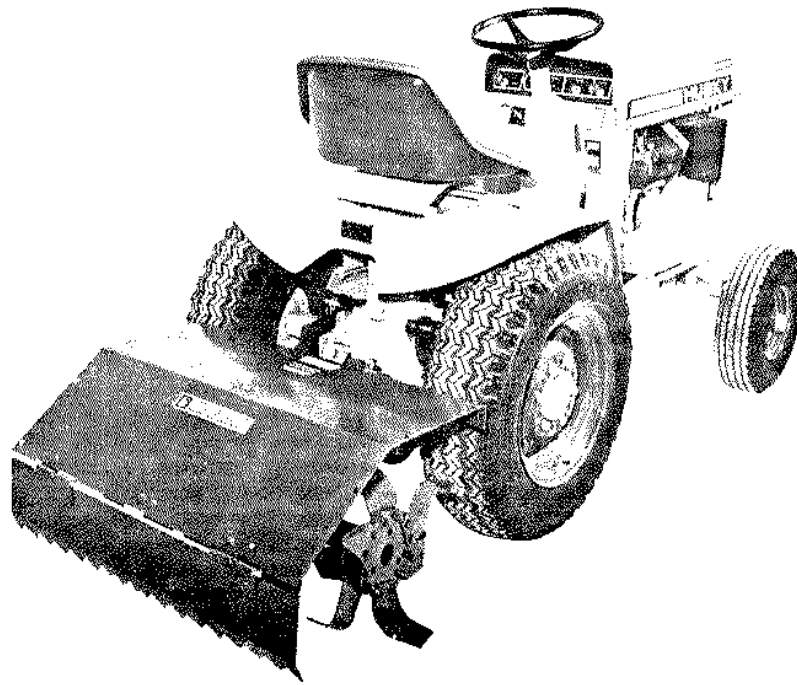


BOLENS

**33" TILLER
ATTACHMENT
MODEL 18090-01**

OWNER OPERATION AND MAINTENANCE MANUAL



BOLENS

PORT WASHINGTON, WISCONSIN, U.S.A.

TO THE OWNER

This is an operational and general maintenance manual only and does not cover major repair. All major repair work must be performed by an authorized BOLENS DEALER or the factory warranty is void. Bolens equipment is carefully engineered to give good performance if properly operated and maintained. Keep your equipment clean and lubricate it as prescribed in this manual. Periodically inspect your unit and perform any upkeep maintenance necessary.

Your dealer is obligated by the factory to completely assemble and service new equipment prior to first delivery, and thoroughly explain and demonstrate its operation. He will repair or replace any parts which fail due to defective material and/or workmanship during the warranty period, and also provide future repair service and supply genuine factory repair parts.

IN EVENT OF ANY PROBLEM OR PARTS REQUIRED ALWAYS CONTACT YOUR DEALER. DO NOT RETURN PARTS TO THE FACTORY. WE REQUIRE PRIOR FACTORY APPROVAL ON RETURNS, AND APPROVALS ARE ISSUED ONLY TO BOLENS DEALERS OR DISTRIBUTORS.

GENERAL SAFETY PRECAUTIONS

Preventing accidents is the responsibility of every equipment operator. The following general safety precautions must be fully understood and followed by every operator of this equipment. Review them frequently and NEVER TAKE CHANCES. BE CAREFUL BEFORE, DURING AND RIGHT AFTER USE OF ANY POWERED EQUIPMENT. ACCIDENTS CAN BE PREVENTED.

1. Before starting the engine, disengage the P.T.O. and place shift lever in neutral position, to prevent unit from being started in gear.
2. Children shall not be allowed to operate vehicle at any time. The average child is not capable of coping with the intricacies of operating a power tool.
3. Do not allow adults to operate vehicle without proper instructions including all safety instructions. In doing so, you will be sure they know how to operate unit properly and also are aware of all the safety precautions.
4. Study your manual. Know your unit before operating it. Take time to operate unit in the safest manner.
5. Never attempt to clear rotor tines while tiller is running. Disengage P.T.O., lower tiller to the ground, and shut off engine, as injury to the hands or feet could result.
6. Do not carry passengers. The passengers could fall off vehicle receiving injuries.
7. Never attempt to make adjustments or repairs of any kind unless first disengaging P.T.O., lowering attachment to the ground, and shutting off engine to prevent injury from moving parts.

8. Never place hands or feet under tiller hood or leveling board when engine is running. Injury to the hands or feet could result.

9. Disengage tiller, shut off engine if anyone approaches running unit. This would help eliminate accidental injury to other persons by running unit.

10. Engine must be stopped, and P.T.O. disengaged when cleaning, servicing, adjusting, repairing, or installing attachments on tractor. This is necessary to avoid possible injury from moving parts.

11. Study all attachment manuals thoroughly before using attachments with tractor, in so doing you will then be aware of both the tractor's and attachment's capabilities when used as a unit, also the safest manner in which to operate them.

12. Always look back to be certain no one is in the way before using reverse. This will avoid the possibility of running over any bystanders or pets who might be in the area in back of the vehicle.

13. Keep tractor and attachments free of excess grease and oil. The unit will operate cooler, be easier to maintain, and safer to operate.

14. Do not mount or leave vehicle while it is in motion or in actual operation, nor leave vehicle unattended while engine is running. Injury to the operator or a tractor run away could occur.

15. Never wear loose clothing when operating unit. Loose clothing can get caught in moving parts and cause severe injuries.

16. Always wear substantial footwear to give your feet as much protection as possible.

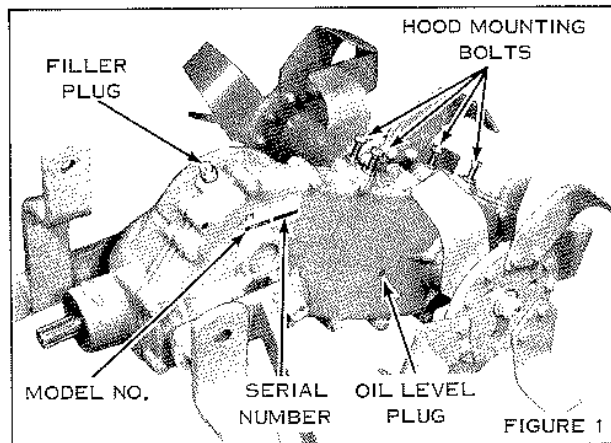
17. Be sure all guards and shields are in place before operating tiller.

18. Keep all nuts, bolts and screws tight to be sure equipment is in safe working condition.

MODEL NUMBER

To ensure prompt service when repairs or adjustments are required, your Bolens Dealer must have the following information. For your own personal reference, fill in the space provided below.

Model Number of Unit _____
Serial Number of Unit _____



Your Bolens dealer has available a master Parts List for your unit. He can identify any parts you may require and furnish genuine factory replacements.

ASSEMBLY

This tiller is shipped completely assembled except for the Hood, Leveling Board, Lift Links and Hitch.

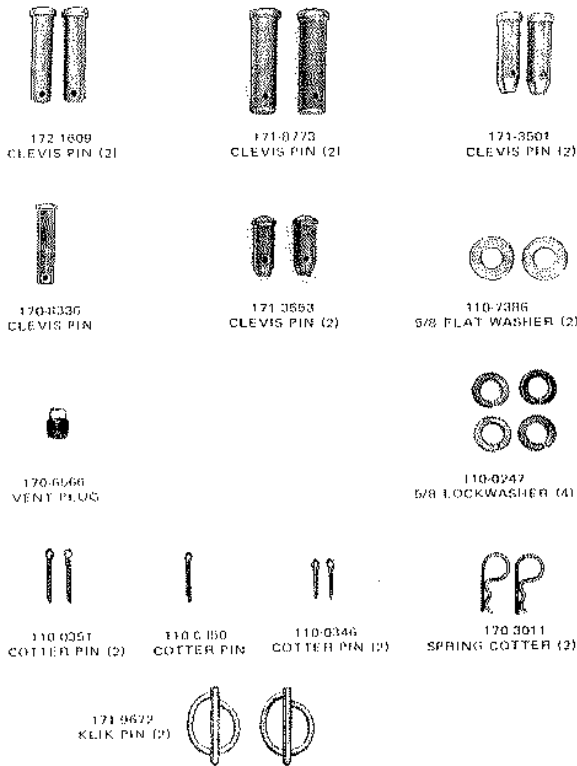


FIGURE 2

1. After removing tiller from the carton, secure left and right-hand hitch arms to sides of tiller gear case using the 5/8" lockwashers and hex nut provided. Hitch arm with double bar off set is attached to the left side, at the same time mount hood support bracket to the rear stud on the left side. See Figure 3.

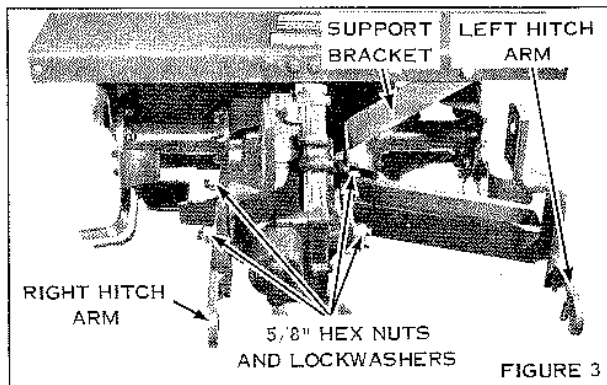


FIGURE 3

2. Remove plastic fill plug located in top forward section of tiller and replace with vent plug supplied. See Figure 1.

3. Next, attach leveling board to rear of hood with hinge pin and secure with 3/32 x 3/4" cotter pins. See Figure 4.

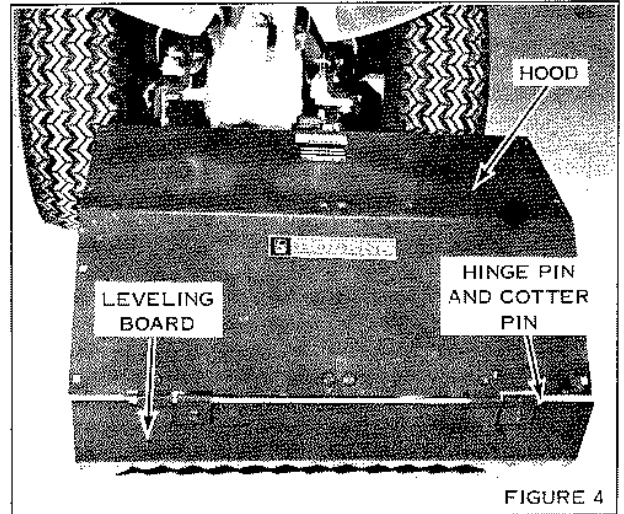


FIGURE 4

4. Recheck all nuts and bolts making sure they are torqued securely. Your tiller is now ready for mounting to your tractor.

MOUNTING

1. Insert the long heavy-duty clevis pins through the lower rear axle hitch supports from the inside out. Secure with 1/8 x 1-1/4" cotter pins provided. See Figure 5.

2. Raise tiller upward so that hook ends of tiller hitch arms are slightly above the hitch pins and lower tiller so that hook ends of hitch arms engage pins. See Figure 5.

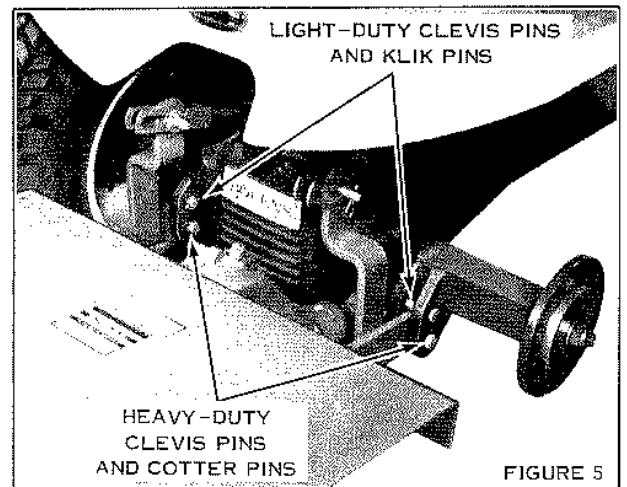


FIGURE 5

3. Insert the long 5/8 clevis pins through the upper holes of the rear axle hitch supports thus locking the tiller hitch arms in position and secure with klik pins provided.

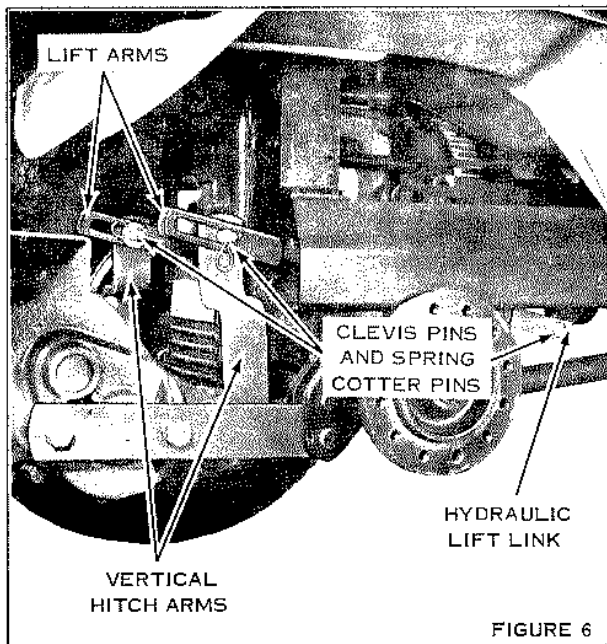
IMPORTANT: THESE PINS MUST BE IN PLACE AT ALL TIMES WHEN TILLER IS IN USE. IF THEY ARE NOT IN PLACE, TILLER WILL LIFT AND ALLOW THE DRIVE SHAFT TO CONTACT THE TRANSAXLE HOUSING, AND POSSIBLY CAUSING DAMAGE.

4. Apply a coat of grease to the rear tractor P.T.O. shaft and tiller input shaft. Depress lock collar on tiller drive shaft and slide drive shaft onto the rear P.T.O. shaft far enough to allow opposite end to slide onto tiller input shaft. After drive shaft is installed onto tiller input shaft, slide drive shaft back until collar locks into groove in P.T.O. shaft.

5. The final step is installation of the lift arms. Slide lift links over top of rear axle attaching slotted end of arms to the vertical tiller hitch arms with clevis pins, flat washers, and spring cotters provided, inserting pins from inside out. See Figure 6.

Loosen jam nuts on opposite end of lift arms and adjust clevis to full thread depth on one side to gain maximum above ground lift. Lock jam nut and adjust clevis on opposite lift link so that it carries an equal share of the tiller weight. This can best be determined by checking the tension on both lift arms when the tiller is slightly raised off the ground. Secure lift arms to rear of tractor hydraulic lift link with clevis pins and spring cotters inserting clevis pins from the outside in. See Figure 6.

IMPORTANT: WHEN ADJUSTING LIFT ARMS ALWAYS ADJUST SO THAT BOTH ARMS CARRY AN EQUAL LOAD, AND BOTH ARE UNDER TENSION WHEN TILLER IS RAISED OFF THE GROUND.



CONTROLS

There are two controls for operating the tiller; the tractor power take-off lever for engaging and disengaging the tiller, and the tractor hydraulic lift lever to raise and lower the tiller. The power take-off lever must be engaged slowly to start the tiller and prevent premature belt failure.

OPERATION

The performance of this tiller will be determined largely by the ground conditions and forward travel speed. If desired depth cannot be obtained in the first pass, additional passes will be necessary.

When tilling, the tractor should be operated at a low ground speed with engine at full throttle to assure maximum power. The depth shoe should be adjusted to obtain the desired depth of tilling with the hydraulic lift in float position so that the tiller can raise itself over rocks or other obstructions without raising the tractor wheels and pushing the tractor forward. In hard soil the depth shoe can usually be at the high position or sometimes can be removed entirely. In cases of tilling in very loose soil with no rocks or for shallow cultivation it is sometimes of some advantage to control the depth by keeping the tiller suspended in the lift linkage.

CAUTION: Do not start tiller when it is in or on the ground. Raise tiller to its highest position at the end of each pass before turning around. When transporting tiller, disengage tractor P.T.O. and raise unit to its highest position. **NEVER REVERSE TRACTOR WITH TILLER IN THE GROUND.** Lift tiller to its highest position and disengage tractor P.T.O. to prevent mechanical damage. For best tilling, tractor should be equipped with wheelweights. The tiller depth shoe is primarily for cultivating use and should then be in the low setting. Tine extensions must not be used except for shallow penetration or cultivating.

LUBRICATION

There are two oil hole plugs in the gear case. The one located on the top front is the filler plug hole. The recessed allenhead plug located on the left sidewall is the oil level plug. Check oil level with unit mounted on the tractor and tines resting on the ground. See Figure 1.

This tiller is filled at the factory with #90 gear lubricant. Check oil level before initial use and after every 25 hours of operation or once each day if used for continuous duty. Add lubricant as necessary to maintain proper level. The drive shaft assembly has a grease fitting on each universal joint, lubricate fittings every eight hours of operation.

Inspect tiller at regular intervals. If any oil leakage is noted, check oil level immediately. Inspect oil seals for wear and replace if necessary.

Bolens reserves the right to change specifications, add improvements or discontinue the manufacture of any of its equipment without notice or obligation to purchasers of its equipment.

Bolens' approval of the use of attachments manufactured by other manufacturers is limited to assurance that such use will not void Bolens warranty on the Bolens equipment to which the outside manufactured attachments are adapted. The responsibility for the design, performance, durability safety in operation, service repair availability, and warranty obligation remain with the outside manufacturer. Bolens specifically excludes from its warranty obligation all such outside manufactured attachments.

Bolens warranty will be voided if unapproved attachments are adapted to use with Bolens equipment and are so used.

BOLENS

**TILLER
ATTACHMENT
33 INCH
MODEL 18090-01**

DRIVE SHAFT
MODELS 18091-01
18092-01

ILLUSTRATED PARTS CATALOG

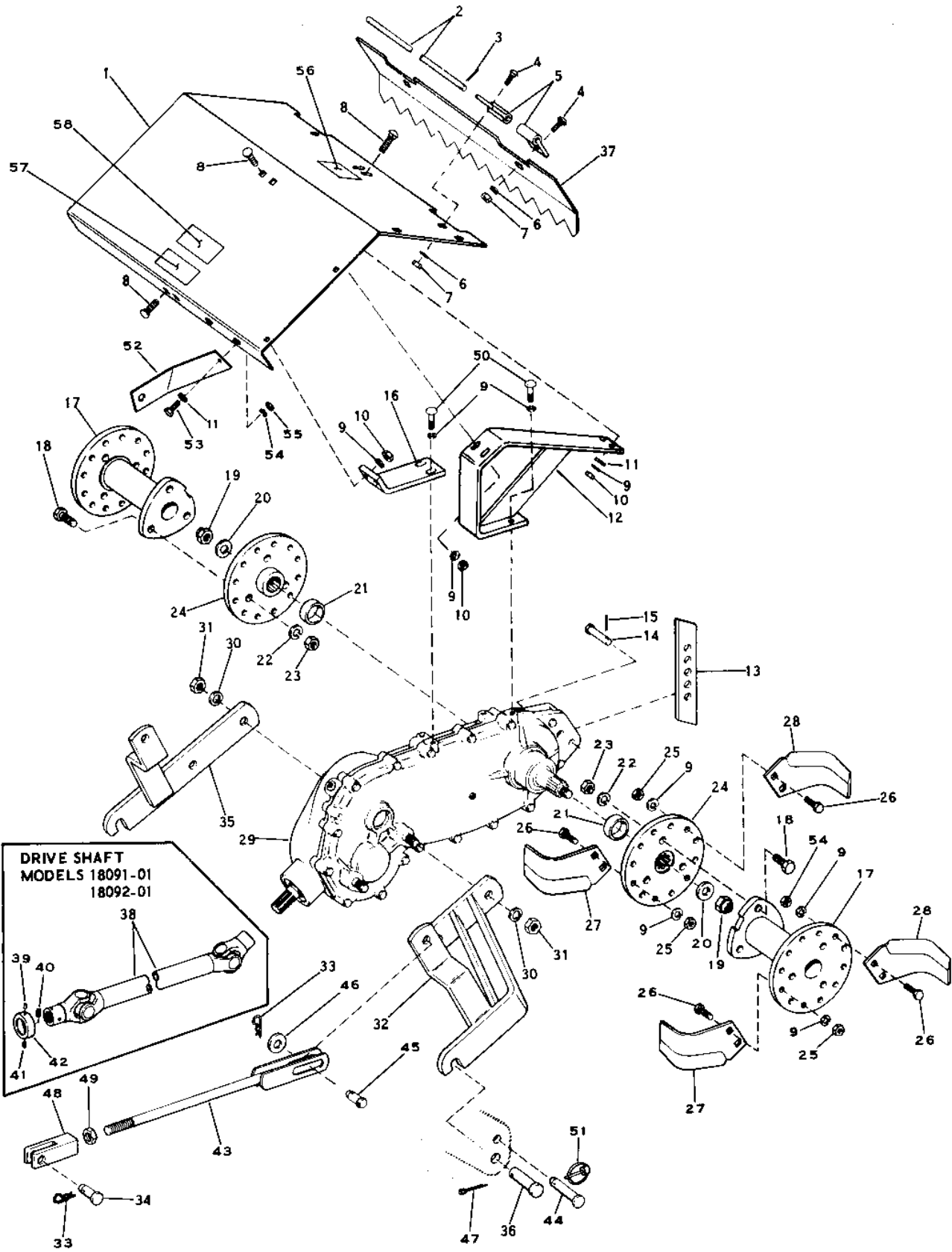


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TILLER ATTACHMENT MODEL 18090-01



TILLER ATTACHMENT MODEL 18090-01

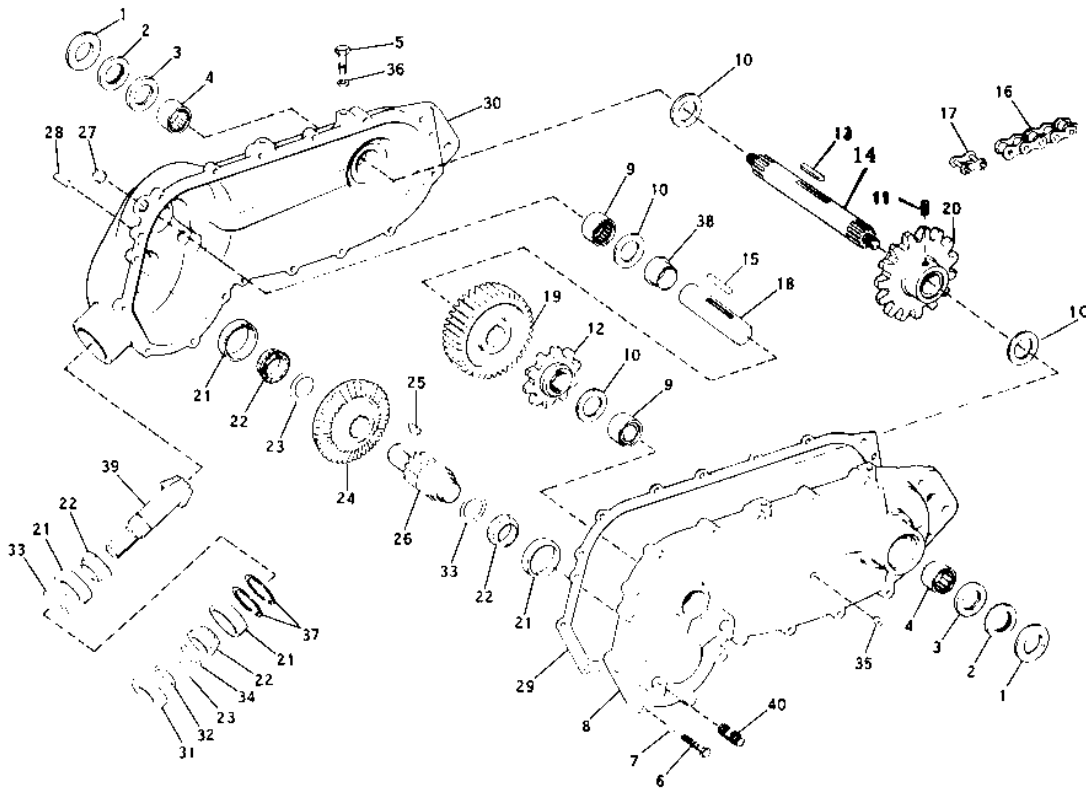
Ref. No.	Part No.	Description	No. Req'd
1	1723 033	Hood	1
2	1723 031	Hinge Pin	1
3	1100 346	Cotter Pin 3/32 x 3/4	2
4	1111 265	Carriage Bolt 5/16-18 x 3/4	4
5	1718 196	Hinge	4
6	1100 242	Lockwasher 5/16	4
7	1182 563	Hex Nut 5/16-18	4
8	1111 285	Carriage Bolt 3/8-16 x 1	6
9	1100 243	Lockwasher	54
10	1110 108	Lock Nut 3/8-16	6
11	1107 383	Flat Washer 3/8	3
12	1719 680	Rear Hood Bracket	1
13	1718 189	Shoe Center	1
14	1708 336	Clevis Pin	1
15	1100 350	Cotter Pin 1/8 x 1	1
16	1718 205	Front Hood Bracket	1
17	1718 138	Spacer	2
18	1107 033	Hex Head Capscrew 1/2-13 x 1-3/4	6
19	1185 229	Hex Lock Nut 5/8-18	2
20	1800 041	Spacer Washer	2
21	1718 170	Sleeve	2
22	1100 245	Lockwasher 1/2	6
23	1121 511	Hex Nut 1/2-13	6
24	1718 140	Tiller Hub	2
25	1110 150	Hex Nut 3/8-24	48
26	1100 010	Hex Head Capscrew 3/8-24 x 1-1/4	48
27	1709 387	R. H. Bend Tine	12
28	1709 388	L. H. Bend Tine	12
29	1723 036	Gear Case Assembly	1
30	1100 247	Lockwasher	4

Ref. No.	Part No.	Description	No. Req'd
31	1121 513	Hex Nut 5/8-11	4
32	1718 304	Lift Arm Assembly - L. H.	1
33	1703 011	Spring Cotter	4
34	1713 553	Clevis Pin 5/8 x 1-5/8	2
35	1718 301	Lift Arm Assembly - R. H.	1
36	1718 773	Clevis Pin	2
37	1723 032	Leveling Board	1
38	*	Drive Shaft Assembly (Includes Ref #39, 40, 41, and 42)	1
39	1185 917	Drive Pin 7/32 x 1/2	1
40	1722 916	Compression Spring	1
41	1185 916	Groove Pin 3/16 x 3/8	1
42	1722 914	Locking Collar	1
43	1718 307	Lift Rod	2
44	1721 609	Clevis Pin	2
45	1713 501	Clevis Pin	2
46	1107 386	Flat Washer 5/8	2
47	1100 351	Cotter Pin 1/8 x 1-1/4	2
48	1714 573	Rod End	2
49	1108 891	Jam Nut 5/8-11	2
50	1719 873	Capscrew 3/8-16 x 1-1/4	4
51	1719 872	Klick Pin	2
52	1723 029	Support Bracket	1
53	1106 918	Hex Head Screw 3/8-16 x 1	1
54	1185 687	Star Washer 3/8	1
55	1121 551	Hex Nut 3/8-16	1
56	1715 633	Decal - Bolens	1
57	1715 670	Decal - Caution	1
58	1719 335	Decal - Tiller Instr.	1

* Drive Shaft Model 18091-01 for
Tractor Model 1477.

Drive Shaft Model 18092-01 for
Tractor Model 1886.

TILLER ATTACHMENT MODEL 18090-01



Ref. No.	Part No.	Description	No. Req'd.
1	1718 153	Seal Washer	2
2	1185 630	Oil Seal	2
3	1185 629	Oil Seal	2
4	1185 721	Needle Bearing	2
5	1719 673	Capscrew 3/8-16 x 1-1/4	4
6	1100 799	Hex Head Capscrew 5/16-18 x 1-3/4	16
7	1100 242	Lockwasher 5/16	16
8	1720 397	Gearcase Cover (Inc Ref #21)	1
9	1185 720	Needle Bearing	2
10	1710 530	Thrust Washer	4
11	1103 494	Set Screw 3/8-16 x 1/2	1
12	1718 147	Sprocket 10-Tooth 1 Inch Pitch	1
13	1718 149	Square Key 5/16 x 2-1/4	1
14	1721 592	Tine Shaft	1
15	1718 686	Special Key 5/16 x 1/4	2
16	1718 151	Roller Chain 1 Inch Pitch	1
17	1718 152	Roller Chain Connector	1
18	1718 394	Shaft	1
19	1718 393	Gear 39 Tooth	1
20	1721 591	Sprocket 15-Tooth 1 Inch Pitch	1

Ref. No.	Part No.	Description	No. Req'd.
21	1177 343	Bearing Cup	4
22	1177 262	Bearing Cone	4
23	1718 781	Shim 1.265 x .005	As Req'd.
24	1718 391	Bevel Gear 40 Tooth	1
25	1708 382	Woodruff Key	1
26	1718 392	Pinion & Shaft	1
27	1706 566	Plug Assembly	1
28	1185 206	Drive Pin	2
29	1718 389	Gasket	1
30	1720 396	Tiller Case (Includes Ref #21)	1
31	1185 734	Oil Seal	1
32	1185 732	Retaining Ring	1
33	1719 443	Shim 2.320 x .005	As Req'd.
34	1719 271	Shim 1-1/4 x .020	As Req'd.
35	1185 741	Pipe Plug 1/8	1
36	1100 243	Lockwasher 3/8	4
37	1185 733	Retaining Ring	2
38	1718 484	Spacer	1
39	1718 390	Pinion 13 Tooth	1
40	1113 755	Stud 5/8-11 x 2-1/4	4