No. 895,850. PATENTED AUG. 11, 1908.

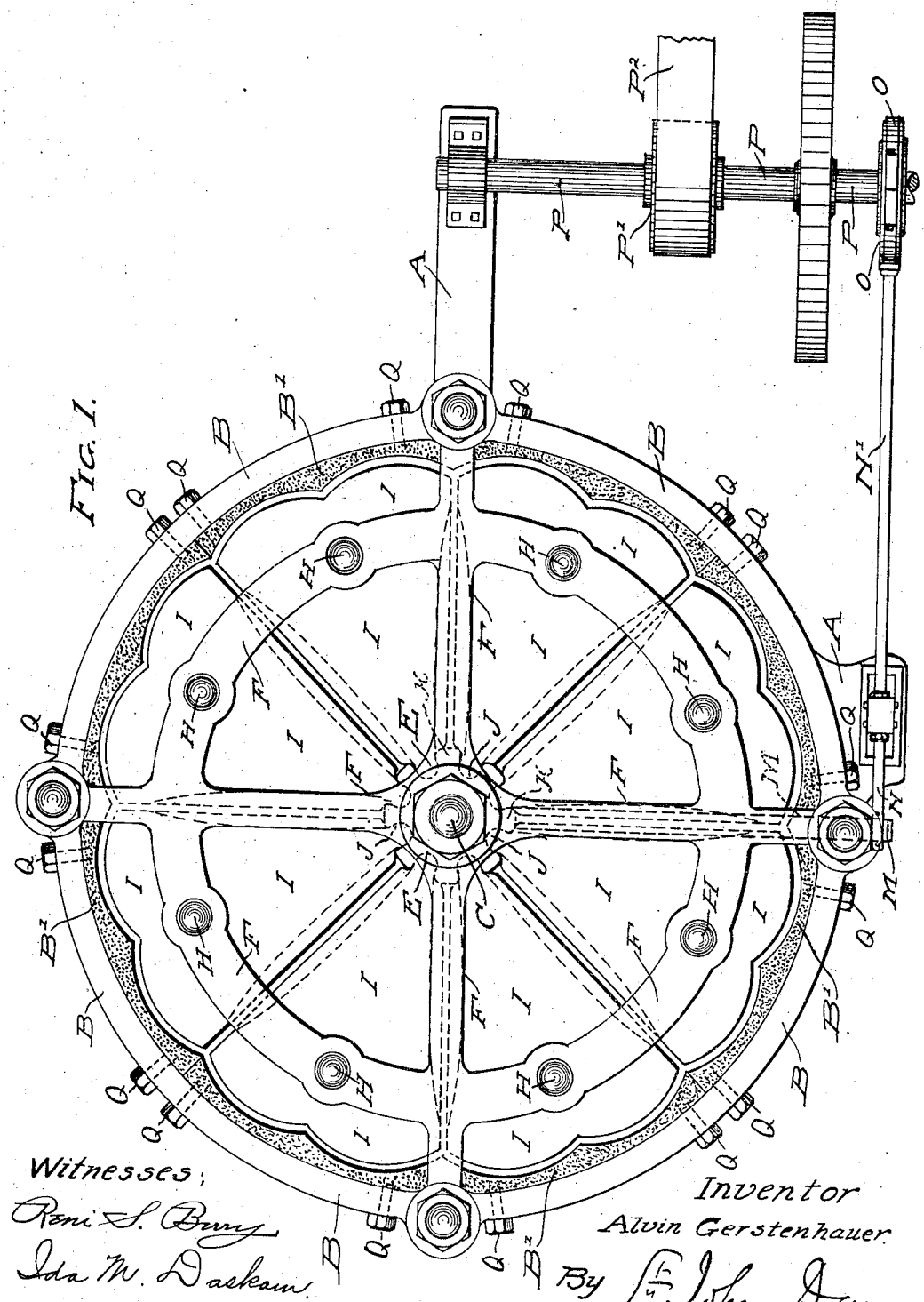
A. GERSTENHAUER.

MECHANISM FOR SPLITTING, BREAKING, OR PULVERIZING ROCKS OR ORES.

APPLICATION FILED MAR. 15, 1906.

3 SHEETS—SHEET 1.

FIG. 1.



Witnesses;
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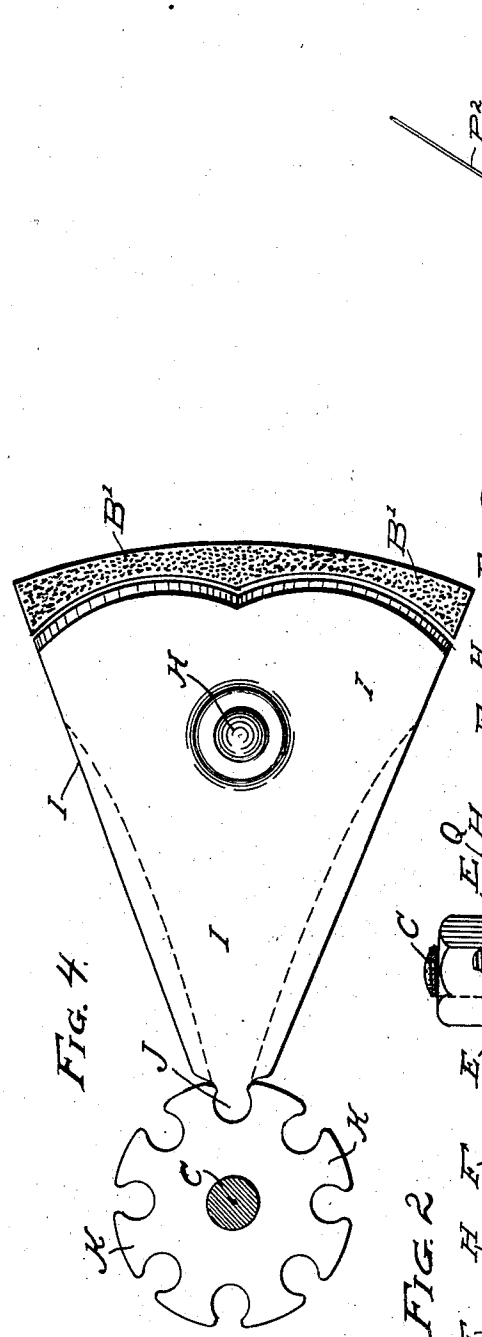


FIG. 4.

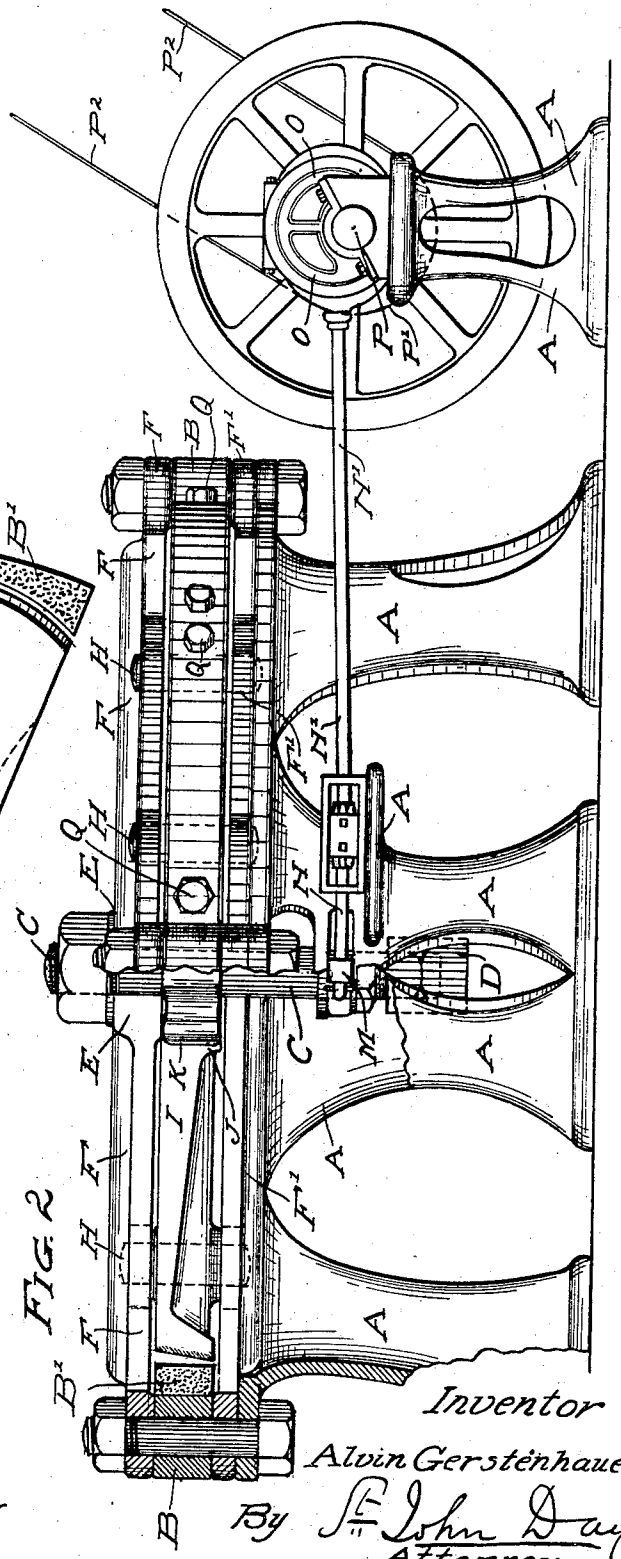


FIG. 2.

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3 SHEETS—SHEET 3.

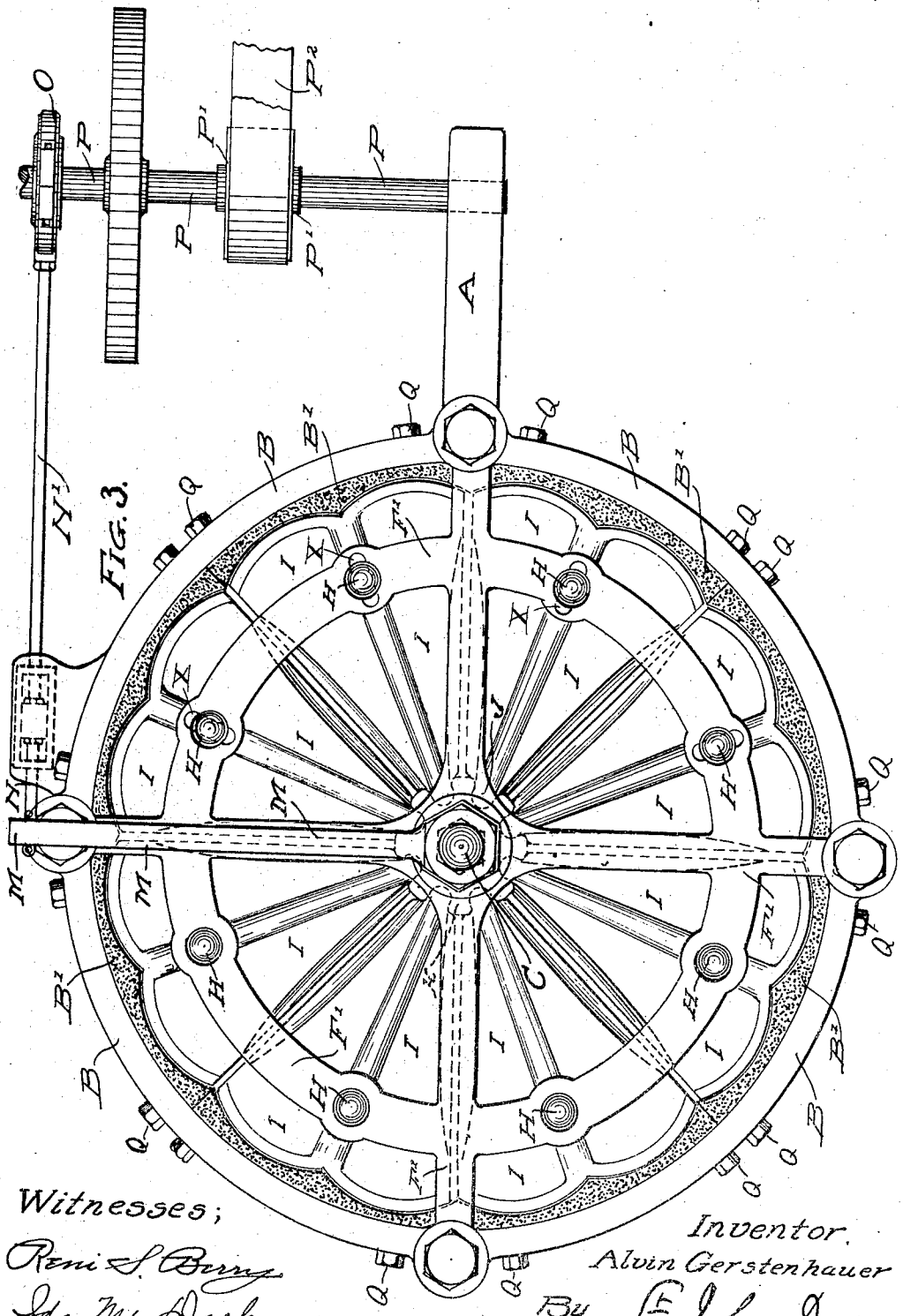


FIG. 3.

Witnesses;
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Ida M. Daskam.

Inventor.
Alvin Gerstenhauer
By F. John Day.
Attorney.

UNITED STATES PATENT OFFICE.

ALVIN GERSTENHAUER, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO JOHN A. SPENCER AND ONE-THIRD TO GEORGE R. TUCKER, OF LOS ANGELES, CALIFORNIA.

MECHANISM FOR SPLITTING, BREAKING, OR PULVERIZING ROCKS OR ORES.

No. 895,850. Specification of Letters Patent. Patented Aug. 11, 1908.

Application filed March 15, 1906. Serial No. 306,288.

To all whom it may concern:

Be it known that I, ALVIN GERSTENHAUER, of the city of Los Angeles, in the county of Los Angeles, in the State of California, have invented certain new or Improved Mechanism for Splitting, Breaking, or Pulverizing Rocks or Ores, of which the following is a full, clear, and exact description or specification, reference being had to the annexed sheets of drawings and to the letters and figures marked thereon.

My present invention relates to that class of mechanism for splitting, breaking and pulverizing rocks and ores wherein the splitting, breaking and pulverizing action is produced by means of the rock, stones and ores being allowed to pass through inclined spaces. The rock, stone or ore to be split, broken, crushed, or pulverized enters into the uppermost, that is to say, the broadest parts of these inclined spaces, and as the splitting, breaking, crushing and pulverizing operations take place by the movable parts of the mechanism operating upon the pieces of rock, stone and ores within these inclined spaces, the rock, and ores descend or pass through the inclined spaces as the fragments become smaller and smaller by the repeated action of the movable parts of the mechanism upon the rocks, stones or ores as they descend, so that the rock, stone or ore leaves the inclined spaces in the state or condition of being as small as can easily pass through the narrowest part of the said spaces.

Each segment of the machine constituting my invention consists of a pivotally movable, somewhat triangularly shaped crushing portion mounted upon a pivot having the outer end of the approximately triangular portion near to the circumference of the container wherein the outer portions of the crushing surfaces are firmly held, and in proximity to which the crushing surfaces of each approximately triangular crushing block each of which is carried upon the aforesaid pivots is vibrated through a short distance so as to move in proximity to the stationary crushers, and at the same time vary the distance between the crushing surfaces at each vibration of the triangular block. By arranging a series of the aforesaid triangular crushing blocks upon pivots mounted in a circular foundation, and by connecting the inner ends of the triangles to the spaces between the teeth of a pinion constructed as hereinafter described, the vibration of such pinion sets the whole of the aforesaid triangular crushing blocks in vibration by the said pinion being mounted upon a vertical central shaft which is set into vibration by an eccentric upon the driving shaft of the machine, the said eccentric being connected by an eccentric strap and rod to a lever of the requisite length connected to the central vertical vibratory shaft. The foundation upon which the hereinbefore described mechanism is carried, is by preference made with openings therein through which the crushed rock, stone or ore passes into a suitable receptacle placed below the foundation after the crushing operation has taken place.

Any desired number of hoppers are, or may be placed above the top of the vibrating crushers, so arranged as to discharge the rocks, stones or ores placed in them above and into the inclined spaces of the crushing parts of the mechanism. In this manner different materials may be operated upon in the mechanism at one and the same time, while by setting the triangular vibrating crushing blocks at different gages under different hoppers, split, broken or crushed rock and ore may be delivered from the machine simultaneously.

Upon the annexed drawings Figure 1, is a plan of the machine for splitting, breaking, and pulverizing rocks, stones, and ores, constituting my present invention. Fig. 2, is a vertical section and part elevation of the same. Fig. 3, is an inverted plan of the said machine. Fig. 4, is a detailed plan on an enlarged scale of the upper face of one of the triangular crushing blocks and the pinion operating them.

With reference to Figs. 1, and 2, of the drawings, the portion thereof marked A, represents the foundation, and the part marked B, projecting vertically upwards above the foundation represents the circumferential annulus or wall wherein the outer segmental surfaces B′, of the splitting, breaking, crushing and pulverizing parts of the mechanism are carried.

At the center of the mechanism there is the vertical vibrating shaft C, which is mounted by preference by its lower end resting in a footstep bearing D, while its upper end is carried in a bearing E, forming the central

part of a spider F, by the inner ends of which spider the bearing E, is carried and permanently maintained in its central position by reason of the outer arms of the spider being connected as shown to the casting B, constituting the circumferential walls and foundations of the mechanism.

Equi-distant from the central or vertical axis of the foundation of the mechanism, there are held into the foundation ribs of the spider F′, Figs. 2, and 3, a series of pivots H, upon each of which a triangular crushing block I, is mounted, so as to be capable of horizontal vibratory motion thereon. For the purpose of maintaining the triangular crushing blocks I, continuously in their operative position upon the pivot H, each pivot H, is preferably driven tight into each block I. This arrangement also provides that the under part of each triangular crushing block I, is kept down to operate smoothly and firmly upon the lower spider F′, of the machine. The inner end or toe J, of each triangular crushing block I, is entered into one of the spaces between two of the teeth of the pinion K, so that as the pinion K, is vibrated or reciprocated through a small angle backwards and forwards in the manner hereinafter described, a corresponding motion is imparted to the toe of each triangular crushing block I, which vibratory movement is in a corresponding ratio imparted to the double curved inclined outer end of each triangular crushing block I, so that the double curved triangular crushing block I, is vibrated with continuous alternating approach towards, and withdrawal from the corresponding fixed curved surfaces of the outer crushing spaces or segments of the machine. The vibratory movement of the central pinion K, is attained by mounting it rigidly upon the vertical shaft C. Upon the shaft C, there is mounted the arm M, whose outer end is coupled by the eccentric rod N, to the eccentric strap N′, embracing the eccentric O, carried upon the rotating shaft P. The rotating shaft P, has keyed upon it the driving pulley P′, which is rotated continuously by an endless belt P^2, at the velocity requisite for producing the necessary movement of the vibrating crushing blocks I, and accordingly as the continuous rotation of the driving shaft P, is thus produced, so the continuous rotation of the eccentric O, is maintained, and therefore the continuity of reciprocating motion of the eccentric rod coupled to the lever M′, is also maintained, whereby a continuous vibration of the shaft C, and pinion K, imparts corresponding continuous vibrations to each of the crushing blocks I.

Should it happen that any temporary break down of the crushing parts of the mechanism should take place whereby one or more than one of the vibrating triangular crushing blocks are placed out of operation this will not affect the serviceability of the machine from performing its operation, saving and excepting that as one or more of these crushing blocks are rendered accidentally or otherwise inoperative, the machine would split, break, crush or pulverize a proportionately smaller amount of rock, stone or ore.

For the purpose of rendering the possibility of any clogging of the machine constituting my invention, by the rock, stone or ore operating upon, with or by it, the parts situated between the upper surface of the triangular crushing blocks and the lower or foundation surface are more or less inclined downwards and inwards, while for the purpose of enabling the rock, stone, or ore to be treated in the said machine being fed thereto with a maximum facility, the upper part of each triangular crushing block in the neighborhood of its inclined tapering edges is slightly inclined downwards for the purpose of rendering the feeding of the material to be treated to the crushing surface as easily as possible.

I claim as my invention—

1. A crushing machine comprising supports, an upper and a lower spider secured to said supports, an annulus having an inner crushing surface supported by said spiders, sectoral blocks pivoted in said spiders, said blocks provided with crushing faces opposed to said annulus, and means for oscillating said blocks.

2. A crushing machine comprising supports, an upper and a lower spider secured to said supports, an annulus having an inner crushing surface supported by said spiders, sectoral blocks pivoted in said spiders, said blocks provided with crushing faces opposed to said annulus, a vertical shaft journaled in said spiders, mechanism connecting the inner ends or toes of said blocks to said shaft, and means for rocking said shaft and simultaneously oscillating said blocks.

In testimony whereof, I have hereunto set my hand in the city of Los Angeles aforesaid, in the presence of two witnesses.

ALVIN GERSTENHAUER.

Witnesses:

ST. JOHN DAY,

J. D. CORY.