No. 706,837. Patented Aug. 12, 1902.

N. P. LUCAS.

GRATER.

(Application filed Mar. 22, 1901.)

(No Model.)

Fig. 1.

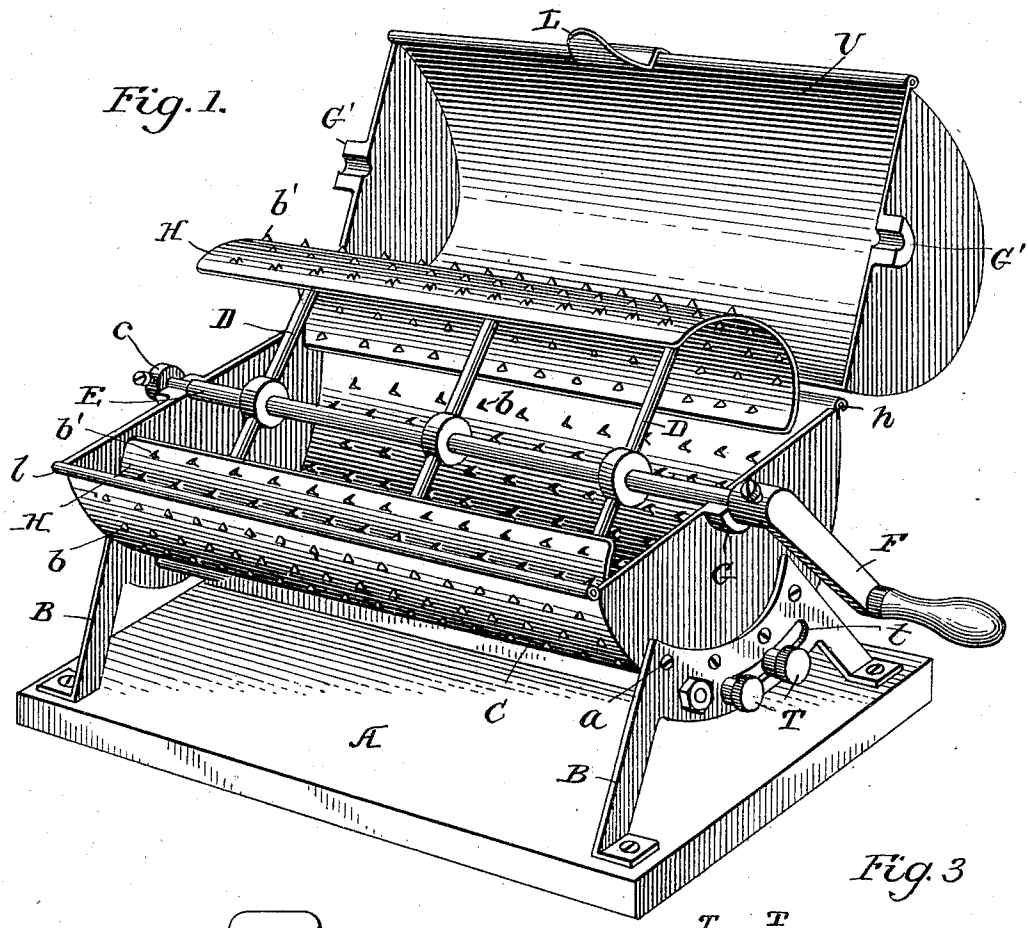


Fig. 2.

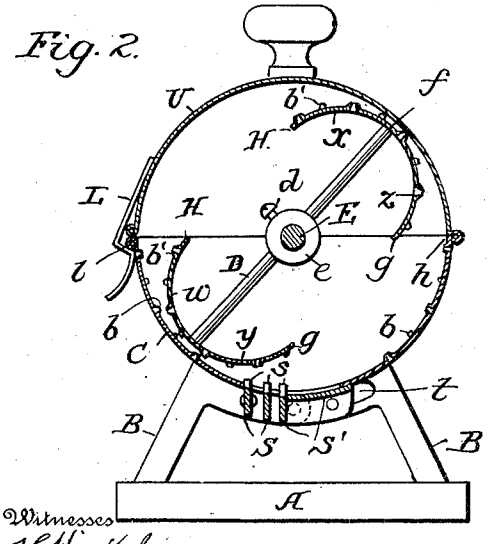
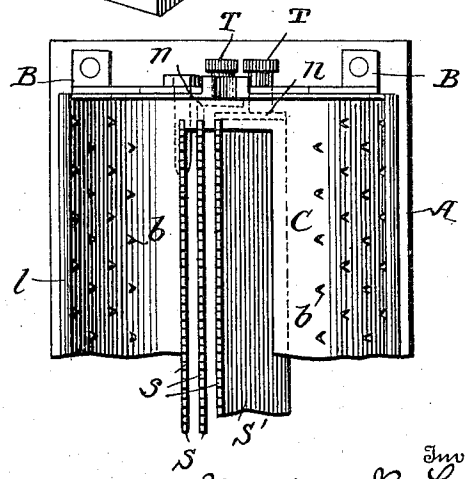


Fig. 3



Witnesses
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UNITED STATES PATENT OFFICE.

NANNIE P. LUCAS, OF WASHINGTON, DISTRICT OF COLUMBIA.

GRATER.

SPECIFICATION forming part of Letters Patent No. 706,837, dated August 12, 1902.

Application filed March 22, 1901. Serial No. 52,363. (No model.)

To all whom it may concern:

Be it known that I, NANNIE P. LUCAS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Graters, of which the following is a specification.

My invention relates to crushers and graters, but more particularly to improvements in rotary graters.

My object is to provide a portable rotary grater of light and simple form, which may be cheaply constructed, and one that will work efficiently and well at all times.

My object is, further, to provide a rotary grater having means for varying the granulation of the material acted upon, and one in which the grating means may be readily removed and cleaned.

My grater consists, primarily, of a grating-trough and rotary means for grating coöperating with said trough. One of my improvements relates to the construction and operation of the rotary grating means, and consists in the use of arms carrying segmental wings set at angles thereto and extending to a substantial distance on each side of the arms, the outer roughened surfaces of said wings being adapted to coöperate with the inner roughened surface of the grating-trough. Furthermore, the edges of these wings are made to flare away from the grating-trough, so that the outer surface of a wing forms a reëntrant angle with the inner surface of the trough and is thus adapted to pick up the material to be grated and force it between the grating-surfaces when the wings are revolved.

By dividing the rotary grating means into arms and wings I am enabled to dispense with a hopper of any kind, for the material may be poured directly into the grating-trough and will at once fall to the bottom thereof to be acted upon by the wings.

Another improvement consists in providing means at the bottom of the trough for regulating the granulation of the material acted upon, an important feature, since different-sized granulations are needed for different purposes. The apparatus is so arranged that the material acted upon is adapted to fall from the bottom of the trough through the regulating means into any suitable receptacle.

I construct and arrange the parts of my apparatus as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of my improved grater. Fig. 2 is a transverse section through the grater with the cover closed, and Fig. 3 is a partial plan view with the cover and rotary grating means removed in order to show the regulating means in the bottom of the trough.

Referring to the drawings, A represents a suitable base, upon which are secured standards B for supporting a trough C of any suitable shape; but, as shown, I make this trough semicircular in cross-section. The trough C may be integral with the standards B or secured thereto, as shown, by rivets *a*. The inside of the trough is roughened in any suitable manner; but by making it of thin sheet metal, as of tin, the roughening may be caused by perforations punched from the outside, forming burs *b* on the inner surface of the trough. There may be any number of these burs, as desired.

The rotary means for grating consists of suitable arms D, secured to a spindle E, adapted to be rotated by a crank F and resting, as shown, in the sockets G on the ends of the trough; but any suitable means may be provided for journaling the spindle to allow of its rotation. A nut *c* or other suitable means may be fastened on the spindle at the end opposite the crank and outside of the trough for preventing longitudinal movement of the spindle, and the arms D may be suitably secured to the spindle; but I have shown set-screws *d* passing through hubs *e*, to which the arms are secured.

While a plurality of arms may be placed at different angular positions about the spindle E, for simplicity's sake I have shown but two sets of arms. At the outer ends of these arms are shown secured wings H of segmental form, having roughened outer surfaces, formed as by burs *b'*. These roughened outer surfaces coöperate with the roughened inner surfaces of the trough C for granulating the material to be acted upon. The wings

H are placed at angles to the arms D and suitably secured thereto, as by soldering. By the term "placed at angles to the arms D" is meant the fact that a tangent to the outer periphery of a wing at the point *f*—for instance, opposite the end of an arm D—forms an angle with said arm. As shown, this is substantially a right angle, as in Fig. 2; but it may be any angle without departing from the spirit of my invention.

Instead of making the curve of the wings H parallel to the curve of the trough I flare the edges G of the wings away from the surface of the trough in such manner as to form an angle between the inner surface of the trough and the outer surface of a wing, so that when the wings are revolved in either direction the material to be grated becomes wedged between the wings and the trough and is effectually granulated, little or none escaping granulation. In other words, the radius of curvature of the wings is less than that of the trough. I prefer to arrange the wings so that rotation may take place in either direction; but this is not absolutely essential to the operation of my device, as may readily be seen, since the halves *x* and *y* could be retained upon the arms, while the halves *z* and *w* could be dispensed with.

In my grater it is intended that the material to be acted upon after granulation shall fall through the bottom of the trough C into any suitable receptacle placed thereunder, and I provide adjustable means (shown more particularly in Fig. 3) for regulating the size of the granulations. This may be any suitable and convenient means; but I have shown slats S and S′ with teeth *s*, and through the intervals between the slats the material is adapted to fall. The widths of the intervals may be varied by varying the relative positions of the slats, and I have shown set-screws T working in slots *t* in the standards B and adapted to screw into projections *n* on the slats and hold them securely in any desired position.

A suitable cover U is provided of such shape as to allow of the rotation of the wings when the cover is closed, and for convenience I have shown the cover of semicircular form, so that when closed it completes a circle in cross-section with the trough. The cover also carries, as shown, sockets G′, adapted to fit over the sockets G and hold the spindle firmly in a journal to prevent wear and vibration. When the cover is opened, it will thus be seen that the spindle E, carrying the rotary grating means, may be removed and cleaned when necessary, while the grating-trough may also be readily cleaned. A latch L is shown attached to the cover, fitting over a projection *l* on the trough when the cover is down, and it may be further stated in regard to the adjustable slats that the means described for adjusting them—namely, the set-screws T—are provided at each end of the trough, but for the sake of convenience have been shown at one end only, as in Figs. 1 and 3.

The specific construction, as shown in the drawings and described in the specification, may be departed from in many particulars and varied in numerous details without departing from the spirit and substance of my invention.

I therefore claim, and desire to secure by Letters Patent, the following:

1. In a grater, the combination of a trough formed with a slot in the lower portion thereof, extending longitudinally of the trough, longitudinal bars arranged in said slot and laterally adjustable with relation to each other and to the trough for regulating the granulation of the material operated upon, means for grating coöperating with the trough, consisting of a spindle having arms carrying wings, and means for rotating the spindle, substantially as described.

2. In a grater, the combination with a trough, of means for grating coöperating therewith, consisting of a spindle having arms carrying segmental wings, extending to a substantial distance on each side of said arms and roughened on the outside, the said wings on each side of the arms being of less radius of curvature than that of the trough, substantially as described.

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

NANNIE P. LUCAS.

Witnesses:
GEO. F. COLLINS,
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