Machine to Dispose off used Sanitary napkins chemically

Patent No: **298227**

Patentee: **Paramadathil Aiswarya**

Current methods of disposal and associated danger

1. Flushing and burying

- leads to blockages, plumbing problems
- outer layer of sanitary napkin is non-degradable
- collection of napkins in heaps block the pipeline
- pollute streams and rivers
- causes hormonal changes in wildlife – enable harmful organisms in the food chain

2. Incineration

- Harmful gas emissions: dioxin, furan, nitrogen oxides, sulphur dioxide, hydrochloric acid, mercury
- Ash produced contain heavy metals like lead, cadmium, copper, zinc
- Dioxins: cancer, immune system damage, reproductive and developmental problems.
- Halogenated hydrocarbons, acid gases – impair lung function.

Objectives of the new machine

- Disposal of sanitary napkins properly, thereby wiping out the risks involved in flushing, burying, and incineration.
- Reduce pollution and health hazards of conventional methods of sanitary waste disposal.
- Reduce cost for proper disposal of sanitary napkins, tampons, baby diapers and under pads.
- Simplify the process of sanitary waste disposal.
- Help in solving greatest problem people face daily.

Key Points of the machine

- One machine- can be used for sanitary napkins, tampons, baby diapers and under pads. (If a method to choose the option while using the machine is implemented)
- Can be manufactured both – domestic (for households) and industrial size (waste disposal plants/ panchayats)

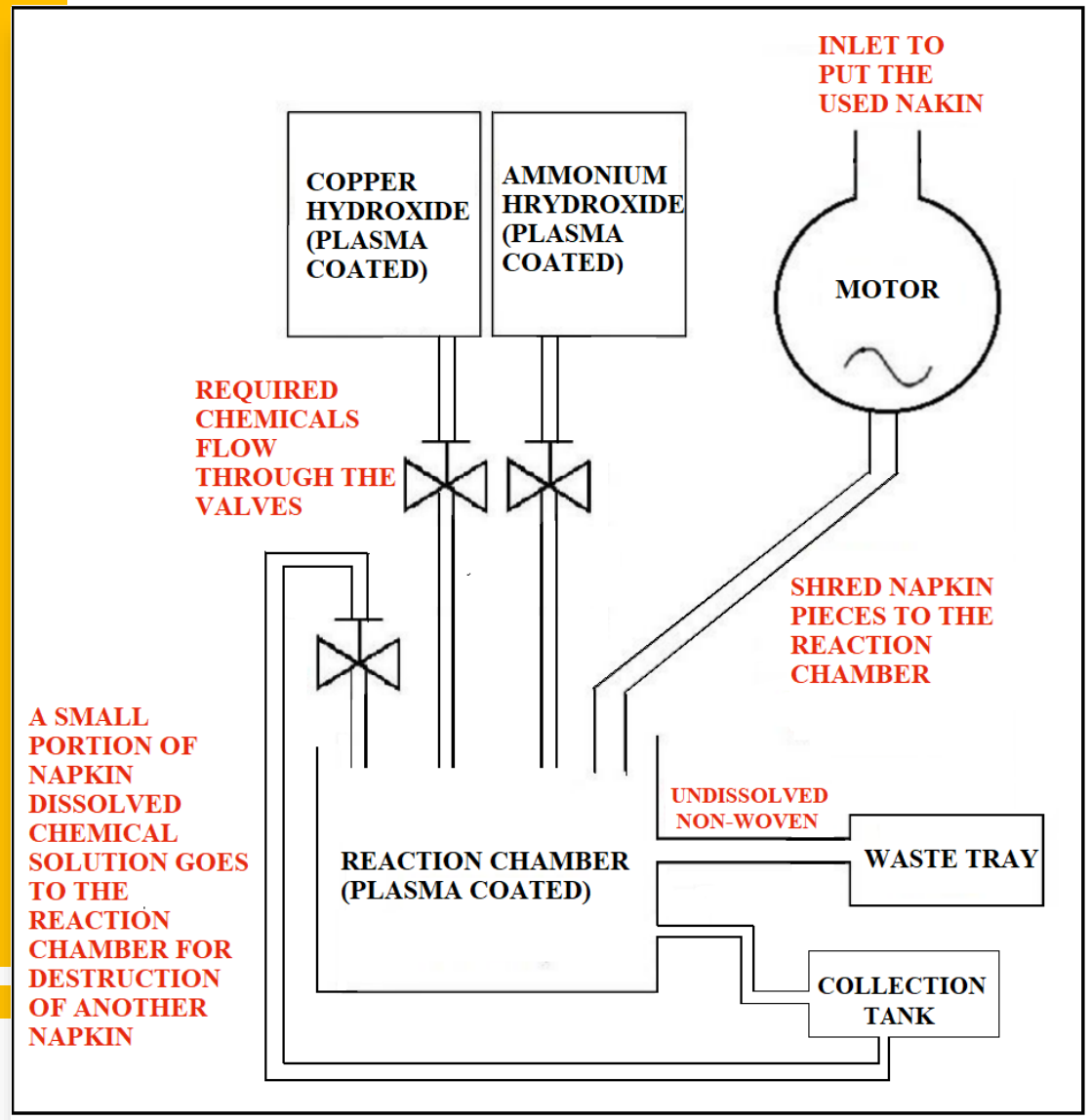
Technical Description

- Sanitary napkin/ diaper/ tampon/ under pad have two parts- cotton (inner material) and non-woven (outer material).
- Use the chemical Cuprammonium Hydroxide [$Cu(NH_3)_4(OH)_2$] which is formed by mixing Copper Hydroxide [$Cu(OH_2$] and Ammonium Hydroxide [NH_4OH].
- Copper Hydroxide + Ammonium Hydroxide = Cuprammonium Hydroxide.

$$4(NH_4OH) + Cu(OH)_2 = Cu(NH_3)_4(OH)_2 + 4H_2O$$

- Inner cotton gets dissolved in Cuprammonium Hydroxide and non- woven can be recycled and used for making bags and covers.
- Cotton dissolved chemical solution is collected in a separate tank and goes back to normal process of disposal of next used napkin.
- Undissolved non-woven is collected in a waste tray.

Working methodology



- User puts used napkin/ diaper / tampon / under-pad through the inlet of the machine.
- Two holding buckets have Copper Hydroxide [$Cu(OH)_2$] and Ammonium Hydroxide [NH_4OH] stored in them. Both of them should be plasma coated from inside.
- Holding bucket of $Cu(OH)_2$ is rotated by some mechanism with DC motor periodically (30 sec time gap) to avoid sedimentation of the chemical.
- User puts the used napkin/ diaper/ tampon/ under-pad through the inlet of the machine. Shredder mechanism includes sharp blades controlled by AC motor.
- Shred napkin pieces go to the reaction chamber, where reaction between napkin and the final chemical is to take place.

Working methodology continued…

- Required amount of $Cu(OH)_2$ and $NH_4(OH)$ for destroying a napkin/ diaper/ under-pad is delivered to reaction chamber (where it forms the final chemical ($Cu(NH_3)_4(OH)_2$)) through tube controlled by a solenoid valve.
- Solenoid valves are in turn controlled by a microcontroller.
- Dissolving of inner cotton part in the chemical takes place in about 2-3 minutes.
- After the above reaction, the undissolved non-woven part is moved to a separate waste tray which can later be recycled and used for making bags and covers.
- The reaction chamber is rotated by some mechanism with DC motor periodically (30 seconds time gap) to avoid sedimentation of the chemicals and speed up the napkin destruction.
- The reaction chamber should be plasma coated from inside.
- Cotton dissolved chemical solution gets collected in a separate collection tank, and a small portion of this goes back to the reaction chamber for the destruction of next used napkin.
- Approximate amount of final chemical $Cu(NH_3)_4(OH)_2$ required to destroy one used napkin is about 150 ml. (This amount will change for diaper and under-pad).
- Chemicals to be mixed in the ratio:- NH_4OH : $Cu(OH)_2$ = 7:5.

Prototype

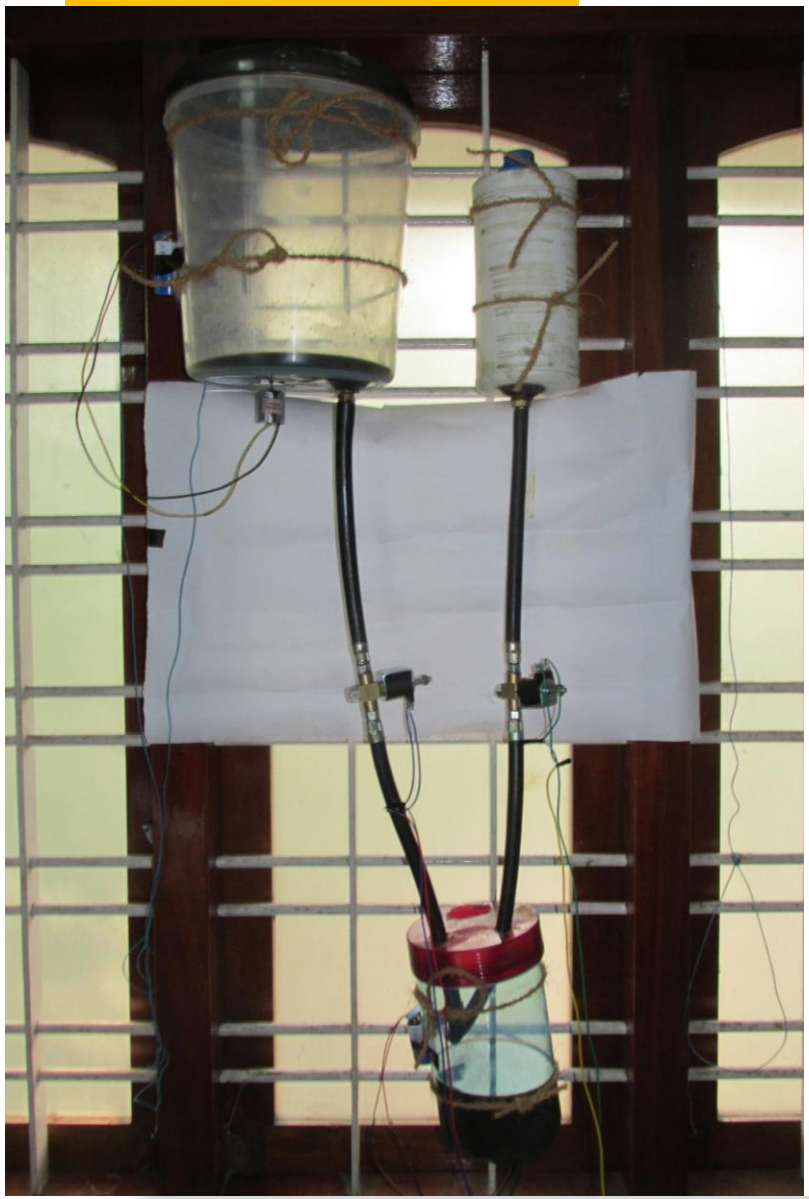
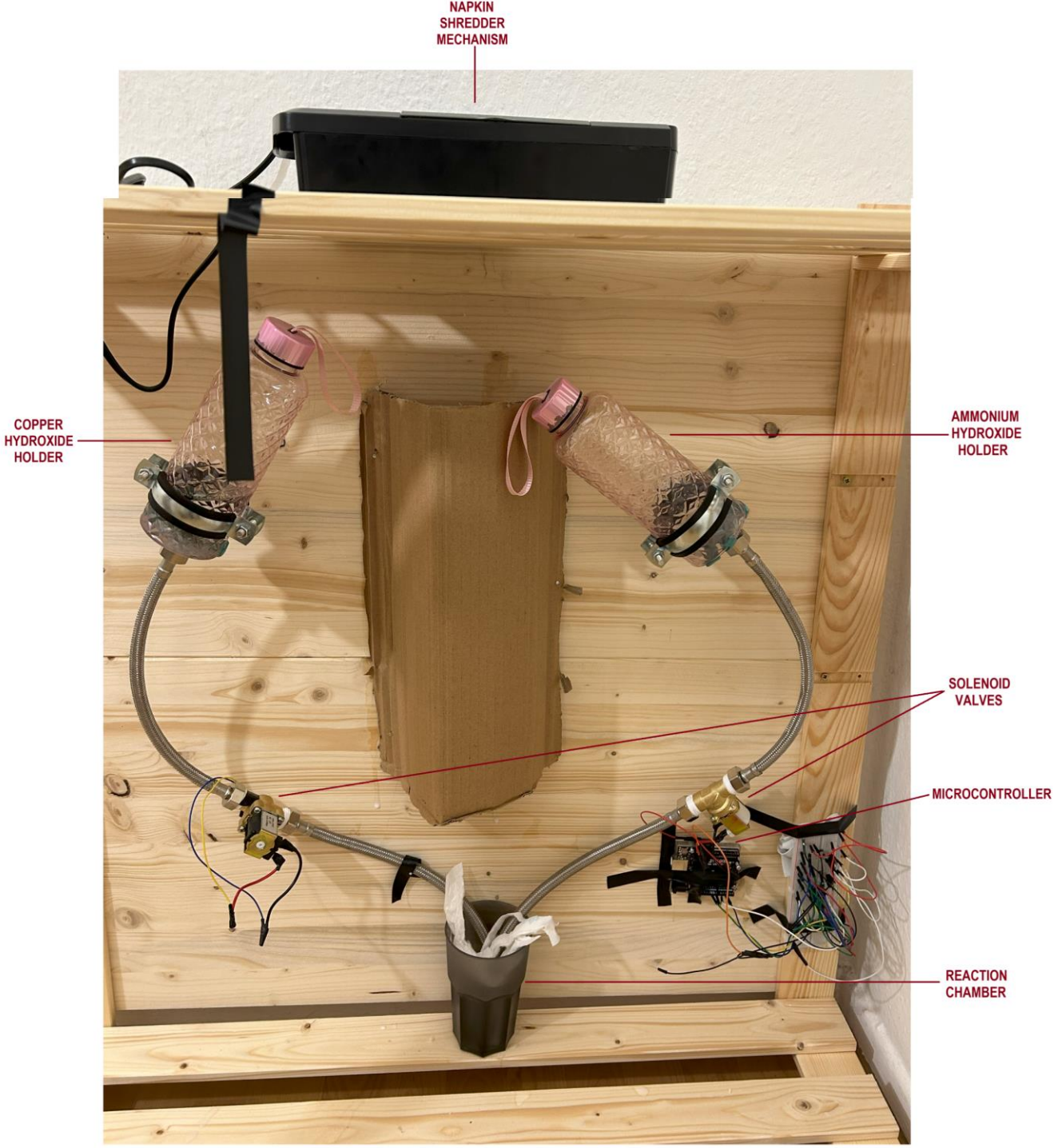


Image1



Note:

These are two prototype models developed at two different times.

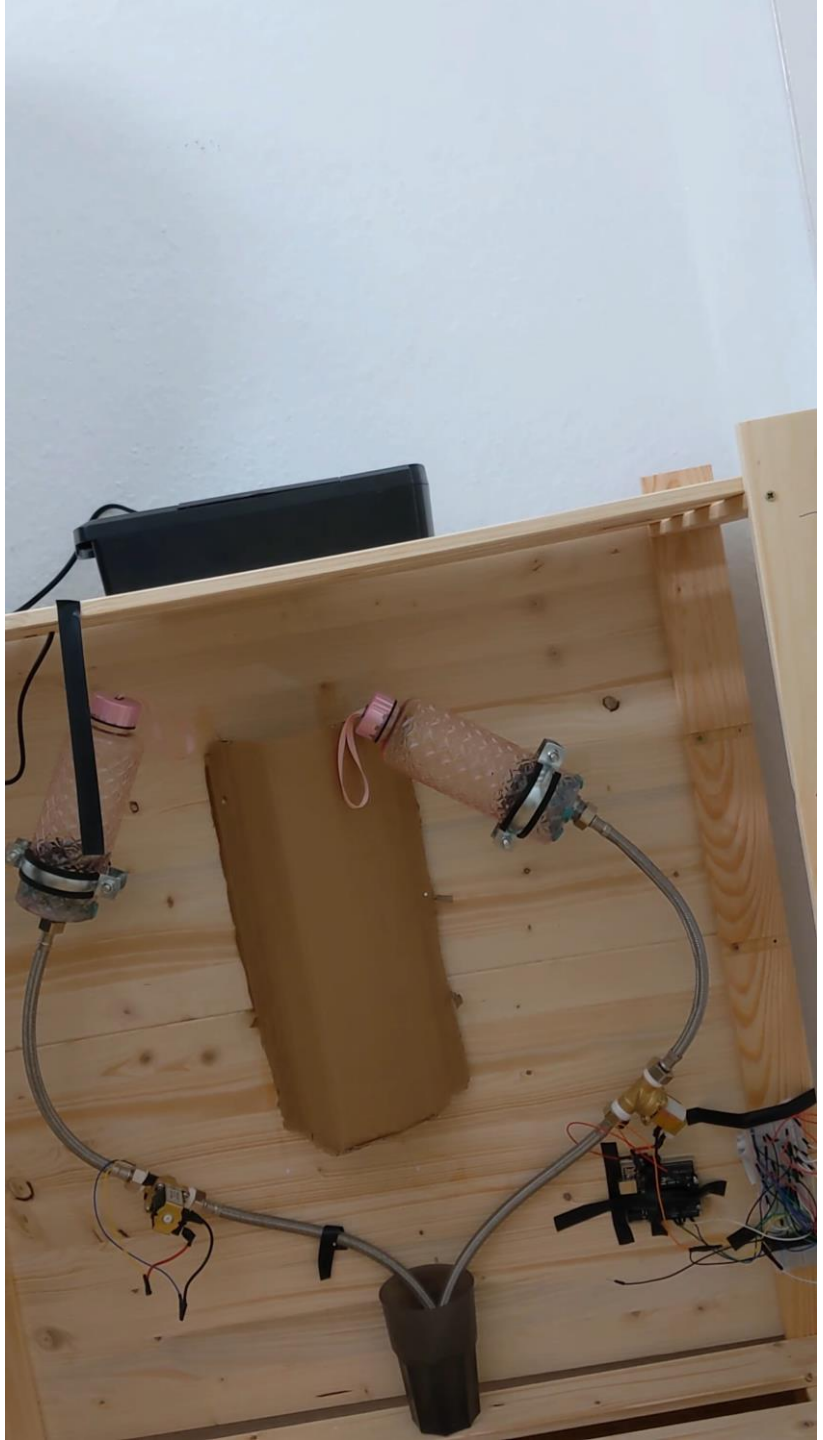
Image2

Technical Video

Video 1

Prototype Videos

Video 2



Prototype Videos

Note: These are two prototype models developed at two different times. And are made by hand at home with limited facilities. And hence, each part of the prototype is not perfect.

Video 3