E. M. NICHOLS.

APPARATUS FOR CLEANING AND SEPARATION OF SAND.

APPLICATION FILED JULY 27, 1908.

936,801. Patented Oct. 12, 1909.

Fig. 1.

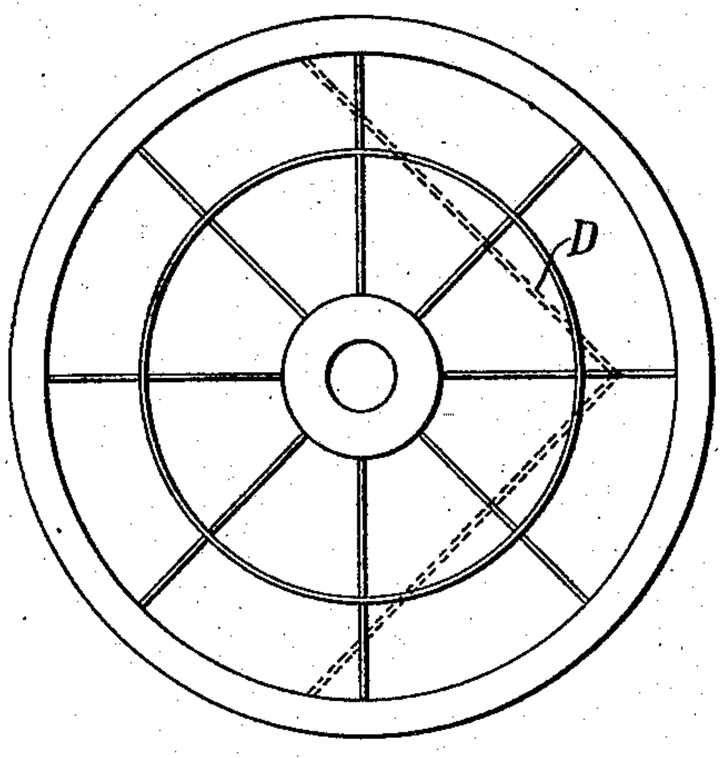


Fig. 3.

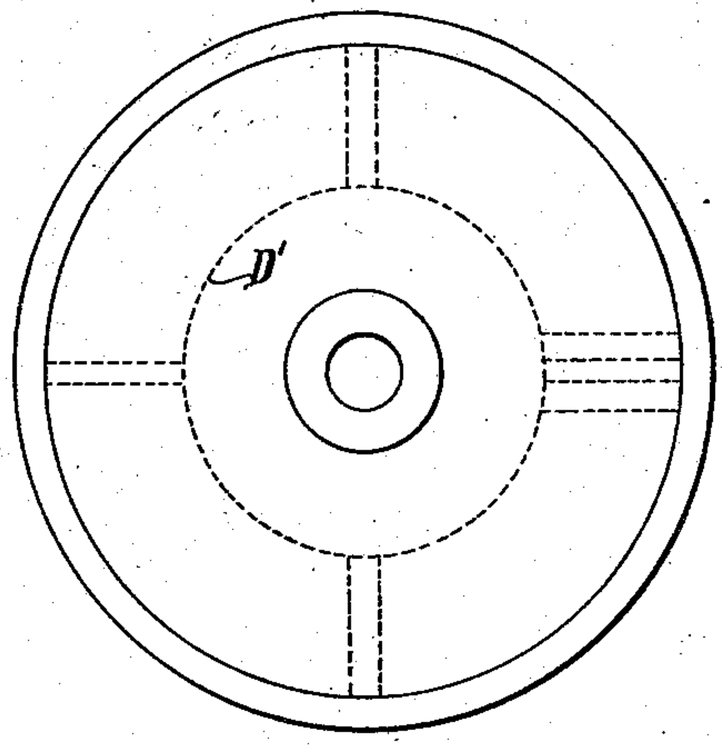


Fig. 2.

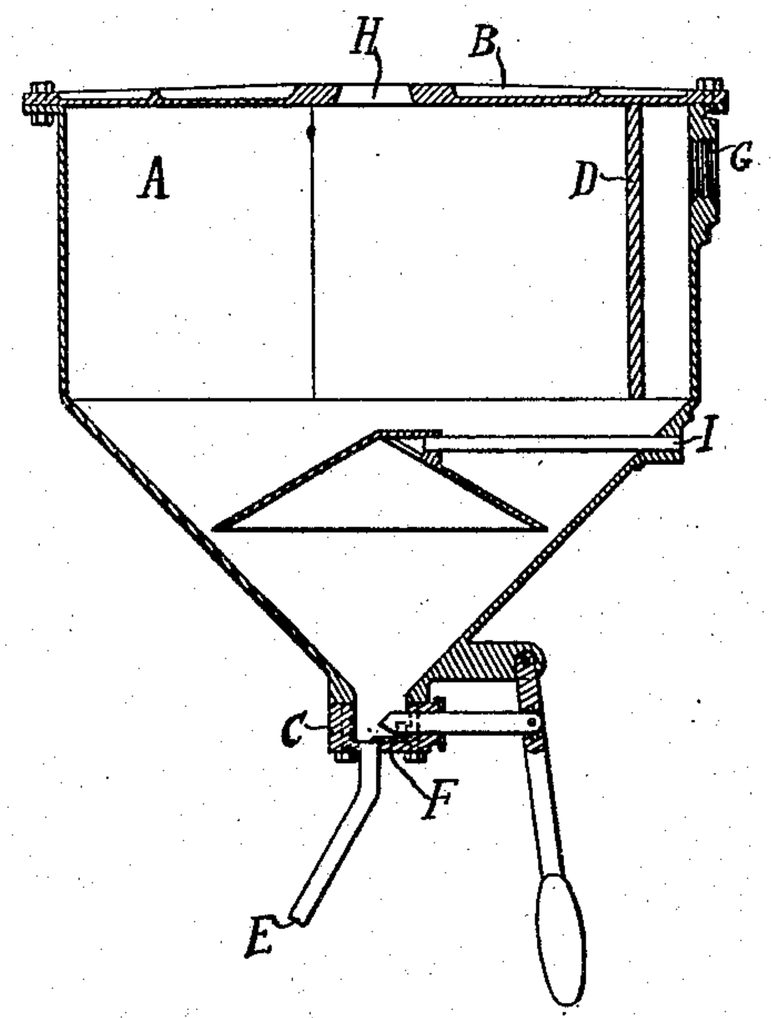
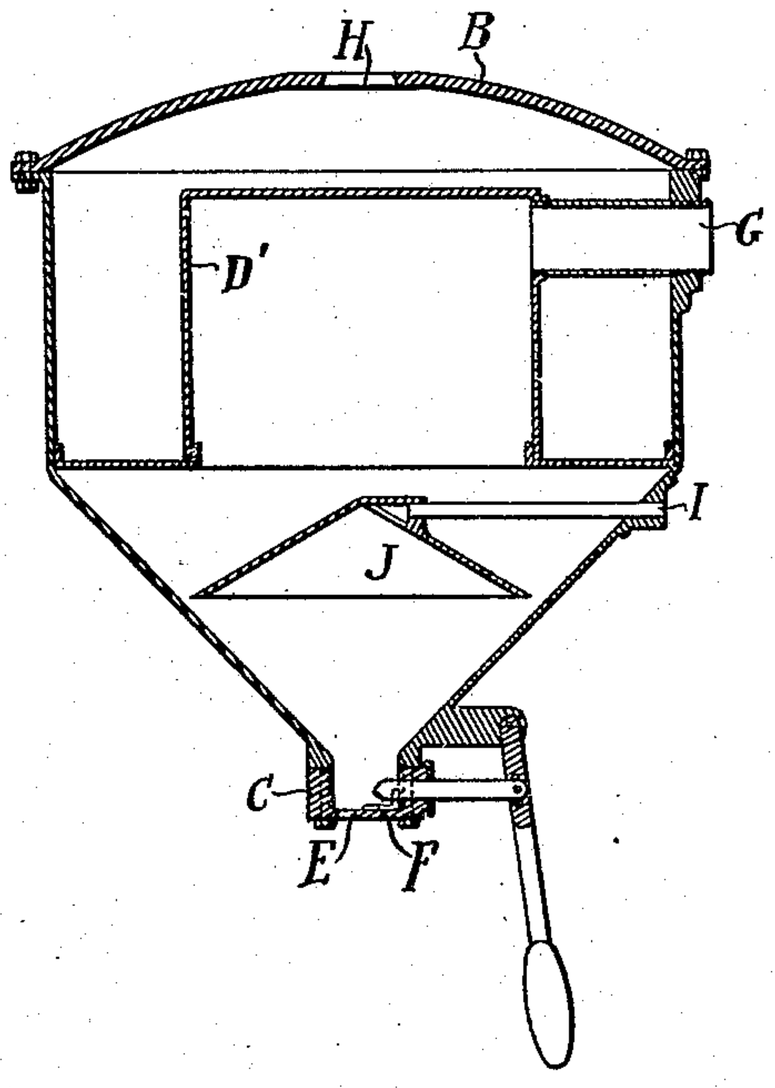


Fig. 4.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CLEANING AND SEPARATION OF SAND.

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To all whom it may concern:

Be it known that I, EUGENE M. NICHOLS, residing in the city of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Cleaning and Separation of Sand, and the following is a clear, full, and exact description, reference being had to the accompanying drawings.

My invention relates to that class of apparatus particularly designed for cleaning and separating sand, where water impelled by an ejector, pump or other mechanical device is used as a means for propelling the sand through pipes or hose to some convenient place for cleaning or storing, one of the objects of the invention being to provide a simple and efficient apparatus for separating the sand from the dirty water and foreign matter while it is being transported, it being further desired that the apparatus shall be so constructed as to permit the clean sand to be restored approximately to the original position occupied before treatment and that without removing it from the inclosure as is ordinarily done.

Another object of my invention is to provide a sand separating apparatus of such construction that the clean sand can be separated from the dirty water while under a pressure greater than is developed by the apparatus at rest, or that which would be developed in an apparatus in which the water is permitted to overflow by gravity; it also being desired that the apparatus shall be free from complicated and expensive parts.

These objects I obtain as hereinafter set forth, reference being had to the accompanying drawings, in which:—

Figures 1 and 2, are respectively a plan and a vertical section of one form of my improved cleaning apparatus, and Figs. 3 and 4, are respectively a plan and a vertical section of a cleaning apparatus, having a form of baffle different from that shown in Figs. 1 and 2.

In the above drawings "A" represents a substantially closed vessel, having a conical or hopper shaped bottom, and provided with a cover "B", having an outlet opening "H" and the vessel "A" has an inlet "G" for dirty water and sand, and is also provided with a conduit "I" for the admission of cleansing water. This latter conduit enters the vessel near the top of the conical bottom portion and terminates within a distributing cone "J", which in this instance it supports some distance above the bottom portion of the vessel and in the center line thereof.

At the lower extremity of the hopper bottom is mounted a valve "F" for controlling the discharge of the sand. Mounted within the upper portion of the vessel "A" is a deflector "D", which in this instance consists of two vertically mounted plates joined to each other along two vertical edges, so as to extend at an angle to each other; it being noted from Fig. 1, that this vertical edge of the deflector is immediately adjacent to the inlet "G".

Under operating conditions cleansing water is supplied through the conduit "I" and dirty water carrying the sand is forced into the vessel "A" through the opening "G". It will be understood that the liquid within this vessel is under a pressure which can be varied in any of a number of ways, such as by throttling the discharge or by attaching the latter to discharge pipes or conduits, extending to a height or having a greater or less frictional resistance. In any case the water and sand entering the vessel "A" through the opening "G" strikes the deflector "D" with the result that the dirty water carrying with it mud and other foreign materials passes downwardly to the lower edge of the deflector "D" and thence around the same upwardly to the outlet "H", while the sand falls down on to the distributing cone "J" and to the sides of the hopper bottom. In so falling this sand is exposed to the cleansing water delivered from the conduit "I" at the sides of the cone "J"; it being understood that this water is of sufficient volume to create an upward flow sufficient to prevent the descent of the dirty water. Moreover said cleansing water meets the falling sand in a uniform manner without setting up a cutting action and effectually removes from it any foreign material still carried. The space within the top of the vessel "A" is so proportioned as to insure such an upward flow of dirty water as will not carry away an undue proportion of fine sand. The valve "F" may be operated in any desired manner to permit a flow of the sand from the vessel "A" and this sand as discharged customarily contains

from 5% to 15% of water to facilitate its flowing.

In the form of my invention shown in Figs. 3 and 4, the baffle is given the form of an inverted bucket shaped structure "D¹", into the upper portion of which the inlet "G" is connected. In any case, however, the arrangement and construction of the baffle is such as to cause a precipitation of the sand and a flow of the dirty water carrying the foreign matter first down and then upwardly to the outlet or discharge opening "H". It is obvious that the discharge valve "F" may be of any desired construction.

By treating the sand under pressure within a closed tank I am enabled to secure a wide range of adaptability for the control of the cleaning operations, as well as for the disposal of the waste water with its entrained foreign matter. I have also found that advantageous results are secured by the employment of a distributer to the interior of which cleansing water is supplied, and which is preferably arranged as illustrated in the drawings.

I claim:

The combination in a sand cleaning and separating apparatus of a closed container having a bottom outlet for cleaned sand, a vertically mounted cylindrical structure closed at the top and open at the bottom, within said container, a pipe extending into the container and entering the cylindrical structure at the top thereof, the container having an outlet above the top of the cylindrical structure, a conical deflector under the cylindrical structure adjacent the lower edge thereof and having its lower edge extending adjacent the sides of the container, with means for supplying cleaning water to the inside of the apex of said deflector.

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