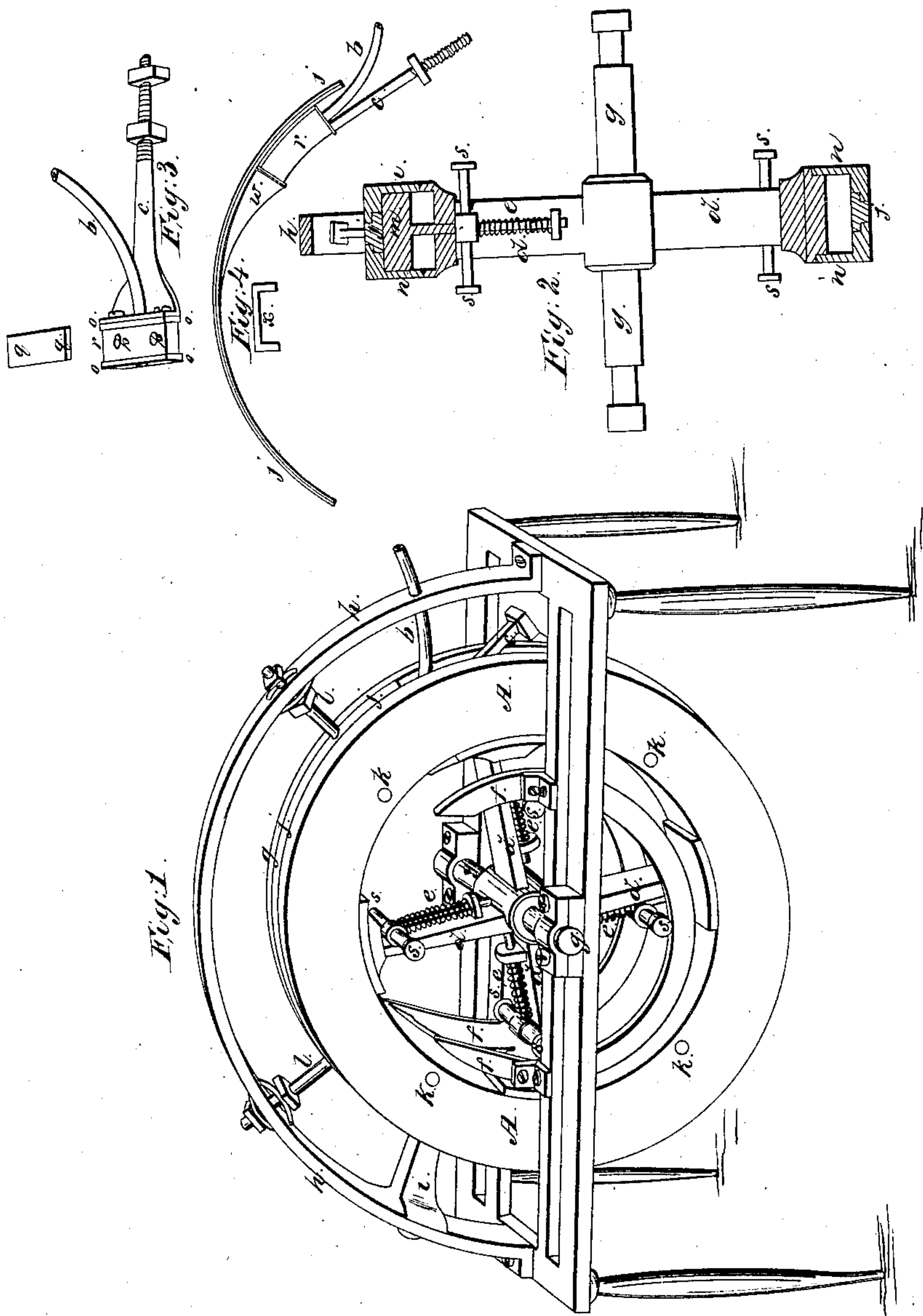


R. M. Sherman,
Rotary Steam Engine.
N^o 1,100. Patented Mar. 12, 1839.



UNITED STATES PATENT OFFICE.

ROGER M. SHERMAN, OF FAIRFIELD, CONNECTICUT.

ROTARY STEAM-ENGINE.

Specification of Letters Patent No. 1,100, dated March 12, 1839.

To all whom it may concern:

Be it known that I, ROGER M. SHERMAN, of Fairfield, in the State of Connecticut, have invented a new and useful Improvement in Rotary Steam-Engines, for which I have solicited Letters Patent of the United States by petition dated September 4, 1838, and of which improvement the following is a just specification.

10 In any rotary steam engine operating on the principle of that described in Letters Patent granted to me under date of the 25th of April, in the year 1837, it is necessary to have a stationary head, or stop, secured to
15 some external fixture, in order to force the steam to react forward against the valves. It is also necessary to have a stationary pipe by which the steam may be introduced under the cap, or cover, which forms the upper
20 part of the steam chamber, within which it is to operate on the valves. The top of the chamber must, therefore, be open wide enough to allow the wheel to revolve freely without interfering with the steam pipe, &c.,
25 and, for the same reason, the cap must be stationary; and as the cap is to remain at rest while the wheel which carries the valve revolves, the joint between them, or the space where they are in contact with each
30 other, must be steam-tight. In the specification annexed to my former patent, the mode directed to effect that purpose is by external pressure upon the cap by means of springs. The improvement now contemplated is so to
35 place the cap and adapt it to the chamber, or periphery of the wheel, as that the steam itself shall keep it tight, and prevent its own escape, by its own pressure. For this purpose, I encompass the periphery of the steam
40 wheel by two metallic bands, of adequate thickness and strength, which bands are so formed as in part to cover over and inclose the top of the steam chamber, but leaving a space between them wide enough to admit
45 the steam pipe; which pipe enters through this space, and passing through the body of the head, or stop, conducts the steam into the chamber. The space between the two bands, which requires to be inclosed so as to
50 form the steam chamber (say for a hundred degrees) is occupied, or filled, by the cap; but this cap, or cover, instead of being pressed down, or kept close by external pressure, is so constructed and placed that its
55 edges extend under the adjacent edges of the two bands, and it is pressed upward against

them, by the internal pressure of the steam. The edges of the bands, and the adjacent edges of the cap are ground together, so as to fit exactly and make a perfect steam-tight joint. 60 They may be adapted to each other by means of a rabbet, or groove, or in any other way in which the internal pressure shall be employed to close the joint. In whatever manner they are fitted to each other, the under 65 side of the cap, and the edges of the two bands must constitute one plain, smooth surface, forming the upper part of the chamber, for the stop and valves to operate against. 70

Should the power of the steam make the pressure of the cap greater than is necessary, and thereby occasion friction to an injurious extent, this may be counteracted to any desirable degree by a rod descending from the 75 arch, and made to press, more or less, upon the cap, by means of a screw and nut; between which nut and the arch a semi-elliptical spring may be advantageously inserted, to render the pressure easy and yielding. 80 When the steam is not in action, the cap may be sustained in its place, by one or more pieces of metal across its top, with their ends resting on the bands.

The cap may, if preferred, be made sufficiently wide to extend the whole width of the chamber; in which case it may consist of a segment of a flat hoop, and be sustained against narrow bands, or ledges, formed by projections on the bands. I prefer, how- 85 ever, to make the cap as narrow as can be done with convenience, as the pressure of the steam upon it, and the consequent friction, are thereby proportionally diminished.

The head, or stop, is a piece of metal 95 which is fitted into the chamber, and constitutes a stationary piston, fitting accurately into the chamber, and as this will be usually rectangular, the stop will be so also; it must present a perfect barrier within the chamber 100 to the escape of steam. It must exert an elastic pressure on the bottom, top, and sides of the chamber, and for this purpose it is packed in a manner to be presently described. 105

The valves, the recesses, the eccentrics, the grooves in which the valves rise and fall, and the general structure of the engine are described in the specification attached to my former Letters Patent, to which reference 110 may be had on these points. As long wear may occasion a space between the tops of

the valves and the cap, it will be expedient, when necessary, to place a packing plate on the top of each valve, like those to be described as used on the stop, making them of such dimensions as shall fit the space which they are to occupy; these will keep in contact with the cap, and compensate for the wear.

In the accompanying drawing, Figure 1 represents a perspective view of the whole machine. A, A, is the steam wheel, which revolves with the shaft *g, g*, sustained on suitable bearings. *b* is the steam pipe which conducts the steam through the stop into the chamber. *c*, is a stem, or arm, firmly attached to the frame of the machine, and also to the head, or stop, for the purpose of holding it in its place. *d, d*, are the spokes, or arms, of the wheel. *e, e*, the valve rods, and their spiral springs. *f, f*, are the eccentrics against which the friction rollers *s, s*, on the cross arms of the valve rod, roll as the valves are operated upon by them. *h*, is the arch attached to the frame at its two ends, and serving to sustain the cap, and a fixture, *i*, which holds its end. This fixture is attached to the arch, its opposite end passing into the groove, or opening, between the bands, and bears against the end of the cap, so as to sustain its pressure. *j*, is the end of the cap where the steam enters; it extends thence to the fixture *i*. The screws *k, k*, serve to hold the bands on the chamber of the steam wheel. *l, l*, are rods attached to the cap, and to the arch by means of nuts, and intervening springs, affording it an elastic action.

Fig. 2 is a cross section of the steam wheel, showing the manner in which the chamber, the bands, and the cap, are, or may be, arranged. *m*, is the steam chamber, formed in the periphery of the steam wheel. *n, n*, are the bands attached to the steam wheel by the screws *k, k*. A section of the cap, is shown at *j*, and of the arch, at *h*.

Fig. 3, represents the stop, marked *r*, with the steam pipe *b*, and the stem *c*, attached to it. The elastic pressure necessary in the stop, I obtain in the following manner. The ends *o, o*, of the stop are made to fit, as nearly as may be, into the chamber, but there is a groove, or depression, along the top, and at each end, formed by reducing

these parts, so as to allow the ends *o, o*, to constitute fillets, or projections, between which metallic packing plates are to be received; the buttons of these grooves are made perfectly flat, and at two points *p, p*, within them, holes are made of sufficient depth to receive spiral springs, which are to act upon flat metallic plates *q, q*, large enough to fill the spaces between the fillets *o, o*. These spiral springs press the metallic plates against the top and sides of the chamber; and the top piece reacts on the bottom of the chamber, and no packing, therefore, is necessary on that side of the stop, or head.

It is necessary to keep the stop, or head, from any oblique movement, as any such movement, or derangement of position, would interfere with the action of the machine. The stem *c*, by which it is held, is, therefore, attached to the frame of the machine in such a manner as to admit of its accurate adjustment by means of screws and nuts, or otherwise.

To prevent the too sudden and abrupt action of the valves, and to cause them to slide gradually up to the top of the steam chamber, I use what I denominate a guide, the position and construction of which is shown in Fig. 4, where *w* is the guide, made in a wedge-like form. It is attached to the cap *j, j*, by means of a screw, or otherwise; its wide end rests against the stop, and it is guttered, or channeled, to admit the steam to pass along it from the steam pipe; this channeling is shown at *x*, which is an end view of the part which abuts against the stop.

The improvement which I claim as my invention, and for which I ask Letters Patent, is—

The fitting of a cap to a rotary steam engine, in the manner, and by the means, set forth; so that the steam, by its own pressure, shall prevent its own escape. For this purpose, I claim nothing but a cap formed and fitted on the principles aforesaid, in combination with such engine.

Fairfield, Feb. 20, 1839.

ROGER MINOTT SHERMAN.

In presence of—

ELIZABETH H. OSBORNE,
THOMAS B. OSBORNE.