TYPES OF PRESSES FOR SHEET METAL FORMING

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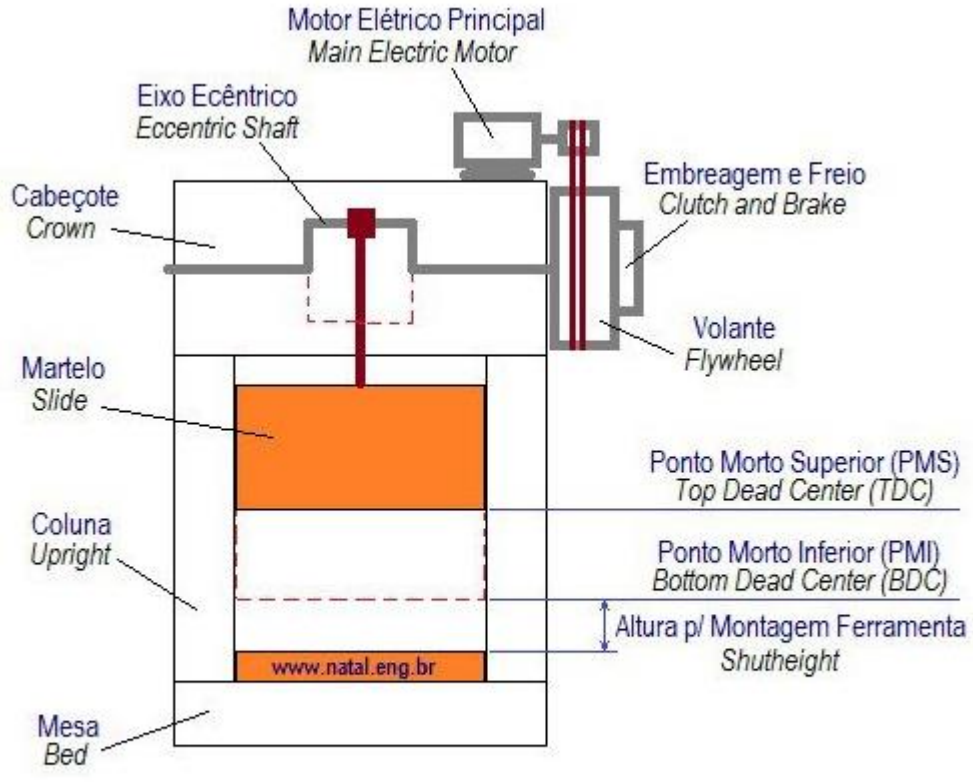
Concern the drive, basically there are 3 groups of presses:

- Mechanical Presses
- Hydraulic Presses
- Servopresses

MECHANICAL PRESSES

The principle of working of a mechanical press is described bellow

- an electric motor turns a flywheel
- the flywheel, a big wheel made of cast iron, stores energy according its speed
- when the flywheel engages at the shaft, by means of a clutch, the shaft starts turning and a eccentric mechanism transform the turning movement in a down and up movement of the slide.
- when the slide reaches "BDC - Bottom Dead Center" position (180° = die closing) a portion of the energy stored in flywheel (maximum 20%) is used as press work for forming the part
- then the slide moves up to "TDC - Top Dead Center Position" and the cycle is over.



PRENSA MECÂNICA
MECHANICAL POWER PRESS

The mechanical press has low energy available and the nominal tonnage can be used only near of "BDC - Bottom Dead Center", when the die is almost closed. The use of nominal force out of this range can break the press. For that reason, the main application of mechanical press is blanking or a not deep forming.

Due to the principle of working of an eccentric mechanism, if something does not permit that the slide reaches the BDC - Bottom Dead Center, the force goes to infinite and can cause serious damage to the die / press. For that reason, it is very important pay attention during the slide adjustment. An incorrect adjustment can damage the die/press.

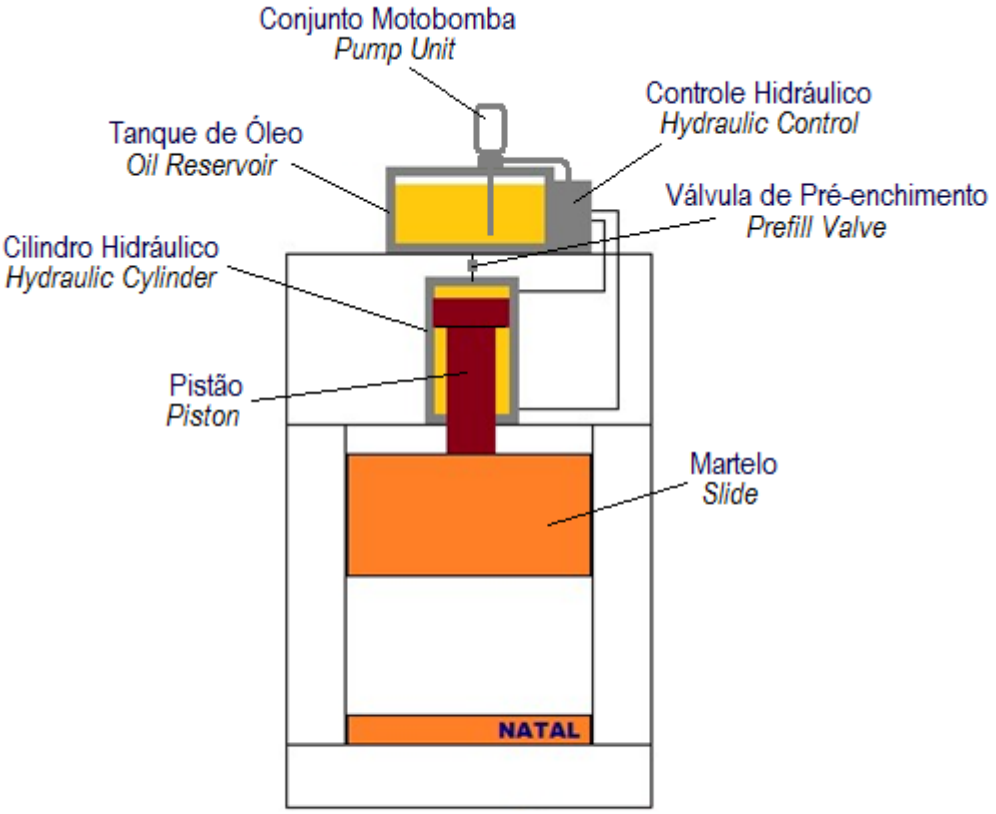
The mechanical press is one of the most used in industry. Advantages:

- high production
- power economy
- less maintenance and easier maintenance
- easy synchronism with automation system

HYDRAULIC PRESSES

The principle of working of a hydraulic press is described bellow

- a hydraulic unit generates oil pressure for the press work
- a hydraulic control controls all possible slide movements
- a prefill valve allows a quick movement of the slide in order to reduce the production dead time (in that condition the press does not perform work)
- during the down movement of the slide the hydraulic control sends oil pressure inside upper side of the hydraulic cylinder and que oil in the lower side returns to the tank
- during the up movement of the slide the hydraulic control sends oil pressure inside lower side of the hydraulic cylinder and the oil in the upper side returns to the tank



PRENSA HIDRÁULICA
HYDRAULIC PRESS

The hydraulic press has high energy and its force can be used along the available travel of the piston, according to the cylinder dimension.

In the hydraulic circuit there is a pressure limiting valve that does not permit the force to exceed the nominal tonnage. Then, if something does not permit the slide to reach "BDC - Bottom Dead Center", as soon the oil pressure reaches the adjusted pressure, the press control is turned off.

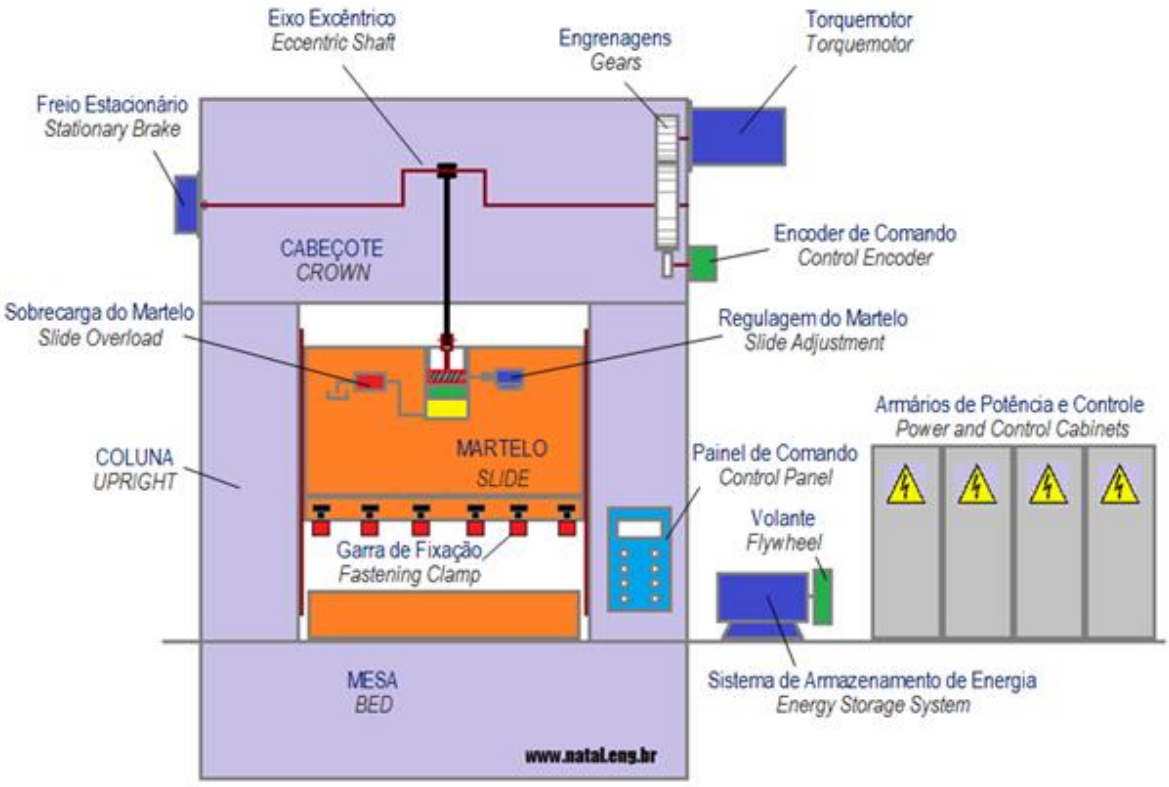
The hydraulic press can perform any part but, due to the high energy, the main application in industry is for deep drawing. Also, it is a very versatile machine and very useful for die makers in a tool room during tryout jobs. It is possible to adjust the force, slide travel and to have total control of the slide movement.

SERVOPRESSES

The development of the servopress happened due to the advancement of electronics and automation.

The principle of working of a servo press is described bellow

- a torque motor (electric motor with high torque) drives directly the press main drive shaft
- when the shaft turns, an eccentric mechanism transforms the turning movement in a down and up movement of the slide
- the control of the torque motor, high technology, can be programmed in several ways to adjust the speed, turn direction, movement curve of the slide and so on. Its permit higher production compared with mechanical press and versatility as the hydraulic press and, the most important, power economy.



SERVOPRENSA
SERVO PRESS

The servopress is a new concept of press, its use in industry starts around year 2000. In Brazil, even nowadays (2020) there are few machines.

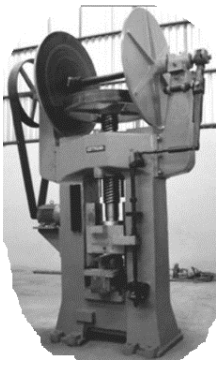
I believe in the next future the servopress will replace most of the mechanical press and a portion of hydraulic press. The servopress has features of the both machines and the advantage of power economy.

However, in cases that demands high energy as deep drawing, it is required a hydraulic press.

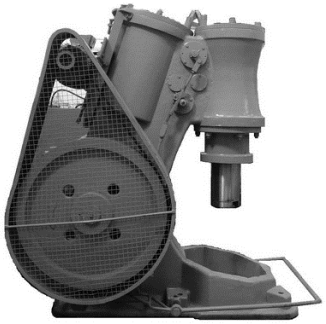
TYPES OF PRESSES FOR OTHER APLICATIONS

Out from sheet metal forming use, there are several types of presses that does not belong this article. For example:

- Friction press driven by spindle,



- Pneumatic press used in forge, etc.



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Date: April, 2020