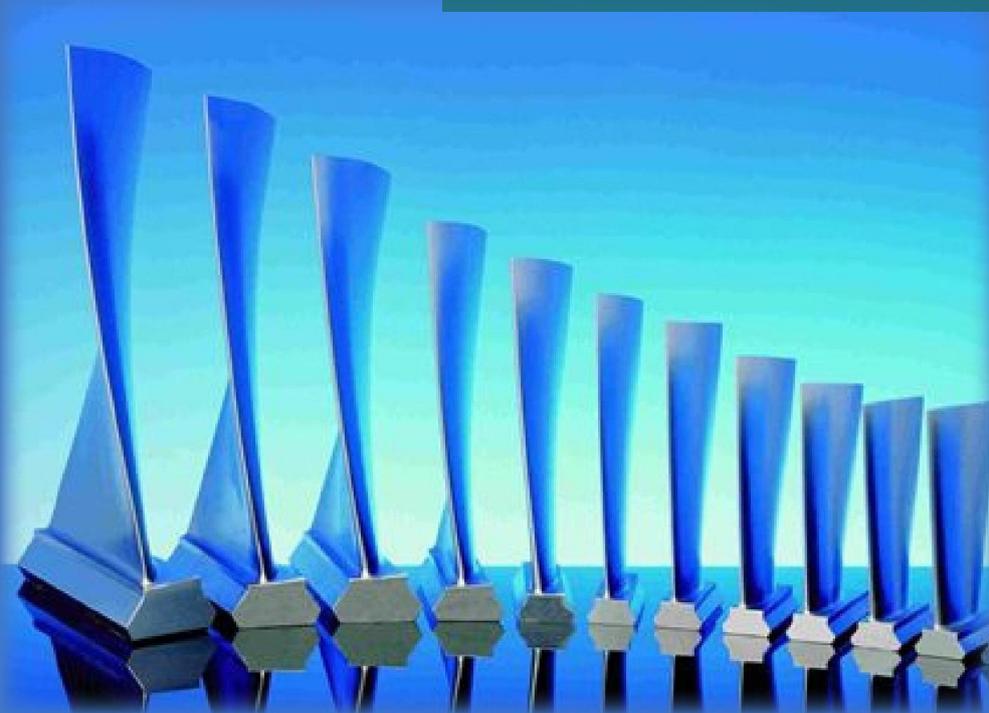




FICEP
NEWS | 11/2020

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Direct Drive Presses: Working with the right energy



Ficep meets the requirements of the forging sector with a range of products that makes use of all the necessary technologies for the development of a complete line, from the cutting of the bars up to the hot forging presses. The flagship of the range is represented by the Direct Drive presses (DD).

to conform themselves to the market requirements mainly bound to the quality of the part and to the efficiency of the process. From this point of view, one of the most recent evolutions is represented by our Direct Drive range of presses, whose latest version is characterized by the presence of a system for the energy recovery, which leads to



Automatic forging cells with DD screw presses

The achievement of finished parts in only one stroke and without scrap: this is the highest aspiration of the companies that realize components through the forging process.

It is no doubt a high level target, influenced also by working conditions that can be hardly kept under control, such as the temperature of the part, or environmental factors for example the humidity of the air, that may alter the press functioning.

Not to mention the evolution of the materials to be forged, more and more performing and requiring systems equal to the task.

During the years many technical innovations followed one another allowing the screw presses

a significant consumption reduction in machines that are traditionally voracious in terms of energy.

Titanium turbine blades

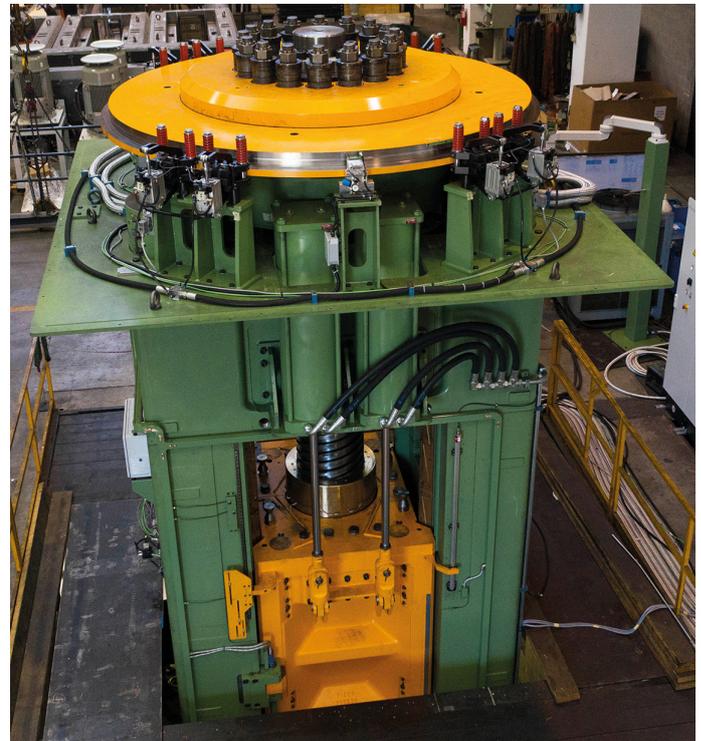


From the Friction to the Direct Drive system

Ficep has been manufacturing screw presses since several decades, therefore we have a long experience in this field. The analysis of the difficulties emerging during the different challenges we have faced, made us realize that the traditional friction screw presses did not guarantee constant results in the time because the leather friction was subject to wearing and to the effect of environmental factors.

The DD series, acronym of Direct Drive, presents above all a simpler construction, with less components because the mechanical part bound to the motion transmission was completely removed. As suggested by the name itself, the brushless motor moves directly the screw: the relevant control through software enables the speed adjustment as well as the possibility to handle it both as motor and as brake, even if the term “current generator” would be more appropriate.

DD85 screw press with RF robot



Final assembly stage of DD560-L screw press

By matching the action of the permanent magnets of the brushless motor and the voltage precise management through software, it is possible to control the screw rotation speed that determines also the down stroke speed of the ram and consequently the relevant kinetic energy when it hits and forges the part. This control represents a key aspect in the forging process, as it is the quantity of energy transferred by the ram to the raw material that determines the deformation degree and the precision level of the forged part.

Precision and efficiency

The Direct Drive system operates like a numerical control, as it is sufficient to set the value of the speed required by the ram at the impact moment and the system will automatically operate during the down stroke to accelerate or to slow down the die's drop. In order to have an idea of the process reliability level that we are able to guarantee, one detail is sufficient: thanks to the electronics supplied by Siemens we assure a 0,5% precision on the energy value of the ram at the end of the drop.

This result could be achieved also thanks to the complete elimination of the motion transmission that had a considerable influence on the process variability and at the same time allowed us to simplify the press maintenance activity.



Fully automatic DD40 screw press

Obviously we have introduced additional improvements in all parts of the press, such as new profiles for screw and nut to reduce the friction, as well as the use of new more compact motors with increased efficiency.



Titanium medical implants/ prosthesis

The close cooperation with Siemens and the will to bring constant improvements to their solutions, recently lead us to develop a new version of DD presses characterized by the presence of a Kinetic Energy Recovery System (KERS) to recover part of the energy used during the forging process.

Thanks to the utilization of a second brushless motor, more compact but with a very high rotation speed, the energy that would normally be lost to brake the press is stored to be re-used in the following forging cycle, with a total energy saving that in particular conditions can reach 60%.

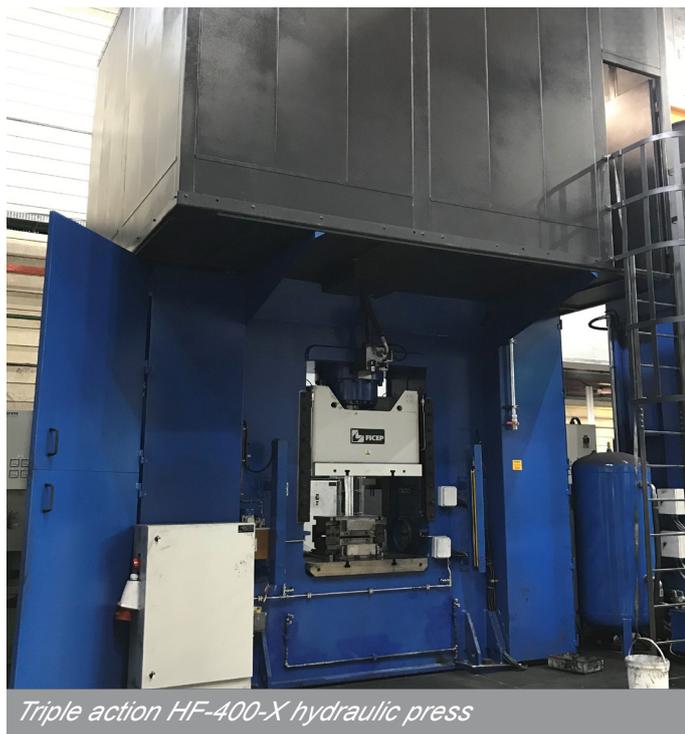
The possibility to finely adjust the ram speed and to modify the relevant stroke makes these presses extremely versatile and attractive for a considerable number of applications. We have a complete portfolio from this point of view that covers all sizes.

The DD presses can be used in the automotive sector, for agricultural and earth-moving machinery, where a considerable portion is

dedicated to the production of axle shafts for heavy transport.

In the aerospace and energy production fields, the high resistance of the titanium alloys, aluminium and special steels for high temperatures requires considerable forging strengths, which make our structurally sturdy presses particularly suitable for the forging of the relevant components.

The petrochemical sector requires the use of important press sizes to process flanges in special duplex and superduplex steels containing alloying elements that lose their characteristics when exposed to high temperatures, therefore it is mandatory to work the raw part at lower temperatures than those typical of the forging process, with force and energy remarkably higher. Furthermore, we can boast also a great success in the field of medical prosthesis, in this case medium-small press sizes are involved.



Triple action HF-400-X hydraulic press

Hydraulic and mechanical presses

Beside the Direct Drive presses we developed other product lines to complete the offer of technology in the forging field with the realization of the hydraulic presses HF series, in two versions: one with electrowelded structure and one with four columns.

4-columns HF1000-4C hydraulic press



The presses with monobloc, electrowelded structure offer a high stiffness with a natural predisposition to operate off-axis and with multiple dies; besides being used in the trimming phase, when the involved strength is not particularly high, they can also work as presses for the real hot forging operation.

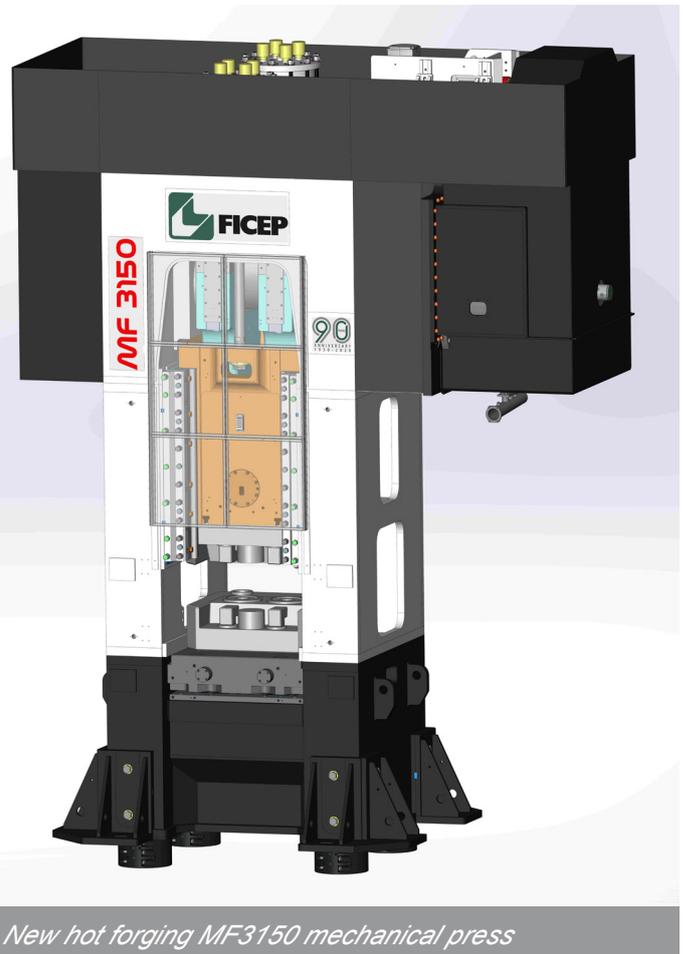
The solution with 4 columns indeed is particularly indicated for the preforming operations reaching a double target: besides carrying out a first deformation of the material, allowing the following press to forge the part completely with less energy, it performs also a mechanic action to break and eliminate the scale produced by the oxygenation on the surface of the raw part during the heating and the transfer from the heater to the press.



Main conrod of MF800 mechanical press

In this way, the forging press can process the “clean” material and achieve a component with more precise geometric characteristics, thus extending the life of the dies.

In more recent times, we started developing a third family of presses for the forging field, that is the MF series of mechanical presses.



New hot forging MF3150 mechanical press

Actually, it is an advanced version compared to the classic mechanical press, which we decided to develop with innovative technical solutions to meet the strong market request and that is perfectly suitable for a wide range of applications. It is well known that the mechanical presses have a faster cycle time compared to the screw presses and the hydraulic presses, even if the ram adjustment required to obtain a proper closing of the die results more complicate, with a setting time slightly higher than the screw/hydraulic presses.

As a consequence they prove absolutely winning for productions that require high volumes of components with small and medium dimensions, where the accuracy of the final part is not the essential requisite.

Complete lines

The long time experience in the forging field led us to approach this sector as partner supplier of all necessary technologies to complete the working process, with the only exception of the heating systems that can be integrated however on request of the Customers.

Our manufacturing unit in Gazzada Schianno (VA) realizes also machines to cut the bars (these can be disc saws, cold/warm/hot shears) and supplies the automation to handle the slugs from the cutting area to the heating system, and then to the preforming or forging presses.

As the machines started becoming more and more accurate, the Customers' attention moved to different phases of the process where the operator's activity could negatively influence the final result, this is the reason why the automation

spread so quickly, as the automated systems always take the same time to bring the piece from the heater to the press and therefore the piece is always processed at the same temperature.

Today even the lubrication of the dies is carried out with robots that distribute a uniform layer on the entire surface of the die thus assuring an optimal sliding of the material on every area of the die.

These operations are quite simple, but they ensure the quality preservation for the entire production batch and the reduction to a minimum of the scraps that represents the main target of our Customers.

Everything is summarized in the possibility to comply with the requirements concerning the new concept of Industry 4.0, allowing the machines produced by Ficep to face with enthusiasm the new challenges of the future.

