

GOVERNMENT POLYTECHNIC, BALANGIR



LARKIPALI, BALANGIR

State Council Regd. No. F21110005004

Name. Ayashkanta Rout

Roll No. 5004.....Semester. 5th.....Session.....

Branch. Auto Mobile..Group ..

Subject. Auto Engine Lab - 11

GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF Auto Mobile



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GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF AUTOMOBILE



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GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF AUTOMOBILE



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AIM OF THE EXPERIMENT

Safety Precaution in automobile workshop and Identification of Different types of tools and Equipments required in an automobile workshop.

APPARATUS REQUIRED

- (1) Double End Spanner
- (2) Ring Spanner
- (3) Tubular Spanner
- (4) Socket Spanner
- (5) Adjustable wrenches
- (6) Torque wrenches
- (7) Screw Driver
- (8) Hammers
- (9) Pliers
- (10) Pullers
- (11) Spark Plug Cleaner
- (12) Filler Gauge
- (13) Valve Spring Compressor.



14) Piston Ring Compressor

15) Piston Ring Expander.

THEORY

General safety Precaution can be divide
3 sections

- (1) Personal safety (safety for It self)
- (2) safety for Doing jobs
- (3) General safety for Tools and machine

(1) SAFETY FOR IT SELF

First of all each worker should take care to protect his body from accidents, in order to ensure Personal safety the following safety Precaution are described below.

- * At working Place one should always wear fit clothes and avoid loose ones.
- * one should not touch any moveable Parts of the machine.
- * Use of the necktie and mufflers should be avoided.



PROTECTIVE HELMET

SAFETY GOGGLES

APRON

SAFETY GLOVES

SAFETY SHOES

Good



- * Always we the Recommended shoes, gloves, apron inside the auto engine shop.
- * One should not touch cutting tool chips at the time of the machine.
- * Use of the necktie and mufflers should be avoided.
- * Always we the Recommended shoes, gloves, apron inside the auto engine shop.
- * One should not touch cutting tools chips at the time of working condition.
- * We should concentrate on work while working in auto engine shop.
- * Not to operate any machine without having knowledge about it.

SAFETY FOR JOB:-

While doing Production of Job or Repairing of any machine Parts due care should be taken otherwise it may cause loss of time. Hence the operators should take safety measures to carry out the Job Perfectly.



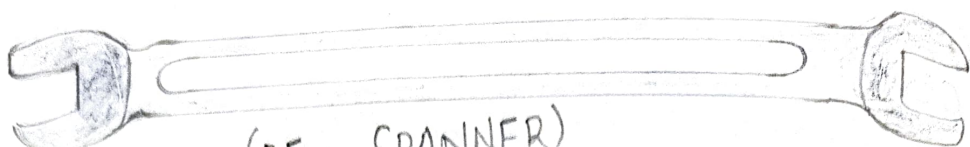
- * After starting any machinery operation, proper arrangement should be made to job for first
- * After marking out the planes and positions then carried accordingly.
- * Proper tools with sharp edges should be used for any types of cutting operation.
- * The workshop floor should be kept clean clear and free from scraps.
- * In workshop goggles and gloves are used.
- * Coolants and lubricants should be used accordingly to the nature of metal while doing cutting job there should not much change in its nature of properties.
- * Use proper tools and material for various function.

SAFETY FOR TOOLS AND MACHINE

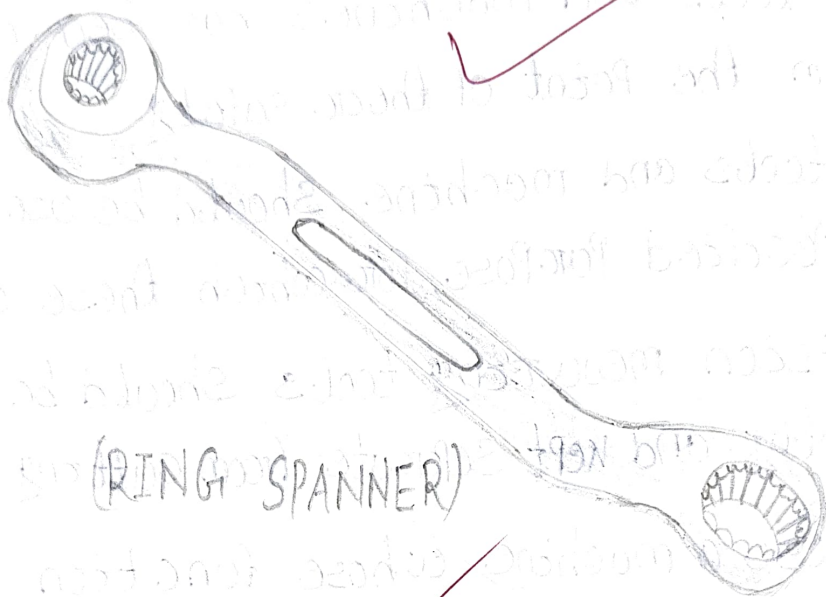
While doing any operation by different types of hand tools and machines, due care should be taken to protect these tools and equipment from loss and damage.



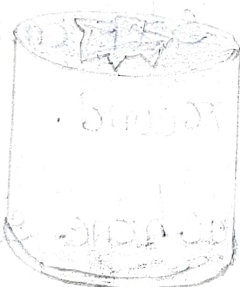
- The following points should be taken
- * Each tools and machines has been made to perform the point of their safety.
 - * That tools and machine should be used only for specified purpose for which these are made.
 - * Precision measuring tools should be taken carefully and kept separate from cutting tools.
 - * Never use a machine whose function is not known to us.
 - * The machine should stop immediately, if it creates any uncused round.
 - * Gear of a running machine should not be changed.
 - * After using a machinery tools it should be cleared.
 - * Before starting a machine it should be assumed that the guards are properly place.
 - * Never keep small tool in the pocket.



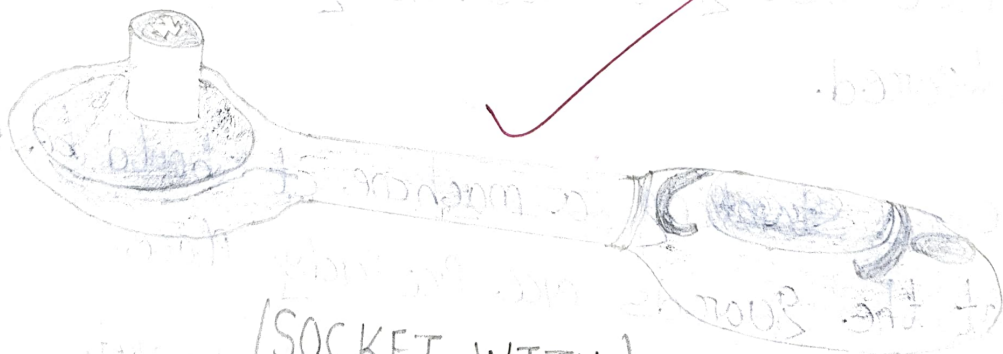
(DE - SPANNER)



(RING SPANNER)



(SOCKET)



(SOCKET WITH)
RATCHET HANDLE



DIFFERENT TYPES OF TOOLS AND USED IN AUTOMOBILE WORKSHOP

HAND TOOLS:- Many kind types and sizes of tools are used in automobile work.

1. DOUBLE END SPANNER:-

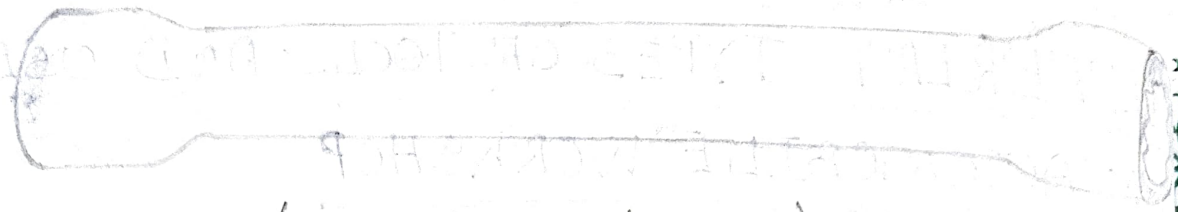
This are the most commonly used types of Spanner in a Automobile workshop. The opening should be the right size to fit the nut or bolt. These spanners are available are different size ranging from 6 to 32mm

2. RING SPANNER:-

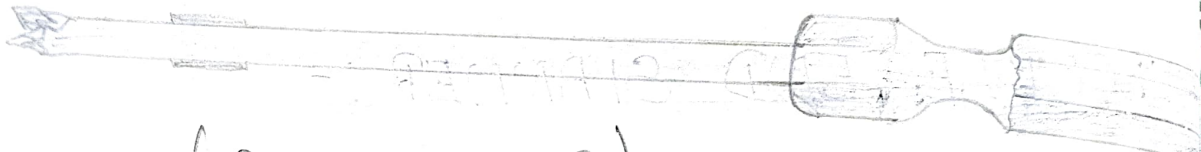
This are the most commonly used types of Spanner in a Automobile workshop. The Ring Spanner should be the right size to fit the nut or bolt.

3. TUBULAR SPANNER:-

These are also used for the same purpose in Ring Spanner. It will be like a long tube having hexagonal ends at each end of different size. These spanner are available in size 8mm to 32mm.



(EXTENSION ROD)



(SCREWDRIVER)



(LNKEY)



4. SOCKET SPANNER :-

These types of spanners are useful in restricted spaces where common types of spanners can't be used. They consist of sockets of different sizes which can be used with various types of handles.

5. ADJUSTABLE WRENCHES :-

This wrench has jaws that can be adjustable to fit nuts and bolts heads of various sizes. These types of wrenches have advantages that these can be suitable for a large number of nut and bolt head size.

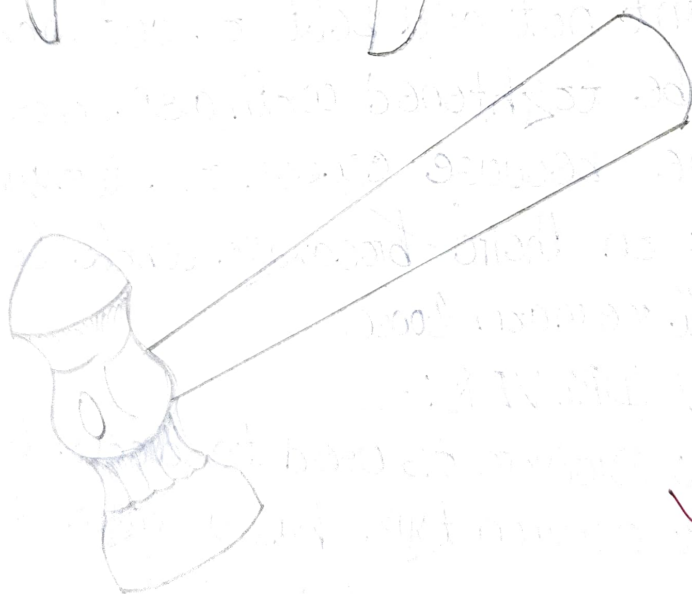
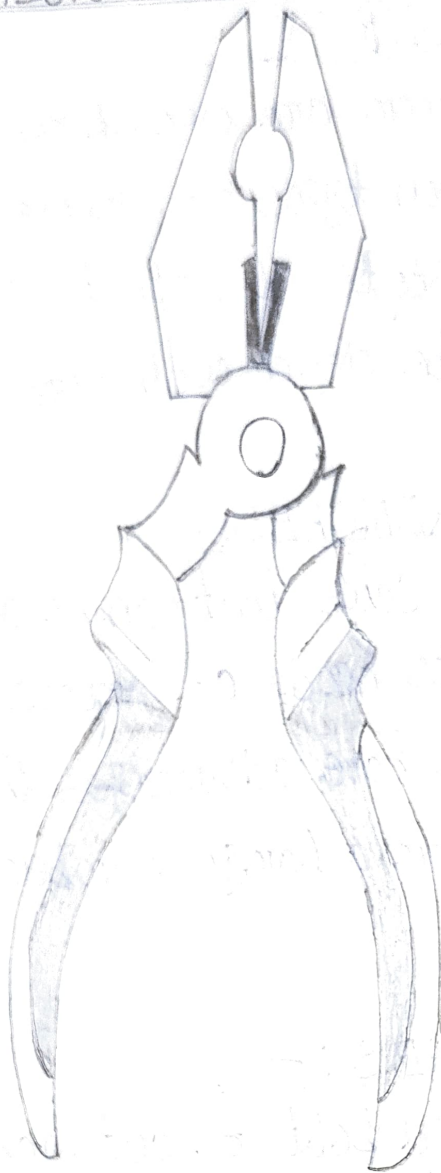
6. TORQUE WRENCHES :-

Important nut and bolt in automobile work have to be tightened with a specified amount of torque because excessive torque may result in their breakage while less torque they will remain loose.

7. SCREW DRIVER :-

A screw driver is used to drive the screw. The most common type has a single flat blade for driving screw slotted heads.

COMBINATION PLIERS



BALL PEEN HAMMER



8) HAMMERS :-

A medium weight ball pin hammer is the one commonly used in automobile work. It should be gripped on the end of the handle.

9) PLIERS :-

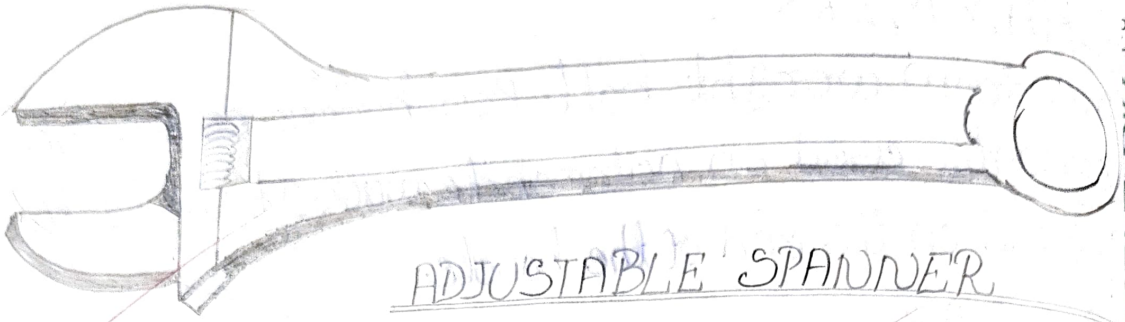
Pliers are a special type of adjustable wrench. The two legs move on a pivot so that items of various sizes can be gripped. There are two types of pliers: gripping pliers and cutting pliers.

10) PULLERS :-

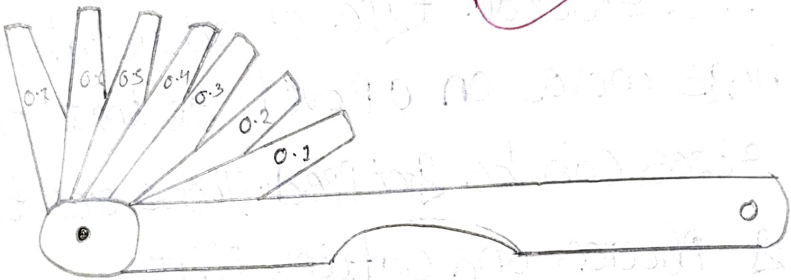
Pullers come in a variety of types. Sizes are used to remove wheels, gears and bearings from shaft from housing. Each pulling operation is different from the other and care must be exercised to prevent damage to the parts during.

11) SPARK PLUG CLEANER :-

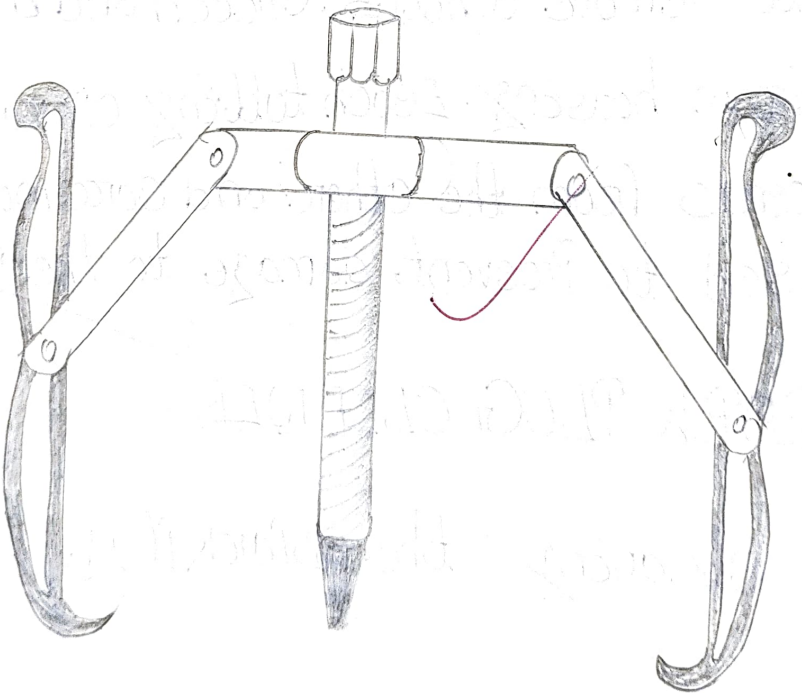
For cleaning the spark plug.



ADJUSTABLE SPANNER



FILLER GAUGE



PULLER



12) FEELER GAUGE:-

For measurement such as valve clearance spark plug gap etc, we used feeler gauges which are simply of different thickness.

13) VALVE SPRING COMPRESSOR:-

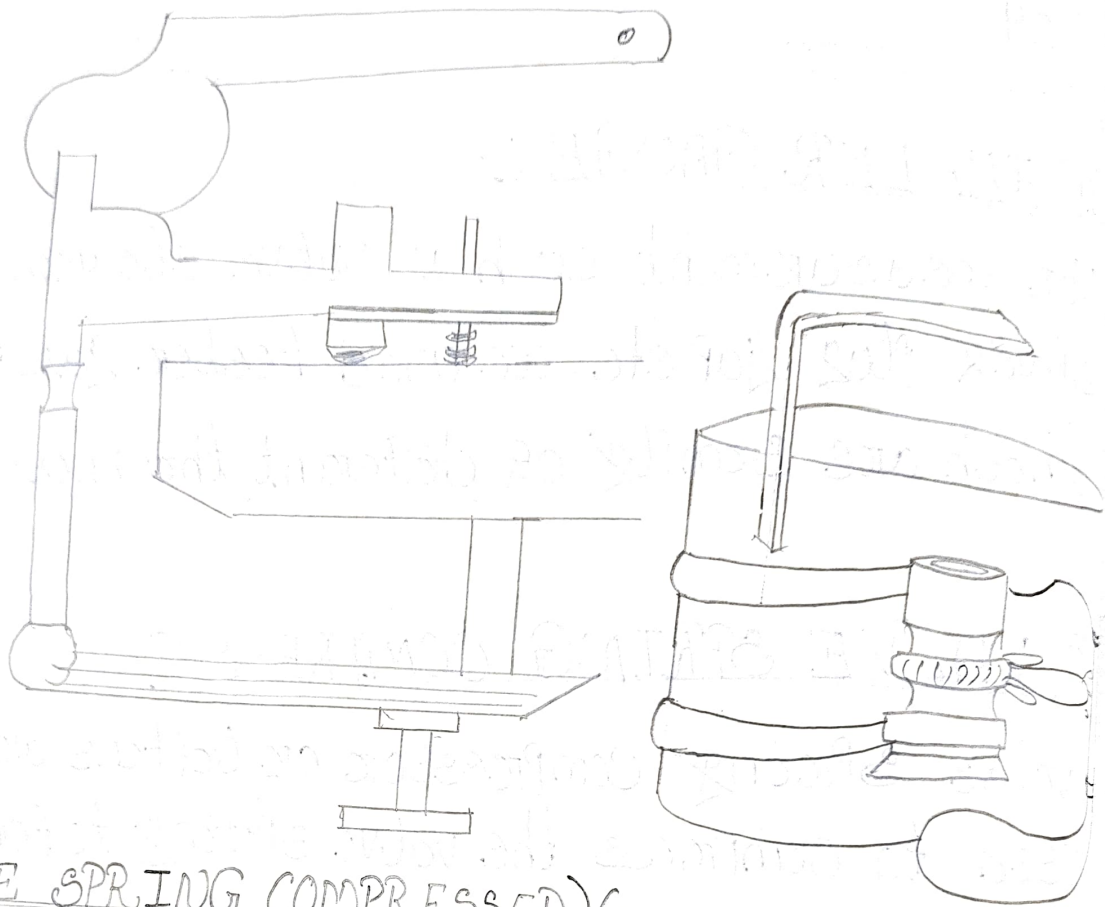
Valve spring compressor or lifters are used to compress the valve spring to facilitate the removal of the valve retainer lock or keeper from the valve system.

14) PISTON RING COMPRESSOR:-

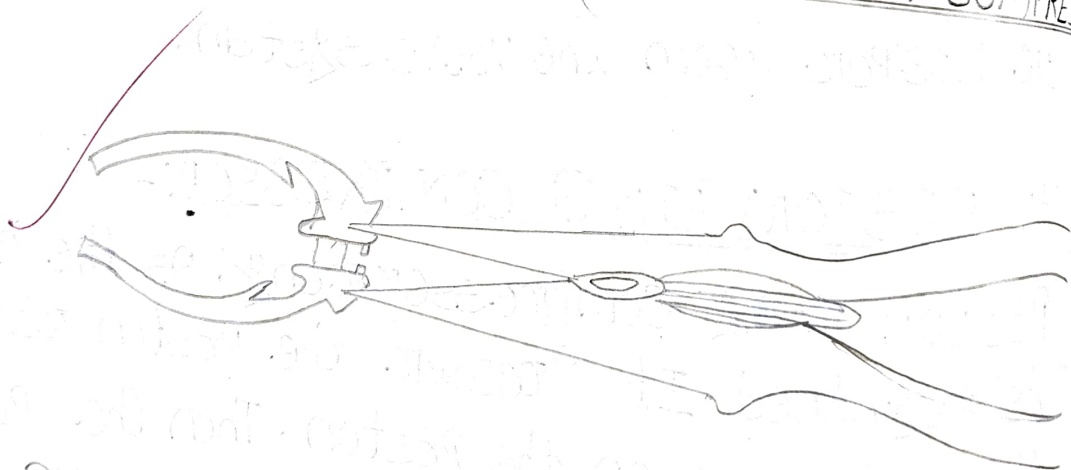
Piston ring compressor. As the compressor is tightened. It presses the piston ring into their grooves on the piston. Then the piston and rod assy is installed into the cylinder.

15) PISTON RING EXPANDER:-

It is generally used to expand and remove the piston rings from their grooves without breaking.



(VALVE SPRING COMPRESSED) (PISTON RING COMPRESSED)



PISTON RING EXPANDER

CONCLUSION:-

From the above study we came to know about study precaution in automobile workshop and identification of different types of tools and equipment required in an automobile workshop. ✓

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SEMESTER:- 5th

BRANCH:- Automobile

DATE :-



AIM OF THE EXPERIMENT

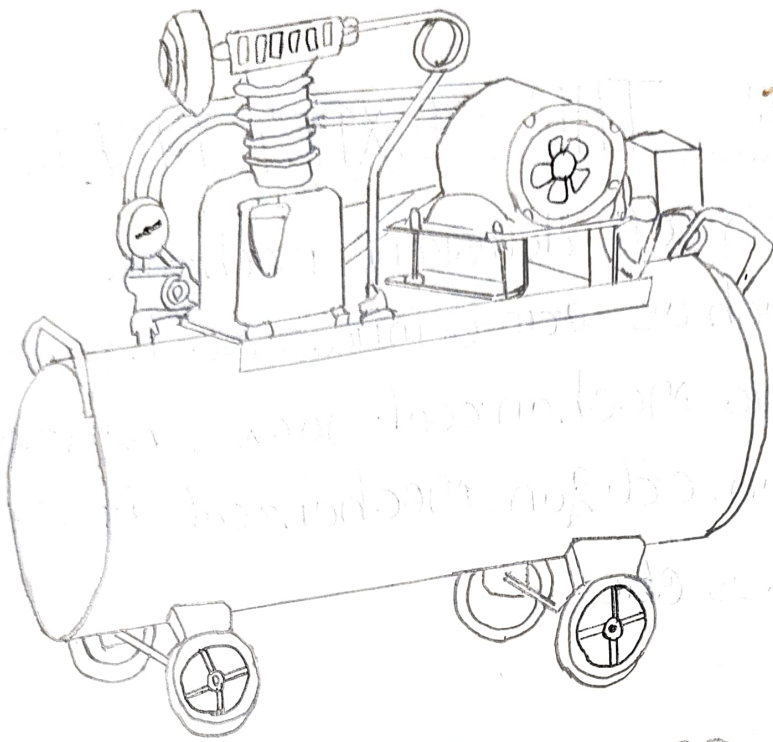
Identification of different machines, equipments such as air compressor, hydraulic hoist, car washer, mechanical jacks, hydraulic jack, grease gun, oil gun, mechanical press, hydraulic press etc.

THEORY

AIR COMPRESSOR

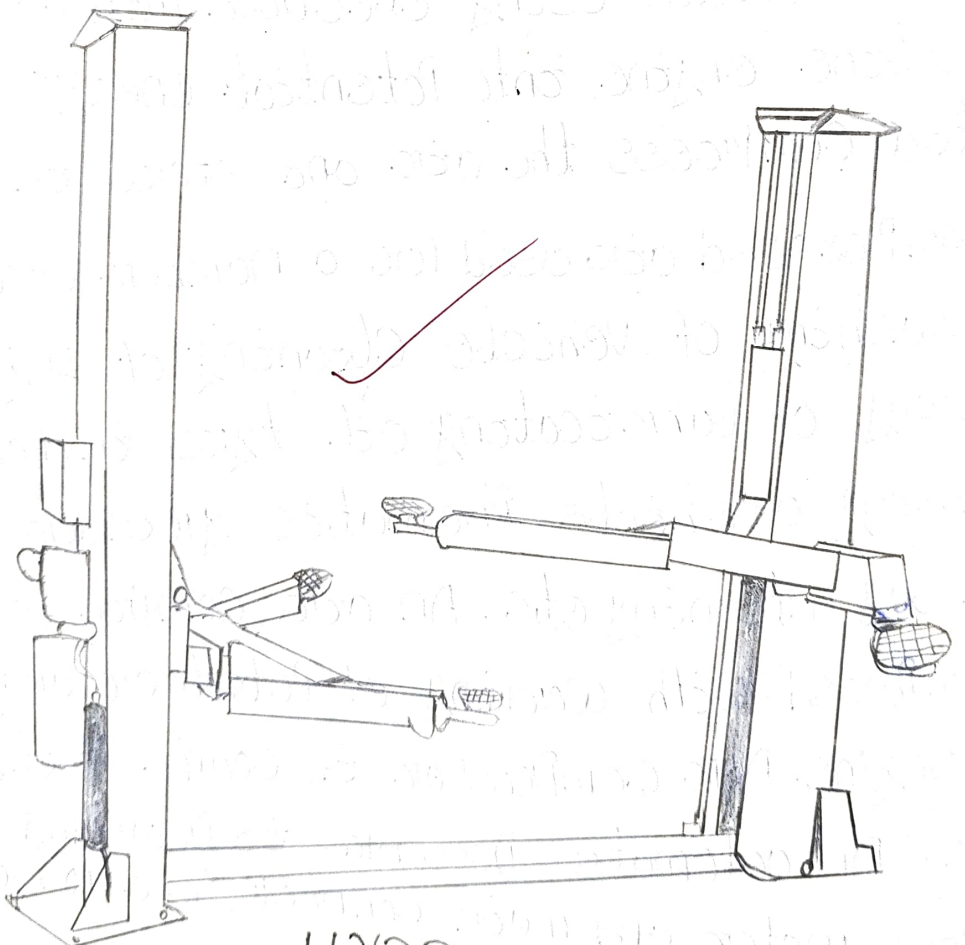
Air compressor is used to compress the air by convert power using electric motor, Diesel or gasoline engine into potential energy and started compress the air and store in tank.

The compressed air used for a number of purposes like washing of vehicle, cleaning of engine, spraying of lubricating oil type inflection, greasing a vehicle, pneumatic grinder, spark plug cleaning etc. An air compressor can be compared with working of petrol or any other engine. Air compressor is couple to electric motor. An automatic pressure is provided between motor and main connect line to break



AIR COMPRESSOR

crane



HYDRAULIC HOIST



Circuit when the pressure inside the air tank reduce a maximum valve.

HYDRAULIC HOIST

In a big workshop a hydraulic hoist becomes necessary to facilitate the service work. Different types of hoists are used in automobile workshop.

They are (i) Drive on lift or single post hoist.

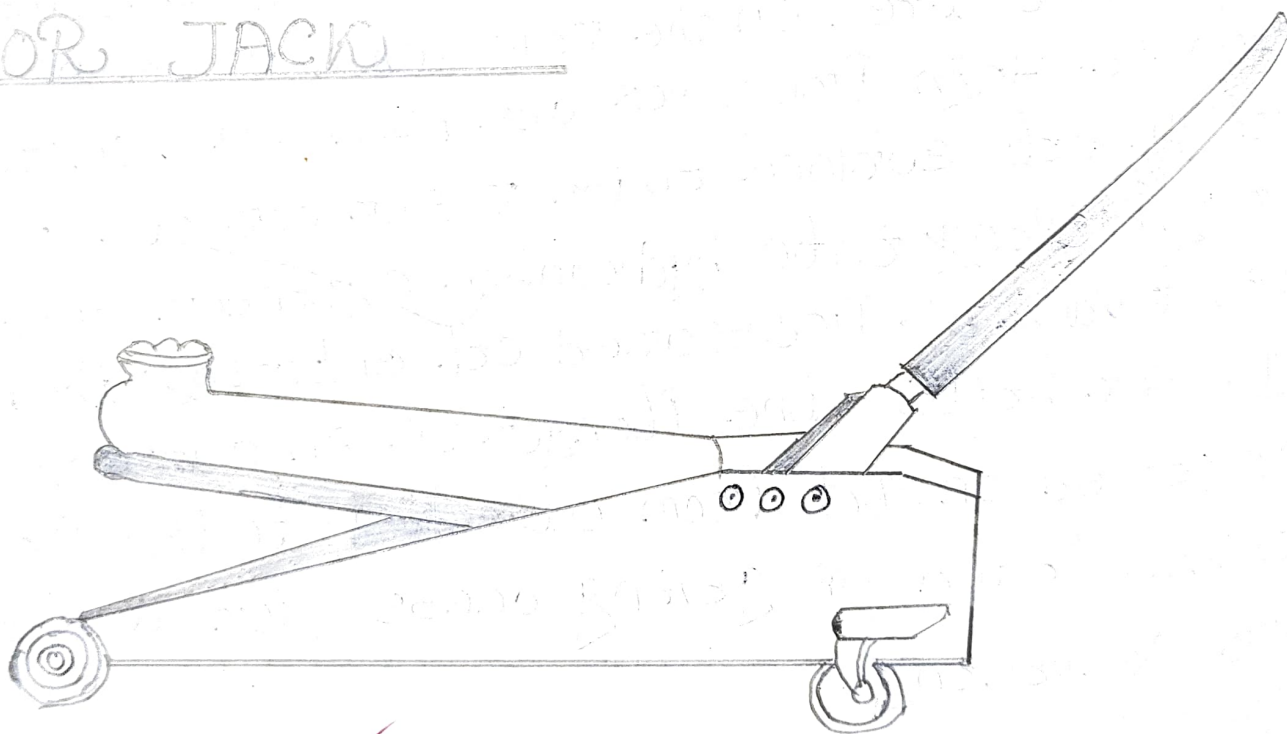
(ii) Two post hoist

(iii) Four post hoist

(iv) Six post hoist.

The lift or hoist consists of a platform which is fixed on the top of the ram working in a hydraulic cylinder. Normal platform will be at ground level and will be raised with the help of hydraulic pressure applied on the ram. When valve 'A' is actuated. High pressure air from the compressor acts on oil surface in the reservoir, oil, rushes through piping into hydraulic cylinder another pivot valve 'B'. Pressured oil entering the bottom cylinder lifts the plunger up. An automobile stationed on platform attached to the plunger is thus lifted up giving access for washing and servicing.

FLOOR JACK





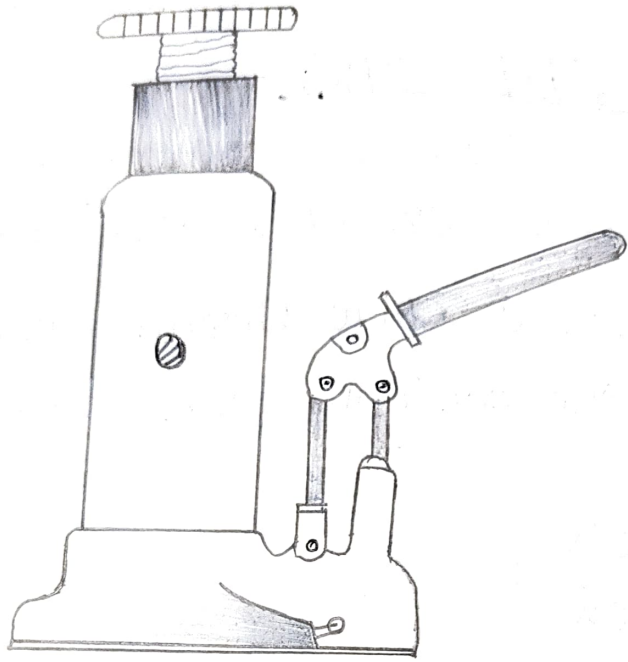
MECHANICAL JACKS:-

A Jack screw Jack is a mechanical device to lift heavy loads or apply great forces. A mechanical Jack equipped a screw thread for lifting heavy equipment. Mechanical Jacks types:-

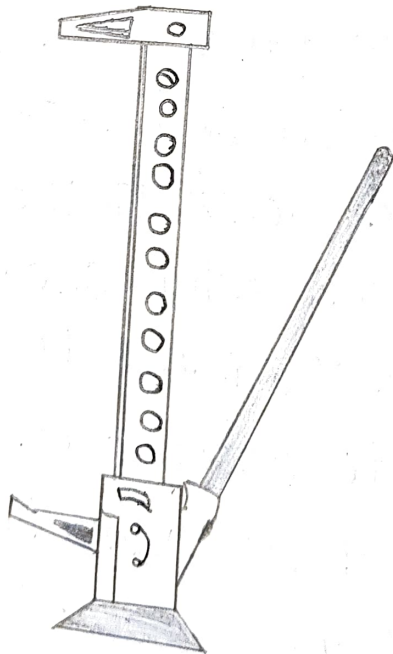
- (i) Floor Jack
- (ii) Bottle Jack
- (iii) Ratchet Jack
- (iv) Scissor Jack

FLOOR JACK

Floor Jacks are very simple devices designed to help lift the vehicle. Your working on the hydraulics allow you to lift a portion of the vehicle with a hand lever. These devices are very strong and don't require a lot of mechanical expertise to use. When choosing floor jacks for your vehicle you need to take the weight of the car into account in general floor jacks should be rated for a minimum of three fourths the weight of your vehicle. Though a floor jack only lifts a portion of your car not the entire weight of the vehicle. Overload jacks can be unsafe. They also move difficult to operate.



BOTTLE JACK



FRAME JACK



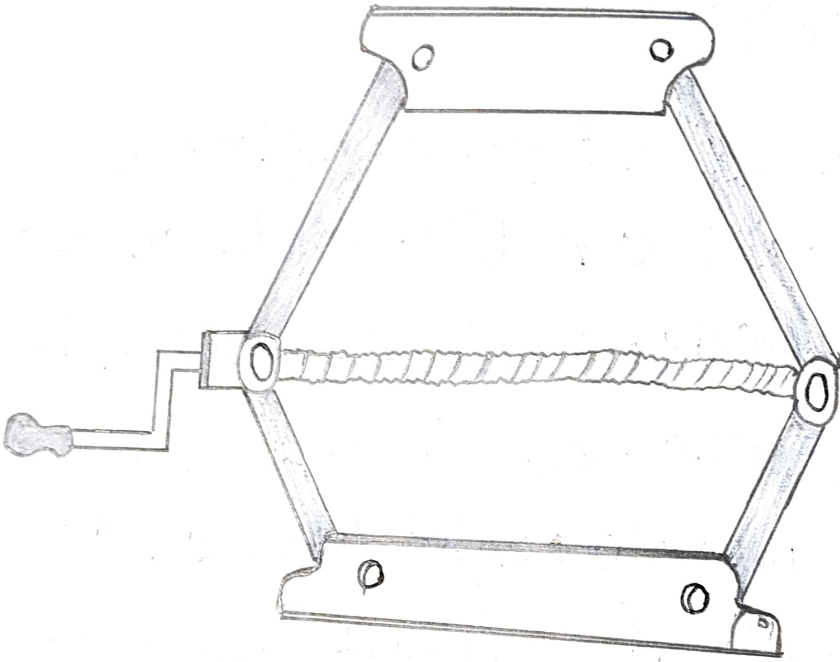
Most floor jacks are positioned on wheels making them easy to move them around your garage. However their weight and size make them a less portable option for ~~on road~~ use.

BOTTLE JACKS:-

A bottle jack is a type of hydraulic jack that looks similar to a bottle with an elongated cylindrical body. While they work like a standard hydraulic floor jacks. Bottle jacks hold more weight than an average floor jack. They also elevate the vehicle higher starting clearance, which can make them more difficult to use on lower vehicle. Bottle jacks tend to be more affordable than for professional mechanics and as a main tool for hobbyist and home repair enthusiasts.

FRAME JACKS:-

Frame jacks are often used from frame equipment but you don't have to be a working on a tractor to make use of one. In fact many people use them for off-roading vehicles and high clearance trucks.



SCISSOR JACK

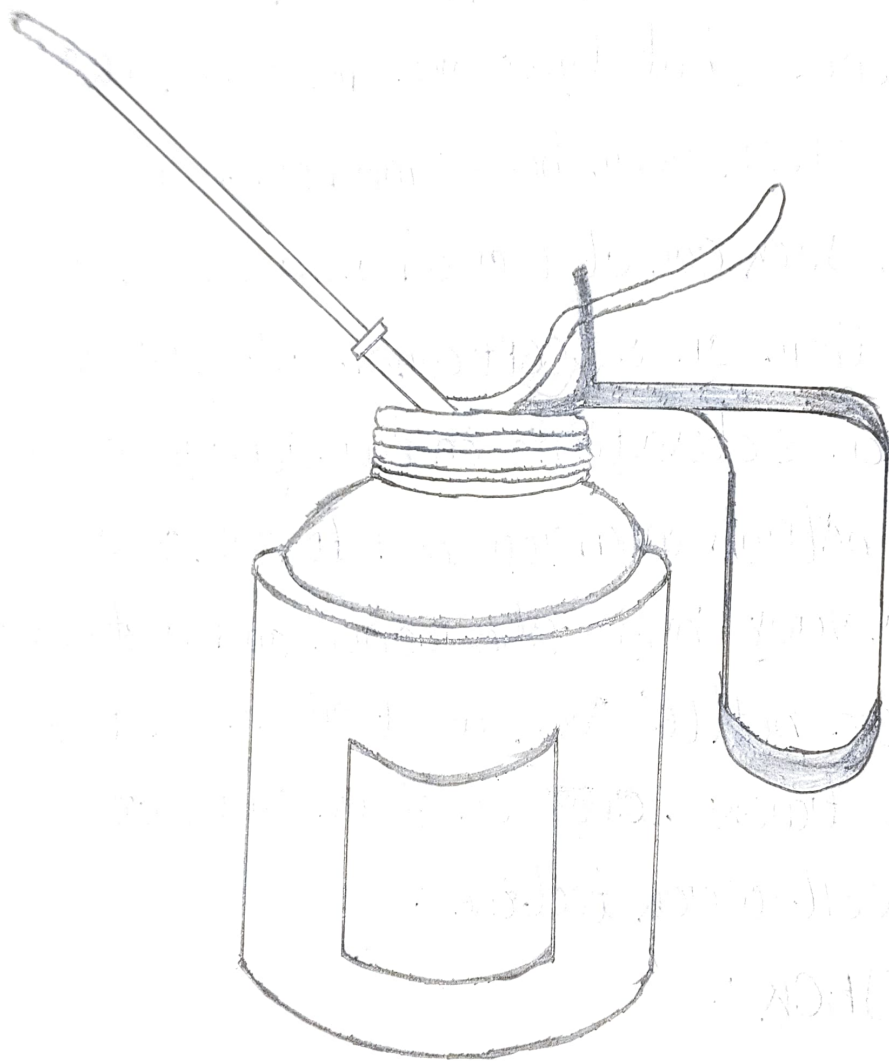
wood



Also referred to as high lift jacks frame jacks are easy to store in the back of a vehicle or off-roading truck. They can be used to help you change tires, but they are designed to get a vehicle on stock from heavy mud or rugged terrain. Frame Jack can also used as a ~~pinch~~ or clamp making them an exceptional all purpose tool in certain situations in your garage. Frame jacks can be helpful when you need to jack up a vehicle with a very high clearance and a standard floor jacks or bottle Jack won't suffice for standard car and most trucks, classic floor jacks or bottle jacks will work too. line.

SCISSOR JACK:-

Scissor Jack use a crank to lift a vehicle when properly positioned. In general, scissor jacks are best for lower weight cars since their capacity is usually rated at either ~~one~~ or two tons. They also have a relatively low lift height ranging anywhere from 15 inches to 30 inches depending on the model you have. The benefit of a scissor Jack to its safety particularly when compared



OIL GUN



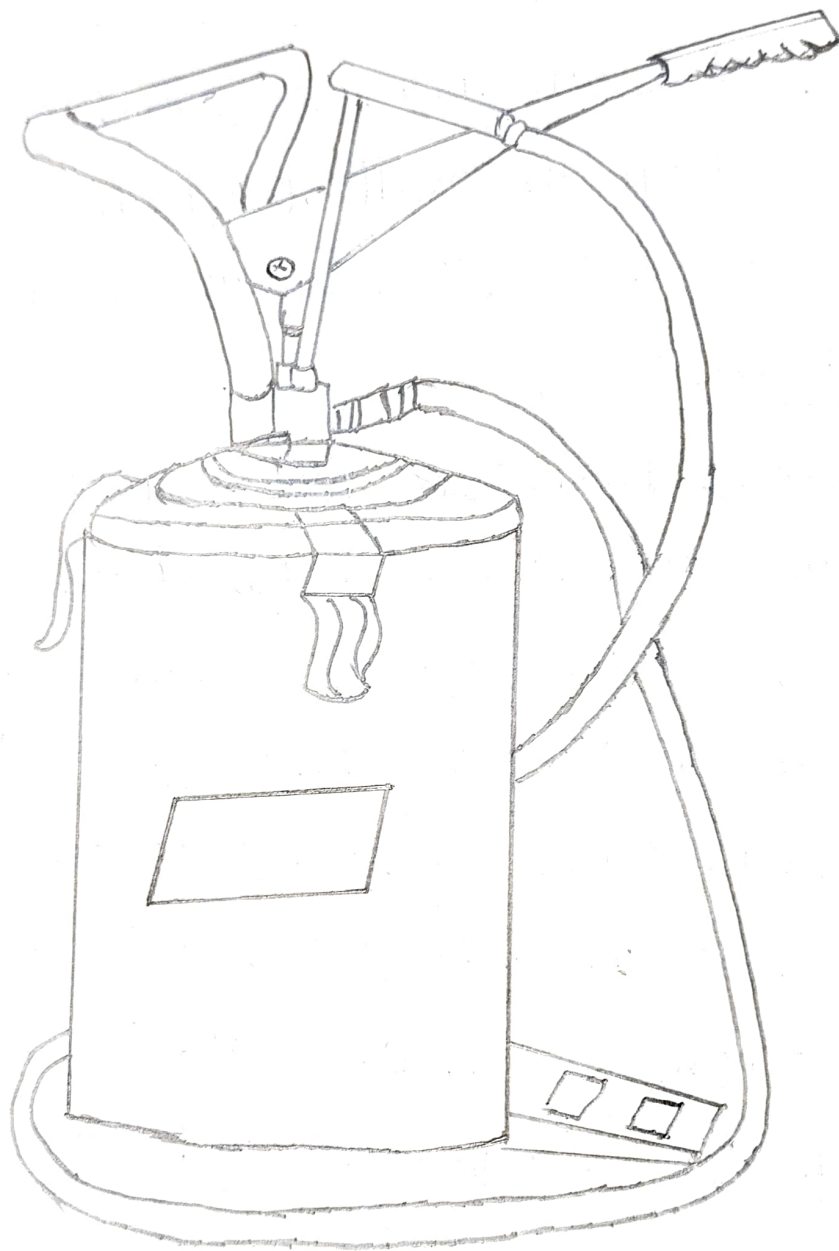
to high lift jacks and frame jacks, which require more care and expertise. Scissor jacks are also light weight and cost effective compare to floor jacks. This makes them an excellent option if you're looking for a portable jack you can around with easy.

HYDRAULIC JACK:-

A Jack is a device that uses forces to lift heavy loads. The primary mechanism with which forces is applied varies depending on the specific type of jack but is typically a screw thread or a hydraulic cylinder. Jacks can be categorized based on the type of force they employ mechanical or hydraulic jack, such as car jacks and house jacks lift heavy equipment and car are based on lifting capacity.

GREASE GUN:-

A Grease gun is common workshop and garage tool used for lubricating. The purpose of the grease gun is to apply lubrication through an operator to a specific point, usually on a grease nipple lead to where the lubricants are needed.



GREASES GUN :-

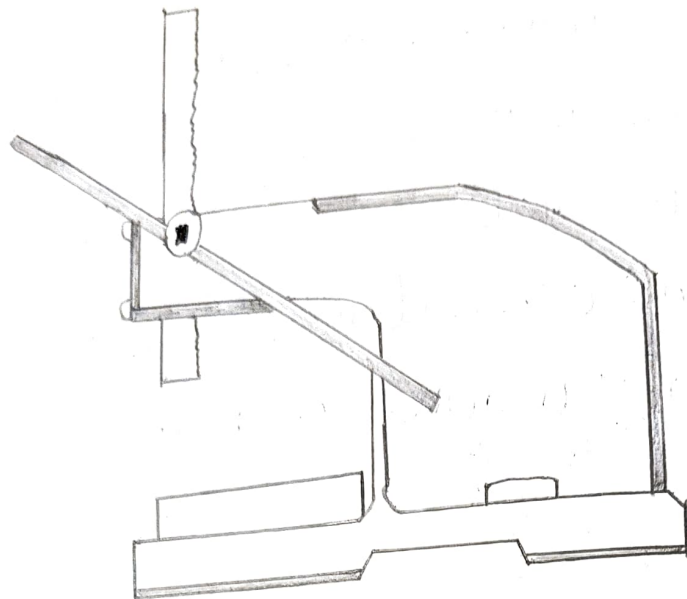
Good



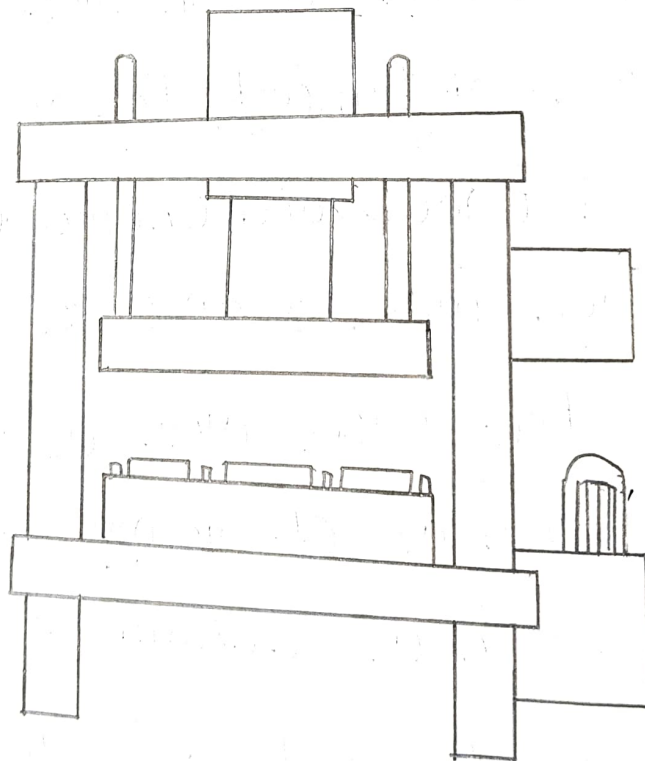
The aperture may be of a type that fits closely with a receiving aperture on any member of mechanical device. The close fitting of the apertures ensure that lubricant is applied only where needed.

OIL GUN

Fire arm maintenance (or gun care for shoot) is a service of periodic preventive maintenance produced aiming to ensure the proper function of a fire arm. often with the use of a variety of specialized tools and chemical solution typically such maintenance is performed by the owner of the fire arm using either simple methods such as cleaning solution or more particles such as cleaning so lubricating removing parts with oil/grease and rotating exposed surface with protective such as varnishing or bluing.



MECHANICAL PRESSES



HYDRAULIC PRESS:-

MECHANICAL PRESSES

A force applied to a machine to move a workpiece is called a mechanical press.

→ Their

→ Their Press

→ Their Press

→ Their

HYDRAULIC PRESSES

A hydraulic press uses a lever.

uses

lever.

has a

place

on the

press.



MECHANICAL PRESS :-

A forging Press commonly shortened to Press is a machine tool that changes the shape of a workpiece by the application of pressure and can be classified into

- Their mechanism:- hydraulic, mechanical, pneumatic
- Their function:- Forging Press, stamping Presses, Press brakes, Punch Press etc.
- Their structure:- knuckle joint Press & screw Press
- Their control:- conventional v: servo Presses

HYDRAULIC PRESS

A hydraulic Press is a machine using a hydraulic cylinder to generate a compressive force. It uses the hydraulic equivalent of a mechanical lever. A hydraulic Press is a machine that has a plate in which the metallic material is placed so that it can be pushed, straight or. Unlike their mechanical counterparts, hydraulic Press machines can compress any material to a full.



Also hydraulic Press take only half of the space that the mechanical ones take because they have the ability to compress a large pressure in a cylinder having a less diameter. Hydraulic Presses commonly used for forging, moulding, punching, deep drawing and metal forming operations with the growth and importance of light-weight in the aerospace and automotive industry.

CONCLUSION:-

From the above study we are now able to identify different machines equipment such as air compressors, hydraulic hoist, car washes, mechanical jacks, hydraulic jacks, Grease Gun, oil gun, mechanical press, Hydraulic Press.

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SEMESTER:- 5th

DATE :- 17.08.2023

Cy 17/8/23

GOVERNMENT POLYTECHNIC, BALANGIR



LARKIPALI, BALANGIR

State Council Regd. No. F21110005004.....

Name. Ayash kanta Rout.....

Roll No. 5004.....Semester. 5th.....Session.....

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Subject. Auto Machine Shop - II.....

GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF AUTOMOBILE



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03	Study about valve lapping and Testing of Leakage.	12.09.23	08 - 09	Inchasi 12/09/23
04	Study of cylinder Boring by using vertical Boring Bore.	3.10.23	10 - 12	Inchasi 3/10/23
05	TO Study about cylinder resleeving by Hydraulic Press	4.10.23	13 - 14	Inchasi 4/10/23
06	TO study about crankshaft Grinding by using crank shaft grinding machine	17.10.23	15 - 16	Inchasi 17/10/23

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09	To study about removing and refitting cylinder liners on cylinder bore	21.11.23	21-22	Subhasis 21/11/23
10	To study about removing of broken stud and bolt by stud extractor and tap wrench.	22.11.23	23-24	Subhasis 22/11/23
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SAFETY PRECAUTION

INTRODUCTION:-

An accident in workshop or auto machine shop can be the cause, loss of eye sides which leads to complete or partially blindness disfigurement or even death.

This precaution of safety can be divided into three sections.

- 1) Safety for itself
- 2) Safety for job
- 3) Safety of tools and materials

SAFETY FOR SELF

First of all each worker should take care to protect his body from accidents. In order to ensure personal safety the following safety precautions are described below.

- At working place one should always wear fit clothes and avoid loose ones
- one should not touch any moveable parts of the machine.



- Use of the necktie and mufflers should be avoided
- Always we recommend shoes, gloves, apron inside the automachine shop.
- One should not touch cutting tools chips at the time of working condition.
- We should concentrate on work while working in auto machine shop.
- Not to operate any machine without having knowledge about it.

SAFETY FOR JOB:-

While doing production of job or repair of any machine parts due care should be taken otherwise it may cause losses of time. Hence the operator should take safety measures to carry out the job perfectly.

- After starting any machinery operation proper arrangement should be made in job for first.
- After marking out the planes and positions then carried out accordingly.



- Proper tools with sharp edge should be used for any types of cutting operation.
- The workshop floor should be kept clean clear and free from scraps.
- In workshop goggles and gloves are used.
- Coolants and lubricants should be used accordingly to the nature of metal while doing cutting job there should not much change in its nature of properties.
- Use proper tools and materials for various functions.

SAFETY FOR TOOLS AND MACHINES

while doing any operation by different types of hand tools and machines, due care should be taken to protect these tools and equipments from loss and damage.

The following point should be taken.

- Each tools and machines has been made to perform the point of their safety



- > That tools and machine should be used only for specified Purpose for which these are made.
- > Precision measuring tools should be taken care fully and kept separate from cutting tools.
- > Never use a machine whose function is not known to us.
- > The machine should stop immediately if it creates any unusual sound.
- > Gear of running machine should not be changed.
- > After using a machinery tools it should be cleaned
- > Before starting a machine, it should be assumed that the guards are properly place
- > Never keep small tool in the pocket.

Snehagiri
8/8/23

NAME:- Ayash kanta Rout
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BRANCH:- Automobile
DATE:- 08/08/2023



AIM OF THE EXPERIMENT:

Valve refacing by valve refacing machine.

APPARATUS REQUIRED:-

- | | |
|-------------|----------------|
| 1) Valve | 3) Coolant |
| 2) Kerosene | 4) Waste cloth |

THEORY:-

Carbon can be removed from the valve by scraping or even chipping whenever required. Through care must be taken to avoid any damage to the valve while chipping. A wire brush mounted in a electric machine may be used to remove the carbon from the valves and the valves guides. After scraping, chipping or abrasion, wash the valves in kerosene and dry by wiping with waste cloth.

OPERATION:-

If the valve does not need replacement then same should be refaced before being fitting in the engine. This may be done on a special



Valve refacing machine. The machine consists of a grinding wheel operated by an electric motor. The valve is held in a chuck which is rotated with electric motor. There is a provision to set the valve chuck at many desired angles. Generally valve angles are 30° to 45° . After starting the machine, light cut is to be done. Then the machine will be stopped and the valve face is to be inspected. If the valve is not best, restart the machine and reface the valve taking light cuts till there are no more pits or scratches on the face. Before starting refacing operations it must be ensured that the grinding wheel is properly dressed. The wheel dressing may be done by machine itself when demand dressing tool. While refacing the valve it should be ensured that the margin should never be ground since they will lose their corrosion



resistance. when ground such valve must be replaced if it found that requiring refacing

CONCLUSION:-

In this experiment we study about valve refacing machine to used valve reference

Subash
9/8/23

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SEMESTER:- 5th
BRANCH:- Automobile
DATE:- 09.08.2023