

INVENTION OF A SEMI-AUTOMATIC METAL AND DUST CATCHER ON THE ROAD

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I INTRODUCTION

Presently available platform scrubber is electrically operated and cannot work by any other means. These platform scrubbers are quite expensive and have a high maintenance cost as per our research done in Indian railways. In our project we have invented a manually driven platform cleaning machine that serves approximately the same functions as available in present electrically operated machines. A floor cleaning machine has housing and a movable hood that covers over vacuum and liquid hoses of the machine that are visible in prior art floor cleaning machines. The vacuum and liquid hoses are each pivotally connected to a wall of the machine housing and are also pivotally connected to a transparent dome provided on the hood. These connections reduce stresses on the hoses when the hood is moved and allow the dome to pivot relative to the hood. The floor cleaning machine also has a pair of slit orifices that eject fan spray patterns of cleaning liquid that are non-coplanar and do not intersect each other. Furthermore, the floor cleaning machine has an oscillating brush assembly that includes a brush that is replaceable without using tools. The brush height can be adjusted via an adjustment member. The structure of the machine is rigid and robust to provide a comfortable platform to the rider. Essentially the structure is needed for the minimum maintenance cost and most of the parts used interchangeably

Keywords : Scrubber, expensive, maintenance, electrically.

II LITERATURE SURVEY

A street sweeper or street cleaner may refer to a person's occupation, or a machine that cleans streets. A street sweeper cleans the streets, usually in an urban area. Street sweepers have been employed in cities since sanitation and waste removal became a priority. A Street -sweeping person would use a broom and shovel to clean off litter, animal waste and filth that accumulated on streets. Later, water hoses were used to wash the streets.

Machines were created in the 19th century to do the job more efficiently. Today, modern street sweepers are mounted on truck bodies and can vacuum debris that accumulates in streets.

Mechanical sweepers in the United Kingdom

By the 1840s, Manchester, England, had become known as the first industrial city. Manchester was home to the first passenger rail service in the world and had one of the largest textile industries of that time. As a result, the robust metropolis was said to be England's unhealthiest place to live. In response to this unsanitary environment, Joseph Whitworth invented the mechanical street sweeper. The street sweeper was designed with the primary objective to remove trash from streets in order to maintain aesthetic goals and safety James and Daniel M. Todd and Charles A. Whiting were willing to risk a reputation gained from 30 years manufacturing experience.

In the fall of 1913, the City of Boise, Idaho, purchased the first Elgin Sweeper, following a demonstration. Boise Street Commissioner, Thomas Finegan, made a comparison showing a savings of \$2,716.77 from the Elgin motorized sweeper when used rather than a horse-drawn sweeper.

The very first street sweeping machine was patented in 1849 by its inventor, C.S. Bishop. For a long time, street sweepers were just rotating disks covered with wire bristles. These rotating disks served as mechanical brooms that swept the dirt on the streets. A common misconception is that Charles Brooks invented the street sweeper in America in 1896. Brooks' design, far from being the "first street sweeper," was just a variation of what already existed, and the patent for it was among the more than 300 street sweeper patents issued in the United States before 1900. Most 19th-century sweepers, including the one in Brooks' patent, were horse carts with no engine on board. The wheels on the cart turned gears or chains which drove the brush and belt. The first self-propelled sweeper vehicle patented in the USA, driven by steam engine and intended for cleaning railroad tracks was patented in 1868, patent #79606. Eureka C. Bowne was the first known woman to get a patent for a street sweeper in 1879, patent #222447.

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III DESCRIPTION OF EQUIPMENTS

3.1 CLEANING BRUSH:

A brush is a common tool with bristles, wire or other filaments. It generally consists of a handle or block to which filaments are affixed in either a parallel or perpendicular orientation, depending on the way the brush is to be gripped during use. The material of both the block and bristles or filaments is chosen to withstand hazards of its intended use, such as corrosive chemicals, heat or abrasion. It is used for cleaning, grooming hair, make up, painting, surface finishing and for many other purposes. It is one of the most basic and versatile tools in use today, and the average household may contain several dozen varieties.

3.2 CHAIN DRIVE:

Chain drive is a way of transmitting mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle, particularly bicycle and motorcycle. It is also used in a wide variety of machines besides vehicles. The power is conveyed by a roller chain known as the drive chain, passing over a gear, with the teeth of the gear meshing with the holes in the links of the chain. The gear is turned, and this pulls the chain putting mechanical force.

3.3 SPUR GEAR :

Spur gears are the simplest and most common type of gear. Their general form is a cylinder or disk. The teeth project radially, and with these straight-cut gears, the leading edges of the teeth are aligned parallel to the axis of rotation. These gears can only mesh correctly if they are fitted to parallel axles. The torque ratio can be determined by considering the force that a tooth of one gear exerts on a tooth of the other gear. Consider two teeth in contact at a point on the line joining the shaft axes of the two gears. The force will have both a radial and a circumferential component. Gears are a very useful simple machine. The torque ratio can be determined by considering the force that a tooth of one gear exerts on a tooth of the other gear. Consider two teeth in contact at a point on the line joining the shaft axes of the two gears.

A gear is a component within a transmission device. Transmit rotational force to another gear or device. A gear is different from a pulley in that a gear is a round wheel. Mesh with other gear teeth, allowing force to be fully transferred without slippage. Depending on their construction and arrangement, geared devices can transmit forces at different speeds, torques, or in a different direction, from the power source. Gears are a very useful simple machine. The most common situation is for a gear to mesh with another gear, but a gear can mesh with any device having compatible teeth, such as linear moving racks.

3.4 WHEEL:

A wheel is a circular device that is capable of rotating on its axis, facilitating movement or transportation or performing labor in machines.

A wheel together with an axle overcomes friction by facilitating motion by rolling. In order for wheels to rotate a moment needs to be applied to the wheel about its axis, either by way of gravity or by application of another external force. Common examples are found in transport applications. More generally the term is also used for other circular objects that rotate or turn, such as a Ship's wheel and flywheel.

3.5 PIPE:

A pipe is a tubular section or hollow cylinder, usually but not necessarily of circular cross-section, used mainly to convey substances which can flow — liquids and gasses (fluids), slurries, powders and masses of small solids. It can also be used for structural applications; hollow pipe is far stiffer per unit weight than solid members.

In common usage the words pipe and tube are usually interchangeable, but in industry and engineering, the terms are uniquely defined. Depending on the applicable standard to which it is manufactured, pipe is generally specified by a nominal diameter with a constant outside diameter (OD) and a schedule that defines the thickness. Tube is most often specified by the OD and wall thickness, but may be specified by any two of OD, inside diameter (ID), and wall thickness. Pipe is generally manufactured to one of several international and national industrial standards.[1] While similar standards exist for specific industry application tubing, tube is often made to custom sizes and a broader range of diameters and tolerances. Many industrial and government standards exist for the production of pipe and tubing. The term "tube" is also commonly applied to non-cylindrical sections, i.e., square or rectangular tubing. In general, "pipe" is the more common term in most of the world, whereas "tube" is more widely used in the United States.

3.6 BOLT & NUT:

A bolt is a form of threaded fastener with an external male thread. Bolts are thus closely related to, and often confused with, screws.

Bolts use a wide variety of head designs, as do screws. These are designed to engage with the tool used to tighten them. Some bolt heads instead lock the bolt in place, so that it does not move and a tool is only needed for the nut end.

The first bolts had square heads, formed by forging. These are still found, although much more common today is the hexagonal head. These are held and turned by a spanner or wrench, of which there are many forms. Most are held from the side, some from in-line with the bolt.

A nut is a type of fastener with a threaded hole. Nuts are almost always used in conjunction with a mating bolt to fasten two or more parts together. The two partners are kept together by a combination of their threads' friction (with slight elastic deformation), a slight stretching of the bolt, and compression of the parts to be held together.

IV DRAWING FOR FABRICATION OF MANUAL GEAR OPERATED SWEEPER VEHICLE

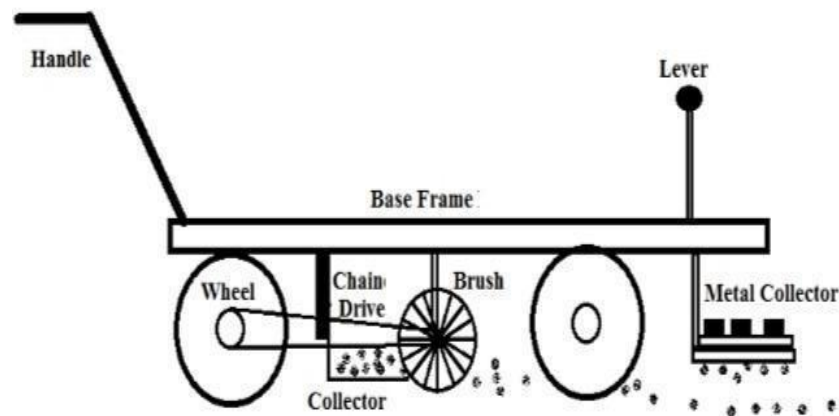


FIG:- 4.7 OVERALL DIAGRAM

V WORKING PRINCIPLE

Here we are using a vehicle handled manually. The magnet and brush is fixed under the vehicle. There are two plates namely the top plate and supporting plate. The supporting plate is made of acrylic. The top plate is hinged to the base plate and a foot pedal is mounted on it thus when the foot pedal is pressed the top plate lifts up. Magnet is fixed under the top plate. When the top plate is in position the chips and bur will be attracted by the supporting plate with the help of a magnet. When the pedal is pressed the magnet and the top plate comes up hence the chips and burrs will fall down. When the vehicle is moved manually the chips are attracted by the magnet thus the chips from the workplace are removed.

When the vehicle is moved manually the chips are attracted by the magnet thus the chips from the workplace are removed. And then other parts automatically rotate for wheel support in the brush unit Metal other wastage scrap collecting the other box.

VI MERITS AND DEMERITS

6.1 MERITS:

- This vehicle is easy to maintain.
- Fabrication cost is low.
- No electrical power is required.
- Metal collector only collect the metal
- Collector collect both stone & dust
- It donot need battery to run.

6.2 DEMERITS:

- This vehicle should be moved manually

VII APPLICATION

- It can be implemented in all manufacturing industries and roadways.

VIII CONCLUSION

The project promises a clean environment by giving evenly cleaned roads in towns and cities. It also pollution less vehicle, this innovation has made it more desirable and economical. And it don't need battery or fuel to run .This is to designed with the hope that it is very much economical and helpful to the public area and give safer air in the environment. The machine is a priority over machines that are weightless and we can be used for narrow roads or pavements. Additionally, it is lesser cost efficient as compared to other machines in terms of both production cost as well as running cost. The machine more over also promise employment for people.

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