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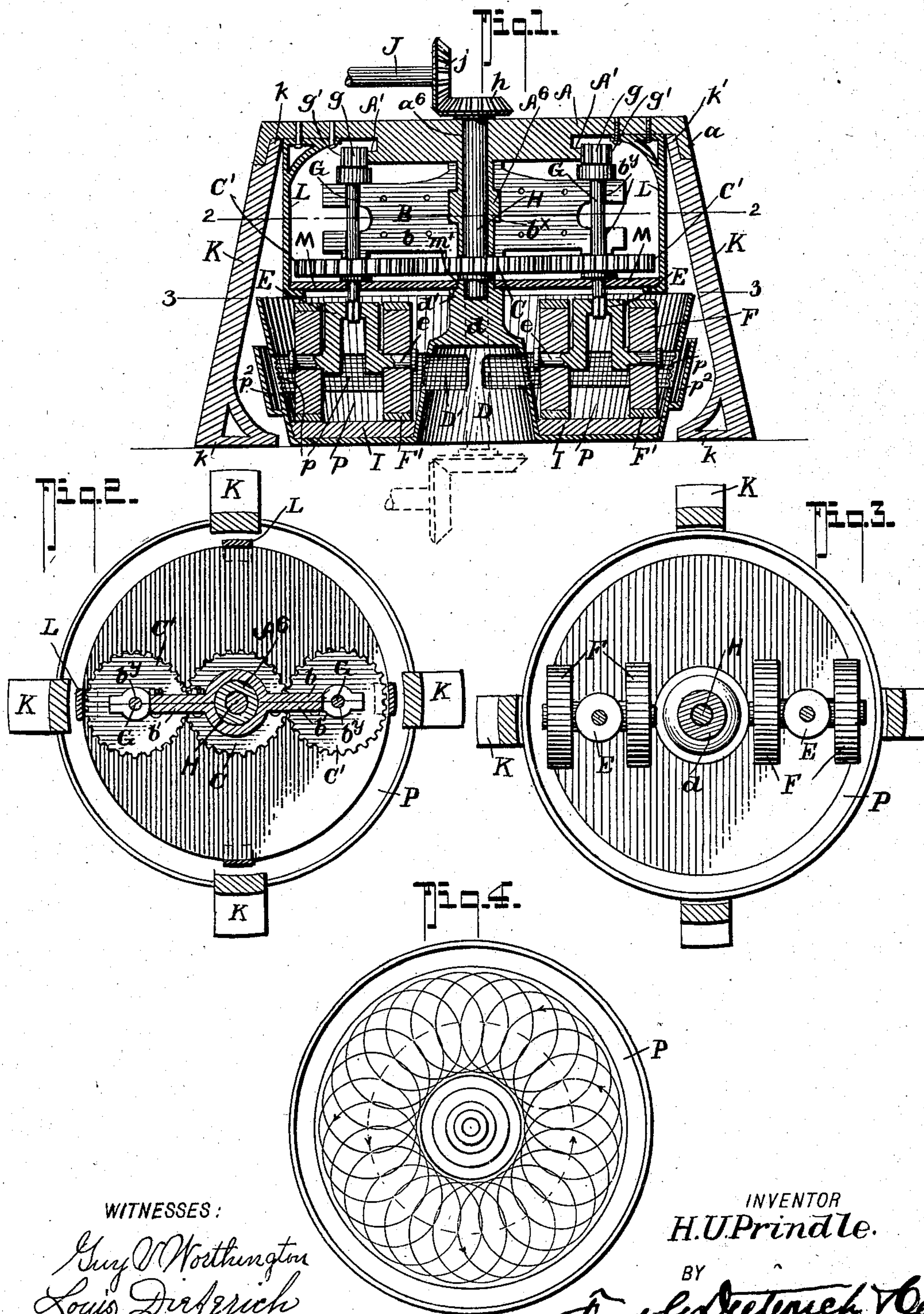
PATENTED FEB. 10, 1903.

H. U. PRINDLE.
CRUSHING MILL.

APPLICATION FILED DEC. 13, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

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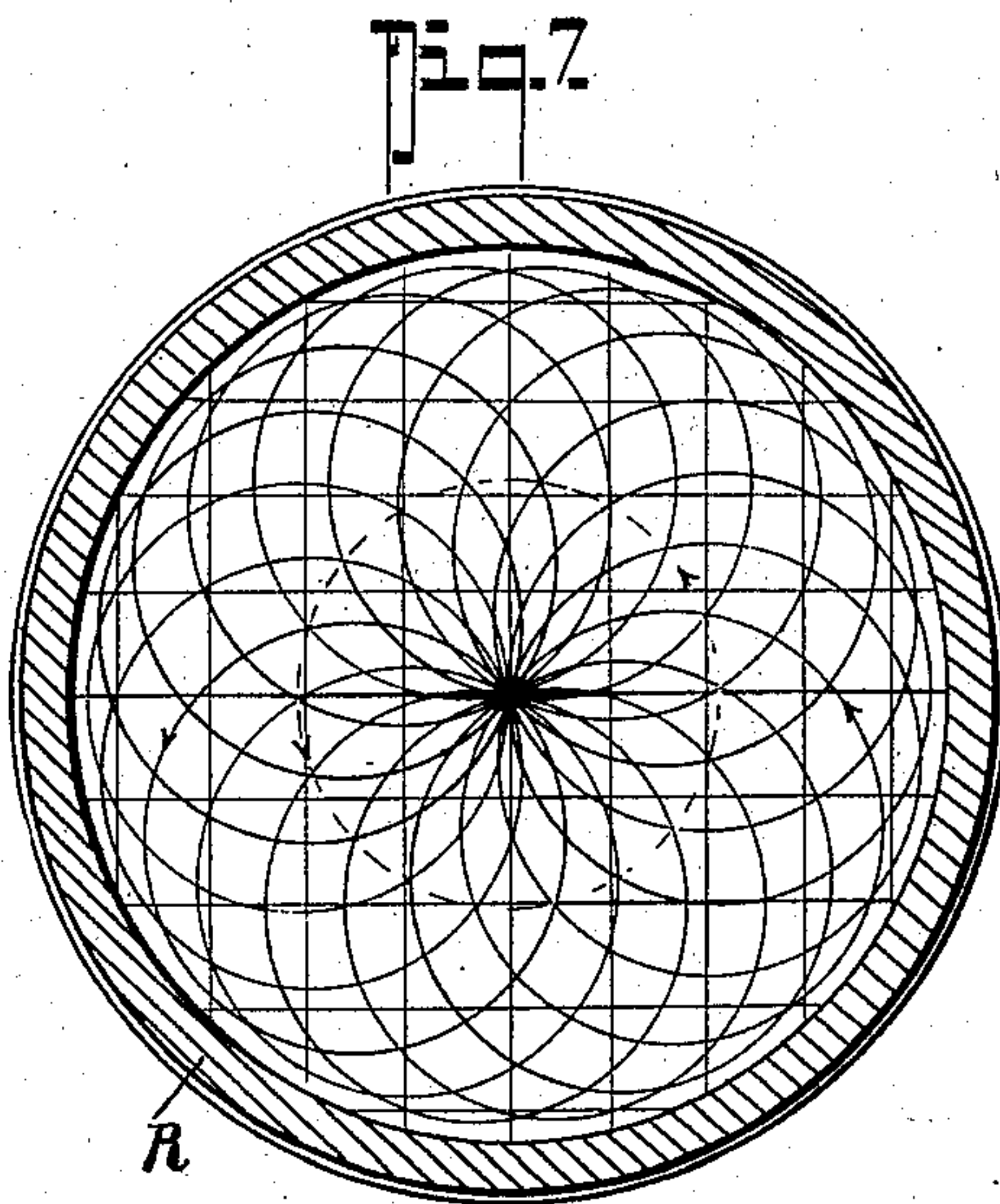
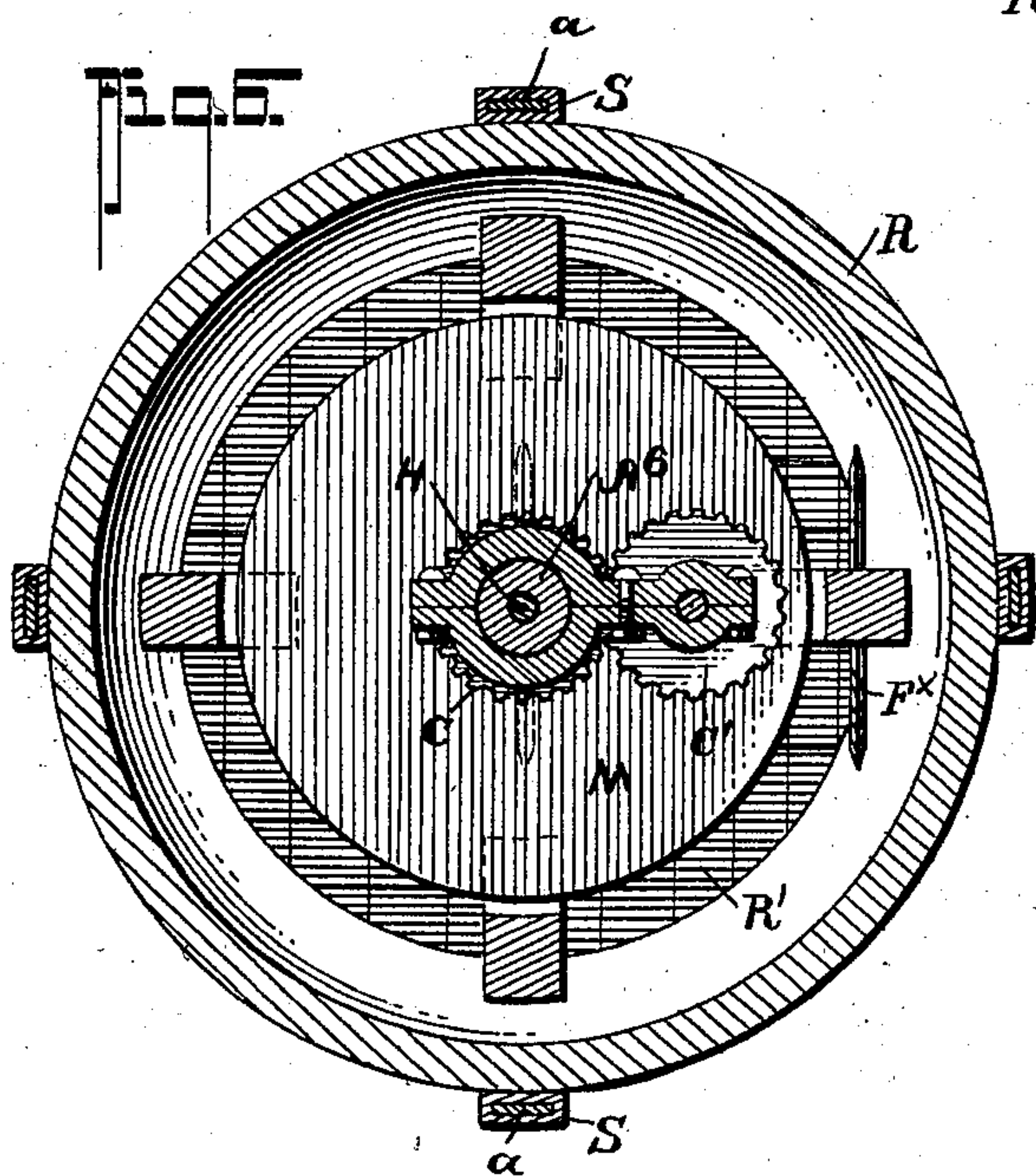
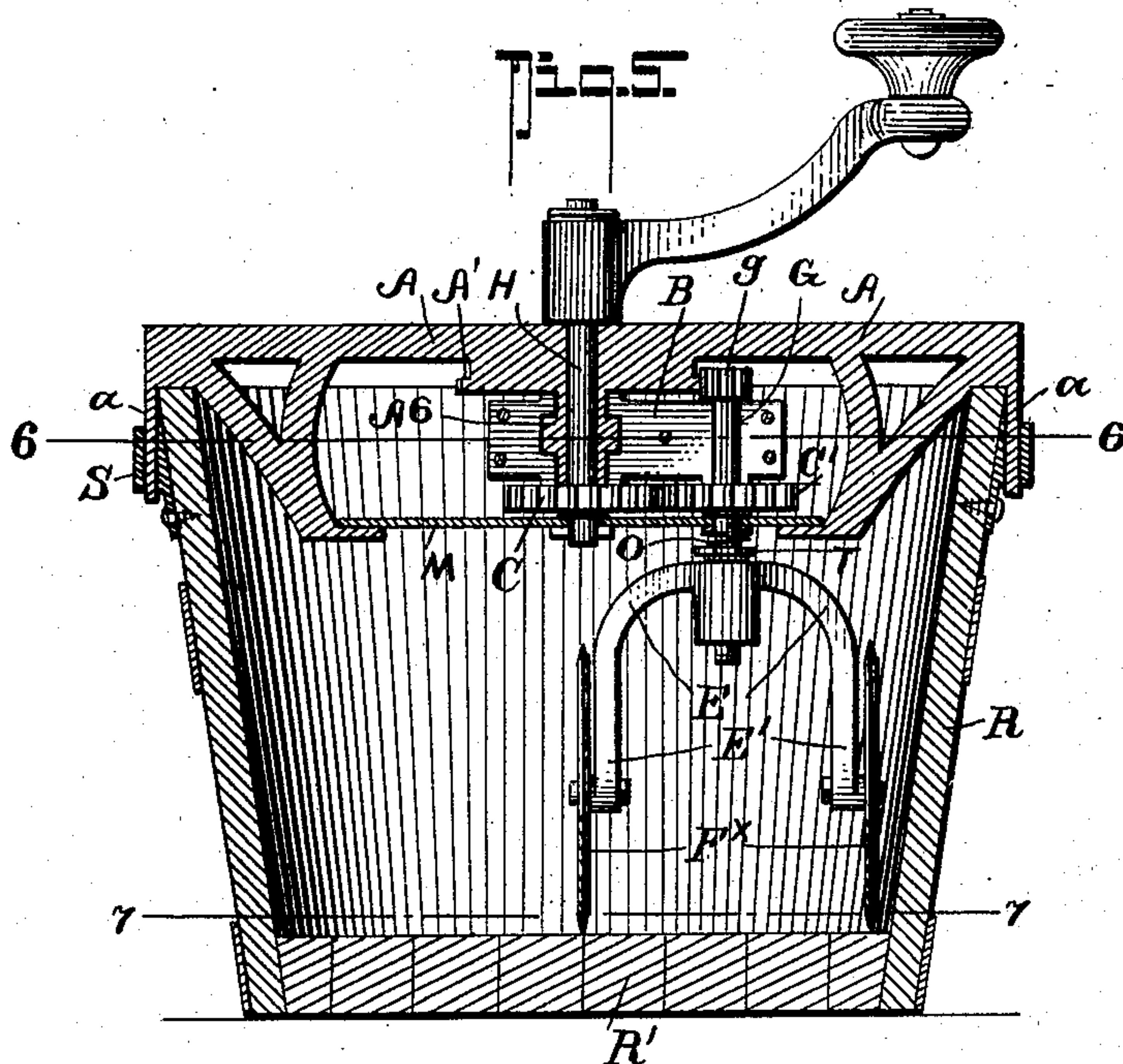
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UNITED STATES PATENT OFFICE.

HENRY URSON PRINDLE, OF SACRAMENTO, CALIFORNIA.

CRUSHING-MILL.

SPECIFICATION forming part of Letters Patent No. 720,480, dated February 10, 1903.

Application filed December 13, 1901. Serial No. 85,821. (No model.)

To all whom it may concern:

Be it known that I, HENRY URSON PRINDLE, residing at Sacramento, in the county of Sacramento and State of California, have invented a new and Improved Crushing-Mill, of which the following is a specification.

My invention relates to improvements in that type of crushing mechanisms in which crushing members are caused to revolve or roll upon a base or tray about a vertical axis, and in the principal application thereof refers more particularly to that type of crushing apparatus technically termed "Chili mills," in which the crushing members operate under a planetary motion.

My invention primarily seeks to provide a mechanism of the character stated of a very simple and inexpensive nature in which the several parts are compactly arranged and capable of effecting a crushing action in an expeditious and effective manner.

My invention in its generic nature comprehends a base or bottom member held with a pan or a cross-head or frame detachably supported thereover, a central rotatable shaft, a bridge member secured to and rotatable therewith and having one or more radially-extending members provided with concentrically-disposed vertical bearings, a vertical shaft supportable within said radially-disposed bearings, rotatable thereon, and crushing devices supported upon the shaft to travel in concentric planes about the central vertical axis rotatable with the shaft upon which they are mounted and having members independently rotatable in a vertical plane.

In its more complete nature my invention comprehends, in connection with the central and concentrically-traveling rotatable shafts and crushing means for each concentrically-disposed shaft, including crushing members rotatable in a vertical plane as they rotate with the shafts upon which they mount and travel around the central axis of the machine, a collecting-pan having screened discharges, a central cone-shaped screened outlet, and deflector devices for incasing the drive mechanism and cutting off communication between the drive-mechanism section and the pan or crushing-section of my machine.

Again, my invention comprehends a novel

arrangement of crushing-pan, a supporting-frame, a rotatable carrier with drive-gearing detachably supported over the pan on the frame, one or more vertically-disposed shafts rotatably mounted on the carrier and having independent rotation and crushing and mincing devices, including members rotatable in a vertical plane and adapted to be connected to said independently-rotatable vertical shafts, whereby my improved mechanism may be adapted for use as an ore-crushing machine or as a mincing apparatus.

In its subordinate features my invention consists in certain novel details of construction and peculiar combination of parts, all of which will hereinafter be fully explained, and specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of my invention, showing the same adapted for use as an ore-crushing mill. Fig. 2 is a horizontal section of the same on the line 2 2 of Fig. 1. Fig. 3 is a similar view on the line 3 3 of Fig. 1. Fig. 4 is a diagrammatic plan view of the pan-bottom, illustrating the path of movement of the crushing members. Fig. 5 illustrates my improvement as adapted for use as a meat-chopper or mincing-machine. Fig. 6 is a horizontal section of the same on the line 6 6 of Fig. 5. Fig. 7 is a diagrammatic section on the line 7 7 of Fig. 5, illustrating the path of movement of the cutting-knives.

In the practical construction of my invention the same embodies a skeleton framework consisting of integrally-joined cross-arms A, having pendent ends *a* to rest upon a supporting-frame, which when my invention is especially adapted for use as an ore-crushing mill consists of a series of inclined supports K, having foot portions *k* and flanged upper ends, as at *k'*, to receive the pendent ends *a* of the cross-arms A, which may be bolted or otherwise made fast to supports K.

Integrally formed with or attached to the cross-arms A is a pendent horizontally-disposed gear-rim A', the purpose of which will presently appear, and centrally the gear portion A' has a pendent central tubular hub A⁶, in which and in the central aperture *a*⁶ in the top frame is rotatably held a drive-shaft H,

the upper end of which carries a bevel-gear *h*, held to mesh with a bevel-gear *j* on a power-shaft *J*, as shown.

Upon brackets *L*, pendent from the cast frame-arms *A A*, to which they are rigidly secured, is loosely supported a cut-off or deflector plate *M*, the purpose of which will hereinafter be further explained, and between said plate *M* and the frame members *A A* is held the rotary carrier and drive-gear mechanism, the peculiar construction of which and correlative arrangement with the main drive-shaft and the independently-rotatable crushing members forms an essential feature of my invention.

The main carrier *B* rotates about the central axis of the machine and in a horizontal plane about the hub *A*⁶. The carrier consists of two half-sections *b b'*, having central bearing portions *b^x* to engage the hub *A*⁶ and end bearing members *b^y* for the supplemental and independently-rotatable shafts *G G*, presently again referred to, and the two sections *b* and *b'* are joined to form a solid member by bolts in any suitable manner—for example, as shown in the drawings.

Upon the lower end of shaft *H* is keyed a drive cog-disk *C*, which meshes with the oppositely-disposed drive cog-wheels *C' C'*, keyed on the supplemental shafts *G G*, the upper end of which (the shafts *G G*) having head portions *g g*, having toothed faces *g' g'*, held to mesh with the gear-rim *A'*, as clearly shown in Fig. 1.

When used as an ore-crusher, the receptacle in which the crushing members are held to travel consists of a dished pan *P*, having screened discharges *p* in the side walls, that empty into an external annular channel *p²*, that discharges at a point above the upper end of the discharges *p*, and the bottom of said pan has a supplemental grinding or crushing surface consisting of removable cast-iron sections *I*, as shown.

Upon the lower end of each shaft *G G* a yoke-frame *E* is held to turn therewith and to have a limited vertical movement thereon, and said yokes have oppositely-projecting spindles *e e*, upon each of which is mounted a crushing-roller *F*, having a steel tire *F'*, adapted to coöperate with the crushing bottom plates *I I*.

So far as described it will be readily apparent to those skilled in the art to which my invention appertains that power being applied to drive shaft *J* the same will impart motion to the shaft *H* and through its gear *C* transmit a rotary motion to the gears *C' C'* on the shafts *G G* and impart an independent rotation thereto, and by reason of the upper toothed ends *g' g'*, that engage the stationary or master gear member *A'*, the shafts *G G* as they are independently rotated are caused to travel around the central axis of the machine, and thereby rotate the carrier or support *B* about the hub *A*⁶, imparting, as it

were, a planetary motion to the shafts *G* and the crushing devices carried thereon, which by reason of the manner in which the crushing-surfaces are attached to the shafts *G G* have an additional motion spirally relatively to their concentric movement over the crushing-base *I*. Thus when motion is imparted to the machine the crushing-rolls *F F* will be caused to travel over the surface in the directions diagrammatically illustrated in Fig. 4, and thereby in a most thorough and effective manner crush all particles held within the pan *P*. As the motion of the crushing-rolls *F F* is such as to throw the auriferous material both toward the outer wall of the pan and toward the center thereof, the pan is formed with a central conical tubular projection *D*, open at the bottom and terminating at the top in a solid head *d*, having an annular seat *d'*, that forms a support for the centrally-apertured edge *m'* of the plate *M*, which prevents splashing or crushed particles flying up onto the drive-gear mechanism, and to allow for the escape of the screenings that are thrown toward the center of the pan the part *D* has screened outlets *D'*, as clearly shown in Fig. 1.

Instead of the drive-shaft *H* being arranged to receive a power-gear at the upper end, as shown in full lines in Fig. 1, said shaft may be extended down through the member *D* and have a power-gear at the bottom, as shown in dotted lines in said Fig. 1.

While my improved crushing mechanism is more especially designed as an ore-crushing mill, it is manifest that with but slight modifications, all within the scope of my invention, the same may be readily adapted for other uses. For example, the same may be used as a means for cutting meats, vegetables, nuts, &c. When thus adapted, but a single crushing or cutting device is used, and the carrier *B* is projected radially from the shaft *H* in one direction only.

The cast frame members in the form of my device illustrated in Figs. 5, 6, 7 project down into sockets *S* on the outside of the supporting means, which in the construction shown is in the nature of a tub *R*, having its bottom *R'* composed of edge grain pieces, as shown. The yoke-frame *E* in the said modified form has its arms *E'* sufficiently spread to cause them to travel close up to the center of the tub, whereby the cutters in the nature of sharp disks *F^x* will traverse the bottom in the manner diagrammatically shown in Fig. 7, and in consequence travel over nearly the entire surface of the bottom. Instead of applying a power-shaft to shaft *H* in the form last described the same may be turned by a crank-handle, as shown.

From the foregoing, taken in connection with the accompanying drawings, it is thought the advantages of my invention will be readily apparent.

It will be noticed the several parts are of

such correlative construction as to admit of their being readily manufactured at a small cost and easily assembled and operated.

When adjusted for crushing or cutting meats, &c., the yoke E is preferably held for a limited yielding movement vertically and held down by means of a coiled spring O, the tension of which may be regulated by the screw-nut T.

By connecting the yokes E to the shafts G in the manner shown allows for the said yokes, together with the rolls F, to rise when the rolls or crushers come into contact with a large or hard particle of the material to be crushed, and in case of the wearing away of the bottom I, the crusher-rolls F and the cutters F^x will be able to keep up an even pressure upon the said bottom by reason of gravitating to a proper contacting position.

While I have shown a tension device for holding the cutter-carrying yoke (see Fig. 5) only, it is obvious the same means may be used for holding the crushing-rolls down against the bottom.

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

1. The combination with a holder for containing the material to be crushed, a frame detachably supportable over said holder, said frame having pendent brackets, and the deflector-plate M supported on said brackets; of the central shaft H, the horizontally-disposed carrier B, rotatable with the shaft H, the shaft G, journaled in the carrier B, the yoke E rotatable with the shaft G, the crusher-rolls mounted on the yoke E for independent rotation, and gear mechanism for joining the shafts H and G, and for imparting a planetary motion to the shaft G with its support E, as set forth.

2. In an apparatus as described, the combination with a holder having screened outlets in its side walls, and an axially-disposed screened outlet; of a holder, a frame detachably mounted on said holder, the centrally-mounted shaft H, the carrier B, held to turn therewith and projected in opposite directions therefrom the shafts G mounted on the ends of said carrier, yoke-frames E one on each shaft G, the rollers F mounted on the yoke E, and the gear connections joining the shafts G G, with the drive-shaft, all being arranged substantially as shown and described.

3. The combination with the supports K, the holder having a central conical upwardly-extending portion D, and having screened outlets in its outer walls and also the walls of its central conical portion D; of the frame A detachably held on the supports K, said frame having a pendent annular toothed rim, the brackets L, pendent from the frame A, the deflector M, supported thereon, the central drive-shaft H, the drive-gear C secured thereto, the sectional carrier B rotatable with the shaft H, the shafts G journaled in the opposite ends of the carrier, said shafts having gear-heads adapted to engage the annular pendent toothed rim of the frame A, a gear on each of the shafts G, held to mesh with the drive-gear C, the yoke-frames E on the lower end of each shaft G, said frames E having stub-axles, the rollers F, one on each of the stub-axles and means for imparting motion to the shaft H, all being arranged substantially as shown and for the purposes described.

HENRY URSON PRINDLE.

Witnesses:

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J. C. SOMERSETT.