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MODERNIZATION OF THE SUSPENDED SAW FOR SAWING CATTLE CARCASSES

Abstract. The article considers the ways of intensifying and optimizing the processing operations, namely, the sawing of carcasses with the help of suspended saws in order to improve them.
Keywords: suspended saw, sawing carcasses, cattle.

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МОДЕРНІЗАЦІЯ ПІДВІСНОЇ ПИЛКИ ДЛЯ РОЗПИЛЮВАННЯ ТУШ ВЕЛИКОЇ РОГАТОЇ ХУДОБИ

Анотація. У статті розглядаються шляхи інтенсифікації та оптимізації процесів перероблення, а саме розпилювання туш за допомогою підвісних пилок з метою їх удосконалення.
Ключові слова: підвісна пилка, розпилювання туш, велика рогата худоба.

The cattle slaughter process involves sawing carcasses into half-carcasses. Additionally, meat-processing facilities and foodservice establishments often require the portioning of meat, bones, or frozen raw materials. A convenient and efficient way to accomplish this is by using a specialized suspended saw.

Suspended saws for sawing cattle carcasses are specialized professional equipment for slaughterhouses and meat processing plants, designed for the rapid and precise sawing of cattle, pig, and small livestock carcasses into half-carcasses and quarters. Their use ensures high productivity and the production of high-quality products. The carcass-sawing process must be of high quality and take little time.

This study addresses the topical issue of modernizing the suspension system of the R3-FEP saw used for sawing carcasses into half-carcasses. This is significant because the quality of semi-finished products and the appearance of the products supplied for further processing play a crucial role in the meat industry.

Microclimate standards, the mechanization of workshop equipment, the rational organization of the technological process, and worker qualifications all play a role in the sawing of carcasses (specifically, the quality of spinal-column sawing) and the resulting quality of the raw material.

Adherence to production standards is crucial for ensuring the quality of the final product. Therefore, as part of the modernization effort, the authors propose replacing the bulky, heavy counterweight suspension device with a spring balancer, which is compact, lightweight, and easy to use and maintain.

The FEP electric saw, designed for the longitudinal sawing of cattle and pig carcasses, is similar in design to the FEG saw but features a longer saw blade, the end of which slides in a guide slot. The blade length is 550 mm, and its thickness ranges from 0.8 to 1.2 mm. To ensure reliable lubrication of the crank-and-connecting-rod mechanism, an oil sump is attached to the lower part of the housing. The oil is splashed by a pin screwed into the lower disc of the crankshaft [1].

The saw allows for sawing up to 125 carcasses per hour and weighs 48 kg. A drawback of saws with a crank-and-connecting-rod mechanism is the vibration caused by the reciprocating motion of the crosshead and saw blade, as well as the rotation of the eccentrically mounted pin and connecting rod. It is impossible to fully balance the reciprocating components, resulting in significant vibration being transmitted to the operator's hands.

The saw is located in the half-carcass sawing and inspection area. Eviscerated carcasses are conveyed to the sawing station, where they are sawn along the spine using an FEP electric saw suspended from a carriage on a dedicated section of the suspension track [2].

The FEP saw can also be suspended using a balancing unit supplied with the K7-FPL lifting platform, from which the operator performs carcass sawing.

Given the significant weight of the saw, the spring balancer compensates for it and thus allows the operator to guide the saw vertically without excessive physical effort. By reducing physical exertion, the system improves worker endurance and, consequently, productivity.

The modernization has resulted in the following benefits:

– reduced material consumption for the construction of the modernized equipment;

– improved working conditions for the operator;

– longer intervals between equipment repairs.

The developed design of the suspension device (Fig. 1) is compact and lightweight compared to the systems used with this saw (a counterweight suspension device).

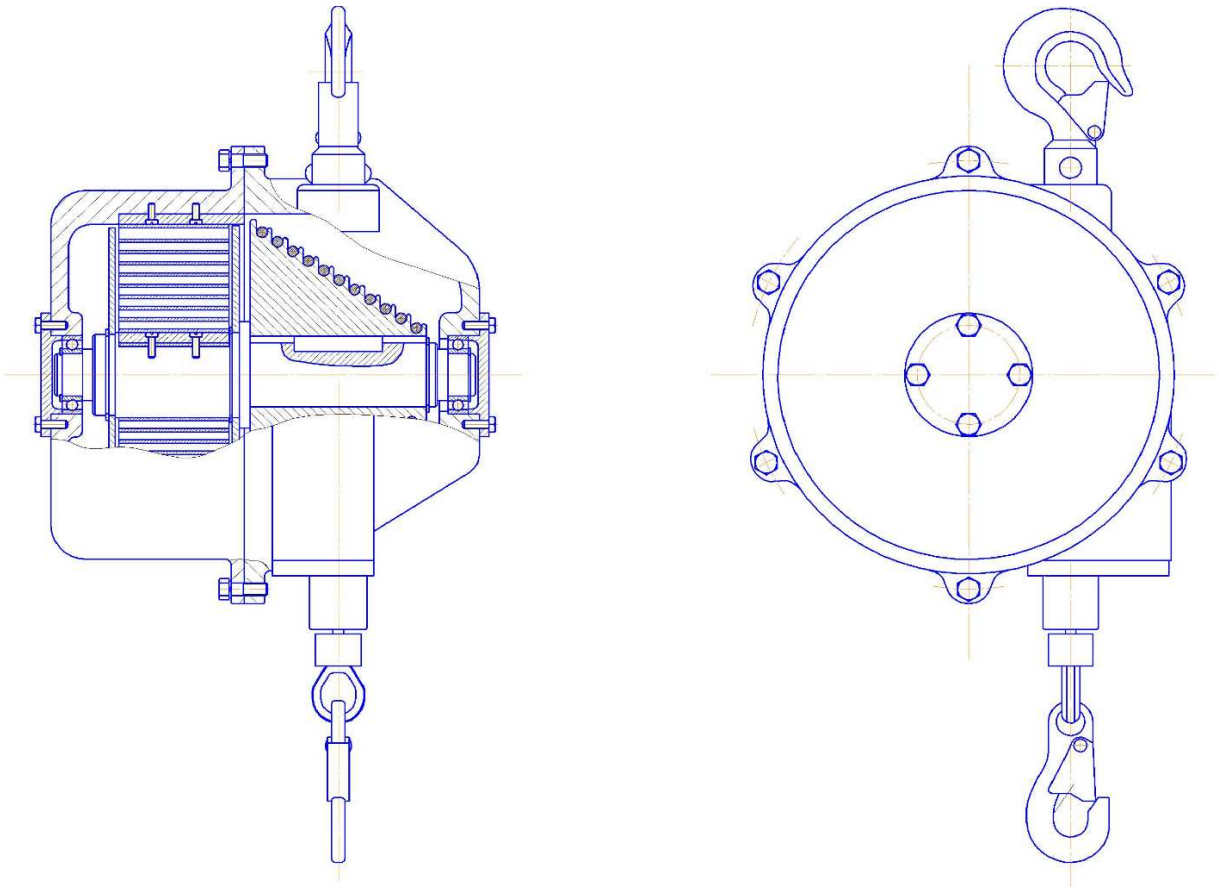


Fig. 1. Diagram of the suspension device

Thus, modernization of the suspension system of the FEP saw by replacing the counterweight suspension device with a spring balancer reduces the physical effort required by the operator and improves working conditions. This contributes to increased worker productivity and improved efficiency of the carcass-sawing process.

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