Oct. 11, 1938. H. A. PAYTON 2,132,800

METHOD OF AND MEANS FOR RECOVERING SUBMARINE DEPOSITS

Filed Jan. 6, 1938

Fig. 1.

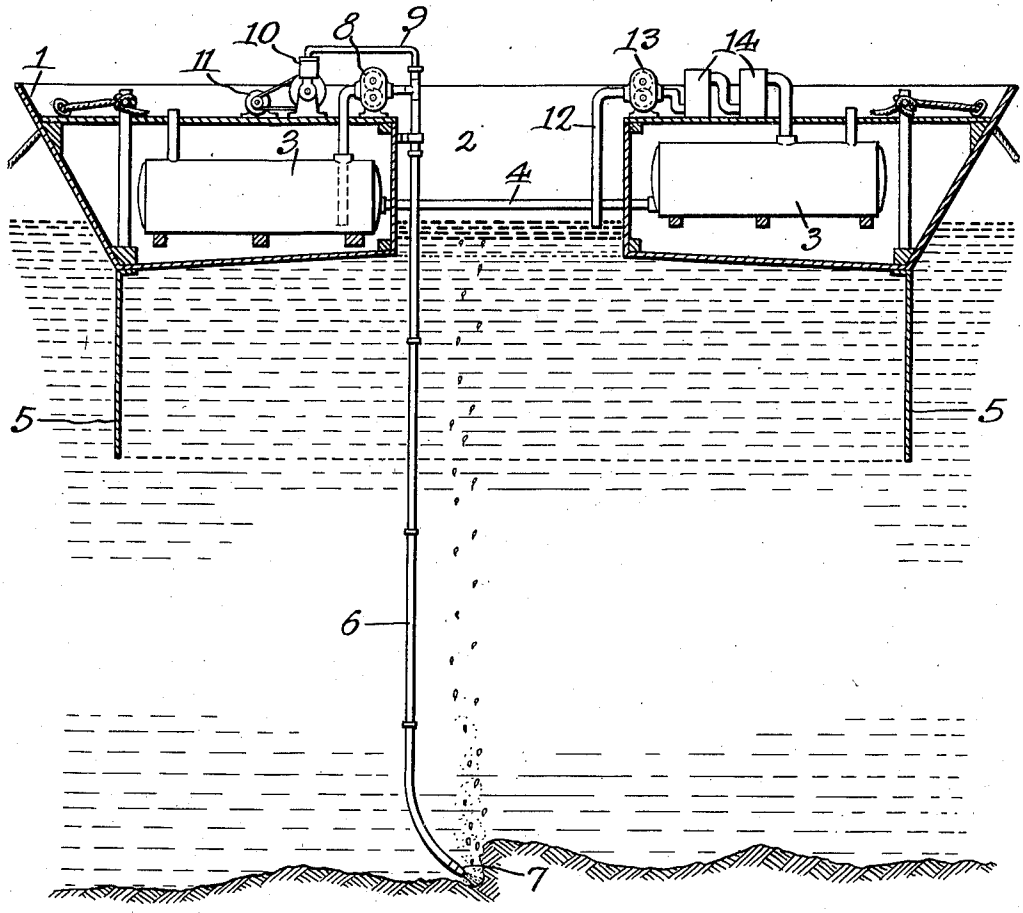


Fig. 2.

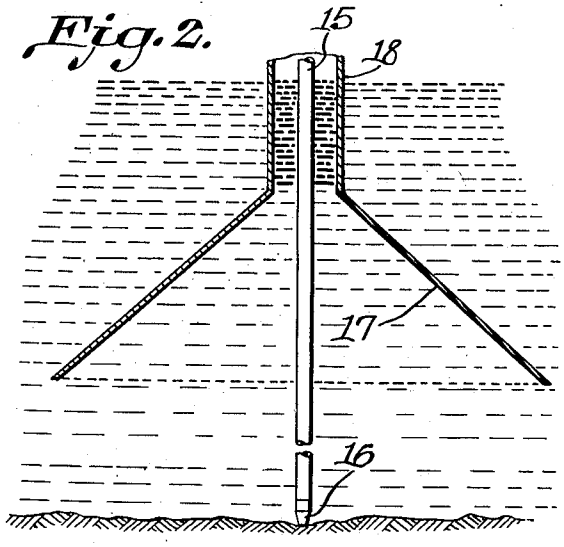
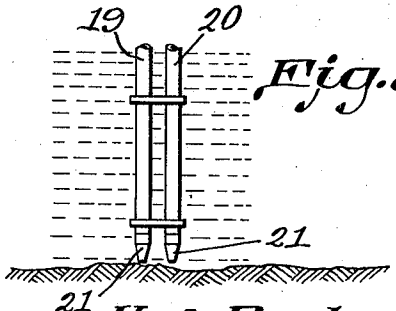


Fig. 3.



H. A. Payton
INVENTOR.

BY C. A. Snow & Co.
ATTORNEYS.

Patented Oct. 11, 1938 2,132,800

UNITED STATES PATENT OFFICE

2,132,800

METHOD OF AND MEANS FOR RECOVERING SUBMARINE DEPOSITS

Harry A. Payton, San Luis Obispo, Calif.

Application January 6, 1938, Serial No. 183,700

7 Claims. (Cl. 262—2)

This invention relates to a method of and means for recovering submarine deposits.

It is well known that ore-bearing sand frequently is found on ocean beds and more especially adjacent to the mouths of rivers. The sand is usually found in natural undulations or ripples where the river currents are slowed down as they merge into the ocean. The sand thus deposited has been found to contain deposits of gold, silver, and other valuable metals usually in very fine particles or "flour".

Heretofore recovery of these submarine deposits has been effected generally by means of dredges which have required the use of extensive equipment and high priced labor which frequently has not been justified by the values recovered.

An object of the present invention is to provide a new and improved method of recovering the flour metal, the said method requiring the use of the minimum amount of equipment which can be manipulated readily and requires little attention.

A further object is to utilize oil under pressure as a medium for agitating the deposited sand, encasing the flour gold or other valuable deposits, and conveying the particles by flotation to the surface where it is trapped and subsequently subjected to a separating operation whereby the values are removed and the oil reused.

With the foregoing and other objects in view the invention consists of certain new and novel steps in the method, and certain features of construction and combinations of parts hereinafter more fully described and pointed out in the claims, it being understood that changes may be made within the scope of the claims without departing from the invention.

In the accompanying drawing have been illustrated different types of equipment which can be used in carrying out the process.

In said drawing

Figure 1 is a section through a barge or like structure equipped with apparatus for carrying out the process.

Figure 2 is a section through a modified means for agitating and collecting the deposited values.

Figure 3 is an elevation of a portion of another agitating means.

In carrying out the process it is essential that a floating structure be provided. This can be in the nature of a barge 1 and it is preferred to form this structure with a well 2 extending therethrough from top to bottom. The barge can be employed as a means for holding oil or, as shown in Figure 1, oil-containing tanks 3 can be mounted in the barge, these tanks being suitably connected, as by means of a pipe 4, so that the level of the oil will be maintained practically the same in all of the tanks. It is to be understood, however, that any other type of oil container can be used or the barge itself can constitute an oil tank.

In the structure illustrated in Figure 1 a continuous apron 5 is extended downwardly from the ends and sides of the barge so as to provide an area of water completely surrounded by the apron and communicating with the bottom of the well 2.

A pipe line 6 is extended downwardly from the barge and terminates at its lower end in a nozzle 7 which can be of the type used in placer mining or of any preferred construction capable of performing the work intended. This pipe line 6 is designed to receive oil from a pump 8 which, in turn, is supplied with oil from one of the tanks 3 or other containers in which the oil normally is stored.

Also opening into the pipe 6, preferably at its upper end, is an air delivery pipe 9 leading from an air pump 10 driven by a motor 11 or the like.

A suction pipe 12 is supported within the well 2 and terminates a short distance below the level of the liquid in the well. This pipe communicates with a suction pump 13 adapted to force liquid through a filter 14 of any desired construction in which separation of minerals from oil can be effected and from which the oil can be discharged back into one of the tanks 3 or other oil containers. As the construction of the filter constitutes no part of the present invention, it has not been deemed necessary to illustrate or describe the same in detail.

In carrying out the method, the barge 1 is anchored above the value-bearing sand and the pipe 6 is then lowered so that nozzle 7 is supported in close proximity to the sand. Oil is then forced downwardly through the pipe and will escape forcibly in the form of a spray, into the sand which thus will be agitated and dislodged. The released oil has an affinity for the flour metal mixed with the sand and will quickly encase the particles. As the specific gravity of the oil is less than that of the water, the oil globules with the encased values, will quickly rise into the area defined by the apron 5 and either flow directly into the well 2 or be deflected to the well by the bottom of the barge which, as shown in Figure 1, can be inclined upwardly toward the well if so desired. As the globules of value-bearing oil reach the well, they will float upon the surface of the water and pump 13, which has been set in operation, will suck the oil upwardly through pipe 12 and de-

liver it to filter 14. At this point the oil will be separated from the metals after which it will be returned to the container 3 from which it can again be used in the same manner as already described.

The agitation of the sand can be accelerated and the flotation of the globules facilitated by the use of air under pressure. This can be directed in pipe 6 while the oil is being directed thereinto so that a spray made up of a mixture of air and oil under pressure will be delivered against the sand deposits.

In Figure 2 the pipe line 15 has been shown extending straight down to a downwardly extending nozzle 16 and a funnel-like deflector or apron 17 has been shown surrounding a large tubular well 18 so that dislodged value-bearing sand and the oil commingled therewith, will be trapped and then deflected upwardly into the well from which the oil and encased metals can be withdrawn as heretofore explained. In this arrangement oil alone can be used or a mixture of oil and air.

If perferred the oil and the air can be directed downwardly against the sand deposits through separate pipe lines as shown at 19 and 20 in Figure 3. Each pipe line has an outlet nozzle 21 and oil will be delivered through one of these nozzles while air is being delivered from the other nozzle and as both the oil and the air are under pressure, they will effectively act to agitate the sand deposits and elevate the values to the surface as already explained.

Under some conditions ordinary hydraulic nozzles can be used in connection with the air and/or oil nozzles to facilitate breaking up the formation being mined.

What is claimed is:

1. The herein described method of recovering submarine deposits which includes the step of directing an oil spray under pressure against sand containing mineral values, thereby to agitate the sand and expose the values for encasement by oil globules rising to the surface of the water.

2. The herein described method of recovering minute mineral particles from submarine sand deposits which includes the step of directing oil and air under pressure into the sand to agitate the same and to release the metal particles for encasement by globules of the oil and for movement with the oil by flotation to the surface of the water.

3. The herein described method of recovering submarine deposits which includes the step of directing an oil spray under pressure against sand containing mineral values, thereby to agitate the sand and expose the values for encasement by oil globules rising to the surface of the water, trapping the metal-bearing oil at the surface, separating the trapped oil from the metals carried thereby, and returning the oil for reuse upon the sand deposits.

4. The herein described method of recovering minute mineral particles from submarine sand deposits which includes the step of directing oil and air under pressure into the sand to agitate the same and to release the metal particles for encasement by globules of the oil and for movement with the oil by flotation to the surface of the water, trapping the metal-bearing oil at the surface, separating the trapped oil from the metals carried thereby, and returning the oil for reuse upon the sand deposits.

5. The method of rescovering metal values from submarine sand deposits which includes the step of agitating the deposits and elevating the values by flotation through the forcible application of oil to the sand deposits.

6. The method of recovering metal values from submarine sand deposits which includes the step of agitating the deposits and elevating the values by flotation through the forcible application of oil and air to the sand deposits.

7. Apparatus for use in the recovery of submarine metal values including a floating structure having a well, a nozzle suspended below the structure, means for directing oil into said nozzle under pressure for emersion as a jet or spray against the sand deposit, thereby to form globules of oil for encasement with metals released by the agitation of the sand and for flotation with said metals to the surface of the water, there being a well in the floating structure for the reception of the oil-encased values, and means on the structure for separating the metals from the oil and for returning the oil to the nozzle.

HARRY A. PAYTON.