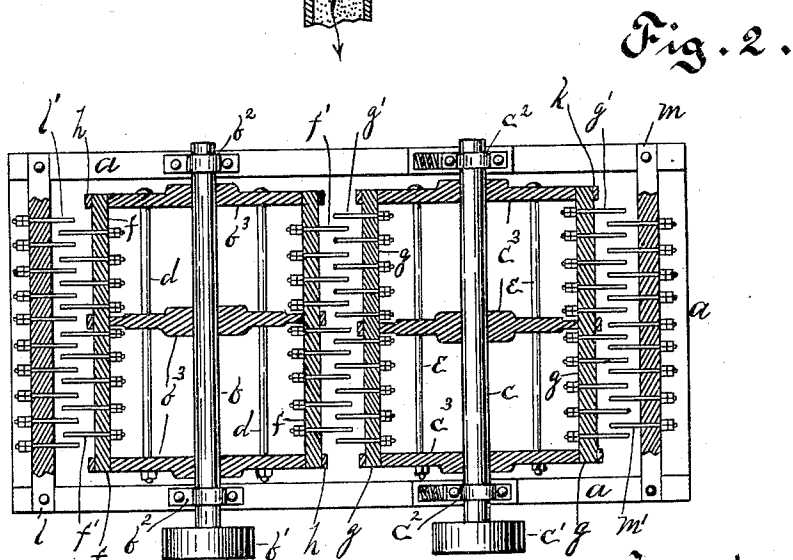
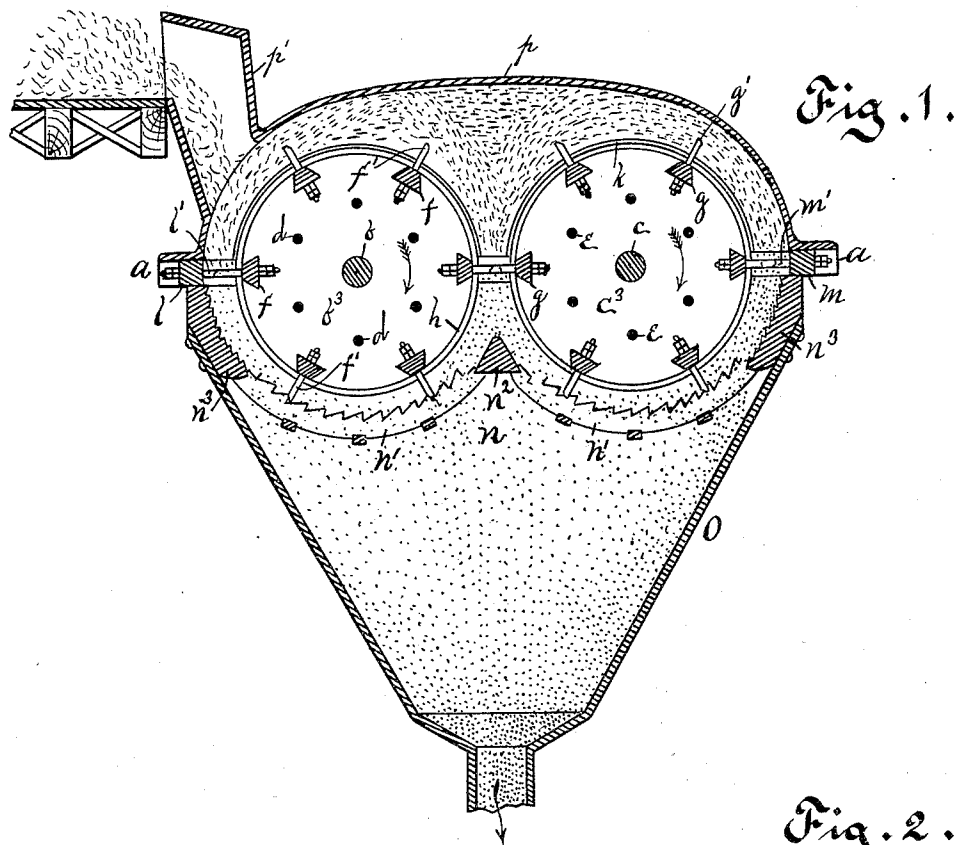


J. HICKEY.
DISINTEGRATING MACHINE.

No. 430,646.

Patented June 24, 1890.



Witnesses:
Otto Haddock.
James A. Jarrett.

Inventor.
John Hickey
By
W. T. Miller
Attorney.

(No Model.)

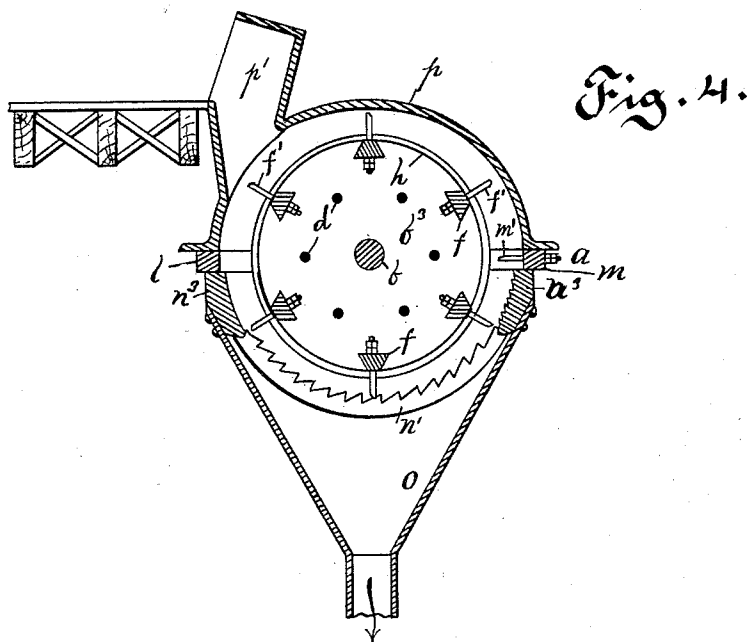
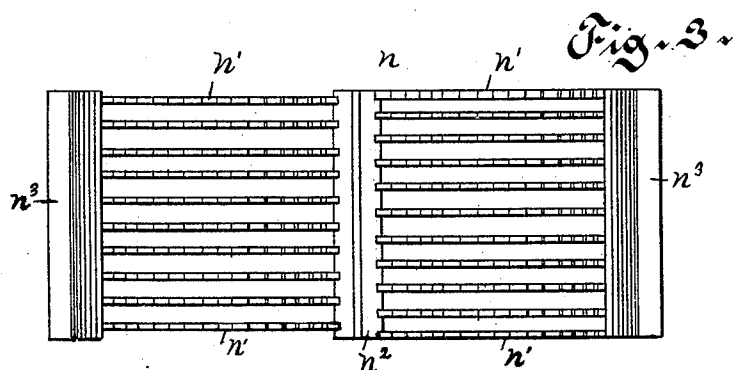
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

JOHN HICKEY, OF BUFFALO, NEW YORK, ASSIGNOR OF TWO-THIRDS TO
EMIL A. BECKER AND ALLAN H. PETTIT, BOTH OF SAME PLACE.

DISINTEGRATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 430,646, dated June 24, 1890.

Application filed April 27, 1889. Serial No. 308,800. (No model.)

To all whom it may concern:

Be it known that I, JOHN HICKEY, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Disintegrating-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in disintegrating-machines, and particularly to that class used in disintegrating stock in the manufacture of fertilizing material; and it consists of the hereinafter described and claimed arrangement of rotating diaphragms, which are mounted on shafts and connected by bars and rods forming open drums, the bars provided with series of teeth, which may mesh or intermesh, according to the quality of material operated upon, while being revolved at a high rate of speed, which I will now proceed to definitely describe and claim.

In the drawings, Figure 1 is a vertical longitudinal section of my improved disintegrator. Fig. 2 is a horizontal section of the same, taken on the plane of the shafts of the drums. Fig. 3 is a detail view, and Fig. 4 is a vertical central section of a modified form of my improvement.

Referring to the drawings, *a* is a frame upon which the shafts *b* and *c* are mounted, the shaft *b*, provided with the pulley or drive wheel *b'*, being mounted in the bearings *b² b²*, and the shafts *c*, with its pulley or drive wheel *c'*, being mounted in its spring-pressed bearings *c² c²*. These bearings, it will be seen, will admit of a lateral movement of the shaft *c*, and thus enable the drums so equipped to yield slightly, in order that a hard foreign substance may pass through without injury to the teeth. On these shafts *b* and *c* are rigidly mounted the disks *b³ b³* and *c³ c³*, respectively. These disks are rigidly connected together by the rods *d* and *e* and also by the bars *f* and *g*, the disks being also rigidly keyed to the shafts. The bars *f* and *g*

are dovetailed into the disks, which would necessitate the bursting of the disks before the bars could fly out, and they are further secured by means of the bands *h* and *k*, which are shrunk over the disks after the bars have been placed in position. The bars are additionally secured to the disks by tap-bolts. These bars, six of which are herein shown to each drum, are provided with a series of teeth *f'* and *g'*, which, as shown in the drawings, intermesh with each other. Where a pulverization is simply dependent upon a sharp blow, (the nature of the stock to be treated determining the same,) the intermeshing would not be necessary; but where the stock must be cut or ground up by attrition upon itself and against the material of which the mill is composed, it would then be necessary for the teeth to intermesh and to use the diaphragm, so that the material may be held until the required degree of fineness is attained.

At the ends of the frame *a*, I have arranged in the pieces *l* and *m* the series of teeth *l'* and *m'*, which are stationary in position and intermesh with the teeth of the drums, as clearly seen in Fig. 2.

Below the frame *a* is placed the hopper *o* for collecting the stock after passing through the machine, and at its upper end is arranged a perforated diaphragm or open grate *n*, which serves to retard the stock in passing to the bottom of the hopper. This open grate *n* is formed by the toothed bars *n'*, connected at their inner ends to the center bar *n²* and at their outer ends to the corrugated pieces *n³*, fitted in the frame. These corrugated pieces *n³ n³*, as well as the toothed bars *n'*, assist materially to disintegrate the stock passing between them. This first disintegration serves to reduce the strain which would otherwise be brought to bear upon the bars of the diaphragm in the event of the bars first receiving the material, thus decreasing the chances of the bar being broken. The grate-bars are further strengthened by the addition of transverse cross-pieces cast integral therewith. Over the frame *a* and inclosing the drums is placed the casing *p*, with its spout *p'*, through which the stock is fed to the machine.

In operation it will be seen that the mate-

rial fed through the spout will first strike the revolving drum on the left-hand side. A portion of the material will then be thrown up and across the top of the casing and onto the teeth of the right-hand drum, the top of the casing simply acting as a chamber for the coarse material, and only when ground sufficiently fine will it be allowed to pass through any of the three gateways formed by the intermeshing of the teeth of the drums and frame, as shown. Should any of the coarser material happen to pass through these gateways or between the bars of the drums, it is caught upon the diaphragm and there subjected to a final grinding between the bars of the diaphragm and the teeth of the drums. The degree of fineness of the material falling into the hopper is dependent upon the gaged width of opening between the bars of the diaphragm.

In Fig. 4 I have shown a modified form of disintegrator, in which but one drum is employed, which is constructed the same as those shown in Figs. 1 and 2, having the shaft *b*, diaphragm *b'*, bars *f*, held by the bands *h*, said bars having the teeth *f''* and the bolts *d* connecting the diaphragms. This modified form differs also in having the side piece *n*³ smooth instead of corrugated, as shown in Fig. 1, and dispenses with the stationary teeth *l'*, and having the stationary teeth *m'* so arranged as to intermesh with the teeth on the right-hand side of the drum, as it is found sufficient in disintegrating some grades of stock to run it through a machine of this description. The teeth *l'* (shown in Fig. 1) could also be dispensed with without departing from the spirit of my invention.

I claim—

1. In a disintegrator, the combination of a casing, a revoluble toothed drum inclosed therein, a series of teeth projecting inward from the wall of the casing abreast of the drum, and a perforated diaphragm below the drum, substantially as described.

2. In a disintegrator, the combination of a casing, a revoluble toothed drum inclosed therein, a series of teeth projecting inward from the wall of the casing abreast of the

drum and intermeshing with the teeth of the drum, a perforated diaphragm below the drum, and a hopper below the diaphragm, substantially as described.

3. In a disintegrator, the combination of a casing, revoluble toothed drums inclosed therein, a series of teeth projecting inward from the wall of the casing abreast of each drum, and a perforated diaphragm or grating below the drums, substantially as described.

4. In a disintegrator, the combination of a casing, revoluble toothed drums inclosed therein, a series of teeth projecting inward from the wall of the casing abreast of each drum and intermeshing with the teeth of the drums, a perforated diaphragm consisting of toothed gratings below and concentric with the drums, and a hopper beneath the gratings, substantially as described.

5. In a disintegrator, the combination of a casing, revoluble toothed drums inclosed therein and revolving in the same direction, a series of teeth projecting inward from the wall of the casing abreast of each drum and intermeshing with the teeth of the drums, a perforated diaphragm consisting of toothed gratings below and concentric with the drums, and a hopper beneath the gratings, substantially as described.

6. In a disintegrator, the combination of a casing, revoluble toothed drums inclosed therein and revolving in the same direction, with the teeth of one drum intermeshing with those of the adjoining drum, a series of teeth projecting inward from the wall of the casing abreast of each drum and intermeshing with the teeth of the drums, a perforated diaphragm consisting of toothed gratings below and concentric with the drums, and a hopper beneath the gratings, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN HICKEY.

Witnesses:

THOS. REYNOLDS,
W. T. MILLER.