should be observed at all times.

1. Never shift transmission gears while sweeper is in motion.
2. Never attempt short turns at high speeds.
3. Do not operate sweeper without chain guards.
4. Never transport sweeper without engaging travel lock.
5. Do not tow sweeper at high speeds. This machine is <u>not</u> equipped with brakes.
6. Never operate sweeper without the correct amount of traction weight on the rear platform.
7. <u>READ THIS INSTRUCTION MANUAL CAREFULLY.</u>

A Careful Operator

IS THE BEST INSURANCE

AGAINST AN ACCIDENT

—National Safety Council.

SWEEPER, TU-WAY, TRACTION DRIVEN TYPE

●

OPERATOR'S INSTRUCTION

SECTION I

●

CONTENTS

CONDENSED SPECIFICATIONS AND SERVICE DATA

BRUSH

Diameter - 30 inches
Length - 96 inches
Sweeping path - 78 inches

BRUSH SPEEDS AT 4 M.P.H.

1st. - 60.00 R.P.M.
2nd. - 102.00 R.P.M.
3rd. - 160.00 R.P.M.

TRANSMISSION GEAR RATIO

1st. - 2.664:1
2nd. - 1.565:1
3rd. - 1:1

ANGLES OF DELIVERY

Right - 30°
Left - 25°

PNEUMATIC TIRES

Front - 6.00 x 9 - 4 ply - rib tread
Rear - 6.00 x 16 - 4 ply - automotive

PNEUMATIC TIRE INFLATION PRESSURES

Front - 35 lbs. per square inch
Rear - 40 lbs. per square inch

CAPACITIES

Transmission - 1 U.S. Quart
Gearbox - 1 U.S. Quart

GENERAL DIMENSIONS

Length overall - 192½ inches
Width overall - 108 inches
Height overall - 49½ inches
Wheel Base - 102 inches
Tread - 62½ inches

SHIPPING WEIGHT - 1650 lbs.

PREPARING A NEW SWEEPER FOR USE

This sweeper has been thoroughly tested and inspected before it left the factory. Nevertheless, a careful inspection should be made before the sweeper is put into use.

ASSEMBLING THE SWEEPER IF RECEIVED "K.D."

The sweeper, in most cases, is shipped completely set up and ready for operation. If the sweeper is received "K.D.", it will be received on two (2) skids comprising of the following:

1. One (1) skid with main frame comprising:
   a. Wheels
   b. Tow pole
   c. Universal joint assembly
   d. Transmission

2. One (1) skid with complete brush comprising:
   a. Complete brush
   b. Brush hood
   c. Brush frame
   d. Brush pivot frame
   e. Hydraulic lift assembly

NOTE: IF EXTRA BRUSHES ACCOMPANY THE SHIPMENT, THEY WILL BE RECEIVED ON INDIVIDUAL SKIDS.

To assemble the sweeper for operation, this procedure must be followed:

1. Remove all components from the skids.

NOTE: DO NOT REMOVE EXTRA BRUSHES. THEY SHOULD BE KEPT ON SKIDS TO FACILITATE STORAGE AND HANDLING.

2. Block up the main frame in order to install the wheels. A suggested procedure for this blocking is outlined as follows: (See Fig. No. 2 Page 8)

   A. If chain hoist is available, secure chain to the tubular frame (1) close to the rear platform (2) and raise the rear of the sweeper to a height so blocks about 10 inches high can be placed under the front corners of the rear platform.

   B. Lower the sweeper on the blocks and remove the chain hoist.

   C. Secure the chain hoist near the front of the sweeper and raise to a height so that the front hangs evenly with the rear of the sweeper.

3. To assemble the rear wheels on the rear axle, this procedure must be followed: (See Fig. No. 2 Page 8)

   A. Remove the five studs (3) from each rear hub (4) located on the rear axle (5).

   B. Remove hub cap (6) from rear wheels (7) and slip

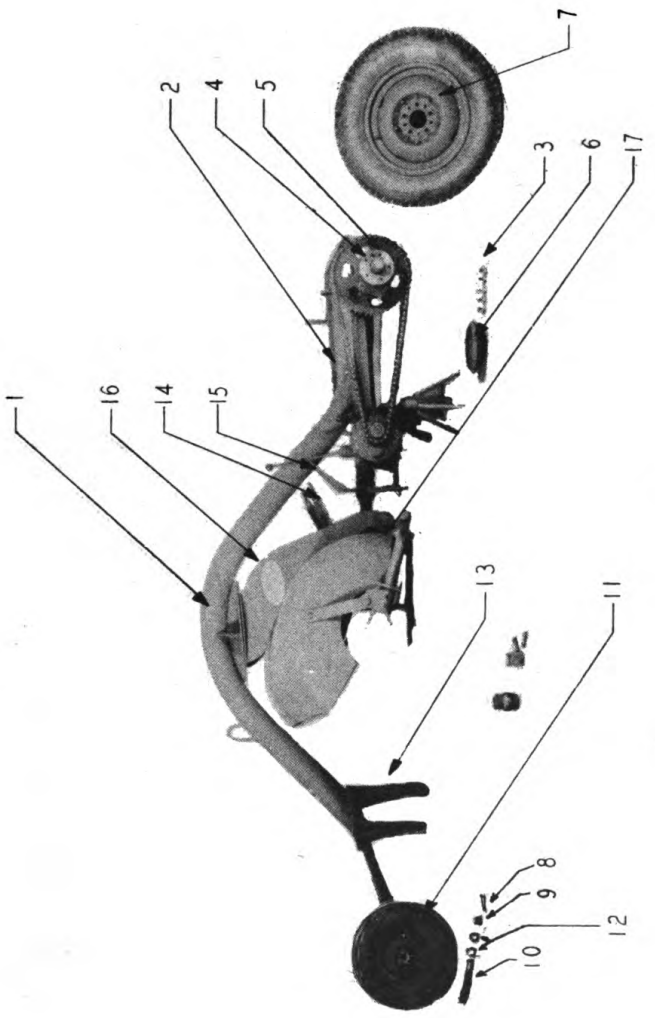


Fig. 2
Sweeper Set Up On Blocks

1. Frame, 2. Rear Platform, 3. Studs, 4. Rear Hub, 5. Rear Axle, 6. Hub Cap, 7. Rear Wheel, 8. Cotter Key, 9. Front Axle Nut, 10. Front Axle, 11. Front Wheel, 12. Bearing Spacer, 13. Steering Fork, 14. Counterbalance Spring, 15. Adjusting Stud, 16. Pivot Frame, 17. Brush Hood.

wheel (7) on axle until it is flush against the wheel hub (4).

C. Insert the five wheel studs (3) previously removed from the rear hubs (4) and draw them down evenly and tightly.

D. Replace hub caps (6) on wheels.

4. To assemble the front wheel in the steering support, this procedure must be followed. (See Fig. No. 2 Page 8)

A. Take out cotter key (8) and remove front axle nut (9) from the axle (10).

B. Withdraw the axle (10) from the front wheel (11) releasing the two bearing spacers (12) which are loose on the axle.

C. Place the front wheel in the steering fork (13). Insert one of the bearing spacers (12) between the wheel (11) and the steering fork (13).

D. Insert the front axle (10) through the steering fork (13), bearing spacer (12), and part way through the wheel (11).

E. Insert the other bearing spacer (12) between the steering fork (13) and the wheel (11) and push axle (10) through the spacer (12) and steering fork (13).

CAUTION: BE SURE TO PLACE THE BEVELED EDGE OF THE BEARING SPACER NEXT TO THE WHEEL.

F. Screw on the front axle nut (9) and draw it tight. Back off the nut (9) until wheel (11) turns free by hand. Insert cotter key (8) to lock the nut (9) on the axle (10). (Refer to "Wheels" Page 20)

5. To assemble the brush to the main sweeper frame, this procedure must be followed: (See Fig. No. 3 Page 10)

A. Remove the counterbalance springs (1) from the adjusting studs (2) on the brush frame.

B. Remove the nuts (6) from the three brush frame mounting plate bolts.

C. Take out cotter keys from pins (3) (4) holding jack lift (5) to the brush frame. Pull out the pins and remove the jack from brush frame. (See Fig. No. 3 Page 10).

D. Slide the brush under the main sweeper frame with brush hood toward the rear of the sweeper.

E. Start the spring tension adjusting studs (2) through the holes provided in the main frame, and at the same time lining up the three holes on the brush frame and on the main frame.

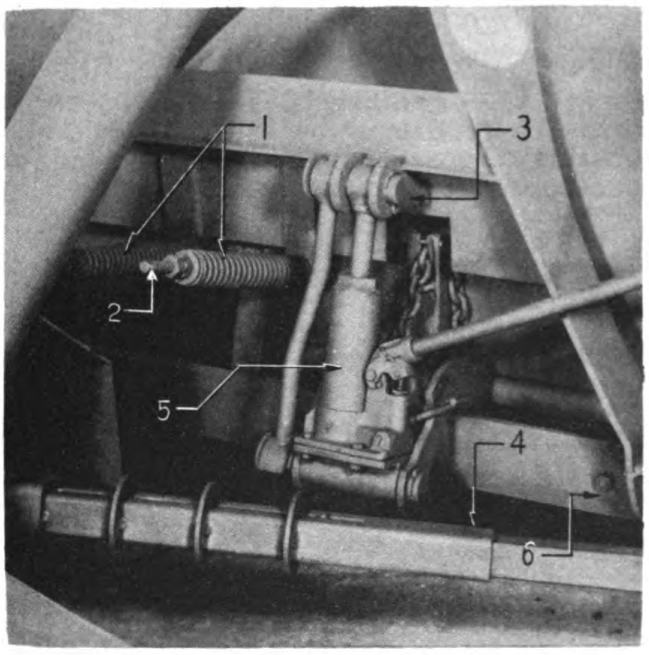


Fig. 3
Brush Lift Components

1. Counterbalance Springs, 2. Adjusting Studs, 3. Jack Pin, 4. Jack Pin, 5. Jack, 6. Nut.

F. Place the flat washers on the three bolts and insert them in the holes lined up during the previous operation. Put lock washers on the three bolts and screw on nuts (6) leaving them loose until brush is adjusted.

NOTE: SEE "BRUSH ADJUSTMENT FOR UNEVEN WEAR" page 17.

G. Replace jack lift (5) assembly by reversing the procedure explained in operation "C". (See Fig. 3 Page 10)

H. Connect the brush adjustment chain, (Refer to "BRUSH ADJUSTMENT FOR WEAR" page 16.)

I. Replace counterbalance springs (1) and adjust. (Refer to "COUNTERBALANCE SPRING ADJUSTMENT" page 19).

LUBRICATION

Lubricate the entire sweeper using Lubrication Chart Fig. No. 14 Page 23 as a guide.

Check the oil level in the transmission. The level must be filled to the height of the level plug.

CAUTION: A SWEEPER SHOULD NEVER BE RUN BEFORE THE TRANSMISSION AND GEARBOX ARE PROPERLY CHECKED AND FILLED WITH OIL.

Check the oil level in the lifting jack. The level must be filled to the height of the filler screw hole and no more. This is important.

PNEUMATIC TIRES

Before operating the sweeper, even to unload, check the following air pressure recommendations.

FRONT TIRE: 35 lbs. per square inch
REAR TIRES: 40 lbs. per square inch

Air pressures must not be allowed to drop below these recommendations. Tires must be checked every 128 hours with an accurate low pressure gauge.

Keep the tire valve caps in place and screwed tight to prevent mud, gravel and water from entering and damaging the valve core, also to prevent the loss of air.

BRUSH ASSEMBLY

Before putting the sweeper into operation, the following brush adjustments should be checked:

1. ADJUSTMENT FOR WEAR - See Page 16.
2. ADJUSTMENT FOR UNEVEN WEAR - See Page 17.

CHAIN DRIVES

The chain drives must be checked before the sweeper is put into its initial operation. The following must be checked:

1. DRIVE CHAIN - REAR AXLE TO GEARBOX - See Page 17.
2. DRIVE CHAIN - BRUSH COUNTERSHAFT TO BRUSH - See page 18.

JACK LIFT ASSEMBLY

The jack lift assembly must be checked to see if it is in working order before putting the sweeper into operation. Check the following:

1. OIL LEVEL - See Page 20.
2. AIR BOUND JACK - See Page 20.

PUTTING THE SWEEPER INTO OPERATION

With the sweeper properly serviced and checked as explained in the preceding pages, operation may be started.

Proper and efficient sweeper operation will be experienced by carefully following the instructions as outlined.

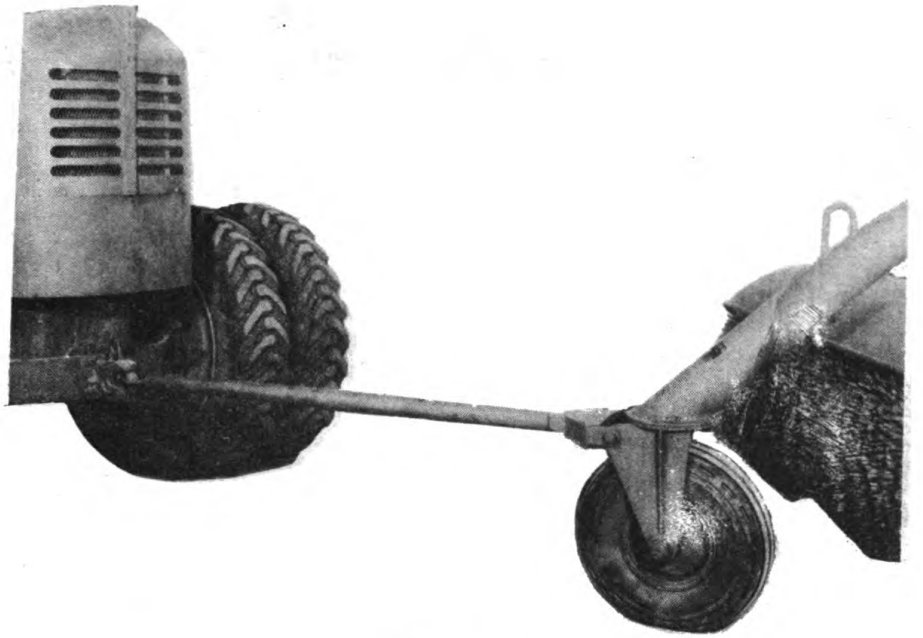


Fig. 4
Tow Pole Hook Up

TOW POLE HOOK UP

The power to propel the sweeper is supplied by a prime mover with a rear drawbar attachment.

The sweeper must be securely attached to the prime mover. See Fig. No. 4, Page 12.

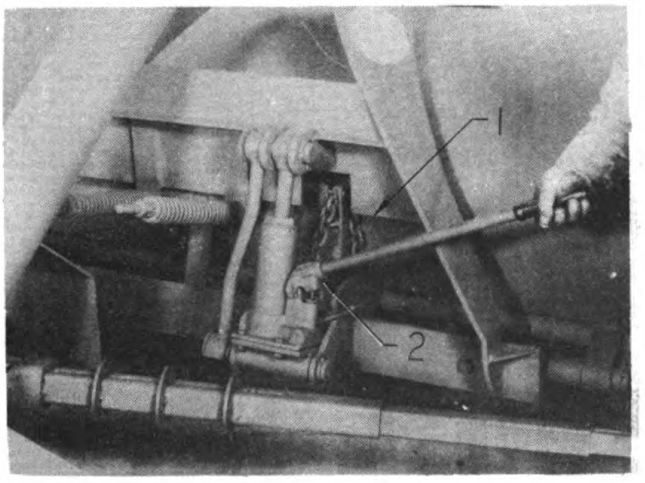


Fig. 5
Raising The Brush

1. Jack Handle, 2. Valve Release Lever.

BRUSH POSITIONS

The brush has five (5) positions, "RAISE", "LOWER", "RIGHT", "CENTER", and "LEFT", encountered during operation.

RAISE

To raise the brush off the ground, turn the valve release lever (2) all the way to the right. Actuate the jack handle (1) up and down until the brush is clear of the ground. (See Fig. No. 5, Page 12).

NOTE: THE BRUSH WILL LIFT 5" OFF THE GROUND WHEN RAISED TO ITS FULL HEIGHT.

LOWER

To lower the brush, turn valve release lever (2) slowly to the left and brush will lower. (See Fig. No. 5, Page 12).

RIGHT - CENTER - LEFT (See Fig. No. 6, Page 13).

To have the sweeper sweep a path to the RIGHT or LEFT, raise the brush off the ground. Pull out the pivot stop and pivot the brush either to the RIGHT or LEFT. Replace the pivot stop in the hole on the right or left side of the pivot frame, locking the brush in position.

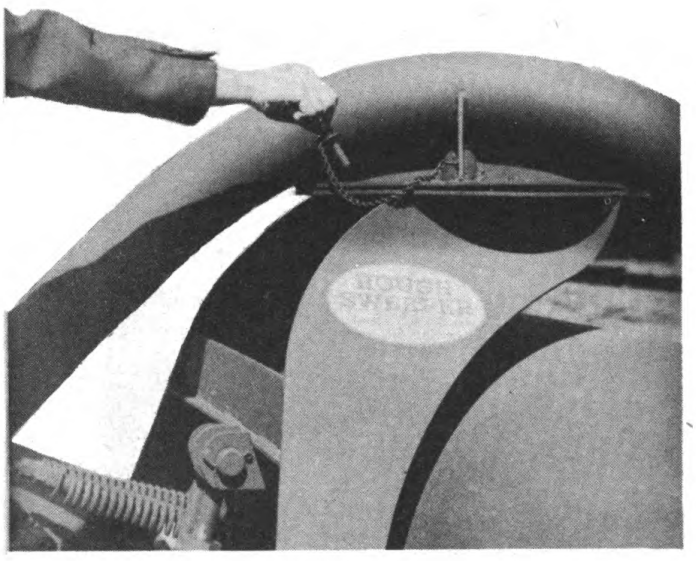


Fig. 6
Engaging Pivot Stop

CENTER position is used in travel position (See TRAVEL POSITION page 15) and is located by the same methos as previously explained in RIGHT AND LEFT positions. (See Fig. No. 6, Page 13).

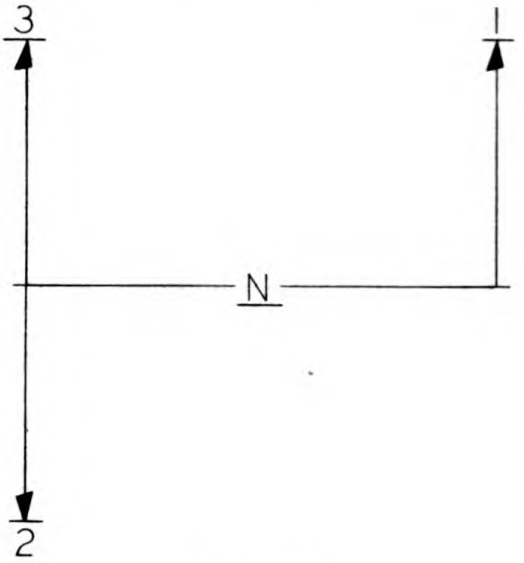


Fig. 7
Gear Shift Diagram

OPERATING THE SWEEPER

With the sweeper standing idle, the transmission may be shifted into the sweeping speed desired. (See Fig. No. 7, Page 14).

The transmission and shift lever are located behind the brush hood and on the left hand side of the sweeper. The operator must station himself on the left hand side of the sweeper in order to shift speeds correctly. (See Fig. No. 8, Page 14).

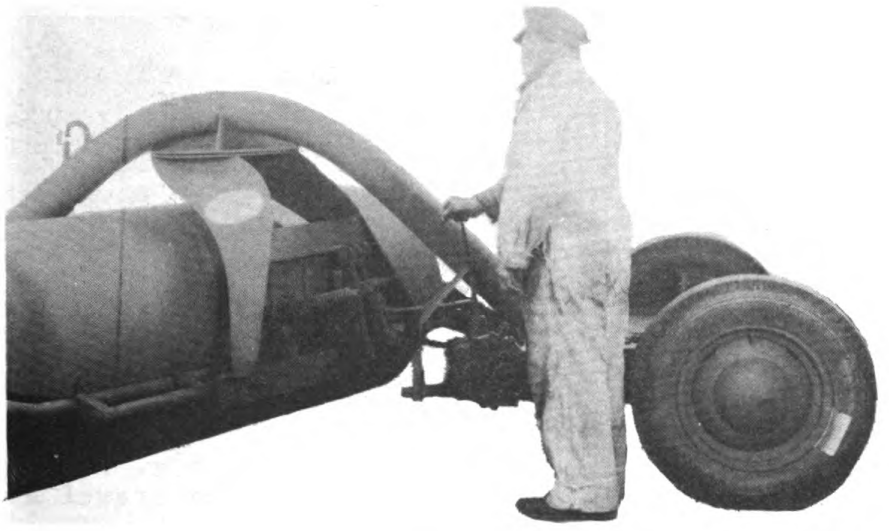


Fig. 8
Operator's Position to Shift Gears

The gear selected depends entirely on the sweeping conditions.

The brush speeds in R.P.M. with the prime mover operating at 4 M.P.H. are as follows:

1st speed - 60 R.P.M.
2nd speed - 102 R.P.M.
3rd speed - 160 R.P.M.

The transmission should be in neutral when transporting the sweeper from one location to another. (See TRAVEL POSITION, Page 15).

CAUTION: NEVER ATTEMPT TO SHIFT GEARS WHILE SWEEPER IS IN MOTION.

CAUTION: WHEN TURNING, WATCH CAREFULLY THE CLEARANCE BETWEEN THE TOW POLE AND SWEEPER HOOD.

ADDING TRACTION WEIGHT

The sweeper should never be operated without placing traction weight on the rear platform.

Sand bags or some similar form of weight is suitable. On 8 ft. sweepers, a maximum of 1000 lbs. is suitable as stenciled on the rear platform.

On all 9 ft. and 10 ft. sweepers and additional amount of weight must be used. This additional weight should not exceed a total maximum weight of 1500 lbs. as stenciled on the rear platform.

TRAVEL POSITION

(See Fig. No. 9, Page 15)

To place the brush in the travel position, lock brush in either CENTER or LEFT position. Raise the brush to its full height. Move travel ram (1) so that it is in line with the jack base shaft (2). Lower brush having the travel ram rest on the jack base shaft.

CAUTION: NEVER TRANSPORT SWEEPER WITH TRANSMISSION ENGAGED. ALWAYS HAVE TRANSMISSION IN NEUTRAL POSITION.

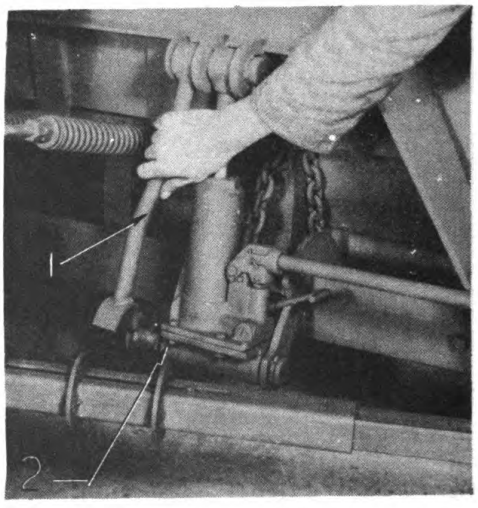


Fig. 9
Engaging Travel Ram

1. Travel ram, 2. Jack base shaft.

OPERATOR'S MAINTENANCE

In addition to operating and lubricating the sweeper, it may be necessary to make minor field adjustments and repairs. All the adjustments discussed in the remainder of the OPERATOR'S INSTRUCTION SECTION can be made by the operator in the field. It is suggested that other servicing be left to field maintenance sections or the sweeper returned to a base for complete overhaul.

CARE OF THE BRUSH

Before starting the initial operation and periodically while brush is in use, it is advisable to soak the brush with water. This toughens the fibres and gives prolonged brush life.

CAUTION: NEVER LET BRUSH REST ON GROUND WHEN SWEEPER IS STANDING IDLE OR IN STORAGE. ALWAYS ENGAGE TRAVEL LOCK.

BRUSH ADJUSTMENT FOR WEAR

As the brush wears, it will be necessary to readjust the lift chain on the lift arm assembly. The chain must be lengthened to compensate for brush wear and must be again shortened when a new brush is installed. To make this adjustment, follow this procedure: (See Fig. 10, Page 16).

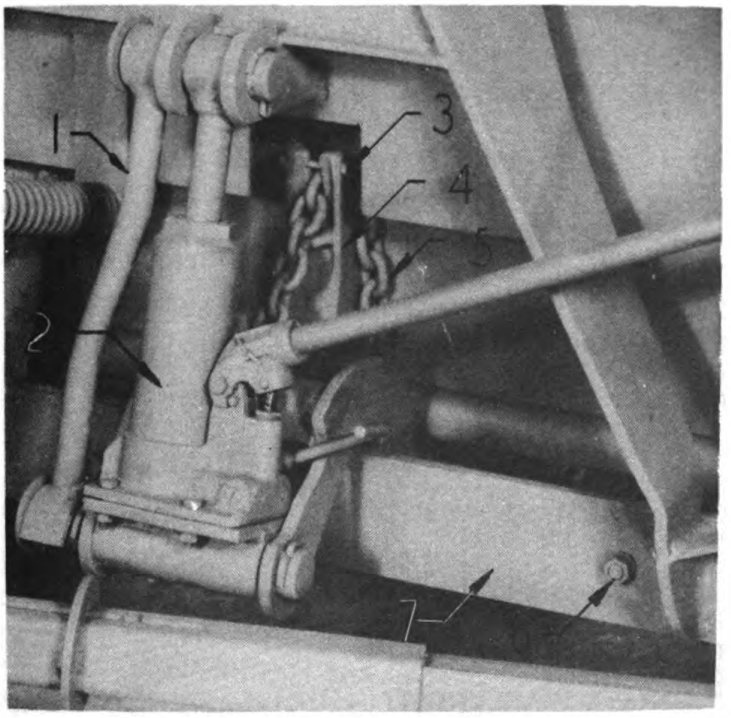


Fig. 10
Brush Adjustments

1. Travel ram, 2. Jack Assembly, 3. Cap screw, 4. Chain Bracket, 5. Chain, 6. Nut, 7. Brush Suspension Frame.

1. Lower brush to ground, disengaging travel ram (1).

2. Lift up on bottom of jack assembly (2) to release chain tension.

3. Take out cap screw (3) from chain bracket (4) and let out chain (5) one link.

4. Replace cap screw (3) in chain bracket (4).

5. See if travel lock (1) will engage, if not, repeat above procedure and let out chain one more link.

BRUSH ADJUSTMENT FOR UNEVEN WEAR

If the brush should wear unevenly and become tapered to some degree from end to end, the brush suspension frame can be adjusted to compensate for this type of wear. To make this adjustment follow this procedure: (See Fig. 10, Page 16).

1. Loosen nuts (6) on the brush suspension frame (7), loosening the two end nuts first, then the center nut.

2. Level brush on the right or left, as the case may be.

3. Tighten all three nuts to lock this adjustment.

NOTE: AFTER THIS ADJUSTMENT IS MADE, CHECK DRIVE CHAINS FOR PROPER ADJUSTMENT. (See Pages 18 and 19).

NOTE: AFTER THIS ADJUSTMENT IS MADE, CHECK BRUSH FOR WEAR. (See Page 16).

CHANGING THE BRUSH

When the bristles of the brush have been worn down to within a few inches of the brush core (3 to 6 inches, depending on the quality of the work to be done) the brush must be changed.

This change must not be made in the field. The procedure for "CHANGING THE BRUSH" is fully discussed in the MAINTENANCE SECTION on page 34.

TURNING BRUSH END FOR END

If the brush has been worn into a cone shape, the brush should be turned end for end.

This change must not be attempted by the operator in the field. "TURNING THE BRUSH END FOR END" is discussed fully in the MAINTENANCE SECTION on page 34.

DRIVE CHAIN ADJUSTMENT - REAR AXLE TO GEARBOX

The adjustment for this chain is very simple and little time and effort is needed to make the adjustment. To properly adjust the chain, the following procedure must be followed: (See Fig. 11, Page 18).

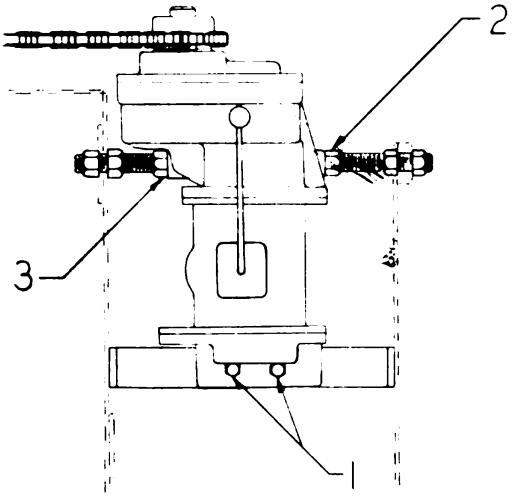


Fig. 11
Drive Chain Adjustment - 1
1. Cap screw, 2. Nut, 3. Nut.

1. Loosen the two cap screws (1) holding transmission to main frame.

2. Back off nut (2) about 1/2 inch.

3. Draw up on nut (3) until desired chain tension is attained.

4. Draw up on nut (2) until tight against gearbox.

5. Tighten two cap screws (1) to lock the adjustment.

NOTE: THE AMOUNT OF CHAIN SAG SHOULD BE SMALL -- JUST ENOUGH ORDINARILY TO BE SHORT OF "FIDDLE STRING" TIGHTNESS, THE CHAIN BEING MOVABLE UP AND DOWN AT MID-SPAN BY HAND WITH LITTLE PRESSURE.

DRIVE CHAIN - UNIVERSAL JOINT TO BRUSH

This drive chain adjustment is also very simple and little time and effort is needed to make this adjustment. Follow this procedure for the adjustment: (See Fig. 12, Page 19).

1. Loosen Allen head screw (1) in brush socket.

2. Loosen the two outside nuts (2) on the brush socket adjusting studs.

3. Draw up inside nuts (3) toward brush socket until desired tension is obtained. (See note under DRIVE CHAIN ADJUSTMENT - REAR AXLE TO GEARBOX Page 18).

4. Tighten the outside nuts (2) and the Allen head screw (1) in brush socket to lock the adjustment.

5. The same amount of adjustment should be made on the left hand side of the brush.

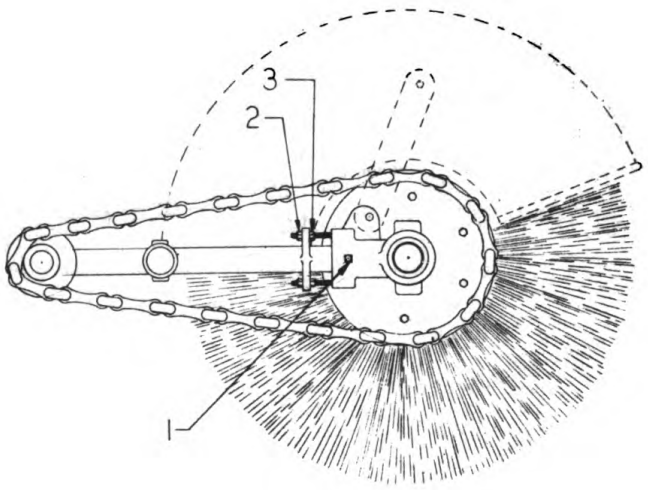


Fig. 12
Drive Chain Adjustment - 2

1. Allen head screw, 2. Outside nut, 3. Inside nut.

COUNTERBALANCE SPRING ADJUSTMENT

The adjustment of the brush for ground pressure is made through the counterbalance springs. The brush should have very light contact pressure when it is in sweeping position. To make this adjustment, this procedure must be followed:

1. Raise brush to full height to take up on the springs.
2. Tighten nuts on adjusting studs until springs just start to compress.
3. Lower brush to ground; lift up on front of brush hood. If brush lifts easily, the right pressure has been obtained. If not, repeat the above procedure until the correct contact pressure is reached.

NOTE: TIGHTEN BOTH NUTS ON ADJUSTING STUDS TO LOCK THE ADJUSTMENT.

BRUSH LIFT

The brush lift consists of the following sub-assemblies:

1. Lift Arm.
2. Jack Lift.
3. Ram travel support.

LIFT ARM ADJUSTMENTS

There is no adjustment on the lift arm proper. The chain adjustment for wear is discussed under BRUSH ADJUSTMENT FOR WEAR page 16.

JACK LIFT ADJUSTMENTS

There are no adjustments on the Jack Lift, but during operation the jack may fail to operate, under certain conditions, and the following failures can be remedied by the operator.

OIL LEVEL IN JACK

If the jack fails to operate, first determine that its oil level reaches the filler screw hole. Position the jack so that it stands vertical on the base. Lower the ram and remove the filler screw slowly. If oil is low, add enough to raise the oil level up to the filler screw hole only and NO MORE. This is important.

AIR-BOUND JACK

If the jack fails to raise, it may be air-bound. To relieve an air-bound condition, pull ram up, open release valve and push ram down.

After checking both failures and the jack still fails to operate, replace the defective jack with a new one and send the old jack to a base for a complete overhaul.

WHEELS

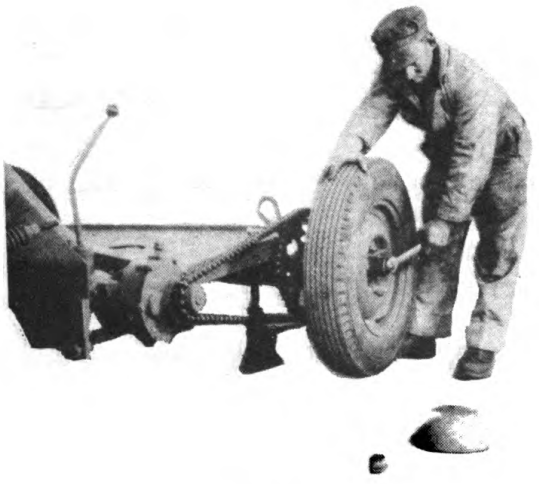


Fig. 13
Wheel Bearing Adjustment

The front wheel and both rear wheels are each carried on two opposed tapered roller bearings. Bearings are adjustable for wear and their satisfactory operation and long life depends upon periodic attention and correct lubrication.

To check and adjust the wheel bearings, follow this procedure: (See Fig. 13, Page 20).

FRONT WHEEL

1. Raise front end of sweeper so that tire clears floor.

2. With hands, test sidewise shake of the wheel. If bearings are correctly adjusted, shake of wheel will be imperceptible and wheel will turn freely with no drag. If bearing adjustment is too tight, the rollers may become overheated. Loose bearings will cause excessive wear and damage.

If this test indicates adjustment is necessary, proceed as follows: (See Fig. 13, Page 20).

1. With front wheel still raised off the floor, remove cotter key from front axle so nut can be moved.

2. Rotating wheel, tighten nut until wheel binds.

3. Then back nut off about 1/6 turn or more if necessary, making sure wheel rotates freely.

4. Replace cotter key and rotate wheel before lowering.

REAR WHEEL

Raise wheel on which adjustment is to be made. Test wheel for loose bearing. If adjustment is necessary, proceed as follows: (See Fig. 13, Page 20).

1. Remove hub cap.

2. Bend lip of axle nut lock washer so that nut and lock washer can be moved.

3. Rotating wheel, tighten adjusting nut until wheel binds.

4. Then back nut off about 1/6 turn or more if necessary, making sure wheel rotates freely.

5. Replace lock by bending over lock washer lip.

6. Replace hub cap and check wheel rotation.

STORAGE OF SWEEPER FOR A MONTH OR LONGER

When sweepers are to be stored for periods of a month or longer, this procedure should be followed:

1. Lubricate entire sweeper, using lubrication chart page 23, as a guide.

2. Place brush in travel position to protect brush.

3. Protect tires by storing sweeper in a dry place and placing blocks under axles to take the weight off the tires and prevent their touching the ground.

4. Remove breather from gearbox and plug hole.

5. Tag the sweeper indicating care given sweeper and date prepared for storage.

SUGGESTIONS TO OPERATOR

The operator's responsibilities do not terminate with merely operating the sweeper. It is his responsibility to see that the sweeper is kept in first-class mechanical and operating condition, as well as to maintain its general appearance. It is, therefore, to each operators advantage to become thoroughly familiar with the functions of every working part of the sweeper. We urge the study of the information and recommendations set forth in this book.

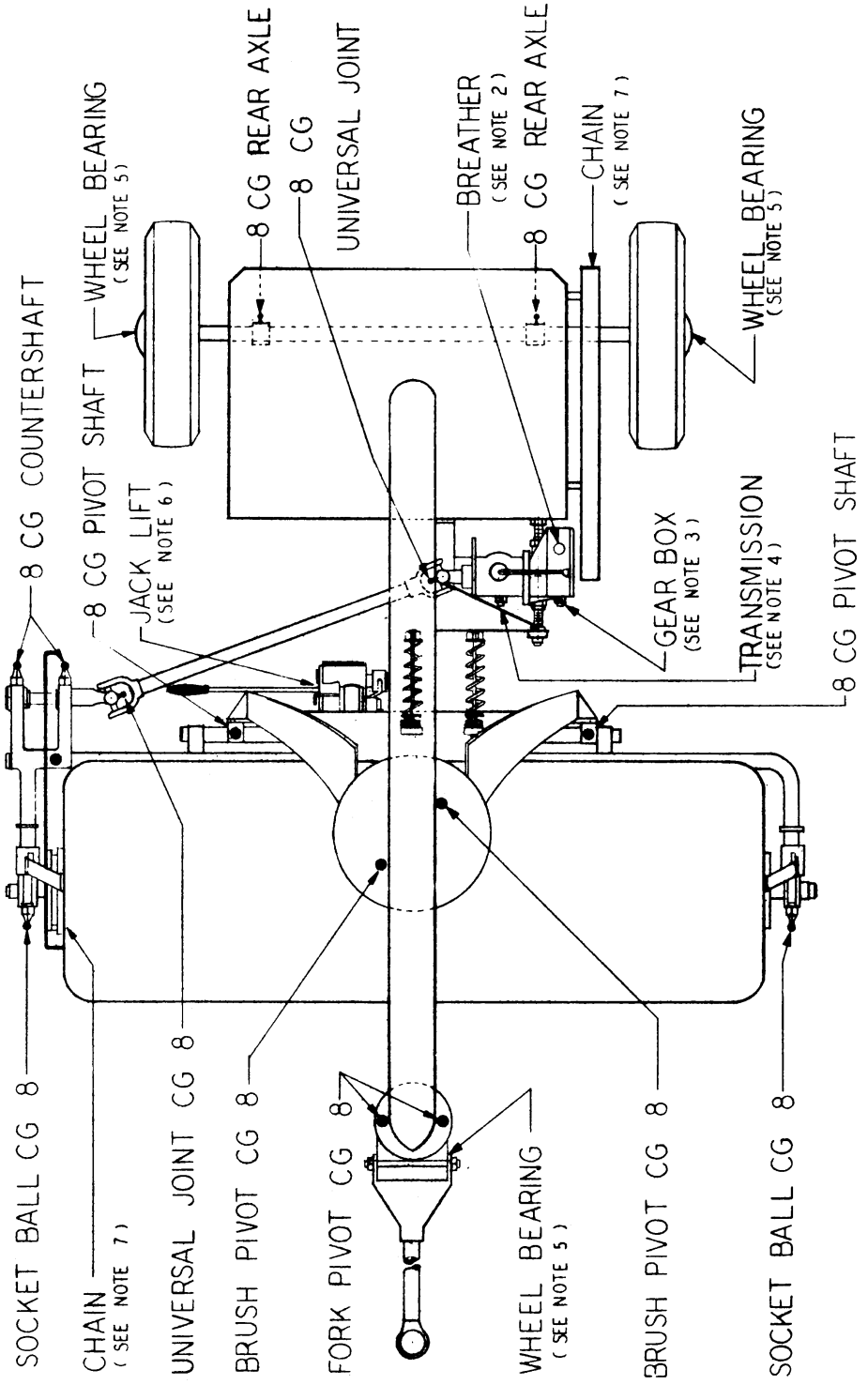


Fig. 14
Lubrication Diagram

LUBRICATING CHART

(See Fig. 14 Page 23)

UNIT	APPROX. CAP.	LOWEST EXPECTED AIR TEMPERATURE		
		ABOVE 32° F.	32° to 0° F.	BELOW 0° F.
TRANSMISSION	1 QT.	GO SAE 90	GO SAE 80	GO SAE 80
GEARBOX	1 QT.	GO SAE 90	GO SAE 80	

KEY TO LUBRICANTS

OE - Oil, Engine Crankcase Grade
WB-2 - Grease, General Purpose No. 2
GO-90 - Lubricant, Gear, Universal, SAE 90
GO-80 - Lubricant, Gear, Universal, SAE 80
CG - Grease, General Purpose
No. 1 (Above 32° F.)
No. 2 (Below 32° F.)

NOTES - ADDITIONAL LUBRICATION AND SERVICE INSTRUCTIONS ON INDIVIDUAL UNITS AND PARTS.

FITTINGS

1. Clean thoroughly before applying the lubricant gun.

GEARBOX BREATHER

2. Every 32 hours remove and clean thoroughly.

GEARBOX

3. Every 128 hours check level with sweeper on level ground and add lubricant if necessary. Every 256 hours drain. Always drain immediately after operation. Refill to level plug. See table.

TRANSMISSION

4. Every 128 hours check level with sweeper on level ground and add lubricant if necessary. Every 256 hours drain. Always drain immediately after operation. Refill to upper level plug. See table.

WHEEL BEARINGS

5. Every 512 hours remove wheels, clean and repack bearings with WB-2 grease.

JACK LIFT ASSEMBLY

6. Every 32 hours check oil level and add lubricant if necessary.

DRIVE CHAINS

7. Every 64 hours remove chain, wash, dry and spray with light oil.

INSPECTION TABLE

Brush	Every	256	Hours
Brush Ground Pressure	"	8	"
Drive Chains	"	64	"
Gearbox	"	128	"
Jack	"	32	"
Tire Pressures	"	128	"
Transmission	"	128	"
Uneven Brush Wear	"	8	"
Universal Joint	"	512	"

SWEEPER, TU-WAY, TRACTION DRIVEN TYPE

●

MAINTENANCE INSTRUCTIONS

SECTION II

●

CONTENTS

MAINTENANCE INSTRUCTIONS

All repairs and adjustments discussed in the MAINTENANCE SECTION must be made in a shop and should not be attempted in the field.

TRANSMISSION

(See Fig. 17, 20 Pages 28, 30)

The transmission is of the three speed, synchromesh type with synchronized second and high speed gears. For shifting instructions see Fig. Nos. 7 & 8, page 14.

REMOVAL OF TRANSMISSION AND GEARBOX FROM SWEEPER

1. Disconnect universal joint by removing cotter key and nut, pulling universal joint straight away from transmission drive shaft.

2. Remove the two cap screws holding transmission to the transmission carrier plate.

3. Remove the nut from the front end of adjusting stud and back off the two adjusting stud nuts about 2 to 3 inches.

4. Slide the adjusting stud toward the rear of the sweeper and out of the hole in the transmission carrier frame.

5. Lower the gearbox end of the unit and lift it away from the sweeper.

DISMANTLING OF TRANSMISSION AND GEARBOX

Drain lubricants from both the transmission and gearbox through drain plug holes in bottom of each case. It is advisable to wash the outside of the cases before attempting to dismantle the unit.

To dismantle the unit the following procedure is recommended:

1. Remove chain sprocket from input shaft by loosening the Allen head screw in the hub of the sprocket and using a gear puller to pull sprocket from shaft.

2. Remove the six screws and lock washers from gearbox cover, tap cover lightly to remove the cover from the housing.

3. Using a gear puller, remove the small driven gear from transmission drive shaft.

4. Pull bearing and gear from gear box input shaft, using a gear puller.

5. Remove the 4 screws and lock washer holding gearbox housing to transmission housing.

6. Support gearbox and with a rawhide mallet or brass rod and hammer, tap lightly on the transmission main shaft and at the same time draw gearbox away from the transmission. (See Fig. No. 15, Page 27).

7. Remove four screws holding control housing to top of transmission.
8. Remove shifter plate spring and take off shifter plate.
9. Remove transmission support bracket from transmission, taking out four cap screws and tapping main shaft lightly to draw bracket away from transmission housing, being careful not to damage grease seal located in support bracket. (See Fig. 16 Page 27.)

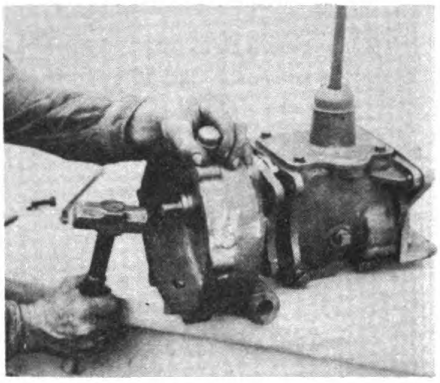


Fig. 15
Removing Gearbox

10. Remove three screws holding main drive bearing retainer and remove retainer.
11. Remove shift fork guide pin through front of retainer.
12. Remove shift fork set screws and remove shift shafts and forks. Be careful not to lose the poppet springs and balls.
13. Remove lock plate, at rear of transmission countershaft and reverse idler gear shaft.
14. With a drift, drive out countershaft. (See Fig. 18 Page 29)
15. Remove main drive gear bearing, shaft and synchronizer blocking ring.
16. Remove snap ring from main drive gear shaft and bearings. (See Fig. 19 Page 29)

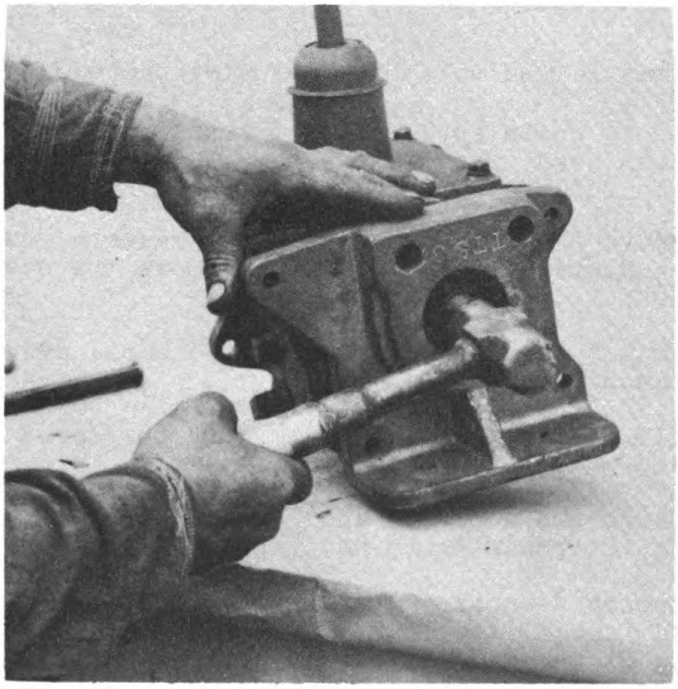


Fig. 16
Removing Transmission Bracket

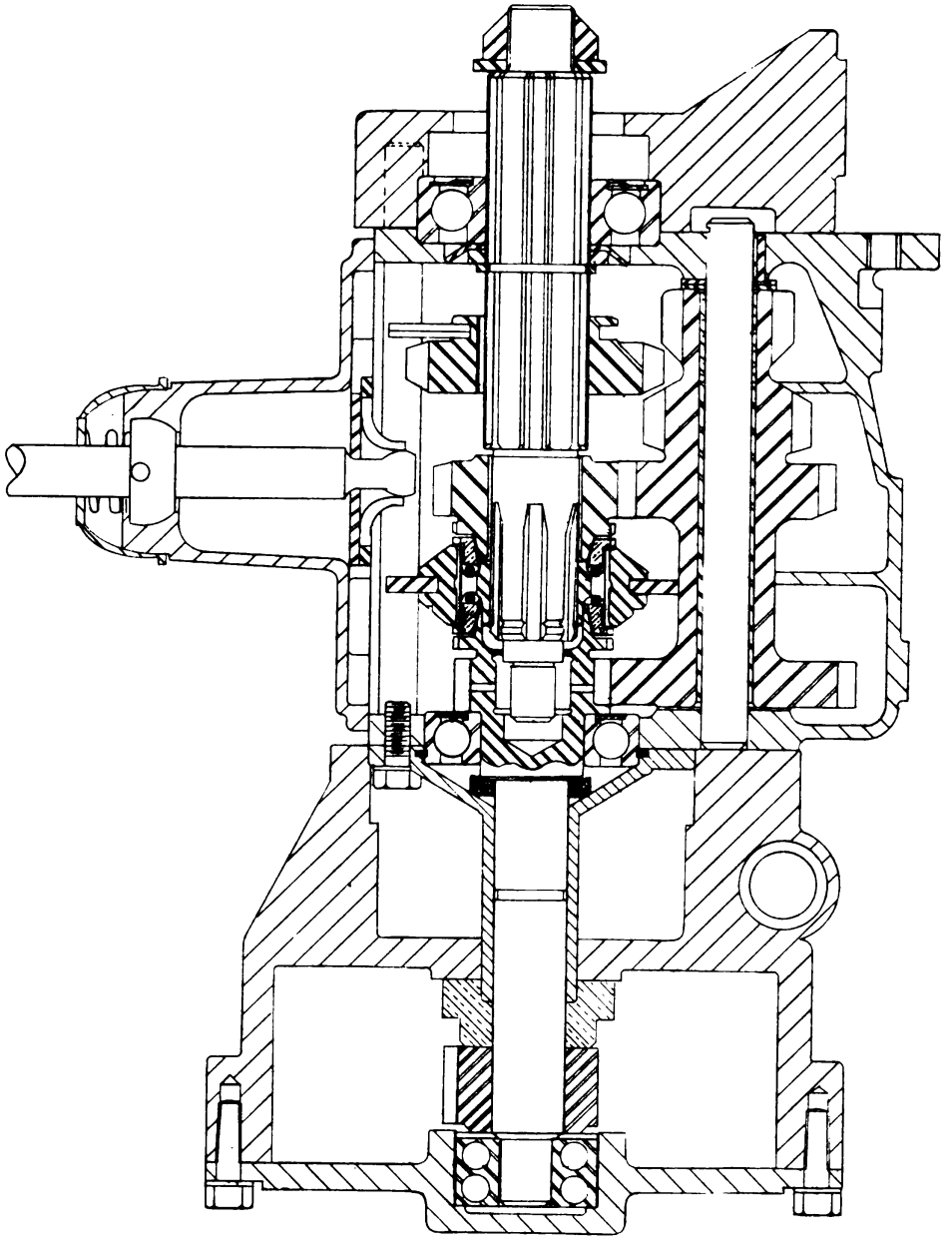


Fig. 17
Transmission - Sectional View

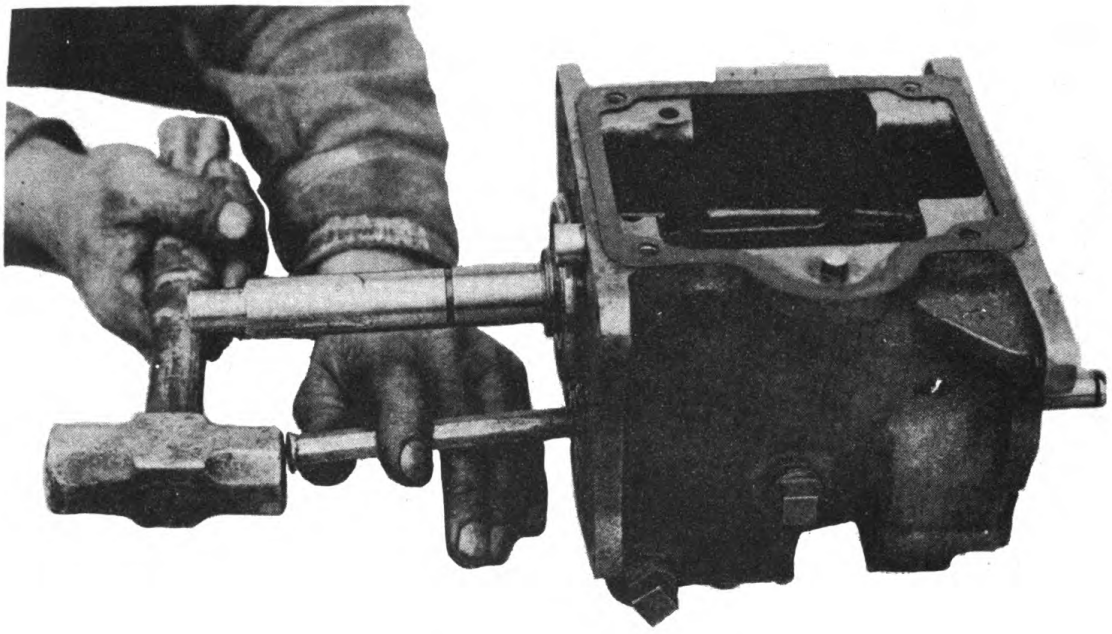


Fig. 18
Removing Countershaft

17. Remove main shaft assembly and remove bearings from shaft.

18. Remove countershaft gear set and three thrust washers, two bushings and a spacer.

19. Remove rear idler gear shaft and gear.

To remove the gears on the main shaft, first remove snap ring on end of shaft holding transmission high gear and intermediate clutch hub. After the removal of the snap ring the gears will slide off the shaft.

To dismantle the synchronizer unit, push apart. Finally, pull the main shaft bearing and remove the oil slinger and spacer. When reinstalling the rear bearing, the sealed side should be placed toward the transmission support bracket.

Wash all parts in suitable cleaning fluid and inspect for wear and damaged parts, replacing any parts which show excessive wear and damage.

Fig. 19
Removing Snap Ring

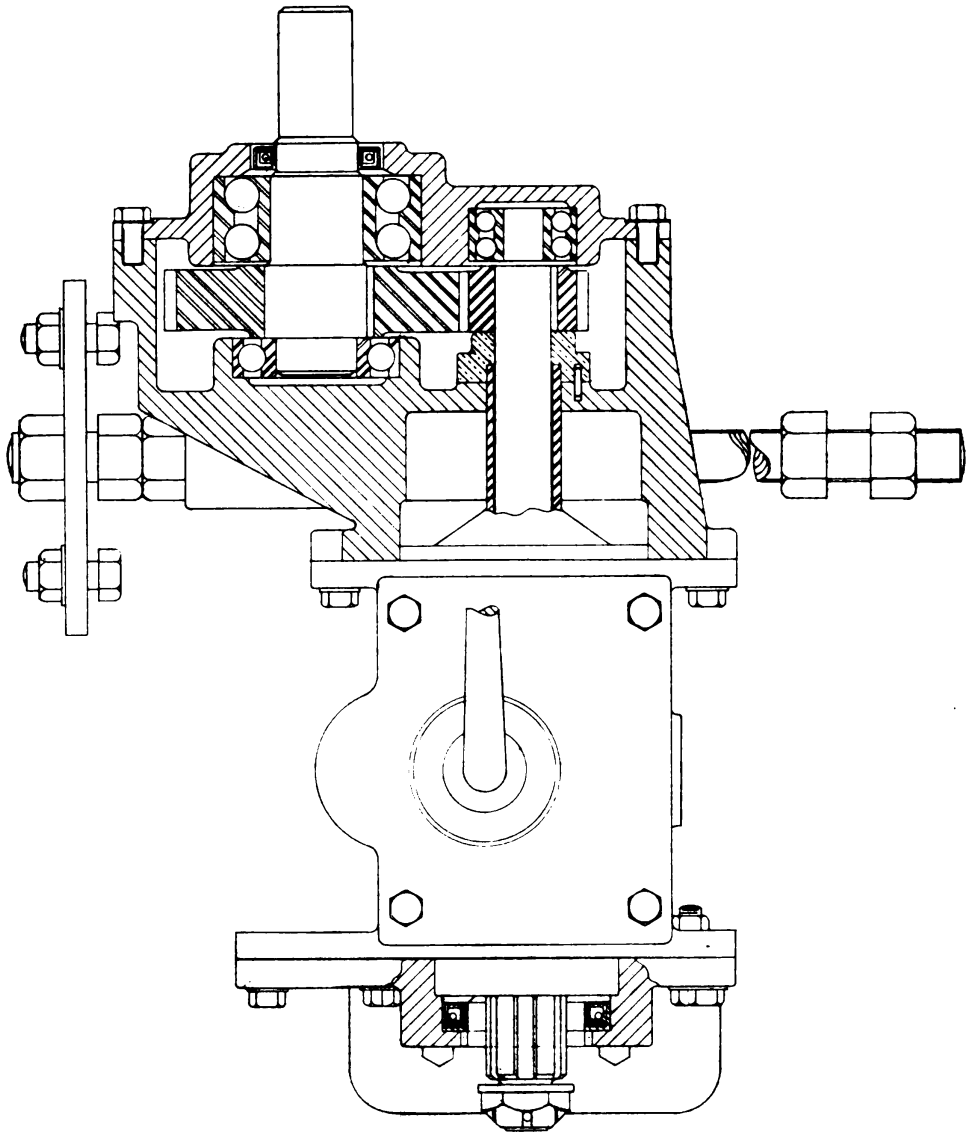


Fig. 20
Gearbox - Sectional View

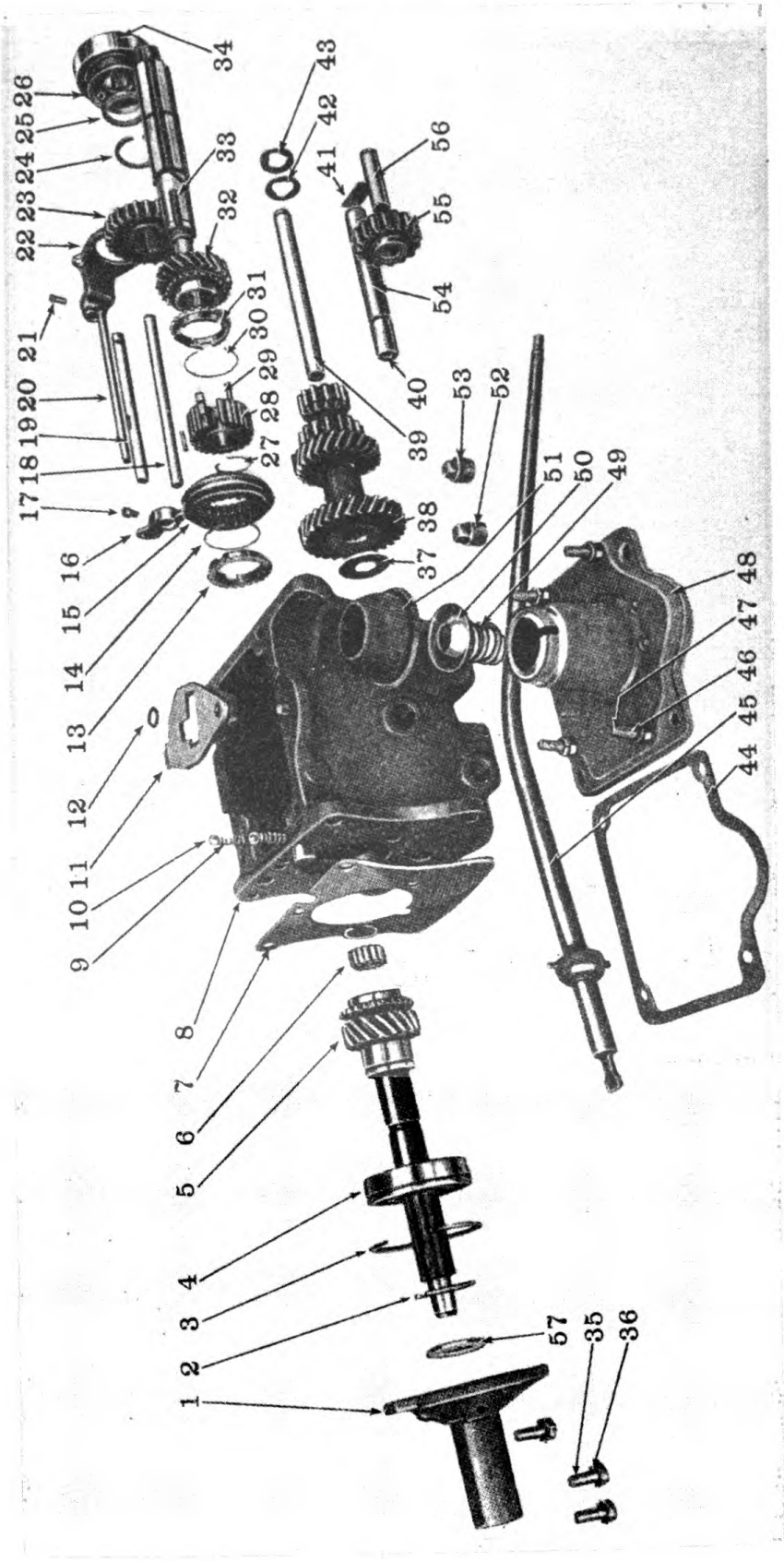


Fig. 21
Transmission - Exploded

TRANSMISSION - EXPLODED

(See Fig. 21 Page 31)

ITEM	PART NO.	DESCRIPTION
1.	TTS-575	Main Drive Gear Bearing Retainer
2.	TTS-554	Main Drive Gear Snap Ring
3.	TTS-553	Main Drive Gear Bearing Snap Ring
4.	TTS-552	Main Drive Gear Bearing
5.	TTS-342	Main Drive Gear
6.	TTS-556	Main Drive Gear Pilot Roller Bearing
7.	TTS-548	Main Drive Gear Bearing Retainer Gasket
8.	TTS-501	Transmission Case
9.	TTS-511	Poppet Spring
10.	TTS-513	Shift Rail Poppet Ball
11.	TTS-508	Shift Plate
12.	TTS-510	Shift Plate Spring
13.	TTS-522	Synchronizer Blocking Ring
14.	TTS-525	Synchronizer Spring
15.	TTS-523	Second and Direct Speed Clutch Sleeve
16.	TTS-506	Shift Fork - High and Intermediate
17.	TTS-512	Shift Fork Lock Screw
18.	TTS-503	Shift Rail - High and Intermediate
19.	TTS-504	Shift Rail - Low and Reverse
20.	TTS-505	Shift Fork Guide Pin
21.	TTS-512	Shift Fork Lock Screw
22.	TTS-507	Shift Fork - Low and Reverse
23.	TTS-531	Sliding Gear - Low and Reverse
24.	TTS-527	Main Shaft Snap Ring
25.	TTS-529	Main Shaft Bearing Spacer
26.	TTS-528	Oil Retaining Washer
27.	TTS-526	High and Intermediate Clutch Hub Snap Ring
28.	TTS-530	High and Intermediate Clutch Hub
29.	TTS-521	Synchronizer Shifting Plate
30.	TTS-525	Synchronizer Spring
31.	TTS-522	Snychronizer Blocking Ring
32.	TTS-520	Main Shaft Second Speed Gear Assembly
33.	TTS-518	Main Shaft
34.	TTS-560	Main Shaft Bearing
35.	TTS-549	Hex Head Screw (Bearing Retainer)
36.	TTS-550	Lock washer
37.	TTS-538	Countershaft Thrust Washer - Front
38.	TTS-535	Countershaft Gears
39.	TTS-539	Countershaft
40.	TTS-536	Countershaft Gear Bushing
41.	TTS-541	Countershaft and Idler Lock Plate
42.	TTS-537	Countershaft Thrust Washer - Rear
43.	TTS-542	Countershaft Thrust Washer
44.	TTS-568	Control Housing Gasket
45.	TTS-377	Control Lever Assembly
46.	TTS-567	Lock washer
47.	TTS-566	Hex Head Screw (Control Housing)
48.	TTS-561	Control Housing Assembly
49.	TTS-570	Control Lever Support Spring
50.	TTS-569	Control Housing Cap Washer
51.	TTS-565	Control Housing Cap
52.	TTS-514	Drain Plug
53.	TTS-514	Filler Plug
54.	TTS-540	Countershaft Bearing Spacer
55.	TTS-543	Reverse Idler Gear Assembly
56.	TTS-546	Reverse Idler Gear Shaft
57.	TTS-558	Front Bearing Retainer Oil Seal

ASSEMBLY OF TRANSMISSION AND GEARBOX

The assembly of the parts in the transmission and gearbox should be performed in the reverse manner in which it was dismantled.

1. Install reverse idler gear and shaft.

2. Assemble countershaft gear set and three thrust washers, two bushings and spacer in proper position using a 3/8" rod to permit gear to hang below correct position and clear main shaft gears. The bushings in the countershaft gear set are the floating type, being free to turn within the gear as well as on the shaft. Dip these bushings in SAE 90 lubricant when assembling and be sure that the spacer is installed between the two bushings. The steel thrust washer at the rear of the countershaft is pinned in the case and the bronze washer is installed between the steel washer and the gear. Only one washer (bronze) is used at the front.

3. Assemble main shaft assembly and install in case, placing oil slinger and bearing in place so that the open side of the bearing is in the transmission case. When assembling synchronizer unit assembly, place right end of a synchronizer spring in one shifting plate. Turn unit around and make exactly the same installation with the other spring in the same shifting plate. This will actually place the spring action opposed.

4. Install main drive gear bearing on shaft with snap rings.

5. Install main drive gear assembly in case and on front end of main shaft with synchronizer blocking ring.

6. Install countershaft.

7. Install lock plate at rear of transmission countershaft and reverse idler gear shaft.

8. Install shift shafts and forks. Be careful to properly locate poppet springs and balls.

9. Install fork guide pin through front of transmission.

10. Using a new gasket, install main drive in place with screws.

11. Install transmission support bracket to the front of transmission being careful not to damage grease seal in bracket when inserting it over shaft. Install five screws to attach bracket to transmission.

12. Press gearbox drive gear onto main transmission shaft.

13. Install bearing and gear on gearbox shaft.

14. Install gearbox assembly to transmission using four screws to attach.

15. Install new gasket between gearbox cover and gearbox and

attach cover using six screws to secure.

TRANSMISSION TROUBLES & REMEDIES

SYMPTOMS	PROBABLE REMEDIES
Slips Out of High Gear.	
End play in main drive gear.	Tighten front retainer.
Damaged Pilot bearing or front bearing.	Replace.
Bent shifting fork.	Replace.
Slips Out Of Second.	
Bent shifting fork.	Replace.
Worn gear.	Replace.
Weak poppet springs.	Replace.
Noise In Low Gear.	
Rear ball bearing broken.	Replace.
Gear teeth pitted or worn.	Replace Gears.
Shifting fork bent.	Replace.
Lack of Lubrication.	Drain and refill.

REMOVING THE BRUSH FROM SWEEPER AND REVERSING END FOR END

If it becomes necessary to install a new brush or in case the brush becomes noticeably tapered and should be reversed end for end, the brush should be removed following this procedure. (See Fig. 22 Page 34)

1. Remove the connecting link in final drive chain, releasing the chain. (See "Replacing Drive Chain" Page 40)

2. Remove the bolts (1) holding the brush socket cap (2) to the brush socket (3) at both ends of the core shaft (4). The brush will now drop out of the sweeper brush support frame.

INSERT NEW BRUSH BY REVERSING THE ABOVE PROCEDURE.

If you are reversing the brush end for end continue the procedure as follows: (See Fig. 23 Page 35).

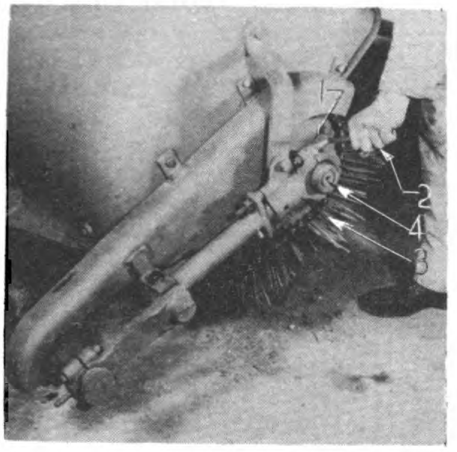


Fig. 22
Removing Brush

1. Bolts, 2. Brush Socket Cap, 3. Brush Socket, 4. Core Shaft.

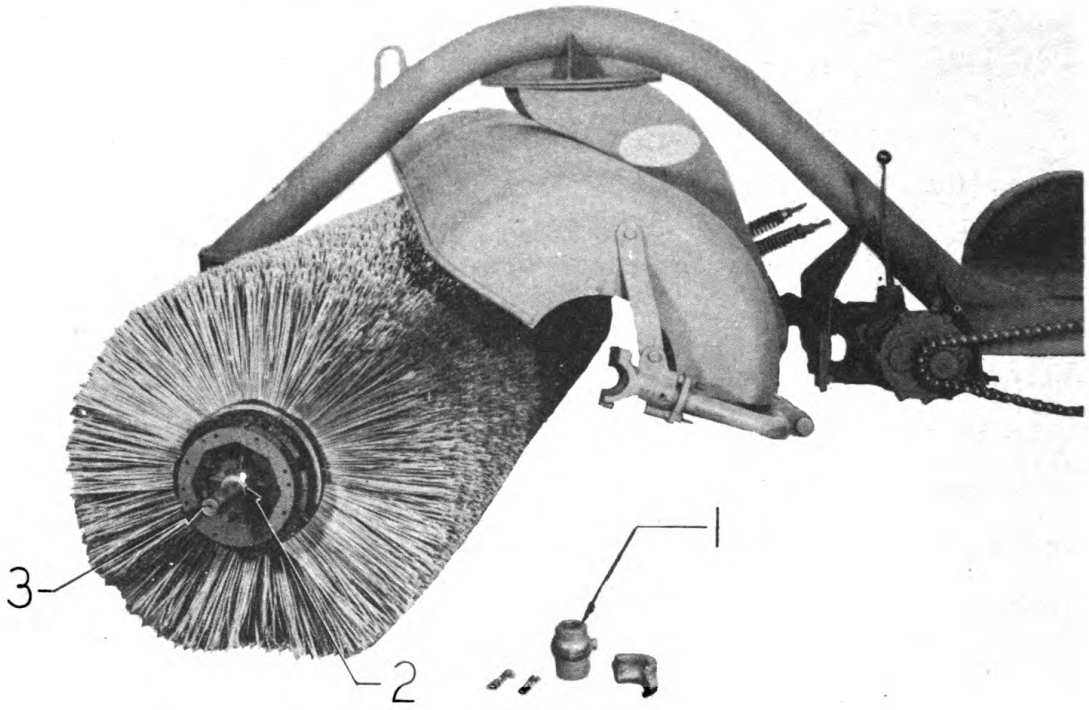


Fig. 23
Turning The Brush
1. Bearing Balls, 2. Spacer, 3. Core shaft.

3. Slide the bearing balls (1) and the spacer (2) off the end of the brush core shaft (3). Remove the cap screws holding the brush sprocket to the end of the brush core.

4. Remount sprocket on opposite end of brush, following with spacer and ball.

5. Reverse removal procedure to again install brush on sweeper brush support frame.

LIFTING JACK

(See Fig. 24 Page 36)

If the jack fails to work after checking the oil level and testing for air bound jack, it will have to be removed from the sweeper to be repaired.

To remove the jack from the sweeper follow this procedure: (See Fig. No. 3 Page 10)

1. Remove the cotter keys from the pins holding the jack to the jack lift assembly.

2. Pull out pins and lift jack away from the sweeper.

To dismantle the jack follow this procedure:

1. Clean the outside of the jack thoroughly.

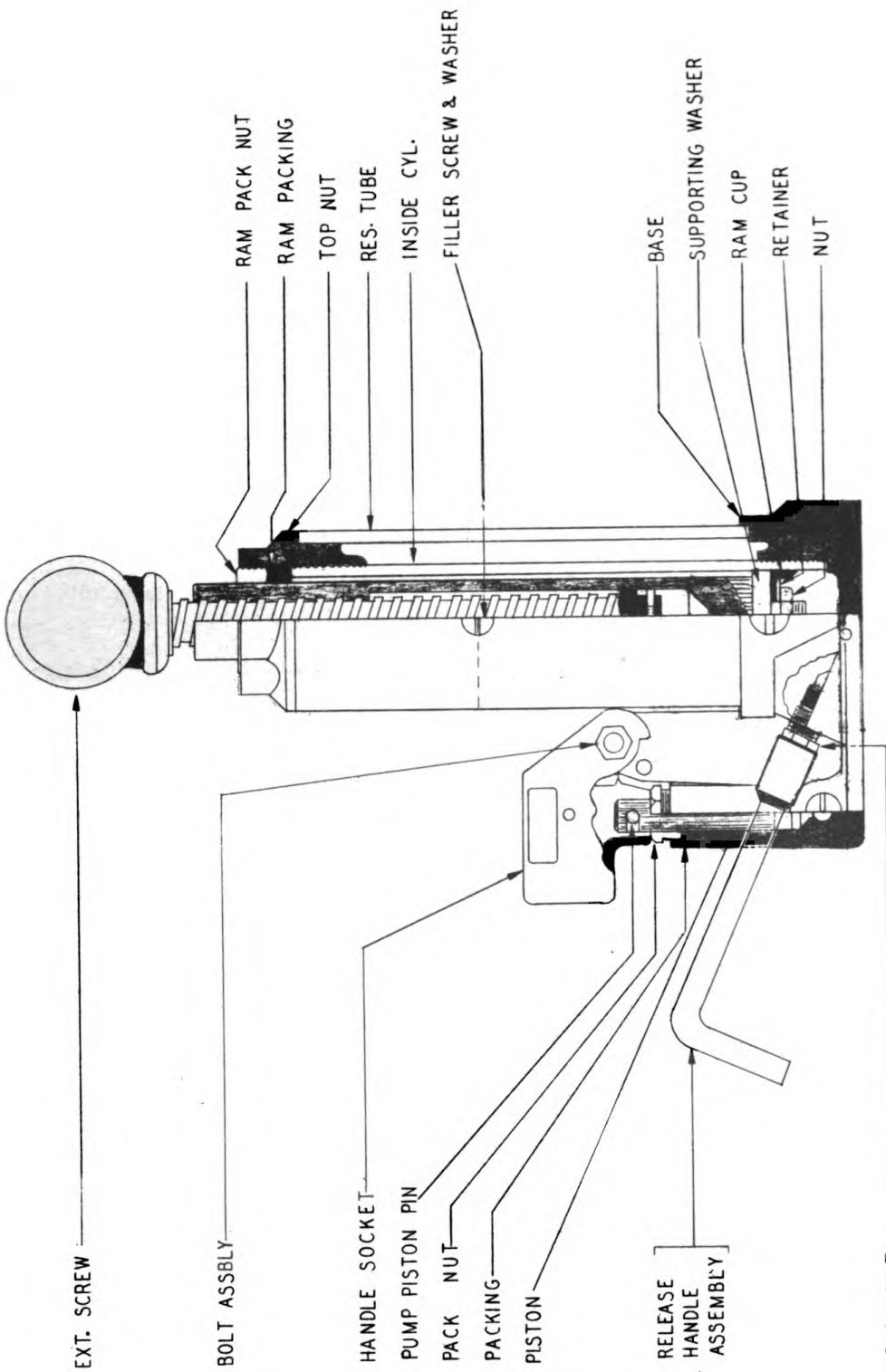


Fig. 24
Jack - Sectional View

2. Open the release valve.

3. Place the base of the jack securely in a vice, remove packing nut and top nut.

4. Pull ram from inside cylinder and pour all oil from the jack.

5. Remove ram cup.

6. Place the ram in soft jaw vice to avoid marring.

7. Apply force to extension screw with pipe wrench to force it out of ram.

8. Upset ram to expel the sheared pin.

9. Remove the handle and handle socket and piston packing nut.

10. Pull out piston and pick out packing.

11. Remove pump valve plug and neoprene seal from pump valve chamber.

12. With plug hole down, strike base of jack on bench until springs and balls fall out of chamber.

13. Remove release screw by turning it out by the packing nut.

14. Pick packing and packing washer from chamber.

Wash all parts in a suitable cleaning fluid and inspect for wear and damaged parts, replacing any parts which show excessive wear or damage.

REASSEMBLY OF JACK

The reassembly of the jack is the reverse procedure of disassembly. To reassemble the jack follow this procedure:

1. Replace packing and washer in release screw chamber and screw in release screw by the packing nut. (See Fig. 26 Page 38)

2. Drop small pump valve ball in pump valve chamber followed by small spring. (See Fig. 25 Page 38)

3. Drop large ball followed by large spring into pump valve chamber. (See Fig. 25 Page 38)

4. Insert new neoprene seal and screw plug into pump valve chamber.

CAUTION: ALWAYS REPLACE OLD NEOPRENE SEAL WITH NEW ONE. NEVER USE THE OLD SEAL.

5. Replace piston packing cup.

6. Dip piston in oil and insert into piston chamber being careful not to damage packing cup.

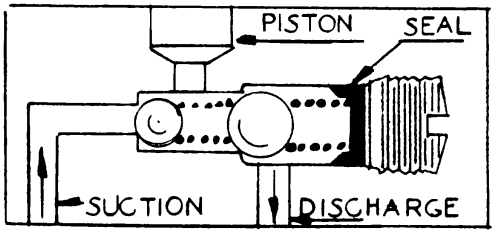


Fig. 25
Replacing Springs and Balls

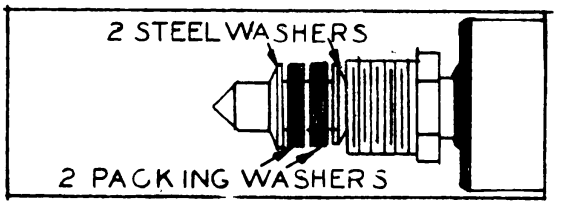


Fig. 26
Replacing Valve Assembly

7. Replace the piston packing nut.

8. Replace handle and handle socket.

9. Screw extension screw in ram with its new lock pin following the thread of the ram.

10. Replace ram cup, tighten retaining nut securely and center punch. It is advisable to dip new ram cup in oil before replacing.

11. Insert ram and extension screw into cylinder being careful not to damage ram cup and tighten down top nut securely.

12. Replace ram packing nut and tighten to medium pressure.

13. Refill jack with oil through filler screw hole to level of hole.

LIFTING JACK TROUBLES AND REMEDIES

SYMPTOMS	PROBABLE REMEDIES
Leakage of Oil When Lifting Brush	
Too much lubricant	Drain to proper level
Worn piston	Replace
Fails To Lift Brush	
Pump valve dirty	Clean
Release valve dirty	Clean
Airbound jack	See page 20
Lack of Oil	Fill to proper level
Fails to Hold Brush	
Worn or loose ram cup	Replace
Bent extension screw	Replace

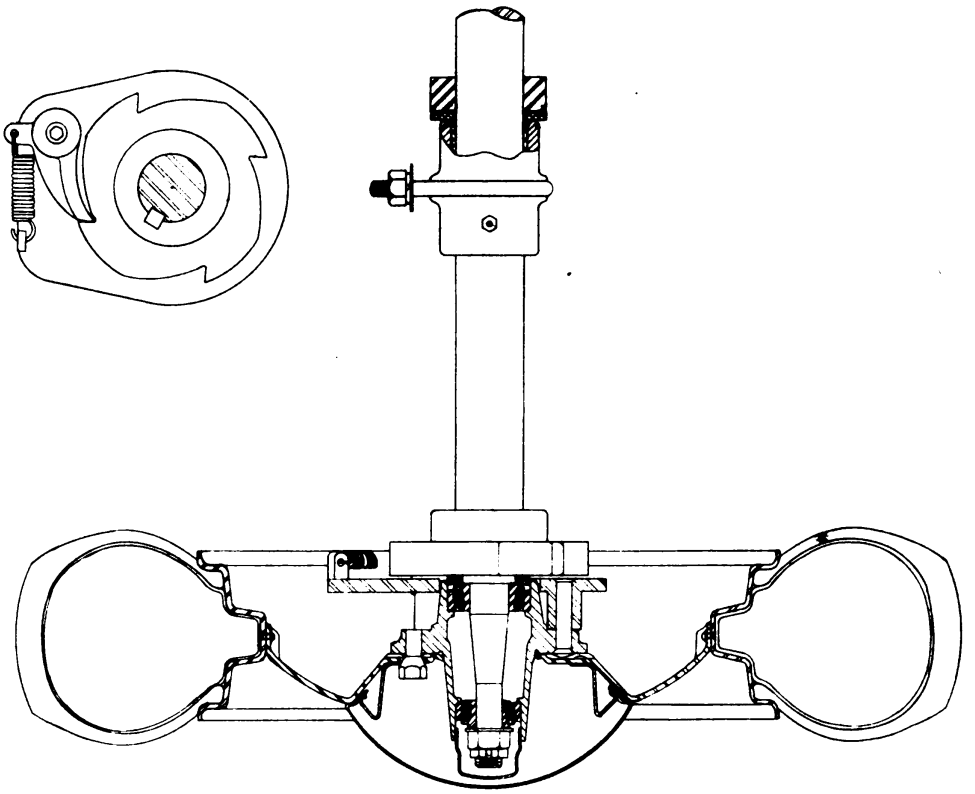


Fig. 27
Rear Axle - Sectional View

WHEEL BEARINGS AND HUBS

(See Fig. 27, Page 39)

Under normal operating conditions the bearings require lubrication and inspection every 512 hours. The hubs and bearings should be removed and washed in a suitable cleaning fluid.

To remove the rear wheel hubs, follow this procedure:

1. Remove wheels by taking out the five studs holding wheels to hubs.
2. Loosen set screw in hub and tap hub lightly, sliding it off axle.
3. Remove the bearing cones and cups from the hub.

NOTE: THE FRONT WHEEL HUB IS PART OF THE FRONT WHEEL ASSEMBLY.

Wash all parts in a suitable cleaning fluid and inspect all parts for wear.

Repack bearing cones and rollers with grease (See Lubricating chart page 23) and reassemble hubs and wheels in the reverse order as that of dismantling, testing bearing adjustment as covered under "WHEEL ADJUSTMENT" page 20.

REPLACING DRIVE CHAIN

To remove and replace a drive chain follow this procedure:

DRIVE CHAIN - REAR AXLE TO GEARBOX

1. Remove chain guard.
2. Release the chain tension by backing off the adjusting stud nuts. (See Fig. 11, Page 18).
3. Remove two cotter keys from a link of the chain which is engaged on the rear axle sprocket.
4. Using a drift and a hammer, drive out the pin rollers and remove the chain. (See Fig. 29, Page 42).

Wash the chain thoroughly in a gasoline. After thoroughly scrubbing the chain in gasoline, with a brush, it should be rinsed in clean gasoline and drained. It is of great particular value to open the chain clearances, allowing ready access of lubricant that otherwise would be ineffective.

Inspect the chain thoroughly for any worn or defective parts. Spray the chain with a light oil and replace.

To replace the chain, follow this procedure:

1. Engage chain around the lower side of each sprocket.
2. Bring the chain around the sprockets so that engagement of the ends of the chain is to be made at the top of the rear axle sprocket.

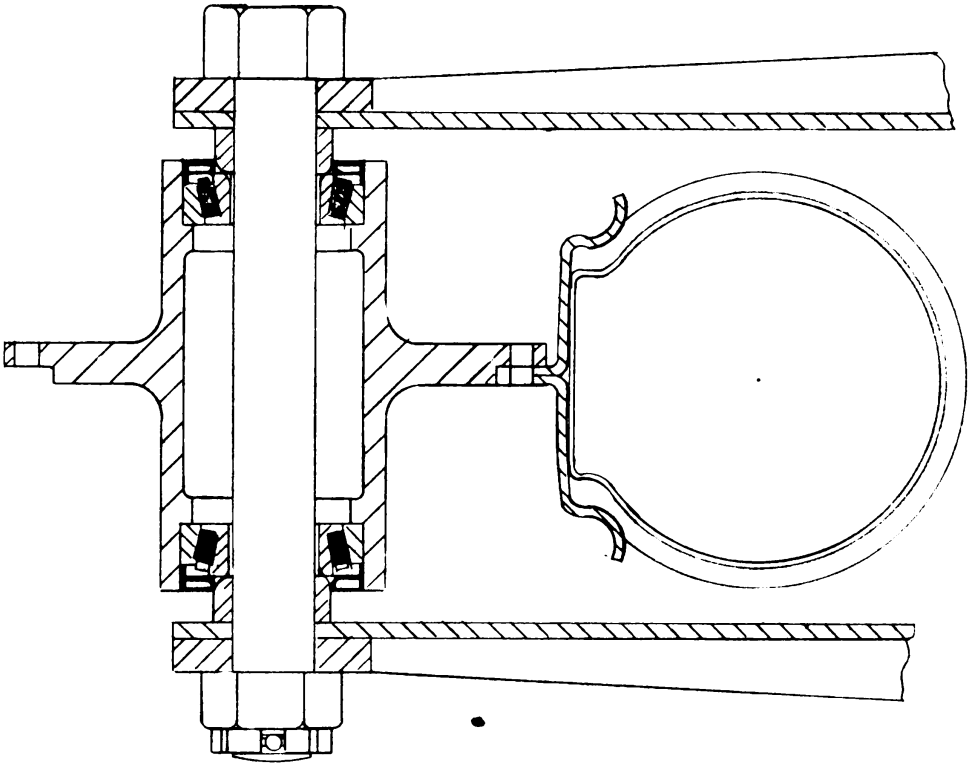


Fig. 28
Front Axle - Sectional View

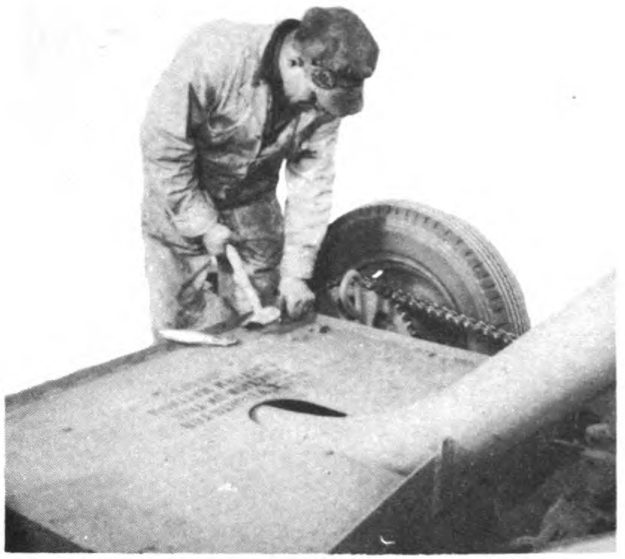


Fig. 29
Replacing Drive Chain

3. Line up the two end links and insert the pin rollers.
4. Put on the link plate and insert the cotter keys.
5. Adjust the chain (See "CHAIN ADJUSTMENT" page 18).
6. Replace the chain guard.

DRIVE CHAIN - BRUSH COUNTERSHAFT TO BRUSH

To remove and replace this chain, follow the same procedure outlined for the removal and installation of the "DRIVE CHAIN - REAR AXLE TO GEARBOX:

CAUTION: IMMEDIATELY AFTER INSTALLING NEW CHAINS, ADJUST THEM FOR CHAIN TENSION. THIS IS IMPORTANT. (See Page 18 FOR "CHAIN ADJUSTMENT").

UNIVERSAL JOINT

(See Fig. 30, Page 43)

The drive from the transmission to the brush countershaft is accomplished through a universal joint assembly.

These universal joints are so designed that correct assembly is a very simple matter. No hand fitting or special tools are required.

The center cross and the needle cup assembly are the only parts subject to wear. When it becomes necessary to replace these parts the universal joint assembly must be removed from the tractor.

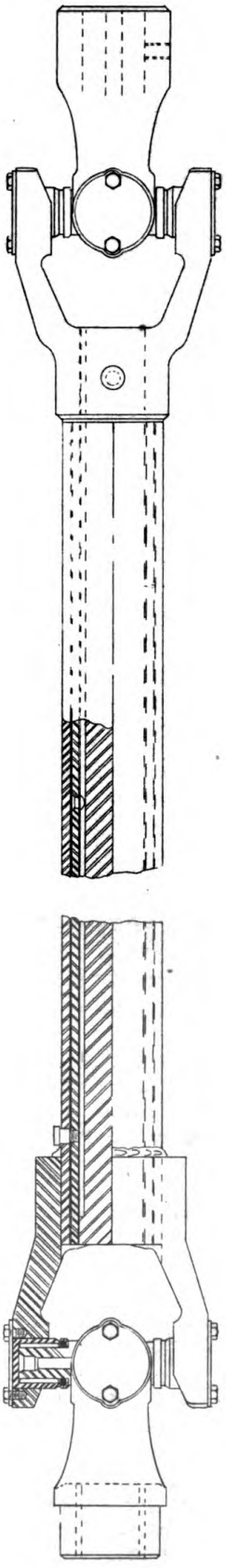


Fig. 30
Universal Joint - Sectional View

To remove the universal joint from the sweeper, this procedure must be followed:

1. Remove cotter key from transmission drive shaft and take off nut.
2. Slide the universal joint straight off the drive shaft.
3. Loosen set screw in joint at brush countershaft end.
4. Slide joint off the brush countershaft and lift the universal joint assembly away from the sweeper.

To install a new universal joint assembly reverse the above procedure.

DISMANTLING UNIVERSAL JOINT

To repair the universal joint it is only necessary to remove the cap screws holding bearing cover plate, and remove needle cup assembly.

After the needle cup assembly is removed the center cross can be removed.

The same procedure is followed for the other end of the assembly.

Wash all parts in a cleaning solution and replace any parts that show wear.

To reassemble the universal joints, reverse the method outlined above.

A Careful Operator

IS THE BEST INSURANCE

AGAINST AN ACCIDENT

—National Safety Council.

SWEEPER, TU-WAY, TRACTION DRIVEN TYPE AND BRUSH FILLING MACHINE

●

SPARE PARTS CATALOG

SECTION IV

●

CONTENTS

PREPARATION OF REQUISITIONS

SAMPLE COPY FOR USE IN THE PREPARATION OF REQUISITIONS

State **PERIOD** designation by use of one of the following terms

(1) **"INITIAL"** - first requisition of authorized allowances.

(2) **"REPLENISHMENT"** - subsequent requisitions to maintain authorized allowances

(3) **"SPECIAL"** - requisitions for necessary repairs not covered by allowances.

Emergency requisitions sent by telephone, telegraph, or radio must always be confirmed immediately with requisition marked "Confirming (state identifying data)"

Prepare a separate requisition for each different machine.

Type **"SPARE PARTS"** in upper right hand corner of requisition form.

WAR DEPARTMENT
Q. M. C. Form No. 400
Revised Apr 6, 1931

(SAMPLE)

SPARE PARTS

REQUISITION

To: Engineer Supply Officer, Columbus Quartermaster Depot, COLUMBUS, OHIO. No. of Sheets 1 Sheet No. 1

Requisition No. E-531-3-43 Date August 14, 1942 Period Special

SHIP TO Engineer Property Officer, Pine Camp, New York

MARKED FOR: Engineer Supply Officer, 802nd Engr. Battalion, Pine Camp, N. Y.

Give complete shipping instructions. Special instructions for packing, marking, routing, etc. should be given at the end of the requisition.

REQUISITIONED BY (show Signature Rank Organization Destination. If different from "SHIP TO" include address)

Robert E. Roe
Robert E. Roe,
Major, C. E.,
Engineer Property Officer.

APPROVED ~~XXX~~ For the Commanding Officer:

John E. Doe
John E. Doe,
Col., C. E.,
Executive Officer

Mfg. No.	ARTICLES	UNIT	ON HAND AND DUE	CONSUMED	REQUIRED	APPROVED
	PARTS FOR SWEEPER TU-WAY, TRACTION DRIVEN TYPE SERIAL NO. TTS-252					
	BASIS: Repair of Disabled Equipment.					
	Delivery is requested by August 20, 1942.					
	REAR AXLE AND WHEEL GROUP					
TTS-168	THRUST WASHER	ea	0	2	2	
TTS-203	DOG	ea	0	2	2	
	UNIVERSAL JOINT GROUP					
TTS-272	NEEDLE CUP ASSEMBLY	ea	0	8	8	
TTS-273	CROSS	ea	0	2	2	
	FRONT WHEEL AND TOW POLE GROUP					
TD-76	GREASE SEAL	ea	0	2	2	
TD-77	BEARING SPACER	ea	0	2	2	
	NONEXPENDABLE ARTICLES SHOWN HAVE BEEN PLACED ON I & I REPORT: (REPORT OF SURVEY, ETC.).					

State proper nomenclature of machine, and make, model, serial number and registration number

State basis or authority, and date delivery is required, immediately below description of machine

State manufacturers' parts numbers and nomenclature descriptions accurately and completely Do not use abbreviations

Double space between items

Group parts required under group headings as shown in manufacturers' parts catalogs

Nonexpendable items must be accounted for

PREPARATION OF REQUISTIONS

A Sample requisition in the correct form for submission by the Engineer Property Officer is shown on the opposite page.

THIS SHALL BE FOLLOWED IN MAKING OUT REQUISITIONS.

In order to eliminate duplication of work, Property Officers may authorize organizations to prepare requisitions in final form, leaving requisition number space blank for completion by Property Officer.

THE FOLLOWING RULES WILL BE OBSERVED CAREFULLY IN PREPARING REQUISITIONS FOR SPARE PARTS:

a. Prepare a separate requisition for each different machine.

b. Type "SPARE PARTS" in upper right hand corner of requisition form.

c. State PERIOD designation by use of one of the following terms:

   (1) "INITIAL" - first requisition of authorized allowances.

   (2) "REPLENISHMENT" - subsequent requisitions to maintain authorized allowances.

   (3) "SPECIAL" - requisitions for necessary repairs not covered by allowances.

d. Give complete shipping instructions.

e. State proper nomenclature of machine, and make, model, serial number and registration number.

f. State basis or authority, and date delivery is required, immediately below description of machine.

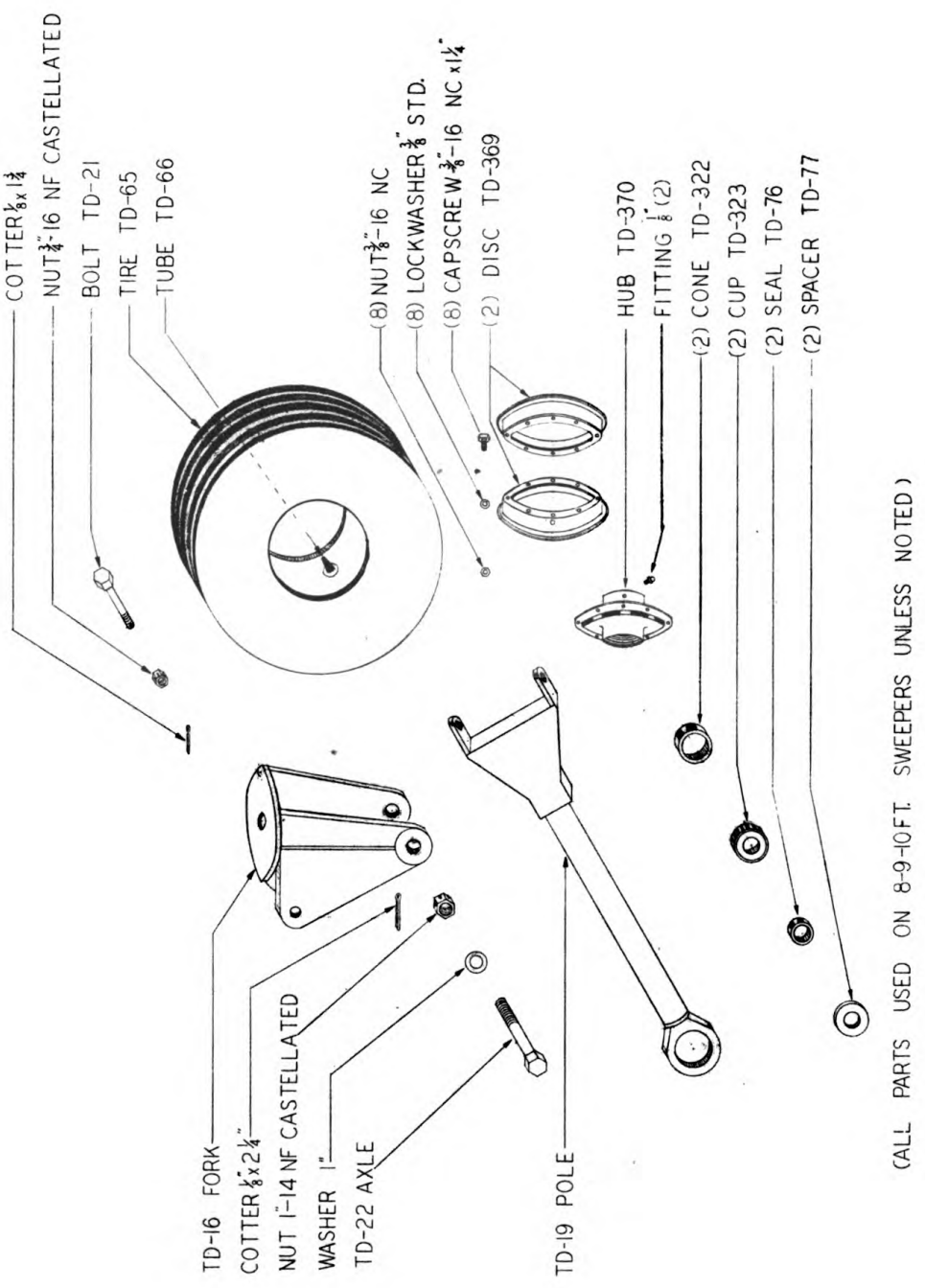
g. Group parts required under group headings as shown in manufacturers' parts catalogs.

h. State manufacturers' parts numbers and nomenclature descriptions accurately and completely. Do not use abbreviations.

i. Double space between items.

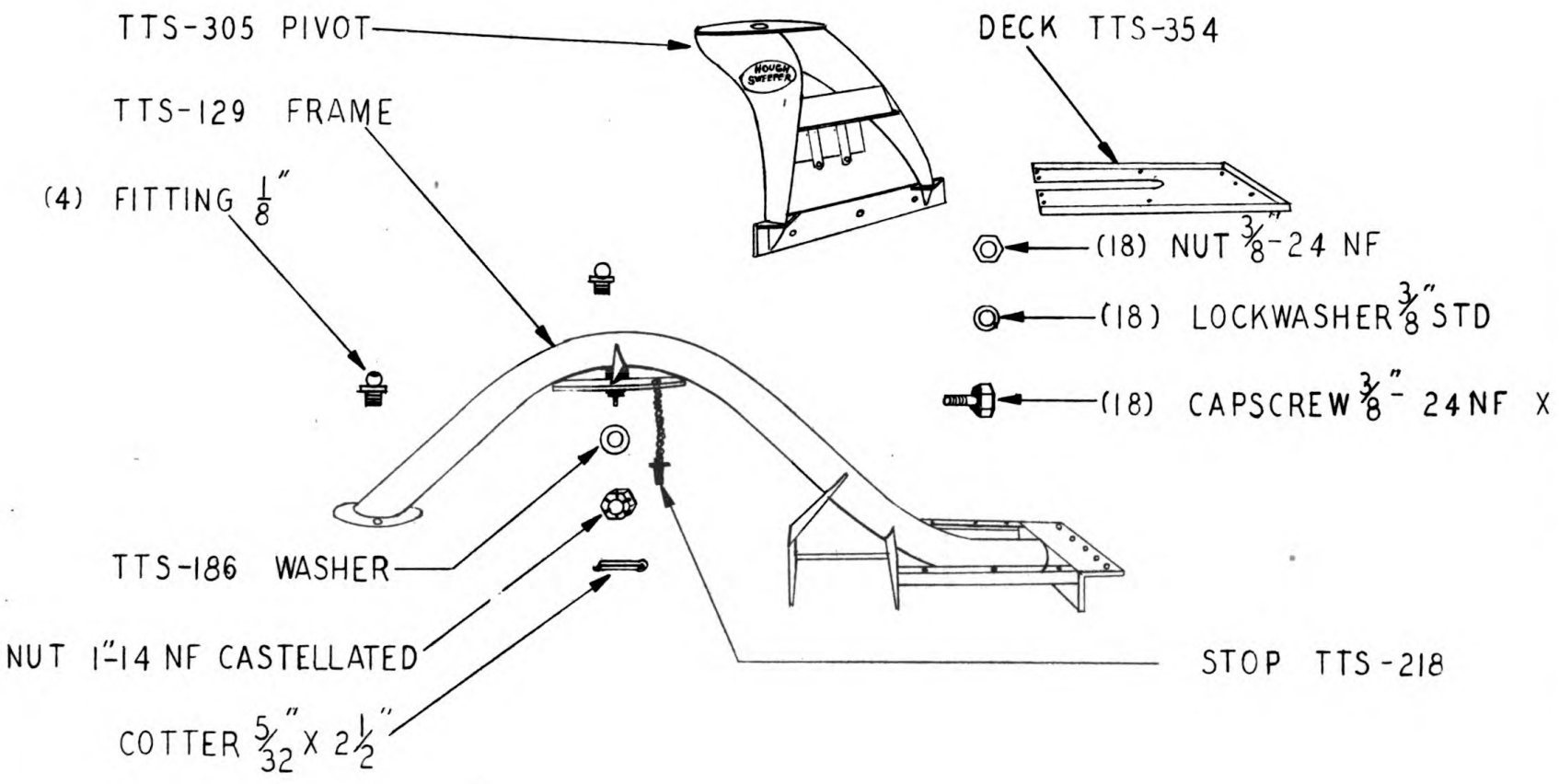
j. Emergency requisitions sent by telephone, telegraph, or radio must always be confirmed immediately with requisition marked: "Confirming (state identifying date)".

k. Nonexpendable items must be accounted for.



CALL PARTS USED ON 8-9-10 FT. SWEEPERS UNLESS NOTED)

Fig. 32
Front Wheel and Tow Pole Group



(ALL PARTS USED ON 8-9-10 FT SWEEPERS UNLESS NOTED)

Fig. 33
Main Frame Group

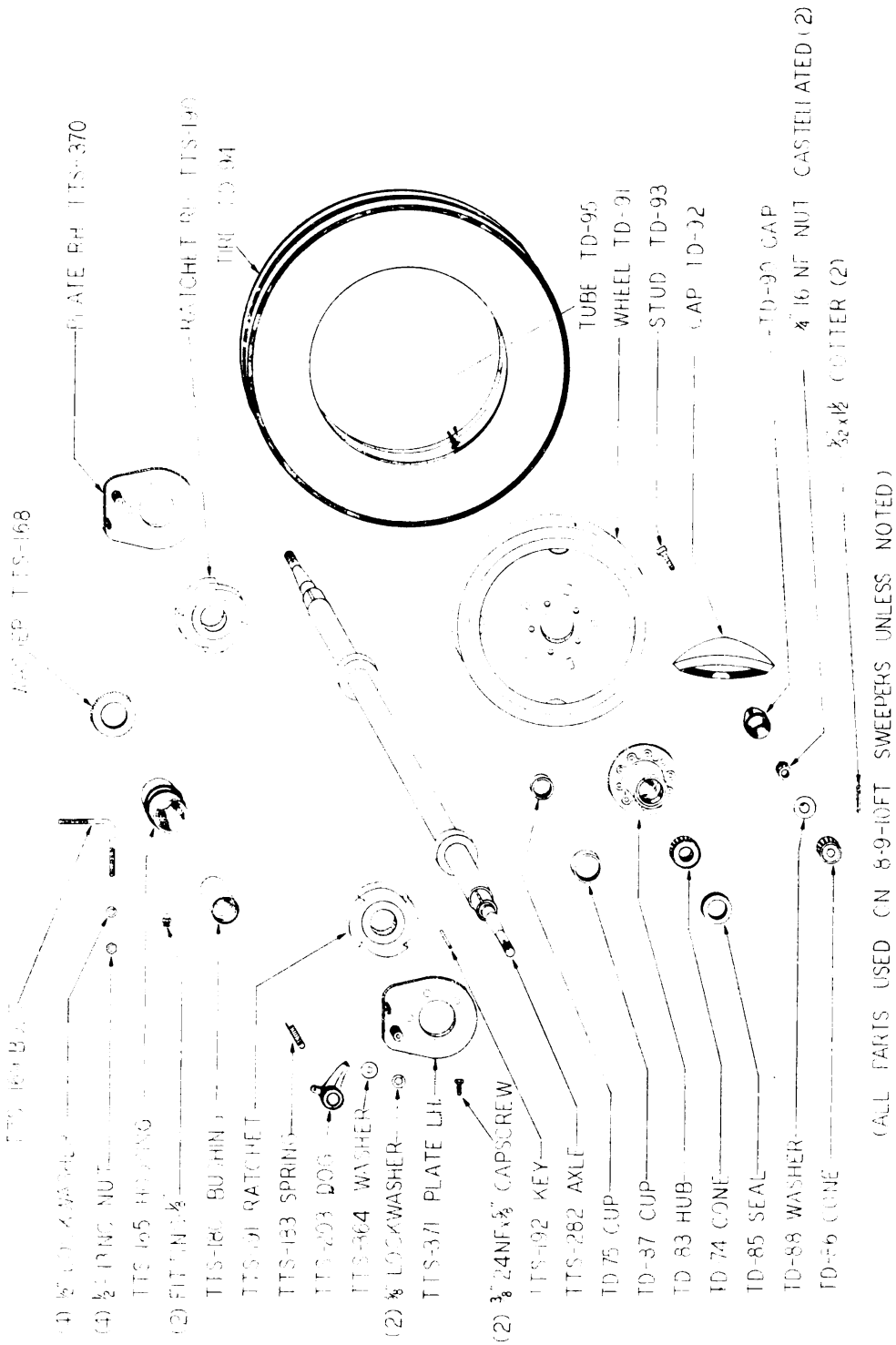


Fig. 34
Rear Axle and Wheel Group

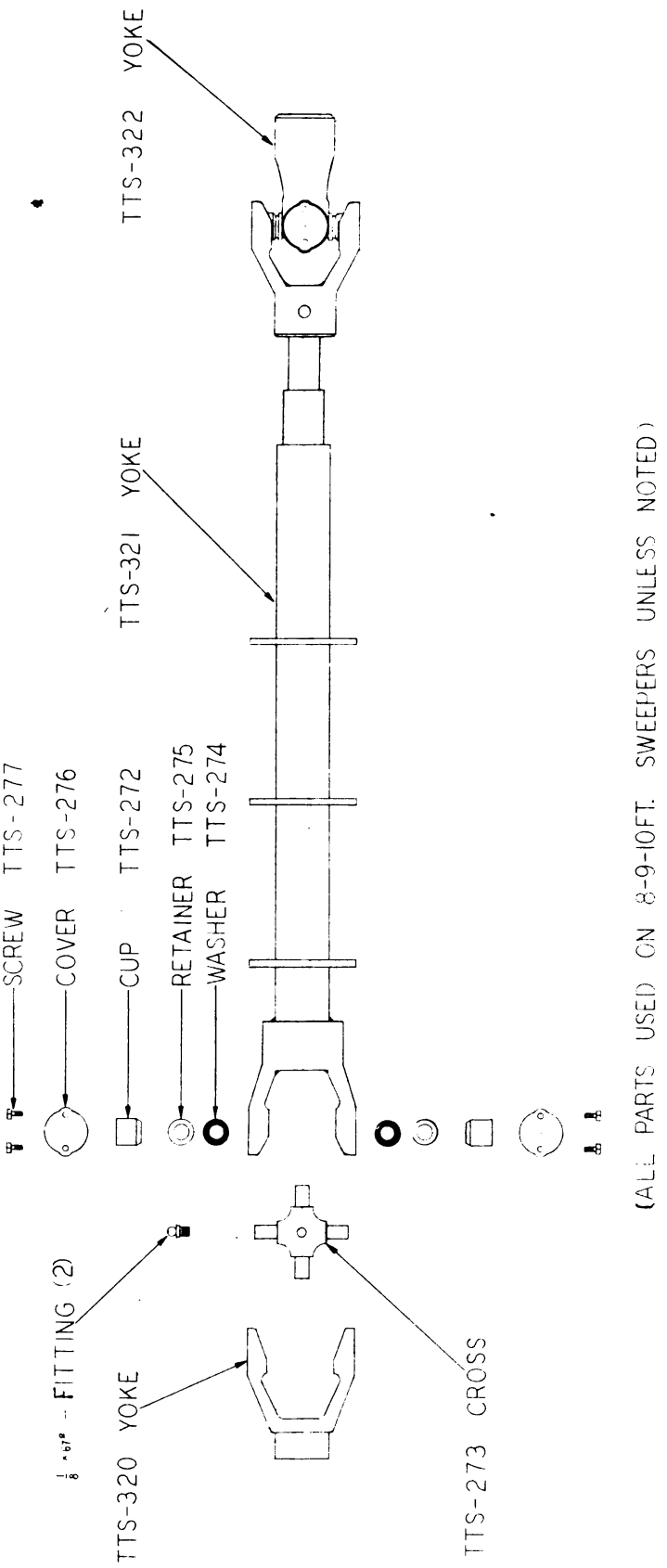


Fig. 35
Universal Joint Group

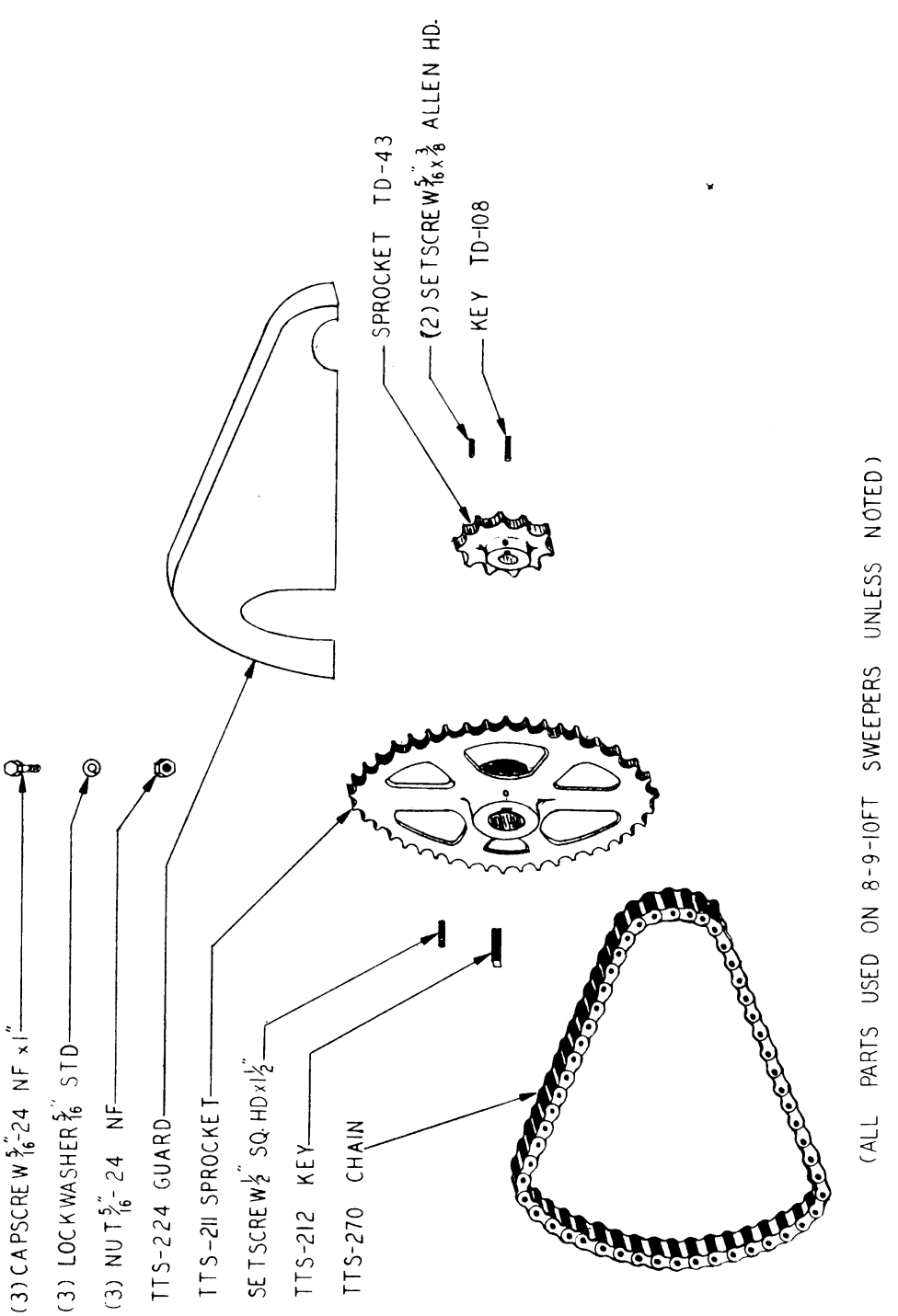
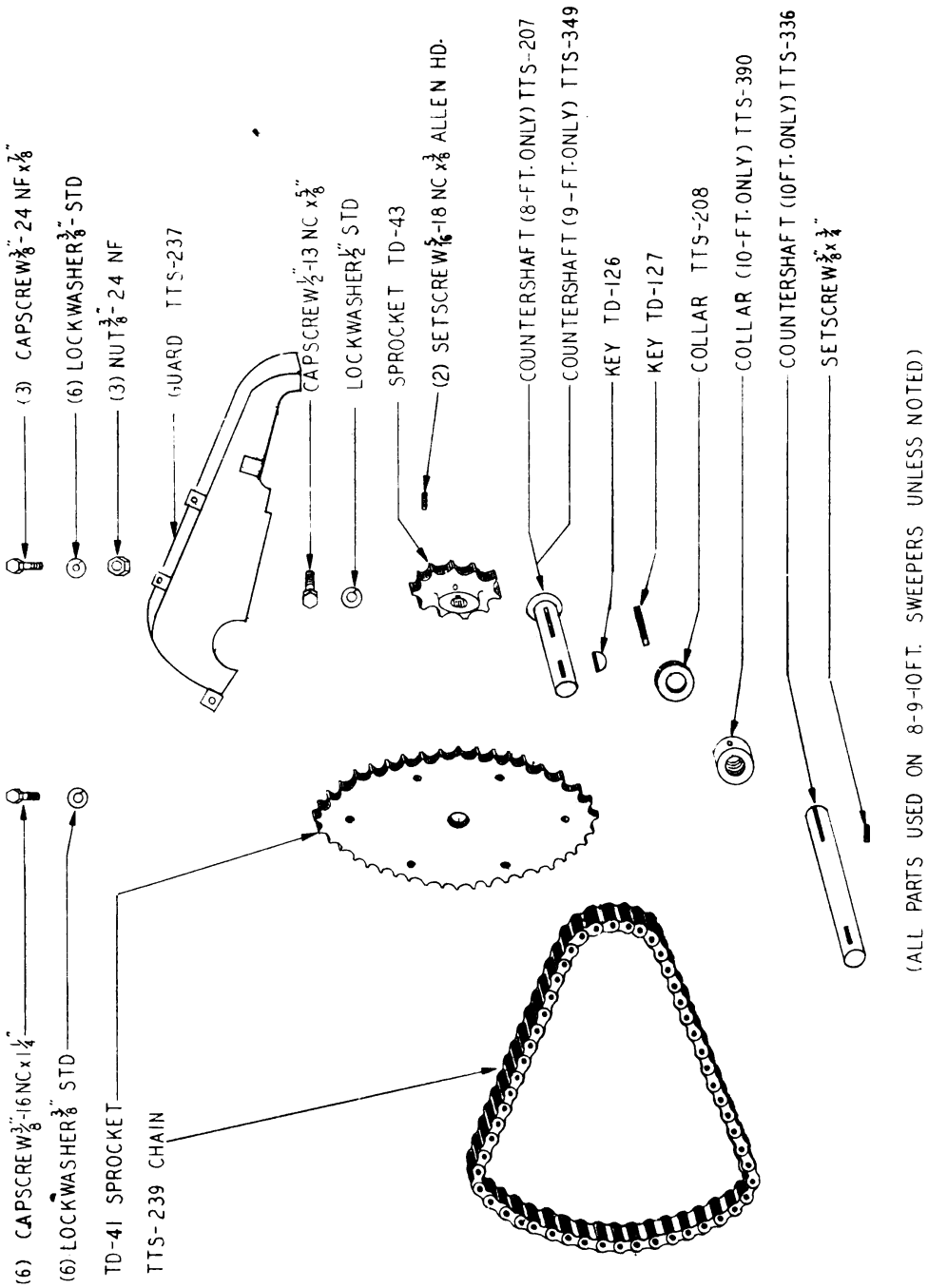


Fig. 36
Wheel Drive Group



(ALL PARTS USED ON 8-9-10FT. SWEEPERS UNLESS NOTED)

Fig. 37
Final Drive Group

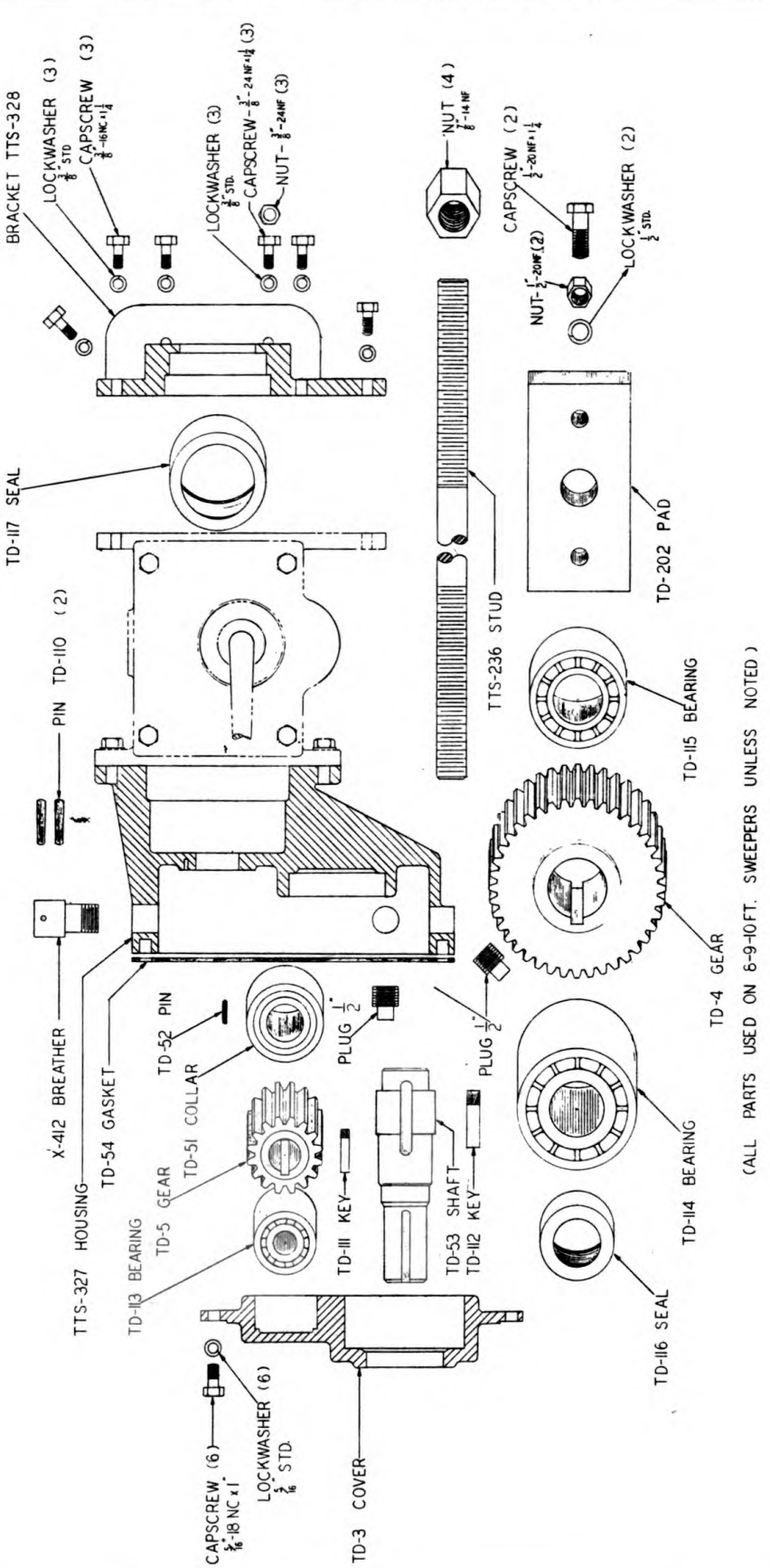


Fig. 38
Gearbox Group

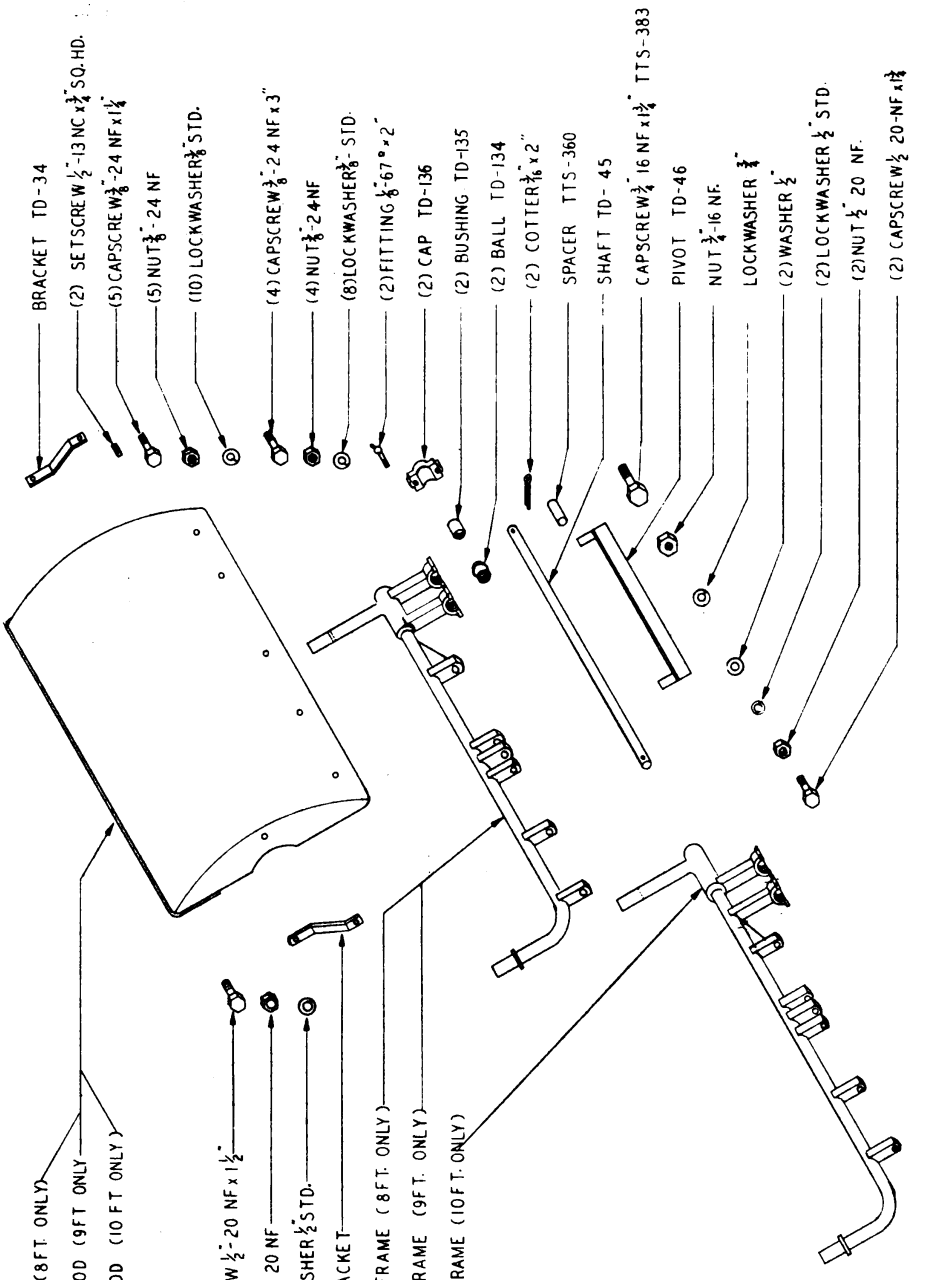


Fig. 39
Brush Frame Group

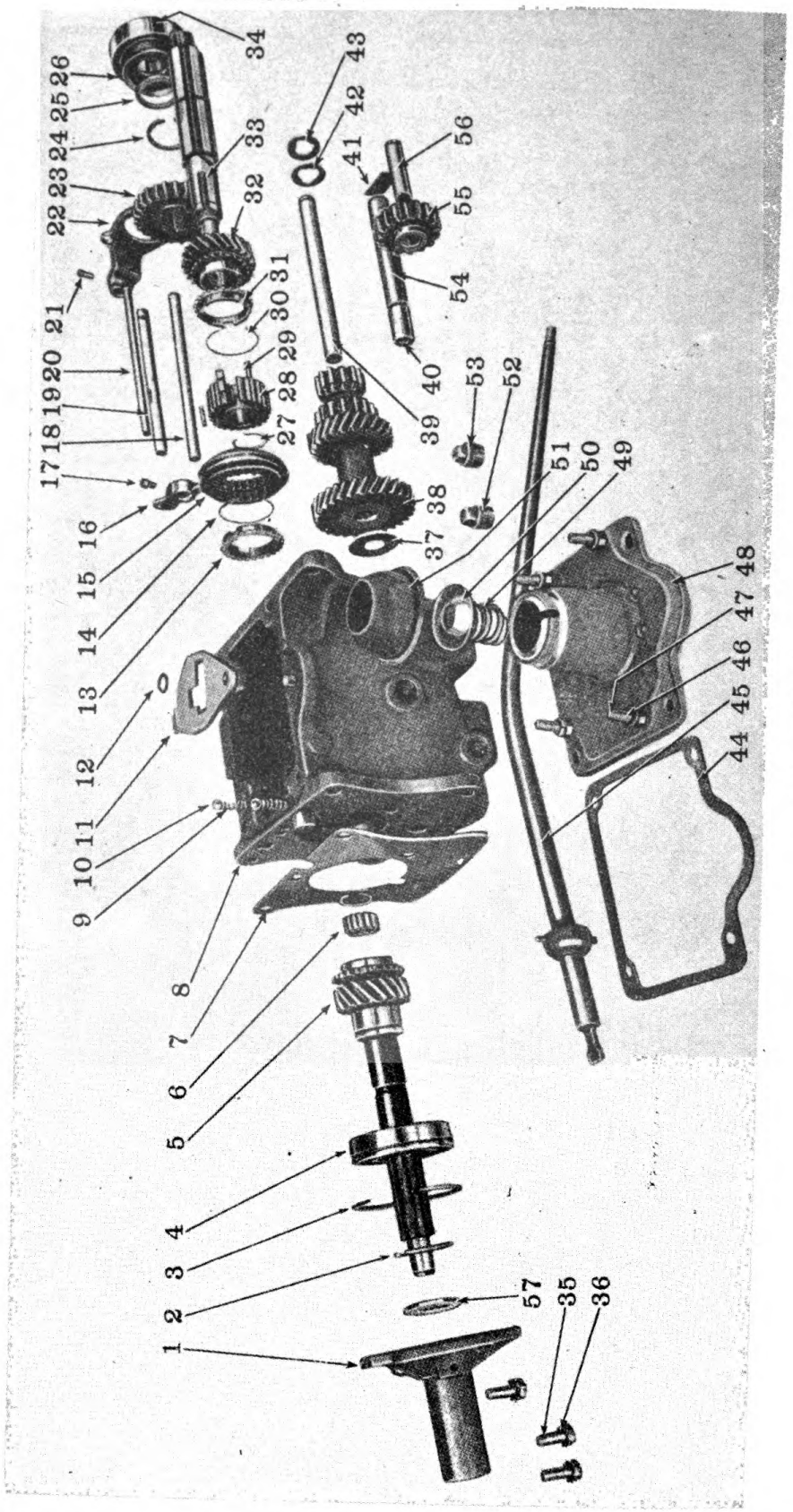
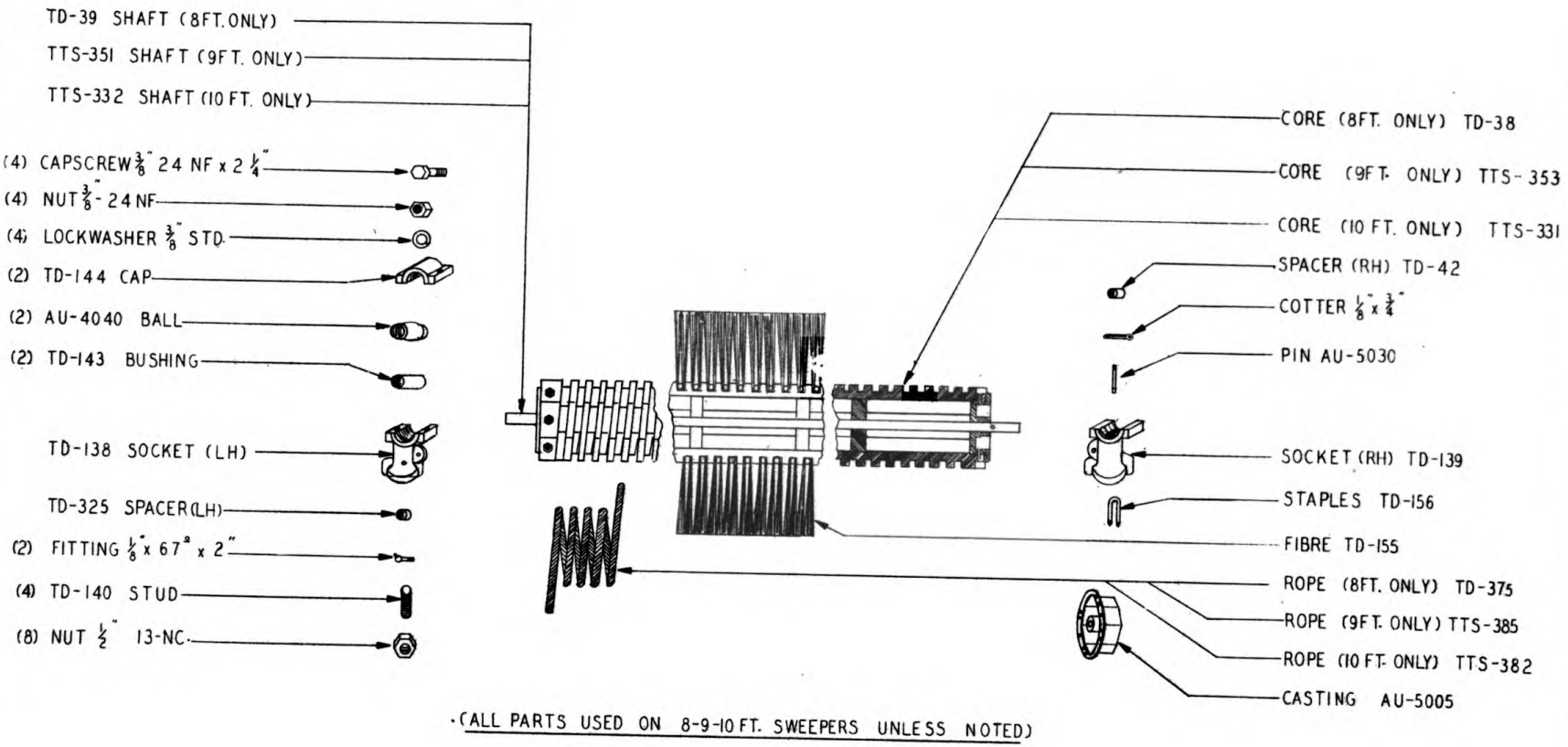


Fig. 40
Transmission Group

TRANSMISSION - EXPLODED

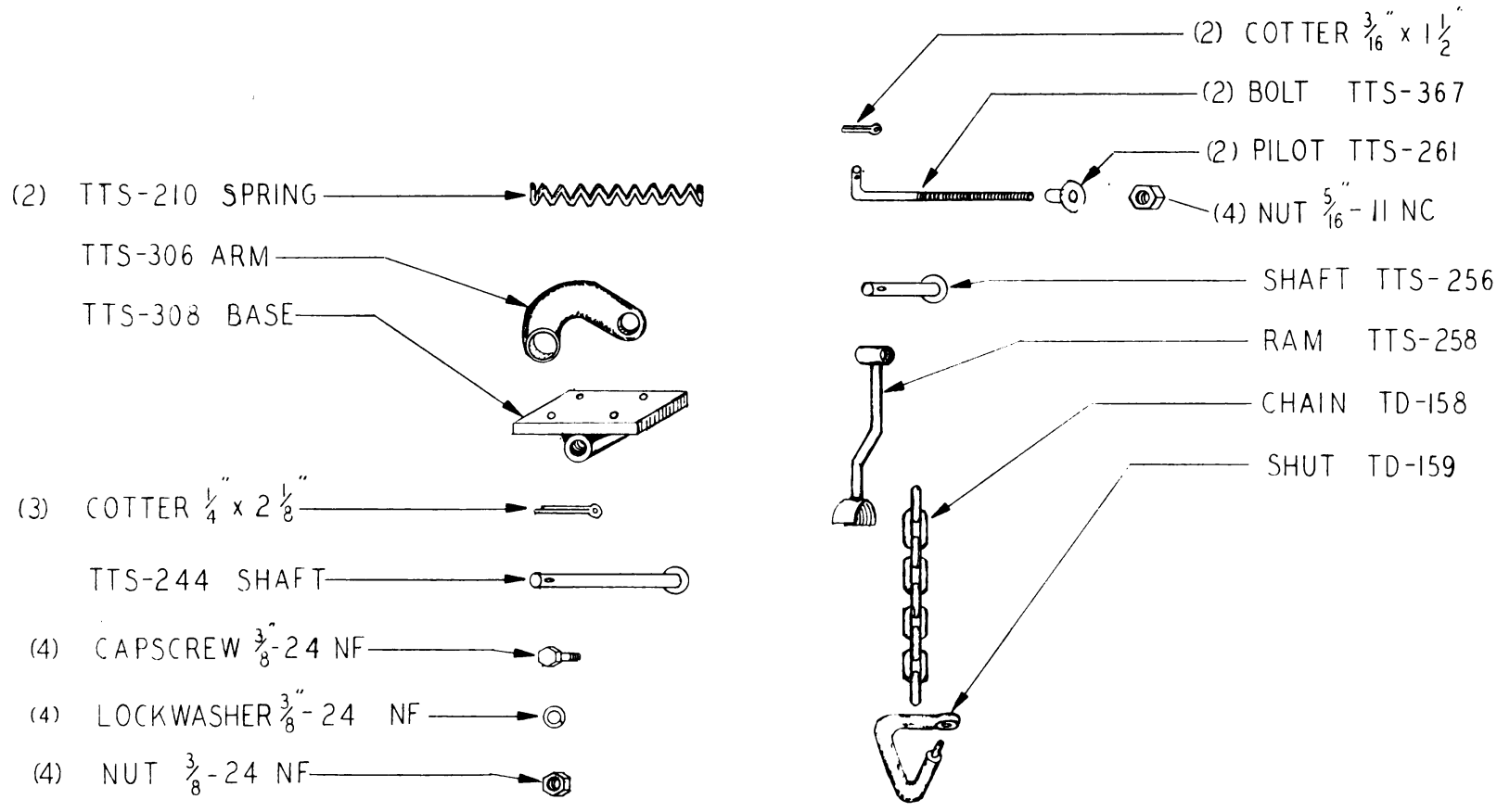
(See Fig. 40, Page 59)

ITEM	PART NO.	DESCRIPTION
1.	TTS-575	Main Drive Gear Bearing Retainer
2.	TTS-554	Main Drive Gear Snap Ring
3.	TTS-553	Main Drive Gear Bearing Snap Ring
4.	TTS-552	Main Drive Gear Bearing
5.	TTS-342	Main Drive Gear
6.	TTS-556	Main Drive Gear Pilot Roller Bearing
7.	TTS-548	Main Drive Gear Bearing Retainer Gasket
8.	TTS-501	Transmission Case
9.	TTS-511	Poppet Spring
10.	TTS-513	Shift Rail Poppet Ball
11.	TTS-508	Shift Plate
12.	TTS-510	Shift Plate Spring
13.	TTS-522	Synchronizer Blocking Ring
14.	TTS-525	Synchronizer Spring
15.	TTS-523	Second and Direct Speed Clutch Sleeve
16.	TTS-506	Shift Fork - High and Intermediate
17.	TTS-512	Shift Fork Lock Screw
18.	TTS-503	Shift Rail - High and Intermediate
19.	TTS-504	Shift Rail - Low and Reverse
20.	TTS-505	Shift Fork Guide Pin
21.	TTS-512	Shift Fork Lock Screw
22.	TTS-507	Shift Fork - Low and Reverse
23.	TTS-531	Sliding Gear - Low and Reverse
24.	TTS-527	Main Shaft Snap Spring
25.	TTS-529	Main Shaft Bearing Spacer
26.	TTS-528	Oil Retaining Washer
27.	TTS-526	High and Intermediate Clutch Hub Snap Ring
28.	TTS-530	High and Intermediate Clutch Hub
29.	TTS-521	Synchronizer Shifting Plate
30.	TTS-525	Synchronizer Spring
31.	TTS-522	Synchronizer Blocking Ring
32.	TTS-521	Main Shaft Second Speed Gear Assembly
33.	TTS-518	Main Shaft
34.	TTS-560	Main Shaft Bearing
35.	TTS-549	Hex. Head Screw (Bearing Retainer)
36.	TTS-550	Lockwasher
37.	TTS-538	Countershaft Thrust Washer - Front
38.	TTS-535	Countershaft Gears
39.	TTS-539	Countershaft
40.	TTS-536	Countershaft Gear Bushing
41.	TTS-541	Countershaft and Idler Lock Plate
42.	TTS-537	Countershaft Thrust Washer - Rear
43.	TTS-542	Countershaft Thrust Washer
44.	TTS-568	Control Housing
45.	TTS-377	Control Lever Assembly
46.	TTS-567	Lock washer
47.	TTS-566	Hex. Head Screw (Control Housing)
48.	TTS-561	Control Housing Assembly
49.	TTS-570	Control Lever Support Spring
50.	TTS-569	Control Housing Cap Washer
51.	TTS-565	Control Housing Cap
52.	TTS-514	Drain Plug
53.	TTS-514	Filler Plug
54.	TTS-540	Countershaft
55.	TTS-543	Reverse Idler Gear Assembly
56.	TTS-546	Reverse Idler Gear Shaft
57.	TTS-558	Front Bearing Retainer Oil Seal



(ALL PARTS USED ON 8-9-10 FT. SWEEPERS UNLESS NOTED)

Fig. 41
Brush Group



(ALL PARTS USED ON 8-9-10FT. SWEEPERS UNLESS NOTED)

Fig. 42
Brush Lift Group

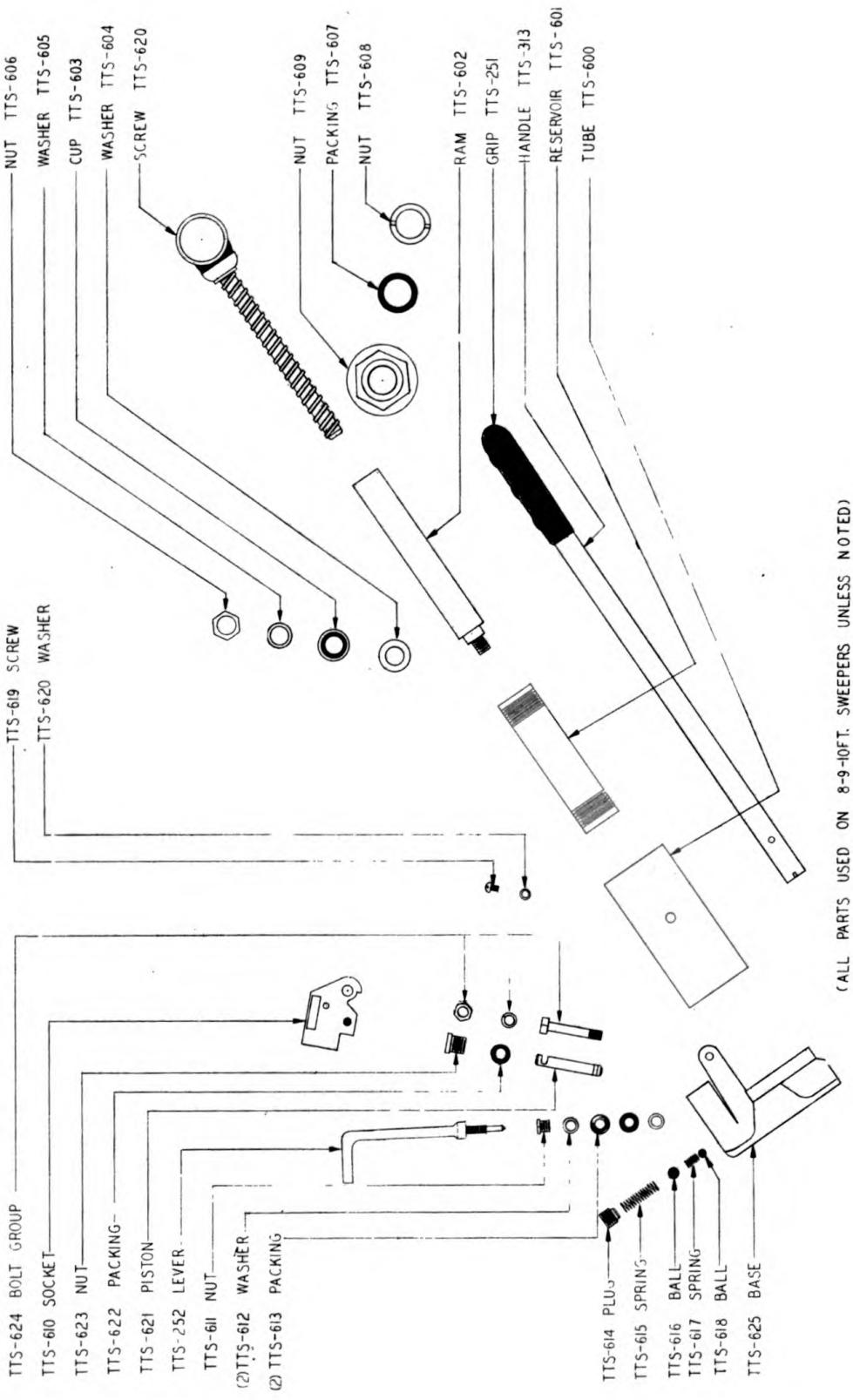


Fig. 43
Jack Group

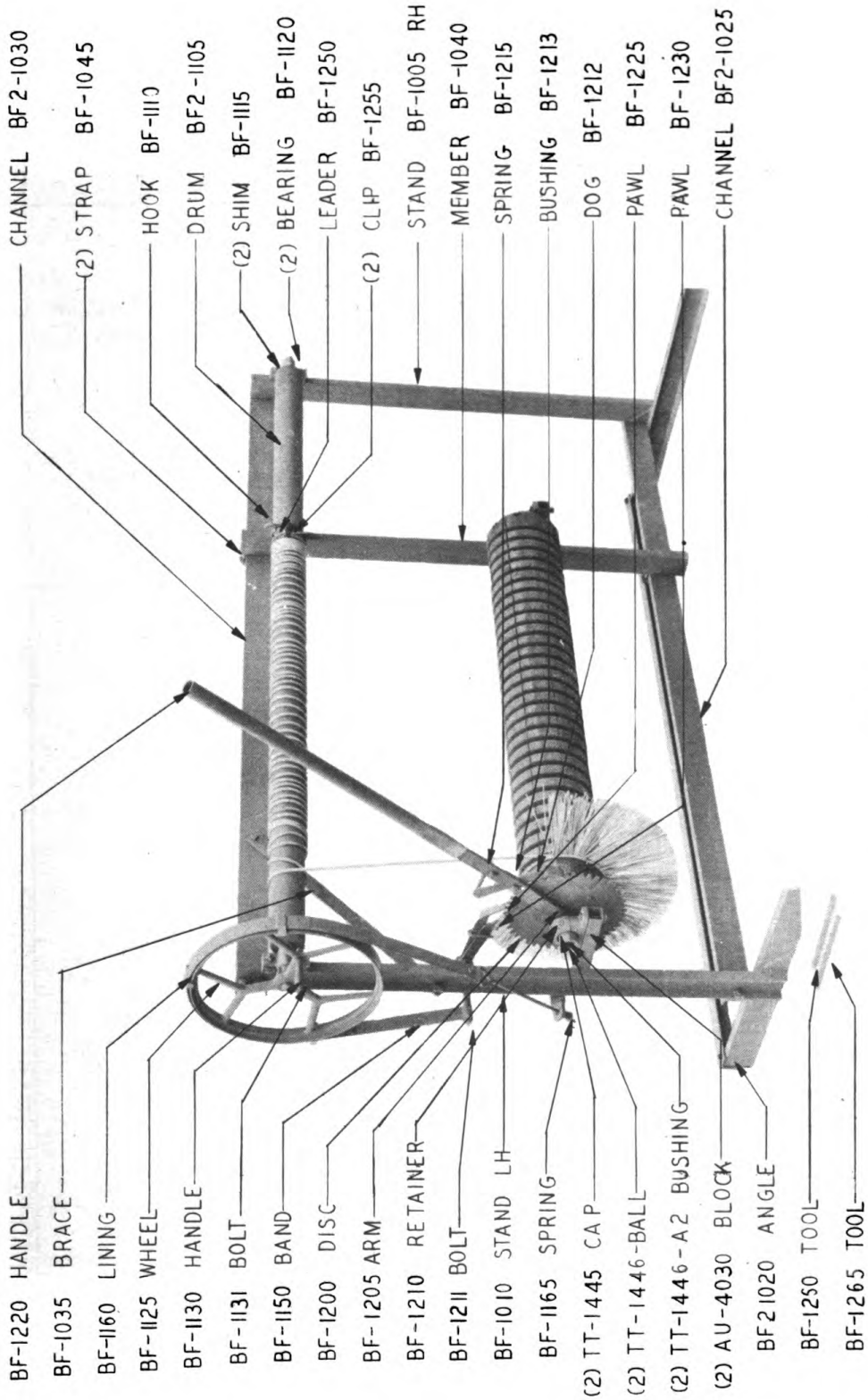


Fig. 44
Brush Filling Machine Group

BEARING CHART

DESCRIPTION	TYPE	PART NO.	MANUFACTURERS' PART NO.	QTY.
	FRONT WHEEL			
Wheel Bearing Cone	Tapered Roller	TD-322	Timken No. 14125A	2
Wheel Bearing Cup	Tapered Roller	TD-323	Timken No. 14274	2
	REAR AXLE			
Inner Bearing Cone	Tapered Roller	TD-86	Timken No. 15118	2
Inner Bearing Cup	Tapered Roller	TD-87	Timken No. 15250	2
Outer Bearing Cone	Tapered Roller	TD-74	Timken No. 09074	2
Outer Bearing Cup	Tapered Roller	TD-75	Timken No. 09194	2
	GEARBOX			
Driver Gear Brg.	Ball	TD-113	New Departure #5303	1
Driven Gear Brg.	Ball	TD-114	New Departure #5308	1
Drive shaft pilot bearing	Ball	TD-115	New Departure #1207	1
	TRANSMISSION			
Main Drive Gear bearing	Ball	TTS-552	Federal #1207	1
Main shaft Brgs. - rear		TTS-560	Max. Type M.R.C. #307 S.K.F. #6307Z . . N.D. #7607. (Optional.)	1
Main shaft pilot roller bearing	Free Roll	TTS-556	Warner Gear - #T846-26	1
	UNIVERSAL JOINT			
Needle Cup Assy.	Needle	TTS-272	Blood-Bros. #3DN4-1A	8

LIST OF PARTS MANUFACTURERS

COMPONENT	MANUFACTURER
Chain - Sprockets	Diamond Chain Indianapolis, Indiana
Transmission	Warner Gear Division Borg-Warner Corporation Muncie, Indiana
Universal Joint	Blood Brothers Machine Co. Allegan, Michigan
Wheel - Front	Geneva Wheel Co. Geneva, Ohio
Wheels - Rear	Motor Wheel Co. Lansing, Michigan
Grease Seals	Chicago Rawhide Co. Chicago, Illinois
Lift Jack	Hein - Werner Corp. Waukesha, Wis.

NUMERICAL INDEX

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
AU-4030	2	Base-Pillow Block		3		1.05	64
AU-4040	2	Bearing Ball Brush		4		3.83	61
AU-5005	2	End Casting		11		2.78	61
AU-5030	2	Pin-Brush Shaft 3/8 SAE 1020 x 3			3	.15	61
BF-1005	1	Stand-R.H. Leg		56		8.10	64
BF-1010	1	Stand-L.H. Leg		65		10.20	64
BF-1020	1	Tie Angle-Stand Leg		51		5.63	64
BF2-1025	1	Tie Channel-lower		54	8	6.60	64
BF2-1030	1	Tie Channel-upper		54	8	6.60	64
BF-1035	1	Brace-upper frame		10		1.13	64
BF-1040	1	Vertical adjusting member		38		4.05	64
BF-1045	2	Strap-vertical member clamp		1	8	.60	64
BF2-1105	1	Drum-Wire Rope		120		22.28	64
BF-1110	1	Hook-Rope Anchor			8	.90	64
BF-1115	2	Shim-Bearing Spacer		3		.83	64
BF-1120	2	Bearing-Drum Shaft		3	4	1.20	64
BF-1125	1	Wheel-Brake		32	8	12.23	64
BF-1130	1	Handle-Crank		1		.45	64
BF-1131	1	Bolt-Handle Retainer			8	.38	64
BF-1150	1	Brake Band Assy.		12		7.80	64
BF-1160	1	Lining only		1	8	2.25	64
BF-1165	1	Spring-Band Tension			8	.30	64
BF-1200	1	Ratchet Disc		10		5.03	64
BF-1205	1	Lever Arm Handle		8	8	2.03	64
BF-1210	1	Retainer Lever		1	8	.30	64
BF-1211	1	Bolt-Special			4	.30	64
BF-1212	1	Dog-Ratchet Lever		2		1.65	64
BF-1213	1	Bushing-Dog			2	.11	64
BF-1215	1	Spring-Dog			5	.30	64
BF-1220	1	Handle		10		1.20	64
BF-1225	1	Pawl-short		1	4	.98	64
BF-1230	1	Pawl-long		1	12	.75	64
BF-1250	1	Leader-Wire Rope		12		.83	64
BF-1255	2	Clip-Leader			4	.11	64
BF-1260	1	Tool-Staple Start		1	8	.98	64
BF-1265	1	Tool-Staple Set		1	8	.53	64

NUMERICAL INDEX - Continued

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
TD-3	1	Cover-Gearbox		12		6.38	57
TD-4	1	Gear-Driver			4	8.40	57
TD-5	1	Gear-Driven		2		5.33	57
TD-16	1	Steering Fork		16		10.73	51
TD-19	1	Tow Pole		33		8.85	51
TD-21	1	Cross Bolt-Tow Pole		1	10	.45	51
TD-22	1	Axle-Front Wheel		4	8	.98	51
TD-30	1	Brush Assembly 8'		323		72.00	61
TD-34	1	Brace-Brush Hood R.H.		2	12	.75	58
TD-35	1	Brace-Brush Hood L.H.		2	12	.60	58
TD-36	1	Brush Hood 8'		222		33.00	58
TD-38	1	Brush Core 8'		95		30.00	61
TD-39	1	Brush Shaft		47		2.78	61
TD-41	1	Sprocket-35 Tooth-1" Pitch-Style "A"	Diamond Chain Co.	15	4	6.00	56
TD-42	1	Spacer-Brush Shaft R.H.			4	.38	61
TD-43	1	Sprocket-13 Tooth 1" pitch	Diamond Chain	3		3.90	55,56
TD-45	1	Pivot Shaft-Main Brush		40		4.50	58
TD-46	1	Pivot Frame-Brush		33	8	5.93	58
TD-51	1	Collar-Gearbox			14	.90	57
TD-52	1	Pin-Bushing Lock			2	.04	57
TD-53	1	Shaft-Gearbox		6		3.38	57
TD-54	1	Gasket-Gearbox Cover		*	*	.83	57
TD-65	1	Tire-Front 6:00 x 9-4 ply		15			51
TD-66	1	Inner tube-6:00 x 9		2	8		51
TD-74	2	Outer Bearing Cone	Timken #09074		4	.53	53,65
TD-75	2	Outer Bearing Cup	Timken #09194		8	.30	53,65
TD-76	2	Grease Seal	Timken #T-5000		2	.19	51
TD-77	2	Bearing Spacer			12	.30	51
TD-83	2	Hub w/bearing cups	Motor Wheel - #31284	3	5	3.38	53
TD-85	2	Grease-Seal	Motor Wheel-#31104		2	.15	53
TD-86	2	Inner Bearing Cone	Timken #15118		8	1.05	53,65
TD-87	2	Innter Bearing Cup	Timken #15350		8	.53	53,65
TD-88	2	Washer - Keyed	Ford #B-1195		4	.11	53

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
TD-90	2	Hub Cap	Motor Wheel-#05998		3	.15	53
TD-91	2	Wheel-6:00 x 16 Rear	Motor Wheel-#31724	23		3.90	53
TD-92	2	Wheel cap	Motor Wheel-#31699	1		1.13	53
TD-93	10	Wheel Studs	Motor Wheel-#05393		5	.08	53
TD-94	2	Tire-Rear 6:00 x		22			53
TD-95	2	16 Inner Tube-6:00 x 16		2	12		53
TD-108	1	Key-Sprocket			2	.15	55
TD-110	2	Taper Pin x #5 x 1-1/4			2	.04	57
TD-111	1	Key-Driven			1	.15	57
TD-112	1	Key-Driver			1	.15	57
TD-113	1	Bearing	New Departure #5303		8	2.85	57,65
TD-114	1	Bearing	New Departure #5308	2	8	6.15	57,65
TD-115	1	Bearing	New Departure #1207	1		2.70	57,65
TD-116	1	Grease Seal	Chicago Rawhide #212112		2	.98	57
TD-117	1	Grease Seal	Chicago Rawhide #2872			.71	57
TD-126	1	Key-5/16 type "C" Woodruff			3	.04	56
TD-127	1	Key			4	.15	56
TD-134	2	Countershaft Balls		1	8	1.20	58
TD-135	2	Bushing			6	1.65	58
TD-136	2	Cap-Countershaft socket			13	1.05	58
TD-138	2	Socket-Brush Ball - R.H.		5	6	1.95	61
TD-139	2	Socket-Brush Ball - L.H.		5	6	1.95	61
TD-140	4	Adjusting Stud			3	.15	61
TD-143	2	Bushing			4	2.10	61
TD-144	2	Cap-Brush Bearing Socket		1	8	.60	61
TD-155		Fibre-22" Hickorette				18.00	61
TD-156	100	Staples - 2" lg. 3/8 spread 1/8" dia.		*	*	.01	61
TD-158	1	Chain-5/16 straight link x 18"		10		.34	61
TD-159	1	Cold Shut - 7/16			3	.08	61
TD-322	2	Bearing Cone	Timken #14125A		6	1.13	51,65

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
TD-323	2	Bearing Cup	Timken #14274		6	.45	51,65
TD-325	1	Spacer-Brush Shaft - L.H.			4	.23	61
TD-329	1	Grease Gun	Lincoln Engr. #5950		12	1.43	*
TD-369	2	Disc-Front Wheel	Geneva Wheel #D-181	2		1.35	51
TD-370	1	Hub-Front Wheel		15	6	5.78	51
TD-375	1	Wire Rope 3/8" x 130 ft.		28		11.18	
TT-1445	2	Cap-Bearing Ball		1	1	.60	64
TT-1446	2	Ball-Pillow Block		3	12	1.65	64
TT-1446-A2	2	Bushing-Ball			2	1.80	64
TTS-129	1	Main Frame Assy.		*	*	93.75	52
TTS-165	2	Housing-Axle Bushing		4	2	1.28	53
TTS-168	2	Thrust Washer			5	1.28	53
TTS-169	2	"U" Bolt			9	.30	53
TTS-180	2	Bushing-Graphite Bronze			8	3.30	53
TTS-183	2	Spring-Drive Plate to Dog			3	.15	53
TTS-186	1	Thrust Washer		2	8	2.55	52
TTS-190	1	Drive Ratchet R.H.		9	3	2.85	53
TTS-191	1	Drive Ratchet L.H.		9	3	2.85	53
TTS-192	1	Key			2	.15	53
TTS-202	1	Pad-Transmission Support		2		.53	57
TTS-203	2	Dog		1	3	.98	53
TTS-205	1	Universal Joint Complete	Blood Bros.-#B-199-3DN	40		22.50	54
TTS-207	1	Countershaft		4	8	1.13	56
TTS-208	1	Thrust Collar			7	.90	56
TTS-210	2	Counterbalance Spring		3		2.48	62
TTS-211	1	Sprocket - 1" pitch - 45 teeth Style "C"	Diamond Chain Co.	21		14.70	55
TTS-212	1	Key			2	.15	55
TTS-215	1	Frame Assembly - Brush		117		50.25	58
TTS-218	1	Pivot Stop with chain			8	.38	52
TTS-224	1	Chain Guard - Wheel Drive		20		10.88	55
TTS-236	1	Shaft-Trans-mission Support		4		.98	57
TTS-237	1	Chain Guard-Final Drive		19	4	10.65	56
TTS-239	1	Chain-72 Links 1" pitch	Diamond Chain Co.	5		1.20	56

NUMERICAL INDEX - Continued

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
TTS-244	1	Shaft		2		1.20	62
TTS-251	1	Rubber Grip	Montgomery-Ward #60C3705		4	.15	63
TTS-252	1	Release Valve handle			4	.60	63
TTS-256	1	Shaft-Jack to Frame		3		1.20	62
TTS-258	1	Ram-Travel Support		4		2.18	62
TTS-261	2	Eye bolt pilot			3	.53	62
TTS-270	1	Chain-86 links-1" pitch	Diamond Chain	14	4	15.90	55
TTS-272	8	Needle Cup Assy.	Blood Bros. - #3DN4-1A			.45	54
TTS-273	2	Cross	Blood Bros. - #3DN1-1		14	2.18	54
TTS-274	8	Cork Washer	Blood Bros. - #3DS-3		*	.04	54
TTS-275	8	Cork Retainer	Blood Bros. - #3DN2		*	.04	54
TTS-276	8	Cover Plate	Blood Bros. - #3DS8		2	.04	54
TTS-277	16	Hex. Hd. Self Tap Screw (10 x 32)	Blood Bros. - #3DS6		1	.02	54
TTS-280	1	Front Wheel Fork and Tow Pole Assy.		*	*	175.00	51
TTS-282	1	Rear Axle		68		27.26	53
TTS-298		Rear Axle Assy.		*	*		
TTS-305	1	Pivot Frame		286		46.31	52
TTS-306	2	Lift Arm		13	5	8.06	62
TTS-308	1	Pivot Plate		5		3.19	62
TTS-309	1	Jack Assembly	Hein-Werner #E9A-3	32		11.70	63
TTS-313	1	Jack Handle		1	8	1.05	63
TTS-320	1	Plain Yoke - Splined	Blood Bros.- #3DSXS22-29	8		3.47	54
TTS-322	1	Plain Yoke-Key	Blood Bros. - #3DSYR20-1	7		5.20	54
TTS-327	1	Housing gear-box		25	10	40.50	57
TTS-328	1	Support Housing Transmission		10		10.07	67
TTS-329	1	Transmission - Warner	Warner Gear #AT84J-1A	41		56.25	32,60
TTS-331	1	Brush Core - 10'		403		37.50	61
TTS-332	1	Brush Shaft - 10'		47		5.33	61
TTS-334	1	Brush Frame - 10'		211		54.75	58

NUMERICAL INDEX - Continued

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
TTS-336	1	Countershaft-10'		9		2.63	56
TTS-341	1	Brush Hood - 10'		266		45.00	58
TTS-342	1	Shaft-Transmission	Warner-Gear #T84J-16A	4		12.86	32,60, 65
TTS-343	1	Brush Frame - 9'		188		52.50	58
TTS-345	1	Brush Hood - 9'		243		39.00	58
TTS-349	1	Countershaft -9'		4	9	1.88	56
TTS-351	1	Brush Shaft - 9'		42		5.10	61
TTS-353	1	Brush Core - 9'		363		33.75	61
TTS-354	1	Rear Deck		55		12.45	52
TTS-360	1	Spacer - Pivot Shaft			9	.60	58
TTS-361	1	Control Lever - Transmission		5		2.81	
TTS-364	1	Washer			2	.30	53
TTS-367	2	Adjusting Bolt-Spring		2		1.35	62
TTS-370	1	Drive Plate - R.H.		15		7.88	53
TTS-371	1	Drive Plate - L.H.		15		7.88	53
TTS-372	1	Transmission Gear-Box Assy.		103		183.75	32,57, 60
TTS-382	1	Rope - 3/8" x 155'		37		12.79	61
TTS-383	1	Cap screw - Special			4	.11	58
TTS-385	1	Rope - 3/8" x 145'		48		12.41	61
TTS-390	1	Collar			8	.56	56
TTS-500	1	Transmission Case Assy.	Warner Gear #AT84J-1A	27	8	8.78	32,60
TTS-501	1	Transmission Case	Warner Gear #T84J-1A	27		8.67	32,60
TTS-502	1	Oil Retaining Cup H&I-Rail	Warner Gear #4684		.8	.02	32,60
TTS-503	1	Shift Rail - H&I	Warner Gear #T84J-20A		6	.45	32,60
TTS-504	1	Shift Rail - L&R	Warner Gear #T84J-21A		6	.45	32,60
TTS-505	1	Shift Fork Guide	Warner Gear #T84-22		2	.17	32,60
TTS-506	1	Shift Fork - H&I	Warner Gear #T84C-23A		2	1.17	32,60
TTS-507	1	Shift Fork - L&R	Warner Gear #T84C-24A		2	1.08	32,60
TTS-508	1	Shifter Plate	Warner Gear #T84B-25		4	.39	32,60
TTS-509	1	Shift Plate Fulcrum Pin	Warner Gear #T84-30		2	.07	32,60
TTS-510	1	Shift Plate Spring	Warner Gear #T84-31		.2	.02	32,60
TTS-511	2	Poppet Spring	Warner Gear #T84-42		.6	.02	32,60

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
TTS-512	2	Gear Shift Fork Lock Screw	Warner Gear #4418M		*	.05	32,60
TTS-513	2	5/16 Steel Balls	Warner Gear #X2136		1	.01	32,60
TTS-514	2	1/2 pipe plug	Warner Gear #X1519		3	.04	32,60
TTS-515	1	Countershaft Washer pin	Warner Gear #T84J-31		.4	.09	32,60
TTS-516		Interlock Plunger	Warner Gear #T84J-86A		.6	.15	32,60
TTS-517	1	Main Shaft Assy.	Warner Gear #AT84H-2			23.10	32,60
TTS-518	1	Main Shaft	Warner Gear #T84H-2	2	9	6.36	32,60
TTS-519	1	Inter. & High Clutch Hub	Warner Gear #T84F-2½A		5	2.82	32,60
TTS-520	1	Main Shaft 2nd speed gear	Warner Gear #AT84F-11A		14	5.42	32,60
TTS-521	3	Shifting Plate	Warner Gear #T84F-13		.6	.08	32,60
TTS-522	2	Synchronizer Blocking Ring	Warner Gear #T84F-14		1	.78	32,60
TTS-523	1	2nd & Direct Speed Clutch Sleeve	Warner Gear #T84F-15		8	2.34	32,60
TTS-524	1	M.S. 2nd Speed Gear Bushing	Warner Gear #T84C-19		2	.17	32,60
TTS-525	2	Synchronizer spring	Warner Gear #4682K		.4	.03	32,60
TTS-526	1	Clutch Hub Snap Ring	Warner Gear #4686		.9	.03	32,60
TTS-527	1	Main Shaft Snap Ring	Warner Gear #T84-17		2	.04	32,60
TTS-528	1	Oil retainer washer	Warner Gear #T84H-137		.7	.08	32,60
TTS-529	1	Main Shaft Bearing Spacer	Warner Gear #T84H-137¼		2	.15	32,60
TTS-530		H&I Clutch Hub Assy.	Warner Gear #1AT84J-2½A		5	6.71	32,60
TTS-531	1	Main Shaft Low & reverse gear	Warner Gear #T84F-12A	1	2	3.75	32,60
TTS-532	1	Main Shaft Nut	Warner Gear #T9-50P		2	.15	32,60
TTS-533	1	Main Shaft Washer	Warner Gear #T84J-50½A	1	1	.03	32,60
TTS-534	1	Oil Seal	Warner Gear #T84J-54		4	.04	32,60
TTS-535	1	Countershaft Gears	Warner Gear #AT84J-8	3	8	10.02	32,60
TTS-536	2	Countershaft Gear Bushing	Warner Gear #T84J-167		.9	.54	32,60
TTS-537	1	Countershaft Thrust Washer	Warner Gear #T84J-29		.3	.18	32,60

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
TTS-538	1	Countershaft Thrust Washer Front	Warner Gear #T84B-30A		.3	.12	32,60
TTS-539	1	Countershaft	Warner Gear #T84G-3		9	.57	32,60
TTS-540	1	Countershaft Bearing Spacer	Warner Gear #T84J-28		2	.48	32,60
TTS-541	1	Countershaft & Idler Plate	Warner Gear #T84G-48		3	.03	32,60
TTS-542	1	Countershaft Thrust Washer	Warner Gear #T84-29		.3	.12	32,60
TTS-543	1	Reverse Idler Gear Assembly	Warner Gear #AT84F-10A	2	5	2.43	32,60
TTS-544	1	Reverse Idler Gear	Warner Gear #T84F-10A	2	1	2.31	32,60
TTS-545	1	Reverse Idler Bushing	Warner Gear #T84-85A	1	1	.12	32,60
TTS-546	1	Reverse Idler Shaft	Warner Gear #T84G-35		3	.30	32,60
TTS-547	1	M.D.Gear Bearing Retainer	Warner Gear #T84G-6E		1	1.38	32,60
TTS-548	1	M.D.Gear Bearing Retainer Gasket	Warner Gear #T84-145A	*	*	.02	32,60
TTS-549	3	5/16-18x7/8 Hex. Head Bolt	Warner Gear #20366-S	*	*	.02	32,60
TTS-550	3	5/16 Lock Washer	Warner Gear #X2877D	*	*	.01	32,60
TTS-552	1	Single Row Radial Oil Shield Brg.	Warner Gear #X3204ML		7	3.45	32,60
TTS-553	1	M.D.Gear Bearing Snap Ring	Warner Gear #B-7070		3	.04	32,60
TTS-554	1	M.D.Gear Snap Ring	Warner Gear #T84-17		3	.04	32,60
TTS-555	1	M.S. Pilot Bearing Snap ring	Warner Gear #T84G-25		3	.02	32,60
TTS-556	13	Roller Bearing	Warner Gear #T84G-26		4	.02	32,60
TTS-557		M.D. Gear Assy.	Warner Gear #AT84J-16A	2		10.31	32,60
TTS-558		M.D. Gear Oil Seal	Warner Gear #T84J-54		2	.04	32,60
TTS-559	3	3/8-16x3/4 Hex. Head Bolt	Warner Gear #20348-S	*	*		
TTS-560	1	#307 Annular Brg. (Main Shaft Brg.)	Warner Gear #X3220J		7	4.50	32,60
TTS-561	1	Control Housing Assy.	Warner Gear #AT84A-148	1		1.88	32,60
TTS-562	1	Control Lever Guide Plate	Warner Gear #T84B-32		4	.18	32,60
TTS-563	1	Control Housing	Warner Gear #T84A-148		9	1.68	32,60
TTS-564	2	3/16 Rivet	Warner Gear #X3058B	*	*	.01	32,60

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
TTS-565	1	Control Housing Cap	Warner Gear #4496K		3	.30	32,60
TTS-566	4	5/16-18x7/8 Hex. Head Bolt	Warner Gear #20366-S	*	*	.02	32,60
TTS-567	4	5/16 Lock Washer	Warner Gear #X2977	*	*	.01	32,60
TTS-568	1	Control Housing Gasket	Warner Gear #T84-115		.2	.04	32,60
TTS-569	1	Control Housing Cap washer	Warner Gear #4497		.7	.04	32,60
TTS-570	1	Control Lever Support Spring	Warner Gear #4498K		.4	.05	32,60
TTS-571	1	Control Housing Packing	Warner Gear #4611		.2	.02	32,60
TTS-573	1	Control Lever Fulcrum Ball	Warner Gear #C8-2½		3	.15	32,60
TTS-574	1	Fulcrum Pin	Warner Gear #C84B-12A		2	.12	32,60
TTS-575		Main Drive Gear Bearing Retainer	Warner Gear #T84J-6		8	1.44	32,60
TTS-600	1	Reservoir Tube-Jack	Hein-Werner #E3-9A-2	2	8	1.16	63
TTS-601	1	Inside Reservoir	Hein-Werner #E3-9A-3	1	5	1.61	63
TTS-602	1	Ram	Hein-Werner #E3-9A-4	1		1.61	63
TTS-603	1	Ram Cup	Hein-Werner #E3-9A-5		2	.53	63
TTS-604	1	Support Washer-Ram Cup	Hein-Werner #E3-9A-6		2	.26	63
TTS-605	1	Retaining Washer Ram Cup	Hein-Werner #E3-9A-9		2	.04	63
TTS-606	1	Retaining Nut-Ram Cup	Hein-Werner #E3-9A-10		3	.53	63
TTS-607	1	Ram Packing	Hein-Werner #E3-9A-7		2	.19	63
TTS-608	1	Packing Nut-Ram	Hein-Werner #E3-9A-8		5	.08	63
TTS-609	1	Top Nut	Hein-Werner #E3-9A-11		9	1.09	63
TTS-610	1	Handle Socket	Hein-Werner #E3-9A-12	1	2	.90	63
TTS-611	1	Pack Nut-Release Screw	Hein-Werner #E3-9A-22		4	.08	63
TTS-612	2	Packing Washer Release screw	Hein-Werner #E3-9A-12		2	.02	63
TTS-613	2	Packing-Release Screw	Hein-Werner #E3-9A-28		3	.08	63
TTS-614	1	Valve Plug	Hein-Werner #E3-9A-25A		3	.08	63
TTS-615	1	Spring-Large	Hein-werner #E3-9A-25A		2	.08	63
TTS-616	1	Steel Ball-Large	Hein-Werner #E3-9A-25A		2	.08	63

PART NO.	QTY.	DESCRIPTION	PART MANUFACTURER	WT. Lb.	WT. Oz.	PRICE EACH	PAGE
TTS-617	1	Spring-Small	Hein-Werner #E3-9A-25A		1	.04	63
TTS-618	1	Steel-Ball-Small	Hein-Werner #E3-9A-25A		1	.04	63
TTS-619	1	Filler Screw	Hein-Werner #E3-9A-23A		1	.02	63
TTS-620	1	Washer-Filler Screw	Hein-Werner #E3-9A-23		1	.15	63
TTS-621	1	Pump Piston	Hein-Werner #E3-9A-15C		3	.71	63
TTS-622	1	Packing-Pump Piston	Hein-Werner #E3-9A-16		2	.08	63
TTS-623	1	Pack Nut-Pump Piston	Hein-Werner #E3-9A-17		4	.08	63
TTS-624	1	Bolt Group-Handle Socket	Hein-Werner #E3-9A-33		8	.08	63
TTS-625	1	Base-Jack			8	3.86	63
TTS-626	1	Extension Screw		1	5	1.61	63