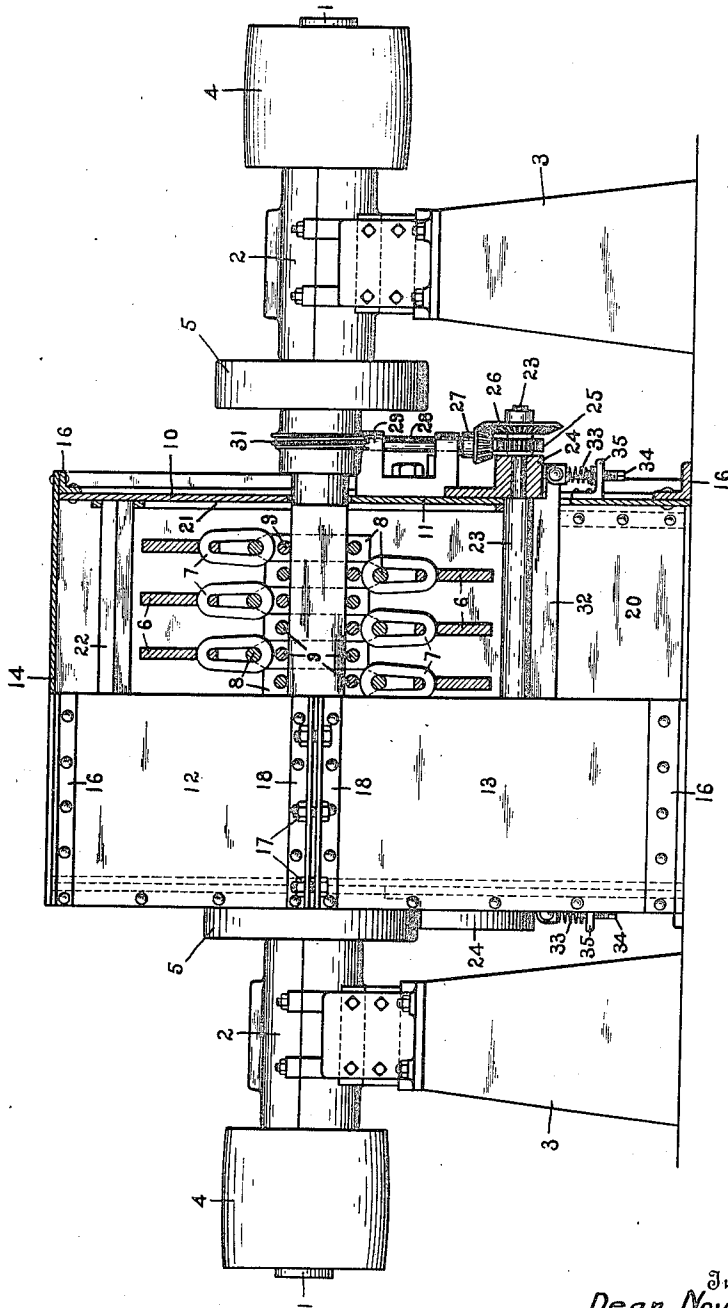


1,182,835

G. L. CAMPEN & D. NOYES.
 ROTARY BEATER.
 APPLICATION FILED SEPT. 24, 1914.

Patented May 9, 1916.
 2 SHEETS—SHEET 1.

Fig. 1.



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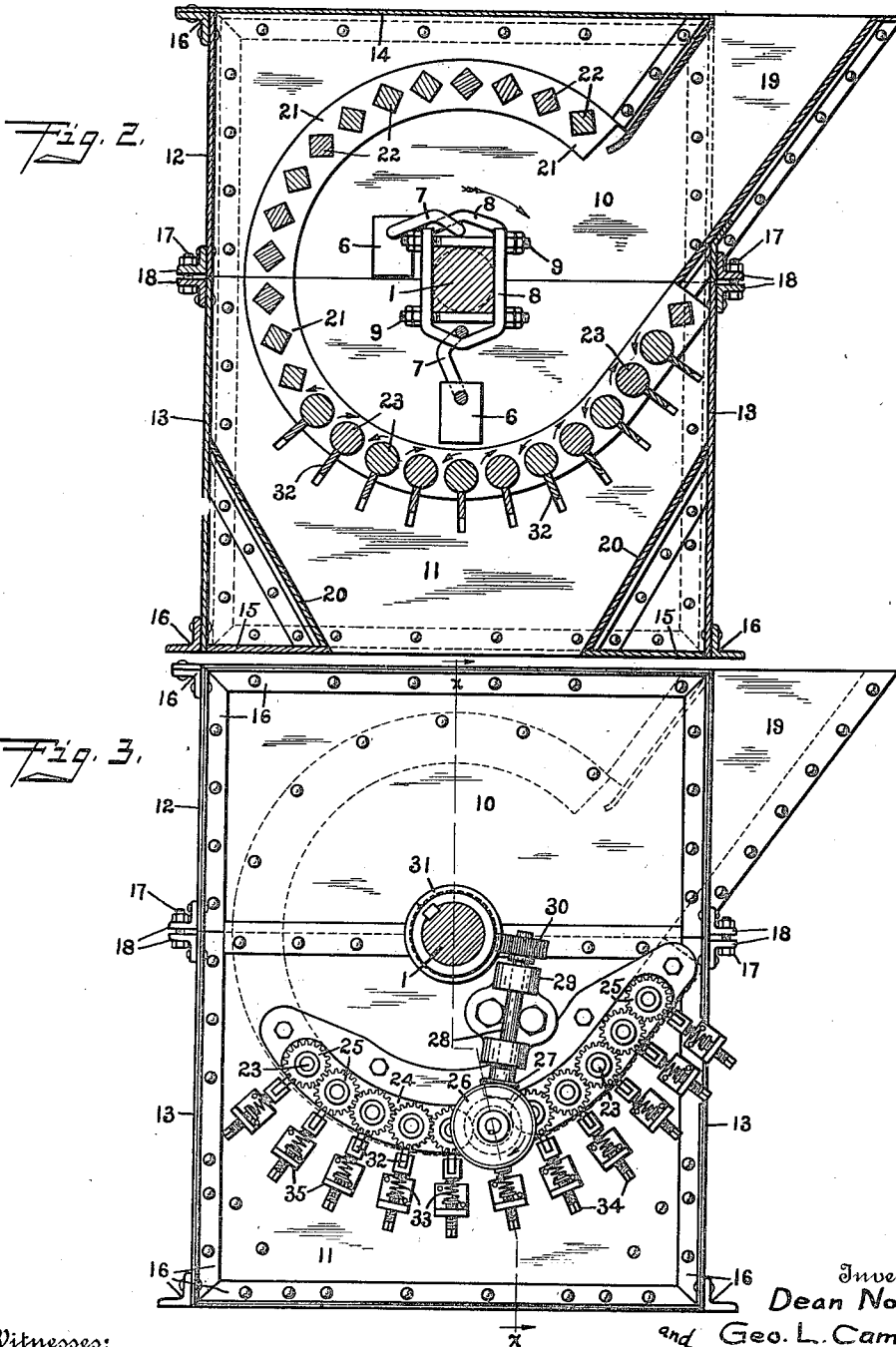
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GEORGE L. CAMPEN AND DEAN NOYES, OF OMAHA, NEBRASKA.

ROTARY BEATER.

1,182,835.

Specification of Letters Patent.

Patented May 9, 1916.

Application filed September 24, 1914. Serial No. 863,540.

To all whom it may concern:

Be it known that we, GEORGE L. CAMPEN and DEAN NOYES, both citizens of the United States, and residents of Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Rotary Beaters, of which the following is a specification.

Our invention relates to crushing and pulverizing machines, and more particularly to machines of the class characterized by rotary beaters or hammers revolving within a cylindrical cage.

It is the object of our invention to provide in a machine of this class means adapting the same for breaking, pulverizing and disintegrating all kinds of materials, including adhesive, gummy, gelatinous and fibrous materials, and mixtures thereof, such as ordinarily might clog the interstices of the cage and prevent or retard the escape of other materials from the crushing chamber.

In the accompanying drawings, Figure 1 is a partial side view and partial vertical sectional view of a machine embodying our invention, Fig. 2 is a transverse vertical section of the same, and Fig. 3 is an end view of the main casing or housing, showing the driving mechanism for the revolving cage-bars. The sectional portion of Fig. 1 is taken on the plane of the line $x-x$ of Fig. 3.

In the structure illustrated, we provide a horizontal main shaft 1 which is journaled in suitable bearings 2, the same being mounted on foundation-blocks 3 as shown in Fig. 1. On the ends of the shaft are secured pulleys 4 which may be connected by belt with a suitable source of power, for revolving the shaft at a high speed. Adjoining the inner ends of the bearings, fly-wheels 5 are secured to the shafts. The central portion of the shaft is square in section, and on said portion thereof there are mounted a plurality of beaters or striking-devices, each comprising a hammer or head-block 6, a connecting-link 7, and a U-shaped clevis 8 which fits upon the square shaft and is clamped thereon by bolts 9. The connecting links 7 are preferably bent as shown in Fig. 2, so that when turned backwardly, as is the upper link shown in said figures, the head-block 6 held by the link may rest against the heads of the bolts 9. The beaters are preferably arranged alternately on opposite sides of the shaft, as shown in Fig. 1.

Inclosing the central portion of the shaft

1 is a housing or casing which, in the structure shown, is formed by end-plates 10 and 11, side-plates 12 and 13, a top-plate 14 and a bottom-plate 15, the said plates being reinforced and connected to each other by angle-iron corner-pieces 16, arranged as shown, and riveted to the plates. The casing is separable on a horizontal plane passing through the axis of the shaft, and the upper and lower portions are detachably secured to each other by bolts 17 which extend between the angle-iron edge-pieces 18 at the sides of the casing. At one side of the upper portion of the casing is a feed-chute 19. Within the lower portion of the casing, at the sides and near the bottom thereof are deflecting-plates 20 which form a chute for directing materials through a discharge-opening in the bottom-plate 15.

On the inner sides of the end-plates 10 and 11 are secured the cage-rings 21, the same being disposed concentrically with the main-shaft 1. The upper part of the cage is formed by square bars 22 which extend longitudinally between the cage-rings, being parallel with each other and with the shaft 1, and their ends fitting into suitable openings in the rings. The lower part of the cage is formed by cylindrical rods or shafts 23 of which the end-portions extend through the cage-rings and are revoluble in bearings formed in bearing-blocks 24 secured on the outer sides of the end-plates 11. At one end each of the shafts 23 has a small gear 25 secured thereon, the gears being so proportioned that they will mesh serially to form a continuous train. One of the shafts has a longer end-portion than the others and on said shaft is secured a bevel gear 26 which meshes with a bevel pinion 27 carried on the lower end of a shaft 28. Said shaft is journaled in a bearing 29 secured on the end-plate 11, and at its upper end carries a worm-wheel 30. The worm-wheel meshes with a worm 31 which is secured on the main-shaft adjacent to the end of the casing. By means of the worm, worm-wheel, bevel-gears, and train of gears 25, rotation of the shaft 1 causes the shafts 23 to revolve at relatively low speed in the directions indicated.

Adjacent to each of the shafts or revoluble cage-bars 23 there is a scraper-bar 32 which extends through slots in the ends of the casing, and of which the edge is pressed yieldingly against the respective shaft by

means of springs 33 which are disposed beneath the projecting ends of the scraper-bar outside the casing. Adjusting-screws 34 are provided in brackets 35, for varying the compression of the springs.

The operation of the mechanism will be apparent. The direction of rotation of the shaft 1 is as indicated in Fig. 2, or so that the beaters move downwardly on the side adjoining the feed-chute 19. Materials introduced into the cage through the feed-chute are struck by the beaters and thrown against the cage-bars, being thereby broken and crushed so as to be able to pass between the bars and fall through the discharge-opening in the bottom of the casing, or be directed thereto by the plates 20. Any material adhering to the revolving cage-bars is carried to the outside of the cage and then dislodged from said bars by the scraper-bars 32.

The described machine has been found particularly effective for breaking up and disintegrating garbage preparatory to the manufacture of fertilizers and the like therefrom. This material often contains sticky, gummy or adhesive substances which cling to the cage-bars and quickly stop up the interstices of the cage when the same is not provided with devices for rendering it self-cleaning. Rags and fibrous materials also tend to collect on the cage-bars and clog the same, but all such materials have been found to be quickly and effectively removed by the use of the revolving cage-bars and the scrapers therefor. It has been found also that such materials as above described lodge almost altogether on the bars at the lower part of the cage, and especially on those immediately adjoining the lower end of the feed-chute. For this reason, with all materials that have been experimented with, it has been found unnecessary to provide revolving cage-bars except at the lower part of the cage and on the side adjoining the feed-chute, but it will be apparent that, if de-

sired, the entire cage might be made up of revoluble bars.

Now, having described our invention, what we claim and desire to secure by Letters Patent is:

1. In a rotary crushing machine, a revoluble beater-shaft, a cage comprising a series of bars arranged in cylindrical form about the axis of said shaft, some of said bars being revoluble about fixed axes, and actuating means connecting said beater-shaft and said revoluble bars.

2. In a rotary crushing machine, a revoluble beater-shaft, a cage inclosing the same and having bars revoluble on fixed axes, and actuating connecting means between said beater-shaft and said revoluble cage-bars.

3. In a crushing machine, a revoluble beater-shaft, a cage disposed around the same and comprising a series of parallel spaced rectilinear bars, some of said bars being revoluble on fixed axes, actuating connecting means between said beater-shaft and said revoluble bars, and scraper-bars engaging said revoluble cage-bars externally of the cage for dislodging materials therefrom.

4. In a crushing machine, a revoluble beater-shaft, a cage disposed around the same and comprising a series of spaced bars extending parallel with the beater-shaft, a chute for directing materials into the cage at one side thereof, some of the bars adjacent to said chute being revoluble to carry materials from the inside to the outside of the cage, scraper-bars engaging said revoluble cage-bars on the outer sides thereof, and means for pressing said scraper-bars yieldingly toward the cage-bars.

In testimony whereof we have hereunto subscribed our names in the presence of two witnesses.

GEO. L. CAMPEN.
DEAN NOYES.

Witnesses:

D. O. BARNELL,
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