A NEW DESIGN OF HANDLESS STIRRED DEVICE

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ABSTRACT: In Chemistry or Biology laboratories, in term of to get a homogenous liquid, a laborist is used to mix the liquid using a vessel and shakes it for a certain time based on the thickness level required. Sometime, this process should be done several times depend on numbers of reaction needed. Consequence, the laborist has to consume more time in the laboratory if they had more than one liquid mixing process. Based on this condition, nowadays, we can find a device that is able to mix the chemical liquid automatically. The device works by combining a magnetization principle and motorization concept. It is separated into two components which is vessel as a top part and dc motor on the bottom. The bottom one functions as a rotating magnetic motor to drive a magnetic stir bar placed inside the vessel. The bar helps the liquid mixed homogenously. In this paper, this device is improved by providing not only one magnetic drive, but two. Moreover, each drive could rotate into two different directions, right or left, depend on inputting command given by the user.

Keywords: Stirred Process, Magnetic Stirred

1. INTRODUCTION

Talking about chemistry laboratory, the first expression flashes in our mind is a picture of laborists shaking their vessel to mix some chemistry liquid. This activity is practiced to produce a homogenous liquid. Observing the method used by laborist in shaking the liquid, they do it manually by shaking, moving, rounding, even using a stick to mix the liquid inside the vessel/reaction bottle.

These conventional methods often consume more time and energy for the laborist to finish their work. Suppose to, there are five kind of homogenous reactions that should be completed in one term. Since the process is done using both hand, then laborist would finish their work five times more than a normal time. Moreover, in any case, a laborist has to stir his/her two chemistry's bottles to two different directions and speeds. For some people, this job is quite difficult since it requires a good balance with both hands. Hence, an automatic stirring device would be so helpful for all labor participants.

A handless stirred device is created to help lab's participants to stir and mix their chemistry's liquid for homogenous proposed. In a conventional way, a lab participant would occupy their both hand to complete their work. Meanwhile, the purposed device will help the laborist could let the device finish the work awhile they complete another occupations.The device works by combining two basic concepts that are motorized and magnetism. The later concept is used because the device utilizes magnetic bar inside the vessel to mix the liquid inside. Moreover, to drive the bar, a magnet is mounted onto a motor placed under the vessel. So, the bar inside the bottle would be driven at the time the motor is working. [1]. This device works automatically since it would be controlled by user depend to the need.

By utilizing this device, a working in chemistry laboratory would be very helpful. The laborist could perform some works at the same time. Consequence, the time used in the laboratory could be cut significantly.

2. RELATED WORKS

This concept was introduced for the first time by Arthur Rosinger at 1944 [1]. Here, the inventor invented a new tool to help a laborist to mix their chemistry liquid by using a coated bar magnet inside a reaction bottle as a stirrer. In 1917, an inventor named R.H. Stringham had invented an early concept to rotate the stirrer by utilizing a stationary electromagnet in the base of a mixer rather than using a rotating permanent magnet. However, a complete version of a magnetic stirrer was introduced by Salvador Bonet in 1977. Besides, Mr. Bonet also invented a standardized level of a stirring power in "liters of water". This standard is used globally in the market nowadays.

3. PROPOSED METHOD

The idea of this work is to generate an innovative design of an automatic stirrer device for laboratory's purposed. This device is used to mix chemistry liquid inside a reaction bottle to obtain a homogenous solvent handless. Normally, lab's workers do it either by shaking the bottle or stirring it using a stick. This activity consumes more time since the worker has to stick me their work along a time. In this paper, a different concept is purposed to help them by implementing motorizing and magnetic application to create a handless device to stir the vessel of chemistry liquid.

The purposed device utilizes a motor and a magnet stick, placed on top of the motor, asa driver to move a magnetic bar placed inside the vessel. The bar would move at the time the motor is moving because on the top of the motor is mounted a magnet brick. This magnet will drive the magnet bar inside the vessel moving along the movement of the motor. This movement is going to stir the liquid in the vessel automatically.

This product is quite different with the kind found in the market. The idea of this device is as a tool that is able to cover all works of the laborist regarding of their stirring work entirely in the laboratory. What does it mean? The device has two motors that are able to rotate to two different directions separately. Each motor can be operate according to time and speed that are commanded by a keypad. Moreover, this device is also provided with a buzzer as an alarm for the laborist to recognize their stirring process finished.

3.1 Design of Product

The design of this product is illustrated as two below figures. The first figure shows the block diagram of the design. Meanwhile, the latter is a flowchart of the design.

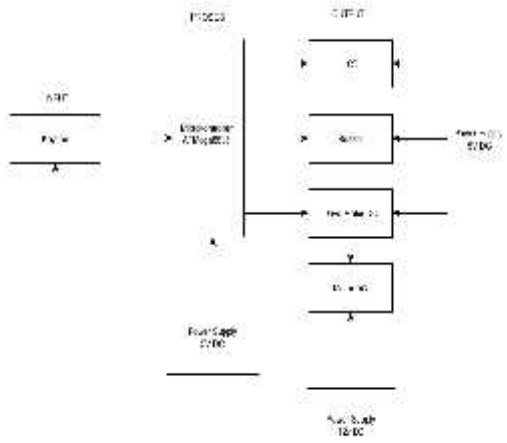

Fig.1 Block Diagram of Design.

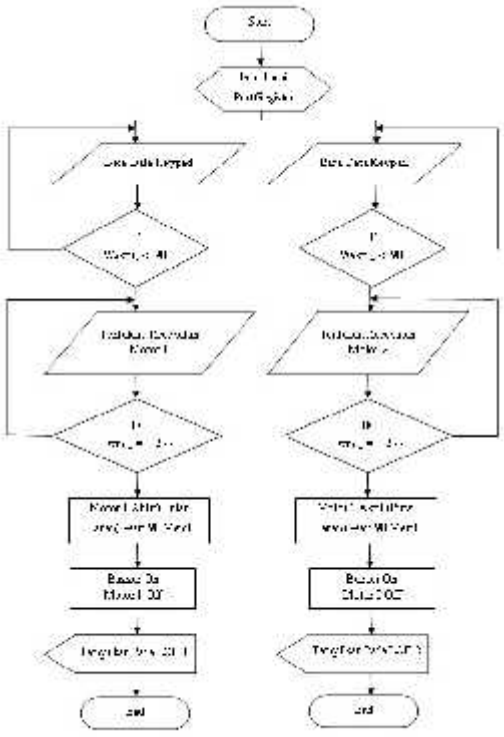

Fig.2 Flowchart of Design.

3.2 Superiority

Compare to an existence product, the idea of the proposed product is to provide a stirring magnetic device that has two motor that is able to rotate separately into two different directions depend on command inputting throwing its keypad. Moreover, the duration and speed of the stirring process could be controlled as well according to the need of the laborist. To give a complete expression of the device, the following picture illustrates the view of the design of the device.

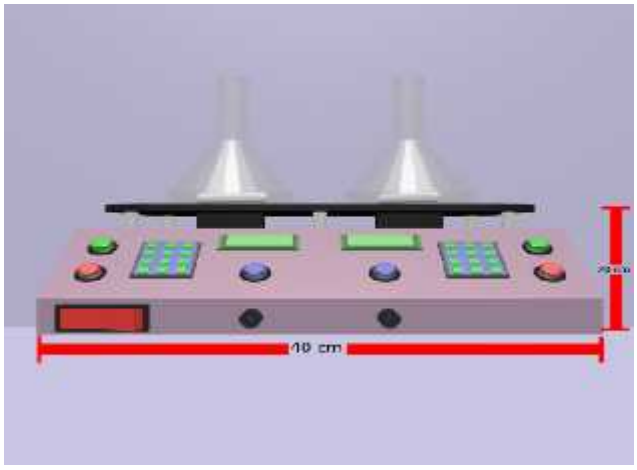

Fig.3 Front View of Design.

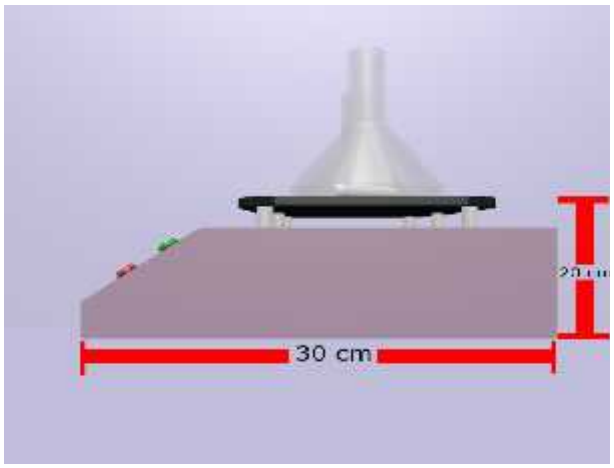

Fig.4 Side View of Design.

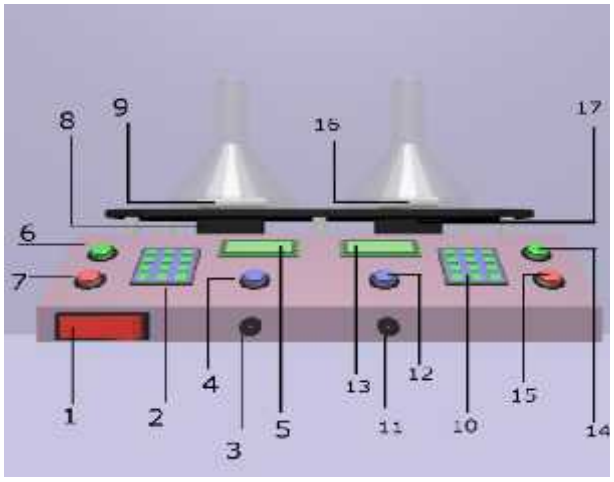

Fig.5 Parts of Design.

As shown in Fig. 5, the detail of each numbers is described in the below.

1. On/Off Button
2. Keypad 1
3. Buzzer1
4. Direction Button for motor
5. LCD as a display
6. Start button 1
7. Stop button 1
8. DC Motor 1
9. Magnet Bar 1 inside the vessel
10. Keypad 2
11. Buzzer 2
12. Direction Button 2
13. LCD 2
14. Start button 2
15. Stop button 2
16. Magnet bar for the second vessel
17. DC Motor 2

4. DISCUSSION

The main aim of the proposed idea is to provide a very helpful device for laborist in stirring or mixing their liquid to obtain a homogenous liquid. So, job after job could be finished completely without worrying the time in laboratory just be consumed for getting a homogenous liquid. Based on this reason, the magnetic stirred laboratory device with two motor working separately is introduces in this paper.

The basic principle of this device is motorization and magnetic. A magnetic bar is put inside a chemistry bottle as a tool to stir the liquid in the bottle. A magnet brick placed on the top of a motor will drive the bar at the time a command throwing a keypad given by user. The user also could select a time and speed of the mixing process depends on the need. The time and speed of the process is adjusted with a kind of reaction process required by the laborist. The following table illustrates the examples of the kind of the reaction process.

Table 1 Kind of Reaction Processes

Items	Reaction Processes		
	Kinds	Time Consumed (second)	Speed Consumed (second)
1	Pb Adsorpton	-	150
2	Fungi Biosorption	-	130
3	Calsium Solvent	>1200	-
4	Sendiment Filterization	35	-
5	Electrolite Adsorbtion	9000	-
6	Extraction of Silver with rate emulsion 1:1	20	1100

5. CONCLUSION

As explained above, the aim of the purposed device is to help a laborist stirring or mixing their liquid handless. So, they could do anything experiment awhile the mixing process is working. Moreover, the device offers a new innovation

regarding to the driving direction of the motor. It can be driven into two different direction depend on the need required by the laborist.

However, in the future research, an upgrade innovation could be implemented as well such as adding a heating element beneath the reaction bottle to warm the liquid inside the bottle. More, number of motor could be added as well to cover many works of stirring and mixing in the laboratory.

6. REFERENCES

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