

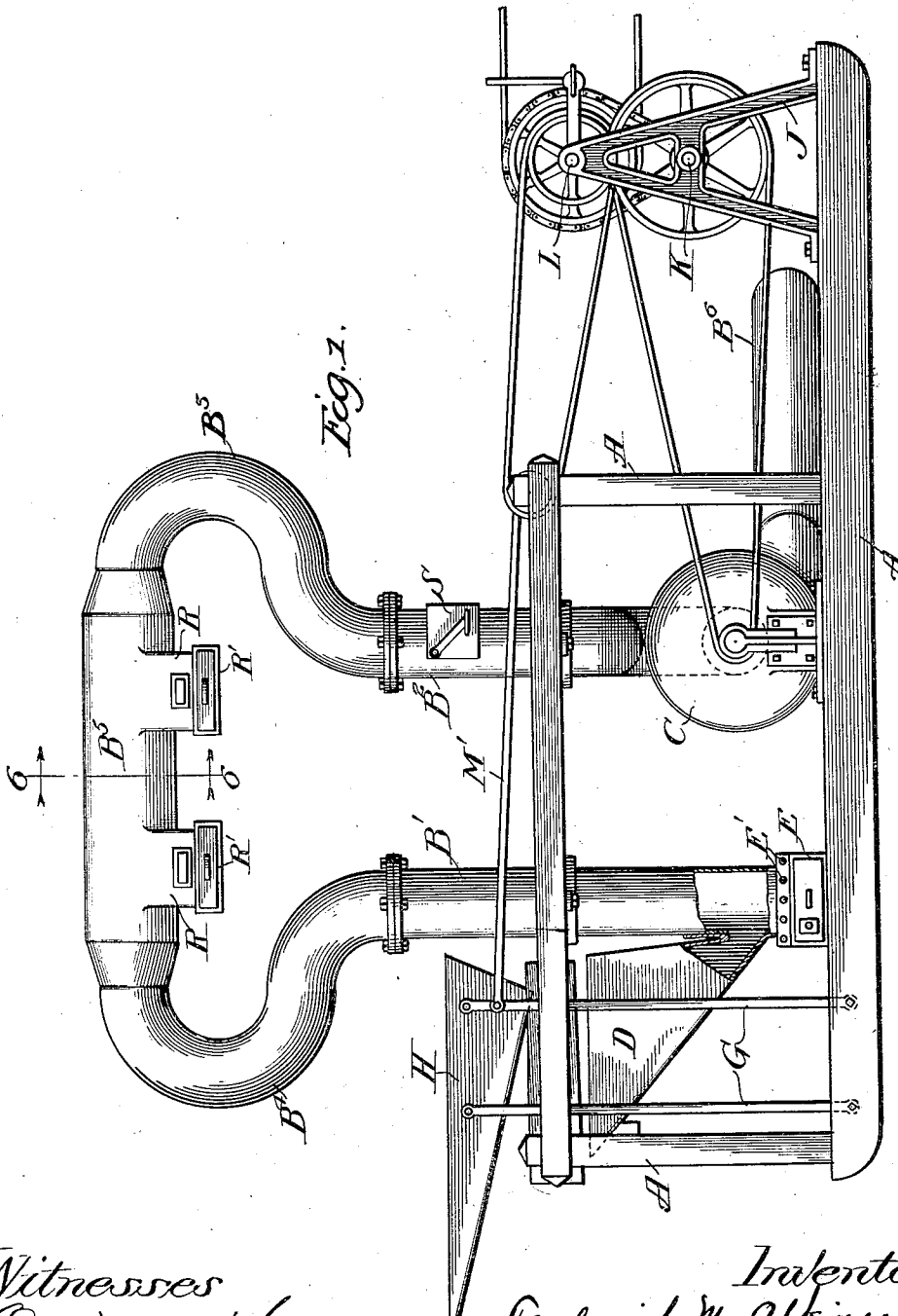
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CONCENTRATOR.

APPLICATION FILED MAY 21, 1910.

1,049,035.

Patented Dec. 31, 1912.

3 SHEETS-SHEET 1.



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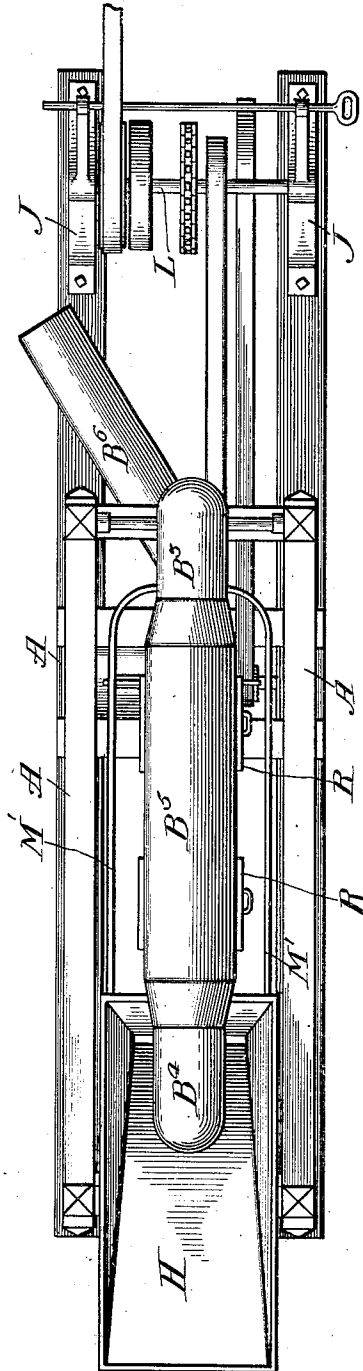
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3 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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CONCENTRATOR.

1,049,035.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FREDERICK M. ATKINSON, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Concentrators, of which the following is a specification.

My invention relates to concentrators, and has for its object improvement in the construction and operation of that kind of concentrator which is used for separating gold from dirt in placer mining. The kind of concentrator here mentioned is sometimes called a "dry washer," because it performs a separation without the use of water, and by means of an air blast. Devices of this kind work on the principle that as gold is heavier than ordinary dirt or sand, a blast of air sufficient to carry away the lighter material will permit the heavier material to drop into a suitable receptacle, from which it may be removed and further cleaned by the ordinary washing process.

In the accompanying drawings, Figure 1 is a side elevation, Fig. 2 is a plan, Fig. 3 is an end elevation, Fig. 4 is a plan of the screen, Fig. 5 is a partial plan showing the connection and crank for vibrating the screen, and Fig. 6 is a partial section on line 6-6 of Fig. 1.

In the said drawings, A represents a wooden frame within which are supported two vertical pipes B¹ and B². The upper ends of the pipes B¹ and B² are united by a uniting section of pipe, the ends of which are given reversed curves, as shown at B³ and B⁴. The central portion of the uniting section is horizontal and of larger diameter and is shown at B⁵. Suspended from the lower part of the horizontal portion B⁵ and communicating with the same, are two chambers R, in the lower portions of which are drawers R¹. The lower end of the vertical pipe B¹ also is provided with a drawer E, immediately above which are a series of apertures E¹. Adjacent to the pipe B¹ is a chute D, immediately above which is a screen box F provided with a series of screens F¹. Above the screen box F is a hopper H, and the said screen box and the said hopper are supported on rocking arms G, shown in Figs. 1 and 3. At the lower end of the pipe B² is an exhaust fan C, the said pipe B² being curved so as to unite the said fan at its center by the bending of the said pipe

B², as shown in Figs. 1 and 3. The discharge from the said fan is shown by a pipe B⁶. Supported on an extension of the frame A is a standard J, on which are the shafts K and L. On the said shafts are pulleys, a chain, and sprocket wheels, furnishing communication between the two and a means of driving the fan C and a shaft M, located on the frame work A. The central portion of the shaft M is made into a crank, as shown in Fig. 5, and from this crank a connecting rod M¹ extends to and connects with one of the vertical supporting rods G of the hopper H and screen frame F. The arrangement of these parts is such that when the driving mechanism supported in the frame J is driven by power, as illustrated by belts in Fig. 1, the shaft M is rotated and consequently the hopper H and screen box F are reciprocated. Located in the other pipe B² is a damper, illustrated at S, the object of which is to regulate the opening through the said pipe B² and consequently the volume of air that will be drawn through the pipes B¹, B² and their connecting piece by means of the fan C.

The operation is as follows: The power being applied to the driving mechanism shown in the standard J, the exhaust fan is set in operation, and the hopper and screen frame are vibrated. Material is then deposited in the hopper, which material finds its way through the bottom of the hopper on to the screen. The vibration of the screen sifts the material, permitting the finer particles to drop through the screen from the chute D and pass from the said chute through an aperture D¹ into the lower portion of the pipe B¹. Here the material meets a current of air drawn by a fan C¹ and entering partly through the aperture E¹ and partly through the aperture D¹. This current of air passing upward raises the lighter particles, including all dust and dirt, carrying the said particles upward and through the pipes to the fan C, and is then discharged outward through the discharge pipe B⁶. The heavier particles, as small nuggets of gold, will drop down into the drawer E, from whence they may be readily removed. Among the particles of fine material carried upward there is found to be a certain amount of flour gold; that is, very fine particles, that are carried upward by the current of air. I find that by making the connection from the pipe B¹ to the pipe B²

of reverse curves and the central portion large, as illustrated in Fig. 1, the change in course of the particles when such change is combined with a larger chamber, as B⁴, tends to cause the particles of gold to settle at certain points in the horizontal section, which points are those represented by the chambers R. As a consequence the fine particles of gold that pass upward are very largely caught in these two chambers and may be removed by means of the drawers R¹. The explanation of the operation of these parts is as follows: The current of air flowing upward in the left hand pipe B¹ carries with it the smaller particles, including dirt, dust and fine gold. When the rising air strikes the reverse curve B⁴, the gold being of greater specific gravity than the air, does not readily change its course, but shoots across the current of air and impinges upon the lower and inclined portion of the inner part of the curve. Here the particles of gold have their velocity retarded, and the current of air drags or rolls them slowly over this curve, after which they readily fall into the nearest chamber R. Particles which, by reason of fineness, are deflected by the air current sufficiently to not follow this course, or which bound outward after impinging upon this curve, retain or regain their velocity and are carried beyond the first chamber R. After entering the larger central section B⁵, the velocity of the air is checked and these carried-over particles settle and are deposited in the lower part of this enlarged section, principally at the

point at which the second chamber R is located.

What I claim is:

1. The combination with two vertical pipes, a chute for discharging material into one of said pipes, and an exhaust fan for drawing air through the other pipe, of a horizontal section of pipe provided with ends having reversed curves and serving to unite the two vertical pipes, said reversed curves being so arranged as to cause particles of gold carried therethrough by a current of air to congregate at specified points in the horizontal portion substantially as described, and receiving chambers located at the said points in the horizontal portion.

2. The combination with two vertical pipes, a chute for discharging material into one of said pipes, and an exhaust fan for drawing air through the other pipe, of a uniting section of pipe connecting together the two vertical pipes, said uniting section having its ends formed into reverse curves and the central portion of enlarged diameter whereby material of the specific gravity of fine gold carried by a current of air through said pipe will be normally deposited at specified points in the enlarged portion of the uniting section, and receiving chambers located at such points.

Signed at Chicago this 25 day of April, 1910.

FREDERICK M. ATKINSON.

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