

About Fine Blanking

Global Expansion of Human Activity and The Wave of Motorization

Enhancing the productivity of international automobile manufacturers In the attractive international automobile manufacturing market, fineblanking(FB) provides a state-of-the-art technology far superior to any other techniques in terms of accuracy, quality and economy.

FINEBLANKED AUTOMOTIVE PARTS

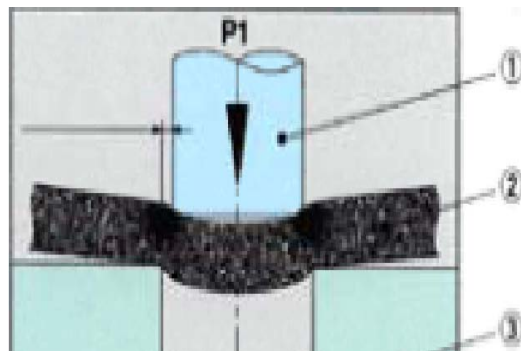
Seventy years have passed since fineblanking was developed by Fritz Schiess in Switzerland. Starting in the late '60s, Japan imported many fineblanking presses from Switzerland. However, users were not completely satisfied with the productivity and services of these machines, and suggested that the fineblank presses be manufactured by Mori Iron which, quite similar to Schiess, had a history of seventy years, an impressive R&D background, and much experience in the design and manufacture of hydraulic presses.

Backed up by the cooperation of the Japanese users of the imported conventional fineblank (FB) presses, the first FB press was manufactured, with improvements made to the efficiency, operability and maintainability of the conventional machines. These improvements to the FB press drew widespread acclaim. This first version was then followed by the development of a new FB, which was equipped with a CNC, creating a new standard for the industry, and greatly contributing to the development of the automotive industry.

The photo illustrates a 8000 kN FB press equipped with a CNC, currently in service at the world's top-level FB production line in the clutch manufacturing industry.

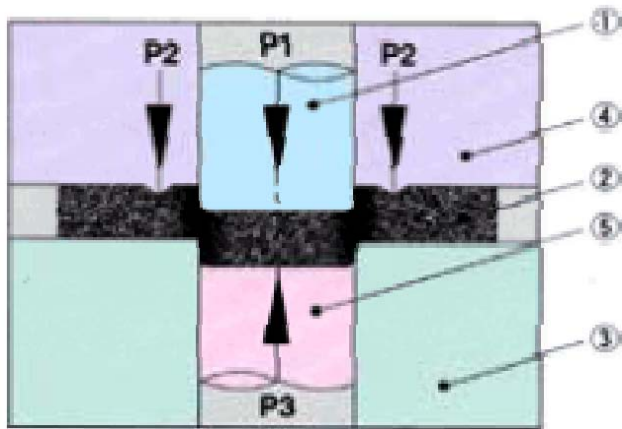
Principles of FB

The FB machine is based on the principle of hydrostatic pressure that plastic deformation of metal is increased by application of high pressure. This principle is based on the studies of Dr. Bridgeman, a U.S. scientist who won the 1964 Nobel prize in physics. The principle is now widely known in many fields.



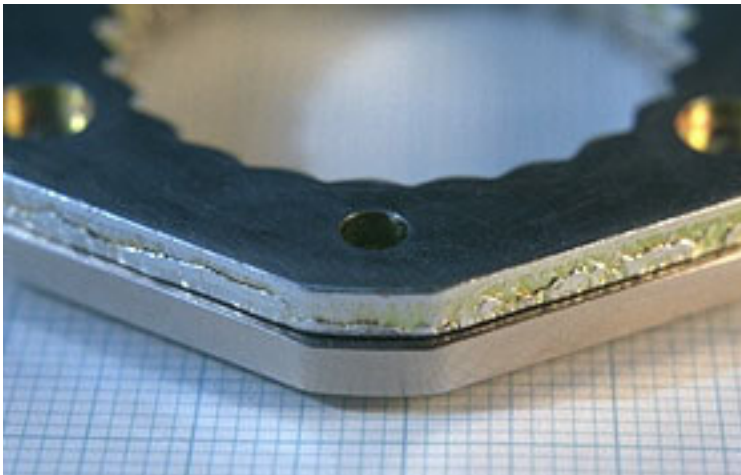
Conventional process

1. Punch
2. Workpiece
3. Die



FB Process

1. Punch
2. Workpiece
3. Die
4. V-ring
5. Ejector



Surface produced by conventional method (Top) Smooth surface produced by FB method (Bottom)

FB Features:

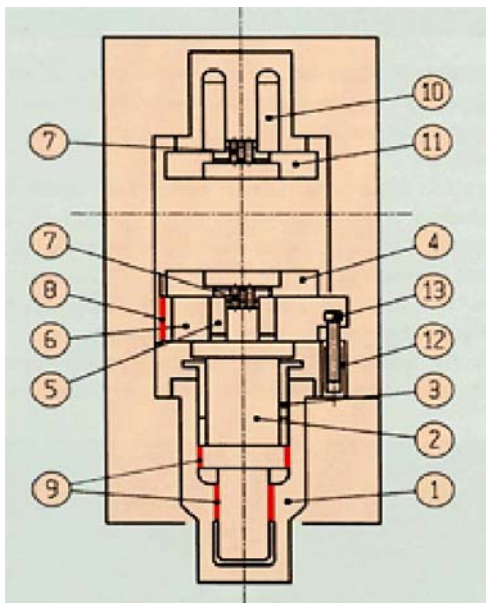
- Provides a clean-cut surface without the need for secondary machining such as shaving or milling.
- Ensures stable production with high quality and precision.
- Permits three-dimensional composite processing including coining, semi-shearing, bending, and drawing.
- Assures better flatness than conventional press techniques.

- The FB requires special presses featuring high accuracy and rigidity as well as precision tools.
- The FB press uses three independently adjustable pressures (Triple Action Mode) for blanking operation.

Selection from an extensive assortment of products

- A wide selection of presses is available. You can choose the product best suited to your particular work requirements, which depend on the shape, quality and thickness of your workpieces.
- Two basic structural types of FB tools are available: a moving punch type and a fixed punch type. The fixed punch tool is mainly used for multi-punching and progressive punching, while the moving punch tool is employed mainly to produce large components.
- There are ten types of hydraulic presses ranging from 1600 kN to 12,000kN. Two mechanical presses of 1,000 and 1,600 kN are also available.

Structure and characteristics

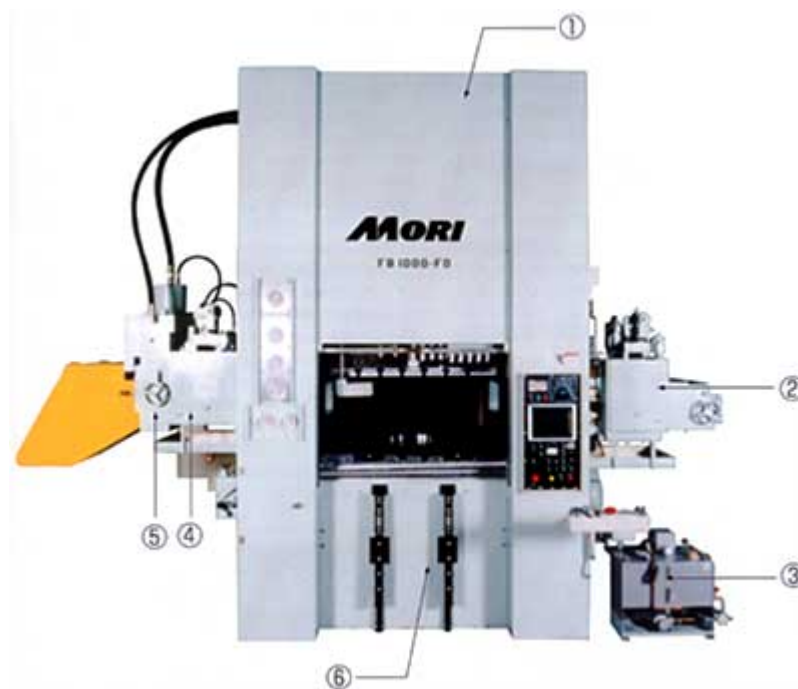


- The press is designed in a welded mono-block structure and is carefully tempered.
- Special steel is used for the cylinder, ram, and bolster.
- The ram slide consists of a preloaded long and broad 8-sided guideway to help the unit withstand eccentric loads in composite forging operations.
- A mechanical stopper ensures stopping at the top dead center, and repeatability is held to a tolerance of below 0.01mm.
- Model FB-250 and later machines are provided with center supports that provide a longer service life, lighter weight, and reduced tool cost.

- The ram is raised hydraulically from below, and is lowered under its deadweight without excessive force being applied.
- Timing of the shearing pressure, V-ring, counter pressure, and additional pressure can be adjusted separately.

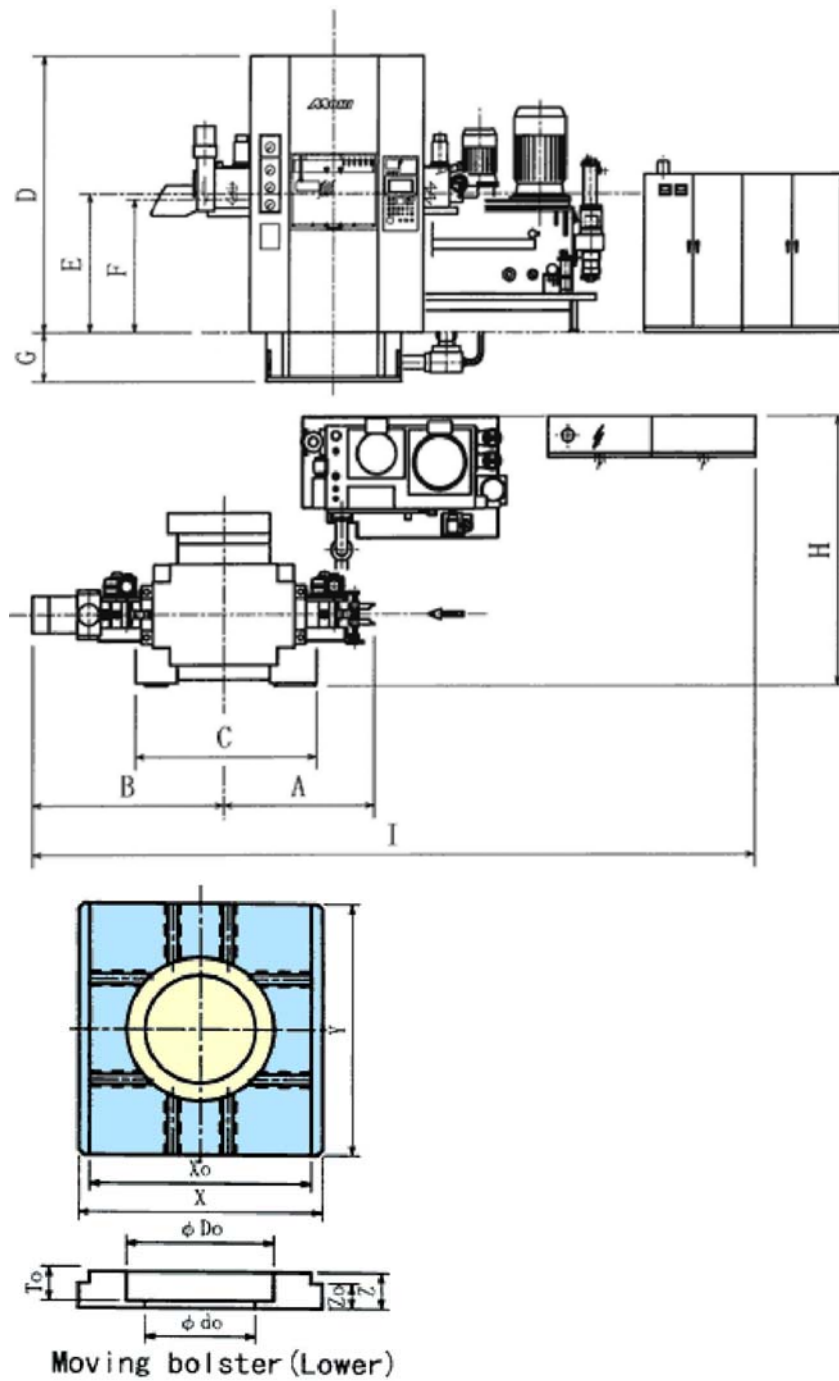
1. Main cylinder
2. Main piston
3. Mechanical stopper
4. Bottom bolster
5. Counter piston
6. Ram slide
7. Center support
8. Ram guide
9. Lower guide
10. V-ring piston
11. Top bolster
12. Approach cylinder
13. Tool protection

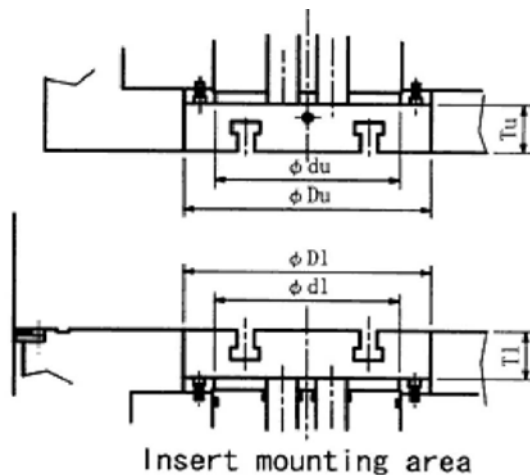
Standard Accessories FB press



1. In-feed unit
2. Lubricating unit
3. Out-feed unit
4. Scrap cutter

Specification





1. Tool protection device

- o When the FB shearing process is completed, the products and slugs are pushed back to the top surface of the tool and are ejected. This is followed by the next process. The tool protection device prevents possible tool breakage by stopping the ram motion immediately when it has detected a remaining product or slug. (Patented)

2. Shut-height adjustment

- o Production can be resumed according to the work data stored in the sequencer CPU merely by entering the volume of regrinding for the punching operation. There is no need to interrupt production. (Patented)

3. Material feed unit

- o Feeding units are required to feed in and feed out both coil and sheet materials. This unit employs an independently controllable roller driven by an AC servo motor, and releases the material when a progressive tool is used.
- o The pass-line and width of the material can be adjusted according to the parts to be produced.
- o When workpiece is inserted automatically, the position to stop the tip of the workpiece and the remaining work volume up to the end of the workpiece can be preset or stored in the memory. This data makes automatic control possible.
- o On the standard machine, the workpiece is fed from left to right, facing the machine. This direction can be reversed according to your requirements.
- o To save machine space, an NC leveler is used. This will eliminate the need to install material feed units on the in-feed and out-feed positions. Instead, a pinch roller to eject the remaining material is used on the out-feed side.

4. Product and Slug Ejection

- o The standard air blower is recommended to improve efficiency . (Use of an optional ejector ensures automatic separation between the parts and slug, and allows the front and back sides of parts to be differentiated. Further more, it prevents the parts from being dented and your plant from being contaminated by splashes of a lubricant. It also protects your work environment against noise.

5. Lubricating unit

- o For FB, you can select the type of lubricant best suited to your particular work requirements.
- o The spray unit provides easy control of the volume of oil applied to the upper and lower sides of the workpiece. It also ensures the minimum oil mist generation.
- o Oil remaining on the bolster can be recovered through a channel.
- o The press will be automatically stopped at the instance of sensing the lower oil limit.

6. Hydraulic unit

- o This is a freestanding unit independent of the press body, and is completely unaffected by vibration or heat.
- o Domestically manufactured hydraulic equipment and pumps are adopted to minimize running costs and to provide better servicing.
- o A quiet plunger-type axial piston pump is used for the main pump.
- o Use of this axial piston pump ensures a longer service life than an in scribed gear pump.
- o The standard hydraulic oil temperature control system is based on water-cooling.
- o (An optional air-cooling device is available; it is provided to prevent cooling water from freezing in cold regions.)
- o Use of an electrostatic oil cleaner eliminates foreign substances which may enter oil, thereby preventing operation failure and oil deterioration.



7. Safety door

- o Continuous operation is possible only while the door is closed. Further safety is ensured by an optical safety device.

8. Scrap cutter

- o The hydraulic scrap cutter allows free adjustment of the length of the scrape to be cut. It has a shearing angle to permit cutting at a lower pressure.

Special Accessories

1. Additional hydraulic circuits

- o Additional independently controllable hydraulic circuits are provided to reduce the number of processes as in composite forging operations and to enhance product accuracy.

2. Material feed monitor

- o This unit stops the press if the roller feeder is overloaded.
- o When a progressive tool is used, this device prevents the tool from being damaged by workpiece interference or incorrect feeding.

3. Pre-roller

- o A collapsible rail fitted on the front of the press permits easy setting and removal of tools.

4. Hydraulic tool clamber

- o This hydraulic clamber ensures accurate, rapid, easy, and safe mounting and dismounting of tools.

5. Hydraulic tool lift roller

- o Installation of this hydraulic tool lift roller in the bolster permits easy handling of heavy tools.

6. Tool change wagon

- o Allows tool changes to be made quickly and safely.
- o Available in fixed or adjustable versions. It allows the tool to be pushed in and pulled out both manually and automatically.

7. Oil mist collector

- o **Contributes to a cleaner working environment in the factory because it prevents contamination of oil splashes, which occurs with use air- blowing parts and slugs.**

8. Moving bolster

- o **Permits easy external setup of the tool and the insert ring to be used in the next step while the press is operating.**

9. Optical safety device

- o **Protects the operator during a tool adjustment. It stops the press when actuated.**

Features of CNC

- **This is a Manual Data Input (MDI) control unit. Before the work is started, you can enter the optimum running conditions in conformity to the shape of components to be made, and the quality and thickness of the workpiece.**
- **The input data are displayed on a color CRT (screen). After being confirmed, they are stored in the CPU memory, which is capable of storing a maximum of 100 different patterns.(more memory available on request)**
- **When the tool is changed, the running data is called up by the serial number of the tool.**
- **The system provides reproduction of accurate running data to ensure stable production of high-quality products even when operated by an unskilled operator. Furthermore, it minimizes tool change time. The system is particularly effective in the production of multiple product types in small quantity.**
- **The CNC unit incorporates functions to check the hydraulic unit and control equipment . In the event of a failure, the details of the failure and name of the equipment are displayed on the control panel and the CRT to allow you to make an instant correction.**
- **Even while the press is operating, running data of the tool for the next job can be called up, checked, and modified.**