

(No Model.)

A. McDOUGALL.

METHOD OF AND APPARATUS FOR MINING GOLD OR OTHER METALS.

No. 531,740.

Patented Jan. 1, 1895.

Fig. 2.

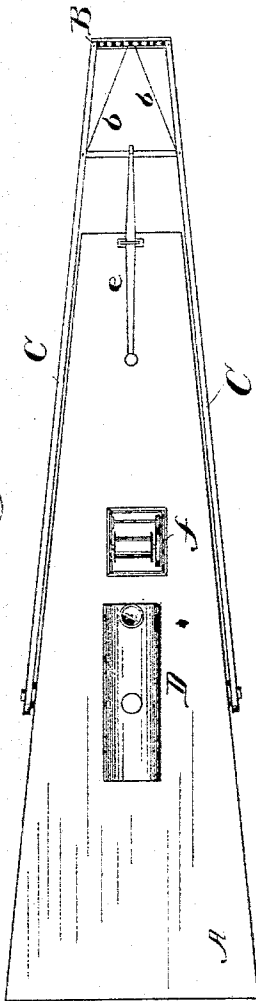
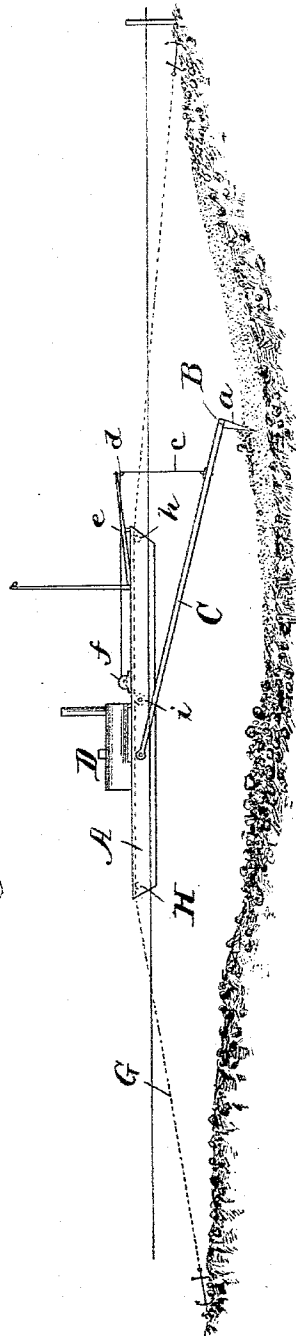


Fig. 1.



Witnesses  
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By his Attorney  
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# UNITED STATES PATENT OFFICE.

ALEXANDER McDOUGALL, OF DULUTH, MINNESOTA.

METHOD OF AND APPARATUS FOR MINING GOLD OR OTHER METALS.

SPECIFICATION forming part of Letters Patent No. 531,740, dated January 1, 1895.

Application filed June 18, 1894. Serial No. 514,972. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER McDOUGALL, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Methods of and Apparatus for Mining Gold or other Metals; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a method of and apparatus for mining gold and other metals, found in mineral bearing sand and gravel forming part of river and lake bottoms.

The bottoms of many of the American rivers and lakes, particularly in the Northwest, contain considerable quantities of sand, earth and gravel in which are found gold, silver, copper and other metals and which I will hereinafter refer to by the generic expression, mineral bearing sand and gravel. These metals are either chemically combined with the sand and gravel or are mechanically mixed therewith. It is now the general practice to remove this mineral bearing sand from the bottom of rivers and lakes by suction produced by centrifugal or other pumps, after which it is drained of water and finally is treated for the removal of the particular metal desired in any well known way. It has however been discovered that this mineral bearing sand or gravel is frequently found to be mixed with heavy stones, rocks, boulders and other obstructions, which not only tend to clog up the suction pipes and damage the working parts of the pumps, but render it impossible to handle such sand and gravel with economy, so that when the mineral bearing sand and gravel are found to be mixed with obstructions of the character mentioned, no efforts are made to remove it, although it may be rich in minerals.

My present invention relates to a method of and apparatus for removing these heavy rocks, stones, boulders and other obstructions, so that the mineral bearing sand and gravel with which they are mixed, can be readily mined by a centrifugal or other pump.

For a better comprehension of the inven-

tion, attention is directed to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved apparatus showing the bed of the river or lake in section, and Fig. 2, a plan view of the apparatus on an enlarged scale.

Referring to the views, A, is a flat boat or scow made preferably of the form illustrated, namely, with its sides inclined toward each other from the stern to the bow. It is to be observed however, that any other construction of bow may be used, and also that a vessel propelled by steam or hand, irrespective of form or build, can be employed.

I prefer to use a scow, since it can be built cheaply, has a large dead weight capacity, and answers every purpose. In addition, a scow also offers a broad flat deck on which may be mounted and carried a pump or pumps and other necessary and desirable mining apparatus. Carried by this scow and capable of being elevated or depressed so as to conform to the configuration of the river or lake bottom; is a rake B, provided with heavy teeth  $\alpha$ , so arranged with respect to each other that they will engage and remove all stones or rocks which are of a size sufficiently large to damage the working parts of the pumps or obstruct the suction pipes thereof. I do not desire to be limited to any particular mechanism for carrying this rake, or to any particular device for raising and lowering it, yet the means illustrated for accomplishing these ends which I shall now describe, can be advantageously used.

Pivoted to each side of the scow A, preferably at a point a short distance back of its central axis, *i. e.* at about its center of gravity, is a heavy arm C, made either of wood or metal. These two arms extend parallel with the sides of the scow and if the latter is of the configuration illustrated, these arms will converge toward each other as shown, whereby a rake of reasonable width, say from six to eight feet, may be attached in any desirable way directly to the free ends of these arms. By pivoting these arms C, at a point back of the central axis of the scow it will be observed that very long arms can be employed for working in considerable depths of water and at the same time the entire resist-

ance of the rake is imposed upon the scow at about its center of gravity, as explained, whereby the scow will always preserve its line of flotation under all conditions. Furthermore, by so arranging these arms the rake will work in the river bottom at a point immediately ahead of the scow, whereby its action can be readily observed and the results noted. Stay rods *b, b*, may be used for the purpose of strengthening the rake if desired.

Mounted on the scow A, is a boiler D, of any desired construction and which may be housed-in in any suitable way. This boiler supplies steam for operating several steam windlasses or capstans, which will be hereinafter referred to. The arms C, carrying the rake B, may be elevated or lowered in any suitable way, preferably by a cable *c*, passing over a block *d*, carried by a supporting arm *e*, said cable being operated by a windlass *f*, supplied with steam from the boiler or operated by hand. In order that the scow A, carrying the rake B, may be moved with respect to the river bottom, I prefer to make use of a heavy cable G, which may be anchored at both ends, as shown, or be attached to stakes or posts, said cable being passed over sheaves H, preferably beneath the deck of the scow, and thence around the drum of a steam windlass *i*, by which the said scow may be propelled.

With this apparatus I proceed to carry out my invention substantially as follows: The cable G, is first arranged with respect to that portion of the river bed in which are found mineral bearing sand and gravel mixed with heavy rocks, stones and other obstructions, said cable passing through the scow, as explained, and over the drum of the steam windlass *i*. The rake B, is now lowered, being preferably allowed to drag freely along the river bottom and the windlass *i*, is started so that the scow will be propelled along the line of the cable G, dragging the rake B, along the river bed and raking up and carrying with it all the heavy rocks, stones and other obstructions. The scow is then returned to the starting point and this operation is repeated until the mineral bearing sand and gravel are free from all obstructions, the cable G, being shifted slightly to one side as the work pro-

gresses, if desired, after which the cable G, is removed to another part of the river and the operation is repeated. After the river or lake bottom has thus been freed of such obstructions as are not removable by suction, the mineral bearing sand or gravel is removed by suction, and the particular metal recovered therefrom in any desirable way.

Broadly considered, my improved method consists in removing large stones, rocks, boulders and other obstructions from mineral bearing sand and gravel and then in removing the mineral bearing sand and gravel by suction.

It is to be understood that other means than those I have described and illustrated for propelling the scow may be availed of. For example, the scow may be moved with respect to the cable G, by a hand windlass or capstan, or it may be provided with independent means or mechanism, such as a screw, or it may be moved by a separate propelling vessel, or the means for propelling it may be located on the shore of the river or lake.

Having now described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

1. The method of mining gold and other metals contained in mineral bearing sand and gravel forming part of lake and river bottoms, which consists in removing by the action of rake teeth such coarse rocks and other obstructions as are not removable by suction, and then in removing the mineral bearing sand or gravel thus freed from obstructions, by suction, substantially as set forth.

2. In an apparatus of the character described, the combination of a floating vessel A, having its sides inclined from bow to stern, the arms C, pivoted to said sides and converging toward each other at the rear end, and a rake B, carried by said arms in the rear of the vessel and capable of vertical movement, substantially as set forth.

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

ALEXANDER McDOUGALL.

Witnesses:

S. GEO. STEVENS,  
CHAS. W. LELAND.