

Development of Device (Magneto Gravity Settlers Equipment) To Absorb The Metal Like Fe, Ni , Cr, And Ni-Chrome, Lead And Its Alloy ,And Solid Contents Available In Air /Water (An Air /Water Cleaning Strategies In Industries Where Machining Occur

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Abstract : In Industries where the machining occur Fe metal , steel, Ni ,Cr , Ni-chrome, Al and its alloy, Cu and its Alloy , lead and its alloy etc. to achieve the desired shape and size in manufacturing process. After Machine the they washed out by water or very small metal particles are collided in air. Therefore these polluted the air and water. Therefore we develop the device to absorbs these Metal contents collided in water or air to clean the environments as early stage in industries. Therefore our environments is safe and free from these metal contents in air/water.

Key words : Air /water purifier From solid/ metallic components, Manufacturing shop , Chip (scrap) contents, microns(10^{-6} m), equipment's /device.

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I. Introduction

In manufacturing Process(conventional /unconventional)in industries to achieve the desired shape and size casting and matching is required . In Machining we remove the metal from the raw material and give the desired shape. When cutting take place we generate scrap/ Chips. Some are bigger and some are very less some time in microns . If the chips / scrap are Bigger in mm then it easily collect and melted it make metal. If they are very small metal particle like in micron(In Abrasive jet marching / Electro discharge Machining / electrochemical machining laser beam machining/ surface grinding/ lapping /honing etc.) and these washed out by the water or sometimes collided in air. In case study of Solid waste management in municipality of Ahmadabad By jiltusharsheth, Kinarapatel and Prof. Deepa shah (2016)the generation of Heavy metal such as Chromium ,copper , nickel , and lead in order of 6.02 , 8.02, 18.55, 1152.96, 150.39, 391 ,1950 tones respectively of year 2011. As it open dumping these quantity post threat to eco system of soil , sub surface of water and grounds and some are collided in air over period of time. In a case study of Karlsruhe City , Germany For Municipality Solid Waste the researchers “ odeile Schwarz, Abdel NasirOmran ,Hans peter Rapps in (2016) found the metallic waste in this city of Aluminum, Chromium, copper , nickel and lead, Arsenic etc. they collect in separate dustbin and recycle it but they also not give the idea how we remove the small chips(small size metal particles) part which are collided in air or wash in water. In Nigeria A case study of Management and Disposal of municipality waste in AbakalikiMetropoliesEbonyi Estate Nigeria, By PetricAkata, Nowfe (2015) gives the industrial metallic waste are 9% over all municipality waste. But he did not give the idea how we recycle it or how we remove it available small size metallic contents in soil , water and air. From Heavy metal toxicity and environments (Powl B Techounwoue, Clements G yedjou, Anita K potalla, Dwayne J Sutton Aug 2014) found that Environmental contamination can also occur Through Metal Corrosion, Atmospheric deposition, Soil erosion of metal ions and leaching of heavy metals, sediment re-suspension and metal evaporation from water resources to soil and ground. These waste metal occurs from industries and domestic waste are cobalt (Co), Cupper (Cu), Chromium (Cr) , Iron (Fe),Magnesium (Mg), Manganese (Mn), Molybdenum(Mo) , Nickel (Ni), selenium (Se),Aluminium(Al), Zinc (Zn).These metal come fromIndustrial sources include metal processing in refineries, coal burning in power plants, petroleum combustion, nuclear power stations and high tension lines, plastics, textiles, microelectronics, wood preservation and paper processing plants. Because of their high degree of toxicity, arsenic, cadmium, chromium, lead, and mercury rank among the priority metals that are of public health significance. These metallic elements are considered systemic toxicants that are known to induce multiple organ damage, even at lower levels of exposure. They are also

classified as human carcinogens (known or probable) according to the U.S. Environmental Protection Agency, and the International Agency for Research on Cancer.

Some of these Metals are bigger (more than 10 mm) it is easily collected as a scrap and recycle it and some have its dimension in microns (nearly 0.001 mm) it is very difficult to collect it and recycle it therefore this device is beneficial for collecting it and remove the metal particles from there. And this device magnet is recyclable it can be periodically change .

Therefore these small metal particles polluted to our environments and when we take the air/ water it goes to our body . These polluted air / water cause many disease like lung cancer , ulcer , stomach disease, asthma etc. therefore it is very necessary to clean the metal particles from the air/ water to prevent these disease. We make a device to absorb these metal contents from air / water . The diagram of these device are shown below.

Theory (principle)-

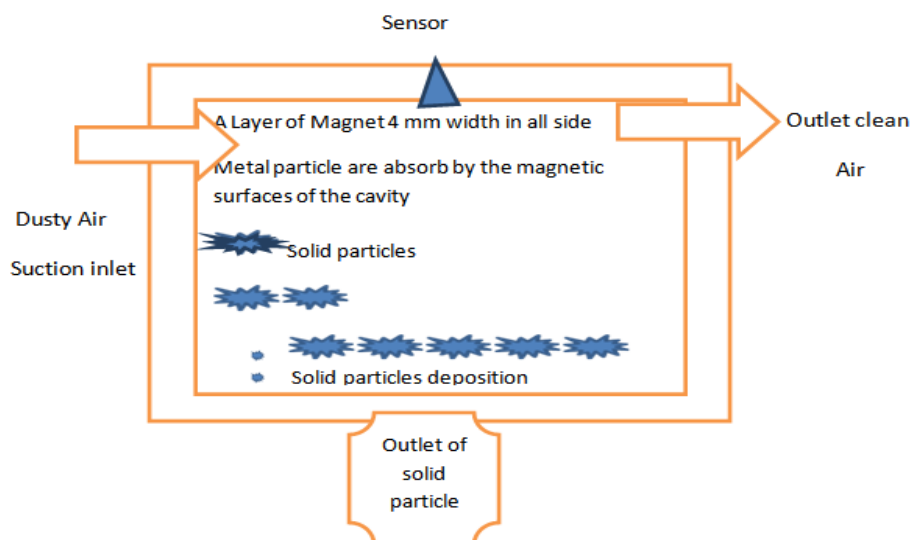
Here this apparatus works on the basis of a hybrid air/water cleaning system. First we utilize the Gravity settlers type then magnetic type; solid particles are settled down in the equipment's (using gravity settlers) as well as metal particles are attracted towards the magnets (using magnetic sheets). The basic principle is that when we suck the air inside the device speed of the air /water (shown in figure 1,2) is high because the diameter of suction pipe is less. In comparison of cavity where the solid and metallic waste are stored. After these high velocity air/ water enter towards the cavity, the velocity of air /water is less due to very high diameter or space in cavity. Due to less velocity; the solid waste components in air/water are settled down due to Newton's Second Law ($F = mg$) of gravity (Due to high weight of solid as well as low velocity) and same time the metallic components are also attracted towards the magnets which are bonded inside the cavity (Equipment's). These solid and metallic components present in the air/water are removed from the air/ water and the clean air/ water moves outside of the environments. This solid/metallic components are removed from the cavity when the cavity is full .We also provide the sensor when the cavity is full with solid/metallic .These sensors give the signal to the operator then operator removes the solid/ metallic waste from the cavity. These instruments are simple in construction. Maintenance is easy and low cost only requires change of magnets after removal of solid/ metallic components because these metallic components are very thin some times in microns (10^{-6} m). These solid/ metallic particles are dumped inside the earth cavity without concrete and upper side of the earth cavity is fully covered with concrete wall because it not again comes to the open environments.

Objective of Device- The device has following objectives

- 1- To clean the Small Metal particle Like Arsenic, Mercury, lead , Copper, Manganese, Iron, Aluminum, Magnesium, chromium, Nickel up to the dimension of 0.001mm (microns)
- 2- To reduce the hardness of water (10PPM) and cloudy ness in air (10PPM) this may clean water and air from metal particles.
- 3- To improve the visibility when clean these metal particles from air up to 10PPM
- 4- To reduce many disease like asthma, cancer, peptic ulcer from the small metal particles.
- 5- To reduce Air and water pollution from metal particle collided in air/water.

Figure 1 shows the magneto gravity settlers air purifiers where Figure 2 shows Magneto Gravity Settlers water Purifier.

Figure 1 OF Magneto Gravity Settlers Air Purifier



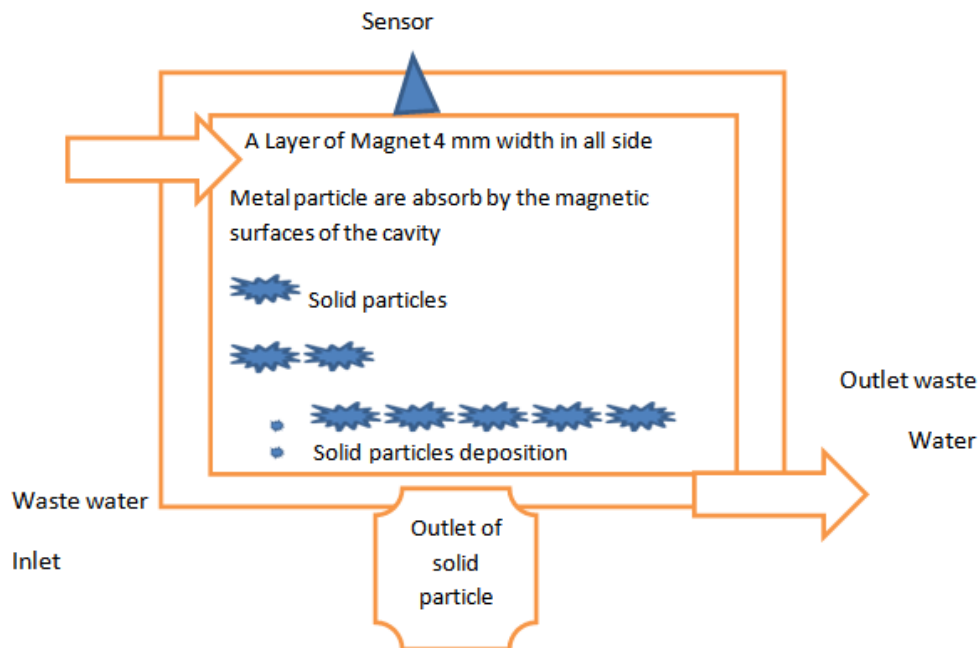


Figure2 OF Magneto Gravity Settlers water Purifier

II. Results

This Magneto-Gravity Sattler's Equipment have found the following observation

- 1- It is simple in construction and also make a portable device.
- 2- It remove the Metal contents Up to 0.001 mm which is attract towards the magnet.
- 3- The magnetic sheet is removable after it full with metallic contents and bonded another magnetic surface on the magneto gravity settlers Equipment's.
- 4- It is installed upside on the industrial room(manufacturing shop) when we clean the air from solid/metallic contents. It suck the dirty air with solid /metallic contents creating vacuum pressure type device and absorb the metallic/solid contents .
- 5- It is installed down side of the industrial room(manufacturing shop) when we clean the water From solid /metallic contents. It also suck the waste water with solid/metallic contents creating vacuum pressure type device and absorb the metallic/ solid contents.
- 6- It also utilize in the space where the solid / metallic waste are found.
- 7- Its Efficiency is near about 80%. To remove small metallic contents from air/ water

III. Conclusion

Here we conclude that this device is very useful from industrial waste (manufacturing Shop) where we generate the small chips when cutting take place. The following observation taken place.

- 1- We clean the metallic/ solid particles from the water /air .
- 2- It reduce the many disease like lung cancer, lung disease, asthma, stomach disease , ulcer occur due to removal of very hazardous metal /solid contents.
- 3- It also beneficial for air/ water cleaning at primary stage after wards the air /water cleaning is done by chemical or micro biological treatment.

Future scope – if it should modify use the filter or bagasse type vacuum cleaner with magnet are there clean our home with metal (Ni-chrome contents)available when heating the room heater .It also utilize in space with some modification to remove the space shuttles garbage.

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