

(No Model.)

3 Sheets—Sheet 1.

G. SIBLEY.

## CRUSHING AND PULVERIZING MACHINE.

No. 275,719.

Patented Apr. 10, 1883.

*FIG. 1.*

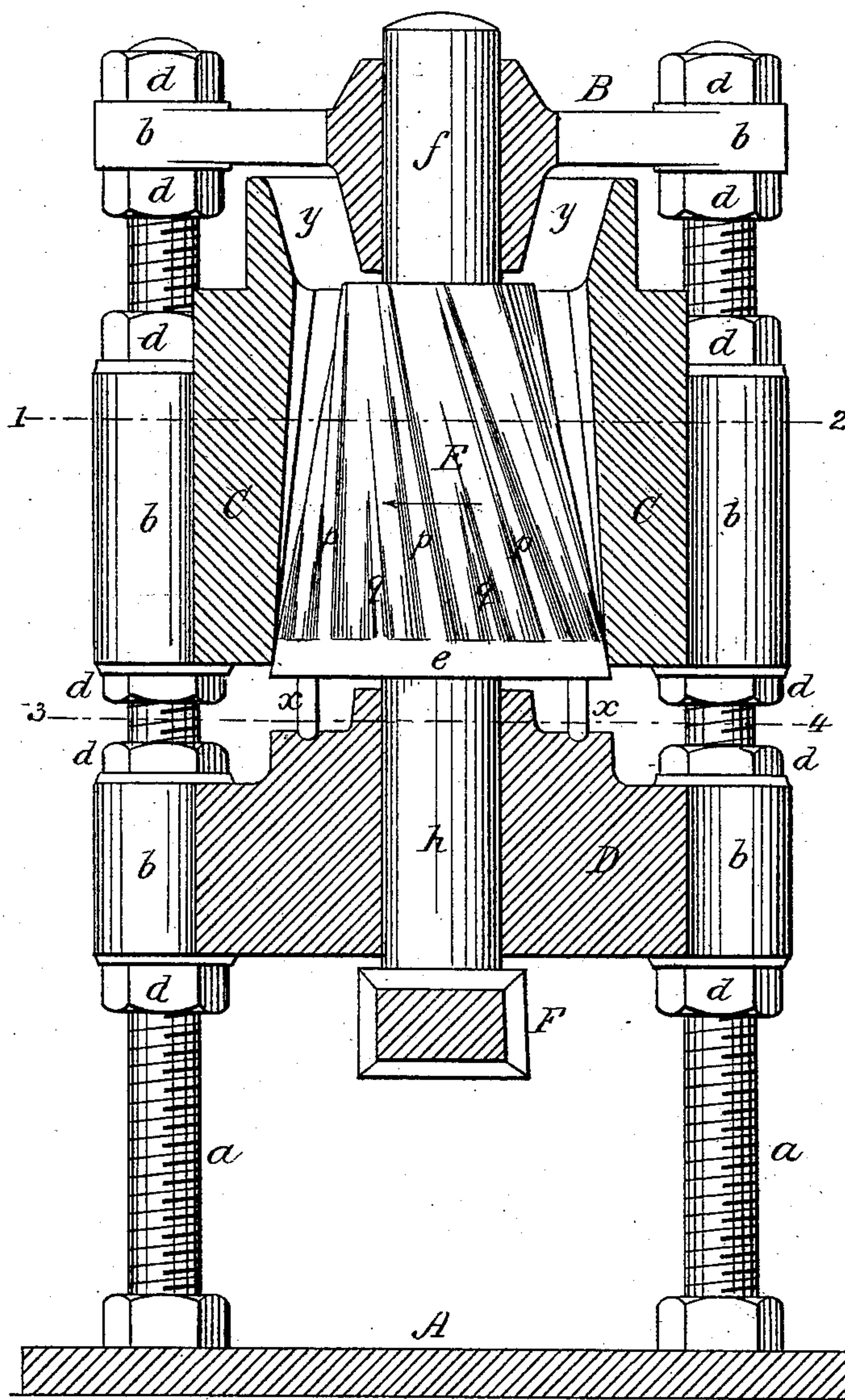
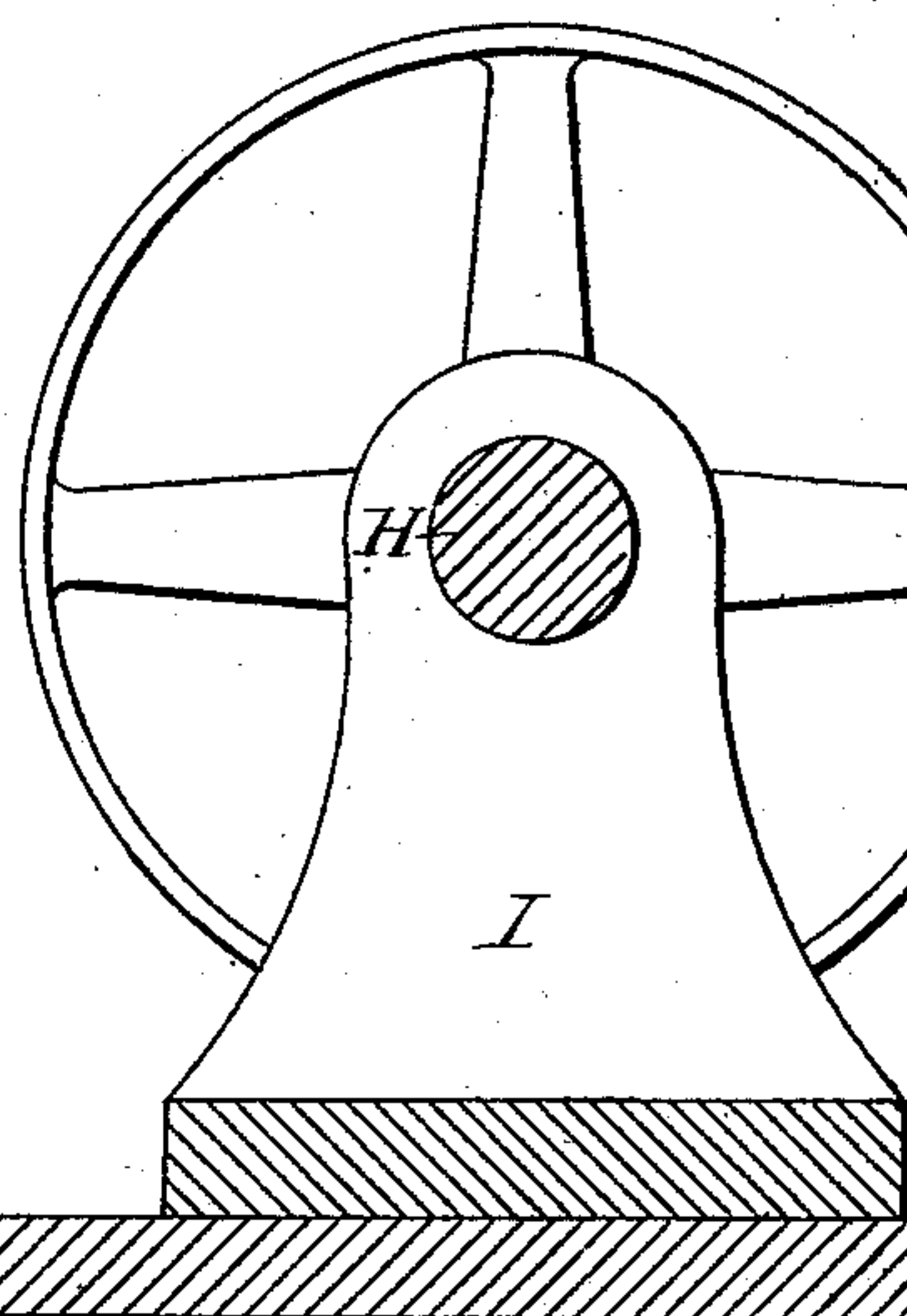
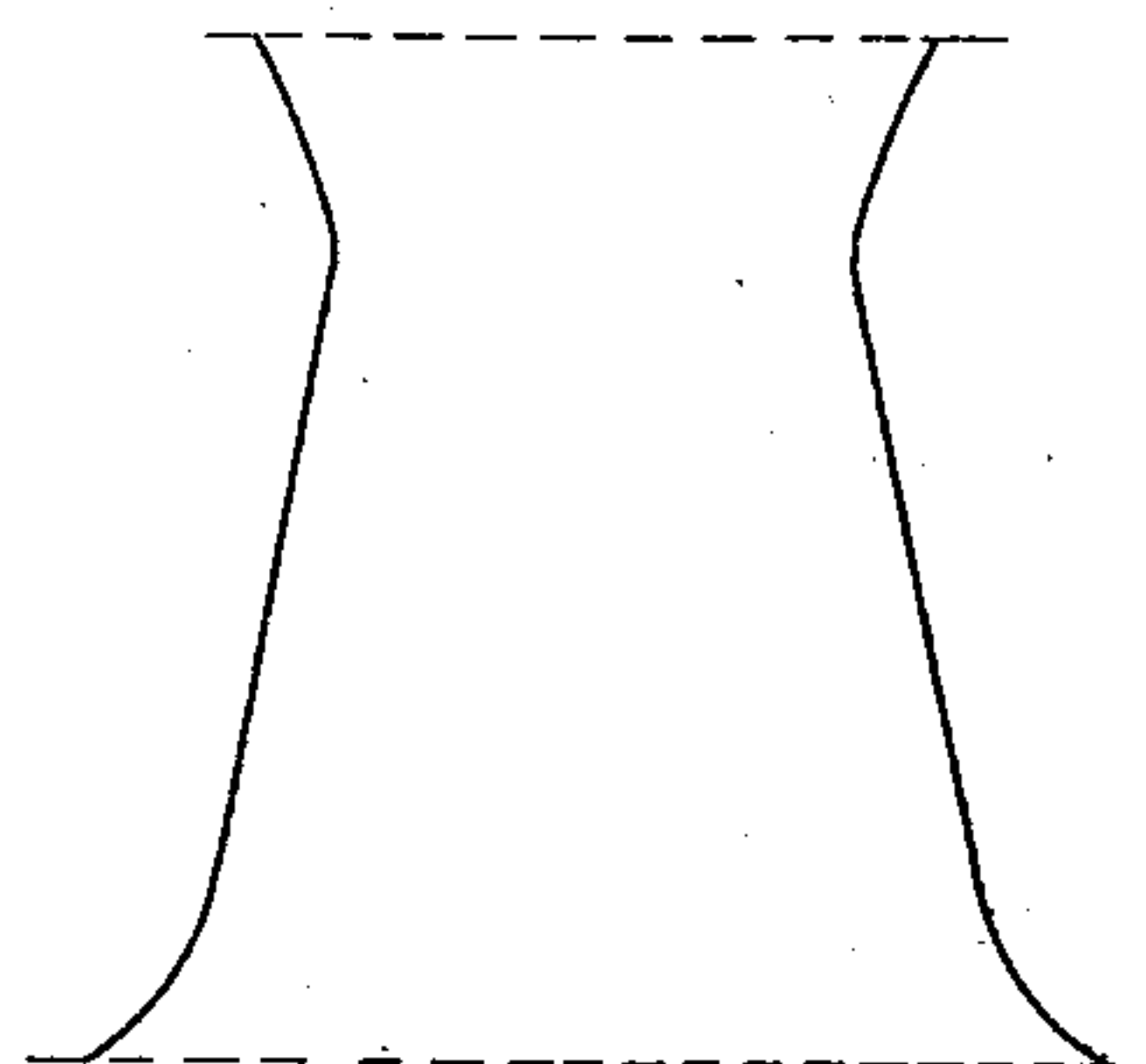


FIG. 2.



WITNESSES:

Harry Drury

David Williams

*INVENTOR.*

Gideon Sibley  
by his Attys.  
Howson and Fry

(No Model.)

3 Sheets—Sheet 2.

G. SIBLEY.

CRUSHING AND PULVERIZING MACHINE.

No. 275,719.

Patented Apr. 10, 1883.

FIG. 3.

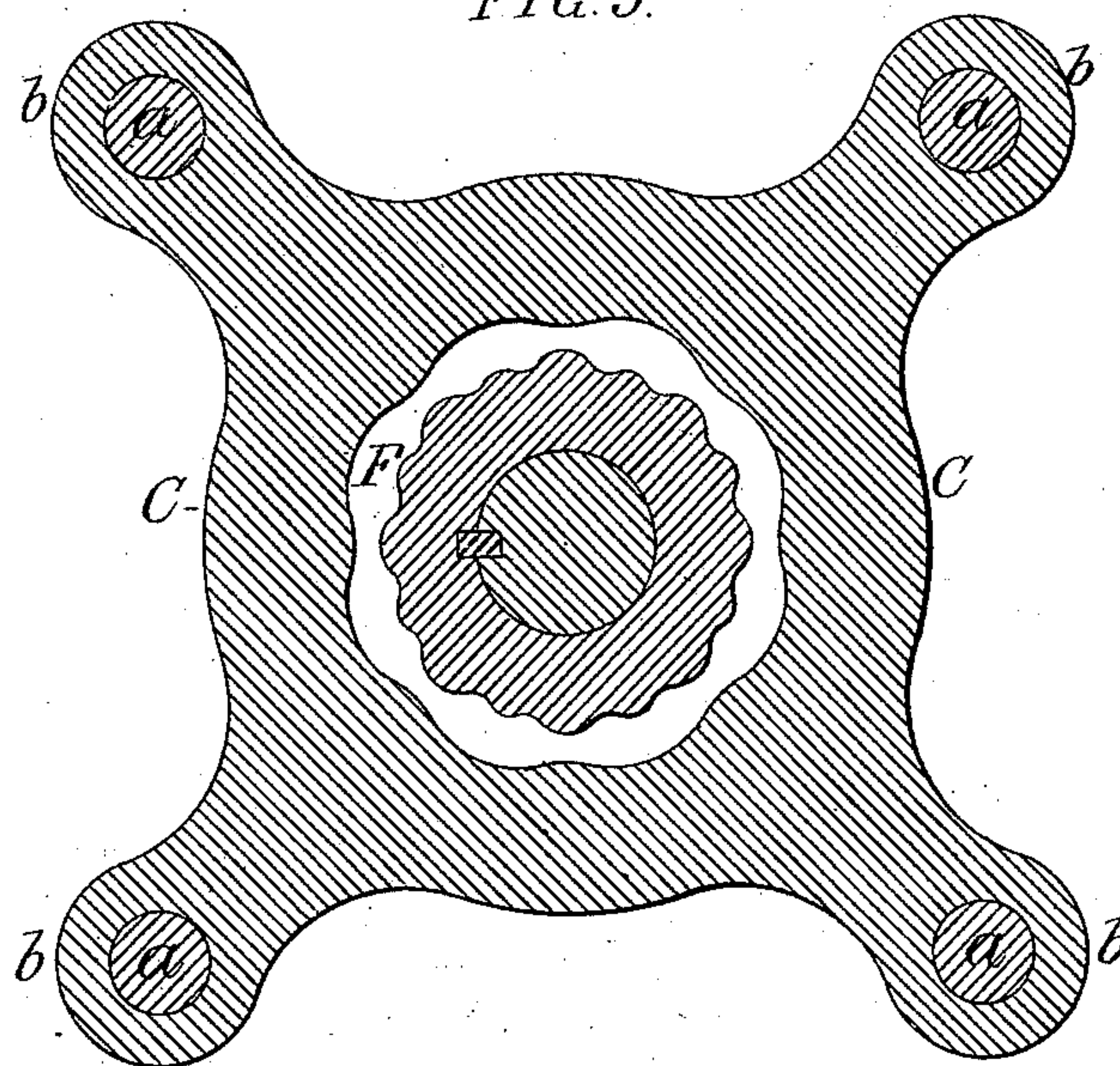
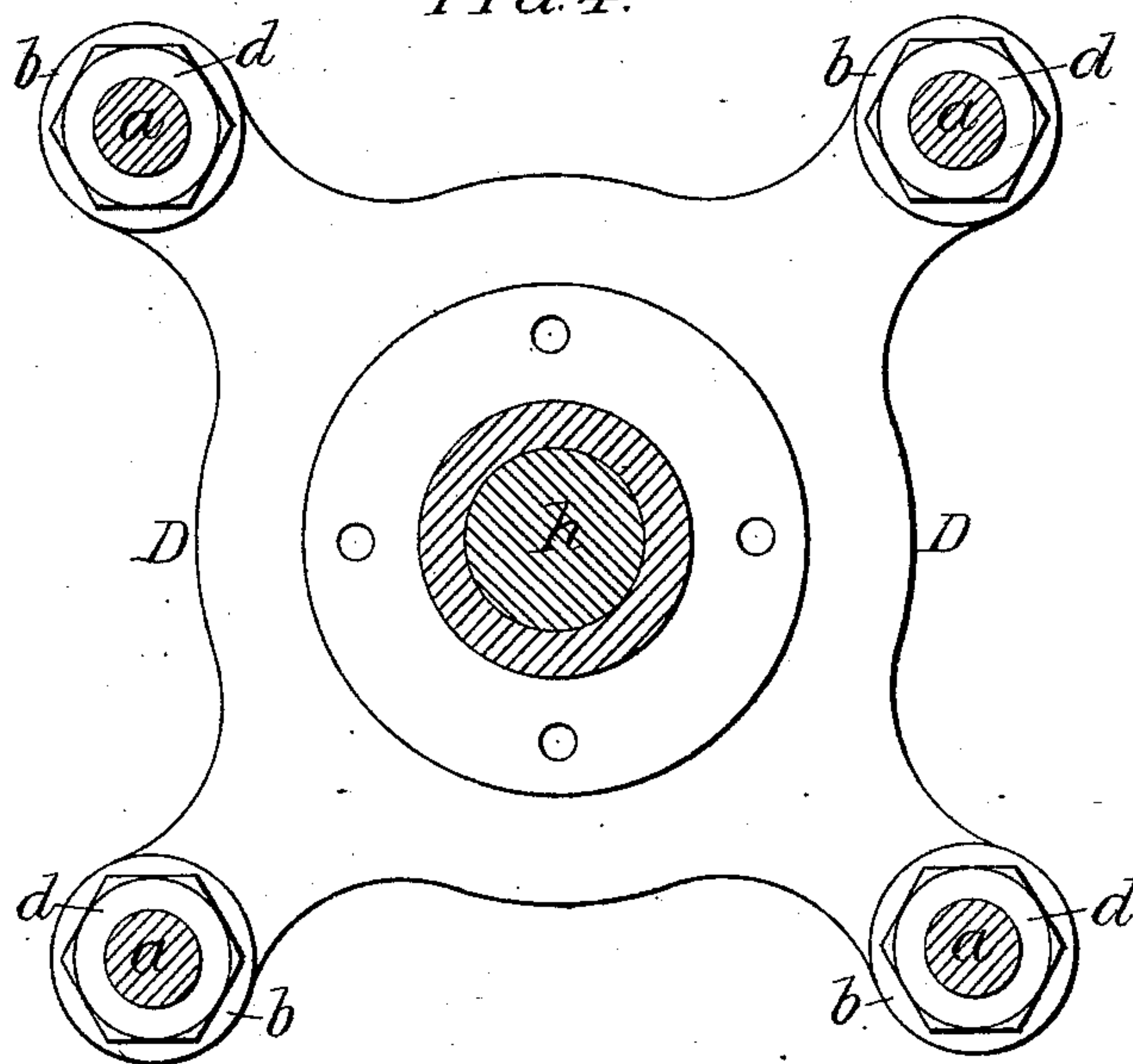


FIG. 4.



WITNESSES:

Harry Drury  
David Williams

INVENTOR

Gideon Sibley  
By his Attys.  
Howson and Jay



(No Model.)

3 Sheets—Sheet 3.

G. SIBLEY.

CRUSHING AND PULVERIZING MACHINE.

No. 275,719.

Patented Apr. 10, 1883.

FIG. 5.

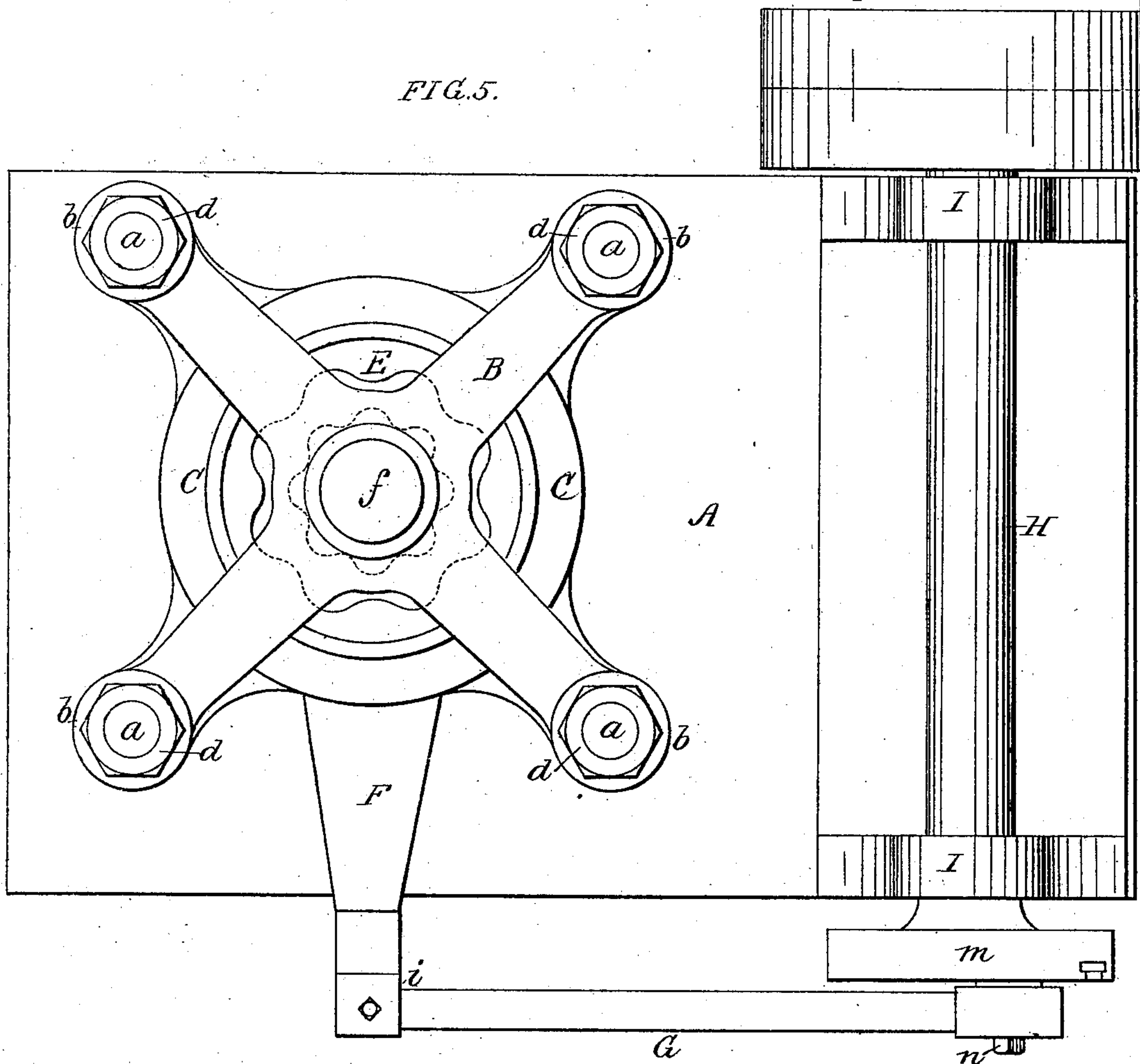


FIG. 6.

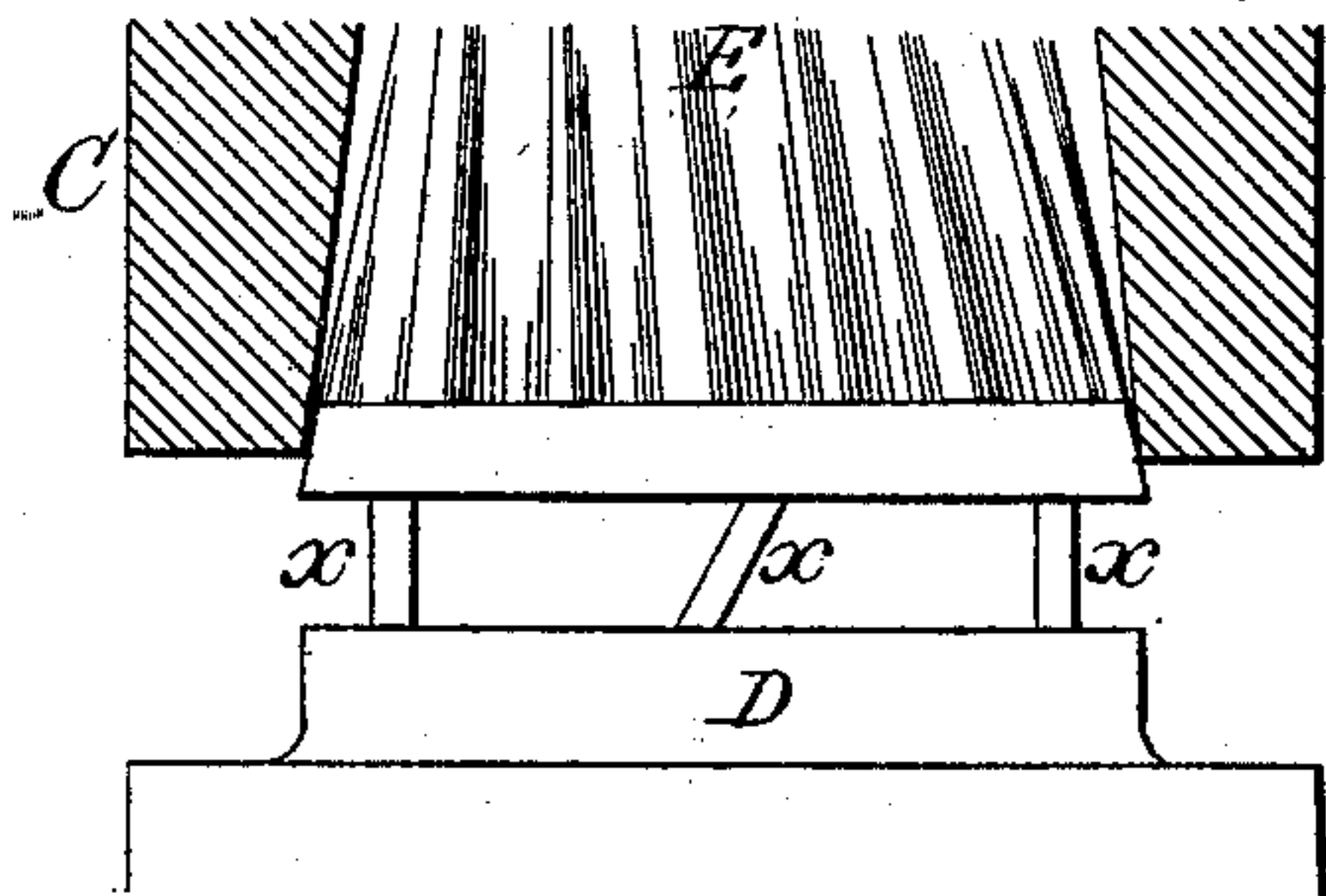
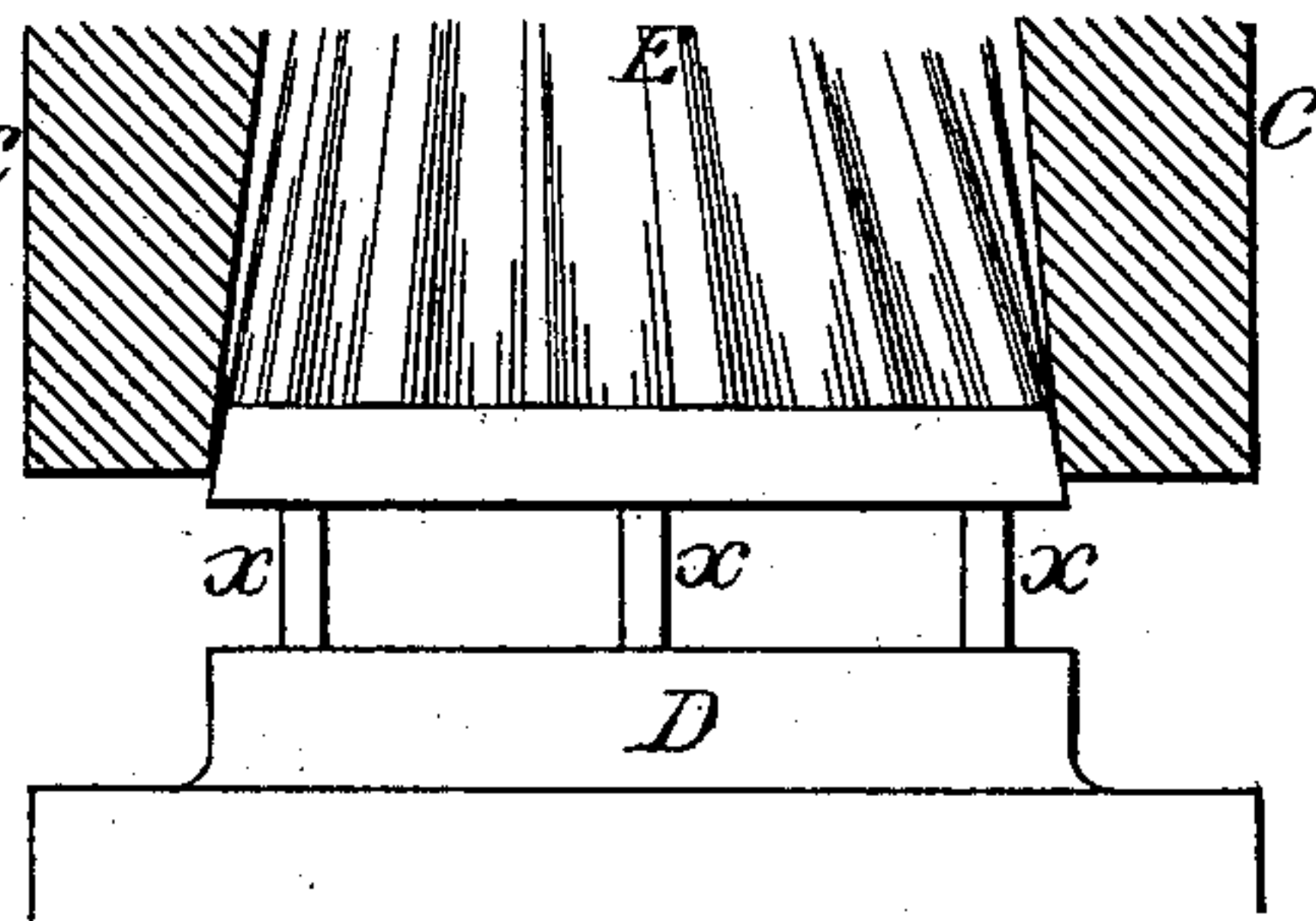


FIG. 7.



WITNESSES:

Harry Drury  
David Williams

INVENTOR

Gideon Sibley  
By his Attys.  
Howson and Ford



# UNITED STATES PATENT OFFICE.

GIDEON SIBLEY, OF PHILADELPHIA, PENNSYLVANIA.

## CRUSHING AND PULVERIZING MACHINE.

SPECIFICATION forming part of Letters Patent No. 275,719, dated April 10, 1883.

Application filed February 17, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, GIDEON SIBLEY, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Crushing and Pulverizing Machines, of which the following is a specification.

My invention consists, mainly, of a crushing and tritulating machine in which are combined an outer shell, a tapering burr having journals adapted to fixed bearings, mechanism for vibrating the burr or shell, and supporting devices interposed between the burr or shell and a fixed part of the machine, and affording mediums by which the said vibrated portion of the machine is caused to rise and fall as it is vibrated, the object being to obtain a better crushing and tritulating effect than can be produced by the conical burr and shell of an ordinary grinding-mill.

In the accompanying drawings, Figure 1, Sheet 1, is a vertical section of my improved crushing-machine; Fig. 2, a diagram illustrating a modified form of the shell and burr; Fig. 3, Sheet 2, a sectional plan on the line 1 2, Fig. 1; Fig. 4, a sectional plan on the line 3 4, Fig. 1; Fig. 5, Sheet 3, a general plan view, and Figs. 6 and 7 diagrams illustrating the operation of the crushing-machine.

To a suitable foundation-plate, A, are secured the lower ends of four threaded pillars, *a*, which are connected together at the top by the cross-piece B, by the shell C, and by the cross-piece D below the shell, these several parts having lugs or projections *b*, through which the pillars pass, and which are adjustably confined thereto by nuts *d*.

The upper journal, *f*, of the tritulating-burr E has its bearing in the cross-piece B, and the lower journal, *h*, has its bearing in the cross-piece D, an arm, F, being secured to an extension of this journal, and this arm being connected by a universal joint, *i*, to one end of a rod, G, the opposite end of which is connected to the pin *n* of a crank or crank-wheel, *m*, on a shaft, H, which has its bearings on a frame, I, secured to the foundation-plate A, the shaft being provided with a driving-pulley to receive a belt from a pulley on any neighboring shaft; or the shaft H may be driven through the medium of any appropriate gear-

ing. When the said shaft H is rotated, a vibrating motion will be imparted to the arm F and to the burr E. This burr is supported on a number of pins, *x*, the lower rounded ends of which bear in concave sockets in the cross-piece D, the upper rounded ends being contained in similar sockets in the under side of the burr. When the burr is at or near the limit of its movement in one direction, the pins *x* will be vertical, as shown in the diagram Fig. 7, and the burr will be at its greatest altitude; but when the burr is moved in the direction of the arrow it will gradually descend as the pins gradually approach the inclined position shown in the diagram Fig. 6; hence as the burr is vibrated it must necessarily rise and fall.

The dress of the burr and shell may be varied in accordance with the character of the material to be crushed and tritulated; but for hard minerals I prefer to cast on the burr alternate long and short inclined ribs *p* and *q*, which terminate at the bottom in the plain annular grinding or pulverizing surface *e*, the shell being provided with similar ribs, which also terminate below in a plain annular grinding-surface corresponding and acting in conjunction with that of the burr, for the fine pulverizing of the mineral which has been crushed into fragments by the combined action of the ribs of the burr and shell. The best grinding and crushing effect will be produced when the burr is moving in the direction of the arrow, Fig. 1; hence I so arrange the pins *x* that the burr will rise during this movement, the burr descending when it moves in a contrary direction, and thereby permitting the fragments to fall between the shell and burr to a limited extent preparatory to the movement of the burr again in the direction of the arrow, and to the rising of the burr during this movement with the best crushing and grinding effect on the fragments which had descended between the shell and burr.

In Fig. 1 the burr is made in the form of a frustum of a cone, the shell being so shaped that there shall be a space gradually diminishing in width from the top to the bottom between the shell and burr, for the free admission between them of the material introduced into the hopper *y*, and for the free descent of the



fragments as they are gradually reduced in size. Both the burr and interior of the shell, however, may be curved at and near their lower end, as shown in the diagram Fig. 2, and in some cases the burr may be fixed and the shell may be vibrated and supported upon pins *x*, the construction shown, however, being preferred.

Instead of using pins *x*, as described, to cause a rising and falling movement of the vibrating portion of the mill, other devices having the same effect may be employed. For instance, rollers on the burr or shell may be adapted to inclined planes on the bed, or the planes may be formed on the burr or shell and the rollers carried by the bed.

I claim as my invention—

1. The combination of the burr and shell, one of which is free to vibrate, with mechanism for vibrating the same, and with supporting devices, substantially as described, whereby it is caused to rise and fall as it is vibrated, as set forth.

2. A crushing or triturating machine in which are combined the following instrumentalities, namely: first, a fixed shell; second, a tapering burr having journals adapted to and free to slide in fixed bearings; third, mechanism for vibrating the burr; and, fourth, supporting devices, substantially as described, whereby the burr is caused to rise and fall as it is vibrated, all substantially as set forth.

3. The combination of pillars *a*, the cross-pieces B and D, and shell C, and the burr E, having journals adapted to bearings in the said cross-pieces, with devices, substantially as described, for vibrating and imparting a rising and falling movement to the burr, as set forth.

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

GIDEON SIBLEY.

Witnesses:

HARRY DRURY,  
HARRY SMITH.