

(No Model.)

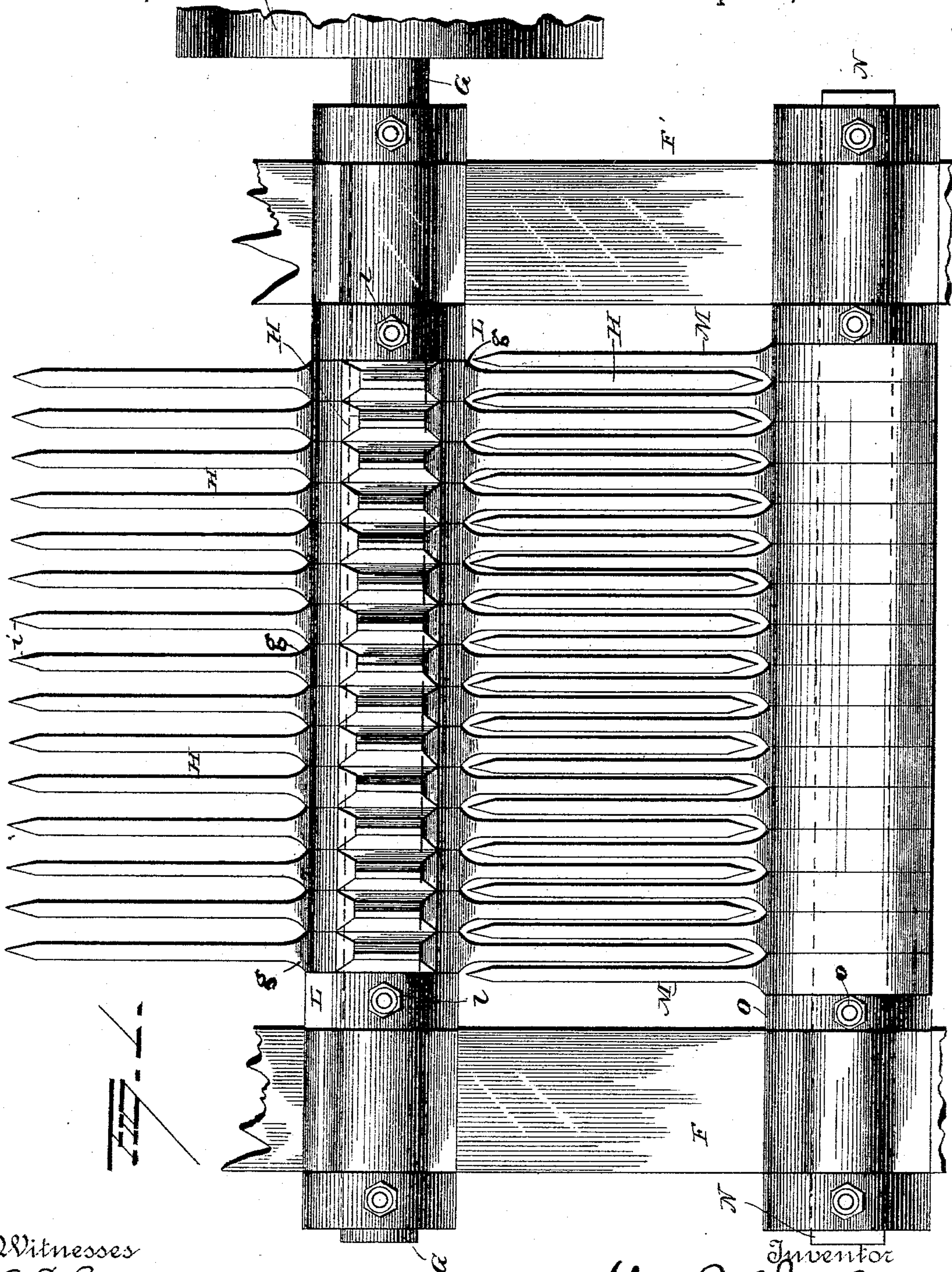
2 Sheets—Sheet 1.

W. B. CHISOLM.

# APPARATUS FOR TREATING FERTILIZERS.

No. 369,434.

Patented Sept. 6, 1887.



Witnesses

J. E. Jones.

Geo. F. Downing.

Inventor

Wm B. Chrysler

By his Attorney

W. A. Symmes.

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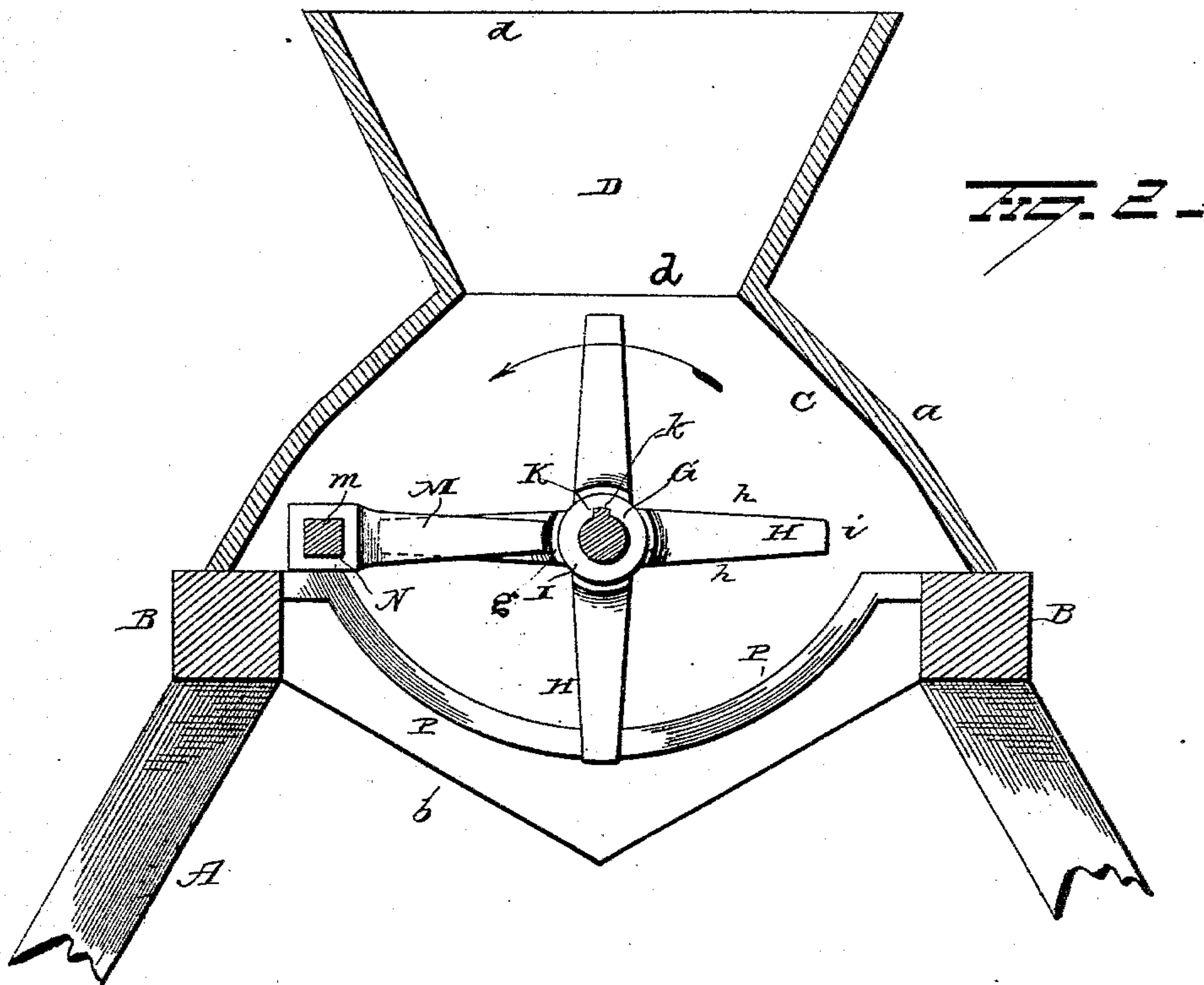
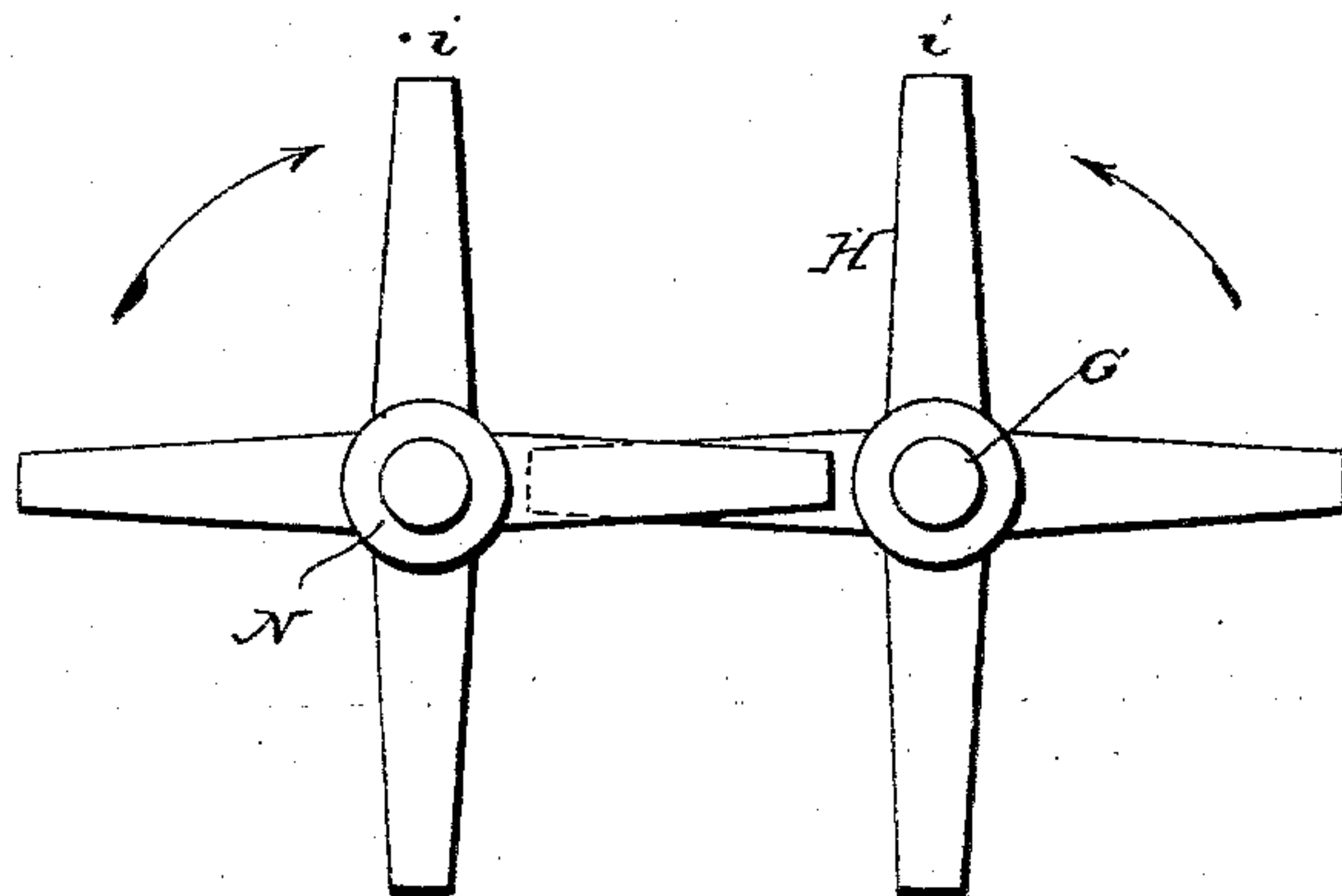


Fig. 3.



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# UNITED STATES PATENT OFFICE.

WILLIAM B. CHISOLM, OF CHARLESTON, SOUTH CAROLINA.

## APPARATUS FOR TREATING FERTILIZERS.

SPECIFICATION forming part of Letters Patent No. 369,434, dated September 6, 1887.

Application filed March 31, 1887. Serial No. 233,153. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM B. CHISOLM, of Charleston, in the county of Charleston and State of South Carolina, have invented certain new and useful Improvements in Apparatus for Mixing and Pulverizing Fertilizers, Disintegrating, &c.; 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.

My invention relates to an improvement in apparatus for pulverizing and mixing fertilizers.

The object is to provide a light, substantial, inexpensive, and effective machine for mixing and pulverizing fertilizing phosphates to any desired degree of fineness.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of the machine, partly in section. Fig. 2 is a transverse vertical section. Fig. 3 is a modification.

A represents a supporting-frame having the longitudinal stringers B B' across the top, on which the cylinder of the machine is supported.

The cylinder C may be variously formed; but it preferably has sloping sides *a*, resting on the stringers B B', and also a downwardly-sloping shield, *b*. Above the cylinder and adapted to feed the fertilizing ingredients to the pulverizing and mixing chamber or cylinder C is the hopper D.

Journaled in the ends of the cylinder, or in the cross-bars F of the frame, if preferred, is the rotary shaft G. This shaft G carries a series of longitudinally-adjustable disintegrating radial arms, H, which are preferably integral with each other—four in number and equidistant from each other. It is evident that any number of these arms might be employed, it simply being necessary that they should be in the same plane. The arms are similar in shape, broad on one side and gradually tapering to the ends. The arms are quickly narrowed on the opposite sides, *h*, after leaving the hub I, thus forming the shoulder *g*, and extending parallel for a short distance, and

finally terminating, preferably, in a point, *i*. These arms are rounded on their edges, and, if desired, may taper gradually throughout their entire length from the hub to point in the form of a wedge. The notch or slot *k* receives a rib, K, on the shaft, permitting the arms to be slid thereon longitudinally, but preventing their slipping with the turning of the shaft. Adjustable collars L, having the adjusting-screws *l*, are located on the shaft just outside of the arms and adapted to hold the arms securely together, or separated by interposing washers between them; and other means might be employed for rigidly holding the arms together. A pulley, S, at one end of the shaft might drive the latter, receiving motion directly from the engine or other driving mechanism. I now propose putting engine direct to shaft and making machine portable by putting it on a frame with roller, so as to move from place to place, as required, with flexible rubber steam-pipe for boilers.

A second set of stationary arms, M, having rounded edges and pointed ends, and otherwise similar in shape to the radial arms H, are provided with a square or angular opening, *m*, at their butt-end, by means of which they are mounted on the square shaft N. The distance between these arms also might be varied by interposing different-sized washers between them, or other means; and I usually prefer to vary the adjustment by the collars O outside of the arms, which are themselves provided with set-screws *o*.

The concaved grate P is located below the radial rotating arms H, and consists of the downwardly-curving parallel bars P, between which the ends of the radial arms H pass as the shaft G rotates, allowing the ground and mixing material to drop between the bars out of the machine. This grate P not only serves as an outlet for the ground material when it becomes properly pulverized, but also it assists the knives in dividing the material by means of their passage between the bars of the grate.

From the arrangement of parts it will be seen that the revolving radial arms H pass between the stationary arms, and when close together the sets of arms just clear each other, the pointed ends *i* passing between the shoulders *g*, thus being in adjustment to grind the



material very fine. When further separated the effect is opposite.

In the modification shown in Fig. 3, in the place of the stationary arms M, previously described, a second set of radial disintegrating-arms are located on a rotary shaft, the two shafts in this case being adapted to revolve in opposite directions. The effect of these shafts is similar to that previously described, the arms of the shaft simply taking the place of the stationary arms and performing their function. Still another change might be resorted to and two rotary sets of arms used, and also two stationary sets, thus making the parts just double that described in the first construction.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described—as, for example, the location of the stationary arms or the formation of the arms—without departing from the spirit and scope of my invention; hence I do not wish to limit myself to the particular construction herein set forth; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a cylinder, a shaft adapted to rotate therein, a set of radial arms on said shaft, and a set of stationary arms

adapted to mesh with the radial arms, of a grate located below the shaft in position to receive the ends of the rotary arms between its bars, substantially as set forth.

2. The combination, with a cylinder, a shaft adapted to rotate therein, a set of longitudinally-adjustable radial arms on said shaft, and a set of longitudinally-adjustable stationary arms, both sets of arms adapted to mesh with each other, of a grate located below the shaft in position to receive the ends of the rotary arms between its bars, substantially as set forth.

3. The combination, with a cylinder, a shaft adapted to rotate therein, a set of longitudinally-adjustable radial arms on said shaft, a set of longitudinally-adjustable stationary arms, both sets of arms adapted to mesh with each other, and adjustable collars for holding the stationary and rotary arms in place, of a grate located below the shaft in position to receive the ends of the rotary arms between its bars, substantially as set forth.

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

WILLIAM B. CHISOLM.

Witnesses:

T. T. HYDE,

J. BACHMAN CHISOLM.