

Jan. 24, 1967

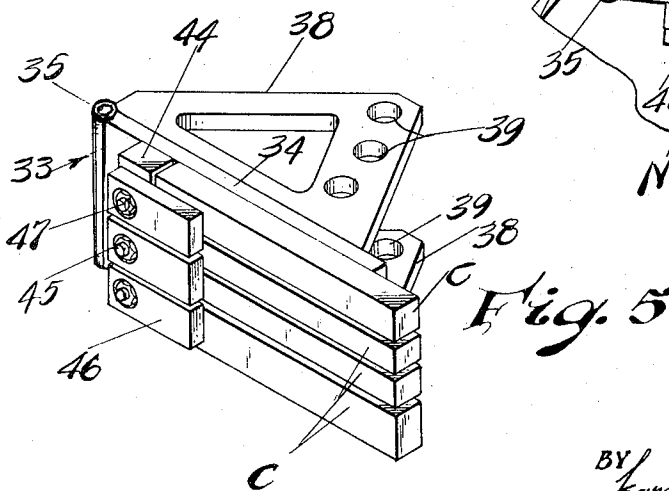
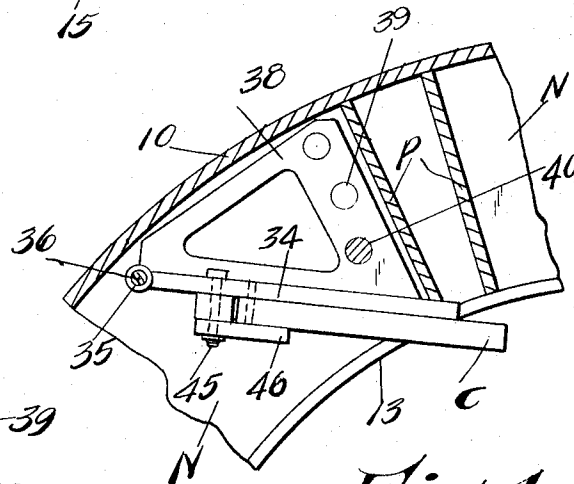
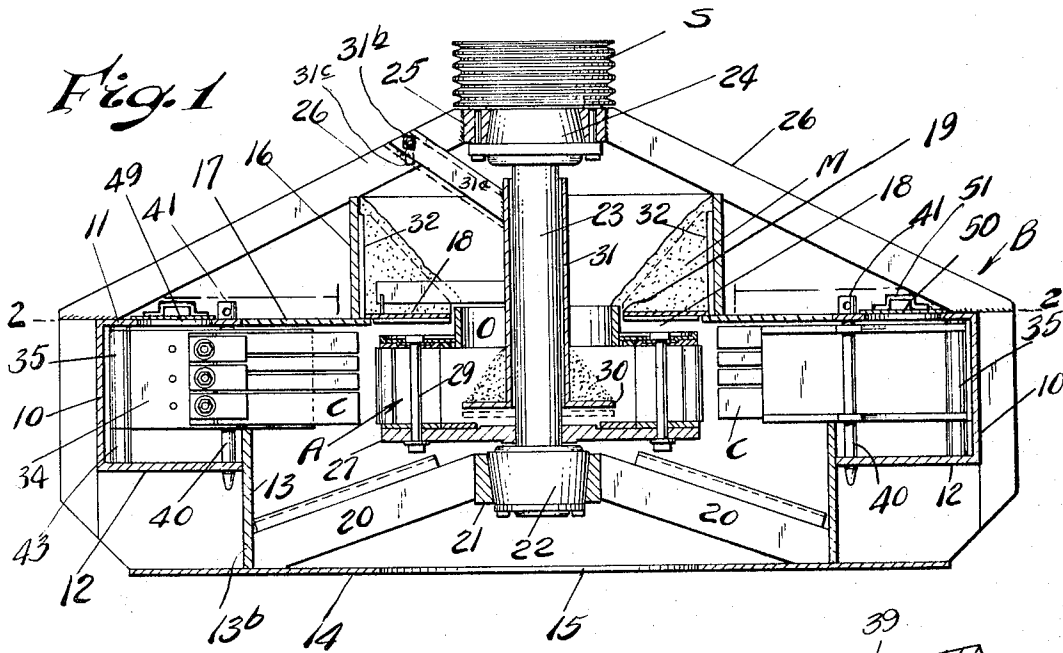
G. W. BEHNKE ETAL

3,300,152

CRUSHER APPARATUS

Original Filed Jan. 3, 1961

2 Sheets-Sheet 1



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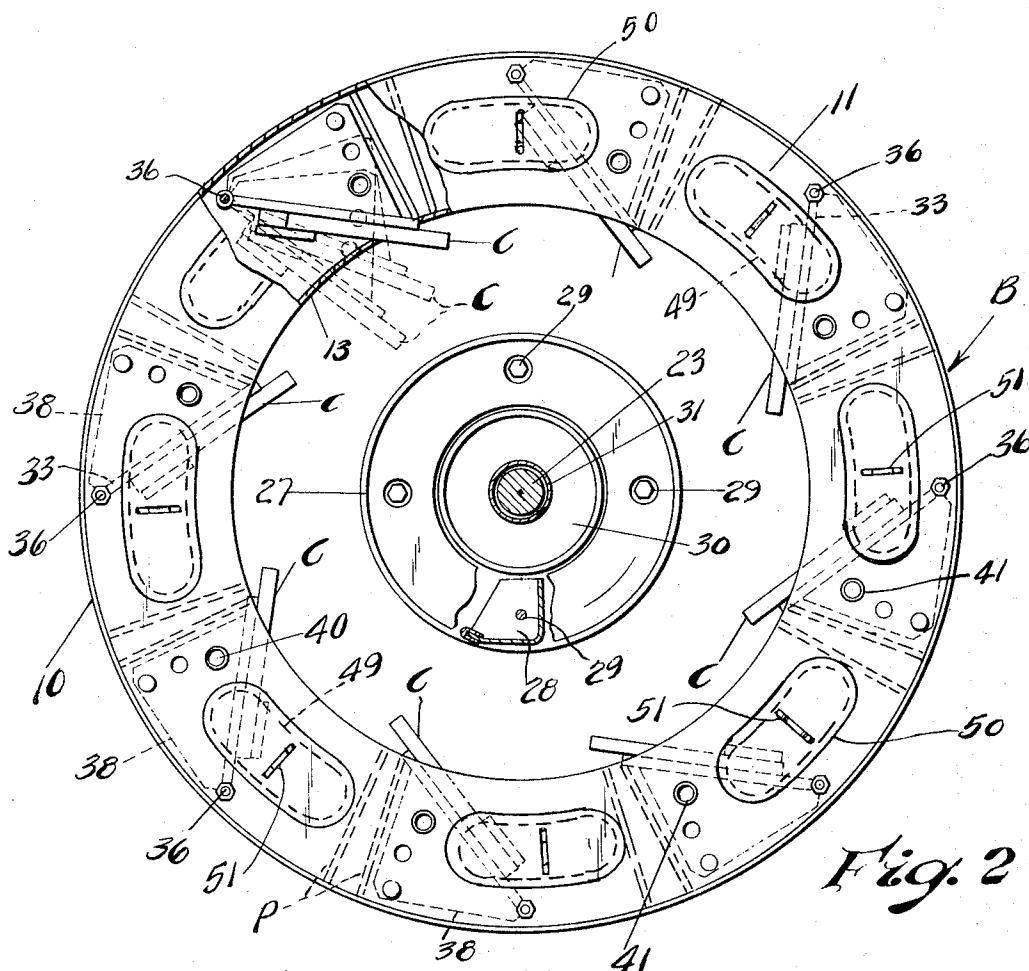


Fig. 2

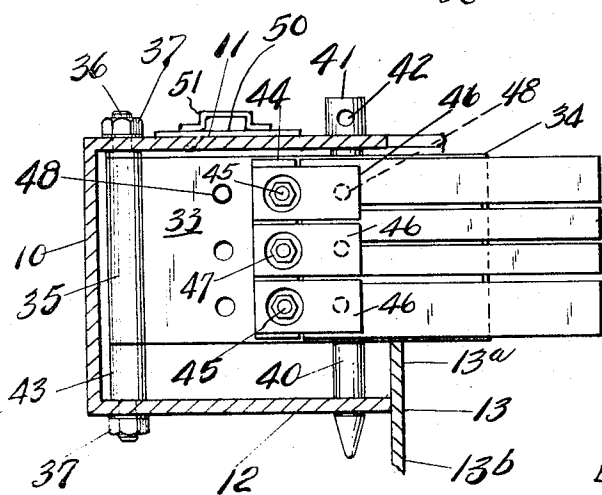


Fig. 3

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3,300,152

CRUSHER APPARATUS

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Continuation of application Ser. No. 80,053, Jan. 3, 1961.

This application Dec. 16, 1963, Ser. No. 330,996

2 Claims. (Cl. 241—275)

This application is a continuation of application Serial No. 80,053, filed January 3, 1961, now abandoned. The invention relates to apparatus for use in breaking up and crushing ore, coal, rock, clinkers, slag, stone and like material, by impact, and to also break up and shred certain fibrous mined materials such as asbestos, and more particularly to adjustable impact bar assemblies which can be adjusted to compensate for wear and the nature of the materials to be crushed.

One of the prime objects of the invention is to design a crusher bowl and impact breaker bar assembly against which various materials to be broken are thrown, by centrifugal force, to reduce it to desired size.

Another object of the invention is to provide a preferably cylindrical shelf bowl having a plurality of circumferentially spaced-apart impact bar assemblies adjustably mounted thereon; provide means whereby the angle of impact of the material on the bars can be easily and quickly changed, and in which the individual impact bars can be easily and quickly adjusted to suit the material to be processed.

A further object of the invention is to provide means associated with the impact bar assembly for securing the assembly in set position, and quickly operable means for adjusting said bars lengthwise as they become worn.

Crusher bowl apparatus of the type herein referred to are subjected to severe abrasive action, so that the problem of wear, maintenance and replacement parts presents an expensive, time consuming operation with considerable downtime required for removal, replacement, repair and adjustment; and we have, therefore, designed a new and novel impact bar assembly and mounting, each unit of which is adjustable to vary the angle of incidence at which the product being processed strikes the impact bars, and provide means whereby the individual bars can be quickly adjusted lengthwise to compensate for wear.

A further object still is to design an impact bar assembly in which the bars can be vertically spaced to break and shred certain relatively hard, shreddable materials.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts, hereinafter more fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportion, and minor details of construction, without departing from the spirit, or sacrificing any of the advantages of the invention.

In the drawings:

FIG. 1 is a vertical, sectional, elevational view of the crusher bowl, slinger mechanism, etc., showing our impact bar assembly mounted in position therein.

FIG. 2 is a top plan view of the crusher bowl assembly taken on line 2—2 of FIG. 1, the bowl being broken away to more clearly show, in broken lines, the adjustability of the impact bar assembly.

FIG. 3 is an enlarged, fragmentary, elevational view through the bowl showing the bracket and impact bar assembly.

FIG. 4 is an enlarged, fragmentary, plan view of the shelf bowl, impact bar assembly and mounting with the cover plate removed.

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FIG. 5 is a perspective, elevational view of the bracket, impact breaker bar mounting and assembly.

Referring now more specifically to the drawings in which we have shown the preferred embodiment of our invention, the crusher bowl proper is generally indicated at B and includes a preferably cylindrical bowl section 10 having upper and lower plates 11 and 12 respectively welded thereto, and a circular plate 13 is welded to the inner edge of the lower plate 12 at a point intermediate its height, the upper projecting section 13a extending a predetermined distance above the plate 12, while the lower section 13b forms a depending skirt, all as clearly shown in FIGS. 1 and 3 of the drawings. A flat base plate 14 is welded to the lower edge of the circular plate 13 to form a base for the bowl, and a centrally disposed opening 15 is provided in said base plate and through which the crushed material (not shown) discharges as it is processed.

A preferably cylindrical, material receiving hopper 16 is mounted on the cover plate 17, and a plate 18 forms the bottom of said hopper, a centrally disposed opening 19 being provided in said bottom plate and a throat member O extends through said opening and communicates with an impeller assembly A as shown.

Circumferentially spaced, upwardly and inwardly inclined arms 20 are secured to the lower skirt section 13b of plate 13, and at their junction form a bearing support 21 in which a bearing 22 is mounted, and a centrally disposed, vertical drive shaft 23 is journaled in said bearing.

The upper end of shaft 23 is journaled in a bearing 24 which is mounted in a bearing support 25, and here again the support 25 is supported by upwardly and inwardly inclined arms 26, the lower ends of the arms being welded to the cover plate 11 while the upper ends converge and are welded to the bearing support 25. A drive sheave S is mounted on the upper end of the drive shaft 23, and can be drivingly connected to any suitable source of power.

The impeller assembly A is mounted on the shaft 23 directly below throat member O, and comprises a circular plate 27 on which a plurality of impeller buckets 28 are pivotally mounted by means of bolts 29, and we do not deem it necessary to describe this impeller assembly in detail, as it is the same as shown and described in Canadian patent for "Bowl Liners for Crushers," Patent No. 644,928, granted July 17, 1962, George W. Behnke and Hans A. Wirth, inventors; suffice to state that the material to be processed is fed to intake hopper 16, flows downwardly through throat O and thence onto the flat section 30 of a vertically adjustable table sleeve 31, from which it overflows onto plate 27 and enters buckets 28, being thence thrown outwardly against the impact bars C as will be later described.

A plurality of gussets 32 are provided in the intake hopper 16 for reinforcing purposes, and the material M fed to the crusher builds up in the hopper as shown, and forms a bed over which the incoming material flows to the impeller.

Crusher bowls of the type referred to are subjected to extremely severe abrasive action and wear; consequently, the adjustability of impact bars to compensate for wear, and the ability to process different types of material with ease of maintenance is of prime importance; we, therefore, provide a plurality of circumferentially spaced partitions P in the housing to form compartments N, and impact bar mounting brackets 33 are mounted therein, each bracket comprising a flat plate 34 disposed on edge with a cylindrical sleeve or section 35 welded to the one edge thereof, said sleeve accommodating a pivot stud 36 which projects through registering opening (not shown)

provided in the plates 11 and 12 with nuts 37 provided on the opposite ends of the stud.

Vertically spaced, triangularly-shaped, laterally-projecting legs or wings 38 project from the plate 34, and spaced apart openings 39 are provided in said legs to accommodate a pin 40, having an enlarged head 41 suitably drilled as at 42 to permit easy removal when desired.

A cylindrical spacer 43 is provided on the lower section of the stud 36 to properly space the bracket in the bowl; the lower edge of the plate bearing on the upper edge of the skirt member 13, and when it is desired to adjust the bracket, it is merely necessary to remove pin 40, swing the bracket about stud 36 to desired position and again insert pin 40 in the proper openings.

The impact bars C are removably secured to the face of the plate 34, said bars being of varying length and width to suit the material being processed, the free ends extending beyond the end of the bracket and into the area or path of the material being processed as it is thrown by the impeller buckets. Spacer stops 44 are secured to the flat face of the plate 34 by means of bolts 45, a clamp 46 being mounted on each stop and overlying the adjacent end of each bar, so that when the nut 47 in the bolt 45 is tightened, the bar C will be tightly clamped in position. Each impact bar is disposed in facial contact with the plate 34, the one end butting against the stop 44 to limit outward movement thereof.

A suitable pattern of openings 48 is provided in the plate 34 so that, as the free ends of the impact bars are worn, they can be adjusted inwardly into the area between the bracket and the impeller and the path of travel of the thrown material.

It has been previously stated that the bars can be of various length and width, and they can also be vertically spaced when desired to perform both a crushing and a shredding action, the distance between the bars determining the fineness of the shredding operation.

The material being processed is thrown from the buckets 28 against the end sections of the impact bars C, and when different kinds of material, or material of different size is being processed, it sometimes becomes necessary to change the angle of incidence at which the material strikes the bars, and this is very easily accomplished by withdrawing the pin 40, swinging the bracket about the pivot stud 36 to desired position, and then replacing the pin to secure the bracket in adjusted position.

To facilitate the mounting and/or adjustment of the impact bars, we provide access openings 49 in the top plate 11 which permits ready access to the impact bar

assembly and mounting, etc., and it is merely necessary to back off the nut 47, adjust the bar to suit and again tighten the nut 47; these openings 49 being covered by a plate 50 as usual, and when the bar is worn to the point where it cannot be further adjusted a new bar is installed.

The sleeve 31 has an arm 31a extending at an angle as shown and is bolted to arm 26 by means of bolt 31b and additional opening 31c is provided for adjustment.

From the foregoing description, it will be obvious that we have perfected a very simple, practical, and relatively inexpensive crushing bowl and impact bar mounting and assembly in which bars can be adjusted to compensate for wear and the angle of incidence can be easily adjusted to suit the material being processed.

We claim:

1. A centrifugal crushing apparatus comprising: a bowl; a vertically disposed driven shaft means for said bowl; centrifugal slinger means mounted on said shaft means within said bowl; means for feeding the material to be crushed to said slinger means; a plurality of circumferentially spaced, impact surface means disposed in a substantially horizontal plane in said bowl around said slinger means and against which the material being processed is flung; fixed guide means supporting the impact surface means for movement substantially linearly inwardly toward the slinger means; and means for holding said impact surface means in various substantially linearly inwardly adjusted positions, said guide means comprising a plurality of circumferentially spaced backer plate means extending generally radially inwardly from said bowl.

2. The combination defined in claim 1 in which each impact surface means comprises a plurality of horizontally disposed, vertically spaced apart impact bars; and said means for holding said impact surface means in various inwardly adjusted positions comprises clamp means permitting each bar to be adjusted inwardly individually.

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