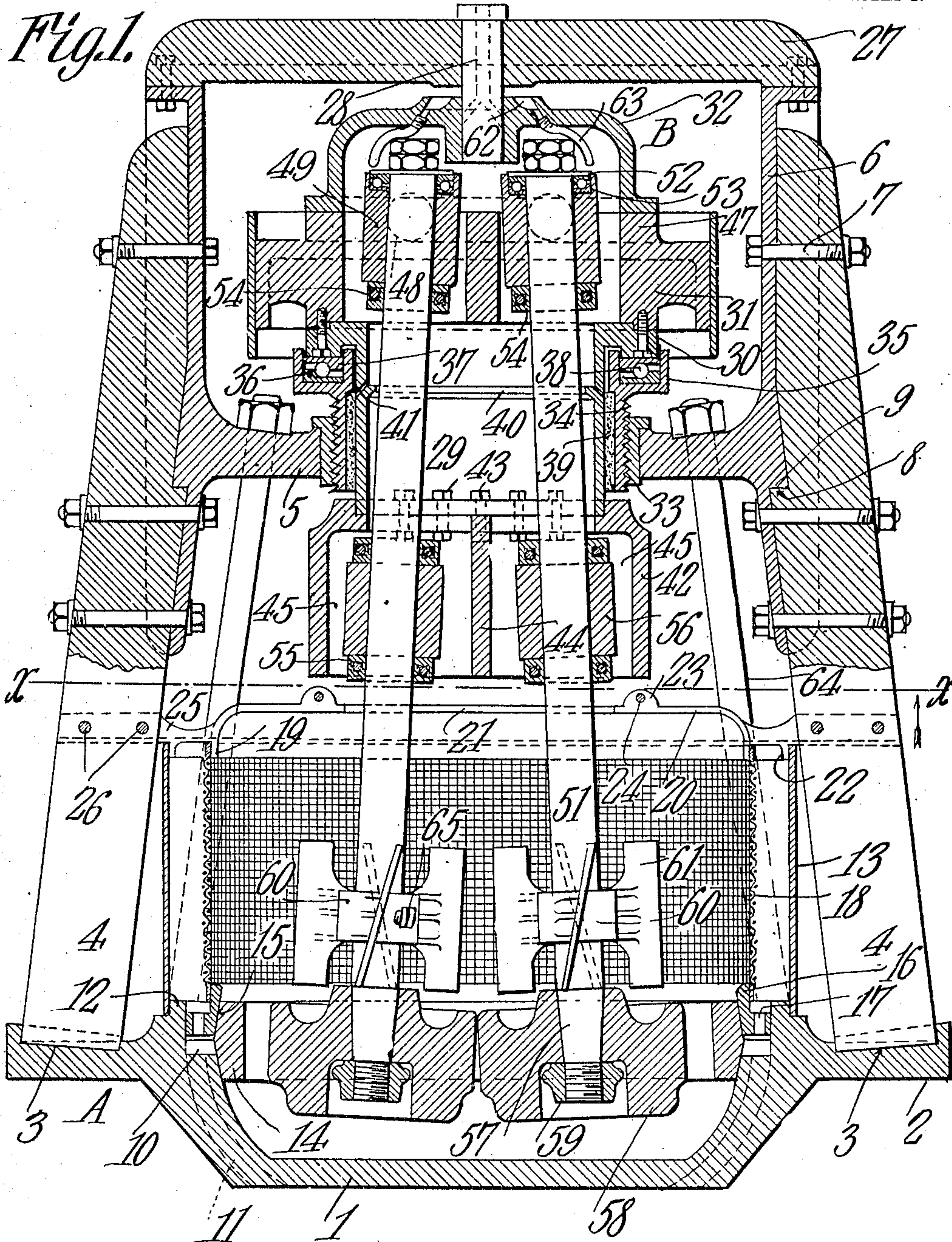


No. 872,201.

PATENTED NOV. 26, 1907.

G. E. RUDNICK.  
PULVERIZING MILL.  
APPLICATION FILED MAY 16, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

*E. H. Stewart*  
*Robert D. Lawson*

*George E. Rudnick,* INVENTOR.

By *Chas. Snow & Co.*  
ATTORNEYS



No. 872,201.

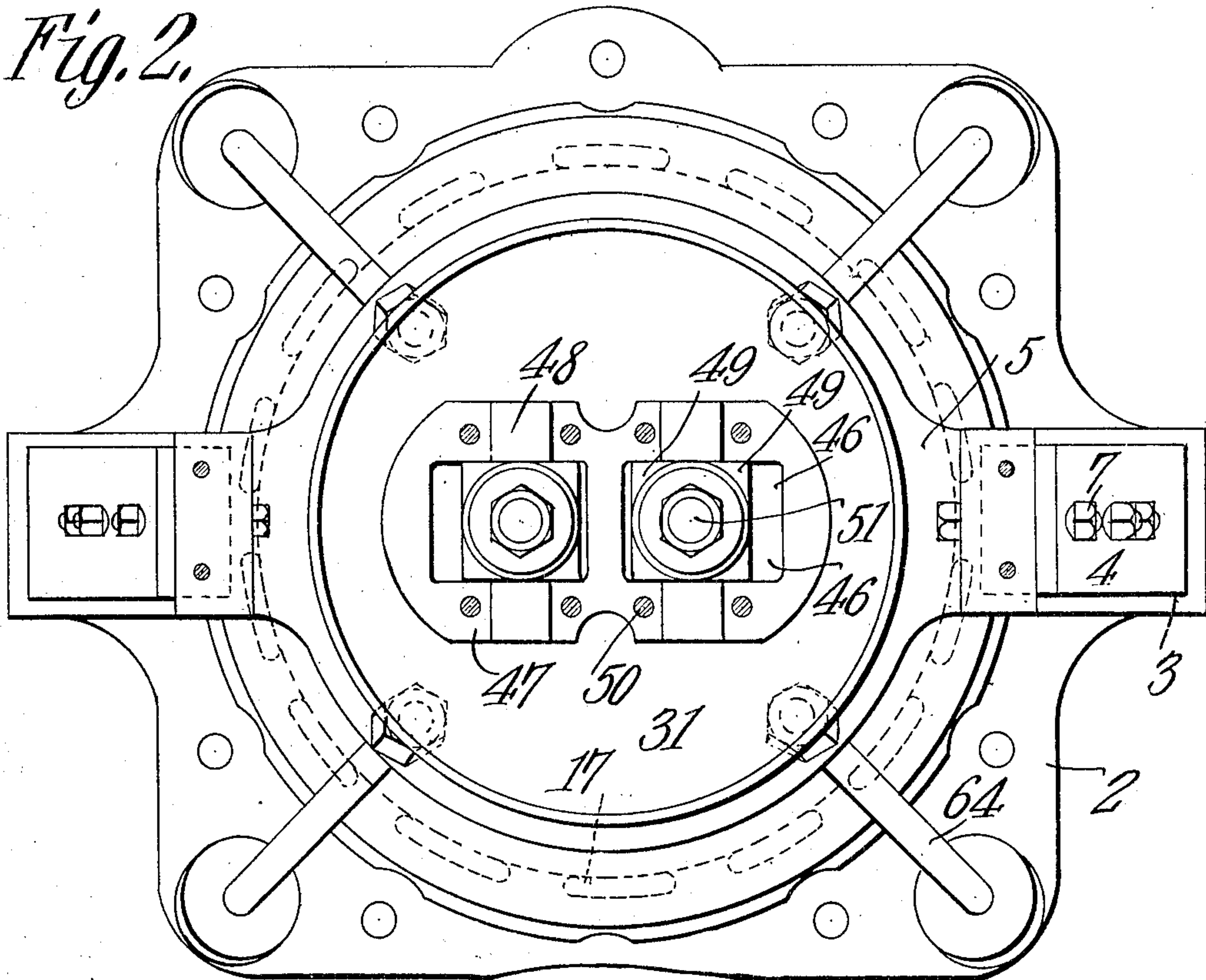
PATENTED NOV. 26, 1907.

G. E. RUDNICK.  
PULVERIZING MILL.

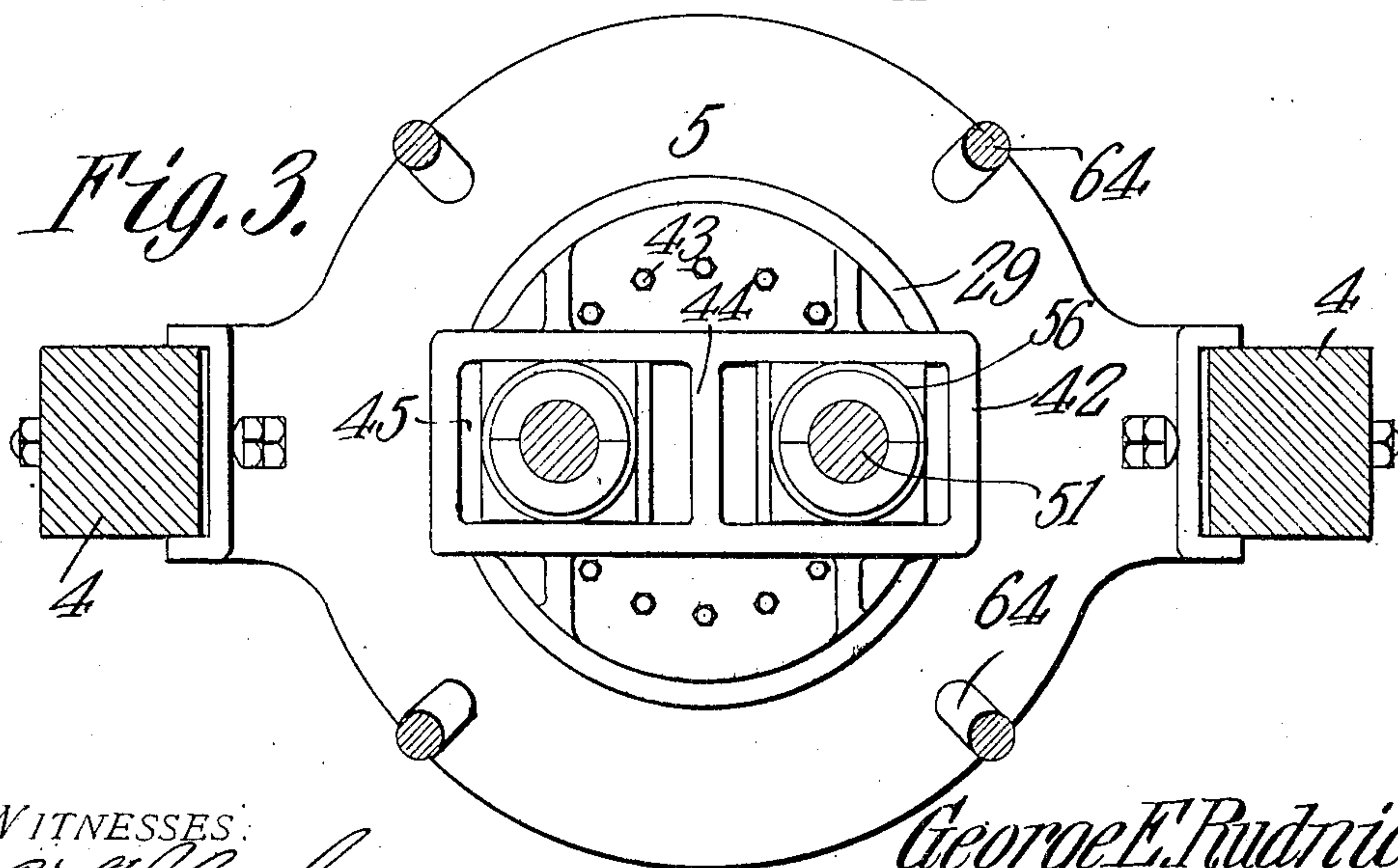
APPLICATION FILED MAY 16, 1907.

2 SHEETS—SHEET 2.

*Fig. 2.*



*Fig. 3.*



WITNESSES:

*E. J. Stewart*  
*Robert D. Lawson*

By

*George E. Rudnick,*  
INVENTOR.

*C. A. Snow & Co.*

ATTORNEYS



# UNITED STATES PATENT OFFICE.

GEORGE E. RUDNICK, OF IOLA, KANSAS.

## PULVERIZING-MILL.

No. 872,201.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed May 16, 1907. Serial No. 373,890.

*To all whom it may concern:*

Be it known that I, GEORGE E. RUDNICK, a citizen of the United States, residing at Iola, in the county of Allen and State of Kansas, have invented a new and useful Pulverizing-Mill, of which the following is a specification.

This invention relates to pulverizing mills of that character utilizing centrifugally operated crushing rollers and the object of the invention is to provide simple and efficient means whereby the roller shafts can be suspended from the driving element in such a manner as to be free to swing outwardly during the operation of said element, thereby bringing the rollers into frictional engagement with the stationary grinding die.

Another object is to provide means revoluble with the driving element for limiting the oscillatory movement of the roller shafts.

A still further object is to provide means whereby the dust produced within the mill will be kept down during the grinding operation.

A still further object is to provide simple and efficient means for adjusting the bearings of the mill so that wear thereon will be readily taken up.

Another object is to simplify and improve the general construction of devices of this character and to increase the efficiency thereof.

With these and other objects in view the invention consists of certain novel features of construction and combinations of parts which will be hereinafter more fully described and pointed out in the claims.

In the accompanying drawings is shown the preferred form of the invention.

In said drawings: Figure 1 is a central vertical section through the pulverizing mill constructed in accordance with the present invention; Fig. 2 is a plan view thereof, the top bearing and cap of the mill being removed; and Fig. 3 is a section on line  $x-x$ , Fig. 1.

Referring to the figures by characters of reference, A designates the base of the mill, the same consisting of a basin 1 constituting a grinding compartment and surrounded adjacent its upper edge by a flange 2 of suitable contour which is adapted to be fastened upon a suitable supporting structure, not shown. Oppositely disposed sockets 3 are formed within the flange 2 and within each of them

is seated the lower end of an inclined standard 4. As shown in the drawings preferably two of these standards are employed and interposed between the upper portions of these standards is a ring 5 having boxes 6 formed upon the periphery thereof at diametrically opposite points and which embrace and are bolted or otherwise secured to the standards as shown at 7. Each of the standards is preferably formed with a shoulder 8 designed to engage a corresponding projection 9 within one of the boxes 6 so that the ring will be rigidly supported by the standards and the bolts will be relieved of transverse pressure.

The basin 1 is formed with an interior annular groove 10 adjacent the upper edge thereof, from which extends outlet passages 11. These passages extend through the wall of the basin and are designed to discharge thereunder any material which may be directed into the annular groove 10. A circular flange 12 extends upward from the basin adjacent the groove 10 and is surrounded by a cylindrical casing 13.

Fitting snugly within the upper portion of the basin is a die ring 14 the upper portion of the outer face of which is inclined as shown at 15 and designed to be surrounded by a wedging ring 16. This ring is formed with a plurality of arcuate slots 17 through which material is designed to pass into the groove 10 and passages 11. A cylindrical screen 18 fits snugly around the wedging ring and is spaced from the casing 13. Projecting into the upper end of the screen is a circular flange 19 formed upon the lower face of a cap 20 having a large circular opening 21 in the center thereof and also formed with a depending circular flange 22 designed to fit snugly within the upper end of the casing 13. Cap 20 is preferably formed of two similar oppositely disposed members only one of which has been shown in Fig. 1 and these members are formed with ears 23 designed to be fastened together by means of bolts such as disclosed at 24. Each member also has an arm 25 radiating therefrom and these arms are designed to be clamped upon opposite faces of the standards 4 by means of bolts 26. It is obvious that the ring 16 serves to tightly bind the die ring 14 within the upper portion of the basin 1 so that displacement thereof during the grinding or pulverizing operation is prevented.

Secured upon the upper ends of the boxes



6 is a cross head 27 through the center of which extends a trunnion 28. This trunnion constitutes a bearing for the driving member B of the mill. This member comprises a  
 5 central bearing sleeve 29 having an annular flange 30 surrounding its upper end and bolted or otherwise secured to a drive pulley 31 provided with a removable cap 32 into the center of which projects the trunnion 28.  
 10 An adjusting nut 33 is mounted to rotate within the ring 5 and the threads therein engage threads formed upon a ring 34. This ring is provided at its upper end with a circular channel 35 in which is fitted a wear ring  
 15 36. Another wear ring 37 is arranged upon the lower face of the flange 30 and is disposed within channel 35 and interposed between the two rings are balls 38 which serve to receive the weight of the driving member and  
 20 reduce the friction to the minimum. Suitable packing 39 may be interposed between sleeve 29 and ring 34 and an interior annular rib 40 is preferably formed within the sleeve and serves to direct oil into ducts 41 opening  
 25 between the sleeve and the ring 34. A skirt 42 is bolted or otherwise fastened to the lower end of sleeve 29 as shown at 43 and, as disclosed in Fig. 3 of the drawings, this skirt is rectangular and divided by means of a central transverse partition 44 into two com-  
 30 partments 45.

By referring particularly to Fig. 2 of the drawings it will be noticed that the pulley 31 has a pair of rectangular openings 46 sur-  
 35 rounded by a boss 47 and bearing upon opposite portions of the boss are trunnions 48 extending from boxes 49 disposed to swing within the openings. The cap 32 is designed to be secured upon the boss in any preferred  
 40 manner as by means of bolts 50 and this cap serves to retain the trunnions in proper position. Revolvably mounted within each of the boxes is a shaft 51 provided at its upper end with a head 52 designed to bear upon the  
 45 bolts 53 supported upon the upper end of the box. A split collar 54 is clamped upon each shaft directly below the box 49 thereof so as to prevent upward movement of the shaft within the box. Obviously the ball bearings  
 50 receive the entire weight of the shafts and the parts carried thereby, and friction between the parts is reduced to the minimum. The shafts extend through the compartments 45 and skirt 42 and each shaft is pro-  
 55 vided with two split collars 55 which are located within the skirt and loosely mounted on each shaft and between the collars 55 is a box 56 and these boxes are designed to reciprocate within the compartments 45 when the  
 60 shafts are swung.

The lower end of each shaft is preferably tapered as shown at 57 and carries a grinding roller 58 which may be fastened thereon in any suitable manner as by means of a  
 65 jam nut 59. A sleeve 60 is secured in any

desired manner upon each shaft and above the grinding roller and radiating from each sleeve are inclined blades 61 so disposed that when they are rotated with the shaft 51 they will create a downward current of air for the  
 70 purpose of preventing dust from rising within the mill.

A circular groove 62 is preferably formed within the cap 32 and extending from this groove are lubricating tubes 63 disposed to  
 75 convey oil from the groove to points directly above the bearings 53. The ring 5 hereinbefore referred to is preferably braced by means of rods 64 extending therefrom at opposite sides of the standards and secured in  
 80 any suitable manner to the flange 2.

The pulley 31 and the parts connected thereto are designed to be driven by a belt or other flexible drive element receiving motion from a motor of any preferred form and  
 85 when this pulley is rotated it is obvious that the sleeve 29 and skirt 42 will also be revolved therewith. The ball bearings 38 will receive the weight of the rotating member B while the trunnion 28 will serve to center  
 90 said member and prevent vibration. As the speed of rotation increases the shafts 51 will be swung outward by centrifugal force, the trunnions 48 acting as pivots therefor and the boxes 56 sliding within the respective  
 95 compartments 45. The rollers 58 will therefore be brought into contact with the die ring 14 and as they are moved thereover they will be caused to rotate and will produce a corresponding movement of the fan blades 61.  
 100 As heretofore stated these blades will direct a current of air downward into the basin and prevent the dust from rising. The material contained within the basin will therefore be thoroughly ground or pulverized and any  
 105 portion thereof passing through the screen 18 will be free to escape through the openings in the ring 16 and through the passages 11. By detaching the two members of the cap 20 and unfastening them from the stand-  
 110 ards 4 the cap can be readily removed from above the screen 18 and its casing 13. Each sleeve 60 can be adjusted longitudinally of the shaft 51 and secured at a desired distance from the bottom of the basin by means of a  
 115 set screw 65 or in any other preferred manner. The rotation of the parts can be reversed by removing the sleeves 60 and reversing them so as to continue to create a downward air current when the shafts 51 are  
 120 rotated. The boxes 56 should also be reversed as it is designed to line only the driving half of each box and to pack the other half with waste for lubricating purposes. It will be seen that the entire mill is very  
 125 rigid and compact and that it will be very efficient in operation. The bearings can be readily reached for the purpose of adjusting or repairing them and the entire machine can be very easily assembled.  
 130



What is claimed is:

1. In a pulverizing mill the combination with a base constituting a basin, a die ring within the basin, and a cylindrical screen 5 surrounding and upstanding from the ring; of a revoluble bearing sleeve, means for supporting the same above the basin, a driving element connected thereto, a skirt depending from the sleeve, boxes mounted to oscillate 10 within and rotate with the driving element, shafts journaled within and depending from said boxes, said shafts being free to oscillate within the sleeve and skirt, boxes surrounding the shafts and bearing within the skirt, 15 grinding rollers carried by the shafts and disposed to cooperate with the die ring.

2. In a pulverizing mill the combination with a base constituting a basin, a die ring therein, and a cylindrical screen upstanding 20 from the basin and surrounding the ring; of a supporting ring above the screen, standards connecting the ring and basin, a sleeve revolvably mounted within the ring, a driving element connected to the sleeve, boxes 25 mounted to oscillate within and to rotate with the driving element, shafts journaled within and depending from the boxes, said shafts being disposed to oscillate within the sleeve and extending into the basin, and

rollers secured to the shafts and disposed to 30 cooperate with the die ring.

3. In a pulverizing mill the combination with a base constituting a basin, a die ring secured within the base, and a screen upstanding from the base and surrounding the 35 ring; of standards, a ring supported thereby and above the basin, a sleeve revolvably mounted within the ring, a driving element secured to and revoluble with the sleeve, a 40 skirt secured to and revoluble with the sleeve, oscillatory shafts movable with and mounted to rotate within the driving element, said shafts extending through the sleeve and skirt, rolls secured to the shaft and 45 disposed to cooperate with the die ring, guide boxes surrounding the shafts, said boxes being disposed to reciprocate within the skirt, and fan blades revoluble with the shafts for directing dust toward the bottom 50 of the basin.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEO. E. RUDNICK.

Witnesses:

DAN. F. SERVEY,  
M. W. TEATS.