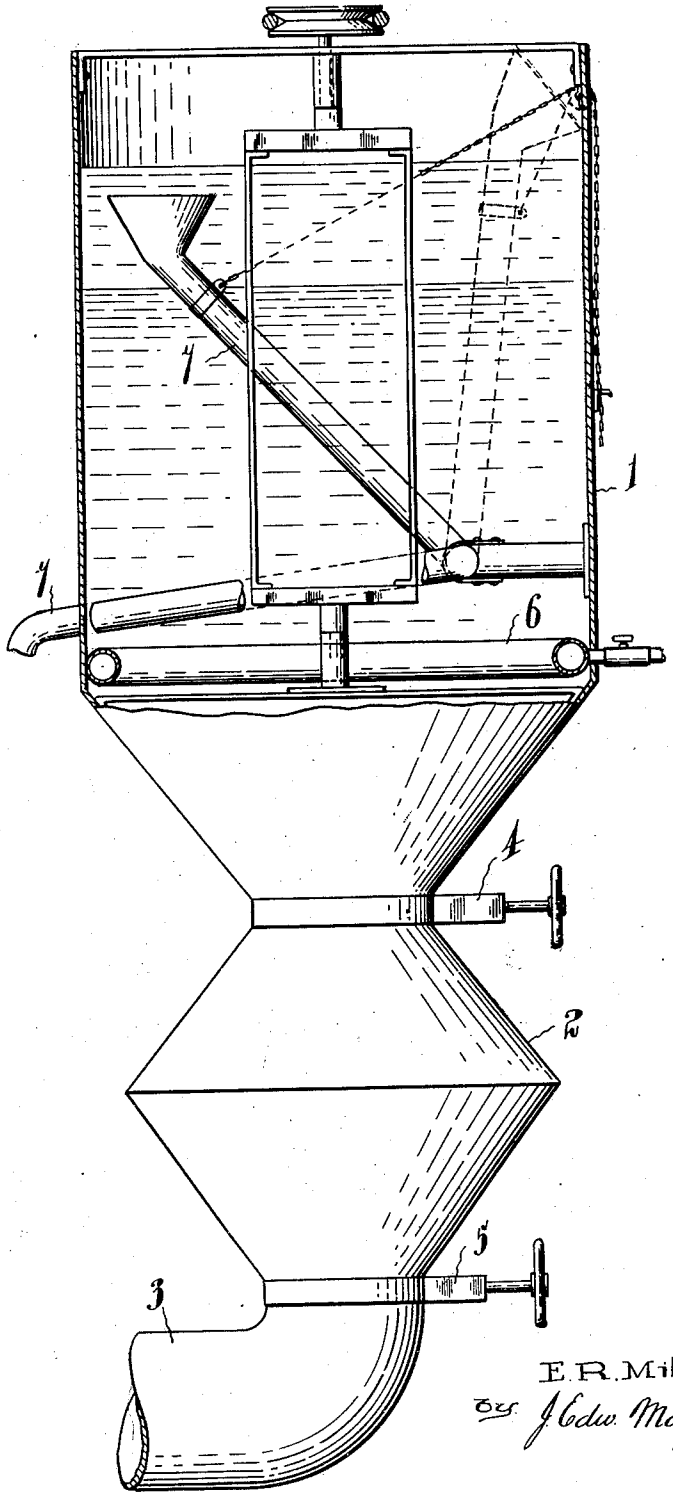
June 25, 1935. E. R. MITCHELL 2,006,088

METHOD OF SEPARATING OIL FROM FULLERS' EARTH OR SIMILAR MATERIAL

Filed Nov. 10, 1932




Inventor
E. R. Mitchell
By J. Edw. Maybee
ATTY.

Patented June 25, 1935 2,006,088

# UNITED STATES PATENT OFFICE

2,006,088

## METHOD OF SEPARATING OIL FROM FULLER'S EARTH OR SIMILAR MATERIAL

Edward Ross Mitchell, Sarnia, Ontario, Canada, assignor of one-half to Russel Kendall, Sarnia, Ontario, Canada

Application November 10, 1932, Serial No. 642,047

1 Claim. (Cl. 196—147)

In oil refineries it is usual to use fuller's earth, clay, or similar material in clarifying oil. The fuller's earth takes up a certain amount of the oil as it is used, and loses its effectiveness for clarifying purposes, hence has to be discarded and a fresh lot employed. This fuller's earth is comparatively expensive, particularly on account of freight charges in the case of refineries located a long distance from the source of supply of the fuller's earth. On top of the original expense, there is also the expense involved in disposing of the fuller's earth after use, as difficulty is often experienced in getting a suitable place for disposal. The oil with which the earth or clay is impregnated is also lost.

It will be seen therefore that there is considerable advantage in reclaiming the earth so as to render it fit for reuse, and also to reclaim the oil with which the earth is impregnated, but the processes and apparatus heretofore employed for the purpose of reclamation have been so complicated and expensive that it has not been commercially worth while to carry out said separation.

My object, therefore, is to devise a simple method and simple apparatus for treating the oil impregnated fuller's earth or clay whereby the earth or clay and oil may be satisfactorily separated and at a cost which makes the separation a commercially profitable proposition.

I attain my object by means of the method and apparatus hereinafter described and illustrated in the accompanying drawing which illustrates diagrammatically suitable apparatus for carrying out the method.

The apparatus in the main comprises two superposed hoppers 1 and 2, the upper hopper 1 being provided with a funnel-shaped lower portion to guide material into the lower hopper 2, the lower hopper also having a funnel-shaped lower portion to guide material into an outlet or discharge pipe 3.

A valve 4 is arranged to control flow from the hopper 1 to the hopper 2, and a valve 5 is arranged to control flow from the hopper 2 through the discharge pipe 3.

Means 6 are provided for heating the material in the hopper 1, which means may comprise a steam coil such as shown, but it will be understood that any other type of heating means may be provided.

The hopper 1 is provided with an oil discharge 7 which is provided with a vertically adjustable inlet, preferably by forming the part in two sections flexibly connected together as shown.

The method of separation is as follows. The valve 4 being closed, a quantity of a separating medium is placed in the upper hopper 1, and also a quantity of oil impregnated fuller's earth or clay, the solids in which will be sufficient to fill the hopper 2. In certain cases substantially two parts of separating medium will be used for one part of oil impregnated earth, while in other cases this proportion may be varied. While other separating mediums may answer the purpose, I find a very satisfactory one comprises a brine solution, in which the salt forms substantially four to six percent of the mixture, but I do not desire to limit myself to this as the amount of salt used will depend considerably on the kind of earth or clay and oil being separated.

The mixture of brine solution and oil impregnated earth and clay is brought to the boiling point of the brine solution, and it is found that this causes the oil and earth to separate, and this separation is facilitated if the mixture is subjected to agitation, which may be by mechanical means or by means of steam or air. Sufficient salt must be employed to prevent the oil emulsifying, and if during the boiling process the bubbles or froth are white, it indicates that the brine solution is not sufficiently strong. By ceasing the agitation of the mixture the heavier sand sinks to the bottom of the hopper and the oil rises to the top above the separating solution, from where it is drawn off through the pipe 7, the mouth of said pipe being dropped to a suitable level so that only the recovered oil is allowed to pass off.

The valve 4 is then opened allowing the earth or clay to pass into the lower hopper 2. When the latter is full, the valve 4 is first closed and the valve 5 then opened, thus allowing the earth or clay to pass off through the discharge pipe 3, after which the valve 5 is again closed.

The apparatus is now ready for the treatment of the next batch of oil impregnated sand in a similar manner, and as the separation has been effected without waiting for the brine to cool, the heat retained in the latter is available for the next batch.

While the oil separated from the sand is not as clear as fresh oil, it is found to be quite a satisfactory oil for most purposes. It is also found that while the reclaimed earth or clay is not quite so effective in clarifying oil as entirely fresh earth, it is found that if a small proportion, say 20%, of fresh earth be added to the reclaimed earth that substantially the same results are obtained as when using new earth altogether.

While the above process and apparatus have been devised particularly for the reclamation of fuller's earth used in the clarification of oils, it will be found apparent that the process and apparatus may be utilized in separating oil from natural oil bearing sands such as found in various parts of the world.

From the above description it will be seen that I have devised a method and apparatus which will satisfactorily attain the object of my invention as set out in the preamble of this specification.

What I claim as my invention is:

A method of separating oil from fuller's earth, clay or similar material, which comprises mixing in a suitable vessel the oil impregnated material with a briny solution, heating said mixture to substantially the boiling point of the brine solution, the salt forming from substantially 4–6% of the mixture, and allowing said mixture to settle to permit the material to deposit in the bottom of the vessel and the oil to float on the briny solution; and removing the material from below the briny solution.

EDWARD ROSS MITCHELL.