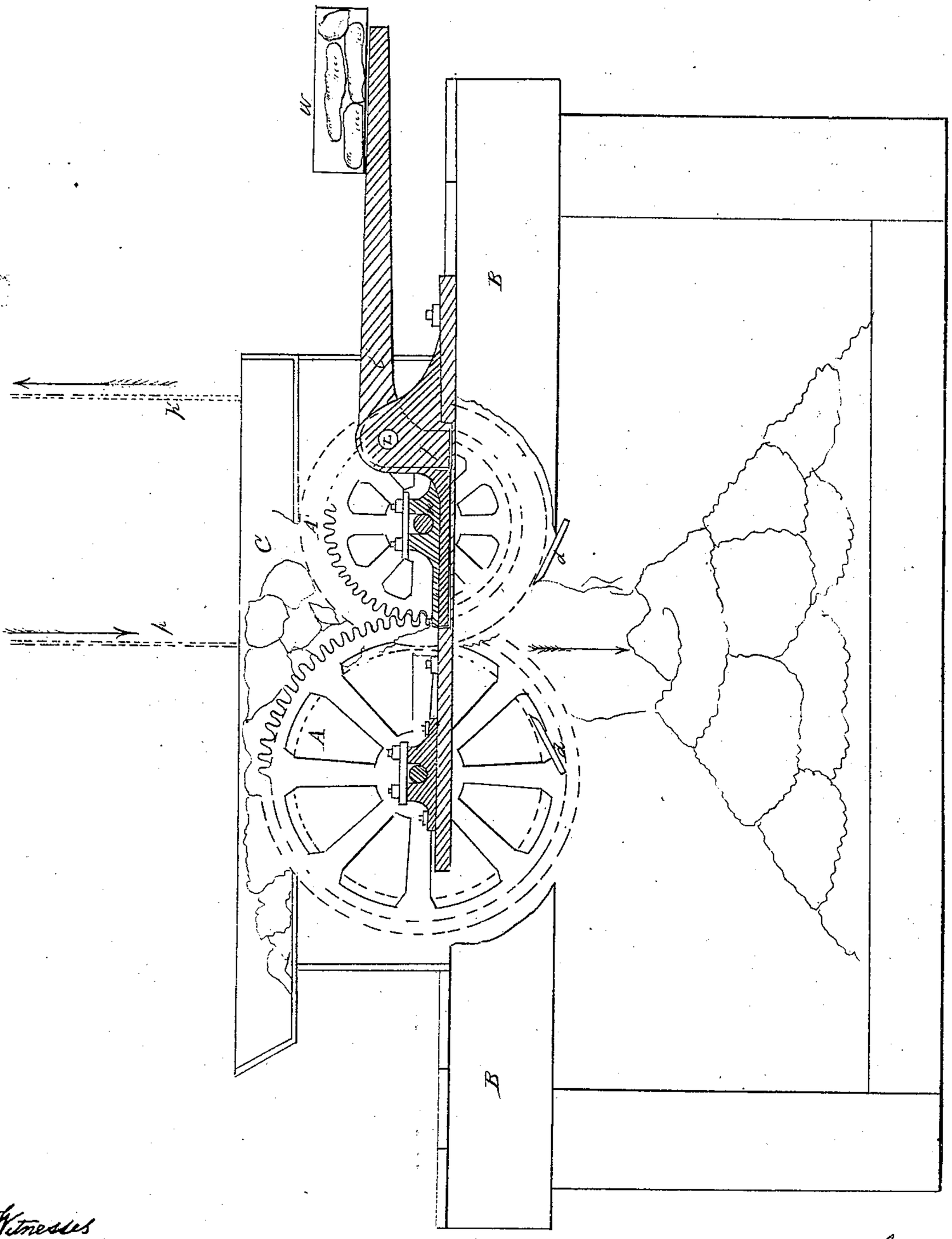
G. F. WILSON.

MANUFACTURE OF ACID PHOSPHATES.

No. 75,328. Patented Mar. 10, 1868.



Witnesses
William Hedge
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UNITED STATES PATENT OFFICE.

GEORGE F. WILSON, OF EAST PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN THE MANUFACTURE OF ACID PHOSPHATES.

Specification forming part of Letters Patent No. **75,328**, dated March 10, 1868.

To all whom it may concern:

Be it known that I, GEORGE F. WILSON, of East Providence, in the county of Providence and State of Rhode Island, have invented a new and improved mode of mixing starch or other farinaceous matter with acid phosphate of lime; and I hereby declare the following to be a full and exact description thereof, reference being had to the accompanying diagram, and to the letters of reference marked thereon.

In the manufacture of acid phosphate of lime, I have found, by experiment, that after the acid has been concentrated by boiling in kettles, and mixing therewith a proper proportion of pure phosphate of lime, and after the partial crystallization or setting thereof, and after mixing this with farinaceous matters, a portion of the acid unites or combines with a portion of the farinaceous matters, and forms, by the application of heat to the degree necessary to dry it, a dark gummy substance, which discolors the product and greatly impedes its pulverization. In order to prevent the formation of this brownish gummy substance, I have devised a new and improved method of grinding, kneading, and mechanically mixing and breaking up this mixture, and of thoroughly incorporating the farinaceous matters with the acid. The means by which I accomplish this result are as follows:

The apparatus required consists, essentially, of two hard cylinders, arranged on parallel axes, to revolve toward each other with unequal velocities at small self-regulating intervals apart, between which the starch and acid phosphate, already coarsely mixed with each other, are passed.

The accompanying drawing exhibits the relations of the parts and their mode of action.

A and A′ are two cylinders supported on the frame B B. Over the cylinders is the hopper C, from which the acid and starch, coarsely mixed, pass between the cylinders. *d d* are scrapers or doctors to remove any acid that may adhere to the cylinders.

The gearing gives to the cylinder A′ about two revolutions to one of the cylinder A. The face of the scraper *d*, which is of hard wood or metal, is nearly tangent to the surface of the cylinder, while the edge of the scraper is parallel to the axis of the cylinder.

The axis of the cylinder A′ rests on sliding bases, which permit cylinder A′ to have a limited motion to and from cylinder A, according to the space between the cylinders required to allow the passage between them of the material to be kneaded. As soon as the occasion for greater interval has passed the cylinders come together.

The weight *w* on the arm of lever *l′*, which works upon an axis, *x*, and short arm *l*, compelling the latter to press forward the box *n*, which contains the axis on which cylinder A′ revolves, a similar weight, lever, and box being adapted to both ends of cylinder A′, exerts a regular pressure upon the mass passing between the cylinders, while it permits irregular lumps to pass through the machine. The cog-gearing in both cylinders A and A′ have teeth sufficiently long to allow of the lateral motion of the cylinder A, as above described, without disengaging said gearing.

Motion is communicated to the cylinders by a belt, *p p′*, over a pulley, or by any mechanical contrivance subserving the desired end.

In practical operation the coarsely-mixed acid and farinaceous matter are fed into the hopper C, and pass between the cylinders A and A′, which, at the outset, are nearly or quite in contact. With the appearance of lumps of acid the cylinders separate, the box *n* forcing the short arm *l* of the lever *l l′* outward at the point *l*, and lifting the weight *w* at the end of the long arm *l′* of the lever, as above described. The portions of the coarse mixture near the more rapidly revolving cylinder moving more rapidly, and slipping upon and mixing with the parts resting against the cylinder moving with the lower velocity, the whole is kneaded and rendered homogeneous. As the mixture issues from between the cylinders, more or less adhering to them, it is detached by the doctors or scrapers *d d*, and falls to the receptacle below.

I have tried cylinders of hard wood and of cast-iron, but my experiments have shown the superiority of fine-grained granite, free from iron, and permitting a smooth dressing.

I claim and desire to secure by Letters Patent of the United States—

1. The improved process hereinbefore described of mixing farinaceous matter with

acid phosphate of lime, in the manner and for the purpose above described.

2. The improved grinding or disintegrating apparatus, constructed and operating substantially in the manner and for the purposes above described.

3. The application of granite rollers in the manner and for the purpose above described.

4. The combination of the grinding-rollers and their connections with the self-adjusting pressure-lever, substantially as and for the purposes described.

GEO. F. WILSON.

Witnesses:

WILLIAM HEDGE,

WINSLOW WARREN, Jr.