(No Model.) 3 Sheets—Sheet 1.

P. A. SNELL.

QUARTZ MILL.

No. 395,670. Patented Jan. 1, 1889.

FIG. 1

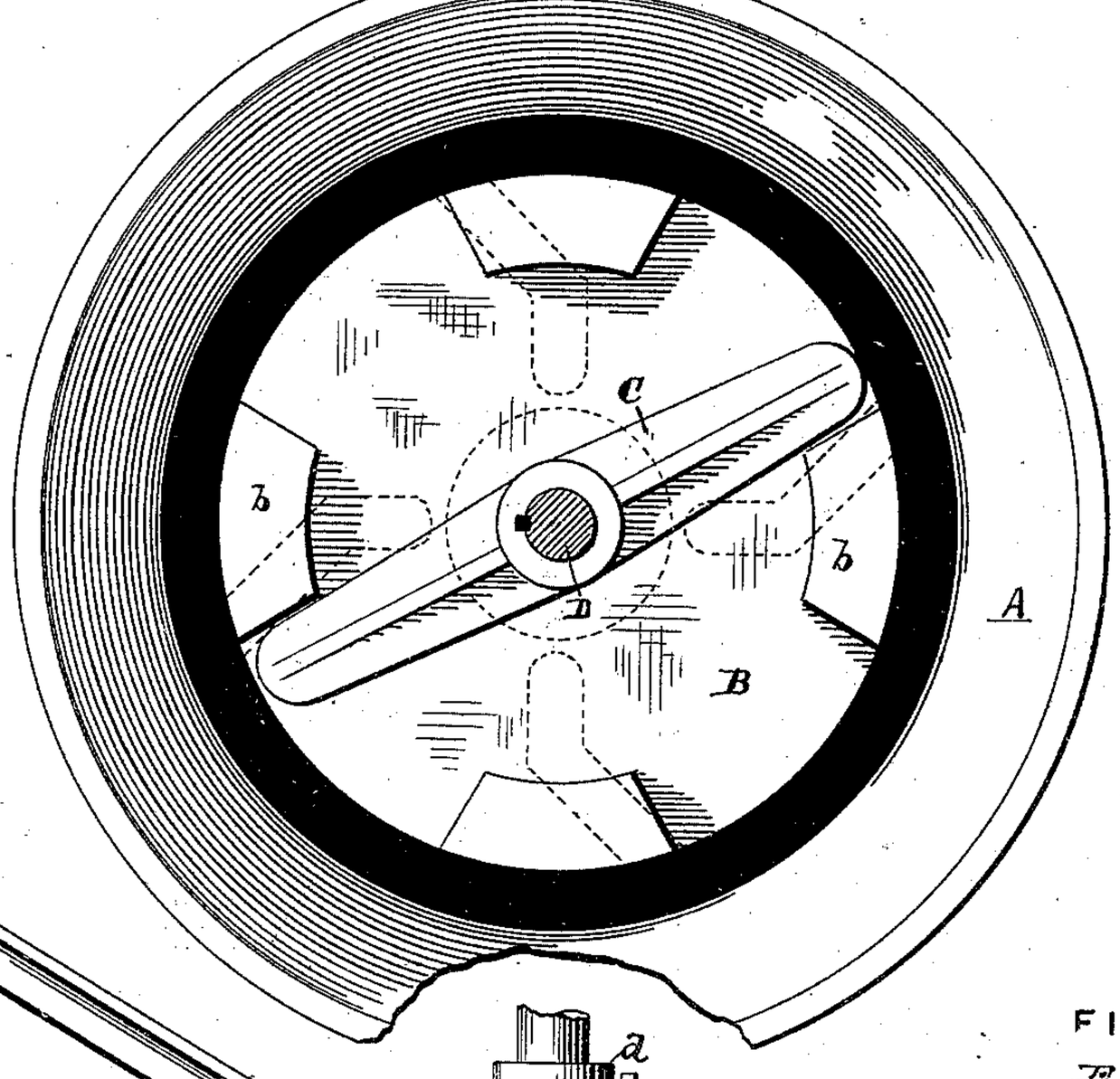


FIG. 6.

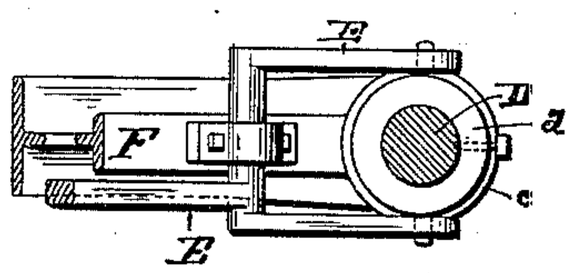
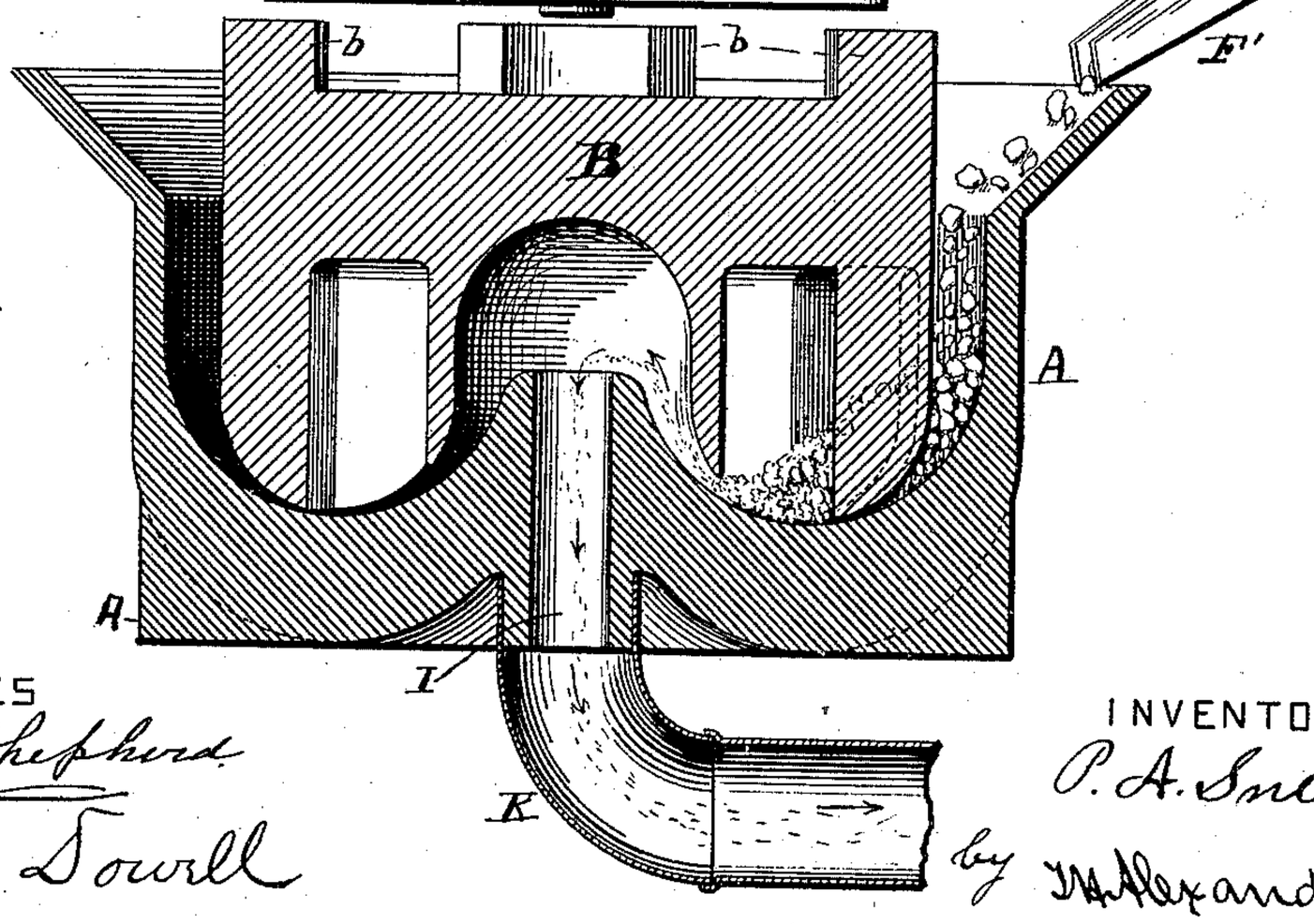


FIG. 2.



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(No Model.) 3 Sheets—Sheet 2.

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FIG. 3.

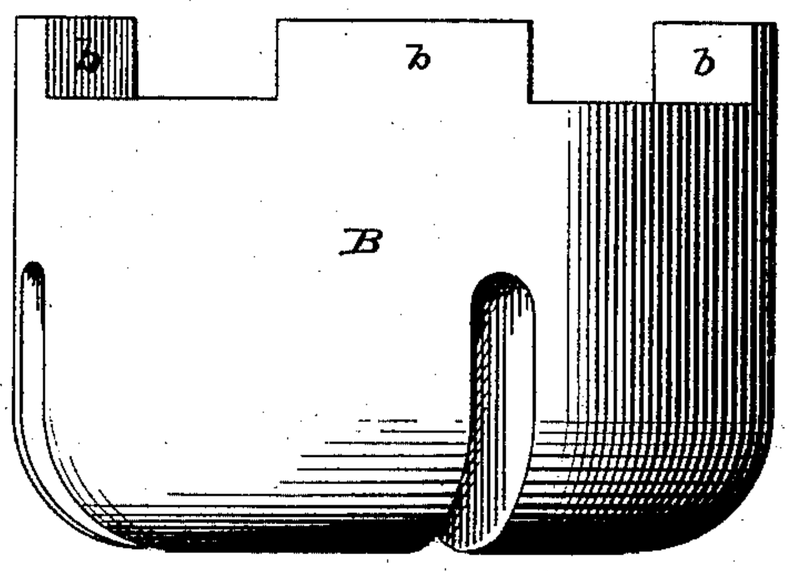


FIG. 4.

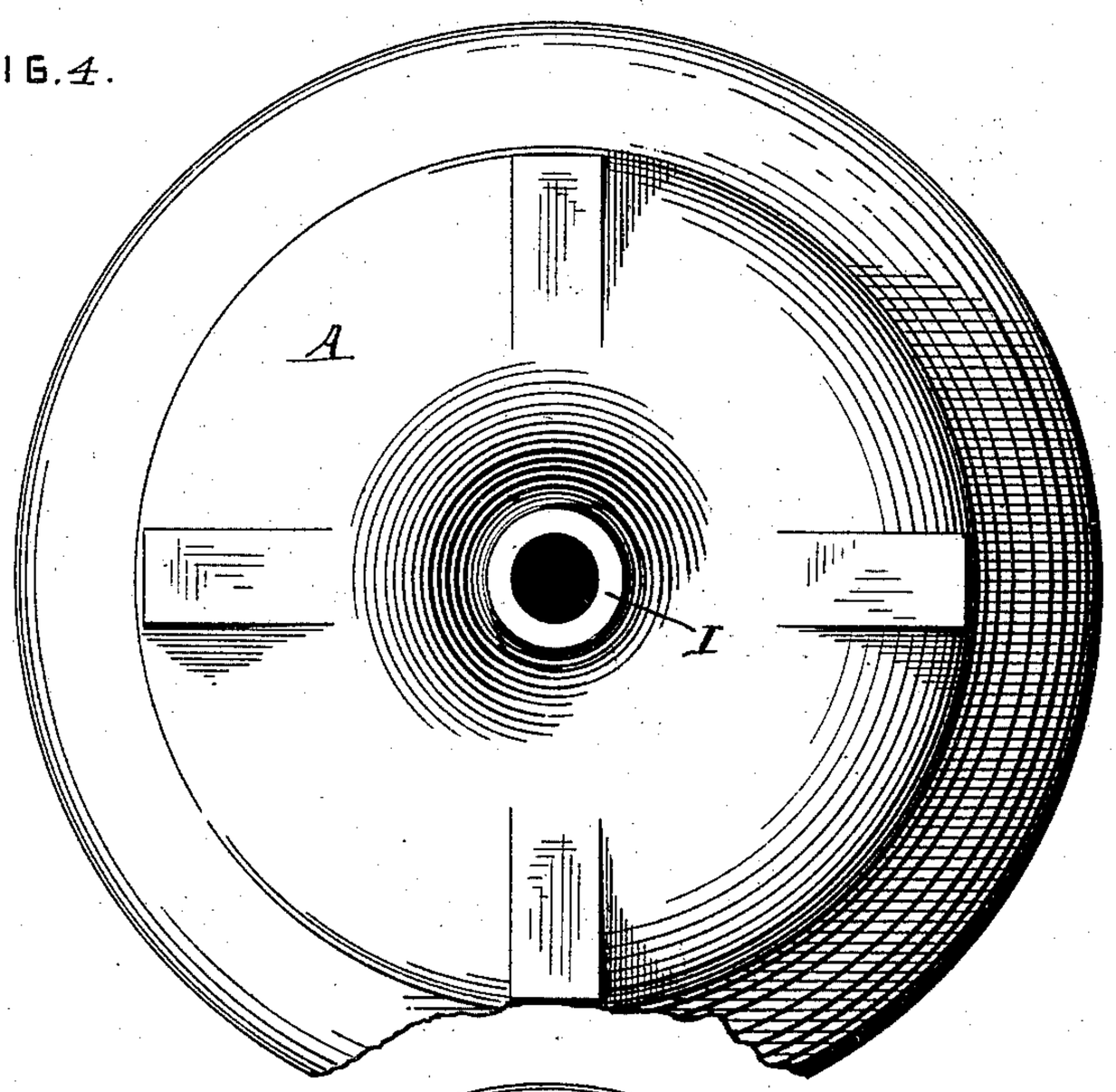
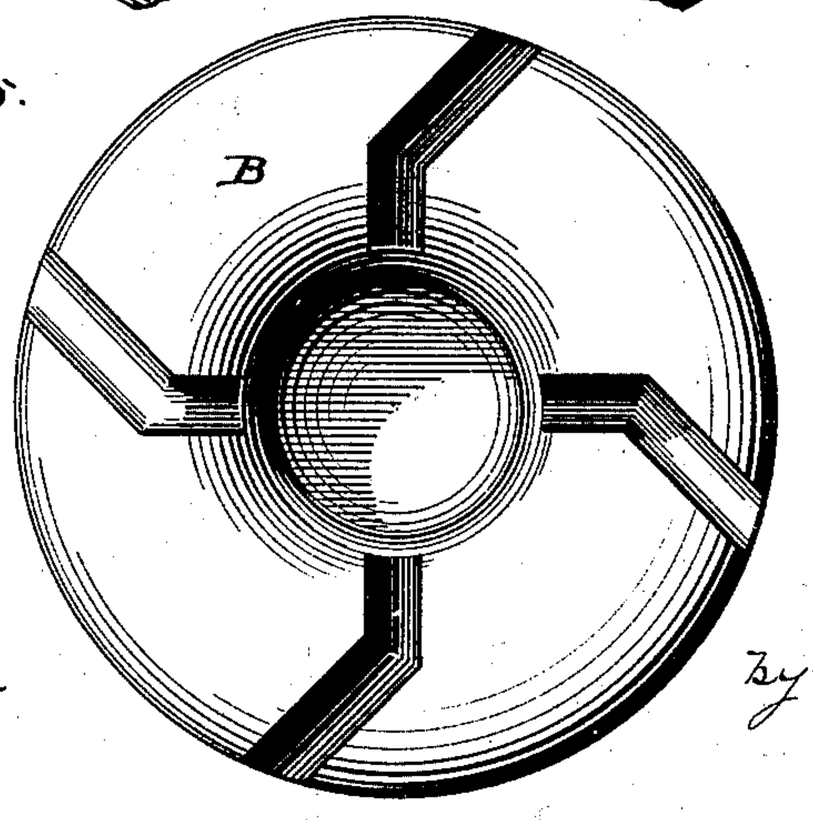


FIG. 5.



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(No Model.) 3 Sheets—Sheet 3.

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QUARTZ MILL.

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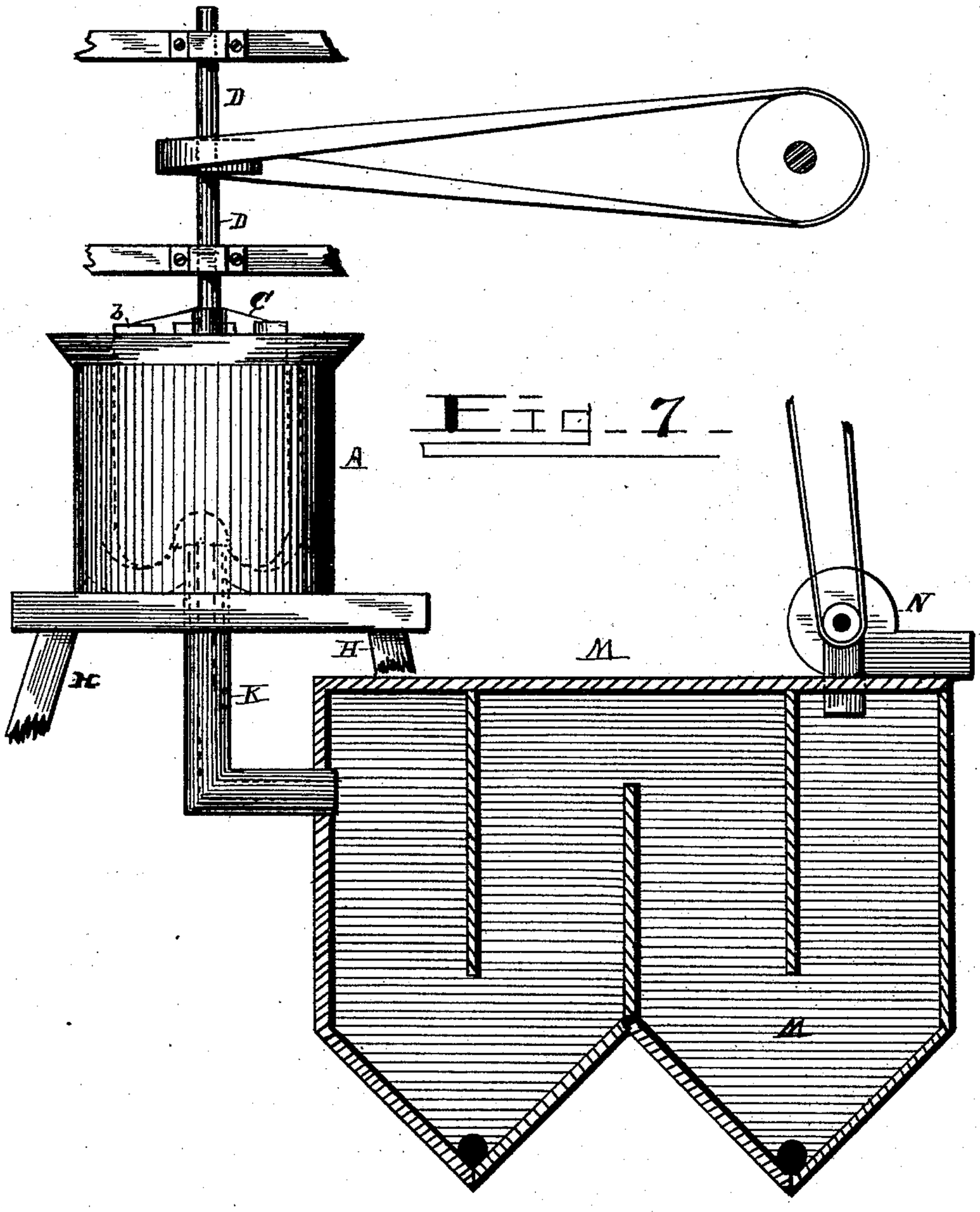

FIG. 7.

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UNITED STATES PATENT OFFICE.

PRINCE A. SNELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND JACOB H. ARMBRUSTER, OF SAME PLACE.

QUARTZ-MILL.

SPECIFICATION forming part of Letters Patent No. 395,670, dated January 1, 1889.

Application filed February 23, 1888. Serial No. 264,990. (No model.)

To all whom it may concern:

Be it known that I, PRINCE A. SNELL, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Quartz-Mills; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in quartz-mills; and it has for its objects to provide a mill in which quartz or other similar material may be gradually disintegrated and finally pulverized and removed, as more fully hereinafter specified. These objects I attain by the means illustrated in the accompanying drawings, in which—

Figure 1 represents a top view of a mill constructed according to my invention. Fig. 2 represents a vertical central sectional view of the same. Fig. 3 represents a side elevation of the runner or rotating grinder of the mill. Fig. 4 represents a bottom view of the mill. Fig. 5 represents a bottom view of the runner, and Fig. 6 represents a detached view of the mechanism for throwing the driving mechanism into and out of gear. Fig. 7 is a view of a complete apparatus for crushing the ore.

Referring to the drawings, the letter A indicates the stationary portion of the mill, which is constructed of metal or other suitable material, and is formed with a cylindrical matrix having an annular convex bottom, from the center of which extends a vertical opening or passage for the purpose hereinafter described. The upper edge of the said stationary portion A is flared outwardly to receive the quartz, which is broken or crushed into fragments of convenient size.

The letter B indicates the runner or running grinder of the mill. The lower portion of the said runner is formed with annular walls inclosing a concave central recess, the lower edges of the walls being convex in cross-section, so as to run in partial contact with the annular bottom of the matrix before mentioned when the runner is in place and properly rotated. Through the annular portion of the runner extends a series of vertical passages leading from the exterior of the runner to the central cavity of the same. These passages extend obliquely inward a portion of their distance, and then at an angle, as shown in Fig. 5, for the purpose hereinafter explained.

The upper face of the runner at its edge is provided with a series of lugs, *b*, which are engaged by a rotating arm, C, in order to give motion to the runner. The said arm is keyed to the lower end of a vertical driving-shaft, D, which is suitably journaled centrally over the mill, as shown in Figs. 2 and 7 of the drawings. The said shaft is capable of a vertical movement in its bearings, and is provided with a loose collar, *c*, setting under a fixed collar, *d*, the loose collar being provided with lateral projections which are engaged by the slotted ends of a bifurcated lever, E, fulcrumed in a bearing on an arm, F, as shown in Figs. 2 and 6 of the drawings.

The mill is supported upon legs H, and at the center of its bottom is a boss, I, to which the draft or escape pipe K is attached. The said escape-pipe extends to and connects with a receptacle, M, having an exhaust fan or device, N, by means of which the pulverized ore may be drawn over and removed from the mill.

The operation of my invention will be readily understood from the drawings in connection with the above description, and is as follows: The quartz is fed in at the flaring mouth of the stationary portion A of the mill through a chute, F′, or in any convenient manner, and falls into the matrix between the inner wall of the same and the outer wall of the runner. At the same time a stream of water may be fed into the mill in any convenient manner, if desired. The runner is in the meanwhile rotated by means of the driving mechanism, and the fragments of quartz are gradually worked down toward the bottom of the matrix toward the point of contact of the runner and said matrix. As the space between the two gradually diminishes, it will be observed that the quartz will be gradually disintegrated

until it is pulverized between the rounded lower ends of the runner and the bottom of the matrix. The passages in the runner, by reason of their peculiar shape and arrangement, direct the quartz as it is disintegrated and ground toward the center of the mill, from which it is discharged. The discharge is effected by means of suction through the central passage and the bent pipe K, which connects with a suitable exhaust device.

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

1. The combination, in a quartz-mill having an annular matrix and central escape-passage, of the annularly-formed runner provided with passages extending from the central cavity to the periphery, whereby the quartz is carried from the outside to the center of the mill to be discharged, substantially as described.

2. The combination, in a quartz-mill having an annular matrix, of the annular runner having a central cavity, diverging passages extending from said cavity to the periphery of the runner and provided with lugs on its upper face, and the rotating arm secured to a vertical driving-shaft, substantially as and for the purpose specified.

3. The combination, in a quartz-mill having an annular matrix and a central opening and an annular runner having a central cavity, and passages extending from the cavity to the periphery of the runner, adapted to conduct pulverized quartz, into the said cavity, of the draft or escape passage and suitable exhaust mechanism whereby the pulverized quartz is drawn off and removed from the mill, substantially as specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

P. A. SNELL.

Witnesses:
T. H. ALEXANDER,
M. P. CALLAN.