

EVOLUTION OF DESIGN AGRICULTURAL TRACTORS

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The new tendencies of designing of modern agriculture tractors and woodworking are considered in nowadays point of view. Basic descriptions, distinguishing this direction of design of recreation zones.

Introduction

As the technical evolution of the farm tractor got rubber pneumatic tires, rear lift, diesel engine instead of the carburetor engine. In recent decades, they added a limited-slip differential, independent PTO, various servos, the number of speeds. Currently implemented the double thrust, the engine power is growing at a constant decrease of the mass of the machine to the power. Particular attention is paid to comfort control station and safety tractor driver.

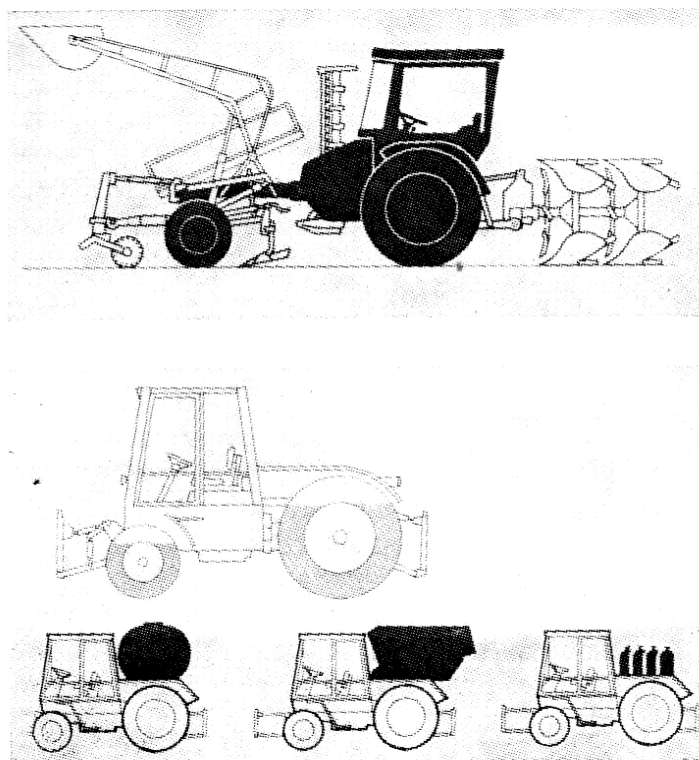
Actuality

Periodic introduction of innovation in the design of the tractor did not affect decisively on his scheme. Not led to a fundamental change and the transition of the Canadian and Ukrainian designers to design models mainly with four driving wheels of the same diameter and articulation of the chassis. (The first such scheme was applied in the beginning of the century by the Canadian firm Pavesi.) [2,146]

Traditionally an agricultural tractor is considered as "mobile energopoint" capable of driving multiple working bodies and machines. Currently, some companies refused to issue conventional tractors in favor of machines specifically designed as a mobile trailer-energy system is a single set of different mechanisms.

Research tasks

In Canada is a universal chassis sales New Idea Unisystem, of mounted with specially designed system of machines and working bodies (grain header, mower, machine for corn, vegetables, and so on), from which excluded tillage equipment. One Man System chassis the different is available in two versions: low and medium power. It is equipped with front and central PTO shafts and front lift. On the front of the chassis can be mounted a small cargo truck. On a more powerful version of the engine (The manufacturer Deutz) [4, 46] is set with a fairly large tilt sideways in order to improve visibility.

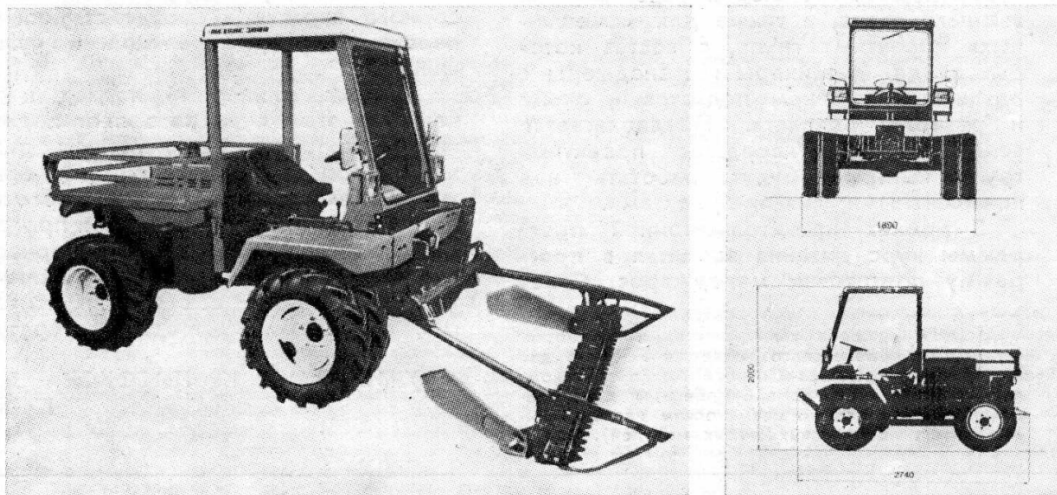


This same technique was used machine designers Intrac ,company Caterpillar, closer to the architecture of the upper structure to the traditional tractor, but differs from it in a more extensive functionality. To her the greatest extent than all currently existing machines can be applied definition of "mobile energopoint." Angling of the engine made it possible to place directly above it shifted forward cabin control station, freeing up the entire rear portion on which you can mount a variety of units or transport is not too bulky goods. But this is an inclined position of the engine and caused the need to reduce the diameter of the drive wheels and the ground clearance, which limits the use of machinery Intrac for arable operations.[5, 233].

By a similar scheme - a front control station - designed by

Canadian machine Metrac two (front and rear) PTO shafts and lifts. At the rear of the chassis with a small cargo truck. Unlike cars Intrac all four driving wheels of equal diameter. Low center of gravity with limited power (20-30 kW) makes this model particularly suitable for use in mountainous terrain.

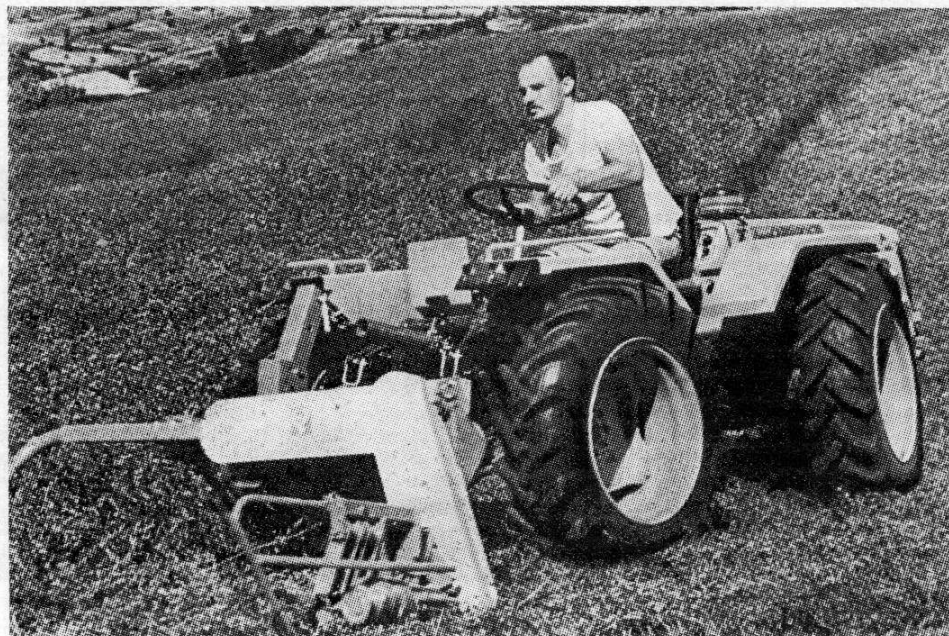
For mountain areas is Swiss tractor Aebi capacity of 33 kW with four driving wheels of the same diameter (with wide tires of low pressure). And a motor control post in order to lower the center of gravity placed near the front and rear axles. The tractor is equipped with a PTO shafts, front and rear lift. The machine is considered by experts as the "ideal" for use during haymaking. A successful solution has given rise to numerous imitations produced in different countries.



Characteristically, the new ideas concerning the very structure of a farm tractor, come mainly from Western European and North American small businesses, and not from major international corporations. For all new models offered by companies in Europe and Ukraine and the United States, characterized by the presence of the front PTO shaft and the lift, which is associated with the leading trend mechanization of agricultural work: primary use of the front working bodies.

The original solution proposed to the Institute of Agricultural Engineering in Milan, which sold the firm Scalmana. Instead of the usual for agricultural tractors of the front three-point lift for hanging tools and working bodies used wheel loader. [6,214].

The company Carraro Antonio (Italy,Canada) produces a small tractor 2000 model with swivel 180 ° control station. Until now, such a solution has been used exclusively on machines of high power (tractors for corn in the milk-wax ripeness). Its use on relatively inexpensive tractor average power makes the most efficient use of the advantages of the front linkage guns in the first place creates the best conditions of visibility.



Analysis of the most successful innovations of agricultural wheeled tractor makes it possible to reliably imagine its evolution by the year 2020.

Firstly, it is obvious that the agricultural machinery to be used for unconventional new and generally these materials, in particular ceramics (some parts and engine parts), synthetic resins (the details of construction elements, etc.)

Secondly, the inevitable Electronization control station, its equipment fundamentally new instrumentation (up to the onboard computer). Thirdly, it is necessary to transfer new tractor fuels (biogas, alcohol), and new energy sources.

Probably the use of new types of tires, improved transmission, and further search for ways to improve the safety and comfort of the wheelhouse, improved visibility and optimization of all of the control and management for ergonomic parameters.

Technical improvements have an impact on the overall design of the tractor, and the design of its top structure. Reducing the size and weight of the engine will set the control station in the optimum zone, electronic devices not only facilitate the management of agricultural machines, but also provide the comfort of the wheelhouse.

We can assume that in the near future park agricultural tractors limited to two types of machines: medium and high power.

In Europe and Ukraine, where the most common medium-sized farms, the most suitable power tractors of 40-60 kW with a drive to all four wheels. Most likely the ratio weight / power of these tractors will not exceed 45 kg / kW. It must be the machine with front cabin, which for ease of maintenance and repair of the main engine components and other units it is advisable to do a flip forward.

On tractors with front and rear PTO shafts and lifts should be installed wide-low pressure tires, having good traction and does not violate the structure of soil; moreover, they readily absorb vibration in running on the plowed ground.

Optimum transport speed of the tractor can be considered 40 to 50 km/h, operating speeds than current should increase by 20-30%. It is assumed that the tractor will have brakes on all wheels, automatic transmission, the ability to replace! electrical mechanical shafts, which can accelerate aggregation tractor with various machines and implements, to simplify control over their work.[1, 25].

Conclusions

In recent years, along with agriculture tractors begin to apply successfully ATV motorcycles, produced in Japan. In this regard, it can be assumed in the near future the emergence of new "mobile energopoint", which combine advantages of a tractor, four-wheeled "all-terrain" of the vehicle and the vehicle. This "hybrid" vehicle may be subject to a deep engineering, design and ergonomic study, improve efficiency and improve working conditions for the tractor driver.



List of literature

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Анотація

ЕВОЛЮЦІЯ ДИЗАЙНУ СІЛЬСЬКОГОСПОДАРСЬКИХ ТРАКТОРІВ

Серж Шкурскі, Дяченко В.Ю.

В статті розкриваються новітні тенденції та напрямки в проектуванні сільськогосподарських тракторів Канади та України, наводяться їх порівняльні характеристики та порівнюються специфіки в проектуванні промислових виробів.