

SHOP MANUAL

MASSEY-HARRIS

PONY

(Other models begin on page MH-40)

IDENTIFICATION

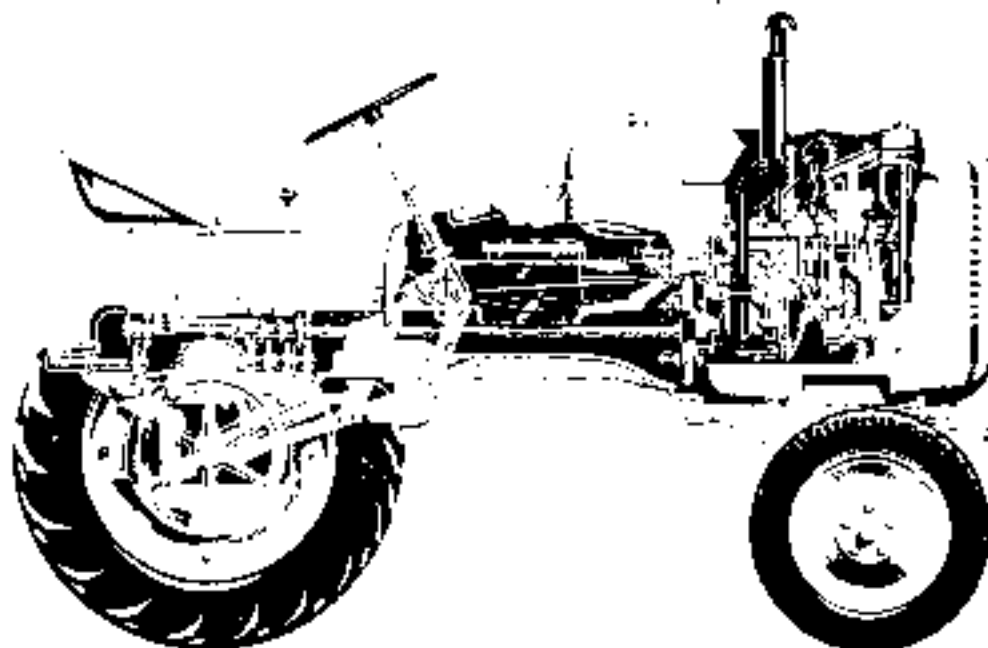
Tractor serial number is located on plate on right side of front frame, above front axle.

Engine serial number is located on left side of cylinder block.

NOTES ON LUBRIC VERSIONS

Adjustable Axle: Serial Nos. PGS 1001 & 24

Standard Axle: Serial Nos. PGS 1001 & 24



Massey-Harris "Pony"

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CONDENSED SERVICE DATA

Massey-Harris Pony

GENERAL

Engine Make	Continental	Compression Ratio	14:1
Engine Model	362	Turning Speed (rpm)	Below
Cylinders	4	Max. Speed (mi./hr.)	3
Born (inches)	3.4	Max. Speed (km./hr.)	5
Stroke (inches)	3.4	Oil System (Adjustable)	No
Displacement (cu. in.)	60	Oil System (Automatic)	No
Compression Pressure at Cranking Speed	90-110	Oil Jet (Reversible)	One
		Forward Speeds	2
		Generator & Starter Make	Auto Lite

TUNE UP

Firing Order	1-3-4-2	Mark Lamps	Hwy Wheel
Valve Tappet Gap	.0100	Spoke Day Mark	Campton
Valve Seat Angle	15	Head	3 Cam.
Ignition Distributor Make	Auto Lite	Pinion Gear	0.025
Ignition Distributor Model	1-3-2	Camshaft Make	362
Breaker Gap	.0100	Head	TSV
Retarded Timing, Deg.	10	Pinion Spring	1/2
Full Advance Timing, Deg.	10	Pinion Jaw (Hwy)	300
Mark Indicators		Pinion Jaw (Low)	2050
Retarded Timing	From 10	Pinion Load (rpm)	1000
Full Advance Timing	None	Ball Pinion Load (rpm)	1980
		PSI Loaded (psi)	650

SIZES—CAPACITIES—CLEARANCES

(Clearances in thousandths)

Crankshaft Journal Diameter	1.995	Ball Bearings Diameter Clearance	15-20
Crankpin Diameter	1.994	Ball Seat Clearance	15
Camshaft Journal Diameter, Front & Rear	.956	Crankshaft Key Fit	.07
Camshaft Journal Diameter, Rear	.956	Camshaft Bearing Clearance	.04-5
Piston Pin Diameter	0.5424	Cam Key Fit on Crank	1-4-5
Valve Stem Diameter	.5-10	Crankshaft Oil Clearance	1
Compressor Ring Width	.02	Transmission & Tollerance Clearance	0.1-5
Oil Ring Width	.016	Final Drive, Taper Clearance	1-1.2
Main Bearing Diameter Clearance	15-20	4-1/2 in. Pinion Gear	0.04
		Fuel Tank Capacity	6-1-5

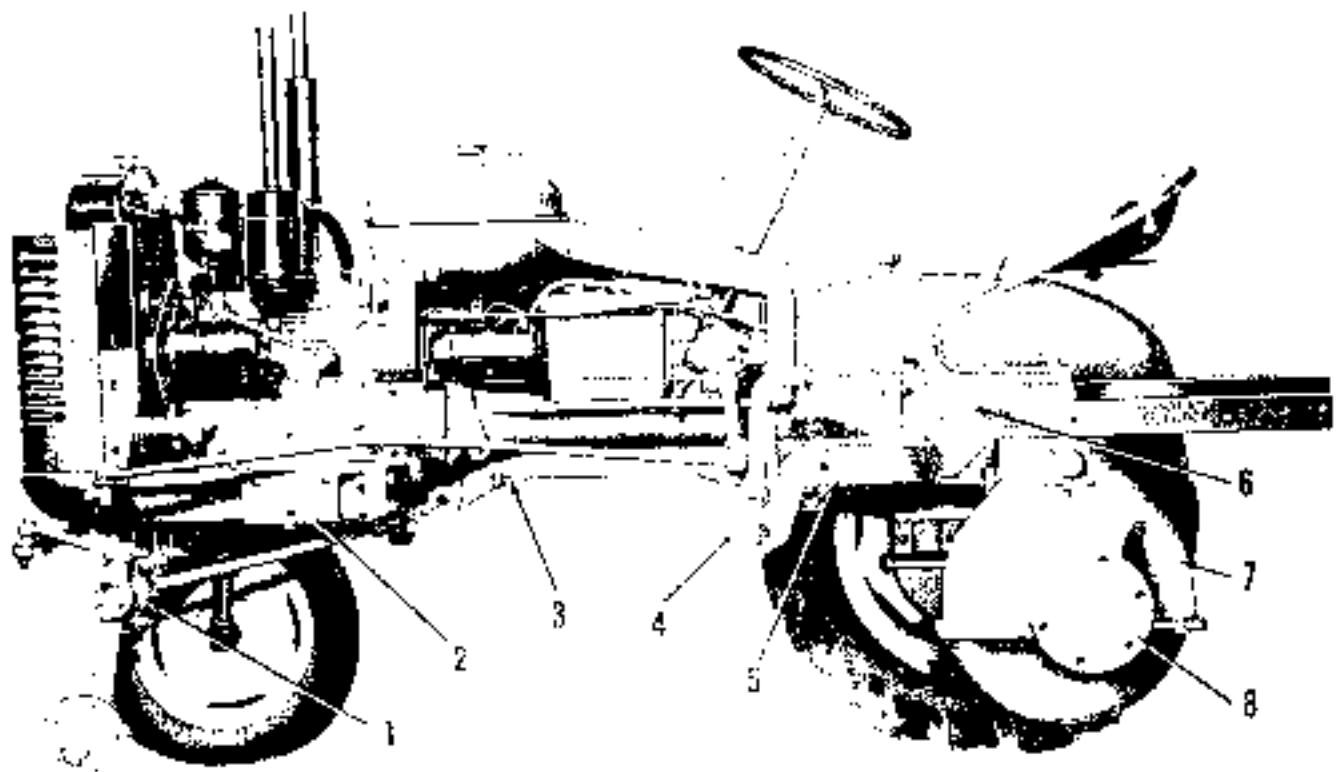


Fig. 48H Left side view of Massey-Harris Pony Tractor

- | | | | |
|--------------------------|-------------------------------|---------------------|-----------------------|
| 1. Adjustable front axle | 3. Top link to clutch housing | 5. Clutch release | 7. Final drive pinion |
| 2. Tractor frame | 4. Clutch housing | 6. Wheel axle shaft | 8. Wheel axle shaft |

FRONT AXLE

AXLE MAIN MEMBER

1. On standard or non-adjustable axle, to renew the main member, pull up under torque tube and remove steering arms and Woodruff keys from upper ends of knuckles. Remove each knuckle, hub and wheel as a single unit. Remove cotter key from rubber rod pivot ball (at rear end of rubber rod) and unscrew wing bolt. Remove cotter key from axle main member, pivot pin and drive pin out rearward.

For removal of main member of adjustable axle, each outer extension arm, knuckle, hub and wheel may be removed as a single unit.

STEERING LINKAGE

Non-Adjustable Axle

2. A non-adjustable drag link with integral socket ends is used and attaches to left steering knuckle arm. The single tie-rod has adjustable socket ends for obtaining correct toe-in of front wheels, which should be $\frac{1}{8}$ inch.

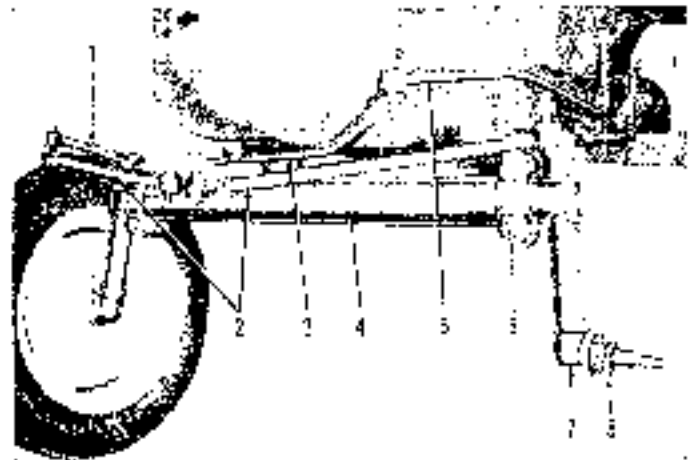
3. **ADJUSTMENT.** Adjustment of toe-in can be lever steering on the Pony tractor is done with the right side panel removed as in Fig. M18. All adjustments are made with front wheels raised or with drag link disconnected to relieve load on steering mechanism.

4. **CAM SHAFT.** To adjust cam on steering shaft bearings, loosen steering column clamp (1) and remove the three cap screws (2). Note that one of these cap screws has a copper washer under its head; replace in same position. Raise cover and separate the shim (4) from pack; split shim and remove it. Replace cover and cap screws and test for end play of bearings. All end play should be removed, but there should be no drag on steering gear except through its mid-position and then only when lever shaft is in correct (zero backlash) adjustment.

5. **LEVER SHAFT.** Loosen lock nut on lever shaft set screw and turn screw in until slight drag is felt when steering wheel is turned through its mid-

Fig. M12—Pony adjustable front axle and linkage

1. Steering arm
2. Tie-rod
3. Bell crank
4. Main member
5. Drive shaft
6. Steering arm cap screw
7. Drive pin



Adjustable Axle

3. A non-adjustable drag link with integral socket ends attaches to bell crank (3-5110, M12) which pivots on a shouldered ball in front frame for support to engine). Two tie-rods (2) with adjustable socket ends attach to the bellcrank end to steering knuckle arms (1). Correct toe-in of $\frac{1}{8}$ inch is obtained by adjusting the tie-rods at their inner ends. Outer ends of tie-rods extend to coordinate with main member extension arms.

STEERING GEAR

position (front wheels raised).

8. **PITMAN ARM.** To synchronize steering gear to front wheels when reinstalling pitman arm on lever shaft, first place front wheels in their straight ahead position; turn steering wheel through its full range and count the complete number of turns. Then turn axle exactly halfway so that gear is in its mid-position (that is, cam lever stud is on high point of cam). Now, install pitman arm and drag link without disturbing position of steering gear or front wheels.

9. **OVERHAUL.** To renew Ross steering gear unit for overhaul, it is necessary to pull pitman arm or disconnect drag link, remove both side panels and top panel (through which steering column protrudes) and disconnect throttle-to-governor rod. Throttle quadrant assembly can be removed from gear unit after unit is removed from tractor.

Renew all worn parts in unit. The two lever shaft bearings should be laced to provide .002-.003 clearance

STEERING KNUCKLES

4. **REBUSH.** Jack up under axle and remove upper wheel and hub as a unit. Remove steering arms and Woodruff keys from upper ends of steering knuckles and withdraw knuckles from axle. Drive the worn bushings out of axle main member by extension arm or the use of adjustable press and install new bushings. Rear or nose bushings to allow I&T recommended clearance of .002-.004. Diameter of new steel or bronze journal is 1.125 inches.

for lever shaft. Adjust unit after reassembly.

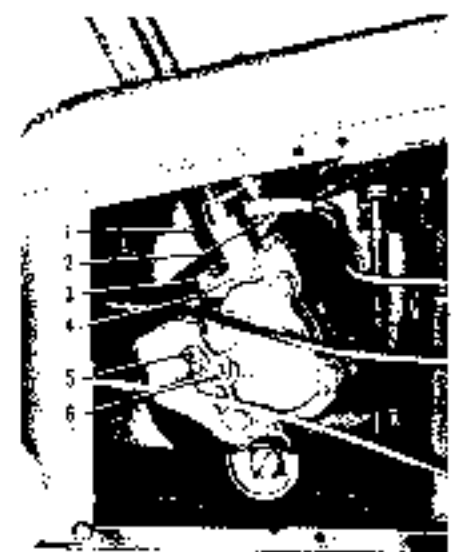


Fig. M13—Pony steering gear adjustment

- | | |
|-----------------------------|--------------------------|
| 1. Steering column clamp | 4. Shim |
| 2. Cap screw | 5. Lever shaft set screw |
| 3. Steering cover cap screw | 6. Housing side cover |

ENGINE AND COMPONENTS

R&R ENGINE WITH CLUTCH

10. To remove engine and clutch unit, remove fuel, water and radiator. Disconnect those wires at carburetor and fuel line to shut-off valve and governor wiring at governor lever. Then remove forward manifold stud nut and lift governor rod support off stud. Disconnect oil gage line from outlet at right side rear of cylinder block. Disconnect electrical harness, wiring battery and field connections of generator, engine relay and ignition wire at end. If tractor is equipped with lights, disconnect from wire harness. On models equipped with hydraulic lift, disconnect or remove hydraulic line from pump. Support engine in a hoist and remove engine-mounting frame with rod engine-to-torque tube bolts. Lift engine and clutch forward and out of front frame and torque tube.

Reinstall engine in reverse manner, making slighty to guide clutch shaft into driven member and pilot bearing.

CYLINDER HEAD

11. Removal of cylinder head requires removal of hose and drain or suction system, the hydraulic lift, model, remove hydraulic pump and reservoir and the air filter. Remove valve cover. Remove seal when cylinder head cap screws are taken out. Turn cylinder head cap off and cut off cap screws and fill filter's lid cap with oil. When main stuffing head is the proper length cap screws in each hole are tightened and screws evenly from center outward, applying the correct torque of 37.7-42.7 foot-pounds.

VALVES

12. Push valves in the engine head. Remove caps on their stem ends (Fig. M114) to provide a rotating motion each time valve is lifted. This causes a wiping action between valve face and its seat and permits longer valve life. To remove valves, remove front, cylinder head, carburetor, distributor and valve chamber cover. Stuff several bits of cloth in all return holes to valve chamber to prevent dropping valve spring keepers into crankcase. Carefully remove valve springs and remove keepers (exhaust valves have split half-round keepers and inlet valves have pins). Lift valves out of guides and springs, take retainers, seats and Rock caps out of chamber. Remove valves if stem diameter is less than the values given below:

Exhaust stem diameter.....	3/16"
Inlet stem diameter.....	3/16"
Valve seat angle (in block).....	45°

Exhaust face angle..... 45°
Inlet face angle..... 45°

Refer to Standard Units Section for valve rotor maintenance.

VALVE SEATS AND INSERTS

13. Valve seats should be re-fitted to 45° corner angle and the width should be reduced to 1/16 inch. Valve seat inserts are supplied for service. Drill insert to kerf size and dry run then measure outside diameter of same. To install inserts, counterbore cylinder block to same diameter as drilled insert and install same with a suitable arrow. Press block near rim of seat recess to lock insert in place. Refinish insert seat to 45° face angle and 1/16 inch width.

VALVE GUIDES AND SPRINGS

14. Guides in this model are straight

with no shoulder. When valves are not guides can be driven downward into valve chamber with a suitable arrow. Top of each guide should be 1/2 inch below gasket surface of cylinder block. Rock guides after installation, to provide stem-to-guide clearance of 0.005 inch for exhaust valves and 0.003 inch for inlet valves. The additional clearance required for the exhaust valve is provided for an exact valve stem, hence the same rocker may be used on both exhaust and inlet guides.

Test valve springs and remove any which do not test 15 pounds plus or minus 2 pounds when compressed to 1 1/2 inches, or when one third of stroke or do not have protective coating. Valve spring free length is 1 1/2 inches.

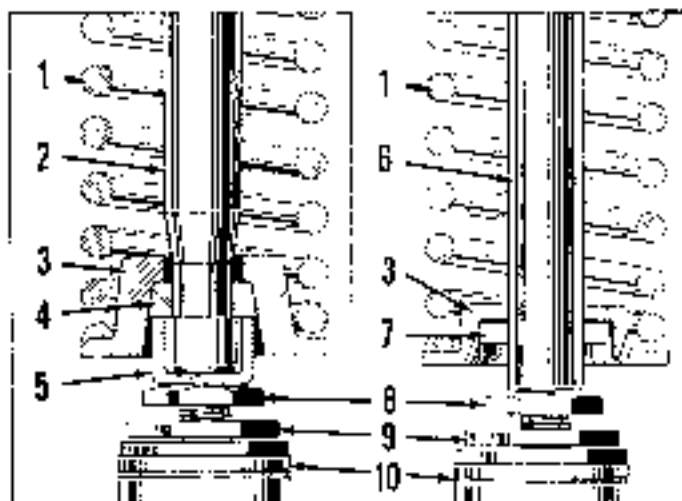


Fig. M114—Continental M&2 exhaust and inlet valves. Valve rotators are used on exhaust valves only.

1. Valve rotator
2. Rock cap
3. Valve stem
4. Valve face
5. Valve seat
6. Valve guide
7. Valve spring
8. Valve spring keeper
9. Valve spring retainer
10. Valve spring cap

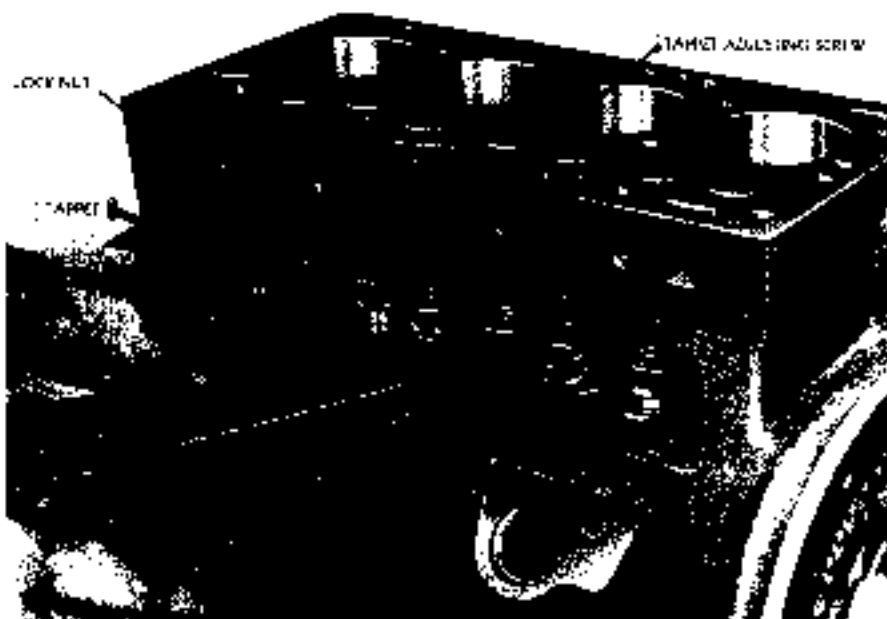


Fig. M115—Adjusting tappets on Continental M&2 engine. A three wrench operation.



Fig. M16—Continental N63 timing gears and valve timing marks. Oversize marking on cam gear corresponds with 1/2 mark on gear case gasket surface.

VALVE TAPPETS (CAM FOLLOWERS)

15. The barrel type tappets can be renewed without disturbing the camshaft or cylinder head by first removing the valve standard cover screws. Lay the tappet adjustment screw completely down and removing the valve spring. While holding the valve up, remove tappet screw and lock and then barrel and lift the barrel out of its base. Oversize tappets are not provided for service. IKT recommended clearance of tappet in its frame should not exceed .025 for quiet operation.

Note: If all valve tappers are to be removed it is recommended that the cylinder head and valves be removed.

16. **ADJUST.** Adjustment of tappet clearance is a three wrench operation (Fig. M15). Recommended gap is .012 cold for inlet and exhaust. To ...

just all of the tappers it will be necessary to remove distributor, distributor and valve standard covers. If only one or two tappets near the end of block are to be adjusted, the distributor need not be removed. Adjust tappets for number one cylinder when number four piston is at top center of its compression stroke, adjust number three when number two piston is on top center of its compression stroke and proceed in the same manner for all cylinders through the firing order 1-3-4-2-1.

VALVE TIMING

17. To check the timing when engine is assembled, set exhaust valve travel of number 3 to 1 cylinder to 320 clearance. Crank engine until the piston of cylinder being checked is on T. A gasket on top of compression cover and another to crank slowly until exhaust valve closes and tappet can be rotated with the key. At this point, the printed cam on flywheel indicating top position should line up with the timing pointer when viewed through timing inspection hole in right side of engine or with a 4 degree or 1/2 inch either way.

If valves are incorrectly timed, remove timing gear cover and inspect relation of timing marks on camshaft gear and crankshaft gear. The punch marked tooth of crankshaft gear is between the two punch marked teeth of camshaft gear.

TIMING GEARS AND COVER

18. **TIMING GEAR COVER.** To check for oil leaks without removal of cover, remove crankshaft front seal and oil to reservoir and re-install governor assembly for overhaul, the timing gear cover can be removed without draining and removing radiator as

models not equipped with hydraulic lift. However, on models equipped with hydraulic lift, it will be necessary to remove radiator. First, remove fuel gauge and valve support. Take off fan belt and fan assembly; remove starting pawl and nut and the crankshaft pulley. Disconnect governor linkage and remove top screws and nuts attaching cover to engine and oil pan. Loosen all other oil pan cap screws and insert a thin knife blade or feeler between oil pan gasket and timing gear cover and separate the two. Dry cover off its dowels and studs. Timing gears may now be inspected, governor weights assembly can be removed from crankshaft gear and governor lower shaft and assembled parts in the cover can be inspected or repaired as required. Crankshaft front oil seal (a spring loaded leather seal with lip facing inward) can be pressed out of cover and renewed.

19. **TIMING GEARS.** If the gears are to be renewed, camshaft removed or marked and play adjusted, the radiator must be drained and removed in addition to the work performed in the preceding paragraph. As will be noted in Fig. M16, the timing gears are meshed so that the punch marked tooth of crankshaft gear is between the two punch marked teeth of camshaft gear.

To remove crankshaft gear, take out the four machine screws fastening governor weights assembly to the gear. Remove weights assembly and crankshaft gear nut. To remove gear without using a puller, rotate crankshaft until the two 3/4 inch holes in gear hub are in register over shaft thrust plate retaining screws. Insert two 3/4-16 screws having 1/2 inch threaded portion into gear hub holes and turn them in evenly until gear is pushed off shaft. An alternate way is to use puller as shown in Fig. M17, being careful that governor plunger bore in crankshaft is not damaged by center leg (arrow) of puller.

To remove crankshaft gear when cover is off, it will be necessary to use a suitable puller.

Note marking (Fig. M18) on gear cover gasket surface of crankcase. This indicates correct oversize or undersize gear to be used in this block. In this instance, it indicates that crankshaft gear and rise over standard should be used. The gear will be similarly marked on its forward face.

When installing the crankshaft gear, it is advisable to remove distributor or oil pan and lock up the shaft.

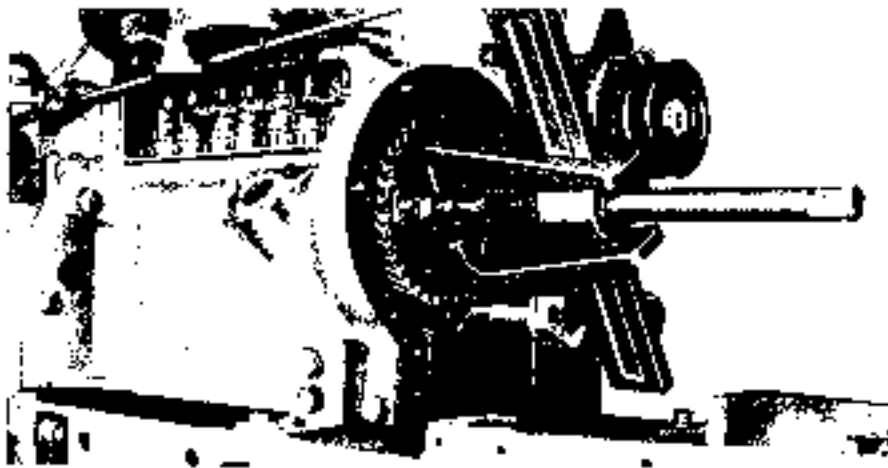


Fig. M17—Pulling Continental N63 cam gear. Note washer between camshaft and puller screw to protect governor plunger bore. Tappets are held up by wire under heads of tappet screws.

CAMSHAFT

20. The camshaft consists of three camshafts which operate the inlet and compression valves. The inlet camshaft and the compression camshafts operate the inlet and compression valves placed under the governor plunger. To remove the camshaft from the block:

Camshaft has three standard bearings which run in bores cut in the cylinder block, no bearings being used at top and bottom. A bore in rear of camshaft carries the slotted oil pump drive shaft. A pin is fitted in the camshaft and passes through this rear bore, the slotted end of oil pump drive shaft engages this pin and is driven by it. A wire in the forward end of camshaft operates the governor plunger (top end shaft assembly) as shown in Fig. M18. A relief hole is drilled just aft of front journal to relieve any pressure created by action of sludge. This hole should be free of dirt and sludge. Dimensions of a new camshaft are as follows:

- Front & center journals 1.145 to 1.150
- Rear journal 1.145 to 1.148 to 1.150
- Inlet valve lift 0.005 to 0.01
- Exhaust valve lift 0.005 to 0.01

Remove the oil pump drive shaft by driving it out with a 0.047 hole reamer. To raise or lower camshaft, it is necessary to move the timing chain on the cylinder block, or to make up or down bearings. This chain drive is controlled by a timing plate behind the camshaft gear. Remove the timing plate if the end play exceeds 0.07.

ROD AND PISTON UNITS

21. Connecting rod and piston assemblies are removed from block. The lower end of each cylinder is chamfered to facilitate installation of pistons and rings from below without disturbing the compressor. An alternate method, providing cylinder seal has been removed, is to install rod and piston from below where the piston, then push upwards through hole cut out the top of rings on piston and into a compressor to guide piston and rings into bore. Rod apart into members at side of rod and cap face toward crankshaft side of engine. Oil sludge on pistons split in acid is placed away from crankshaft. Weight connecting rod cap bolts is 20-25 foot pounds.

PISTONS AND CYLINDERS

22. Cast iron pistons were originally used in this engine and present performance rate aluminum pistons. Pistons are available in standard and oversizes of .002, .004, .008 & .010, etc.



Fig. M18. Continental N62 camshaft with governor plunger in position. Hole aft of front journal is for relief of vacuum or pressure created in governor plunger bore.

raise piston as described in preceding paragraph.

If new rings are to be installed, the cylinder head should be removed and the narrow ridge at top of cylinder set out to pool of carbon ring top. It is also better. Fit of piston in cylinder is checked with a 1/4 inch wide feeler placed between piston skirt and cylinder wall at right angle to the piston pin (through side of piston skirt) as shown in Fig. M19. A pull of 5-10 pounds should be required to pull a 1/4 inch thick feeler from between piston and cylinder wall.

PISTON RINGS

23. Measure top of ring at wide end of cylinder at lowest downward portion of cylinder. Correct gap is .001-.012 for all sizes. Check side clearance of rings in their grooves after carbon is removed. Clearance for compression rings is .0015-.0035 and for oil control rings is .0015-.0035. Piston rings of .025, .030, .040 & .050 oversize are

available. Top and bottom rings are installed with the side marked "Top" facing up.

CONNECTING RODS AND BEARINGS, PISTON PINS AND BUSHINGS

24. Precision insert type main and big end bearings can be removed after removal of the oil pan. Desired clearance of bearing on the crankpin is .0015-.002. Underline inserts of .002, .004 and .008 are available. Check rod for side play on crankpin; .006-.010 are if installed. Estimate for a misaligned rod or bore on side of rod or crankpin journal.

Piston pins are solid type, full floating and retained in piston bosses by spring steel lock rings. An indication of heat in the piston or subsequent piston in hot oil or water will facilitate removal and reinstallation of pin. The new lock rings whenever old ones have been disturbed. If oversize pins .002, .004 or .008 or new bearings are to be installed, the necessary amount of clearance for the new bearing is .0015-.0035. The .0015-.0035 clearance is checked with a 1/4 inch wide feeler. Piston and oil control rings are installed. After connecting rods whenever new pins or bearings are installed.

CRANKSHAFT AND MAIN BEARINGS

25. Crankshaft is mounted in two precision insert type bearings which may be removed without removing

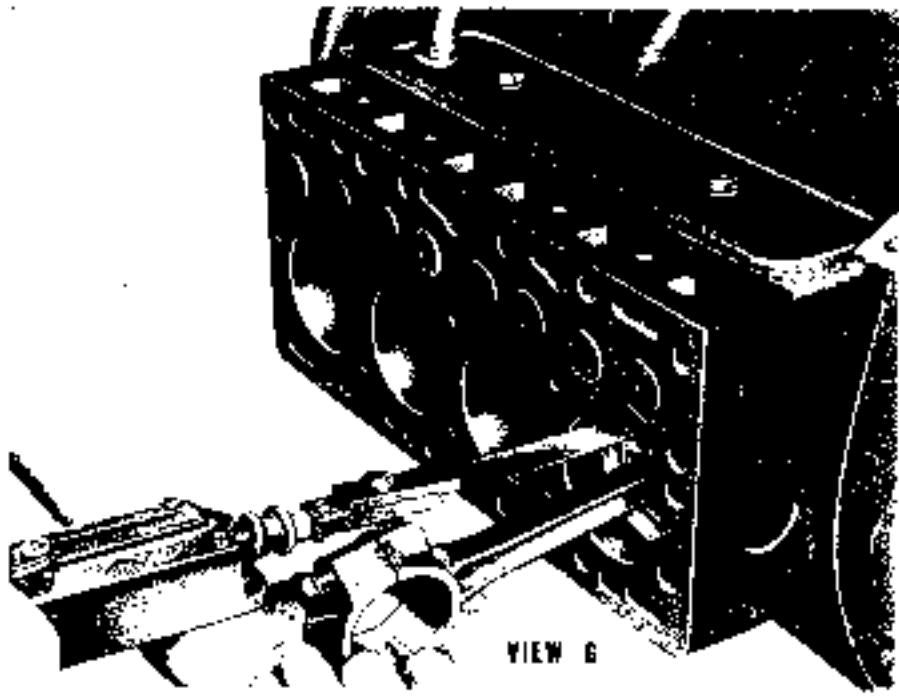


Fig. M19. Fitting Continental N62 piston. Use 1/4 inch wide feeler, .0015 thick. Correct fit requires 5-10 pounds pull.

Paragraphs 25-30

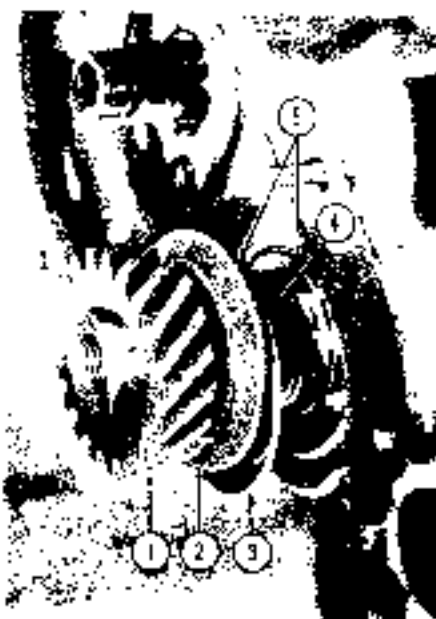


Fig. MH10—Adjusting crankshaft and play on Continental No2. Shims (4) are varied to obtain .001-.002 end play. Locate bronze washer (3) on dowels (5) before driving thrust plate (2) and crank gear (1) in position.

shaft of engine. Drained clearance of crankshaft in these assembly is .0015-.002 inch. Crankshaft journals size and wear limits are as follows:

Main journal diameter	1.1995-2.000
Main bearing oil clearance	.0015-.002
Repair if clearance exceeds	.0032
Crankpin diameter	1.499-1.500
Renew or regrind shaft if journals or pins out of round more than	.003
Main bearing cap out torque	92.5-95, val. 21
Underize bearings of 199, 200 and 240 are available for service.	

Crankshaft and play of 698-907 is controlled by shims between thrust plate (2) (Fig. MH10) and front journal of crankshaft. To adjust end play, remove timing gear cover and crankshaft gear. Pry off the crankshaft gear (1), thrust plate (2) and remove shims (4) as necessary to reduce end play. Shims are .002 and .004 thick. To recheck end play with timing gear cover off, the crankshaft pulley must be in place and the starter assembly lubricated. Be sure the punch marked tooth of crankshaft gear is meshed between the two punch marked teeth of crankshaft gear when re-assembling.

CRANKSHAFT REAR OIL SEAL

25. Crankshaft rear seal is a spring-loaded type, pressed into a retainer which is fastened to the rear of cylinder block as shown in Fig. MH11.

Removal of seal requires splitting the tractor as described in Clutch section and removal of clutch and flywheel. When re-assembling and retainer, use a thin knife blade or feeler to separate oil pan gasket from the retainer. Press new seal in retainer so that lip will face towards inside of engine. Install seal carefully using oil to lubricate lip and make guide sleeves to guide it over crankshaft flange.

FLYWHEEL

27. Flywheel may be removed after tractor is split and the clutch removed as described in Clutch section. There is no need to mark relative position of flywheel to crankshaft flange as it can be installed in any position only. Flywheel thrust should not exceed .004 at rear face. Flywheel ring gear is renewable and should be drilled on flywheel with bore of teeth towards the rear for easy engagement of starter drive gear.

OIL PAN

26. The sheet metal pan as illustrated in diagram may be removed. Removal of pan is recommended to carry production models by the front cover front pin and tractor must be blocked up under forward end of torque tube as front pin removed before pan can be lowered. When re-assembling pan, take care when fastening the rear cap

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article as it is possible to drop these into flywheel housing and then removal from this compartment is difficult and may sometimes require splitting tractor at this point.

OIL PUMP

28. Pump is located on the rear exterior surface of cylinder block as shown in Fig. MH11. Pump is driven by the crankshaft. Removal of the pump requires splitting the tractor as outlined in Clutch section and removal of flywheel. A 0.007 thick lead gasket (1) is located between pump body (4) and cover plate (3). Between cover plate and engine is a paper gasket made of vegetable fiber over shaft (11) is a press fit in the body. Diameter of new idler shaft is .501. The body bore for drive gear and shaft assembly (7) contains bronze bushing (10), if bushing is worn it is recommended that new pump body wear bushing be installed. Diameter of new drive gear shaft is .263. Thickness of new drive gear or idler gear is .213. Check pump for good condition which should not exceed 0.005. Gaps in screw-in type side clearance should not exceed 0.005.

OIL PRESSURE RELIEF VALVE

30. The valve assembly is located on right side of cylinder block. Valve is spring loaded plunger type, maintaining oil pressure of 20-25 pounds at op-

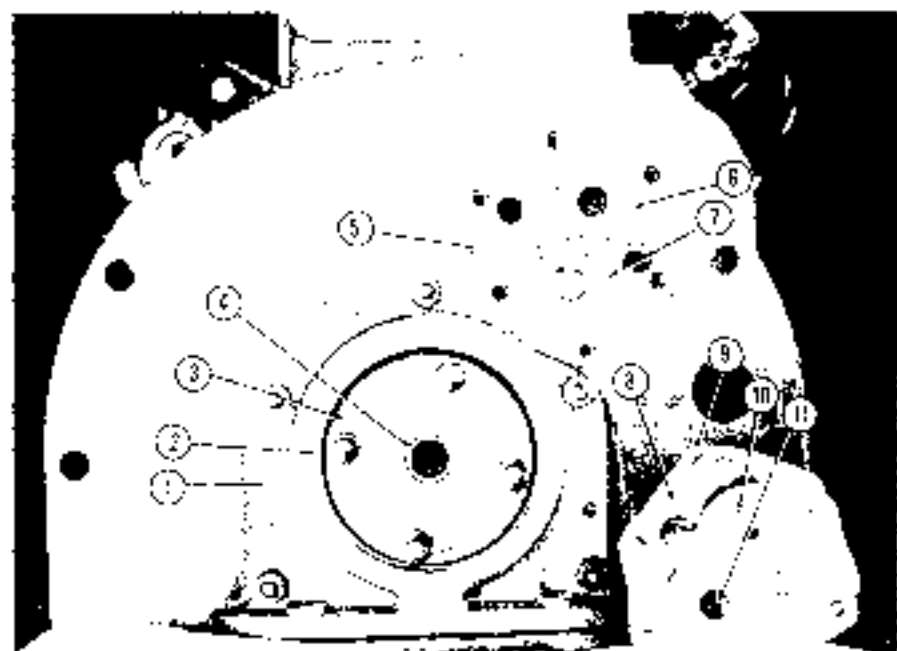


Fig. MH11—Continental No2 oil pump assembly and crankshaft rear oil seal. Repairs on these units require removal of clutch and flywheel.

1. Oil pump gasket
2. Oil pump cover plate
3. Oil pump cover plate
4. Oil pump body
5. Oil pump shaft
6. Oil pump shaft
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32. VALVE ADJUSTMENT: Two types of relief valves have been used on the Pony tractor. In engines up to serial number 9130, a cast iron plunger, M-H part number 1400903M1 is used; engines with serial number 8334 and up contain the cylinder type plunger, M-H part number 15325A. Relief valve spring, M-H part number 22195A (painted red) should be used to obtain correct oil pressure setting.

CARBURETOR

M. Marvel-Schebler carburetor model TSV16 or model TSV24 is used. Adjustments on the TSV carburetor are limited to idling speed and oiling mixture adjustments. Both should be performed when engine is warmed to operating temperature. Idling speed is 900 rpm. Float setting is $\frac{1}{16}$ inch and is measured from rear set face of float to gasket surface of bowl cover, refer to Standard Data Section for additional data.

GOVERNOR

33. SPEED ADJUSTMENT: To adjust maximum no-load governor speed, remove float assembly which exposes lever mechanism. Rotate quadrant screw clockwise as in Fig. MH12. Change the idling speed from 900 by turning $\frac{1}{8}$ inch lock nut (B) on governor rod until desired speed is obtained. If engine surges at no-load speed, turn in on bumper screw (D) until surge is eliminated; this will cause slight increase in no-load speed. Governor governed speeds follow:

Crankshaft rpm (Load)	1800
(No Load)	2050
belt Pulley rpm (Load)	1080
(No Load)	1200
Power Take-Off rpm (Load)	540
(No Load)	615

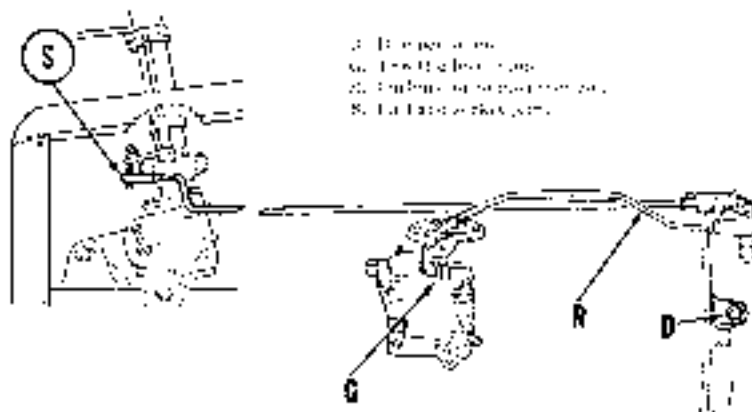


Fig. MH12—Pony governor linkage assembly.

34. LINKAGE ADJUSTMENT: To check or set all linkage, first adjust camshaft-to-governor rod (B) so that there is $\frac{1}{16}$ inch clearance between throttle lever and its wide connecting rod (C) when governor lever is in wide open position. Turn bumper screw (D) out so it is cooperative. Check to see that all linkage operates freely; then start engine and warm to operating temperature; then adjust as outlined in preceding paragraph.

35. OVERHAUL GOVERNOR: To remove governor, first remove timing gear cover as method under TIMING GEAR COVER section. Fig. MH13 shows position of weights and carrier, plunger and shaft of the governor gear. Fig. MH14 shows governor lever shaft and bumper spring and screw in timing gear cover. Inspect weights and pins for wear; also check weights for amount of wear on thin plunger contacting surface. Inspect plunger for wear on its shaft and also on weight-contacting surface of its end. If lever shaft bearing in timing gear cover is worn, remove the cover which attaches arm (1)—Fig. MH14; to lever shaft; take out roller pin (2) and pull lever shaft from cover. Note that a steel ball is located in lower hole of cover; bottom of lever shaft rests on this ball. The worn hole (3) may be driven out of cover; hole in cover and received. Renew the ball and use it bumper spring (5). Fig. MH14 is loose in cover, remove it in place.

If a newly overhauled governor does not operate properly, check for a plugged pressure relief hole in the camshaft. Refer to Paragraph 21.

COOLING SYSTEM

FAN ASSEMBLY

36. Adjust fan belt to the correct tension by backing the generator on

Paragraphs 30-36

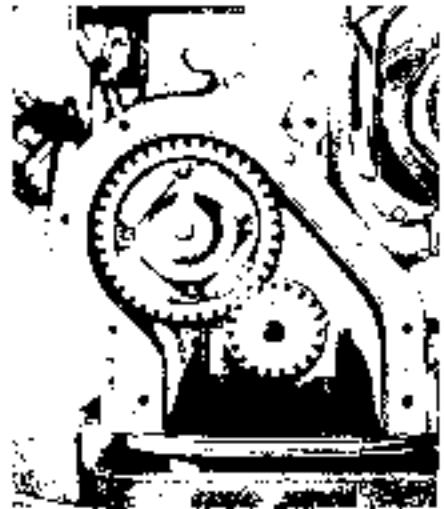


Fig. MH13—Pony timing gears, showing position of governor weights and carrier, attached to camshaft gear.

the idling stop. Fan assembly can be removed from tractor after hood and fan belt have been taken out. Radiator need not be disturbed on models without hydraulic lift. Parts for overhauling the fan assembly are not supplied; the complete unit is removed if repairs are required.

RADIATOR

37. Tanks & front of radiator assembly are not detachable. Radiator is mounted to the tractor by two supports (formerly a one piece unit) which are fastened to each side of radiator. On later Pony models a pressure type cap-raced radiator may be removed after hood and grill have been taken off.

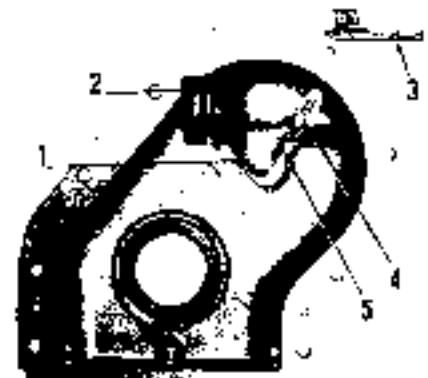


Fig. MH14—Pony governor lever shaft assembly in timing gear cover.

1. Arm 2. Lever pin 3. Governor rod 4. Governor lever
5. Lever spring 6. Lever pin 7. Bumper screw 8. Lock nut

IGNITION SYSTEM

37. Three models of Auto-Life distributors are used on Pony tractors 1AD 4025A, 1AD 6002A or 1AD 800-22G. The distributor is mounted on right side of engine. Condenser is located within the distributor. Breaker point gap is .020. For overhaul and setting procedure refer to Standard Units section.

38. **IGNITION TIMING.** To time ignition with distributor installed, crank engine until number one piston is coming up on compression and continue to crank slowly until painted mark on flywheel (Fig. M12) aligns with timing pointer when viewed through inspection opening at right side of crank; intake and piston is now at top center of its compression stroke. Then ignition switch on and rotate distributor a few degrees clockwise; add tension air spins plug wire close to lead or grounded point and very slowly rotate distributor until spark occurs at end of plug wire back distributor to position. To check ignition with timing light, operate at 1000 or 1500 rpm (do not operate above 1000 rpm as automatic advance starts at this speed) and make check with timing light connected in series with either number one or number five spark plug wire. If timing is correct, the light will flash at the same instant that painted mark on flywheel aligns with timing pointer. If the two do not align as they flash, rotate distributor to bring both marker register is obtained.

ELECTRICAL SYSTEM

GENERATOR

39. Turn brush generator, Auto-Life model G33M480435 is accessible without disturbing any other tractor parts. Generator output is normally controlled by the light switch. The switch has three positions. Position number one (brush fully in) inserts a resistance into generator field circuit to reduce generator output to about three-quarters. Position number two (center, half-way out) removes the resistance from generator field circuit and

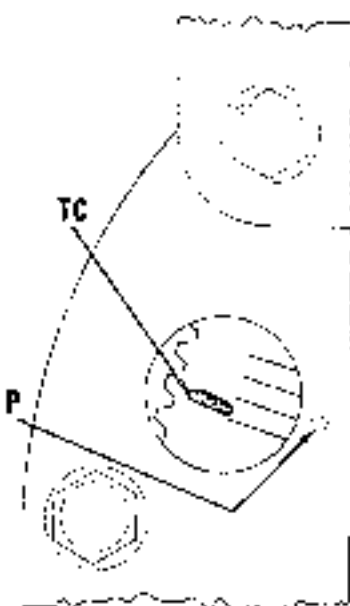


Fig. M15—Distributor timing mark is indicated on flywheel face by painted mark PC as shown.

brings maximum generator output to charge a low voltage battery. Number three (brush fully out) closes the field circuit and also removes the resistance from generator output to compensate for the current draw of the lights. Maximum generator output is obtained at the generator. Good brush. For testing and repair information on the generator and its cut-out relay (Auto-Life CB4014) refer to Standard Units section.

STARTING MOTOR

40. Auto-Life starting motor, model M24146A is mounted on left side of torque tube and its piston engages flywheel ring gear from the rear. To remove starting motor, first take off the left side panel, loosen and remove hold-down bolts and set battery up and back against steering gear housing. This will allow sufficient room to remove starting motor from torque tube. Caution: Mounting flange of starting motor is thicker in area than mounting flange of end of torque tube. This when starting motor is in place in position there will be about 1/2 inch space between torque tube and starting motor flange end. Do not draw mounting bolts too tight as these flange ends might break off. Repair and test data for this unit are covered in Standard Units section.

CLUTCH

41. **ADJUST.** To adjust the clutch pedal, refer to Fig. M16 and on the view A view on opposite clutch pedal side. Turn yoke of adjustment one inch.

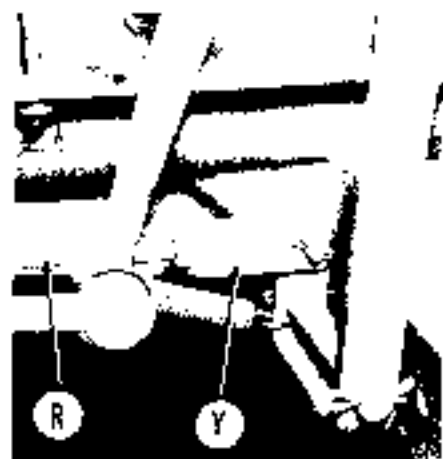


Fig. M16—Pony clutch pedal adjustment. Turn yoke Y, on rod R, until pedal has one inch free travel.

42. **TRACTOR SPLIT FOR CLUTCH.** B & R. As shown in Fig. M17, clutch can be removed from flywheel with torque tube as said from engine and frame. To perform this split, remove main shaft, dipper fork, etc. at its front or rear joint, disconnect wheel hub from generator, insert cut out relay (if so equipped), disconnect gauge line at right side of engine, slide wire to carburetor, disconnect governor lever shaft and remove governor cal ring from upper manifold from shaft. Shut off fuel supply at tank and disconnect fuel line at carburetor. Disconnect hydraulic pump cylinder lines on tractor so equipped. Move engine forward half of tractor in front of a concrete block as that shown in view A view. Back up rear half of tractor by installing a rolling cone jack under torque tube. Remove four axle pins and pivot bolt (P) from torque tube and take out belts and cap screws which attach torque tube to tractor and cut frame. Separate clutch halves enough to permit removal of clutch from flywheel.

43. **B & R CLUTCH.** Clutch can be removed when tractor is split as in preceding paragraph. If so when engine is out. When removing or re-installing clutch on flywheel (Fig. M18) turn alternate cover-to-flywheel cap screws evenly to prevent distortion of the clutch cover. Use a

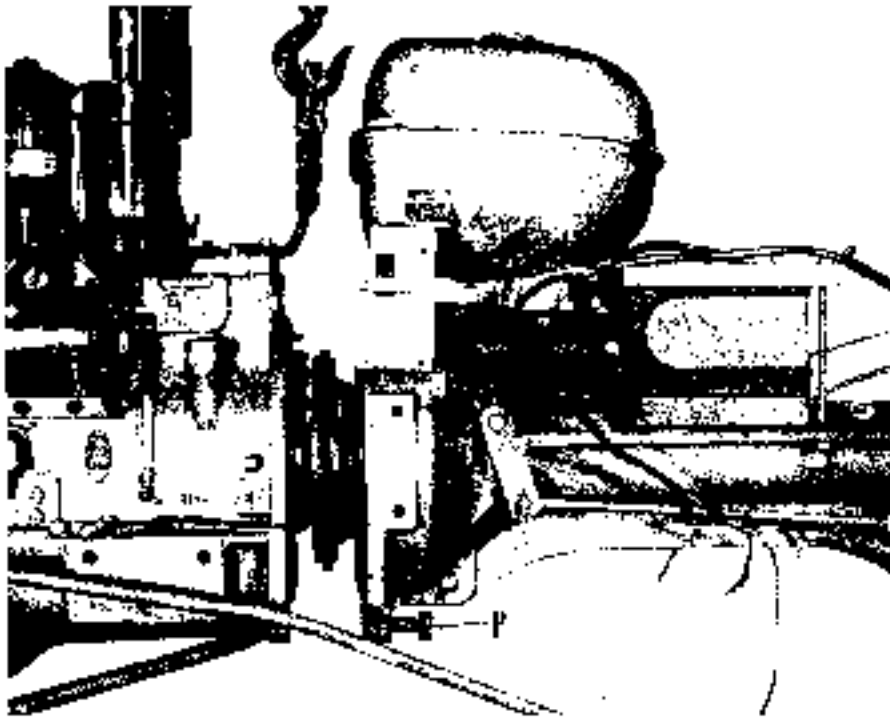


Fig. MH17—Splitting Pony tractor for clutch removal. Note method of supporting engine and front frame. A floor jack (not shown) supports rear portion of tractor. (P) is front axle radius rod pivot bolts.

slight clutch slack or clearance lead to either the driven plate or flywheel when the clutch is engaged. When a clutch is engaged, the band exerts uniform pressure on the driven plate engine relative to clutch shaft. Place transmission in gear so that clutch shaft does not turn.

43. OVERHAUL CLUTCH. The clutch on the Massey-Harris Pony tractor is a standard model B-13M. The clutch cover assembly on early production models was a Borg-Warner number 250-249. The clutch cover assembly on late production models is a Borg-Warner number D-523. All models of the Pony are for use listed with a Borg-Warner number 14-000 driven shaft input.

Disassemble reactably in relative level adding assemblies are covered in the Standard clutch section of the separate Standard Units Manual. Disassembly details is given in chapter 5 of the separate Standard Units Manual.

44. R & R CLUTCH RELEASE BEARING. Release bearing and its collar are accessible when tractor is split for clutch removal as expressed in these next paragraphs.

The roller bearing is inserted bearing is pressed on its collar and can be

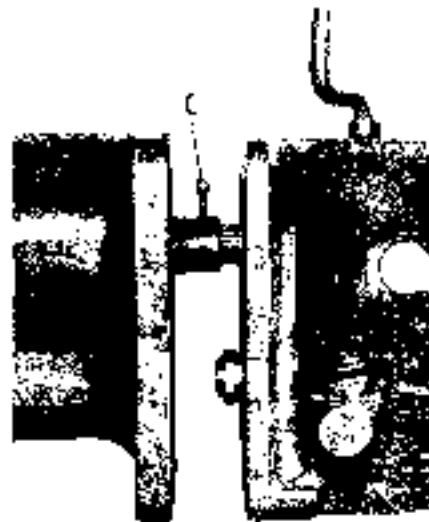


Fig. MH18—Exploded view of Pony clutch cover assembly showing its component parts.

- | | |
|----------------------|-------------------|
| 1. Clutch cover | 4. Oil ring |
| 2. Drive shaft cover | 5. Oil ring cover |
| 3. Drive shaft | 6. Oil ring |
| 7. Clutch cover | 8. Oil ring |
| 9. Drive shaft cover | 10. Oil ring |

case is pressed off for removal. Be certain to attach the return spring to collar when reinstalling.

Whenever clutch is being overhauled, check contact of clutch release fork against release bearing collar. Hold collar against fork and, using a 3/16th inch feeler, check each side of collar to see that the two faces of release fork are contacting the collar.

Roll clings to return spring, contact the ends in the torque tube when release fork shaft ribs are not lost and its bearing are supplied for service.

45. R & R CLUTCH SHAFT. Removal of clutch drive shaft requires pulling a torque tube bearing to be in transmission joint as shown in Fig. MH19. Pushed as far as support forward portion of tractor by a ceiling hoist to the right front cross and frame rails angle which attached under rear of torque tube. Minus up rear portion of tractor with a 6000 lb. floor jack. Disconnect torque tube at each end and remove the two cotter pins which attach frame ring angles to the torque cross angle. Remove the two transmission-to-torque tube bolts and separate tractor at the end. As shown in the illustration, the side of coupling which is welded to rear of clutch shaft, is fastened to transmission input shaft by roller pin which must be removed to permit withdrawal of the clutch shaft.

When reassembling, install clutch shaft in torque tube by that its forward end is inserted in the tubular guide for clutch release bearing collar in forward portion of torque tube. Bring transmission and final drives assembly and the forward portion of tractor together until transmission input shaft can be inserted into clutch shaft coupling, making sure that lines in input shaft and coupling are aligned to receive the center pin. Insert and spread center pin and secure it.

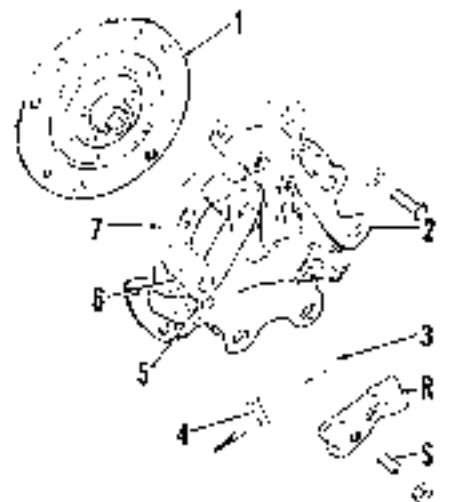


Fig. MH19—Splitting Pony tractor at torque tube-to-transmission joint for removal of clutch shaft or transmission front shaft. Note cotter pin (C) which fastens clutch shaft to transmission input shaft.

ly draw the two portions of torque tube together, using hand crank to

turn engine until splines of clutch driven plate engage splines of clutch

shaft. Place transmission in gear so that clutch shaft does not turn.

TRANSMISSION AND CONNECTIONS

47. The transmission of Pony tractor is carried in a cast-iron housing with the differential assembly. The rails are separated by a wall in the housing. Transmission is a three speed unit to be reverse and, as shown in Fig. MH20, three shafts are used to transmit the power. Removal of any one of the shafts or assembly of transmission requires its removal from the tractor. Shifter rails and forks are carried in transmission side cover which can be removed while transmission is in tractor.

48. **SHIFTER RAILS AND FORKS.** To remove transmission side cover and shifter assembly (Fig. MH21), raise the clutch lever on shift lever, pull out shift lever pin and remove shift lever from housing. Cover-to-transmission cap screws can then be removed and cover taken off housing. Disassembly and reassembly of the unit is apparent from a study of illustration. Rail (2) for first and reverse fork is $\frac{1}{2}$ inch long at point (1). Reverse forks (11 and 13) if worn, or wear gear contacting surfaces and detect springs (6) if they have lost their tension.

49. **INPUT SHAFT OIL SEAL AND BEVEL PINTON SHAFT FRONT CAP GASKET.** To renew either the input shaft front oil seal or gasket for bevel pinton shaft front cap, split tractor at the torque tube to transmission joint as explained under R & R CLUTCH SHAFT. Input shaft oil seal (Fig. MH22) can be dried out of its seat for renewal. Install seal with lip facing inward. Gasket under bevel pinton shaft front cap is made of Vellumet.

50. **R & R TRANSMISSION.** To remove unit for overhaul or removal of any of the transmission shafts, it is first necessary to remove the final drive units and the differential as outlined in their respective sections. Remove the transmission-to-torque tube bolts and pull transmission (with clutch shaft attached) from torque tube. To reinstall transmission to

torque tube, the clutch shaft should first be installed in torque tube so that its forward end is inserted in the tubular nut for clutch release bearing collar in forward portion of torque tube. Place transmission-differential housing or movable shoe jack or platform and wheel into position so that transmission input shaft can be inserted in clutch shaft coupling, making sure that holes in input shaft and coupling align to receive cotter pin. Insert and spread cotter pin and carefully draw the transmission and torque tube together using hand crank to turn engine until splines of driven

member engage splines of clutch shaft. Leave transmission in gear so that clutch shaft does not turn. Bolt transmission and torque tube together and reinstall differential and final drive units.

51. **BEVEL PINTON (SLIDING GEAR) SHAFT.** This shaft (10, Fig. MH23) may be removed either before or after removal of input shaft (6, following paragraph) but it is recommended that it be removed last so that shaft can be locked in two gears or

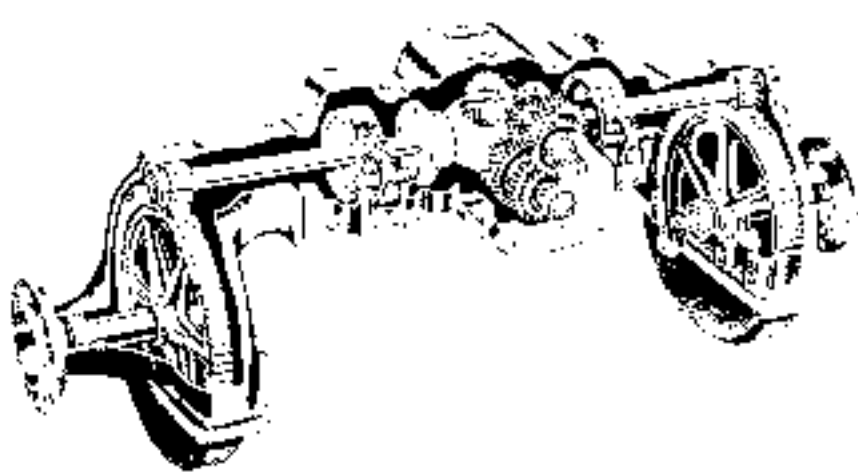


Fig. MH20—Cutaway of Pony transmission, differential and final drive unit. A wall in the common case separates the differential from the transmission. Final drive housings are detachable from transmission case.

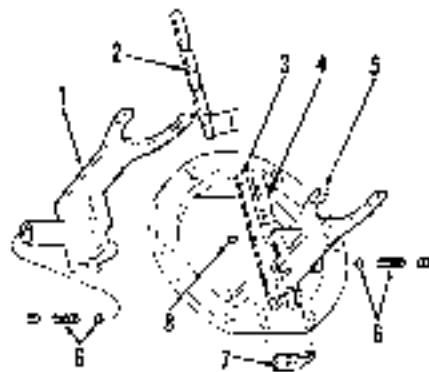


Fig. MH21—Pony transmission shifter rails and forks in transmission side cover. First and reverse fork rail (2) can be identified by measuring length of section (1) which is 1 1/16 inch.

1. First and reverse fork rail	4. Second and third fork rail
2. First and reverse fork	5. Second and third fork
3. Shift pin	6. Shift pin
4. Second and third fork rail	7. Shift pin
	8. Reverse fork



Fig. MH22—Pony transmission front seals. Input (upper) shaft seal is installed with lip facing inward. The sliding gear (lower) shaft is integral with main bevel pinton and is sealed by a cap and gasket.

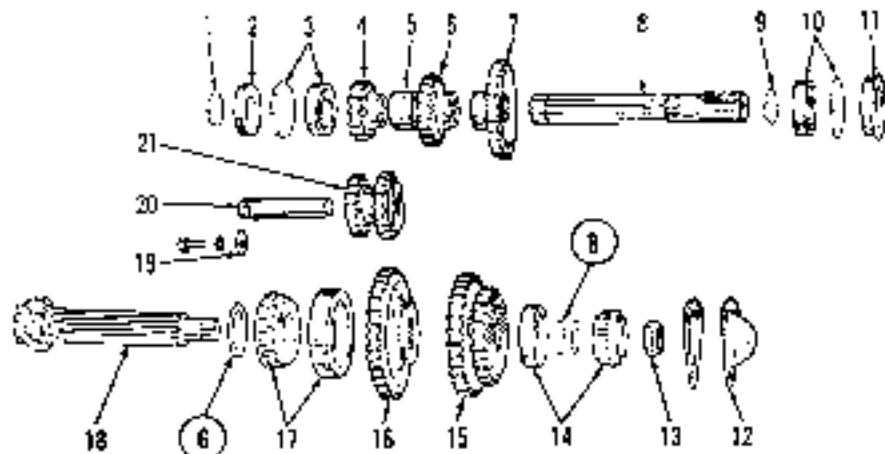


Fig. MH23—Pony transmission assembly. Shims (8) are for bevel pinion shaft bearing adjustment, Shims (9) are for mesh adjustment of main drive bevel gears.

- | | | |
|---------------------------|---------------------------------|--------------------------------|
| 1. Input shaft assembly | 8. Shim | 17. Bevel I & R shaft assembly |
| 2. Input shaft | 9. Shim | 18. Input & R shaft assembly |
| 3. Shaft bearing assembly | 10. Front cover cap & snap ring | 19. Shim bearing assembly |
| 4. Front cover cap | 11. Input shaft | 20. Shim bearing assembly |
| 5. Gear | 12. Bevel shaft cap & gasket | 21. Shim bearing |
| 6. Shim | 13. Shim | |
| 7. Shim | 14. Front bearing assembly | |

.0025 of shims to obtain correct pre-load of .002-.004. Shims are provided in thickness of .010, .0125, .015 and .018 to obtain the correct combination. Example: If shaft end play measures .005 a total of .0075 in shims must be removed, so remove two .010 shims and replace them with one .0125 shim. After bearings are adjusted and nut (13) tightened to 50 foot pounds, stake a portion of nut into groove in bevel pinion shaft to lock. Note: If bevel pinion shaft must be renewed, use matched gear set M H part number 850 119 M11 and renew bevel ring gear on differential case and adjust mesh of main drive bevel gears as in paragraph 56.

52. INPUT SHAFT. The shaft (8) can be removed by prying out front seal (11) and removing shim rings (19) and (20) position of snap ring (11) on rear of input shaft is shown in Fig. MH24. Remove input shaft and front bearing from nut and nut of housing. Remove rear bearing, gears and gear spacer through cover opening on side of housing. Front bearing may be pressed off input shaft if renewal is required. Cup washer (21) may be driven rearward out of housing wall if renewal is required. Note: It is possible to remove the input shaft without removing differential assembly from the housing but time consumed in attempting to remove rear snap ring (11) with differential in place will usually exceed the time required to lift & R differential. Due to use of matched ball bearings, there are no adjustments on input shaft.

53. REVERSE IDLER SHAFT. This shaft can be removed after bevel pinion shaft or input shaft is out. Remove

cup washer (21) from rear end of shaft between bevel pinion and rear bearing cone (17) use for mesh adjustment of bevel gears. Bearing cups (14) and (17) may be driven out of housing if removal is required and the rear bearing cone (17) may be pressed off shaft.

Refer to paragraph 56 for mesh adjustment of bevel gears.

To reinstall bevel pinion shaft, insert the components in the order shown in the illustration. If new bearings or bevel pinion shaft are used, adjust bearings to correct pre-load as follows: Add enough shim rings (8) to provide slight amount of end play when nut (13) is tightened to 50 foot pounds torque. Measure amount of shaft end play with dial indicator and remove that amount of shims plus

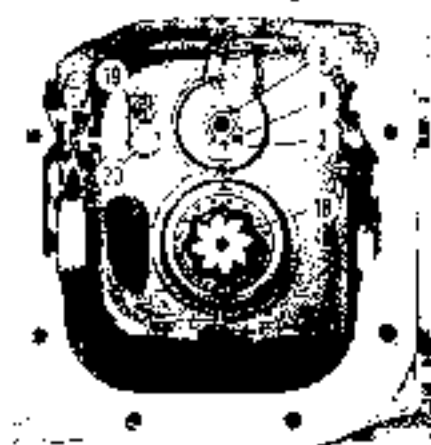


Fig. MH24—Rear view Pony transmission with differential removed. Note scribed markings on rear face of bevel pinion shaft. Identical markings will be found on bevel ring gear as these are supplied in matched sets.

- | | |
|---------------|------------------------|
| 1. Gear shim | 10. Bevel pinion shaft |
| 2. Cup washer | 11. Shim bearing (21) |
| 3. Shim | 12. Bevel pinion shaft |

once until nut (13) can be loosened. With differential and the seal-side side cover removed, proceed as follows: Lock the bevel pinion shaft by meshing both sliding gears at once and remove front cup (12), drive a punch under staked portion of nut (13) and unscrew nut from bevel pinion shaft. Push the shaft rearward into differential compartment. Front bearing cone (14) will be released as shaft is bumped rearward; both sliding gears can be removed through cover opening on right side of housing. Small shims (6) located on front end of shaft are for adjustment of bearing pre-load; the larger shims (8) located

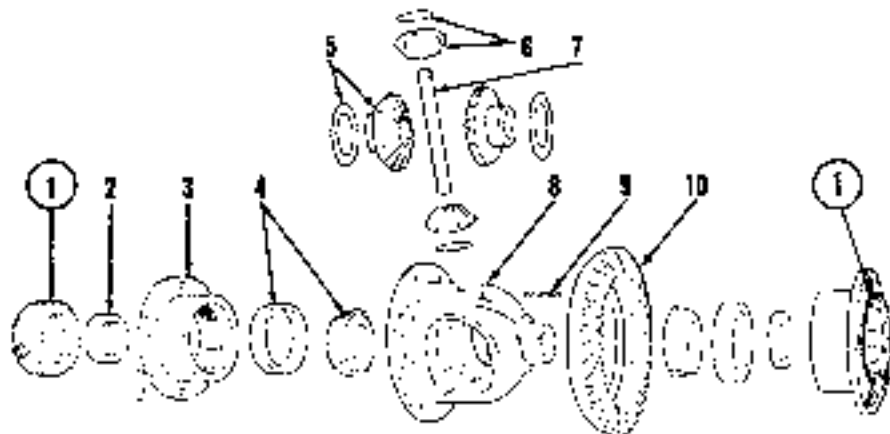


Fig. MH25—Pony differential assembly. Bevel ring gear is retained to differential case by cup screws. Adjusting nuts (3) control pre-load on differential bearings and backlash (.006-.008) of main drive bevel gears.

- | | |
|-----------------------|------------------|
| 1. Bevel pinion shaft | 6. Shim bearing |
| 2. Shim bearing | 7. Shim bearing |
| 3. Shim bearing | 8. Shim bearing |
| 4. Shim bearing | 9. Shim bearing |
| 5. Shim bearing | 10. Shim bearing |
| | 11. Shim bearing |

cap screw in differential compartment which holds small lock plate (18) in position. The idler shaft (20) is bolted rearward and reverse idler gear (21) is removed through cover opening in right side of housing. The two oil-absorbent bushings in reverse idler gear may be pressed out for renewal. Diameter of new idler shaft is .547 inch and bushings should be sized to 7403-7505. Reverse idler gear is installed with larger diameter gear toward front of transmission compartment.

DIFFERENTIAL

The differential assembly is contained in rear compartment of common transmission-differential housing. The bevel ring gear is bolted to the differential case. Differential bearings are adjusted by means of threaded nuts in bearing retainers.

54. R & R DIFFERENTIAL. Renewal of differential assembly requires removal of final drive unit (Fig. 53), transmission differential housing, and removing final drive unit. Remove rear cover or combination oil pulley and power take-off if so equipped. If no work is to be done on the differential, the bearing retainers (3-Fig. MH25) and housing should be indexed for correct assembly. Remove bearing retainers without disturbing adjusting nuts (1) and take differential out top opening of housing.

When installing differential, bevel ring gear is placed on left side of compartment when viewed through rear opening. Adjust backlash of bevel gears and differential bearing pre-load as follows: Install differential and fasten bearing retainers to housing without adjusting nut locks. Tighten both adjusting nuts (1) until heavy drag is obtained then rotate differential to assure that bearings are seated. Back off left adjusting nut until backlash of bevel gears is .003-.004 when measured with dial indicator on rim of ring gear; then turn in right adjusting nut until bearings are just slightly pre-loaded (.002-.004 pre-load recommended). Note: If bevel pinion shaft is out of transmission compartment, this pre-load can be felt as a slight drag when differential is rotated but if bevel pinion shaft is in place the pre-load on its bearings will have to be taken into account. Install adjusting nut locks, rear cover and final drive unit. Note: If transmission bevel pinion shaft and bevel ring gear were renewed, adjust mesh of these

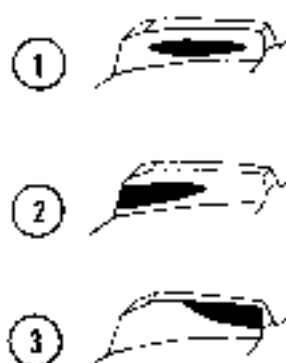


Fig. MH26—Mesh pattern on bevel ring gear teeth. (1) is correct tooth bearing; (2) bevel pinion is too close to same center; (3) bevel pinion is too far from same center.

gears as explained in MAIN DRIVE BEVEL GEARS section.

55. OVERTHAUL. Differential (Fig. MH25) is easily dismantled after lock pin (9) is driven out of differential case. Bearing nuts (4) may be pressed off case and bearing cups (4) pulled or driven from retainers (3) for renewal. When greasing oil seals (2), an adjusting nut (1), install seals with lips facing inward. When reassembling,peen edge of case near to lock pin (9) in position. Note: If bevel ring gear must be renewed, use matched 20cr set, M H part number 850-119 M11, and renew bevel pinion

shaft in transmission. Ring gear to differential case cap screw should be tightened to torque of 50 foot pounds. Adjust mesh of bevel gears as per following paragraph. Adjust differential bearings and backlash of bevel gear as per preceding paragraph.

MAIN DRIVE BEVEL GEARS

56. Bevel pinion shaft and bevel ring gear are supplied as a matched set and must not be renewed separately. Adjust mesh of these bevel gears as follows: Install bevel pinion shaft and differential. Coat pinion teeth with red lead or prussian blue and rotate the pinion. Observe the impressions on ring gear teeth caused by contact of bevel pinion teeth. If bevel pinion teeth contact center of ring gear teeth as shown in Fig. MH26, they are correctly meshed; if not, add or remove shims (11-Fig. MH23) between bevel pinion and bevel pinion shaft bearing cone (17) to move the bevel pinion into correct mesh position. Note: In order to retain correct pre-load on bevel pinion shaft bearing, whatever thickness of shims (11) is added or removed from the shaft (1) same amount of shims (11) should be added or removed. Recheck backlash after mesh adjustment is complete.

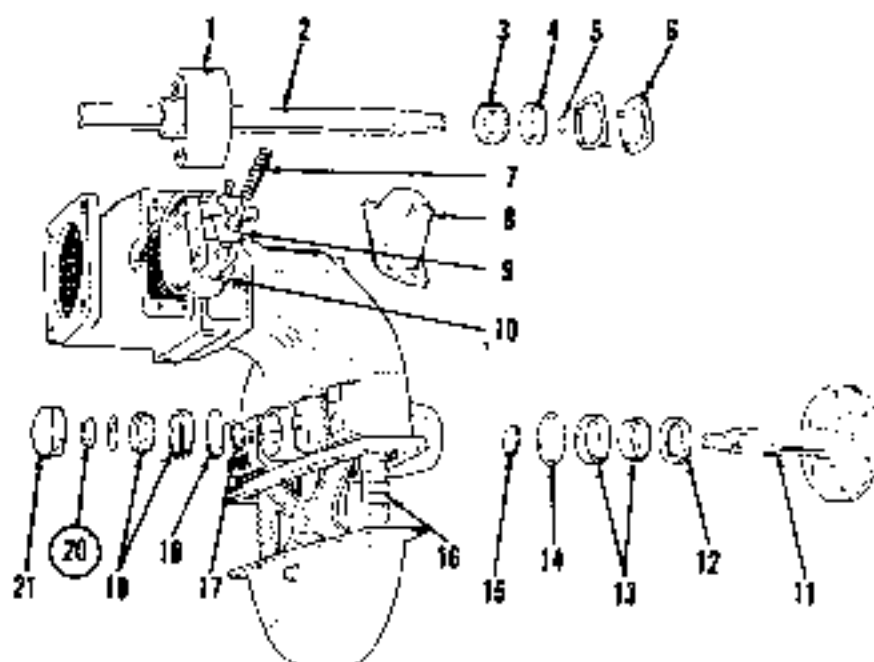


Fig. MH27—Pony final drive assembly. Wheel axle shaft bearings are adjusted by nut (20). Brake drum (1) is keyed to final drive shaft (2).

- | | | |
|----------------------|----------------------------|-------------------------------|
| 1. Wheel drum | 8. Bevel cover plate | 15. Oil drain water separator |
| 2. Final drive shaft | 9. Lock pin | 16. Oil seal |
| 3. B. E. Case | 10. Brake base | 17. Oil seal |
| 4. Spring housing | 11. Shim | 18. Power take-off support |
| 5. Shaft seal | 12. Wheel shaft | 19. Power take-off nut |
| 6. Oil & grease | 13. Shim | 20. Lock nut |
| 7. Brake drum cone | 14. Inner bearing assembly | 21. Axle shaft nut & washer |
| | 15. Inner bearing cone | 22. Axle shaft cap |

FINAL DRIVE

57. **FINAL DRIVE ASSEMBLY.** Includes two axle shafts, each fastened to one of main shaft-differential housing. Located in each housing is a half axle shaft on each end of which is a worm gear from this gear comes a master or bull gear located on the wheel axle shaft in lower part of housing. The brake assembly is located in upper part of housing.

58. **R & R FINAL DRIVE UNITS.** To remove one or both final drive units, slack under rear of tractor (1) or attach chain to frame cross angle and drive 2, inch wooden wedges under each side of front frame at front axle joint to prevent tractor from tipping over. Remove rear wheels and clutchbar, disconnect brake rods at pedal shaft and remove the two chain links which attach frame side angles to frame cross angle. Be wary of the ball joint on final drive housing to main shaft-differential housing. Put full final drive and from tractor repeat for other final drive.

59. **MASTER (BULL) GEAR AND WHEEL AXLE SHAFT.** Bull gear or wheel axle shaft may be removed with the following final drive housing from tractor. Place jack under transmission and remove rear wheel and clutchbar. Take down bull gear cover, remove dust cap (21-Fig. MH27) and spacer pin (22). Remove inner bearing cap (19) and the bull gear inner snap ring (17) from the shaft. Install a puller as illustrated in Fig. MH28; then push the wheel axle shaft out of bull gear and housing. Outer bearing cone (18-Fig. MH27) and oil seal (12) will come out with the wheel axle shaft. Inner and outer bearing cups (19) and (18) can be pulled or driven from housing for renewal. Bull gear (16) can be reinstalled in reverse of its original position so that opposite, opposite sides of teeth are in contact with pinion and thus increase life of bull gear. When reassembling wheel axle shaft bearings should be given a slight amount of pre-load but not enough to compress the housing. Stake nut (20) into groove on wheel axle shaft to lock. Note: If the complete final drive is being overhauled, it is advisable to install (16) gear and wheel axle shaft first so that pre-load on bearings can be felt.

60. **BULL PINION AND DRIVE SHAFT.** It is possible to remove the bull pinion and shaft bearing without



Fig. MH28—Removing Pony wheel axle shaft and bull gear. Puller screws are threaded into drawbar mounting holes in housing.

detaching final drive housing, however, if bearing is tight on shaft it may be necessary to detach the housing and perform work as follows: With final drive housing removed, two methods may be used to remove bull gear pinion or its shaft. Remove outer snap ring (21) and snap ring (20). Drive a brass drift and heavy hammer and bump the shaft (2) inward and thru out of bearing (14) and pinion (16). If available a press may be used to press shaft out of housing. If press is not available and shaft will not give after a few blows with the hammer and drift, nut on screw on brake drum (1) and bump the shaft outward far enough to install a nut on bearing and pinion. Pull bearing and pinion from shaft and remove

shaft and brake drum from tractor opening of housing. Bull gear pinion can be reinstalled in reverse of its original position so that opposite sides of its teeth contact the bull gear teeth and thus increase riding life. Because bull bearings are used, no adjustment is required on this assembly.

BRAKES

61. **ADJUST.** Two adjustments can be made on brakes. As shown in Fig. MH29, the rod between brake cam shaft and pedal shaft is adjustable device. These rods are adjusted only to equalize the pedals, if then released position. Brake rods are adjusted by means of the adjusting nuts (6) which are tensioned when front brake cover plate (7) is off as in the illustration. To adjust, loosen the lock nut and turn adjusting nut out. With rear wheel raised, the drum should turn freely within brake band when brakes are released. Adjust bands on both sides of tractor and test by applying pressure to both pedals at once with tractor in operation and rear wheels off ground. Equalize brakes by loosening adjusting nut (6) on the tighter side.

62. **IT & IT BANDS.** To remove brake band, remove both front and rear brake cover plates and loosen lock nut and adjusting nut (6) from lower

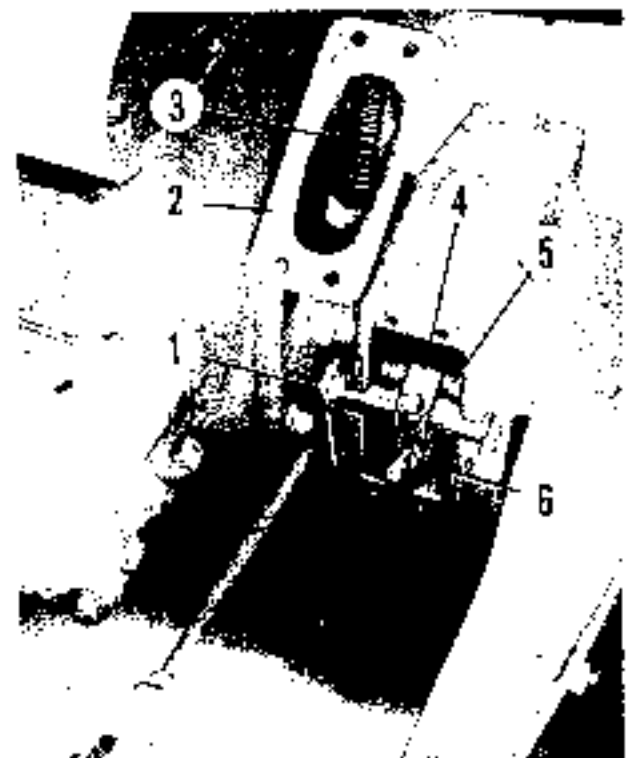


Fig. MH29—Adjusting Pony brakes. Adjust pedal rod to equalize height of pedals. Turn adjusting nut (6) on brake band to adjust lining clearance.

1. Brake drum
2. Brake cover plate
3. Release screw
4. Adjusting cam screw nut
5. Lock nut
6. Adjusting nut

end of brake band. Pivot the nut on one end (4) so that upper end of brake band is exposed enough to push out bevel gear pin which fastens band to the cam. Thread brake band around drum and out either front or rear opening.

Lining is supplied separately or complete band with riveted lining can be purchased. Adjust brake as per preceding paragraph.

63. R & R DRUMS. Brake drums are

removed with four drive shaft assemblies in preceding paragraph. Use Ball Gear Pinion and Drive Shaft. Drum is keyed to shaft and locked in position by a wire safety set screw.

BELT PULLEY AND POWER TAKE-OFF

64. ADJUST PULLEY SHAFT BEARINGS. The only adjustment which can be performed is the adjustment of belt pulley shaft bearings. Remove (17) pulley retaining cap screw and ball pulley (16--Fig. MH30); then add or remove shims (13) until pulley shaft turns freely in its bearings with no end play.

65. R & R POWER TAKE-OFF SHAFT. Remove the two bolts in drive shaft cap and cover (25--Fig. MH30). Remove snap ring (23) and pump power take-off shaft capward out of housing. Spin gear (22) out from its withdrawal through the opening in bottom of housing. Ball bearings (18) and (20) and seal (18) may be driven out of housing for inspection.

66. R & R BELT PULLEY SHAFT. Remove nutty retaining cap screw, pulley and Woodruff key from pulley shaft. Remove bearing cap (14), rolling lumber of shims (13) between it and housing. Remove expansion plug (6) by piercing it with a chisel or punch and prying it out of its bore. Back-up gear (8), and press belt pulley shaft out the pulley side of housing. Bearing cap and cover (25) will come out with pulley shaft. Bevel gear (9) and bearing cone (18) can then be removed from inside of housing. Shim nut cap (17) will remain in its bore and may be driven out for renewal. (10) and (15) is pressed into bearing cap (14) so that its lip faces toward shims (13) are provided for adjustment of pulley shaft bearings. A bush (12) is placed between shim pack (13) and housing.

67. R & R DRIVE SHAFT. Remove nut from tractor drive lever (21) and top lever off shaft (11). Pull shaft, gear and coupling (2) forward, being careful not to lose detent ball (8) as the shaft is pulled

from housing. Unstick and remove nut (27) from drive shaft (19). Reverse snap ring (31) and try drive shaft forward and out of housing. Bevel gear (26) will remain in the housing while

ball (18) and snap ring (20) will be removed with drive shaft. Detent spring (8) requires removal. A nut is removed through the opening (4) when plug is removed.

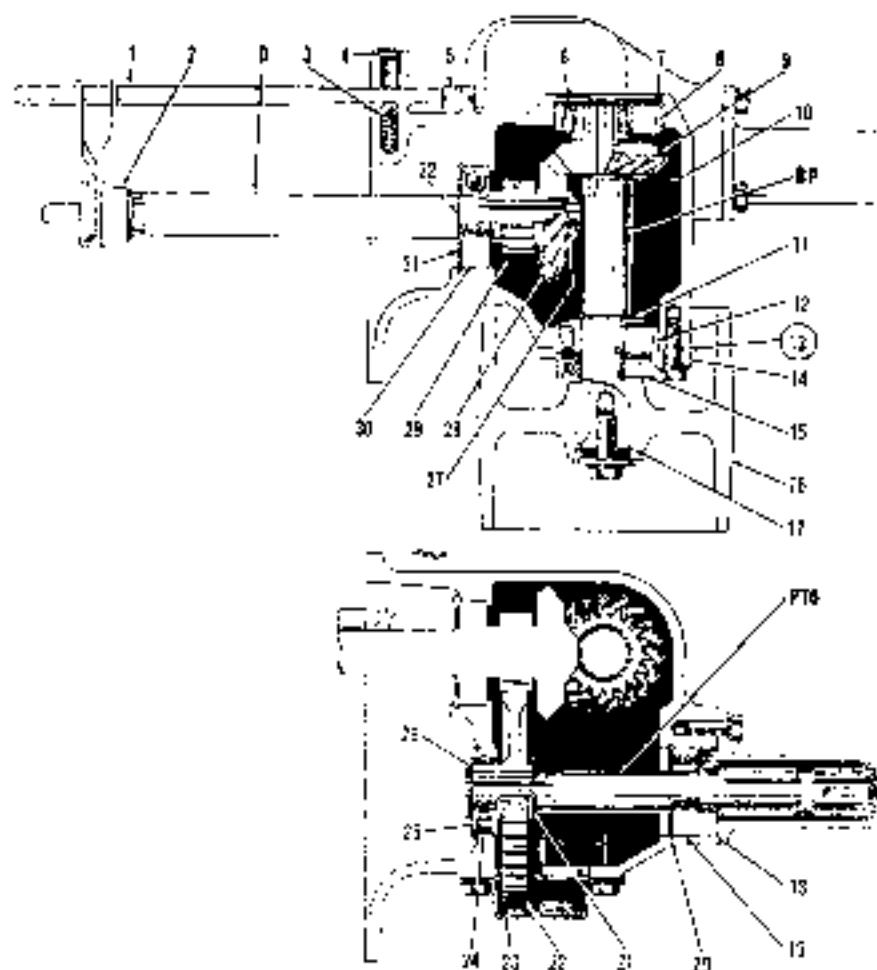


Fig. MH30-Pony combination belt pulley and power take-off unit. Drive shaft (19) pilot bushing (12) rear of transmission input shaft and coupling (2) engages splined and on input shaft to drive the unit. Shims (13) are for adjustment of pulley shaft bearings.

D. Drive shaft

1. Drive shaft
2. Drive coupling
3. Detent ball & spring
4. Shim
5. Rubber lever
6. Plug (21)
7. Top lever (21)
8. Detent ball & spring
9. Bevel gear
10. Shim nut cap
11. Drive lever
12. Pilot bushing

PTO. Power take-off shaft

13. Shim
14. Shim nut cap
15. Shim
16. Shim
17. Shim nut cap
18. Ball bearing
19. Drive shaft
20. Ball bearing
21. Shim nut cap
22. Gear
23. Snap ring

BP. Belt pulley shaft

24. Shim nut cap
25. Shim nut cap
26. Shim nut cap
27. Shim nut cap
28. Shim nut cap
29. Shim nut cap
30. Shim nut cap
31. Shim nut cap
32. Shim nut cap

POWER LIFT (HYDRAULIC UNIT)

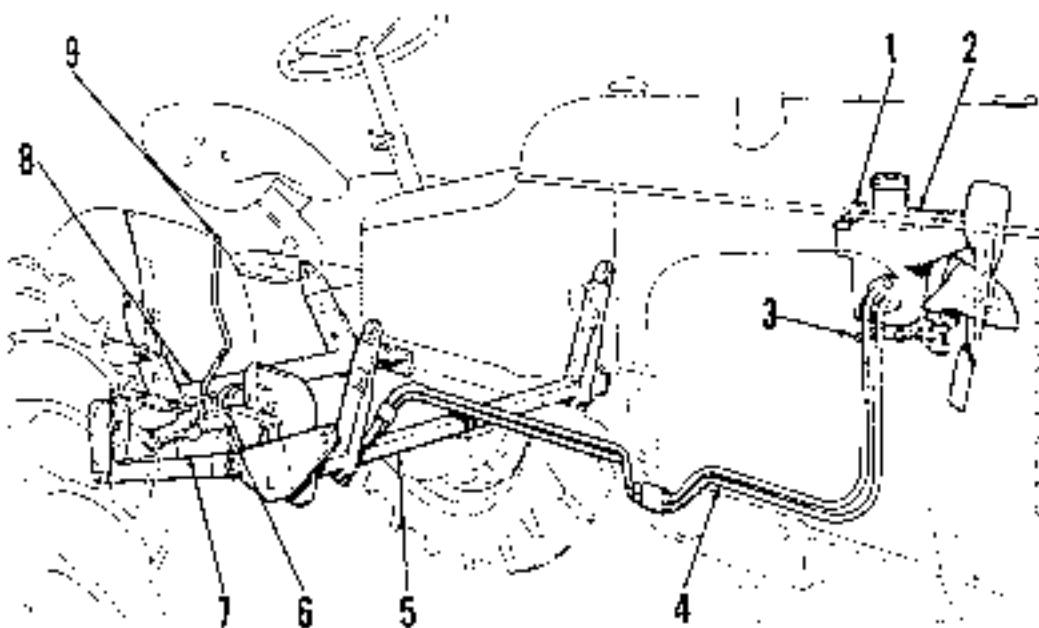


Fig. MH31—Phantom view showing installation of hydraulic power lift system on Massey-Harris Pony tractor.

1. Lift socket
2. Lift control valve
3. Hydraulic pump
4. Hydraulic line
5. Hydraulic line
6. Hydraulic line
7. Hydraulic line
8. Hydraulic line
9. Hydraulic line

Adjustment

To obtain 7 & 8 flow, MHA's may be adjusted to obtain the desired speed and work positions of the particular implement. This is done by loosening the lock washers and screws (7) and (8) and turning on rod (11). Adjust up or down to obtain the desired lowered position.

R & R And Overhaul Cylinder And Control Valve

It is recommended that hydraulic cylinder and control valve be removed from tractor as a unit so as to eliminate dirt and oil leakage which are inevitable if units are disassembled and reassembled on tractor. Remove cap from drain pipe in the oil reservoir and allow reservoir to drain. Remove hydraulic lines and (3—Fig. MH32) from the control valve. Remove the two cylinder attaching rubber seals and pins and lower cylinder and control valve (as a unit) away from tractor. Separate control valve and cylinder by removing the two control valve attaching cap screws.

Expend on the cylinder normally as in the removing packings and gaskets however, metal parts should be checked when they come apart. First step in disassembly is to remove the cap screw (8—Fig. MH33) and with drawing of the head and piston assembly from cylinder. The nuts and pins

used for further disassembly are removed after an examination of the unit. When case of the cylinder is to be

all internal parts with SAE No. 1 and oil ball bearings, rings, seals and washers.

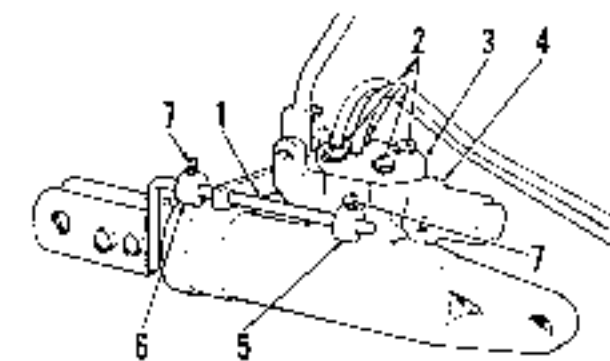


Fig. MH32—Pony hydraulic cylinder and control valve assembly.

1. Hydraulic pump
2. Hydraulic line
3. Hydraulic line
4. Hydraulic line
5. Hydraulic line
6. Hydraulic line
7. Hydraulic line

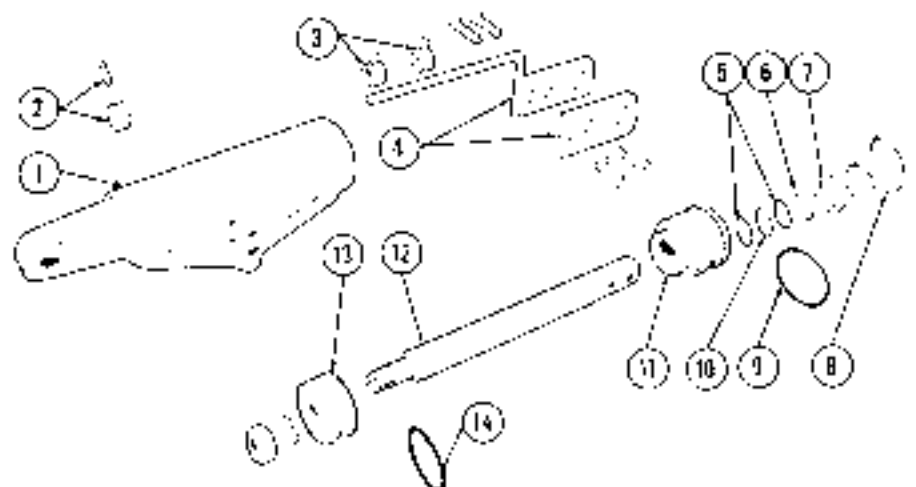


Fig. MH33—Exploded view of Pony hydraulic lift work cylinder.

- | | | |
|---------------|----------------|----------------|
| 1. Piston | 11. Piston pin | 17. Piston pin |
| 2. Piston pin | 12. Piston pin | 18. Piston pin |
| 3. Piston pin | 13. Piston pin | 19. Piston pin |
| 4. Piston pin | 14. Piston pin | 20. Piston pin |
| 5. Piston pin | 15. Piston pin | 21. Piston pin |
| 6. Piston pin | 16. Piston pin | 22. Piston pin |

Paragraphs 71-74

Procedure for disassembling the pressure control valve and is outlined after an explanation of the unit and reference to Fig. MH34. The unit should be washed and thoroughly examined for cracks and excessive wear. When reassembling, renew all seals and gaskets and any other questionable parts.

When re-installing control valve to the cylinder, make certain that the two "O" ring gaskets are properly located between the gasket surfaces of the control valve and cylinder. When re-installing the hydraulic face pad to the control valve, make certain that the "O" ring gasket (2, Fig. MH34) is properly located and that the pad gasket does not cover relief port (1). Tighten the four round head pad attaching screws to a torque of 7-9 foot pounds only. Remove head end fill reservoir up to half; start engine and operate power lift several times; then fill reservoir up to battle mark, and replace head

Trouble Shooting

72. LOSS OF LIFTING POWER. Indicates that hydraulic lines pad gasket on control valve is covering relief port (1—Fig. MH34) or the "O" ring gaskets which are located between the control valve and cylinder, hydraulic lines pad and control valve, hydraulic lines pad and reservoir, and/or reservoir and pump, are improperly seated. Renew gasket between pad and control valve and install new "O" ring gaskets.

FLUID (OIL) LEAKS BETWEEN HYDRAULIC LINES PAD AND CONTROL VALVE. Indicates that too much lifting torque was applied when tightening the four round head pad attaching screws. Remove pad; install a new pad gasket and "O" ring gasket, re-install and tighten screws to a torque of 7-9 foot pounds only.

LIFT WILL NOT RAISE IMPLEMENT. Indicates that oil reservoir is empty, or, if reservoir is full, it indicates that the pump, control valve and/or cylinder has failed. Inspect and renew for overhaul in case cylinder has failed on any faulty coils.

LIFT WILL NOT STAY IN POSITION. Indicates that control valve is faulty or that piston seals are leaking. Renew valve, or install new piston seals.

SHORT PISTON SEAL LIFE. Indicates that cylinder, piston or bearing is worn. Inspect and renew worn parts.

HYDRAULIC PUMP

73. The gear type pump is located on upper inner end of the cylinder block and is driven by the fan belt. The working fluid (SAE No. 10 oil) is supplied by an oil reservoir which is attached to the pump. Hydraulic sys-

MASSEY-HARRIS PONY

tem should be drained and refilled at least once a year to remove accumulation of dirt or water in reservoir. Drain system thoroughly after using waste oil to clean pump.

R & R And Overhaul

74. Drain cooling system and remove hood, radiator, galle and fan. After hour, operate and drain dipper in the oil reservoir and drain to strainer to drain. Disconnect fan, disconnect all hydraulic pipes, and remove belt. Remove the belt which holds the end strap to the oil head on the oil reservoir, and lay out on the way. Remove the two nuts which hold the hydraulic lines to the reservoir. Remove the two retaining cap screws that hold the pump to cylinder block. Lift pump, reservoir and belt assembly (as a unit) for tractor. Remove the one retaining cap screw which holds the oil reservoir to the pump, and remove reservoir. Remove fan and pulley from pulley shaft.

Remove cap screws retaining fan cover to pump body and remove cover, bearings, gears and seals. Check the component parts against the specs listed below.

Gear bore in pump body

(New) 1.1855-1.1857

Renew body if gear bore is 1.1855-1.1857

Gear diameter (New) 1.1855-1.1857

Renew gears if diameter is 1.1855-1.1857

Max. diam. clearance between gears and body 0.0015

Bearing bore (New) 0.506-0.507

Max. allowable bearing wear 0.0015

Shaft diameter (New) 0.640-0.642

Max. allowable shaft wear 0.0015

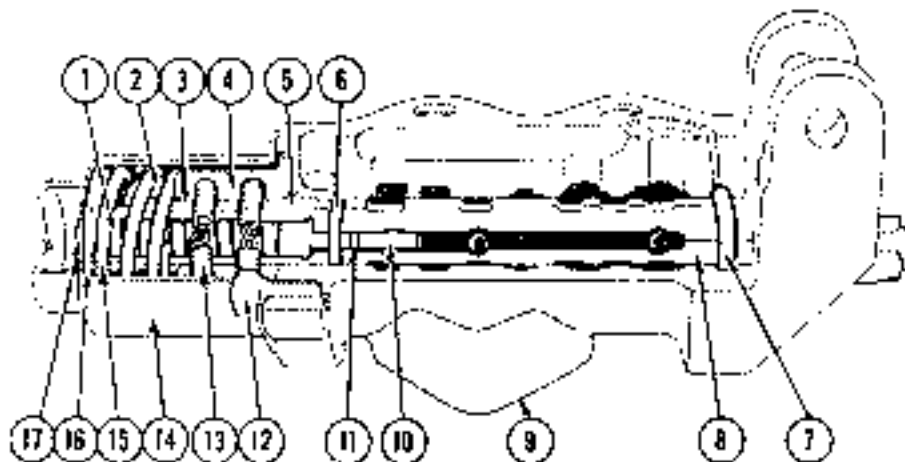


Fig. MH34—Cutaway view of the Pony hydraulic lift control valve.

- | | | |
|---------------------------|------------------|-------------------|
| 1. Relief port | 8. Body in block | 14. Spring |
| 2. Ball cap | 9. Stroke | 15. Spring |
| 3. Ball cap gasket | 10. Piston | 16. Washer |
| 4. Ball cap O-ring | 11. Valve | 17. Spring gasket |
| 5. Ball cap O-ring gasket | 12. Valve gasket | |
| 6. Housing | | |
| 7. Packing ring | | |

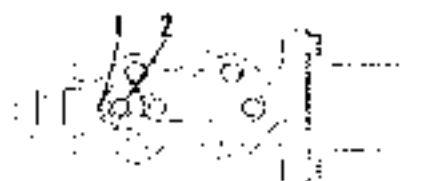


Fig. MH35—Top view of Massey-Harris Pony control valve with hydraulic line pad removed.

- | | |
|----------------|------------------|
| 1. Relief port | 2. O-ring gasket |
|----------------|------------------|

MASSEY-HARRIS PONY

Paragraph 74

Reassemble and reinstall pump, reservoir and filler assembly on a unit by reversing the disassembly and removal procedure, making certain that the two "O" ring gaskets are properly located between the mating surfaces

of the pump and oil reservoir. When reinstalling the hydraulic lines paid to the oil reservoir, make certain that the two "O" ring gaskets are properly located and tighten the two nuts to a torque of 20-25 foot pounds. Before

installing, bleed oil reservoir up to baffle, start engine and operate power lift several times. Then fill reservoir up to baffle again.

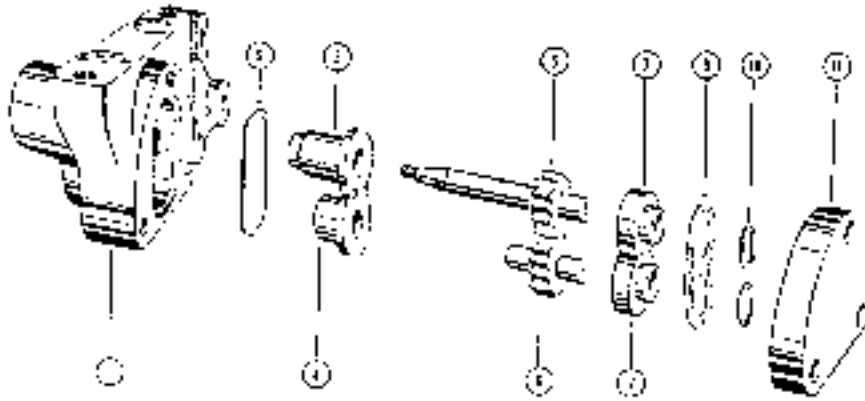


Fig. MH36—Exploded view of Pony hydraulic lift pump.

- | | | |
|--------------------------|---------------|---------------|
| 1. Pump body | 6. Drive gear | 10. Seal ring |
| 2. Drive pin and bearing | 7. Drive gear | 11. Seal ring |
| 3. Drive pin and bearing | 8. Drive gear | |
| | 9. Drive gear | |