In parallel, said second cylinder (10) is supplied with compressed air to stay in the 0° position. Only said first cylinder (1) therefore performs a rotation until said stationary edges (6) of said rotary disc (5) of said first cylinder (1) are blocked against said medium rectangular stop (13) of said rotary disc (12) of said second cylinder (10) having twice as much torque as said first cylinder (1) and positioned at 0°.

Figure 8 illustrates the rotational movements of each of the cylinders (1, 10) when said valve to be controlled must perform a rotation from a first position at 90° to a second position at -90°. In order to perform a rotation of said valve to be controlled from a first position at 90° to a second position at -90°, said first valve (1) is supplied with compressed air by means of a first compressed-air valve and said second cylinder (10) is supplied with compressed air by means of a second compressed-air valve so that said rotary disc (5) of said first cylinder (1) and said rotary disc (12) of said second cylinder (10) both perform a rotation to the left.

Said second cylinder (10) having a torque twice as high as that of said first cylinder (1), said first cylinder (1) is driven by said second cylinder (10) to the 0° position, but said first cylinder (1) continues its travel to the position at -90°, where said stationary edges (6) of said rotary disc (5) of said first cylinder (1) are blocked against said median rectangular stop (13) of said rotary disc (12) of said second cylinder (10).

Figure 9 illustrates the rotational movements of each of the cylinders (1, 10) when said valve to be controlled must perform a rotation from a first position at -90° to a second position at 90°. In order to perform a rotation of said valve to be controlled from a first position at -90° to a second position at 90°, said first cylinder (1) is supplied with compressed air by means of a first compressed-air valve and said second cylinder (10) is supplied with compressed air by means of a second compressed-air valve so that said rotary disc (5) of said first cylinder (1) and said rotary disc (12) of said second cylinder (10) both perform a rotation to the right.

A simultaneous supply of said first and second cylinders (1, 10) prevents said first cylinder (1) from being blocked in the 0° position, said first cylinder thus being able to continue its travel to the 90° position.

Figure 10 illustrates an embodiment of the device for controlling the flow of a fluid in a pipe according to the invention. According to this embodiment, five compressed air devices for controlling valves (22, 23, 24, 25, 26) are placed in parallel and each connected to a valve to be controlled (27, 28, 29, 30, 31) located in said pipe (~~31~~32), said valves defining four sections (33, 34, 35, 36), one section being comprised between two successive valves. Each of the

## CLAIMS

1. A compressed-air device for controlling valves, characterized in that it comprises, in a longitudinal direction, a first vane-type rotary cylinder (1) having a front face (2) as well as a back face (4), said front face (2) being provided with a rotatable head (3), and a second vane-type rotary cylinder (10) having a front face (11) and a back face, said first and second cylinders (1, 10) each being supplied with compressed air by means of a compressed air valve connected to two ports (7, 8; 14, 15) on each of said first (1) and second (10) cylinders,

- said first vane-type rotary cylinder (1) being arranged to rotate said valve to be controlled between a first predetermined position and a second predetermined position in a single motion, said back face (4) of said first cylinder (1) comprising a rotating disc (5) provided with stationary edges (6),

- said second cylinder (10) being arranged to describe an angle from a first predetermined position to a second predetermined position in a single motion and comprising, on its front face (11), a rotating disc (12) provided with a stop (13), said second cylinder (10) further having a torque greater than that of said first cylinder (1), and

- said first (1) and second (10) cylinders being connected to each other by mutual interlocking, said stop (13) of said rotary disc (12) of said second cylinder (10) being arranged to be inserted between said stationary edges (6, 7) of said first cylinder (1) and further having a width arranged to allow the stationary edges (6) of said rotary disc (5) of said first cylinder (1) to perform a predetermined rotation before being blocked by said stop (13).

2. The compressed-air device for controlling valves according to claim 1, characterized in that said first vane-type rotary cylinder (1) is arranged to rotate said valve to be controlled by a 180° angle in a single motion.

3. The compressed-air device for controlling valves according to claim 1 or 2, characterized in that said first vane-type rotary cylinder (1) is arranged to stop in a predetermined intermediate position comprised between said first predetermined position and said second predetermined position of said valve to be controlled.

4. The compressed-air device for controlling valves according to claim 3, characterized in that said intermediate position of said first cylinder (1) is reached following a rotation from a position at 90° to a position at 0° or from a position at -90° to a position at 0°.

5. The compressed-air device for controlling valves according to any one of claims 1 to 4, characterized in that said second vane-type rotary cylinder (10) is arranged to describe an angle from a first position at 0° to a second position at 90° or from a first position at 90° to a second position at 0°.

6. The compressed-air device for controlling valves according to any one of claims 1 to 5, characterized in that said second vane-type rotary cylinder (10) has a torque twice the torque of said first vane-type rotary cylinder (1).

7. The compressed-air device for controlling valves according to any one of claims 1 to 6, characterized in that said rotary disk (5) of said first cylinder (1) has two diametrically opposite stationary edges (6).

8. The compressed-air device for controlling valves according to any one of claims 1 to 7, characterized in that said stop (13) of said rotary disc (12) of said second cylinder (10) has a median rectangular stop (13).

9. The compressed-air device for controlling valves according to claim 8, characterized in that said median rectangular stop (13) has a width (l) allowing the stationary edges (6) of said rotary disc (5) of said first cylinder (1) to perform a rotation by a 90° angle before being blocked by said median rectangular stop (13).

10. The compressed-air device for controlling valves according to any one of claims 1 to 9, characterized in that said rotary disks (5, 12) of said first (1) and second (10) cylinders are surrounded by an enclosure or a protective mask.

11. A device for controlling the flow of a fluid in a pipe (~~31~~32), comprising:

- at least one valve (21) located in said pipe to control said flow of said fluid in said pipe (31), and
- at least one compressed-air device for controlling valves according to claims 1 to 10, each compressed-air device for controlling valves respectively being able to be associated with a valve (21) located in said pipe (~~31~~32).

12. The device for controlling the flow of a fluid in a pipe (~~31~~32) according to claim 11, characterized in that said pipe (~~31~~32) is a pipe with a single-use cartridge.

13. The device for controlling the flow of a fluid in a pipe (~~31~~32) according to claim 12, characterized in that said single-use cartridge comprises at least one valve (21), said at least one valve (21) being arranged to be fastened to said rotatable head (3) of said first cylinder (1) of a compressed-air device for controlling valves.

14. The device for controlling the flow of a fluid in a pipe (~~31~~32) according to claim 13, characterized in that the fastening of said valve to the rotatable head (3) of said first cylinder (1) is done using a connecting element (9) secured to the rotatable head (3) of said first cylinder (1) and arranged to interlock on said valve to be controlled.

15. A synthesis or purification machine for radioactive compounds arranged to receive a single-use cartridge and comprising a control unit controlling the rotation of the valves from a first predetermined position to a second predetermined position, characterized in that it comprises at least one compressed-air device for controlling valves according to claims 1 to 10.

In parallel, said second cylinder (10) is supplied with compressed air to stay in the 0° position. Only said first cylinder (1) therefore performs a rotation until said stationary edges (6) of said rotary disc (5) of said first cylinder (1) are blocked against said medium rectangular stop (13) of said rotary disc (12) of said second cylinder (10) having twice as much torque as said first cylinder (1) and positioned at 0°.

Figure 8 illustrates the rotational movements of each of the cylinders (1, 10) when said valve to be controlled must perform a rotation from a first position at 90° to a second position at -90°. In order to perform a rotation of said valve to be controlled from a first position at 90° to a second position at -90°, said first valve (1) is supplied with compressed air by means of a first compressed-air valve and said second cylinder (10) is supplied with compressed air by means of a second compressed-air valve so that said rotary disc (5) of said first cylinder (1) and said rotary disc (12) of said second cylinder (10) both perform a rotation to the left.

Said second cylinder (10) having a torque twice as high as that of said first cylinder (1), said first cylinder (1) is driven by said second cylinder (10) to the 0° position, but said first cylinder (1) continues its travel to the position at -90°, where said stationary edges (6) of said rotary disc (5) of said first cylinder (1) are blocked against said median rectangular stop (13) of said rotary disc (12) of said second cylinder (10).

Figure 9 illustrates the rotational movements of each of the cylinders (1, 10) when said valve to be controlled must perform a rotation from a first position at -90° to a second position at 90°. In order to perform a rotation of said valve to be controlled from a first position at -90° to a second position at 90°, said first cylinder (1) is supplied with compressed air by means of a first compressed-air valve and said second cylinder (10) is supplied with compressed air by means of a second compressed-air valve so that said rotary disc (5) of said first cylinder (1) and said rotary disc (12) of said second cylinder (10) both perform a rotation to the right.

A simultaneous supply of said first and second cylinders (1, 10) prevents said first cylinder (1) from being blocked in the 0° position, said first cylinder thus being able to continue its travel to the 90° position.

Figure 10 illustrates an embodiment of the device for controlling the flow of a fluid in a pipe according to the invention. According to this embodiment, five compressed air devices for controlling valves (22, 23, 24, 25, 26) are placed in parallel and each connected to a valve to be controlled (27, 28, 29, 30, 31) located in said pipe (31), said valves defining four sections (33, 34, 35, 36), one section being comprised between two successive valves. Each of the

## CLAIMS

1. A compressed-air device for controlling valves, characterized in that it comprises, in a longitudinal direction, a first vane-type rotary cylinder (1) having a front face (2) as well as a back face (4), said front face (2) being provided with a rotatable head (3), and a second vane-type rotary cylinder (10) having a front face (11) and a back face, said first and second cylinders (1, 10) each being supplied with compressed air by means of a compressed air valve connected to two ports (7, 8; 14, 15) on each of said first (1) and second (10) cylinders,

- said first vane-type rotary cylinder (1) being arranged to rotate said valve to be controlled between a first predetermined position and a second predetermined position in a single motion, said back face (4) of said first cylinder (1) comprising a rotating disc (5) provided with stationary edges (6),

- said second cylinder (10) being arranged to describe an angle from a first predetermined position to a second predetermined position in a single motion and comprising, on its front face (11), a rotating disc (12) provided with a stop (13), said second cylinder (10) further having a torque greater than that of said first cylinder (1), and

- said first (1) and second (10) cylinders being connected to each other by mutual interlocking, said stop (13) of said rotary disc (12) of said second cylinder (10) being arranged to be inserted between said stationary edges (6, 7) of said first cylinder (1) and further having a width arranged to allow the stationary edges (6) of said rotary disc (5) of said first cylinder (1) to perform a predetermined rotation before being blocked by said stop (13).

2. The compressed-air device for controlling valves according to claim 1, characterized in that said first vane-type rotary cylinder (1) is arranged to rotate said valve to be controlled by a 180° angle in a single motion.

3. The compressed-air device for controlling valves according to claim 1 or 2, characterized in that said first vane-type rotary cylinder (1) is arranged to stop in a predetermined intermediate position comprised between said first predetermined position and said second predetermined position of said valve to be controlled.

4. The compressed-air device for controlling valves according to claim 3, characterized in that said intermediate position of said first cylinder (1) is reached following a rotation from a position at 90° to a position at 0° or from a position at -90° to a position at 0°.

5. The compressed-air device for controlling valves according to any one of claims 1 to 4, characterized in that said second vane-type rotary cylinder (10) is arranged to describe an angle from a first position at 0° to a second position at 90° or from a first position at 90° to a second position at 0°.

6. The compressed-air device for controlling valves according to any one of claims 1 to 5, characterized in that said second vane-type rotary cylinder (10) has a torque twice the torque of said first vane-type rotary cylinder (1).

7. The compressed-air device for controlling valves according to any one of claims 1 to 6, characterized in that said rotary disk (5) of said first cylinder (1) has two diametrically opposite stationary edges (6).

8. The compressed-air device for controlling valves according to any one of claims 1 to 7, characterized in that said stop (13) of said rotary disc (12) of said second cylinder (10) has a median rectangular stop (13).

9. The compressed-air device for controlling valves according to claim 8, characterized in that said median rectangular stop (13) has a width (l) allowing the stationary edges (6) of said rotary disc (5) of said first cylinder (1) to perform a rotation by a 90° angle before being blocked by said median rectangular stop (13).

10. The compressed-air device for controlling valves according to any one of claims 1 to 9, characterized in that said rotary disks (5, 12) of said first (1) and second (10) cylinders are surrounded by an enclosure or a protective mask.

11. A device for controlling the flow of a fluid in a pipe (31), comprising:

- at least one valve (21) located in said pipe to control said flow of said fluid in said pipe (31), and
- at least one compressed-air device for controlling valves according to claims 1 to 10, each compressed-air device for controlling valves respectively being able to be associated with a valve (21) located in said pipe (31).

12. The device for controlling the flow of a fluid in a pipe (31) according to claim 11, characterized in that said pipe (31) is a pipe with a single-use cartridge.

13. The device for controlling the flow of a fluid in a pipe (31) according to claim 12, characterized in that said single-use cartridge comprises at least one valve (21), said at least one valve (21) being arranged to be fastened to said rotatable head (3) of said first cylinder (1) of a compressed-air device for controlling valves.

14. The device for controlling the flow of a fluid in a pipe (31) according to claim 13, characterized in that the fastening of said valve to the rotatable head (3) of said first cylinder (1) is done using a connecting element (9) secured to the rotatable head (3) of said first cylinder (1) and arranged to interlock on said valve to be controlled.

15. A synthesis or purification machine for radioactive compounds arranged to receive a single-use cartridge and comprising a control unit controlling the rotation of the valves from a first predetermined position to a second predetermined position, characterized in that it comprises at least one compressed-air device for controlling valves according to claims 1 to 10.

In parallel, said second cylinder (10) is supplied with compressed air to stay in the 0° position. Only said first cylinder (1) therefore performs a rotation until said stationary edges (6) of said rotary disc (5) of said first cylinder (1) are blocked against said medium rectangular stop (13) of said rotary disc (12) of said second cylinder (10) having twice as much torque as said first cylinder (1) and positioned at 0°.

Figure 8 illustrates the rotational movements of each of the cylinders (1, 10) when said valve to be controlled must perform a rotation from a first position at 90° to a second position at -90°. In order to perform a rotation of said valve to be controlled from a first position at 90° to a second position at -90°, said first valve (1) is supplied with compressed air by means of a first compressed-air valve and said second cylinder (10) is supplied with compressed air by means of a second compressed-air valve so that said rotary disc (5) of said first cylinder (1) and said rotary disc (12) of said second cylinder (10) both perform a rotation to the left.

Said second cylinder (10) having a torque twice as high as that of said first cylinder (1), said first cylinder (1) is driven by said second cylinder (10) to the 0° position, but said first cylinder (1) continues its travel to the position at -90°, where said stationary edges (6) of said rotary disc (5) of said first cylinder (1) are blocked against said median rectangular stop (13) of said rotary disc (12) of said second cylinder (10).

Figure 9 illustrates the rotational movements of each of the cylinders (1, 10) when said valve to be controlled must perform a rotation from a first position at -90° to a second position at 90°. In order to perform a rotation of said valve to be controlled from a first position at -90° to a second position at 90°, said first cylinder (1) is supplied with compressed air by means of a first compressed-air valve and said second cylinder (10) is supplied with compressed air by means of a second compressed-air valve so that said rotary disc (5) of said first cylinder (1) and said rotary disc (12) of said second cylinder (10) both perform a rotation to the right.

A simultaneous supply of said first and second cylinders (1, 10) prevents said first cylinder (1) from being blocked in the 0° position, said first cylinder thus being able to continue its travel to the 90° position.

Figure 10 illustrates an embodiment of the device for controlling the flow of a fluid in a pipe according to the invention. According to this embodiment, five compressed air devices for controlling valves (22, 23, 24, 25, 26) are placed in parallel and each connected to a valve to be controlled (27, 28, 29, 30, 31) located in said pipe (32), said valves defining four sections (33, 34, 35, 36), one section being comprised between two successive valves. Each of the

## CLAIMS

1. A compressed-air device for controlling valves, characterized in that it comprises, in a longitudinal direction, a first vane-type rotary cylinder (1) having a front face (2) as well as a back face (4), said front face (2) being provided with a rotatable head (3), and a second vane-type rotary cylinder (10) having a front face (11) and a back face, said first and second cylinders (1, 10) each being supplied with compressed air by means of a compressed air valve connected to two ports (7, 8; 14, 15) on each of said first (1) and second (10) cylinders,

- said first vane-type rotary cylinder (1) being arranged to rotate said valve to be controlled between a first predetermined position and a second predetermined position in a single motion, said back face (4) of said first cylinder (1) comprising a rotating disc (5) provided with stationary edges (6),

- said second cylinder (10) being arranged to describe an angle from a first predetermined position to a second predetermined position in a single motion and comprising, on its front face (11), a rotating disc (12) provided with a stop (13), said second cylinder (10) further having a torque greater than that of said first cylinder (1), and

- said first (1) and second (10) cylinders being connected to each other by mutual interlocking, said stop (13) of said rotary disc (12) of said second cylinder (10) being arranged to be inserted between said stationary edges (6, 7) of said first cylinder (1) and further having a width arranged to allow the stationary edges (6) of said rotary disc (5) of said first cylinder (1) to perform a predetermined rotation before being blocked by said stop (13).

2. The compressed-air device for controlling valves according to claim 1, characterized in that said first vane-type rotary cylinder (1) is arranged to rotate said valve to be controlled by a 180° angle in a single motion.

3. The compressed-air device for controlling valves according to claim 1 or 2, characterized in that said first vane-type rotary cylinder (1) is arranged to stop in a predetermined intermediate position comprised between said first predetermined position and said second predetermined position of said valve to be controlled.

4. The compressed-air device for controlling valves according to claim 3, characterized in that said intermediate position of said first cylinder (1) is reached following a rotation from a position at 90° to a position at 0° or from a position at -90° to a position at 0°.

5. The compressed-air device for controlling valves according to any one of claims 1 to 4, characterized in that said second vane-type rotary cylinder (10) is arranged to describe an angle from a first position at 0° to a second position at 90° or from a first position at 90° to a second position at 0°.

6. The compressed-air device for controlling valves according to any one of claims 1 to 5, characterized in that said second vane-type rotary cylinder (10) has a torque twice the torque of said first vane-type rotary cylinder (1).

7. The compressed-air device for controlling valves according to any one of claims 1 to 6, characterized in that said rotary disk (5) of said first cylinder (1) has two diametrically opposite stationary edges (6).

8. The compressed-air device for controlling valves according to any one of claims 1 to 7, characterized in that said stop (13) of said rotary disc (12) of said second cylinder (10) has a median rectangular stop (13).

9. The compressed-air device for controlling valves according to claim 8, characterized in that said median rectangular stop (13) has a width (l) allowing the stationary edges (6) of said rotary disc (5) of said first cylinder (1) to perform a rotation by a 90° angle before being blocked by said median rectangular stop (13).

10. The compressed-air device for controlling valves according to any one of claims 1 to 9, characterized in that said rotary disks (5, 12) of said first (1) and second (10) cylinders are surrounded by an enclosure or a protective mask.

11. A device for controlling the flow of a fluid in a pipe (32), comprising:

- at least one valve (21) located in said pipe to control said flow of said fluid in said pipe (31), and
- at least one compressed-air device for controlling valves according to claims 1 to 10, each compressed-air device for controlling valves respectively being able to be associated with a valve (21) located in said pipe (32).

12. The device for controlling the flow of a fluid in a pipe (32) according to claim 11, characterized in that said pipe (32) is a pipe with a single-use cartridge.

13. The device for controlling the flow of a fluid in a pipe (32) according to claim 12, characterized in that said single-use cartridge comprises at least one valve (21), said at least one valve (21) being arranged to be fastened to said rotatable head (3) of said first cylinder (1) of a compressed-air device for controlling valves.

14. The device for controlling the flow of a fluid in a pipe (32) according to claim 13, characterized in that the fastening of said valve to the rotatable head (3) of said first cylinder (1) is done using a connecting element (9) secured to the rotatable head (3) of said first cylinder (1) and arranged to interlock on said valve to be controlled.

15. A synthesis or purification machine for radioactive compounds arranged to receive a single-use cartridge and comprising a control unit controlling the rotation of the valves from a first predetermined position to a second predetermined position, characterized in that it comprises at least one compressed-air device for controlling valves according to claims 1 to 10.