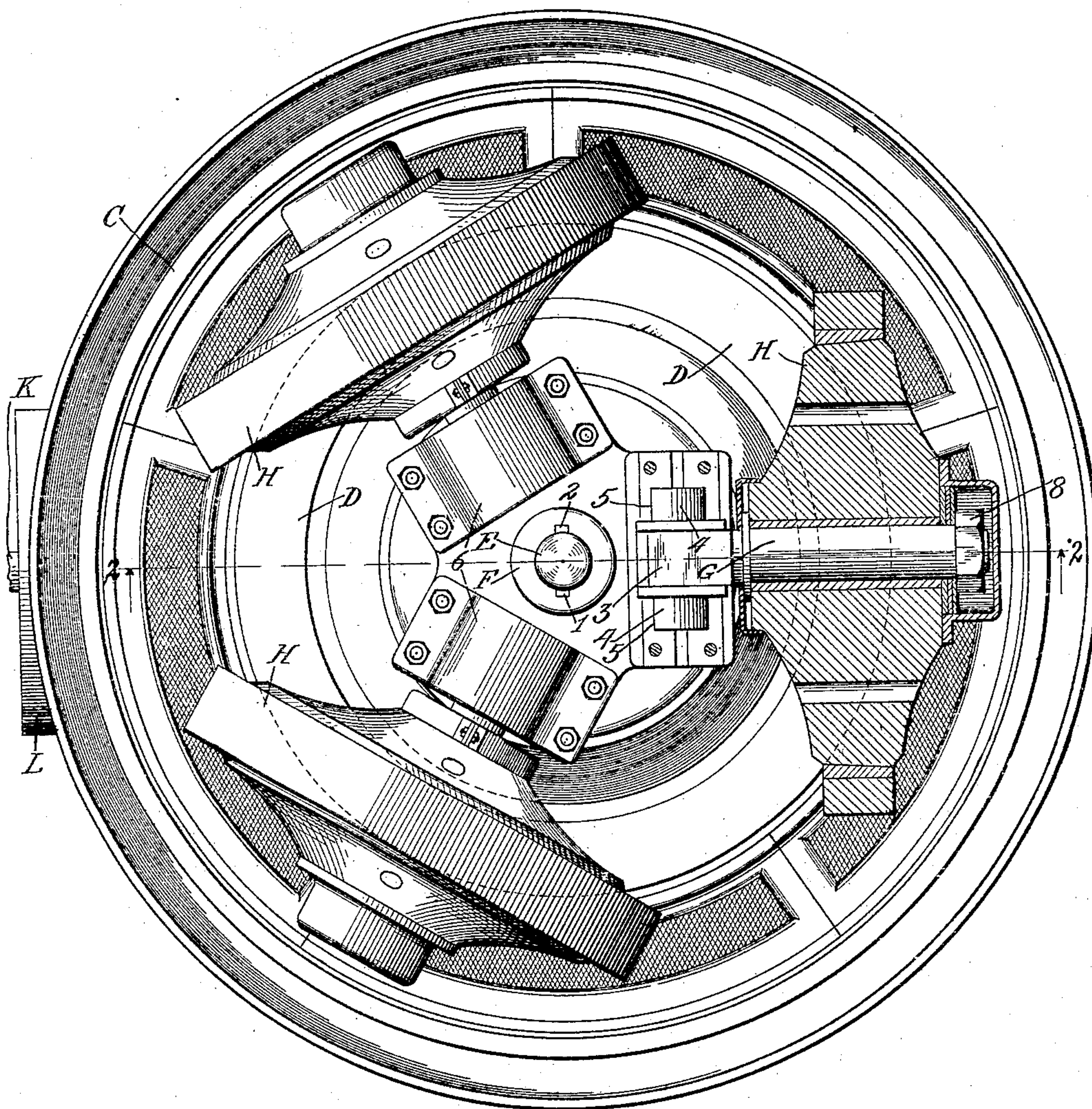


W. B. EASTON.  
CHILIAN MILL.  
APPLICATION FILED APR. 25, 1907.

Patented Aug. 17, 1909.  
2 SHEETS—SHEET 1.

931,186.

*Fig. 1.*



*Witnesses:*

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*Inventor:*

*William B. Easton*

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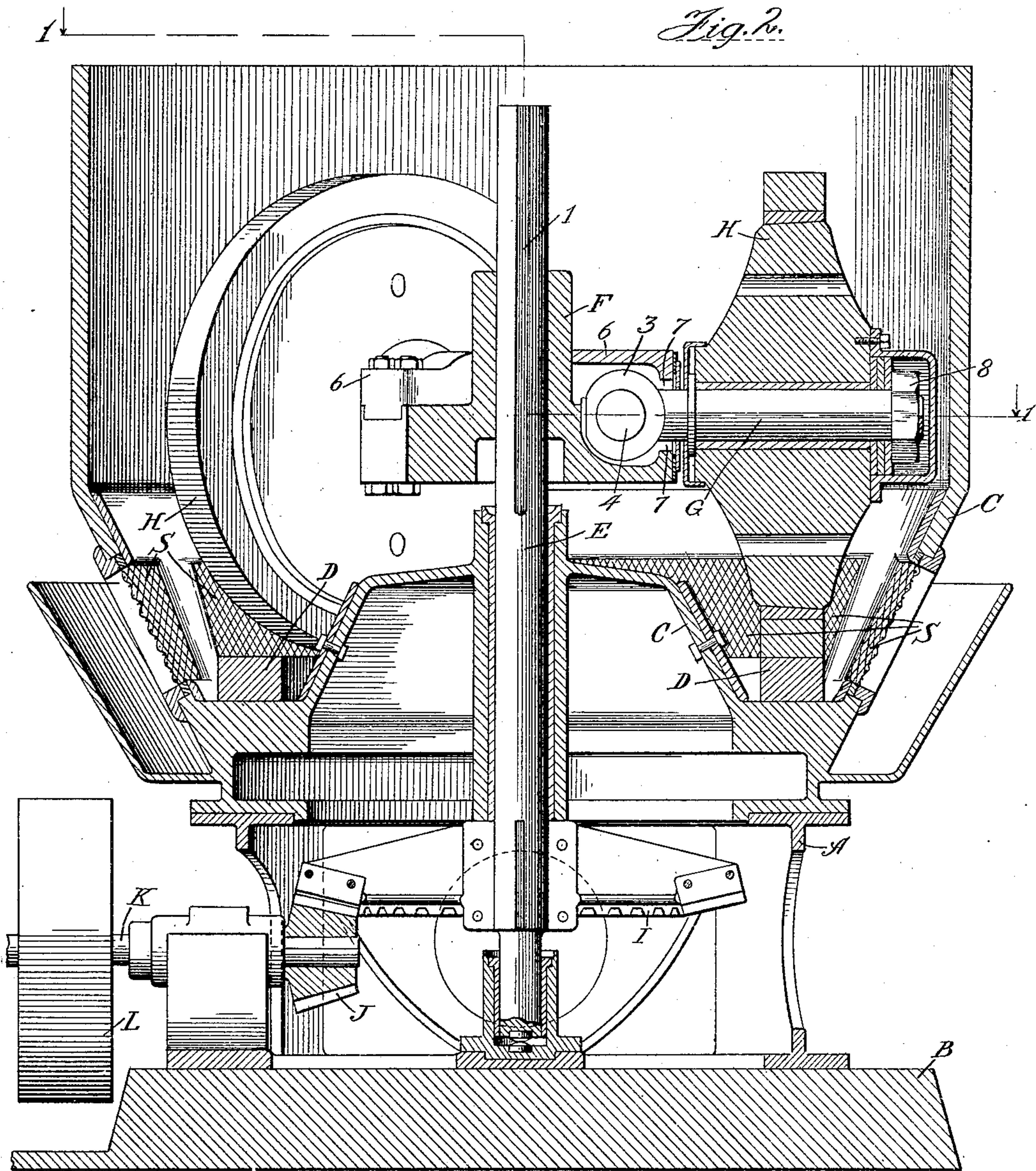
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# UNITED STATES PATENT OFFICE.

WILLIAM B. EASTON, OF CHICAGO, ILLINOIS.

## CHILIAN MILL.

No. 931,186.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed April 25, 1907. Serial No. 370,326.

*To all whom it may concern:*

Be it known that I, WILLIAM B. EASTON, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Chilian Mills, of which the following is a specification.

This invention relates to rock and ore crushers, and particularly to that type of secondary crushers known as Chilian mills and comprising an annular pan or basin having a circular track therein, an upright driving shaft mounted in bearings concentric with said track, a driving head or spider secured to rotate with said shaft, stub-axes projecting laterally from said spider substantially at right angles to said driving shaft, and crushing rollers revolubly mounted on said stub-axes so as to rest and roll upon the circular track within the pan or basin.

In the improved mill of this type constituting the present invention, the centrifugal action of the crushing rolls is balanced against the gravity of a floating driving head to which the axles of the rolls are individually and pivotally secured, the vertical movement of the floating head and rolls being unrestrained except by their connections with each other.

In the accompanying drawings, in which my invention is fully illustrated,—Figure 1 is a top plan view of a Chilian mill of my invention, certain parts thereof, not essential to illustrate the invention, being omitted; and Fig. 2 is a sectional elevation on the line 2—2 of Fig. 1.

Referring now to the drawings, A designates the frame of the mill, which, as shown, is supported upon a suitable base or foundation B, C the pan or basin in which the ore to be crushed is contained, D a circular track at the bottom of said pan or basin, E an upright shaft mounted in suitable bearings in the mill frame concentric with the track D, F a head or spider secured to rotate with said driving shaft, G stub-axes on said head or spider F, and H the crushing rollers revolubly mounted on said stub-axes, which rest and in operation run upon the circular track D.

The shaft E is herein shown as driven in the following manner: Secured to the driving shaft adjacent to its lower end, is a bevel gear I, with which meshes a pinion J secured to rotate with a shaft K adapted to

be driven from any suitable source of power, not shown, by means of a belt applied to a driving pulley L secured to said shaft.

As regards their general features, all of the foregoing members are old and well known in the art and, excepting as hereinafter particularly described, may be of any usual or desired construction and will be readily understood by persons skilled in the art without a more detailed description thereof.

In the present improvement the driving head or spider F is splined (as at 1 and 2) to the driving shaft E, so as to rotate therewith, but is left free to move or float up and down said shaft, supported only by its connection with the stub-axes of the crushing rollers H. These axles, in turn, are secured to the driving head or spider by knuckle joints, the axes of which are substantially horizontal, so that said axles are free to swing independently in vertical planes, but are constrained to rotate horizontally with the driving spider and shaft. The crushing rollers H are journaled upon these stub-axes G and rest with all their weight upon the track D, so that when moved along said track by the rotation of the driving head or spider connected to the stub-axes, the rollers will tend to crush by their weight whatever material is fed upon the track in advance of them. Any usual or convenient means (not herein illustrated), for feeding this material into the machine, may be provided, and when sufficiently reduced, it will find its way out of the machine through screens S, in a manner well understood, but these features form no part of the present improvement.

In the particular construction shown, the knuckle joints between the stub-axes and the floating spider are provided by forming said stub-axes with heads 3 having opposite trunnions 4 which engage suitable bearings 5 formed in the head or spider F. To provide for assembling the parts, the trunnion bearings 5 are shown as provided with removable caps 6, and the stub-axes project from these trunnion bearings through suitable holes or openings 7 in the outer sides of the bearings, these holes being made sufficiently larger than the axles to permit of their desired angular movement in vertical planes and relatively to the driving head. The rollers H are shown as secured to the stub-axes G



by nuts 8 having screw threaded engagement with the ends of said axles outside of said rollers, and to prevent access of dirt and grit, the exposed joints are protected by means of suitable caps, as will be readily understood from an inspection of the drawings.

In the operation of the improved construction of Chilian mill thus described, the several rollers H will be held to the shaft to rotate therewith by the floating driving head or spider, which will automatically assume its correct position vertically of the driving shaft according to the condition of the machine and the conditions under which the machine is operated. If the rolls and track are new, the floating head will be relatively high on the shaft and may be lifted still higher by the accumulation of material upon the track beneath the rollers, but as the tires of the rollers and the track wear down, the floating head will automatically settle accordingly, and it will settle in the same manner whenever the mass of material between the rolls becomes less or offers less obstruction to the track. At the same time, each roll, by reason of its independent knuckle joint connection with the driving head, will be free to move up and down independently of the other rolls, in case any extraordinary obstruction too refractory to be crushed by the roll becomes accidentally interposed between the track and roll.

The tendency of the spider to settle down on its shaft and tip the rolls inwardly at their tops, will be counterbalanced by the centrifugal force which the rollers will exert in the form of a direct outward pull on the stub-shafts, which pull, acting about the contact points of the rolls with the track as a fulcrum, will serve to lift and maintain the spider at such an elevation as will keep the stub shafts substantially horizontal.

It will be observed that a feature of importance lies in the fact that applicant's construction is exceedingly simple and strong and very durable. It will be noted that the pivots of the stub-axles consist of integral trunnions formed directly on the inner extremities of the axles and that these trunnions are journaled in bearing boxes arranged tangentially to the vertical shaft, these boxes being formed half in the upper

surface of the head and half in the cap plates. This construction provides for a direct and strong connection between the axles and the head and enables the axles to be driven directly from the head and with the least possible strain on the pivots so as to thereby give the crushing wheels the maximum freedom of vertical movement. By thus forming the pivots directly on the inner ends of the axles and in confining them upon the upper side of the head it will be observed that the structure is rendered very simple and easily assembled, while, at the same time, by reason of the enlarged openings in the boxes the axles have ample vertical movement.

I claim—

1. In a crushing mill, the combination with a circular track and an upright driving shaft located centrally thereof, of a floating driving head mounted to slide vertically upon said shaft but secured to rotate therewith, axles pivotally secured to said driving head and crushing rolls journaled upon said axles and running upon said track, the centrifugal action of said rolls serving to counterbalance the gravity of the floating head and the vertical movement of said head and rolls being unrestrained except by their mutual reactions, substantially as described.

2. In a crushing mill, the combination with a circular track, an upright driving shaft located centrally thereof, a floating driving head mounted to slide vertically upon said shaft but secured to rotate therewith, transverse trunnion bearings on said head and stub axles having lateral trunnions on their inner ends mounted in the tangential trunnion bearings of the head and crushing rolls journaled on said stub axles, the centrifugal action of said rolls serving to counterbalance the gravity of the floating head, and vertical movement of said head and rolls being unrestrained except by their mutual reactions, substantially as described.

In testimony, that I claim the foregoing as my invention, I affix my signature in presence of two subscribing witnesses, this 13th day of April, A. D. 1907.

W. B. EASTON.

Witnesses:

K. A. COSTELLO,  
M. V. McGRATH.