

Fixture for Piston, Pin & Connecting Road Assemble & Disassemble of Reciprocating Air Compressor

Abhishek Yadav¹ Ankit Jain² Gurudev Patel³ Kaamil Jadav⁴ Mr. Ganesh Mudaliyar⁵
⁵Lecturer

^{1,2,3,4,5}Department of Mechanical Engineering

^{1,2,3,4,5}Samarth College Of Engineering and Technology, Himmatnagar, Gujarat, India

Abstract— Air compressor has the piston cylinder system, there's a pin connected between piston & connecting rod, that can't be easily assemble & disassemble. This is very time consuming process. So we can make a fixture where the pin is easily assemble & disassemble.

Key words: Piston, Pin, Connecting Road, Air Compressor

I. INTRODUCTION

A piston is a component of reciprocating engines, reciprocating pumps, gas compressors and pneumatic cylinders, among other similar mechanisms. It is the moving component that is contained by a cylinder and is made gas-tight by piston rings. In an engine, its purpose is to transfer force from expanding gas in the cylinder to the crankshaft via a piston rod and connecting rod in a pump. The function is reversed and force is transferred from the crankshaft to the piston for the purpose of compressing or ejecting the fluid in the cylinder. In some engines, the piston also acts as a valve by covering and uncovering ports in the cylinder wall.

The gudgeon pin is typically a forged short hollow rod made of a steel alloy of high strength and hardness that may be physically separated from both the connecting rod and piston or crosshead. The design of the gudgeon pin, especially in the case of small, high-revving automotive engines is challenging. The gudgeon pin has to operate under some of the highest temperatures experienced in the engine, with difficulties in lubrication due to its location, while remaining small and light so as to fit into the piston diameter and not unduly add to the reciprocating mass.

In a reciprocating piston engine, the connecting rod connects the piston to the crank or crankshaft. Together with the crank, they form a simple mechanism that converts reciprocating motion into rotating motion. Connecting rods may also convert rotating motion into reciprocating motion. Historically, before the development of engines, they were first used in this way. As a connecting rod is rigid, it may transmit either a push or a pull and so the rod may rotate the crank through both halves of a revolution, i.e. piston pushing and piston pulling. Earlier mechanisms, such as chains, could only pull. In a few two-stroke engines the connecting rod is only required to push. Today, connecting rods are best known through their use in internal combustion piston engines, such as automotive engines. These are of a distinctly different design from earlier forms of connecting rods, used in steam engines and steam locomotives.

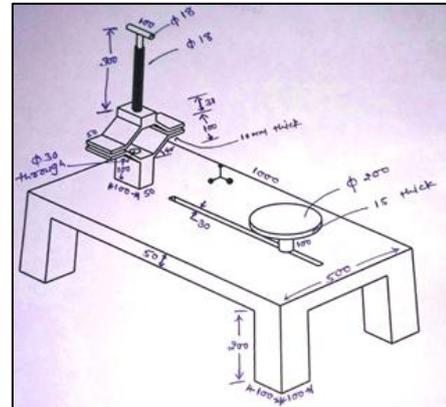


Fig. 1: Design of the Fixture

II. MODEL OF FIXTURE

A. Model of the Fixture

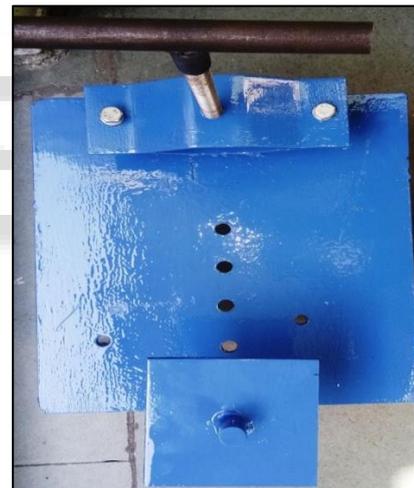


Fig. 2: Model of Fixture

B. Base of Fixture

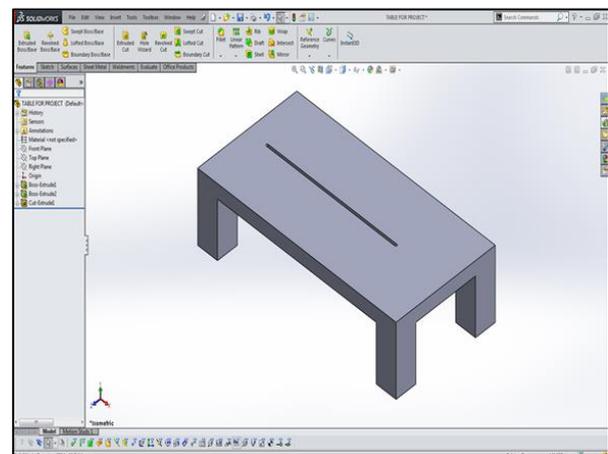


Fig. 3: Base of Fixture

C. Base of Connecting Rod

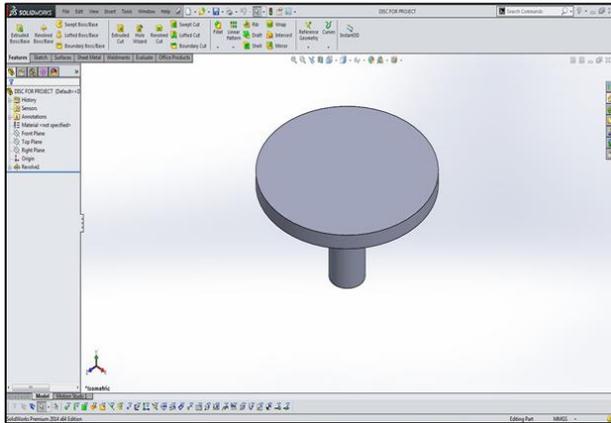


Fig. 4: Base of Connecting Rod

D. Design of Threaded Rod

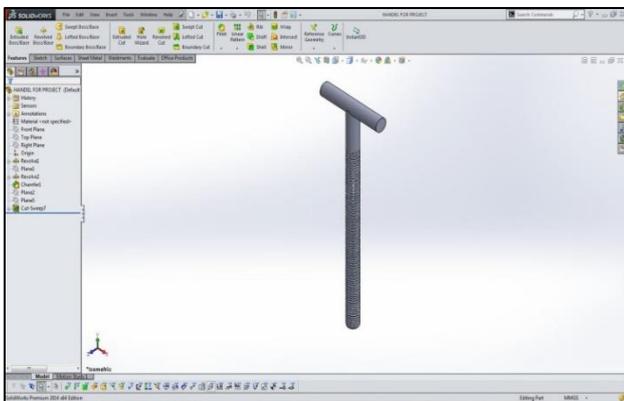


Fig. 5: Design of Connecting Rod

E. Design of V-Block

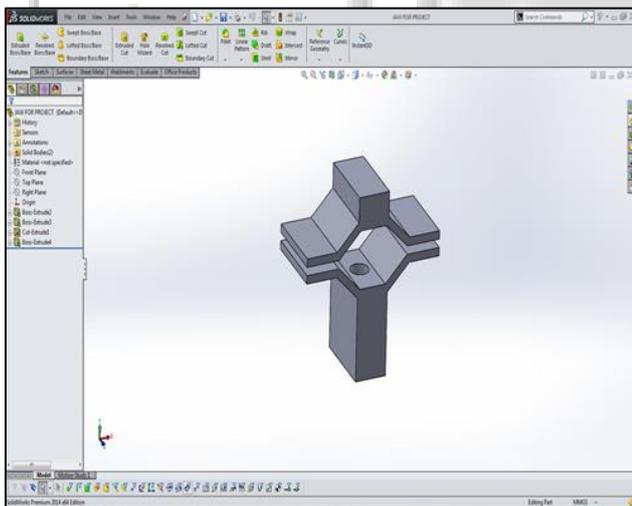


Fig. 6: Design of V-Block

Piston Size	140MM
Connecting rod Size	245.3MM
Size Of Bearing	65MM
Gudgeon pin Length	120MM
Gudgeon pin Diameter	30MM
Threaded rod Diameter	28MM

Table 1: Big Piston Parameters

Piston Size	63.5MM
Connecting rod Size	169.6MM

Size Of Bearing	30.5MM
Gudgeon pin Length	55.6MM
Gudgeon pin Diameter	20MM
Threaded rod Diameter	18MM

Table 2: Small Piston Parameters

III. WORKING OF FIXTURE

When we perform on the piston structure the piston fixed between upper v-block and lower v-block. The connecting rod will rest between the piston and connecting rod support disc. When the piston pin adjusts in pin guide. The pin guide will connect with threaded rod. The threaded rod will moves in reciprocating direction. When push the rod in pin guide the pin will be insert in piston or connecting rod this process is called pin inlet process. When the pin removal process the threaded rod set at the pin end goes Downward with the help of threaded block. Then the pin will remove downward direction.

IV. PROBLEM DEFINITION

- To make easy removal and insert of pin to assemble and dissemble connecting rod with piston to create a fixture which make assemble and dissemble easy.
- It also decrease the chance to damage to the piston cylinder connecting rod and pin This fixture is compact & using less floor area It is also less time consuming process Easy handling and less maintenance.

V. ADVANTAGES OF FIXTURE

- Freely available from the atmosphere.
- Explosive proof. No protection against explosion required.
- Easily transportable.
- No return lines are required.
- Clean system.

VI. DISADVANTAGES OF FIXTURE

- It is inaccurate in operation.
- Effects to end of gudgeon pin.
- Creates noise pollution.

VII. FUTURE SCOPE

- Complete automation can be achieved.
- Easy locking technique can be derived.
- Mobility of fixture can be increased.
- Portability can be improvised.
- V-block can be magnetized for an environment where clamping is possible.

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