F. DALLEMAGNE.

ORE CONCENTRATING AND SEPARATING APPARATUS.

APPLICATION FILED APR. 15, 1908

953,900.

Patented Apr. 5, 1910.

2 SHEETS—SHEET 1

FIG. 1.

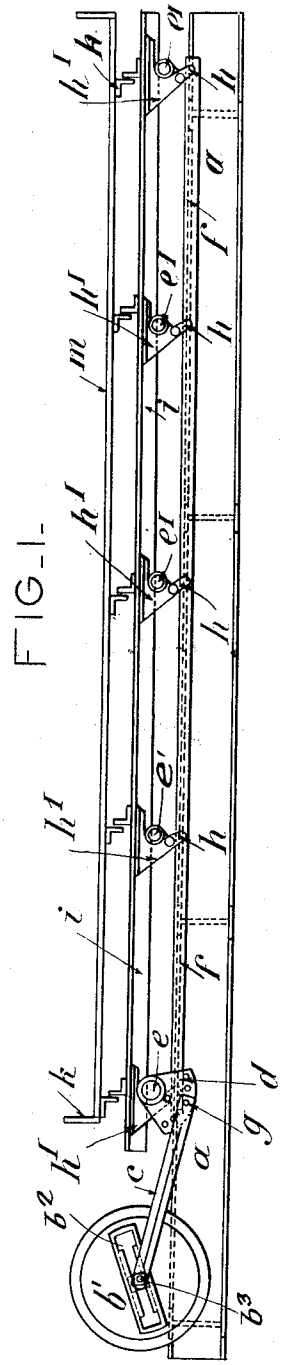
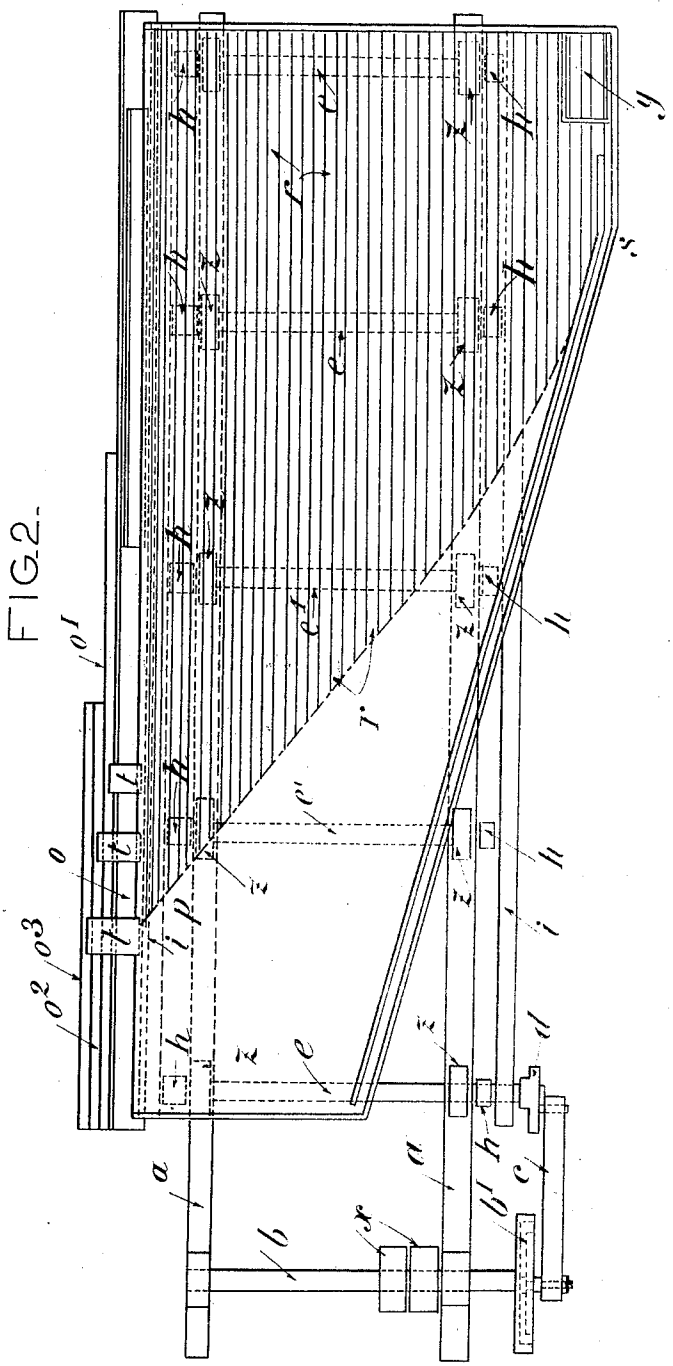


FIG. 2.



Witnesses:

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2 SHEETS—SHEET 2.

FIG_4_

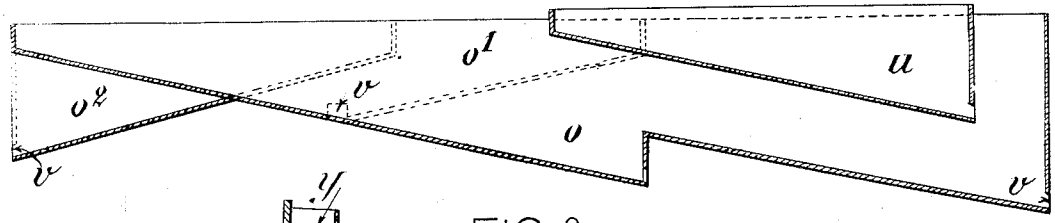


FIG_3_

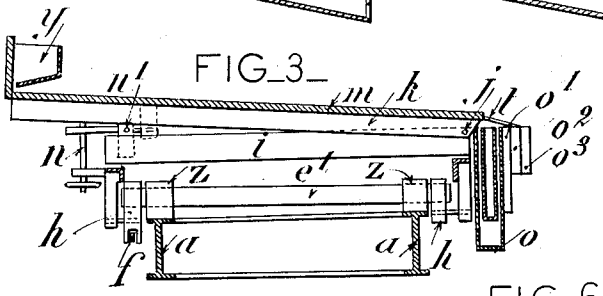


FIG_5_

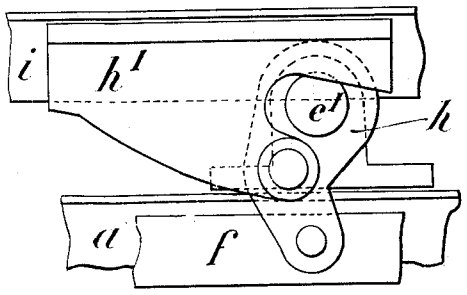


FIG_6_

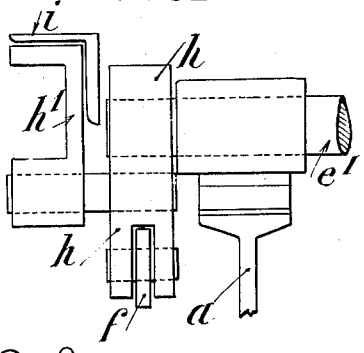


FIG_8_

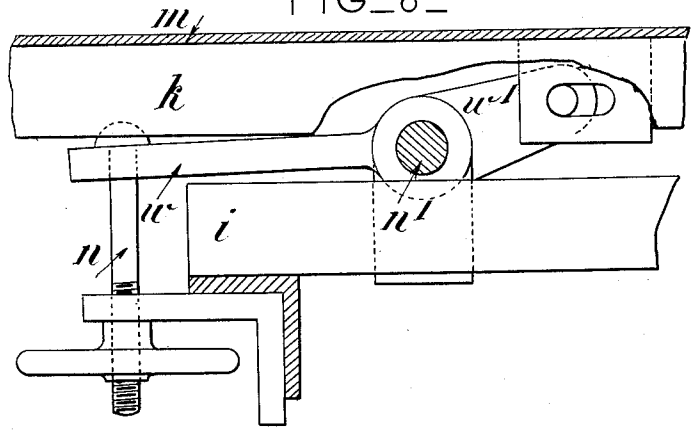
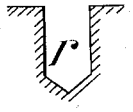


FIG_7_



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UNITED STATES PATENT OFFICE.

FRANÇOIS DALLEMAGNE, OF IRUN, SPAIN.

ORE CONCENTRATING AND SEPARATING APPARATUS.

953,900. Specification of Letters Patent. Patented Apr. 5, 1910.

Application filed April 15, 1908. Serial No. 427,147.

To all whom it may concern:

Be it known that I, FRANÇOIS DALLEMAGNE, citizen of France, residing at Irun, in the Kingdom of Spain, have invented new and useful Improvements in Ore Concentrating and Separating Apparatus, of which the following is a specification.

This invention relates to an apparatus for separating by very simple mechanical means, complex ores finely mixed and having a difference of density of only the two thousandths part of the unit. In such system of separation, the differences of density and equivalence of ores are brought into use and it has been endeavored to obtain the sorting by employing the first moment of the fall of the particles to be separated.

To this end, a grooved platform is used, to which is imparted, through a special device, an alternating oscillatory circular movement which can impart to the materials to be sorted a number of oscillations reaching to 2,000 per minute. A grain of the material may thus receive up to 100,000 oscillations before leaving the platform. This power of sorting is precisely that which allows of the separation of very fine materials, whose densities approach very much one to the other.

The device allows of modifying the form of the circular movement and thus to utilize either the horizontal movement or the vertical movement or any combination of the two.

In the accompanying drawings: Figure 1 is a front view of the apparatus; Fig. 2 is a plan view; Fig. 3 is a cross sectional view; Fig. 4 is a longitudinal section through the recuperator; Fig. 5 is a detail front view on a large scale of certain parts for the transmission of motion; Fig. 6 is an end view of the parts shown in Fig. 5; Fig. 7 is an enlarged section of one of the grooves in the platform of the apparatus; Fig. 8 is a view on a large scale of the device allowing of regulating the inclination of the platform.

The base of the apparatus is formed by an appropriately strutted rigid metallic frame *a*. The driving shaft *b* and its fly-wheel *b'* actuated by pulleys *x x* impart the alternative motion to the sector *d*, and to the shaft *e* through the connecting rod *c*. The fly-wheel *b'* is provided with a slot b^2 in which the pin b^3 of connecting rod *c* is adjustable. The simple displacement of the pin *g* on the sector *d* allows of varying the form of the motion as will be seen hereinafter. The shaft *e*, through the medium of the crank *h* and the connecting rod *f*, communicates its motion to other cranks *h* and to other parallel shafts *e'* on which are keyed the cranks *h*. On said cranks *h*, are pivoted levers *h'* to which is secured a rigid frame *i* which follows the alternative circular motion. On said frame *i* rests another movable frame *k*, which may be suitably inclined, by means of a screw *n*. This screw acts on a lever *w*, keyed on a longitudinal shaft *n'*, mounted on supports secured to the frame *i*. On said shaft *n'* are keyed at convenient distances, five small crank-arms *w'* the pins of which are engaged in eyes formed in the supports secured to the frame *k*. It will be understood that by either rotating the shaft *n'* in one direction or in the opposite direction, the small crank arms *w'* will cause the platform *m* to ascend or descend. The rotation of said shaft *n'* is insured by the screw *n* which, when unscrewed in its support, draws down the lever *w* and, when screwed, allows such lever to rise by reason of the weight exerted by the platform on such lever. This operation may be easily understood by reference to Fig. 8.

The frames *i* and *k* are movably secured one to another through an axle *j* which connects in pairs each of the five angle-iron cross-pieces which acts as struts for said frame. On the frame *k* is a platform *m*, of any rigid material and of rectangular, trapezoidal or any other shape. Such platform *m* is provided with longitudinal parallel grooves *r*, whose section is shown in Fig. 7. The depth of such grooves diminishes as it approaches the curve *p s* which ends them. A perforated pipe *q* supplies the platform *m* with the water required for working. The separated materials fall into a recuperator *o* which is composed of several distinct channels *o o'* o^2 o^3 which severally receive a single material. Their bottoms are inclined so that the materials be discharged through the orifices *v*. The inner channel *u* is movable and may be situated at the desired point for discharging a certain class of materials. The materials enter through a distributer *y* and are conducted from the platform *m* to the channels *o*, *o'*, o^2 and o^3 of the recuperator by means of rigid plates *t* which may be placed at the desired points and be of size necessary for the work.

The function of grooves r, whose section is indicated in Fig. 7, is to be filled with materials of greater density, which through the oscillatory motion imparted by the apparatus, sort themselves as in a screen, and as the materials advance lengthwise, the grooves being shallower, the upper part of the materials, that is to say the lighter materials, rise above the level of the platform and are carried into the next groove, which is parallel, and which will effect the same operation until the materials of same density, meet in the same groove or grooves, which they then follow to the end, and fall at a same place of the discharge channels $o\ o'\ o^2\ o^3$.

The motion of the platform m may be varied according to the nature of the ores to be sorted, by moving the pin g on the sector d. It will be understood that by such movement, the operative angle of the crank shafts h and accordingly the form of the motion of levers h', of frame i and of platform m will be modified. By this means a vertical oscillatory motion, or a horizontal oscillatory motion, or a combination of both, may be imparted to the platform m. In addition to this the amplitude of all said motions may be varied by displacing the pin b^3 of the connecting rod c in slot b^2 of the fly-wheel b'.

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

1. In an ore concentrating and separating apparatus, the combination of a stationary frame, a movable frame arranged above said stationary frame, a platform secured to said movable frame, cross shafts parallel one with each other journaled in the stationary frame, means for imparting to the first cross shaft an alternating rotary motion, cranks keyed on the cross shafts, a rod connecting said cranks, and levers pivoted on said cranks and fixed to the movable frame, substantially as described and for the purpose set forth.

2. In an ore concentrating and separating apparatus, the combination of a stationary frame, a movable frame arranged above said stationary frame, a platform connected to said movable frame, means for inclining said platform with relation to the movable frame, cross shafts parallel one with each other journaled in the stationary frame, a sector fixed on the first cross shaft, a pin adjustably secured on said sector, a driving shaft journaled on the stationary frame, a crank fly wheel fixed on said driving shaft, a rod connecting the pin to an adjustable point of the crank fly wheel, cranks keyed on the cross shafts, a rod connecting said cranks, and levers pivoted on said cranks and fixed to the movable frame, substantially as described and for the purpose set forth.

3. In an ore concentrating and separating apparatus, the combination of a stationary frame, a movable frame arranged above said stationary frame, a platform connected to said movable frame, a screw mounted on said movable frame, a longitudinal shaft journaled on said movable frame, a lever keyed on said longitudinal shaft and engaging the screw, small crank arms keyed on said longitudinal shaft, supports secured to the platform and provided with elongated eyes in which are engaged the pins of the small crank arms, cross shafts parallel one with each other journaled in the stationary frame, a sector fixed to the first cross shaft, a pin adjustably secured on said sector, a driving shaft journaled on the stationary frame, a crank fly wheel fixed on said driving shaft, a rod connecting the pin to an adjustable point of the crank fly wheel, cranks keyed on the cross shafts, a rod connecting said cranks, and levers pivoted on said cranks and fixed to the movable frame, substantially as described and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANÇOIS DALLEMAGNE.

Witnesses:

ANTOINE LAVOIS,

H. C. COXE.