(No Model.)

C. A. T. SJOGREN.

VALVE MOTION FOR STEAM PUMPS.

No. 301,287. Patented July 1, 1884.

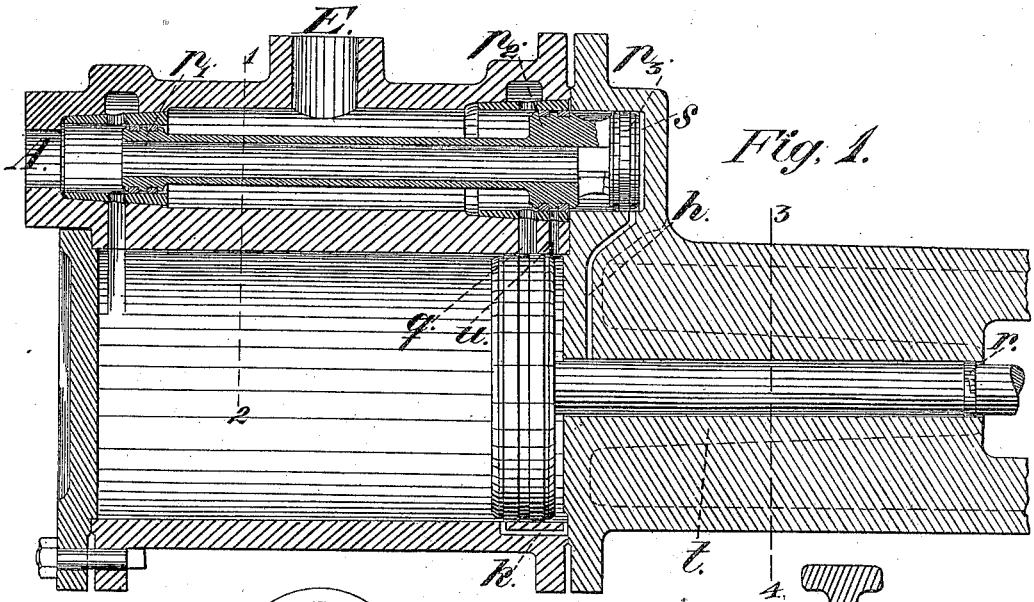

Fig. 1.

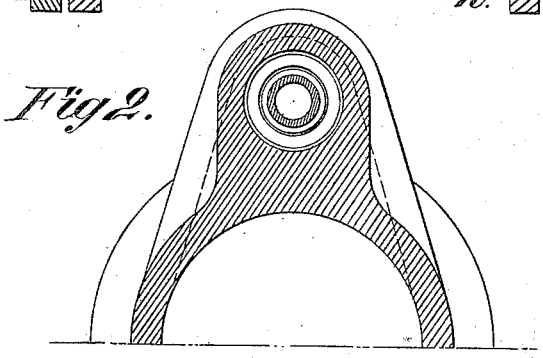

Fig 2.

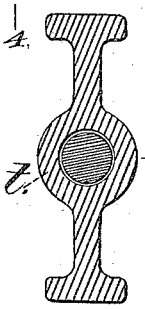

Fig 3.

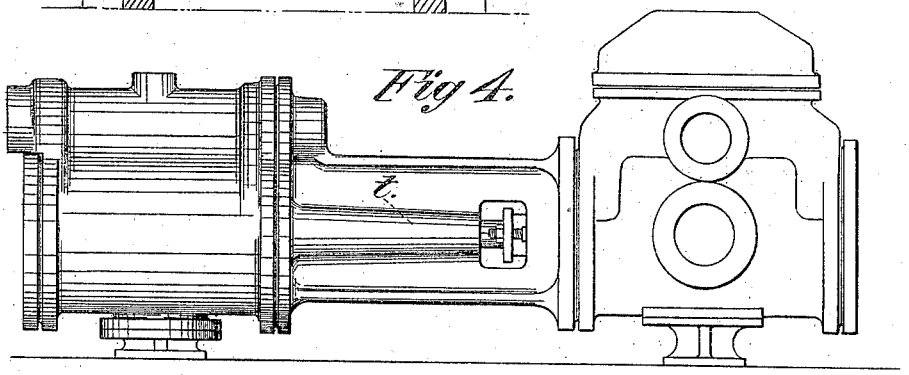

Fig 4.

Witnesses.
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UNITED STATES PATENT OFFICE.

C. AXEL T. SJOGREN, OF DENVER, COLORADO.

VALVE-MOTION FOR STEAM-PUMPS.

SPECIFICATION forming part of Letters Patent No. 301,287, dated July 1, 1884.

Application filed October 6, 1883. (No model.)

To all whom it may concern:

Be it known that I, C. AXEL T. SJOGREN, a subject of the King of Sweden, residing at Denver, in the county of Arapahoe and State of Colorado, have invented a new and useful Improvement in Valve-Motions for Steam-Pumps, of which the following is a specification.

My invention relates to improvements in valve-motions of steam-pumps for water, air, or other fluids where the distribution-valve consists of a hollow differential round slide-valve, and to which motion is given by means of steam admitted or exhausted through the agency of piston and piston-rod; and the object of my invention is to provide a cheap, strong, and simple valve-motion which will start the pump on admitting steam in any position of piston and valve in relation to each other. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical length section through the center of the steam-cylinder, valve-chest, and valve; Fig. 2, a cross-section through the valve, valve-chest, and half of steam-cylinder on the line 1 2; Fig. 3, a cross-section through the connection between the two cylinder-heads on the line 3 4. Fig. 4 is an outside view of the pump.

Similar letters refer to similar parts throughout the several views.

Steam is admitted to the pump at the opening A and exhausted through the opening E. The round slide-valve consists of a hollow stem carrying three pistons, p', p^2, and p^3. Of these, p^2 and p^3 have same diameter; but p' is of smaller diameter. The pistons p' and p^2 distribute the steam to one or the other side of the piston-head, and by admitting or exhausting steam behind the piston p^3 the valve is moved. If the space s behind the piston p^3 is in communication with the open air, the steam-pressure on the valve is toward the right, and when the pressure is on the full area of p^3 and the circular area of p' the movement of the valve is toward the left. The full area of piston p^3 being larger than the circular area of piston p^2, the piston will move toward the right as far as permitted. If steam is admitted behind the piston p^3 in s, the pressure to the right will be as before; but the pressure toward the left will be on pistons p^3 and p^2. Toward the right it was and still is on pistons p^3 and p'. The area of piston p^2 being larger than the area of piston p', the valve will move to the left as far as permitted. From the space behind the piston p^3, or from s, leads a communication-passage, h, down to the cylindrical opening in the cylinder-head in which the piston-rod travels. This part of the cylinder-head is made to form a cylinder, t, of same length or little longer than the stroke of the piston, with a diameter a trifle larger than that of the piston-rod. On the piston-rod, and at a distance from the piston same as the length of stroke, is a packing-ring, r, placed, which moves air-tight in the cylindrical part t of the cylinder-head. The passage k is made in such a way that it forms a communication between both sides of the piston at the end of the stroke from left toward right. At the same time as this communication is established the exhaust-port q is shut by the packing-rings of the piston passing over it. In order to accomplish this, the port-hole q is drawn somewhat toward the center of the cylinder. Another smaller auxiliary port, u, at the end of the cylinder is, when right-hand end of cylinder exhausts, covered by the piston p^2 of the slide-valve. Fig. 1 shows the parts in the position when the left-to-right stroke is completed and the valve ready to change its position for the return-stroke. The communication through k established, exhaust-ports q and u closed, the steam passes through k up through h and to s behind the piston p^3 on the slide-valve, and causes it to move toward the left, thus admitting steam on the right hand of the piston, first through the passage u and afterward through the main port q, in the same time exhausting the steam from the left side of the piston. When the piston has completed its back-stroke, the packing-ring r has passed the opening of the passage h and put the space s in communication with the open air, thus causing the slide-valve to move to the right, the position shown in drawings, admitting steam on the left side of piston and exhausting on the right side, and so on *ad infinitum*. It will be seen that with this arrangement of slide-valve the pump will start, steam being admitted, at any position of the valve and piston.

I am aware that prior to my invention differential round slide-valves have been used. I therefore do not claim them as my invention; but

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

1. The combination, in a steam-pump, of a differential round slide-valve, with the cylindrical projection *t* on the cylinder-head, the passage *h*, the packing-ring *r*, the passage *k*, and ports *q* and *u*, placed as specified, for purpose set forth.

2. In a steam-motor, the cylindrical projection *t* on the cylinder-head, the passage *k*, the passage *h*, and the packing-ring *r*, when used to move the distribution-valve on said motor, all substantially as set forth.

C. AXEL T. SJOGREN.

Witnesses:
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E. W. HAVERSTICK.