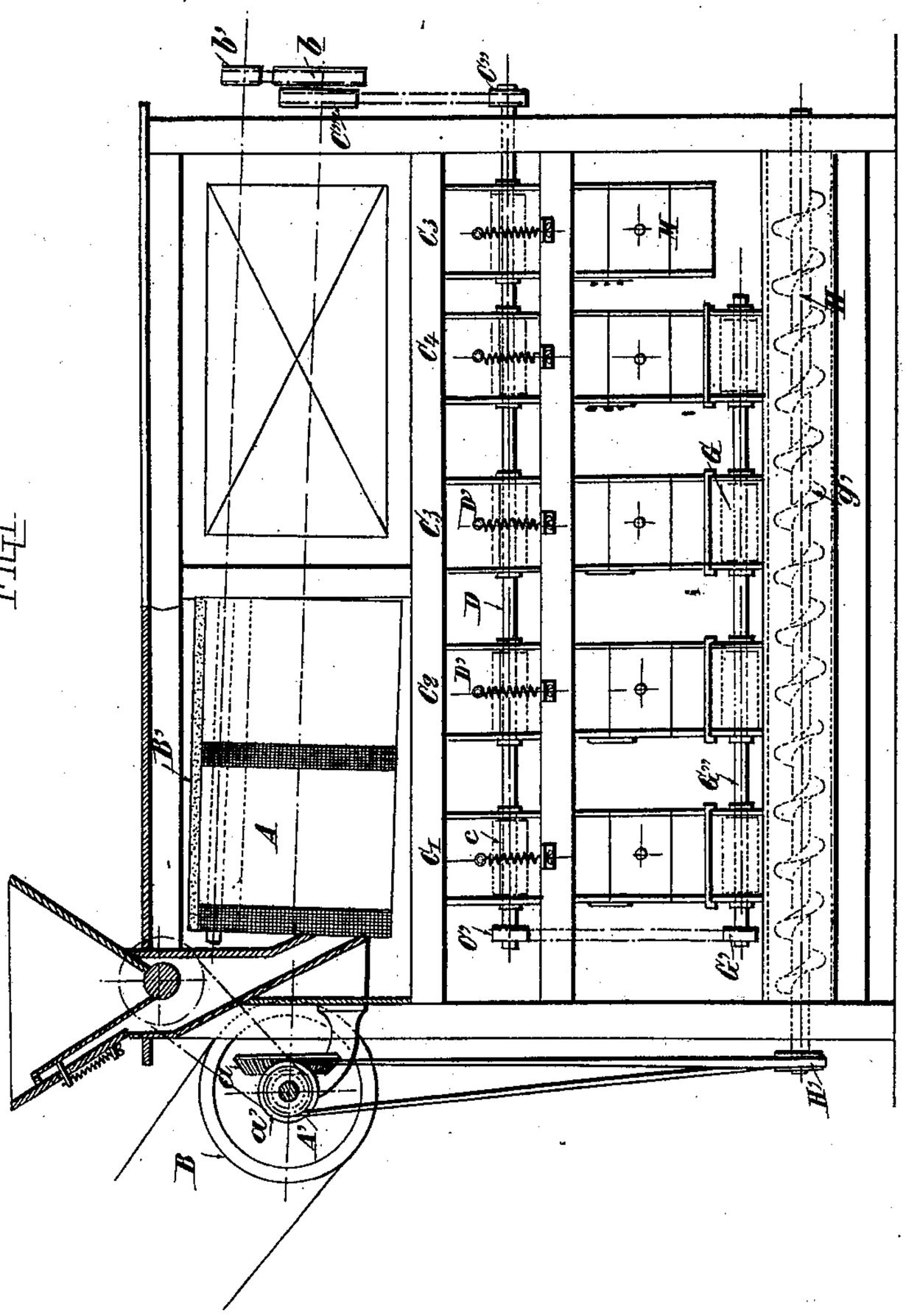
(No Model.) 3 Sheets—Sheet 1.

J. ANCEL.

ORE SORTER.

No. 602,250. Patented Apr. 12, 1898.

FIG. 1.



WITNESSES:

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ATTORNEYS.

(No Model.) 3 Sheets—Sheet 2.

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ORE SORTER.

No. 602,250. Patented Apr. 12, 1898.

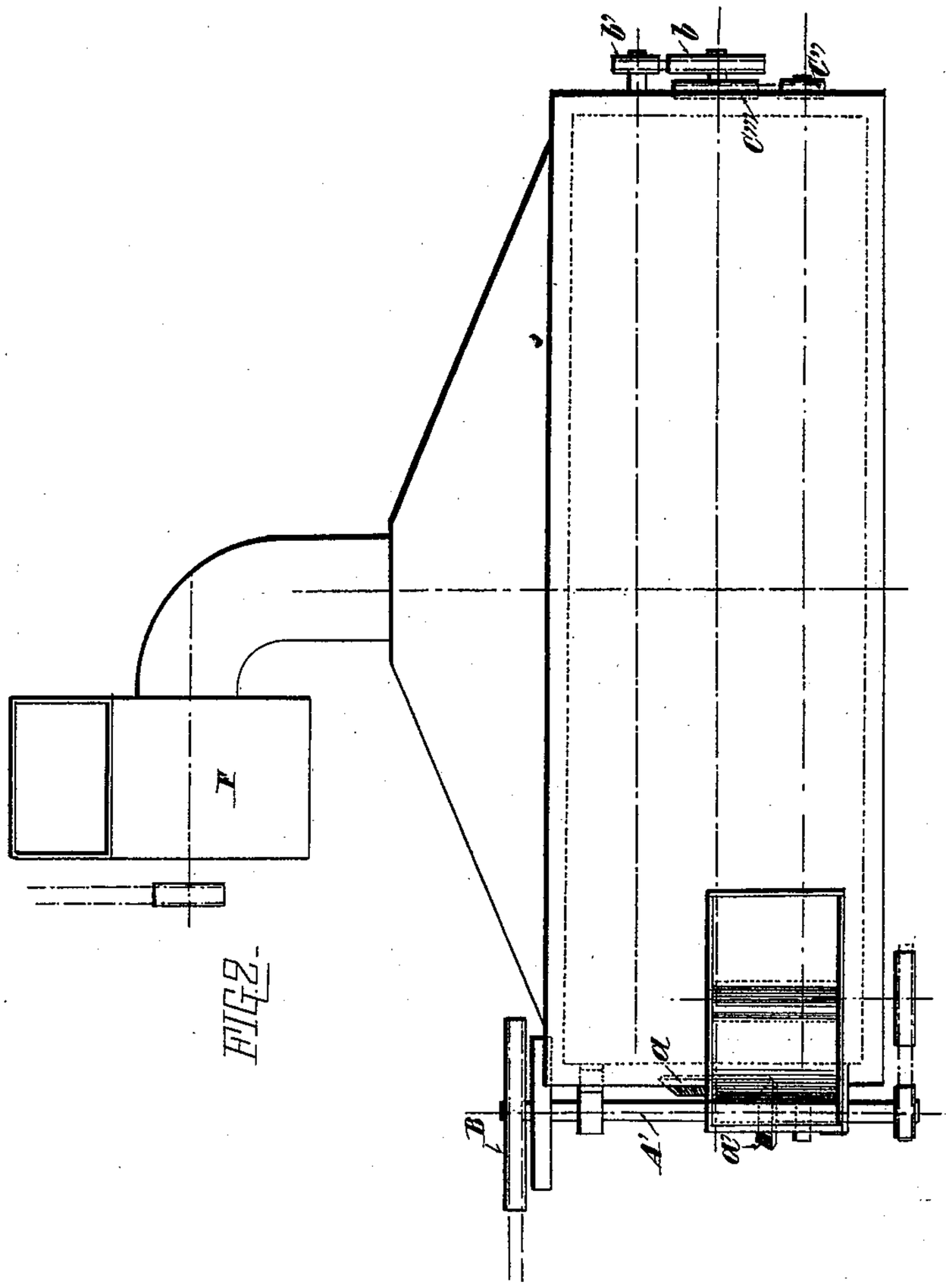

FIG. 2.

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(No Model.)

3 Sheets—Sheet 3.

J. ANCEL.

ORE SORTER.

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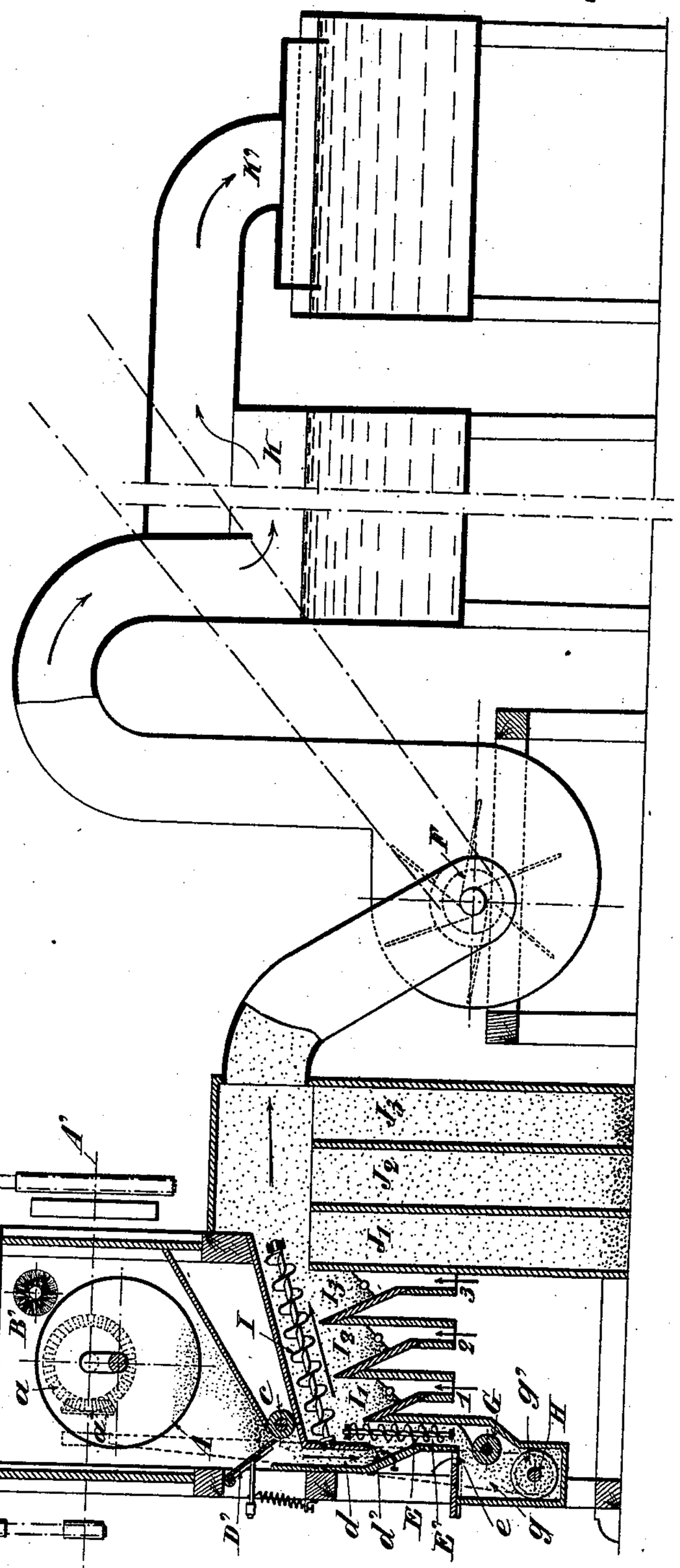
FIG. 3.



WITNESSES:

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Geo. L. Wheelock.

INVENTOR

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UNITED STATES PATENT OFFICE.

JACQUES ANCEL, OF PARIS, FRANCE.

ORE-SORTER.

SPECIFICATION forming part of Letters Patent No. 602,250, dated April 12, 1898.

Application filed September 30, 1897. Serial No. 653,569. (No model.) Patented in France March 11, 1897, No. 264,878.

To all whom it may concern:

Be it known that I, JACQUES ANCEL, a citizen of the Republic of France, residing at Paris, in said Republic of France, have invented certain new and useful Improvements in Ore-Sorters, (for which Letters Patent were granted to me in France, No. 264,878, dated March 11, 1897,) of which the following is a specification.

The object of this invention is to provide improved apparatus for sorting ore according to size and density, (or specific gravity,) the construction and operation of which will be best understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation, partly broken away, and Fig. 2 a plan, of the apparatus, while Fig. 3 is a cross-section of the same.

My novel ore separator or sorter mainly consists of an inclined bolting or sifting cylinder A, the successive meshes of which gradually increase in size, so that the ore may in the first place be sorted according to the size of the pieces or lumps.

The cylinder A receives continuous rotary motion through the medium of the bevel-wheel *a*, which gears with the wheel *a'*, mounted upon the shaft A', which carries the driving-pulley B.

In order to prevent the ore from obstructing the meshes of the cylinder A, I cause the outer surface of such cylinder to be rubbed or swept by means of a cylindrical brush B', which receives rotary motion in the direction opposite to that of the cylinder A from the two driving-pulleys *b b'*.

The bottom of the upper chamber, which contains the cylinder A, is sloping and conveys the ore to five apertures C' C^2 C^3 C^4 C^5. The first four apertures and the parts arranged below them are alike, so that I shall confine myself to describing one aperture only and shall proceed to describe next the last or terminal chute, over which the aperture C^5 is located.

Under any one of the four first apertures—say the aperture C', receiving the smallest ore—there is arranged a cylinder *c*, which receives continuous rotary motion from driving-pulleys C'' C''', one of which, C''', is rigidly secured upon the shaft of the cylinder A, while the other, C'', is fast upon the shaft D, carrying the whole set of cylinders *c*. Owing to the motion of the cylinder *c* the ore which collects above it drops continuously into the vertical chute *d*, passing as it does so between the cylinder and the movable partition D', the said chute *d* being provided at the bottom with a valve *d'*, the area of whose aperture is adjustable at will. The ore passing through the passage left open by this valve *d'* drops onto an Archimedean or conveyer screw or worm-wheel E, which revolves about its own axis under the action of a current of air or blast produced by the sucking and blowing fan F. The ore is thus divided as it meets the wings or vanes of the wheel E and is acted upon by the blast under most favorable conditions. Here then the second part of the sorting operation—viz., sorting according to density—is performed. The denser portions of the ore descend to the bottom of the vertical chute E' onto a cylinder G, receiving continuous rotary motion from the pulleys C' and G', which are fast upon the shafts D and G'', respectively. From this cylinder G the denser parts fall into a chamber *g*, where they are interrupted by an Archimedean or feeding screw H, which conveys them outside the machine. The screw H revolves under the action of the pulley H', which receives its motion direct from the driving-shaft. The least dense particles are carried away by draft of air and as they move along meet the sloping worm-wheel I, turning under the action of such draft of air or blast. The particles of the ore carried along by the blast now become sorted or classified according to density in the compartments I' I^2 I^3. The parts which do not collect in these compartments and are in the condition of dust then pass over other compartments J' J^2 J^3, where they may be in their turn classified according to density. The almost impalpable dust that does not descend into these last-mentioned compartments is carried farther on as far as the fan, which eventually drives or blows them into the receivers K K', containing water or any desired fluid. As the operations just described take their course air is drawn in by the fan through the aperture *l*, the size or area of which is adjustable at will by means of a sliding valve, damper, trap, or the like.

Should it be found in the course of the operation that dust accumulates in the compartments I′ I² I³, such dust may be expelled thence by slightly opening the compartments at the bottom, where they are fitted with valves for the purpose. Air will then be drawn in by the fan in the direction of the arrows 1, 2, and 3, and those of the particles contained in the several compartments which are too fine are thus once more set in motion.

The dust-compartments J′ J² J³, the outer side walls of which converge toward the discharge end, Fig. 2, extend throughout the length of the entire apparatus, while as regards each of the apertures C′ C² C³ C⁴ mentioned above the means for sorting the ore according to density are quite distinct from each other.

From the foregoing remarks it will be seen that the apparatus enables the ore to be sorted into pieces or lumps of five different sizes, the lumps of the first four sizes being, moreover, divided into four classes according to density or specific gravity, and the dust common to the first four sizes being in the last instance separated into four classes according to their fineness. The aperture C⁵, which up to this stage I have disregarded, receives the biggest lumps, (fifth size,) which fall into a chamber M, wherein they accumulate. Within this chamber an Archimedean screw may be arranged, if desired, for the purpose of conveying the material outside the apparatus.

Instead of having a single ventilator F for the whole apparatus I may have one for each part C′, C², C³, or C⁴. Likewise I may arrange in the passages 1 2 3 adjustable conical spouts, so that the sectional area of said passages may be increased or descreased in order to regulate the speed of the air. Furthermore, I may extend the screw I above the chambers J′ J² J³.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination, with means for separating ore according to its size, of means for separating the same according to its density, comprising a series of chutes for receiving the ore particles which have been separated according to their sizes, a vertical screw conveyer turning in suitable bearings, one of said conveyers for each of said chutes, valves for controlling the supply of ore particles from said chutes to said conveyers, a vented chamber below the said chutes and the screw conveyers, a conveyer arranged in said chamber, means for turning said last-named conveyer, compartments behind said vertical conveyer, and a suction-fan producing a current whereby said vertical screw conveyers are caused to revolve and whereby the particles of ore are deposited into said compartments according to their density, substantially as set forth.

2. The combination of a series of chutes for receiving the particles of ore, a second series of chutes below the latter, valves controlling the openings between the first and second series of chutes, a series of upright screw conveyers arranged in said second series of chutes, a series of screw conveyers arranged above and at an angle to said upright screw conveyers, compartments arranged under the said angularly-arranged screw conveyers, and means for producing a current of air by which the said screw conveyers are all caused to revolve and whereby the particles of ore are deposited into said compartments according to their density, substantially as set forth.

3. In an ore-sorter, the combination with a series of compartments, and means for feeding ore particles to said compartments, of a screw conveyer arranged transversely over said compartments, said conveyer turning freely in suitable bearings, and an air-suction device producing a current whereby said conveyer is caused to turn, and the particles of ore deposited in said compartments according to density, substantially as set forth.

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

JACQUES ANCEL.

Witnesses:
EDWARD P. MACLEAN,
EDOUARD BARBARY.