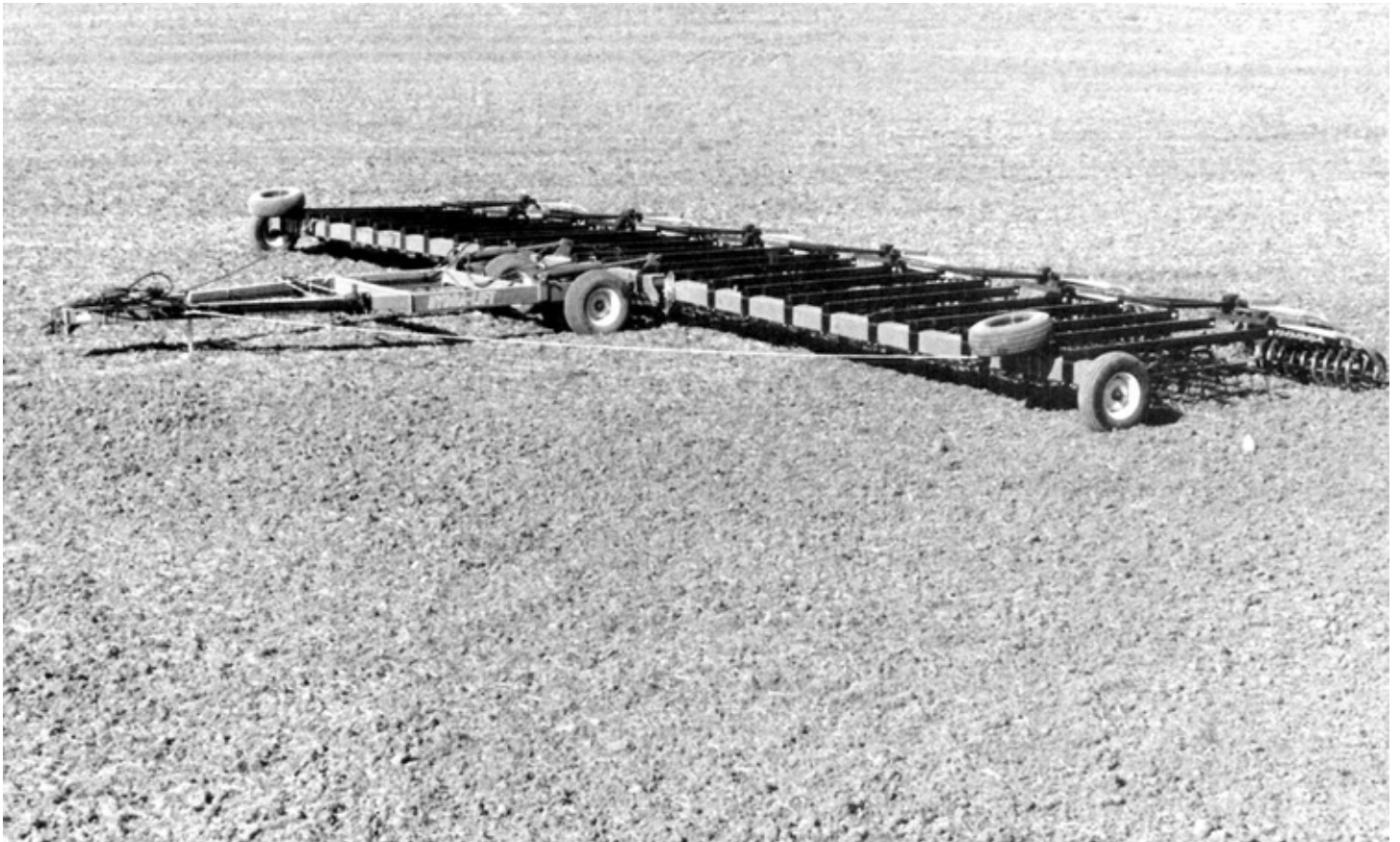


Evaluation Report

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Blanchard Hydra-Lift Harrow Packer Drawbar

A Co-operative Program Between



ALBERTA
FARM
MACHINERY
RESEARCH
CENTRE



PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

BLANCHARD HYDRA-LIFT HARROW PACKER DRAWBAR

MANUFACTURER AND DISTRIBUTOR:

Blanchard
Box 1444
46 Street and Millar Avenue
Saskatoon, Saskatchewan
S7K 3P7

RETAIL PRICE:

\$15,488.00 (July 1983, f.o.b. Lethbridge, Alberta)

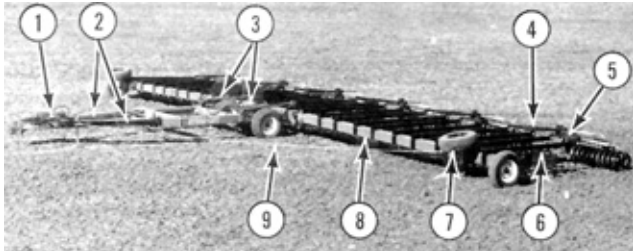


FIGURE 1. Blanchard Hydra-lift Harrow Packer Drawbar: (1) Catch Assembly, (2) Auto Fold-Out Arms, (3) Lift Cylinders, (4) Long Packer Draw, (5) Short Packer Draw, (6) Harrow Support Arm, (7) Transport Wheels, (8) Boom, (9) Wing Draw Cable.

SUMMARY AND CONCLUSIONS

Overall Performance: Performance of the Blanchard Hydra-lift harrow packer drawbar was very good.

Soil Finishing: The tine harrows performed well under most conditions encountered when adjusted to spread trash and to level the soil surface. Minimal plugging of the harrows occurred when operating in heavy trash conditions at steep harrow tine angles. The harrows levelled rough surfaces well, broke loose soil lumps, and trailed well on sharp turns.

Packing: The packers performed well in all field conditions and trailed well during sharp turns. The packing force of 86 lb/ft (1218 N/m) was suitable for creating a firm seedbed in all conditions encountered during the test.

Ease of Operation and Adjustment: The Blanchard Hydra-lift was very stable and maneuvered well in field and transport position. The Blanchard was very convenient to put into field position but often required the operator to dismount and untangle the harrow chains from the harrow support arms to allow the harrows to rest on the soil surface. Hitching to the Blanchard Hydra-lift was safe and convenient in both field and transport position if the jack and jack stand provided were used. Care had to be taken when using the jack in transport because of the minimal clearance between the jack handle and harrow tine bars. Adjustment of the harrow tine angle was inconvenient and time consuming because of the need to remove bolts from each of the 12 harrow sections.

Power Requirements: A tractor with a maximum power take-off rating of 135 hp (101 kW) was required to operate the 60 ft (18.3 m) unit.

Operator Safety: Caution was required to ensure that the rear hitch jack was in position when unhooking from a tractor to avoid the hitch lifting up and causing possible operator injury. The wing draw cables were difficult to see in field position. A slow moving vehicle sign was not provided.

Operator's Manual: Assembly, lubrication, maintenance and some operating instructions were included in the operator's manual. A complete parts list was not included.

Mechanical Problems: Several mechanical problems occurred during the evaluation. The wing draw cable attaching brackets slid along the boom, two hydraulic cylinders were faulty and all the grease fittings on the packers were damaged and replaced twice during the test.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifications to the harrow support arm attaching brackets to prevent interference with the harrow chains when lowering the implement.
2. Modifications to prevent interference between the jack handle and the harrow tine bar in transport position.
3. Modifications to allow easier harrow tine angle adjustment.
4. Modifications to the tine angle adjustment settings to ensure all settings provide useful field tine angle adjustments.
5. Supplying a slow moving vehicle sign as standard equipment.
6. Supplying a complete parts list.
7. Supplying more complete operating instructions.
8. Modifications to the placement of the packer grease fittings to ensure that damage to the fittings does not occur.

Senior Engineer: E. H. Wiens

Project Technologist: G. A. Magyar

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. This recommendation has been noted and will be considered in future production runs.
2. A new type of screw-jack will be provided on new production runs to eliminate this problem.
3. Work will be done on this recommendation in the future.
4. On future machines, the adjustment link on the harrows will be modified.
5. A mounting bracket will be supplied for a slow moving vehicle sign. The sign itself, because of existing laws, will be the responsibility of the farmer or dealer.
6. A complete parts book is in process and will be included with each machine in the future.
7. The operating instructions will be reviewed and any necessary changes will be made.
8. Modifications to protect the grease fittings on the packer bearings are almost complete and future machines will be equipped this way.

GENERAL DESCRIPTION

The Blanchard Hydra-lift is a 60 ft (18.3 m) wide harrow and packer drawbar for use in seedbed preparation and soil finishing after seeding.

The Hydra-lift consists of twelve 5 ft (1.5 m) harrows, equipped with double tine teeth, and twelve 5 ft (1.5 m) steel coil packers that produce a packing force of 86 lb/ft (1281 N/m) of width. The harrow sections are hung from the harrow support arms by chains while the packer draws are attached to the ends of the support arms with bolts. The packers are in two rows of six each and are preceded by a single row of harrows. Dual hydraulic cylinders, mounted on the main frame, raise the harrows and packers into transport position. A separate hydraulic cylinder raises the catch assembly, releasing the auto-fold out arms, allowing the wings to fold rearward for transport position as the machine is driven forward.

FIGURE 1 shows the location of major components while detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The Blanchard Hydra-lift was operated in the field conditions shown in TABLE 1 for 112 hours while processing about 3224 ac (1305 ha). It was evaluated for quality of work, ease of operation and adjustment, power requirements and safety. The harrow packer drawbar was used predominantly for seedbed finishing after seeding with air seeders.

TABLE 1. Operating Conditions

FIELD CONDITION	HOURS	FIELD AREA	
		ac	(ha)
Cultivated wheat stubble	39	1564	(626)
Cultivated flax stubble	6	109	(44)
Cultivated canola stubble	14	287	(115)
Summerfallow	25	701	(280)
Breaking	28	563	(225)
Total	112	3224	(1290)

RESULTS AND DISCUSSION

QUALITY OF WORK

Soil Finishing: The five bar spring tine harrows were effective in smoothing surface ridges, spreading loose trash and breaking loose soil lumps. The steel coil packers further served to level the soil and break soil lumps. The harrows were effective in uprooting and exposing weeds loosened by a cultivator. Soil ridges formed by the packer coils ranged in depth from 1.1 in (28 mm) in soft soil conditions to 0.9 in (22 mm) in firmer soil.

FIGURE 2 shows a stubble field seeded with an air seeder as the first spring operation, both before and after soil finishing with the Blanchard Hydra-lift harrow packer drawbar. FIGURE 3 shows a summerfallow field seeded with an air seeder as a second operation, both before and after soil finishing with the harrow packer drawbar.

Harrow and packer soil levelling effectiveness was increased when the Hydra-lift was operated at an angle to the direction of seeding. Double packing cultivated fields in different directions from each other resulted in a very smooth field surface (FIGURE 4). This was not considered necessary in all cases.

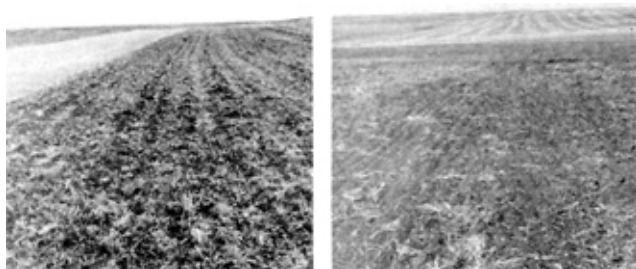


FIGURE 2. Stubble Field Seeded with an Air Seeder as the First Spring Operation. (Left: Before Soil Finishing, Right: After Soil Finishing).



FIGURE 3. Summerfallow Field Seeded with an Air Seeder as a Second Operation. (Right: Before Packing, Left: After Packing).



FIGURE 4. Double Packing of Summerfallow Field in Different Directions. (Top: First Packing, Bottom: Second Packing).

Harrows: Although the straight spring tine teeth were less aggressive in soil finishing than forward bent tine teeth, they tended to collect less loose trash. The harrow tine angle was

fully adjustable and the tines could be adjusted to clear the loose trash under most dry conditions. When fully plugged, the harrows could easily be cleaned by raising the harrows with the transport cylinders. In heavy trash cover conditions, the straight teeth provided sufficient trash clearance. The harrow sections were properly spaced and covered well, even on sharp turns.

Packing: Packing force of the 1.5 in (38 mm) square coil packers was approximately 86 lb/ft (1281 N/m). This packing force was adequate to form a firm seedbed for good crop emergence in all conditions encountered in the test.

Coverage by the coil packers was even and correct packing alignment was maintained when turning.

In moist conditions, care had to be taken to avoid overpacking of the seedbed.

Skewing and Stability: The Blanchard Hydra-lift was very stable. Sideways skewing was not a serious problem in normal field conditions. Normal allowance had to be made to maintain implement placement for consecutive passes in hilly conditions.

EASE OF OPERATION AND ADJUSTMENT

Transporting: The Blanchard Hydra-lift was placed into transport position (FIGURE 5), using the hydraulic cylinders provided, in about three minutes. The hydraulic cylinders were connected in parallel and were operated using a tractor remote outlet. The hydraulic cylinders rotated the boom 90 degrees, lifting the harrow support arms which raised both the harrows and packers off the ground. As the booms rotated, the transport wheels were lowered to the ground. A separate hydraulic cylinder (not provided) raised the catch assembly, freeing the auto-fold arms. Driving the implement ahead slowly caused the auto-fold arms to swing backward, allowing the wings to fold rearward for transport position. A safety transport lock was provided for the lift cylinders.

Overall transport width was 15.6 ft (4.7 m) while transport height was 10.5 ft (3.2 m). The Blanchard 60 ft (18.3 m) Hydra-lift towed well at normal transport speeds.



FIGURE 5. Blanchard Hydra-lift in Transport Position.

Field Position: Changing from transport to field position with the Blanchard Hydra-lift was relatively easy. Backing the unit while maintaining proper mainframe section alignment, allowed the wings to fold out into field position evenly. Raising the catch assembly allowed the auto-fold arms to rest alongside the main frame. Lowering the catch assembly locked the auto-fold arms to the mainframe (FIGURE 6). The harrows and packers were then lowered until the transport wheels were slightly off the ground. Driving ahead slowly while lowering the unit was necessary to allow the packer sections to trail out behind the harrow sections. As indicated in the operator's manual, it was necessary to pull ahead while lowering the unit to avoid packer sections folding under the harrows.

When lowering the implement, the harrow chains would catch on the harrow support arms, not allowing the harrows to be lowered to the ground (FIGURE 7). It is recommended that the manufacturer consider modifications to the harrow support attaching arm brackets to prevent the harrow chains from being caught when lowering the implement.

Hitching: The Blanchard Hydra-lift had a negative hitch weight of 44 lb (200 N) in transport position and 66 lb (300 N) in field position. A jack, mounted at the front of the boom frame, allowed the unit to be conveniently hitched and unhitched in both

field and transport positions. Caution was required when operating the jack because of the interference between the jack handle and the harrow tine bar (FIGURE 8). It is recommended that the manufacturer consider modifications to eliminate the interference of the jack handle with the harrow tine bar. Care was required when hitching and unhitching the unit in uneven field conditions.

Hitching convenience was increased by the fact that the hitch link remained horizontal when unhitched from the tractor. Hitching also included the hook-up of four hydraulic lines with quick couplers to the tractor remote outlets.

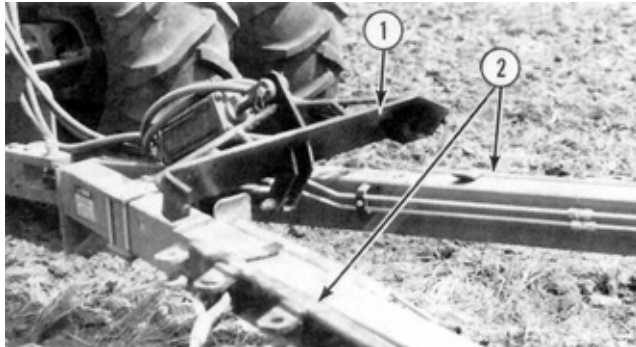


FIGURE 6. Catch Assembly being Lowered to Lock Auto-Fold Arms to Main Frame: (1) Catch Assembly, (2) Auto-Fold Arms.

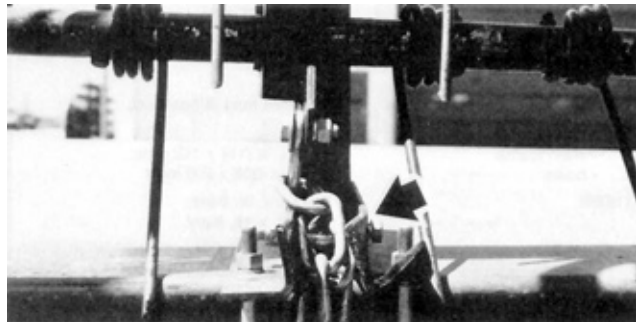


FIGURE 7. Interference Between Harrow Chain and the Harrow Support Arm Attaching Bracket.



FIGURE 8. Interference Between Jack Handle and Harrow Tine Bar.

Maneuverability: Maneuverability of the Blanchard Hydra-lift was very good in both transport and field position. In field position, corners could be made with the inside wheel travelling in a circle about 6.6 ft (2 m) in diameter. This resulted in a turning radius of about 63.3 ft (19.3 m). In transport position, a turning radius of 44 ft (13.5 m) permitted easy negotiation of most 90 degree corners encountered.

Harrow Tine Angle Adjustment: Harrow tine angle adjustment was inconvenient since it required a bolt to be removed from each of the 12 harrow sections to be relocated in one of six positions. Only four of the six positions provided useful field adjustments. In one extreme position the harrow tines pointed forward at too severe an angle, while in the other extreme position, the harrow tines were virtually flat. It is recommended that the manufacturer consider modifications to

allow easier harrow tine angle adjustment and to ensure all settings provide useful field tine angle adjustments.

Servicing: Operating instructions recommended lubrication of the 24 greases fittings on the packer axle bearings, the two auto-fold out arm grease fittings and the four boom swivel grease fittings daily. Wheel bearings required repacking every 300 hours.

POWER REQUIREMENTS

Draft: Average draft for the 60 ft (18.3 m) Blanchard Hydra-lift harrow packer drawbar ranged from 3820 lb (17 kN) to 5840 lb (26 kN) at speeds ranging from 4.5 to 7.5 mph (7 to 12 km/h) in a preworked summerfallow field with average trash cover.

Maximum draft occurred at the steepest harrow angle setting and minimum draft occurred at the lowest harrow angle setting. This was due to a greater amount of trash being dragged by the harrows as well as increased tine aggressiveness at the steeper harrow angle setting.

Tractor Size: Field power measurements indicated that a tractor with a maximum power take-off rating of 135 hp (101 kW) was required to operate the 60 ft (18.3 m) harrow packer drawbar on level ground at normal field speeds for an intermediate harrow angle setting. This tractor size has been adjusted to include tractive efficiency and the tractor operating at 80% of maximum power on a level field.

OPERATOR SAFETY

Caution was required when unhooking the Blanchard Hydra-lift from the tractor to ensure the rear hitch jack was in position to hold the hitch down as the tractor pulled away. Failure to adjust the jack to the proper height could result in the hitch lifting up, causing possible operator injury.

Caution was also required when walking around the wing cables with the unit in field position. The cables were suspended 1.3 ft (0.4 m) above the ground and were difficult to see in poor light conditions.

A mechanical transport lock for the lift cylinders was provided.

The Blanchard was 15.6 ft (4.72 m) wide in transport position. This necessitated caution when towing on public roads, over bridges and through gates.

No slow moving vehicle sign was provided. It is recommended that a slow moving sign be provided as standard equipment.

OPERATOR'S MANUAL

Assembly, lubrication, maintenance and some operating instructions were supplied. A complete parts list was not supplied. It is recommended that a parts list be supplied and that the operating instructions be expanded.

DURABILITY RESULTS

TABLE 2 outlines the mechanical history of the Blanchard Hydra-lift during 112 hours of field operation. The intent of the test was evaluation of functional performance. An extended durability evaluation was not conducted.

TABLE 2. Mechanical History

ITEM	OPERATING	EQUIVALENT FIELD AREA	
	HOURS	ac	(ha)
- One packer hitch was bent and straightened at	12	376	(150)
- The wing cable attaching brackets slid along the boom at	13, 83	429, 2005	(172, 802)
- The tine bars were bent when lowering the implement into field position and were straightened at	22, 74	602, 1799	(241, 720)
- The transport lock was repaired at	22, 112	602, 3224	(241, 1290)
- The grease fittings on all the packers were damaged by rocks and replaced at	53, 112	1205, 3224	(482, 1290)
- The sealed bearing on the left tandem wheel failed. The axle was replaced at	53	1205	(482)
- The jack was bent and repaired at	53	1205	(482)
- Two packer hitches broke and were replaced at	53	1205	(482)

- Two adjustment arms on the harrows were broken and rewelded at	83	2005	(802)
- Two faulty hydraulic cylinders were replaced at	99	2883	(1153)
- A worn pin on the right main frame axle assembly was replaced at	99	2883	(1153)

DISCUSSION OF MECHANICAL PROBLEMS

WING CABLE BRACKETS

When making sharp turns, the wing cables became slack. After completing the turn, the impact clue to cable tightening caused the cable attaching brackets to slide along the frame. If gentle turns were made and the wing cables kept tight, this problem did not occur.

HYDRAULIC CYLINDERS

When the unit was lowered, the hydraulic cylinders would not hold the implement, causing the packers to fold under and interfere with the harrows. This resulted in tine bar damage as well as bending and breaking of the packer hitches. After the faulty hydraulic cylinders were replaced, no further problems were encountered.

GREASE FITTINGS

The placement of the grease fittings on the packers caused the fitting to be broken off (FIGURE 9) when using the implement in rough or rocky field conditions. All grease fittings were replaced twice during the test. It is recommended that the manufacturer consider modifying the placement of the grease fittings to ensure that damage to the fittings will not occur.

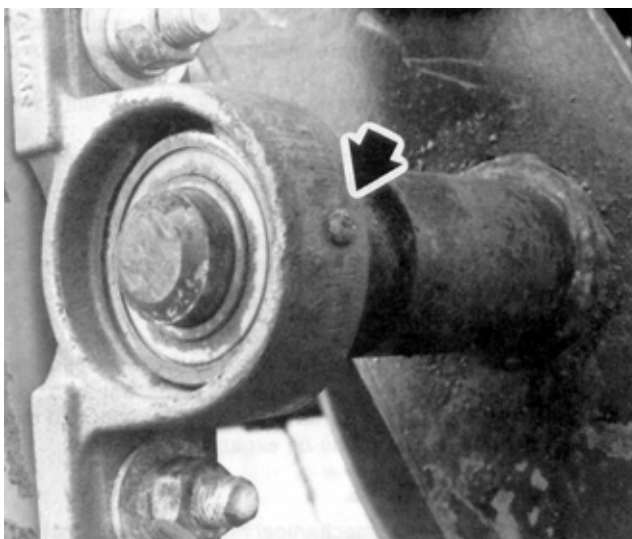


FIGURE 9. Damaged Packer Grease Fitting.

APPENDIX I

SPECIFICATIONS

MAKE:	Blanchard Harrow Packer Drawbar	
SERIAL NUMBER:	1036	
MODEL:	Hydra-lift	
MANUFACTURER:	Blanchard P.O. Box 1444 46 Street & Millar Avenue Saskatoon, Saskatchewan S7K 3P7	
DIMENSIONS:	FIELD POSITION	TRANSPORT POSITION
- width	62.0 ft (18,898 mm)	15.5 ft (4724 mm)
- length	36.8 ft (11,227 mm)	47.6 ft (14,503 mm)
- height	3.25 ft (991 mm)	10.5 ft (3200 mm)
- minimum ground clearance		11.0 in (279 mm)
- wheel tread	61.6 ft (18,771 mm) 10.7 ft (3251 mm)	
PACKERS:		
- type	coiled steel, 1.5 in (38 mm) square	
- number	12	
- width	5 ft (1524 mm)	
- coil diameter	18 in (457 mm)	
- coil pitch	6 in (152 mm)	
- rows	2	
- weight	430 lb (193.5 kg)	
HARROWS:		
- type	double tine tooth	
- number	12	
- rows of tines	5	
- row spacing	13 in (330 mm)	
- tine spacing	7.25 in (184 mm)	
- tine length	14 in (356 mm)	
- tine diameter	0.38 in (9 mm)	
HITCH:		
- vertical adjustment range	7 in (178 mm), 4 positions	
FRAME:		
- main frame	4.5 x 6 in (114 x 152 mm)	
- boom	8 x 8 in (200 x 200 mm)	
TIRES:	6, 11L x 15, 8-ply 2, 9.5L x 15, 8-ply	
WEIGHTS:	FIELD POSITION	TRANSPORT POSITION
- right mainframe	2800 lb (1260 kg)	4068 lb (1830 kg)
- left mainframe	2765 lb (1244 kg)	4068 lb (1830 kg)
- right wing	12131b (546 kg)	28331b (1275 kg)
- left wing	12131b (546 kg)	28331b (1275 kg)
- hitch	- 66 lb (- 30 kg)	- 44 lb (- 20 kg)
TOTAL	7924 lb (3566 kg)	13,758 lb (6190 kg)
SERVICING:		
- grease fittings	30, every day	
- wheel bearings	8, repack every 300 hr	

APPENDIX II MACHINE RATINGS

The following rating scale is used in PAMI Evaluation Reports:

- Excellent
- Very good
- Good
- Fair
- Poor
- Unsatisfactory



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