

(No Model.)

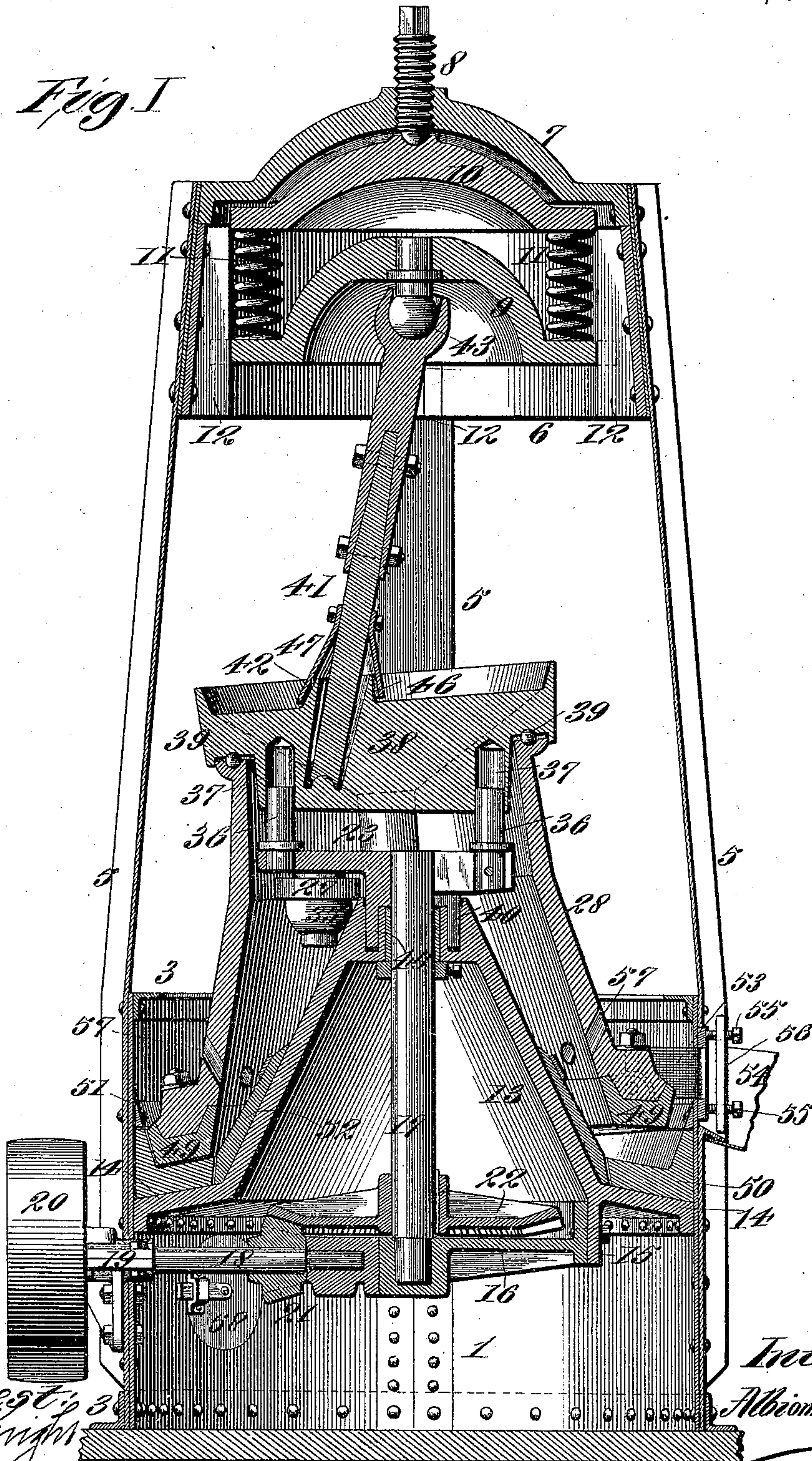
2 Sheets—Sheet 1.

A. M. ROUSE.
GYRAL PULVERIZER.

No. 575,495.

Patented Jan. 19, 1897.

Fig I



Alfred E. Knight
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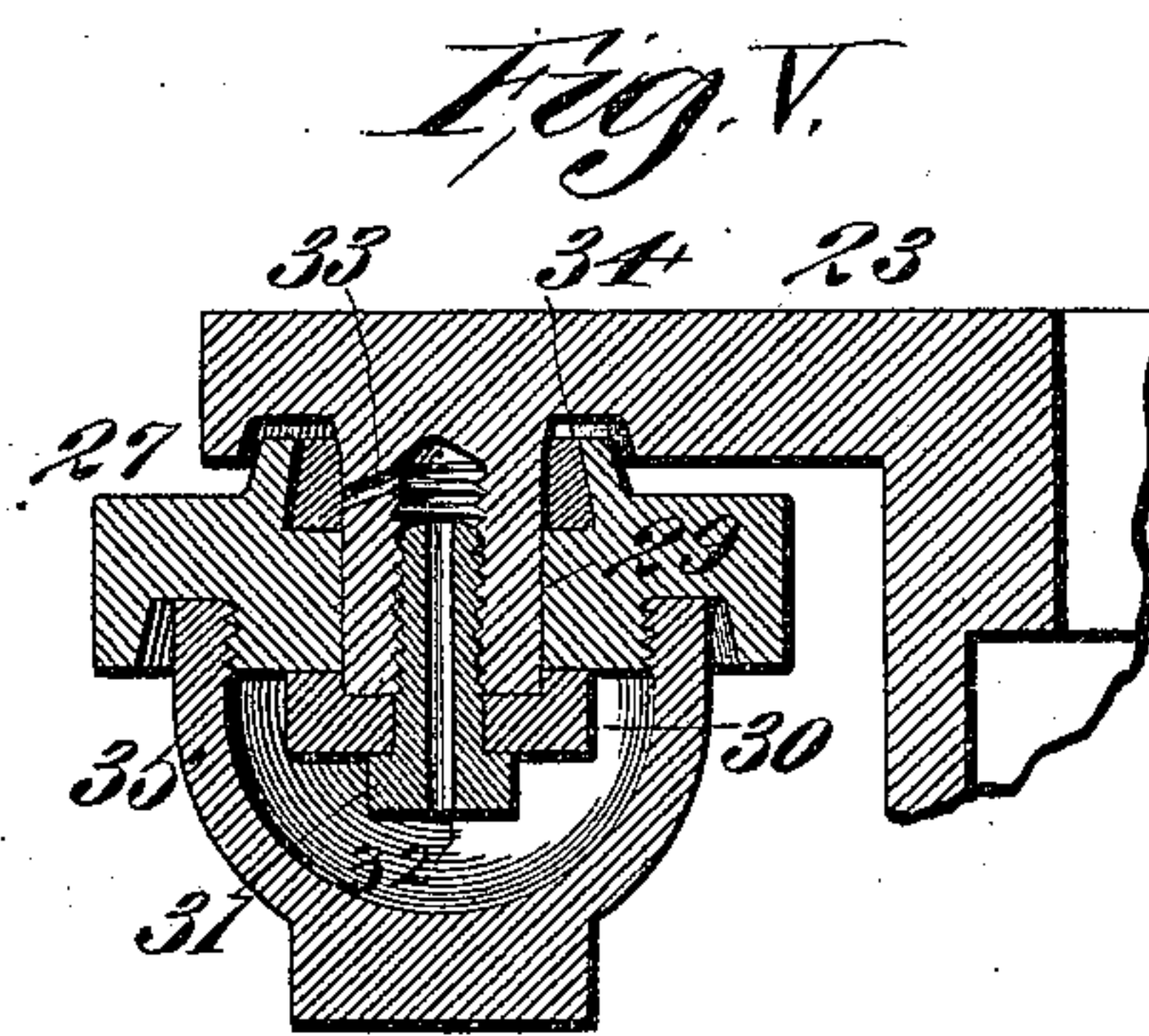
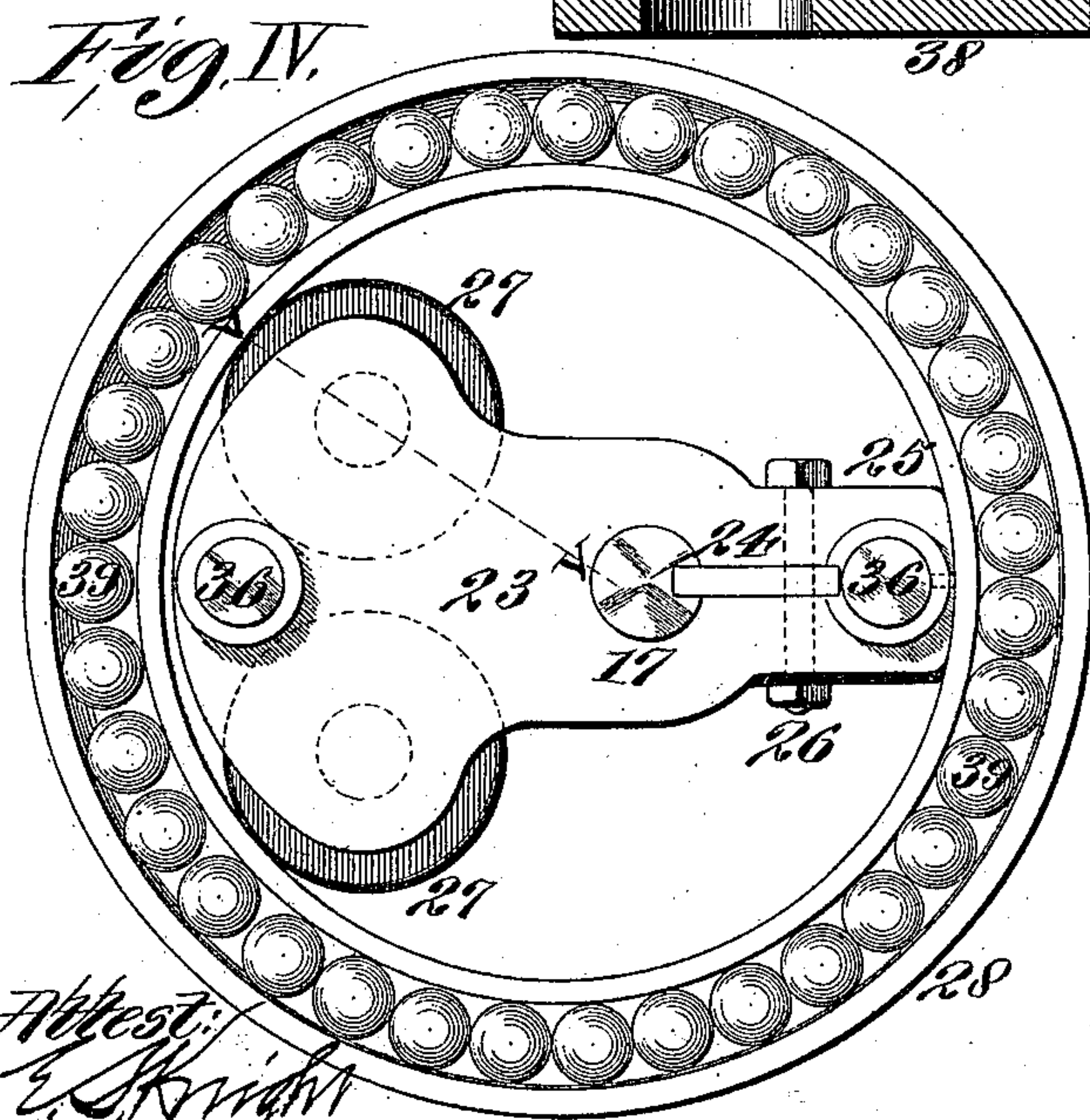
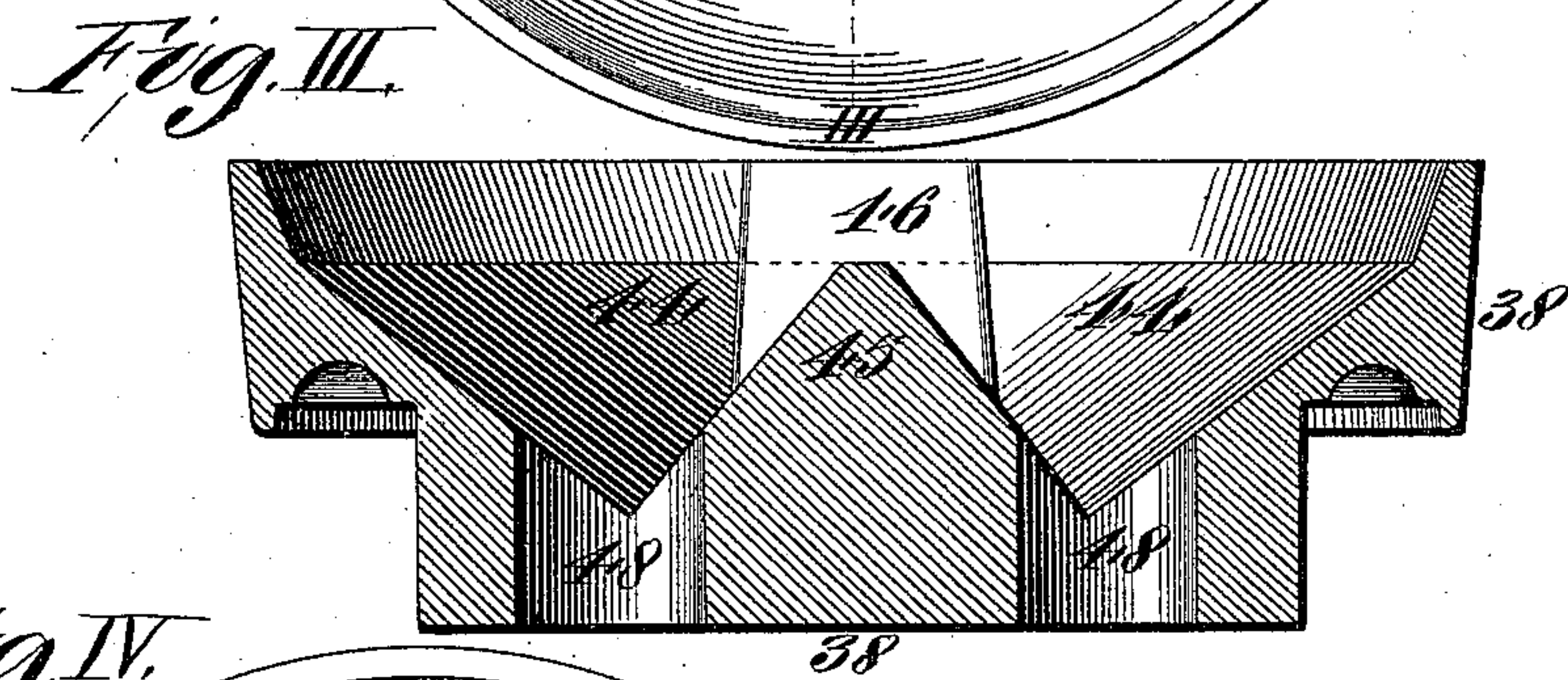
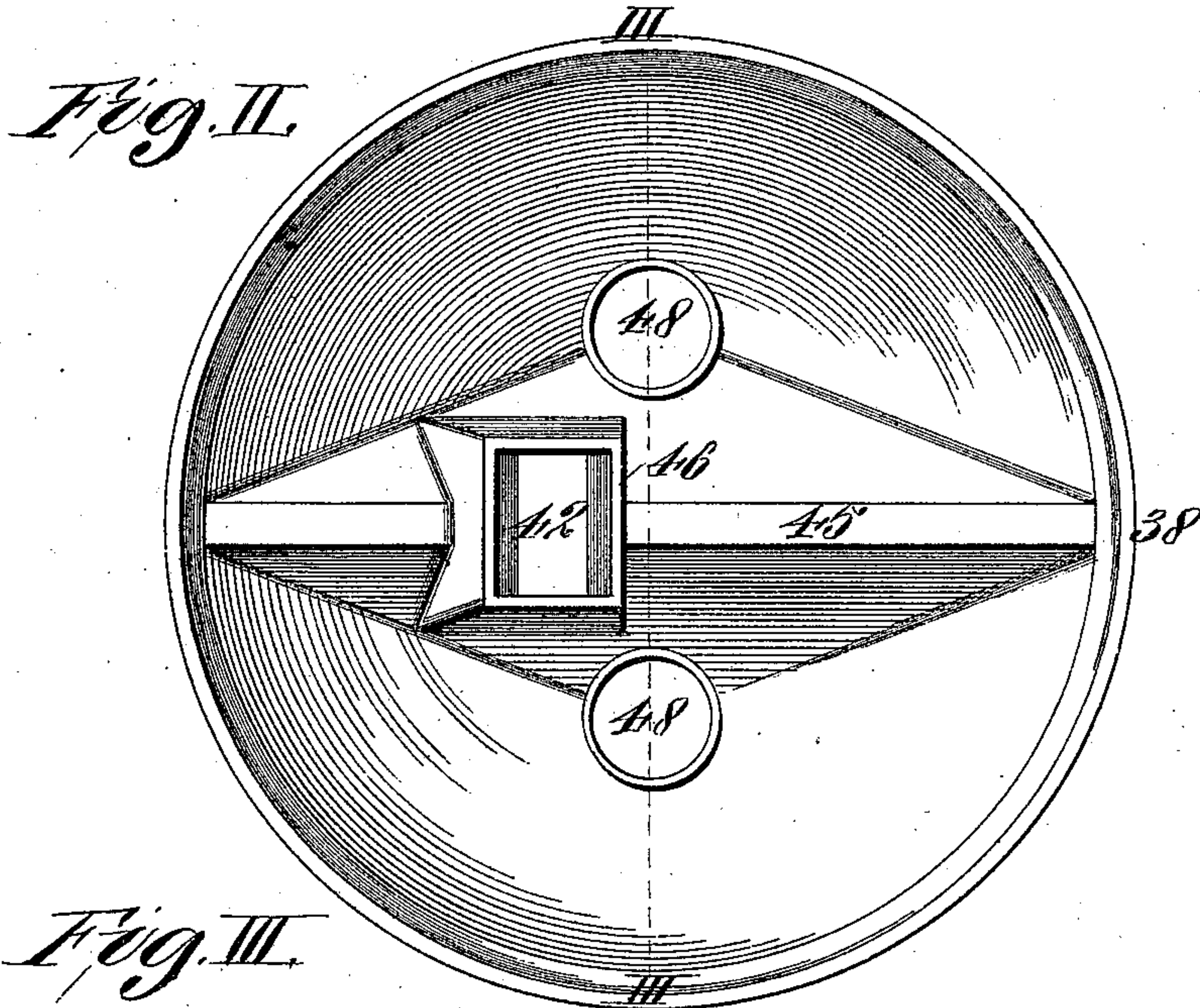
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2 Sheets—Sheet 2.

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GYRAL PULVERIZER.

No. 575,495.

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Inventor:
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UNITED STATES PATENT OFFICE.

ALBION M. ROUSE, OF DENVER, COLORADO, ASSIGNOR TO THE MINERS
RELIEF ASSOCIATION, OF SAME PLACE.

GYRAL PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 575,495, dated January 19, 1897.

Application filed January 25, 1896. Serial No. 576,814. (No model.)

To all whom it may concern:

Be it known that I, ALBION M. ROUSE, of the city of Denver, county of Arapahoe, State of Colorado, have invented certain new and
5 useful Improvements in Gyrals Pulverizers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 My invention relates to certain improvements in gyrals pulverizers which are principally intended for pulverizing ores, but which may be used for pulverizing other materials.

My invention consists in features of novelty hereinafter fully described, and pointed
15 out in the claims.

Figure I is a vertical section of my improved machine. Fig. II is a top view of the feed-head. Fig. III is a section taken on line
20 III III, Fig. II. Fig. IV is a top view of the gyrals cone and the power-crank. Fig. V is an enlarged section taken on line V V, Fig. IV.

Referring to the drawings, 1 represents a drum or hoop supported on a base 2 and
25 strengthened at top and bottom by means of angle-iron rings 3. This drum is riveted or bolted to four uprights 5, made, preferably, of channel-iron.

6 represents a hoop secured to the upper
30 ends of the uprights, and fitting within this hoop is a cap 7, provided centrally with a set-screw 8. Within the ring 6 are two heads 9 and 10, between which are placed powerful springs 11. The heads are held from turning
35 by means of brackets or wings 12, secured to the inner side of the ring 6 and engaging notches made in the flange of the head 9, as seen in Fig. I. Within the drum or ring 1 is a center cone 13, having a lower flange 14,
40 riveted or otherwise secured to the inside of the drum or ring. Within a depending flange 15 of the cone 13 and secured to said flange is a spider 16, in which is journaled the lower end of a shaft or spindle 17 and the inner end
45 of a driving-shaft 18. The outer end of the shaft 18 is journaled in a box 19, secured to the ring or drum 1, and this end of the shaft is provided with a driving-pulley 20. On the inner end of the shaft 18 is keyed a bevel
50 gear-wheel 21, that meshes into a larger bevel gear-wheel 22, keyed to the lower end of the

shaft 17 above the spider 16. The upper end of the shaft 17 has journal-bearing in the upper end of the cone 13, and above the cone the shaft is provided with a crank 23, the crank
55 being held from turning on the shaft by means of a key 24, set into the shaft and fitting in the split end 25 of the crank. (See Fig. IV.) The split end of the crank is tightened on the key by means of a transverse bolt
60 26. The crank is eccentrically located on the shaft 17, and its long end is provided with rollers 27, that bear against the upper part of a gyrating cone 28, that fits over the crank 23 and over the cone 13.

The manner of connecting the rollers 27 to the crank 23 is illustrated in Fig. V. The crank has two journal projections, one for each
65 roller 29, to which the rollers are secured by means of washers 30, held in place by screws 31, tapped into the projections. Each screw 31 has a central opening 32, and each journal projection 29 has a perforation 33. Each roller 27 has a cavity 34 in its upper face, with which the perforation 33 communicates. To
70 the under side of each roller 27 is screwed a cup 35 for containing oil. The oil passes through the cup by capillary attraction, through the perforations 32 and 33 into the cavity 34, and lubricates the bearing between the roller 27
75 and the journal projection 29.

Projecting upwardly from the crank 23 are two or more pins 36, that fit in sockets 37, made in the under side of a head 38, fitting on top of the cone 28, so as to cause the head to be
80 turned with the shaft 17 and crank 23.

39 represents ball-bearings between the head 38 and cone 28.

The under side of the crank 23 is provided with a flange 40, that fits in a groove or chan-
85 nel in the top of the cone 13.

41 represents a rod or strut, the lower end of which fits in a socket 42, eccentrically located in the head 38. The upper end of this rod or strut has a ball-and-socket connection
90 43 with the head 9, as seen in Fig. I.

The upper face of the head 38 is provided with two cavities 44, one on each side of a central rib 45, as seen in Figs. II and III. The socket 42 is made in the rib 45, and the
95 rib is formed with a raised flange 46, surrounding the socket and over which laps a shield

47, secured to the rod or strut 41, so as to prevent matter entering the cavity 42.

The mineral to be pulverized is deposited in the cavities 44 and passes through openings or holes 48 in the head 38 into the space between the cones 13 and 28. Secured to the lower edge of the cone 28 is a shoe 49, beneath which is a die 50, resting on the flange 14 of the cone 13. To the drum or hoop 1 above the die 50 is riveted a ring 51, which serves to protect the die and to guide the material into the space between the die and the shoe. Surrounding the lower part of the cone 13 is a protecting-ring 52.

In the operation of the machine it will be seen that as the shaft 17 is turned there will be imparted to the cone 28 a gyrating or lateral vibrating movement by virtue of the crank-rollers 27 bearing against the inner side of the upper end of the cone. This causes the shoe 49 to be constantly moving toward and away from the die around the machine, thus crushing the ore or material that falls between the shoe and the die as the shoe moves away from the die, and by virtue of the springs 11 the cone 28, carrying the shoe, is pressed downwardly with much force, causing the ore to be crushed or pulverized between the shoe and the die. The pressure exerted by the springs is of a relief or cushion character, so that in case a lump of ore gets between the shoe and the die that requires greater force to pulverize with one pressure than the strength of the machine can stand the springs will yield, avoiding breakage of the machine, and the lump of ore will gradually be acted upon until it is broken and pulverized. The tension of the springs may be adjusted at will by means of the set-screw 8.

53 represents a screen located at an opening made in the upper part of the hoop 1, and through which the material is discharged into a suitable trough 54. This screen I have shown held in place by set-screws 55, supported from the uprights 5 by means of strips 56.

57 represents perforations made in the lower part of the cone 28, through which the material being pulverized or operated upon may pass to and from the space between the two cones.

I claim as my invention—

1. In a pulverizer, the combination of a central cone, a gyrating cone located over the central cone, and provided with a shoe at its lower edge, a die supported by the central cone beneath said shoe, a feed-head located on said gyrating cone, a strut fitted eccentrically to said head, a head bearing against the upper end of said strut under the influence of a series of springs bearing against said head, substantially as set forth.

2. In a pulverizer, the combination of a central cone supporting a die, a gyrating cone located over the central cone, means for imparting movement to the gyrating cone, a feed-head mounted on the last-mentioned cone, a strut fitted eccentrically at its lower end to

said head, and springs bearing upon the upper end of said strut, substantially as set forth.

3. In a pulverizer, the combination of a central cone supporting a die, a gyrating cone located over the central cone, a shaft passing through the central cone and having a crank on its upper end above the central cone, rollers journaled to said crank and adapted to bear against the gyrating cone, a head located on the gyrating cone and connected by pins to said crank, and a spring-pressed strut fitted eccentrically to said head, substantially as and for the purpose set forth.

4. In a pulverizer, the combination of a central cone supporting a die, a gyrating cone located over the central cone, a shaft passing through the central cone and provided with a crank at its upper end above said central cone, rollers journaled to said crank and adapted to bear against the gyrating cone, a head located on the gyrating cone, a pin-and-socket connection between said head and crank, and a spring-pressed strut eccentrically fitted to said head; said rollers being provided with cavities and oil-cups, and being secured to said crank by means of perforated journals, over which the rollers fit and to which the rollers are secured by washers and perforated screws, substantially as set forth.

5. In a pulverizer, the combination of a central cone supporting a die, a gyrating cone fitting over the central cone, means for imparting movement to the gyrating cone, a feed-head mounted on the gyrating cone, a strut fitted eccentrically at its lower end to said feed-head, and means for applying pressure to the upper end of said strut, consisting of two movable heads, springs placed between the heads, and a set-screw bearing upon the upper one of said last-mentioned heads, substantially as set forth.

6. In a pulverizer, the combination of a hoop or drum, a central cone having a flange secured to said hoop, a die resting upon said flange, a gyrating cone fitting over the central cone and to which is secured a shoe, a spider secured to a vertical flange formed upon said central cone, a driving and a vertical shaft journaled in said spider, a gear connection between said shafts, a crank on the upper end of said vertical shaft, rollers journaled to said crank and adapted to bear against said gyrating cone, a feed-head located on the gyrating cone, ball-bearings between said feed-head and gyrating cone, pins fitted to said crank and entering sockets in said feed-head, a strut fitted eccentrically to said feed-head, and a spring-pressed head having a ball-and-socket joint with the upper end of said strut, substantially as set forth.

7. In a pulverizer, the combination of a drum-base, a die carried by the drum, a cone working on the die and adapted to be given a gyratory movement, suitable means for imparting said gyratory movement to said cone consisting of a crank eccentrically mounted on a shaft, rollers carried by the crank which

bear against the cone, a head carried on the cone and having connection with the crank, and means for applying pressure to said head consisting of a hoop supported from the drum
5 by means of uprights, a cap carried by the hoop a yielding head in the cap and a thrust-bar between said head and the head on the cone, substantially as shown and described.

8. In a pulverizer, the combination of a cen-
10 tral cone, a gyrating cone located over the central cone, means for imparting movement to the gyrating cone, a feed-head fitting on

the gyrating cone, and a spring-pressed strut fitted eccentrically to said feed-head; said feed-head having a rib 45 with a socket 42 15 and flange 46 to receive said strut, and said feed-head having cavities 44 and openings 48; said strut being provided with a shield 47, substantially as set forth.

ALBION M. ROUSE.

In presence of—

ALBION E. ROUSE,
N. D. SIBLEY.