

Manual Operated Height Adjustable Load Lifting Carrying And Floor Recleaning Portable Machine

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Abstract- Cranes do play most vital role in the manufacturing industries. A crane is a mechanical lifting device equipped with a winder, wire ropes, and sheaves that can be used to lift and lower materials and to move them horizontally. In this project we aim to create a machine that reduces man power that is additional. This manual operated crane consists of an arrangement of rope, pulleys and hand winch along with an additional feature of cleaning the floor.

Keywords- Crane, Hooks, Pulleys, Roller, Cleaner, Hand-winch, Steel wire Rope, load

I. INTRODUCTION

The ancient Egyptians and Mesopotamians were the first recorded people to have utilized basic crane-like pulley systems known as shadufs to extract water from rivers and irrigate dry and arid land. These improvements significantly increased what is known as a machine's 'mechanical advantage' which measures how much it can multiply an input force an output into force. A crane is a mechanical lifting device equipped with a winder, wire ropes, and sheaves that can be used to lift and lower materials and to move them horizontally. It uses one or more simple machines to create mechanical advantage and thus move loads beyond the normal capability of a human. Cranes are commonly employed in the transport industry for the loading and unloading of freight; in the construction industry for the movement of materials; and in the manufacturing industry for the assembly of heavy equipment. A crane is a machine used to move materials both vertically and horizontally, utilizing a system of a boom, hoist, wire ropes or chains, and sheaves for lifting and relocating heavy objects within the swing of its boom. To be in control of the location of materials within the production environment, it is vital that material handling equipment is installed to enhance the consistent flow of materials from the point of material receipt through the production processes to the storage and dispatch point. This would invariably be much faster than if such processes were done manually. Therefore, an effective material handling system would give manufacturers a competitive advantage in terms of reduced delivery time. Thus, an effective material handling system can be defined as the process of safe and timely loading,

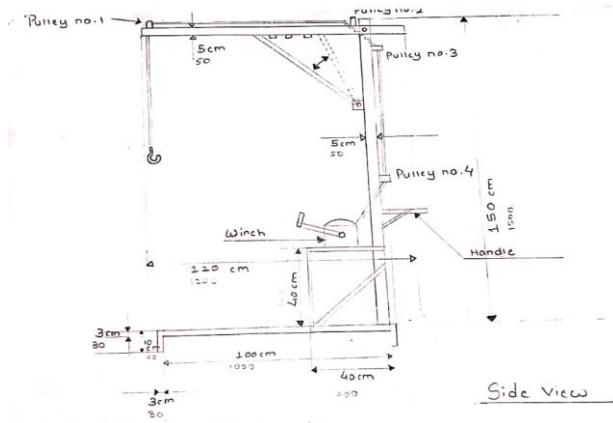
transporting, and unloading of materials which can be economically achieved. Though material handling equipment may be considered as essential, non-value-added manufacturing elements which add to the cost of the product, its introduction into the production environment enhances production efficiency by reducing excess work content associated with poor utilization of time. These requirements may include efficient and safe movement of materials to the desired place, timely movement of the materials when needed, a supply of materials at the desired rate, storing of materials utilizing minimum space and the lowest cost solution to the material handling activities. The device uses one or more simple machines, such as the lever and pulley, to create mechanical advantage to do its work. Cranes are commonly employed in transportation for the loading and unloading of freight, in construction for the movement of materials, and in manufacturing for the assembling of heavy equipment

II. PROBLEM STATEMENT

Now, as we know thousands of small & medium scale industries are present in India. Each and every industry have purchases & delivery most often 3-4 times a week. Most of them have workers to load or unload the material. Now, the material which is to be loaded or unloaded is not a task of a single person. Even if there are more workers available, it doesn't reduce the suffering caused to any of them. Not just loading and unloading but also for the conveyance of heavy materials, much efforts are needed. If we thought about it carefully, making a machine which could easily lift more weight, which could be transportable from one place to another with a sufficient place for carrying more load would be beneficial for most of the small scale as well as developing industries. Also in industrial places such as production department, storage department, etc. we find a lot of waste material like chips of various materials, damaged tools such as inserts, etc. are found on the floor which are too harmful for people working and also creates untidy view which naturally affects workers.

III. SOLUTION OVERVIEW

For the above problems, we aim to overcome them by making a small size crane along with a cleaner attached to it at its foundation so as it would clean the floor automatically whenever the crane will be used for its application. The suffering and hard practices of the workers would be reduced and it'll help to detonate the risks of serious injuries and also would avoid creating disputes amongst them. One can easily head for lifting heavy weighing objects and keep them from one place to another by applying a lesser amount of force. The transportation of material or object to be lifted can be done at an ease as the whole structure have wheels.



IV. WORKING PROCESS

The combination of small gears driving large gears can amplify the force several times to provide greater power. The hand winch is used to pull the load by cranking the winch drum by hand, and the gear-driven winch wire rope drum pulls the load by turning the wire rope wound on it. It is equipped with a manual steering automatic brake, which makes it safer to operate. When the winch rope is pulling the load and the winch drum remains stationary, the brake ratchet bites into the load-bearing ratchet and acts as a brake. The major principle here will be of the pulley system i.e., it helps reverse the direction of the lifting force. When one end of the rope is pulled down, the load on the other end of the rope is pulled up. So, the direction of the force changes from down to up. When two or more forces are used in a system, then the pulley not only changes the direction of applied force but so multiplies the input force. If one fixed and one movable pulley is applied in a system, the system almost doubles the amount of force applied by a person. As the name sounds, working of our machine is quite simple. If one wish to lift a certain material which is heavy in weight and require much force, then this machine could be used in that place.

Firstly, by unlocking the wheels of the structure, move/ place it towards the object which is to be lifted. Once you reach there, again put the brakes on.

Secondly, unlock your hand-winch. Then rotate the lever and lower the hook of the crane until it reaches the object. Now, find the best part to hook your wire to the object to be lifted. If the object doesn't have such point, simply tie it with a rope or a chain neatly.

Now, hook the rope and then pull the hand winch in the opposite direction. Gradually your rope will be winded and the object will be lifted up. Now when the rope reaches to the desired height, lock the hand-winch and now leave the lever.

After doing the process carefully, unlock the brakes of the wheels and start pushing the machine towards the location where you want to drop off the load. When you reach there, keep the object exactly above to drop point or if not possible then find the nearest spot.

After reaching there, again repeat the same process i.e. firstly lock the wheels. Then unlock the hand-winch and then start rotating the lever until the object rests on the floor. Then unhook the rope and keep the machine back at its place.

As for the cleaning part, there is no need for any additional force or actions as the cleaner below it will rotate automatically wherever the machine goes. It may happen that the load we are going to hook would have unwanted tiny waste on it which would fall off on the floor while shifting it from one place to other and would make the floor untidy and hence the cleaner will clean that automatically by following the same path. The cleaner will collect this stuff in a removable plate and the one can deposit it into the right place.

V. CONCLUSION

All this concluded, the development of such lifting machine will be a lot beneficial to the small scale industries as it functions in most of the material handling operations. This machine is not only limited for use in production industries but could also be used in various other places such as in garages for lifting heavy motor parts like engines, also it could be used in bus stations, railway stations, libraries, construction etc. also this machine costs the minimum which makes another strong reason to use it as an alternative option. Our goal is to make the safety of workers a priority which would not be overpassed and to give our helping hand in the way of material handling procedures followed in most of the small-scale industries.

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