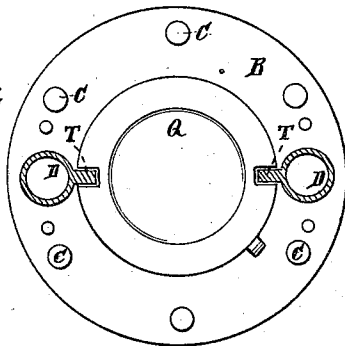
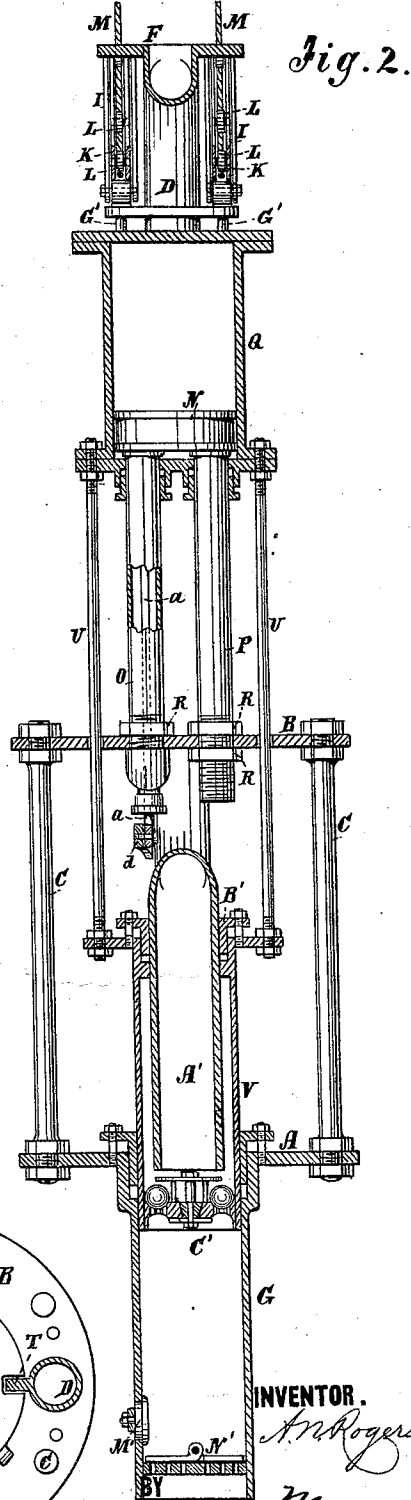
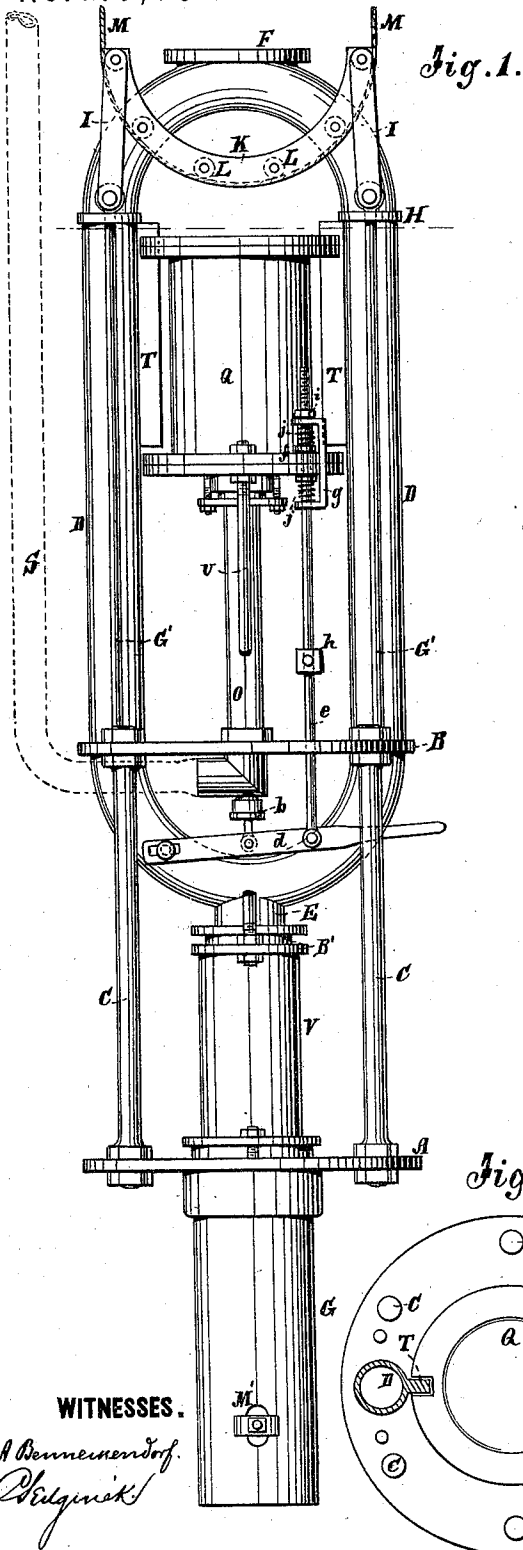


A. N. ROGERS.
Steam Mining-Pumps.

No. 149,681.

Patented April 14, 1874.



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Fig. 4.

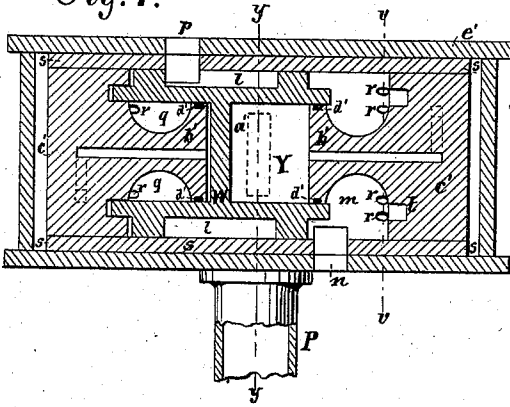


Fig. 5.

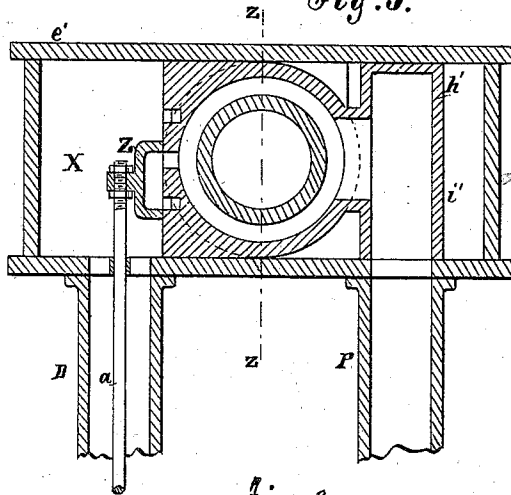


Fig. 6.

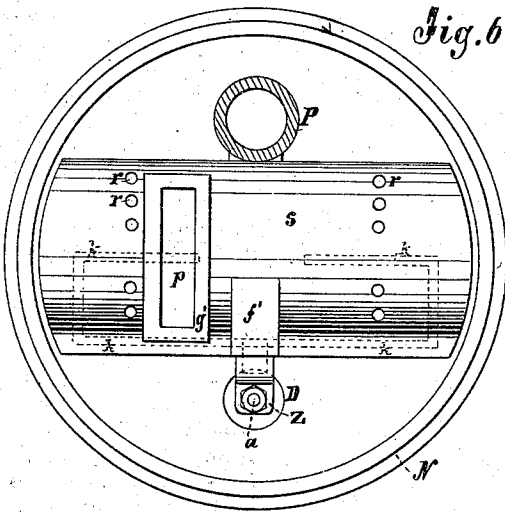


Fig. 8.

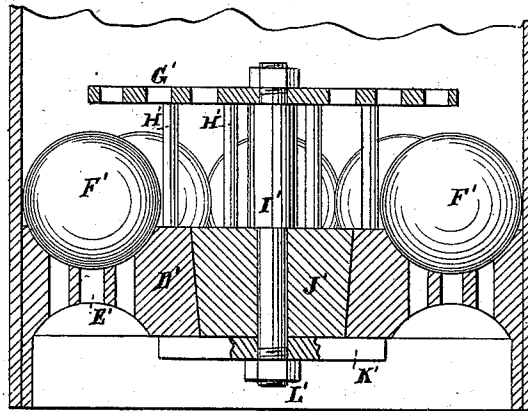


Fig. 7.

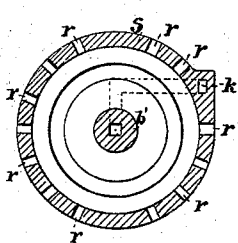
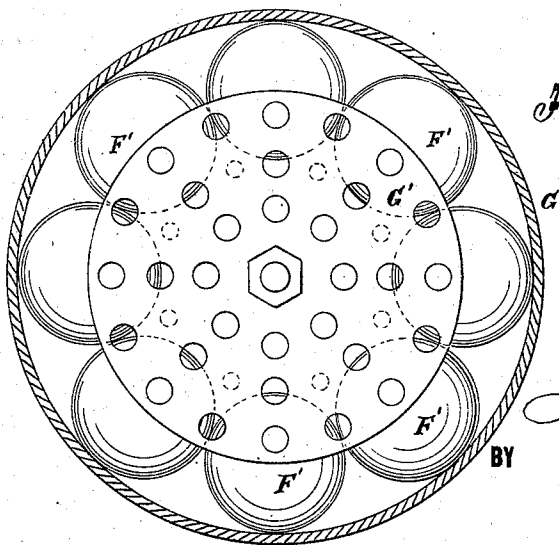


Fig. 9.



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UNITED STATES PATENT OFFICE.

ANDREWS N. ROGERS, OF CENTRAL CITY, COLORADO TERRITORY.

IMPROVEMENT IN STEAM MINING-PUMPS.

Specification forming part of Letters Patent No. **149,681**, dated April 14, 1874; application filed February 14, 1874.

To all whom it may concern:

Be it known that I, ANDREWS N. ROGERS, of Central City, in the county of Gilpin and Territory of Colorado, have invented a new and Improved Steam Mining-Pump, of which the following is a specification:

The object of this invention is to furnish a new and improved form of steam mining-pump adapted to the progressive work of sinking a water-shaft, or of freeing from water any mines, quarries, or other cavities that may be submerged. The invention consists of a reciprocating steam-cylinder with a stationary piston and a continuous acting force-pump in a light strong frame, having apparatus by which it can be conveniently suspended by ropes and pulleys, so as to be conveniently adjusted as the work progresses, the steam being conducted down to the engine by pipes, and the water forced up by other pipes, of which sections will be added on as the engine descends. The invention also consists of certain improvements in the construction of the engine and the pump to adapt it for the use for which it is intended, which will be particularly described and claimed.

Figure 1 is a side elevation of my improved pump. Fig. 2 is a sectional elevation. Fig. 3 is a section of Fig. 1 on line *x x*. Fig. 4 is a sectional elevation of the steam-piston taken on the line *z z* of Fig. 5, which is a section of Fig. 4, on the line *y y*. Fig. 6 is a plan of the steam-piston with top removed. Fig. 7 is a section through the valve on line *v v* of Fig. 4. Fig. 8 is a sectional elevation of the pump-valve, and Fig. 9 is a horizontal section of the working-piston of the pump and a top view of the valve.

Similar letters of reference indicate corresponding parts.

A and B represent a couple of metal disks firmly connected together a short distance apart, one above another, by the rods C; the upper one is also connected firmly to the two branches D of a large pipe, E F, for conducting the water up from the pump, and the lower one is also connected to pump-cylinder G. Disk B also has suspending-rods G' attached to it, which extend along up the sides of the branches D through the ears H near the upper ends, and are jointed to links I, which

depend from the yokes K, whereon rollers L are mounted, around which the ropes M, for suspending the machine in the mine, pass. These devices constitute the frame whereon the working parts are mounted, as follows: The steam-piston N is fixed in a stationary position a suitable distance above the disk B on the top of two hollow piston-rods, O and P, within the reciprocating cylinder Q, said rods being fastened to the disk by clamping-nuts R, and projecting through it to the lower side. The rod O is for conducting live steam to the engine from a pipe, S, (shown dotted,) from the mouth of the mine, and rod P is for the exhaust. It may discharge at the end of its extension below the disk, or it may have a pipe attached for conducting the steam away. The cylinder works on guides T on the branches D of the water-pipe, and connects by rods U with the working-plunger V of the pump. The valve for the steam-engine is at W. Within the piston N steam enters to it from the hollow rod O at the chest *x*, and is let into and exhausted from the cylinder *y*, in which valve W works by the slide-valve Z, which is worked by a rod, *a*, extending down through the steam-pipe O and the stuffing-box *b* to the lever *d*, from which a rod, *e*, extends up through the flanges *f* of the cylinder and through the bent bar *g*, said rod having a stop, *h*, below the flanges, another, *i*, above, and a coiled spring, *j*, between each end of the bar and said flanges. The bar *g*, striking the stops just before the cylinder stops, shifts the valve Z, and the springs *j* allow the bar *g* to shift a little, so that the cylinder can move onto the end of its stroke after shifting the valve. The dotted lines *k*, Fig. 6, and the dotted and full lines *k*, Fig. 4, show the course of the steam in entering the cylinder *y* from the ports of the valve Z. The steam exhausts from said cylinder into the annular space *l*. The valve *n* opens chamber *m* to the cylinder Q below the piston by uncovering port *n*, when it shifts to the left, and at the same time opens the exhaust from the upper part of said cylinder to the hollow piston P, by uncovering port *p* to the annular space *l*. When it goes the other way it opens chamber *q* and admits live steam to the upper part of the cylinder Q through port *p*, at the same time opening port

n to the exhaust. Steam enters chambers *m* and *g* from chamber *X*, through the perforations *r* in the shell or case *s* containing said chambers and the valve. At the outer end of each chamber is an annular groove, *t*, coinciding with the end of the valve, and receiving it at the end of its stroke in that direction to cushion it by the steam shut into said groove when the piston enters. The valve *W* is a hollow movable cylinder with only one head, *a'*, which is in the middle, and works between the two stationary pistons *b'* formed on the heads *c'* of the valve-cylinder *s*. These heads, together with the pistons *b'*, are fitted in the cylinder *s*, so as to be taken out and put in readily to adjust the valve; also, the packing *d'*. The case *s* will, in practice, be cast together with head *c'*. It drops down into its place in the piston *N* from the top when the head *c'* is put on, and is held fast by said head when screwed on. In practice a ground joint will probably be required between the case *s* at port *n* and the head of piston *N*, also at the lower end of the joint *i'* of the exhaust-tube within the case. The working-piston *V* is hollow, and has a valve, *C'*, where the water enters its lower end, and it receives another stationary piston, *A'*, into it through the stuffing-box *B'* in its upper end, said stationary piston being the lower portion of the pipe *E*, through which the water escapes. It extends as low as the valve *C'* will allow when the piston *V* is raised. The pump-barrel *G'* is of about twice the capacity of the stationary piston *A'*, and receives about twice as much water into it, when the piston rises, as is forced through the stationary piston during the same time, which, being forced through valve *C'* into the piston on its downstroke, from which only half the quantity was emptied on the upstroke, causes a continuous discharge as well when the piston goes down as when it goes up with only two valves. Moreover, the flow is not only continuous and uninterrupted, but it is in one direction, and therefore free from the shocks and jars due to the frequent and sudden stops and changes of the flow in the ordinary continuous or double-acting pumps. The valve *C'* is composed of a plate or disk, *D'*, with numerous perforations, *E'*, in a circle, each

having a small seat and a ball, *F'*, to close it. Said balls are kept in place by a disk, *G'*, supported by rods *H'* a sufficient distance above the disk *D'* to allow the balls to play, and held fast by a rod, *I'*, passing down through a center plug, *J'*, in the disk *D*, and a bridge, *K'*, by which, and a nut, *L'*, the plug and the disk *G'* are held in place. The object of this arrangement is to enable the balls to be put in place and taken out through the disk *D'* from the bottom by removing the nut *L'* and raising the plug *J'*, rod *I'*, and disk *G'*. A hand-hole is made in the lower part of the pump-barrel at *M'* for introducing the arm to adjust the balls. *N'* is the valve at the bottom of the pump-barrel.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the disks *A B*, pump-rods *C*, pipes *D E F*, and pump-barrel *G*, in the manner herein described, to constitute the frame-work for the operative parts of a mining-pump to be suspended by ropes, as set forth.
2. The combination of suspending-rods *G'*, links *I*, yokes *K*, and pulleys *L*, with the pump for suspending it by ropes, as described.
3. The stationary piston *N*, reciprocating cylinder *Q*, hollow piston-rods *O P*, the steam-valves *W*, and slide-valve *Z*, substantially as specified.
4. The valve *W* having a chamber, *y*, in each end, in combination with stationary heads *b'*, chambers *m g*, ports *n p*, and the inlet-orifices *r*, substantially as specified.
5. The valve cylinder or case, fitted in the chamber of piston *N*, and secured by and between the heads, as described.
6. The combination of bar *g* and springs *j*, with the rod *e* and its stops, and the flanges of the cylinder for shifting valve *Z* before the cylinder-stops, substantially as specified.
7. The disk *G'*, standard *H'*, rod *I'*, plug *J'*, and bar *K'*, with the valve-disk *D'*, and the balls *F'*, substantially as specified.

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Witnesses:

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