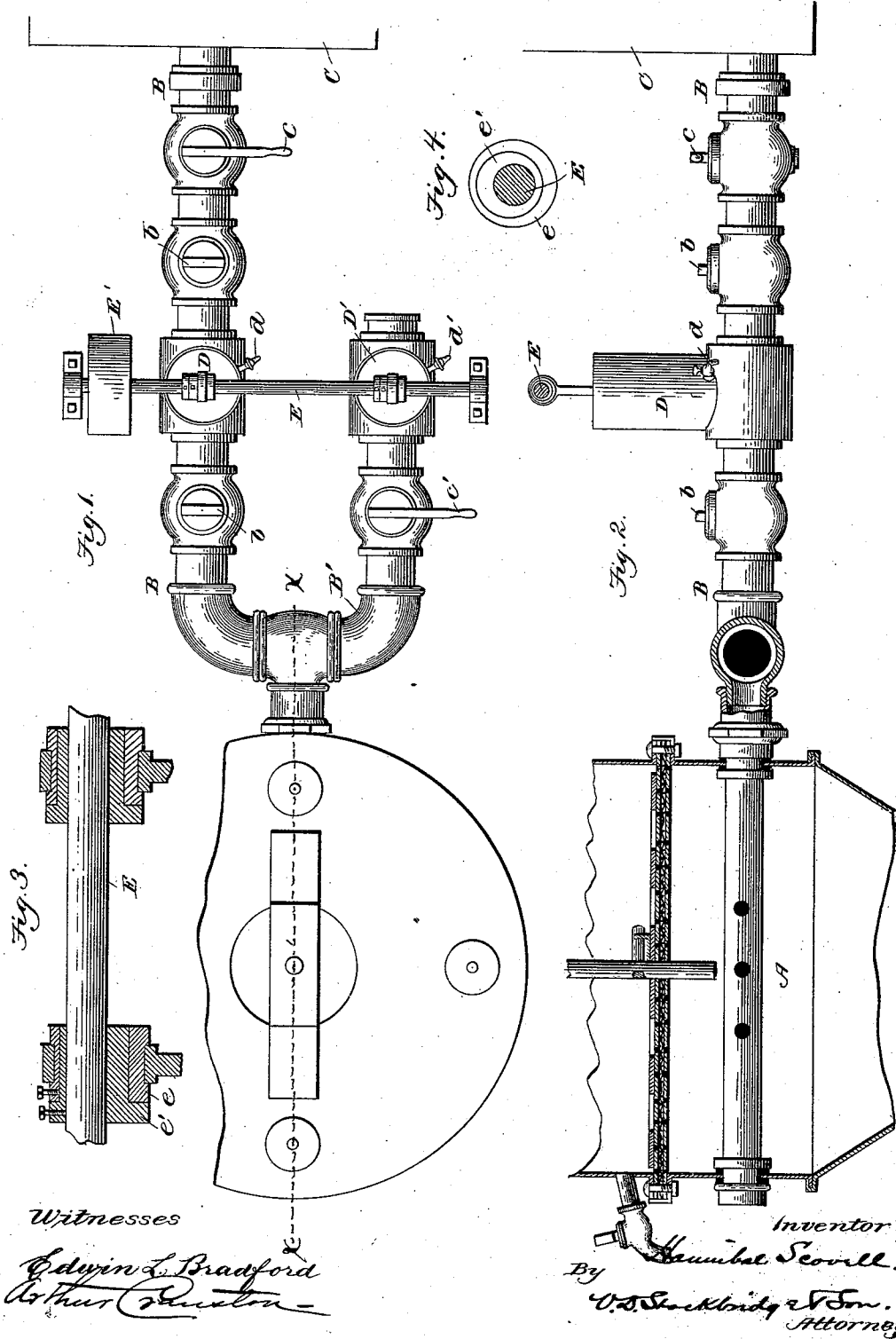


(No Model.)

H. SCOVELL.
ORE CONCENTRATOR.

No. 468,931

Patented Feb. 16, 1892.



UNITED STATES PATENT OFFICE.

HANNIBAL SCOVELL, OF PORTLAND, COLORADO.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 468,931, dated February 16, 1892.

Application filed May 23, 1891. Serial No. 393,864. (No model.)

To all whom it may concern:

Be it known that I, HANNIBAL SCOVELL, a citizen of the United States, residing at Portland, in the county of Ouray and State of Colorado, have invented certain new and useful Improvements in Ore-Concentrators; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in ore-concentrators of the character described in my application, Serial No. 368,591, filed October 18, 1890, wherein an intermittent, upwardly-progressive, reciprocating, or undulatory movement is given to a volume of liquid carrying mineral in suspension.

The invention consists, essentially, in improved means for imparting to pulp the movement described and claimed.

In the drawings, Figure 1 is a plan, and Fig. 2 is a sectional elevation, of my improvement on the line *xx* of Fig. 1. Fig. 3 is a section, on an enlarged scale, of compound adjustable eccentrics for operating the pump-pistons; and Fig. 4 is a sectional elevation of the compound eccentric attached to the shaft.

A is a vessel or tank having a horizontal diaphragm or screen and other appendages similar to that described in my application, Serial No. 368,591, before referred to.

B is a conduit leading from reservoir C or other suitable water-supply to the lower part of vessel A.

B' is a pipe connected with the conduit B, extending past or beyond the inlet of the vessel A. This extension is closed at its outer end by a cap or other device.

D and D' are pumps arranged in or communicating with the conduits B and B', respectively, substantially as shown in the drawings. These pumps are operated by means of a driven shaft E and double or compound eccentrics *e e'*, adjustable on the shaft and with relation to each other, so as to regulate the length of stroke of the pump-pistons. The shaft is driven from any prime motor through the medium of pulley E'.

Between the tank and the pump D and between the vessel A and pump D' are cocks *c c'* for shutting off the flow of water, as may

be desired, and connected with the cylinders of both pumps are petcocks *d d'* for the purpose of draining said cylinders, as occasion may require.

b b are the usual check-valves of a force-pump.

One part of the double or compound eccentric is adjusted and held to the shaft, and the other part is held to its fellow by a set-screw, as shown, or by other suitable means. The eccentrics are adjusted to regulate the stroke of the two pumps, so that pump D' will have about one-fourth the capacity or length of stroke of pump D. The adjustment and relative stroke of the pumps are varied according to the character of the material to be treated.

It should be understood that my invention contemplates the simultaneous use of two pumps adjusted to different capacities with relation to each other. Obviously the pumps may be of different sizes and therefore of different capacities with the same length of stroke. When at rest, the stop-cocks *cc'* are closed and petcocks *d d'* open.

In operation, the pumps being started and pulp being fed to the upper part of vessel A, the cock *c* opened and petcock *d* closed, the water will be drawn from source of supply by the upward movement of the pump-piston and will be driven forward to the vessel A by the downward forcing or reverse movement of said piston. This operation continues until the vessel A is filled to a level above the diaphragm, when the cock *c'* is opened and petcock *d'* closed. At this time piston of pump D', which is synchronous with that of pump D, draws backward from the vessel A a volume equal to its capacity, and upon the reverse movement a volume equal to the capacity of both pumps is injected or forced into the vessel. These successive operations of forcing a relatively large volume of water into and withdrawing a small volume from the vessel A gives an upwardly-progressive, reciprocating, or undulatory movement to the volume of liquid passing through the vessel. The upward and forward impulse of the water serves to lift the suspended minerals step by step, and the backward impulse arrests the upward movement and draws it downward slightly and keeps the contents of the liquid

aroused and suspended, while permitting the heavy portions to settle below the lighter, and finally draws the heavy parts through the screen to the lower part of the vessel A, whence they are discharged for further treatment.

Having now described my invention, what I claim is—

1. In an ore-concentrator wherein an upwardly-progressive undulatory movement is imparted to a volume of liquid, the combination of a concentrating tank or vessel, a source of water-supply, a conduit leading from supply to tank, a force-pump interposed in said conduit between the pulp and vessel, and a second pump in said branch, substantially as described.

2. The combination of a conduit leading from source of water-supply to tank or vessel, a pipe having its outer end closed communicating with said tank or vessel, and a pair of

force-pumps, one in the conduit and one in the closed pipe, substantially as described.

3. The combination of a conduit, a pipe having one end closed, a concentrating tank or vessel, and a pair of synchronously-operating pumps of differential capacity, substantially as described.

4. The combination of a conduit, a concentrating-vessel, a closed pipe, a pair of synchronously-operating pumps, and means for adjusting the stroke of said pumps with relation to each other, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

HANNIBAL SCOVELL.

Witnesses:

J. C. BODEN,

GEORGE E. WOLLASTON.