L. BICKFORD.

Fertilizer.

No. 21,181. Patented Aug. 17, 1858

Fig. 1.

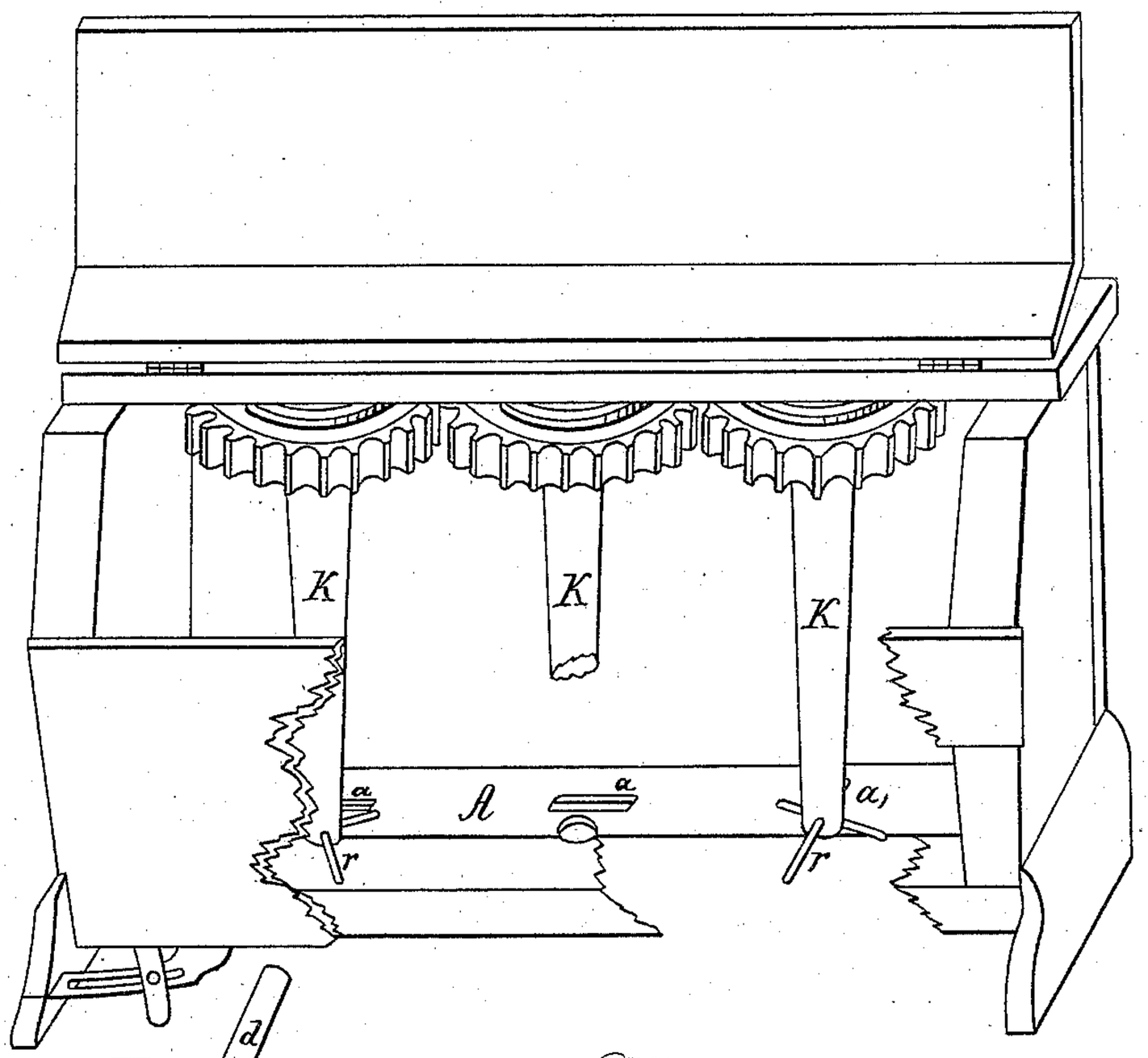
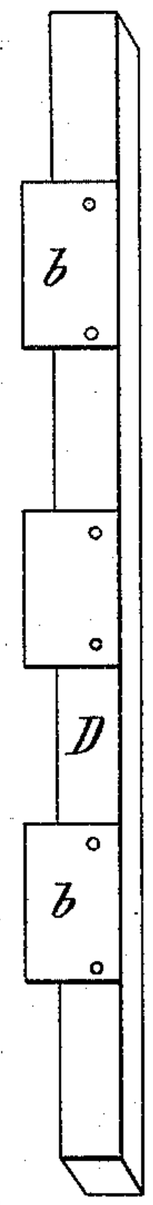


Fig. 2.

Fig. 3.



UNITED STATES PATENT OFFICE.

L. BICKFORD, OF MACEDON, NEW YORK.

IMPROVEMENT IN MACHINES FOR SOWING FERTILIZERS.

Specification forming part of Letters Patent No. **21,181**, dated August 17, 1858.

To all whom it may concern:

Be it known that I, LYMAN BICKFORD, of Macedon, in the county of Wayne and State of New York, have invented a new and useful Improvement on Machines for Sowing Guano and other Fertilizers, and particularly on the machines for such purposes for which Letters Patent were granted to Warren S. Bartle, April 22, 1856; and I do hereby declare that the following is a full and exact description thereof, reference being had to the annexed drawings, making a part of this specification.

My invention consists in forming the part of the hopper through which the distributing-apertures are made, and also the slide or slides by which the size of the apertures is regulated, of thin metallic plates or other fit material, or of plates of metal or other material sloped to an edge, so that a thin or sharp edge bounds the sides of the apertures, which construction and arrangement more effectually than any other severs and detaches particles from the mass and causes the passage through the apertures of the substances sown to be the shortest possible, and permits these substances to pass the apertures obliquely as well as otherwise, and to prevent the apertures being clogged by adherence, accumulation, or otherwise when such are used in connection with vertical shafts carrying horizontal stirrers for the purpose of agitating and feeding the fertilizers through the apertures.

Figure 1 of the drawings is a perspective view of the hopper of Warren S. Bartle's machine for sowing guano and other fertilizers, patented April 22, 1856, with the front and part of the bottom broken out for the purpose of showing my improvement more distinctly. A is the part of the bottom of the hopper in which are the apertures *a a a*, through which the fertilizing substances are distributed, consisting of a plate of sheet metal or other suitable material as thin as can be, and yet have sufficient strength and stiffness to cause it to retain its proper form and resist the pressure that may be upon and against it. The plate is made thus thin for the purpose of causing the apertures to be bounded by a thin or sharp edge. The apertures may be at any desirable distance apart, and may be rectangular, circular, or of any other convenient form. Above and near to each of the outlet-apertures *a* is placed one of a series of vertical distributers, which each consist of a vertical shaft and radial arms, *r*, perpendicular thereto. These distributers are geared together at the top, and revolve upon their vertical axes, each one in a direction contrary to that of its immediate neighbor.

Fig. 2 is a view of the under side of the hopper-bottom, the slides by which the distributing-apertures are regulated, and the device for actuating the slides. *b b*, Figs. 2 and 3, are the slides for varying the size of the apertures *a a a*, Fig. 1, made of the same material and thickness as is the part of the hopper-bottom above described. On the under side and at the back part of them they are fastened by rivets or screws to a bar of wood, D, Figs. 2 and 3, or other fit material, for the purpose of stiffening them and keeping them in contact with the plate above. These slides are made thus thin that when moved across the distributing-apertures to form one of their sides they may present a thin edge, and to keep the apertures bounded by a thin or sharp edge. The slides are actuated by the parallel bars *c c* and lever *d*, Fig. 2. Other modes of actuating would, however, answer equally well.

Instead of separate slides for the several apertures, there may be a single one extending across them all.

Both the plate in which are the distributing-apertures, and also the slide or slides, may be made of thicker material than that above described, though not so conveniently, and the same end attained—that of bounding the sides of the apertures by a thin or sharp edge—by making the under side of the plate and the upper side of the plate about the apertures in such manner as at the boundaries of the apertures to reduce it thin or sharp, and also so sloping the under sides of the slides as to make the edge crossing the apertures thin or sharp.

Instead of putting the slides on the under side of the plate in which are the apertures, they may be placed upon the upper side, and I therefore do not intend to limit myself to the former position.

Some of the fertilizers used absorb moisture largely, and when damp are clammy and sticky, and when portions of them are moved into the distributing-apertures by the distributers K K, Fig. 1, the particles tend to adhere to the mass above; but the part of the hopper-bottom in which the distributing-apertures are and the

regulating-slides operating in contact with it being in my improvement both made of thin material or of material sloped to an edge, as above described, a thin or sharp edge bounds the sides of the apertures *a a a*, Fig. 1, which serves to cut off and detach portions or particles from the mass as often as the radials *r r* of the distributers sweep over the apertures. All such fertilizers as guano, muck-marl, and comminuted barn-yard manure in their passage tend to adhere to the sides of the apertures if the apertures to any appreciable extent partake of the form and nature of a tube, which they always do by being made through thick material not sloped; but the apertures by my improvement being made through thin sheet metal or thicker metal sloped as above described, and the slides regulating their dimensions being of the same thickness of material or in like manner sloped, a thin or sharp edge bounds the apertures and causes the passage of the fertilizers through the bottom of the hopper or from the hopper to the distributing-tubes, to be the shortest possible, and also permits them to pass either vertically or obliquely freely, so that in their passage they do not adhere or accumulate and clog the apertures. The thicker the material through which the distributing-apertures are made, if not thinned by sloping, the longer is the passage from the hopper to the distributing-tubes the less obliquely the fertilizers can pass the apertures, and the greater the extent of surface for the substances sown to adhere to, and so great is the difference caused by increase of thickness in this respect that apertures made through material one-fourth of an inch thick at times clog and operate badly.

I do not claim as my invention the formation simply of distributing-apertures in the bottom of a hopper of a machine for sowing fertilizers, seeds, or other things, for such are employed in the machine for which Letters Patent were granted to Warren S. Bartle, April 22, 1856, and in other sowing-machines; but

What I claim as new, and desire to secure by Letters Patent, is—

A hopper-bottom, A, formed of sheet metal or its equivalent, in which are arranged apertures *a*, constructed as set forth, when combined with a series of vertical stirrers, K, and a slide or slides, *b*, arranged on the under side of the bottom A, in the manner and for the purposes substantially as described.

In testimony whereof I hereunto set my hand to this specification.

LYMAN BICKFORD.

Witnesses:

THOMAS C. DONN,

P. HANNAY.