E. DAGGETT.

MINE-PUMP.

No. 193,228. Patented July 17, 1877.

Fig. 1.

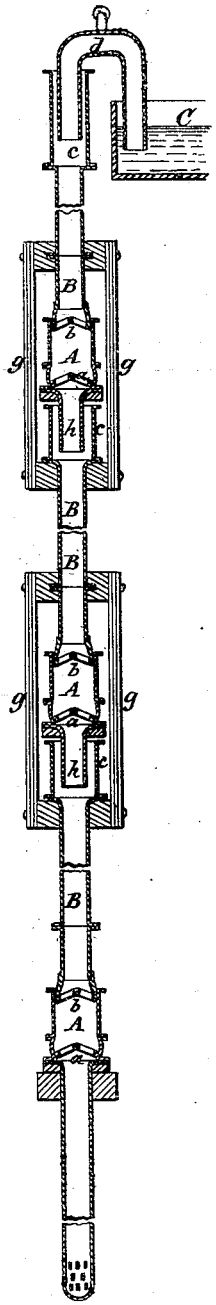


Fig. 2.

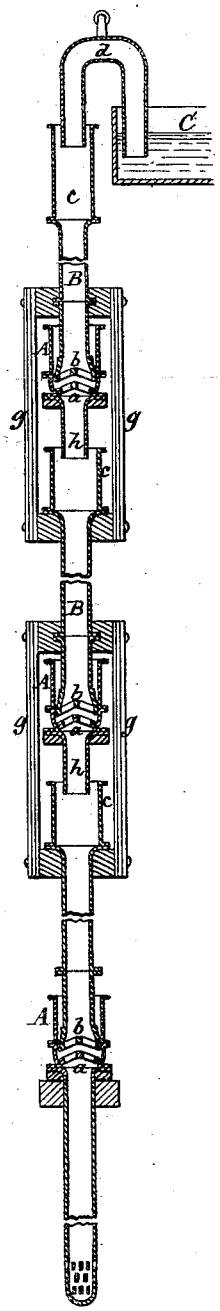


Fig. 3.

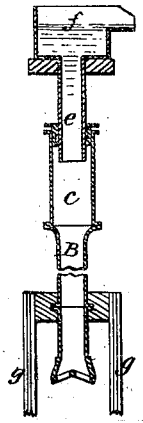
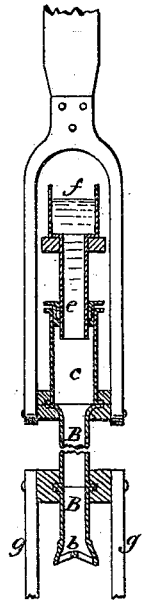


Fig. 4.



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UNITED STATES PATENT OFFICE.

ELLSWORTH DAGGETT, OF SALT LAKE CITY, UTAH TERRITORY.

IMPROVEMENT IN MINE-PUMPS.

Specification forming part of Letters Patent No. **193,228**, dated July 17, 1877; application filed May 5, 1877.

CASE B.

To all whom it may concern:

Be it known that I, ELLSWORTH DAGGETT, of Salt Lake City, in the county of Salt Lake and Territory of Utah, mining engineer, have invented certain new and useful Improvements in Mine-Pumps; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description thereof.

My improvements relate to that class of pumps in which a longitudinally-reciprocating pipe is employed for operating the valves and conducting water from the pump-barrel.

Pumps of this class are well adapted to mining purposes, in that they occupy but little space in a shaft, and (by reason of certain improvements made by me, subject of a separate application for Letters Patent) they may be operated without "balance-bobs," as in Cornish pumps.

My present invention consists mainly in the combination, with two or more stationary pump-barrels having suitable valves, of two or more reciprocating pipes, which operate the piston-valves, and are united together and operate simultaneously, so that the several barrels and pipes co-operate as one pump, the water being forced from the lowest pump to one next above, and so on until it can be freely discharged at the top of a shaft or at any lower point from which flowage is possible.

Another feature of my invention consists in the combination, with the reciprocating pipe in a mine-pump, of a tank or chamber mounted on the top of and moving with said pipe, from which the water lifted thereto may be discharged, either by a pump located above it, by a siphon, or by means of any other suitable apparatus.

To more particularly describe my invention, I will refer to the accompanying drawings, in which—

Figures 1 and 2 represent, in section, a mining-pump, embodying the several features of my invention, and illustrate the moving pipes in their highest and lowest positions while the pump is in operation. Fig. 3 illustrates another method of discharge from the upper pipe. Fig. 4 represents the pitman-connection to pump, arranged as in Fig. 3.

A in each instance denotes a pump-barrel. Three of these are shown. Their number will be increased or lessened, according to requirements. Each pump is provided with a suitable valve, *a*, at the bottom of the barrel, and the movable valve *b* is connected with the reciprocating pipe B in each case.

At the top of each pipe B is a tank, *c*. From the tank of the upper pipe the water may be delivered in various ways; but I have in this instance shown a siphon, as at *d*, which discharges into a stationary tank, C. The siphon is, of course, variable in its action, its slowest current occurring when the tank *c* is at its lowest position, and its fastest when the the tank *c* is in its highest position. With pumps of long stroke, operating at a speed of from four to say seven strokes per minute, a siphon properly proportioned will perform good service.

In Fig. 3 I show the pipe B and tank *c*, to be provided with a stuffing-box at its top, engaging with a stationary pipe, *e*, which projects downward from the bottom of the stationary tank *f* into the movable tank *c*.

It will be seen that the presence of tank *c* permits the pipe *e* to be made of the same diameter as pipe B, and therefore there is no increase of speed within pipe *e*, and consequently no increase of pressure involved in discharging the water into the tank *f*, from which a free overflow is effected, as shown.

It will be seen that the several pump-barrels are located at intervals one above the other, and, in this instance, in the same line. This line may be vertical or inclined, according to the character of the shaft in which the pump is used.

The distance between the barrels may be varied according to circumstances. The moving pipe B of the intermediate pump is connected at its top with the lower end of the pipe B of the pump above, and at its lower end with the top of the pipe of the pump below by means of the two tie-bars *g*, which are so connected to the pipes as to afford an open space within which a pump is located. The several pipes B, thus connected, are simulta-

neously operated as one pipe, power being applied to a pump-rod connected to the top of the upper pipe.

The lower barrel has a suction-pipe provided with the customary strainer, as shown. Each of the upper barrels has a light suction-pipe, *h*, which extends into the movable tank next below, and has a length slightly greater than the length of the stroke of the pump, so that when the pipe B and its tank *c* is at its lowest point the end of pipe *h* will still be submerged therein.

It will be seen that as the pipes B are elevated, water will be drawn into the lower barrel through the stationary pipe, and into each of the upper barrels from the moving tanks on the pipes next below. As the pipes next descend the water is forced from the barrels into the pipes and their tanks, and so on. Although each moving tank below a pump will have less water in it when the tank is fully elevated than when at its lowest point, the surface of the water therein will always occupy about the same position with reference to the barrel next above, because the quantity of water drawn therefrom into the barrel will equal that which was drawn at the last stroke from the barrel below, and because the tank moves upward with its pipe with a speed equal to that at which the water is drawn therefrom. The dimensions of the tank are so proportioned with relation to the size of the pipe, the barrel, and the length of stroke, that the lower ends of the short suction-pipes *h* will always be submerged. In the upper tank *c*, when the siphon is employed therewith, the level of the water varies, because the siphon, being continuous in its action, must draw water at all times during the upward and downward movement of the tank and its pipe. When the tank *c* is employed with the packing-box and interior tank-pipe, as in Fig. 3, the tank *c* is obviously always filled with water, the discharge therefrom being constant both during the upward and downward movement of the pipe B.

It will be understood that suitable guides are provided for maintaining the pipes in proper position to secure an easy and regular movement.

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

1. In a mine-pipe, two or more stationary pump-barrels placed one above the other and provided with suitable valves, in combination with two or more reciprocating pipes which are connected to each other by tie-bars, and operate simultaneously within their respective pump-barrels, substantially as described.

2. In a mine-pump, the combination, with a pump-barrel, a reciprocating pipe, and suitable valves, of a tank mounted upon the upper end of the reciprocating pipe and moving with it, substantially as and for the purposes specified.

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Witnesses:
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