

Dec. 23, 1952

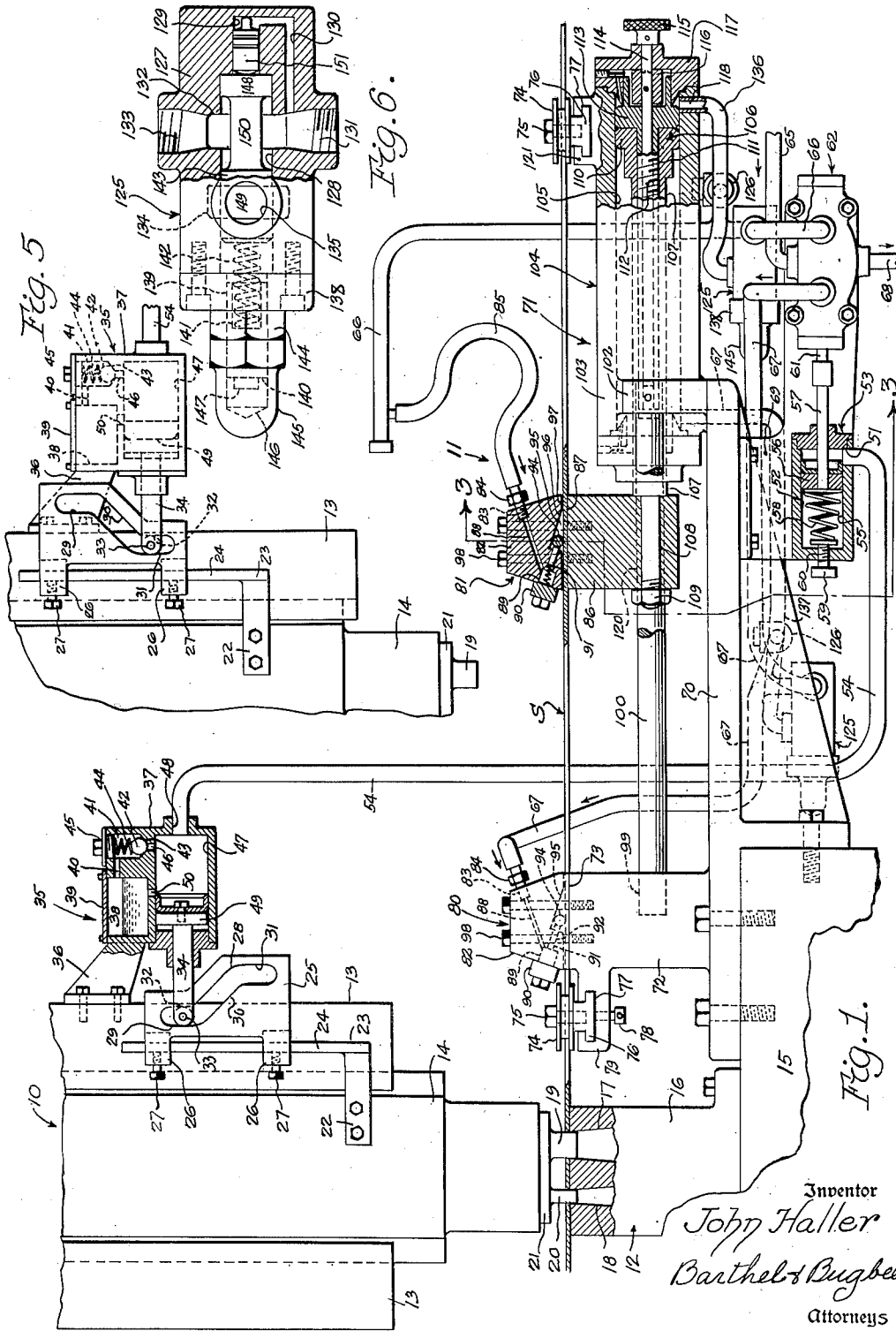
J. HALLER

2,622,874

INTERMITTENT RECIPROCATORY FEEDING APPARATUS

Filed Aug. 21, 1948

2 SHEETS--SHEET 1



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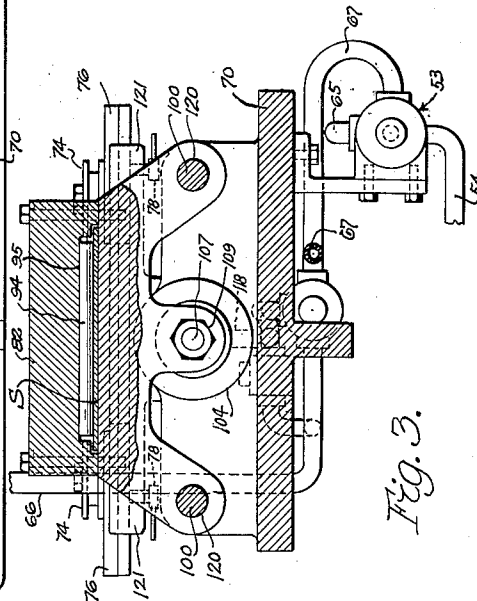
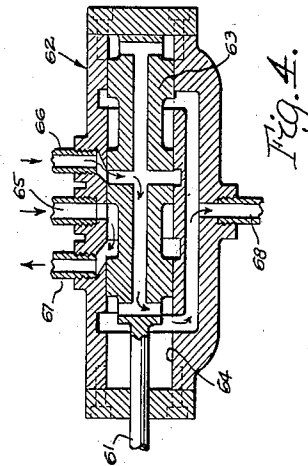
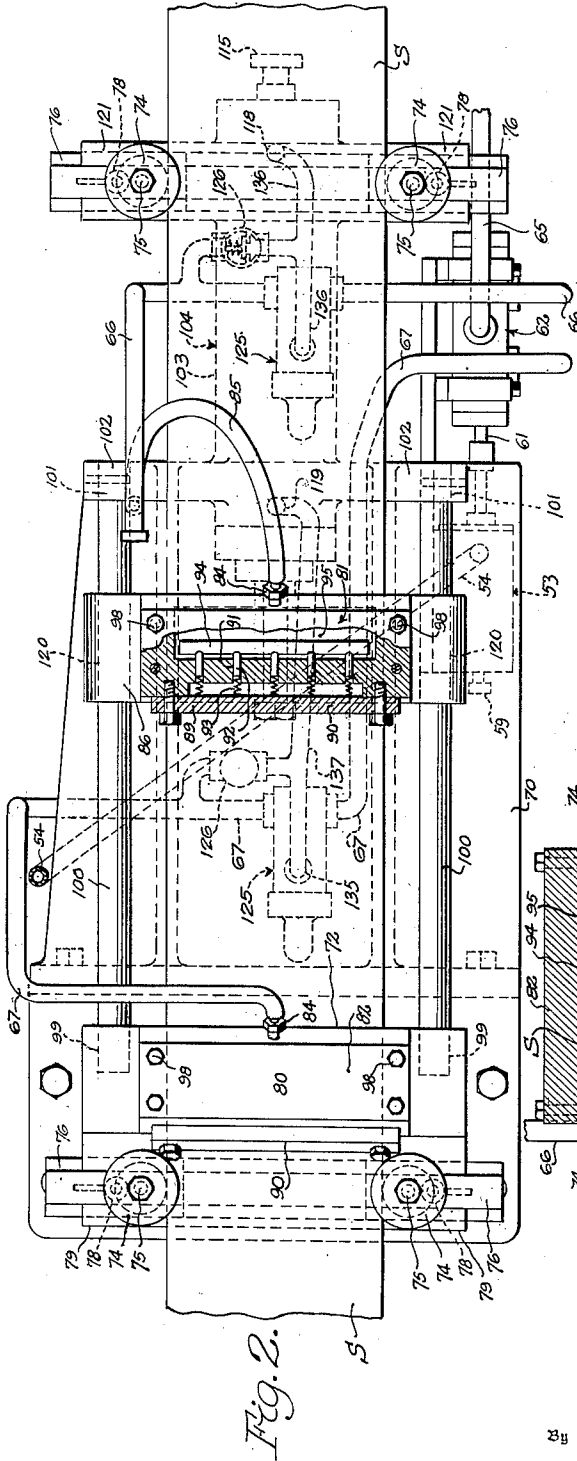
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INTERMITTENT RECIPROCATORY FEEDING APPARATUS

Filed Aug. 21, 1948

2 SHEETS—SHEET 2



Inventor
John Haller
Barthel + Bugbee
Attorneys

UNITED STATES PATENT OFFICE

2,622,874

INTERMITTENT RECIPROCATORY
FEEDING APPARATUS

John Haller, Detroit, Mich.

Application August 21, 1948, Serial No. 45,503

5 Claims. (Cl. 271-2.5)

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This invention relates to material feeding arrangements and, in particular to arrangements for feeding sheet material or coil stock intermittently to processing machines utilizing such material, such as punch presses, or stamping or shearing machines.

One object of this invention is to provide an intermittent feeding arrangement for sheet or coil material wherein the material is engaged by clamps actuated by hydraulic fluid, the flow of which is controlled by a hydraulic device attached to the machine, thereby bringing about an almost instantaneous response of the feeding mechanism to the motion of the machine.

Another object is to provide an intermittent feeding arrangement of the foregoing character for sheet or coil material wherein the machine being served is provided with a pair of hydraulically operated clamping devices, one of which is stationarily mounted on the machine bed and the other mounted on a reciprocable slide, the clamping devices being alternately engaged so that the sheet material is advanced intermittently, the clamping devices being operated by hydraulic fluid, the flow of which is controlled in response to the action of a hydraulic pump attached to a moving part of the machine being served.

Another object is to provide an intermittent feeding arrangement of the foregoing character for sheet or coil material wherein the pressure fluid for intermittently actuating the material clamping devices is supplied from a hydraulic pump or other suitable source, the flow of pressure fluid being controlled by a valve which in turn is actuated by a servo-motor hydraulically connected to a hydraulic piston and cylinder device connected to a moving part of the machine being served, a sequence valve being preferably included in the circuit to defer operation of the hydraulic feeding motor until a predetermined pressure has been built up in the clamping circuit.

In the drawings:

Figure 1 is a side elevation, partly in section, of a feeding arrangement for sheet material, attached to a punch press, according to a preferred form of the invention;

Figure 2 is a top plan view of the feeding arrangement shown in Figure 1;

Figure 3 is a vertical cross-section taken along the line 3-3 in Figure 1, showing the details of one of the hydraulic clamps;

Figure 4 is a diagrammatic central longitudinal section through the four-way valve shown

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in side elevation at the lower right-hand corner of Figure 1;

Figure 5 is a fragmentary side elevation of a control device slightly modified from that shown in the upper left-hand corner of Figure 1 so as to operate the feeding mechanism on the downstroke of the machine, rather than on the upstroke as in Figure 1; and

Figure 6 is a side elevation, partly in longitudinal section, of a sequence valve preferably used in the hydraulic circuit shown in Figures 1 and 2.

Referring to the drawings in detail, Figure 1 shows a sheet metal working machine, generally designated 10, such as a punching or stamping press, adapted to be served by an automatic feeding arrangement, generally designated 11, according to a preferred form of the present invention. The machine 10 is conventional and the details form no part of the present invention. As shown diagrammatically in Figure 1, the machine 10 consists of a bed 12 having vertical guide members 13 secured thereto by means not shown and serving to reciprocably guide a platen 14. The machine 10 is provided with a base or bed 15 to which is bolted a die unit 16 having a pair of die cavities 17 and 18 cooperable with punches 19 and 20 of a punch unit 21 secured to the lower end of the platen 14.

Bolted or otherwise secured to the platen 14 is the horizontal arm 22 of an L-shaped bracket 23 to the vertical arm 24 of which a cam plate 25 is adjustably secured. For this purpose the cam plate 25 is provided with a pair of vertically-spaced arms 26 bored to receive the bracket arm 24 and having set screws 27 threaded into the ends thereof to engage and clamp the cam plate 25 in any position of adjustment vertically along the bracket 23. The cam plate 25 is provided with a zig-zag cam groove 28 having an upper horizontal portion 29 connected by an inclined portion 30 to a lower horizontal portion 31.

Mounted in the cam groove 28 is a roller or cam follower 32 which in turn rotates upon an axle 33 mounted on the end of a piston rod 34 of a motive device generally designated 35. The latter is connected to the guide member 13 by a bracket 36 bolted thereto, and consists of a casing 37 having a reservoir 38 in the upper portion thereof closed by a cover plate 39 and connected by a passageway 40 to a valve chamber 41 containing a check valve or relief valve 42. The latter is urged downwardly into a seat 43 by a coil spring 44, the upper end of which engages a plug 45 threaded into the upper end of the valve cham-

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ber 41. The valve chamber 41 below the valve seat 43 is connected by a passageway 46 to the right-hand end of a cylinder bore 47 having an outlet port 48 in one end thereof. Reciprocally mounted in the cylinder bore 47 is a piston head 49 which, in turn, is mounted upon the piston rod 34. The reservoir 39 is directly connected to the left-hand end of the cylinder bore 47 by a passageway 50. The reservoir 39 contains a suitable hydraulic liquid, such as oil.

Extending downwardly from the port 48 to a port 51 in the cylinder 52 of a servomotor 53 is a fluid supply pipe 54 which serves to convey hydraulic fluid to and from the motive device 35. The servomotor 53 has a cylinder bore 55 which is considerably less in volume than the cylinder bore 47 of the motive device 35, so that a "crowding effect" is obtained. By this crowding effect, the excess fluid not required to operate the servomotor 53 is discharged through the ports 46 and 40 and the check valve 42 back into the reservoir 38, an extremely rapid action being obtained by this arrangement. The servomotor bore 55 contains a piston 56 mounted on a piston rod 57 extending through one end of the cylinder 52. The piston 56 is urged toward the right by a coil spring 58, the opposite end of which is engaged by the end of an adjusting screw 59 which is threaded through a bore 60 in one end of the servomotor cylinder 52.

The servomotor piston 57 is connected to the outer end of a valve rod 61 which is reciprocally mounted in a standard fourway control valve 62. The four-way control valve 62 is conventional and well-known among hydraulic engineers, and its details form no part of the present invention. Any suitable type of reversing valve may be used in place of the four-way valve 62 and a brief description of its principal features, as shown in Figure 4, will suffice. The three-headed hollow valve spool 63 reciprocates in a valve bore 64 (Figure 4) which is provided with spaced ports to which are connected a central pressure fluid supply pipe 65, pressure fluid service pipes 66 and 67 on opposite sides thereof, and a pressure fluid discharge or exhaust pipe 68 connected to the cylinder bore 64 near the ends thereof so as to be covered by the end heads of the valve spool 63 when the valve is in its neutral position. The pressure fluid supply pipe 65 is connected to a suitable hydraulic pump (not shown) and the pipe 68 leads to a fluid reservoir (not shown) from which the pump draws its fluid. The control valve 62 and servomotor 53 are both mounted on a bracket 69 which is bolted to the underside of the feeding mechanism bed 70 (Figure 1) which in turn is bolted to the machine bed 15. The feeding mechanism bed 70 supports the feeding mechanism, generally designated 71, by which the sheet stock or coil stock S is fed to the machine 10.

Rising from the left-hand end of the bed 70 is an upright 72 in the form of a metal block having a flat top surface 73 over which the sheet stock S slides. The stock S is guided by grooved guide wheels 74 mounted on studs 75 which are in turn threaded into slides 76 slidably mounted in T-shaped grooves 77 so as to adapt the guide wheels 74 to varying widths of stock S. Set screws 78 serve to secure the slides 76 in their adjusted positions. The T-shaped grooves 77 are formed in a forwardly-extending and overhanging portion 79 forming a part of the upright 72.

The upright 72 and its surface 73 form the

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lower portion of a stationary clamp generally designated 80 which is intermittently operated to alternately clamp and release the stock S in cooperation with a movable clamp 81 of similar construction. The clamps 80 and 81 are disclosed and claimed in my co-pending application Serial No. 734,904 filed March 15, 1947 on which was granted the Haller patent No. 2,467,740 issued April 19, 1949 for Step-by-Step Feeding Device and their details form no part of the present invention.

The clamps 80 and 81 are of similar construction, hence a single description will be sufficient for both. Each clamp is provided with a block-like casing 82 having a port 83 into which is threaded a pipe connection 84. The pipe connection 84 of the stationary clamp 80 is connected to the service pipe 67, whereas the connection 84 of the movable clamp 81 is connected by a flexible pipe 85 to the service pipe 66. The movable clamp 81 has a block-like base 86 corresponding to the block-like upright 72 and having a similar flat surface 87 at the top thereof over which the stock S slides.

The port 83 opens into a downwardly-inclined passageway 88 (Figure 1) leading to a laterally-elongated chamber 89 closed by an elongated plate 90 bolted to the casing 82. Leading downwardly from the chamber 89 are inclined multiple bores 91 containing reciprocable plunger pins 92 (Figure 2). The plungers 92 are urged downward in the bores 91 by coil springs 93, and their lower ends engage an elongated roller 94 which is mounted in a tapering recess 95 having an upper wall surface 96 inclined downward toward the walls or surfaces 73 or 87 over which the stock S slides. The clamps 80 and 81 are each provided with a slot 97 extending there-through for the passage of the stock S (Figure 3). Bolts 98 extend downward through the casing 82 to secure it to the upright 72 or base 86 as the case may be (Figure 1).

The upright 72 is provided with horizontally-spaced sockets 99 for receiving the forward ends of spaced parallel guide rods 100, the rearward ends of which are mounted in bores 101 in arms 102 extending laterally outward from the cylinder 103 of the hydraulic feeding cylinder or motor 104. The motor 104 is of the variable stroke type disclosed and claimed in my Patent No. 2,428,493 issued Oct. 7, 1947 for Stock Feeding Mechanism for Punching, Stamping and Cutting Machines.

The cylinder 103 of the motor 104 has a cylinder bore 105 in which reciprocates a compound adjustable stroke piston generally designated 106. The latter consists of a hollow piston rod 107 (Figure 1) the outer end of which is reduced in diameter and, after passing through a bore 108 in the clamp base 86, terminates in a threaded portion carrying a nut 109. The inner end of the piston rod 107 carries a head 110.

The piston rod 107 is provided with an internally-threaded bore 111 into which is threaded a threaded stem 112 of a movable piston head 113, this, in turn, being bored longitudinally with a bore of square cross-section adapted to slidably receive a square shaft 114 carrying a hand wheel 115 at its outer end and a similarly-bored collar 116 located on the inner side of the cylinder head 117. The opposite ends of the cylinder bore 105 are provided with ports 118 and 119 into which are threaded branches of the service pipes 66 and 67 respectively. Thus, by rotating the hand wheel 115, the piston heads 110 and 113 may be

caused to move toward or away from one another, thereby lengthening or shortening the stroke of the compound piston 106 in the cylinder bore 105.

In order to guide the movable clamp 81 in its reciprocation, the base 86 thereof is bored as at 120 (Figure 3) for the passage of the guide rods 100. The rearward portion of the stock S is also guided by grooved guide wheels 74 similar to those previously described and similarly numbered and similarly mounted on studs 75 carried by slides 76 reciprocating in T-slots 77 formed in arm portions 121 extending laterally outward from the upper rearward end of the cylinder 102 (Figure 2).

To insure that the sheet or strip S of material will be grasped with sufficient pressure to prevent slippage before the feeding stroke commences, a sequence valve, generally designated 125 (Figures 1 and 6) is preferably inserted in each of the service pipes 66 and 67, along with a check valve 126. The sequence valve 125 consists of a casing 127 having a longitudinal bore 128 terminating at one end in a plunger lifting bore 129 of reduced diameter having a passageway 130 extending from the outer end thereof back to the intake port 131 which leads into an annular enlargement 132 from which the outlet port 133 leads outward. Both of these ports are connected to gaps in the service pipes 66 and 67 so as to be in series therewith. The annular enlargement 132 forms a part of the lower end of the bore 128, which portion, for convenience, will be designated as the chamber 132.

Surrounding the bore 128 above the chamber 132 and spaced away from it is an annular enlargement 134 from which an auxiliary port or sequence port 135 opens outward. Pipes 136 and 137 run from the sequence valves 125 in the service pipes 66 and 67 respectively to the opposite end ports 118 and 119 of the hydraulic feeding motor 104 (Figure 2). Bolted to the upper end of the bore 128 is a cap 138 having a smaller threaded bore 139 extending longitudinally thereof co-axial with the bore 128. Threaded into the bore 139 is an adjusting screw 140 having a socket 141 in the lower end thereof adapted to receive the upper end of a coil spring 142, the lower end of which engages the upper end of a valve plunger 143 and urges it downward. A lock nut 144 locks the screw 140 in its adjusted position for regulating the force exerted by the coil spring 142 upon the valve plunger 143 whereas a cap 145 with a socket 146 therein covers the otherwise exposed end 147 of the screw 140.

The valve plunger 143 is of approximately cylindrical form with heads 148 and 149 separated from one another by a reduced diameter neck 150 lying within the chamber 132. The lower end of the valve plunger 143 is engaged by a plunger-lifting piston 151 which is reciprocable in the plunger-lifting bore 129.

In the operation of the clamping arrangement shown in Figures 1 to 4 inclusive, the sheet or coil stock S is threaded through the slots 97 in the movable and stationary clamps 81 and 80 as shown in Figure 1, and the hand wheel 115 rotated to adjust the stroke of the hydraulic motor 104 to the desired feeding stroke for the stock S, depending upon the size of workpiece to be stamped or punched out by the punch unit 21. The operator then starts the hydraulic pump (not shown) which supplies hydraulic pressure fluid through the supply pipe 65 to the four-way con-

trol valve 62, which in turn actuates the fixed and movable clamps 80 and 81 alternately as well as actuating the hydraulic motor 104 to advance the stock S.

The operator now starts the machine 10 causing the platen 14 to descend and punch out a workpiece from the stock S. As the platen 14 rises, it carries the cam plate 25 upward, causing the inclined portion 30 of the cam groove 28 to engage the roller 32 on the end of the piston rod 34 and shift the piston 49 to the right. Assuming the cylinder bore 47 to be full of fluid, this fluid is forced under pressure through the pipe 54 into the right-hand end of the cylinder bore 55 of the servo-motor 53, shifting its piston 56 and piston rod 57, as well as the valve rod 61 of the four-way control valve 62 to the left, compressing the coil spring 58. When the valve rod 61 and three-headed spool 63 are thus shifted to the left to the opposite position from that shown in Figure 4, pressure fluid from the supply pipe 65 can pass directly into the service pipe 66, since the middle head of the valve spool 63 is now to the left of the supply pipe 65.

The pressure fluid passing through the pipe 66 enters the annular enlargement or chamber 132 through the inlet port 131 and passes outward through the outlet port 133 into the remainder of the pipe 66 and thence through the flexible pipe 85 into the clamp chamber 89 of the movable clamp 81. There it acts against the upper ends of the plungers 92, forcing them downward and causing the roller 94 to be wedged tightly into the converging chamber 95. This causes the roller 94 to react against the inclined surface 96 so as to force the stock S tightly into frictional engagement with the surface 87 of the base 86 of the movable clamp 81.

Meanwhile, a portion of the pressure fluid in the service pipe 66 has passed through the passageway 130 (Figure 6) of the first (right-hand) sequence valve 125 (Figure 2) into the lower end of the plunger-lifting bore 129 where it acts against the lower end of the piston 151. When the pressure has risen to a point where the force exerted on the piston 151 is able to overcome the force of the coil spring 142, it shifts the valve plunger 143 upward, causing the head 149 to pass above the annular enlargement or chamber 134 so that the space around the neck 150 interconnects the annular enlargements or chambers 132 and 134. Pressure fluid then flows from the chamber 132 through this spaced and outward through the auxiliary port 135, thence through the pipe line 136 to the port 118. The pressure thus entering the right-hand end of the cylinder bore 105 of the feeding motor 104, acts against the compound piston head 113 and shifts it, the piston rod 107 and the movable clamp 81 to the left, shifting the stock S to the left.

The clamp 81 continues to move the stock S a distance equal to the length of stroke of the compound piston 106, whereupon it halts. Throughout all of this feeding movement, of course, the stationary clamp 80 has been in its released position because the service pipe 67 leading thereto has been connected through the second sequence valve 125 and through the control valve 62 to the exhaust pipe 68. Thus, there is no pressure at this time in the chamber 89 of the stationary clamp 80, hence the roller 94 thereof fails to tightly grip the stock S as it slides past, propelled by the moving clamp 81. At the same time, the fluid displaced from the

left-hand end of the motor cylinder 102 escapes through the pipe 137 and check valve 126 into the service pipe 67 and thence, in the manner stated above, to the exhaust pipe 68.

When the platen 14 reaches the top of its stroke and starts downward upon a punching stroke, the foregoing motions are reversed. The downward travel of the platen 14 causes the cam groove 28 of the cam plate 25 to move the piston rod 34 of the motive device 35 to its left-hand position as shown in Figure 1. This, in turn, creates a suction in the pipe 54 and right-hand end of the servo-motor cylinder bore 55, permitting the coil spring 53 to shift the servo-motor piston rod 57, valve rod 51 and valve spool 63 of the control valve 62 to the right into the position shown in Figures 1 and 4. This reverses the flow of the pressure fluid in the supply pipe 65 from the service pipe 63 to the service pipe 67.

This action actuates the fixed clamp 83 to cause its roller 94 to tightly grip the stock S and hold it stationary against the surface 72 on the upright 72. When the pressure within the chamber 89 of the fixed clamp 83 rises to an amount sufficient for the piston 151 to overcome the force of the coil spring 142 and lift the plunger 143 thereof, in the second sequence valve 125 located in the service pipe 67, pressure fluid is then enabled to flow from the pipe 67 through the bore 123 to the enlargement 134 and out through the auxiliary port 135 and pipe 137 to the port 119 at the left-hand end of the cylinder 103 of the hydraulic motor 104. Thus, the fixed clamp 83 securely grips the stock S before the hydraulic motor 104 becomes operative to retract the movable clamp 81 back to its starting point. When pressure fluid from the branch 137 of the pipe 67 enters the port 119 at the left-hand end of the cylinder bore 103 of the feeding motor 104, it retracts the compound piston 106 and the movable clamp 81 to the right into the positions shown in Figure 1. Since the service pipe 66 is now connected to the discharge or exhaust line 68, no pressure exists in the chamber 89 of the movable clamp 81, hence the roller 94 thereof releases its grip on the stock S now temporarily held by the stationary clamp 83 and permits it to slide thereof while the movable clamp 81 is being retracted. Meanwhile, the fluid displaced from the right-hand end of the cylinder 103 of the hydraulic motor 104 escapes through the port 118, auxiliary line 136 and check valve 126 into the service pipe 66 now connected to the exhaust pipe 68, as stated above. The platen 14 continues its downward stroke and the punch unit 21 punches out another workpiece, after which the platen 14 moves upward and the foregoing cycle of operations is repeated.

As previously stated, the cylinder bore 67 of the motive device 35 is of considerably larger capacity than the servo-motor cylinder bore 55. Accordingly, during the first part of the stroke of the piston head 49, the servo-motor cylinder bore 55 is rapidly filled as its piston head 53 moves to the left. The excess fluid in the cylinder bore 47 is then discharged through the port 46, lifting the ball check valve or relief valve 42 against the thrust of the coil spring 44 and causing the excess fluid to escape through the port 43 into the reservoir 38.

The modification shown in Figure 5 is similar to the corresponding portion shown in the upper left-hand corner of Figure 1, except that the direction of the cam groove 28 is reversed in the

cam plate 25. The motive device 35 remains exactly the same. In the operation of the modification shown in Figure 5, however, the motive piston 49 moves to the left on the upstroke of the platen 14 and to the right on the downstroke thereof, exactly the reverse of the motion in Figures 1 to 4 inclusive. The remainder of the circuit and mechanism of Figure 5 are the same, except that the stock S is advanced on the downstroke of the platen 14 and held stationary on the upstroke thereof. It is, of course, obvious that all motion of the stock S should cease before the punches 19 and 20 reach it.

What I claim is:

1. An intermittent feeding arrangement for feeding sheet material to a press having a reciprocable material-processing member, said arrangement comprising a stationary material support, a movable material support, a pressure-fluid-actuated clamp mounted adjacent each support and having a clamping member movable hydraulically into clamping engagement with said material against its respective support, a hydraulic motor operatively connected to said movable support to move the same, a pressure-fluid distributor hydraulically connected to said clamps and to said hydraulic motor, a servo-motor operatively connected to said pressure fluid distributor to shaft the same, a pressure-fluid pump hydraulically connected to said servo-motor and mechanism operatively connecting said material processing member to said pump whereby the motion of said material-processing member shifts said servo-motor to responsively shift said distributor and supply pressure fluid alternately to said clamps and to the opposite sides of said motor.

2. An intermittent feeding arrangement for feeding sheet material to a press having a reciprocable material-processing member, said arrangement comprising a stationary material support, a movable material support, a pressure-fluid-actuated clamp mounted adjacent each support and having a clamping member movable hydraulically into clamping engagement with said material against its respective support, a hydraulic motor operatively connected to said movable support to move the same, a pressure-fluid distributor hydraulically connected to said clamps and to said hydraulic motor, a cam device operatively connected to said material-processing member, a servo-motor operatively connected to said pressure fluid distributor to shift the same, and a pressure fluid pump hydraulically connected to said servo-motor and operatively engageable with said cam device whereby the motion of said material-processing member shifts said servo-motor to responsively shift said distributor and supply pressure fluid alternately to said clamps and to the opposite sides of said motor.

3. An intermittent feeding arrangement for feeding sheet material to a press having a reciprocable material-processing member, said arrangement comprising a stationary material support, a movable material support, a pressure-fluid-actuated clamp mounted adjacent each support and having a clamping member movable hydraulically into clamping engagement with said material against its respective support, a hydraulic motor having a cylinder and a reciprocable piston therein operatively connected to said movable support to move the same, a pressure-fluid distributor hydraulically

connected to said clamps and to said hydraulic motor, said pressure-fluid distributor having a pair of alternatively selective service ports either of which becomes a pressure-fluid delivery port while the other service port becomes a fluid return port, a servo-motor operatively connected to said pressure-fluid distributor to shift the same, a pressure-fluid pump hydraulically connected to said servo-motor, mechanism operatively connecting said material processing member to said pump whereby the motion of said material-processing member shifts said distributor to supply pressure fluid alternately to said clamps and to the opposite ends of said cylinder, one of said service ports being hydraulically connected to one end of said cylinder and to one of said clamps and the other service port being hydraulically connected to the other end of said cylinder and to the other of said clamps.

4. An intermittent feeding arrangement for feeding sheet material to a press having a reciprocable material-processing member, said arrangement comprising a stationary material support, a movable material support, a pressure-fluid-actuated clamp mounted adjacent each support and having a clamping member movable hydraulically into clamping engagement with said material against its respective support, a hydraulic motor having a cylinder and a reciprocable piston therein operatively connected to said movable support to move the same, a pressure-fluid distributor hydraulically connected to said clamps and to said hydraulic motor, a servo-motor operatively connected to said pressure fluid distributor to shift the same, a pressure fluid pump hydraulically connected to said servo-motor and mechanism operatively connecting said material processing member to said pump whereby the motion of said material-processing member shifts said servo-motor to responsively shift said distributor and supply pressure fluid alternately to said clamps and to the opposite ends of said cylinder.

5. An intermittent feeding arrangement for feeding sheet material to a press having a reciprocable material-processing member, said arrangement comprising a stationary material support, a movable material support, a pressure-fluid-actuated clamp mounted adjacent each support and having a clamping member movable hydraulically into clamping engage-

ment with said material against its respective support, a hydraulic motor operatively connected to said movable support to move the same, a pressure-fluid distributor hydraulically connected to said clamps and to said hydraulic motor, said pressure-fluid distributor having a pair of alternatively selective service ports either of which becomes a pressure-fluid delivery port while the other service port becomes a fluid return port, a servomotor operatively connected to said pressure-fluid distributor to shift the same, a pressure-fluid pump hydraulically connected to said servomotor, mechanism operatively connecting said material processing member to said pump whereby the motion of said material-processing member shifts said distributor to supply pressure fluid alternately to said clamps and to the opposite sides of said motor, one of said service ports being hydraulically connected to one side of said motor and to one of said clamps and the other service port being hydraulically connected to the other side of said motor to the other clamp, and a sequence valve connected between each clamp and its respective side of said motor and having a yielding-urged valve member therein shiftable in response to a predetermined rise in pressure in said clamp to divert pressure fluid to said motor whereby to exert a predetermined clamping grip on said material before permitting said motor to shift said material.

JOHN HALLER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,096,073	Spencer	Oct. 19, 1937
2,166,423	Clark	July 18, 1939
2,301,028	Esch	Nov. 3, 1942
2,347,261	Harrington et al.	Apr. 25, 1944
2,354,860	Hartsock et al.	Aug. 1, 1944
2,367,248	Vickers et al.	Jan. 16, 1945
2,379,002	Haller	June 26, 1945
2,406,503	Papsdorf	Aug. 27, 1946
2,409,968	Welsch	Oct. 22, 1946
2,428,493	Haller	Oct. 7, 1947
2,467,740	Haller	Apr. 19, 1949
2,470,252	Kyle	May 17, 1949