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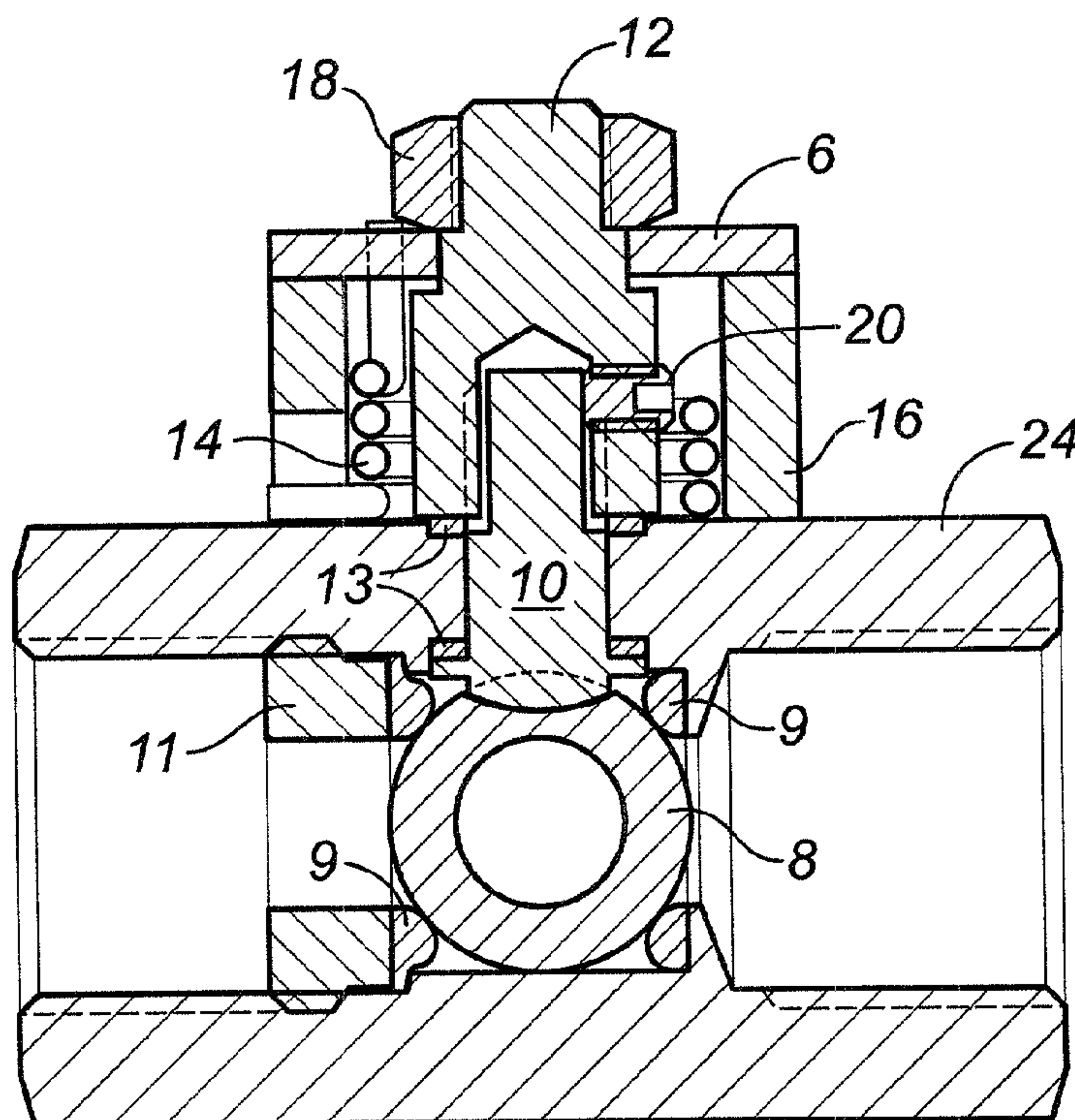
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(54) Titre : CLAPET A BILLE A RAPPEL PAR RESSORT

(54) Title: SPRING RETURN BALL VALVE



(57) Abrégé/Abstract:

There is a multitude of check valve designs available on the market today. The present invention relates to hand operated valves and in particular to hand operated ball valves. Hand operated valves are widely known in the industry as an efficient method to control the flow of fluids from one source to another. The envisioned design provides for a safety feature whereby the valve can be preset to either an always open or an always closed position by way of a spring return mechanism. The invention provides for a novel spring return mechanism that is easily adapted to existing valve designs.

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DESCRIPTION:**BACKGROUND OF THE INVENTION****1. Field of the Invention**

The present invention relates to hand actuated valves and in particular to a spring return actuator for hand actuated ball valves.

2. Description of the Prior Art

U.S. patent No. 708,698 and U.S. Pat. No. 4,046,350 describes valve actuators being used with a spring return. Such valves as described can lose operating power in cases of power failure or failure in the control mechanisms or connecting lines. In case of such failures it is desirable in some uses that the valve always fail open and in some other uses that the valve always fail closed. For these uses, a spring return is commonly utilized with the

power actuator. To insure adequate spring pressure through the entire stroke, these return springs are usually long and bulky. In the present invention, the spring return actuator is a stand-alone feature that is not coupled with a power actuator and is not a fail-safe system in event of a power failure. The present invention provides for a compact spring return assembly that adapts easily to existing ball valve designs.

SUMMARY OF THE INVENTION

Now, in accordance with the present invention, a spring return housing is provided for that adapts easily to current ball valve configurations. The spring return housing is a complete unit that fits to the ball valve via an adapter on the ball valve stem that locates the handle. The adapter attaches to the ball valve actuating stem and resides in the spring anchor cylinder that locates on the ball valve body. The handle in turn locates on the ball valve stem adapter so that when the handle is turned the ball valve is actuated. The handle also locates the spring end so that when the handle is turned the spring is compressed and when the handle is released the spring returns to rest, either closing or opening the valve.

Thus, it is an object of the present invention to provide a novel spring return for hand actuated valves. Further objects and features of the present invention will become apparent upon reading the following description together with the drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a valve assembly 24 with spring return housing 16 and handle 6 according to the invention;

FIG. 2 is a top side view of the valve assembly 24 with spring return housing 16 and handle 6 according to the invention;

FIG. 3 is a front end view of the valve assembly 24 ball valve 8 spring return housing 16 and handle 6 according to the invention.

FIG. 4 is a back end view of the valve assembly 24 ball valve 8 spring return housing 16 and handle 6 according to the invention.

FIG. 5 is a horizontal cross sectional view of valve assembly in closed position with valve body 24, ball valve 8, ball valve actuator 10, adapter 12, return spring 14, spring housing 16, actuating handle 6, assembly retaining nut 18, adapter retaining screw 20 and upper spring anchor.

FIG. 6 is a horizontal cross sectional view of valve assembly in open position with valve body 24, ball valve 8, ball valve actuator 10, adapter 12, return spring 14, spring housing 16, actuating handle 6 and assembly retaining nut 18.

FIG. 7 is an exploded view of entire spring return valve assembly with valve body 24, ball valve 8, ball valve seals 9, ball valve retainer 11, seals 13, ball valve actuator 10, adapter 12, return spring 14, spring housing 16, actuating handle 6, assembly retaining nut 18, lower spring anchor 20 and upper spring anchor 22.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Valve actuators according to the invention are most commonly used with 90 degree rotating valves. That is, valves such as ball valves, plug valves and butterfly valves that operate from full open to full closed by a 90-degree rotation of the valve stem. Thus, the valve depicted by valve assembly 24 in FIG. 1 is, by way of example, a ball valve. Spring return housing 16 is mounted to valve body 24 with retaining nut 18. Valve adapter 12 projecting above the center of ball valve 8 is connected to the actuator 10 of the ball valve for rotating the ball manually. Spring return housing 16 is located on the valve body. Spring return pressure is provided in the spring housing 16 for operation in FIG. 7 so that the spring compresses with the rotation of the actuator from closed to open and spring pressure returns the valve from open to closed when handle 6 is released.

Details of valve 24 and spring housing 16 are depicted in FIGS. 5, 6 and 7. Housing 16 is depicted in two positions, in FIG. 5 valve is closed and spring is at rest and in FIG. 6 valve is open and spring is compressed. As depicted in FIGS. 1, 3 and 4 spring return housing 16 has a partial skirt that fits on the valve body 24 preventing rotation of the spring housing on the valve body 24. FIG. 5 depicts one position of zero rotation while FIG. 6 depicts a rotation of 90 degree. Slot in spring housing 16 and hole in handle 6 act as spring end anchors to allow for spring compression when handle 6 is rotated.

Spring housing 16 has spring 14 with one end disposed in spring cylinder 16 and a second end attached to actuating handle 6. Ends of spring housing extend over skirt of valve body 24. Stem adapter 12 extends through spring housing 16 connecting valve stem

10 with the actuating handle 6.

While the present invention has been described with relation to a specific embodiment, it is not intended to be limited thereto. Thus it is the intention to cover the invention as set forth within the full scope of the following claims.

We claim:

1. In a hand actuated ball valve assembly having a handle for rotating a valve in a first direction and a spring mechanism for rotating said valve in the opposite direction, the combination in said spring mechanism comprising:
 - a. an extension on the ball valve actuator rod;
 - b. a cylinder that fits over the extension and rests on the valve body in such a fashion as to prevent the rotation of the cylinder on the valve body;
 - c. a spring that rests inside said cylinder that is anchored to the cylinder;
 - d. said cylinder enclosing said spring;
 - e. a handle for rotating the ball valve between open and closed;
 - f. said handle fitting to said extension in such a way as to locate and lock together so that when the handle is rotated both the extension and ball valve are also simultaneously rotated;
 - g. said spring being anchored to both the enclosing cylinder and the handle in such a fashion so that when the handle is rotated, rotational force is applied to the spring;
 - h. a rotational spring mechanism that returns to its original position when any external inputted rotational force is released from the spring;
2. A hand actuated ball valve with spring return mechanism comprising:
 - a. a ball valve;

- b. a hand actuator coupled to said ball valve comprising;
 - c. an actuator body enclosing a spring;
 - d. a valve stem locating an extension providing for valve rotation in said valve body;
 - e. A cylinder for the purpose of housing a rotational spring and locating on the valve body;
 - f. a rotational spring assembly mounted inside of the cylinder body and locating on the valve body whereby actuation of the valve handle puts the spring into compression while actuating said ball valve.
3. A spring return valve actuator assembly that comprises a spring, a spring housing, an adapter assembly and an actuating handle for the tension control of a valves check mechanism's position when at rest.
4. A fluid control check assembly that has a predetermined fluid flow position when acted upon by an outside force but returns to the original pre-set position when the outside force is removed.
5. A fluid control check assembly that has a predetermined fluid flow position due to an internal pre-set force.

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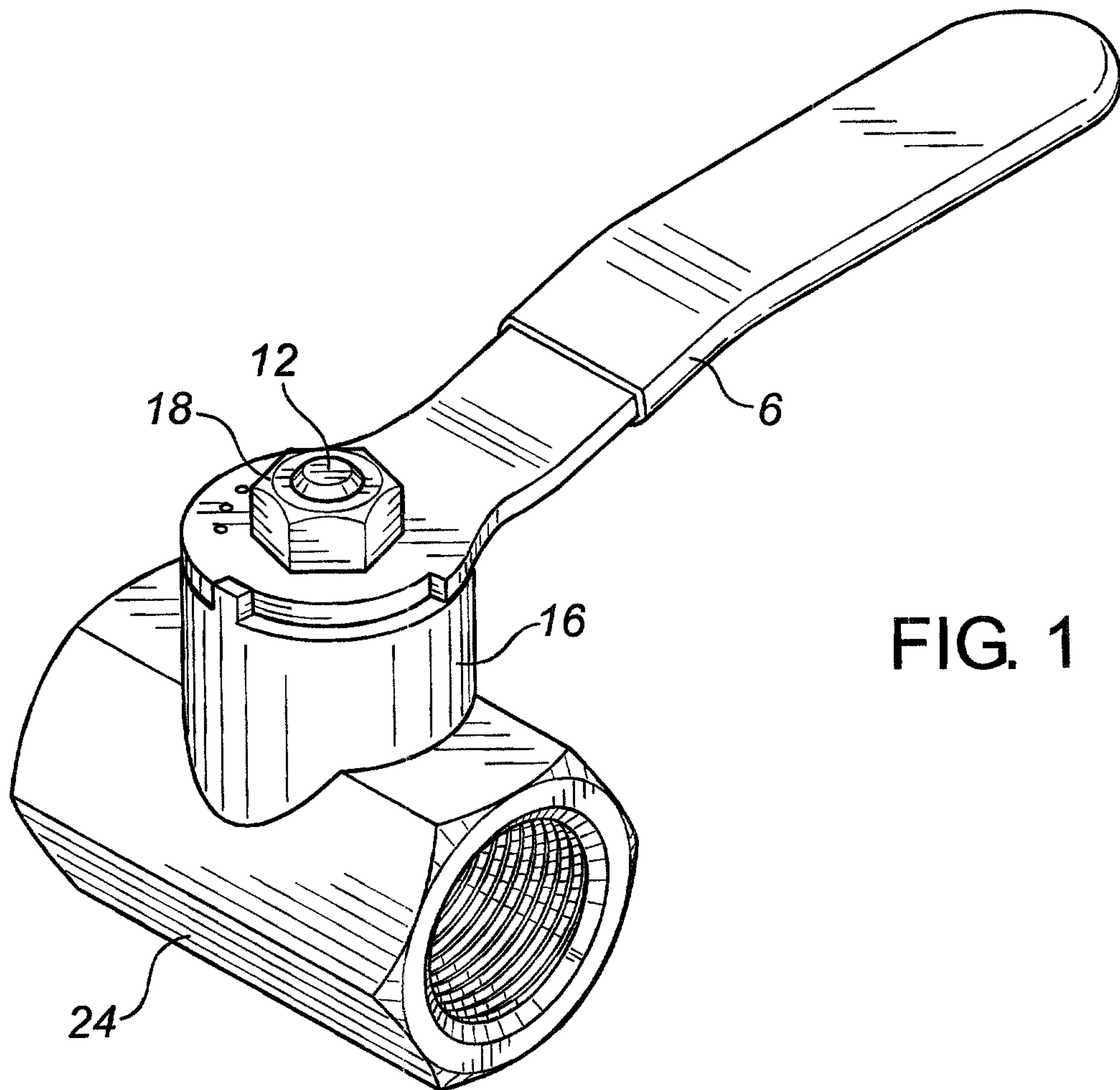


FIG. 1

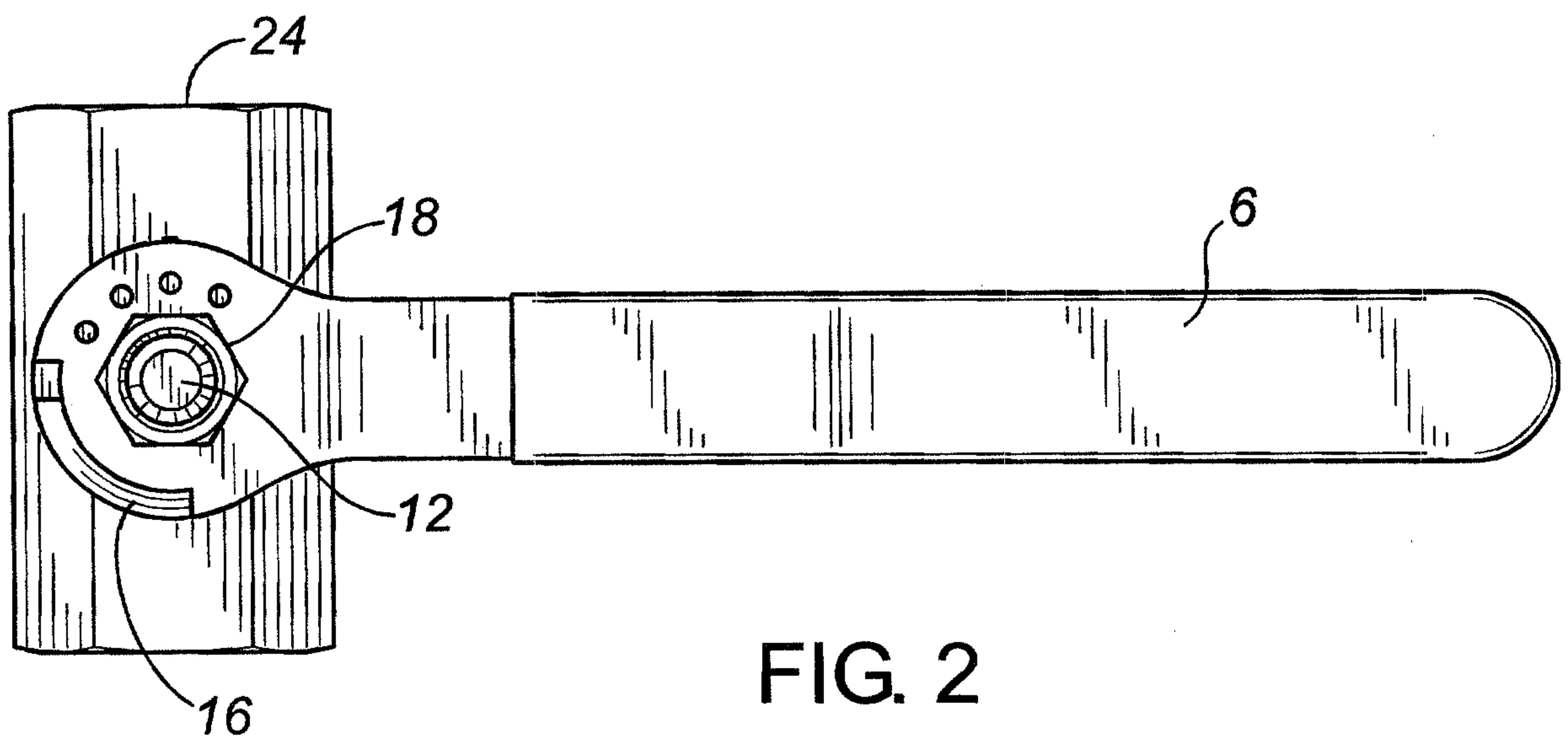
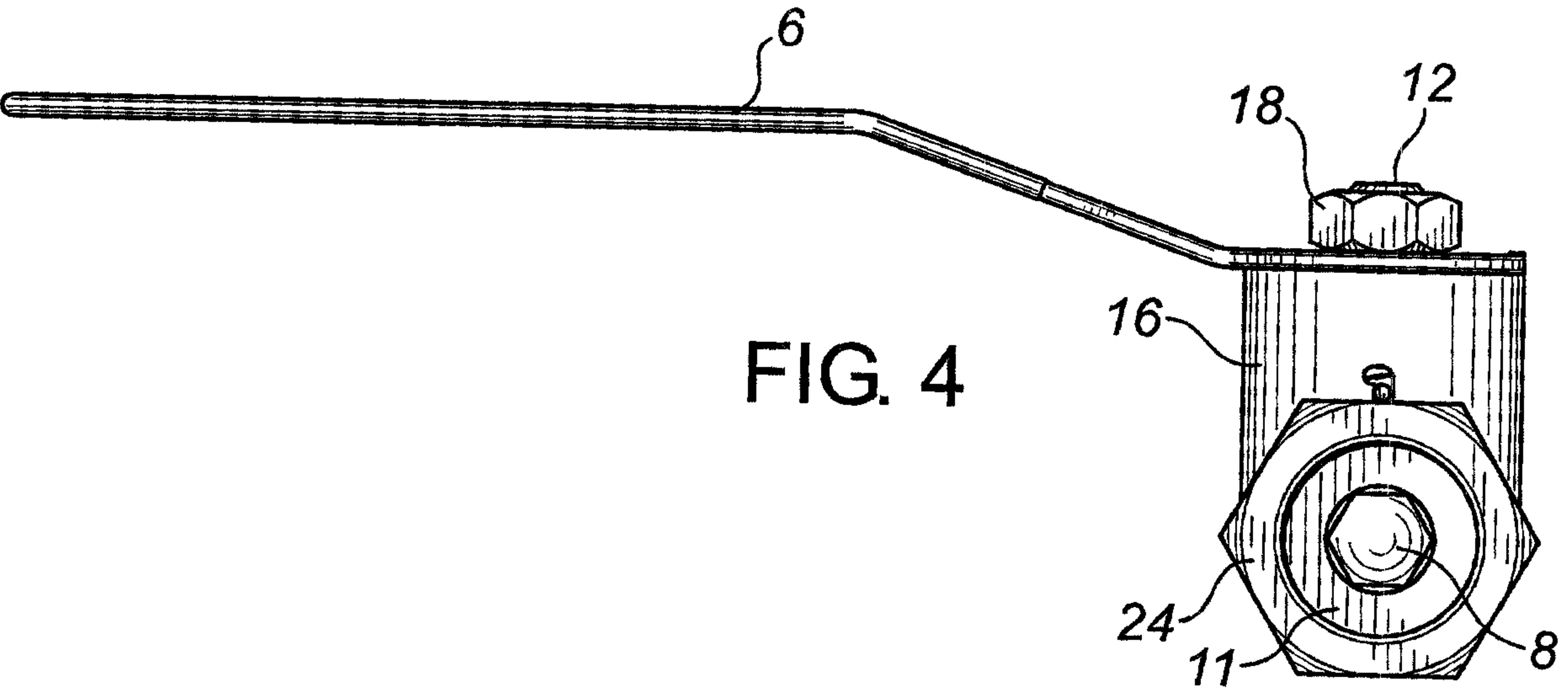
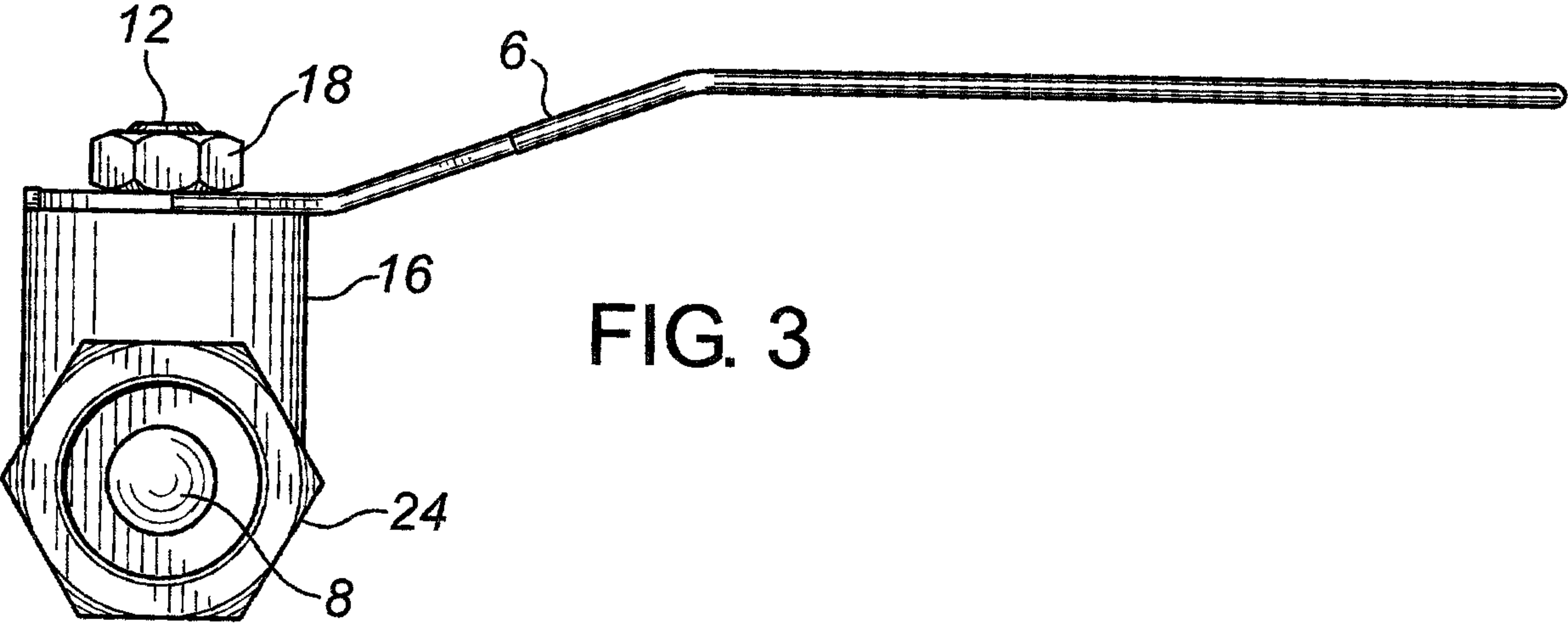


FIG. 2

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FIG. 5

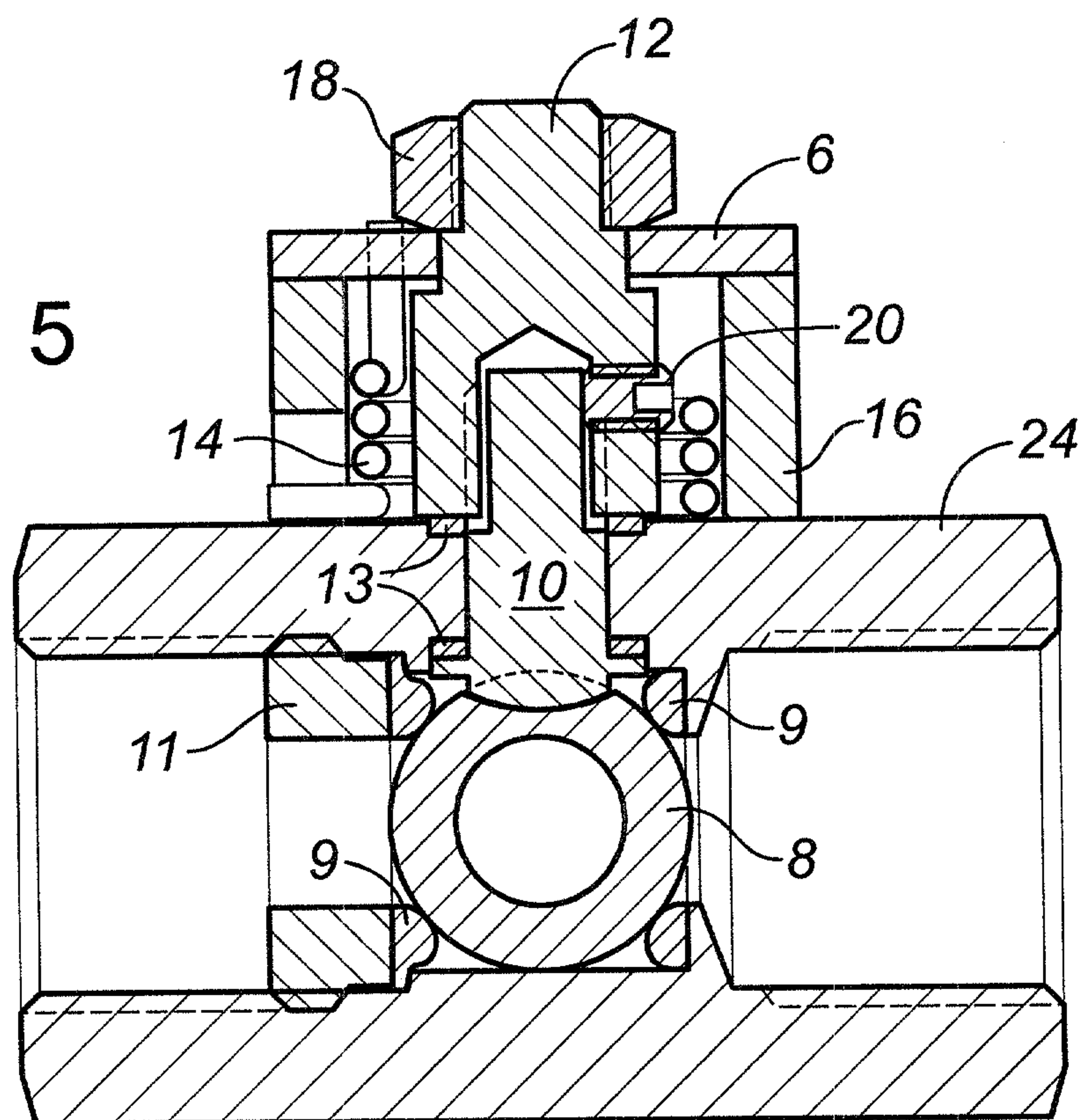


FIG. 6

