

Large Round Balers

JAN 09 1967
R

Bill Hires
Agricultural Engineering Department
College of Agriculture

The continuing search for a labor-saving method of hay harvest led to the development of the large round baler. At this time, there are 13 manufacturers selling 23 balers of three different types that produce large round bales of 850 to 1,900 pounds in size. These bales appeal to cow-calf farmers since they resist weather damage and can be stored outside, thus reducing labor requirements.

Types of Large Round Balers

Three baler types are produced: 1) ground roll, 2) carried bales formed in an expandable chamber, and 3) carried bales formed in a fixed chamber. The most popular balers are the ones with the carried bales formed in either the expandable or fixed chamber.

Ground Roll Baler. There are two ground roll balers being produced. Following are some of their characteristics. The bale rolls on the ground on top of the incoming windrow. The upper portion of the bale in one ground roll baler is confined by a series of cables and rollers while the other baler confines the bale by revolving chains and slats (raddle). Ground roll balers have a lower density than other balers, averaging six to eight pounds per cubic foot. Baler capacity is also lower than other balers, averaging one to six tons per hour. Tractor power takeoff (PTO) horsepower requirements are in the 35 to 40 horsepower range.

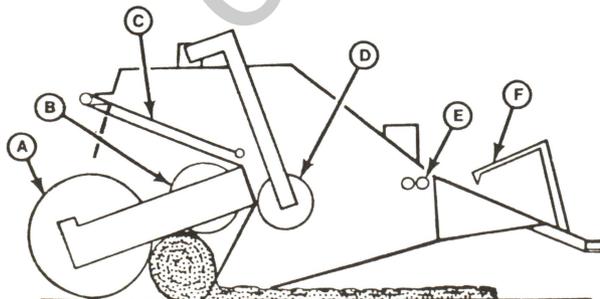


Figure 1. Ground Roll Baler. Lundell 760C: (A) Pickup, (B) Bale Forming Roller, (C) Bale Forming Cables, (D) Bale Forming Roller, (E) Twine Rollers, (F) Second Bale Starter.

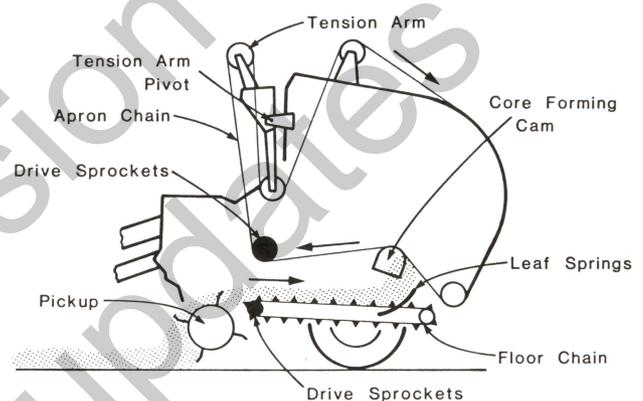


Figure 2. Expandable Chamber Baler.

Expandable Chamber Balers. Bales formed in these balers have tension applied by either belts or chains and slats commonly called raddles. Tension is applied to the bale as the core is formed until the bale is completed. Some of the balers of this type produce a bale with a uniform density, while others produce a bale with a density at the outer diameter that is about double that at the center. Whole bale density averages from 7 to 13 pounds per cubic foot, and production averages from 3 to 13 tons per hour. Tractor PTO horsepower requirements vary from 50 to over 100 hp.

Carried Fixed Chamber Balers. These balers tumble hay within the bale chamber until the last stages of

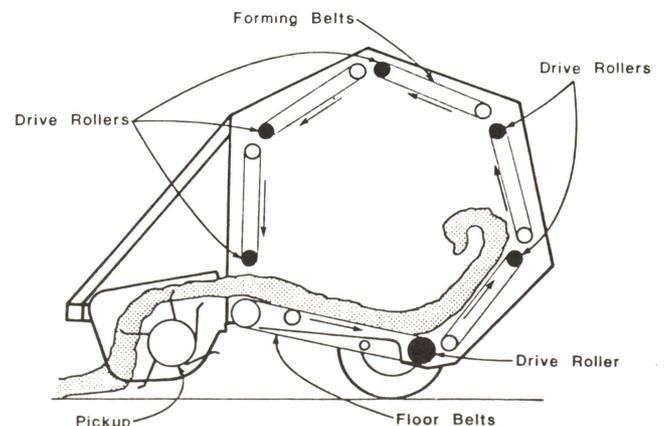


Figure 3. Carried Fixed Chamber Baler.

formation, when tension is maintained by hydraulic pressure. The baling chamber is a series of belts or rollers. The operator reads a hydraulic pressure gauge to determine when a bale is done. These bales have a low density or soft-core center and an outer diameter density about double that of the center. Whole bale density averages 7 to 13 pounds per cubic foot, and production capacity is about 3 to 13 tons per hour. PTO power requirements are about 60 to 75 hp.

Work Quality

Ground Roll Balers. These balers produce a low density bale with irregular surfaces. Nonuniform windrows cause poor quality bales. Irregular and low density bales result in severe weathering with high moisture penetration. Pickup and bale-chamber losses are impossible to measure because hay is rolled on the ground, and all losses appear on the ground behind the pickup.

Carried Expandable Chamber Balers. Good bales are easier to make when windrows are large and uniform. Occasionally, the bale core is hard to start and might even need to be discharged and a new bale started. Bale formation is usually easier if an extended weave pattern is followed while baling. (See Guide 1955 for a diagram of this pattern.) These balers can be used to produce bales varying in weight. Bales tend to be uniform in shape and density. Under most conditions, you back up the baler before discharging the bale. Take care in lowering the rear gate or door, as expensive damage can occur if the gate strikes the unloaded bale as it closes. Drive forward before closing the gate to prevent this. One baler has an optional attachment that will

cause the bale to move away from the rear gate. Twine consumption varies with bale size and number of wraps. From 150 to 450 feet per ton is needed as compared to small square bales that need 670 feet per ton.

Carried Fixed Chamber Balers. Windrow size and shape is not as critical for these bales, and an extended weave is not needed when starting the bale as the hay tumbles loosely in the chamber. When the outer part of the bale is being formed, an extended weave driving pattern will be needed on irregular or light windrows, as the hay is under tension and will not move across the chamber. For ideal bales, use the maximum bale chamber capacity.

Baler Attachments

Attachments available depend on the particular manufacturer. Devices such as horns or lights mounted on the tractor are available to signal when the bale is done. One manufacturer offers bale sensing instruments that warn of an improperly shaped bale. Manual, electric, or hydraulic twine feeding mechanisms may be used. Automatic and dual twine feed mechanisms are also available. These speed up tying and make faster baling possible. Tedder devices are being used to fluff up windrows mashed down by tractor tires or to bring wide windrows to the same width as the baler pickup. Bale ejectors can move the bale away from the tailgate. Bale counters are standard equipment in most cases. Two attachments available on some machines or from outside manufacturers are wrapping equipment for applying plastic completely around the bale and hay preservative equipment for metering chemical preservatives into the bale as it is formed.

Ground Roll Balers

model or series designation	Hawk Bilt Col 580	Lundell 760
maximum weight of bale—pounds	1200	1400
bale diameter or width x height—inches	36-72	to 66
bale length—inches	80	60
bale wrapped with twine?	yes	yes
number of twine knotters	none	none
number of twine wraps around bale	2-4	varies
type of twine recommended	baler	baler
baler capacity—tons per hour	15	6-10
pick up width—inches	—†	60
pick up type—tine bar, other	—	—
bale compression method—belts, packer arms, raddle, other	raddle	rollers
baler overall height—inches	111	78
baler overall width—inches	114	96
baler overall length—inches	230	196
baler shipping weight—pounds	4918	3700
tractor size required—PTO horsepower	35	30+
tractor PTO rpm required—540 or 100	540	none*
tractor minimum hydraulic pressure—psi	none	—
tractor minimum hydraulic flow rate—gpm	none	—
recommended field travel speed—mph	4½ to 5	to 5

†—means data not available

*ground driven

Comments

Large round balers, like all other farm machines, require a skilled operator and the correct operator's

manual. Statements here are not meant to take the place of any operator's manual or related publication. All maintenance, lubrication and adjustments should be made only after reading the operator's manual.

Carried Fixed Chamber Balers

model or series designation	McKee Round Baler	New Idea AVCO 456	Owatonna Mft. Co. 595
maximum weight of bale—pounds	1760	1800	1500
bale diameter or width x height—inches	71	72	72
bale length—inches	59	60	60
bale wrapped with twine?	yes	yes	yes
number of twine knotters	none	none	—†
number of twine wraps around bale	8-12	varies	varies
type of twine recommended	*	*	—
baler capacity—tons per hour	13	to 14	10 to 15
pick up width—inches	59	60	66
pick up type—tine bar, other	tine bar	tine bar	tine bar
bale compression method—belts, packer arms, raddle, other	belts	belts	rollers
baler overall height—inches	96	96	108
baler overall width—inches	99	99	96
baler overall length—inches	189	189	174
baler shipping weight—pounds	3638	3630	4365
tractor size required—PTO horsepower	60	60+	70+
tractor PTO rpm required—540 or 1000	540	540	540
tractor min. hydraulic pressure—psi	—	1500	1500
tractor min. hydraulic flow rate—gpm	—	—	—
recommended field travel speed—mph	—	2-6	6

*sisal or plastic

†—means data not available

Carried Expandable Chamber Balers

model or series designation	John Deere		Ford		Gehl	
	410	510	551	552	RB1400	RB1600
maximum weight of bale—pounds	850	1700	900	1500	900	1500
bale diameter or width x height—inches	60	72	60	72	60	72
bale length—inches	48	63	45	60	45	60
bale wrapped with twine?	yes	yes	yes	yes	yes	yes
number of twine knotters	none	none	none	none	none	none
number of twine wraps around bale	varies	varies	7	7-10	8-10	varies
type of twine recommended	*	*	baler	baler	baler	baler
baler capacity—tons per hour	12+	15+	4-6	8-10	8-10	8-10
pick up width—inches	60	72	45	60	45	60
pick up type—tine bar, other	tine bar	tine bar	tine bar	tine bar	tine bar	tine bar
bale compression method—belts, packer arms, raddle, other	belts	belts	belts	belts	belts	belts
baler overall height—inches	100	109	94	107	94	107
baler overall width—inches	82	98	80	96	80	96
baler overall length—inches	157	169	139	165	139	165
baler shipping weight—pounds	2935	3880	3600	3980	3600	4200
tractor size required—PTO horsepower	40+	70+	40	50	40	50
tractor PTO rpm required—540 or 1000	540	540**	540	540	either	540
tractor min. hydraulic pressure—psi	1000	1000	1000	1000	1000	1000
tractor min. hydraulic flow rate—gpm	2	2	5	5	5	5
recommended field travel speed—mph	2-6	2-6	varies	varies	varies	varies

*sisal or plastic

**belts with hydraulic tension

Carried Expandable Chamber Balers

model or series designation	Hesston				Int. Harv. 2400 bigroll
	5500	5540	5580	5800	
maximum weight of bale—pounds	1100	1200	1500	1500	1500
bale diameter or width x height—inches	60	72	72	72	72
bale length—inches	60	47.3	60	60	60
bale wrapped with twine?	yes	yes	yes	yes	yes
number of twine knotters	none	none	—†	none	none
number of twine wraps around bale	8-10	8	8	8-10	varies
type of twine recommended	baler	*	*	baler	baler
baler capacity—tons per hour	to 8	to 10	to 12	8-10	—
pick up width—inches	60	54	66	60	60
pick up type—tine bar, other	tine bar	tine bar	tine bar	tine bar	tine bar
bale compression method—belts, packer arms, raddle, other	belts	belts	belts	belts	belts
baler overall height—inches	100	102	103	105	102
baler overall width—inches	95	83	95.8	92	96
baler overall length—inches	146	147	147	158	156½
baler shipping weight—pounds	3620	3800	4215	3910	3350
tractor size required—PTO horsepower	55+	40+	45+	55+	45
tractor PTO rpm required—540 or 1000	540	540	540	540	540
tractor minimum hydraulic pressure—psi	1500	—	—	1500	1200
tractor minimum hydraulic flow rate—gpm	—	—	—	—	6
recommended field travel speed—mph	2-6	2-6	2-6	2-6	2-6

†—means data not available

*sisal or plastic

Carried Expandable Chamber Balers

model or series designation	Massey-Ferguson		Sperry			Vermeer	
	MF-450	MF-1560	New Holland 846	851	403F	504F	605F
maximum weight of bale—pounds	1000	2000	850	1500	650	1500	1900
bale diameter or width x height—inches	60 maximum	72	54	66	to 48	to 60	to 72
bale length—inches	48	60	54	66	36	47	60
bale wrapped with twine?	yes	yes	yes	yes	yes	yes	yes
number of twine knotters	none	none	none	none	none	none	none
number of twine wraps around bale	7-8	varies	varies	varies	varies	varies	varies
type of twine recommended	baler	baler	baler	baler	baler	baler	baler
baler capacity—tons per hour	—	10-12	6-10	9-13	to 8	to 12	to 15
pick up width—inches	60	60	56	72	36	48	60
pick up type—tine bar, other	tine bar	tine bar	tine bar	tine bar	tine bar	tine bar	tine bar
bale compression method—belts, packer arms, raddle, other	belts	*	raddle	raddle	belts	belts	belts
baler overall height—inches	94	104	92	105	86	94	104
baler overall width—inches	81	95	91	96	80	84	95
baler overall length—inches	152	170	155	162	148	162	170
baler shipping weight—pounds	3090	4380	3300	4200	2850	3600	4370
tractor size required—PTO horsepower	35	60	40-60	55-75	40	60	60
tractor PTO rpm required—540 or 1000	540	either	540	either	either	either	either
tractor min. hydraulic pressure—psi	1000	1600	1200	1500	1000	1000	1000
tractor min. hydraulic flow rate—gpm	4.5	4.5	6	6	4.5	4.5	4.5
recommended field travel speed—mph	2-6	2 to 6	3-5	3-5	3-5	3-5	3-5

*Belts with hydraulic tension

■ Issued in furtherance of Cooperative Extension Work Acts of May 8 and June 30, 1914 in cooperation with the United States Department of Agriculture. Leonard C. Douglas, Director, Cooperative Extension Service, University of Missouri and Lincoln University, Columbia, Missouri 65211. ■ An equal opportunity institution.