Automated Garbage Collection Mechanism

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Abstract **- The present invention relates to a mechanism for effective garbage collection. The mechanism comprises of a robotic arm with a gripper that has a servo motor which is programmed to lift garbage bin and empty the garbage in truck garbage collection container. The arm is fitted in the middle of truck chassis.**

Index Terms **- robotic arm, health, mechanical system for collection of garbage automatically.**

1.INTRODUCTION

Garbage is increasing worldwide and with it the quantity of toxic substances in garbage is also increasing. The garbage collector person touches dustbin having garbage, this causes various skin diseases, respiratory diseases which prove to be very dangerous for them.

2. SUMMARY OF INVENTION

According to present invention, a robotic arm placed in middle of truck chassis will provide a dustbin lifting mechanism for effective collection of garbage comprising of Screw and T-nut; Metal rails and metal box; Metal rods; Gripper; Motors – DC motor and servo motor; Programming board like Arduino UNO; Teach pendant having potentiometer and switches; and Wooden plank and mechanism supporting bearings.

Wherein the said screw is fitted on wooden plank using bearings for support and the T-nut rotates freely in screw.

Wherein the T-nut is inserted in metal box which slides over the metal rails. So, when the DC motor attached to one end of screw rotates it results in motion of metal box and as the arm is attached at top of this metal box thus it also moves.

Wherein the arm is made of two metal rods which has gripper attached at end with its servo motor. The servo motor is programmed using Arduino so as to grip dustbins of various sizes.

wherein the C structure in fitted at one side of arm, so that the roller fitted at same side of arm rolls over it and resulting into vertical motion of arm. At end of the c structure there is stopper which defined the end point of arm.

Wherein compartment in garbage collector container in truck will collect wet garbage and dry garbage separately.

Wherein both the dry and wet garbage dustbins are fitted in ring so that the arm will pick both the dustbins and empty them in the truck container.

3. BRIEF DESCRIPTION OF DRAWINGS

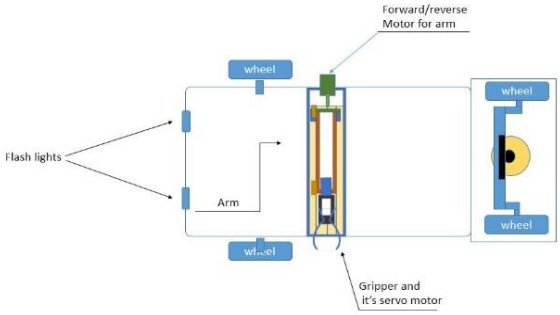


Figure 1: illustrates the position of arm to be fixed on truck chassis

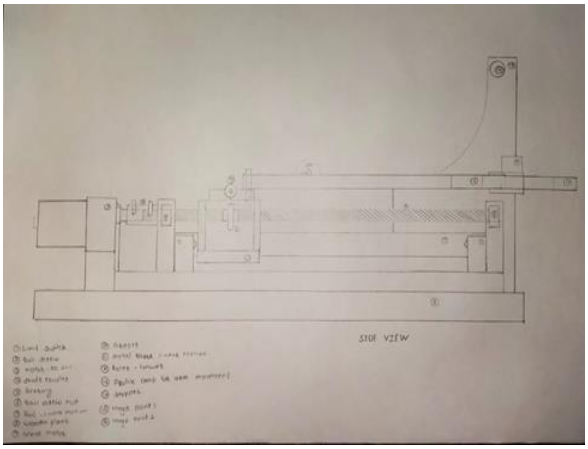


Figure 2: illustrates the assembly of different components of arm

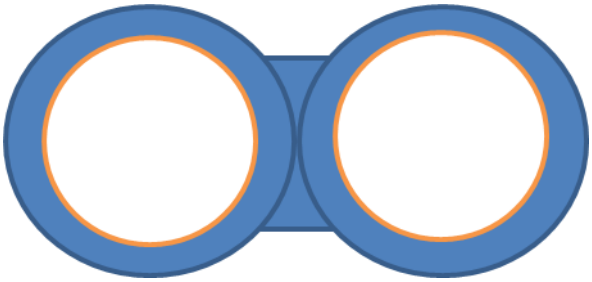


Figure 3: illustrates the ring for holding the dry garbage and wet garbage bin together

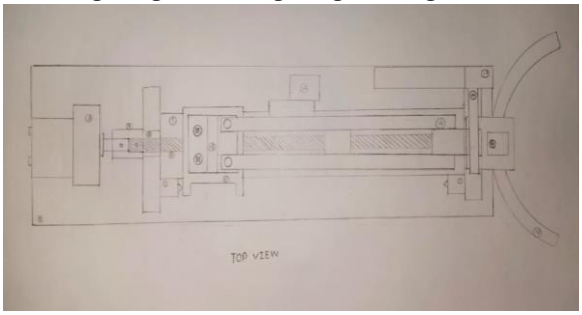


Figure 4: illustrates top view of robotic arm

4. DETAILED DESCRIPTION OF THE INVENTION

Reference to figure 2 illustrating the assembly of arm comprising:

Limit switch (1); ball and screw (2); DC motor (3); shaft coupler (4); bearing (5); ball screw T-nut (6); metal rails (7); wooden plank (8); servo motor (9); gripper (10); metal block (11); roller (12); profile comp for arm movement(c-structure) (13); stopper (14); hinge point 1(15); hinge point 2(16).

The arm mechanism is whole assembled on the wooden plank (8), the DC motor (3) is fixed at one end of wooden plank. The shaft of DC motor (8) is coupled with the screw (2) using shaft coupler (4). The screw (2) is fixed on wooden plank (8) using bearings (5). The ball screw T-nut (6) is inserted in metal block (11) in which the T-nut (6) can freely rotate and thus can move the metal block over the metal rails (7). The arm is made of two metal rods having gripper (10) attached at end with its servo motor (9). The whole arm is attached at top of metal block using hinge 1 (15). A roller (12) is attached to one side of arm and on the same side the c- structure (13) is attached to wooden plank (8), so that the roller (12) rolls over the structure (13) resulting in vertical motion of arm. Stopper (14) is attached to c- structure at end so that arm cannot fall.

Two limit switches (1) are attached at end of metal rails (7) so as to get end points of rail (7).

It is still further object is to disclose an improvement, wherein the ultrasonic sensor can be attached at the end of arm, so that it will stop the arm at certain distance from dustbin so that the gripper does not exceed further and make the dustbin spill down.

It is still further object is to disclose an improvement, wherein the metal detector sensor can be attached at end of arm so that it will detect metal substances present in dustbin if any as they are dangerous.

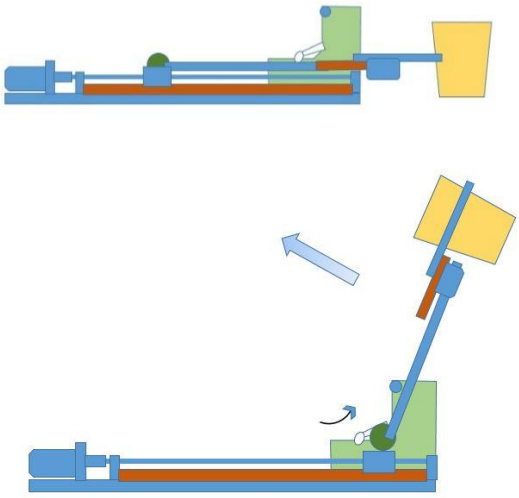
It is still further object is to disclose an improvement, using feedback from DC motor overload of dustbin can be detected so that it will not harm gripper and the whole mechanism.

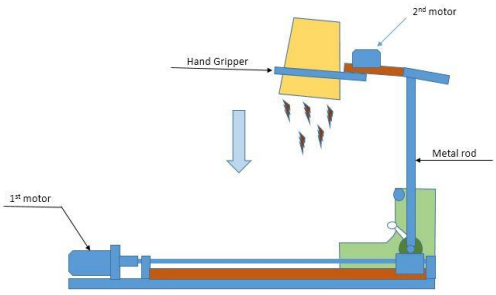
It is still further object is to disclose an improvement, using a suction system at bottom of truck will help truck to collect the loose garbage from roadsides.

It is still further object is to disclose an improvement, the truck can be electric vehicle rather than IC engine vehicle so that there will be no emission of dangerous gases and will be eco-friendly.

It is still further object is to disclose an improvement, a database system can be implemented by taking feedback from sensors during collection of garbage from specific areas and can be computed and a message can be sent by getting feedback from sensors such that “the dustbin was overweight”, “the dustbins were not in place” (if not in place), “The dustbin has metal substances” etc.

5. WORKING OF ROBOTIC ARM





6. CONCLUSION

We conclude that using the simple mechanism of ball and screw and the setup proposed above, and in spite of three joints by using only two motors we can easily collect garbage using the robotic arm. This will help in maintaining hygiene and also protect health of garbage collector person and now during pandemic of covid-19, spread of this dangerous virus can be avoided.

REFERANCES

[1] www.google.com