

(No Model.)

M. B. ZERENER.
CENTRIFUGAL ORE SEPARATOR.

No. 538,310.

Patented Apr. 30, 1895.

Fig. 1.

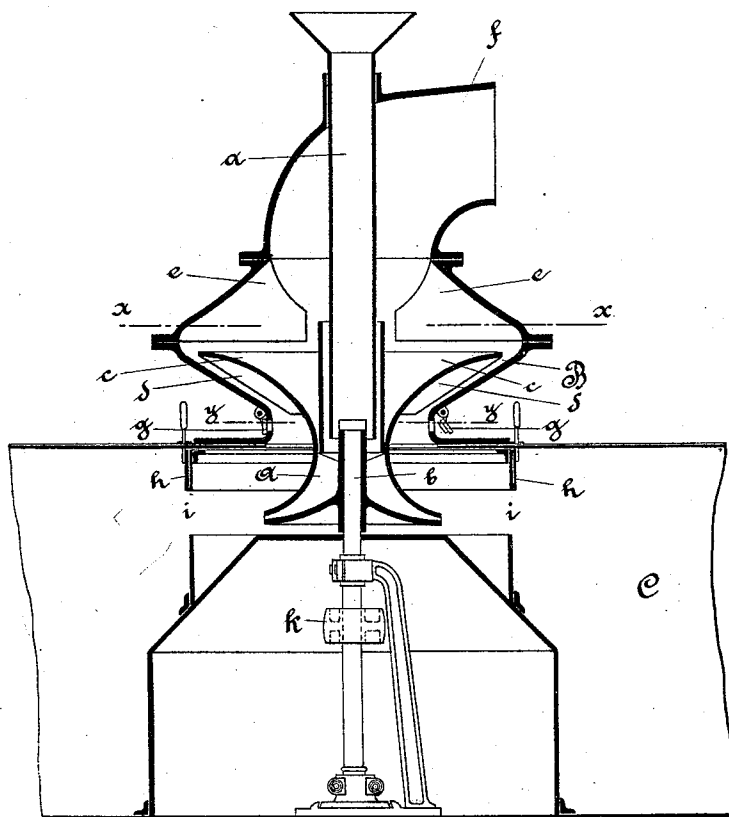


Fig. 2.

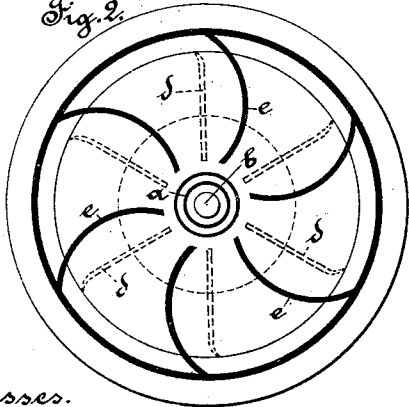
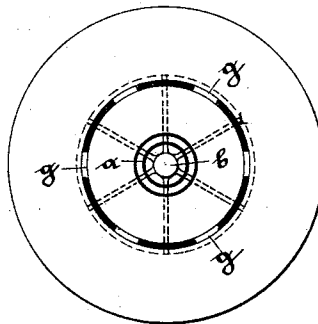


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

MARTIN BERNHARD ZERENER, OF DRESDEN, GERMANY.

CENTRIFUGAL ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 538,310, dated April 30, 1895.

Application filed May 2, 1892. Serial No. 431,473. (No model.) Patented in Germany December 22, 1891, No. 71,308; in England April 5, 1892, No. 6,564; in Belgium April 15, 1892, No. 99,102; in Spain May 9, 1892, No. 13,193; in Italy May 18, 1892, No. 31,834/328; in France July 18, 1892, No. 220,617; in Austria-Hungary September 30, 1892, No. 28,939 and No. 49,802, and in Sweden April 13, 1893, No. 4,331.

To all whom it may concern:

Be it known that I, MARTIN BERNHARD ZERENER, a subject of the Emperor of Germany, residing at Dresden, Saxony, German Empire, have invented certain new and useful Improvements in or Relating to Centrifugal Ore-Separators and the Like, (for which I have obtained Letters Patent of Germany, No. 71,308, dated December 22, 1891; France, No. 220,617, dated July 18, 1892; Belgium, No. 99,102, dated April 15, 1892; Great Britain, No. 6,564, dated April 5, 1892; Sweden, No. 4,331, dated April 13, 1893; Spain, No. 13,193, dated May 9, 1892; Italy No. 31,834/328, dated May 18, 1892, and Austria-Hungary, No. 28,939 and No. 49,802, dated September 30, 1892,) of which the following is a specification.

In the usual dry ore-dressing process by centrifugal force it is in most cases necessary or at least advisable, to remove the dust contained in the mixture of ore, &c., by means of a current of air or blast produced artificially. Hitherto, therefore, a separate fan or blower has been employed for the production of the blast. This had to be operated independently of the centrifugal machine, causing more or less inconvenience and complication.

The object of this invention is to devise a centrifugal ore-dressing machine which will itself produce the wind or blast necessary for its successful operation, the construction being such that one common shaft carries both the centrifugal machine and the fan or blower device, both of which may if necessary be integral with each other or joined in one body.

The success of centrifugal ore-dressing or separating very largely depends upon the maintenance of the proper relation between the power of the blast and the speed of motion of the centrifugal machine. This relation must be as constant and uniform as possible if unsatisfactory results in the separation or sorting of the ore are to be avoided. Supposing for instance that the number of revolutions of the centrifugal machine increases; if the pressure of the air does not augment in proportion, dust will not fail to gain access to the valuable material and

impair its quality. The improved arrangement remedies this defect, as it is adapted to maintain the relation between the speed of the centrifugal machine and the power of the blast invariably alike. A machine constructed in this manner is shown in the accompanying drawings, in which—

Figure 1 is a vertical section of the machine; Fig. 2, a cross-section on line $x x$ of Fig. 1, and Fig. 3 another cross section on line $y y$ of Fig. 1.

The blast producer or blower as here shown by way of example may act by means of wings or vanes though any other type of blower fan or blast-producer may be employed without departure from the principle of the invention.

The ore or material to be treated in the centrifugal apparatus A is introduced through the hopper or chute a .

As shown in the drawings the centrifugal apparatus consists of a hollow body provided with radiating partitions or bridges which divide the space within into a number of compartments for the ore to pass through in succession; but according to circumstances this hollow body may be replaced by a simple flat disk or any other arrangement suitable for centrifugal work, for the special arrangement of the centrifugal machine does not lie, any more than the special arrangement of the ventilating machine, within the scope of this invention.

b is the vertical shaft whereon the centrifugal and the blast producing devices are mounted. The portion c forming the fan or blower immediately joins the body A at the top. Upon its external surface it is provided with vanes d by means of which it draws up the air and forces it upward against stationary vanes e which are curved and adapted to direct the air through the chimney or outlet f above them. These vanes e serve to change the direction of the air so as to cause it to flow up out of the machine instead of traveling around and around in the larger part of the casing above the fan.

The primary function of the vanes e is as

above stated to direct the ore which would otherwise tend to rotate around in the casing and thereby retard the action of the fan besides causing the heavy dust particles to stay in the larger part of the casing.

Valves *g* may be arranged in the part of the chamber B intermediate between the fan *c* and the body A. Lower down is an annular damper *h* by means of which the discharge orifice of the centrifugal machine may be reduced in width to a certain extent though not more than is consistent with the free passage of the material treated. When it is desired to diminish the quantity of air to be exhausted from the space or chamber C, in which the centrifugal operation takes place, one or more of the valves *g* may be opened whereby the air is admitted in a direct way. When, on the contrary the amount of air should continue uniform while the speed of the blast at the discharge-orifice *i* of the centrifugal machine requires changing or adjusting the damper *h* is closed or opened to a greater or less extent.

The shaft *b* receives motion through the medium of a driving strap or belt on the pulley *k*. Although in the drawings it is assumed that the blast is led off at the top, the same might equally well be done through the lower part of the machine, the general arrangement being modified accordingly.

I claim—

1. In a centrifugal machine for dressing, separating or sorting ore, the combination with the rotary blast producing apparatus having a draft channel or passage through which the air is caused to pass, of a centrifugal apparatus rotating in unison with the blast producing apparatus, and a stationary chamber surrounding the centrifugal apparatus having an annular draft channel or passage opposite the discharge of the centrifugal apparatus, and in a plane at right angles to the plane of rotation of said centrifugal apparatus, whereby the products will be forced out through said chamber in opposition to the air passing in through the same; substantially as described.

2. In a centrifugal machine for dressing, separating or sorting ore, the combination with the rotary blast producing apparatus

having a draft channel or passage through which the air is caused to pass, of a centrifugal apparatus rotating in unison with the blast producing apparatus, and a stationary chamber surrounding said centrifugal apparatus having an adjustable annular draft channel or passage opposite the discharge of the centrifugal apparatus and in a plane at right angles to the plane of rotation of said centrifugal apparatus, as and for the purpose set forth.

3. In a centrifugal machine for dressing, separating or sorting ore, the combination with the rotary centrifugal blower and the casing having the central discharge passage and the stationary vanes in said discharge passage for checking the rotary movement of the dust laden air, of the centrifugal apparatus located below the blower in position to discharge the products in opposition to the air passing to the blower; substantially as described.

4. In a centrifugal machine, for dressing, separating or sorting ore, the combination with the rotary centrifugal blower and centrifugal apparatus below the same, of the casing inclosing said blower and centrifugal machine and having openings therein between the blower and centrifugal apparatus and dampers closing said openings; substantially as described.

5. In a centrifugal ore treating machine, the combination with the centrifugal apparatus and a fan mounted on the same shaft and an annular damper, of a casing having fixed vanes and valves, substantially as described and illustrated in the accompanying drawings.

6. In a centrifugal ore treating machine, the combination of a centrifugal apparatus, revolving fan, fixed case with vanes, valves and outlet, an annular damper and a central hopper or chute, substantially as described and illustrated in the accompanying drawings.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

MARTIN BERNHARD ZERENER.

Witnesses:

OTTO WOLFF,
HUGO DUMMER,
Both of Dresden.