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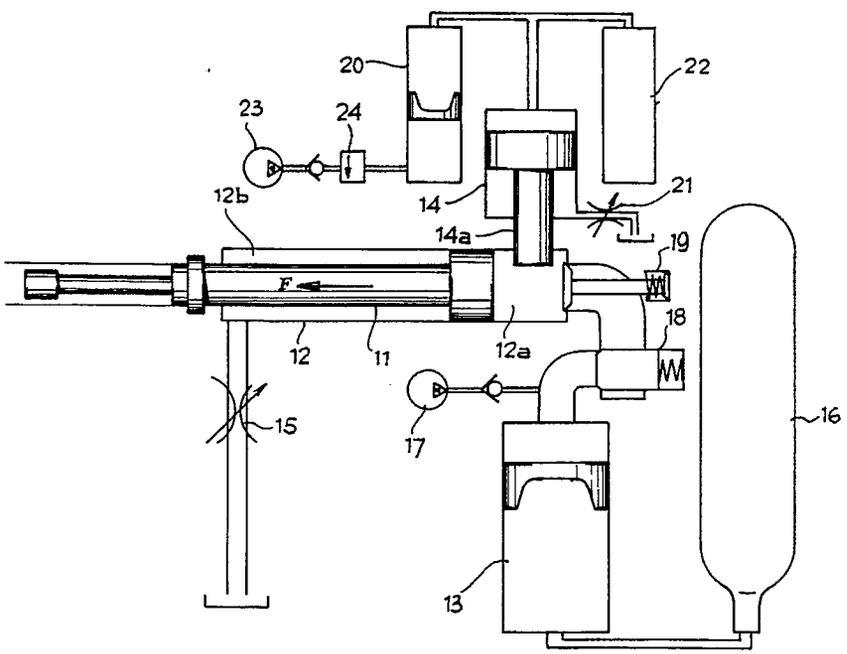
(54) Injection unit for die-casting machines.

(57) This invention relates to an injection unit for die-casting machines, which includes: an injection piston (11) driven and movable in a cylinder (12); a first gas accumulator (13) which connects to a reserve tank for gaseous fluids (16) on one side and on the other side, to said cylinder (12), through a pump and valvular means (17,19) to operate the slow and rapid feed motion of the injection piston (11); and a second gas accumulator (20) connected to a multiplier cylinder (14) on one side and on the other side to a pump with adjustable force valves (23,24) to operate a final compression stage with the use of the injection piston (11).



EP 0 442 247 A2

The present invention relates to die-casting machines and particular relates to an injection unit for said machines.

The injection of materials into the die-casting machines is carried out by a piston in accordance with an operating cycle which can be divided into three consecutive stages:

- an initial feed motion of the piston so as to fill the injection chamber, a discharge of any air which may be present so as to bring the metal to the level of the entrance of the cavities in the forming die;
- a successive rapid feed motion of the piston so as to fill the forming chamber with the material; and
- a sudden final compression for the setting of the formed piece.

Correspondingly, said machines are fitted with a unit capable of following these stages through an operation of the pistons with a gaseous fluid. It is nevertheless the aim of this invention to suggest an injection unit for die-casting machines with a different combination and layout of its components so as to improve the functioning and to attain a more effective performance of the injection stages, especially the final stage of compression, to the complete advantage of a correct and good outcome of the process and of the produced pieces.

To this end, the injection unit of this-invention includes: an injection piston which is movable inside a cylinder; a first gas accumulator which on one side connects to a reserve tank of gaseous fluid and, on the other side, connects to said cylinder up stream of the piston through a pump and valvular means so as to operate the slow and rapid feed motion of the piston; a multiplier cylinder with a two section piston placed perpendicularly to the cylinder of the injection piston upstream of the cylinder; and a second gas accumulator which on one side connects to the multiplier cylinder and to a possible reserve tank of gaseous fluids and, on the other side, to a pump with a valve that adjusts the force to operate the final compression stage of the operating cycle of the machines.

The accompanying drawing in which a single figure is a schematic view of a preferred embodiment of an injection unit, will be described in more detail.

In said drawing, the injection piston is indicated by (11) and is driven and movable in a cylinder (12) in which there is an upstream chamber (12a) and a downstream chamber (12b), considering the direction of progress (F) of the piston (11) during the operating stage. A first gas accumulator (13) and a force multiplier cylinder (14) are connected to the upstream chamber (12a) of the cylinder (12). The first gas accumulator (13) is designed to operate the slow and then rapid feed motion of the piston (11) in combination with a register throttle valve (15) connected to the downstream chamber (12b) of the cylinder (12) and in accordance with what is needed for the carrying out of an operating cycle of a die-casting machine.

More precisely, the fist gas accumulator (13) connects to a reserve tank for gaseous liquid (16) on one side and on the opposite side is connected to the cylinder chamber (12,12a) with the intervention of a pump (17) and of valvular means (18,19).

The multiplier cylinder (14) includes a two section piston (14a) placed perpendicularly into the injection cylinder (12). The lower section of the multiplier piston (14a) extends to the upstream chamber (12a) of the injection piston (11). The multiplier cylinder (14) is connected, upstream of its piston (14a), to a second gas accumulator (20) which, inside an operating cycle of the unit, operates the compression stage for the injection piston (11) with the help of a throttling valve (21) connected to the multiplier cylinder (14) downstream of the two section piston. Said second accumulator (20) is also connected to a possible second reserve tank of gaseous fluid (22) on the same side to which it is connected to the accumulating cylinder (14); a pump (23) with the intervention of an adjustable force valve (24) is connected on the other side of the second gas accumulator.

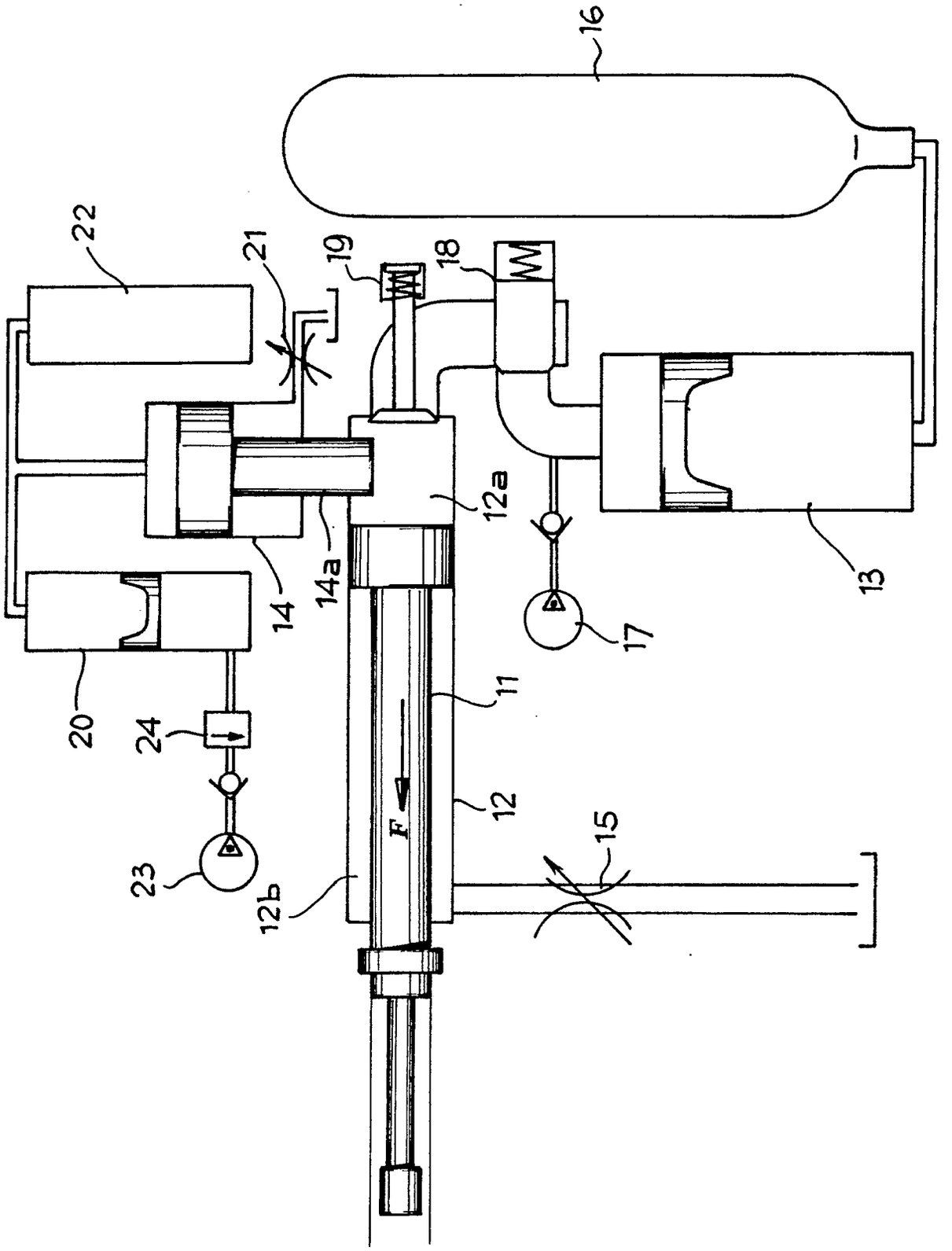
The drawing shows the components of the unit whose particular connection allows for the adjustment of the slow and rapid feed motion of the injection piston in the first two stages of its operating cycle through the use of the first gas accumulator (16), and with the contribution of the valvular devices (17,18) and the throttling valve (15). The injection piston is maneouvred by the action of the multiplier cylinder through the use of the second accumulator (20) and with the contribution of the valves (21,24) during the final compression stage.

Claims

1. An Injection unit for die-casting machines, including an injection piston (11) driven and movable in a cylinder (12) in which there is an upstream chamber (12a) and a downstream chamber (12b) considering the direction of feed motion of the piston during the operating stage; and a multiplier cylinder (14) with a two section piston (14a) of which the lower section extends perpendicularly into the upstream chamber (12a) of the injection cylinder (12), characterized in that it also comprises a first gas accumulator (13) connecting on one side to a reserve tank for a gaseous fluid (16) and on the other side to said cylinder (12), upstream (12a) of the injection piston (11)

through a pump and valvular means (17,19) to operate the slow and rapid feed motion of the injection piston (11) with the contribution of a register throttling valve (15) connected to the downstream chamber (12b) of the injection cylinder (12), and a second gas accumulator (20) connected on one side, to the multiplier cylinder (14) upstream of the two section piston (14a) and on the opposite side to a pump with an adjustable force valve (23, 24) to operate the final compression stage with the use of the injection piston (11), with the contribution of a throttling valve (21) connected to the multiplier cylinder (14) downstream of the two section cylinder (14a).

2. Injection unit according to claim 1, characterized in that said second gas accumulator (20) is also connected to a reserve tank for gas (22) on the same side to which it is connected to the multiplier cylinder (14).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12b