

**Project Name : Desalination using reverse osmosis and screw force**

**Team : Guru Rathod**

Under 30Kg, 100% mechanical device purifies water continuously using energy harnessed by up down movement of waves captured by using tethered buoys attached to one-way ratchet screw or disc combination and reverse osmosis filter and discharges brine automatically.

The device consists of Buoys connected to an oscillating lever ratchet, which rotates the screw in either directions cyclically using mechanical stoppers / direction changers and a frame. When the screw is rotated in one direction, it compresses the water inside the reverse osmosis chamber and filters the water. Once the screw reaches at the end of reverse osmosis filter, the mechanical stoppers automatically changes the direction of the screw and starts moving in other direction and pressurize the water in opposite reverse osmosis chamber and the process continues continuously for forever as the components used in the assembly is non-corrosive.

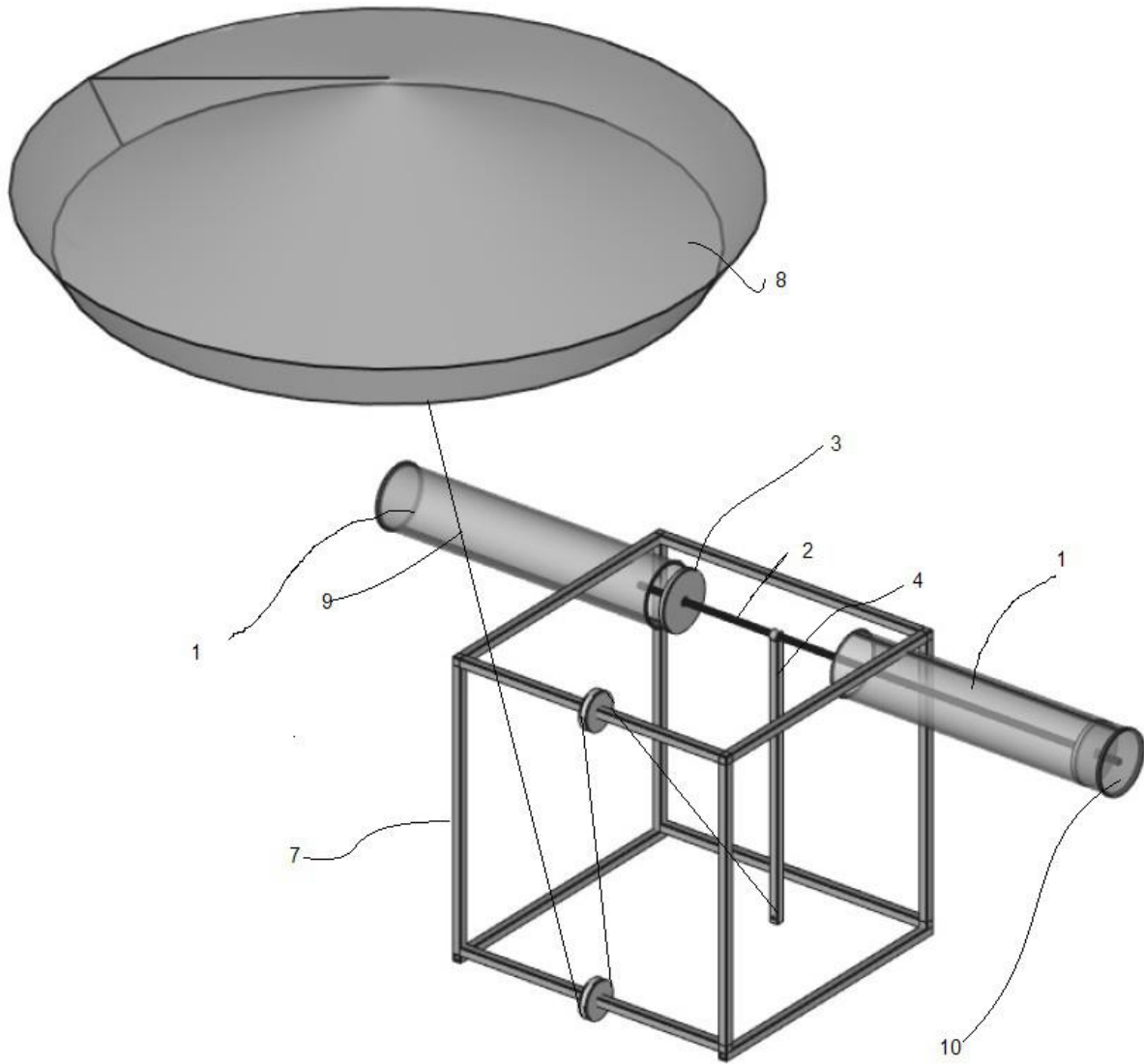


Fig. 1

## Detailed Description of the System

Presented technique of purifying or desalinating water is based on reverse osmosis technique. In this technique, water is forced to flow from semipermeable membranes using pressure. This apparatus consists of pipe (1), which contains water to be purified, screw (2) with head (3), which opposes the water flow in reverse direction of screw movement when pressurized. A ratchet or a disc (4), which allows rotations in one direction freely and opposes in other direction. A single flap (5) or propeller (6) or buoy (8) with rope (9) and a frame (7) to hold them as shown in the Fig 1. Either buoy or propeller or flap or any combination of them can be used to operate the assembly to purify the water. Different kind of semi permeable membranes (10) are used to filter out the impurities from the water, which are attached to the pipe (1) in different ways. The screw can be rotated by human muscle power or it can be rotated using force, which is imparted by wave on either a flap or propeller or buoy. When wave hits the propeller or buoy or flap, the wave energy is converted into rotational energy. This rotational energy is transferred to the screw using attached ratchet, which turns the screw in only one direction. For every consecutive wave hitting the assembly, the screw is rotated partially in one direction. When screw keeps rotating, it creates pressure on the water, which is inside it. The pressure helps to perform the reverse osmosis on water, where impure water is forced to go through the semipermeable membranes. At this time, only pure water is allowed to pass through the membranes and the impurities are trapped inside the membrane and back of the membrane. Which can be discarded (4) when the screw movement is completed till the specified length of pipe. That movement is then reversed and the other end of the screw again starts operating on the other side of the pipe in the assembly as shown in the Fig 1. A flywheel (11) and or gearbox (12) can be used to smoothly and continuously transfer the power to screw for rotation. The usage of flywheel improves the efficiency and performance of the system and can produce more water in available energy supply.

