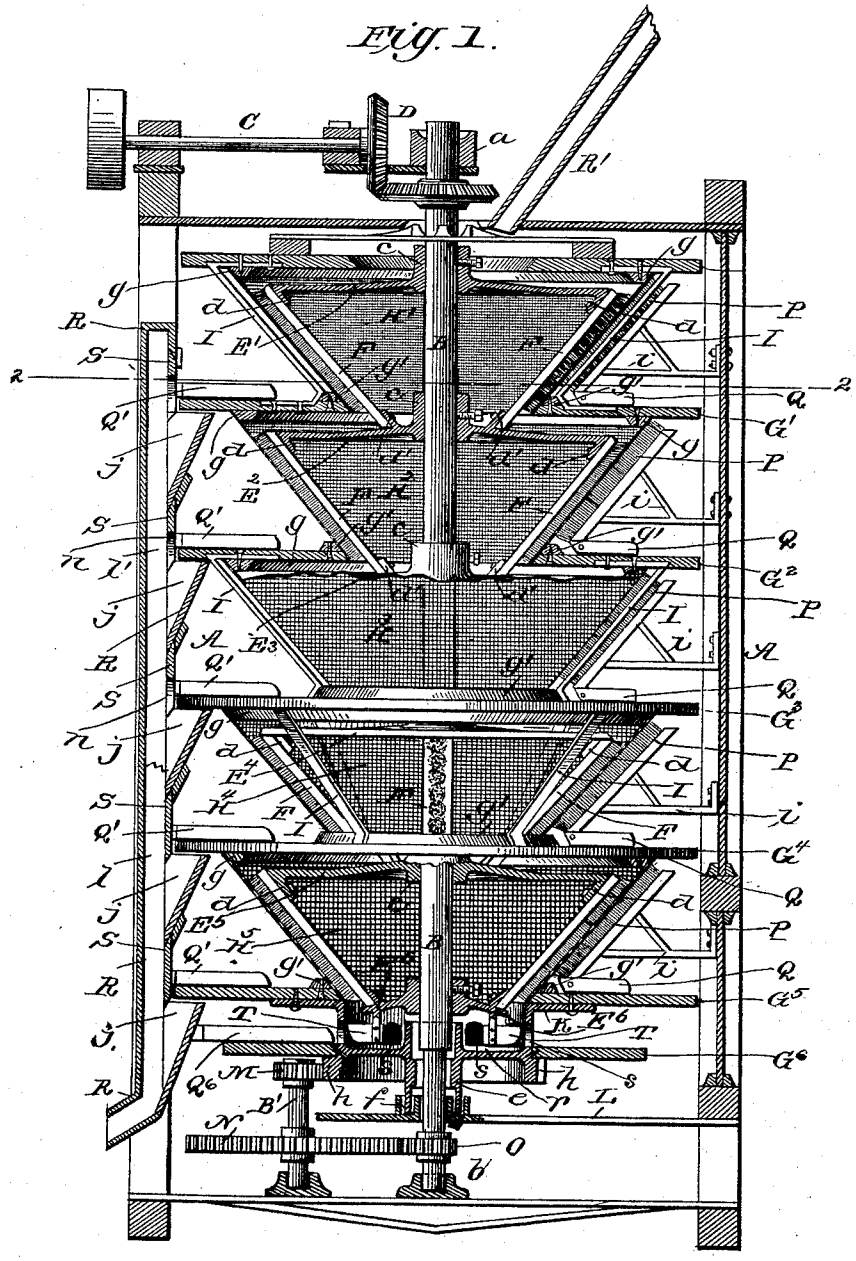
(No Model.) 2 Sheets—Sheet 1.

V. MONNIER.

FLOUR BOLTING APPARATUS.

No. 448,538. Patented Mar. 17, 1891.

Fig. 1.



WITNESSES:
Fred G. Dieterich
Amos W. Hart

INVENTOR:
Victor Monnier.
BY Munn & Co
ATTORNEYS

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Fig. 2.

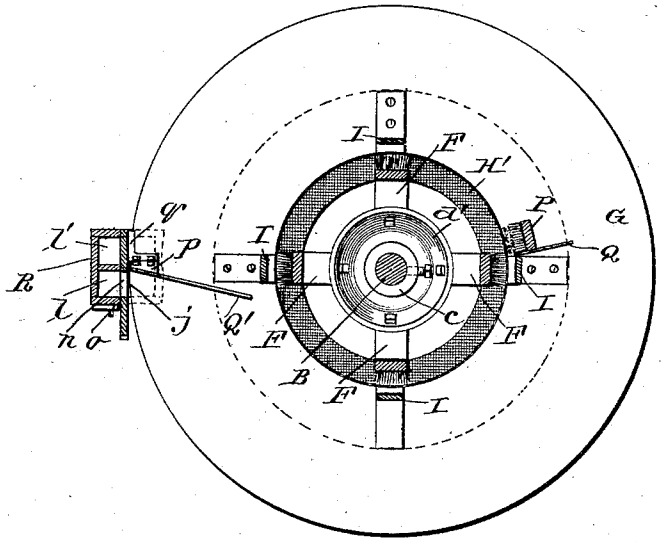


Fig. 3.

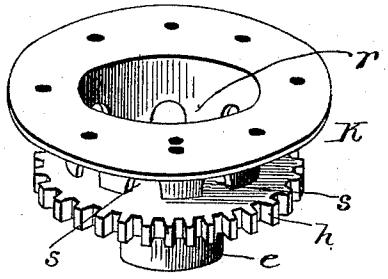
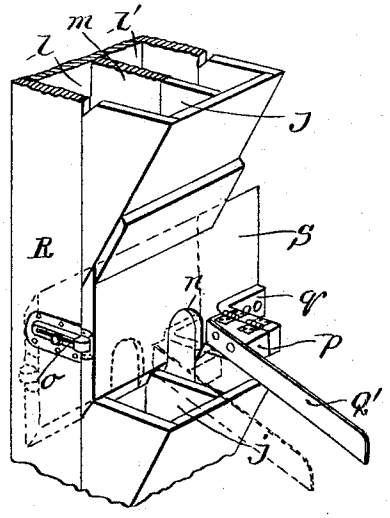


Fig. 4.



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UNITED STATES PATENT OFFICE.

VICTOR MONNIER, OF GRAFTON, NORTH DAKOTA.

FLOUR-BOLTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 448,538, dated March 17, 1891.

Application filed September 24, 1890. Serial No. 366,029. (No model.)

To all whom it may concern:

Be it known that I, VICTOR MONNIER, of Grafton, in the county of Walsh and State of North Dakota, have invented a new and useful Improvement in Flour-Bolting Apparatus, of which the following is a specification.

My invention is an improvement in the class of vertical centrifugal bolting mills or apparatus. The apparatus includes a series of horizontal revolving disks arranged one above another and a like series of revolving screens or bolts surrounding them, and also a series of annular tables, which are located at lower points than the disks and exteriorly of the screens. The meal or "stuff" to be bolted is delivered upon the upper one of the aforesaid disks and is thrown laterally against the adjacent screen. A portion passes through the latter and is discharged from the machine, while the coarser remainder is delivered upon the next disk and subjected to the same operation as before, and so on successively until the flour is all separated from the bran or offal, which latter is then removed by separate means.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of my improvement. Fig. 2 is a horizontal section taken on the line 2 2, Fig. 1. Figs. 3 and 4 are detail perspective views.

The working parts composing the bolting apparatus proper are inclosed by a vertical rectangular oblong case or box A. A vertical shaft B is arranged centrally in said casing and has fixed top and bottom bearings *a b*, as shown. Rotation is imparted to this shaft B by means of a power-driven horizontal shaft C and miter-gearing D. A series of horizontal circular metal disks E' E^2 E^3, &c.—in this instance six in number—are keyed on the vertical shaft B and arranged equidistantly. It will be seen that the lowest disk E^6 is smaller—*i. e.*, narrower than the others. They are slightly conical around the central hub *c*. The upper five disks have also a flat peripheral portion, and are provided on the under side with four flanges *d*, which are located contiguous to the outer edge and inclined inward at an angle of about forty-five degrees. All the disks, save the uppermost one E', have also four similar flanges *d'* arranged on the upper side adjacent to the hub *c* and inclined outward from the latter at an angle of forty-five degrees. Both sets of flanges *d d'* are cast integrally with their respective disks. Their function is to serve as supports and points of attachment for the brushes or bars F, four in number, carrying brushes, the same being arranged obliquely and bolted to the flanges *d d'* at their respective ends. The shaft B, disks E', &c., and brushes F constitute what may be termed the "internal portion" of the bolter, and of course revolve together.

I will now describe the exterior or complementary revolving portion of the apparatus. It consists, mainly, of a series (six in number) of horizontal annular wooden plates or tables G' G^2, &c., and five bolting-screens H', &c., each of which surrounds and is arranged parallel to a set of the brushes F, so that the latter work in contact with its inner side, as shown. The screens have the form of a transverse section of a funnel. The tables G',&c.,are arranged one above another, surrounding the shaft B, each at a point just above one of the disks E' E^2, &c. They are rigidly connected by means of angular iron bars I, whose horizontal ends are bolted to the under and upper sides of adjacent tables, as shown. Thus all the upper five tables G' G^2 G^3 G^4 G^5 are supported on the lower one G^6, and it is in turn secured to and supported on an iron base, consisting of a frame K, whose annular gudgeon *e* is stepped and rotates in a corresponding socket *f*, formed in the horizontal bar L, that traverses and is secured to the lower portion of the casing A. The bolting-cloths of the several screens H' H^2, &c., are graduated in fineness of mesh, the upper one H' being the finest, the next H^2 coarser, and so on, the lower one H^5 being the coarsest. Each screen is attached at its upper edge to an annular rib *g* on the under side of a table and at its lower edge to the inner circular thickened edge *g'* of the next lower table.

It will be seen that the portion of the apparatus just described—to wit, the tables and screens—constitutes in effect an integral portion of the apparatus, which is supported on the frame K. It also revolves with the latter, but at a lower rate of speed than the parts supported by and revolving with the shaft B.

The said frame is provided with a cog-gear

h, which meshes with a pinion M on a vertical counter-shaft B′, whose gear N in turn engages the pinion O on shaft B. For the purpose of removing from the outer side of the bolting-screens H′ H², &c., the flour that may adhere to them, I arrange one brush P in each compartment and support it rigidly at the required obliquity by means of a bracket *i*, attached to the inner side of the casing A. The flour falls on the tables below. A scraper Q, consisting of a thin metal plate, is attached to the lower end of each of these stationary brushes P and works close to the table below. As will be seen, its length and arrangement are such as to move the bolted stuff that falls on the table toward the middle of the latter, in which location it may be reached and removed by another set of longer scrapers Q′, that cause it to diverge into one of the projecting mouths or "pockets" *j* of spout R, arranged at one side of the casing A. These scrapers Q′ are long narrow plates of thin metal and extend inward from the spout R over the platform G′, &c. Their outer ends are secured to slides S, that will be presently described.

The spout R is divided into two passages *l l′* by a lengthwise partition *m*, Figs. 2 and 4. There may be one or more of these partitions, according to the number of passages required, for different grades of flour bolted by the different screens. The delivery of the bolted stuff from each table G′ G², &c., into the adjacent mouth *j* of the spout R is regulated at will by means of the aforementioned slides S, Fig. 4, which have each a single notch or opening *n* in its lower edge, and are held vertical but are adjustable transversely in suitable keepers or guides on said spout. I employ a spring or other form of catch or lock *o* to hold the slide S fixed in the position required to deliver flour into either of the passages *l* or *l′* in the spout.

As shown in Fig. 4, each scraper Q′ is bolted to a wooden piece *p*, which is hinged to a right-angular arm *q*, that is in turn bolted to a slide S. The scrapers are hinged so that they may bear on the tables to the degree determined by their own gravity, and thus always work in close contact with the tables even if the latter should be slightly unsteady or irregular in movement.

The main features of the operation of the apparatus in practical use will be apparent from the foregoing description. The material to be bolted is delivered from the upper spout R′ onto the upper disk E′ at a point near the hub *c* of the latter, and by centrifugal action is thrown laterally against the adjacent surrounding screen H′. The finest portion, aided by the four revolving brushes F, passes through said screen and, being removed by the stationary brush P, falls upon the contiguous table G′, from which it is removed by scrapers Q and Q′ and forced into the nearest mouth or pocket *j* of spout R. The portion of the material which is too coarse to pass through the screen H′ escapes downward onto the next disk E², when the operation is repeated. The tailings delivered internally from the lower screen H⁵ enter the cylindrical pocket *r*, Figs. 3 and 1, of the gudgeoned frame K, and are pushed out by revolving wings T through lateral openings *s* onto the platform G⁶, whence they are removed by a scraper Q⁶ into any suitable receptacle. This lowermost table G⁶ has a less diameter than the others, as before stated, and is attached to the cylindrical side of frame K just above the gear *h*. It will be noted that the hub or hollow gudgeon *e* of said frame K is at no point in contact with shaft B. The counter-shaft B′ is supported by suitable means.

This form of bolting apparatus has great advantages in economy of the power required for operating it and in the fact that the meal is allowed to slide gently by its own gravity over the whole surface of the bolting-cloth, which is thus working at once, so that a large quantity of meal is passed through it in a limited space of time, and, further, in the method of removal of the bolted product in separate grades of fineness.

What I claim is—

1. In a centrifugal bolting apparatus, the combination, with a vertical rotating shaft, a series of horizontal disks mounted thereon for successively receiving the stuff to be bolted, and brushes attached to and rotating with said disks, of an external revolving part consisting of a series of horizontal tables which are rigidly connected, a corresponding series of screens arranged opposite to and surrounding the disks and attached to said tables, and a series of scrapers working on the tables for removing the flour, substantially as shown and described.

2. In a centrifugal bolting apparatus, the combination, with a vertical rotary shaft, of a series of horizontal disks mounted thereon, a series of sets of brushes, each set being attached at their upper ends to the peripheral portion of one disk and at their lower ends to the inner or central portion of the adjacent disk, whereby they are held oblique, as shown, a series of horizontal rigidly-connected tables which revolve around the disks, a like series of screens, each attached to two contiguous tables and arranged in oblique position in contact with the aforesaid brushes, and scrapers for removing the flour from the tables, as shown and described.

3. In a centrifugal bolting apparatus, the combination, with a vertical rotating shaft, of a series of distributing-disks mounted horizontally thereon and provided with inwardly and outwardly inclined flanges arranged at the periphery and contiguous to the center of said disks, as specified, a series of brushes attached to said flanges and thus held oblique, a series of rigidly-connected horizontal tables which revolve around the brushes and disks, a series of screens attached to and thus rotating with

said tables and arranged oblique in contact with the brushes, and a series of scrapers working on said tables for removing the flour, as shown and described.

4. In a centrifugal bolting apparatus, the combination, with a rotating shaft, horizontal distributing-disks, and brushes arranged obliquely, of the surrounding rotating tables and screens and a series of fixed brushes arranged exteriorly of and in contact with said screens, a series of scrapers attached to the lower ends of the fixed brushes for moving the bolted flour to the center of the tables, and a corresponding series of longer scrapers for removing the flour into lateral pockets or receptacles, substantially as shown and described.

5. In a centrifugal bolting apparatus, the combination, with an internal part composed of the vertical shaft, horizontal distributing-disks mounted thereon, and brushes attached to and rotating with the disks, of a surrounding or outer part composed of a series of horizontal flour-receiving tables, screens attached to said tables, a series of rigid bars connecting the latter, and a rotating base-frame K, supported independently of said shaft, and means for rotating the internal and external part simultaneously, substantially as shown and described.

6. In a centrifugal bolting apparatus, the combination, with the vertical shaft, distributing-disks fixed thereon, and a series of oblique brushes, all rotating together, of a surrounding part composed of a series of horizontal flour-receiving tables, which are rigidly connected, a series of screens attached to them and working in contact with the said brushes, a rotating base-frame K, which supports and carries the said tables and screens and is provided with a hollow gudgeon that surrounds the shaft, and gearing which connects the shaft and frame for imparting rotation from the one to the other, as shown and described.

7. In a centrifugal bolting apparatus, the combination, with the interior rotating part and the exterior rotating part composing the main portion of the bolting apparatus, of the rotating base-frame K, which supports and carries such exterior part, the said frame having a cylindrical pocket with lateral openings for reception and exit of the tailings, and wings attached to the lower portion of the interior and working in said pocket of frame K for aiding the discharge of the tailings, as shown and described.

8. In a centrifugal bolting apparatus, the combination, with horizontal rotating tables upon which the bolted product is received, of a series of scrapers, blocks to which the latter are hinged, and a right-angular arm attached to some portion of the casing of the apparatus, as shown and described.

9. In a centrifugal bolting apparatus, the combination, with a series of horizontal rotating flour-receiving tables arranged one above another, a vertical discharge-spout having two or more longitudinal passages, and a series of mouths, one being arranged opposite each table, a series of notched slides covering said mouths and adjustable transversely in suitable guides, and scrapers working on said tables and attached to the slides, whereby the scrapers are adjusted simultaneously with the latter, substantially as shown and described, for the purpose specified.

VICTOR MONNIER.

Witnesses:
J. E. CRONAN,
D. MCLELLAN.