ABSTRACT: Device for controlling the feeding of a plurality of hydraulic power devices comprising a plurality of cavities, each communicating, at one of its ends, with one of the said power devices and in each of which slides a piston for feeding one power device, the said feed pistons being connected to a common driving member which discharges the same simultaneously in translation in one direction and the other, so that the said pistons discharge the hydraulic fluid from the cavities into the associated power devices and suck the said fluid from the power devices into the cavities according to their direction of displacement.
DEVICE FOR CONTROLLING THE FEEDING OF HYDRAULIC POWER DEVICES

The present invention has essentially for its object a device for controlling the feeding of hydraulic power devices, in particular power devices for actuating the pressing element of a press, shearing machine or the like.

It is known that presses, such as folding presses, cutting or punching presses, etc. comprise a member movable in translation, generally constituted by a plate or tray which comes to bear or act upon a workpiece, for instance a sheet of paper, or upon a cutting or punching tool, the said workpiece or the said tool being held against a fixed member constituted generally by a counterplate. In order to obtain correct folding or cutting, it is necessary that the movable plate remain, during its displacement, rigorously parallel with the counterplate, in order that the folding or the cutting or punching pressure be uniformly distributed whatever the location of the said workpiece or of the said tool on the plate may be, i.e. whatever the location at which the plate or the counterplate receives the load may be.

The same goes for the shearing machines wherein the cutting blade must be displaced in a parallel direction to the counterplate.

A solution proposed to ensure a rigorously parallel displacement of the plate or the movable blade of a press or a shearing machine consists in driving the plate or the blade by means of pivoting connecting rods actuated by a single double-acting power device.

However, this solution is not applicable to all types of presses or shearing machines and it is necessary, in a number of such machines, that the plate or the like be actuated by a plurality of hydraulic power devices.

Now it has not been heretofore managed, in presses or the like, the pressing element of which is driven by a plurality of power devices, to obtain a rigorously parallel displacement of the said pressing element, owing to the difficulties encountered in so controlling the various power devices that their action occur in perfect synchronism and so as to prevent disymmetries from appearing in the long run between the power devices, for instance differences between the travels of the power devices.

The present invention has essentially for its object a device for controlling the feeding of a plurality of power devices enabling to avoid the above-mentioned inconveniences and remarkable notably in that it comprises a plurality of cavities, each communicating, at one of its ends, with one of the said power devices and in each of which slides a piston for feeding one power device, the said feed pistons being connected to a common driving member which displaces the same simultaneously in translation in one direction and the other, so that the said pistons discharge the hydraulic fluid from the cavities into the associated power devices and suck the said fluid from the power devices into the cavities according to their direction of displacement.

Owing to the use of a single driving member, there is obtained a rigorously synchronous actuation of the various pistons being displaced in the various cavities and, consequently, rigorously synchronous feeding and displacement of all the power devices associated with each cavity.

According to another characteristic feature of the invention, means are provided for feeding periodically the said cavities with makeup hydraulic fluid and maintaining constant the volume of hydraulic fluid contained in each cavity and the power device associated therewith.

This supply of makeup fluid to the aforesaid cavities enables to compensate for the leaks which inevitably occur in the entire hydraulic system, in particular in the power devices, and therefore to maintain constant the mass of fluid being displaced between each cavity and the power device associated thereto and, consequently to maintain constant the travel of the power devices.

The invention ensures rigorous parallelism of the plate or the like during its displacement whatever the effort required from each power device may be and even in case of fluid leakage in one or several power devices.

According to still another characteristic feature of the invention, the aforesaid driving member is constituted by a hydraulically controlled element movable in translation.

According to one form of embodiment of the invention, the aforesaid cavities are arranged side by side and open, at their ends opposite to those communicating with the power devices, in a common chamber in which is displaced the said driving member constituted by a hollow cylinder mounted slidably with respect to a fixed piston and forming with the latter a double-acting system.

According to a modified form of embodiment of the invention, the aforesaid cavities are aligned with one another and arranged coaxially with respect to a chamber in which is displaced the said driving member constituted by a piston provided with double-acting control.

Other characteristics and advantages of the invention will appear from the following description.

In the appended drawings given solely by way of example:

FIG. 1 is a sectional view of a device according to a first form of embodiment of the invention, designed for the feeding of power devices for operating a press or the like, the feed pistons as well as the driving cylinder of the said pistons being shown in the position they occupy at the end of their upward travel before the power devices are fed;

FIG. 2 is a sectional view upon the line II-II of FIG. 1;

FIG. 3 is a view identical to FIG. 1, the feed pistons and the driving cylinder being shown in the position they occupy at the end of their downward travel after the power devices are fed;

FIG. 4 is a sectional view of a device according to a second form of embodiment of the invention, designed for feeding the power devices of a press or the like, the feed pistons and the driving piston being shown in the position they occupy before the power devices are fed;

FIG. 5 is a view identical to that of FIG. 4, the pistons being shown in the position they occupy after the power devices are fed;

FIG. 6 illustrates diagrammatically and partially in section a device for controlling the power devices;

FIG. 7 is a top view of the device of FIG. 6.

According to the form of embodiment illustrated in FIGS. 1 to 3, the device designed to control four power devices of a press comprises essentially a lower body or block 1 of generally cylindrical shape in which are provided four identical cavities 2 which are also cylindrical and whose axes are parallel with that of the body 1 and open on both faces of the latter, and an upper casing 3 in the shape of a cylindrical sleeve, the said casing 3 extending in prolongation of the lower body 1 and being secured to the latter in a fluidtight manner.

Two sideplates, namely a lower sideplate 4 and an upper sideplate 5 close the space defined by the assembly constituted by the body 1 and the casing 3. The sideplates 4 and 5 are secured to the body 1 and to the casing 3 respectively, in a fluidtight manner.

In each cavity 2 is mounted slidingly a piston 6 for feeding a power device, the rod 7 of this piston 6 penetrating into the chamber 8 defined by the casing 3.

Ports 9 provided in the lower sideplate 4 enable to make each cavity 2 communicate with one hydraulic power device as will be explained hereinafter.

Each feed piston 6 and its rod are traversed from end to end by a central conduit 10 which opens, on the one hand, on the front face 6a of the piston and, on the other hand, on the free end face 7a of the rod 7.

Each feed piston 6 divides the cavity 2 in which it is mounted into two portions, namely a front portion 2a located below its front face 6a and rear portion 2b located above its rear face 6b.

In the chamber 8 defined by the casing 3 slides a cylindrical hollow element 11 whose outer diameter is very slightly less...
than the inner diameter of the said casing so as to ensure easy-fit sliding; this cylindrical element also slides relative to a fixed piston 12 concentric with the casing 3 and whose rod 13 is rigid with the sideplate 5. The cylindrical hollow element 11 comprises an inner chamber 14 allowing it to slide relative to the piston 12; this chamber being closed at its upper portion by a plate 15 provided with a central opening for the passage of the rod 13. The fixed piston 12 divides the chamber 14 in which it is housed into two portions, namely a front portion 14a and a rear portion 14b. Two conduits 16a and 16b both open at the upper end of the rod 13 enabling the supply of hydraulic fluid into either the chamber 14a or the chamber 14b. It is seen that the assembly constituted by the cylindrical body 11 and the fixed piston 12 provided with the rod 13 constitutes a double-acting power device. The cylindrical element 11 itself divides the chamber 8 in which it is slidingly mounted into a lower portion 8a comprised between the upper face 1a of the cylindrical block 1 and the front face 11a of the said cylindrical element and a rear chamber 8b comprised between its rear face 1b and the upper face 5. The portion of the chamber 8 communicates directly with the portion 2b of each cavity 2 and, on the other hand connected through the medium of a conduit 17 to a pan or the like 18 containing makeup hydraulic fluid. The portion 8b of the chamber 8 communicates with the exterior through the two ports 19 and 20 provided in the sideplates 5.

Each feed piston 6 is connected with the cylindrical element 11 by resilient fixing means constituted by threaded rods or the like 21 screwed onto the front face 11a of the said cylindrical element and passing through openings provided in the rods 7; springs 22 tend to apply the end face 1a of each rod 7 against the front face 11a of the cylindrical element 11.

Each cavity 2 comprised at its upper portion a shoulder 23 intended to limit the upward travel of the feed piston 6. The location of the shoulders 23 is so selected that when the rear face 1b of the feed piston 6 comes into contact therewith, the rear face 11b of the cylindrical element 11 is not yet in contact with the lower face 5a of the upper sideplate 5.

Each cavity 2 communicates through the medium of a pipe 25 connected to the port 9 of the lower sideplate 4 with the chamber 26 of one of the four power devices 27 (shown aligned for the sake of easy illustration) whose pistons 28 support the movable pressing plate 29 cooperating with the fixed counterplate 30 (the plate and counterplate are illustrated diagrammatically and partially for the sake of convenience illustration). A pressure-controlled contact 31 is provided on each conduit 25 to preclude overload of the said power devices.

The assembly constituted by the front portion 2a of each chamber 2 and the chamber 26 of each power device 27 (as well as the connecting pipe) is filled with hydraulic fluid, this fluid being situated in the said portion 2a or in the chamber 26 according to the position of the piston 6 which thus ensures the feeding of the power device.

The supply of fluid to the double-acting power device constituted by the cylindrical element 11 and the fixed piston 12 is ensured by a pump 34 sucking the fluid from a container 35 and supplying, through the medium of a distributor 36 whose position is controlled automatically according to the displacement of the pressing plate, the pipes 37 and 39 connected respectively to the conduits 16a and 16b. The portion 8b of the chamber 8 is connected directly to the hydraulic circuit supplied by the pump 34 through a pipe 33 connected to the port 19 through the medium of a unidirectional calibrated valve 39.

A valve 40 connected through the medium of pipes 41 and 42 to the container 35 and to the portion 8b of the chamber 8 controls the communication between the said chamber 8 and the said container. The valve 40 comprises a rod 43 rigid with a piston 44 moving in a cylindrical enclosure 45. A spring 46 tends to maintain the valve 40 closed, preferably from its seat 47. The portion of the enclosure 45 located below the piston 44 is connected to the pipe 38, whereas the portion of this enclosure 45 located above the piston 44 is connected to the pipe 33.

The operation of the device is as follows: the members of the device being assumed to occupy the position shown in FIG. 1, when the distributor 36 supplies the fluid directly by the pump 34 into the conduit 16a through the medium of the pipe 37, the portion 14a of the chamber 14 is supplied and the cylindrical element 11 is pushed downwards, its front face 11a comes to bear against the rear faces 7a of the rods 7 of the feed pistons 6, so that the latter are also driven downwards and discharge the hydraulic fluid contained in the front portions 2a of the cavities 2 into the chambers 26 of the power devices 27. The pistons 28 of the said power devices move upwards and drive the pressing plate 29 along with them. So long as the plate 29 does not come into contact directly or indirectly with the counterplate 30, the fluid exerts but little pressure on the calibrated valve 39, so that the latter remains closed and prevents the fluid from penetrating into the portion 8b of the chamber 8. The negative or vacuum pressure created in the portion 8b of the chamber 8 by the downward motion of the cylindrical element 11 results in a sucking of the fluid into the said portion 8b from the container 35 through the pipe 41, the valve 40 remaining open by the spring 46 and the pipe 42. When the pressing plate meets the sheet to be folded or the cutting or punching tool, the resistance offered to its feed motion leads to an abrupt increase in the pressure of the fluid and the latter opens the calibrated valve 39, so that the fluid penetrates into the upper portion 8b of the chamber 8. The action of this fluid adds to that of the fluid penetrating in the portion 14a of the chamber 14 through the conduit 16a. Since the rear face 11b of the cylindrical element 11 is much greater than the section of the inner chamber 14, there occurs an abrupt increase in the thrust exerted on the cylindrical element 11 and, therefore, on the feed pistons 6 and, consequently, on the power devices 27, and the latter can therefore provide the force required for the folding operation or for the penetration of the cutting or punching tool into the material to be cut or punched. The opening of the calibrated valve 39 also results in that fluid pressure is applied to the portion of the enclosure 45 located above the piston 44, so that the valve 40 is in closing contact with its seat and the connection between the container 35 and the portion 8b of the chamber 8 is cut off. The cylindrical element 11 continues to move downwards until its front face 11a meets the upper face 1a of the block 1.

At that moment, the position of the distributor 36 is reversed, the fluid is admitted into the portion 14b of the chamber 14 through the pipe 38 and the conduit 16b and the cylindrical element 11 moves in translation upwards and drives along the feed pistons 6. The latter suck the fluid contained in the chambers 26 of the power devices 27, so that the pistons 28 of the said power devices slide downwards and drive along the pressing plate 29 with them. When the feed pistons 6 come into contact with the shoulders 23, their upward motion stops, whereas that of the cylindrical element 11 continues until its rear face 11b comes into contact with the face 5a of the sideplate 5, as a result the front face 11a of the element 11 faces the apertures 10, thus enabling the lower portion 8a of the chamber 8 to communicate with the portions 2a of the cavities 2. Since the portion 8a of the chamber 8 is connected to the pan 18, it results therefrom that if the hydraulic fluid does not fill completely the portion 8a of the chamber 8 as well as the portions 2a and 2b of the cavities 2, fluid makeup takes place automatically by way of suction of the fluid contained in the said pan 18. It is also seen, in particular, that any leakage susceptible of occurring in the power devices 27 is automatically compensated for. When fluid is supplied into the inner chamber 14b to drive the cylindrical element 11 upward, hydraulic pressure is applied to the portion of the enclosure 45 located below the piston 44, so that the valve 40 moves away from its seat, thus reestablishing a communication between the portion 8b of the chamber 8 and the container 35 and, consequently, enabling the said portion 8b of the chamber 8 to be emptied.
FIGS. 4 and 5 show another form of embodiment of a device also designed to control four power devices of a press. In these Figures, like reference numerals denote the same members as in FIGS. 1 to 3. According to this form of embodiment, the device comprises essentially a cylindrical casting 50 closed at both ends by sideplates 51 and 52 and provided internally with four transverse equidistant partitions 53, so that the interior of the casting 50 is divided into five compartments, i.e., four identical coaxially aligned cylindrical cavities and a chamber 55 which is also cylindrical and also coaxial with the cavities 54. In each cavity 54 is slidably mounted a piston 56 which divides it into two portions 54a and 54b. The portion 54a of each chamber 54 is provided with a port 57 to which is connected the pipe 25 of each power device 27. The assembly constituted by the portion 54a of each chamber 54 and the chamber 26 of each power device 27 (as well as the connecting pipe) is filled, as in the previous case, with hydraulic fluid, this fluid being located in the portion 54a of the chamber 26 according to the position of piston 56 which thus ensures the feeding of the power devices. The portion 54b of each chamber 54 communicates with the exterior through ports 58 and 59.

In the chamber 55 is mounted, also in a sliding manner, a piston which divides it into two portions 55a and 55b. Two ports 61a and 61b communicating with the portions 55a and 55b, respectively, of the chamber 55 enable to admit fluid, one on the other side of the piston 60, thus allowing double-acting control of the said piston. The ports 58a and 59b are connected to the pipes 37 and 38, respectively.

The feed pistons 56 and the driving piston 60 are rendered rigid with one another by rods 62 passing through the partitions 53, so that the four pistons 56 are driven in translation in one direction and the other by the piston 60.

Pipes 63 connected to the pipes 25 connect the chamber 26 of each power device and the portion 54a of each cavity to the pan 18 containing the makeup hydraulic fluid through the medium of an obturating device constituted by a valve 64 slidably mounted in a casing 65 communicating with the portion 18 on the one hand and with the pipes 63 on the other hand. The valve 64 is subjected to the action of a spring 66 which normally opposes it against the mouths 67 of the pipes 63, thus cutting off the communication between the pan and the pipes (see FIG. 4) and to the action of a rod 68 rigid with the piston 56 housed in the cavity 54 located at the end of the casting 50 opposite to the chamber 55, this rod moving the valve away from the mouths 67 and thus setting up a communication between the pan and the pipes 63.

The operation of this device is as follows: the members being in the position illustrated in FIG. 4, the admission of fluid through the pipe 37 results in the feeding of the portion 55a of the chamber 55, so that the piston 60 moves from left to right and drives the pistons 56 along with it. The hydraulic fluid contained in the portions 54a of the chambers 54 is delivered into the chambers 26 of the power devices 27 whose pistons 28 move upwards until the pressing plate 29 comes into contact, directly or indirectly, with the counterplate 30.

As in the case of the previous device, the fluid flowing in the pipe 37, during this first stage of the motion, exerts but little pressure on the calibrated valve 39, so the said pressure being insufficient to open the valve. The negative pressure produced in the portions 54a of the cavities 54 by the displacement of the pistons 56 results in the sucking of the fluid from the container 35 through the pipe 41, the valve 40 maintaining open by the spring 46 and the pipe 42 connected to the ports 59. When the plate meets the counterplate, the increase in fluid pressure in the pipe 37 opens the calibrated valve 39, so that the fluid penetrates into the portions 54a of the chambers 54 through the pipe 33 and the ports 58. The action of the fluid on each feed piston 56 adds to the action of the fluid on the piston 60, thus resulting in considerable increase of the thrust exerted on the pistons 28 of the power devices 27. The opening of the calibrated valve 39 also results in moving the valve 40 into closing contact with its seat and, consequently, in the communication between the container 35 and the ports 59. When the assembly constituted by the feed pistons 56 and the driving piston 60 reaches the right-hand end of its travel (FIG. 5) the position of the distribution 54 of the fluid 60 is reversed, the fluid admitted through the pipe 38 penetrating into the portion 55a of the chamber 55 and pushes from right to left the piston 60 which drives the pistons 56. The latter suck the hydraulic fluid from the chambers 26 of the power devices 27 and the latter retract. The fluid pressure in the inlet pipe 38 is applied to the portion of the enclosure 45 located above the piston 44, so that the valve 45 moves away from its seat and the fluid in the portions 54b of the chambers 54 is discharged into the container 35. When all the pistons 56 and 60 reach the end of their travel towards the left, the rod 68 moves the valve 64 from its bearing position on the mouths 67, so that if the hydraulic fluid does not fill the chambers 54a, fluid makeup takes place by way of suction of the liquid from the pan 18.

Each power device 27 may advantageously be provided with a member controlling the travel of its piston, the said member being constituted by a threaded rod 70 traversing the bottom wall of the chamber 26 and, moreover, penetrating into the latter (FIG. 6). The threaded rod 70 is mounted in a rotatable sleeve 71 which is also threaded. The rotation of the sleeve 71 results in an upward or downward motion of the threaded rod which constitutes an adjustable stop enabling to adjust at will the lower position of the piston 28 and, therefore, the travel of this piston.

Simultaneous rotation of the threaded rods 70 of the various power devices 27 can be performed by an electric motor 72 which drives, through the medium of a reducer 73, one of the sleeves 71, the other sleeves being connected to the sleeves driven by means of a chain 74 meshing with gears 75 rigid with each sleeve. This rotation may also be ensured by a hydraulic motor.

It should be noted that this adjusting device, owing to the fact that it enables to move the pistons 28 upwards, may be used to operate the power devices 27 which, in this case, are controlled mechanically.

Of course, it is also possible to use instead of the single-acting power devices 27 wherein the return motion of the piston takes place by gravitation, power devices whose piston is subjected to the action of a return spring or, alternatively, double-acting power devices, especially in the case where the motion of the pressing plate takes place downwardly instead of upwardly as shown.

Of course, the invention is by no means limited to the forms of embodiment described and illustrated, as the latter have been given only by way of example. In particular, it comprises all the means constituting technical equivalents to the means described as well as their combinations, should the latter be carried out according to the spirit of the invention. It is apparent from the above description that in both of the embodiments, namely that of FIGS. 1—3 and that of FIGS. 4 and 5, there is a driving piston means movable from a given starting position toward an end position and then back to the starting position. This driving piston means is formed in the embodiment of FIGS. 1—3 by the cylindrical body 11 and in the embodiment of FIGS. 4 and 5 by the several pistons 56 and 60. In the embodiment of FIGS. 1—3, the stop structure 23 by preventing the feed pistons 6 from following the cylindrical body 11 when the driving piston means formed by the latter returns from the starting position of FIG. 1 forms through the resulting coaction between the feed pistons 6 and the driving piston means 11 to create the gap therebetween a means automatically placing the hydraulic assembly in communication with a source of makeup fluid upon return of the driving piston means to its starting position. This hydraulic assembly is of course formed by the cylinder surrounding the driving piston means and the latter. In the embodiment of FIGS. 4 and 5, the rod 68 by actuating the valve 64 upon return of the driving piston means 56, 60 to its starting position shown in FIG. 4 again forms for this embodiment a means placing the hydrau-
lic system formed by the driving piston means 56, 60 and the outer casing 50 automatically in communication with the source of makeup fluid 18 when the driving piston means of this embodiment returns to its starting position.

Furthermore, it is to be noted that in both of the above embodiments the driving piston means has a first working area to be acted upon by relatively low-pressure fluid and a second working area which communicates with a low-pressure source while the first area is worked on by the low-pressure fluid. Thus, in the embodiment of FIGS. 1-3 the cross-sectional area of the front portion 14a of the inner chamber 14 forms the first area of this driving piston means 11 which initially is acted upon by the low-pressure fluid while the area formed by the rear face 11b forms the second area of the driving piston means which communicates through the valve 40 with the source of low-pressure 35 while the first area of the piston means is acted upon by the low-pressure fluid. The same is true of the embodiment of FIGS. 4 and 5 where it will be seen that only the area of piston 60 directed toward the chamber portion 55a forms the first area which initially is acted upon by the low-pressure fluid while at the same time the several cavities 54b and the areas of the several pistons 56 directed toward these chambers communicate through the several ports 59 and the valve 40 with the source of low-pressure 35.

In both of the embodiments the calibrating valve 39 forms a means which responds to engagement with the load for automatically introducing fluid at a relatively high pressure to act on the first working area of the piston means as well as to automatically actuate the valve means 40 for cutting off communication between the second area of the driving piston means and the source of low pressure while placing this second area of the driving piston means also in communication with the relatively high-pressure fluid.

As a result, there is an increased driving force not only because of the increase in the pressure of the fluid acting on the first working area of the driving piston means but also because the second area of the driving piston means becomes effective with the higher fluid pressure to increase the driving force.

Finally, it is to be noted in connection with FIGS. 6 and 7 that the several threaded stop screws 70 are mechanically driven simultaneously to determine an end position for each of the pistons 28 of each power means 27. This power means is of course controlled by the fluid pressure assembly constituted by the above-described driving piston means and the casing surrounding the latter as well as the connections between this fluid pressure assembly and the several power means 27. However, one of the most advantageous of this construction is that the mechanical drive means for determining the position of the stop means 70 is also capable of acting through the stop means 70 for advancing the pistons 28 of the several power means 27, so that in the event of failure of the fluid pressure assembly it is still possible to operate with the several power means 27.

What I claim is:

1. A hydraulic press having a movable pressing element, a plurality of hydraulic power devices for actuating said pressing element, each one of said hydraulic power devices having a chamber, a reciprocally moving piston in said chamber and a stop member of adjustable length, a device for controlling the feeding of said hydraulic power devices, said device comprising a plurality of cavities containing a hydraulic fluid, each cavity communicating, at one of its ends, with one of the said power devices, a movable feed piston in each one of said cavities for feeding the associated power device, an inner chamber, a hydraulically controlled and reciprocally movable driving member located in said chamber and connected to said feed pistons whereby the latter are displaced simultaneously in translation in one direction or the other, and discharge said hydraulic fluid from said cavities into said associated power devices or suck said fluid from said power devices into said cavities according to their direction of displacement, makeup hydraulic fluid container connected to said cavities and means for feeding periodically said cavities with said makeup hydraulic fluid and maintaining constant the volume of the hydraulic fluid contained in each cavity and its associated power device, said cavities being arranged side by side and open, at their ends opposite to those communicating with said power devices, in said inner chamber and said driving member being constituted by a hollow cylinder having a front wall and rear face, said cylinder being mounted slidably relative to a fixed piston and within which a pressure fluid is admitted for causing it to move with respect to said fixed piston, each aforesaid feed piston being provided with a rod having a free end connected by means of resilient fixing members to the front wall of the said cylinder, so that it is alternately pushed by said cylinder or drawn by the latter through the medium of said resilient fixing members.

2. A hydraulic press according to claim 1, wherein each aforesaid feed piston and its associated rod are traversed by a conduit opening at the free end of said rod the travel of said feed piston being slightly less than that of the said cylinder, so that at the end of each stage of traction of the said feed piston, the front face of said cylinder moves away from said rod and frees said conduit, thus making each cavity communicate with said inner chamber, the latter communicating with said makeup hydraulic fluid container.

3. A hydraulic press according to claim 2, wherein said inner chamber is connected at its end opposite to that communicating with the aforesaid cavities, to a hydraulic circuit operating the aforesaid cylinder, a calibrated valve being in said hydraulic circuit to control the inflow of fluid into the said chamber, the action of said fluid on the rear face of the said cylinder adding to the action of the fluid admitted into said cylinder.

4. A hydraulic press according to claim 1, wherein the aforesaid stop member of each one of said power devices is constituted by a threaded rod mounted in a rotatable threaded sleeve.

5. A hydraulic press according to claim 4, wherein the aforesaid sleeves are rotated jointly by a transmission chain driven by a motor.

6. In a hydraulic press having a movable pressing element, a plurality of hydraulic power devices for actuating said pressing element, each one of said hydraulic power devices having a chamber, a reciprocally moving piston in said chamber, a stop member of adjustable length, a device for controlling the feeding of said hydraulic power devices, said device comprising a plurality of cavities containing a hydraulic fluid, each cavity communicating, at one of its ends, with one of the said power devices, a movable feed piston in each one of said cavities for feeding the associated power device, an inner chamber, a hydraulically controlled and reciprocally movable driving member located in said chamber and connected to said feed pistons whereby the latter are displaced simultaneously in translation in one direction or the other, and discharge said hydraulic fluid from said cavities into said associated power devices or suck said fluid from said power devices into said cavities according to their direction of displacement, makeup hydraulic fluid container connected to said cavities and means for feeding periodically said cavities with said makeup hydraulic fluid and maintaining constant the volume of the hydraulic fluid contained in each cavity and its associated power device, said cavities being aligned with one and another and arranged coaxially with said inner chamber, said driving member being constituted by a driving piston rigid with said feed pistons, so that the said feed pistons are driven simultaneously in one direction or the other by driving piston, each power device and its associated cavity being connected to said makeup hydraulic fluid container through the medium of a valve controlled by the displacement of all the aforesaid pistons, the said valve being provided to set up the communication at the end of each sucking stage of the aforesaid feed pistons.
7. A hydraulic press according to claim 6, wherein the aforesaid stop member of each one of said power devices is constituted by a threaded rod mounted in a rotatable threaded sleeve, the aforesaid sleeves being rotated jointly by a transmission chain driven by a motor.