2.Press Machine

24 MARKS

INTRODUCTION:

Products made through the sheet metal processing include automobile bodies, utensils, electronic components, electrical parts, aerospace parts, refrigeration and air conditioning parts etc. Sheet metal is generally considered to be a plate with thickness less than about 5 mm. Articles made by sheet metal work are less expensive and lighter in weight. Sheet metal forming work started long back 5000 BC. As compared to casting and forging, sheet-metal parts offer advantages of lightweight and versatile shapes.

MATERIALS USED IN PRESS WORK

GALVANISED IRON

Zinc-coated iron is known as "galvanised iron"'. This soft steel sheet is popularly known as GI sheet.

Applications: pans, buckets, furnaces, heating ducts, cabinets, gutters, etc. are made mainly from GI sheets.

STAINLESS STEEL

This is alloy of steel with nickel, chromium, and traces of other metals. It has good corrosive resistance and can be welded easily.

Applications: fuel tanks, rims, bus bodies, canneries, dairies, food processing and chemical plants, kitchen wares, etc.

COPPER

Copper sheets are available either as cold-rolled or hot-rolled sheets.

Application: Radiators, bearings, brakes, Gutters, expansion joints, roof flashing and hoods are some of the common examples of copper sheet.

ALUMINIUM

Aluminium cannot be used in pure form, but is used with a very small amount of copper, silicon, manganese and iron.

Applications: Engine block, engine head, piston, Household appliances, refrigerator trays, lighting fixtures, windows, in the construction of airplanes.

TIN PLATE

Tin plate is sheet iron coated with the tin to protect it against rust.

Applications: Oil can for automobiles, Roofs, food containers, dairy equipments, furnace fittings cans and pans.

PRESS

- **Working Principle:**

The press is a metal forming machine tool designed to shape or cut metal by applying mechanical force or pressure. The materials are sheared or formed between punch and die.

➢ CLASSIFICATION OF PRESS

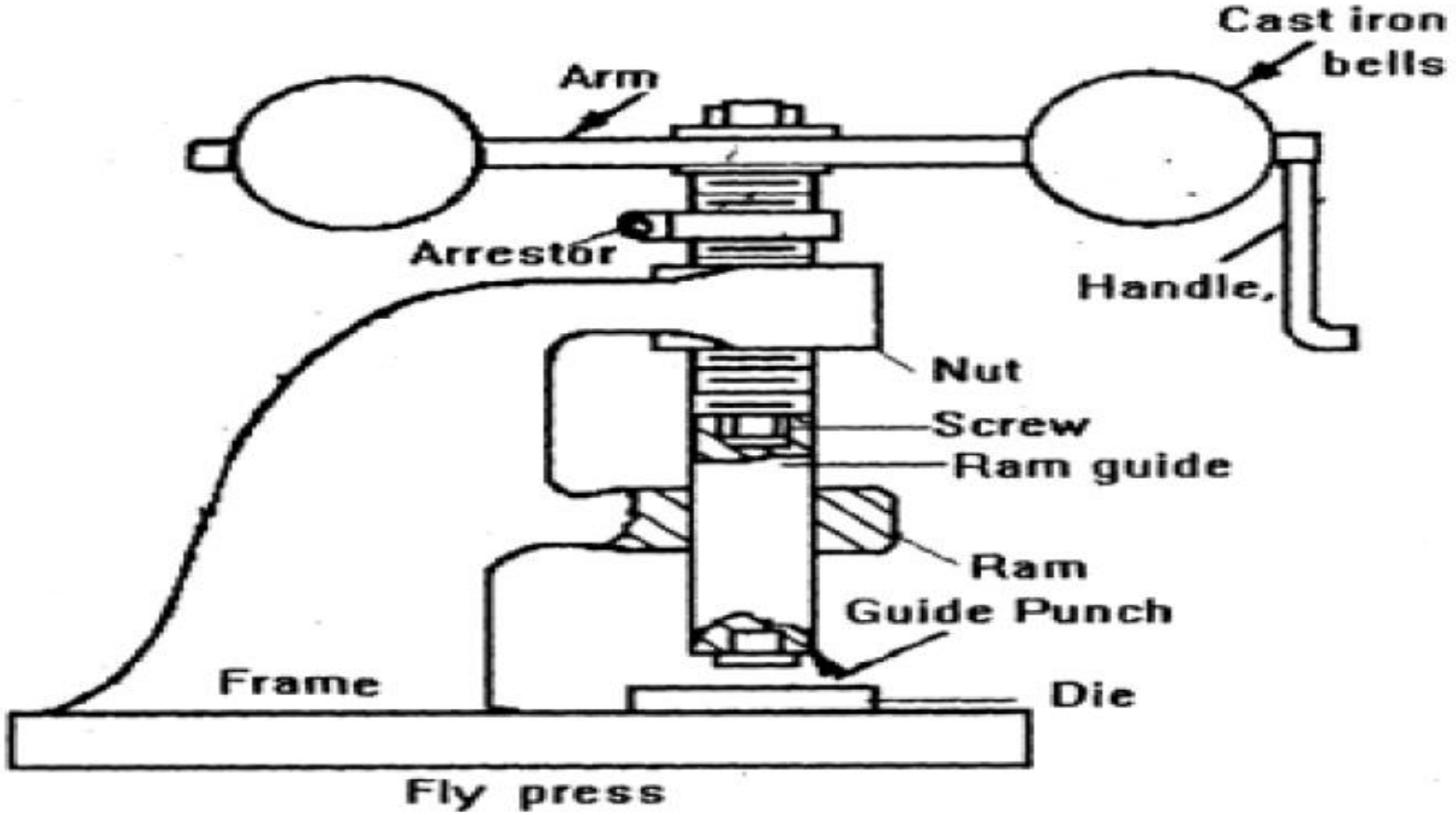
According to design of frame:

1) Bench
2) Gap
3) Inclinable
4) Arch
5) Straight side
6) Horn
7) Pillar

According to method of applying power to ram:

1) Crank
2) Cam
3) Eccentric
4) Power screw
5) Knuckle joint
6) Rack and pinion
7) Toggle
8) Hydraulic
9) Pneumatic

Major Parts of Press



Q. Which are the major parts of the mechanical press? And describe their functions.

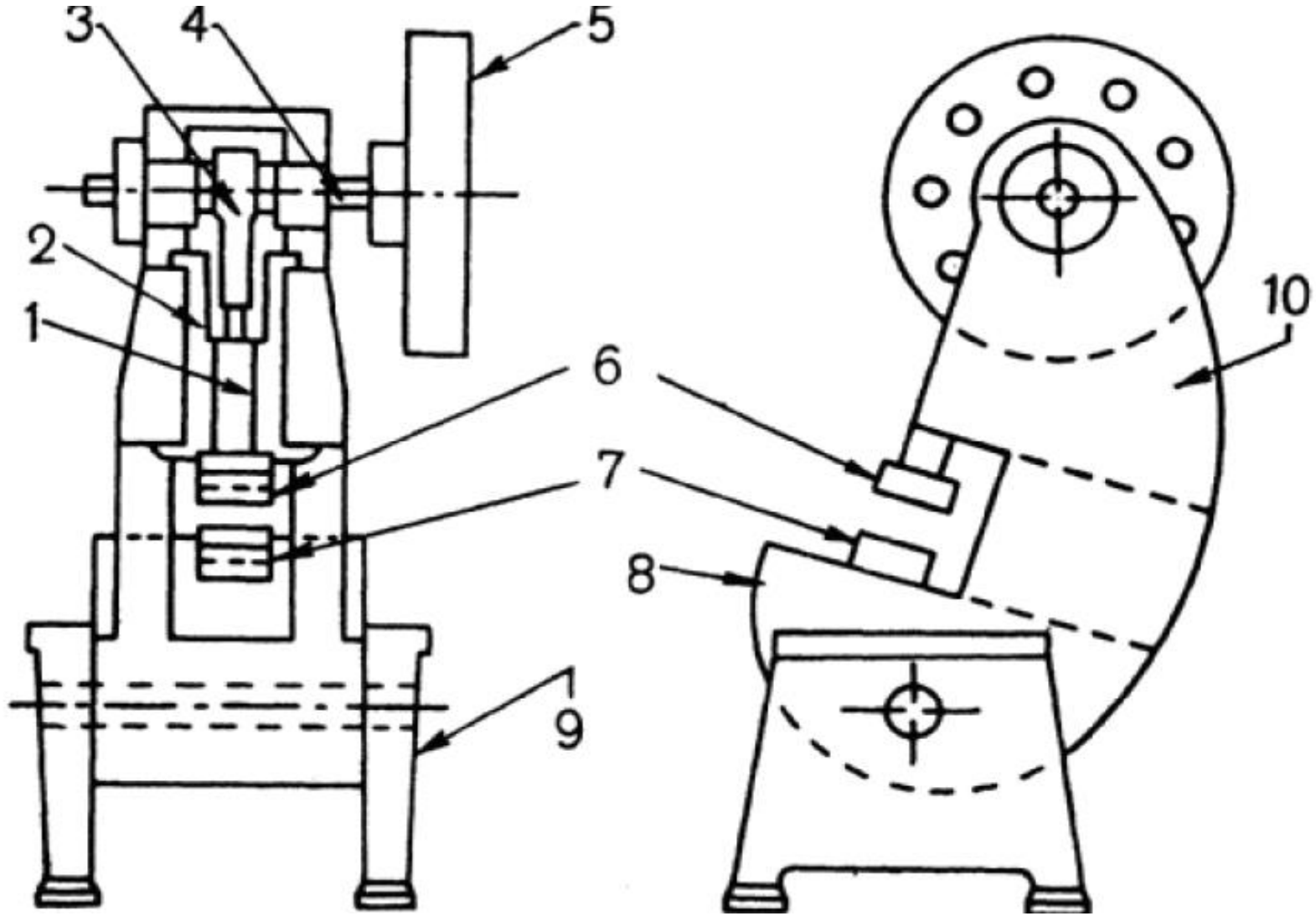
***Base*:** The base is the supporting member of the press and provides arrangement for tilting and clamping the frame in an inclined press.

Frame: All presses except the straight side type have "C" shaped frame to take up the vertical thrust of the ram.

Bolster plate: The bolster plate is a flat plate fitted on the base for supporting the die block and other accessories of the press.

Ram: The ram is the reciprocating member of the press that slides within the press and guides and supports the punch at its bottom end.

Pitman: The pitman is the connecting rod in a crank or eccentric driven press. The position of stroke of the ram can be changed by altering the length of the connecting rod.



1. Ram 2. Ram guide, 3. Pitman, 4. Crankshaft, 5. Flywheel, 6. Punch, 7. Die, 8. Bolster plate, 9. Base, 10. Frame.

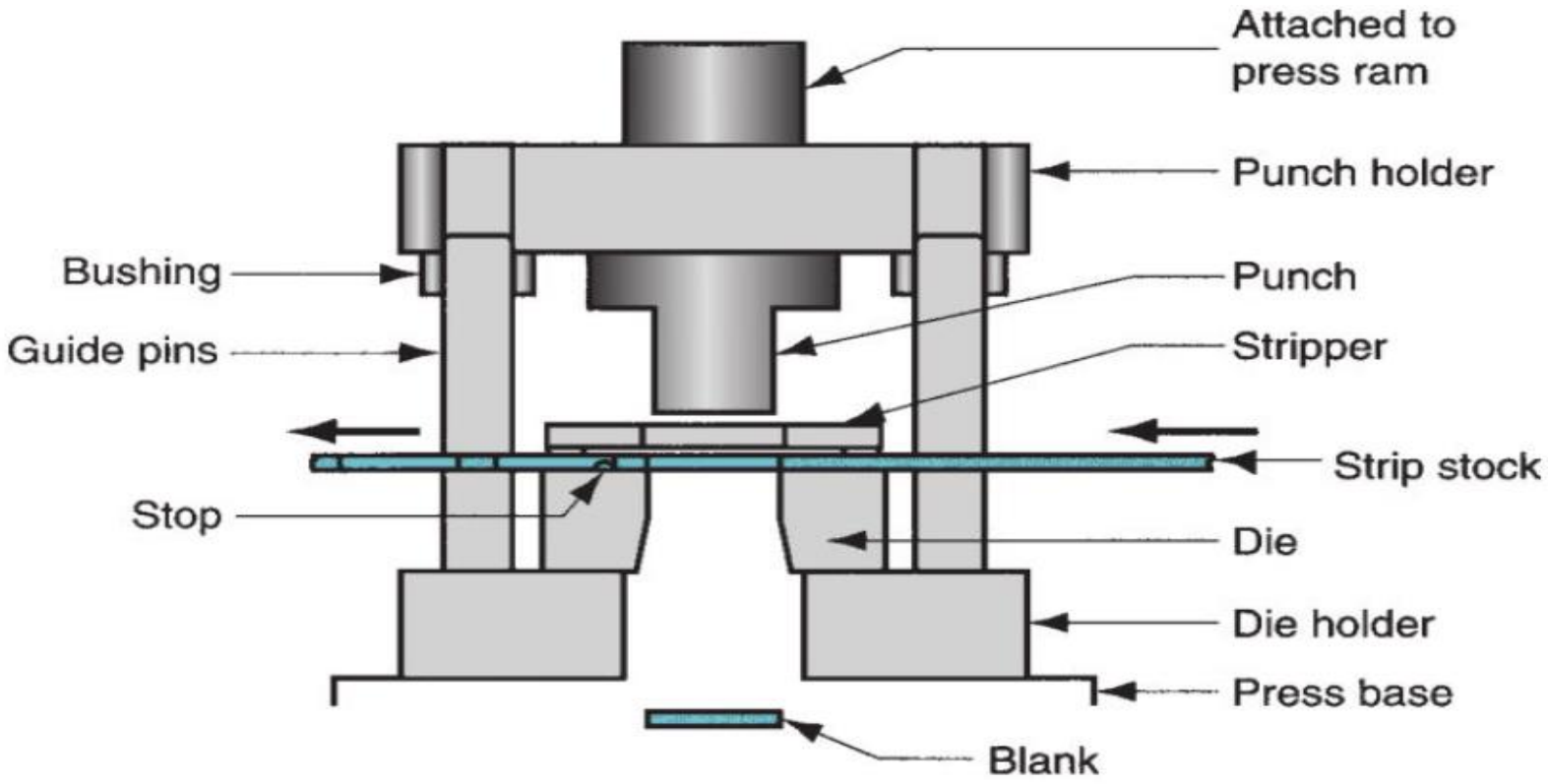
Crank, eccentric or other driving mechanism: The rotary movement of the motor is converted into the reciprocating movement of the ram by crank and connecting rod, eccentric and connecting rod, or many other mechanisms.

Fly wheel: The fly wheel is mounted at the end of the driving shaft and is connected to it through a clutch. The energy is stored up in the flywheel during idle periods and it is expended to maintain the constant speed of the ram when the punch is pressed into the work. The fly wheel is directly coupled with the electric motor.

Clutch: The clutch is used for connecting and disconnecting the driving shaft with the fly wheel when it is necessary to start or stop the movement of the ram

Brakes: The brakes are used to stop the movement of the driving shaft immediately after it is disconnected from the fly wheel.

Parts of Standard Die set



The general nomenclatures of tools used in presses are called **dies and punches.** The term die is also sometimes used to denote the entire press tool including a punch.

A punch is that part of the press tool which enters into the cavity formed in the die section.

A die is that part of the press tool which has an opening or cavity to receive the punch.

Die Accessories:

The die accessories are used in conjunction with the dies and punches for systematic operation, correct location, and removal of finished products. The following are the different die accessories.

Stops: The stops are used for correct spacing of the sheet metal as it is fed below the punch to give the greatest output in given length of the plate. Button stop and lever stop.