(No Model.) 3 Sheets—Sheet 1.

A. C. NAGEL, R. H. KAEMP & A. W. F. G. LINNENBRÜGGE.

DISINTEGRATING APPARATUS FOR FLOUR MILLS.

No. 312,215. Patented Feb. 10, 1885.

Fig. 2.

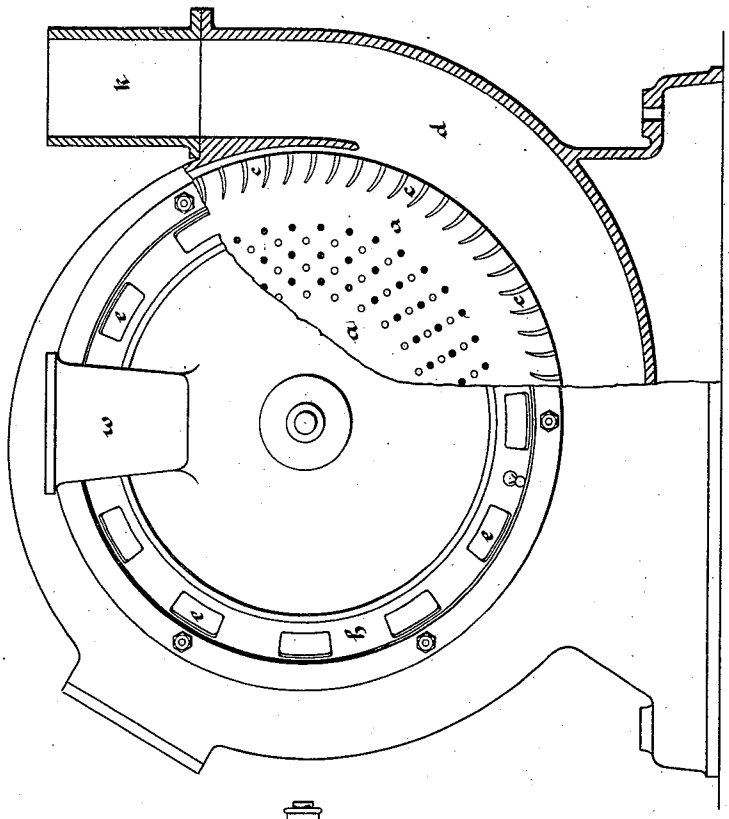
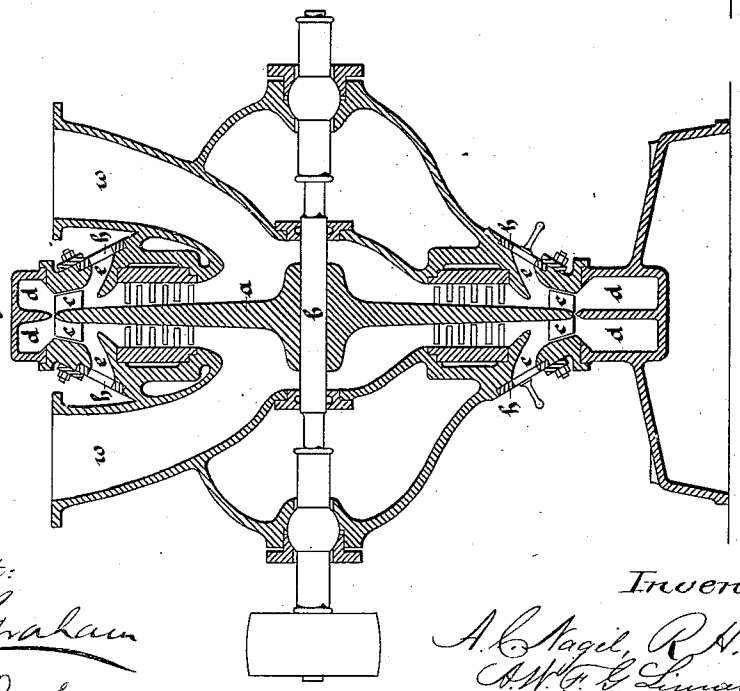


Fig. 1.



Attest:
Geo. H. Graham
A. S. Jasbera.

Inventors,
A. C. Nagel, R. H. Kaemp,
A. W. F. G. Linnenbrügge
by Munn & Co Philipp
atty's.

N. PETERS. Photo-Lithographer. Washington, D. C.

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A. C. NAGEL, R. H. KAEMP & A. W. F. G. LINNENBRÜGGE.

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Fig. 4.

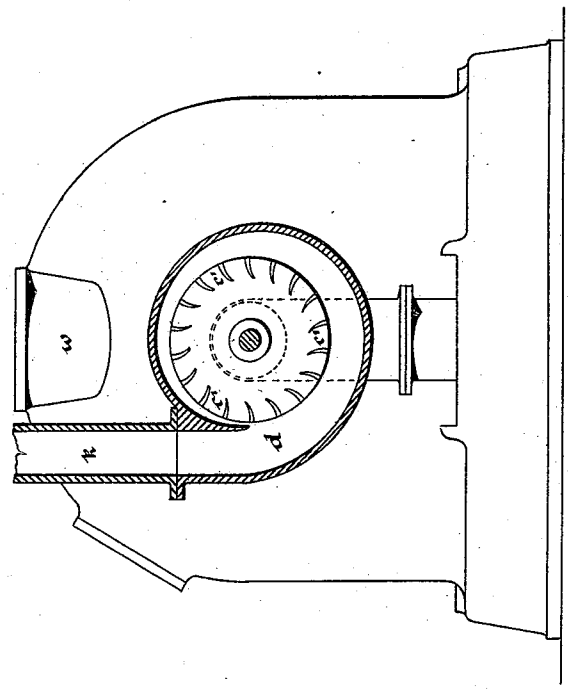
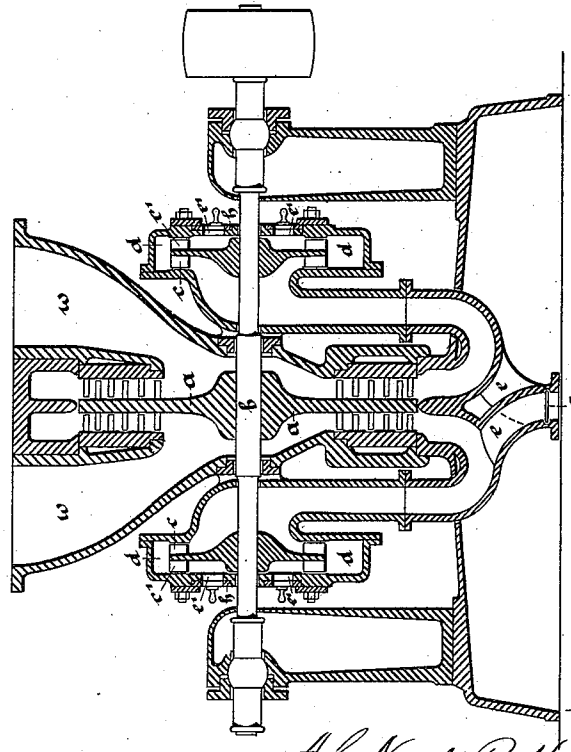


Fig. 3.



Attest:
Geo. H. Graham
A. N. Jasbera

Inventors,
A. C. Nagel, R. H. Kaemp
A. W. F. G. Linnenbrügge
by Munson & Philipp
attys.

N. PETERS. Photo-Lithographer. Washington, D. C.

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A. C. NAGEL, R. H. KAEMP & A. W. F. G. LINNENBRÜGGE.

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No. 312,215. Patented Feb. 10, 1885.

Fig. 6.

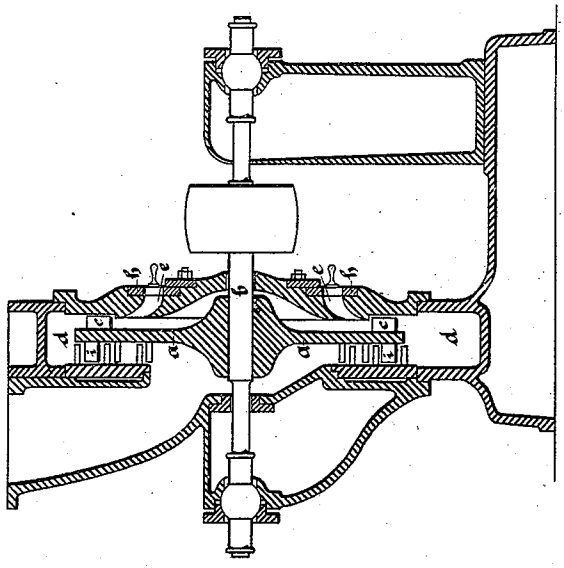


Fig. 7.

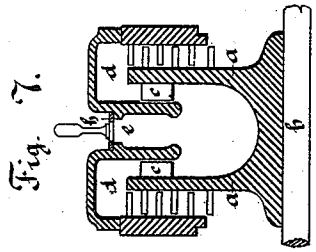
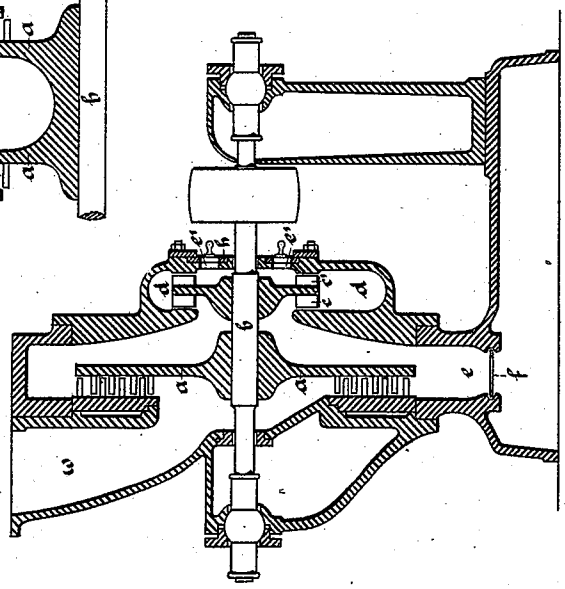


Fig. 5.



Attest:

Geo. H. Graham

A. H. Gaebera

Inventors,

A. C. Nagel, R. H. Kaemp

A. W. F. G. Linnenbrügge

by Munson & Philipp

Attys

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

AUGUST CHRISTIAN NAGEL, REINHOLD HERMANN KAEMP, AND ADOLF WILHELM FRANZ GEORG LINNENBRÜGGE, OF HAMBURG, GERMANY, ASSIGNORS TO NAGEL AND KAEMP, OF SAME PLACE.

DISINTEGRATING APPARATUS FOR FLOUR-MILLS.

SPECIFICATION forming part of Letters Patent No. 312,215, dated February 10, 1885.

App'ication filed July 23, 1884. (No model.) Patented in France October 16, 1877, No. 120,755; in Germany February 23, 1883, No. 26,904; in England March 5, 1883, No. 1,160; in Belgium March 10, 1883, No. 60,716; in Italy May 11, 1883, XXX, 459, and in Austria-Hungary December 27, 1883, XXXIII, 2,613; XVII, 2,573.

To all whom it may concern:

Be it known that we, AUGUST CHRISTIAN NAGEL, REINHOLD HERMANN KAEMP, and ADOLF WILHELM FRANZ GEORG LINNENBRÜGGE, all residing in Hamburg, German Empire, have invented new and useful Improvements in Disintegrating Apparatus for Flour-Mills, (for which we have obtained Letters Patent in Great Britain, March 5, 1883, No. 1,160; France, March 10, 1883, addition to No. 120,755; Belgium, March 10, 1883, No. 60,716; Italy, May 11, 1883, Vol. XXX, No. 459; Austria-Hungary, Tom. XVII, XXXIII, Fol. 2,573, 2,613, December 27, 1883; Germany, February 23, 1883, No. 26,904,) of which the following is a specification.

Our invention relates to disintegrating apparatuses, such as are used for comminuting grain.

The object of the invention is to convey the grist to its place of destination by means of an air-current.

The invention consists in the combination, with the beaters or pin-disks in these apparatuses, of fan-blades that run in a channel leading to the machine or apparatus in which the produced grist is to be sifted or purified, or to a collecting-chamber, all as more particularly hereinafter described and claimed.

The improvements are especially intended to be applied to the disintegrators described in the specification of the United States Letters Patent No. 228,669; but they may also be used with other apparatuses of the same kind.

Figure 1 of the annexed three sheets of drawings represents in vertical longitudinal section a double disintegrator having fan-blades on the rotating pin-disk *a*. Fig. 2 is a side view thereof, partly in section. Figs. 3 and 4 are like views of a double disintegrator provided with separate fans placed sideward of the disk *a* on the shaft of the same. Fig. 5 represents in vertical section a disintegrator with a single system of co-operating pins and one separate fan. Fig. 6 is a like section of a machine of the single system having on the rotating disk the main fan-blades *c* and the accessory blades *i*. Fig. 7 is a section of a portion of a machine with two rotating disks, *a*, provided each with pins on one side and blades *c* on the other.

In all cases air is admitted to the main fan-blades through orifices so arranged as that the air-current produced by the blades will meet the grist after it has left the beating-pins. This arrangement is indispensable in the aforesaid patented disintegrators which are closed round about, in order to prevent as much as possible air from passing between the beating-pins. The fan-blades rotate in a housing that forms around the path of the blades a channel, *d*, with which communicates the pipe or conduit *k*, leading to the machine or place to which the grist is to be conveyed. By preference the said channel is made of such form as that its transverse sectional area increases toward its outlet end. In the double disintegrator shown by Figs. 1 and 2, in which the blades *c* are on the rotating pin-disk *a*, the orifices *e* for the admission of air are placed in a circle on either side of the casing of the machine, and so that the air will be drawn in between the outer row of pins and the blades *c*. The apparatus being in operation, the comminuted material is thrown by the pins of the disk *a* into the air-current, which then carries it onward, while simultaneously it acts as an efficient cooling medium. The width of opening of the orifices *e*, and consequently the strength of the air-current, may be regulated by means of the circular slides *h*, which are perforated with openings to coincide with the orifices *e*, and the solid portions of the slides *h* may be moved more or less over the orifices to regulate the extent of their openings, and thereby control the quantity of air admitted to the fan-blades.

In the machine shown by Figs. 3 and 4, in which the pin-disk *a* is also provided with pins on both sides, the fan-blades *c* are fixed to a disk or to arms fastened on the shaft *b* of the pin-disk by the side of the latter. The orifices or channels *e*, for the admission of air

to the blades *c*, are at the bottom of the machine. The grist will in this case be caught by the air-current as it drops or flies to the lower part of the housing of the disk *a*, and will then be carried toward and past the blades *c*, and through the channel *d* into the pipe *k*.

In addition to the blades *c* the fan-disk may be provided with the blades *c'*, serving to draw air through the openings *e'*, and to mix the same with the current of air and grist delivered by the former. The orifices *e* and *e'* may be regulated respectively by means of the slides *f* and *h*.

Fig. 5 represents a machine which is like the one described last except that the disk *a* has only on one face pins to co-operate with a system of stationary pins, and that, consequently, there is but one fan to produce the current for conveying the grist. In a like manner the machine shown by Figs. 1 and 2 may be constructed with but one rotative and one fixed system of pins, and with a single series of fan-blades placed on the face of the disk *a*, which carries the pins.

On account of the centrifugal action of the pins, as well as of the fan-blades, a rarefaction of air is caused in the space in which the pins and the fans rotate. In the double machines shown by Figs. 1 to 4 this is of no consequence; but in the machines with a single pair of pin systems there arises from this rarefaction a preponderating air-pressure on the back of the rotating disk, which causes the shaft *b* to be pressed endwise against one of its bearings. The pressures resulting respectively from the action of the pins and of the blades may, however, be made to act in contrary directions on the rotating disk by placing the blades *c* on the face of the disk which is opposite to the face that carries the pins, as shown by Fig. 6; and if in this case the blades are duly proportioned to the pins the two pressures will balance each other. But if the air-rarefying power of the blades *c* is greater than that of the pins, the difference may be compensated by means of small blades *i*, Fig. 6, placed on the same side or face of the disk *a* as the pins, and which are made of such size and arranged in such number that the desired result will be attained. Another construction for balancing the pressures acting lengthwise on the shaft *b* is shown by Fig. 7. In this modification there are on the shaft *b* two disks, *a*, operating by means of pins fixed to their outer faces, while the blades *c* are on the inner ones, the air being admitted through apertures *e*, arranged between the housings that form the channels *d*. This construction may, however, be inverted by placing the pins on the inner faces of the disks and the blades on the outer faces.

We claim as our invention—

1. In disintegrating apparatuses acting by means of beating-pins on the material to be comminuted, the combination, with a rotating pin-disk, *a*, of fan-blades *c*, running in a housing that forms around the path of the blades a channel, *d*, and which housing is provided with one or more air-orifices *e*, the blades *c* and the orifice or orifices *e* being so arranged in respect to each other and to the beating-pins as that the air-current produced by the blades will meet the grist after it has left the pins, and the channel *d* having a pipe connected thereto for the conveyance of the grist by the air-current to its place of destination, substantially as and for the purpose described.

2. In a disintegrating apparatus, the combination, with a disk, *a*, having beating-pins on one side and fan-blades *c* on the other, and a housing that forms a channel, *d*, around the disk, of the fan-blades *i*, attached to the disk on the same side as the pins, as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

AUGUST CHRISTIAN NAGEL.
REINHOLD HERMANN KAEMP.
ADOLF WILHELM FRANZ GEORG LINNENBRÜGGE.

Witnesses:
CHAS. R. HOYT,
H. SCHRADER.