

M. Stannard
Slide Valve.

Nº 97,456.

Patented Nov 30, 1869.

Fig. 1.

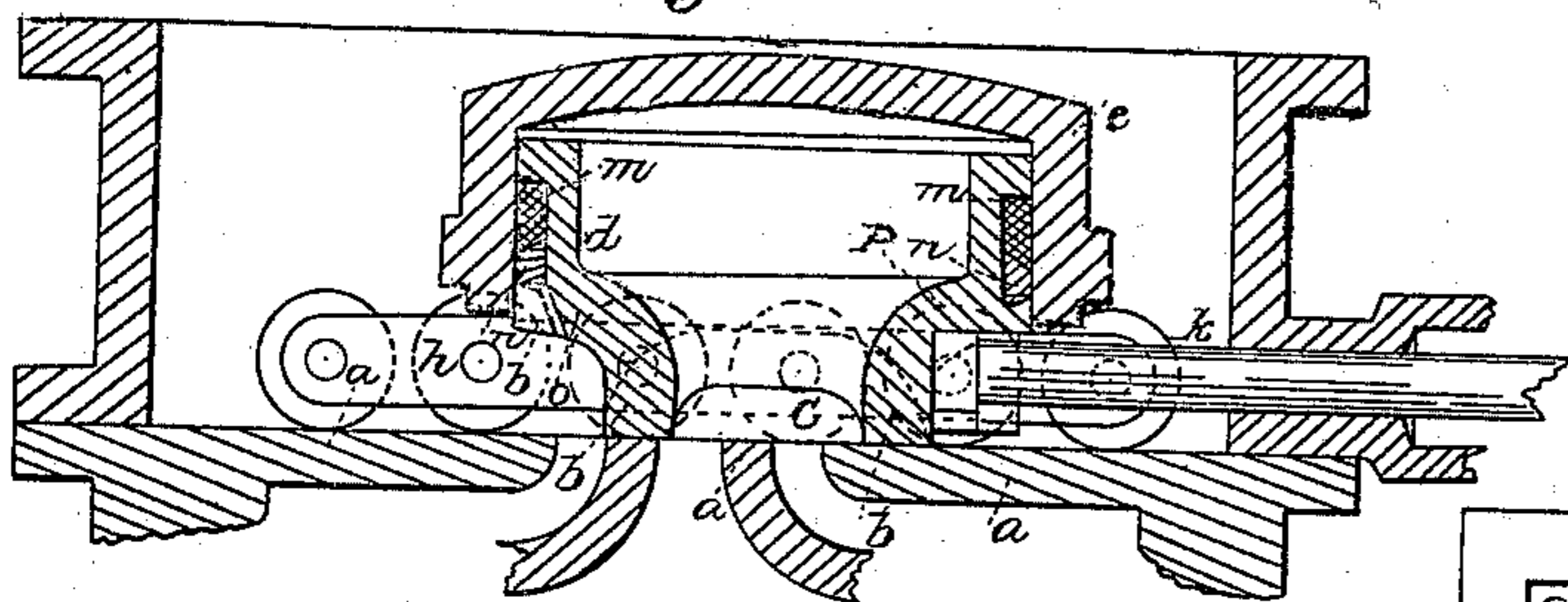


Fig. 2.

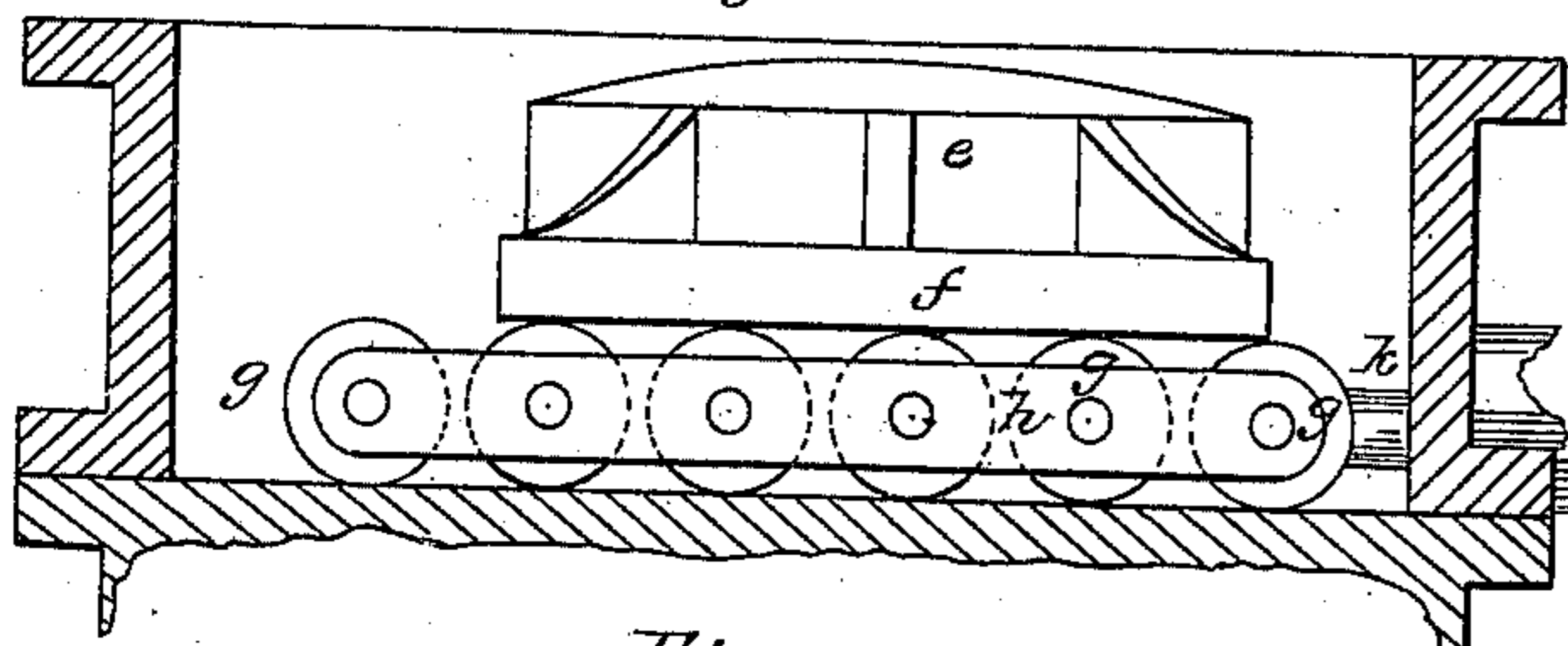


Fig. 3.

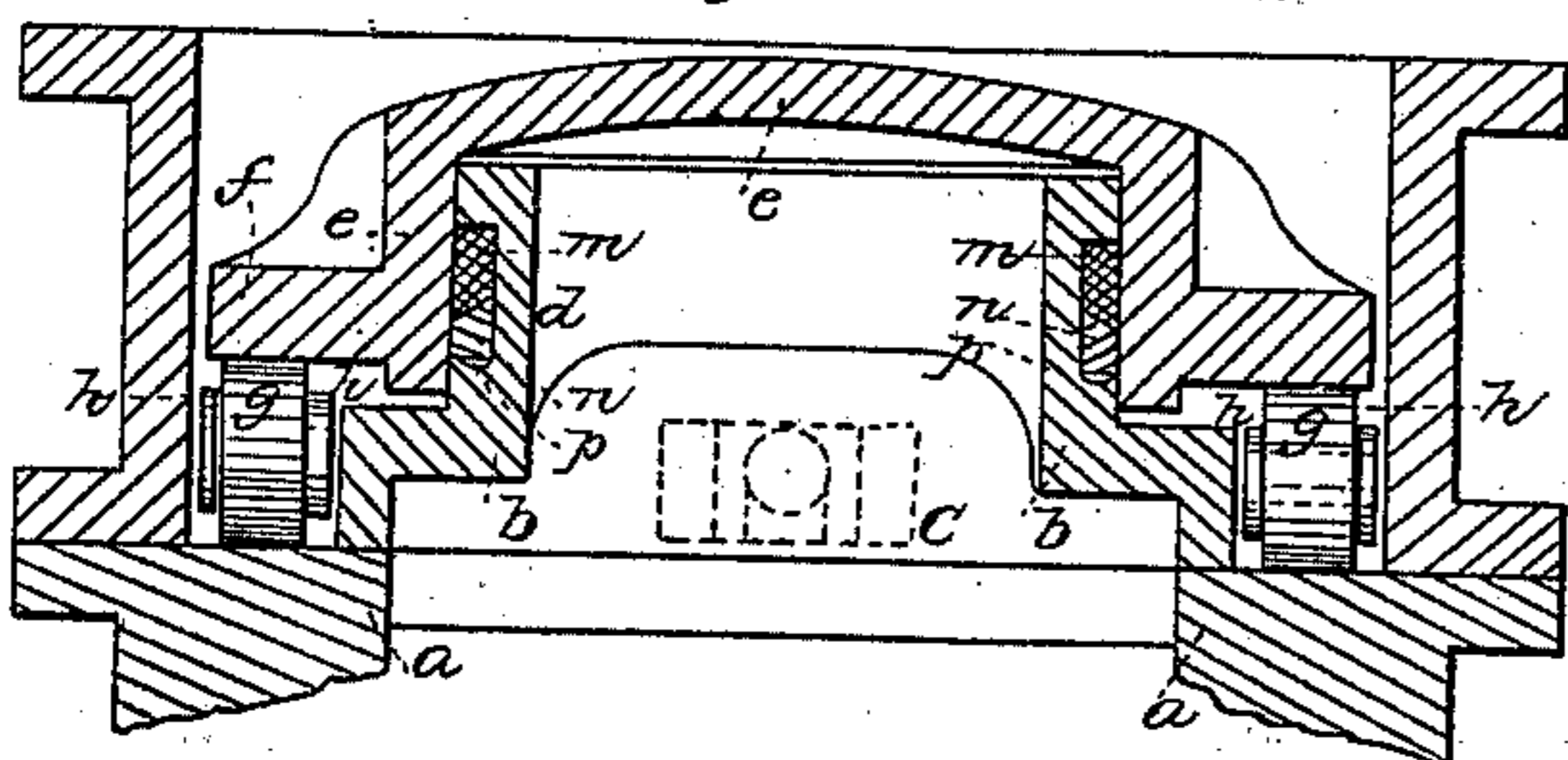


Fig. 6.

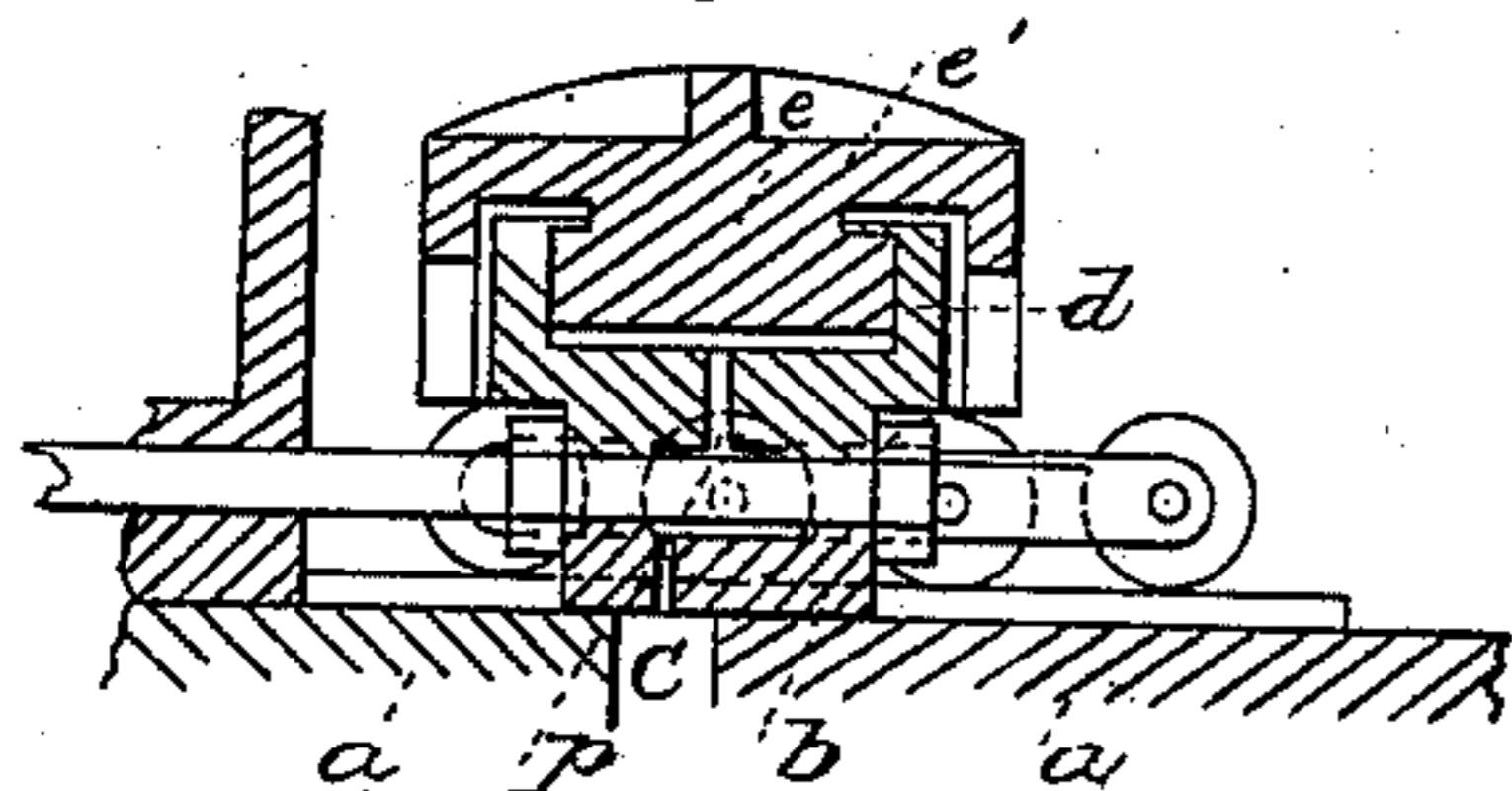


Fig. 4.

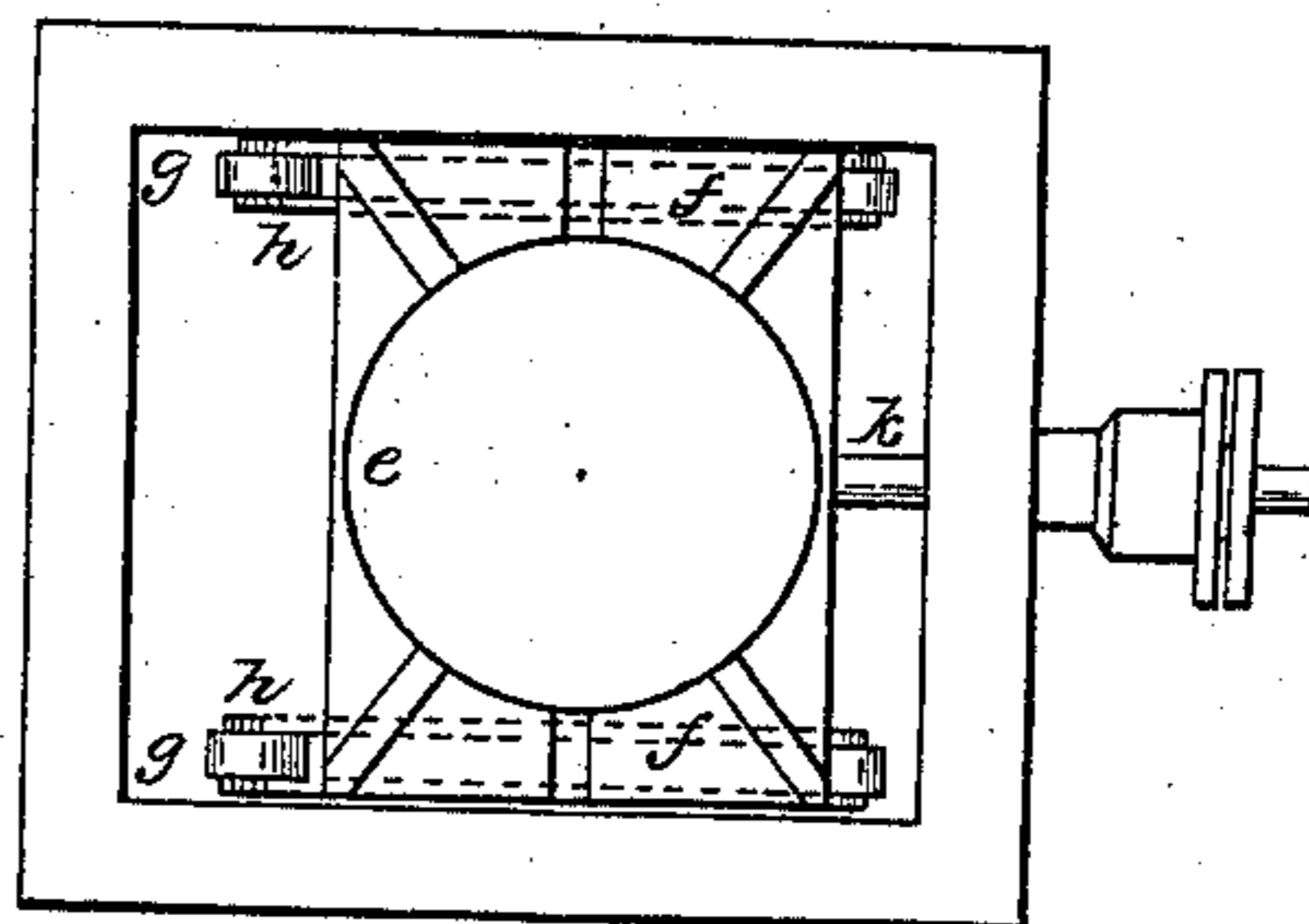
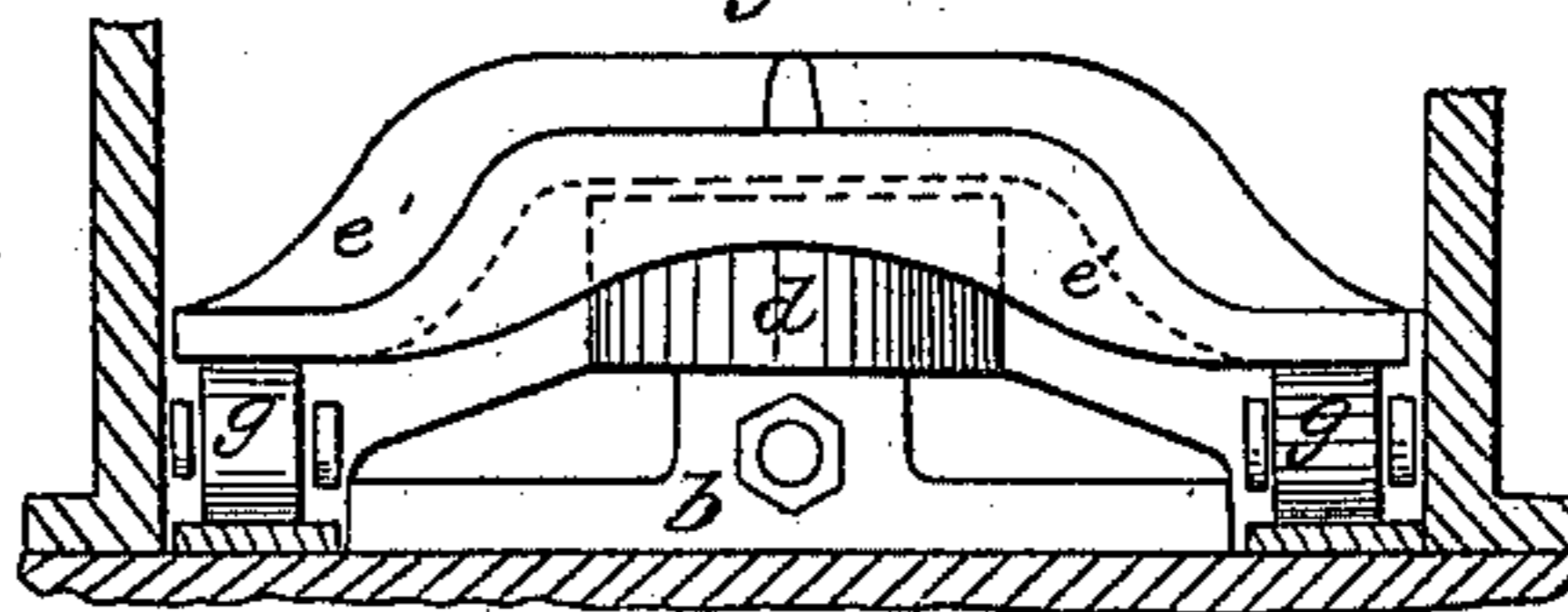


Fig. 5.



Fig. 7.



Witnesses.
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MONROE STANNARD, OF HARTFORD, CONNECTICUT.

Letters Patent No. 97,456, dated November 30, 1869.

IMPROVED STEAM SLIDE-VALVE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, MONROE STANNARD, of the city and county of Hartford, in the State of Connecticut, have invented certain new and useful Improvements in Slide-Valves; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to slide-valves for steam-engines or hydraulic-apparatus, and has for its object to produce a practicable arrangement whereby the power required to move the valve may be lessened.

I may here mention, that I am aware that, prior to my invention, an arrangement has been used in which the valve itself rides on anti-friction rolls, so adjusted as to prevent absolute contact of the valve with its seat. The adjustment of the valve face relatively to the rolls and its seat, is always attended with great difficulty, and the arrangement is not well adapted to varying pressures of steam, nor does it afford means of compensating for wear of the parts.

I am also aware that valves have been "balanced" by connecting with them a cylinder, in which fits a piston, which has been suspended or supported by a vibratory link, whereby a portion or the whole of the pressure, which would have forced the valve upon its seat, is transferred to the piston, and to the pivots of its sustaining-link. This arrangement is not convenient of application, and involves objectionable wear of the cylinder and piston, caused by their constant relative movements.

My invention consists in so combining anti-friction wheels or rolls with a partly or perfectly-balanced valve, that the part of the balancing-apparatus, to which the pressure is transferred, may be supported by and ride on the said rolls or wheels, while, at all times, the valve may be free to find its seat, and adjust itself vertically thereto.

To enable others skilled in the art to make and use my invention, I will proceed to a description of some of its practical applications.

In the drawings—

Figure 1 shows a central longitudinal vertical section of a locomotive steam-chest and valve, embodying my invention;

Figure 2 shows a view of the interior of the chest, its side being removed to show a side view of the valve;

Figure 3 is a central cross-section of the apparatus; and

Figure 4, a plan of the same, drawn on a reduced scale.

To these four figures the immediately following part of the description particularly refers.

a indicates the valve-seat, and

b, the valve, which has in it an exhaust-cavity, *c*, and operates to admit and release steam to and from both ends of the cylinder in the same way as any single cup slide-valve.

To the top of the valve is attached a tubular piston, *d*, the interior of which communicates with the exhaust-cavity *c*.

The piston *d* enters and fits steam-tight in a short cylinder, *e*, which is closed at its upper end, and near its lower end is furnished with an external flange, *f*, of rectangular form. This flange is parallel with the valve face, and projects laterally beyond the ends of the valve, where it is supported, at each end, upon series of anti-friction rolls *g*, which rest on tracks parallel with the valve-seat.

The rolls *g* are kept in their proper relative positions by pins passing through their axes, and fixed to parallel bars *h*, located one on each side of each series.

k is the valve-rod, by which the valve and consequently the cylinder with which it is connected are moved.

It will be readily understood, by those who are familiar with the principles of balanced valves, that part or the whole of the downward pressure, which would otherwise have been exerted upon the valve, is, by the described arrangement, prevented from acting on the valve, and is transferred to the cylinder, which, as it is supported on, and rides on the anti-friction rolls *g*, may be easily moved even under great pressure. The proportion of weight thus prevented from pressing on the valve may, by properly proportioning the area of the cylinder, be so regulated that the valve will be pressed down with only sufficient force to keep it in contact with its seat, and thereby its friction and wear may be reduced to a minimum.

The valve, by reason of its connection through the piston with the cylinder, is free to move vertically, and is thus rendered self-adjusting relatively to its seat. This makes the adjustment of the size of the rolls *g*, and the height of the track on which they roll, a matter of little importance. There will be little or no wear of the piston and cylinder, because their relative movements only take place by the imperceptibly slow change caused by difference of wear of the valve-seat and face and the rolls and tracks.

Although the piston *d* may be furnished with any suitable kind of packing, which will make it steam-tight in the cylinder, yet I will describe the one I deem best, the peculiar features of which are of my invention.

The piston *d* is flanged at top and bottom, which makes a recess in its periphery. The upper part of this recess is filled with hemp, India rubber, or other suitable elastic material, (indicated by *m* in figs. 1 and

3,) while the lower part of the said recess is occupied by a metal ring, *n*, which is bevelled at its upper edge.

One or more holes, *o*, are drilled through the lower flange, and these communicate with an annular groove or channel, *p*, just under the ring *n*. This channel forms a steam-space under the ring *n*, into which space steam passes through the holes *o*, and forces the ring *n* upward against the elastic packing *m*, which is thereby compressed and forced against the bore of the cylinder. A self-adjusting packing is thus furnished, which seldom requires attention.

The ring *n* is made in two parts, one of which is shown in plan by Figure 5, but the second ring could be in one piece, if either flange of the piston *d* were made removable.

Figures 6 and 7 illustrate another modification of my invention, as applied to a simple slide admission-valve without an exhaust-cavity.

a is the valve-seat;

b, the valve; and

c, the steam-port.

d is a cylinder, formed on the valve, and

e, a piston fitting therein.

This piston is attached to a yoke, *e'*, the ends of which rest on the anti-friction rolls *g*.

This plan involves no principle different from the one first described, and needs no further explanation,

except that any steam or water which may leak into the cylinder *d* will discharge itself through a small hole, *p*, which passes downward through the valve, and is so located that it will communicate with the port *c*, when this is covered by the valve, but will be closed by lying over the seat when the port is open.

Other equivalent parts may be substituted, without departing from the substance of my invention, as an example of which, I may mention that a flexible diaphragm attached to the valve and to a plate supported on rolls or wheels, may be substituted for the piston and cylinder hereinbefore described.

What I claim as my invention, and wish to secure by Letters Patent, is—

1. The combination, with the described balance-valve, of anti-friction rolls, substantially as hereinbefore set forth.

2. The combination of the ring *n*, the steam-communications *o*, and the yielding packing *m*, with the piston *d* and cylinder *e* of a balance-valve, substantially as above specified.

In testimony whereof, I have hereunto set my hand, this 27th day of May, 1867.

MONROE STANNARD.

Witnesses:

CHAS. H. OWEN,

CHAS. J. COLE.