



## THE ROLE OF ROTARY MECHANISMS IN THE DEVELOPMENT OF HUMANITY

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### ABSTRACT

This article discusses the emergence of rotary mechanisms, its role in human development, and the discovery of rotary mechanisms in the Bronze Age.

**Keywords:** Mechanism, Cart, Wheel, Screw, Potter's Wheel, Progress, Technology, Discovery.

### INTRODUCTION

During the past millennia, mankind has made many discoveries that have made a fundamental turn for the development of society. An example is the training of dogs, the application of the process of hunting wild animals with animal power, the discovery of fire leading to a change in human biological processes, or the discovery of the bow and arrow, the ability to hunt animals that fly and run fast. One of the discoveries that made a fundamental turn in the life of mankind and started the development was the discovery of the rotating mechanism, the starting point of the first moving tools.

### MAIN PART

It is known that wheels are one of the most important inventions behind the technologies of ancient times, because it is very difficult for us to imagine that it is possible to transport various loads of different weights without wheels. People of many regions of the world - Australia, Africa, America - did not have the ability to use the wheel until the arrival of Europeans. They used animals to carry or transport loads. The invention of the wheel led to a radical change in the way of life of the Indo-European peoples. As a result, people became more comfortable to carry goods over long distances or to move to other places. As a result of the invention of attaching axles to cart wheels, a wide path was opened for the migration of ancient people from one country to another. As a result, Indo-European tribes soon settled in vast areas from South Russia to Iran and India.

Rotating mechanisms were one of the discoveries that occupied the main place in the development of mankind. [1, pp. 34-37] For the first time, rotary mechanisms were





used as pottery wheels and wheels in the Bronze Age. As a result of using it as a potter's wheel, as a result of the change in the technology of processing ceramics, the elegance and quality of ceramics increased, which in turn initiated a new stage of development in human aesthetics. Ceramic objects discovered in the Neolithic period increased the possibility of transportation of food and water sources in remote areas and movement in large parts of desert areas. [2, pp. 15]

In ancient times, it is very difficult to imagine the movement of all types of transport without wheels, including cars, buses, trams, and trains. It is known that before the invention of wheels, people carried their goods by dragging them to destinations or loading them on sleds. Often, when transporting large objects, round logs were used, that is, logs were cut and rolled under the load, and the logs, in turn, were placed from the front. From sources related to the history of technology, it is known that the first wheel was made in Mesopotamia (present-day Iraq) in 3500-3000 BC. [3, pp. 67] They are very simple and are attached to the cart with a long and thin iron (wheel axle). The iron axle between the two wheels was a whole, that is, the axle and the wheel formed an inseparable whole. Such wheeled carts caused inconvenience in turning. In the process of further inventions, the axles were fixed to the cart, and the wheels turned freely. Ancient cargo and war chariots had two and four wheels. In the 2nd millennium BC, the ancient ancestors of mankind invented the spoked wheel in southwest Asia.

A legitimate question arises as to how the discovery of the wheel as a rotating mechanism created positive changes in the development of mankind. One of the greatest inventions in the history of mankind is the wheel. The wheel is one of the oldest human inventions. It is the tool that allows us to get closer to our destination, and at the same time, it has inspired many discoveries hundreds of years ago. Some sources say that the wheel was invented by potters 3000 years ago and was used to transport various loads.

Tens of thousands of inventions have been inspired by the wheel, from the mill's water wheel to complex devices. And this made it possible to create complex machines. [1, pp. 39] Many modern technologies, such as centrifuges, electric motors, internal combustion engines, jet engines, power plants, etc., incorporate a wheel base.

According to scientists' estimates, the oldest form of wheels was used to roll thick logs and heavy stones from one place to another. Perhaps, it was then that attention was paid to the properties of rotating bodies for the first time. For example, if the middle part of a log rolling under a load is thinner than its edges, it rolls relatively smoothly under the load and does not deviate from the direction. Noticing this, the ancients made a kind of easy means of packing by deliberately carving or burning the center of





the cone and leaving the outer parts as they were. As a result of further improvements in this direction, there were full circular grooves on both ends of the barrel and a long shaft between them. Later, a method of preparing them separately and then firmly connecting them to each other was established. [4, pp. 11-12] The wheel was invented in this way, and the first carts appeared in harmony with it. Over the next several centuries, several generations of wheelwrights and cart-makers continued to search for the perfecting of this invention.

In the first samples, integral wheels were firmly attached to the axle and rotated together with it. Such wheels are perfect for moving on flat and straight roads. But in cases where each of the wheels should turn at different speeds during turns, such wheeled carts became unusable very quickly. The wheels themselves were not perfect. They were made by shaving a whole piece of wood. Despite this, the carts remained heavy and difficult to turn. They moved very slowly and were usually accompanied by slow but strong oxen. One of the examples of the wheel and cart in the old construction as shown was found in the excavations of Mohenjadaró, one of the famous monuments of the Indian civilization, located in the territory of the present Islamic Republic of Pakistan. [3, pp. 65]

One of the factors that led to a great and advanced step in the development of technology was the invention of spoke types of wheels. In this case, the fact that each of the wheels could rotate independently of each other was the biggest innovation. In order for the wheel to rub against the axle less or more gently, and thereby to extend the service life of the axle, animal fat was melted or resin was applied to the place where the axle and the wheel connect. In order to reduce the weight of the wheels and thereby facilitate the movement of the cart, grooves were carved in the wheels, and in order to increase their strength, they were fixed with the help of transverse clamps. In the Stone Age, it was impossible to come up with a better constructive solution. However, as a result of the introduction of metals into human activity, wheels began to acquire a completely new look. Now they started to prepare metal outer cover and kegal on their wooden base. Such a wheel could spin dozens of times faster than its wooden ancestor and was more likely to avoid damage from hitting stones. By adding three-pointed vultures to carts built on such advanced wheels, man was able to increase his speed several times.

The development of wheels in increasing the speed of carts, in turn, made it possible to move faster by adding a cart to a horse. [5, pp. 222-228] Of course, the use of animal power to increase its speed in the process of rounding the grains and transporting the goods made it possible for humanity to develop carts and transport goods over long distances faster. This will act as a factor in the next development of humanity.





Another form of rotary mechanisms, which played an important role in the development of mankind, is the charkhpalak. According to its functional nature, the charkhpalak is one of the structures that raise water from streams and canals that flow much lower than the irrigated lands.

It is a big wheel with blades around the circumference of which basins are installed. The size of the diameter of the wheel is taken depending on the size of the canal or ditch, the amount of water flowing. The number of buckets depends on the diameter of the wheel. The flowing water acts on the spokes of the wheel and turns the wheel, so that the buckets are filled with water. When the wheel deviates, the water in the bucket is poured into the rod, and flows from the rod to the desired place through the channel. Charkhpalak is one of the oldest water structures. The first charkhpalaks appeared in Ancient Egypt in the 4th-3rd millennium BC. Charkhpalak was the main means of water extraction in ancient Uzbekistan.

It is difficult to find another invention that has given such a great impetus to the development of technology. The cart, the potter's wheel, the mill, the water wheel, and the block are just a short list of important machinery of which the wheel is the most important component. [6, pp. 524] Each of these inventions constitutes a whole era in human life.

## CONCLUSION

In our article, we can make several conclusions about the role of the rotary mechanism in human development:

First of all, the discovery of the first rotary mechanisms increased the potential of cargo transportation in the development of mankind.

Second, the invention of the wheel, a moving vehicle, gave mankind the opportunity to move from one place to another. This, in turn, created favorable conditions for the process of migration for ancient people.

Thirdly, the use of the rotary mechanism - the potter's wheel - in the production of ceramic products made it possible to increase the quality of ceramic products.

Fourthly, the making of pottery by the potter's wheel increased the elegance of pottery, and this shows the development of human practical arts.

Fifth, the further development of the rotary mechanism became the basis for inventions that contributed to the development of mankind such as the cart, pottery wheel, mill, water wheel and so on.

Sixthly, the ideas about circular movement had an impact on the religious thinking of mankind. For example, there were views about the birth and rebirth of a person after death.





Seventhly, in the development of mankind, rotating mechanisms were not only used for vehicles, but also became the basis for the creation of the first circular ceramic pipes and the first sewage networks.

Eighth, the rotary mechanism was the basis for the invention of the charkhpalak, which is used to bring water above the water level.

Ninthly, the rotary mechanism became the basis for the development of the exact sciences, especially the physical science, and the emergence of physical laws in the development of mankind.

In conclusion, it can be said that rotary mechanisms are based on the inventions of cars, trains, planes, etc., which serve the future of mankind.

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