N. K. E. MALMSTEN & K. T. THORSSELL.

CRUMBLING DEVICE FOR SUPERPHOSPHATE AND OTHER MATERIALS.

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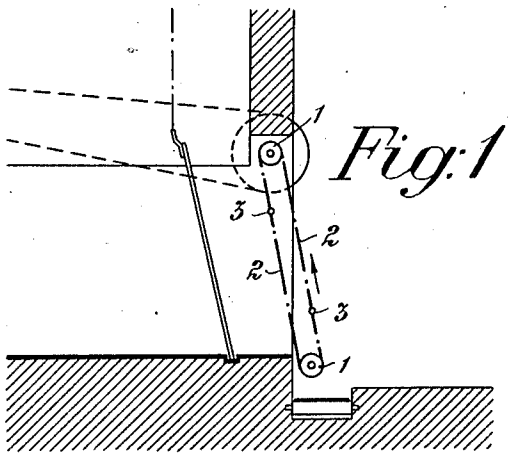
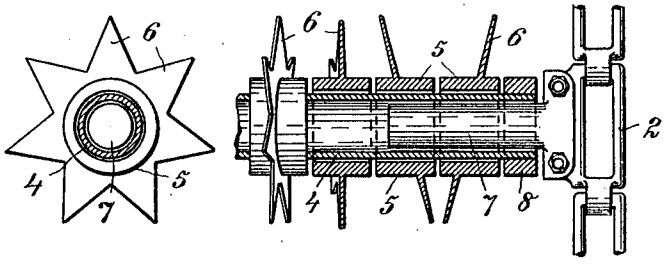


Fig: 1

Fig: 2



Witnesses.
John Murtagh
L. J. Murphy

Inventors:
Karl Theodor Thorssell
Nils Kristian Emil Malmsten
By their Attorneys:
Cooper & Goepel

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

NILS KRISTIAN EMIL MALMSTEN AND KARL THEODOR THORSSELL, OF MALMÖ, SWEDEN.

CRUMBLING DEVICE FOR SUPERPHOSPHATE AND OTHER MATERIALS.

1,026,273. Specification of Letters Patent. Patented May 14, 1912.

Application filed November 27, 1911. Serial No. 662,738.

To all whom it may concern:

Be it known that we, NILS KRISTIAN EMIL MALMSTEN and KARL THEODOR THORSSELL, citizens of Sweden and subjects of the King of Sweden, residing at Malmö, Sweden, have invented certain new and useful Improvements in Crumbling Devices for Superphosphate and other Materials, of which the following is a specification.

This invention relates to a device for crumbling superphosphate or like materials and it is chiefly intended to be used in connection with such emptying devices for superphosphate chambers at which the mass of superphosphate is pushed toward the one opened side of the chamber by suitable means, for instance by a vertical shield, viz. when the contents of the chamber are pushed in form of a block toward stationary cutting or crumbling devices. But the crumbling device can also be made transportable itself and thus carried toward the stationary contents of the chamber. The device can also be used for other purposes, for instance for digging out superphosphate or other materials with similar consistency for the purpose of filling it in sacks and the like.

Having briefly outlined our improved apparatus we will proceed to describe the same in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings Figure 1 shows a longitudinal section of the fore part of a superphosphate chamber and Fig. 2 shows a longitudinal section of the crumbling device and a cross section through the same.

At the sides of the chamber opening there are two chains or the like, running over the chain wheels 1. The crumbling devices 3 are fastened to the chains across the opening. Hitherto cutting devices have been provided consisting of fine wires, knives or the like which however require a great amount of power and are exposed to a considerable strain, when they are passed through the end of the block of superphosphate. Moreover it is not to be forgotten that all cutting devices have a very injurious influence on the consistency of the mass. These inconveniences are totally remedied by our invention, by which the cutters are exchanged against one or several rotating devices provided with projections of any kind. These projections attack the mass during their rotation without cutting it and loosen or detach by way of crumbling small parts thereof from the fore end of the block. Fig. 2 shows a construction of such a crumbling device. It consists of a number of sleeve formed bodies 5 loosely mounted upon a tube 4 or the like. Each of these sleeves is provided with a toothed disk or flange 6 which is so arranged that it forms an oblique angle with the center line of the tube 4. In the ends of the tube are loosely fitted taps 7, fastened in the chains for the purpose of carrying the crumbling device. The tube 4 is preferably provided with a collar 8 at each end, between which collars the sleeves are arranged. When these crumblers pass downward across the block of superphosphate, which is fed toward the opening, the different sleeves will rotate around the tube 4, when they touch the superphosphate and thus they will enter the mass and loosen small pieces thereof, which is made easier on account of the sleeves being wholly independent of each other and the toothed disks being arranged obliquely. The sleeves can also be substituted by one single sleeve provided with a number of toothed disks or the like and reaching across the whole opening, but we prefer to arrange each disk on a separate sleeve or body, so that the toothed disks on two adjacent sleeves at any time form different angles in relation to each other. The toothed disks may also be substituted by other projections, pins or the like. The crumbling bodies need not to be mounted on a rigid shaft or tube, but they may also be arranged upon a flexible wire or the like, stretched between the chains; or connected to each other in the same way as the links in a chain, the one end of which is fastened to one of the driving chains and the other end of the same to the other driving chain and eventually simultaneously so arranged that each link can rotate freely independent of the other ones. The effect of the rotating disks may be increased, if the teeth of two adjacent disks are different in number.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. The combination, in a device for crumbling superphosphate or other materials of like consistency, of a number of rotatory

bodies, independent of each other and mounted on a common shaft being each of the bodies provided with toothed disks or flanges forming oblique angles with the center line of the shaft, and means for simultaneously carrying the shaft with the rotatory bodies along the surface of the mass to be crumbled.

2. The combination, in a device for crumbling superphosphate or other materials of like consistency, of a number of rotatory bodies, independent of each other and mounted on a common shaft being each of them provided with toothed disks or flanges forming oblique angles with the center line of the shaft, the teeth of two adjacent disks being different in number, and means for simultaneously carrying the shaft with the rotatory bodies along the surface of the mass to be crumbled.

3. The combination, in a device for crumbling superphosphate or other materials of like consistency, of a number of rotatory bodies independent of each other, each having projecting parts and all of them mounted on a flexible shaft or a chain that is connected with means for simultaneously carrying it together with the rotatory bodies along the surface of the mass to be crumbled.

4. The combination, in a device for crumbling superphosphate or other materials of like consistency, of a number of rotatory bodies having projecting parts jointly and pivotally connected with each other, the two outmost ones being connected with means for simultaneously carrying the shaft with the rotatory bodies along the surface of the mass to be crumbled.

In testimony, that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

NILS KRISTIAN EMIL MALMSTEN.
KARL THEODOR THORSSELL.

Witnesses:
E. RÅBERG,
H. BRAUZELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."