Electronic Service Manuals

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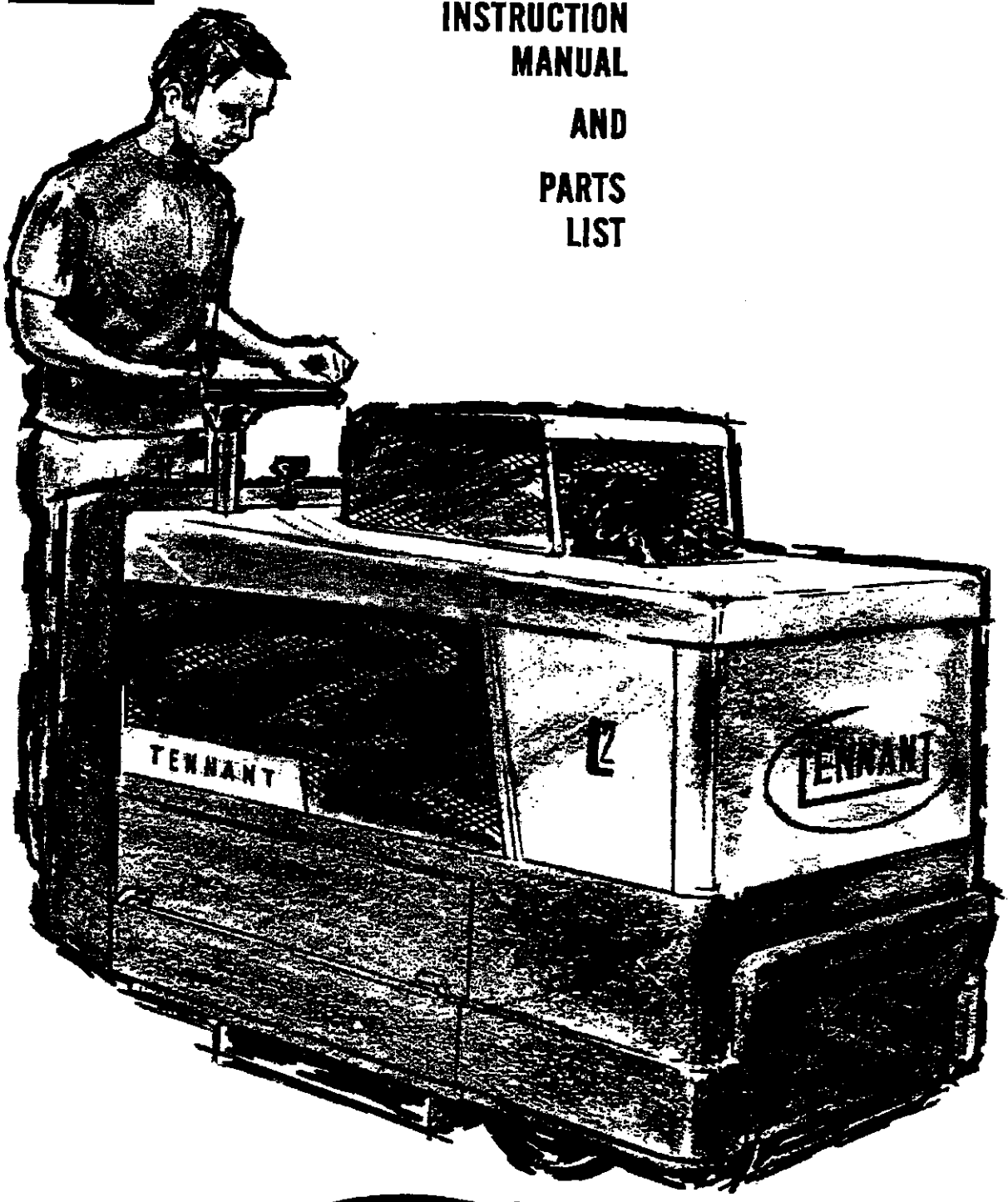
Serving the Cleaning Industry Since 1922

MM074

L2 FLOOR MACHINE

INSTRUCTION MANUAL AND PARTS LIST



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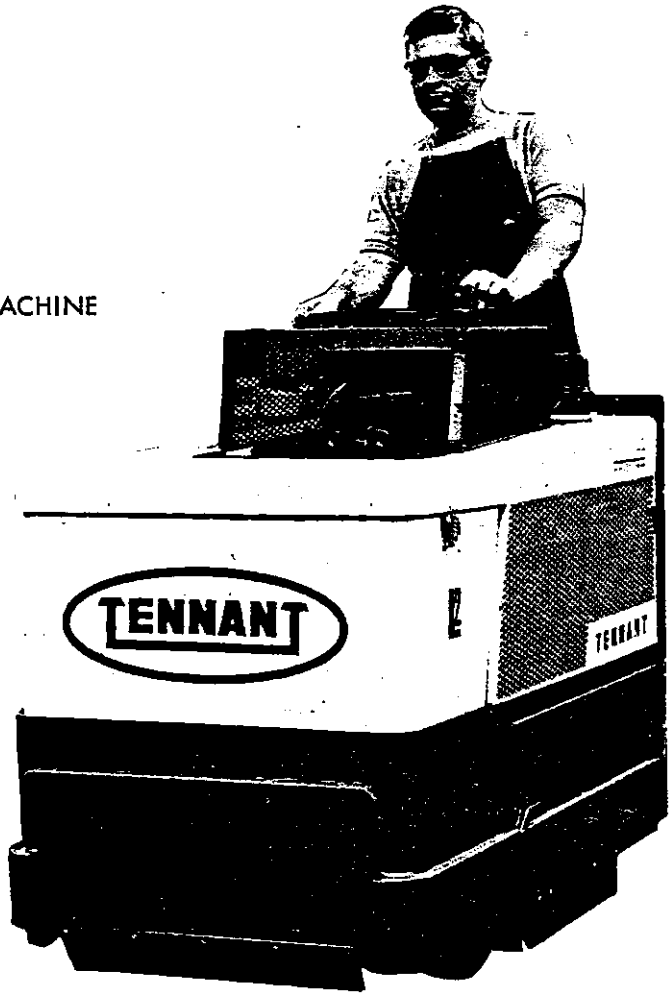
TENNANT®

SPECIALIZED
MAINTENANCE SYSTEMS

SWEEPERS • SCRUBBERS • SCARIFIERS • FLOOR COATINGS

TENNANT L2
INDUSTRIAL FLOOR MACHINE



NOTE

THIS MANUAL COVERS ONLY THOSE MACHINES BEGINNING WITH FIRST SERIAL NO. 788.

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This manual is furnished with each new Tennant L2 Floor Machine. Your operators will easily learn how to operate the machine, and understand its mechanical functions by following the directions and absorbing the information under OPERATING INSTRUCTIONS.

Your Tennant L2 will give you excellent service and save you maintenance expenses if you follow the instructions in this manual. However, as with all specially engineered equipment, you can get best results at minimum cost IF:

1. Machine is operated with reasonable care.
2. Machine is maintained regularly per instructions provided.

You may order parts and supplies direct from TENNANT COMPANY, 701 North Lilac Drive, Minneapolis, Minnesota, 55422. A complete illustrated parts listing is included in this manual. However, be sure to give serial and model number of your machine when ordering parts or requesting information. A phone or wire order will receive our prompt attention.

Contact your nearest TENNANT Factory Representative for information or assistance concerning your TENNANT L2.

Stock Number - MM074

Issue R7-71

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PREPARING MACHINE FOR OPERATION

1. If battery has been disconnected for shipment, connect and tighten battery cables.
2. Check engine crankcase oil level. Although lubricated at factory, some oil loss may have occurred during shipment. Therefore, level must be checked before starting engine. If needed, add oil as recommended in Engine Section.

NOTE: Be sure to change oil every 50 operating hours and oil filter as indicated on maintenance chart, page 12.

IMPORTANT: When adding oil, be careful not to overfill. Make sure filler cap is kept tight or oil may be forced out when engine is running.

3. Fill fuel tank with clean, fresh regular grade gasoline (octane rating 90 or above). Do not mix oil with gasoline. (See "LPG Section" if your machine is equipped for operation on LP Gas).

WARNING: Never fill tank while engine is running.

4. Check tightness of air cleaner mounting bolt and make sure element is in place. (See Maintenance Chart, page 12, and Engine Section).
5. Check oil level in hydraulic system. (See sight gauge on outside of oil reservoir, visible through oval opening on left side of machine).
6. Check oil level in chain case housing (FIG 1). (Level should be to plug opening.) If required, add SAE 20 motor oil.

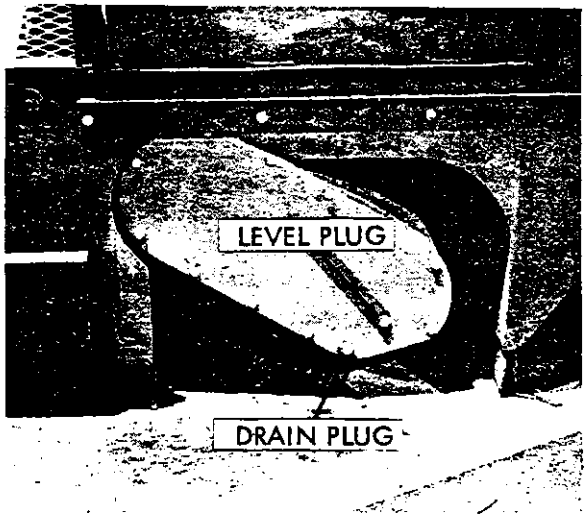

FIG 1

FUNCTION OF CONTROLS
(See FIG 2)

Engine Choke: Pull for "ON" when starting cold engine.

Tool Pressure Valve: Turn clockwise to increase pressure. Be sure valve is in extreme counter-clockwise when starting engine. NOTE: Valve is very sensitive, with only $\frac{1}{4}$ turn required to obtain maximum pressure. The valve should be opened when the tool is not in use.

Tool Control Lever: Push forward to raise tool, pull back to lower tool. (Use Lock-Up Control to hold tool up.) Lower tool only after machine is moving.

Engine Throttle Control: Pull all the way out to obtain engine operating speed. Turn clockwise to lock at constant speed. NOTE: When operating, tool is engaged and in contact with floor, engine should always be run at maximum speed of 2350 to 2450 R.P.M.

Tool Lock-Up Control: Used to mechanically hold tool up to prevent it from settling to floor when machine is not being used. TO OPERATE: Raise tool to extreme "UP" position and pull Lock-Up Control all the way out, then turn to lock.

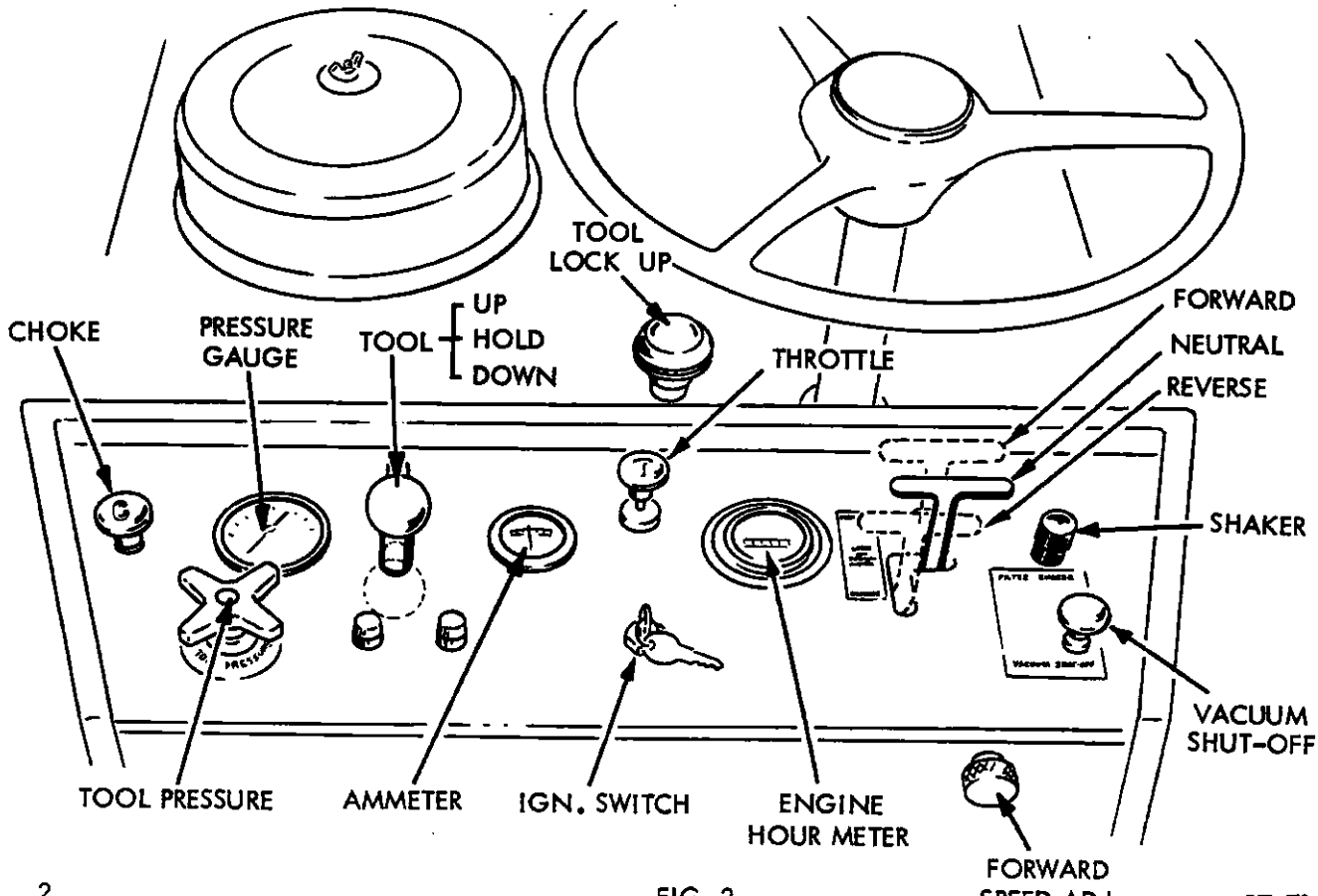

FIG 2

FUNCTION OF CONTROLS (Continued)

Safety Interlocks: If the machine is in motion, and the operator leaves the platform, the machine hydraulic drive will automatically stop. The engine will also shut off if the directional control lever is not in neutral when the operator leaves the platform. The control lever must be in neutral in order to start the engine.

Directional Control Lever: Must be in neutral to start engine. This lever controls hydraulic drive motor at rear wheel. Working in conjunction with the Forward Speed Adjustment, it regulates speed of travel while engine speed remains constant.

Forward Speed Adjustment: Controls movement of Directional Control Lever to operate machine at a constant forward speed. Turn clockwise to increase speed.

Vacuum Shut-Off: Pull to shut off vacuum to tool chamber and filter system. Vacuum must be shut off when running shaker on machines equipped with power shaker and envelope filter system.

Ignition Switch: To start engine, turn to extreme clockwise position. (Directional control lever must be in neutral).

Filter Shaker (Optional): Controls motor that shakes filter envelopes. On machines without envelope filter system, dust bag is shaken manually.

CAUTION: Never hold shaker button down continuously for more than a few seconds.

WARNING

THIS MACHINE IS NOT EQUIPPED WITH A PARKING BRAKE -

PARK ON LEVEL GROUND.

OPERATING INSTRUCTIONS

To Start the Engine: (See "LPG Section" for LP Engine starting instructions)

1. The model L2 is equipped with an electrical safety interlock on the ignition. The operator must have the directional control lever in neutral before the engine can be started.
2. Make sure that cleaning tool is clear of floor. (Tool locked in "UP" position.)
3. Check to see that gasoline valve is turned on. (Located under tank.)
4. Pull choke. (See choking instructions in Engine Section.)
5. Turn ignition key to "START" position. After engine starts, open throttle fully and lock. (If engine fails to start after a few attempts see Engine Section.)
6. If engine is hard to start after it has been standing idle a short time when hot, the heat from the engine may have evaporated the gasoline in the carburetor. To correct this, pump the primer located on the fuel pump a few times to force gasoline into carburetor.

Home

To Propel Machine After Engine Is Running:

1. Pull engine throttle control all the way out and turn to lock.
2. Move speed and directional control valve to "FORWARD" position.

   NOTE: Engine must always be operated at governed speed (2350 to 2450 R.P.M.)
3. Adjust "FORWARD SPEED CONTROL" to obtain desired speed.
4. Push forward on tool lift lever to take weight off tool lock.
5. Push tool lock-up control knob "IN".
6. Lower tool and keep tool lever in "hold" while operating.

   WARNING: Never lower tool when machine is standing still; you must have forward motion or floor will be damaged.
7. Adjust tool pressure valve until desired cleaning action is obtained or until manifold vacuum gauge indicates "4".

   WARNING: A reading of "4" indicates engine loading is near 80% of power. This loading should not be exceeded.

   Once set, the tool pressure will not require further adjustment unless floor conditions change.

OPERATING INSTRUCTIONS (Continued)

8. To lift tool from floor, push forward on control lever while machine is still in forward motion. Then set lock by pulling knob all the way out.

9. To stop machine, lift tool from floor, set "UP" lock and place speed and directional control lever in "NEUTRAL".

NOTE: If you involuntarily leave the platform, the machine will stop if in motion and engine will stop because of the platform safety switch. To re-start, stand on the platform and follow the regular starting instructions.

If you wish to leave the platform and yet keep the engine running:

A. Raise the tool, stop the forward motion and set the tool "UP" lock. Place tool control in "hold".

B. Push in throttle control.

C. Make sure directional control lever is in neutral position.

NOTE: If engine "kills" when tool is down:

A. Hold tool control in "UP" position.

B. Make sure speed and directional control lever is in "NEUTRAL".

C. Turn ignition switch to "START". Even if engine does not start immediately, tool will be raised from floor. Lock tool in "UP" position by means of tool lock-up knob.

To Stop Machine:

1. Lift tool from floor.

2. Place directional control lever in "NEUTRAL".

To Empty Dirt Hopper:

1. Remove rubber latch at front of machine.

2. Grasp flange and pull hopper completely out of machine.

3. Dump dirt from hopper and replace, being sure to engage rails on side of hopper with those on machine frame.

General Operating Suggestions:

1. Always run engine at maximum governed speed when tool is down. Engine speed is independent of forward speed and must be at maximum to assure proper vacuum and tool action.

OPERATING INSTRUCTIONS (Continued)

2. Plan your work in advance. Try to arrange long runs with minimum starting and stopping.
3. Overlap tool paths a few inches to avoid missing any spots.
4. Pick up oversize debris such as bulky cartons before starting.
5. Dump the hopper when pick-up failure is noticed. When dirt hopper is full, no pick-up is possible.
6. On machines equipped with optional power shaker and filter system, shake filters each time hopper is dumped and during operation whenever dusting is noticed.

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SERVICE AND MAINTENANCE INSTRUCTIONS

General Tensioning Principles for V-Belts:

1. The best tension for a V-belt drive is the lowest tension at which it will not slip, under the highest load condition.
2. Do not over-tighten belt. This will shorten belt and bearing life.
3. Check the tension on a new drive belt frequently during the first day of operation and periodically thereafter.
4. Keep belts and sheaves free of any foreign material which may cause slip.

V-Belt Trouble Shooting:

Trouble	Cause	Correction
Belt Slipping	a. Not enough tension b. Drive over-loaded c. Oily drive	a. Tighten b. Check for excessive load on system c. Correct condition
Belt Squealing	a. Drive overloaded b. Heavy starting load	a. Check for excessive load on system b. Increase tension
Turned-Over Belt	a. Broken cords from manually running belt onto sheaves b. Not enough tension	a. Reduce distance between sheave centers when installing belt b. Increase tension
Repeated Belt Breakage	a. Broken cords from manually running belt onto sheave	a. Reduce distance between sheave centers when installing belt
Rapid Wear	a. Worn sheave grooves b. Sheave misalignment c. Belt slipping	a. Replace sheaves b. Align c. Tighten belt
Underside Cracked Or Belt Hardened	a. Excessive heat	a. Eliminate slippage

To Adjust Hydraulic Pump Drive Belts:

1. Loosen three bolts securing the pump mounting bracket. (See FIG 3, page 8).
2. Shift bracket in slotted mounting holes to tighten belts.

SERVICE AND MAINTENANCE INSTRUCTIONS (Continued)

CAUTION: Before tightening bolts, make sure that pump bracket is not shifted to cause misalignment of sheaves.

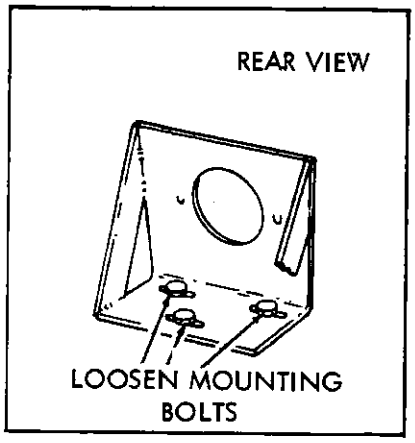


FIG 3

To Remove Hydraulic Pump Drive Belts:

1. Remove upper panel from right side of machine to expose vacuum fan and pump assemblies.
2. Refer to "Adjust Hydraulic Pump Drive Belts" page 7 to loosen belts. Then remove them from pump sheaves.
3. Remove housing mount bolt, ("A" FIG 4).
4. Pull out on housing mount to provide clearance and remove pump drive belts from engine sheave.

To Adjust Vacuum Fan Drive Belt:

1. Loosen four fan housing mounting bolts. (FIG 4)
2. Shift housing forward to tighten belt.

   CAUTION: Do not overtighten belt.
3. Tighten mounting bolts.

To Remove Vacuum Fan Drive Belt:

1. Remove hydraulic pump drive belts. (See above)
2. Loosen four fan housing mount bolts. (See FIG 4).
3. Remove belt.

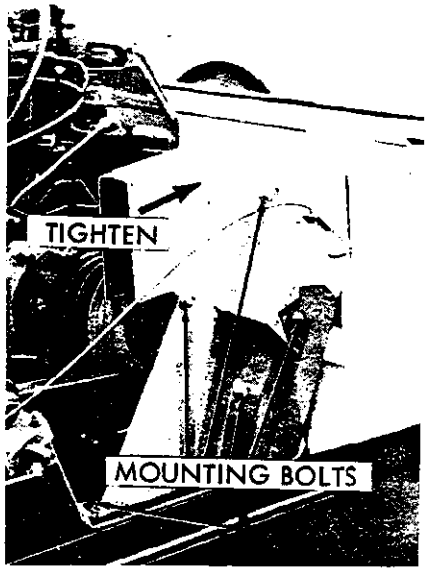


FIG 4

To Adjust Tool Drive Belts:

1. Remove filter box cover.
2. Tighten nuts indicated (FIG 5, page 9) to increase belt tension. Be sure to tighten or loosen nuts equally when making adjustment.

SERVICE AND MAINTENANCE INSTRUCTIONS (Continued)

To Remove Tool Drive Belts:

1. Remove vacuum fan and pump drive belts.
   (See page 8)
2. Remove adjustment nuts as indicated in FIG 5 to disengage idler from belts.
3. Remove belts.

   NOTE: ALWAYS replace worn belts with complete and matched set.

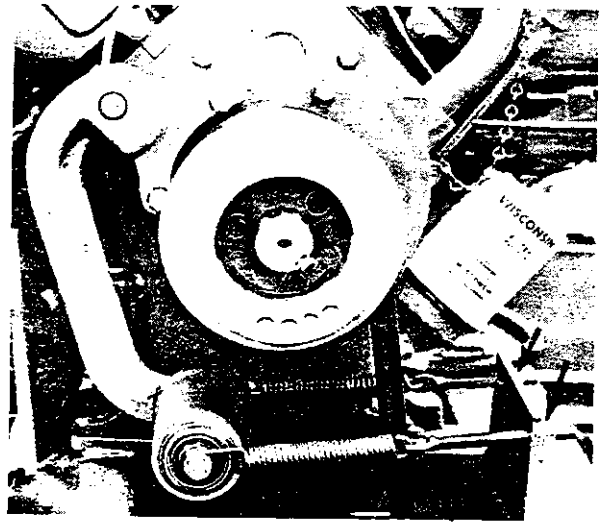


FIG 5

To Remove Revo-Tool Or Wire Brush:

1. Shut off engine.
2. Open tool access doors on both sides of machine.
3. Lower tool to floor.
4. Remove two retaining bolts from brush hanger arm ("A" FIG 6).
5. Slide out brush bearing plug and hanger arm.

   NOTE: If hanger arm does not slide out easily, insert one retaining bolt in threaded hole, ("B" FIG 6), to force arm off locating pins.

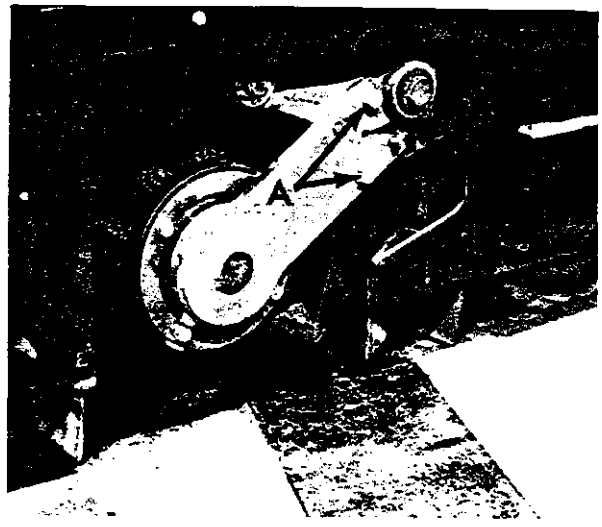


FIG 6

6. Pull complete tool assembly out through access opening.

To Install Revo-Tool Or Wire Brush:

1. Slide tool or brush into position. The two welded keystrips inside hub should line up with keyways on opposite drive plugs. "Sight" through hub to be sure keystrips and keyways are in line. To align all parts, you may need to move brush control lever to "UP" position and pry up or push down on brush control arms.

SERVICE AND MAINTENANCE INSTRUCTIONS (Continued)

2. Push Revo-Tool or brush into place so hub fits over drive plug. Do not force it. It should slide in easily if properly aligned.
3. Replace brush plug on right side and tighten bolts.

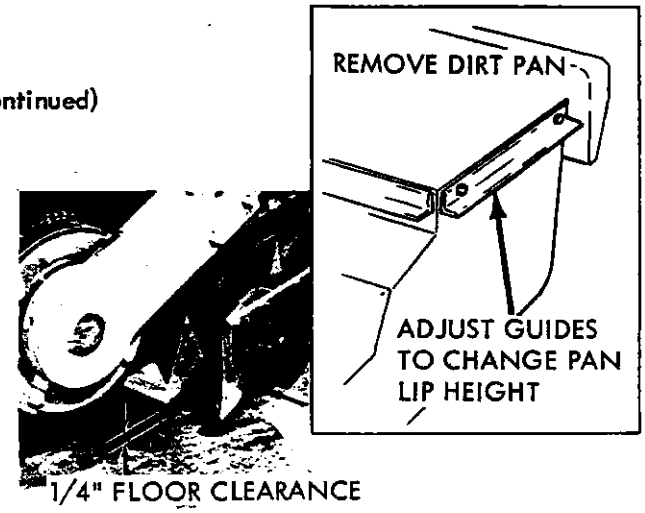


FIG 7

To Adjust Dirt Pan Lip Height:

1. Park machine on smooth, level floor.
2. Open access doors.
3. Height from floor should be ¼" on both sides (See FIG 7).
4. Adjust height by pulling out dirt pan, loosening rail mounting bolts, and shifting rails up or down.

To Adjust Dust Skirt Height: (FIG 8)

1. Loosen skirt retaining bolts and shift in slotted holes.
2. Height should be 1/8" with machine on smooth, level floor and without weight of operator.

   NOTE: Be sure to adjust height of skirts mounted on access doors.

To Adjust Neutral Setting of Directional Control Lever:

1. Park machine on smooth, level floor surface.
2. Block up rear of machine so drive wheel can turn freely; OR have someone remain on operator's platform while adjustment is being made.

   CAUTION: Be sure tool is in "UP" position.
3. Run engine at approximately half throttle and check if rear wheel "creeps" with directional control lever in neutral.
4. If adjustment is required, refer to FIG 9 to disconnect the hydraulic pump control arm.

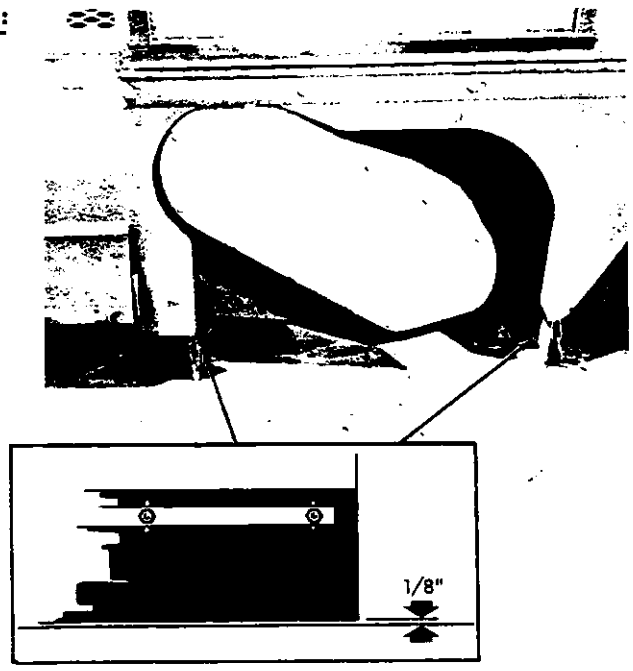


FIG 8

5. With the linkage disconnected, find neutral position of arm and adjust linkage as indicated. Be sure directional control lever on instrument panel remains in neutral.

Engine Maintenance:

For all instructions, see the Wisconsin Engine Section.

If your engine needs servicing or emergency repair parts, contact the nearest Wisconsin Engine Service Station.

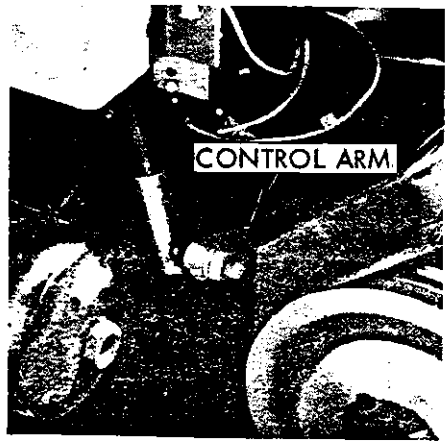
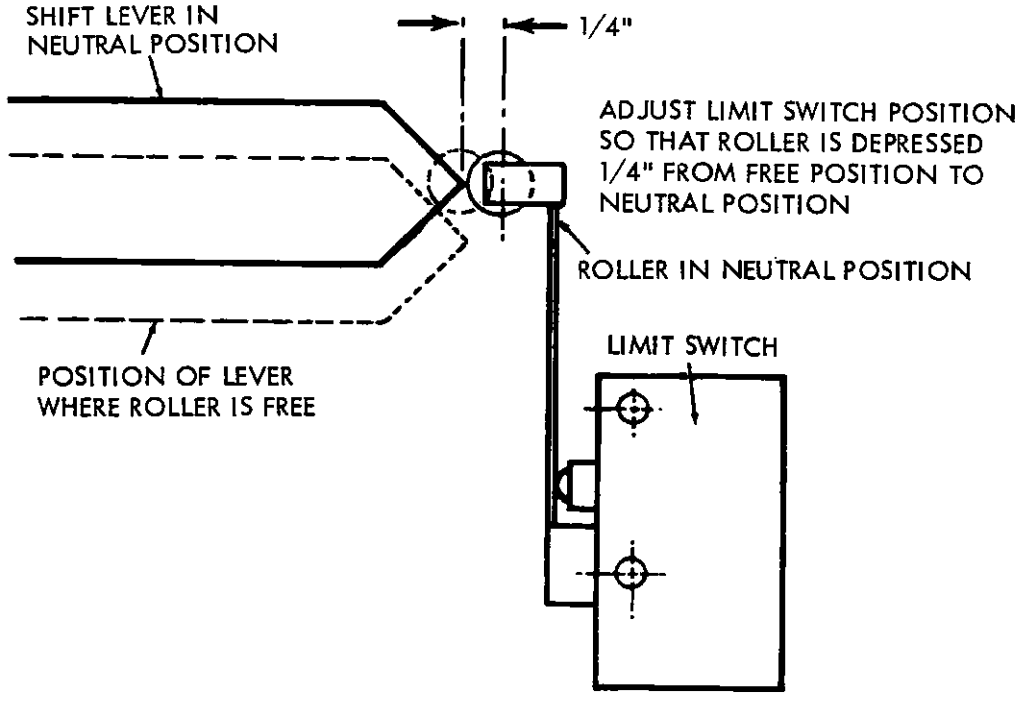
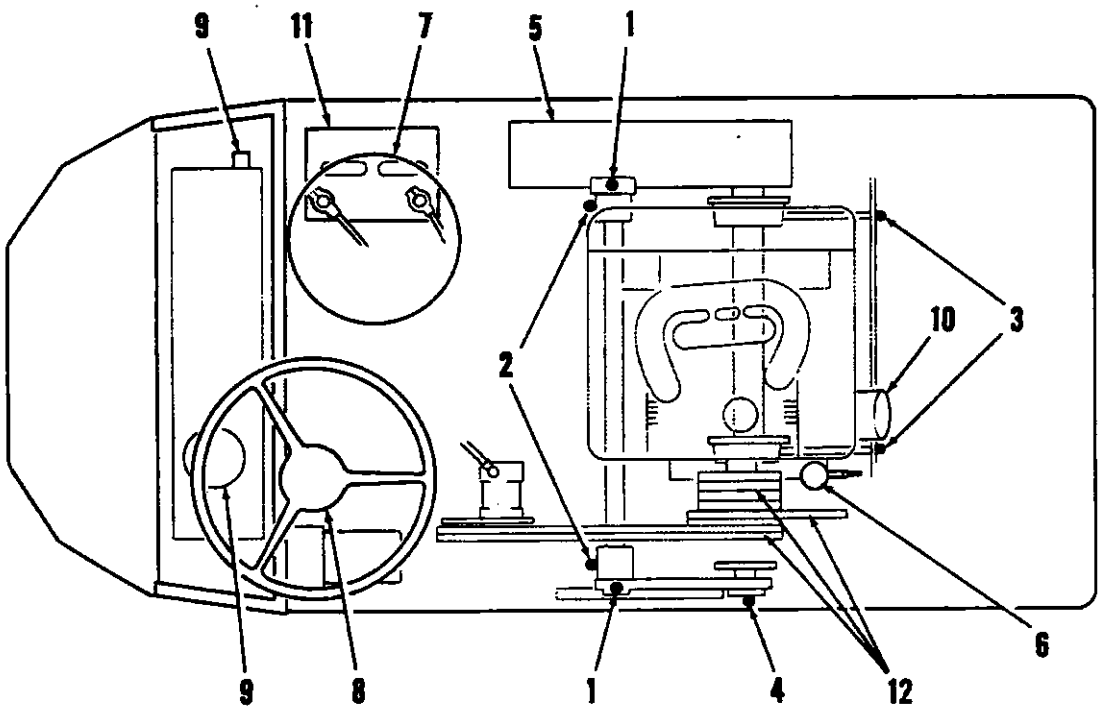


FIG. 9

To Adjust Neutral Safety Switch:

The neutral safety limit switch will allow engine operation only when the directional control lever is in neutral position. The switch is mounted next to the directional control lever linkage. If the switch is replaced, it should be adjusted so that it is tripped when the directional lever is in neutral position. This is done by shifting the switch slightly on its mounting screws. Before adjusting the switch, the neutral setting of the directional control lever must be correct (see section on previous page). Adjust the switch, as shown in the drawing, so that when the control lever is in neutral, the switch roller will be depressed about 1/4-inch from its free position.





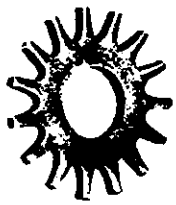
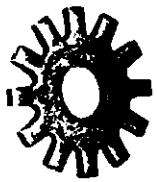
MAINTENANCE

	LOCATION	PROCEDURE	HOURS
1	Stabilizer Shaft (2)	Grease Gun Lithium Base–multipurpose	50
2	Brush Lift Arm (2)	Lithium Base–multipurpose	50
3	Cross Shaft (2)	Lithium Base–multipurpose	50
4	Tool Arm (Right Side) (1)	Lithium Base–multipurpose	50
5	Chain Case Housing	SAE 20 or 30	Check – 50 Change – 500
6	Engine Crankcase	See engine manual	Check – 8 Change – 50
7	Engine Air Cleaner	Inspect and service as required	Check – 8
8	Steering Gear	Multi–purpose Gear Lube #140	Check – 100
9	Hydraulic Tank	Check Oil Level and Breather Change Oil and Filter	50 500
10	Engine Oil Filter	Change Cartridge	100
11	Battery and Cables	Check	50
12	Belts	Check Tension	50

HOW TO ASSEMBLE AND USE THE REVO-TOOL

The Revo-Tool can perform a variety of cutting jobs, from mild abrasion to vigorous scarifying, by varying the cutter pattern and type of cutters used. For example, patterns using the fewest cutters have the most powerful action.

Types of Cutters:

CUTTER	CUTTER NUMBER	CUTTER THICKNESS	DIAMETER OF CENTER HOLE	USE
	No. 9 TENNANT PART NO. 4099	5/32"	3/4"	Recommended for general, all-around use: concrete scoring and roughening, grime and paint removal, etc.
	No. 3 TENNANT PART NO. 3895-3	5/32"	3/4"	Has a pulverizing action for cleaning steel decks, removing pitch and gravel from roofs, etc. Action is less severe than cutters No. 1 or No. 9.
	No. 4 TENNANT PART NO. 3895-4	5/32"	5/8"	Recommended for light, easy-to-remove accumulations. It is the least severe of the four types of cutters. Same tooth as cutter No. 3.
	No. 1 TENNANT PART NO. 3894-1	3/16"	3/4"	For pre-sanding and leveling wood floors.
	ALTERNATE 345 #6603 & 345 #6604 in full pattern to obtain proper spacing		5/8"	Has shaving action for general cleaning.

HOW TO ASSEMBLE AND USE THE REVO-TOOL (Continued)

Three Terms Referring to Mounting of Cutters:

1. Cutter Spacing: This refers to the number of spacers which separate cutters on a rod. Four types of spacing are used. They are designated by the following code letters:

Code Letter	Type of Spacing
A	No spacers between cutters
B	One spacer between cutters
D	Two spacers between cutters
C	Four spacers between cutters

NOTE: C spacing is used only for scoring or grooving concrete. Cutters are mounted in line, $\frac{1}{2}$" apart. On B and D type spacings, the cutters on adjacent rods are staggered to obtain complete coverage over the span of the tool.

2. Cutter Bundle: This is a group of cutters, or cutters and spacers, that fills part of a rod within a section of the frame. (A section is the part between two adjacent flanges.)

3. Bundle Pattern: This is the arrangement of cutter bundles on the frame. There are three bundle patterns: full, half and one-quarter pattern. The coding for these is as follows:

Code Letter	Pattern Type	Description
(none)	Full pattern	8 rods filled full length
M	Half pattern	4 rods filled full length
L	One-quarter pattern	2 opposed bundles per section

How To Order An Assembled Revo-Tool:

Four symbols are used to designate assembled tools:

1. Part number of the frame - 17492.
2. Type of pattern - None, M or L.
3. Type of cutter - 1, 3, 4 or 9.
4. Type of spacing - A, B, C or D.

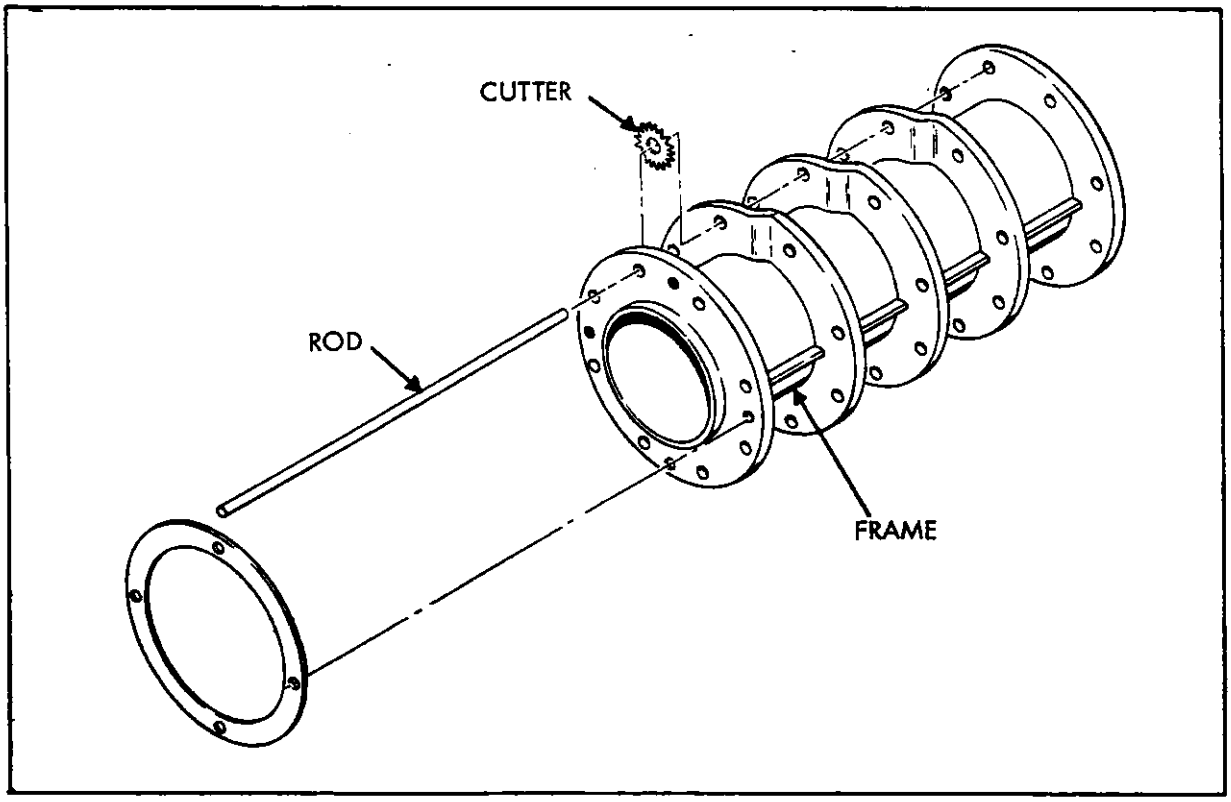
HOW TO ASSEMBLE AND USE THE REVO-TOOL (Continued)

Examples of Tool Combinations:

1. Revo-Tool Number 17492-1A: This is a tool filled with a full pattern of No. 1 cutters, with no spacers between cutters.
2. Revo-Tool Number 17492-M3D: This is a tool filled in a half pattern with No. 3 cutters, separated by two spacers.
3. Revo-Tool Number 17492-L9B: This is a tool filled with a one-quarter pattern of No. 9 cutters, separated by one spacer.

Wire Brushes Available for Removal of Average Soilage

PART NO.	DESCRIPTION
17554	20 Gauge wire - 8 5/8" dia. brush
17555	28 Gauge wire - 8 5/8" dia. brush
17556	28 Gauge wire - 12" dia. brush



Exploded View of Revo Tool

RECOMMENDED MAINTENANCE ITEMS
FOR
TENNANT L2 FLOOR MACHINE

Suggested Quantity	Part Number	Description
1	17155	SKIRT, rear
2	17341	SKIRT, door
1	17451	SKIRT, front
1	17184	DEFLECTOR
1 set	17811-4	V-BELT; B-43 BELT, Steel Cable, ORS (matched set of 4)
1 set of 2	17985-2	V-BELT (11M1220)
1	46461	V-BELT (3V250)
2	11687	BELLOWS, rubber
2	17133	VACUUM BAG
1	17408	CABLE, throttle control
1	17110	LOCK, hopper
4	JD24S1	SPARK PLUG, gasoline (Champion D-16 or AC-C86) (Obtain from Local Source)
4	YD-35	SPARK PLUG - LPG (Champion #D-9-J)
2	11425	CUP PACKING (for Brush Cylinders)
4	11451	LEATHER BACK-UP RING (For Brush Cylinders)
2	11453	"O" RING (for Brush Cylinder)
2	11455	DUST EXCLUDER (for Brush Cylinder)
1	17253	SHIELD, Dust Left
1	17254	SHIELD, Dust Right
1	07423	FUSE
1	SK0106B	SEAL KIT FOR CHAR-LYNN HYDRAULIC MOTOR

MANUFACTURER'S CROSS REFERENCE LIST

Part Name	TENNANT Part No.	Manufacturer	Manufacturer's Part No.
		BEARINGS	
BEARING ASSEMBLY	17754	New Departure	Z497506
BEARING CUP	17808	Timken	13621
BEARING CONE	17809	Timken	13685L
BEARING CUP	24989	Timken	LM67010
BEARING ASSEMBLY	11830	Dodge	SC1-15/16
FLANGE BEARING	17179	Oilite	F-1505-1
BEARING ASSEMBLY	17180	New Departure	8507
BEARING ASSEMBLY	07107	SKF	6204-A2RSNR
BEARING ASSEMBLY	09636	New Departure	488507
BEARING ASSEMBLY	11742	New Departure	87509
BEARING ASSEMBLY	17753	New Departure	29508
BEARING ASSEMBLY	20043	New Departure	499503
		BELTS	
V-BELT SET (engine to pump)	17985-2	Gates Rubber	11M1220
V-BELT SET (engine to cross shaft)	17811-4	Goodyear	B43
V-BELT	46461	Goodyear	3V-250
		FILTERS	
FILTER ELEMENT, Hyd. Oil	17957	Michigan - Dynamics	S-69
FILTER, Hyd. Breather	24908	Purolator	AF-3
FILTER, Engine Oil (package of four)	*	Wisconsin	RY-40-S4
FILTER CARTRIDGE, Eng. air cleaner)	23792	Fram	CA-151-PL

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