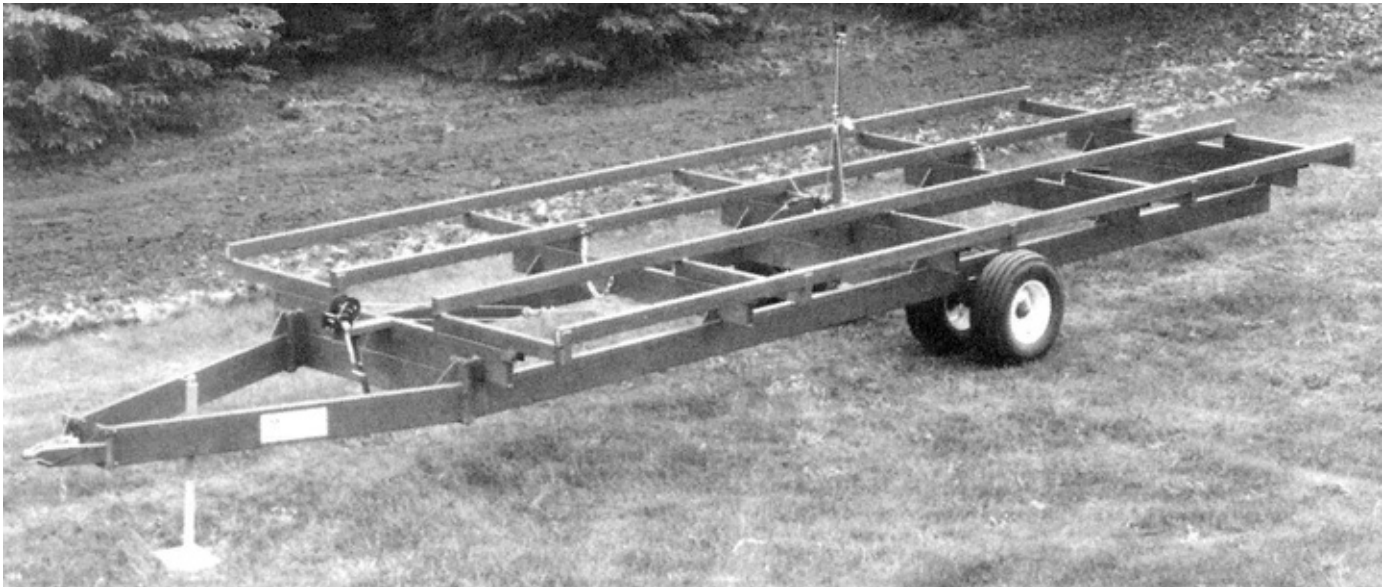


Evaluation Report

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Mumby Round Bale Mover

A Co-operative Program Between



ALBERTA
FARM
MACHINERY
RESEARCH
CENTRE



PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

MUMBY ROUND BALE MOVER

MANUFACTURER AND DISTRIBUTOR:

Mumby Manufacturing
Box 332
St. Brieux, Saskatchewan
S0K 3V0
(308) 275-4510

RETAIL PRICE: \$5,920.00 December 1987, f.o.b. Portage la Prairie, Man)

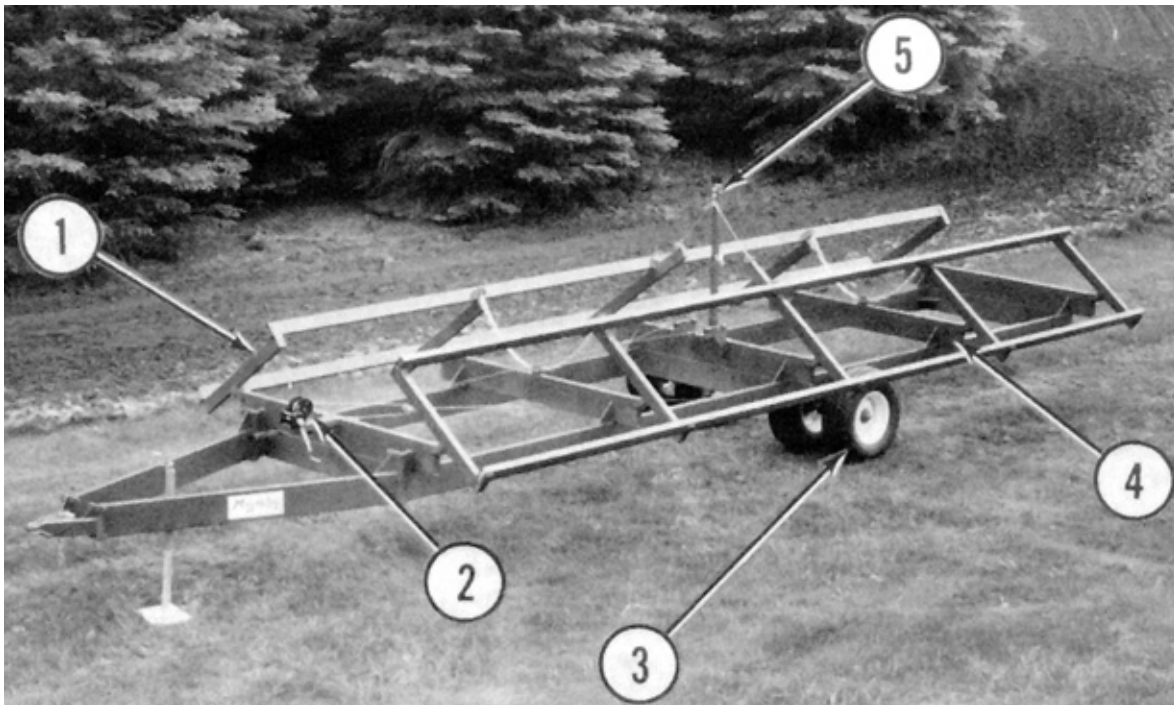


FIGURE 1. (1) Tilting Bale Beds, (2) Hand Winch, (3) Dolly Wheels, (4) Main Frame, (5) Cable Mast.

SUMMARY

Rate of Work: The rate of work was highly dependent on the skill level of the front-end loader operator and the distance travelled to the unloading site. In general, it took about 10 minutes to fully load the Mumby and 30 seconds to unload.

The Mumby's bale beds allowed space for 8 bales 6 ft (1.8 m) long or 10 bales 5 ft (1.5 m) long and had a total rated capacity of 11,400 lbs (5171 kg).

Quality of Work: The Mumby Round Bale Mover's performance rated good in most conditions. The Mumby was effective in moving and unloading round bales of most types and sizes. The Mumby unloaded bales in windrows of 4 or 5 bales per side, however, there was a space of 24 ft (7.3 m) between rows. Crop losses and bale damage were negligible as there was no aggressive action taken on the bales.

Ease of Operation and Adjustment: PAMI rating for hitching, loading, transporting and lubricating the Mumby was good. The Mumby required a front-end loader to place eight or ten round bales on the bed rails. Unloading was quick and easy and was accomplished by pulling a lever and operating a hand winch. However, occasional load imbalance would create a dangerous situation for the operator. PAMI rated unloading as fair.

Power Requirements: The Mumby could be towed with either a truck or tractor. It required a 115 hp (85.8 kW) tractor for adequate towing.

Operator Safety: Some safety concerns became apparent after using the Mumby the first few times. When the winch crank was turned to unload the wagon, one side of bales would roll off before the other and cause an imbalance in the load which would result in the wagon tipping to the loaded side. PAMI's rating was fair.

Operator's Manual: The operator's manual consisted of brief operating instructions, maintenance, hub assembly illustrations with parts list for the hub. PAMI's rating was poor.

Mechanical History: The winch cable that raised the tilting beds failed after 4 hours of operation.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Eliminating machine imbalance during unloading or allowing the operator to unload from a remote position.
2. Supplying a stronger winch cable.
3. Supplying a suitable operator's manual.
4. Providing a slow moving vehicle emblem.

Station manager -- G.M. Ominchinski

Project Technologist -- R.K. Harris

THE MANUFACTURER STATES THAT

With regard to recommendations (1- 4):

1. Although there have been no serious problems with machine imbalance, we are in the process of designing a linkage that will make both sides unload the bales at the same time. An electric winch will also be available as an option.
2. This is the first time we've experienced any problem with the winch cable, but it can be enlarged to 3/8 in cable.
3. An operator's manual is currently being updated and improved.
4. All units produced since June, 1987 are equipped with a DANGER sticker, located right beside the winch, which says to "Clear area to the sides of the unit prior to unloading" and also a maximum speed rating sticker of 25 mph (40 km/h).

In the future all units will also be equipped with a slow moving vehicle sign.

GENERAL DESCRIPTION

The Mumby round bale mover is a four wheeled trailer designed to transport and place round bales. It consists of a rectangular steel frame with a vee hitch attached to the front and a suspension arranged around two wheels per side mounted slightly aft of centre in a dolly configuration. Five steel crossmembers equally spaced are welded perpendicular to the main frame rails. Two steel bale beds are hinged to the ends of the crossmembers and run the full length of the frame. The bale beds are tiltable to allow bales to be unloaded and are activated when the operator turns the handle of a cable winch. Complete specifications are presented in APPENDIX I, and FIGURE 1 shows the location of major components.

SCOPE OF TEST

The Mumby round bale mover was operated in typical prairie fields (TABLE 1) for approximately 375 hours, while moving about 5,000 bales. It was evaluated for ease of operation, quality of work, operator safety and suitability of the operator's manual.

Mechanical problems were monitored throughout the evaluation.

TABLE 1. Operahng Conditions

Crop	No. of bales	Field conditions
Alfalfa	2925	Fairly smooth firm fields
Brome/Timothy	175	Some rough fields
Timothy/Clover	400	Smooth, no stones
Native grasses	1500	Ruts, stones, soft ground
Total	5000	

RESULTS AND DISCUSSION

RATE OF WORK

Rate of work was highly dependent on the skill of the loader operator, but generally it took ten minutes to fully load the Mumby. The Mumby transported bales safely at speeds of 25 mph (40 km/h), and could be unloaded in the space of time required to release the locking pins and to turn the winch crank about 7 turns (under 30 seconds). The Mumby had a volume capacity of eight, 6 ft (1.8 m) or ten, 5 ft (1.5 m) long bales. When loaded with eight 1500 lb (680 kg) bales, the wagon's load rating was exceeded by 28%, if speeds of 25 mph (40 km/h) were exceeded. Under 25 mph, its rated capacity of 11,400 lbs accommodated eight, 1425 lb (650 kg) bales or ten, 1140 lb (520 kg) bales.

QUALITY OF WORK

The Mumby did not impart any aggressive action on the bales, and crop losses were considered negligible. It did however place the bales in different orientation from which they settle on the ground after baling, reducing the bales' ability to shed moisture. When unloaded, the windrows of bales were placed about 24 ft (7.3 m) apart which required rehandling with the front-end loader (FIGURE 2.)

EASE OF OPERATION AND ADJUSTMENT

Hitching: The Mumby was equipped with a stamped steel ball hitch, that required a 2-5/16 in compatible ball, and an implement

jack to raise the hitch to the proper height. Once the hitch was lowered onto the ball, a spring pin was inserted through the hitch lock to ensure that the lock would remain in place. Connection of the safety chain in accordance with ASAE standard S338.1 (Safety Chain for Towed Equipment) completed the hookup. PAMI's rating was good.



FIGURE 2. Space Left Between Unloaded Bales.

Loading: The Mumby was loaded with a front-end loader equipped with bucket tynes and hay grapples. Bales were raised from the field and gently placed on the bale beds with their axis parallel to the bed rails. It was necessary to load the Mumby evenly from side to side or an imbalance would occur and tip the wagon. Loading time was dependent on the skill level of the loader operator. In general, it took about 10 minutes to fully load the wagon. PAMI's rating was good.

Transporting: The dolly wheel suspension rode smoothly and kept the load level when moving across uneven or rough ground. With a turn radius of 18.5 ft (5.6 m) the Mumby was very maneuverable. The 11-15-LT tires were suitably sized to carry eight, 1425 lb (650 kg) bales at normal agricultural road speeds not exceeding 25 mph (40 km/h). For higher speeds it was necessary to reduce the load. The Mumby towed straight and true and required 5 hp (3.75 kW) to keep it moving across a firm alfalfa field. The Mumby towed very well when empty behind a truck at highway speeds. The Mumby required 32.7 ft (10.0 m) to bring it to a full stop when fully loaded and towed at 15 mph (24 km/h) with 120 hp (90 kW) tractor. PAMI's rating was good.

Unloading: The Mumby round bale mover was very easy to unload and took about 30 seconds. Unloading consisted of backing or stopping at the desired unloading site, releasing the lock pins that hold the bale beds in transport position and turning the crank handle on the winch until the bales rolled from the tilted beds (FIGURE 3). Sometimes one bed would unload before the other causing a load imbalance which would cause the side of the wagon that unloaded first to raise off the ground. This created a dangerous situation for the operator who was standing either beside the hitch rails or inside of them. PAMI's rating was fair.

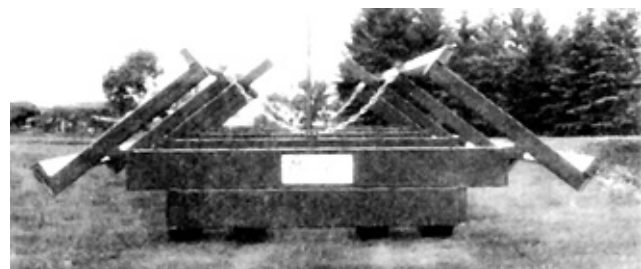


FIGURE 3. Tilting Bale Beds.

Lubrication: The hinges of the bale beds were lubricated at the start of each work day. Lubrication took one person 5 minutes. The spring loaded pins that lock the tilting bale beds in place were greased weekly or when required. PAMI's rating was good.

POWER REQUIREMENTS

ASAE standard S365.1T (Brake Test Procedures and Brake Performance Criteria for Agricultural Equipment), states that: "The weight of the trailed equipment without brakes should not exceed the weight of the agricultural equipment used as the towing vehicle." To comply with the standard, a towing vehicle weighing not less than 15,000 lbs (6800 kg) should be considered the minimum size. In general a 115 hp (85 kW) tractor would be an adequate towing vehicle.

OPERATOR SAFETY

Although the Mumby was equipped with reflectors on all four corners, it did not display a slow moving vehicle sign or decals warning the operator or bystanders of potential danger zones. It is recommended that the manufacturer supply a slow moving vehicle emblem and hazardous working zone decals. Visibility to the rear was restricted by the height of the load, and extreme care was required when transporting on busy roads, or when backing to an unloading area. Sometimes when unloading, the bale mover would react violently to a load imbalance if one side of the machine emptied before the other. This situation put the operator's safety in jeopardy and PAMI recommends that the manufacturer take steps to eliminate this safety concern.

During the evaluation of the Mumby, PAMI addressed this concern by installing a hydraulic unloading cylinder, operated from the tractor seat. PAMI's rating was fair.

OPERATOR'S MANUAL

The Mumby round bale mover was supplied with an owner's manual, however, it contained only brief operating instructions, maintenance instruction, and hub assembly illustrations. It is recommended that the manufacturer provide a more detailed operator's manual that would include information on safety, maintenance, service, and operating instructions. PAMI's rating was poor.

MECHANICAL HISTORY

The cable that connects the winch drum to the tilting bale beds failed after 4 hours of operation, and was replaced with a larger diameter cable. No further mechanical problems were observed.

APPENDIX I		
SPECIFICATIONS		
MAKE	Mumby	
SERIAL NUMBER:	10	
OVERALL DIMENSIONS:		
- length	34 ft	(10.4 m)
- width	9 ft	(2.7 m)
- height	7 ft	(2.1 m)
- bed height	3 ft	(0.9 m)
- bed length	26 ft	(7.9 m)
- bed. rail width	3 ft	(0.9 m)
- ground clearance	12 in	(305 mm)
TIRES:	four, 11-15 LT	
HYDRAULICS:		
WEIGHT:		
- left wheels	1399 lbs	(635 kg)
- right wheels	1417 lbs	(643 kg)
- hitch	241 lbs	(109 kg)
- total weight	3057 lbs	(1387 kg)
LOAD CAPACITY:	11,400 lbs	(5182 kg)
TRACTOR REQUIREMENTS:	PAMI recommends 115 hp (85 kW)	
TURN RADIUS	18.5 ft	(5.6 m)
HITCH:		
- type	Ball	
- ball size	2-5/16 in	
WINCH:		
- model	Shelby 5352	
- rated capacity		
- first layer	1500 lb	(680 kg)
- no. of turns to operate	7	
- cable diameter	0.25 in	(6.3 mm)
NUMBER OF LUBRICATION POINTS:		
- 10 hours	14	
- 250 hours	4 (wheel bearings)	

SUMMARY CHART

MUMBY ROUND BALE MOVER

RETAIL PRICE:	\$5,920.00 (December 1987, f.o.b. Portage la Prairie, Man.)
RATE OF WORK:	Depended upon operator's skill
QUALITY OF WORK:	Good; no aggressive action; large space between rows.
EASE OF OPERATION AND ADJUSTMENTS:	
- Hitching	Good; straight forward
- Loading	Good; front-end loader required; alternate side to side loading.
- Transporting	Good; speed restricted to 25 mph (40 km/h) at full capacity.
- Unloading	Fair; some safety concerns were apparent.
- Lubrication	Good; the hinge points of the tilting bale bed required daily greasing.
POWER REQUIREMENTS:	PAMI suggests a 115 hp (85 kW) tractor
OPERATOR SAFETY:	Fair; load imbalance caused the wagon to tip when unloaded.
OPERATOR'S MANUAL:	Poor; manual should contain information on safety, operation and adjustments, maintenance and service.
MECHANICAL HISTORY:	Winch cable failed at 4 hours.



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