

Repair Operations

FOR

THE

**FORDSON
MAJOR**

MANUFACTURED IN ENGLAND
BY
FORD MOTOR COMPANY LTD

FORWARD

This publication has been prepared to guide mechanics in the sequence of operations necessary to enable any repair listed in the Repair Time Schedule to be successfully carried out.

It is not intended, in this publication, to give detailed repair or adjustment instructions. Only a brief summary of the necessary operations is given and, if further detailed information is required, reference should then be made to the Service Bulletins or Repair Manual.

The sequence of operations is given in tabular form on the left-hand page, with exploded illustrations on the right-hand page showing the major parts being handled during the repair.

The repair operations in this book are listed in numerical order and broken down into the sub-sections, when necessary, to avoid unnecessary duplication. The specialised tools used in each operation are listed at the end of the operation sequence.

When using this book in conjunction with the Repair Time Schedule, reference will have to be made to the detailed operation (and its sub-sections, when necessary) as indicated under the heading "Associated Operations" where this appears.

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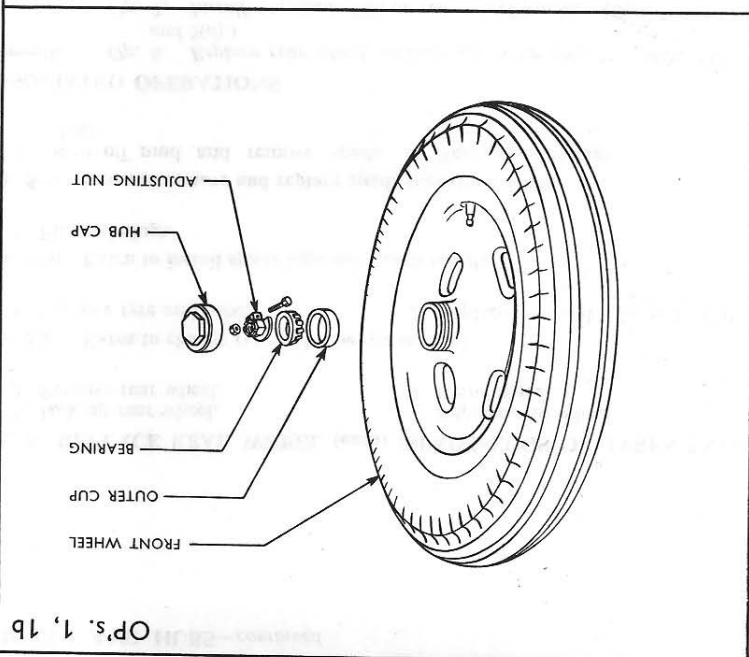
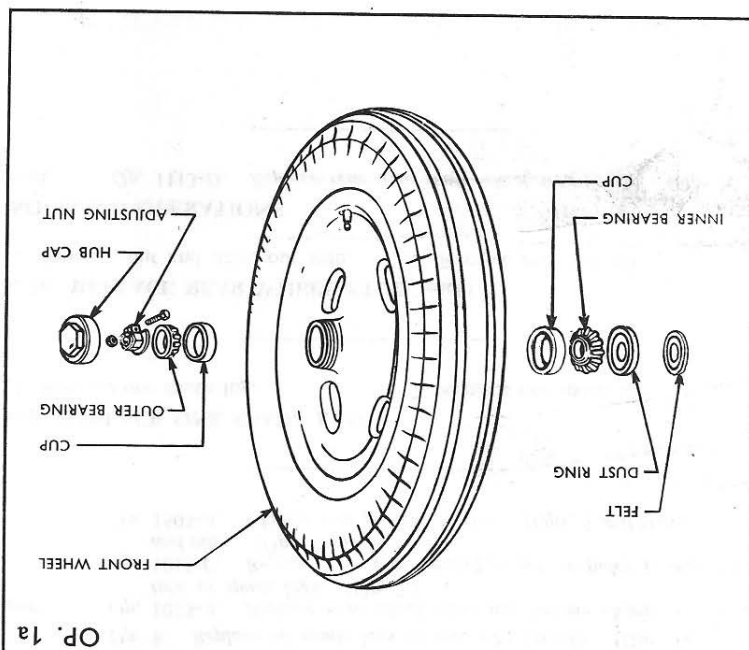
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CONTENTS

WHEELS AND HUBS

- Op. 1 LUBRICATE AND ADJUST FRONT WHEEL BEARINGS (each wheel)**
1. Jack up on front axle.
 2. Remove hub cap.
 3. Remove split pin, clamp bolt and adjusting nut.
 4. Remove wheel.
 5. Repack bearings with grease.
 6. Replace wheel, adjust bearings, tighten clamp bolt and fit split pin.
 7. Replace hub cap.
 8. Remove jack.
- Op. 1(a) Extra to replace wheel bearings and cups**
1. Extract grease retainer, inner and outer cups.
 2. Fit grease retainer, inner and outer cups.
- Op. 1(b) Extra to replace wheel (pneumatic) includes changing tyre and tube**
1. Remove tyre and tube.
 2. Replace tyre and tube and inflate.
- ASSOCIATED OPERATIONS**
- Domestic**
- Op. 2. Replace front wheel bearings and cups (each wheel). (Ops. 1 and 1(a).)
 - Op. 3. Replace front wheel (pneumatic) includes changing tyre and tube. (Ops. 1 and 1(b).)
- Export**
- Op. 1015-B. Replace one front (pneumatic) wheel. (Ops. 1 and 16.)
 - Op. 1105-A. Lubricate and adjust front wheel bearings (both wheels). (Op. 1.)
 - Op. 1105-D. Replace front wheel bearings and cups (both wheels). (Ops. 1 and 1(a).)
 - Op. 1503-C. Change front pneumatic tyre. (Ops. 1 and 16.)

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WHEELS AND HUBS—continued

Op. 5 REPLACE REAR WHEEL (each) (SPADE LUGS OR TYRES EXTRA)
 1. Jack up rear wheel.
 2. Remove rear wheel.
 3. Replace rear wheel.
 4. Remove jack.

Op. 5(a) Extra to change tyre and tube (pneumatic)
 1. Remove tyre and tube.
 2. Replace tyre and tube and inflate.

Op. 5(b) Extra to install spade lugs only (each wheel)
 1. Fit spade lugs.

Op. 5(c) Extra to remove and replace spade lugs (each wheel)
 1. Clean off mud and remove spade lugs.
 2. Replace spade lugs.

ASSOCIATED OPERATIONS

Domestic Op. 6. Replace rear wheel, includes changing tyre and tube. (Ops. 5 and 5(a).)

Op. 7. Install new spade lugs on rear wheel (each). (Ops. 5 and 5(b).)

Op. 8. Replace all spade lugs on rear wheel (each). (Ops. 5 and 5(c).)

Export Op. 1015-A. Replace rear wheel, does not include changing tyre and tube or spade lugs. (Op. 5.)

Op. 1015-C. Replace rear (pneumatic) wheel, includes changing tyre and tube. (Ops. 5 and 5(a).)

Op. 1503-A. Change rear pneumatic tyre. (Ops. 5 and 5(a).)

Op. 9 REPLACE ONE SPADE LUG

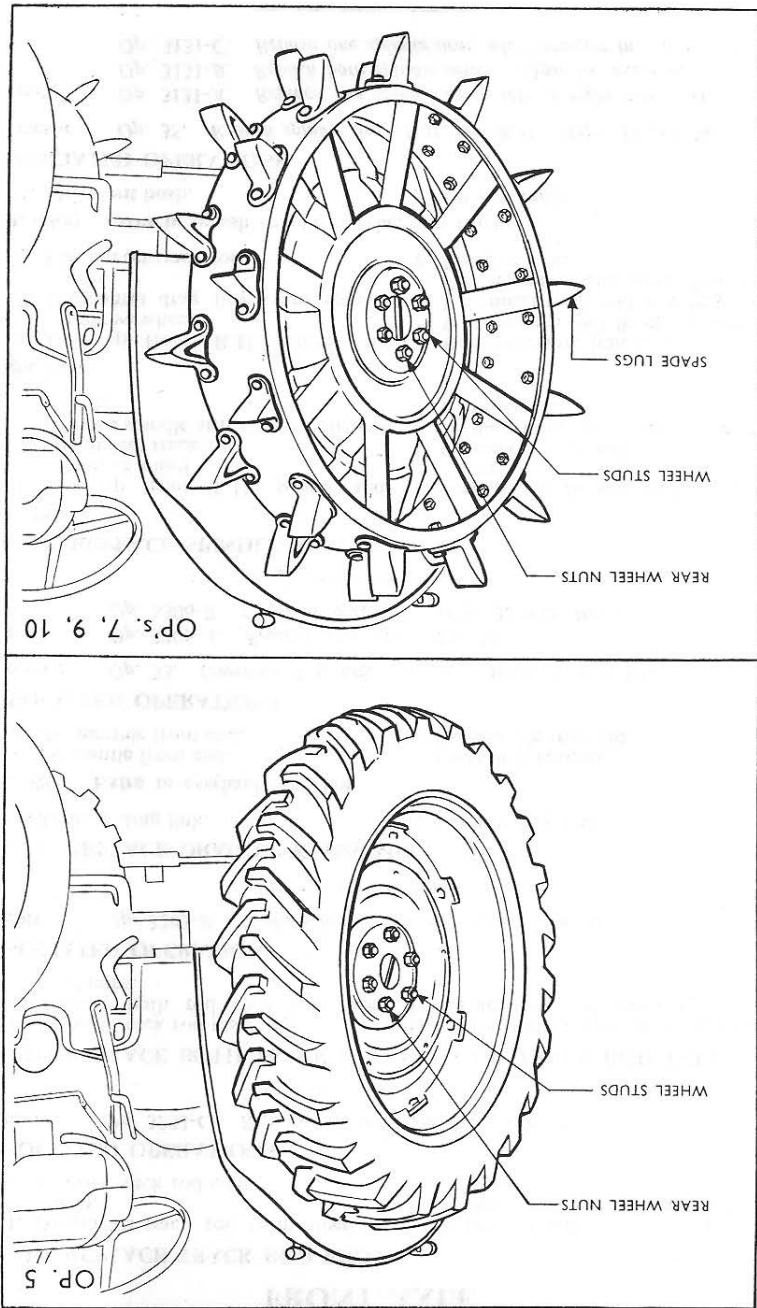
1. Remove one spade lug.
 2. Replace one spade lug.

Op. 10 REPLACE REAR WHEEL STUD (each)

1. Remove nut and drive out stud.
 2. Replace stud and nut.

ASSOCIATED OPERATIONS

Export Op. 1113-D. Replace rear axle shaft wheel stud (each). (Op. 10.)



FRONT AXLE

Op. 30 REPLACE TRACK ROD END

1. Disconnect track rod from steering arm.
2. Remove track rod end.
3. Fit new rod end.
4. Connect track rod to steering arm.

ASSOCIATED OPERATIONS

Export Op. 3283-C. Replace one track rod end. (Op. 30.)

Op. 31 REPLACE BOTH TRACK ROD ENDS OR TRACK ROD TUBE

1. Remove track rod assembly.
2. Remove both rod ends and tube.
3. Refit tube clamps and track rod ends.
4. Replace track rod assembly.

ASSOCIATED OPERATIONS

Export Op. 3283-B. Replace both track rod ends. (Op. 31.)

Op. 32 REPLACE DRAG LINK ASSEMBLY

1. Remove drag link.
2. Replace drag link.

Op. 32(a) Extra to overhaul drag link

1. Dismantle front end.
2. Reassemble front end.
3. Dismantle rear end.
4. Reassemble rear end.

ASSOCIATED OPERATIONS

Domestic Op. 33. Overhaul drag link assembly. (Ops. 32 and 32(a).)

Export Op. 3306-A. Replace drag link. (Op. 32.)

Op. 3306-B. Overhaul drag link. (Ops. 32 and 32(a).)

Op. 34 REPLACE SPINDLE ARM

Left Hand

1. Jack up front L.H. wheel and fit clamp
2. Disconnect track rod.
3. Remove spindle arm clamp bolt and
4. Replace spindle arm and fit clamp
5. Reconnect track rod.
6. Replace wheel and adjust bearings.
7. Remove jack.

Right hand

1. Jack up front R.H. wheel and
2. Disconnect drag link from spindle
3. Disconnect track rod.
4. Remove clamp bolt and arm.
5. Replace arm and fit clamp bolt.
6. Reconnect track rod and drag link.
7. Replace wheel and adjust bearings.
8. Remove jack.

Op. 34(a) Extra to rebush spindle steering arm (each)

1. Drive out bush.
2. Fit new bush.

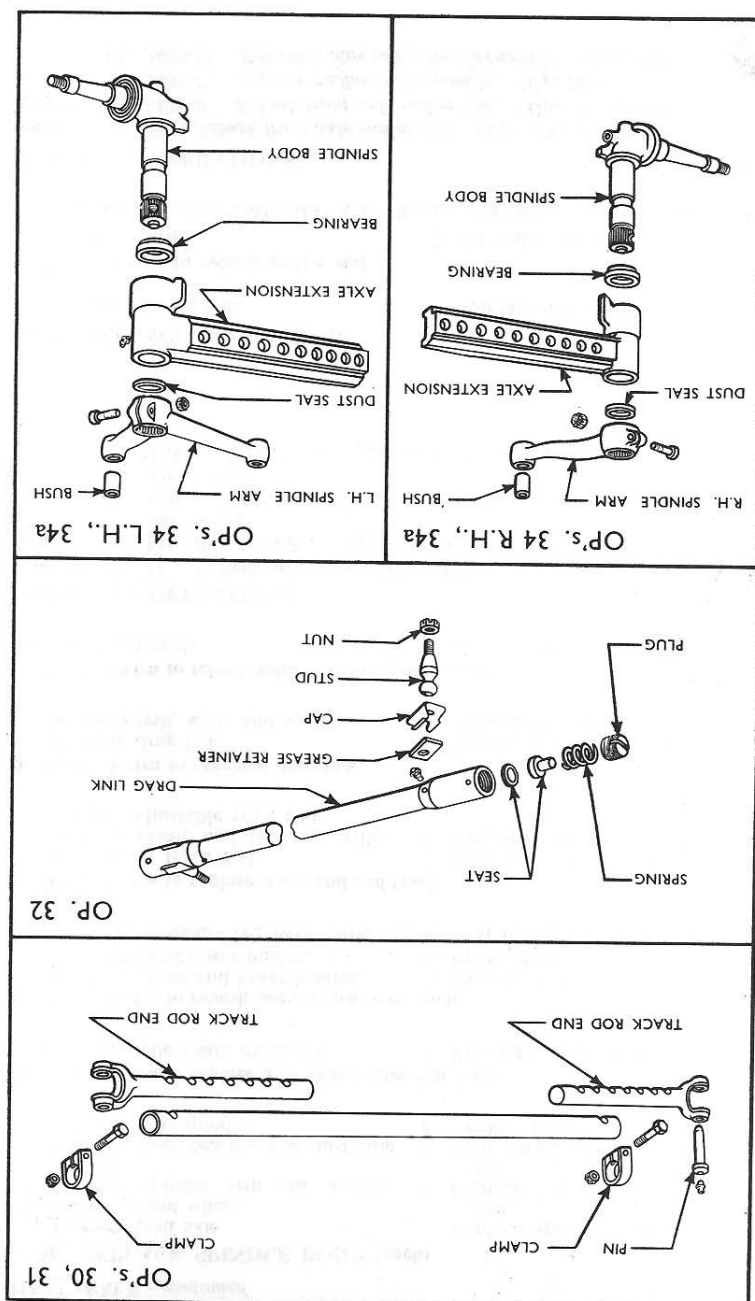
ASSOCIATED OPERATIONS

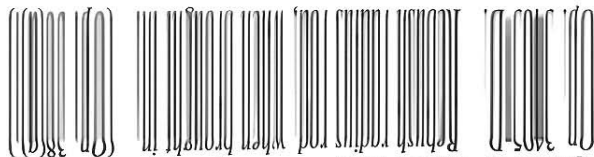
Domestic Op. 35. Rebush spindle arms L.H. and R.H. (Ops. 34 and 34(a).)

Export Op. 3131-A. Replace one spindle arm—left or right hand. (Op. 34.)

Op. 3131-B. Rebush both spindle arms. (Ops. 34 and 34(a).)

Op. 3131-C. Rebush one spindle arm, when brought in. (Op. 34(a).)





Domestic Op. 39. Rebuild front axle radius rod. (Ops. 38 and 38(a).)
Export Op. 3405-B. Rebuild front axle radius rod. (Ops. 38 and 38(a).)
Op. 3405-C. Replace radius rod assembly. (Op. 38.)

ASSOCIATED OPERATIONS

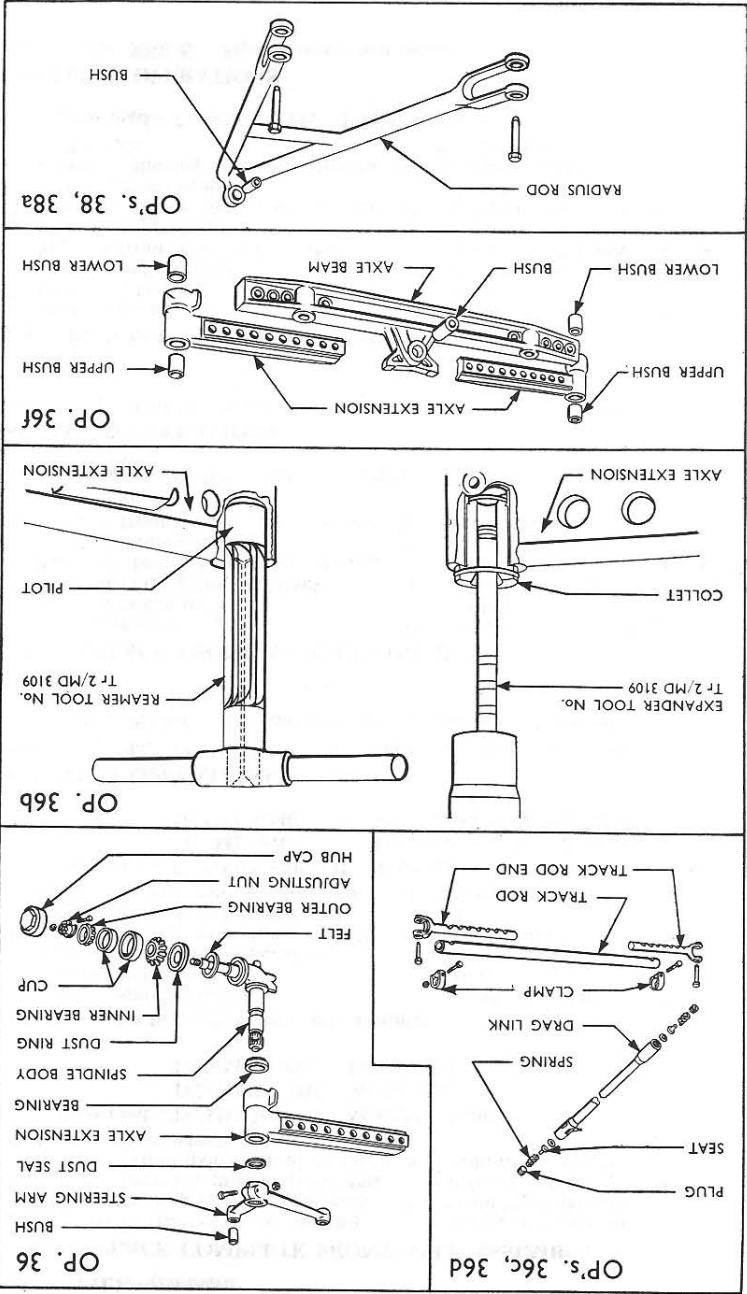
- Op. 38 REPLACE RADIUS ROD**
1. Remove radius rod.
 2. Replace radius rod.
- Op. 38(a) Extra to rebuild radius rod**
1. Remove bush.
 2. Fit and ream bush.
- Tools used—Tr/MMD 3407-AB.** Radius rod bushing remover and replacer.

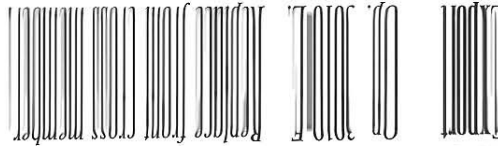
Domestic Op. 37. Rebuild axle beam extensions (each). (Ops. 36, 36(a) and 36(b).)
Export Op. 3010-B. Rebuild (each) front axle beam extension. (Ops. 36, 36(a) and 36(b).)
Op. 3010-C. Rebuild both front axle beam extensions, when brought in. (Op. 36(b).)
Op. 3105-A. Replace (one) spindle body. (Op. 36.)

ASSOCIATED OPERATIONS

- Op. 36(e) Extra to rebuild spindle steering arm (each)**
1. Drive out bush.
 2. Fit new bush.
- Op. 36(d) Extra to overhaul drag link**
1. Remove drag link.
 2. Remove ball, seats and springs.
 3. Replace ball, seats and springs.
 4. Replace drag link.
- Op. 36(c) Extra to replace track rod end (each)**
1. Disconnect track rod.
 2. Remove clamp and bolt and with-draw adjustable yoke end.
 3. Refit yoke end, clamp and bolt.
 4. Reconnect track rod to spindle arm.
- Op. 36(b) Extra to rebuild beam extensions (each)**
1. Remove upper and lower bushes.
 2. Fit upper and lower bushes.
 3. Expand bushes.
 4. Ream bushes.
- Tools used—Tr/MD 3109.** Driver, expander, reamer and stock.
- Op. 36(a) Extra to replace axle beam extension (each)**
1. Remove axle beam extension.
 2. Replace axle beam extension.
- Op. 36 REPLACE SPINDLE BODY (each)**
1. Jack up front axle.
 2. Remove front wheel.
 3. Remove spindle arm and spindle body.
 4. Remove inner bearing and dust ring from wheel spindle.
 5. Replace spindle body and spindle arm.
 6. Replace dust ring and inner bearing.
 7. Refit wheel and adjust bearings.
 8. Remove jack.

FRONT AXLE—continued





ASSOCIATED OPERATIONS

- Op. 42 REPLACE FRONT CROSS MEMBER**
1. Drain radiator.
 2. Remove bonnet, radiator shell, hoses and radiator.
 3. Support front of tractor suitably.
 4. Remove trunnion pin.
 5. Remove offside side channel and front cross member.
 6. Remove starting handle coupling (if fitted).
 7. Replace starting handle coupling in member.
 8. Replace front cross member, trunnion pin and side channel.
 9. Remove front supports.
 10. Replace radiator, radiator shell and hoses.
 11. Replace bonnet.
 12. Refill radiator.
- Tools used—**Tr/NMD 3006. Trunnion aligning pin.

ASSOCIATED OPERATIONS

- Op. 41 REPLACE FRONT AXLE CENTRE BEAM**
1. Jack up tractor.
 2. Remove radius rod.
 3. Disconnect drag link and track rod.
 4. Remove beam extensions leaving front wheels attached.
 5. Remove trunnion pin and withdraw centre beam.
 6. Relocate centre beam and fit trunnion pin.
 7. Replace beam extensions and wheels.
 8. Reconnect track rod and drag link.
 9. Replace radius rod.
 10. Remove jack.
- Tools used—**Tr/NMD 3006. Trunnion aligning pin.

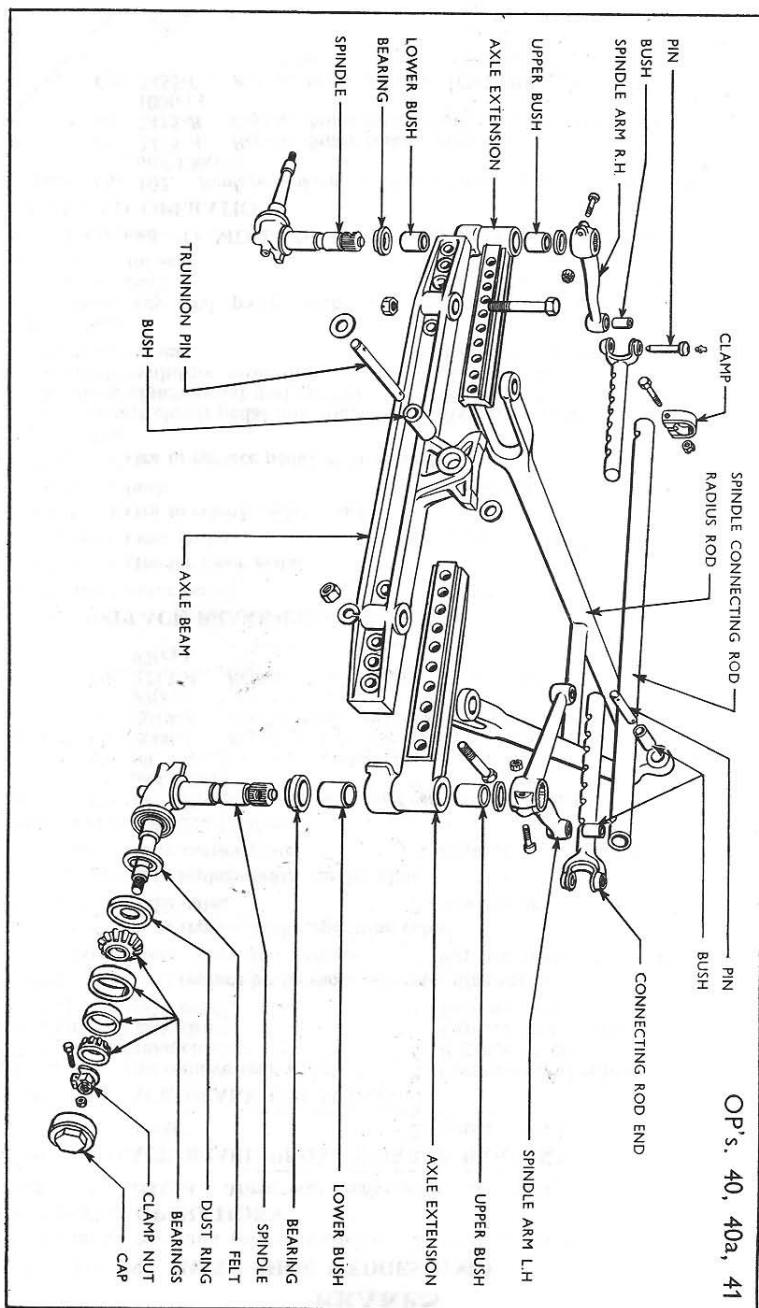
ASSOCIATED OPERATIONS

- Op. 40(a) Extra to overhaul front axle assembly**
1. Remove spindle bodies.
 2. Remove radius rod.
 3. Remove axle beam extensions.
 4. Rebuild beam extensions, spindle arms and radius rod.
 5. Disconnect and overhaul drag link.
 6. Rebuild trunnion pin and radius rod.
 7. Replace extension beams, radius rod, spindle bodies and steering arms.
 8. Reconnect drag link.
- Tools used—**Tr/NMD 3005-AB. Trunnion bush remover and replacer.
Tr/2/MD 3109. Driver, expander and reamer.
Tr/NMD 3407-AB. Radius rod bush remover and replacer.

Op. 40 REPLACE COMPLETE FRONT AXLE ASSEMBLY

FRONT AXLE—continued

1. Support the front of tractor suitably.
 2. Disconnect drag link at front end.
 3. Remove trunnion pins at front and rear. Wheel axle clear of tractor.
 4. Remove front wheels.
- Tools used—**Tr/MD 3000. Assembly clamp.
Tr/2/NMD 3004. Wedge tool.
Tr/NMD 3006. Trunnion aligning pin.



BRAKES

Op. 90 ADJUST BRAKE SHOE WEDGES ONLY

1. Remove cover and rotate expander.
2. Replace cover.

ASSOCIATED OPERATIONS

Export Op. 2000-A. Minor brake adjustment. (Op. 90.)

Op. 95 REPLACE BRAKE PEDAL STIRRUP BRACKET

1. Remove bracket.
2. Replace bracket.

Op. 97 REPLACE BRAKE DRUM (each)

1. Jack up and remove rear wheel.
2. Remove brake cover.
3. Remove brake drum.
4. Replace brake drum.
5. Centralise and adjust brakes.
6. Replace cover.
7. Replace rear wheel.
8. Remove jack.

Op. 97(a) Extra to replace brake shoes and retracting springs

1. Remove brake shoes and springs.
2. Replace brake shoes and springs.

Op. 97(b) Extra to replace brake operating cable

1. Remove brake cable.
2. Replace brake cable.

Op. 97(c) Extra to replace brake carrier plate

1. Remove brake carrier plate.
2. Replace brake carrier plate.

ASSOCIATED OPERATIONS

Domestic Op. 98. Replace brake shoes and retracting springs (each side). (Ops. 97 and 97(a).)

Export Op. 99. Replace brake carrier plate (each). (Ops. 97, 97(a) and 97(c).)

Op. 2019-Z. Replace all brake shoes and adjust. (Ops. 97 and 97(a).)

Op. 2213-A. Replace (each) brake carrier plate. (Ops. 97, 97a and 97(c).)

Op. 100 REPLACE BRAKE PEDALS—OUTER

1. Remove outer pedal.
2. Replace outer pedal.

Op. 100(a) Extra for inner pedal

1. Remove inner pedal.

Op. 100(b) Extra to rebush pedals (each)

1. Remove bush.
2. Fit new bush and ream.

Op. 100(c) Extra to replace pedal shaft oil seals

1. Disconnect clutch pedal link rod.
2. Remove clutch pedal and stirrup.
3. Partially withdraw cross-shaft.
4. Remove oil seal.
5. Replace oil seal.
6. Replace cross-shaft.
7. Replace clutch pedal link rod.
8. Reconnect pedal link rod.

L.H. Side

1. Remove key and partly withdraw cross-shaft.
2. Remove oil seal.
3. Replace cross-shaft and key.
4. Reconnect pedal link rod.

R.H. Side

1. Remove key and partly withdraw cross-shaft.
2. Remove oil seal.
3. Replace cross-shaft and key.
4. Reconnect pedal link rod.

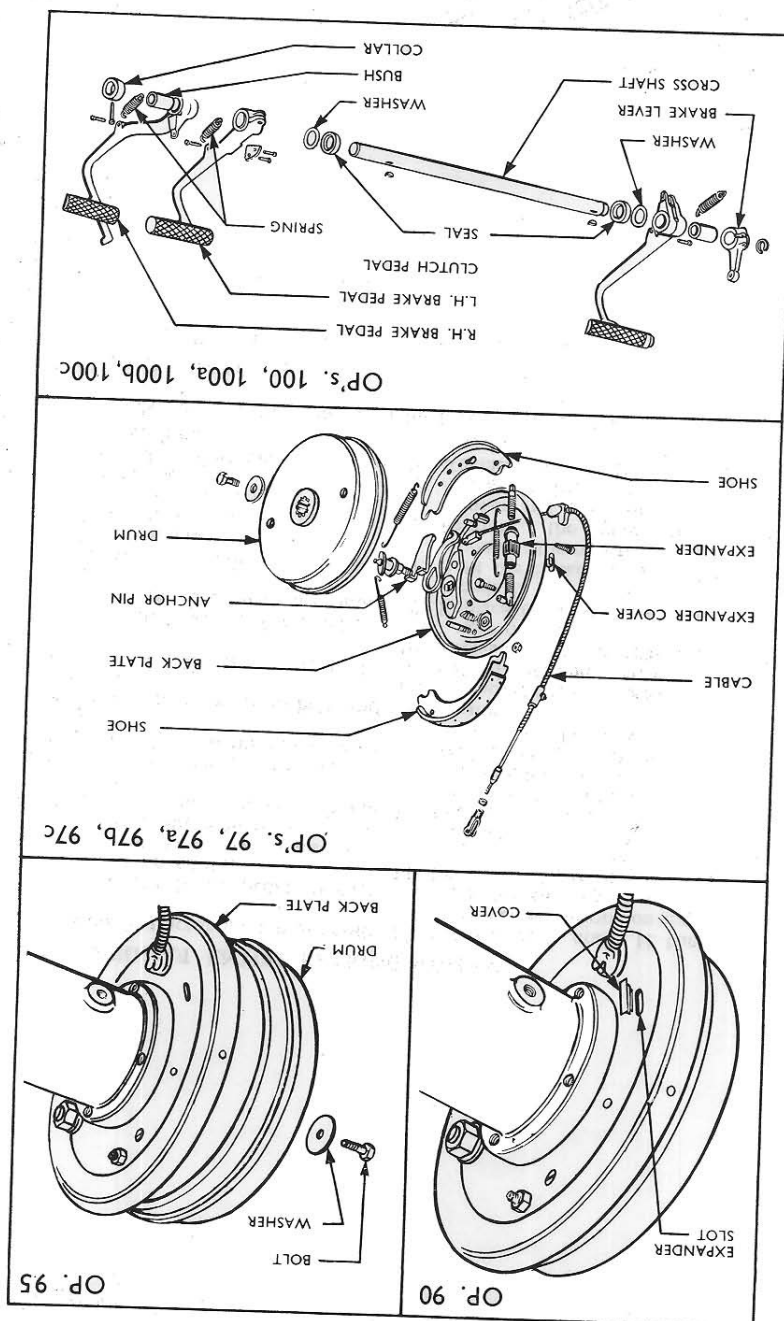
ASSOCIATED OPERATIONS

Domestic Op. 102. Replace brake pedal shaft oil seals (both sides). (Ops. 100, 100(a) and 100(c).)

Export Op. 2455-A. Replace brake pedal. (Op. 100.)

Op. 2455-B. Replace brake pedal shaft oil seals. (Ops. 100, 100(a) and 100(c).)

Op. 2455-C. Rebuild brake pedals. (Ops. 100, 100(a) and 100(b).)



BRAKES—continued

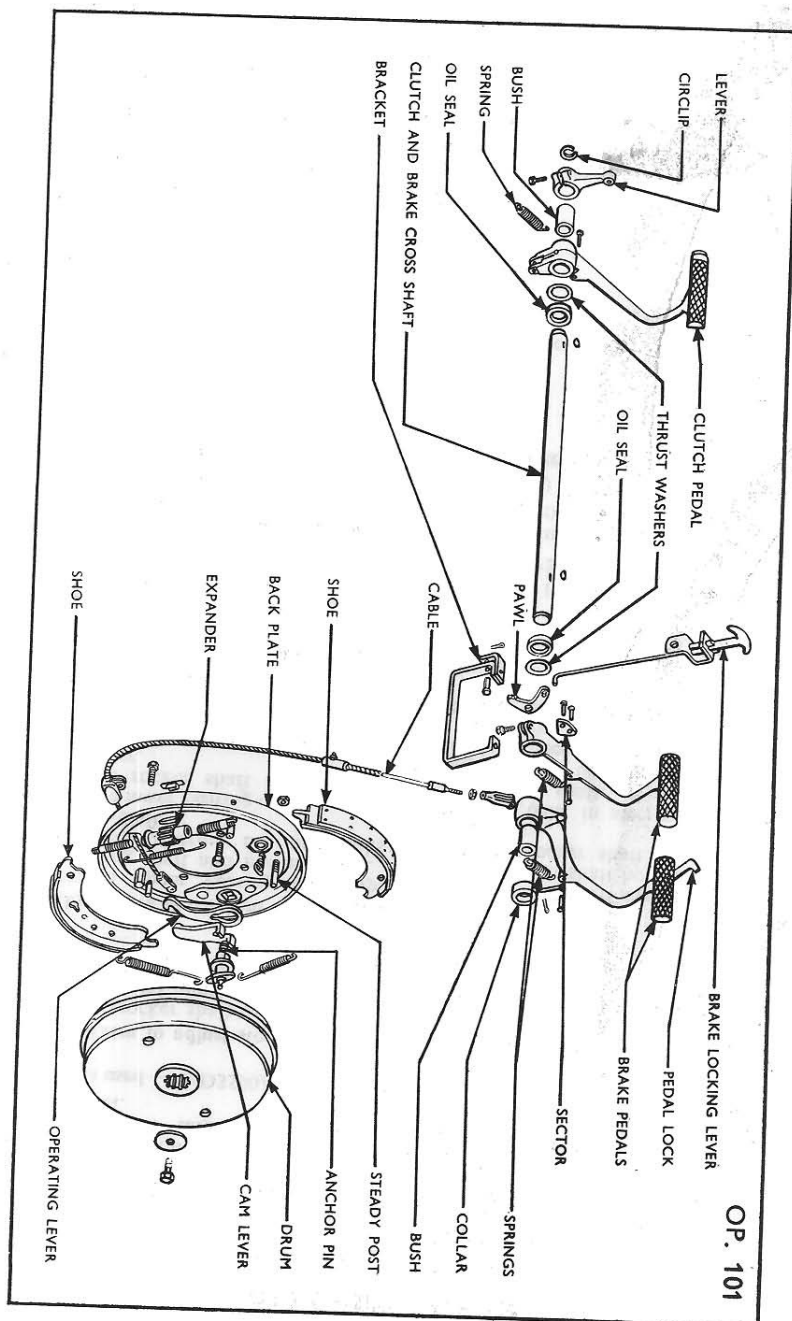
Op. 101 OVERHAUL ENTIRE BRAKING SYSTEM

1. Jack up the tractor and remove both wheels.
2. Remove the brake pedal bracket and return springs.
3. Disconnect the brake cables from the inner and outer brake pedals.
4. Remove the inner and outer brake pedals.
5. Remove the outer pedal bush.
6. Fit a new bush in the outer brake pedal.
7. Remove the brake cross-shaft and oil seals.
8. Remove the R. and L.H. brake drums.
9. Remove the R. and L.H. brake plates and disconnect the brake cables.
10. Remove the brake shoes and springs from each back plate.
11. Lift the cam lever and operating lever from the anchor pin and remove the pin.
12. Remove the adjustable steady post from each plate.
13. Replace the R. and L.H. back plate on each extension housing. Lock the bolt heads with wire.
14. Enter the adjustable steady post but do not tighten. Ensure the felts are fitted.
15. Locate the brake cables in each support bracket and refit the retaining bolt and pin.
16. Replace the cam and operating lever and enter the hooked end in the cable.
17. Replace the brake shoes and springs.
18. Refit the R. and L.H. brake drum.
19. Replace the brake cross-shaft and new oil seals.
20. Replace the inner and outer brake pedals.
21. Refit the brake pedal bracket and connect the return springs.
22. Reconnect the brake cables to the inner and outer brake pedals.
23. Adjust the brakes on each side.
24. Replace both wheels and remove the jack.

Tools used—Tr/MD 2867B. Clutch and brake shaft oil seal replacer.

ASSOCIATED OPERATIONS

Export Op. 2000-B. Overhaul braking system. (Op. 101.)



STEERING GEAR

Op. 120. REPLACE STEERING GEAR ASSEMBLY

1. Remove bonnet.
2. Remove steering wheel.
3. Disconnect fuel lines and remove fuel tank.
4. Disconnect drop arm.
5. Remove fuel tank bracket.
6. Remove steering assembly.
7. Replace tank support bracket.
8. Replace drop arm.
9. Reconnect drop arm and connect pipes.
10. Replace fuel tank and connect pipes.
11. Replace steering wheel.
12. Replace bonnet.

Tools used—Tr/D3590A. Drop arm remover.

- Op. 120a Extra to adjust steering gear (Rocker shaft and steering shaft end float)
1. Remove rocker shaft cover plate.
2. Drain oil and remove rocker shaft.
3. Remove steering shaft column.
4. Check steering shaft and rocker shaft end play and fit new shims as required.
5. Fill with oil.

Op. 120(b) Extra to overhaul steering gear

1. Remove upper bearing and cup, steering shaft and nut assembly.
2. Dismantle steering nut and balls from shaft.
3. Remove lower bearing cup.
4. Remove rocker shaft oil seal and retainer.
5. Drive out inner and outer rocker shaft bushes.
6. Remove steering column and shaft bush.
7. Fit new bushes in steering column and rocker shaft housing.
8. Fit new rocker shaft oil seal and retainer.
9. Replace balls in steering nut and install on shaft.
10. Replace lower bearing cup and balls.
11. Replace steering shaft and nut assembly.
12. Replace upper bearings and cup.

Tools used—Tr/D3576AB. Rocker shaft bush remover and replacer.

ASSOCIATED OPERATIONS

- Op. 121. Adjust steering gear. (Ops. 120 and 120(a).)
- Op. 122. Overhaul steering gear. (Ops. 120, 120(a) and 120(b).)
- Op. 3500-A. Adjust steering gear. (Ops. 120 and 120(a).)
- Op. 3500-C. Overhaul steering gear. (Ops. 120, 120(a) and 120(b).)
- Op. 3500-D. Replace steering gear. (Op. 120.)
- Op. 3500-E. Overhaul steering gear, when brought in. (Ops. 120(a) and 120(b).)

Op. 123. REPLACE STEERING WHEEL

1. Remove steering wheel.
2. Replace steering wheel.

ASSOCIATED OPERATIONS

- Op. 3600-A. Replace steering wheel. (Op. 123.)

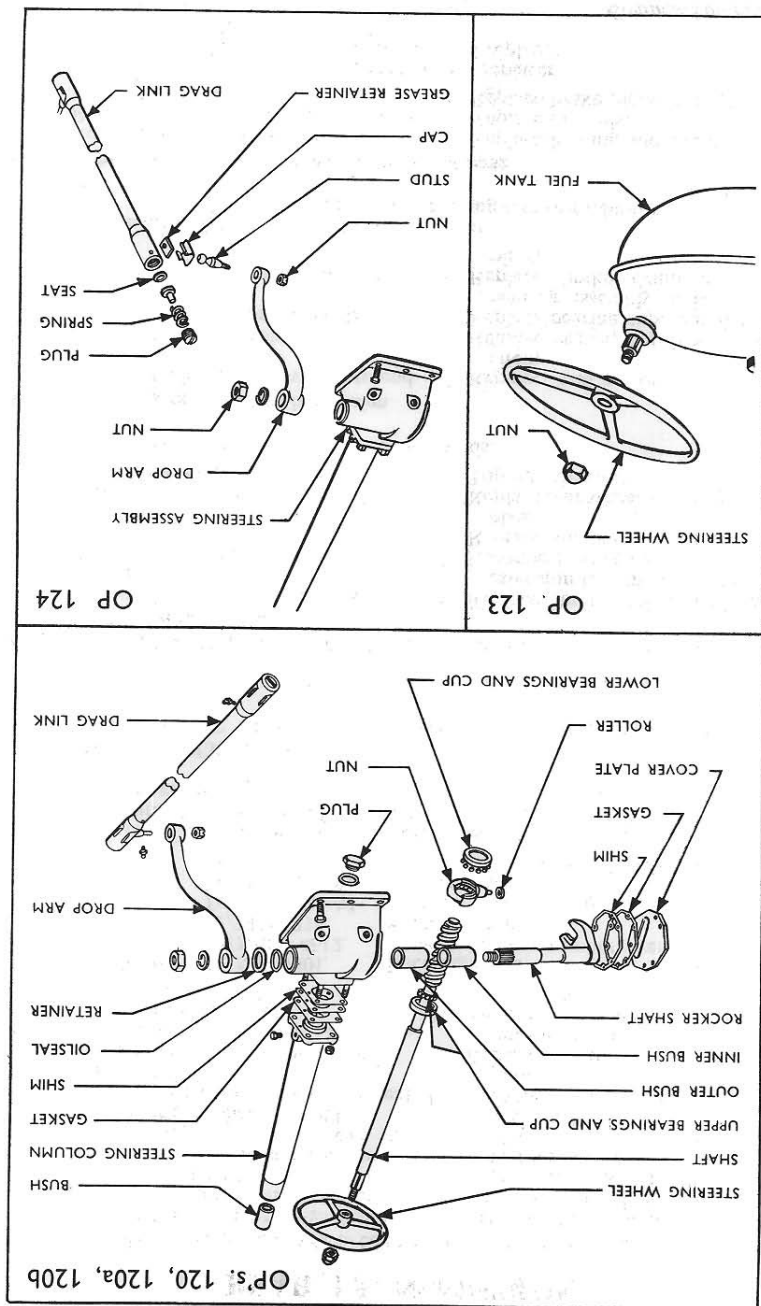
Op. 124 REPLACE STEERING DROP ARM

1. Disconnect drag link at rear end.
2. Remove drop arm.
3. Replace drop arm.
4. Reconnect drag link.

Tools used—Tr/D3590A. Drop arm remover.

ASSOCIATED OPERATIONS

- Op. 3590-A. Replace steering drop arm. (Op. 124.)



Continued on Page 22

Tr./D2217-B. 550. Handle. Outer oil seal replacer.

Op. 160(b) Extra to replace brake extension housing

1. Remove brake plate assembly.
2. Remove oil seals, circlip and outer bearing.
3. Replace bearing and circlip.
4. Replace oil seals.
5. Replace brake plate assembly.

Tools used—Tr. D2773-B. Inner oil seal replacer.

Tools used—Tr/D 7006. Bearing remover.
Tr/D 4261-AB. Inner bearing remover adaptor.

- Op. 160(a) Extra to replace bull pinion
1. Remove brake drum cover plate and
2. Remove bull pinion shaft.
3. Remove bull pinion inner bearing
4. Remove inner bearing from shaft.
5. Replace bearing on shaft and fit
6. Remove bearing cup from housing.
7. Replace bearing cup, and shaft and bearing assembly in housing.
8. Replace brake drum and cover plate.

Tools used—Tr/MD 4301. Locating studs.

1. Lower oil level in rear transmission.
2. Jack up rear and remove wheel.
3. Remove mudguard and rear foot plate.
4. Disconnect brake cable.
5. Remove bull pinion and brake extension housing assembly.
6. Replace bull pinion and brake extension housing assembly.
7. Reconnect brake cable.
8. Replace mudguard and rear foot plate.
9. Replace rear wheel and remove jack.
10. Top up lubricant.

Op. 160 REPLACE BULL PINION AND BRAKE EXTENSION HOUSING ASSEMBLY (each)

ASSOCIATED OPERATIONS Export Op. 4235-C. Replace (either) rear axle shaft oil seal. (Op. 158.)

ASSOCIATED OPERATIONS

Note.—If the oil seals on both sides are to be replaced the above is duplicated with the exception of lowering the oil level and removing transmission top cover.

Tools used—Tr/M/D 4301.
Tr/NMD 4612.
Tr/M/D 4235.
Tr/M/D 4221-A1.
Tr/M/D 4221-B1.
Tr/D 994781.
Ram cylinder housing lifting eyebearings cone replacer.
Axle shaft bearing cone remover.
Pre-load gauge.
Large reduction gear nut wrench.
Locating studs.

158. REPLACE REAR AXLE SHAFT OR OIL SEAL (either)
1. Lower oil level in rear transmission.
2. Jack up rear and remove wheel.
3. Remove mudguard.
4. Remove rear transmission top cover.
5. Remove large reduction gear nut and rear axle shaft assembly.
6. Remove bearing cone and oil seal from shaft.
7. Replace bearing cone and oil seal.
8. Remove rear foot plate and disconnect brake cable.
9. Remove bull pinion and brake extension housing assembly.
10. Replace rear axle shaft and adjust bearing preload.
11. Replace bull pinion and brake extension housing.
12. Reconnect brake cable and fit foot plate.
13. Replace rear transmission top cover and mudguard.
14. Replace wheel and remove jack.
15. Top up lubricant.

REAR TRANSMISSION