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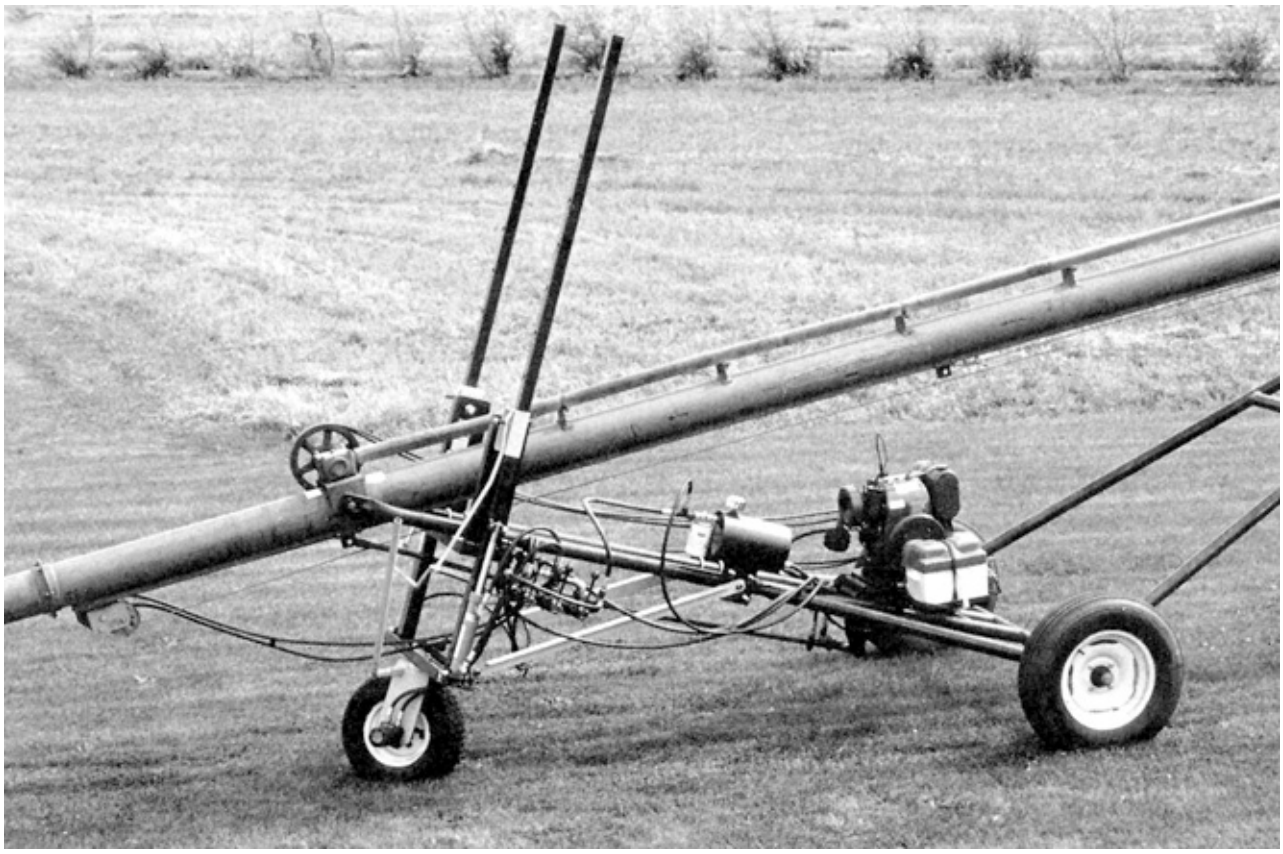

Pow'r Wheel Self-propelled Grain Auger Attachment

A Co-operative Program Between

ALBERTA FARM MACHINERY RESEARCH CENTRE

PAMI
PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

POW'R WHEEL

MANUFACTURER AND DISTRIBUTOR:

Prairie West Manufacturing Limited
27 Thatcher Drive East
P.O. Box 275
Moose Jaw, Saskatchewan
S6H 4N9

RETAIL PRICE:

$1650.00 (September 1981, f.o.b. Moose Jaw with optional hydraulic winch)

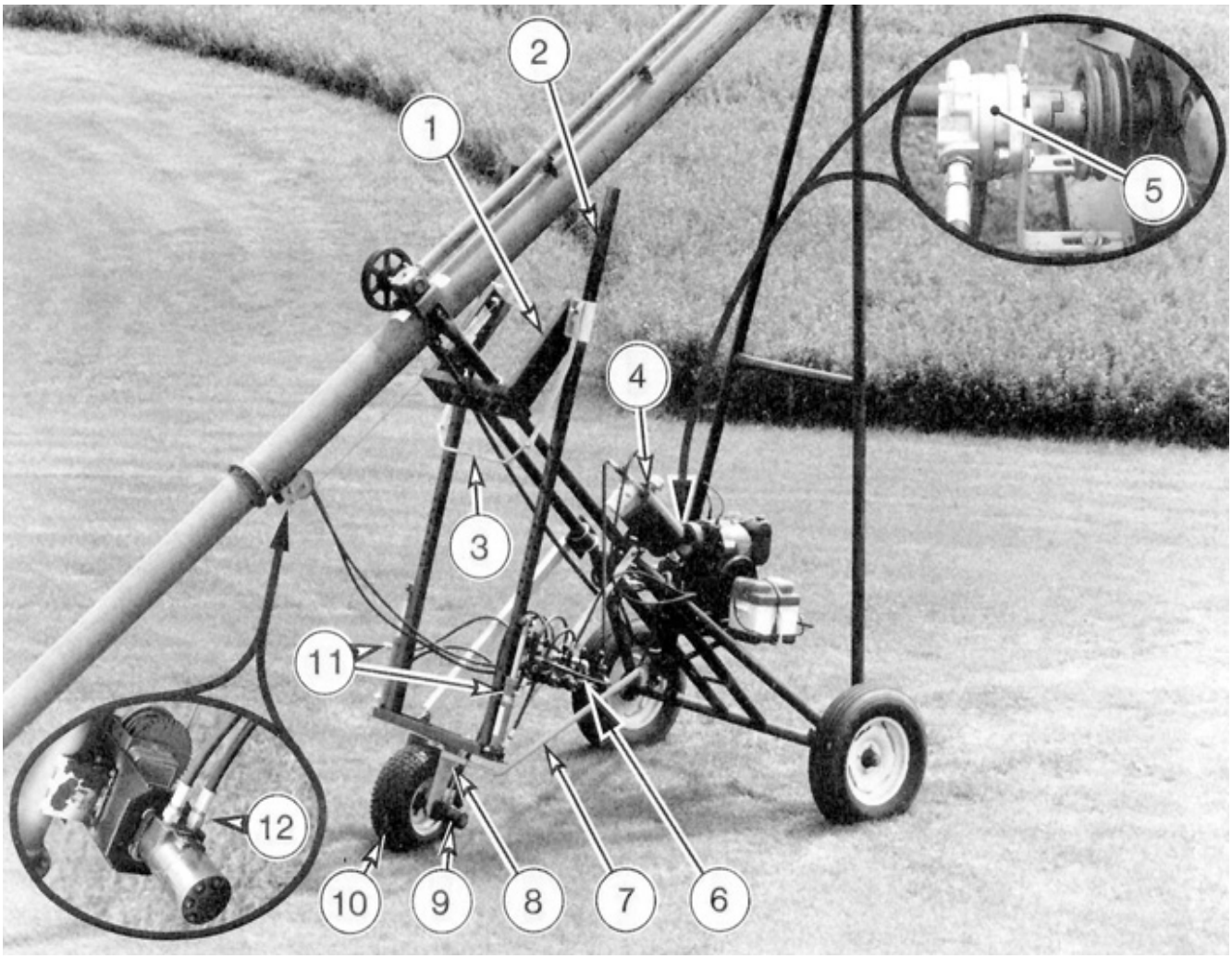

FIGURE 1. Pow'r Wheel: (1) Main mounting bracket, (2) Slide rails, (3) Locking bar, (4) Hydraulic oil reservoir, (5) Hydraulic pump, (6) Hydraulic controls, (7) Steering bar, (8) Drive wheel bracket, (9) Hydraulic drive motor, (10) Drive wheel, (11) Hydraulic cylinders, (12) Optional hydraulic winch motor.

SUMMARY AND CONCLUSIONS

Overall functional performance of the Pow'r Wheel attachment was fair. Maneuverability of a given auger equipped with the attachment was good on hard ground, at low speeds, but the auger was difficult to maneuver at higher speeds and on rough ground. The attachment could move the auger at speeds up to 8 km/h (5 mph) on slopes up to 12°. Mounting the attachment to an auger did not affect normal road transport characteristics of the auger. Although the optional hydraulic winch worked well, raising and lowering the auger was inconvenient because the operator had to move from one side of the auger to the other when adjusting the lock bar. In addition, the mounting bracket did not slide easily along the slide rails. The inlet and outlet of the auger were clearly visible by the operator while the auger was being positioned.

The 10 kW (14 hp) auger engine had ample power to operate the attachment.

The Pow'r Wheel was safe to operate if normal precautions were observed. Assembly instructions were provided, however these were incomplete. Mounting of the attachment took two men about five hours. No operating instructions were provided.

No serious mechanical problems occurred during the test.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifying the controls and locking bar for easier, smoother operation and reducing drive wheel wobble to improve auger maneuverability.
2. Increasing the length of the return hydraulic line to reduce tension on the hose when the auger is fully raised.

3. Providing an operator manual clearly outlining assembly, operating and safety instructions.

Chief Engineer -- E.O. Nyborg
Senior Engineer -- J.C. Thauberger
Project Engineer -- C. W. Bo/ton

THE MANUFACTURER STATES THAT:

With respect to recommendation number:

1. Larger holes have been provided in the slide rails to facilitate placement of the locking pins. Lubrication of the slide rails may be required until excess paint is worn off. A defective drive wheel may have caused the "wobble" referred to. We have not encountered this previously.
2. Hydraulic lines on newer models are long enough to allow augers to be fully raised. A short hose may have been shipped in error.
3. A complete assembly and operator manual is presently in preparation.

Manufacturer's Additional Comment:

With proper instruction, assembly of the Pow'r Wheel should only require one man five hours.

Note: This report has been prepared using SI units of measurement. A conversion table is given in APPENDIX III.

GENERAL DISCRIPTION

The Pow'r Wheel (FIGURE 1) is designed to mount on a conventional engine driven grain auger to make it self-propelled. The attachment, which is powered by the auger engine, consists of a hydraulically driven wheel, a hydraulic inlet lift and an optional hydraulic winch, which are used for maneuvering and positioning the auger at a grain bin and for moving the auger short distances between grain bins.

When the ground drive is used to move the auger, the operator walks alongside the auger, steering the drive wheel with the steering bar (FIGURE 1). Three control valves enable the operator to adjust the inlet height, adjust the outlet height and to move the auger forward or backward. Travel speed is controlled by the engine speed and by the flow control valve. Hydraulic outlets are provided for powering a bin sweep.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The Pow'r Wheel was attached to a 180 mm (7 in) diameter, 12 m (40 ft) long Brandt grain auger, powered by a 10 kW (14 hp) Kohler gasoline engine. The Pow'r Wheel was operated for about 5 hours on a variety of ground surfaces and slopes. In addition, the grain auger with mounted attachment was transported over gravel and paved highways for a distance of about 30 km (20 mi). The Pow'r Wheel was evaluated for ease of assembly, ease of operation and adjustment, maneuverability, operator safety and suitability of the operator manual.

RESULTS AND DISCUSSION

EASE OF ASSEMBLY

It took two men about five hours to attach the Pow'r Wheel to an auger, using tools normally found in farm shops. The holes in the hydraulic pump mounting plate had to be elongated to connect the hydraulic pump to the engine shaft. A coupler had to be welded to the side of the winch to mount the optional hydraulic winch motor.

EASE OF OPERATION AND ADJUSTMENT

Ground Drive: The grain auger was easy to maneuver on smooth, hard ground at low speeds. On rough ground or at higher speeds, the auger was difficult to control. Excessive play in the drive wheel pivot bolt caused the wheel to wobble on rough ground. It was awkward to change ground speed while moving, since the operator must hold both the steering bar and the direction control valve. If the direction control valve was released, to adjust the speed control, the auger abruptly stopped, as the direction control valve self-centred. It is recommended that the controls be modified for easier, smoother operation and that the drive wheel pivot be modified to reduce drive wheel wobble.

The Pow'r Wheel attachment was able to move the auger on grassy slopes up to 12°. This is steeper than slopes found in most farm yards. The turning radius was 2.9 m (9.5 ft). Moving speeds were adjustable over a range from 0 to 8 km/h (0 to 5 mph) in both forward and reverse directions.

Raising and Lowering: The hydraulic cylinders were used to change the height of the auger inlet. The optional hydraulic winch was used to change the angle of elevation of the auger. Although the winch worked well, the locking bar, used to engage or disengage a pin in each slide rail, could not be adjusted from the operator's position. It was necessary to adjust one pin and then move around the auger and adjust the other pin. It is recommended that the manufacturer modify the locking bar to eliminate this inconvenience.

The mounting bracket did not slide smoothly on the slide rails. When raising the auger, the operator had to push down on the undercarriage to prevent the drive wheel from rising off the ground. Also, when the auger was lowered, the mounting frame tended to stick and release suddenly, causing shock loading of the winch cable. There was no provision for lubrication of the slide rails.

At maximum elevation, the return hydraulic hose from the control valves was stretched almost to breaking. It is recommended that the hose length be increased.

Both the inlet and outlet of the auger were clearly visible, from the operator's position, while the auger was being maneuvered.

Transporting: Mounting the Pow'r Wheel on a grain auger did not affect transporting characteristics of the auger. The test machine transported well and was stable at speeds up to 80 km/h (50 mph) on paved highways and at speeds up to 50 km/h (30 mph) on gravel roads.

During transport, the drive wheel had a ground clearance of 200 mm (8 in) with the hydraulic cylinders retracted and the auger in the fully lowered position. The steering bar was detached and carried in the towing vehicle during road transport.

POWER REQUIREMENTS

The 10 kW (14 hp) engine had ample reserve power to operate the Pow'r Wheel under all test conditions.

OPERATOR SAFETY

The Pow'r Wheel was safe to operate if normal precautions were followed. Care had to be used when moving on rough ground. A firm grip had to be maintained to prevent sudden movement of the steering bar. The self-centering control valves provided safety since, in the event of an operator fall, the machine would automatically stop. There were no belts, chains or other exposed hazards.

OPERATOR MANUAL

No operating instructions were supplied. The assembly instructions were incomplete and confusing. It is recommended that an operator manual be provided, clearly outlining assembly, operating and safety instructions.

DURABILITY RESULTS

The Pow'r Wheel was operated for about 5 hours. The intent of the test was to evaluate functional performance. An extended durability evaluation was not conducted. One of the control valves was faulty and replaced before the test. No mechanical problems occurred during testing.

APPENDIX I

Specifications

Make:	Pow'r Wheel
Serial No.:	217A
Mass:	180 kg
Hydraulic Components:	
-- Pumps	one, Parker Series H
-- Motors	two, Applied Hydraulics H Series
-- Controls -- spool valves	three, Gresen hydraulics, 4 way, 3 position valves
-- flow controls	one, Parker Series F
-- selector valves	one, Gresen S-50
-- Cylinders	two, B & T Fluid Power
-- Relief valve	one, Gresen 2716
-- Hoses	eleven, 10 mm dia. three, 13 mm dia.
-- Reservoir Capacity	6.5 L
-- Operating Pressure	2600 to 13,000 kPa
Drive Wheel Tire:	
-- Size	20 x 8.00- 10, 2 ply
Lubrication Points:	
-- Sealed bearing	1

Optional Equipment:

- -- Hydraulic winch
- -- Hydraulic bin sweep attachment

APPENDIX II

Machine Ratings

The following rating scale is used in PAMI Evaluation Reports:

(a) excellent	(d) fair
(b) very good	(e) poor
(c) good	(f) unsatisfactory

APPENDIX III

1 kilogram (kg)	= 2.2 pounds mass (lb)
1 newton (N)	= 0.2 pounds force (lb)
1 metre (m)	= 3.3 feet (ft)
1 kilometre per hour (km/h)	= 0.6 miles per hour (mph)
1 kilowatt (kW)	= 1.3 horsepower (hp)
1 litre (L)	= 0.22 Imperial gallons (gal)

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