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[54] **DEVICE FOR SELECTING AUTOMATICALLY ONE FROM AT LEAST THREE HYDRAULIC RECEIVER CIRCUITS**
3 Claims, 1 Drawing Fig.

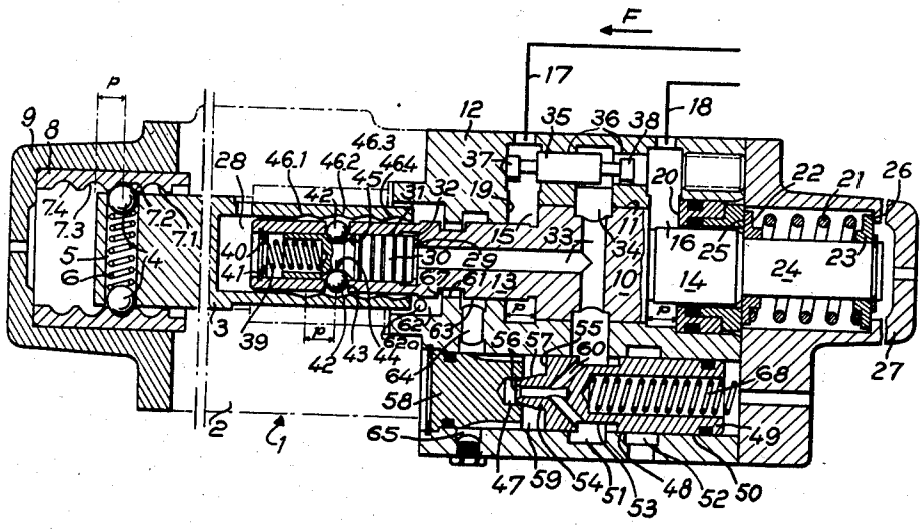
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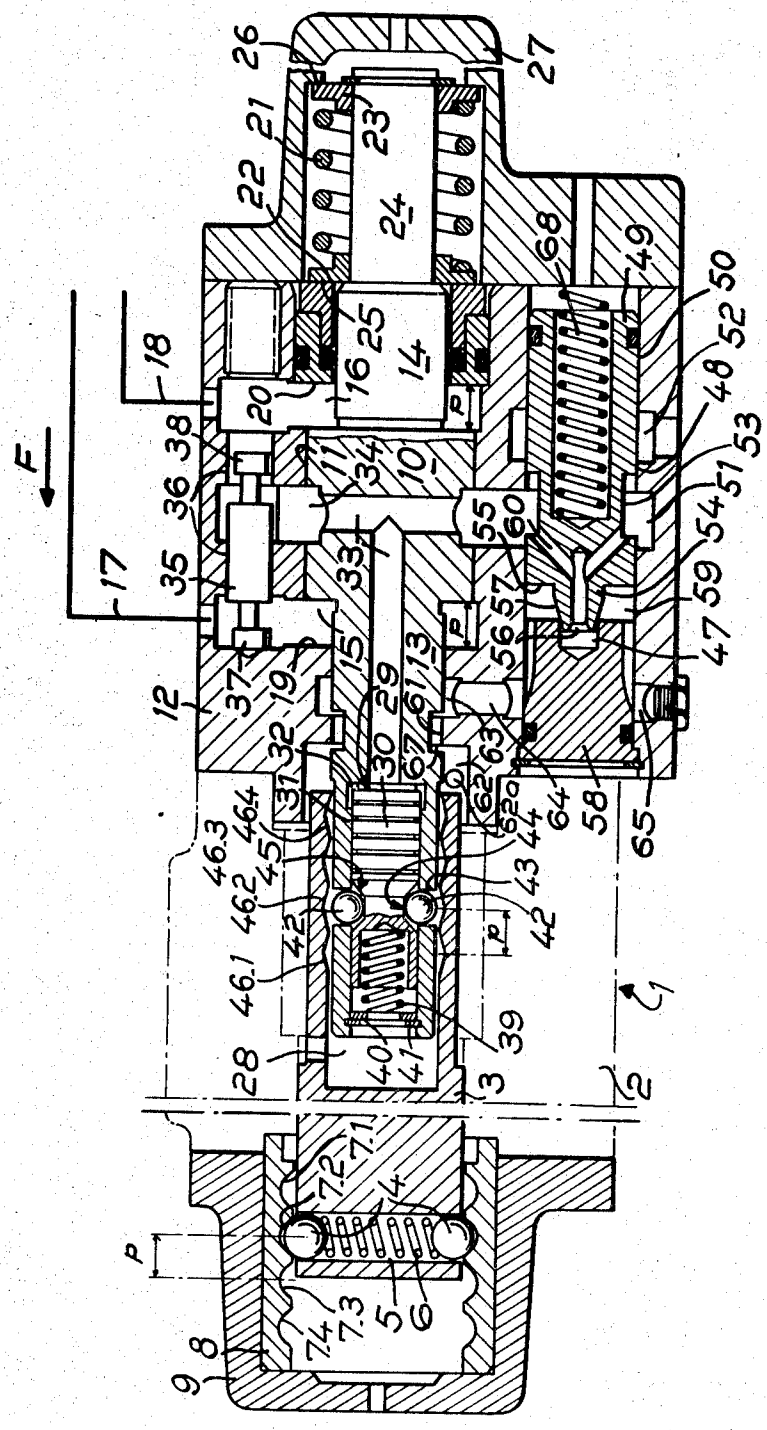
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ABSTRACT: This invention relates to devices for automatically selecting one hydraulic receiver circuit from at least three such circuits in a programmed order. According to the invention, the piston of an actuating jack is extended by two rods projecting from each side thereof and this assembly is interposed between two stops so that its travel in the two directions is limited to a length proportional to the step of the movable element of a distributor. One of these rods is connected to a resilient return member and the second of said two rods contains a step by step device for connecting it momentarily with the movable element of the distributor. The step by step device comprises a coupling piston slidably mounted in the cylinder of the second rod and also comprises at least one coupling member guided freely along a substantially radial direction.



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DEVICE FOR SELECTING AUTOMATICALLY ONE FROM AT LEAST THREE HYDRAULIC RECEIVER CIRCUITS

In numerous branches of technology it is desired to connect automatically one after the other hydraulic receiver circuits in a predetermined succession or in a reverse succession according to whether the command signal is given by one or other of two pilot circuits. This requirement may relate to power circuits for an hydraulic motor, sequential circuits of a press, chain transfer or the like, hydraulic circuits for controlling the change of speeds in a gear box, etc.

The present invention has for an object to provide for this automatic selection a simple, strong, safe and efficient device which is easy to produce, to regulate and to maintain and whose cost is relatively low.

In this device there is present, which is already known for manual controls, a distributor comprising two members of which one is movable with respect to the other. These members have recesses which, according to the position which the movable member is occupying, allow one of at least three receiver circuits to be connected to an hydraulic control circuit, and the other receiver circuit to a return circuit. The movable member also cooperates with a resilient locking member which acts to immobilize the said movable member in each one of the positions which it is likely to occupy.

The invention relates more particularly in order to achieve the object mentioned, to an actuating device sensitive to two pilot signals and connected kinetically to the movable member of the distributor in order to move it.

In accordance with the invention this actuating device comprises a jack whose piston, drawn back to a median position by a resilient member, separates in the cylinder two chambers connected to two hydraulic pilot circuits and cooperates with two stops limiting its travel in both directions to a length proportional to the step of this movable member, a momentary connecting member being interposed between the said movable member and the piston of the actuating jack, said link member being controlled by another jack connected to the particular pilot circuit in use.

According to an embodiment particularly useful in the case where the movable member of the distributor is a slide valve, the aforementioned momentary link member is at least one finger guided relative to the piston rod of the driving jack, in a substantially radial direction and placed between, on the one hand, a cam of its jack referred to as a coupling jack and, on the other hand, any one of at least three notches arranged in a part of the movable member of the distributor at a step equal to the travel of the said actuating jack, the piston rod of this latter being provided coaxially with a coupling jack whose cam-carrying piston cooperates on a face with a resilient member and discharges on its other face into an hydraulic chamber connecting, through at least one nonreturn member, with the two chambers of the actuating jack.

Moreover, the actuating jack cooperates with an automatic resetting device which preferably comprises a distributor capable of establishing by rolling contact, communication between the pilot circuit in use and a return circuit, this distributor being controlled by a piston whose two stepped faces are disposed in two chambers which are normally insulated the one from the other by a valve connecting the said faces and which are connected on the said pilot circuit in use, the first directly and the second through the valve, this second chamber being also connected to the said return circuit by a passage whose orifice is controlled by the piston of the actuating jack in its median position, the control piston of the aforementioned distributor also cooperating with a resilient member calibrated to balance a lower pressure than that which triggers the coupling finger.

Various other characteristics of the invention will appear moreover from the specific description which follows.

An embodiment of the object of the invention is shown by way of nonlimiting example in the accompanying drawing the single FIG. of which shows the device in longitudinal section.

The actuating or driving device described hereinafter with reference to the drawing is applied in a nonrestricting manner and only to understand how it operates, to the control of a gear box with four gears and particularly to that which was the object of the French Pat. No. 1,513,369 of 23rd Nov. 1966, in the name of Societe Anonyme Deruppe S.A. Of course the driving device according to the present invention can be used to control any box with more than three speeds and more generally any mechanism, machine or other apparatus in which it is necessary to supply selectively hydraulic receiver circuits as, for example, those which are detailed hereinafter.

Moreover, this driving device cooperates for the selection of the circuits with a distributor **1** which may be of any type and it is for this reason that the distributor is not shown in detail in the drawing but only outlined so as to show only the members which are necessary to practice the invention. The distributor may be of the turning or sliding type.

The distributor chosen as an example comprises a body **2** in which is arranged a slide valve **3**. The body **2** is connected to the four hydraulic receiver circuits causing the changing of the four speeds of the box. In the case where this latter is that described in the aforementioned French Pat. No. 1,513,369, each of the said receiver circuits supplies the jacks of two brakes, the body **2** is also connected to an hydraulic control circuit supplying fluid under pressure and to a return circuit feeding the fluid to a tank in which the pump sucks to pressurize the fluid supplied by the control circuit. The body **2** and the valve **3** have in a known manner internal grooves, holes or channels distributed in such a way that to each of the four possible positions of the valve, the control circuit is connected to one of the receiver circuits and that the return circuit communicates with the three other receiver circuits. These different positions of the valve are separated with respect to one other by the same length or step *p*.

The valve **3** cooperates with a locking member allowing it to be immobilized in each of the four positions which it is likely to occupy. In the embodiment shown, this locking member is formed by two balls **4** mounted in opposition to each other in a diametric hole **5** of the valve, and between which a spring **6** is placed to separate them resiliently from each other. Each of these balls cooperates selectively with four recesses **7.1**, **7.2**, **7.3** and **7.4** arranged in a hollow in the body **2** or in a member **8** arranged in this latter. It is important to notice that these recesses **7.1** to **7.4** are equidistant from each other and that their pitch *p* is equal to that of the four possible positions of the valve. Advantageously, the locking member thus constituted is accessible and to this end may be situated between a free end of the valve **3** and a removable cap of the body **2**.

The driving device of the invention is arranged in kinematic connection with the opposite end of the valve **3**, so as to displace this latter step-by-step in one direction or the other according to whether it is ordered by one pilot signal or another.

This device comprises a piston **10** arranged to slide in a cylindrical bore **11** of a box **12** arranged on the body **2** of the distributor. This piston is integral with coaxial rods **13** and **14** of the same diameter Moreover, its extreme faces, which are annular in shape since they surround the said rods, are situated in chambers **15** and **16** of the box which are permanently connected by any appropriate means to the two pilot circuits **17** and **18** respectively. Moreover, the annular faces of the pistons **10** cooperate with the ends **19** and **20** of said chambers **15** and **16**, these ends effectively forming stops. It should be observed that if this piston occupies the median position shown on the drawing, the path which it may follow in one direction or the other is limited, by contact with the stops **10** and **20**, to a value equal to the pitch *p* of the positions of the valve **3**.

In order to draw back the said piston **10** in the medium position a spring **21** is provided. It is placed between two washers or rings **22** and **23** arranged to slide on an extension **24** of the piston rod **14** between two stop members integral with this extension and formed by a shoulder and a ring usually called a circlip. These washers are arranged to rest on stop members **25** and **26** of the box **12** and its cap **27**.

The path of the piston 10 instead of being limited by contact with the ends 19 and 20, may be limited by mutual abutment of the washers 22 and 23; in this latter case a cross tube of a suitable length may be placed between the said washers.

Under these conditions, if the piston 10 under the influence of the hydraulic pressure prevailing in the chamber 16 slides in the direction of the arrow F, it takes with it the washer 23 by the circlip of the extension 24 and compresses the spring 21 because the washer 22, being applied against the stop member 25, remains stationary. As soon as the piston 10 is no longer controlled by the hydraulic fluid, the spring 21 expands and draws it back. When the washer 23 is in contact both with the stop member 26 and the extension circlip 24, and when the washer 22 is in contact both with the stop member 25 and the shoulder of the said extension, the piston 10 is in the median position. Similarly, if the piston 10 under the influence of the hydraulic pressure prevailing in the chamber 15 slides in the opposite direction to that of the arrow F, it takes with it the washer 22 by the shoulder of its extension 24 and compresses the spring 21 against the washer 23 held immobile by the stop member 25. As described hereinbefore, as soon as the piston is no longer controlled by the hydraulic pressure, the spring 21 expands and draws it back towards its median position in which the washers 22 and 23 are supported on the stop member of the extension 24 and also on the stop member of the corresponding box 12.

It thereby results that if the pilot conduit 18 is supplied, the piston 10 is displaced in the direction of the arrow F and after the dropping pressure, the spring 21 draws back the said piston in to its median position. It is the same if the pilot conduit 17 is supplied instead of the conduit 18 but in this case the piston 10 slides in the opposite direction to that of the arrow F.

As will be understood from the foregoing, a kinematic link is established between the valve 3 of the distributor 1 and the piston 10 in such a way that the movement of the latter is communicated step-by-step to the said valve. For this purpose the rod 13 of the piston 10 penetrates into the tubular end 28 situated opposite the valve 3 and bears a screw coupling jack 29 connected to the pilot circuit 18 or 18 in use.

In the embodiment shown in the drawing, this jack comprises a piston 30 mounted to slide in a cylindrical bore 31 of the rod 13. One of the faces of the piston 30 enters an hydraulic chamber 32 connected permanently, due to internal conduits 23 of the actuating or drive piston 10, to an intermediate chamber 34 arranged in the box 12 between the aforementioned chambers 15 and 16.

It is necessary for the chamber 32 not only to be connected to the pilot circuit in use but it must be isolated from the other pilot circuit. For this purpose, the intermediate chamber 34 is connected to end chambers 15 and 16 by one or more appropriate members which may be formed for example by two nonreturn valves or, as can be seen on the drawing, by a selection valve 35. This latter is mounted to slide in a cylindrical bore 36 of the box 12 in which the three chambers 15 and 16 and 34 lead. The end faces of the valve 35 are subjected to the pressures prevailing in the chambers 15 and 16, i.e. in the pilot circuits 17 and 18. Moreover, this valve is extended coaxially by cruciform stop heads 37 and 38 arranged to limit its travel. Finally, the length of the said valve is determined in such a way that in an end position it frees a passage across a part of the bore 36 to establish communication between the intermediate chamber 34 and the end drive chamber opposite this position, although it cuts off completely the other part of the bore 36 to isolate this intermediate chamber 34 from the other end chamber.

Thus, when the pilot circuit 18 for example is put into use, the hydraulic fluid pushes the valve 35 back to the position shown on the drawing and from then on this fluid exists not only in the chamber 16 but also in the intermediate chamber 34 and, through the conduits 33, in the coupling chamber 32, although this fluid may not enter into the guide chamber 15 since it is prevented from doing so by the selection valve 35. In other words, this latter forms a member selecting automatically the connection of the chamber 32 to the pilot circuit in use.

The coupling piston 30 cooperates moreover by its opposite face with a spring 39 bearing on a washer 40 immobilized in the rod 13 by means of a ring 41 referred to as a circlip. The spring 39 tends to draw back this piston to the position of disengagement shown on the drawing, in which the hydraulic fluid contained in the chamber 32 is without influence.

This piston is intended to establish the aforementioned kinematic link between the drive rod 13 and the valve 3. To this end, at least one coupling finger, guided relative to the rod 13 in a substantially radial direction, is interposed between a cam of the said jack 30 and notches of the same number as the locking recesses 7 in the said valve 3.

According to the embodiment shown on the drawing, two balls 42 acting as locking fingers are lodged in the holes 43 of the tubular part of the rod 13, these holes being situated opposite a groove 44 of the piston 30 when this latter is in the disengaged position. The groove 44 is circumscribed on the side of the chamber 32 by a conical wall 45 forming the notch, so that if the said piston slides in the direction of the arrow F with respect to the rod 13, the cam 45 pushes back the balls 43 towards the exterior and this causes them to project. On the other hand, if the piston is drawn back by the spring 39 to the disengaged position, the balls 42 may disappear completely, penetrating to the end of the groove 4. These balls are capable of cooperating with any one of the circular grooves 46.1 to 46.4 hollowed out in the tubular end 28 of the valve 3. These grooves are, in the embodiment shown, wherein the distributor 1 controls four circuits, four in number, and are distributed uniformly at the same pitch p as the locking recesses 7.1 to 7.4. Moreover, the said grooves are V-shaped in profile so as to allow an easier release of the balls 42 then exist for the balls 4 outside the recesses 7.

The selection valve 35 allows the pilot circuit 17 or 18 in use to be connected not only to the corresponding actuating or drive chamber 15 or 16 and to the coupling chamber 32, but also to a chamber 47 of an automatic resetting device 48 described hereinafter. This device allows a single cycle of operation to be completely controlled (i.e. the advance by one step in one direction or the other of the valve 3 and the return to the initial position of the device according to the invention) and will now allow the carrying out of another subsequent cycle. In other words, this device allows the execution of successive selections to be timed which occurs when the information transmitted by the pilot circuit in use persists.

The device 48 comprises a distributor 49 constituted by a cylindrical valve mounted to slide in a recess 50 of the box 12. In this latter are arranged two annular grooves 51 and 52, the first of which is connected directly to the intermediate chamber 34 and the second of which is connected to the return circuit of the hydraulic installation. At rest, i.e. in the position shown on the drawing, the distributor valve 49 obturates the groove 42 so that the pressure in the pilot circuit in use and the recesses to which it is connected may increase. But this valve 49 is capable of establishing, when it is shifted in the opposite direction to that of the arrow F, by an annular recess 53 hollowed out in its periphery, communication between the grooves 51 and 52 and as a result, the pilot circuit in use and the cavities to which it is connected are connected to the return circuit which has the effect of producing a decrease in pressure.

The distribution valve 49 is extended by a piston head 54 having two stepped faces 55 and 56 connected by a valve holder 57. This valve holder cooperates usually, i.e. in the position shown on the drawings, with a seat of a member 58 bordering the aforementioned chamber 47 which is circumscribed by the said member. This latter is connected in a sealed manner in the box 12 and immobilized by any appropriate means. Of course, this member may be removed and replaced by a complete part of the box 12. The valve 57 isolates the chamber 47 referred to as the central chamber, from a peripheral chamber 59 arranged in the recess 50 between

the face 55 of the piston 54 and the face situated opposite the member 58.

Moreover, the central chamber 47 is connected, by internal conduits 60 from the piston 54 which lead into the annular recess 53 of the valve 49, to the intermediate chamber 34. In these conditions the central chamber 47 is connected permanently to the pilot circuit in use under the control of the selection valve 35 as is already the case for the coupling chamber 32.

Moreover, the peripheral chamber 59 is itself connected to the return circuit for the hydraulic fluid but in a temporary manner. In fact, it need only be connected when the piston 10 is in the median position shown on the drawing. Consequently, communication between the peripheral chamber 59 and the return circuit is controlled by the said piston. In the embodiment shown on the drawing, the rod 13 of the piston 10 is arranged to slide in a recess 61 of the box 12 which has two chambers 62 and 63. The chamber 62 communicates permanently with the return circuit through an orifice 62*a* and the chamber 63 with the peripheral chamber 59 by a conduit 64 and a circular groove 65 of the box 12 as well as longitudinal grooves 66 of the member 58. The valve 13 has, finally, a groove 67 opposite the part of the bore 61 between the chambers 62 and 63 when the piston is in the median position shown on the drawing, this groove being longer than the said part. Consequently, the groove 56 establishes connection between the chambers 62 and 63, i.e. finally between the peripheral chambers 59 and the return circuit, only when the piston is in a median position; on the other hand, when this latter occupies any one of its end positions, the rod 13 shuts off the part of the bore 61 between the chambers 62, 63 and thus isolates these latter from each other, consequently closing the peripheral chamber 59.

The distributor valve 59 is under the influence not only of the pressure of hydraulic fluid filling the central chamber 47 and eventually the peripheral chamber 59 but also of an opposing spring 68 bearing on the cap 27. This spring is calibrated to balance a pressure P_0 applied on both faces 55 and 56 of the piston head 54. In other words, when the chambers 47 and 59 are in communication the pressure existing in these two chambers being the same as that set up in the pilot circuit in use, the spring 68 acts on the valve 49 to build up the said pressure and to maintain it equal to P_0. In fact, if this pressure is higher than P_0 the valve 49 operates to establish connection between the grooves 51 and 52 by its recess 53, i.e. between the pilot circuit in use and the return circuit. On the other hand, if this pressure becomes slightly less than P_0, the valve 49 returns and shuts off the groove 52 thus isolating the pilot circuit from the return circuit. In these conditions the valve 49 is submitted to the opposing forces of the spring 68 and of the hydraulic pressure applied to the faces 55 and 56, stabilizes the said pressure while keeping it at P_0 by passing the hydraulic fluid between its recess 53 and the groove 52.

Moreover, it is important to note that the face 56 has a smaller surface than the total section of the piston head 54 which allows the release threshold of the resetting device 48 to be determined.

In fact, when the valve 57 separates the central chamber 47 from the peripheral chamber 59, which although isolated from the return circuit by the rod 13 is at the pressure of this latter, the distributor 49 is only submitted to the counter actions of the spring 68 and of the hydraulic fluid in the chamber 47, which is at the pressure of the pilot circuit. Given that this pressure is exerted on a reduced surface which is that of the face 56, the valve 57 can only open when the said pressure reaches a value P_3 higher than the aforementioned pressure P_0. This value is determined by the ratio of the surface of the face 56 and of the total section of the piston 54. Under these conditions, as soon as the pressure in the pilot circuit reaches the value P_3 the valve 57 opens and the said pressure is applied intermediately on the other face 55 of the piston 54. The instantaneous application of the pressure on an increased surface has the effect of possibly displacing the valve 59 which establishes through this force a connection between the said pilot circuit and the discharge circuit. The pressure lowers rapidly, but is stabilized at the value P_0 by the intervention of the spring 68.

The spring 21 is calibrated to balance, in the chambers 15 and 16 of the actuating or drive jack, a pressure P_2 lower than the aforementioned value P_3 but higher than the value P_0. In a similar manner, the spring 39 is calibrated to balance in the chamber 32 of the coupling jack, a pressure P_1 between the values P_0 and P_2. Finally, the spring 6 acting on the locking balls 4 of the valve 3 in the body 1 is calibrated to cause a force such that the locking obtained can resist the release force of the coupling balls 42 when the piston 30 is subjected to an hydraulic pressure P_0, but gives way when the balls 42 are interlocked and transmit the thrust of the traction of the actuating or drive piston 10 subjected to a pressure P_2.

The automatic selection device according to the invention as has been described hereinabove, operates as will be described hereinafter. The pilot circuits 17 and 18 being assumed not to be transmitting any information, the various members of the device occupies the positions appearing on the drawing.

If hydraulic fluid is discharged into the pilot circuit 18, it appears directly in the actuating or drive chamber 16 and through the passage freed by the selection valve 35, in the coupling chamber 32 and the central resetting chamber 47. Of course, if the valve 35 were to occupy previously the position opposite to that shown on the drawing, the hydraulic fluid would cause its displacement to free the aforementioned passage.

The pressure in the chambers 16, 32 and 47 increases and when it reaches the value P_1, the hydraulic fluid pushes the piston 30 in the direction of the arrow F against the action of the spring 39. At the time of this displacement the cam 45 acts on the balls 42 and engages them strongly in the groove 46.2. In this first time, the coupling of the drive piston 10 with the valve 3 is thus produced.

The pressure of the hydraulic fluid in the said chambers 16, 32 and 47 continues to grow and when it reaches the value P_2, the hydraulic fluid induces, against the action of the spring 21, the displacement of the actuating or drive piston 10 in the direction of the arrow F, which consequently, drives the valve 3 in the same direction, since the locking device 4, 6 gives way when the coupling device resists. When the piston 10 arrives at the end of its travel, i.e. when it abuts the base 10, the balls 4 are situated opposite the recess 7.3 into which they are then interlocked automatically under the action of the spring 6.

The pressure in the chambers 16, 32 and 47 continues yet again to increase and when it reaches the value P_3, the hydraulic fluid causes the valve 57 to open, which thus establishes a connection between the chambers 47 and 59. Given that the connection between this chamber 59 and the return circuit is interrupted by the rod 13 closing the passage between the chamber 62 and 63, the pressure P_3 prevailing in the two chambers 47 and 59 is thus applied over all the section of the piston 54. The distributor valve 49 thus shifts forcibly in the opposite direction to that of the arrow F against the action of the spring 68. The recess 53 then connects the grooves 51 and 52 and as a result of which the pilot circuit in use 18 as well as the chambers 16, 32, 47 and 59, are connected to the return circuit. The pressure drops and when it becomes equal to the value P_0 it stabilizes, given that the valve 49 under the counteractions of the spring 68 and of this pressure, occupies a position of stable equilibrium in which the grooves 51 and 52 communicate through a small passage causing a flow of the fluid.

The aforementioned drop in pressure is practically instantaneous. The locking device 4, 6 resists and holds the valve 3 during the execution of the following action. The actuating of drive piston 10, under the action of the spring 21, which has become preponderant, returns to the median position shown on the drawing. At the beginning of this return action, the balls 42 escape under the combined action of the traction of

the rod 13, of the thrust of the spring 39 and of the reaction of the inclined ramp of the groove 46.2. The rod 13 is thus uncoupled from the valve 3. During this return action, the hydraulic fluid forced back from the chamber 16 and 33 by the pistons 10 and 13 respectively, is evacuated to the return circuit by flowing between the recess 53 of the valve 49 and the groove 52 but the hydraulic pressure remains equal at the value P_0 under the influence of the spring 68. At the end of the travel of the piston 10, the groove 67 of the rod 13 connects the peripheral chamber 59 to the return circuit and from then on the pressure on the faces 55 and 56 of the piston 54 is canceled. The spring 68, no longer being balanced by the pressure P_0, pushes back the valve 49 and closes the central chamber 47 by the valve 57. All the members of the device are returned to their initial position but the balls 42 are situated opposite the groove 56.3. The device is thus available for a new selection cycle and will act as soon as one of the pilot circuits 17 and 18 is put into use. If the pilot circuit 18 has remained in use without interruption, a new selection cycle is executed as soon as the valve 56 is closed.

Of course, the operation of the device during one cycle is the same as described hereinabove if the pilot circuit 17 is put into use instead of the pullout circuit 18. The only difference resides in the fact that the actuating or drive piston 10 is displaced in the opposite direction to that of the arrow F and transmits in the same direction the displacement by one step to the valve 3.

The embodiment of the device according to the invention described hereinabove is particularly interesting because the various members used are easy to execute to make it fit and to adjust. There are, moreover, integrated into a compact unit to which only three connections have to be provided for the two pilot circuits and the return circuit. Moreover, the operation of this device is certain and efficient.

Nevertheless there is nothing to prevent certain of the members being replaced by other members which have an equivalent function. More particularly, the selection valve 35 may be replaced by two nonreturn valves arranged in the pilot circuits 17 and 18; the automatic resetting device 48 may be replaced by a time-controlled closing member for the two pilot circuits 17 and 18, controlled by the actuating or drive piston 10 when it arrives to its end of travel positions. Moreover, in the case where the valve 3 of the distributor 1 is of the rotary type, the coupling device 29 may be replaced by another equivalent, but which comprises in addition a member transforming the translation movement of the piston 10 into a movement of rotation.

The invention is not limited to the embodiment shown and described in detail, since various other modifications may be arranged without departing from its scope.

I claim:

1. In a device for automatically selecting individually one hydraulic receiver circuit from at least three such circuits in a programmed order, applicable particularly to the selective speed control of a gear box having at least three speeds, and comprising a distributor which is disposed between said three receiver circuits and a hydraulic control circuit, and of which the movable element, capable of occupying at least three equidistant positions of the same step cooperates with a resilient intervening locking member for each of them and also with an actuatable jack having two chambers separated by a piston, said chambers being connected to two pilot circuits indicating the selection of the receiver circuits in one direction or in the other, said jack being connected to said movable element by a stepping device, the improvement which consists in that the piston of the actuating jack is extended coaxially by two rods extending from each side thereof, the assembly thus constituted between interposed two stops limiting its travel in the two directions to a length proportional to the step of the movable element of the distributor, a first one of said two rods being connected to a resilient member for return towards the median position the second one of said two rods containing the said step-by-step device intended for connecting it momentarily with the said movable element, and wherein said step-by-step device comprises a coupling piston slidably mounted in the cylinder of said second rod and of which a face extends into an hydraulic cylinder communicating, by means of an automatic selector member such as a slide valve, with that chamber of said actuating hydraulic jack that is connected to the pilot circuit in operation, while the other face of said coupling piston is supported by a resilient return member, and wherein said step-by-step device also comprises at least one coupling member guided freely along a substantially radial direction, in the second said rod and interposed between a cam of said coupling piston and any one of at least three notches having automatic escapement, provided in a part of the movable element of said distributor with a step equal to the travel of the actuating hydraulic jack from its median position.

2. A device according to claim 1, that comprises, in combination, an automatic resetting device that comprises an auxiliary distributor, constituted by a piston slidably mounted in a cylinder of which a first groove and a second groove cooperating with a third groove of said distributor piston to produce by throttling, when sliding, a drop in pressure of the pilot fluid, and wherein the distributor is supported at one end of a resilient member and has, at its other hand, two stepped faces situated in two chambers which are normally isolated one from the other by a valve, and wherein said second chamber is also capable of being connected to the said return circuit under the control of the actuating piston in its median position only, by means of grooves provided in said second rod of said actuating piston and in a guiding cylinder of the latter.

3. A device according to claim 2, wherein said resilient member cooperating with said coupling piston is adjusted to balance a hydraulic pressure lower than that which balances the adjusting of the resilient member attracting said piston of said actuating hydraulic jack, and wherein the resilient blocking member of said movable element of said distributor is calibrated to resist the disappearing force of the fastening member of this movable element with said first rod of said actuating hydraulic jack but to yield to the force of the latter, and wherein said resilient member attracting the resetting piston is calibrated to balance a pressure exerted on its two stepped faces which is lower than that which triggers the fastening member.