L. B. Pitcher,

Governor.

No. 7,272. Patented Apr. 9, 1850.

Fig. 1.

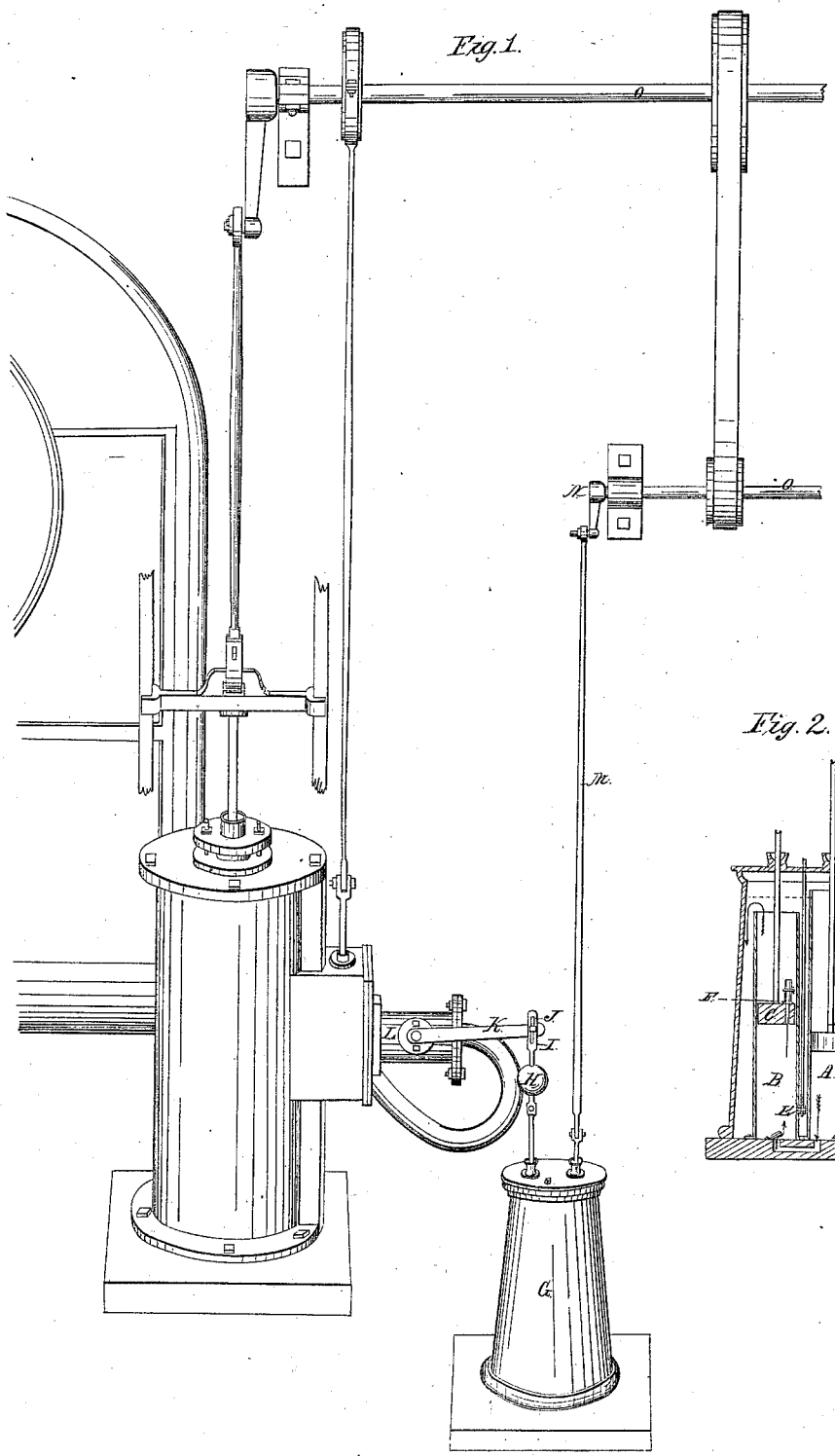
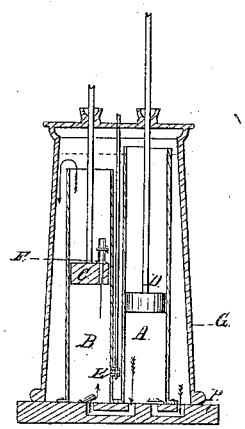


Fig. 2.



UNITED STATES PATENT OFFICE.

LEMAN B. PITCHER, OF SYRACUSE, NEW YORK.

HYDRAULIC REGULATOR FOR MACHINERY.

Specification of Letters Patent No. 7,272, dated April 9, 1850; Antedated March 23, 1850.

To all whom it may concern:

Be it known that I, LEMAN B. PITCHER, of Syracuse, in the county of Onondaga and State of New York, have invented new and useful Improvements and Combinations on Hydraulic-Motion Regulators—a Machine Used for the Same and Similar Purposes and as a Substitute for the Common Fly-Ball Regulators; and I do hereby declare that the following is a full, clear, and exact description of the construction, combination, and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective and line view of the machine and parts, connected to and with the machinery sought to be regulated and to the steam valve or gate governing or regulating the quantity of steam going to and moving the steam engine. Fig. 2 is a cross section view of reservoir, pump, cylinder, piston heads and rods, and faucets.

Letters A, B, C, &c. refer to parts mentioned.

To enable others to construct, combine and use my invention, I proceed to describe its construction and operation.

I construct two cylinders A, and B, of a smooth and uniform bore, and place them side by side in a perpendicular position, standing on and fastened to a base or bed plate.

Cylinder A, is of two inches bore, more or less, and ten inches in length, more or less, and with a piston head and rod D therein forms a pump hereinafter called pump A, which is connected by pitman M, to crank N, attached to shaft O, and machinery sought to be regulated, in such a manner that pump A, worked by machinery O, will move or work with a reciprocal motion, and move the water into cylinder B, in floods or gushes, and cause piston C, of cylinder B, to rise and fall at each action of pump A.

Cylinder B, is of two inch bore, or more or less, and ten inches in length, or more or less, having a piston head and rod C, therein, acted upon and moved by the water coming from pump A, and connected to lever K, of steam valve or gate L, by means of pitman I, or otherwise, in such a manner as to partially or wholly close or open steam valve or gate L, when the motion of machinery O is too fast or too slow.

Piston head C, should move up and down in cylinder B, perfectly free and without any friction, so that the least variation of motion in pump A, will cause the piston C, to rise or fall.

A weight H, of ten pounds, or more or less, is attached to pitman I, or otherwise, connecting piston C, to lever K, in such a manner that said weight will vibrate up and down as pump A, acts, and open or close valve L, when the motion of machinery O, varies, by its motion and momentum, overcoming any ordinary friction about valve L, as with the blow of a hammer.

A faucet E, is inserted into cylinder B, through which the water moved by pump A, may pass from cylinder B into reservoir G. The discharge of water from cylinder B, must be uniform, whether piston C, be high or low in cylinder B. To insure a uniform discharge I fill reservoir G, with water until cylinder B, is immersed, so that the water in cylinder B, and reservoir G will flow together and be on a level over the top of cylinder B, by which the tendency of the water to flow by its own gravity through faucet E, will be destroyed or balanced. The uniform flow of water through faucets E and F is caused only by the weight of piston C, and parts connected pressing on the water in cylinder B, below piston C. This faucet E may be used alone or with faucet F.

A faucet F is inserted in or an escape hole is made in or through piston head C, through which the water from cylinder B may escape upward, filling cylinder B to and overflowing its top, in such a manner that the water is discharged from the top of the water pressed under piston C, in cylinder B, whether piston C, be up or down in cylinder B. The water in cylinder B above piston head C, does not vary the discharge through faucet F. This faucet F may be used alone or with faucet E. It is not necessary to keep cylinder B, immersed. when faucet F alone is used. Faucets E and F, are to be so adjusted as to allow that quantity of water to escape which the desired motion of machinery O will cause pump A, to furnish.

To obviate opening and closing steam valve L, at each reciprocal action of pump A, when the motion of machinery O, is correct, and at the same time to retain and use the vibrating motion of piston C, and parts connected, to strike, move and overcome the friction of steam valve or gate L, a slot J, is made in the upper end of pitman I, in length about equal to the vibration thereof, through which a bolt or stud is passed and attached to lever K, piston C, and parts connected, vibrate at each action of pump A, also moves up and down in cylinder B, as the motion of machinery O varies, moving lever K, until the desired motion is restored, it is when the motion of machinery O varies, and piston C is moved up or down, that the slot J, strikes the stud, as with the blow of a hammer, and moves the steam valve or gate L and readjusts the quantity of steam going to steam engine and restores the motion of machinery to the desired motion. Any other device or arrangement, other than the slot described, may be used or employed between piston C, and valve L which will allow the vibrations of piston C, and parts connected without moving the steam valve or gate L when the motion of machinery O, is correct, and yet move the valve L as with a blow when the motion of machinery O does vary.

The base or bed plate P, on which pump A, and cylinder B, stands, has a canal or water course therein, leading from reservoir G into pump A, at or near its bottom, and from pump A, into cylinder B, at or near its bottom, with suitable valves therein or on to insure the passage of the water in the course desired.

A cone cylinder G, of 6 and 8 inches in diameter more or less and 15 inches in length more or less, stands and is attached to the base or bed plate P, or otherwise, in such a manner as to surround pump A, and cylinder B, and forms reservoir G, which is filled with water until cylinder B, is overflowed or immersed. On the top of cylinder forming reservoir G, a cover or head is placed, through which the piston rods C, and D, pass and are guided in their action, any other convenient size, form or shape may be given to reservoir G.

Having shown and described the construction and combination of this hydraulic motion regulator, I here describe its operation. The steam engine being started and moving the machinery at the desired motion, and the several parts connected as before described.

Faucet E and F, are adjusted to escape, that quantity of water which pump A, will furnish, any more or less motion of steam engine will cause pump A, to move more or less water into cylinder B, than can or will escape through faucet E and F and cause or allow piston C to rise or fall and to partially close or open or close or open the steam valve so as to restore the motion of steam engine by adjusting the quantity of steam going to and acting on the steam engine.

Other sizes, forms, and shapes may be given to each and every piece and part of this machine, other than that already set forth and shown, and other combinations may be made and had other than that already shown and set forth and described. Therefore I wish it distinctly to be understood that I intend to vary or alter the form, size and shape of any, each or all the pieces and parts as circumstances may require, and to vary, alter or change the combination or combinations of this machine within itself or with the machinery to be regulated or with the steam or other motive power to be adjusted or regulated, as circumstances may require. While I maintain an analogous combination or combinations and adhere strictly to the principles embraced.

This machine is to be used in regulating steam and water power and machinery, for the purpose of giving regular motion to machinery, in any form or way usual to apply hydraulic or fly ball regulators as circumstances may require. Water oil or other fluid may be used in the combination of this machine.

Piston C, should vibrate 100 times per minute, more or less, and vibrate or move up and down three inches, more or less, at each action of pump A.

In this invention, I do not claim the size, form or shape of any piece or part as new, or the general combination of pumps, pistons, or floats or other parts connected to the machinery to be regulated, or to the motive power to be regulated, which are in use in the general combination of hydraulic motion regulators, but claim to have overcome, two several difficulties, which has heretofore existed in this kind of regulators; as follows: First, the want of sensitiveness to take early notice of any variation of motion, of quickness in motion to open or close the steam valve,—of power energetically applied to overcome friction of steam valve; secondly, the difficulty which has always existed in obtaining and maintaining a uniform discharge of water or liquid; from under pistons, rising and falling, as motion varied, connected to steam valve, and acted upon by water moved by pumps, but

What I do claim, and desire to secure by Letters Patent of the United States is—

The combination of pump A, moved with a reciprocal motion, with the machinery sought to be regulated, and with the water or fluid acting on piston C, and parts connecting it to steam valve, which controls the steam moving said machinery, in such a manner as to cause piston C, to rise and fall

at each action of pump A, without moving the valve, while the machinery has the proper speed, and moving or opening or closing said steam valve with a quick striking motion, overcoming friction about said valve, as with the blow of a hammer, when the motion of said machinery is too fast or too slow, or any analogous arrangement which will produce the same result, substantially in the manner and for the purposes and objects herein before shown and set forth.

LEMAN B. PITCHER.

Witnesses:
LUCIUS C. ASHLEY,
SAMUEL ASHLEY.