

Jan. 25, 1938.

A. LOWY

2,106,183

SUCTION ELEVATOR

Filed May 5, 1936

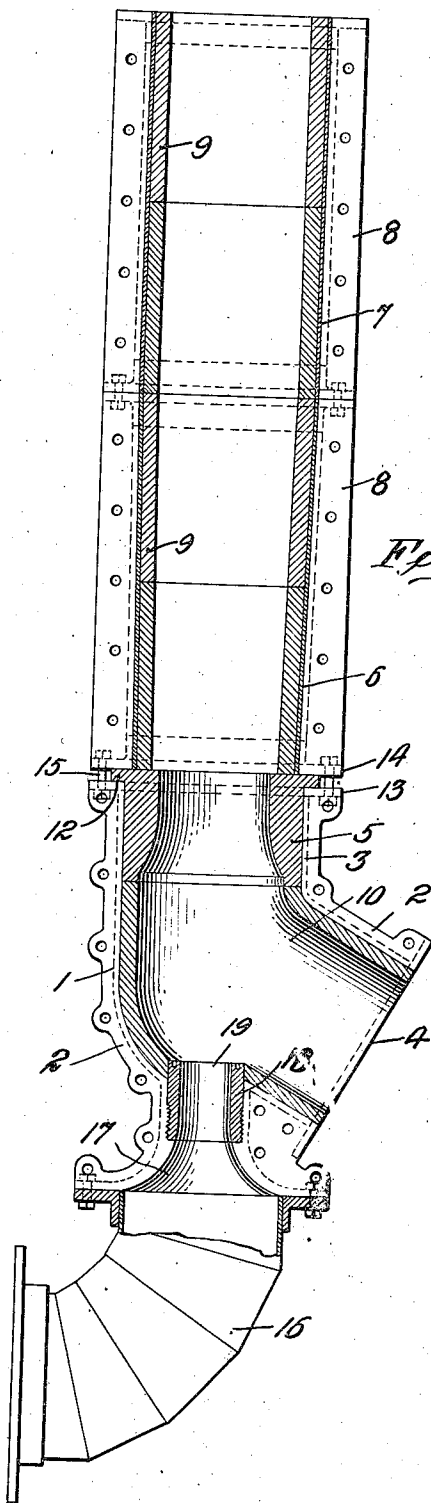


Fig. 1.

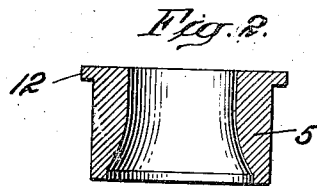


Fig. 2.

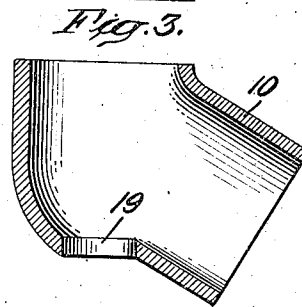


Fig. 3.

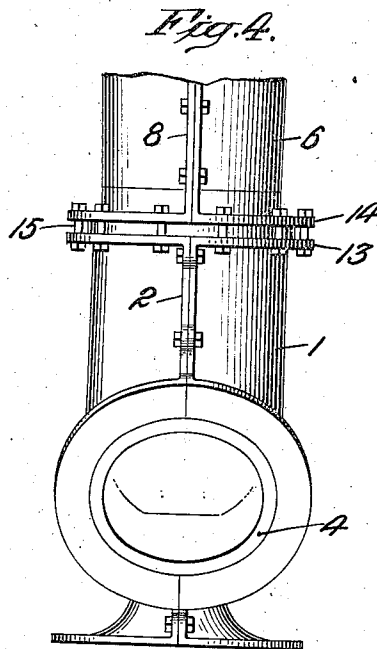


Fig. 4.

INVENTOR  
ARTHUR LOWY  
BY Sager & Malcolm  
ATTORNEYS

## UNITED STATES PATENT OFFICE

2,106,183

## SUCTION ELEVATOR

Arthur Lowy, Newark, N. J., assignor to New York Engineering Company, New York, N. Y., a corporation of New York

Application May 5, 1936, Serial No. 77,911

4 Claims. (Cl. 302—15)

This invention relates to suction elevators of the type shown in Ludlum Patent #1,668,855 and has for its object to simplify the construction and improve the efficiency and operating characteristics of such apparatus.

Suction elevators of the above type have heretofore been provided with a mixing chamber containing a projecting water supply nozzle which not only increases the cost of construction and assembly but also presents certain disadvantages from an operating standpoint. For one thing, the projecting water nozzle interferes with the flow of material and, due to the irregular contour of the mixing chamber, produces turbulence and otherwise interferes with the efficient operation of the device. Furthermore a pocket is formed around the nozzle into which sediment may collect or large stones or rocks may become wedged when the device is shut down. Attempts have been made to provide manholes through which access to the interior of the mixing chamber can be had for removing material lodged herein but manholes are objectionable because they are subject to wear and are hard to keep tight. Also, when these elevators are used in placer gold mining a substantial loss occurs because gold collects in the pockets and may be surreptitiously removed by the workmen.

The present invention provides an improved suction elevator which avoids all the above-mentioned objectionable features of the prior art. In its preferred embodiment the invention comprises a mixing chamber which is stream-lined in the direction of flow so as to set up a minimum of turbulence and to permit gravel and other material to flow therethrough with the least possible resistance. The water supply nozzle terminates in an opening in the lining of the mixing chamber without protruding into the chamber. In this way the nozzle is prevented from interfering with the flow of material and is also protected against wear which would otherwise result from constant contact with the materials which pass through the chamber. As will hereinafter appear, my device is also much cheaper to construct and much easier to assemble than prior art devices of this type.

These and other features and advantages of the invention will be described in connection with the accompanying drawing, in which:

Fig. 1 is a vertical section of a portion of a hydraulic elevator embodying the invention;

Fig. 2 is a sectional view of the nozzle ring;

Fig. 3 is a section of the liner for the mixing chamber; and

Figure 4 is an elevation of the nozzle section of the elevator.

In the following description and in the claims certain specific terms have been used for convenience in referring to various details of the invention. These terms, however, are to be interpreted as broadly as the state of the art will permit.

Referring more particularly to the drawing, the suction elevator is shown as comprising a mixing chamber which is preferably formed by a split housing 1 having flanges 2 by which it may be joined together. The housing 1 comprises an upper discharge section 3 and a lower intake section 4 the axis of which extends at an angle to the axis of the discharge section 3 so that the housing forms, in effect, an elbow. The discharge section 3 contains a nozzle ring or throat 5 communicating with an expanding uptake 6 which, in turn, communicates with a cylindrical uptake 7. The expanding uptake 6 and cylindrical uptake 7 are both formed of semi-circular pipe sections having flanges 8 by which they may be joined together to form a closed pipe. Wearing rings or liners 9 are carried within this pipe.

The housing 1 also contains a liner 10 of suitable wear-resisting material such as manganese steel. This liner 10 is formed as a single piece and is stream-lined in the direction of flow so that all sharp angles or indentations which would cause turbulence are avoided. The nozzle ring 5 is positioned above the liner 10 in the discharge section 3 of the housing and is provided with a flange 12 which is clamped between flanges 13 and 14 formed on the housing 1 and on the semi-circular pipe sections of the expanding uptake 6. Bolts 15 extend through said flanges 13 and 14 for securing the assembly.

Water under pressure is supplied through a pipe 16 which is secured to a lower nozzle butt 17 formed as a part of the housing 1 and carrying a nozzle liner 18 terminating in an opening 19 in the liner 10 of the housing 1. The nozzle 18 may be threaded or otherwise secured in the nozzle butt 17 and may be permanently secured in place since it is out of contact with the material passing through the chamber and is not subject to wear. The nozzle 18 is preferably located with its axis coinciding with the axis of the top discharge opening of the housing 1 so that water passing through the nozzle 18 is forced directly upward through the expanding uptake 6 so as to create suction for drawing material into the opening 4 and carrying same up-

wardly through the elevator in a manner well known in the art.

I have found that my elevator operates at a greatly increased efficiency due to the streamlining of the various passages, which prevents turbulence and avoids the interposition of other objects such as water nozzles in the path of the gravel and other materials being elevated. The streamlining also materially reduces the wear on the lining because the material is caused to pass uniformly through the various passages without formation of eddy currents which would cause it to impinge upon the walls thereof. The device also avoids all recesses or pockets in which material could accumulate or lodge, and thereby eliminates the necessity for shutdowns for cleaning purposes as well as preventing direct loss of valuable material such as gold through manual removal from such pockets.

The one-piece liner 10 of the housing 1 eliminates the necessity for a plurality of joints which would be required in a sectional liner and is secured in place without the use of fastening bolts. For inserting this liner it is only necessary to separate the split housing 1. After the liner is in place it is securely held by the bolts securing the flanges 2 of the split housing. The nozzle butt 17 may be formed as an integral part of the housing since it is not subject to wear and does not need to be replaced. The one-piece liner 10 is lighter than previous sectionalized liners and is preferable because it does not require fastening bolts or other means to effect tight joints. The streamlined construction reduces the wear to a minimum and avoids the necessity for frequent replacement, particularly when the liner is made of wear-resisting material such as manganese steel. Other portions subjected to wear, such as the nozzles 5 and 12, may also be made of manganese steel or other wear-resisting materials if desired.

Although a specific embodiment thereof has been shown for purposes of illustration, it is to be understood that various changes and modifications may be made therein as will occur to a person skilled in the art. Hence the invention is only to be limited in accordance with the following claims when interpreted in view of the prior art.

The invention claimed is:

1. In a suction elevator, a chamber having

inlet and discharge openings arranged with their axes at an angle so that the material changes its direction of travel in passing therethrough, a one-piece lining for said chamber having a substantially continuous and unbroken surface adapted to permit passage of material without turbulence, and a water supply nozzle terminating substantially flush with said lining so that the nozzle is out of the path of the flow of material in said chamber and does not interfere with the smooth flow of material therethrough.

2. In a suction elevator, a chamber comprising a housing in the form of an elbow having intake and discharge openings, said housing being split along a plane passing through said openings, a one-piece liner therein having a continuous unbroken inner surface adapted to permit flow of material therethrough without turbulence, and a water supply nozzle terminating substantially flush with said liner so that the nozzle is out of the path of the flow of material in said chamber and does not interfere with the smooth flow of material therethrough.

3. In a suction elevator, a chamber comprising a housing in the form of an elbow having intake and discharge openings, said housing being split along a plane passing through the axes of said openings, a liner therein having a continuous unbroken inner surface adapted to permit flow of material therethrough without turbulence, and a nozzle formed in said housing and terminating substantially flush with the inner surface of said liner so that the nozzle is out of the path of the material in said chamber and does not interfere with the smooth flow of material therethrough.

4. In a suction elevator, a chamber comprising a housing in the form of an elbow having intake and discharge openings, said housing being split along a plane passing through the axes of said openings, a liner therein having a continuous unbroken inner surface adapted to permit flow of material therethrough without turbulence, a nozzle butt formed as a part of said housing, and a nozzle liner secured to said housing adjacent said nozzle butt and terminating substantially flush with said first liner so that the nozzle is out of the path of the flow of material in said chamber and does not interfere with the smooth flow of material therethrough.

ARTHUR LOWY.