Aug. 6, 1957 E. A. BRADLEY 2,801,838

ROTARY DISINTEGRATING DRUM FOR CONTINUOUS MINER

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Fig. 1.

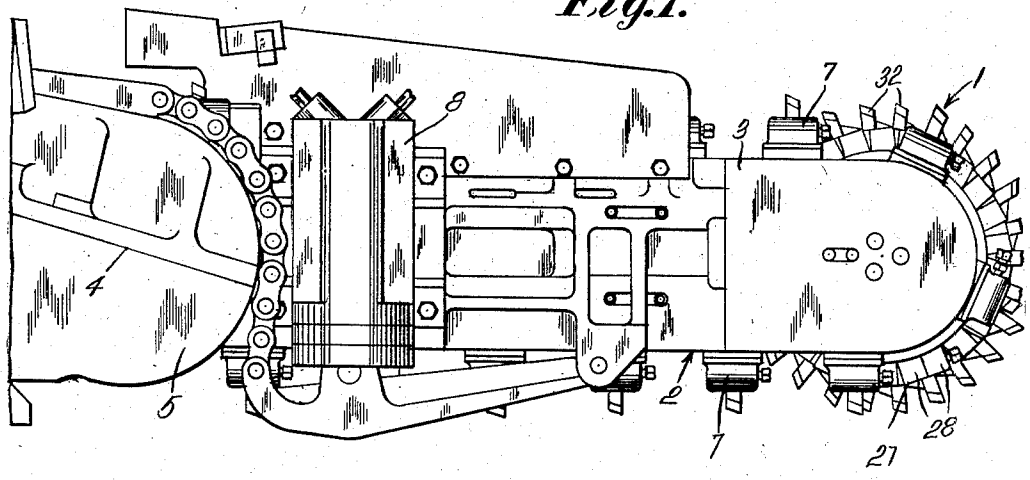

Fig. 2.

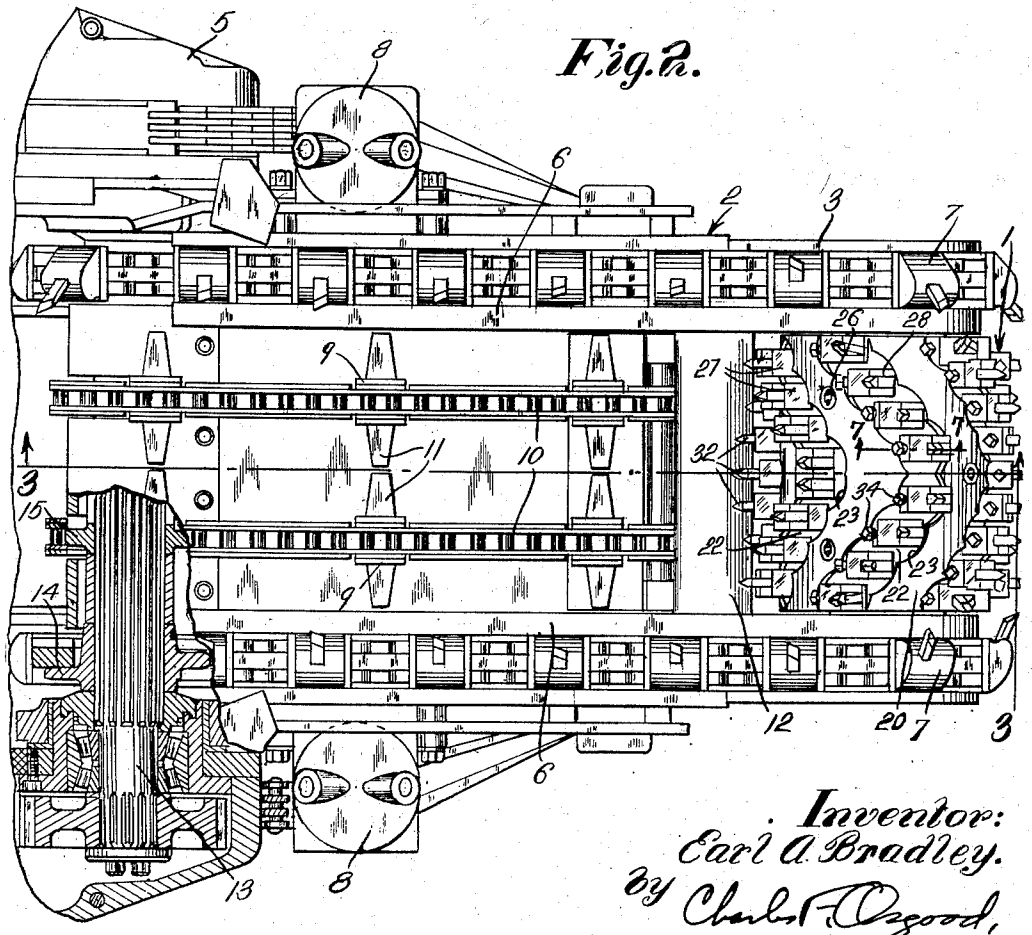

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Fig. 3.

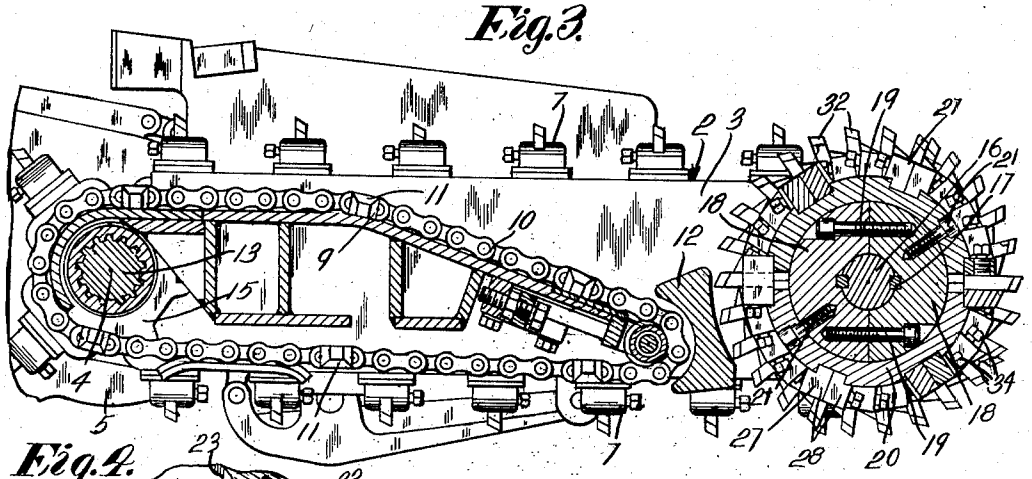

Fig. 4.

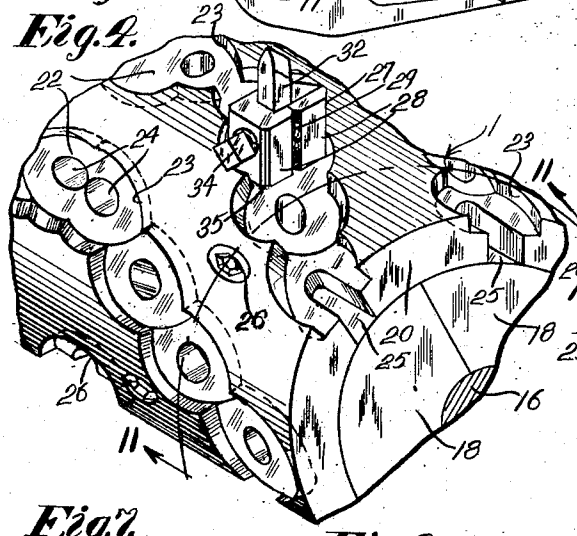

Fig. 5.

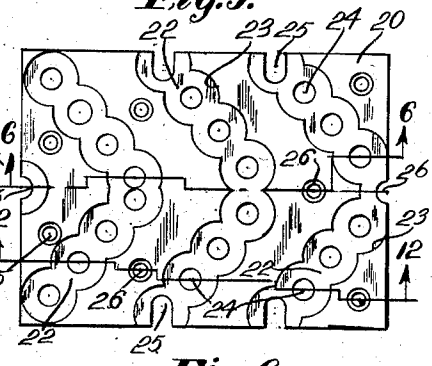

Fig. 6.

Fig. 7.

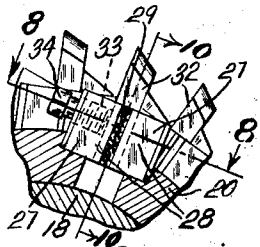

Fig. 8.

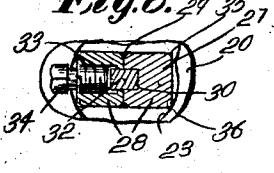

Fig. 9.

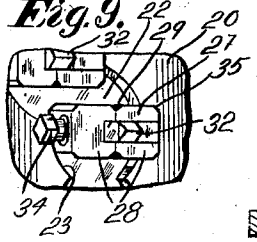

Fig. 10.

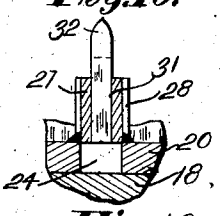

Fig. 11.

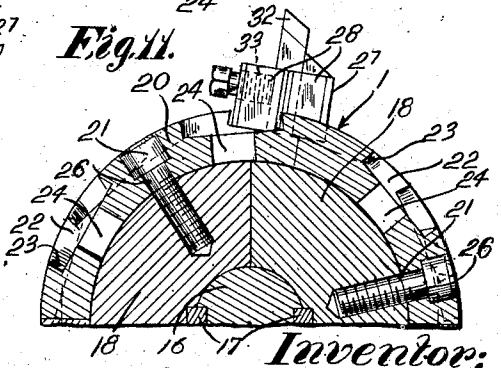

Fig. 12.

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ROTARY DISINTEGRATING DRUM FOR CONTINUOUS MINER

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Application October 21, 1954, Serial No. 463,706

11 Claims. (Cl. 262—26)

This invention relates to a mining apparatus and more particularly to a rotary toothed disintegrating drum for a continuous miner.

In continuous miners for dislodging mineral, such as potash or coal, from its native bed, a rotary toothed drum is usually employed and the drum structure and tooth mountings or holders must be extremely rugged in structure, and the tooth mountings or holders must be reliably supported in order to withstand the severe conditions of service. The present invention contemplates improvements over known types of rotary toothed disintegrating drums in that the drum structure is relatively simple and rugged in design, and the manner of mounting the tooth supports or holders on the drum is substantially improved.

An object of the present invention is, therefore, to provide an improved rotary toothed disintegrating drum for a continuous mining apparatus. Another object is to provide an improved detachable shell or sleeve-type drum structure embodying an outer shell or sleeve having a novel formation and arrangement of recesses or channels on the drum sleeve for receiving the tooth supports or holders. Yet another object is to provide an improved rotary disintegrating drum which is relatively simple and rugged in design and having improved holder mountings for the disintegrating teeth. These and other objects and advantages of the invention will, however, hereinafter more fully appear.

In the accompanying drawings there is shown for purposes of illustration one form which the invention may assume in practice.

In these drawings:

Fig. 1 is a side elevational view of the disintegrating head mechanism of a continuous miner, having a preferred illustrative embodiment of the improved rotary disintegrating drum incorporated therein.

Fig. 2 is a plan view of the disintegrating head mechanism shown in Fig. 1, with parts shown in section to illustrate structural details.

Fig. 3 is a central longitudinal vertical section taken on line 3—3 of Fig. 2.

Fig. 4 is an enlarged fragmentary perspective view of the improved disintegrating drum, with the drumshaft shown in cross section and parts omitted.

Fig. 5 is a developed plan view of a half-sleeve or shell section of the drum, showing the arrangement of the recesses thereon for receiving the tooth supports or holders.

Fig. 6 is a vertical section taken on line 6—6 of Fig. 5.

Fig. 7 is a fragmentary end view of the drum, showing some of the tooth supports in position on the outer drum sleeve.

Fig. 8 is a detail section taken on line 8—8 of Fig. 7, showing one of the tooth supports or holders.

Fig. 9 is a fragmentary plan view of the drum and tooth supports shown in Fig. 7.

Fig. 10 is a detail longitudinal vertical section taken on line 10—10 of Fig. 7.

Fig. 11 is a detail vertical section taken on line 11—11 of Fig. 4.

Fig. 12 is a vertical section taken on line 12—12 of Fig. 5.

The improved rotary toothed disintegrating drum is generally designated 1 and is shown embodied in a disintegrating head mechanism 2 of a continuous mining apparatus of the type known as a "Joy Continuous Miner." The drum of the present invention is an improvement over that disclosed in the Arthur Lee Barrett application Serial No. 374,693, filed August 17, 1953, owned by the same assignee, and now matured into Patent No. 2,751,207, dated June 19, 1956.

The disintegrating head mechanism 2 with which the improved disintegrating drum is associated may assume various forms, but herein comprises a head frame 3 pivotally mounted at 4, to swing in vertical planes, on a suitable support 5. The head frame comprises outer vertical side guide bars 6 rigidly secured together in parallel relation, and endless disintegrating chains 7 are guided for circulation in parallel vertical orbits about the marginal guideways of these guide bars. Hydraulic jacks 8 serve to swing the head mechanism in vertical planes about its pivot, as is fully disclosed in the John D. Russell application Serial No. 215,431, filed March 14, 1951, also owned by the same assignee, and now matured into Patent 2,751,208, dated June 19, 1956.

The rotary toothed disintegrating drum is adapted to tear away or dislodge mineral, such as potash or coal, from its native bed, and the disintegrated mineral may be discharged rearwardly onto parallel flight conveyors 9 guided on the head frame intermediate the parallel guide bars for circulation in parallel vertical orbits. These conveyors each comprise an endless center chain 10 carrying transverse flights 11. A deflector 12, extending transversely between and secured to the side bars 6, serves to deflect the disintegrated mineral from the toothed drum and to direct it toward the parallel conveyors, and the latter carry the mineral thereon rearwardly of the head mechanism to the usual conveyor system of the mining apparatus.

Coaxial with the pivot 4 of the disintegrating head mechanism is a drive shaft 13 to which are secured drive sprockets 14 engaging and driving the side disintegrating chains 7. Also secured to the shaft 13 are sprockets 15 which engage and drive the parallel conveyors. Suitably journaled within the side guide bars at the sides of the head frame is a transverse front shaft 16 and keyed at 17 to this shaft is a cylindrical drum body 18 desirably made up into two halves rigidly secured together, as by screws 19.

Now referring to the improved sleeve and tooth-supporting structure of the drum, it will be noted that fitted about the exterior periphery of the drum body 18 is an outer sleeve or shell 20 desirably composed of two halves and rigidly secured to the drum body 18, as by series of radially located screws 21. Evidently, this outer shell or sleeve may be made in one piece but by making the same in two halves, manufacture of the drum is facilitated. In Fig. 5, one of the shell halves is shown in developed plan and formed as by drilling on the outer periphery of the shell are series of channels or grooves 22 of herringbone-like formation, i. e. in the form of opposite spirals, and these recesses or grooves are formed by a series of overlapping recesses or bores 23 arranged in parallelism. Each bore is provided with a reduced bottom opening 24 and certain of the end openings are slotted outwardly through the ends of the shell at 25. Also formed on the shell body are properly spaced openings 26. After the channels or grooves have been completed, the shell halves are suitably bent or otherwise formed into semicircular shape and the screws 21 pass

through the openings 26 for securing the sleeve or shell halves on the exterior of the drum-body. Evidently, if desired, the shell halves may be secured together as by welding and under certain conditions may be secured to the drum-body in other manners. Fitted within each of the bores 23 of the channels or grooves are supports or holders 27 desirably comprising two identical parts 28 secured together, as by welding, at 29, and each of the parts has a groove or recess 30. These grooves, when the holder parts are welded together, provide a rectangular socket 31 for receiving the rectangular shank of a conventional tooth or cutter bit 32. Threadedly secured at 33 within an opening in the front part of each holder is a set screw 34 which engages the bit shank to hold the bit in cutting position within the holder socket. If desired, the holders or tooth supports may have bottom projections fitted within the bottom openings 24. The four corners of each holder are desirably rounded off as at 35 to fit the walls of the bores 23 and each holder is secured, as by welding, at several of its corners at 36 to the bore-walls (Fig. 8). Thus, each of the tooth supports or bit holders is firmly held in position on the outer shell of the drum structure.

As a result of this invention, an improved rotary disintegrating drum is provided for dislodging potash, or a similar mineral, from its native bed. In the improved drum structure, by the provision of the outer sleeve or shell with its particular channel or groove arrangement for receiving the tooth supports, extreme ruggedness is obtained, and by the provision of the series of overlapping bores forming the channel and by composing the shell of two complemental parts, manufacture of the drum sleeve is simplified. The novel oppositely spiral or herringbone-like formation of the channels on the outer shell of the drum enables an improved arrangement of the tooth holders, and more reliable tool mountings are provided. The improved drum structure is not only reliable in design but is also relatively simple and rugged in construction, well adapted to meet the relatively severe service conditions encountered.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A toothed disintegrating drum for a continuous miner comprising, in combination, a cylindrical drum having a separate outer cylindrical shell, said shell having channels on its exterior periphery, said channels being formed by a series of overlapping bores having bottom surfaces, and tooth supports fitted in said bores and secured to the bore-walls, said tooth supports seated against said bottom surfaces of said overlapping bores.

2. A disintegrating drum as set forth in claim 1 wherein said channels on the shell-exterior having oppositely inclined portions at opposite sides of the longitudinal center of said drum.

3. A disintegrating drum as set forth in claim 2 wherein said tooth supports are of generally rectangular shape and are each socketed to receive a detachable tooth, said tooth supports being fitted in said bores with each tooth support engaging the bore-walls and welded to the bore-walls at certain corners thereof.

4. A toothed disintegrating drum for a continuous miner comprising, in combination, a cylindrical drum having a separate outer cylindrical shell provided with a

series of overlapping circular bores partially but not completely perforating the shell and cooperating to provide a relatively shallow channel or groove, said bores of the channel or groove adapted to receive tooth supports and providing bottom surfaces against which said tooth supports rest.

5. A disintegrating drum as set forth in claim 4 wherein said series of overlapping circular bores cooperate to provide relatively inclined channel or groove portions opening through the opposite ends of said drum.

6. A disintegrating drum as set forth in claim 5 wherein said overlapping circular bores provide channels on the drum periphery each channel having opposed relatively inclined portions, said bores respectively receiving said tooth supports thereby to locate the tooth supports in spaced apart relation.

7. A toothed disintegrating drum for a continuous miner comprising a separate outer cylindrical shell having a series of circular shallow recesses partially but not completely perforating the shell and arranged on the shell periphery in parallel overlapping relation to form a relatively shallow continuous channel, each of said circular recesses adapted to receive a tooth support and providing bottom surfaces against which said tooth supports rest.

8. A toothed disintegrating drum as set forth in claim 7 wherein a tooth support of rectangular shape is receivable in each of said circular recesses with each support welded at certain corners thereof to the bore-walls.

9. A toothed disintegrating drum for a continuous miner comprising a cylindrical drum element having a peripheral groove extending from one end thereof to the other, said groove having irregular side walls, and tooth supports received in said groove, with the irregularities of said side walls serving to space said supports apart along the length of said groove.

10. A toothed disintegrating drum for a continuous miner comprising a cylindrical drum element having a series of peripheral grooves spaced circumferentially thereabout and extending at substantial angles with respect to a plane to which the axis of said drum element is perpendicular, said grooves being relatively shallow and having undulating sidewalls, and tooth supports received in said grooves and seated against the groove bottoms with the undulations projecting between said tooth supports to space the latter apart in a predetermined manner along the lengths of said grooves.

11. A toothed disintegrating drum element as set forth in claim 10 wherein said grooves extend from one end of said drum element to the other and each has relatively inclined portions.

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