Multipurpose operation machine for poultry

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ABSTRACT

In earlier days the excretory wastages of hens in the poultry farms was cleaned by employees. Due to scientific and technological development, those wastages can be disposed by lot of cleaning vehicles. This cleaning will be carried in the period of every month. But the wastes that are stockpiled over the layers of saw dust and sand would get to be tightened and hence it needs to scrub every two days. By scrubbng the tightened thick layers into spongy and squashed form, hygienic health for chickens can be maintained. But still today in India, scrubbing can be done by employees only by means of manual work. This needs to include the labour cost also into the account of poultry expenses. Cleaning the layers at every month and disposing those wastes is done by various high cost equipments.

To overcome these difficulties, a design in which the machine is to be automated for performing the scrubbing operations, as well as cleaning and dispersing the wastes as manures to agricultural fields, with the help of simple mechanisms and automata. Therefore the poultry waste management can be done.

INTRODUCTION

Automation plays a vital role in mass production in order to reduce the fatigue of the workers. Therefore the various operations in the broiler poultry farms should be carried out either automatically or semi automatically. First of all the operations that are required to manage the farms are in need to be studied thoroughly.

The floor surface area of the broiler poultry farms are having so many layers comprised of sand, rice husk, saw dust and some other composition. After the repeated usage of space, the layers may get tightened and hence it is needed to scrub every two days. This scrubbing of layers is being done by manual or automated operations depending upon the development in technology. And then the layers are needed to be clean at every forty five days. This cleaning is done by various different types of equipments available in the market. The wastes of poultry can be used as a manure or fertilizer for agricultural fields when the poultry manure is being mixed up with the cattle manures. To disperse or to spread out these manures, a lot of manual tools and different kind of equipments are introduced.
LITERATURE SURVEY

A detailed survey is made from the existing equipments and machines for the management of poultry and its based operations.

Racking process:

The layers on the floors of poultry are scrubbed manually by employing the workers. Shovels are majorly used to scrubs the thickened layers. Human effort is the major investment to perform this operation. The main drawback of this manual racking process is that it requires more time. The efficiency in operation depends upon the skill of the labour. The accuracy in operation may be decremented from the lack of involvement of the worker.

Cleaning operations:

For the floors of the poultry, flexible microfiber dusters are helpful substitutes for feather dusters. Mopping is the finalised sweep tool for poultry floors. Each pass with a properly treated dust mop helps to remove dirt, dust, and abrasive particles, without leaving the floor dull or slippery. Rotation of the dust mop leads to clean the floors of poultry. Depending on the type of equipment and the manufacturer’s recommendations, hard floors for broiler farm can be vacuumed. Typically, a vacuum cleaner equipped with a suction-only hard floor brush-tool may be used to remove dry dust and dirt from floors. This method cleans more thoroughly than dust mopping, while removing more fine dust from the surface and debris from cracks and crevices.

Manure Dispersing:

Poultry litter’s traditional use is as fertilizer. As with other manures, the fertilizing value of poultry litter is excellent, but it is less concentrated than chemical fertilizers. The poultry manures is being mixed with the cattle manures at the certain proportions and then it is dispersed in the agricultural fields by using some manual tools and tractor equipments.

METHODOLOGY

Initially the components were purchased and collected at various places. At first the base was framed by using L-frames which is welded as if to form as a rectangular section. Then the gears are inserted over the axle rod which is machined by lathe works for perfect fixing with those gears. Bearing are provided over the axle shaft and it is been welded at the bottom of the base frame.

The axle wheels are attached to the end of the shaft and the setup is made ready to resemble like a carrier moving vehicle. Four more frames were welded vertically at the corners whereas sheet metal is folded to boxlike structure and fitted over the welded vertical frames in order to form a storage tank. Two L-frames were welded at the base frame and a motor along with a pulley is placed over it. Another pulley is inserted in a rod along with racking blades and it is fitted to the base frame. A belt drive is given to these pulleys.

Two more rods along with a mating gear were fitted to the carrier moving vehicle, one at parallel to the front axle shaft and other is parallel to the rear axle shaft. The shaft of mating gear at the rear axle is also provided with a large sized pulley. A hopper is provided from the tank in which the entry passage of the hopper is set above the pulley.
The shaft of mating gear at the front end is desired to have a pair of conveyor roller drums. Similarly the pair of drums is fixed at the above end also and then the conveyor belt is provided over the roller drums. Buckets were fastened on the surface of conveyor belts at regular intervals of distance and the conveyor belt drive should be able to run as per the machine movement.

When the power supply is given to the electric motor, the motor starts to rotate which in turn also rotates the pulley attached to it. Due to rotation of the pulley, the belt transmits the power to the pulley of racking tool axle. This racking tool axle consists of number of racking blades to scrub the poultry layers and hence the racking process can be performed.

A pair of gears is attached to the axle of both the front and the back wheels. The mating gear of front axle gear is having two widened pulleys on both the sides and the belt is connected across the pulleys, acts as a conveyor. The movement of machine vehicle tends to rotate the pair of gears and enables to move the belt conveyor upwards. The buckets that are provided to the surface of the belt carry away the poultry layer wastes because of the simultaneous movement of belt conveyor and the machine vehicle. These carried wastes are then poured into the collection tank of tray which is fixed above the setup. As the rear axle gear rotates, the mating gear also rotates which in turn also rotates the pulley attached to its axle. When the pulley of rear axle rotates, then only the manures that are fed inside the hopper can be dispersed into the agricultural fields.

**MULTI PURPOSE OPERATIONS**

The rotation of electric motor induces the racker blades to perform racking operation by scrubbing the thickened layer of hen’s excretory wastes into squasha and spongy form. The movement of our multipurpose machine tends to activate the set of gears connected to the conveyor and hopper because of the rotation of axle shafts. Pulleys are provided adjacent to the gears. Two sets of pulleys at front axle moves the conveyor belt in motion and hence the cleaning of waste layers is done. Pulley near the rear axle leads to disperse or to spread out the manures over the field lands and hence the dispersing can also be completed. Therefore our machine enables to maintain the hygienic environment around the poultry broiler farms.

**DIAGRAM**

**COST ESTIMATION**

Total cost = Rs. 7600
DESIGN SPECIFICATION

MOTOR:
- Power – 0.5 hp
- Torque – 10 kg-cm
- Speed – 1400 rpm

GEAR:
- Type – spur gear
- Gear ratio – 4:3

OVERALL DIMENSIONS:
- Length – 960 mm
- Breadth – 640 mm
- Height – 600 mm

ADVANTAGES
- Initial and maintenance Human effort can be reduced and hence it minimizes the labor cost.
- High efficiency in operation as because of automation. The cost is less when compared to other machines.
- This machine can also disperse the poultry wastes as manures in the gardening process for better nourishment of soil.
- The time required for each processes is reduced.
- Multiple operations includes racking, cleaning and dispersing can be performed.

APPLICATIONS

Our automatic multipurpose operation machine can be used in all the broiler poultry farms for racking and cleaning processes.

It is used in the agricultural fields for dispersing the mixture of cattle and poultry manures at uniform rate with high degree of automation.

CONCLUSION

Hence from this detailed survey, the major operations like racking and cleaning the layers of poultry farm and the manure dispersing in the fields can be performed effectively by this multipurpose automatic machine for poultry.

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