J. S. FASTING.

ROTARY SPIRAL SIEVE.

APPLICATION FILED JAN. 18, 1910.

997,185.

Patented July 4, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

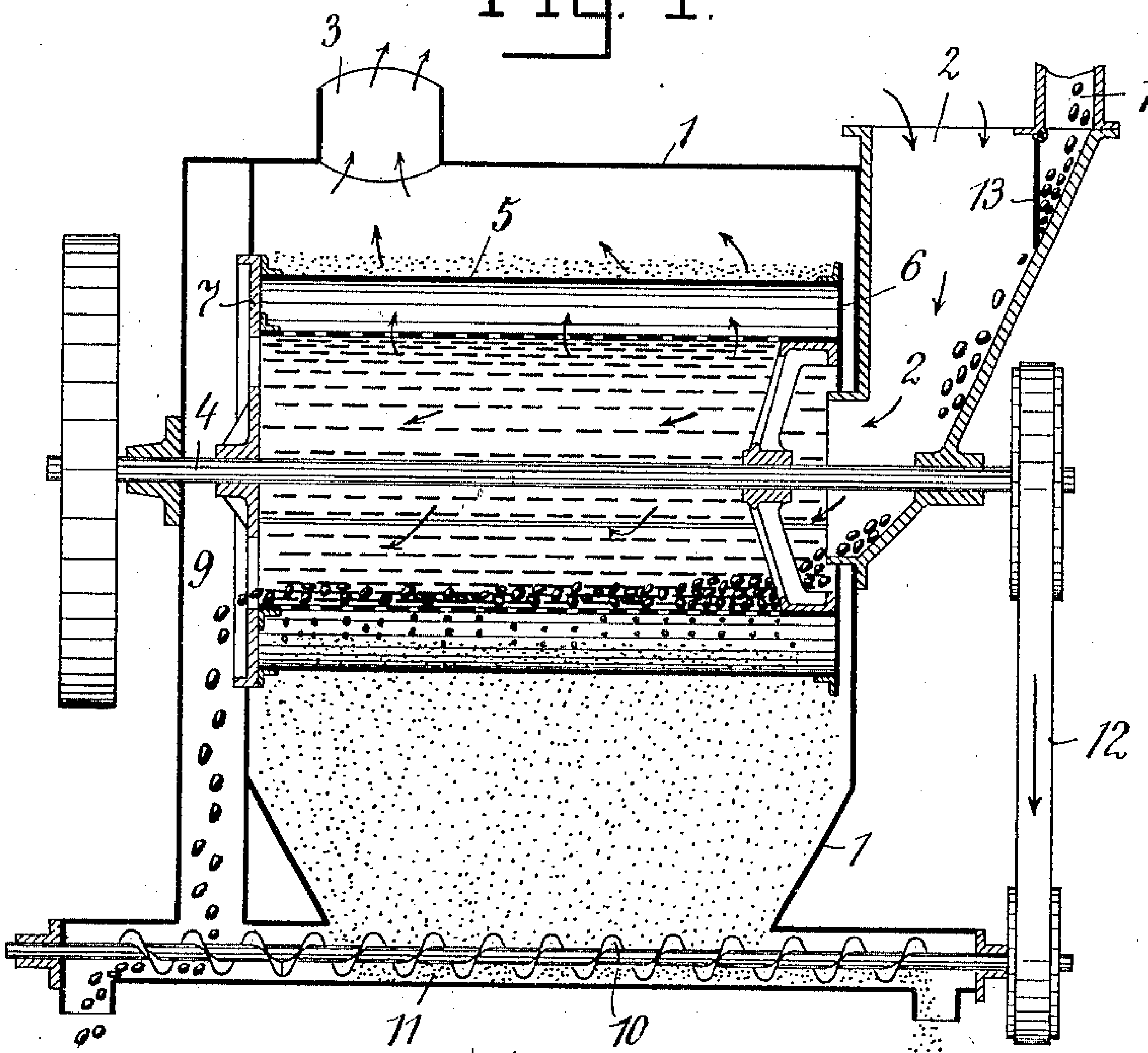

Fig. 2.

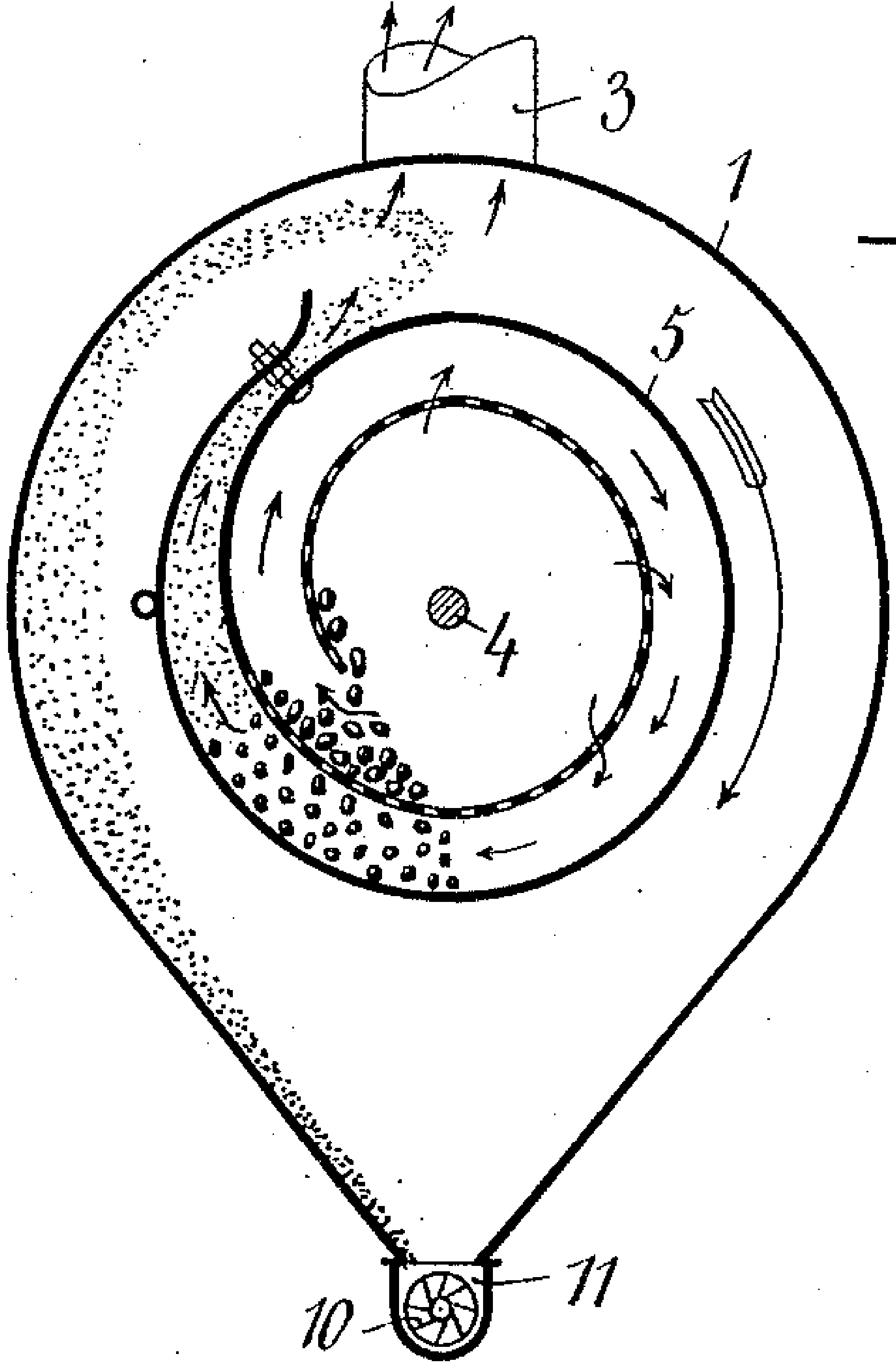

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Fig. 3.

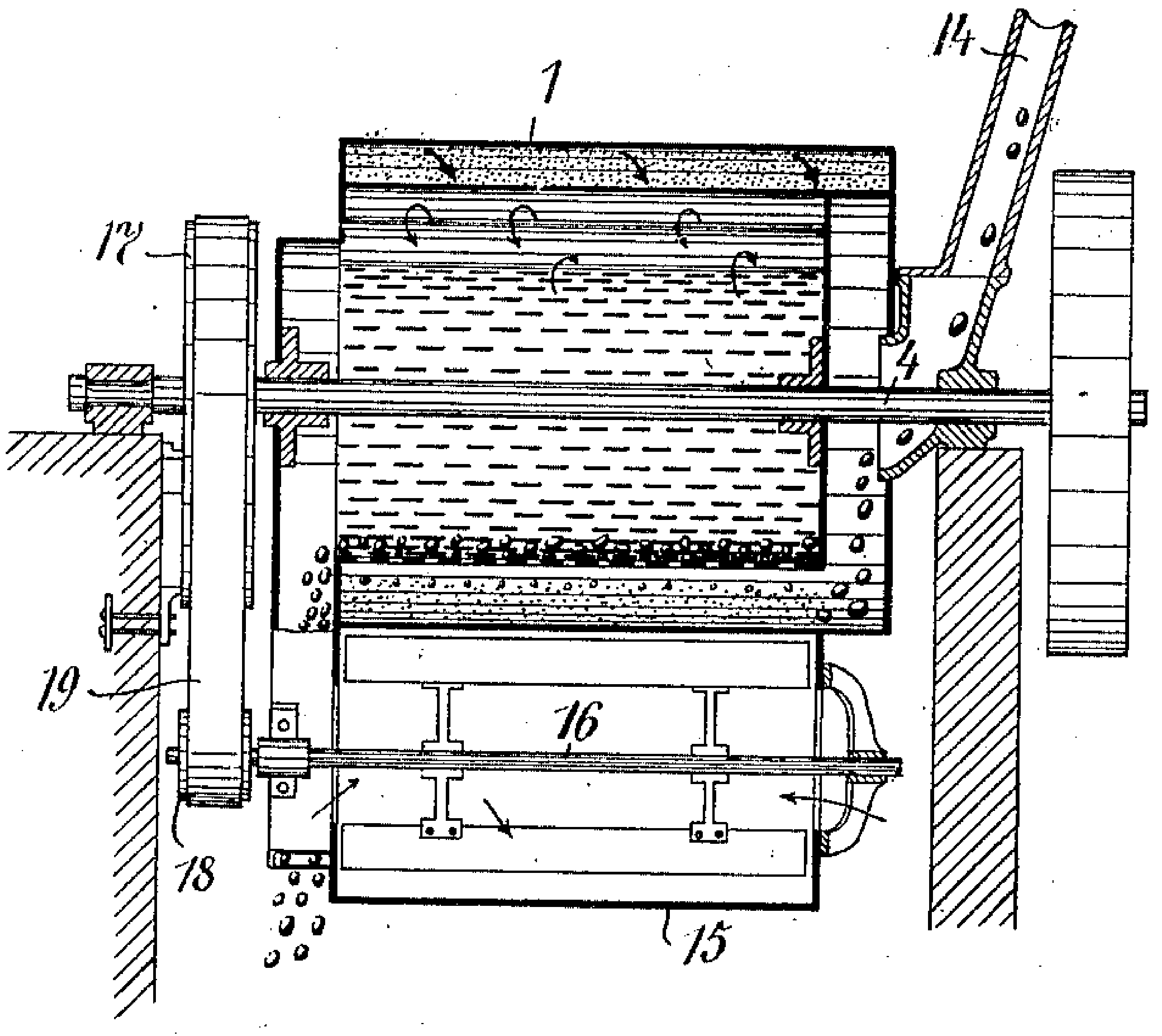
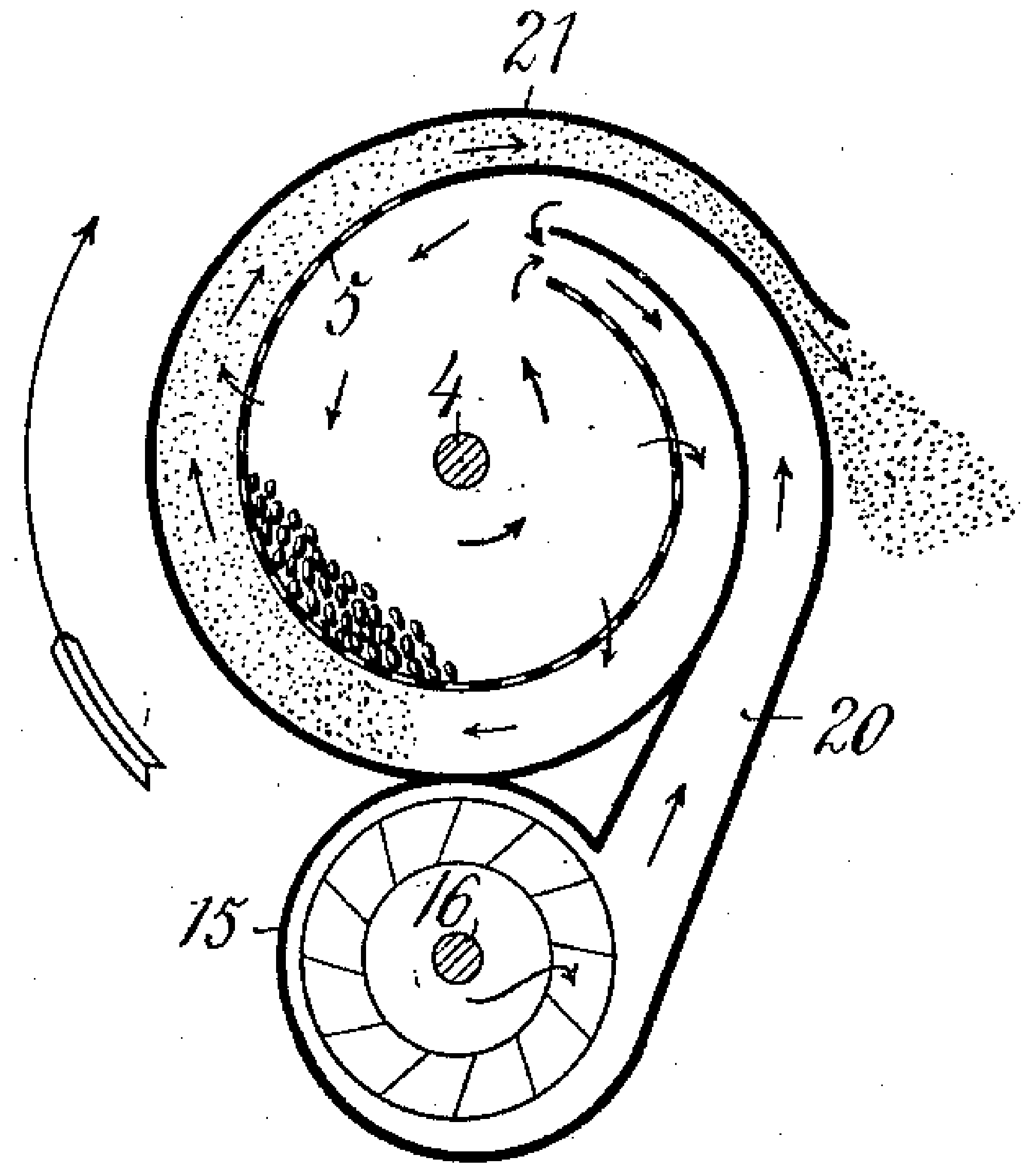


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHAN SIGISMUND FASTING, OF FREDERIKSBERG, NEAR COPENHAGEN, DENMARK, ASSIGNOR TO F. L. SMIDTH & CO., OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

ROTARY SPIRAL SIEVE.

997,185. Specification of Letters Patent. **Patented July 4, 1911.**

Application filed January 18, 1910. Serial No. 538,756.

To all whom it may concern:

Be it known that I, Johan Sigismund Fasting, a subject of the King of Denmark, residing at Frederiksberg, near Copenhagen, Denmark, have invented certain new and useful Improvements in Rotary Spiral Sieves, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to rotary sieves for the separation of the finer and coarser particles of pulverized cement and other materials. In accordance with the invention a sifting drum, having spirally disposed walls which are perforated in part to permit the passage therethrough of the finer material, is arranged to rotate upon a substantially horizontal axis. The material to be sifted is fed to the drum at one end and the coarser particles are allowed to escape at the other end. Means are provided for directing a current of air into the central portion of the drum and the air is allowed to escape through the spiral passage formed by the spirally disposed walls and through an opening in the periphery of the drum. The outer portions of the spiral wall or walls are imperforate and the drum is rotated in the direction of the spiral winding of the walls. The coarser particles of the material to be sifted are therefore continually returned toward the axis of rotation of the drum and as the finer particles fall through the perforations of the inner portions of the spiral walls they are caught up by the current of air which is directed against them at right angles to their direction of fall and are carried with the current of air outward through the spiral passages of the drum to the peripheral opening from which they are discharged separately from the coarser particles. As the current of air loses its velocity as it passes from the peripheral opening, the finer particles, theretofore borne by the current of air, are precipitated and fall into the receptacle provided therefor. Should it be found that the air carries with it in suspension some of the finest particles of the material, the air may be returned to its source of supply and so passed through the apparatus continuously, the same air being used over and over again.

The invention will be more fully explained hereinafter with reference to the several embodiments thereof shown in the accompanying drawings, in which—

Figure 1 is a view in axial section of one form of the apparatus. Fig. 2 is a view in transverse section of the apparatus shown in Fig. 1. Fig. 3 is a view similar to Fig. 1 but showing a different form of the apparatus. Fig. 4 is a view in transverse section of the apparatus shown in Fig. 3.

In the apparatus shown in Figs. 1 and 2 a fixed casing 1 is provided with an inlet 2 through which the air is supplied under pressure and, it may be, with a separate inlet 14 for the material to be sifted, the latter being provided, if necessary, with a check valve 13 to prevent the air admitted under pressure through the inlet 2 from passing out through the inlet 14. Mounted in suitable bearings which may be supported on the casing 1 is a substantially horizontal shaft 4 which supports the spiral drum 5. The end wall 6 of the drum is provided with a central opening for the admission of the material to be sifted and of the air to the central portion of the drum, while the end wall 7 is provided with a spiral, annular opening, the outer margin of which may be defined, in part at least, by the perforated, inner portion of the spiral wall 5. The coarser particles of the material to be sifted pass longitudinally along the perforated wall from the inlet end to the outlet end from which they may pass through a discharge passage 9 into the casing 11 of a spiral conveyer 10.

The finer particles of the material to be sifted, as they fall through the perforations of the inner portion of the spiral wall 5 are caught up by the current of air which is directed from the central portion of the drum into the spiral passage formed by the spiral wall, such current of air striking the particles substantially at a right angle to their direction of fall, as clearly indicated in Fig. 2. As the air passes on through the spiral passage it carries with it, in suspension, the finer particles out through the peripheral opening in the wall of the spiral, rotating drum. As the air passes out through this opening it loses its velocity and the finer particles theretofore carried in suspension are precipitated and fall to the conveyer at the bottom thereof. The blade or web of the latter is formed in two parts, spirally wound in opposite directions so that when the conveyer is rotated in the proper direction the coarser particles will be delivered at one end thereof and the finer particles at the other end. The conveyer may be driven by any suitable means, such as a belt 12 passing over a pulley on the shaft of the conveyer and a pulley on the shaft 4 of the spiral drum. Such of the coarser particles as are not carried forward at first by the current of air, but are fine enough to pass through the perforations of the drum are returned by the outer, imperforate portions of the spiral wall to the central portion of the drum where they may fall again through the perforations, thus having another opportunity to be taken up and carried forward by the current of air. Such particles as are not thus caught up by the current of air eventually pass out with the coarsest particles through the discharge passage 9. Obviously, the perforations in the inner portion of the spiral wall may be arranged in groups or in any suitable manner to permit the desired results to be obtained. Obviously, also the air might be conducted from the outlet 3 of the casing 1 to the pump or fan by which the air is delivered to the inlet 2 so that it may be used over and over again should it be found that the finest particles of the material are carried in suspension with the air through the air outlet 3.

In the embodiment of the invention illustrated in Figs. 3 and 4 the spiral, rotating drum, supported as before upon the shaft 4 and provided with a combined air and material inlet 14, is formed of a spiral wall 5, the inner portion of which is perforated, and a spiral imperforate plate 21. The fan casing 15 is in this case secured to the spiral drum so that it rotates therewith, the air being discharged by the fan 16 into the spiral drum through an opening which extends along the entire length. The fan 16 may be driven by pulleys 17 and 18 on the shaft 4 of the drum and on the shaft of the fan 16 respectively and a belt 19. The material to be sifted is delivered into the spiral passage between the spiral wall 5 and the spiral plate 21 and, by the rotation of the drum in the proper direction, is carried back into the central portion of the drum within the perforated portion of the wall 5 so that the finer particles which pass through the perforations may be caught up by the current of air which is directed into the drum in the same manner and eventually pass through the passage to the peripheral opening, carrying with it the finer particles in suspension, such finer particles being precipitated as the current of air loses its velocity after passing through the peripheral opening. The coarser particles eventually pass out through the opening at the outlet end of the drum and are deposited separately from the finer particles.

Various other changes in details of construction and arrangement may be made to suit different considerations of use without departing from the spirit of the invention.

I claim as my invention:

1. A rotary sieve comprising a rotary drum having a spiral perforated wall and having in its periphery an opening for the discharge of the finer material and in its end an opening for the discharge of the coarser material, means to rotate the drum in the direction of the spiral winding of its wall, and means to direct a current of air in the same direction through the spiral passage formed by the spiral wall and through the peripheral opening.

2. A rotary sieve comprising a rotary drum having a spiral wall with its inner portion perforated and its outer portion imperforate and having in its periphery an opening for the discharge of the finer material and in its end an opening for the discharge of the coarser material, means to rotate the drum in the direction of the spiral winding of its wall, and means to direct a current of air in the same direction through the spiral passage formed by the spiral wall and through the peripheral opening.

3. A rotary sieve comprising a rotary drum having a spiral perforated wall and having in its periphery an opening for the discharge of the finer material and in its end an opening for the discharge of the coarser material, means to rotate the drum in the direction of the spiral winding of its wall, means to direct a current of air in the same direction through the spiral passage formed by the spiral wall and through the peripheral opening, and a casing surrounding the drum and having an opening for the discharge of air and an opening for the discharge of the finer material precipitated within the casing.

4. A rotary sieve comprising a rotary drum having a spiral perforated wall and having in its periphery an opening for the discharge of the finer material and in its end an opening for the discharge of the coarser material, means to rotate the drum in the direction of the spiral winding of its wall, means to direct a current of air in the same direction through the spiral passage formed by the spiral wall and through the peripheral opening, and a casing surrounding the drum and having an opening in its bottom for the discharge of the finer material and forming at its end a passage for the discharge of the coarser material.

5. A rotary sieve comprising a rotary drum having a spiral perforated wall and having in its periphery an opening for the discharge of the finer material and in its end

an opening for the discharge of the coarser material, means to rotate the drum in the direction of the spiral winding of its wall, means to direct a current of air in the same direction through the spiral passage formed by the spiral wall and through the peripheral opening, a casing surrounding the drum and having an opening in its bottom for the discharge of the finer material and forming at its end a passage for the discharge of the coarser material, and a spiral conveyer in the bottom of the casing having its blade or web wound spirally in opposite directions to discharge at one end the finer material from the bottom of the casing and at its other end the coarser material from said passage.

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

JOHAN SIGISMUND FASTING.

Witnesses:
HERMAN RÉE,
JULIUS LEHMANN.
