

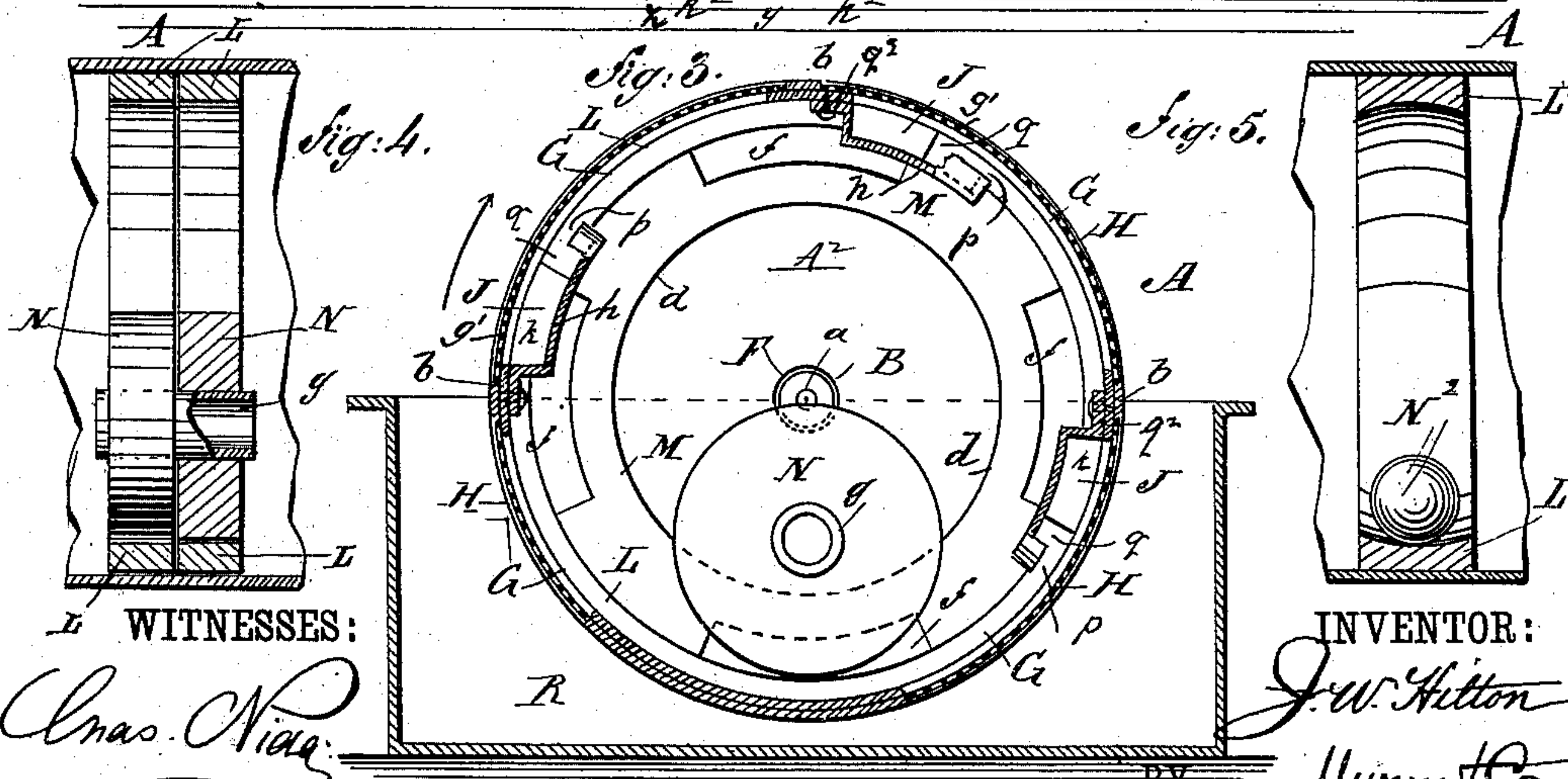
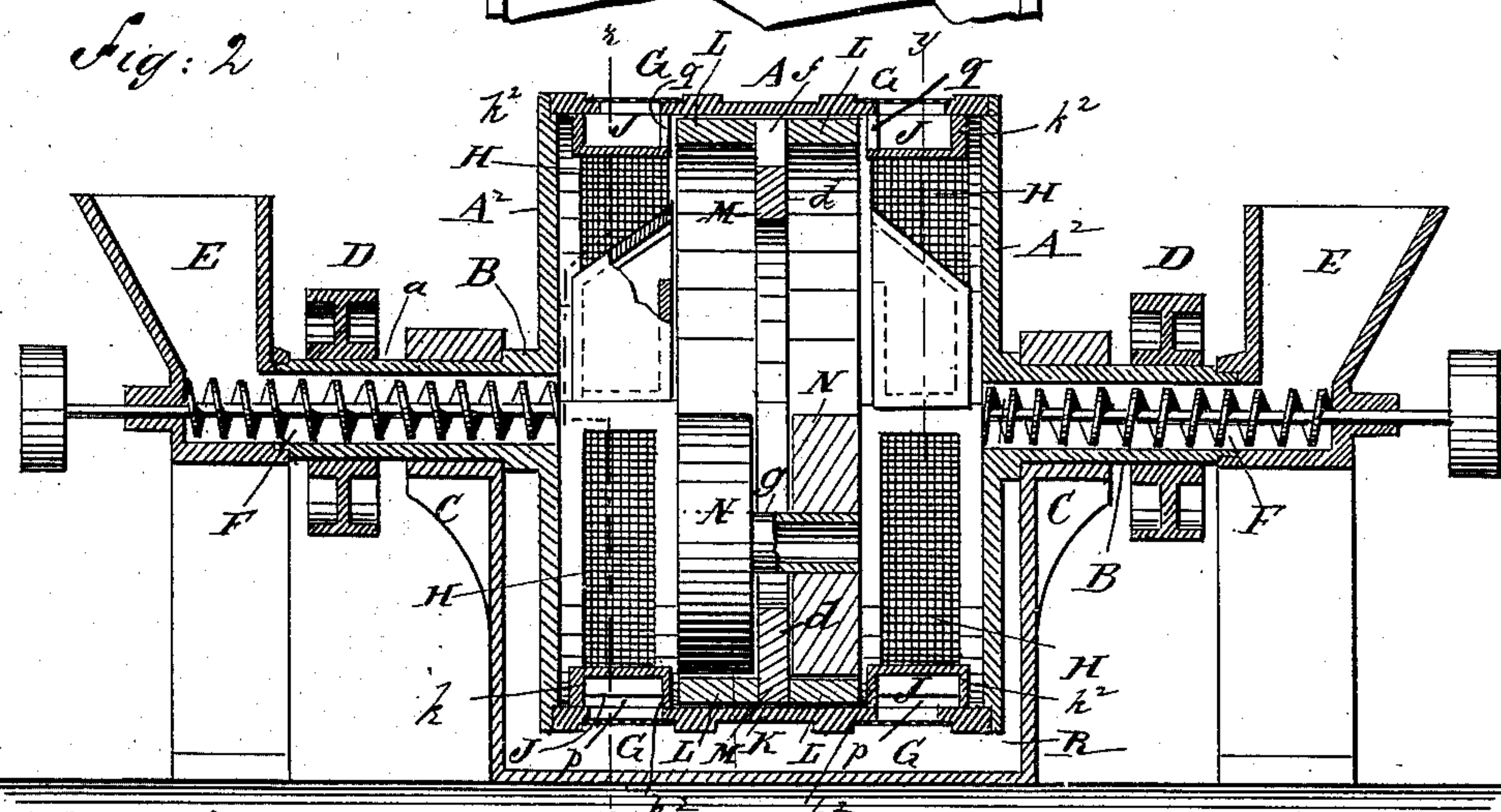
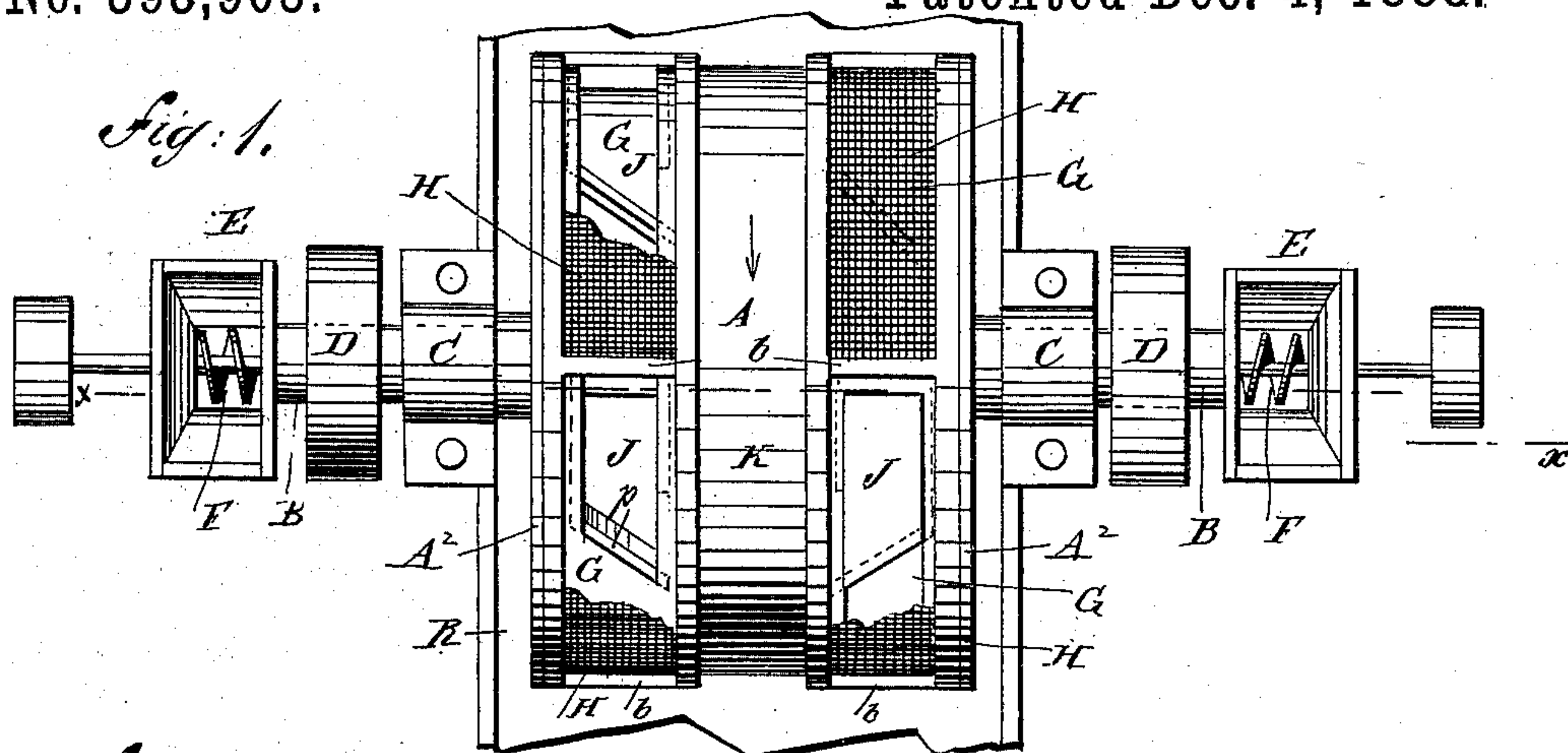
(No Model.)

2 Sheets—Sheet 1.

J. W. HILTON.
PULVERIZING MACHINE.

No. 393,905.

Patented Dec. 4, 1888.



WITNESSES:

Chas. N. V. A.
C. Sedgwick.

INVENTOR:

J. W. Hilton
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ATTORNEYS.

(No Model.)

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Fig. 6.

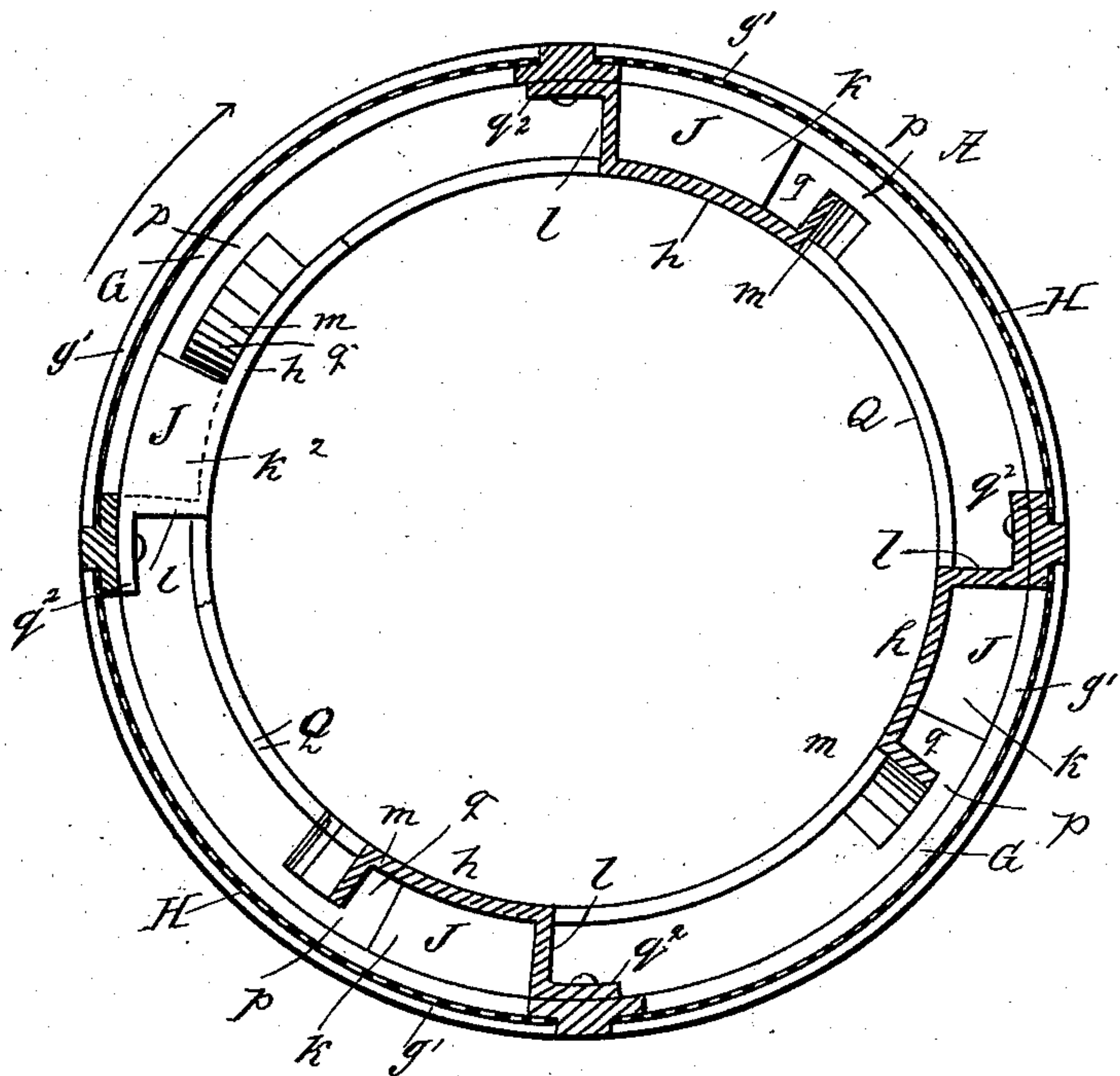
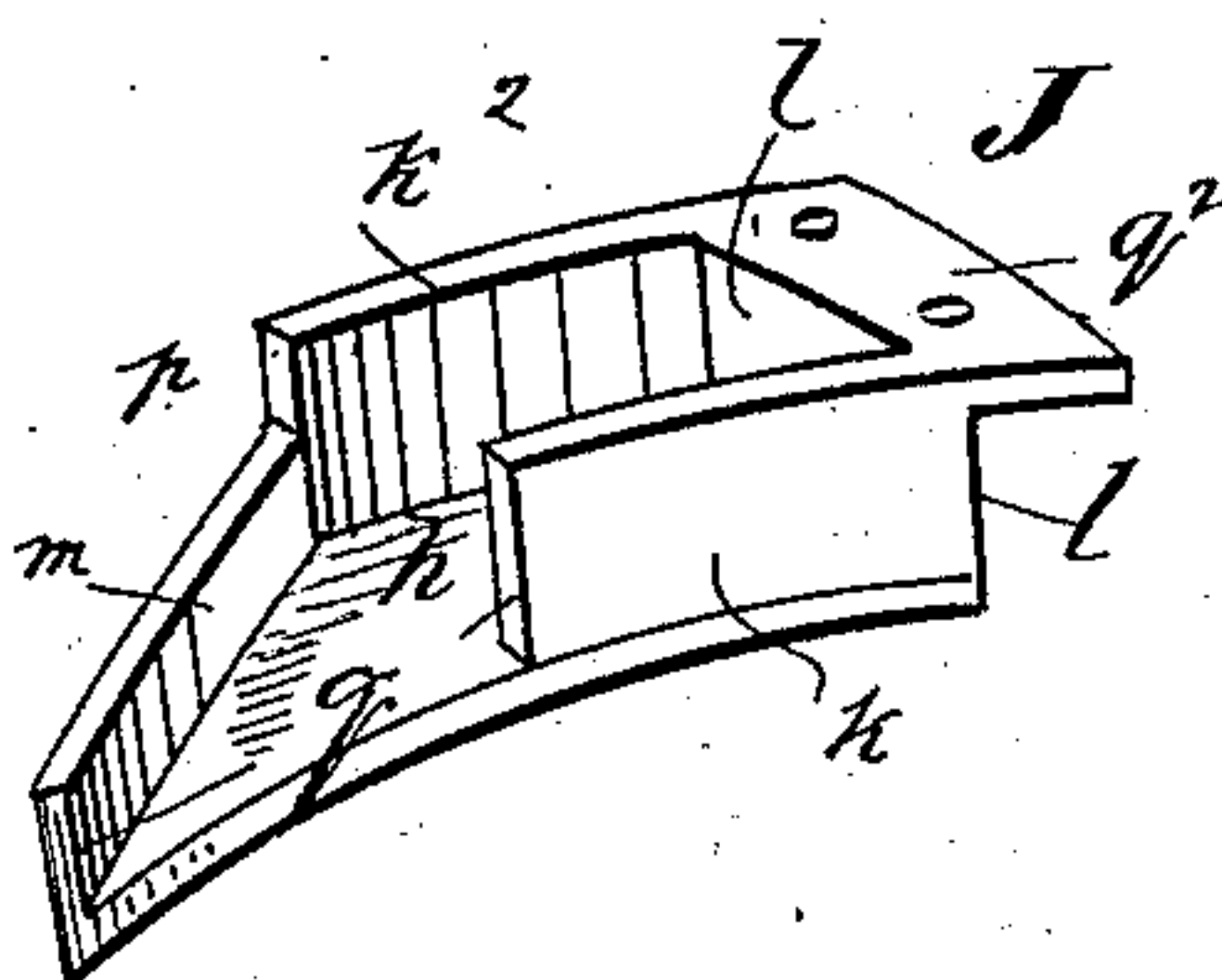


Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES W. HILTON, OF BROOKLYN, NEW YORK.

PULVERIZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 393,905, dated December 4, 1888.

Application filed September 19, 1887. Serial No. 250,118. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. HILTON, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved
5 Pulverizing-Machine, of which the following is a full, clear, and exact description.

This invention relates to a machine particularly intended for the pulverizing of ore, although, as will be apparent from the description hereinafter given, it is applicable to other
10 uses; and it consists in the construction and combinations of parts, as will be hereinafter fully described, and specifically pointed out in the claims.

15 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

20 Figure 1 is a plan view of the pulverizing-machine with parts of the exterior being broken away the better to illustrate internal parts. Fig. 2 is a central vertical longitudinal section through the machine on line $x x$, Fig. 1. Fig. 3 is a cross-section of same on
25 line $y y$, Fig. 2. Figs. 4 and 5 are sectional views in detail showing modifications in the arrangement and formation of some of the parts. Fig. 6 is a cross-sectional view, on a larger scale, on the line $z z$ in Fig. 2, and showing
30 a modification in the method of attaching the buckets; and Fig. 7 is a view in detail of one of the ore buckets or elevators detached.

In constructing the machine under the present invention I employ a main drum or cylindrical casing, A, closed by end heads, A², each
35 provided with axial tubular bearings B, mounted in suitable supports, C, therefor, to which may be applied gears or pulleys D, by which to rotate same, and in communication
40 with each axial passage a in the tubular bearings is a stationary hopper, E, and within said passages $a a$ are screws F F, adapted for independent rotation for the introduction of the ore, &c., into the interior of the drum.

45 The drum A in and across its width in peripheral lines toward each edge is provided with a series of openings, G G, covered by screens H H, and between such screened openings a solid or unbroken peripheral portion,
50 K, of the drum is left, which is covered by two rings, L L, of steel, &c., having between them and resting on the inner periphery of the

drum a ring, M, which is of sufficient width to form a peripheral rib or flange, d , between the two pulverizing-surfaces formed by the
55 rings L, said ring M being provided in and through its thickness with one or more apertures, f .

N N represent a pair of pulverizing-rollers resting upon the rings L L and joined together
60 by an axial wrist or pintle, g , straddling the rib or flange d , whereby the pulverizing-rollers work in unison or have parallel bearing upon the rings L.

Located in a circular or peripheral line interiorly of the drum coincident with the
65 screened openings are a series of buckets or elevators, J, for conveying and reconveying the unpulverized or insufficiently pulverized ore to the plane of pulverization, and are here
70 shown as four in number, each of a length equal to a portion only of the length of the screened openings G G.

Each bucket J is a box-like structure curved longitudinally to fit the inner periphery of
75 the drum, and consists of an inner wall, h , the outer wall being formed, when the bucket is in place, by a portion, g' , of the gauze or screen H, inner and outer side walls, $k k^2$, rear closed wall, l , and front or forward wall, m , which latter
80 is of a less depth than the bucket and stands detached from the ends of the side walls, $k k^2$,—that is, it extends in an angular or oblique line from the outside wall, k^2 , forward, meeting the plane of the inner side
85 wall, k , in advance of its end, leaving by its reduced height an opening, p , between its upper edge and the screen H, and by its angular extension beyond the end of the inner wall, k ,
90 a side opening, q , therein, particular reference being had to Figs. 6 and 7.

Each bucket may be made separately, as particularly seen in Fig. 7, and provided with a lug or extension, q^2 , of or on its rear wall, l ,
95 through and by which it may be bolted or otherwise secured to the drum A, and, as shown in Fig. 6, the several buckets may be attached to or formed upon a rigid hoop or ring, Q, whereby the buckets may be more firmly held
100 and secured in place and against detachment.

The ore to be pulverized is introduced through each head of the revolving drum by the screws F and deposited upon the screened portions G, and as the drum is rotated and the

forward opening, *p*, at the nose of the bucket permits the ore by its gravity falls into the bucket toward its closed rear end, *l*, and in the continuation of the revolution of the drum the bucket is carried into such an inverted position that its before forward opened end, *p*, is rearmost and lowermost, when from gravity the ore, &c., will pass off laterally or inwardly at the opening *q*, being guided by the angular direction of the forward end wall, *m*, serving as a chute therefor, and it then falls across a lateral plane to and upon the pulverizing surfaces or rings *L L* in advance of the position of the pulverizing-rollers *N N*, and on a continuation of the revolution of the drum the ore, &c., settles and always remains in the lowest position on said rings *L*, and is carried under the crushing and pulverizing rollers *N*, there always being, as is obvious, a rolling contact between said rollers and the peripheral pulverizing-surfaces of the drum.

The ore, which has been crushed in a greater or less degree by the action of the pulverizing-rollers, will as it accumulates fall or be crowded upon the screened peripheries *G G*, such thereof as is fine enough passing through the screens, the remainder thereof being again taken up by the buckets, as before, and again discharged upon the pulverizing-surface for the repeated pulverizing action.

In practice the ore may be subjected to the pulverizing action when in a dry condition or introduced with water through the axial bearings *B*, or otherwise, and the drum may be wholly or partially immersed in a liquid-tank, *R*, all as is deemed desirable and expedient.

The apertures *f* in the rib *d* permit the entrance of ore from one pulverizing-surface through to another, securing an even disposition upon either ring should a greater quantity be deposited or remain upon one than upon the other, and thus the work performed on the pulverizing-surfaces is equalized, and, if desired, the ring *M* may be removed, the rollers and the rings *L* forced together or replaced by other rings, and the rollers *N N* may be moved together upon their pintle to form in substance one roller of wide tread, and, again, instead of rollers formed with flat faces, as seen in Figs. 2, 3, and 4, they may be formed with bearing-surfaces of convex or other shape—as, for instance, formed by the employment of a roller-ball, *N²*—the pulverizing surface or periphery being preferably concave, as seen in detail in Fig. 5, and on each side of the roller of wide tread or of the roller-ball rings similar to the ring *M* or other means may be employed to confine and guide the roller upon the pulverizing-surface.

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

1. The combination, with the drum *A*, having a series of openings, *G*, screens *H*, covering or closing said openings, the drum having a solid or unbroken peripheral portion, *K*, a ring, *L*, within the drum on the part *K*, and the roller *N*, of the series of curved buckets *J*, open next to the screens, each secured to the inner side of the drum, and provided with the oblique forward wall, *m*, of less depth than the bucket, to form the inlet-opening *p* between its edge and the screen, and also to direct the discharged material laterally to the roller through a discharge-opening, *q*, formed between the inner free end of the said wall *m* and the end of the inner side wall, *k*, of the bucket, substantially as set forth.

2. The combination, with the drum, its screens, and the unbroken peripheral portion *K* between the screens, of the two spaced rings *L L*, movable toward each other within the drum on its part *K*, the removable ring *M*, separating the two rings and having a series of openings, *f*, through which the material operated upon may pass from one ring to the other, the loose rollers *N N*, resting on the rings, and a pintle on which said rollers are mounted movably, substantially as set forth.

3. A pulverizing-machine comprising a drum, *A*, having peripheral openings *G*, an intermediate unbroken portion, *K*, and heads closing the cylinder, screens *H*, covering each opening *G*, curved buckets secured within the drum and closed on their open outer sides by said screens, each bucket having an oblique front wall or end of less height than the bucket to form the front inlet-openings, *p*, next to the screens, said oblique walls also forming guides to direct or discharge the material upon the intermediate unbroken portion, *K*, substantially as set forth.

4. In an ore-pulverizer, the bucket *J*, curved longitudinally and formed with closed sides *k k² l*, an end wall, *m*, of less depth than the bucket, extending along the inner wall from the wall *k²* forward and meeting the plane of the side wall, *k*, in advance of the end, whereby the openings *p q* are formed, substantially as set forth.

5. In an ore-pulverizer, the circular series of buckets *J*, open on their outer sides, and having oblique front end walls, *m*, of less depth than the buckets, whereby openings *p q* are formed, and the ring *O*, connecting the several buckets and having openings between the buckets, substantially as set forth.

JAMES W. HILTON.

Witnesses:

HIRAM K. SCOTT, Jr.,
HIRAM K. SCOTT.