

J. N. FLOOD.
HYDRAULIC CLASSIFIER FOR ORES.
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982,583.

Patented Jan. 24, 1911.

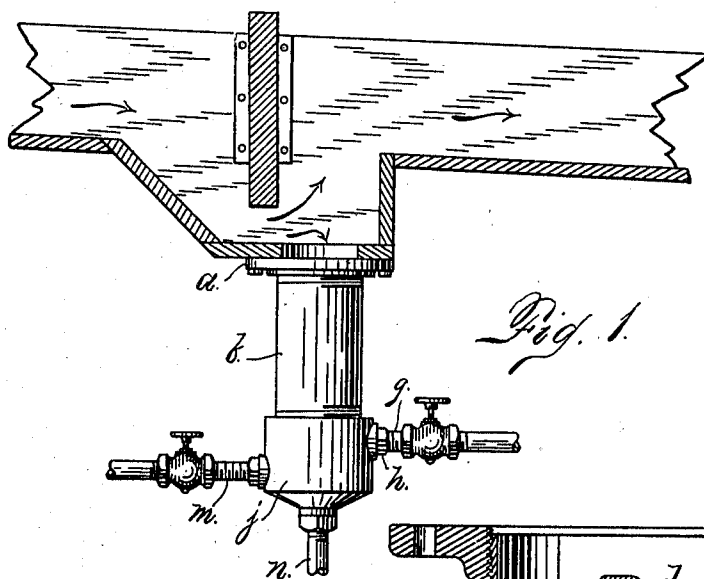


Fig. 1.

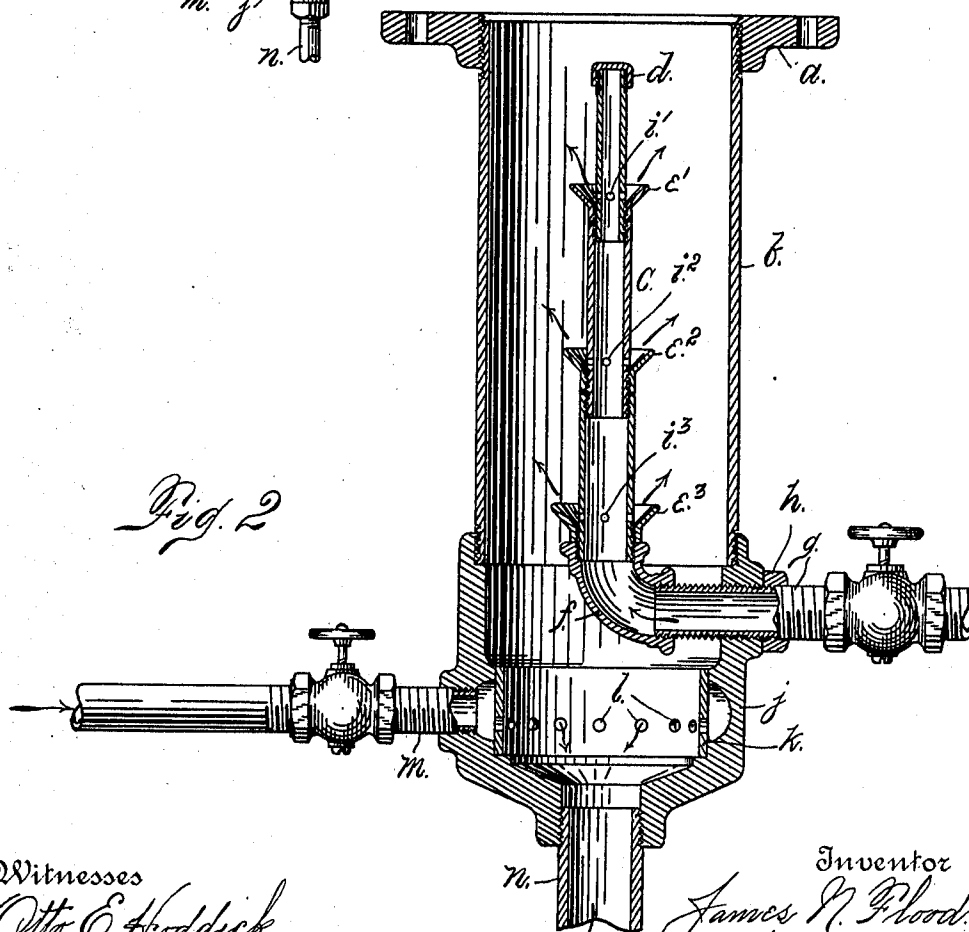


Fig. 2.

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To all whom it may concern:

Be it known that I, JAMES N. FLOOD, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Hydraulic Classifiers for Ores; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in hydraulic classifiers and means for applying the upward current of the water to classifiers using a sorting column of constant area, and to using a pocket or spitzkasten compartment for the classification of ore pulps. In each of the said types of classifiers the pulp to be classified is run into the classifier by means of a suitable launder and subjected to an upward or rising current of water through which the heavier particles fall, discharging through an opening in the bottom of the classifier, while the rejects or the particles too light to settle through the said upward current are passed to the next classifier for further separation.

In the use of the different types of classifiers various methods are employed to apply the water pressure to the classifier in such manner that an upward current is produced, through which certain ore particles fall under the influence of this water current, while other particles may be held in suspension at or near the top of the sorting column or compartment, until an accumulation of these particles form a mass and it falls to the bottom of the column, carrying with it particles which should have been rejected, thus lessening the efficiency of the classifier and requiring an objectionable amount of water or pressure to prevent such mass forming. It is this unnecessary amount of water and the consequent improper sizing of the particles that seriously affect the further treatment of the classified material.

As a special apparatus suitable for carrying out the main feature of my invention, I preferably employ a water column of suitable size, centrally located in the so-called sorting column or compartment, through which classifying water is conveyed and distributed into the sorting column or compart-

ment, so that a series of upward water currents are produced and particles falling in the column are subject to the influence of each series, thus preventing the forming of an accumulated mass of particles.

In the construction of a water column for conveying and distributing the water into the sorting column or compartment of the classifier, I preferably use a series of short pieces of iron pipe, screwed one into the other, of different sizes so that each section will permit of a maximum distribution of water into the sorting column through a series of small holes drilled through each section of the pipe at or near the junction where screwed together.

There are other minor features of invention involved in the elemental construction, and particular arrangement herein described all of which will more fully hereinafter appear.

In the drawings referred to herein and forming a part of this specification: Figure 1 is a side elevation showing the usual arrangement of attaching a classifier to a conveying launder having a pocket to intercept the flowing material, the same having attached thereto my apparatus for classifying ores. Fig. 2 is a sectional side elevation of this classifier showing the centrally located water column for distributing the water pressure forming the series of upward currents described.

The sections of pipe forming this column are preferably arranged so that the intake or largest pipe is located near the bottom of the classifier. A cone or cup shaped deflector is provided on the outside of each section of pipe below each series of holes, so that the water is deflected upward at about 40 degrees, forming a current through which particles will fall to the next series of openings and again be influenced by the current produced there, and so on to the discharge at the bottom of the classifier. It is this arrangement of a series of upward currents that permits of the use of little water to break up mass forming and gives continuous selective action on proper size particles.

The same reference characters indicate the same parts in all the views.

a indicates the flange which is screwed on to the sorting column and is bolted to a trough or launder through which the ore pulp flows.

b is a sorting column, preferably an iron

pipe of constant cross-sectional area, into which the pulp falls from the conveying trough or launder.

c is the centrally located classifying water column made of sections of iron pipe screwed one into the other.

d is a pipe cap screwed on to, and closing the water column *c* at its upper end.

*e*¹, *e*², and *e*³ are cup-shaped deflectors made of cast iron and are screwed on to the sections forming column *c*.

f is a cast iron bow into which the column *c* screws.

g is a pipe nipple which is provided with a long thread and passes through the base of the classifier into the cast iron bow *f*, and supports the column *c*.

h is a cast iron lock nut intended to fasten pipe *g* securely.

*i*¹, *i*², and *i*³ are holes drilled through column *c* to distribute the upward currents of water into the sorting column *b*.

j is the cast iron base forming the bottom of the sorting column.

k is a circular piece of iron casing pressed into cast iron base *j*, having holes drilled through its periphery.

l are holes drilled through casing *k* to admit water into base *j* of sorting column *b*.

m is an iron pipe screwed into the base *j*, which admits water into the space surrounding the casing *k*.

n is a pipe nipple screwed into base *j*, and is the discharge for the material classified in sorting column *b*.

In the operation of this classifier the pulp falls into the top of the sorting column *b*. Water under pressure is admitted into column *c* through nipple *g*. This water passes through holes *i*¹, *i*², and *i*³, against deflectors *e*¹, *e*², and *e*³ upwardly into the annular space surrounding column *c* in sorting column *b*; at the same time water is admitted into the space in base of classifier through nipple *m* into space surrounding casing *k*, through holes *l*, in such quantity as to keep base *j* filled with water, while the

discharge *n*, which is of constant size is open. The water from column *c* passing into the annular space surrounding it fills the sorting column *b* and the classifier is then in operation. The pulp falling into the top of the sorting column *b* is now subjected to the rising current, and individual particles in falling must pass the series of water currents deflected upwardly at *e*¹, *e*², and *e*³, before passing out of discharge *n*. The particles not sufficiently heavy to fall in this rising current are rejected and pass out of sorting column *b* into a conveying launder for further treatment.

Having thus described my invention, what I claim is:

1. In a classifier, the combination with a sorting column, of a centrally disposed water column located within the sorting column, the said water column being perforated at different elevations, and an outwardly and upwardly inclined deflector mounted on the water column surrounding the perforations of the different elevations, whereby a series of water currents are discharged into the sorting column and deflected outwardly and upwardly therein, substantially as described.

2. The combination with a pulp feeding means, of a sorting column, arranged to receive the pulp from the pulp feeding means, a centrally disposed water column located within the sorting column, the said water column being closed at the top and having perforations at different elevations, outwardly and upwardly inclined, cup-shaped deflectors surrounding the said perforations of the water column, whereby a series of water currents are deflected upwardly and outwardly in the sorting column.

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

JAMES N. FLOOD.

Witnesses:

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