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Ben Mues Co

UNITED STATES PATENT OFFICE.

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PUMP.

Specification of Letters Patent No. 28,439, dated May 22, 1860.

To all whom it may concern:

Be it known that I, GEORGE H. MILLS, of East Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a longitudinal elevation of a steam pump with my improvement exhibiting the principal parts in section. Fig. 2, is a plan of the same.

Similar letters of reference indicate corresponding parts in the two figures.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

A, represents the inner stationary cylinder of the pump to which the piston or plunger B, is fitted in the usual manner, said cylinder being closed at its ends by heads a' , a' , the latter of which is constructed with a stuffing box b , for the piston rod c , to work through. This cylinder A, is made much longer than the cylinder of an ordinary pump that is to say much longer than the stroke of the piston, added to the thickness of the piston and has its exterior turned up perfectly cylindrical and concentric with its bore.

C, is the outer stationary cylinder portions of which near the ends thereof are bored truly of a uniform size somewhat larger than the exterior of the inner cylinder, and the middle portion of which is made somewhat larger than the said truly bored portions as shown at d , d , (Fig. 1) to constitute the suction chamber to the bottom of which is connected the suction pipe D, and on the top of which is the vacuum chamber E. Annular cavities e , e' , are cast in the said outer cylinder C, outside of the truly bored end portions thereof to constitute two discharge chambers which are both connected with the same air vessel F, which covers the vacuum chamber E. The said outer cylinder C, is bolted to a bed plate G. The inner cylinder A, is secured within the outer cylinder in a position concentric and parallel thereunto by means of the head a , at one end and two rods f , f , at the other end. The truly bored end portions of the outer cylinder C, are provided with two series of ports g , g , and g' , g' , extending nearly all

around it and leading from its interior to the two discharge chambers e , e' , and the inner cylinder is provided with a precisely similar series of ports h , h , and h' , h' , arranged exactly opposite to g , g , and g' , g' . The inner cylinder A, is also provided with two series of ports i , i , and i' , i' , extending nearly all around it, the outer edges of said ports being opposite to the ends of the suction chamber d , d , that is formed within the outer cylinder.

H, is the intermediate cylinder bored out to fit snugly but easily to the exterior of the inner cylinder A, and having its exterior turned concentrically with its bore to fit snugly but easily within the bored end portions of the outer cylinder C. This intermediate cylinder is provided with two series of ports m , m , and m' , m' , of similar form to g , g , g' , g' , and i , i , i' , i' , so constructed and arranged around it, g , h , m , and g' , h' , and m' , being also properly arranged, so that while those m , m , register with i , i , those m' , m' , register with g' , g' , and h' , h' , as shown in Fig. 1, and that, while those m' , m' , register with i' , i' , those m , m register with g , g , and h , h . One end of the intermediate cylinder H, passes through a stuffing box k , k , in one end of the outer cylinder C, and the corresponding end of the intermediate cylinder is fitted with a stuffing box j , around the cylinder. The piston rod c , which also constitutes the piston rod of the steam cylinder I, which is furnished with a cross head L, which works on parallel guides l , l , which connect the pump cylinder with the steam cylinder I, and the said cross head is connected by rods n , n , with cranks o , o , on a shaft J, on which there are also two eccentrics p , p , whose rods q , q , are connected with lugs r , r , on the intermediate cylinder H, of the pump for giving the said cylinder its reciprocating motion. The cranks o , o , control the length of the reciprocating movement of the piston B, which should be such that it just covers the ports i , i , and i' , i' , of the inner cylinder as it terminates in one and the other direction. The length of stroke of the intermediate cylinder produced by the eccentrics p , p , is just sufficient to open its ports m , m , to the outlet ports g , g , h , h , and the inlet ports i , i , alternately and to open its ports m' , m' , to the outlet ports g' , g' , h' , h' , and the inlet ports i' , i' , alternately, the said ports in the intermediate cylinder always opening to the inlet ports at either end as they open to the outlet ports at the other end.

The eccentrics p, p , are arranged 90° in advance of the cranks o, o , and hence the ports commence to open at the commencement of the stroke of the piston and are wide open when the piston is at the middle of its stroke. As the piston is moving to the left in which condition it is represented in Fig. 1, the ports m , form a communication between the inner cylinder and the suction chamber behind the piston, and the water enters the inner cylinder by the ports i, i , and at the same time the ports m', m' , form a communication between the ports g', g' , and h', h' , and the water is discharged from the inner cylinder in front of the piston into the discharge chamber. As the piston moves in the opposite direction the water enters the inner cylinder by the ports i', i' , and leaves it by g , and h .

20 The intermediate cylinder H, having a positive action relatively to the plunger

causes the opening and closing of the ports to take place always at the right time with the greatest precision, and as the several series of ports extend around their several cylinders, or the ports of the same series are arranged at opposite points in the circumference of their respective cylinder, the intermediate cylinder works without lateral pressure or in equilibrio and consequently with but little friction.

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

The implement of the intermediate cylinder H, in combination with the two stationary cylinders A, C, and piston B, as and for the purpose herein shown and described.

GEORGE H. MILLS.

Witnesses:

CHAS. H. COFFIN,
GEO. W. WAITT.