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THE 45-HORSEPOWER URSUS POLISH TRACTOR

Engr M. Krainski, production chief  
 Ursus State Tractor Factory

An agricultural tractor produced entirely in Poland by the Ursus State Engineering Plant was exhibited at this year's industrial fair in Poznan. The tractor, trade-marked Ursus, has a single cylinder, medium compression, and a two-stroke engine of 45 horsepower with hot-bulb ignition. This type of design definitely increases the weight of the engine in proportion to its power and may be used only in tractors where a relatively heavy vehicle is desired. The keynote of this engine is simplicity, which facilitates servicing considerably. It operates satisfactorily on lower grade oils and stands up under longer periods of operation without requiring repairs. Because of this, it is more suitable than other types for Polish domestic requirements. The fuel consumption is somewhat higher than for high-compression diesel engines with comparable horsepower. However, the simplicity in design, which results in much lower costs, makes up for this.

This type of engine has found wide acceptance almost all over the world. It is used in tractors made by Lanz, a German firm, three Italian, one French, one Hungarian, and one Australian company.

The block case, cylinder, and crankcase are a single unit, forming a solid frame for the chassis, to which all other assemblies are attached.

The tractor, strictly an agricultural machine, has iron wheels; the rear wheels are equipped with steel spurs. It has no electrical equipment and must therefore be started by heating the hot bulb with a special gas-line lamp.

Because this tractor was designed for universal purposes, it has six gears in one gear box (three gears for field operation and three faster gears for road travel) and a front axle with a spring. The tractor may be equipped with an ordinary fuel pump or with a special type having an additional injection of gasoline for starting.

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By substituting rubber-tired wheels for the metal ones, adding a lever to the reduction gear, and adding the electrical equipment (which has already been designed), the tractor can be utilized for road transport. However, present difficulties in the production of suitable tires compel the factory to limit its output during the current year to farm tractors only.

All parts of the Ursus and the Lanz tractors, widely used in Poland, are completely interchangeable. This is true even for certain parts of different design.

Beginning with the third quarter of 1947, tractors of the Ursus type will be put into serial production by the Ursus State Engineering Plant. Before the war, this plant manufactured tanks and military tractors, as well as heavy trucks, and thus has at its disposal experienced engineers, technicians, and craftsmen.

In January 1945, the Ursus State Engineering Plant represented only a collection of damaged or destroyed factory buildings, totally stripped of all installations and equipment. Immediate reconstruction work made it possible, by December of the same year, to begin operations in the cast iron foundry, the machine shop, the tool shop, and the automotive repair shop. In January 1946, the plant began production of spare parts for the Lanz Bulldog tractors, which, in 1947, amounted to 25 tons per month. In June 1946, the designs of the new tractor were completed, and 11 months later the first tractors were already built, despite shortages of materials, machines, and tools.

Twelve other factories also collaborated in the production of the tractors. They supplied equipment, fuel and oil pumps, injectors, parts stamped from sheet metal, springs, gaskets, etc.

#### Technical Specifications of the 45-Horsepower Ursus Tractor

The following are technical specifications of the 45-horsepower Ursus tractor:

In-line engine, single cylinder, two stroke, medium compression, with hot-bulb ignition.

Cylinder diameter	225 mm
Piston stroke	260 mm
Stroke volume	10.3 liters
Revolutions per minute	300/630
Maximum horsepower	45
Horsepower under normal operation	36
Fuel consumption	about 240 g/hp-hr
Centrifugal governor	
Closed-pressure lubricating system	
Cooling system (thermosiphon)	
Radiator capacity	50 liters
Capacity of petroleum tank	90 liters
Capacity of gasoline tank	7 liters
Capacity of oil tank	6.5 liters
Double plate clutch	
Gear box with six gears:	<u>Speed (km/hr)</u>
1st gear	3.3
2d gear	4.4
3d gear	5.8
1st reverse gear	4.1

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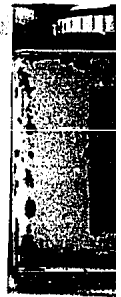
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4th gear	For tractors with	{ 9.4 12.6 16.7 11.9
5th gear	tires and reduction	
6th gear	lever only	
2d reverse gear		

Brakes: foot brake for rear wheels; hand brake for gear box

Specifications:

Length	3,455 mm
Width	1,780 mm (1,820 on tires)
Wheel base	2,035 mm
Front wheel track	1,280 mm
Rear wheel track	1,365 mm
Tare weight	about 3,500 kg



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