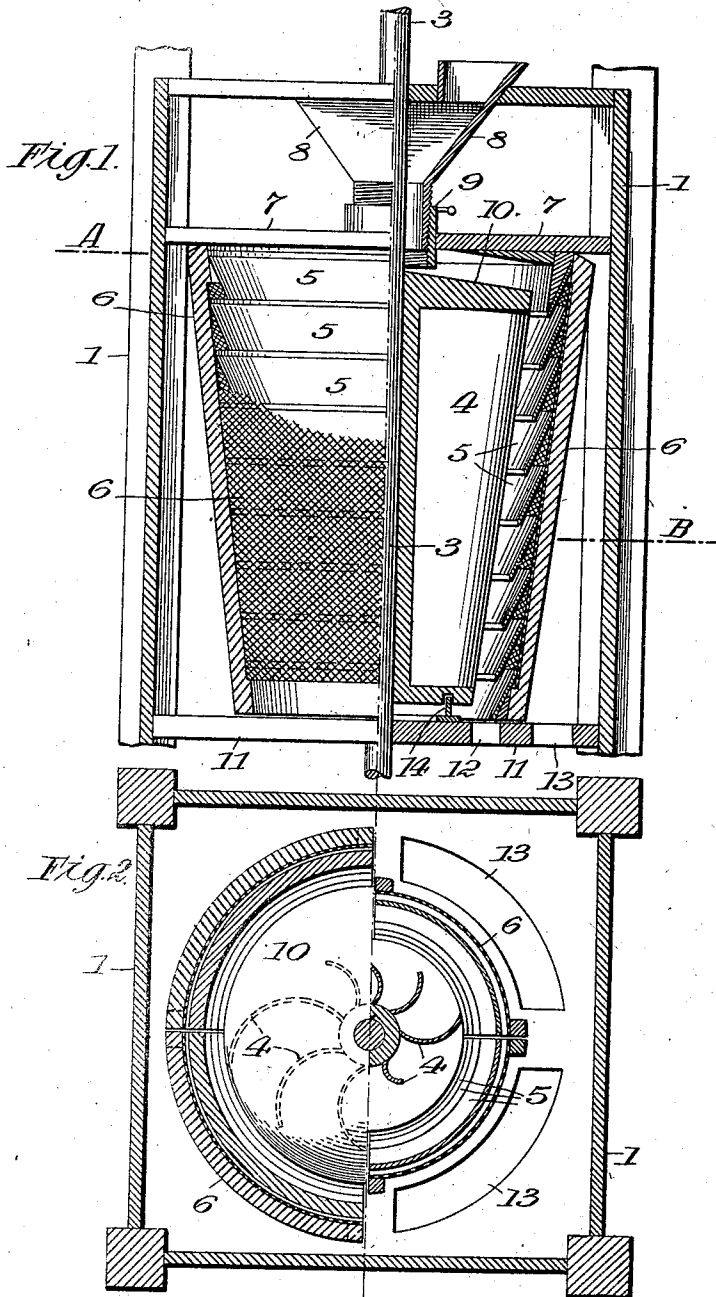


F. HOLL.
PNEUMATIC SIFTER.
APPLICATION FILED MAY 22, 1914.

1,159,030.

Patented Nov. 2, 1915.



Witnesses
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UNITED STATES PATENT OFFICE.

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PNEUMATIC SIFTER.

1,159,030.

Specification of Letters Patent.

Patented Nov. 2, 1915.

Application filed May 22, 1914. Serial No. 840,356.

To all whom it may concern:

Be it known that I, FRANZ HOLL, engineer, a subject of the German Emperor, and resident of Luisenstrasse 7, Worms-on-the-Rhine, Germany, have invented new and useful Improvements in and Relating to Pneumatic Sifters, of which the following is a specification.

The present invention relates to an improved pneumatic sifter and has more special reference to that type in which undulatory motion is imparted to a definite quantity of air inclosed in the machine. The stock is thus subjected to the action of blasts or waves of wind.

According to the present invention a vertical structure is used in which a fan rotating around a vertical axis causes a current of air to impinge with varying intensity on the successive horizontal layers of the stock. As a rule the stock which falls in a practically vertical direction through the machine is initially subjected to a strong air current, but the machine can be constructed to subject the stock, when desirable in view of its nature, to an air current initially weak but of gradually increasing strength. Such variation in the strength of the air current in successive horizontal layers is obtained, according to the present invention, by subjecting the stock while falling to the action of a vertical conical fan, or of a cylindrical fan used in combination with a conical casing. In the first case the air pressure is naturally strongest where the fan vanes are longest decreasing gradually with their length while, in the second case, the same effect is produced by the increasing interval between fan and casing. Both types of construction, can, if desired be combined by using a conical fan in a conical casing.

The casing may be constituted by the sides of the cover of the machine, by a sieve, or by louver-like rings partly inserted one in another or finally by a combination of the above.

One method of carrying out the invention is shown in the accompanying drawings in which:—

Figure 1 is a part vertical section of the machine. Fig. 2 is a horizontal section on line A—B of Fig. 1.

In a cover 1 of any suitable form a vertical shaft 3, carrying a fan 4, is rotatably journaled. The fan is tapered downward

and, in the present instance, comprises two larger and a plurality of smaller vanes. The latter serve the purpose of separating the air which flows in behind the larger vanes and transforming it into a plurality of small weaker vanes. Funnel-shaped rings 5 are disposed one above another around the fan, forming a louver-like casing, likewise tapered downward and composed of four segment like parts. This segmental casing is surrounded by a gauze covering 6 also consisting of four parts. The feed-hopper 8 for the stock is disposed around the shaft 3 on the head 7 above the fan. A screwed sleeve 9 engages movably over the lower cylindrical part of the hopper which is also screwed so that the opening between the hopper and the upper fan casing 10, which acts as a spreader, may be increased or decreased as desired.

Openings 12 for the discharge of the coarse and openings 13 for the fine sifted products are provided in the bottom of the cover.

14 is a T ring, secured to the cover bottom 11, which by engaging in a concentric groove in the bottom fan casing forms an air-tight joint between the two.

The operation of the device is as follows:—The stock is poured into the feed hopper 8 and passes through the adjustable slit on to the spreader 10 whence it falls and is flung against the louver-like casing 5. A continuous separation of the finer from the coarser parts takes place on the surface of these rings, the finer parts being carried upward through the openings between consecutive rings whereas the coarser parts accumulate thereon falling off at intervals on to the surface of the ring immediately underneath to be shifted anew and so on until they are collected through the opening 12.

The fine particles, carried by the air pressure upward through the spaces separating the rings impinge on the gauze screen 6, where a further separation of the parts takes place, only the finest particles passing through the gauze to fall behind it and be removed through the opening 13.

For sifting materials not required to present a very high degree of fineness or uniformity, the casing 5 alone is sufficient, and the gauze screen may in this case therefore be omitted.

By removing the casing 5 the gauze alone

may be used for sifting in which case the stock rolls down its inclined surface and is blown through horizontally.

It is clear that the essence of the invention resides in the fact that the current of air and namely always of the same air, is driven through the fan in the form of distinct consecutive blasts, in such manner that the strength of the current varies continuously from one horizontal position to another. If the fan tapers conically from top to bottom, a continuous decrease of the maximum blast follows from the consideration that a fan of lesser diameter produces a weaker blast than a fan of greater diameter. The same effect is obtained with a cylindrical fan in which case the shape of the casing must vary continuously, as though of constant strength at all heights the action of the blast on the stock will then vary continuously because the interval between fan and casing and consequently stock is continuously varied.

The action of the baffle rings consists in transforming the air-waves generated by the fan vanes into a plurality of more or less ascending air-waves which carry the stock with them. Naturally the lighter and finer particles rise higher than the heavier ones and are carried over into the tranquil zone behind. The heavy parts are, on the contrary unable to follow the ascent and gather on the surfaces of the baffle-rings, whence they fall down to be sifted anew.

The casings are built narrower or wider, flatter or steeper according to the requirements of the stock to be treated. Further a plurality of sieves or of the louver acting rings, or a plurality of combinations of the same may be arranged concentrically to each other so as to sort the stock into a number of grades of fineness at one operation. In such case a correspondingly increased number of delivery openings must be provided in the bottom.

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. In a device of the character described, the combination of a fan including vanes of varying radius, a separating casing surrounding said fan, and means for feeding material through said casing, substantially as described.

2. In a device of the character described,

the combination of blast creating means, a separating casing surrounding said means and comprising a series of frusto-conical rings assembled in overlapping relation, and means for feeding material to said casing, substantially as described.

3. In a device of the character described, the combination of blast creating means, a separating casing surrounding said means and comprising a series of frusto-conical rings assembled in louver-formation, and a mesh embracing said rings, and means for introducing material to said casing, substantially as described.

4. In a device of the character described, the combination of blast producing means, a separating casing inclosing said means and comprising a series of frusto-conical rings assembled in overlapping relation and tapering toward the base of said casing, and a mesh embracing said rings, means for introducing material to said casing, a conical spreader arranged beneath said introducing means for directing the material between said casing and blast producing means, and a movable sleeve associated with said introducing means and adapted to be adjusted above said conical spreader to regulate the quantity of material introduced, substantially as described.

5. In a device of the character described, the combination of a housing, a shaft journaled in said housing, a fan mounted on said shaft and including tapering vanes of varying radius, a separating casing surrounding said fan and comprising a series of frusto-conical rings assembled in louver-formation and tapering toward the base of said casing, and a mesh embracing said rings, a hopper for introducing material to said casing, a conical spreader rotatable with said fan and arranged beneath said hopper, and a movable sleeve on said hopper for adjustment above said spreader for regulating the quantity of material introduced, substantially as described.

Mannheim, Germany, dated this 12th day of May A. D. 1914.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this twelfth day of May A. D. 1914.

FRANZ HOLL.

Witnesses:

ANNA CRUSIZ,
JOSEPH HAUSER.