Design and Fabrication of

Automated Water-feed System

A Project Report

Submitted by

G.JAGANNATH	**- 71205114017**
M.KEERTHIKANTH	**- 71205114018**
E.PRAVEEN KUMAR	**- 71205114033**

in partial fulfillment of the requirement in the subject of
(ME1357) Design and Fabrication Project

Under the guidance of
PROF.C.R.KAMALAKANNAN

DEPARTMENT OF MECHANICAL ENGINEERING

KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE – 641 006

ANNA UNIVERSITY :: CHENNAI 600 025

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BONAFIDE CERTIFICATE

fied that this project report entitled "**Design and Fabrication of Automated Water-feed System**" is onafide work of

G. Jagannath	- 71204114017
M. Keerthikanth	- 71204114018
E. Praveen Kumar	- 71205114033

carried out the project work under my supervision.

ature of the Head of the Department

Signature of the Supervisor

HEAD OF THE DEPARTMENT

SUPERVISOR

DEPARTMENT OF MECHANICAL ENGINEERING

KUMARAGURU COLLEGE OF TECHNOLOGY

COIMBATORE 641 006

CERTIFICATE OF EVALUATION

llege : Kumaraguru College of Technology

nch : Mechanical Engineering

nester : Sixth Semester

	Name of the Students	Title of the Project	Name of the Supervisor with Designation
	G. Jagannath	"Design and Fabrication of Automated Water-feed System"	Prof. C.R.Kamalakannan
	M. Keerthikanth		
	E. Praveen Kumar		

Report of the project work submitted by the above students in partial fulfillment of the award of elor of Engineering degree in Mechanical Engineering of Anna University were evaluated and rmed to be report of the work done by them

TERNAL EXAMINER)

(EXTERNAL EXAMINER)

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ACKNOWLEDGEMENT

ACKNOWLEDGEMENT

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We would be failing in our part if we do not thank the lab technicians Mr.Sasikumar, .Aurumugam, Mr. Balaganesh of our department without whom our project would not have been a cess.

Finally our sincere thanks to our beloved parents without whose motivation and ever persuading orts this project work couldn't have been completed.

SYNOPSIS

The objective of the project work is to increase the luxury by automation chnique and developing a system that can handle and deliver drinking water in efficient manner.

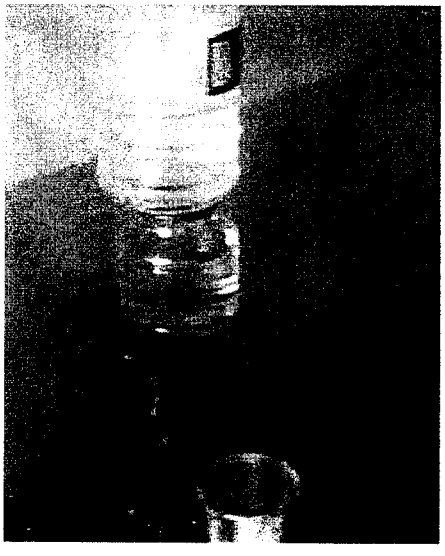
The system consists of a platform fitted with light sensors. When a person ters the stage the sensors sense his presence and activate the carriage type vitching control. The switching controls the folowing sequence of operations.

- The pump inside the can is activated.
- The plastic cup (Use and throw type) is filled with water to a certain amount. The filled condition of the glass is sensed by the LDR sensor and the motor is controlled.
- The rack and pinion arangement at the bottom of the tray enables the tray to come out and deliver the water.
- When the empty glass is placed after drinking the water in it the tray moves in. T he above steps are repeated as long as the person stands in the platform.

SYNOPSIS

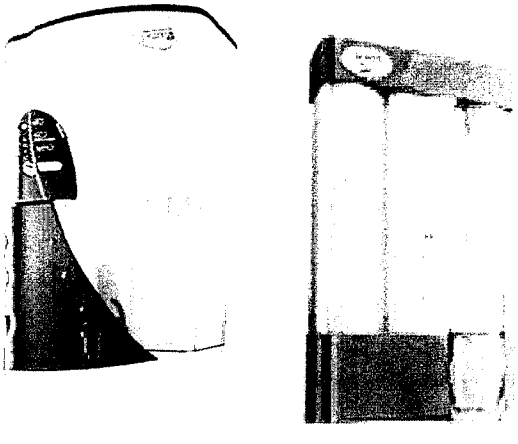
INTRODUCTION

EED FOR THE PROJECT



Now most of the water used for drinking in the institutions are mineral ater. These mineral water are available in the form of cans. The conventional stem of drinking water cans are very tedious and unfriendly to operate. This stem can be made more user friendly by automation techniques. Such a system called 'User friendly water can system'. The main operation techniques studied d the steps so far taken regarding the project is described in this report.

ONVENTIONAL METHOD



In the day today practice for drinking water purpose water purifiers like qua guard, pure it, water doctors and other kind of filters made by different

anufactures are installed in public places for drinking water handling. In some ses direct mineral in the form of cans. Are stored and utilized. The former ethod is now popular because low investment, less maintenance high liability and easy handling.

In all the methods the main purpose of producing pure drinking water is hieved. But a question arises as "Is this pure water reaches the pubic in a safe ay". This is because though the water is safe till the outlet, they are ntaminated when they are handled by the unclean glases exposed to germs and llutions in the public places.

Also we find it very difficult to handle the taps and also polluting the same some situations. In all these situations we realize the need for a system that n automatically render pure and also safe drinking water right to our hands hen approached. Such a machine is called as **AQUACOP**.

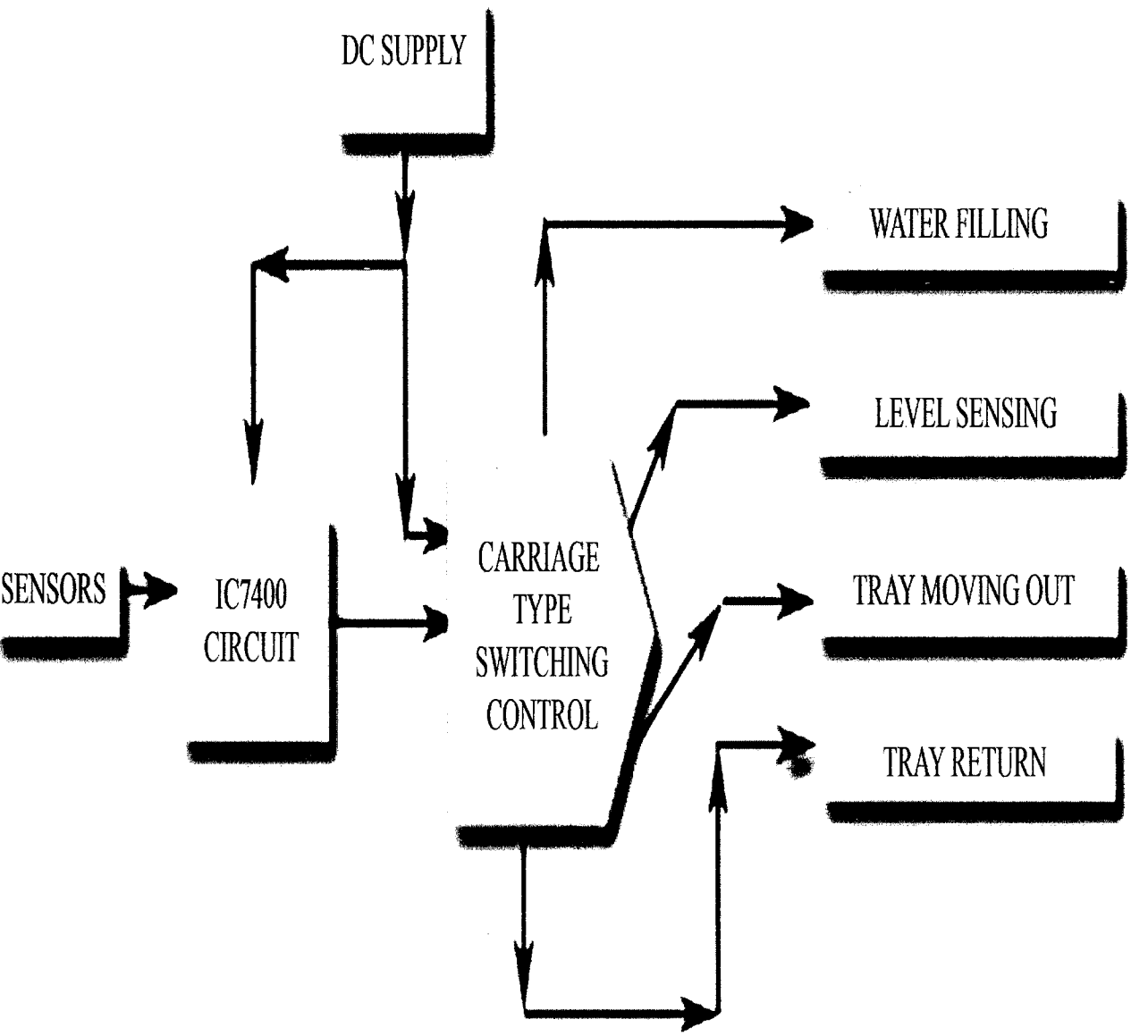
DVANTAGES OF THE PROPOSED METHOD

The automated water feed system provides the following utility and vancement.

- Store the pure drinking water and the water handling glass in a closed housing and protect it against atmospheric contamination.
- Automatically fills the water glass with water when a person approaches it and delivers the glass right to his hand.
- Automatic sensing of the person presence and switching on and off of the system.
- Ensure the purity and hygiene of the water handled.
- Reduce the fatigue of the public and encourages the less effort in doing simple but critical tasks.

SCHEMATIC DIAGRAM

SCHEMATIC DIAGRAM

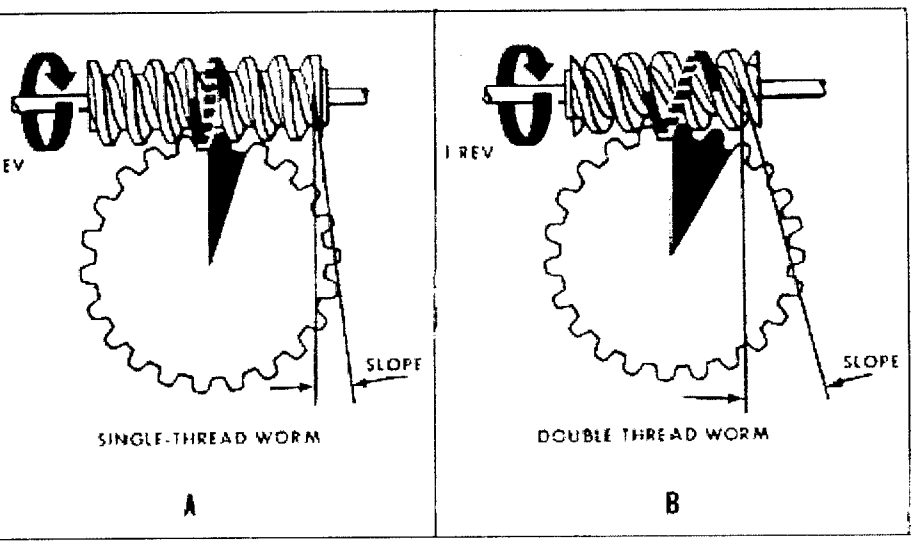


TRANSMISSION SYSTEM

ORM AND WORM WHEEL

orm drive is a gear arrangement in which a worm (which is a gear in the n of a screw) meshes with a worm gear (which is similar in appearance to a r gear, and is also called a worm wheel). The terminology is often confused mprecise use of the term *worm gear* to refer to the worm, the worm gear, or worm drive as a unit.

e other gear arrangements, a worm drive can reduce rotational speed or allow ner torque to be transmitted. The image shows a section of a gear box with a nze worm gear being driven by a worm. A worm is an example of a screw, of the six simple machines.



plications:

orm drives are a compact, efficient [efficient only in terms of volume; heat ction issues cause vast inefficiencies ranging up to 50%] means of stantially decreasing speed and increasing torque. Small electric motors are nerally high-speed and low-torque; the addition of a worm drive increases the ge of applications that it may be suitable for, especially when the worm ve's compactness is considered.

rm drives are used in presses, in rolling mills, in conveying engineering, in ing industry machines, and on rudders. In addition, milling heads and rotary es are positioned using high-precision duplex worm drives with adjustable klash.

ne era of sailing ships, the introduction of a worm drive to control the rudder a significant advance. Prior to its introduction, a rope drum drive was used ontrol the rudder, and rough seas could cause substantial force to be applied ne rudder, often requiring several men to steer the vessel, with some drives ing two large-diameter wheels to allow up to four crewmen to operate the der.

Worm drives have been used in a few automotive differentials. The worm r carries the differential gearing. This protects the vehicle against rollback. s has largely fallen from favor due to the higher-than-necessary reduction os. The exception to this is the Torsen differential, which uses worms and netary worm gears in place of the bevel gearing of conventional open ferentials. Torsen differentials are most prominently featured in the HMMWV l some commercial Hummer vehicles, and as a center differential in some all eel drive systems, such as Audi's quattro. Very heavy trucks, such as those d to carry aggregates, often use a worm gear differential for strength. The rm drive is not as efficient as a hypoid gear, and such trucks invariably have a y large differential housing, with a correspondingly large volume of gear oil, absorb and dissipate the heat created.

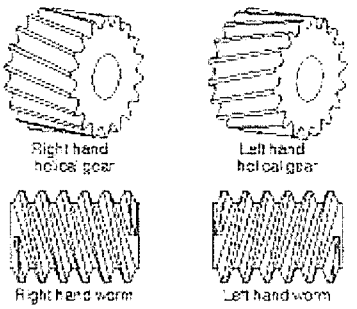
Plastic worm drives are often used on small battery-operated electric tors, to provide an output with a lower angular velocity (fewer revolutions minute) than that of the motor, which operates best at a fairly high speed.

s motor-worm-gear drive system is often used in toys and other small trical devices.

es:

. Left hand drive

. Right hand worm drive



RIGHT HAND WORM WHEEL:

A right hand helical gear or right hand worm is one in which the teeth twist clockwise as they recede from an observer looking along the axis. The designations, right hand and left hand, are the same as in the long established practice for screw threads, both external and internal. Two external helical gears operating on parallel axes must be of opposite hand. An internal helical gear and its pinion must be of the same hand.

LEFT HAND WORM WHEEL:

A left hand helical gear or left hand worm is one in which the teeth twist counterclockwise as they recede from an observer looking along the axis.

FORMULA USED FOR WORM WHEEL DRIVE:

The *gear ratio* of a worm gear is worked out through the following formula:

$$\frac{\text{number of teeth on worm wheel}}{\text{number of teeth on worm}}$$

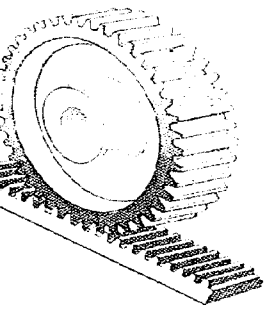
The worm acts as a single toothed gear so the ratio is;

$$\frac{\text{number of teeth on worm wheel}}{1}$$

The worm wheel is in turn connected to the reduction gear box. The driven ft consisting of the pinion to drive the rack is driven by to DC motors (with gearbox assembly) one on the either side. Thus a single shaft is driven by o motor

CK AND PINION

A **rack and pinion** is a pair of gears which convert ational motion into linear motion. The circular *pinion* engages teeth on a flat - the *rack*. Rotational motion applied to the pinion will cause the rack to ve to the side, up to the limit of its travel. The rack is the flat, toothed part, pinion is the gear. Rack and pinion can convert from rotary to linear of from ear to rotary. The diameter of the gear determines the speed that the rack ves as the pinion turns.



PLICATIONS:

Rack and pinions are commonly used in the steering system of cars to convert rotary motion of the steering wheel to the side to side motion in the wheels. e rack and pinion arrangement is commonly found in the steering mechanism cars or other wheeled, steered vehicles. This arrangement provides a lesser chanical advantage than other mechanisms such as recirculating ball, but ch less backlash and greater feedback, or steering "feel".

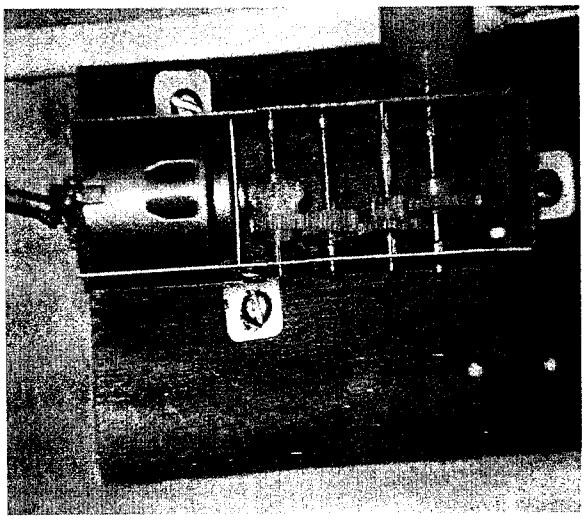
Rack and pinion gears give a positive motion especially compared to the ction drive of a wheel in tarmac. In the rack and pinion railway a central rack ween the two rails engages with a pinion on the engine allowing the train to pulled up very steep slopes.

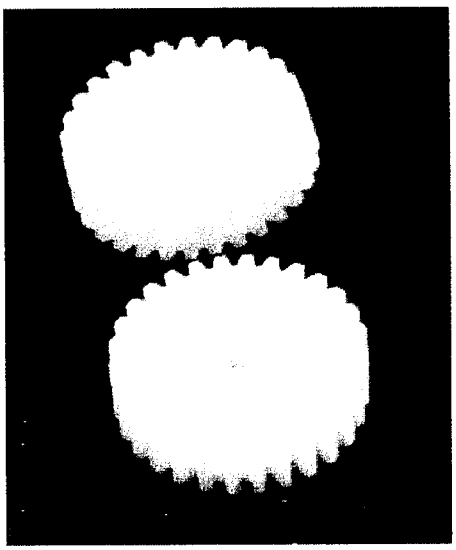
The cost of the original rack and pinion of our requirement RS.300. But is two heavy and does not meet with the torque capacity of the motor. So rack and pinion arrangement is made by using nylon material. At start of the design, the mechanism was designed with shaft and ball bearings. ce the fabrication became tedious involving the design of shaft gears ball arings etc , the rack and pinion arrangement is used. This arrangement is used take care of the process of moving the tray in and out .

e pinion used in the project for driving the tray has the following ecifications as measured by the profile projector.

- Major diameter-**24.75mm**
- Minor diameter-**23.01mm**
- Pitch-**2.13mm**
- Tooth Thickness -**1.03mm**
- Depth-**1.74**

ERABOX





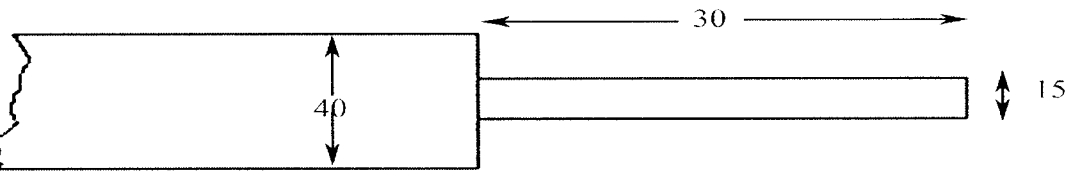
he torque required to drive the tray is accomplished by using reduction ear box. As per the requirements of the project the gear box has to fit thin the dimension of 2*3*8 cm small size gears of same speed ratio, hich are used as spare parts for the watches and meters, were bought nd assembled on sheet metal frame.

wo such gear boxes were made and coupled to the DC motor with orm and worm wheel arrangement as explained before.

IAFT

The gear box shafts are of 1.5 mm dia. And the worm wheel shaft is
ım dia. Soto accomplish it initially alluminium and mild steel rods of 10
m dia for connecting the two shafts of different diameter

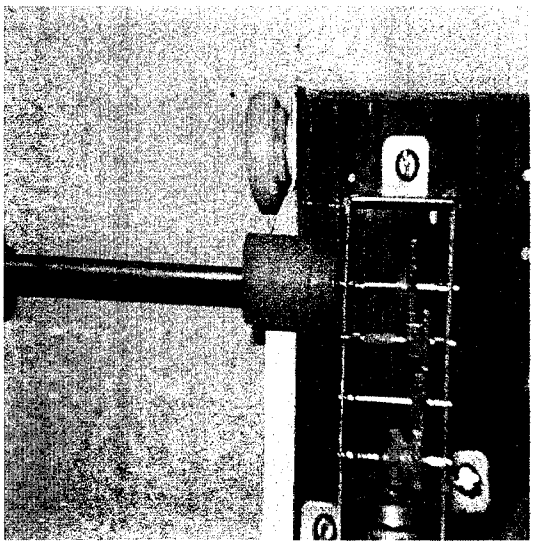
The shaft was machined in lathe shop as per the dimensions given
the figure that follows.



ALL DIMENSIONS ARE IN MM

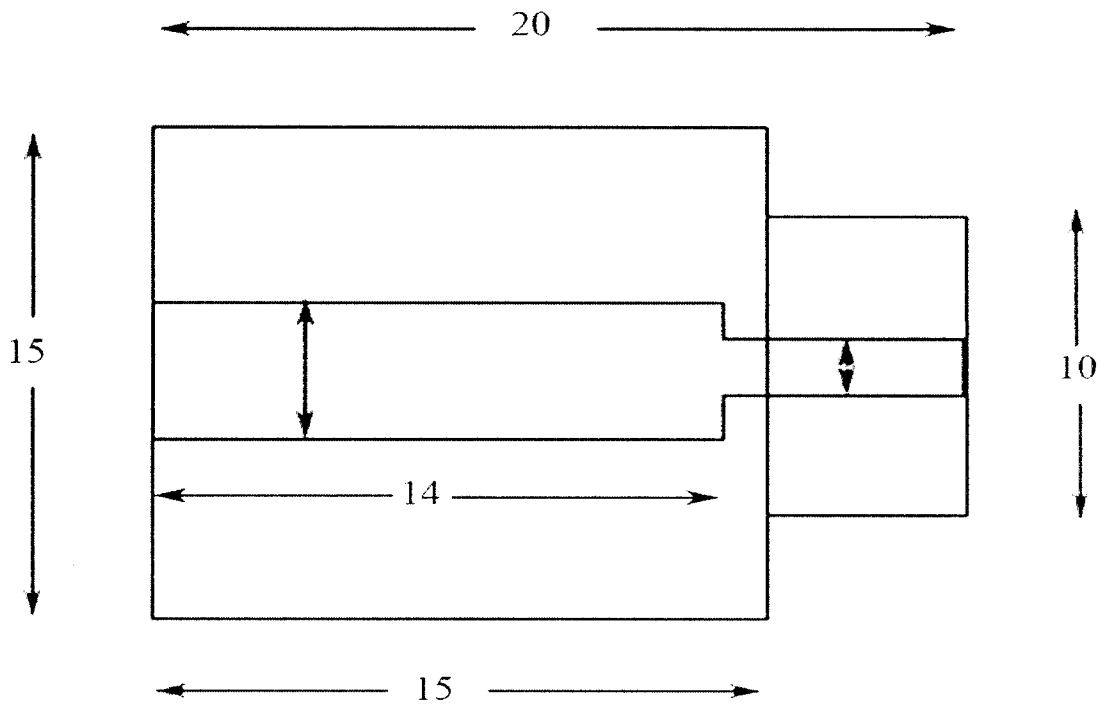
But due to the small diameter both the aluminium and mild streel shaft got
flected at the ends in the form of dumbbell. So the deflected region were
achined in bench grinding machine and tool grinding machine. Then the small
afted was hardened by heat treatment in furnace. Yet the profile was not
iform due to grinding. So the method was a failure.

OUPLING



To overcome the problem two shafts of dia 1.5mm and 4mm are directly ed in the gearbox and worm wheel respectively. Then the two shafts were nnected by means of couplings made of nylon.

The following diagram shows the coupling dimensions.

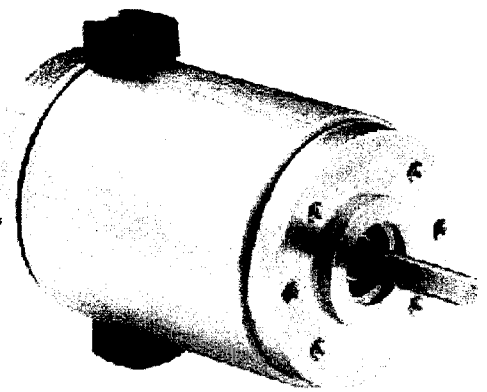


ylon rod of 20 mm dia is used as the work piece for the fabrication of the uplings. Two couplings of the above dimensions are made and connected to e shafts.

VALVE CONTROL

OTOR CONTROLLED VALVE

To enable the filling of the glass initial tap was use to open and closs the motor with high speed reduction and high torque was designed to be used. e output shaft from the motor is vertically coupled with the tap axis .



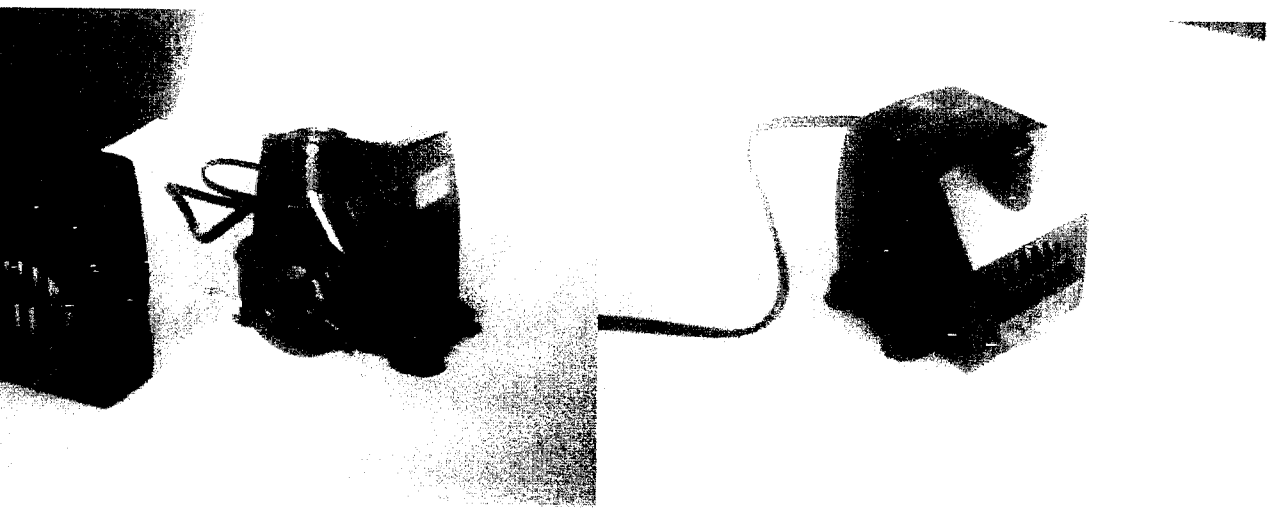
To enable smooth opening and closing of the tap with less torque Various be valve and hydraulic valves were tried.

Finally brass valve was found to work on smooth touch and easily trolled. But the pressure of the water was so lees that that filling of tumbler ame very time consuming and less effective. So different pumps were estigated to meet the requirement. Pilot operated check valve mechanism was o studied . But since the bore of the plunger was too small it was not suitable.

SUBMERSIBLE PUMPS

TRODUCTION

The history of submersible pumps dates back to 1998, the in which it was ented. This ump initially found most versatile in use of applications for vaging purpose and then gained popularity for deep well applications. Since 0, they found tremendous applications in the field of irrigation engineering vell as in more dewatering. With improved materials and construction, mersible pumps continue to find applications such as circulating water nps, fuel handling pumps, pumps in fish trawlers, and in oceanography. Now ays, they occupy pioneering position in deep well pumping and are becoming ular in surface pumping like cooling water circulation boostering and amental fountain.



In submersible pumps sets, both pump and motor are installed deep inside tube well so hat suction head is minimized which makes it possible to lift er from depths as deep as 450 meters. These pumps are essentially single or tistage centrifugal turbine pumps. The complete unit consisting of pump and rrel cage induction motor (motor in the lowest position) is suspended in the (casing pipe) vertically from the discharge rising pipe.

Submersible pumps with radial impellers are made for low discharge with
n total heads whereas pumps with mixed flow impellers are for medium
harge with medium heads. To couple the submersible pumps and motors
er jaw type of brush coupling can be used. The non return valve located at
top of the pump in discharge outlet connection is fully streamlined for
oth flow and is normally supplied with screwed conditions.

ORKING OF SUBMERSIBLE PUMPS

In submersible pump set both the motor and the pump are installed deep
vn into the inside the tube well so that the suction head is minimized which
kes it possible to lift water from depths as low as 450 meters. These pumps
essentially single stage or multistage centrifugal turbine pumps designed to
n a compact unit in the conjunction with a coupled wet type squirrel cage
uction motor, both of which operate totally submerged below the surface of
water. The complete unit consists of pump and motor is suspended in the
e vertically from the discharging pipe. The pipe is firmly secured to the
vicing edge of the well by means of supporting clamps. The pump can be
alled in the horizontal or inclined formation also.

The pump bearings are water lubricated and protected against
ingress of sand by suitable structural elements, the casings of radial impeller
clamped together by flat steel tie bars. The individual casing of mixed flow
ellers are connected to one another by stud bolts. The non return valve at top
he pump in discharge outlet connection is fully streamlined for smooth flow
is normally supplied e screw connections. The pump casing between the

p and motor is guarded by perforated strainer to prevent the entry of any ended material in water.

Wearing ring is fitted on each stage bowl and inlet body, so only wearing ring is to be replaced in case of damage and wear and tear of e bowl and inlet body. Either jaw type or bush type windings are used. mersible pumps are wet type squirrel cage induction motors completely l with pure clean water. It consists of proof insulated windings. All the rs are sealed effectively against water contamination.

The axial thrust generated by the pump is absorbed by a t bearing which compensates the pressure, which arises as a result of nal expansion of water filled in the motor. The cables are led out of the r through cable sealing glands and protected against mechanical damage by ble guard length of the pump.

/ANTAGES OF SUBMERSIBLE PUMPS:

Easy to install

Installation requires no foundation. Instead of pump house, a small well head covered with a lid is constructed

No suction trouble:

As the pump rests below water level, flow inside the pump is automatic, no suction difficulties arise and no leakage in the pump.

No maintenance

As the bearings are water lubricated, periodic oiling and greasing is not needed.

Noiseless operation

Both pump and motor are placed deep down in the well, so there is no disturbance from the pumping noise

High efficiency

Overall efficiency is higher than that of shaft type pumps. Higher the efficiency, lower is the power consumption, which means lower cost of operation

APPLICATIONS OF SUBMERSIBLE PUMPS

Submersible pumps can be used as

- **Primary pump for drinking water supply installation** for cities, rural industries and irrigation.
- Fully automatic domestic water supply pump
- Pressure booster pump in a close coupled adoption in a steel barring having a below ground section inlet. This pump offers minimum variation in discharge due to change in heads because of its steep head discharge characteristics
- Cooling water circulation and air conditioning

- A pump for lowering the ground water level on building sites
- Ornamental fountain pumps
- Dewatering in mines and for lift generation.
- Underground gasoline storage pumping system
- Supplies factory with industrial water
- Supply or drain water at engineering construction works

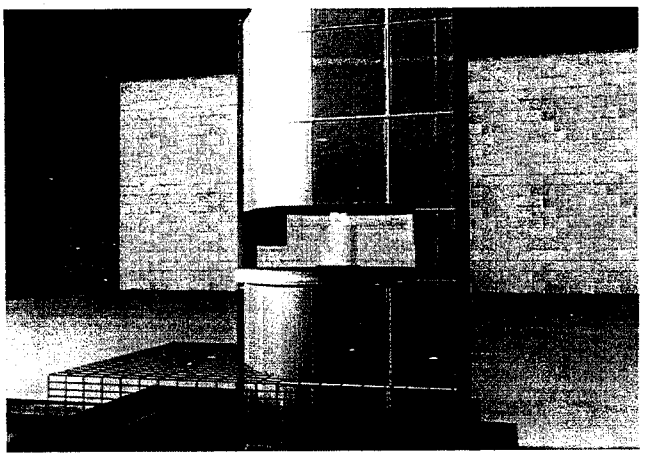
is pump is installed inside the can for pumping water.

CARRIAGE TYPE SWITCHING CONTROL

ARRIAGE TYPE SWITCHING CONTROL

The carriage type switching control consist of a carriage moving on a angular track. The each side of the hexagon on the track represents an eration to be performed.

This control is installed bellow the tray arrangement.



As this arrangement moves over the side of the triangle it keeps clossing d opening the corresponding circuits alternatively and thus enables to perform e sequence of operations.

But initially for fabricating this unit we bought a DC motor of 12V pacity and made it into a form of a vehicle. We made this vehicle with two heels. Then we replaced the wheels with toothed cylinders to enable it to move hoothly over the track. The track has been designed but is yet to be fabricated.

A LDR circuit is designed and is tested with the vehicle and used for rforming the operation.

STUDY OF SENSORS

TRODUCTION:

The study of different types of sensors were made to suit the requirement . e sensors are used to sense the presence of the person.

ES OF SENSORS:

1. LIGHT DEPENDENT RESISTORS(LDR)
2. ULTRASONIC SENSORS
3. PROXIMITY SENSORS

GHT DEPENDENT SENSORS (LDR):

An LDR is a component that has a resistance that changes with the light ensity that falls upon it. They have a resistance that falls with an increase in light intensity falling upon the device.

The light dependent resistor, LDR, is known by many names including the otoresistor, photo resistor, photoconductor, photoconductive cell, or simply photocell. These devices have been seen in early forms since the nineteenth ntury when photoconductivity in selenium was discovered by Smith in 1873. nce then many variants of photoconductive devices have been made.

Other light dependent resistors, or photo resistors have been made using

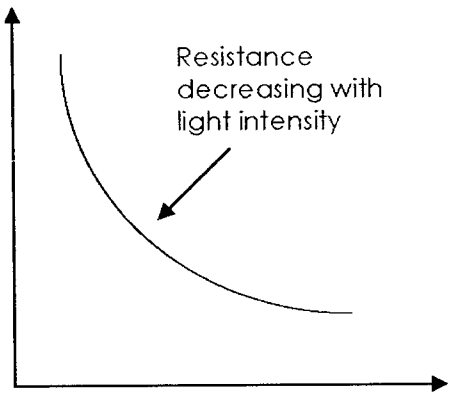
d semiconductor materials including germanium, silicon and gallium
enide.

The resistance of an LDR may typically have the following resistances

Daylight = 5000?

Dark = 20000000 ?

The following graph shows the relationship of light intensity with
stance. The light intensity is taken in x-axis and the resistance is taken in y-



From the above graph, we can see that as the, light intensity increases, the
sistance decreases to a greater extent.

PPLICATIONS:

There are many applications for light dependent sensors. These include the
llowing.

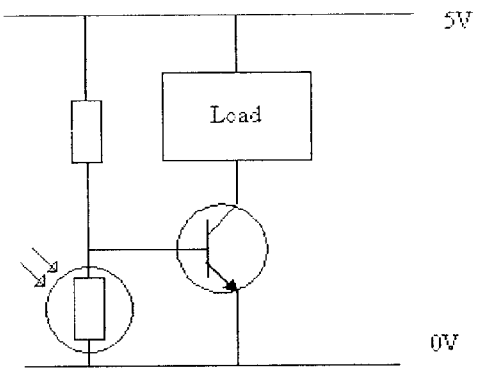
LIGHTING SWITCH

LDR is to automatically turn on a light at certain light level. An example of s could be a street light.

CAMERA SHUTTER CONTROL

LDRs can be used to control the shutter speed on a camera. The LDR would used the measure the light intensity and the set the camera shutter speed to e appropriate level

AMPLE OF AN LDR:



The circuit given above shows a simple way of constructing a circuit that turns on when it goes dark. The increase in resistance of the LDR in relation to the other resistor which is fixed as the light intensity drops will cause the transistor to turn on. The value of the fixed resistor will depend on the LDR used, the transistor used and the supply voltage.

. ULTRASONIC SENSOR

Ultrasonic sensors (also known as **transducers** when they both end and receive) work on a principle similar to radar or sonar which valuate attributes of a target by interpreting the echoes from radio or ound waves respectively. Ultrasonic sensors generate high frequency ound waves and evaluate the echo which is received back by the ensor. Sensors calculate the time interval between sending the signal nd receiving the echo to determine the distance to an object.

Systems typically use a transducer which generates sound waves n the ultrasonic range, above 20,000 hertz, by turning electrical energy nto sound, then upon receiving the echo turn the sound waves into electrical energy which can be measured and displayed.

The technology is limited by the shapes of surfaces and the density or consistency of the material. For example foam on the surface of a fluid in a tank could distort a reading.

TRANSDUCERS

An ultrasonic transducer is a device that converts energy into ultrasound, or sound waves above the normal range of human hearing. While technically a dog whistle is an ultrasonic transducer that converts mechanical energy in the form of air pressure into ultrasonic sound waves, the term is more apt to be used to refer to piezoelectric

rystals have the property of changing size when a voltage is applied, hus applying an alternating voltage (AC) across them causes them to scillate at very high frequencies, thus producing very high frequency ound waves.

DETECTORS

Since piezoelectric crystals generate a voltage when force is applied o them the same crystal can be used as an ultrasonic detector. Some ystems use separate transmitter and receiver components while others combine both in a single piezoelectric transceiver.

Alternative methods for creating and detecting ultrasound include magnetostriction and capacitive actuation.

APPLICATIONS

1. Humidifiers
2. Sonar
3. Medical Ultrasonography
4. Burglar Alarms
5. Non-Destructive Testing
6. This technology can be used for measuring: wind speed and direction (anemometer), fullness of a tank, and speed through air or water. For measuring speed or direction a device uses multiple

detectors and calculates the speed from the relative distances to particulates in the air or water. To measure the amount of liquid in a tank, the sensor measures the distance to the surface of the fluid

7. Use in medicine

   Medical ultrasonic transducers (probes) come in a variety of different shapes and sizes for use in making pictures of different parts of the body. The transducer may be passed over the surface of the body or inserted into an body opening such as the rectum or vagina. Clinicians who perform ultrasound-guided procedures often use a probe positioning system to hold the ultrasonic transducer.

PROXIMITY SENSOR

Proximity sensors are sensors able to detect the presence of earby objects without any physical contact. A proximity sensor often mits an electromagnetic or electrostatic field, or a beam of ectromagnetic radiation (infrared, for instance), and looks for changes the field or return signal. The object being sensed is often referred to s the proximity sensor's target. Different proximity sensor targets emand different sensors. For example, a capacitive or photoelectric ensor might be suitable for a plastic target; an inductive proximity ensor requires a metal target.

The maximum distance that this sensor can detect is defined nominal range". Some sensors have adjustments of the nominal range r means to report a graduated detection distance.

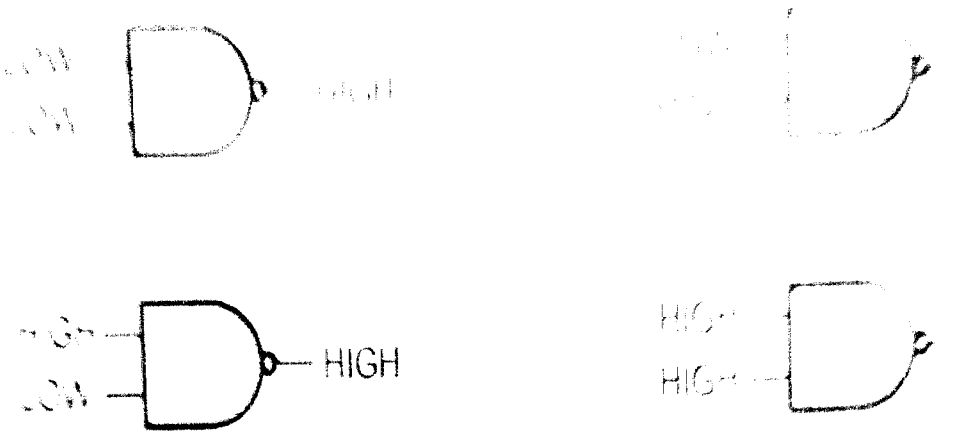
Proximity sensors can have a high reliability and long functional ife because of the absence of mechanical parts and lack of physical ontact between sensor and the sensed object.

MAIN CIRCUIT OF THE PROJECT

IAIN CIRCUIT OF THE PROJECT

The Circuit utilizes the NAND gate logic and triggers the carriage pe switching control when the light is blocked.

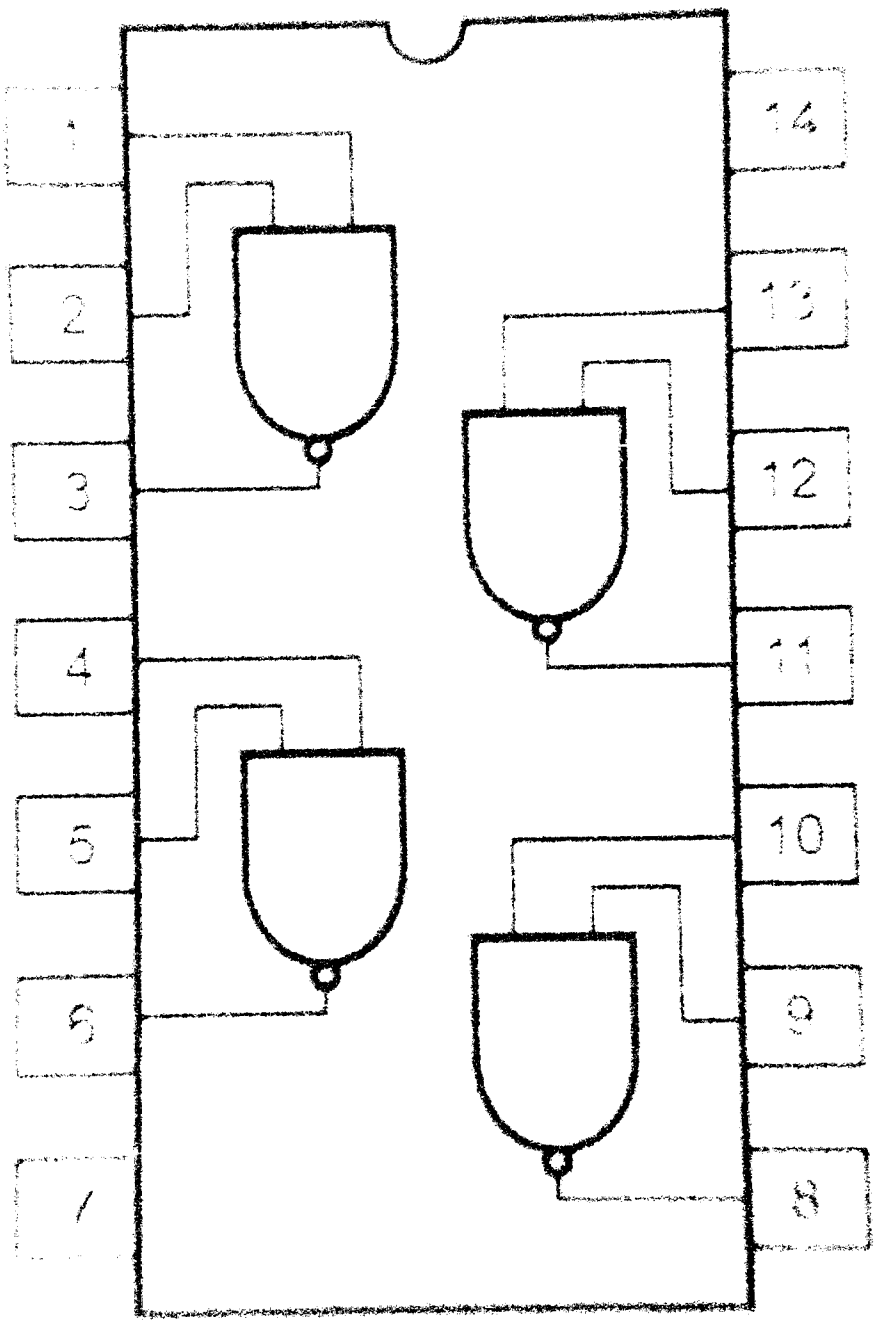
The logic and truth table is given below



Inputs		Outp
A	B	
0	0	
0	1	
1	0	
1	1	

IC7400

he pin configuration of the IC7400 is shown below.



STUDY OF FRAME MATERIALS

TUDY OF FRAME MATERIALS

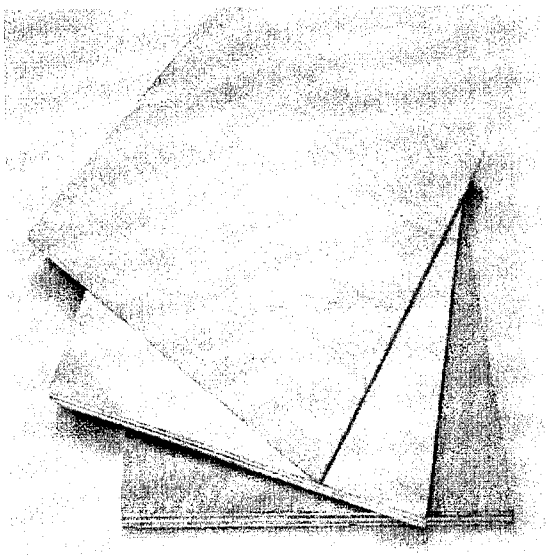
NTRODUCTION:

In our project, the frame is made of waterproof plywood. At the eginning we planned to make the frame in metal. But the main sadvantage of the metals is it gets corroded and gets rusted very uickly. So the metal frame cannot be done as our project involves in rinking water.

As the metal cannot be used for design of frame, we then planned o design the frame in acrylic sheets. Acrylic is a light weight plastic nade from petroleum. Acrylics are manufactured as fibers, plastics or esins. But the main disadvantage of using acrylic sheets is the cost of ne sheet is very high and the clamping and fitting cannot be done roperly. Also the finishing is a bit difficult in acrylic sheets.

Since the acrylic sheets cannot be used for the design of the frame, ve planned to design the frame in plywood material. The plywood that ve used in our project is water proof plywood. The main advantage of sing water proof plywood is the wood does not absorb the water easily as in the case of other woods. Also this wood lasts longer period, there by giving life to the frame.

LYWOOD:



Generally the plywood will be in the form of a heet of specific thickness. The thickness of the plywood for ommercial purpose varies from 2 mm to 18 mm. in this project, the ickness of the plywood is 16 mm so that the frame will be stronger nd will have a greater life. Also the size of the sheet varies with certain pecification. The standard sizes of the plywood's are 8*4 sq.m, 7*4 q.m, 6*4 sq.m, and 4*4 sq.m.

In our project, the waterproof plywood is sed. The waterproof plywood is used because this plywood does not bsorb the water very quickly. The plywood is made into chemical reatment and surface coating to make it more resistible in water. Thus he plywood is made as waterproof.

OW ARE PLYWOODS MANUFACTURED?

Plywood is manufactured by slicing or rotary eling thin [<2.5 mm] sheets of material [veneer] from a flitch or g and then laminating three or more veneers into a rectangular sheet rhaps 1200 mm × 1200 mm for very thin sheets otherwise 1200 mm × 00 mm. Laminating an odd number of plies [3, 5, 7 ...] reduces arping while increasing the number of plies increases the resistance to earing forces.

The plies are generally laid so that the grain irections alternate between lengthwise and crosswise with the grain irection of the two surface veneers parallel to the longer dimension of ectangular sheets. Three-ply is stronger along the surface grain axis but s the number of plies increase the lengthwise/crosswise strengths and tiffness of a plywood sheet will become more equal. Three-ply bends asier along the grain direction of the surface plies because only the ore ply will have crosswise grain. To ensure the strength and stiffness haracteristics of three-ply in the face grain direction it is required that he thickness of each surface veneer is between 25% and 33% of the otal sheet thickness, i.e. the two surface sheets comprise 50% to 66% of he total sheet thickness.

P-2212

s predominantly utilized as aircraft fuselage and wing panels [stressed kins] with Finnish birch plywood sheet thicknesses starting as low as .4 mm [1/64"]. Such panels are supported/restrained on all sides. Thicker three-ply has many uses, spar webs for example where just two pposite edges are supported or restrained. Five or more plies are sually available in sheet thicknesses of 5 mm or greater and such lywood designs should be balanced; that is the total thickness of the dd numbered plies [number 1 being the face ply] should be about the ame total thickness as the even numbered plies. The centre ply is nown as the 'core', the outer plies as the 'faces' (or the 'face' and 'back') nd the intermediate plies are the 'cross bands'. The density of plywood s usually much the same as the parent wood, slightly higher if oftwood. The stiffness of plywood can be increased without an increase n weight by laying the two outer plies so that their grain direction is at 45° to the long axis of the sheet. Forty five degree plywood is slightly tronger than the normal 90° sheets but it is much more expensive and difficult to acquire. Humidity effects may be less apparent in the 45° lywood.

ACRYLIC SHEETS

Acrylic is a light weight plastic made from petroleum. Acrylics are manufactured as fibers, plastics or resins. These materials are molded, colored or treated to form finished products. Acrylics are available in opaque and transparent forms. They are manufactured in various colors .

Cast acrylic sheet is a material with unique physical properties and performance characteristics. It weighs half as much as the finest optical glass, yet is equal to it in clarity and is up to 17 times more impact resistant. Cast acrylic sheet is made in over 250 colors, in thicknesses from .030" to 4.25' and can transmit ultraviolet light or filter it out, as required.Aircraft manufacturers use Cast Acrylic sheet in jets and helicopters. Because of its light and energy transmission properties architects find Cast acrylic sheet ideal for skylights, sun screens, fascia panels and dome structures.

PROPERTIES OF ACRYLIC SHEET

Acrylic sheet has many valuable properties that make it an exceptionally useful material. Some of the properties of acrylic sheets are given below.

- Acrylic sheet is strong and resists weathering and sharp blows.
- Acrylic sheet is flexible when compared with glass.

- Acrylic sheet is less breakable than glass.
- Acrylic sheet is abrasion resistant.
- Acrylic sheet can withstand sunlight for long durations.
- Acrylic sheet is resistant to most chemicals and industrial fumes.
- Acrylic sheet can transmit or filter ultraviolet light.
- Acrylic sheet can be cleaned easily.
- Acrylic sheet can be cut by various methods.
- Acrylic sheet is corrosion resistant.
- Acrylic sheet is a good insulator.

APPLICATIONS OF ACRYLIC SHEET

Acrylic sheet can replace glass in many applications. The applications of acrylic sheet in various industries include:

- Aircraft and Automotive
- As Acrylic sheet resists sunlight, it is used as sunscreens, roof tops, lighting fixtures etc.
- Acrylic sheet is used for making furniture, sign boards, decorating panels, television screens, boat windshield, camera lenses, aquariums, toys, incubators and appliances etc.
- Acrylic sheets are used for security applications, as they can be

MAIN FRAME OF THE PROJECT

ARPENTARY TOOLS USED DURING TH DESIGN OF FRAME

ED OF CARPENTARY TOOLS:

During the design of frame, the standard plywood sheet will be of some standard measurements. In our project, we required 6*4 sq.m sheet. For the design of the frame, the wood is to be cut into different sizes to the required dimensions of the frame. Besides there are some drills that are to be done in the frame for fitting the water can. Also there must be some square holes needed for fitting the door. For such purposes, the requirements of such tools are definitely needed. These tools will make the job easier and saves much time.

YPES OF CARPENTARY TOOLS:

1. Chisel
2. Jack plane
3. Handsaw blade
4. Reaper
5. Beading

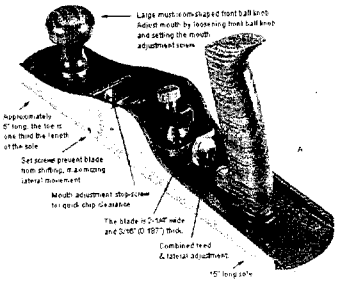
HISEL:

A chisel is a tool with a characteristically shaped cutting edge such that wood chisels have lent part of their name to a particular rind) of blade on its end, for carving and/or cutting a hard material uch as wood, stone, or metal. The handle and blade of some types of hisel are made of metal or wood with a sharp edge in it.

In use, the chisel is forced into the material to cut the material. The driving force may be manually applied or applied using a mallet or ammer. In industrial use, a hydraulic ram or falling weight ('trip ammer') drives the chisel into the material to be cut.

A gouge, one type of chisel, is used, particularly in woodworking, woodturning and sculpture, to carve small pieces from the material. Gouges are most often used in creating concave surfaces. A gouge typically has a 'U'-shaped cross-section.

JACK PLANE:



Jack plane is the general-purpose bench plane, used or general smoothing of the edges and sizing of wood. Jack planes are bout 15 inches long, and the blade usually has a moderately curved dge. In preparing stock, the jack plane is used after the scrub plane and efore the smooth plane. The name is related to the saying "jack of all rades". Jack planes perform both the work of smooth planes and trying lanes. A jack plane has a measuring screw which moves the blade in or ut of the plane's body so it can make the work piece straighter. Jack lanes are the steel equivalent to the wood block plane.

A jack plane came to be referred to as a "No. 5" plane or a "Bailey pattern No. 5," at the end of the 19th century. Prior to that, all but the blade was made of wood in bench planes. A man named Bailey contributed the design that persists to this day, and continues to enjoy credit for this improvement. The No. 5 nomenclature originally used by Stanley Tools to label its Bailey pattern jack plane product continues to identify jack planes made by various manufacturers.

To sharpen the blade, water stones, oilstones and ceramic stones can be used

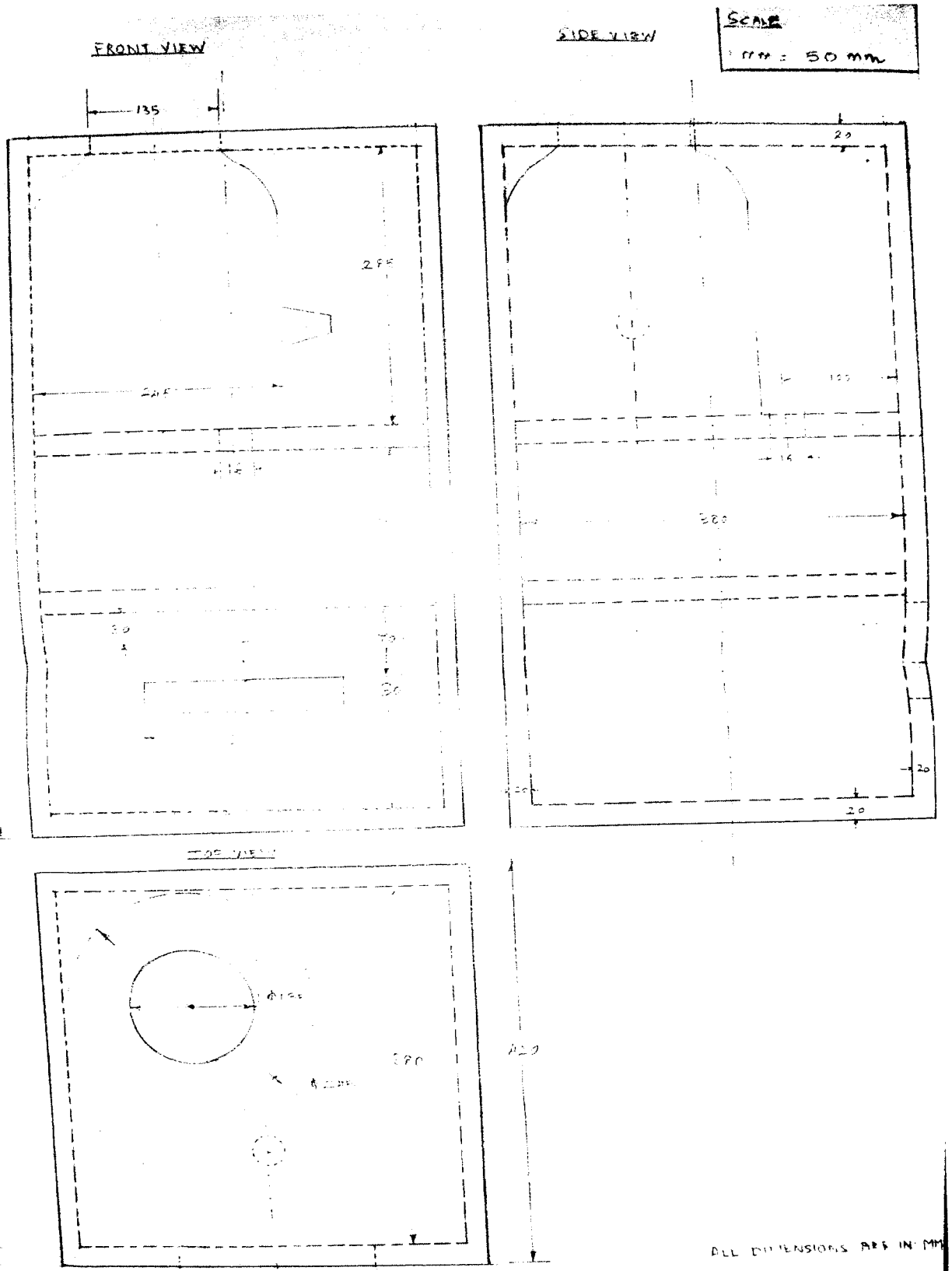
ANDSAW BLADE:

In woodworking and carpentry, hand saws, also nown as "panel saws", are used to cut pieces of wood into different apes. This is usually done in order to join the pieces together and reate a wooden object. They usually operate by having a series of sharp oints of some substance that is harder than the wood being cut. The and saw is a bit like a tenon saw, but with one flat, sharp edge.

Handsaws have been around for thousands of ears. Egyptian hieroglyphics exist depicting ancient woodworkers awing boards into pieces. Ancient bow saws have been found in Japan. The cut patterns on ancient boards may be observed sometimes to bear he unique cutting marks left by saw blades, particularly if the wood vas not 'smoothed up' by some method.

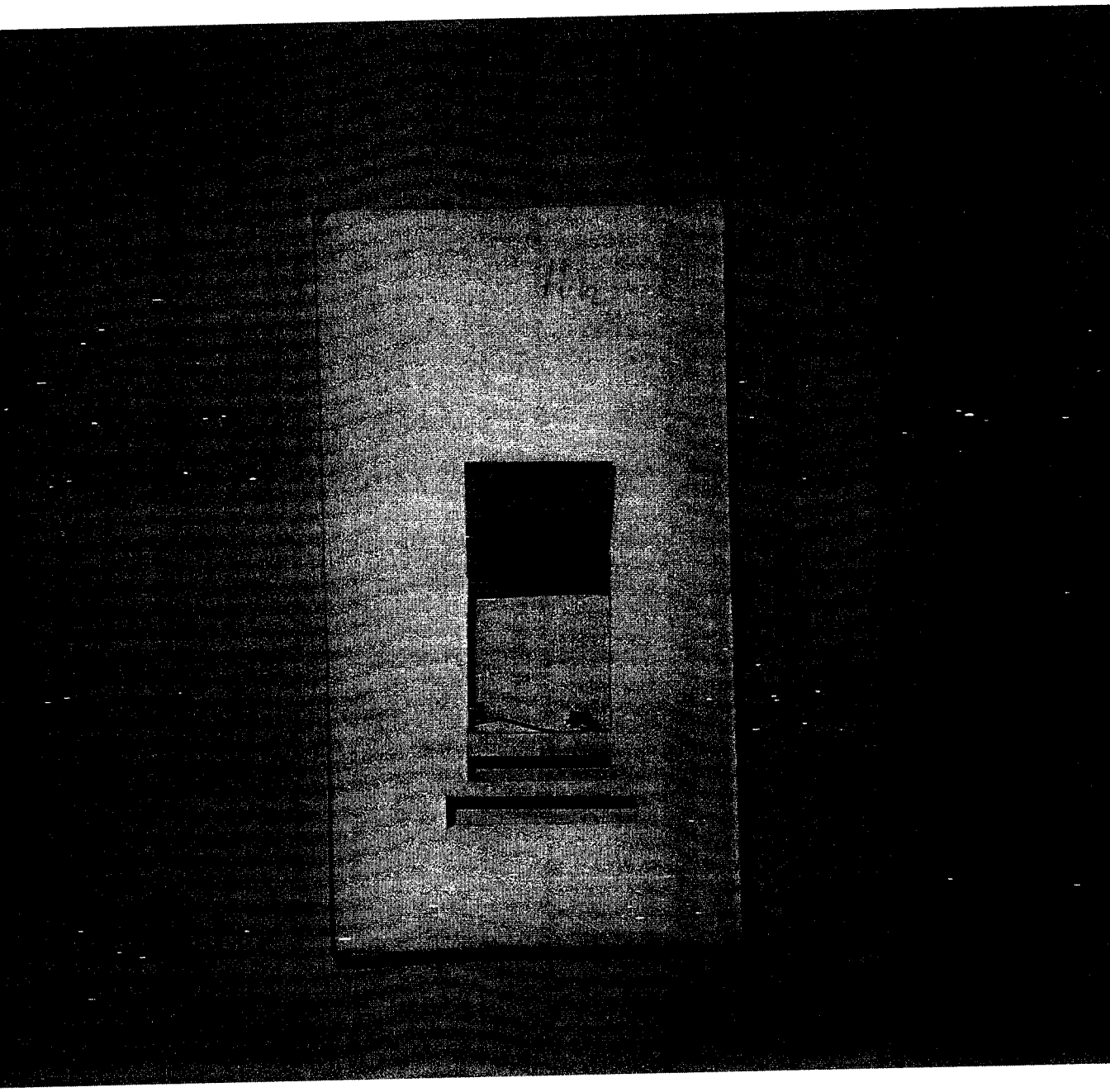
Materials for saw blades have varied over the ages. There were probably bronze saws in the time before steel making echnology became extensively known and industrialized within the past housand years or so.

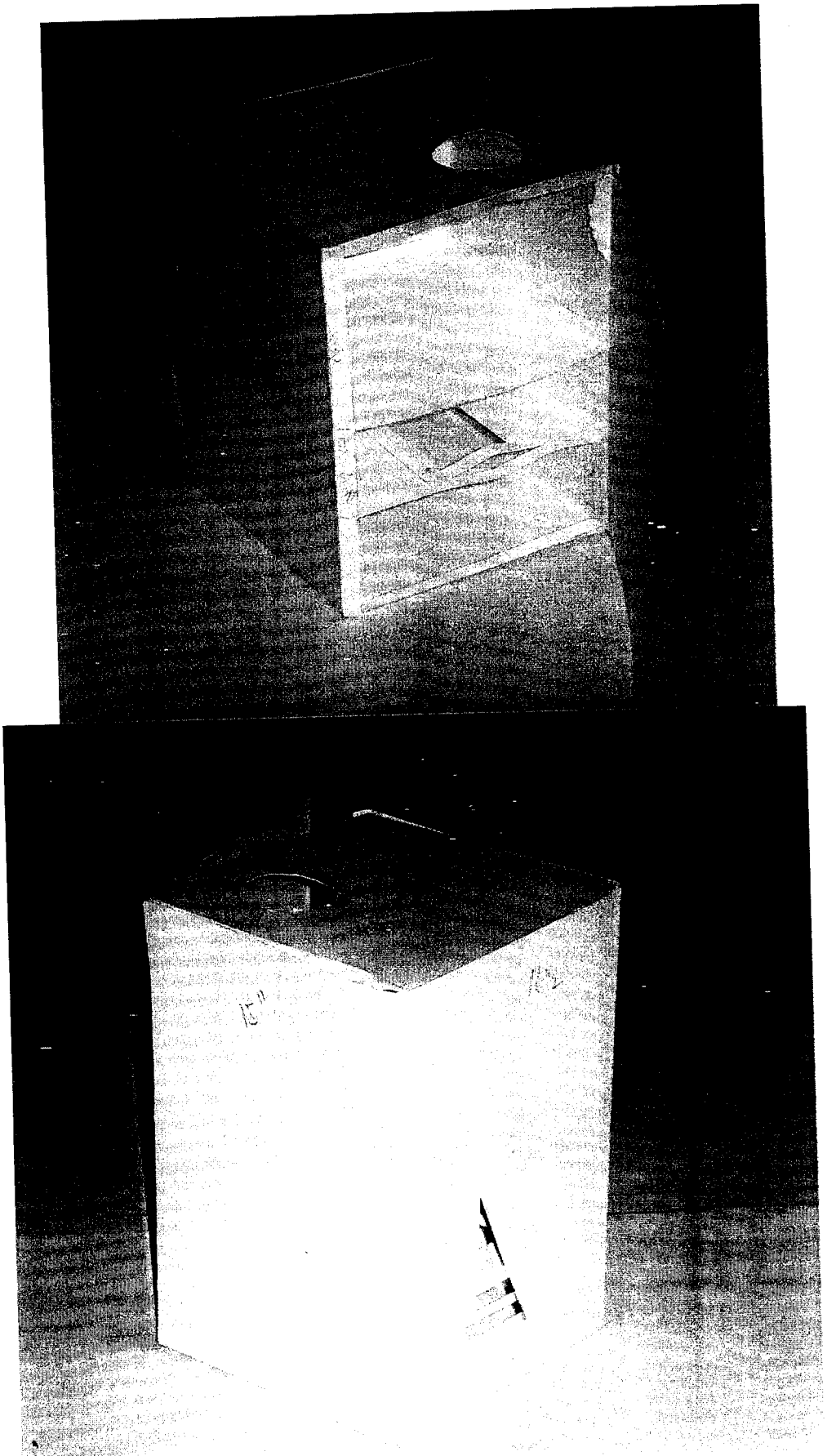
AME DESIGN


FRONT VIEW
SIDE VIEW
SCALE
1 mm = 50 mm
135
20
20
20
20
ALL DIMENSIONS ARE IN MM

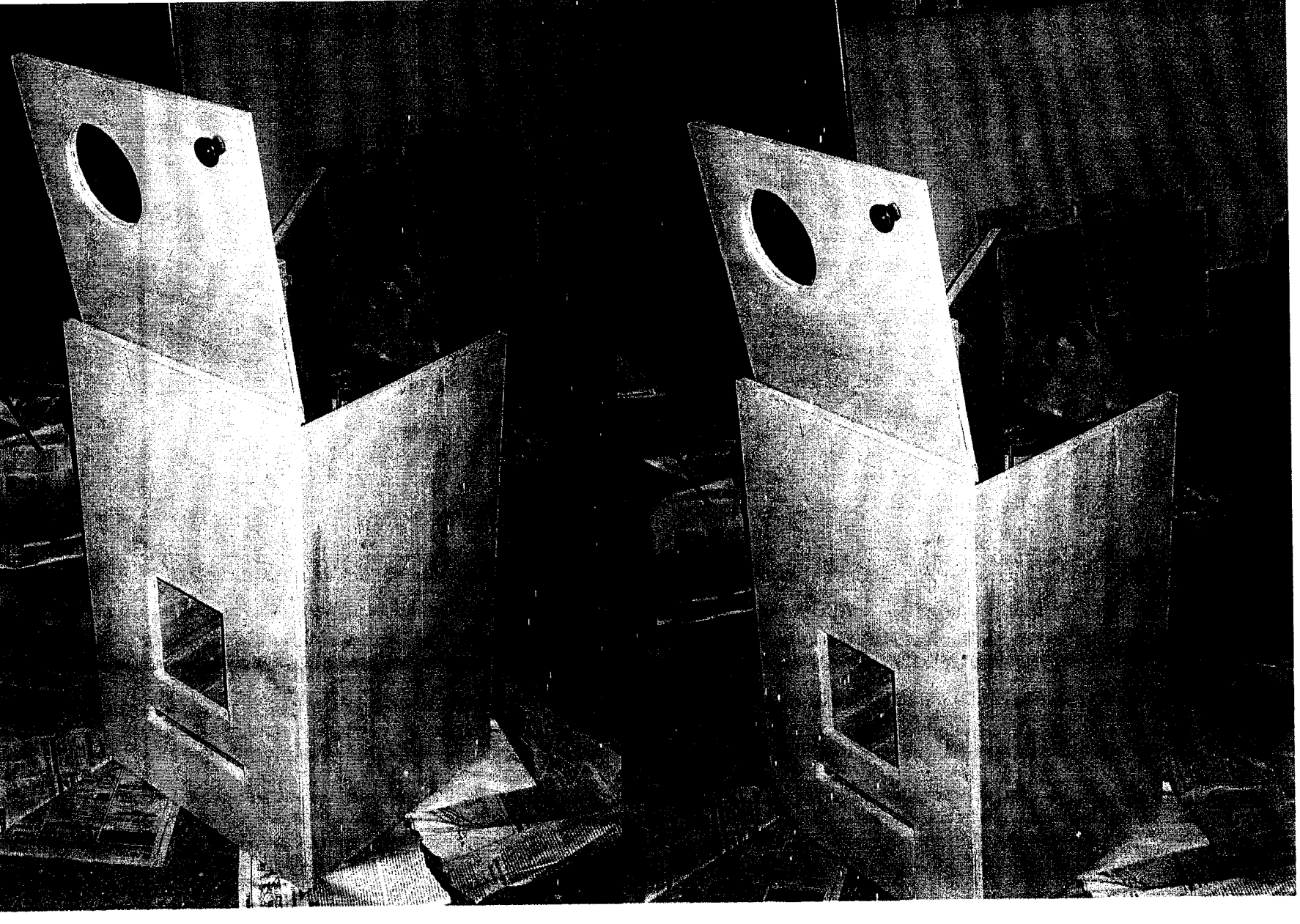
MODEL

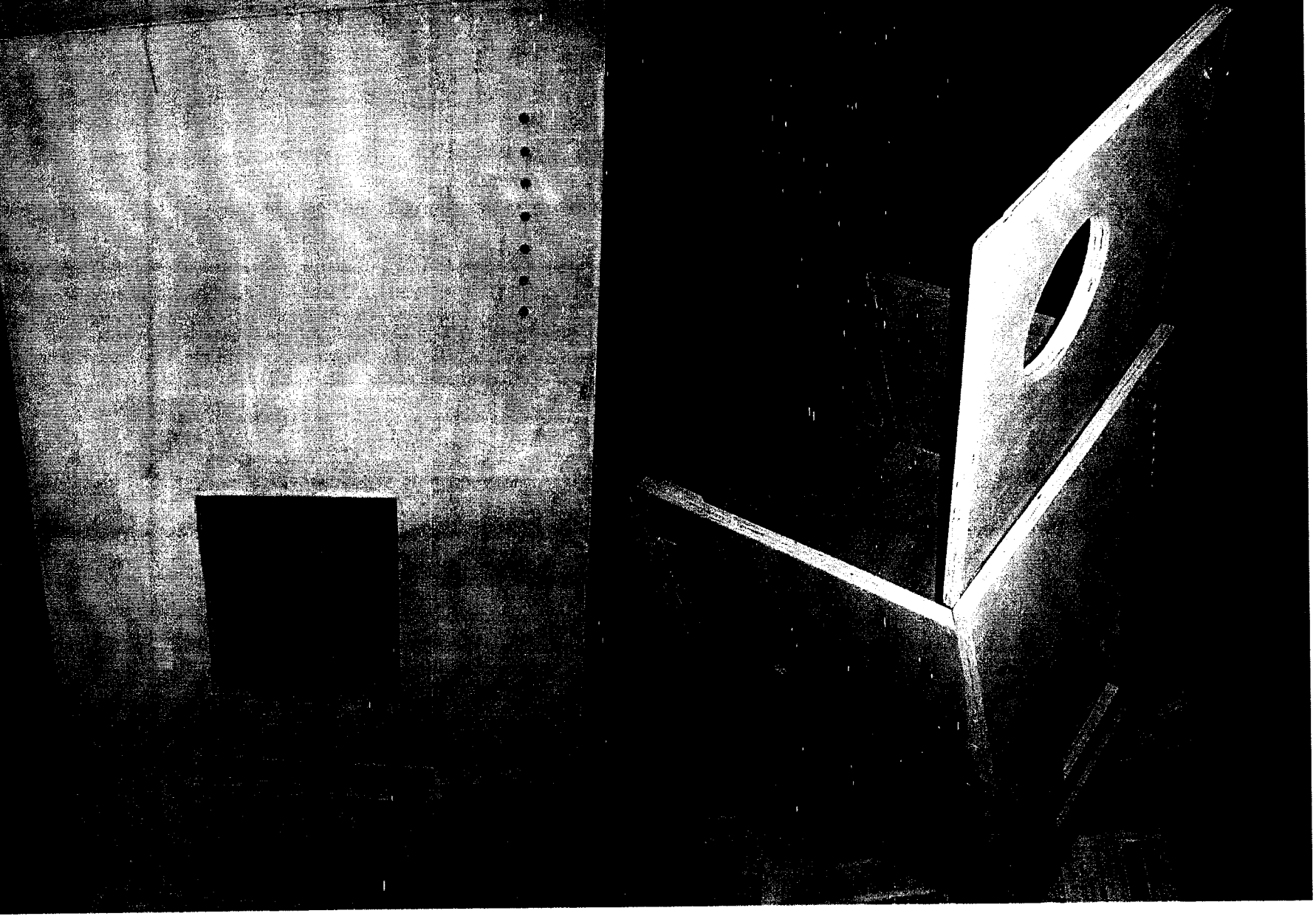
FRAME





FRAME CONSTRUCTION



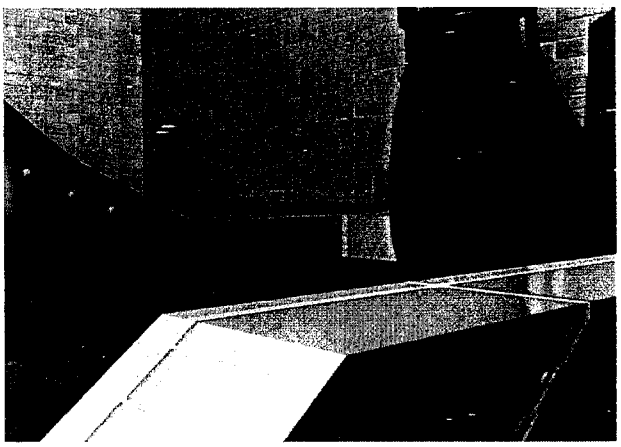


WORKING

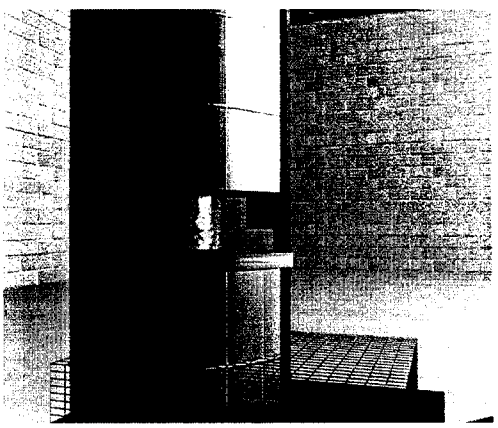
WORKING

The working of the system is diagrammatically explained as follows

- The entry of the person blocks the rays to the LDR and this actuates the Carriage type switching control. This initial triggering controls the other sequence of operations. The fabrication of this control is explained in the later section.

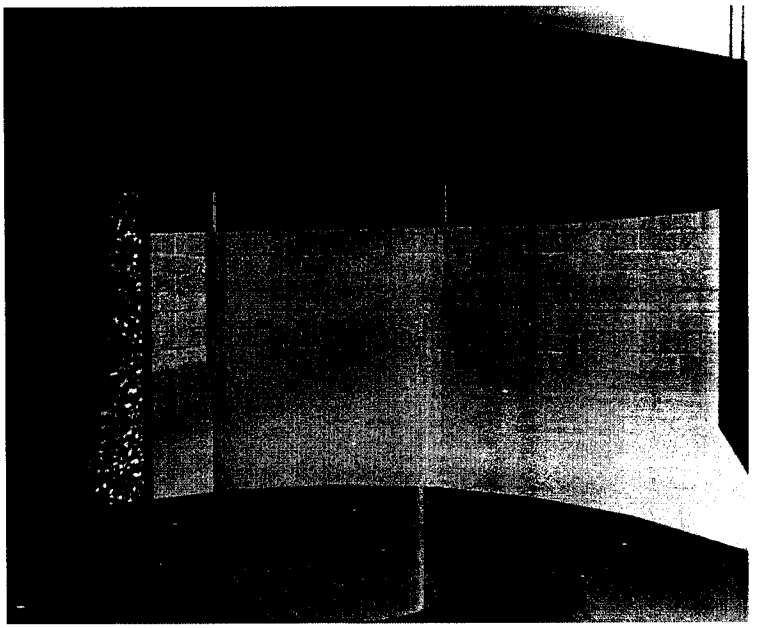


- The tap motor is activated and the cup is filled with water.

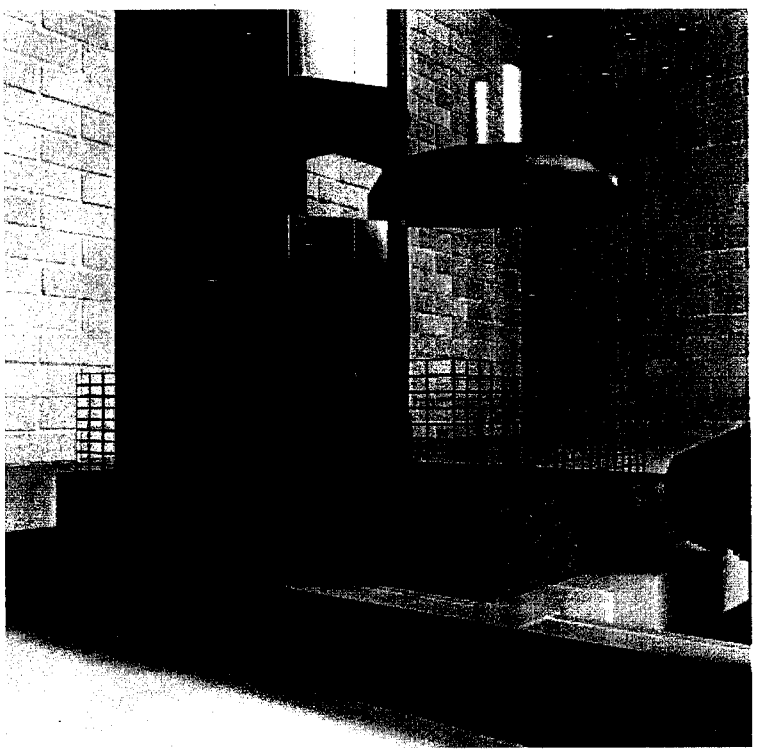


- The level of water in the cup is sensed by the LDR and the pump

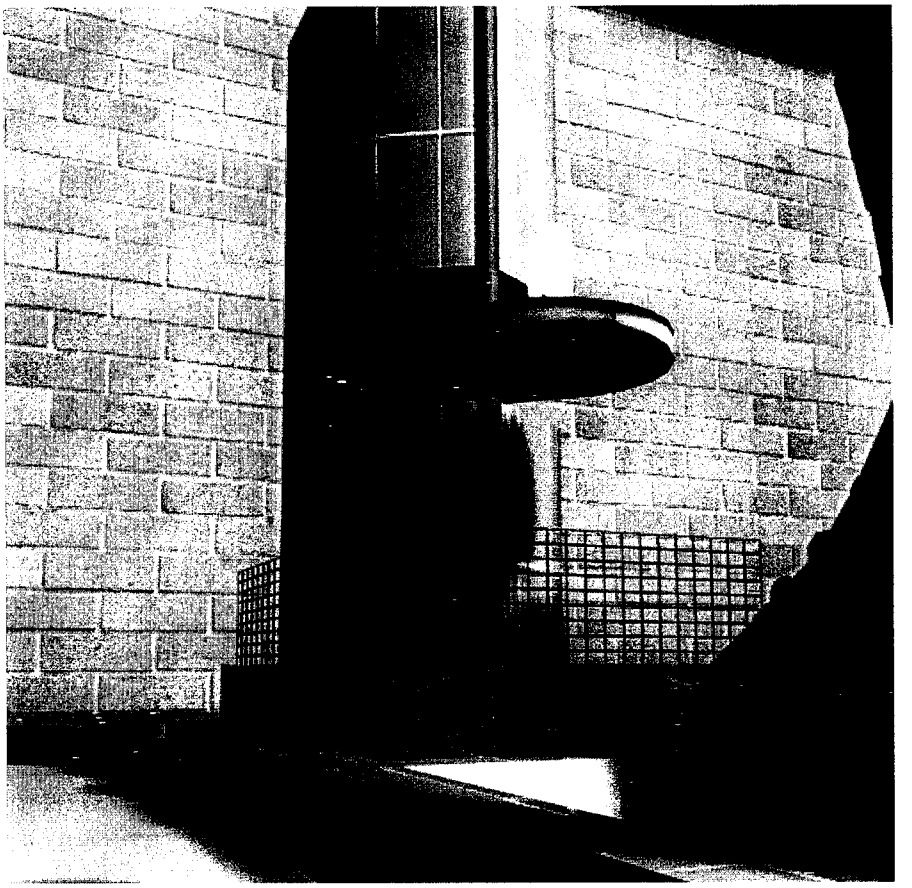
is switched off by the motor controlled switch.



- The tray moves out and delivers the water to the person who have come to drink water.



- When the person places the empty glassy cup on the tray the tray moves in to fill water again.



Thus the whole process is repeated again and again and the user gets water as long as he stands on the platform.

COST ESTIMATION

- Dc MOTORS-Rs.200
- LDR sensors and Circuit-Rs.600
- Submersible pump-Rs.400
- Water storage and plumbing-Rs.500
- Waterproof plywood frame-Rs.1500
- Acrylic sheets-Rs.300
- Aesthetics-Rs.300
- Miscellaneous-Rs.200

Total cost = Rs. 4000

Conclusion

Thus the project has been successfully completed and has been found vercome the difficulties of conventional system and hence deliver pure and safe water to the people in a user friendly manner.

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