

# HG Ultra High Efficiency Unit

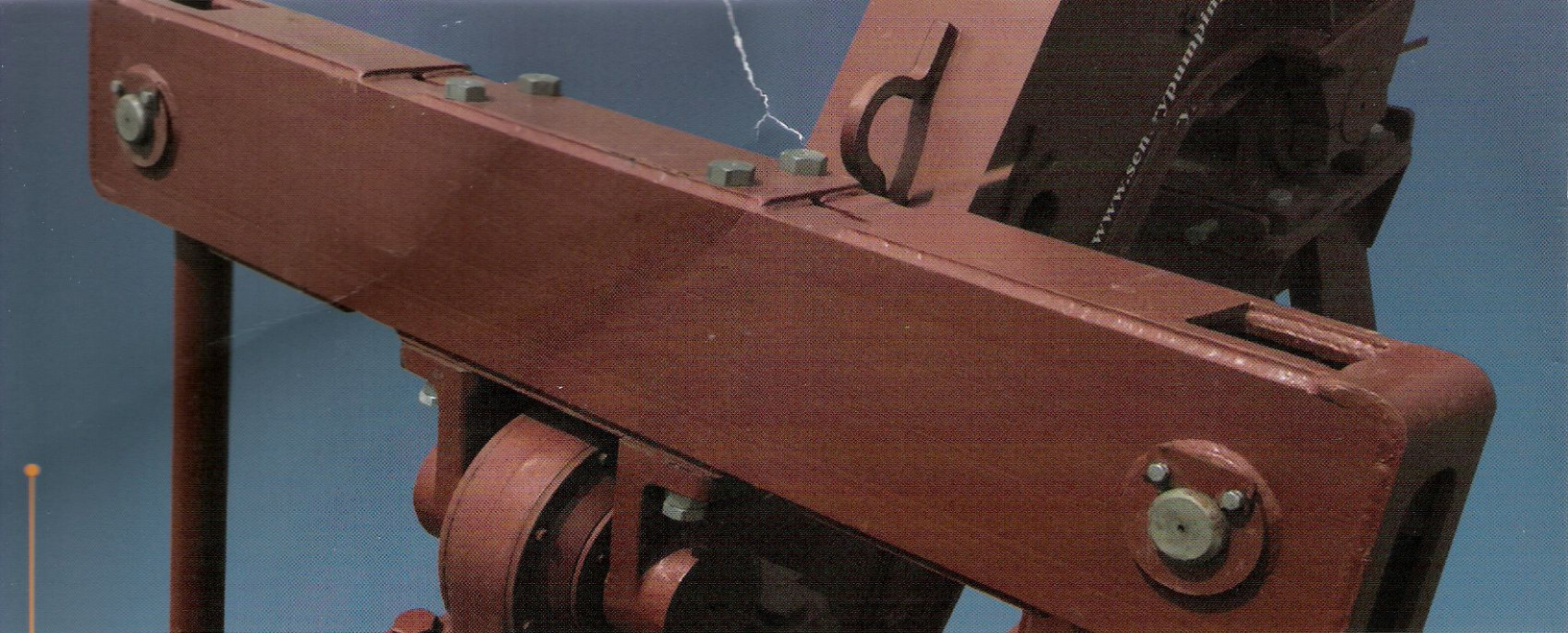


# SENTRY®

ALWAYS ON DUTY



ISO 9002

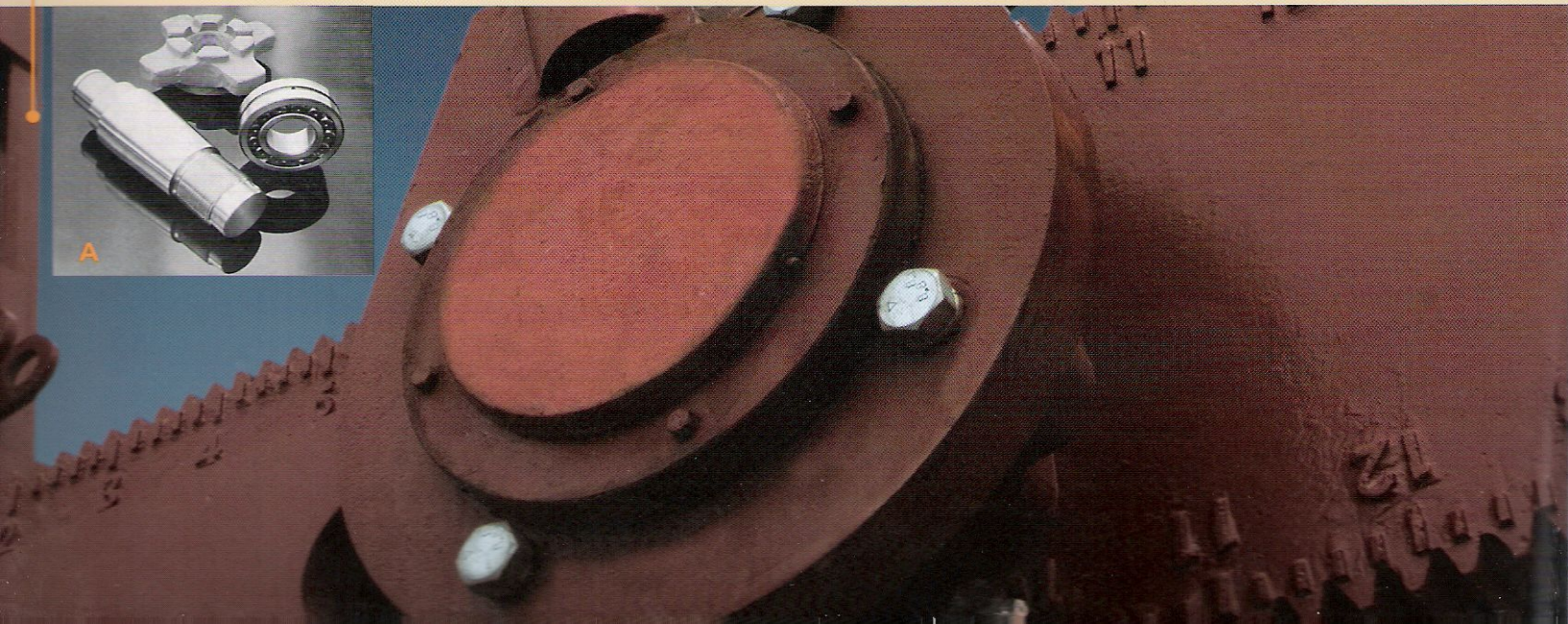
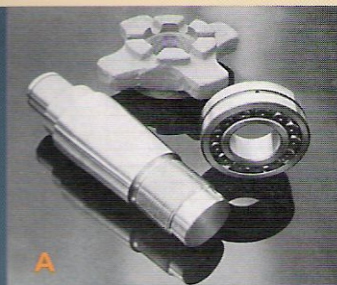


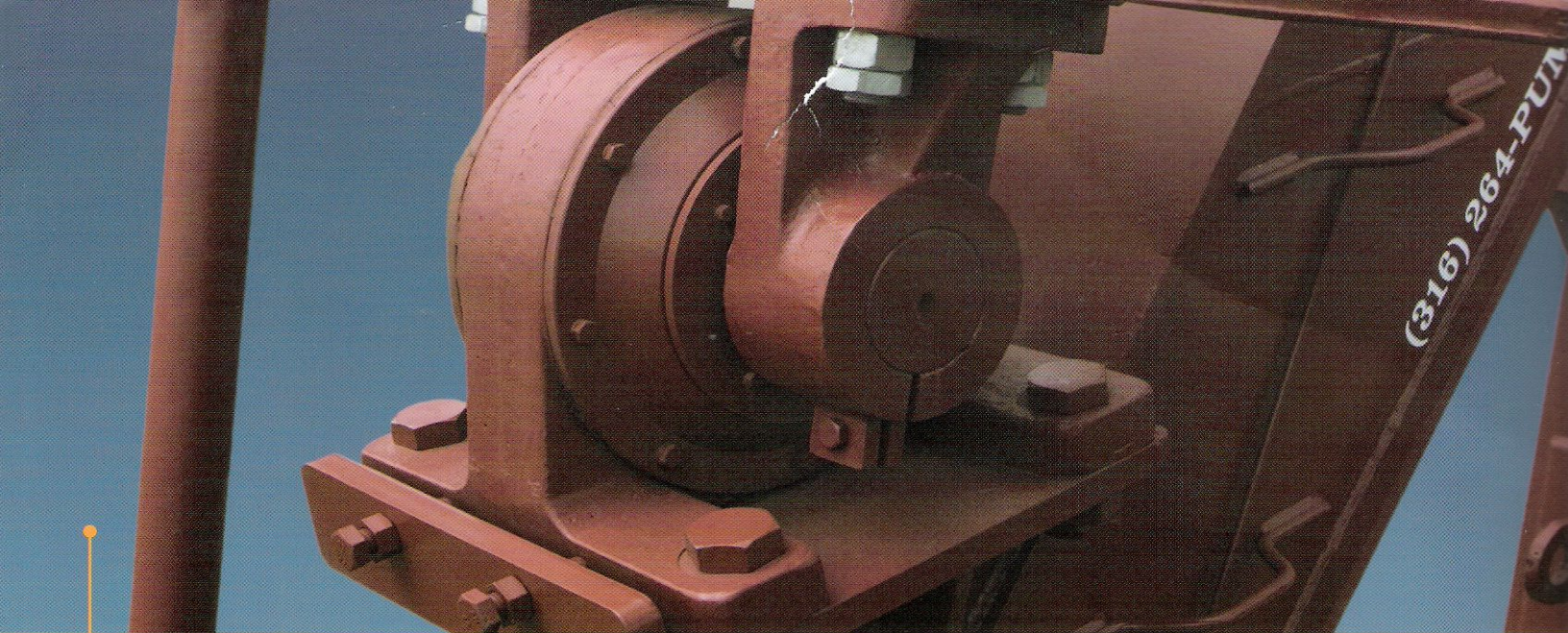
**Equalizer beam:** The HG Series equalizer beam is of reinforced boxed construction, bolted directly to the massive beam bearing assembly. This provides constant equalization of loads via the solid steel pitman arms and alloy steel pins.

## Reduce energy costs by 20% with the Sentry HG pumping unit.

The Sentry HG uses the most innovative, the most advanced pump-jack technology on the market to boost energy efficiency significantly and to reduce horsepower requirements for the unit's motor. The secret lies in carefully engineered crank weights and beam weights, working in tandem to create a dynamic structural imbalance, assisting gearbox torque at critical moments in the stroke. Built to strict API Standards, with thousands

**Crank pins:** Pins assemblies feature oversized self-aligning double roller bearings mounted in machined ductile iron housings. Hardened, ground tapers of extended length on the high-tensile steel wrist pins (A) create additional surface contact. Cast steel knockoff pin nuts are standard on all units.



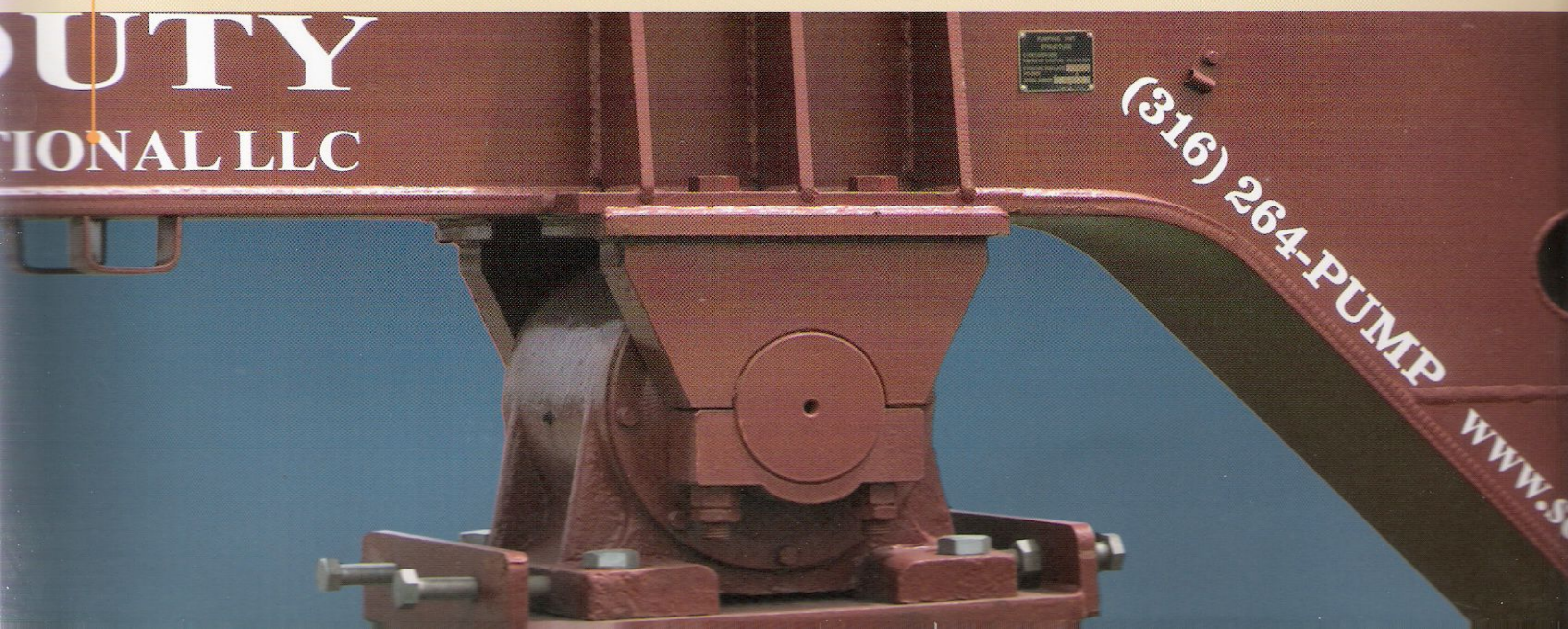


**Equalizer beam bearing assembly:** Unmatched in the industry for strength and durability, the assembly incorporates huge fully-machined ductile iron castings, oversized roller bearings, and large lubrication reservoirs. All bearings and oil seals are readily available throughout the world.

of units on the job worldwide, the Sentry HG will pay for itself by lowering your operating costs. Sentry represents the standard of the Industry in pumping units. Today's Sentry pump-jacks incorporate more than a century of combined manufacturing expertise and feedback from operators in the field which Sentry and its joint-venture partners have utilized to benefit the Industry. Our methods of manufacture have been refined and refined again to

the satisfaction of our diversified customer base. Over the years, Sentry units have lifted millions of barrels out of the ground. Reliably. Economically. With low maintenance, supported by round the clock service and a full parts inventory. There are no compromises in the design of these units. No shortcuts in their construction. And, therefore, no surprises at the wellhead. Pump strong. Pump sure. Pump Sentry.

**Center beam bearing assembly:** Constructed of fully machined ductile iron, the casting houses oversized roller bearings and a large lubricant reservoir. Triple angular gussets transfer vertical and torsional stresses to the walking beam.



**Gear Reducer:** The Sentry gear box utilizes a combination of a ductile iron housing and forged, high-tensile cast-steel gearing to produce a gear box that is vastly superior to the common cast and steel combinations.

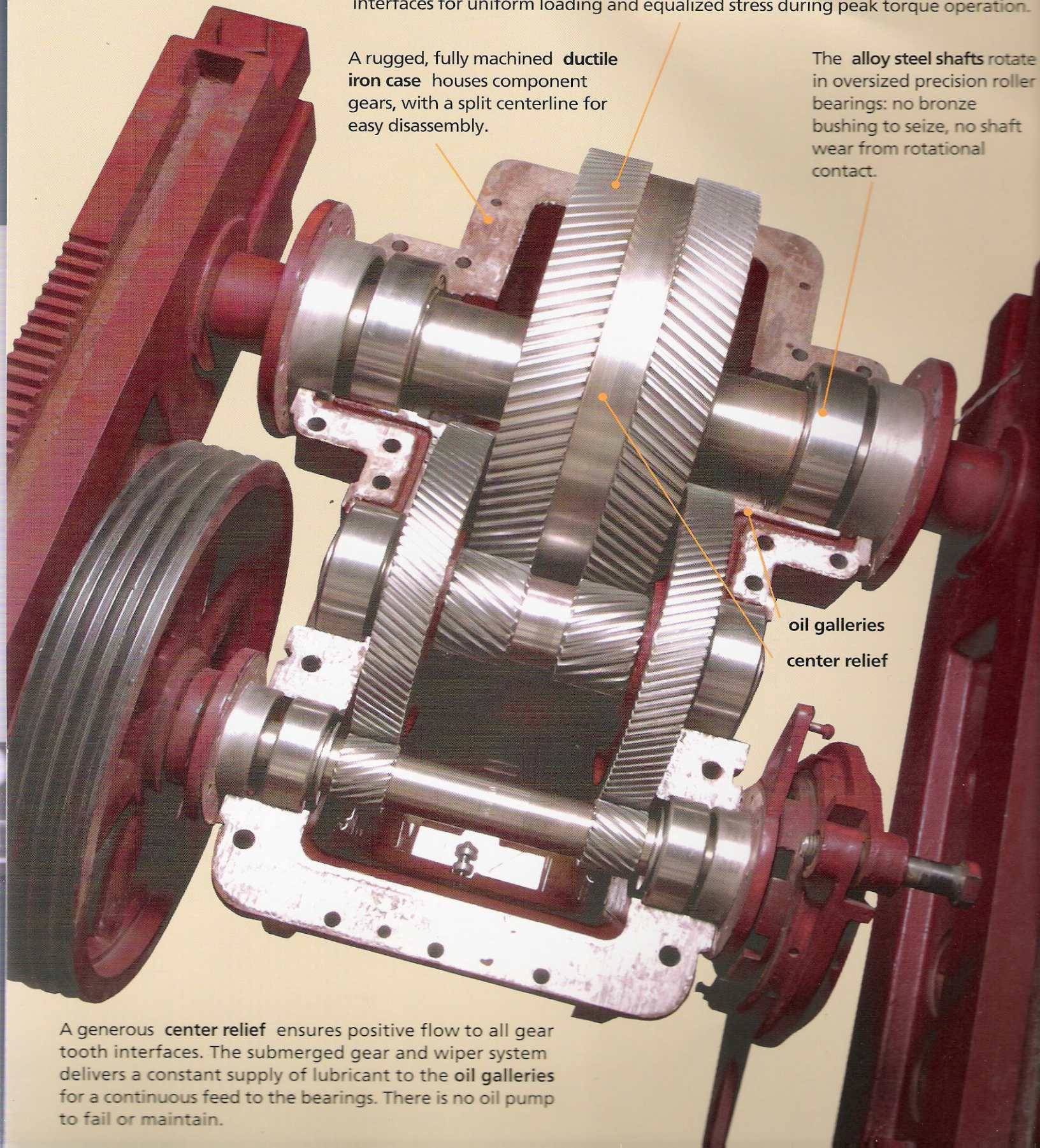
All Sentry gear reducers feature precision machined high tensile, **double helical gears**. These heat-treated steel gear teeth significantly exceed the API criteria for pitting and bending stresses. This design allows extra wide gear tooth interfaces for uniform loading and equalized stress during peak torque operation.

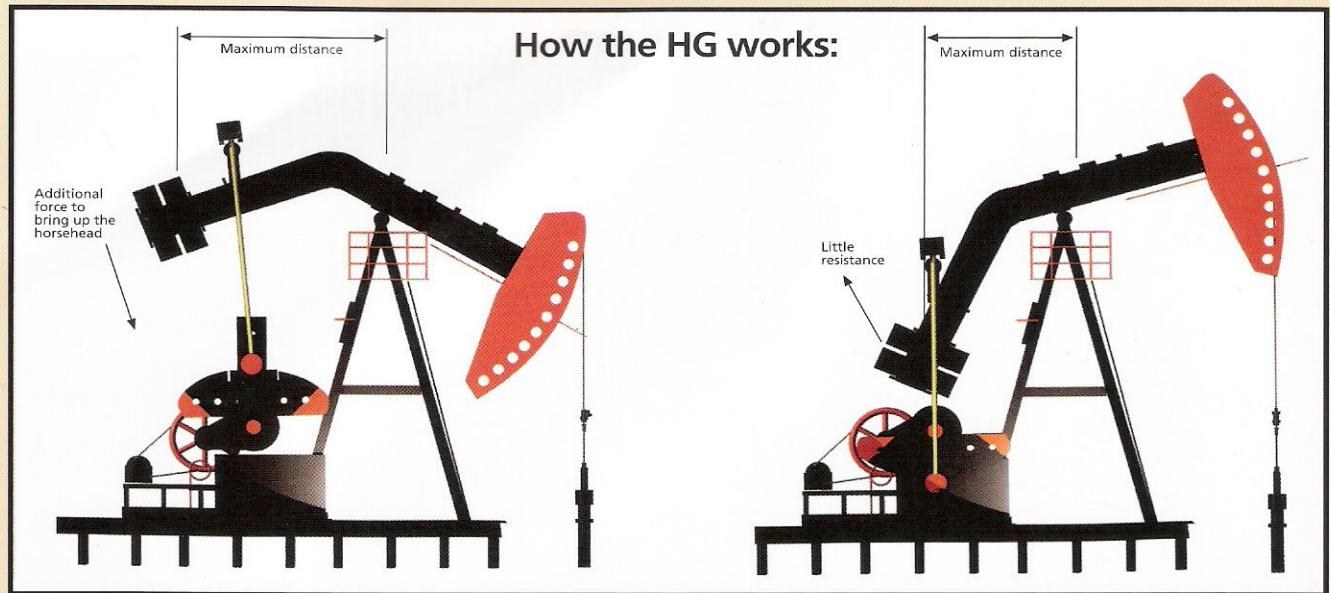
A rugged, fully machined **ductile iron case** houses component gears, with a split centerline for easy disassembly.

The **alloy steel shafts** rotate in oversized precision roller bearings: no bronze bushing to seize, no shaft wear from rotational contact.

**oil galleries**  
**center relief**

A generous **center relief** ensures positive flow to all gear tooth interfaces. The submerged gear and wiper system delivers a constant supply of lubricant to the **oil galleries** for a continuous feed to the bearings. There is no oil pump to fail or maintain.





### Sentry HG: Let Gravity and Geometry Work for You and Save You Money.

The Sentry HG is a revolutionary, patented design which utilizes a curved walking beam, beam weights and adjustable balance crank weights to optimize the efficiency of the pumping unit process.

At the beginning of the upstroke, with the horsehead down and motor demand at its greatest, the HG beam weights are creating the greatest leverage by being at the maximum distance from the Samson post.

At the beginning of the downstroke, with the horsehead up, a conventional unit relies on the weight of the rod string to pull the crank weight back up, typically resulting in negative torque on the motor.

The Sentry HG on the other hand has now positioned the beam weight at a minimum distance from the Samson post, resulting in less leverage to resist the horsehead's fall. Both theoretical calculations and actual field data have demonstrated that the HG curved walking beam pump unit requires approximately 20% less energy to achieve the same amount of work.

**Sentry Pumping Units International Inc.**

(316)264-PUMP (7867)

[www.sentrypumping.com](http://www.sentrypumping.com)



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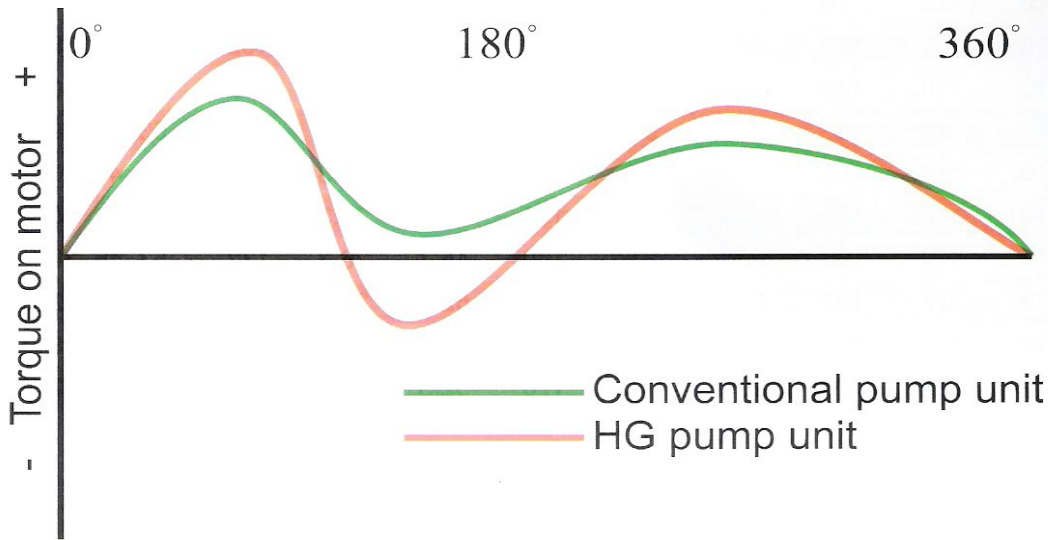
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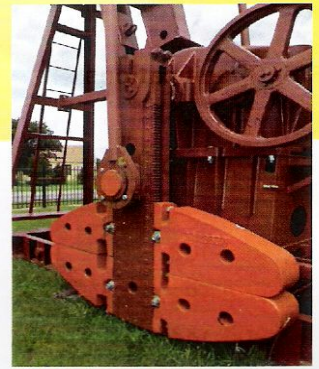
ISO 9002

# And the result?

The combination of the two counter weights results in less motor torque during upstroke and reduces negative torque on the downstroke.



Both theoretical calculations and actual field data have demonstrated that the HG Curved Walking Beam Pump Unit requires a less powerful motor and roughly 20% less energy consumption.



Size	Structure	Stroke	Gear Box Ratio	Gear Box Sheave	Belt Size	Bridle Cables	Set Back	Structural Unbalance	Weight
320	256	120	30.88	C-42"	C-180	2 - 14.5'x1-1/16	74"	200+	49,700#
320	256	144	30.88	C-42"	C-210	2 - 16'x1-1/16	98"	200+	52,600#
456	305	168	31.73	C-42"	C-210	2 - 20'x1-1/4	121-1/2"	2700-	67,100#
640	365	192	39.5	C-42"	C-225	2 - 20'x1-1/4	145-1/2"	150+	74,270#
912	365	192	30.25	C-55"	C-255	2 - 22'x1-14	145-1/2"	1280+	81,800#

## Strokes per minute Prime Mover Sheave Diameter

Formula

Example

Formula

Example

$$\text{SPM} = \frac{\text{RPM} \times d}{R \times D}$$

$$\text{SPM} = \frac{1170 \times 12}{30.12 \times 47} = 9.9$$

$$d = \frac{\text{SPM} \times R \times D}{\text{RPM}}$$

$$d = \frac{12 \times 30.12 \times 47}{1170} = 14.5$$

Where: RMP = 1170 revolutions per minute of prime mover  
R = 30.12 ratio  
d = 12" Pitch Diameter of Prime Mover Sheave  
D = 47" Pitch Diameter of Gear Reducer Sheave

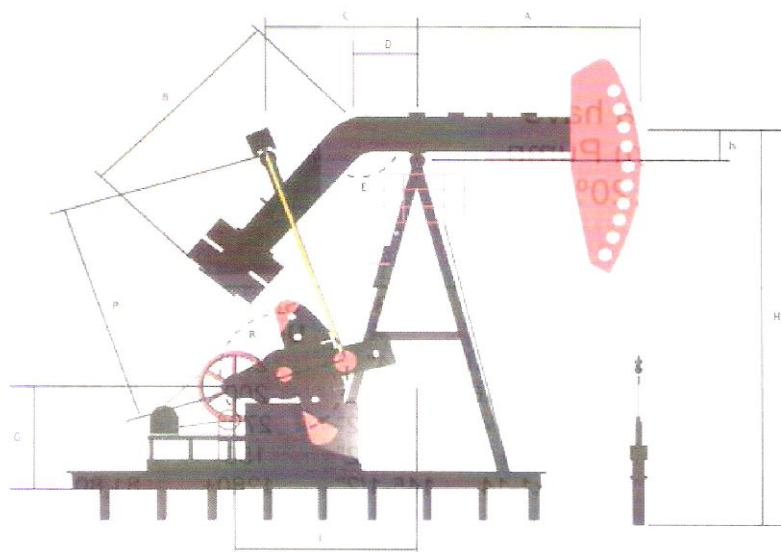
Where SPM = 12 Strokes per minute  
R = 30.12 ratio  
D = 47" Pitch Diameter  
RPM = 1170 revolutions per minute of prime mover

Use nearest size available depending upon belt section and number of grooves in sheaves.

# And the result?

## Size Specifications

Unit type	A	C	I	P	H	G	B	O	h	E	R1, R2, R3	R
320-256-120	118	73	78	135	209	75	116	21.6	17.4	135°	35, 29, 29	72.8
320-255-144	144	73	78	135	224	91	116	21.6	17.4	135°	35, 29, 23	88.6
320-256-168	168	110	110	186	276	91	152	53.5	22	130°	53, 45, 38	88.6
320-256-192	189	110	110	186	276	91	152	53.5	22	130°	53, 47, 40	88.6
456-305-144	144	110	110	186	276	91	152	45.7	23	132°	53, 46, 38	88.6
456-305-168	189	110	110	186	276	91	160	45.7	23	132°	53, 46, 38	88.6
456-305-192	192	110	110	186	276	91	160	65	26.3	132°	53, 47, 40	88.6
640-305-168	189	110	110	186	276	91	160	45.7	26.3	132°	53, 46, 38	88.6
640-305-192	192	110	110	186	276	91	160	65	26.3	132°	53, 47, 40	88.6
640-355-168	189	110	110	186	276	91	160	45.7	26.3	132°	55, 46, 38	88.6
640-365-192	192	110	110	186	276	91	160	45.7	26.3	132°	53, 46, 38	88.6
912-305-168	192	119	127	198	299	102	170	52.5	26.3	132°	57, 50, 42	100.4
912-365-168	189	110	110	186	276	91	160	45.7	26.3	132°	53, 46, 38	88.6
912-365-192	192	119	127	198	299	170	170	52.5	26.3	132°	57, 50, 42	100.4



The HG Curved Walking Beam Pump Unit built to API standards

**Sentry Pumping Units International, Inc.**  
**1221 E. Murdock**  
**Wichita, Kansas 67214**  
**(316) 264-7268 (PUMP)**  
**FAX: (316) 945-4494**  
**www.sentrypumping.com**  
**sentrypumping@aol.com**

## Torque Factor

Unit Type	C'bal Torque of cranks only (10 <sup>3</sup> lb/in)	Structural Imbalance (10 <sup>3</sup> lb)	Reduction Rating (10 <sup>3</sup> lb.in)
320-256-120	637	92.5	320
320-255-144	935	0.77	320
320-256-168	935	0	320
320-256-192	935	2.2	320
456-305-144	966	8	456
456-305-168	966	12.3	456
456-305-192	1196	0	456
640-305-168	966	12.3	640
640-305-192	1196	2.2	640
640-365-168	1450	8	640
640-365-192	1450	-0.8	640
912-305-168	1196	-0.8	912
912-365-168	1450	8	912
912-365-192	1487	5.8	912