Autonomous Lubrication System

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Abstract-*Automation in the present world is irrevocable. A machine is basically automated for the efficient use of man and machine. Lubrication nowadays is the most important aid for any industry. Machines in different industries are to be lubricated in order to reduce the friction that gets generated due to the movement of machine parts. If lubrication is not done properly, then the bearings may wear out and this can result in the reduction of efficiency of the machine. Moreover, lubrication prevents corrosion which helps the machine sustain for a long time. Lubrication of the machines is not only an important task but also a difficult one. It is to be done at regular intervals to all the machine parts. The lubrication points may vary from 40 to 50 in every machine. Hence, it can create fatigue and is a time consuming procedure. Automatic lubrication is the process which eliminates the above ambiguities. It provides lubrication to all the machine points within a short span of time. It is a speed, safe process and provides uniform lubrication.*

Keywords-Fire sensor, L293D driver, LCD display, MSP430 microcontroller and temperature sensor.

I. INTRODUCTION

Lubrication is the most important system in many industries. Due to heavy competition, the industries need to be more effective. Even today, manual lubrication is observed in many industries. Manual lubrication is a time consuming process and requires much of human effort. It is the method of checking the excess heat generated in the machine and supplying lubricants manually. Also, the functioning of the machine should be stopped while applying the lubricants.

In manual lubrication, sufficient lubricants are applied avoiding over greasing. This can maximize the re-lubrication interval. This method can be good for most grease-lubricated components and there are many applications that require frequent application of lubricants. This could be dangerous if applied in large volumes. Hence, application of

lubricants in small amounts at short intervals is preferred over application in large amounts for long intervals.

Lubrication when done carefully and sufficiently incorporates many advantages. The efficiency and durability of the machine can be increased to maximum. Automatic lubrication system desires to improve the process of lubrication. It allows complete automation of machine tools in industries. The main aim of this method is to apply lubricants in measured amounts at regular and short intervals. Sometimes, it becomes impractical to apply lubricants manually because of the physical location of lubricating points. Moreover, time and availability of humans also affects the process. This shows that machine availability, manpower and production cycles play an important role in the lubrication process. Automatic lubrication is unaffected by these factors and provides proper lubrication.

II. EXISTING SYSTEM

In the existing system, manual lubrication is followed. This method is quite complicated and has many disadvantages. It is time consuming and requires human efforts. Frequent monitoring of the system is also required. If lubrication is not done properly, then the machine wears out quickly resulting in the loss to the operator.

III. PROPOSED DESIGN

In order to overcome the difficulties of the existing system and to provide cost effective lubrication, the following design is approached. In the proposed design, we have used two sensors i.e., temperature and fire sensors. They are given certain threshold values and if the machine detects values above these ranges, then the motors are switched ON and lubricants are pumped sufficiently.

This saves time and is very efficient. It avoids fire accidents in the industries.

IV. BLOCK DIAGRAM

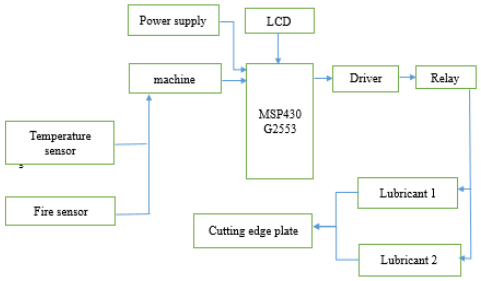

Fig: Block diagram of automatic lubrication system

V. WORKING

In Industries, due to the friction generated between the machine parts, temperature can exceed sometimes to dangerous levels and there can be chances of heat generation. In such cases, proper lubrication is to be done. This makes the system work smoothly and efficiently. The proposed system is used to pump lubricants to the required points of the machine. The system detects different parameters like temperature of the machines and fire in the industry. For this, two sensors are used i.e., temperature and fire sensors. Some predefined values of these sensors are stored in MSP430. Temperature sensor is given a range above 40ºC. Fire sensor starts detecting when the value in the sensor gets below 400. The maximum range of this sensor is 1034.

When the temperature value is above the mentioned range and the fire value is below 400, then the system becomes active. LM324 is used for comparing the stored and machinery values. After this, the information is passed to the relay circuit and driver starts operating. Relay acts as an on/off switch. Two pipelines are arranged through which the lubricants are pumped according to the requirement.

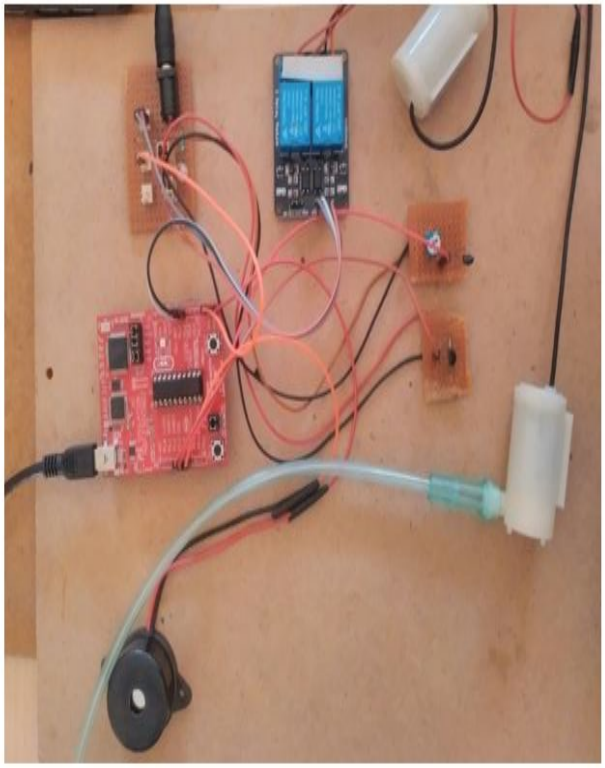

Fig: Experimental setup of automatic lubrication system

The circuit gets active and a buzzer sound indicates that the lubricant is being pumped to the machine.

Fig: Circuit in working condition

VI. FLOW CHART

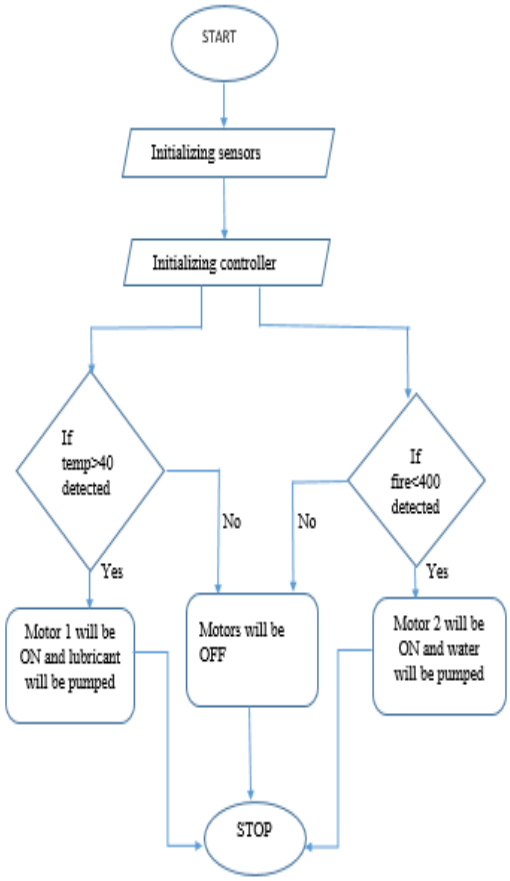

Fig: Flowchart of automatic lubrication system

VII. RESULTS

There can be three results in this project. They are:

- When the temperature is high (temperature>40 degree Celsius), Motor 1 will be ON and the desired lubricant is pumped
- When fire is detected (fire value <400), then the Motor 2 will be ON and water is pumped/
- When both the sensors detect normal conditions, then the Motors will be OFF.

VIII. CONCLUSION

Here, it is concluded that the man power requirement and cost for the process of lubrication can be eliminated. Greasing losses can be decreased when compared to manual greasing. The system incorporates safety to the user as well as the machine. This system provides lubrication to the points that are beyond the reach of operator.Automatic lubricating system is both easy and economical. It supplies lubricants to multiple points whenever required and makes the machine to work efficiently for longer durations.

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