ASSEMBLY DIAGRAM OF COMPONENTS OF I.C. ENGINE

A Project Report for Industrial Internship

In the partial fulfillment for the award of the degree of

B.Tech

In the

Mechanical Department

of

Dr B.C. Roy Engineering College

at

Ardent Computech Pvt. Ltd.

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✉ training@ardentcollaborations.com

CERTIFICATE FROM SUPERVISOR

This is to certify that we have successfully completed the project titled Assembly Diagram of Components of I.C. Engine under my supervision during the period from November 2022 to December 2022 which is in partial fulfillment of requirements for the award of the **B.Tech** degree and submitted to the Department of Mechanical Engineering of Dr. B. C. Roy Engineering College.

NAME	SIGNATURE
ABHIRUP ROY	Abhirup Roy
BRATIN KUMAR SOU	Bratin Kr. Sou
SANTANU BASU RAY	Santanu Basu Ray

Soumyadip Sarkar

Signature of the Supervisor

Date: 13/12/2022

Name of the Project Supervisor: **Soumyadip Sarkar**

ARDENT COMPUTECH PVT. LTD. KOLKATA

ACKNOWLEDGEMENT

The achievement that is associated with the successful completion of any task would be incomplete without mentioning the names of those people whose endless cooperation made it possible. Their constant guidance and encouragement made all our efforts successful.

We take this opportunity to express our deep gratitude towards our project mentor Soumyadip sir for giving such valuable suggestions, guidance and encouragement during the development of this project work.

Last but not the least we are grateful to all the faculty members of Ardent Computech Pvt. Ltd. for their support.

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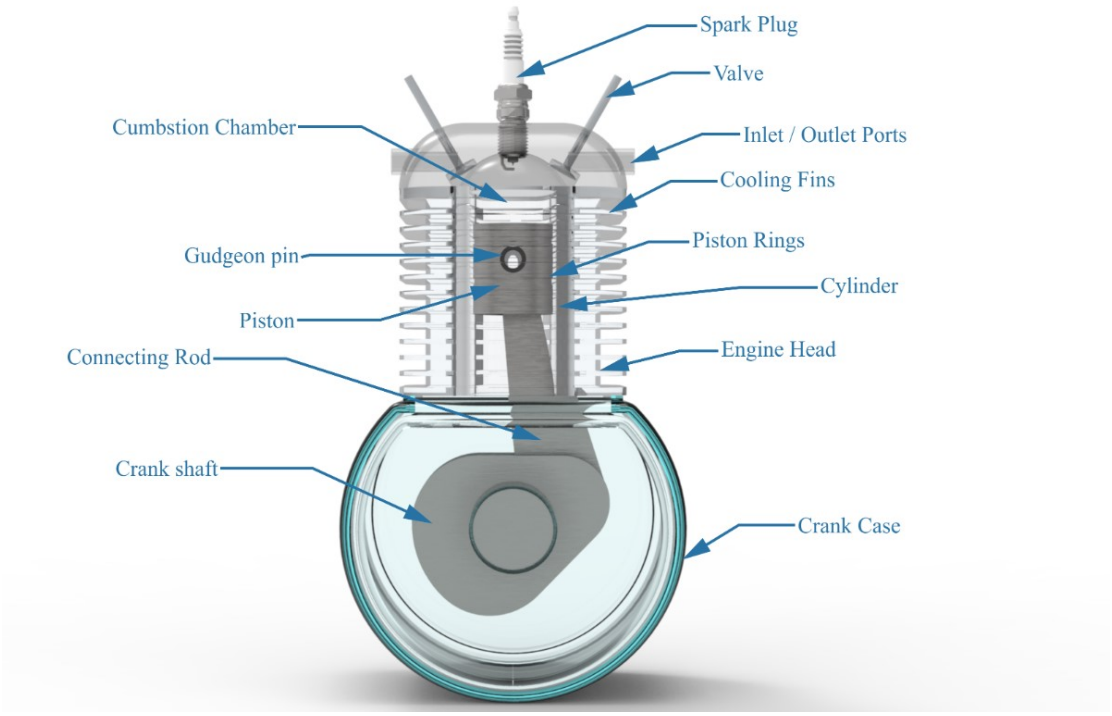
PROJECT OBJECTIVE

The objective of the training in AutoCAD 2D & 3D is to learn how to create basic 2D drawings then gradually complex 3D drawings in the AutoCAD software. The AutoCAD software is one of the most sophisticated computer applications that we are likely to encounter. Therefore, learning to use it can be challenging. Learning AutoCAD to use daily for drawing creation and editing, or simply need to understand how to navigate around a drawing file, this training provided me all.

In this project we have tried to cover all the parts of a 100cc single cylinder I.C. Engine.

INTRODUCTION

I.C engine is the abbreviation of Internal Combustion Engine which is a single acting engine. I.C Engine is a heat engine in which the combustion of a fuel occurs with an oxidizer (usually air) in a combustion chamber that is an integral part of the working fluid flow circuit. The major part of an I.C engine includes connecting rod, piston, valves, cam shaft, cam sprocket, gudgeon pin, cir clips and many more.



Advantages of I.C. Engine:

1. I.C. engine have high overall efficiency.
2. Low weight power ratio.
3. Initial cost is low.
4. Even in cold condition, they can started easily.
5. Requires less space due to their compact sizes.
6. Mechanical simplicity is more.

Applications of I.C. Engine:

I.C. Engines find a wide variety of applications. They are used in:

1. Vehicles such as scooters, buses, etc.
2. Air Crafts.
3. Construction equipments such as bull dozers, power shovels, etc.
4. Industries
5. Locomotives
6. Pumping sets

DESCRIPTION OF EACH PART

A typical I.C. Engine has the following parts:

1. Cam Shaft
2. Cam Sprocket
3. Gudgeon Pin
4. Circlip
5. Connecting Rod
6. Exhaust Valve

7. Inlet Valve
8. Spring
9. Piston Ring
10. Piston(100 cc Petrol Engine)
11. Gasket
12. Gear Nut
13. Crank Nut
14. Rocker Arm
15. Driving Gear
16. Crank Flywheel
17. Crank Shaft
18. Spark Plug

The piston is directly connected to the crank by connecting rod. The crankshaft is generally geared with a camshaft which transmits motion to valves inside the cylinder head. In this, the reciprocating motion of piston is converted in rotary motion of crankshaft.

The cylinder is completely closed at top end by cylinder head. This cylinder head has openings and mountings of an inlet valve, an exhaust valve and a spark plug. While the bottom end of cylinder which is connected with crankcase is centrally open for reciprocating motion of piston and connecting rod.

The piston along with compression ring and oil ring will reciprocate in central bore of cylinder. The small end of connecting rod is connected to piston by using gudgeon pin and circlips, while big end of connecting rod is connected to crank pin of crank.

The crank web and crank shaft are forged integral parts of crank and the crank hocked by crank nut and the driving gear having internal splines fits on external is pressed fit in the crank. Flywheel is keyed on taper of crank and is axially spines of crank and is axially locked by gear nut head, using timing chain to operate inlet and exhaust valves. The camshaft generally the crank also has sprocket to drive camshaft which is placed above cylinder has two cam operate roller followers of rocker arms. Thereafter, this centrally pivoted rocker arms will profiles (lobed portion) at 90° to each other. This cam profile will operate the opening of valves. The linear motion of both inlet valve and exhaust valve is controlled by helical compression springs.

The spark plug is mounted on the cylinder head such that the head of spark plug lies inside the compression chamber.

Crank shaft is high tensile forged steel cylindrical shaft. The crank web is integral part of crank shaft. Bearings are mounted on crank shaft for support. One end has splines to mount driving gear and other end is having taper with key-way mount flywheel. The driving sprocket of timing chain is pressed fit on crank shat to rotate over head cam shaft.

Driving gear of high carbon steel is having 2.5 mm module gears with internal splined hole. It is mounted on external splines of crank shaft. It drives the sliding gear box to transmit rotary motion to wheels.

Gear nut is mounted on M14 metric threads on crank shaft to lock driving gear axially.
Connecting rod is high tensile forged steel link having long shank of I or H cross-section. It has two cylindrical ends having through hole called connecting rod ends.

The gudgeon pin is inserted in the hole of small end and the two ends of gudgeon pin are supported on pin holes of piston. The crank pin is inserted in the hole of big end and two ends of crank pin are pressed fit in pair of crank web. The small end will reciprocate with the piston and big end will rotate about centre of crank. Thus it converts reciprocating motion of piston into rotary motion of crank.

Piston is a hollow cylindrical piece which reciprocates inside the cylinder by the pressure of combustion of fuel is called piston. They are usually made of aluminium alloy. The closed crown of piston may be made flat, convex or concave according to the design of combustion chamber in cylinder head. It has 2 nos. of cylindrical grooves on the top outer periphery for mounting compression ring and oil ring.

At the centre it has two bosses with super finished holes to insert gudgeon pin and 2 nos. of vertical cylindrical grooves for circlip to lock axial movement of gudgeon pin. The open bottom portion has recess in the wall to allow free movement of connecting rod.

Piston rings are made of high tensile steel. They are cylindrical rings with end open and having rectangular cross-section. They are pushed fit on piston and the slide

in cylinder to prevent leakage through the clearance between cylinder and piston. There are two types of rings. Compression ring to prevent leakage and o ring to spread and scrap lubricating oil.

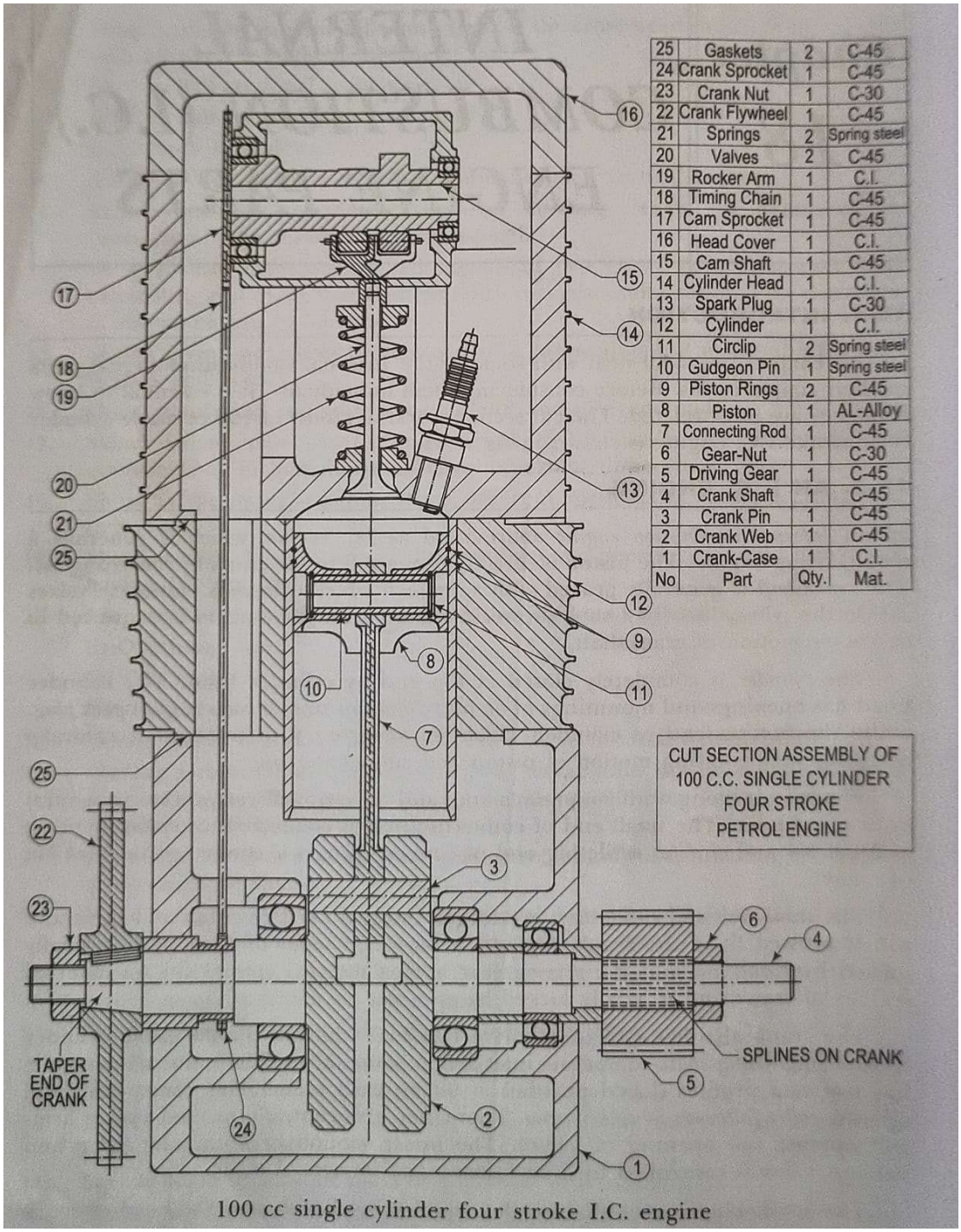
Gudgeon pin is cylindrical high tensile steel with ground finish. It fits in the bosses of piston and supports small end of connecting rod.

Circlip is a standard high tensile steel cylindrical flat. It fits in the vertical cylindrical recess of piston to restrict axial movement of gudgeon pin.

Cam sprocket is screwed on cam shaft. It will rotate the cam shaft to open and close valves at desired timings. It is driven sprocket for cam shaft.

Timing chain is mounted on driving sprocket of crank shaft and driven sprocket of cam shaft. It will transmit rotary motion from crank shaft to cam shaft to operate the valves at desired timings.

Gaskets are 0.2 mm thick shims of high carbon anti corrosive steel. It is placed between mating face of cylinder. It will create leak proof joints. It will not allow hot gases produced in combustion chamber to move out from cylinder. So it ensures to get 100 % power stroke.

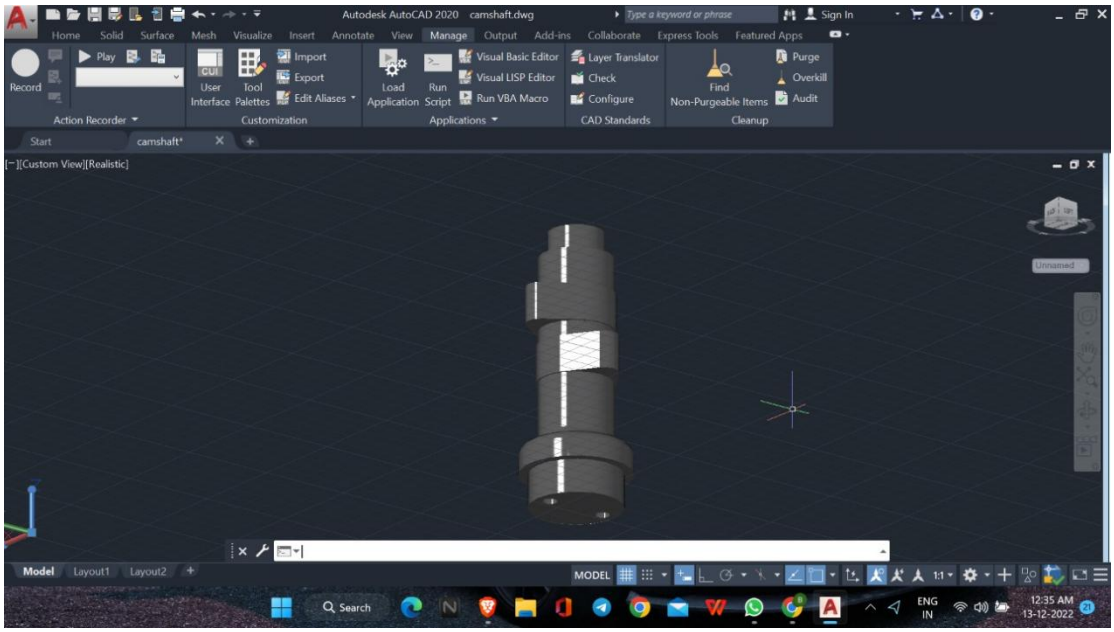


No	Part	Qty.	Mat.
25	Gaskets	2	C-45
24	Crank Sprocket	1	C-45
23	Crank Nut	1	C-30
22	Crank Flywheel	1	C-45
21	Springs	2	Spring steel
20	Valves	2	C-45
19	Rocker Arm	1	C.I.
18	Timing Chain	1	C-45
17	Cam Sprocket	1	C-45
16	Head Cover	1	C.I.
15	Cam Shaft	1	C-45
14	Cylinder Head	1	C.I.
13	Spark Plug	1	C-30
12	Cylinder	1	C.I.
11	Circlip	2	Spring steel
10	Gudgeon Pin	1	Spring steel
9	Piston Rings	2	C-45
8	Piston	1	AL-Alloy
7	Connecting Rod	1	C-45
6	Gear-Nut	1	C-30
5	Driving Gear	1	C-45
4	Crank Shaft	1	C-45
3	Crank Pin	1	C-45
2	Crank Web	1	C-45
1	Crank-Case	1	C.I.

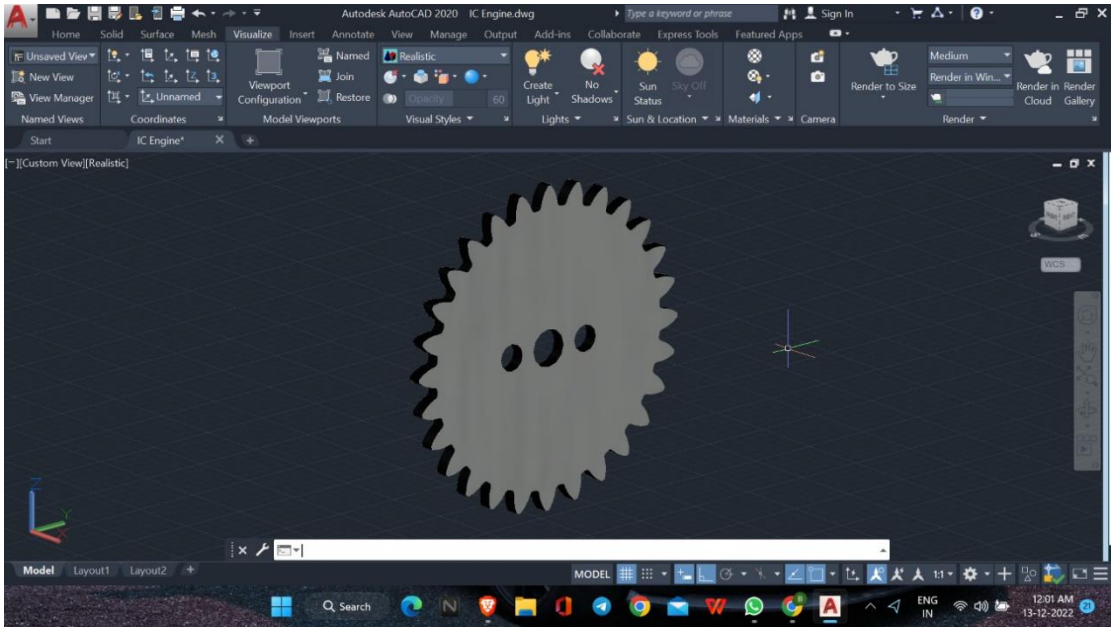
100 cc single cylinder four stroke I.C. engine

COMPONENTS WITH PICTURES

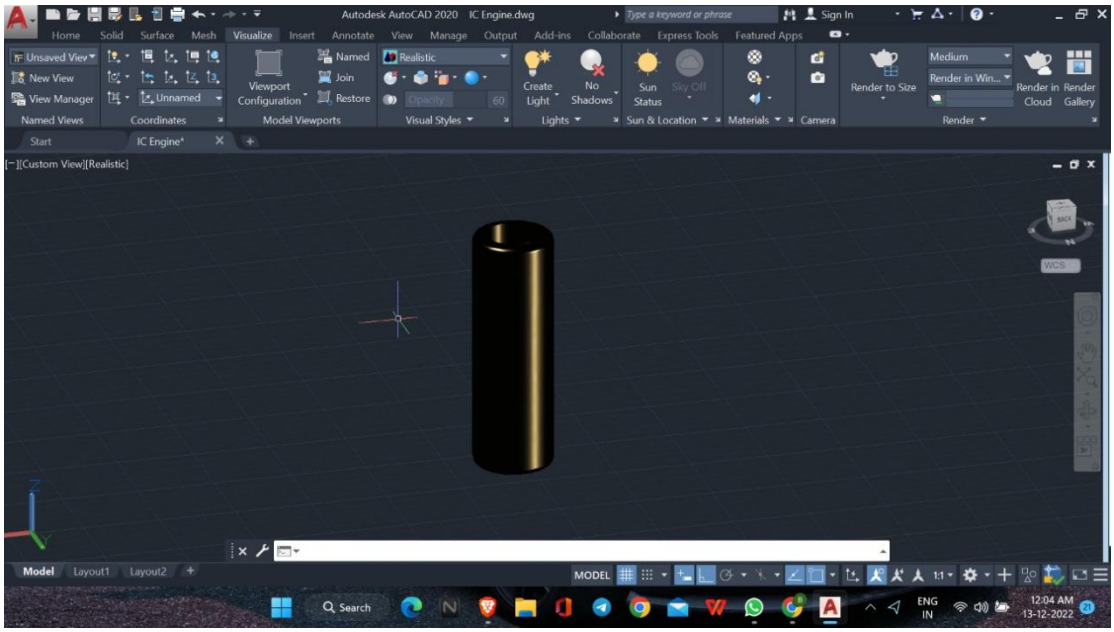
1) CAM SHAFT



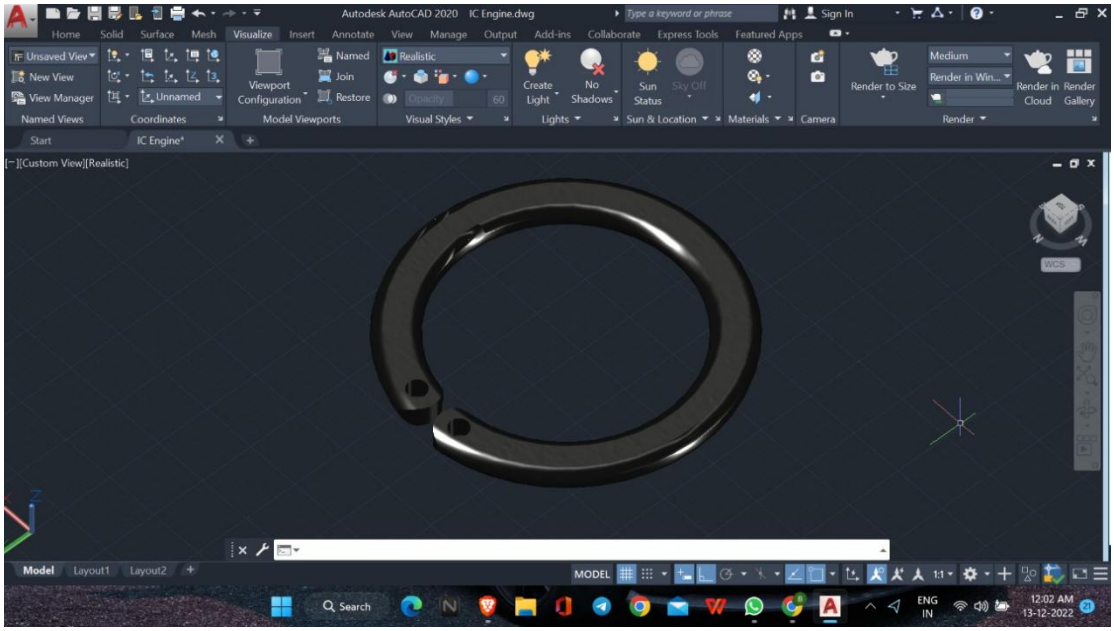
2) CAM SPROCKET



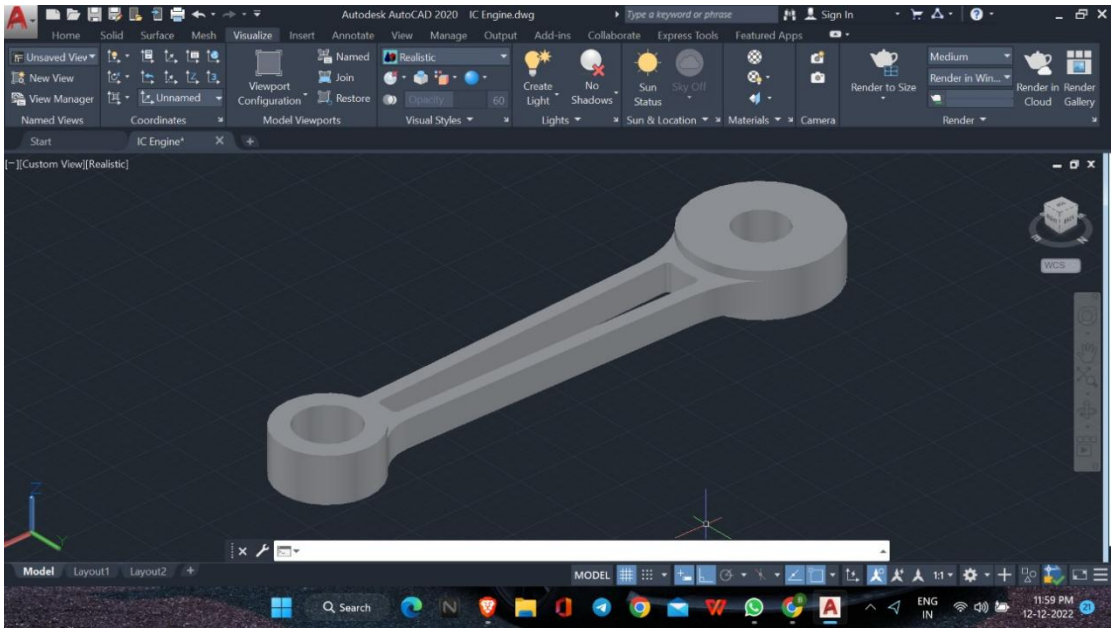
3) GUDGEON PIN



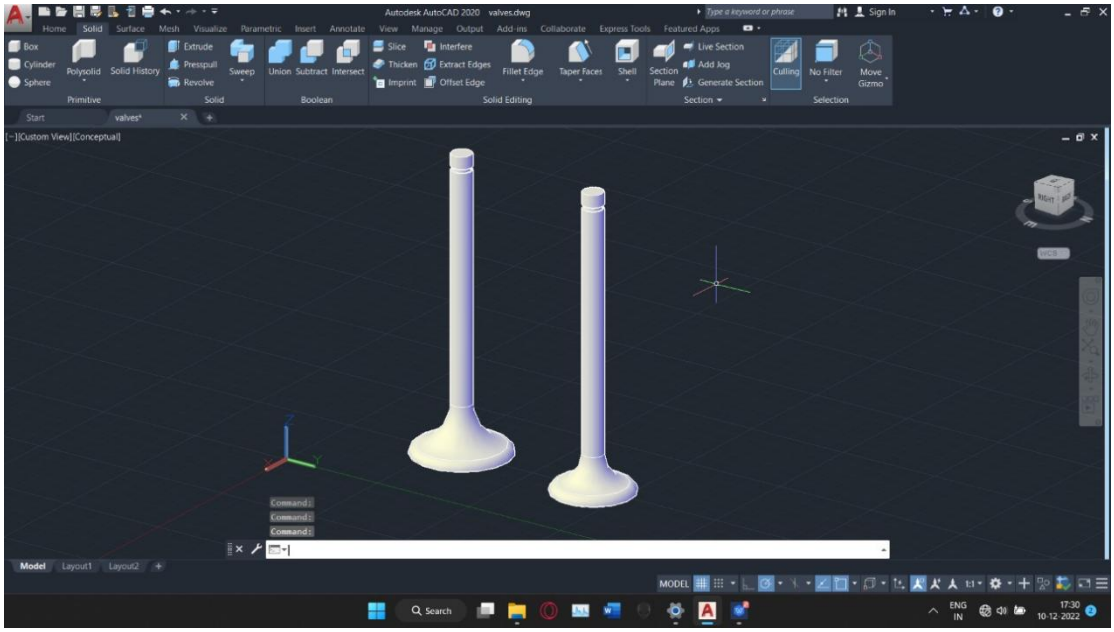
4)CIRCLIP



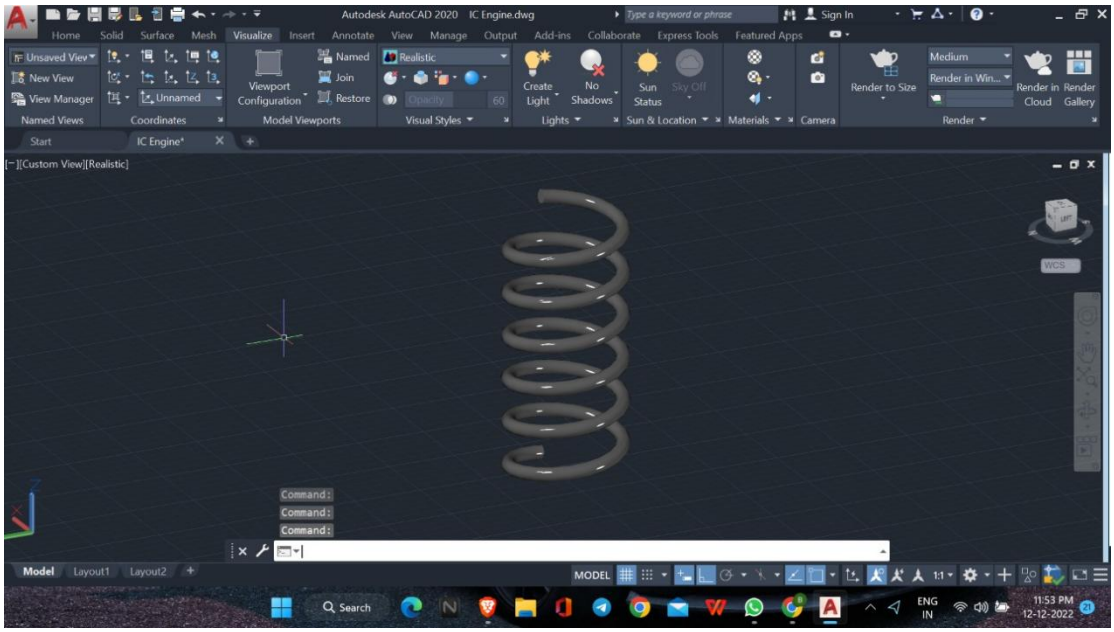
6) CONNECTING ROD



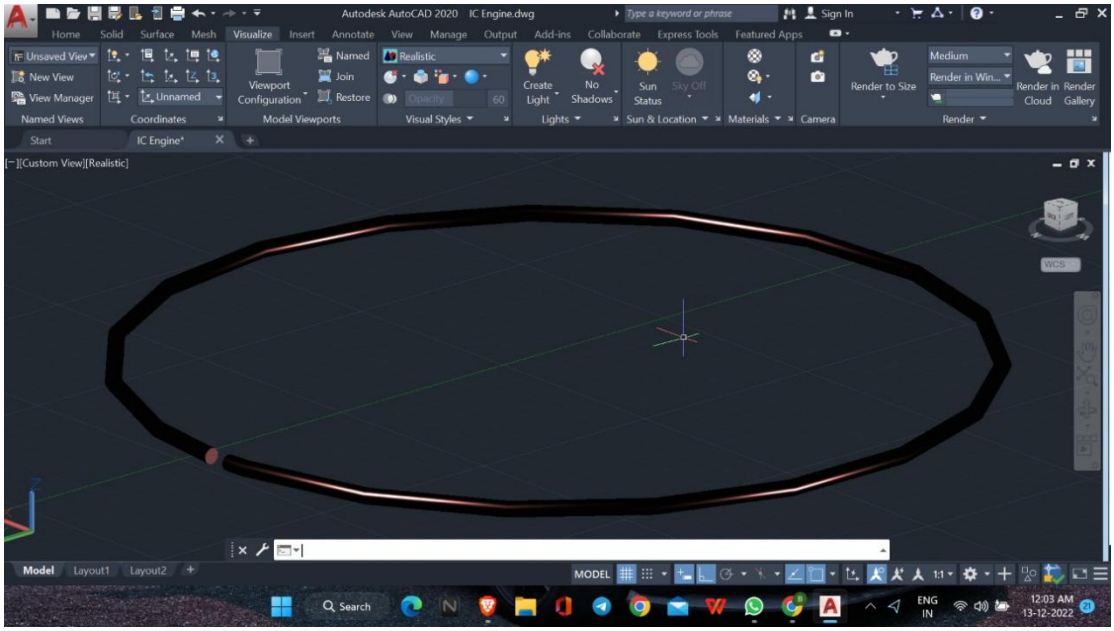
7) EXHAUST VALVE AND INLET VALVE



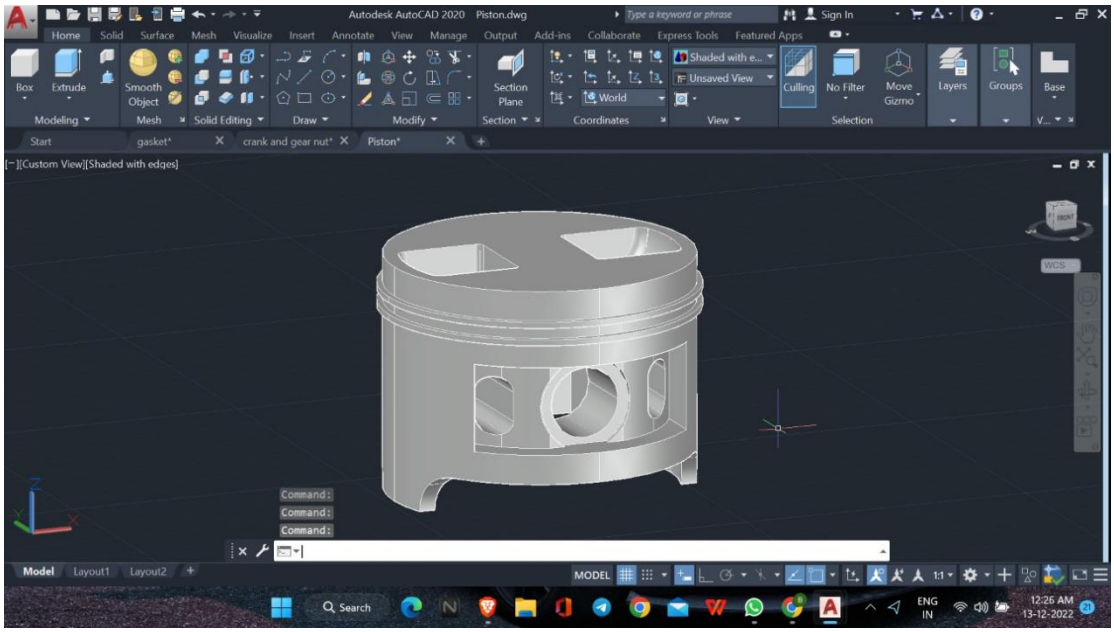
8) SPRING



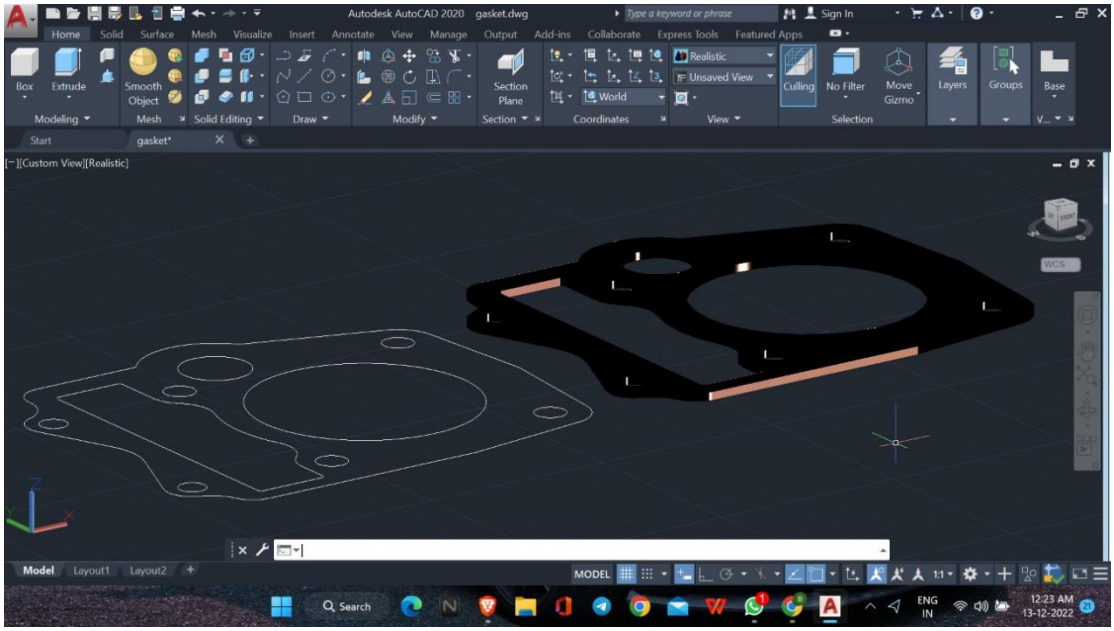
10) PISTON RING



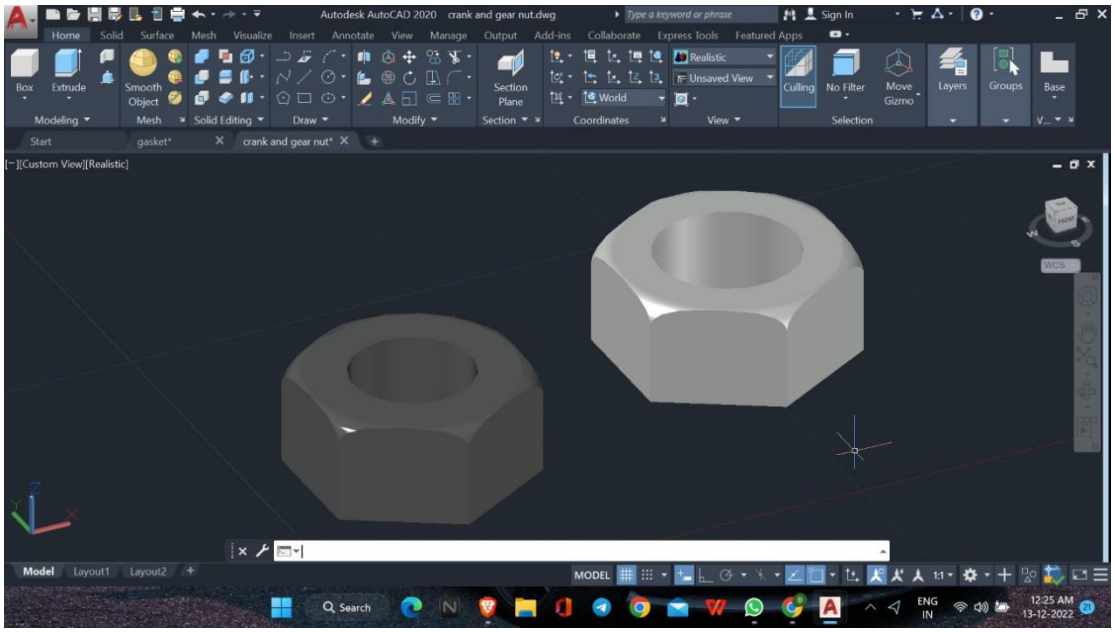
11) PISTON



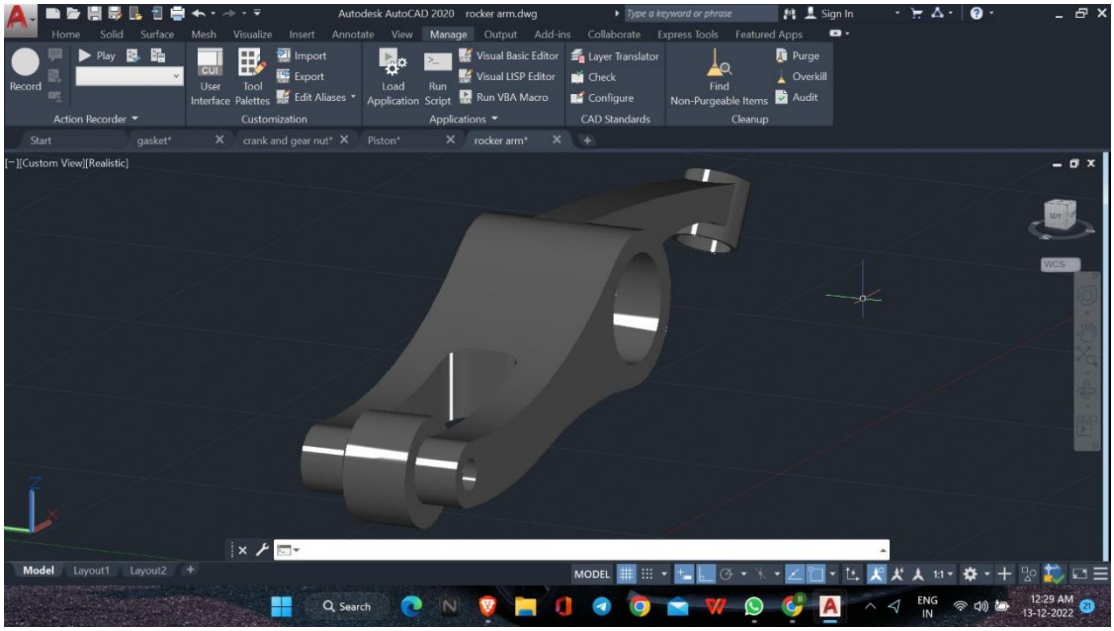
12) GASKET



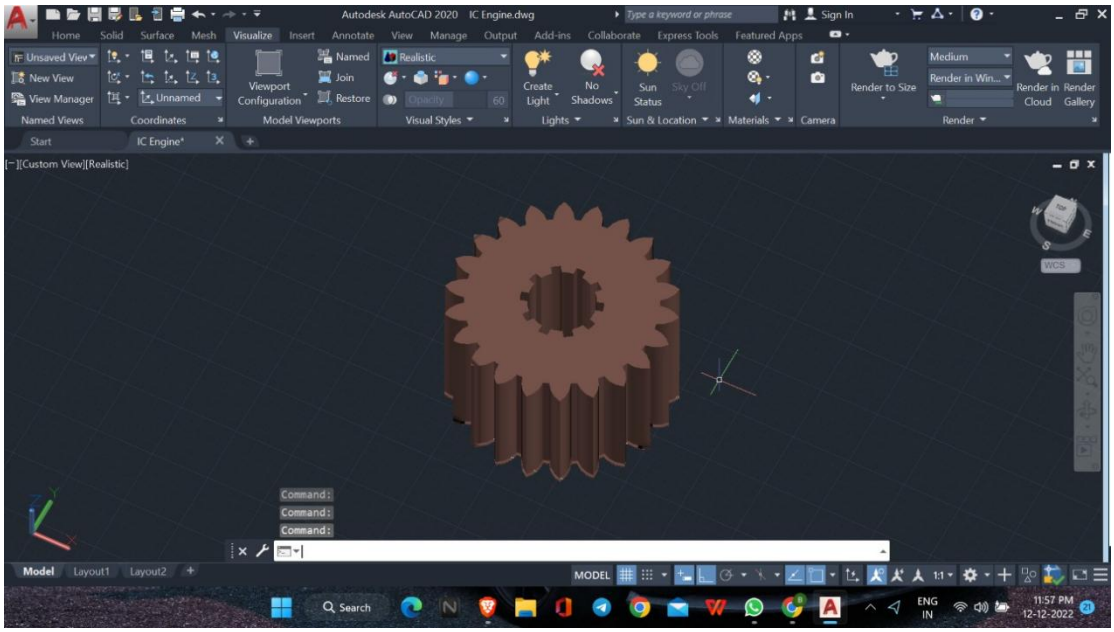
13) GEAR NUT & CRANK NUT



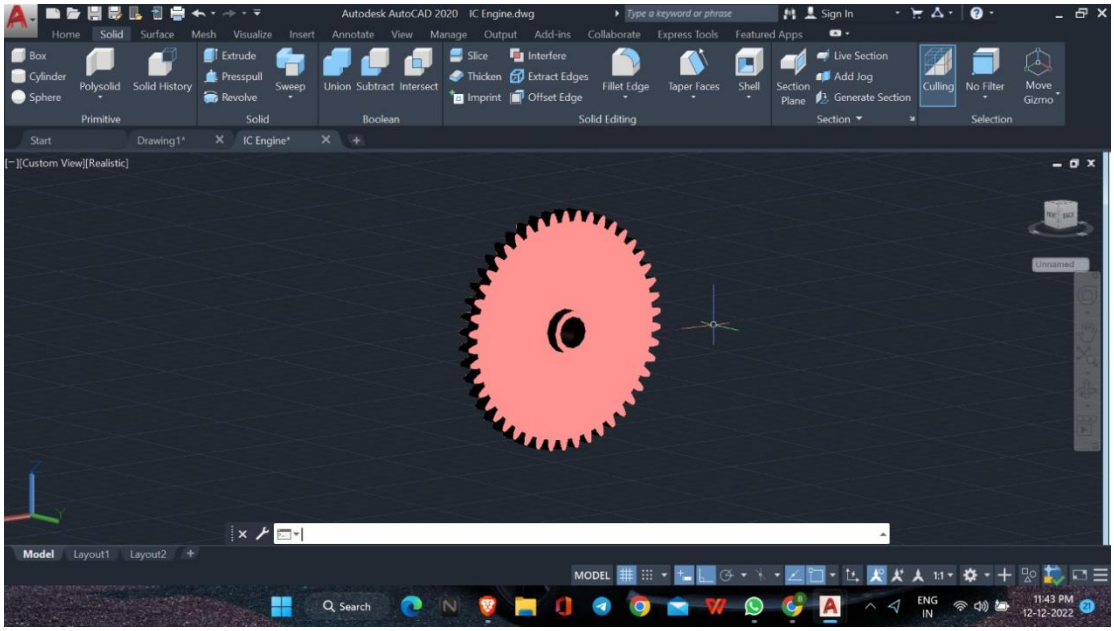
14) ROCKER ARM



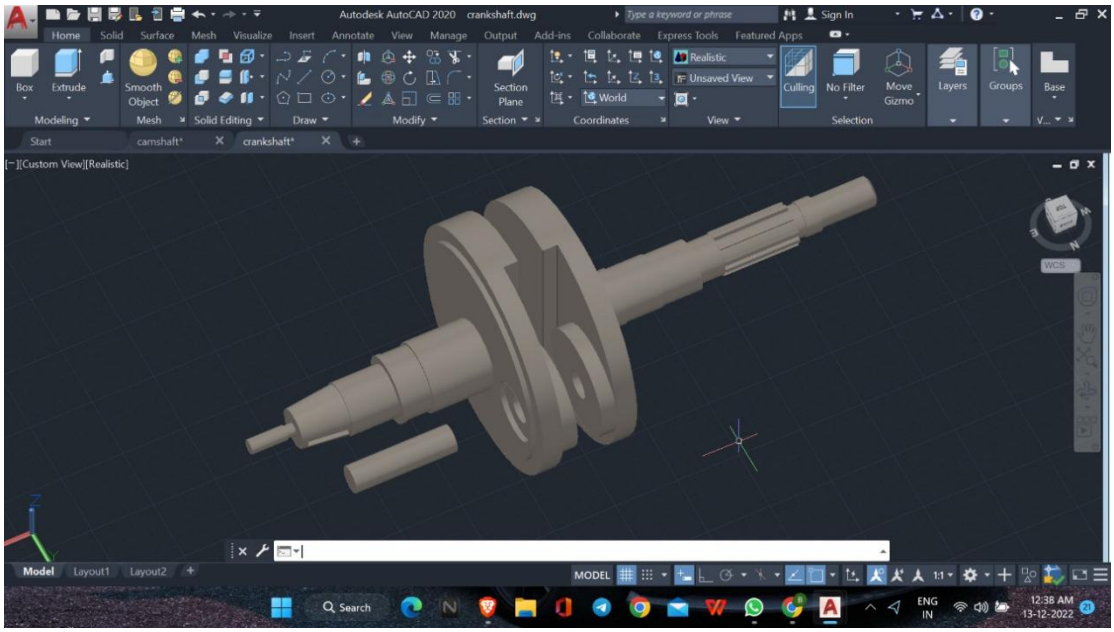
15) DRIVING GEAR



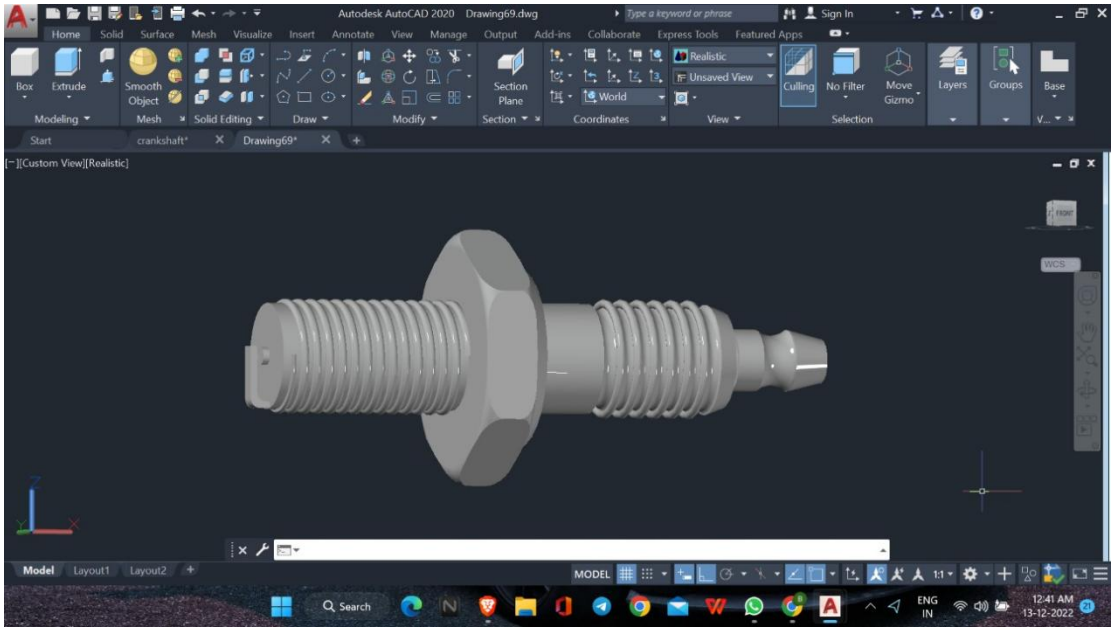
16) CRANK FLYWHEEL



17) CRANKSHAFT



18) SPARK PLUG



CONCLUSION:

Our project depicts the components of an I.C. Engine keeping in mind of the original dimensions mentioned in the Book of Machine Drawing by Professor N.D. Bhatt.

Each part has been drawn precisely so that can be assembled to get a precise overview and cross section of an actual 100 cc Single cylinder four stroke I.C Engine.

The rest of the parts which were not shown in the lists are beyond the scope of our knowledge.