J. L. TERWILLIGER.

MILL.

APPLICATION FILED JULY 30, 1908.

921,911. **Patented May 18, 1909.**

3 SHEETS—SHEET 1.

Fig. 1.

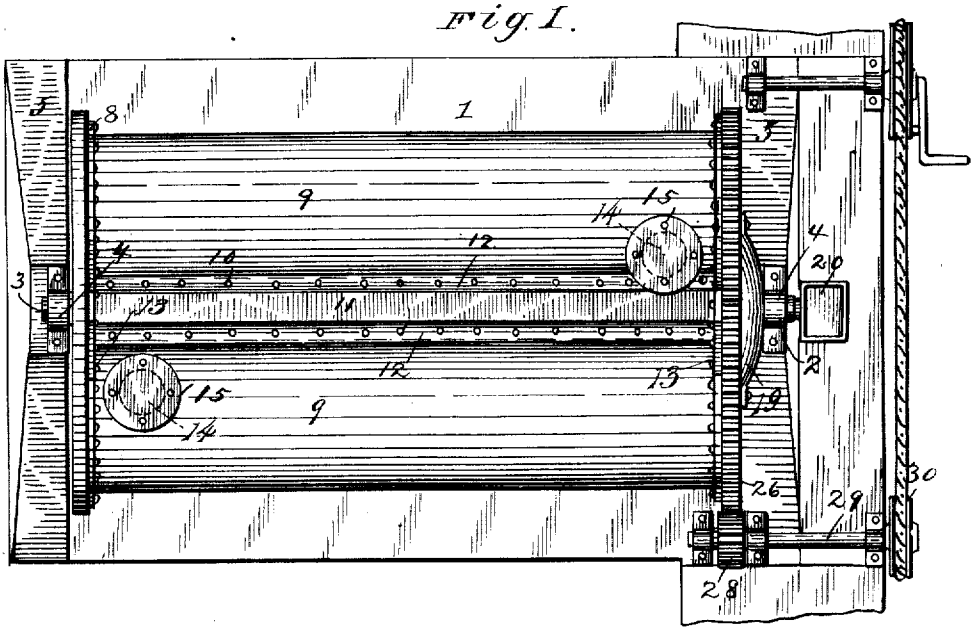
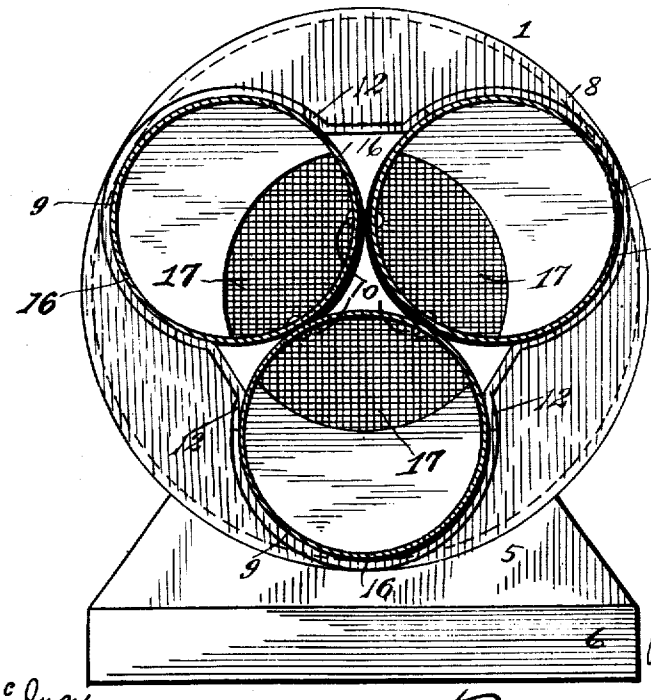


Fig. 5.



Witnesses

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3 SHEETS—SHEET 2.

Fig 2.

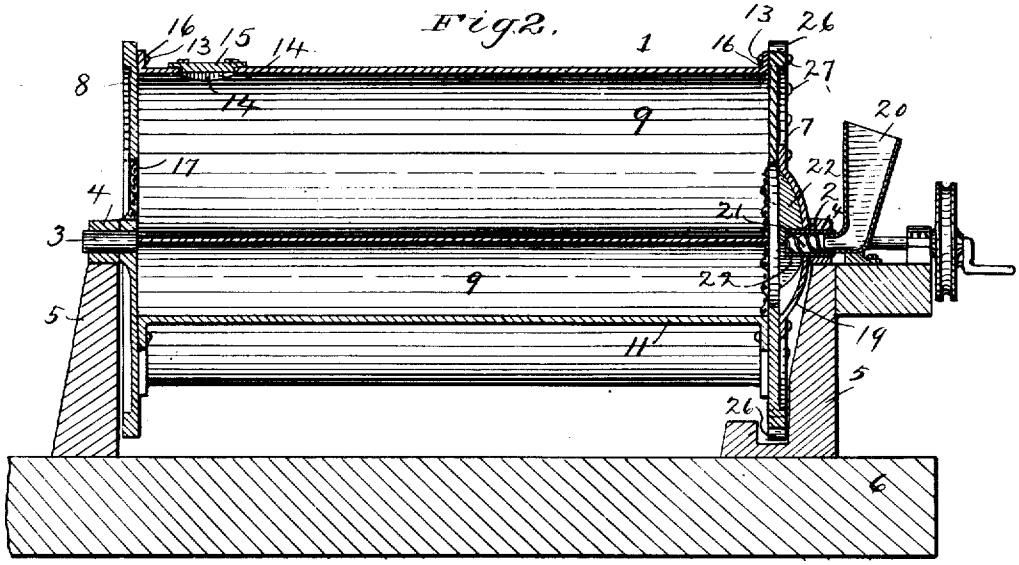
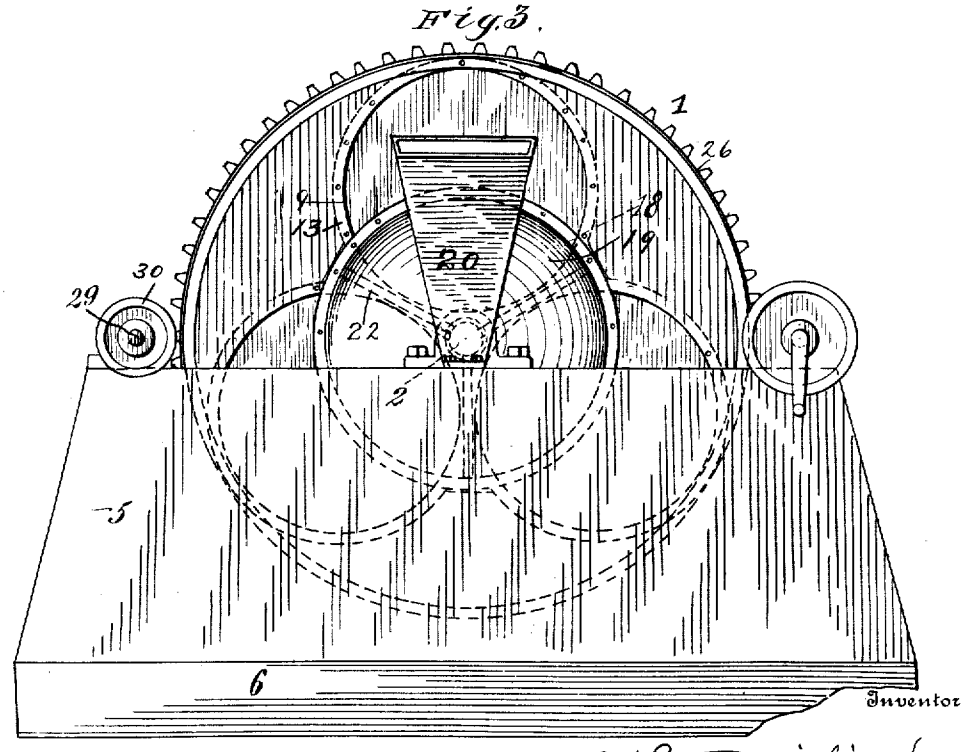


Fig 3.



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3 SHEETS—SHEET 3.

Fig. 4.

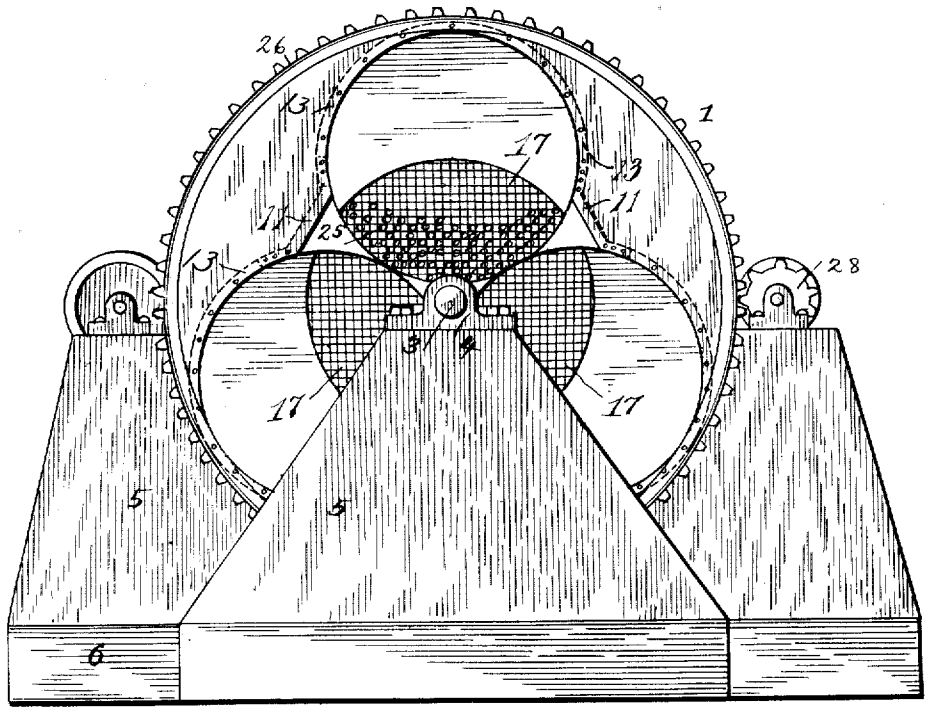


Fig. 7.

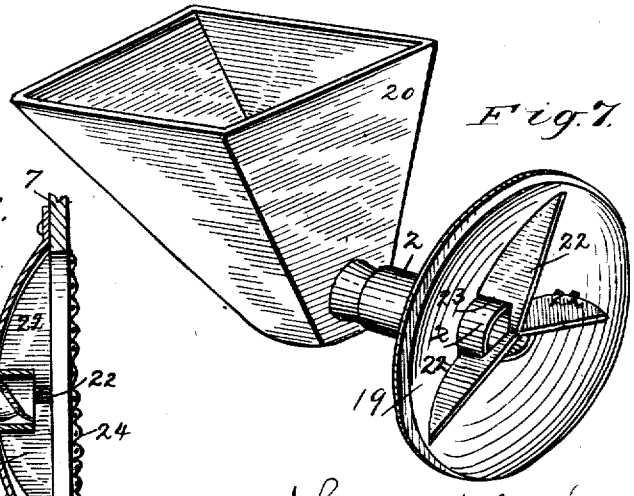
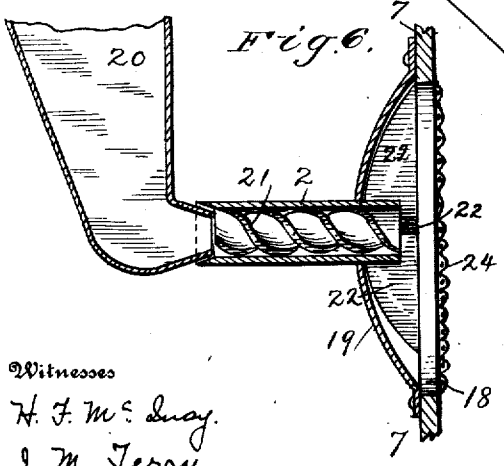


Fig. 6.



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UNITED STATES PATENT OFFICE.

JUBAL L. TERWILLIGER, OF FLORENCE, COLORADO.

MILL.

No. 921,911. Specification of Letters Patent. Patented May 18, 1909.

Application filed July 30, 1908. Serial No. 446,186.

To all whom it may concern:

Be it known that I, JUBAL L. TERWILLIGER, a citizen of the United States, residing at Florence, in the county of Fremont and State of Colorado, have invented certain new and useful Improvements in Mills, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in mills for grinding and pulverizing ore, cement and the like.

The object of the invention is to provide a mill of this character which will be simple and practical in construction and effective in accomplishing its intended purpose.

With the above and other objects in view, the invention consists of the novel features of construction and the combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the improved mill; Fig. 2 is a vertical longitudinal section; Figs. 3 and 4 are end views of the rotary body; and Fig. 5 is a transverse section. Fig. 6 is a detail vertical section through the lower end of the hopper and the inlet to the mill; and Fig. 7 is a detail perspective of the parts shown in Fig. 6.

The mill comprises a rotary body 1 disposed horizontally and having at its ends trunnions 2, 3 mounted for rotation in bearings 4 upon uprights 5 rising from a suitable base 6. The body 1 comprises two ends or heads 7, 8 between which are secured three cylindrical tubes 9. A greater or less number of the tubes 9 may be provided and they are arranged in contact with each other and secured together by rivets or the like 10 at their points of contact and also by longitudinally extending brace straps or plates 11 the edges of which are bent angularly to provide flanges that are riveted, as shown at 12, to the tubes 9. This construction effectively unites the tubes 9 and the latter are securely united to the heads 7, 8 by forming the ends of the tubes with radial flanges and riveting said flanges, as shown at 13, to the heads. Suitable man-holes 14 may be provided in the tubes 9 and closed by covers 15 which may be bolted or otherwise removably secured in position. The head 8 is located at the discharge end of the body and is formed with openings 16 of less size than the internal diameter of the tubes 9 and said openings are closed by screens 17 of comparatively fine mesh. The head 7 at the inlet end of the body is formed with a large concentric opening 18 covered by a concavo-convex or funnel-shaped cap 19 in which the trunnion 2 is concentrically arranged. Said trunnion 2 is hollow and of cylindrical form and serves as an inlet for the three tubes 9, which latter form three longitudinal compartments in the body.

The ore, cement or other material to be pulverized is fed to the tubular trunnion 2 by depositing the same in a hopper 20, the reduced lower end of which receives said trunnion; and such material is fed through the latter by providing upon its inner wall a spiral flange 21, as clearly shown in Fig. 6 of the drawings. In order to divide the material passing through the tubular trunnion 2 into three equal parts so that each of the tubes or compartments 9 will receive an equal amount, three radially projecting division plates or blades 22 are arranged in the cap or plate 19. Said plates 22 radiate from the longitudinal axis of the body and are disposed between the adjacent tubes 9, their outer edges being notched, as shown at 23, to receive the projecting inner end of the trunnion 2. Said divisional plates divide the space or chamber within the cap 9 into three compartments each of which is in communication with one of the tubes or compartments 9 of the body through the opening 18 in the head 7. If desired, a screen 24 of coarser mesh than the screen 17 at the discharge end of the body, may be arranged over the opening 18 in the head. In order to pulverize the material passing through the tubes or compartments 9, loose grinding elements 25 of spherical or other form are provided in said tubes. Said grinding elements are preferably in the form of rounded pebbles or rock of about the size of an egg. Said tubes are preferably filled about half full with these grinding stones so that when the body is rotated they will roll over and over and effectively pulverize the material passing through the body. Any suitable means may be provided for rotating the body but a gear ring 26 is preferably secured upon the head 7, as shown at 27, and is in mesh with a driving pinion 28 upon a shaft 29 journaled in suitable bearings upon the supporting frame or base. The drive shaft 29 may be provided with a pulley 30 or a driving belt leading from any suitable source of power.

In operation, the crushed ore, cement or

other material to be pulverized is deposited in the hopper 20 and power is applied to the wheel 30 to rotate the shaft 29 and hence the body 1. As the latter revolves the material in the hopper will feed through the trunnion 2 and be divided by the plates 22 into three equal streams, each one of which latter enters one of the tubes or compartments 9 of the body. The screens at the end of said tubes 9 will retain the grinding stones 25 therein and said stones will effectively pulverize the material which will gradually work out of the fine screen 17 at the discharge end of the body.

Having thus described the invention what is claimed is:

1. A mill comprising bearings, a rotatable body having trunnions rotatable in the bearings, one of said trunnions being hollow to provide an inlet, said body also having a plurality of longitudinal compartments, a dished cap arranged at the inlet end of the body and in communication with said compartments, said cap having a central opening in which the tubular trunnion is secured, a feed screw in said tubular trunnion, a hopper projecting into said tubular trunnion, and radially arranged division plates arranged in said cap and having their central portions recessed to receive the inner end of the tubular trunnion.

2. A mill comprising bearings, a rotary body consisting of circular heads, longitudinally arranged cylinders having flanged open ends secured to said heads, a trunnion centrally arranged upon one head and rotatable in one of said bearings, a tubular trunnion rotatable in the other bearing, a feed screw arranged in said tubular trunnion, a hopper having a discharge end projecting into said tubular trunnion, a concaved cap having a central opening in which the tubular trunnion is secured, said cap being secured concentrically upon the outer face of the adjacent head of the body, the portions of the last mentioned head beneath the cap and opposite the open ends of the cylinders being removed to afford communication between the cavity in the cap and said cylinders, screens over said openings in the last mentioned cap, the other head having portions opposite the cylinders removed, screens over the openings in the last mentioned head, radially arranged division plates in the cap and having their central portions recessed to receive the inner end of the tubular trunnion, and means for rotating the body.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JUBAL L. TERWILLIGER.

Witnesses:

W. H. KELSO,

J. E. BROADHEAD.