

Modification of Tyre Unloader Mechanism

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Abstract- The “Tyre Unloader” Mechanism is widely used in tyre manufacturing industries which has the function to strip the finished tyre from the curing press when the upper and lower mold seat opens and the bladder deflates. The mechanism was employed with an arm chain and sprocket setup, which was responsible for all the operation to be carried out.

During production hours, it would break due to frequent wear and tear, it ultimately disturbs the whole production line and end up investing time to get it repaired. Through this project, the main aim was to prevent wastage of production hours, to increase workers safety, effective utilization of time and money, to improve quality and working standards.

I. INTRODUCTION

Curing is a crucial process involved in tyre manufacturing, which involves application of pressure and heat energy, which stimulate chemical reaction between the rubber and other materials. The green tyre is placed in a mould where it takes the final shape. This process is carried out on a tyre curing press, and it takes 16 minutes for curing of passenger tyres. The steps involved are summarized as below:

- i. Loading & Centering: Green tyre loaded on mould with bladder fully expanded.
- ii. Shaping: Mould is closed, pressure and heat is applied, followed by curing
- iii. Stripping: Removal of cured tyre from the mould.

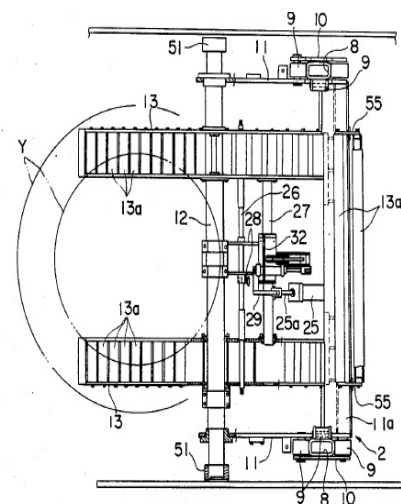
The removal of tyre is done by a tyre unloader mechanism, which will advance forward and perform the operation of stripping. The most commonly used type employs a sprocket and chain mechanism. The problem is encountered here, because there is frequent wear & tear of chain, despite of all the preventive measures taken, and therefore ultimately leading to breakage.

II. LITERATURE SURVEY

The Apparatus for Unloading Cured Tires from a Tyre Vulcanizing Press[1] which is being patented under The ‘United States Patent’ had proposed the idea of an apparatus

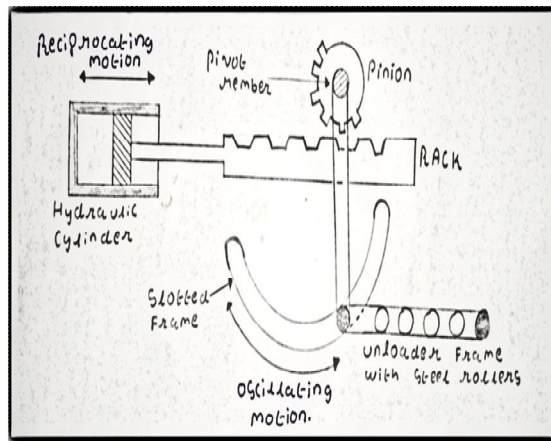
including a tire support member tiltably mounted on a liftable support member; a mechanism for moving the tire support member horizontally toward and away from the center forming mechanism of the tire curing press for receiving and unloading a cured tire; a mechanism for tilting the tire support member toward a tire discharging side of the press at a lifted position over the center forming mechanism thereof; and a guide cam member fixedly located in association with the lifted tilting position of the tire support member for guiding the same toward a lower tire discharge point in a predetermined tilted posture.

This mechanism is commonly known as ‘Arm-Chain’.



III. METHOD OF SOLUTION

The unloader unit consists of a hydraulic cylinder, rack & pinion. The hydraulic cylinder is horizontally positioned & the rack is connected to the rod in such a way that the rack reciprocates. The teeth of rack is in mesh with the pinion, thereby transmitting the motion. The pinion will drive the pivot control member which is responsible for horizontal & vertical movement of unloader frame.



IV. CONCLUSION

The overall aim of our project as described above is to maximize worker's safety during working hours ,minimize loss of production which results due to failure of arm chain ,increase the reliability of equipment ,promote safer working conditions and lastly to prevent major repairs in case of break down maintenance.

REFERENCES

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