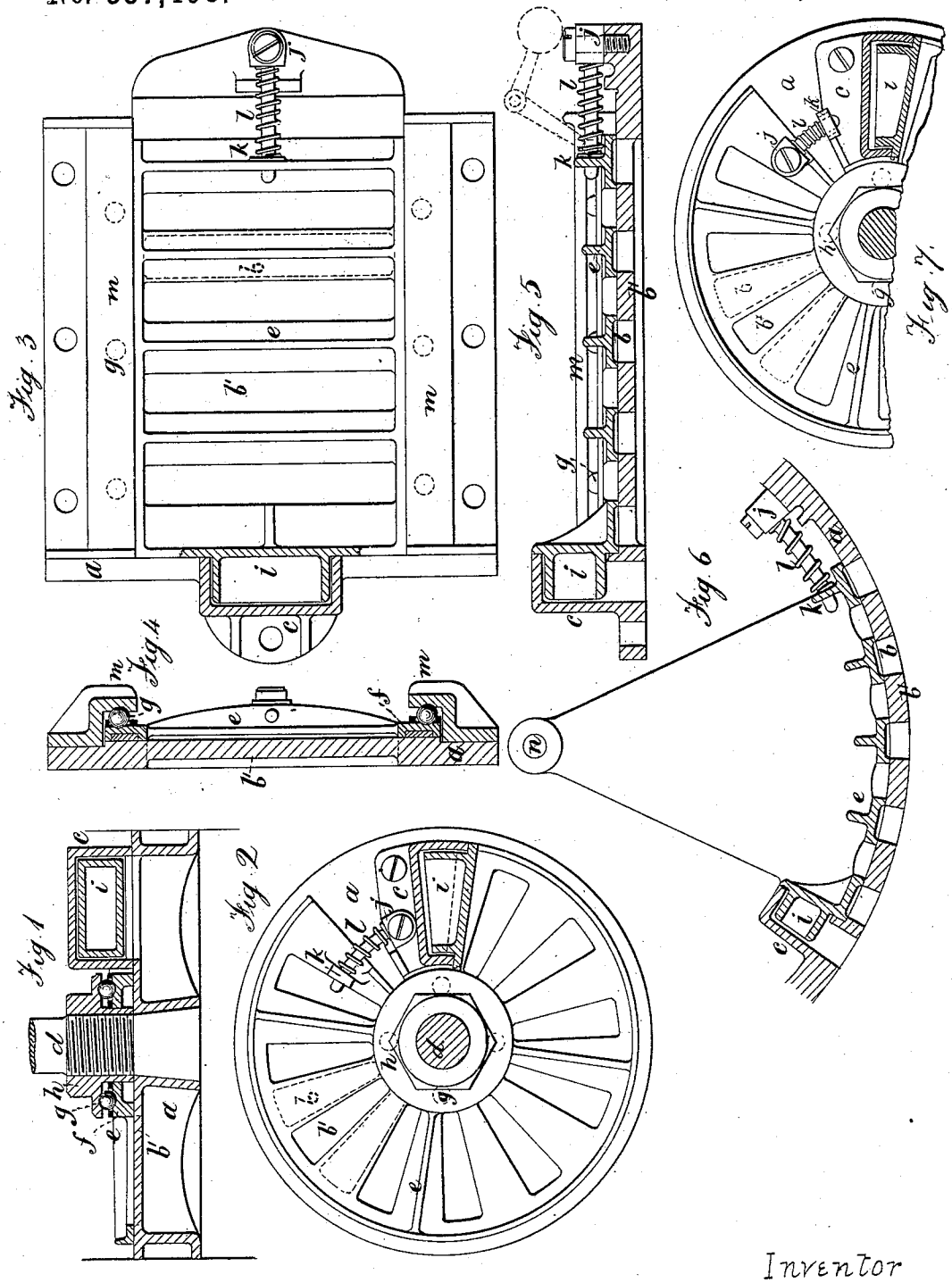
(No Model.)

A. HORNE.

VALVE.

No. 337,498. Patented Mar. 9, 1886.



Witnesses

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VALVE.

SPECIFICATION forming part of Letters Patent No. 337,498, dated March 9, 1886.

Application filed November 11, 1885. Serial No. 182,418. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER HORNE, a subject of the Queen of Great Britain, residing at Liverpool, in the county of Lancaster, England, have invented a new and useful Improvement in Valves, of which the following is a specification.

This invention relates to valves which are opened and closed by the motion of a fluid—as in the case of pump and like valves.

The object is to so construct a valve that it shall open and close freely and rapidly, shall not be subject to undue wear on the acting surfaces, and shall when open give a free and unobstructed way for the passage of the fluid.

The invention consists, essentially, in combining a rotating reciprocating or oscillating gridiron or like valve with a spring or springs or equivalent closing device—such as a weight with a piston or plunger—and a container or their equivalents, for effecting the opening of the valve by the pressure of the fluid on the plunger or container.

In order that my invention may be fully understood I have appended a sheet of drawings, showing three modifications of valve under my invention.

Figure 1 is a transverse section, and Fig. 2 a plan, of a rotary valve under my invention. Fig. 3 is a plan, and Figs. 4 and 5 transverse sections at right angles, of a reciprocating valve under my invention. Fig. 6 is a transverse section of an oscillating valve under my invention. Fig. 7 is a detail showing the reverse arrangement of abutment and stem *j* and guide *k* to what is shown in Fig. 2—that is to say, the stem *j* is secured to the movable valve *e*, and the guide *k* is on the valve-seat, or the container *c*, which is part of the valve-seat.

Figs. 1 and 2: *a* is the valve-seat with openings *b* and bars *b'*; *c*, container secured to the valve-seat by screws, (the said container may be cast with the seat;) *d*, valve-spindle; *e*, valve surrounding the spindle *d*, and provided with openings corresponding to the openings *b*. The valve is made with a bearing-surface, *f*, having a groove therein, wherein rest anti-friction balls *g*. The said balls *g* bear against an adjustable screwed cap, *h*, on the spindle *d*. The valve is made with the plunger *i*, which fits in the container *c*.

j is an abutment and stem secured to the valve-seat and fitting freely in a guide, *k*, on the valve *e*. The stem *j* might be secured to the valve and the guide *k* be in the seat on the valve.

l is a spring.

The action is as follows: The spring *l* maintains the valve when in equilibrium in the position shown, with the openings in the valve *e* above the bars of the seat. When pressure acts on the fluid by suction or otherwise to cause it to pass the valve in an upward direction, the pressure of the fluid in the container causes the valve to rotate against the resistance of the spring, and the openings for the valve and seat are brought in a line, so as to allow a free passage to the fluid. As soon as the actuating pressure on the fluid is sufficiently reduced the spring again closes the valve. The anti-friction balls allow of the valve moving freely. It will be obvious that there is very little pressure on the wearing-surfaces while the valve is in motion, and that the valve can be placed in any desired position.

Figs. 3 and 4: Here the valve is rectangular and moves backward and forward in a straight line. The same letters of reference are used as in Figs. 1 and 2 and the action is similar. In this case side guides, *m*, are used instead of a central spindle, and the friction-balls are between such guides and the valve.

The dotted lines in Fig. 5 show how a weight might be substituted for a spring; but I do not consider such construction so advantageous. I claim the weight as an equivalent for the spring for seating the valve.

Fig. 6: In this view the valve forms a portion of a cylinder, and oscillates on a pin, *n*. The same letters refer to parts corresponding to those in the previous figures.

In the various forms shown the valve moves across its seat in opening and closing the ports, and the container or chamber communicates with the adit side of the seat and directs the pressure of the fluid against the plunger or piston, so that the valve is moved across its seat and opened thereby.

I claim—

1. The combination of a valve which moves across its seat with the seat, a plunger or piston, a container or chamber communicating

with the adit side, so that the pressure of the fluid shall be directed to act against the piston, and a spring for seating the valve, substantially as and for the purposes described.

2. The combination of the valve-seat *a*, container *c*, valve-spindle *d*, valve *e*, cap *h*, plunger *i*, abutment and stem *j*, and spring *l*.

3. The combination of the valve-seat *a*, container *c*, valve-spindle *d*, valve *e*, bearing *f*, anti-friction balls *g*, cap *h*, plunger *i*, abutment and stem *j*, guide *k*, and spring *l*.

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Witnesses:
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