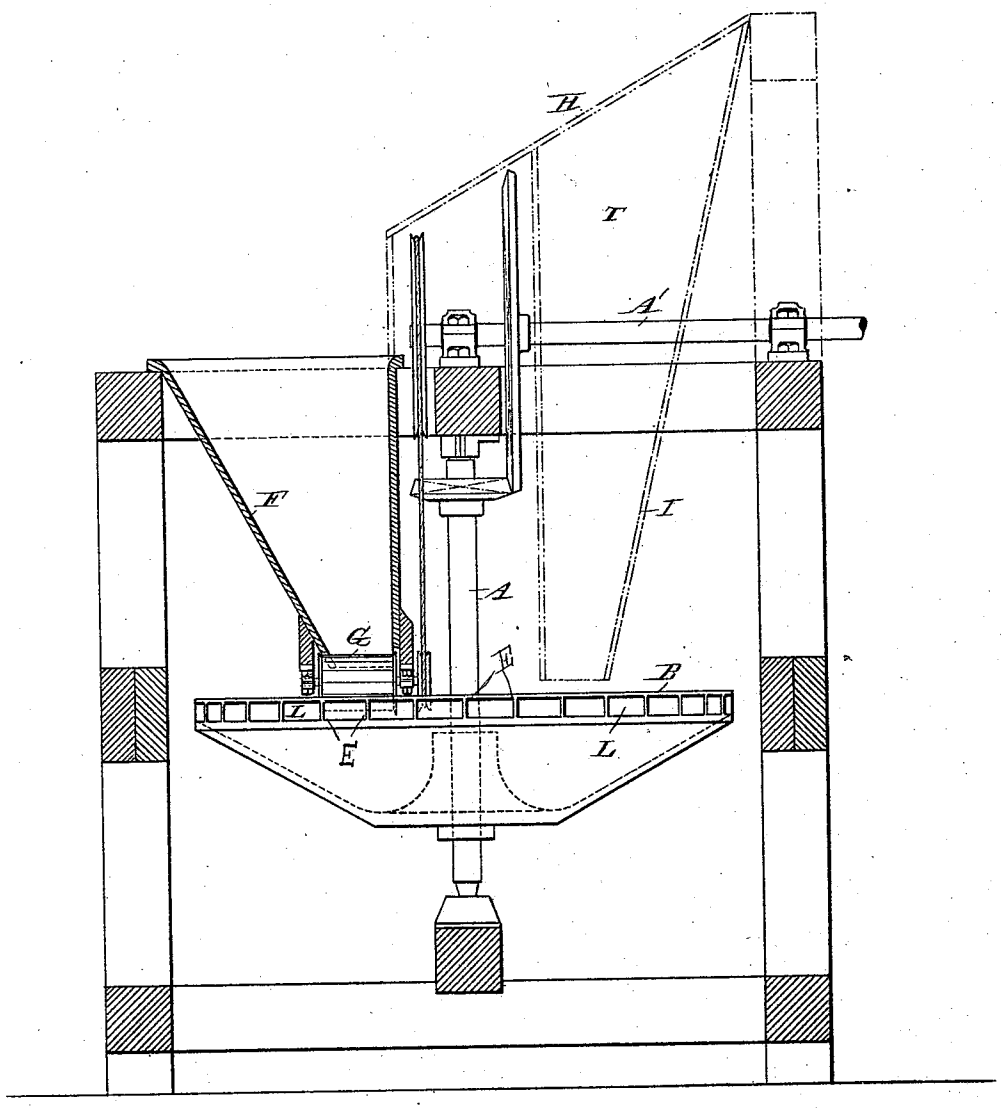
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O. SUNDGREN.

CENTRIFUGAL WINNOWING APPARATUS.

No. 455,977. Patented July 14, 1891.

Fig. 1



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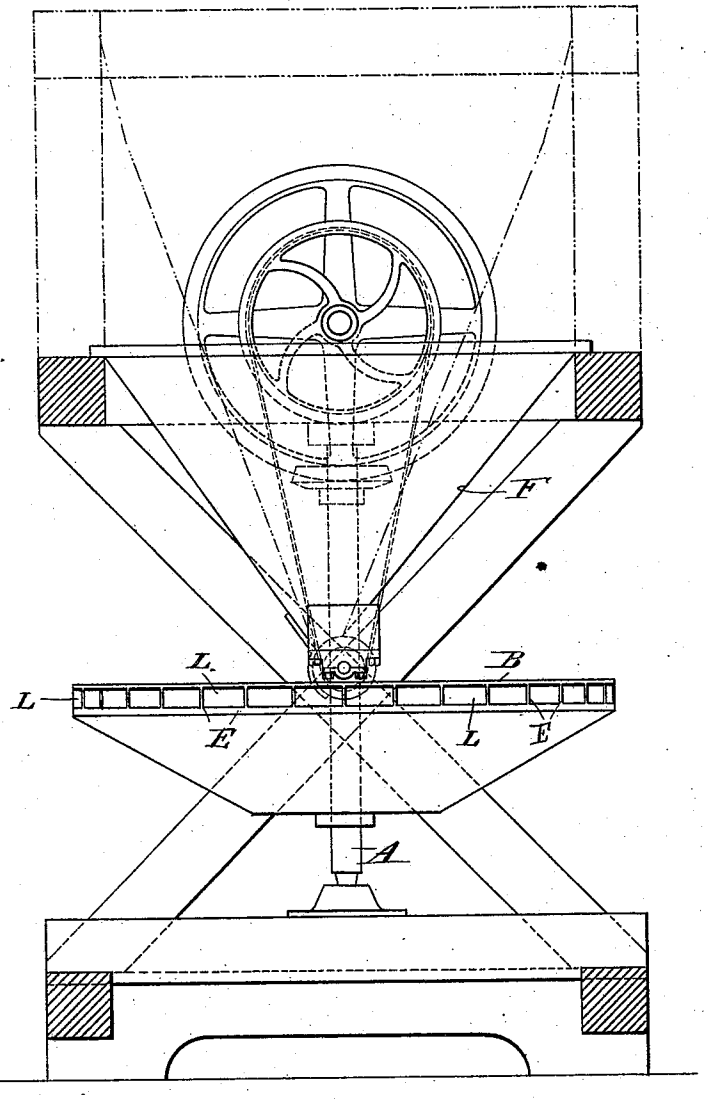
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CENTRIFUGAL WINNOWING APPARATUS.

No. 455,977. Patented July 14, 1891.

Fig. 2



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CENTRIFUGAL WINNOWING APPARATUS.

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Fig. 3

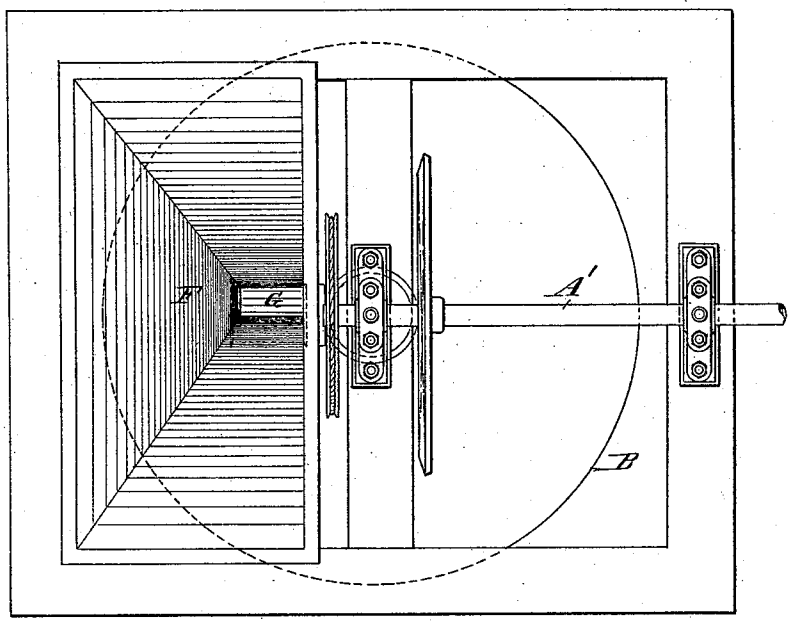
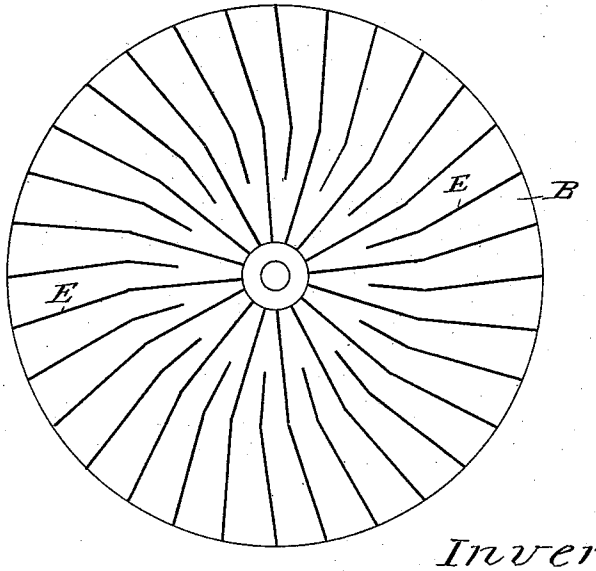


Fig. 6.



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CENTRIFUGAL WINNOWING APPARATUS.

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Fig. 4

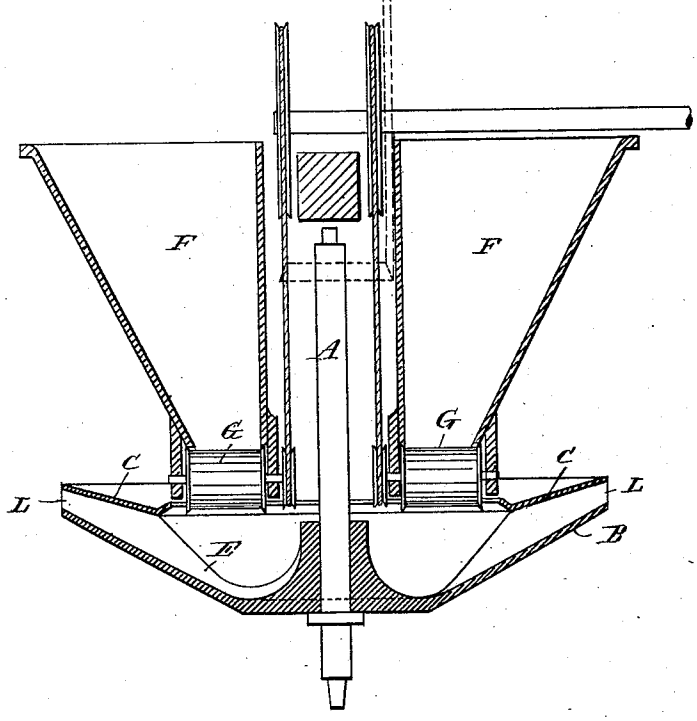
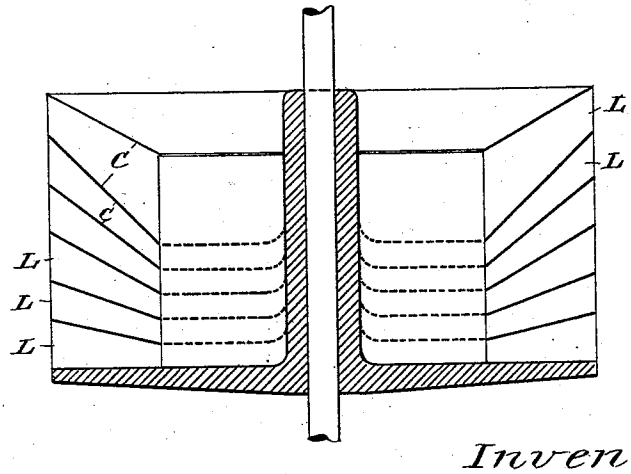


Fig. 5



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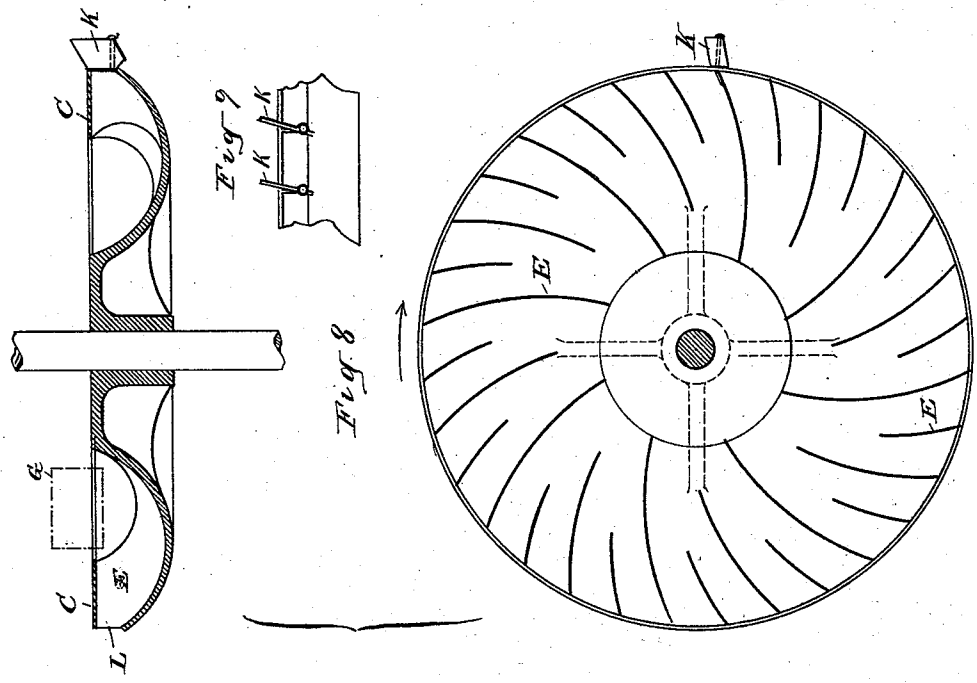


Fig. 9. Fig. 8.

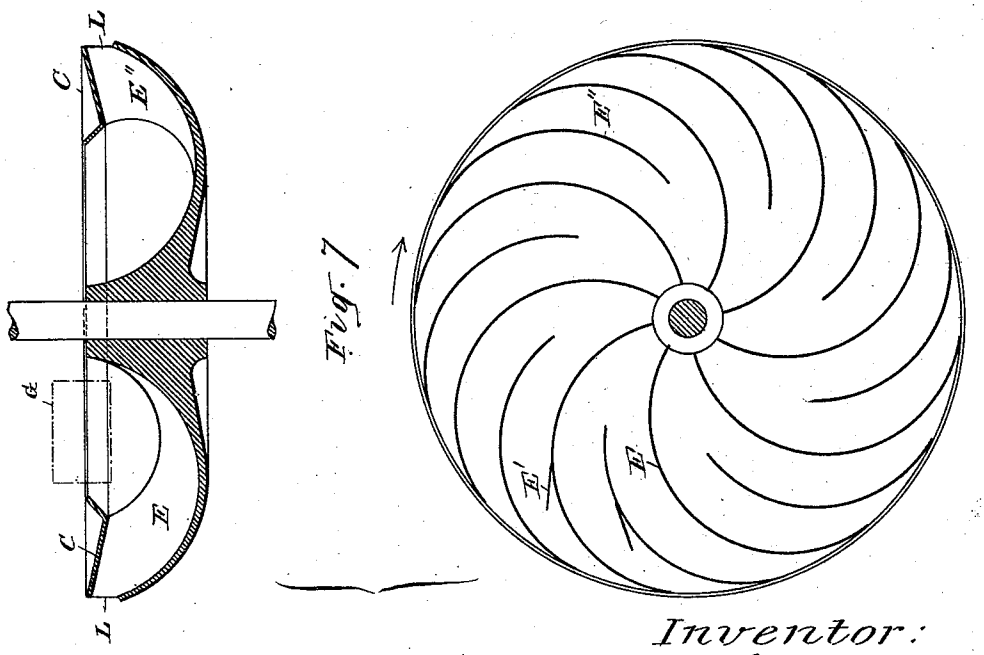


Fig. 7.

Witnesses.
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UNITED STATES PATENT OFFICE.

OLOF SUNDGREN, OF OSTERSUND, SWEDEN.

CENTRIFUGAL WINNOWING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 455,977, dated July 14, 1891.

Application filed April 4, 1890. Serial No. 346,519. (No model.)

To all whom it may concern:

Be it known that I, OLOF SUNDGREN, a subject of the King of Sweden, residing at Ostersund, in the Kingdom of Sweden, have invented a new and useful Centrifugal Winnowing Apparatus for Separating Graniform Substances of Different Weights, of which the following is a specification.

The separation of particles of different weights is effected by this my newly-invented apparatus by throwing them freely upward and outward into the air by means of a rotating disk or drum. This apparatus differs from others employed for the same purpose partly in the devices for conducting the particles into one disk and partly in other details, whereby the particles, instead of being thrown straight outward in a horizontal direction, are thrown outward and upward at an angle of about thirty degrees with the horizon. Further, the particles are not thrown out around the whole circumference of the disk, but only around a part of the same toward one or more sides of the apparatus.

In the accompanying drawings, Figure 1 represents, partly in side elevation and partly in vertical section, apparatus embodying my invention; Fig. 2, another side elevation, partly in section, of the same apparatus; and Fig. 3 represents a plan of same. Fig. 4 represents, partly in elevation and partly in vertical section, one form of the throwing-disk and other details, hereinafter more fully described. Fig. 5 represents in vertical section a modified form of the throwing disk, bowl, wheel, or drum. Fig. 6 represents a plan view of one form of the throwing disk, bowl, wheel, or drum. Fig. 7 represents in plan and vertical section another modified form of the throwing wheel, bowl, or disk; and Fig. 8 represents, also in plan and vertical section, another modified form of same. Fig. 9 illustrates certain adjustable doors, hereinafter more fully described.

On the vertical shaft A the throwing-disk B, resembling a bowl, is fixed. The outer part of the throwing-disk is covered by the ring-shaped lid C, so as to form an annular opening concentric with the shaft, through which opening the matter to be winnowed or separated is let down into the disk, bowl, or wheel, to be thrown by the centrifugal force outward and upward toward the circumference, under the lid C, and out of the disk or wheel, in order that the matter may immediately acquire the rotary motion of the disk, and thereby get under the influence of the centrifugal force and be thrown out. There are wings or partitions E extending almost radially and catching the matter. These wings serve likewise to hold the lid C. The matter is fed into the throwing-disk by means of the funnel or hopper F, at the lower end of which is a feeding-roller G. In connection with the funnel is sometimes used the inclined plane H, (see Fig. 1,) the top of which constitutes a sieve. The matter passes first the inclined plane H and drops then into the funnel. The matter passing through the sieve in the inclined plane H is conducted down to the throwing-disk by means of a funnel T, located under the sieve, and enters thus into the disk at another place nearer the circumference of the disk or drum B than does the matter dropping down through the funnel F, and consequently the coarser and finer matter escapes at different parts of the circumference of the disk. The sieve or plane H, with its funnel T, is indicated by dotted lines only in the drawings, as it is only intended for matter consisting of pieces or particles of very different sizes.

To the feeding-roller G motion is transmitted from the shaft A by means of the intermediate shaft A′, wheels, and belts or cords, as clearly represented in the drawings.

The wings in the throwing-disk, the bottom of which, as represented in Figs. 1, 2, and 4, has an inclination of about thirty degrees, are not disposed radially, but the outer parts lie in directions or lines tangential to a circle concentric with the disk but of much less diameter, in order that the matter may leave the disk sooner than it would if the wings had a radial position throughout their whole length.

For collecting the matter there are suitable collecting-compartments located at the side of the apparatus. These compartments need not extend all around the apparatus, but only that part of it obliquely in front of the funnel or funnels, the exact position depending upon how far the particles are driven around by the rotation of the disk. The matter is

thrown out at one or two sides of the apparatus, according to whether the feeding takes place at one or at two places. At trials made it has been proven that the matter is thrown along about a quarter of the circumference of the disk in advance of the position of the funnel.

In Fig. 4 two feeding-funnels F are represented.

In the modification represented in Fig. 5 the throwing-disk is provided with a number of lids or bottoms C, the parts of which situated next to the center being horizontal sieves, while the outer portions have greater inclinations relatively to each other in proportion to their height above the bottom. The sieves are finer relatively to each other, according to their height above the bottom, the lowest being the finest, so that the finest matter falls to the bottom of the throwing-disk.

Other modifications of the throwing-disk are easy to devise—such, for example, as are represented in Figs. 7, 8, and 9. By these figures it will be seen that the disk itself may be bowl-shaped and the wings curved, so that the latter may be alternately longer and shorter from the circumference toward the center of the disk. (See E and E″, Fig. 7.) Small additional wings E′ may be employed, if desired, to change and adjust the direction of the discharge or to cause the matter to follow the inner sides of the wings. L indicates the openings through which the material is thrown out of the disk.

In order to adjust the throwing angle more exactly, some adjustable doors K may be adapted at the outer ends of the wings, as represented in Figs. 8 and 9. The door K is pivoted to one or more shafts or bolts projecting outward from the end of a wing or from the disk, so that it may be adjusted in different inclinations. The matter is hit by these doors when leaving the disk, and receives thus an impulse by which its direction of motion is modified, according to the position of the doors. Lastly, it should be remarked that the lid C likewise may be inclined more or less upward.

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

1. In a separator, the combination, with the feed-roller, operating means therefor, and a revolving disk, of an inclined plane, the upper part of which constitutes a sieve, a funnel for conducting matter from the sieve to the feeding-roller, and another funnel located in front of the lower end of the plane conducting matter from the sieve to the throwing-disk direct, the said funnels feeding the material to the disk between the center and the periphery thereof, substantially as specified.

2. In a separator, the combination, with a shaft and operating means for the same, of a rotating disk provided with a plurality of lids located one above the other and having different angles of inclination, the topmost lid having an opening at the center and the others provided with sieves, said sieves being finer in proportion as they are located farther down, substantially as specified.

3. In a separator, the combination, with a shaft and operating means for the same, of a rotating disk provided with a plurality of lids located one above the other and having different angles of inclination, the topmost lid having an opening at the center and the others provided with sieves, said sieves being finer in proportion as they are located farther down, and substantially radial wings between said lids, as and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

OLOF SUNDGREN.

Witnesses:
J. B. ELFSTROM,
LAURENTZ HAGGLOS.