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Description

This invention relates to roller crushers, which are machines for crushing materials, typically minerals, usually to reduce them to particles of a particular maximum size. Roller crushers comprise at least one, and usually two contra-rotating, roll assembly(ies), each provided with crushing members, e.g. teeth, on their periphery.

It is obviously important that the crushing members on each roll assembly are effectively prevented from movement relative to the roll assembly, as this would seriously detract from the crushing action. Thus, it is known to provide a solid shaft or a drum with spaced annular discs formed with teeth at their peripheries, and to weld or bolt the discs to the drum or shaft. It is also known to provide a square sectioned shaft with a series of discs having a central hole to fit the shaft, the centre hole extending to lobes, and with concrete run down the aligned lobes to key the discs to the shaft. With such constructions, any wear or damage to, particularly, the teeth on the discs, occasions considerable time being spent in the removal of the existing discs from the shaft or drum and hence the apparatus being out of commission for considerable periods of time. Equally, such apparatus cannot readily be modified to suit different crushing requirements, again because of the problem of removing one set of discs and their replacement by discs of a different tooth profile or disc diameter.

German Auslegeschrift 1 221 081 discloses a roll for a roller crusher which comprises a plurality of tooth bearing segments which are detachably mounted on a roll body. In this specification, each tooth bearing segment is secured to the roll body by means of a plurality of screws. Thus, in order to change one or more of the tooth bearing segments, considerable time and effort is required, to access, release and subsequently retighten the fixing screws.

U.S. Patent Specification 4 219 291 discloses a plurality of circular elements which are assembled side-by-side on a drum. However, this specification does not disclose a roll which is suitable for use in a roller crusher. Rather, it discloses a rotary cutter, in which the circular elements co-operate with a bed knife assembly, to cut strands of filaments into pellets. More importantly, however, the circular cutting discs can be removed from the drum only by removing the drum assembly from its bearings, and then disassembling the apparatus, so that the cutting disc can be removed in turn from the drum, in a direction only axially thereof.

The present invention aims to provide roll assemblies for roller crushers, which may be improved in terms of ease of replacement of tooth bearing elements.

According to a first aspect of the invention, there is provided a roll assembly for a roller crusher, the assembly comprising a roll body which is formed on its periphery with a plurality of grooves, a plurality of tooth bearing segments detachably mounted on the roll body and each having an arcuate portion of which an outer surface co-operates with corresponding outer surfaces of the remaining rooth bearing segments to form an outer cylindrical surface of the roll, from which cylindrical surface teeth project radially outwardly, each said arcuate portion having an inner surface which fits closely the periphery of the roll body, and each tooth bearing segment being further provided with a radially inwardly extending projection which is engaged within a respective one of the grooves, characterised in that the tooth bearing segments are arranged side-by-side in rows extending along the grooves, are axially located in their operative positions by abutment means which are disposed at both ends of the roll body and maintain the tooth bearing segments in abutting side-by-side relationship, and are radially located in their operative positions by the interengagement of said projections in said grooves, the arrangement being such that, upon releasing at least one of the abutment means, the tooth bearing segments may be slid axially along the grooves into positions in which the projections are disengaged from the grooves, to permit removal of the tooth bearing segments from the roll in a direction radially of the roll.

Said grooves may extend parallel to the axis of the roll body. Alternatively, they may be dispoed helically on the roll body.

Said rows may extend parallel to the axis of the roll body, or alternatively, may be disposed helically on the roll body.

For each said row of tooth bearing segments, the locations of the teeth on the tooth bearing segments may be offset with respect to the axis of the roll body. Said locations may be so offset in an irregular pattern.

The roll body may be of one-piece construction. Alternatively, it may comprise a plurality of annuli arranged side-by-side. The length of each of said annuli may be substantially equal to the length of each of said tooth bearing segments, in a direction axially of the roll body. The annuli may be mounted on a common shaft, and both the annuli and the shaft may be provided with a keyway to permit movement of the annuli axially but not angularly of the shaft.

Endmost ones of the tooth bearing segments may be secured to the roll body, to provide at least one of the abutment means.

In a preferred arrangement, at least one of the abutment means comprises clamping half-rings which are secured to one end of the roll body.

The teeth may be integrally formed with the tooth bearing segments. In an alternative arrangement, the teeth may be in the form of removable picks, which are located in respective pick boxes formed in or provided on the tooth bearing segments.

Each of said projections may have a cross-section which substantially fills the cross-section of the respective groove.

Said grooves and/or said projections may be of substantially dovetail section.

Substantially the whole of the inner surface of said arcuate portion, other than said radially inwardly extending portion, may fit closely the periphery of the roll body.

According to a second aspect of the invention there is provided a roller crusher comprising a housing and a roll assembly mounted in bearings in the housing and definig a nip between the roll assembly and a further member, such that material may enter the nip and be crushed by the roll assembly, wherein the roll assembly is in accordance with the first aspect of the invention, and the roll assembly is so mounted in the housing as to afford between at least one end of the roll assembly and its respective bearing a spacing which is at least equal to the width of one of the tooth bearing segments such that, upon releasing the respective abutment means, the tooth bearing segments may be slid axially along the grooves into positions in which they may be removed from the roll assembly in a direction radially of the roll assembly, without removing the roll assembly from its bearings.

Such a roller crusher may comprise two said roll assemblies mounted for contra-rotation and adapted to co-operate with one another to define said nip.

The roller crusher may further comprise a wear plate which is detachably mounted on said housing to cover at least part of said spacing.

The invention will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a semi-diagrammatic perspective view of a roller crusher embodying the invention, with part broken away for clarity.

Figure 2 is a vertical section through one roll assembly of Figure 1, showing one construction of tooth bearing segment;

Figure 3 is a side elevational partial view similar to Figure 2, but showing tooth bearing member provided with pick boxes to accept conventional picks;

Figure 4 corresponds to Figure 3 but shows tooth bearing members formed to serve as pick boxes for conventional picks;

Figure 5 corresponds to Figure 1 but shows an alternative roll assembly construction; and

Figure 6 is a perspective view of one roll body forming annulus.

In Figure 1, a roller crusher comprises two contra-rotating roll assemblies 1, 2, the shafts 3, 4 of which are located in bearings at each end of the apparatus, the apparatus being provided with drive means for the roll assemblies within a housing generally indicated at 5. As is generally indicated in Figure 1 and more particularly in Figure 2, each roll assembly 1, 2 has a body provided with a number of longitudinally disposed parallel dovetail-like grooves 6, and tooth bearing members 12 are formed with dovetail-like projections 7 to fit in the grooves 6.

The teeth are so formed and located on the rolls that those on the roll face 1 face those on the roll 2, and such that when the rolls are located in the machine and caused to rotate, the teeth will grip and crush material falling into the nip of the rolls.

For each roll assembly 1, 2, a plurality of individual tooth bearing segments are provided, disposed side-by-side in rows along the grooves 6. As seen in cross-section in Figure 2, there are eight rows 6, and eight segments 12, spaced equally at 45° intervals around the periphery of each roll assembly 1, 2. Each segment 12 is formed with an integral tooth 11, or indeed more than one tooth if so required, and each segment 12 is formed with a respective dovetail-like projection 7 to fit in respective ones of the dovetail-like grooves in the roll body surface. With an abutment plate 9 secured at one end of the roll body, the requisite number of segments 12 can be slid onto the roll body from the opposite end, and another abutment plate 10 secured to the roll body to hold the segments 12 in position. As shown in Figure 1, each abutment plate 9, 10 may be secured to the end face of the roll body by means of screws which engage apertures in the roll body. The abutment plate 9 may, if desired, be fixed, and the plate 10 removable.

The apparatus illustrated in Figures 1 and 2 provides for the replacement of the teeth of the roll assemblies considerably more simply and with drastically reduced down time of the machine, in comparison with the prior art, such that segments with worn or damaged teeth may be replaced by new segments, with the roll assemblies *in situ*. Thus, the abutment plate 10 may be released, and slid along the shaft by a distance at least equal to the width of each segment 12. With, then, the abutment plate 10 spaced from the end of the roll body, the segments 12 can be slid along the roll body into the gap between the roll body and the plate 10, and then removed for replacement, radially of the roll assembly 1, 2.

It will be appreciated that, if the abutment plates 10 take the form of clamping half-rings, then each half-ring may be removed radially of the roll assembly 1, 2, after release from the end face of the roll body.

In the forms of construction shown in Figures 3 and 4, provision is made for the use of conventional point-attack picks as the teeth on the roll bodies. Thus, as is shown in Figure 3, each segment 12 may have secured to its outer periphery a relatively conventional pick-box 13 in which a point-attack pick 14 is located. In Figure 4, a still further alternative is shown where the segment 12 itself serves as the pick-box, by being formed with an appropriately shaped bore 15 angularly disposed within the segment 12 and in which the pick 14 can be located. With the constructions of Figure 3 and 4, in any instance where there is only wear or damage to the picks, they can simply be removed and replaced without the removal of the segments from the roll assembly, but there is the retention of the advantage that in any instance where there is wear or damage to both the pick and the segment, the

segment can be removed as has been described above.

In Figure 1, the roll assemblies are so formed that the teeth (whether they be integral or formed by removable picks) are set in straight rows longitudinally of the roll. However, it may be advantageous for adjacent teeth in any one row to be offset. Thus, as is illustrated in Figures 5 and 6, each roll body is formed by a shaft 16 and a number of drum-like annuli 17 adapted to fit the shaft 16, each annulus at its periphery being formed with a number of parallel dovetail-like slots 6 to receive a number of segments 12, each provided with a corresponding dovetail-like projection 7. The centre bore 18 of each annulus is formed with a keyway slot 19 to locate it on the shaft 16 and by strategically positioning each keyway slot 19 on the number of annuli involved, adjacent annuli can be set on the shaft such that the teeth on the segments on the adjacent annuli are offset. The offsetting can be set to provide straight rows of teeth at any required angular disposition in relation to the shaft axis, to provide rows of teeth that are helically disposed along the length of the roll, or if desired, to provide a random distribution of teeth.

It will be appreciated that, in the arrangement shown in Figures 5 and 6, the individual annuli 17 may be moved their own length along the shaft 16, after removal of the abutment plate 10, to enable a gap to be formed between any two adjacent annuli 17, to allow the removal and replacement of tooth bearing segments 12, without disconnecting the roll assembly from its bearings.

There may be seen in both Figures 1 and 5 wear plates 8, which are detachably secured to the housing, to cover the clearance space between the respective end of the roll bodies and the housing, and therefore prevent oversized debris from falling through this clearance space, whilst the machine is working. Of course, it will be appreciated that, in order to remove and replace tooth bearing segments 12 on the roll bodies, the wear plates 8 are firstly removed.

In Figures 5 and 6, the tooth bearing segments 12 are of substantially the same width as the annuli 17.

Although, in the illustrated embodiments, each section shows eight tooth bearing segments 12 at 45° intervals, it will be appreciated that alternative configurations of tooth bearing segments may be provided. For example, in cross-section, there may be provided two tooth bearing segments each subtending an angle of 180°, and each having four projections 7 to fit the four corresponding grooves 6 in the respective roll body.

As an alternative to the abutments 9, 10 other means may be provided, such as, for example, locking endmost tooth bearing segments 12 to the respective roll body.

Each roll body, whether of one piece construction or formed from a plurality of annuli, may be formed by casting. Alternatively or additionally, the grooves 6 may be formed by suitable machining. Each roll body may be of a suitably tough material such as mild steel, keyed to a suitable, relatively small diameter, alloy shaft. The tooth bearing members 12 are preferably cast from a hard wearing and impact resistant tool steel, such as manganese steel.

Claims

1. A roll assembly for a roller crusher, the assembly comprising a roll body which is formed on its periphery with a plurality of grooves, a plurality of tooth bearing segments (12) detachably mounted on the roll body and each having an arcuate portion of which an outer surface cooperates with corresponding outer surfaces of the remaining tooth bearing segments to form an outer cylindrical surface of the roll, from which cylindrical surface teeth (11) project radially outwardly, each said arcuate portion having an inner surface which fits closely the periphery of the roll body, and each tooth bearing segment (12) being further provided with a radially inwardly extending projection (7) which is engaged within a respective one of the grooves, characterised in that the tooth bearing segments (12) are arranged side-by-side in rows extending along the grooves (6), are axially located in their operative positions by abutment means (9, 10) which are disposed at both ends of the roll body and maintain the tooth bearing segments (12) in abutting side-by-side relationship, and are radially located in their operative positions by the interengagement of said projections (7) in said grooves (6), the arrangement being such that, upon releasing at least one of the abutment means (9, 10), the tooth bearing segments (12) may be slid axially along the grooves (6) into positions in which the projections (7) are disengaged from the grooves (6), to permit removal of the tooth bearing segments (12) from the roll in a direction radially of the roll.

2. A roll assembly according to Claim 1, wherein said grooves extend parallel to the axis of the roll body.

3. A roll assembly according to Claim 1, wherein said grooves are disposed helically on the roll body.

4. A roll assembly according to Claim 1, 2 or 3, wherein said rows extend parallel to the axis of the roll body.

5. A roll assembly according to Claim 1, 2 or 3, wherein said rows are disposed helically on the roll body.

6. A roll assembly according to any preceding claim, wherein, for each said row of tooth bearing segments, the locations of the teeth on the tooth bearing segments are offset with respect to the axis of the roll body.

7. A roll assembly according to Claim 6, wherein for each said row of tooth bearing segments, said locations are offset in an irregular pattern.

8. A roll assembly according to any preceding claim, wherein said roll body is of one-piece construction.

9. A roll assembly according to any of Claims 1 to 7, wherein said roll body comprises a plurality

of annuli arranged side-by-side.

10. A roll assembly according to Claim 9, wherein the length of each of said annuli is substantially equal to the length of each of said tooth bearing segments in a direction axially of the roll body.

11. A roll assembly according to Claim 9 or 10, wherein said annuli are mounted on a common shaft.

12. A roll assembly according to Claim 11, wherein said annuli and shaft are provided with a keyway to permit movement of the annuli axially but not angularly of the shaft.

13. A roll assembly according to any preceding claim, wherein endmost ones of the tooth bearing segments are secured to the roll body, to provide at least one of the abutment means.

14. A roll assembly according to any preceding claim, wherein at least one of the abutment means comprises clamping half-rings secured to one end of the roll body.

15. A roll assembly according to any preceding claim, wherein the teeth are integrally formed with the tooth bearing segments.

16. A roll assembly according to any one of Claims 1 to 14, wherein the teeth are in the form of removable picks, located in respective pick boxes formed in the tooth bearing segments.

17. A roll assembly according to any one of Claims 1 to 14, wherein the teeth are in the form of removable picks, located in respective pick boxes provided on the tooth bearing segments.

18. A roll assembly according to any preceding claim, wherein each of said projections has a cross-section which substantially fills the cross-section of the respective groove.

19. A roll assembly according to any preceding claim, wherein said grooves are of substantially dovetail section.

20. A roll assembly according to any preceding claim, wherein said projections are of substantially dovetail section.

21. A roll assembly according to any preceding claim, wherein substantially the whole of the inner surface of said arcuate portion, other than said radially inwardly extending projection, fits closely the periphery of the roll body.

22. A roller crusher comprising a housing and a roll assembly mounted in bearings in the housing and defining a nip between the roll assembly and a further member, such that material may enter the nip and be crushed by the roll assembly, wherein the roll assembly is in accordance with any one of the preceding claims, and the roll assembly is so mounted in the housing as to afford between at least one end of the roll assembly and its respective bearing a spacing which is at least equal to the width of one of the tooth bearing segments such that, upon releasing the respective abutment means, the tooth bearing segments may be slid axially along the grooves into positions in which they may be removed from the roll assembly in a direction radially of the roll assembly, without removing the roll assembly from its bearings.

23. A roller crusher according to Claim 22, comprising two said roll assemblies mounted for contra-rotation and adapted to co-operate with one another to define said nip.

24. A roller crusher according to Claim 22 or 23, further comprising a wear plate which is detachably mounted on said housing to cover at least part of said spacing.

Patentansprüche

1. Walzenanordnung für eine Quetschmühle, welche Anordnung einen Walzenkörper enthält, der an seinem Umfang mit einer Mehrzahl Rillen und einer Mehrzahl von zahntragenden Segmenten (12) versehen ist, die an dem Walzenkörper lösbar befestigt sind und jeweils einen bogenförmigen Abschnitt aufweisen, von welchem eine Außenfläche mit entsprechenden Außenflächen der übrigen zahntragenden Segmente zusammenwirkt, um eine äußere Zylinderfläche der Walze zu bilden, von der Zähne (11) radial nach außen vorstehen, wobei jeder bogenförmige Abschnitt eine Innenfläche hat, die eng zum Umfang des Walzenkörpers paßt, und jedes zahntragende Segment (12) weiterhin mit einem radial nach innen vorstehenden Vorsprung (7) versehen ist, der in einer der Rillen festgehalten ist, dadurch gekennzeichnet, daß die zahntragenden Segmente (12) Seite an Seite in Reihen angeordnet sind, die sich längs der Rillen (6) erstrekken, axial in ihren wirksamen Stellungen durch Anschlageinrichtungen (9, 10) festgelegt sind, die an beiden Enden des Walzenkörpers angeordnet sind und die zahntragenden Segmente (12) in Seite an Seite anstoßender Beziehung halten und radial in ihren wirksamen Stellungen durch den gegenseitigen Eingriff der Vorsprünge (7) in den Rillen (6) gehalten sind, wobei die Anordnung derart ist, daß beim Lösen wenigstens einer der Anschlageinrichtungen (9, 10) die zahntragenden Segmente (12) axial längs der Rillen (6) in Stellungen verschoben werden können, in denen die Vorsprünge (7) von den Rillen (6) freikommen, um einen Ausbau der zahntragenden Segmente (12) von der Walze in radialer Richtung der Walze zu gestatten.

2. Walzenanordnung nach Anspruch 1, bei der die Rillen sich parallel zur Achse des Walzenkörpers erstrecken.

3. Walzenanordnung nach Anspruch 1, bei der die Rillen sich schraubenlinienförmig am Walzenkörper erstrecken.

4. Walzenanordnung nach Anspruch 1, 2 oder 3, bei der die Reihen sich parallel zur Achse der Walzenkörpers erstrecken.

5. Walzenanordnung nach Anspruch 1, 2 oder 3, bei der die Reihen schraubenlinienförmig an dem Walzenkörper angeordnet sind.

6. Walzenanordnung nach einem der vorhergehenden Ansprüche, bei der für jede Reihe zahntragender Segmente die Stellen der Zähne an den zahntragenden Segmenten in bezug auf die Achse des Walzenkörpers versetzt sind.

7. Walzenanordnung nach Anspruch 6, bei der

für jede Reihe zahntragender Segmente die genannten Stellen in einem unregelmäßigen Muster versetzt sind.

8. Walzenanordnung nach einem der vorhergehenden Ansprüche, bei der der Walzenkörper von einstückigem Aufbau ist.

9. Walzenanordnung nach einem der Ansprüche 1 bis 7, bei der der Walzenkörper aus einer Mehrzahl von Seite an Seite angeordneten Ringen besteht.

10. Walzenanordnung nach Anspruch 9, bei der die Länge eines jeden der Ringe im wesentlichen gleich der Länge eines jeden der zahntragenden Segmente in einer Richtung axial zum Walzenkörper ist.

11. Walzenanordnung nach Anspruch 9 oder 10, bei der die Ringe auf einer gemeinsamen Welle angeordnet sind.

12. Walzenanordnung nach Anspruch 11, bei der die Ringe und die Welle eine Keilnutverbindung aufweisen, die eine axiale Bewegung der Ringe, jedoch keine Winkelbewegung derselben auf dem Schaft erlaubt.

13. Walzenanordnung nach einem der vorhergehenden Ansprüche, bei der die endseitigen zahntragenden Segmente an dem Walzenkörper festgelegt sind, um wenigstens eine der Anschlageinrichtung zu bilden.

14. Walzenanordnung nach einem der vorhergehenden Ansprüche, bei der wenigstens eine der Anschlageinrichtungen klemmende Halbringe enthält, die an einem Ende des Walzenkörpers befestigt sind.

15. Walzenanordnung nach einem der vorhergehenden Ansprüche, bei der die Zähne integral mit den zahntragenden Segmenten ausgebildet sind.

16. Walzenanordnung nach einem der Ansprüche 1 bis 14, bei der die Zähne in Form lösbarer Meißel ausgeführt sind, die in entsprechenden Meißelkästen angeordnet sind, die in den zahntragenden Segmenten ausgebildet sind.

17. Walzenanordnung nach einem der Ansprüche 1 bis 14, bei der die Zähne in Form lösbarer Meißel ausgeführt sind, die in entsprechenden Meißelkästen angeordnet sind, die an den zahntragenden Segmenten vorgesehen sind.

18. Walzenanordnung nach einem der vorhergehenden Ansprüche, bei der jeder der Vorsprünge einen Querschnitt aufweist, der im wesentlichen den Querschnitt der entsprechenden Rille ausfüllt.

19. Walzenanordnung nach einem der vorhergehenden Ansprüche, bei der die Rillen einen im wesentlichen schwalbenschwanzförmigen Querschnitt haben.

20. Walzenanordnung nach einem der vorhergehenden Ansprüche, bei der die Vorsprünge einen im wesentlichen schwalbenschwanzförmigen Querschnitt haben.

21. Walzenanordnung nach einem der vorhergehenden Ansprüche, bei der im wesentlichen die gesamte Innenfläche des bogenförmigen Abschnitts mit Ausnahme des sich radial nach innen erstreckenden Vorsprungs eng an den Umfang des Walzenkörpers angepaßt ist.

22. Quetschmühle mit einem Gehäuse und einer Walzenanordnung, die in Lagern in dem Gehäuse angeordnet ist und einen Spalt zwischen der Rollenanordnung und einem weiteren Element ausbildet derart, daß das Material in den Spalt eintreten kann und durch die Rollenanordnung zerkleinert wird, wobei die Rollenanordnung in Übereinstimmung mit einem der vorhergehenden Ansprüche ausgeführt ist und die Rollenanordnung in dem Gehäuse so montiert ist, daß sie zwischen wenigstens einem Ende der Rollenanordnung und ihrem entsprechenden Lager einen Abstand bildet, der wenigstens gleich der Breite eines der zahntragenden Segmente ist, so daß beim Lösen der entsprechenden Anschlageinrichtung die zahntragenden Elemente axial längs der Rillen in Stellungen verschoben werden können, in denen sie von der Walzenanordnung in einer Richtung radial zur Walzenanordnung entfernt werden können, ohne die Walzenanordnung aus ihren Lagern zu entfernen.

23. Quetschmühle nach Anspruch 22, enthaltend zwei der genannten Walzenanordnungen, die zur Drehung in entgegengesetzter Richtung gelagert und dazu eingerichtet sind zusammenzuwirken, um den genannten Spalt auszubilden.

24. Quetschmühle nach Anspruch 22 oder 23, weiterhin enthaltend eine Verschleißplatte, die lösbar an dem Gehäuse befestigt ist, um wenigstens einen Teil des Zwischenraums zu bedecken.

Revendications

1. Ensemble formant cylindre pour un broyeur à cylindres, l'ensemble comprenant un corps de cylindre comportant à sa périphérie une pluralité de rainures, une pluralité de segments (12) portant des dents, montés de manière amovible sur le corps de cylindre et comportant chacun une portion arguée dont une surface extérieure coopère avec des surfaces extérieures correspondantes des segments restants portant des dents pour réaliser une surface cylindrique extérieure du cylindre, surface sur laquelle des dents (11) font saillie radialement vers l'extérieur, chaque portion arquée ayant une surface intérieure qui s'adapte étroitement à la périphérie du corps de cylindre, et chaque segment (12) portant des dents comportant en outre une saillie s'étendant radialement vers l'intérieur (7) qui s'engage dans une rainure respective, caractérisé en ce que les segments (12) portant des dents sont disposés côte à côte selon des rangées s'étendant le long des rainures (6), sont localisés axialement dans leur position de fonctionnement par des moyens de butée (9, 10) qui sont disposés aux deux extrémités du corps de cy-

lindre et qui maintennent les segments (12) portant des dents en butée côte à côte, et sont localisés radialement dans leur position de fonctionnement par l'interengagement desdites saillies (7) dans lesdites rainures (6), la disposition étant telle que, lors de la libération d'au moins un des moyens de butée (9, 10), les segments (12) portant des dents peuvent être glissés axialement le long des rainures (6) jusqu'à des positions dans lesquelles les saillies (7) sont dégagées des rainures (6) pour que les segments (12) portant des dents puissent être retirés du cylindre suivant une direction radiale par rapport à celui-ci.

2. Ensemble formant cylindre selon la revendication 1, dans lequel lesdites rainures s'étendent parallèlement à l'axe du corps du cylindre.

3. Ensemble formant cylindre selon la revendication 1, dans lequel lesdites rainures sont disposées en hélice sur le corps de cylindre.

4. Ensemble formant cylindre selon la revendication 1, 2 ou 3, dans lequel lesdites rangées s'étendent parallèlement à l'axe du corps de cylindre.

5. Ensemble formant cylindre selon la revendication 1, 2 ou 3, dans lequel lesdites rangées sont disposées en hélice sur le corps de cylindre.

6. Ensemble formant cylindre selon l'une quelconque des revendications précédentes, dans lequel, pour chacune desdites rangées de segments portant des dents, les emplacements des dents sur les segments portant des dents sont décalés par rapport à l'axe du corps de cylindre.

7. Ensemble formant cylindre selon la revendication 6, dans lequel, pour chacune desdites rangées de segments portant des dents, lesdits emplacements sont décalés selon une configuration irrégulière.

8. Ensemble formant cylindre selon l'une quelconque des revendications précédentes, dans lequel ledit corps de cylindre est d'une seule pièce.

9. Ensemble formant cylindre selon l'une quelconque des revendications 1 à 7, dans lequel ledit corps de cylindre comprend une pluralité d'anneaux disposés côte à côte.

10. Ensemble formant cylindre selon la revendication 9, dans lequel la longueur de chacun desdits anneaux est sensiblement égale à la longueur de chacun desdits segments portant des dents, suivant le sens axial du corps de cylindre.

11. Ensemble formant cylindre selon la revendication 9 ou 10, dans lequel lesdits anneaux sont montés sur un arbre commun.

12. Ensemble formant cylindre selon la revendication 11, dans lequel lesdits anneaux et l'arbre sont dotés d'une cannelure permettant un déplacement axial, mais non angulaire, des anneaux sur l'arbre.

13. Ensemble formant cylindre selon l'une quelconque des revendications précédentes, dans lequel les segments extrêmes portant des dents sont fixés au corps de cylindre, pour réaliser au moins un des moyens de butée.

14. Ensemble formant cylindre selon l'une quelconque des revendications précédentes, dans lequel au moins l'un des moyens de butée comprend des demi-bagues de serrage fixées à une extrémité du corps de cylindre.

15. Ensemble formant cylindre selon l'une quelconque des revendications précédentes, dans lequel les dents viennent de matière avec les segments portant des dents.

16. Ensemble formant cylindre selon l'une quelconque des revendications 1 à 14, dans lequel les dents sont sous la forme de pics amovibles situés dans des boîtes à pic respectives réalisées dans les segments portant des dents.

17. Ensemble formant cylindre selon l'une quelconque des revendications 1 à 14, dans lequel les dents sont sous la forme de pics amovibles situés dans des boîtes à pic respectives prévues sur les segments portant des dents.

18. Ensemble formant cylindre selon l'une quelconque des revendications précédentes, dans lequel chacune desdites saillies présente une section tranversale qui remplit pratiquement la section transversale de la rainure respective.

19. Ensemble formant cylindre selon l'une quelconque des revendications précédentes, dans lequel les rainures ont en coupe une forme sensiblement en queue d'aronde.

20. Ensemble formant cylindre selon l'une quelconque des revendications précédentes, dans lequel lesdites saillies ont en coupe une forme sensiblement en queue d'aronde.

21. Ensemble formant cylindre selon l'une quelconque des revendications précédentes, dans lequel pratiquement la totalité de la surface intérieure de ladite portion arquée, autre que ladite saillie s'étendant radialement vers l'intérieur, s'adapte étroitement à la périphérie du corps de cylindre.

22. Broyeur à cylindres comprenant une enveloppe et un ensemble formant cylindre monté sur des paliers dans l'enveloppe et définissant une zone de pincement entre l'ensemble formant cylindre et un autre organe, de sorte que la matière puisse entrer dans la zone de pincement et être broyée par l'ensemble formant cylindre, dans lequel l'ensemble formant cylindre est conforme à l'une quelconque des revendications précédentes et est monté dans l'enveloppe de façon à ménager entre au moins une extrémité de l'ensemble formant cylindre et son palier respectif un espace qui est au moins égal à la largeur de l'un des segments portant des dents, de sorte que, lors de la libération des moyens de butée respectifs, les segments portant des dents peuvent être glissés axialement le long des rainures dans des positions à partir desquelles ils peuvent être retirés de l'ensemble formant cylindre suivant une direction radiale par rapport à ce dernier, sans avoir à démonter l'ensemble formant cylindre de ses paliers.

23. Broyeur à cylindres selon la revendication 22, comprenant deux ensembles formant cylindres montés de manière à tourner en sens inverse et aptes à coopérer l'un avec l'autre afin de définir ladite zone de pincement.

24. Broyeur à cylindres selon la revendication 22 ou 23, comprenant en outre une plaque d'u sure qui est montée de manière amovible sur ladite enveloppe pour couvrir au moins une partie dudit espace.

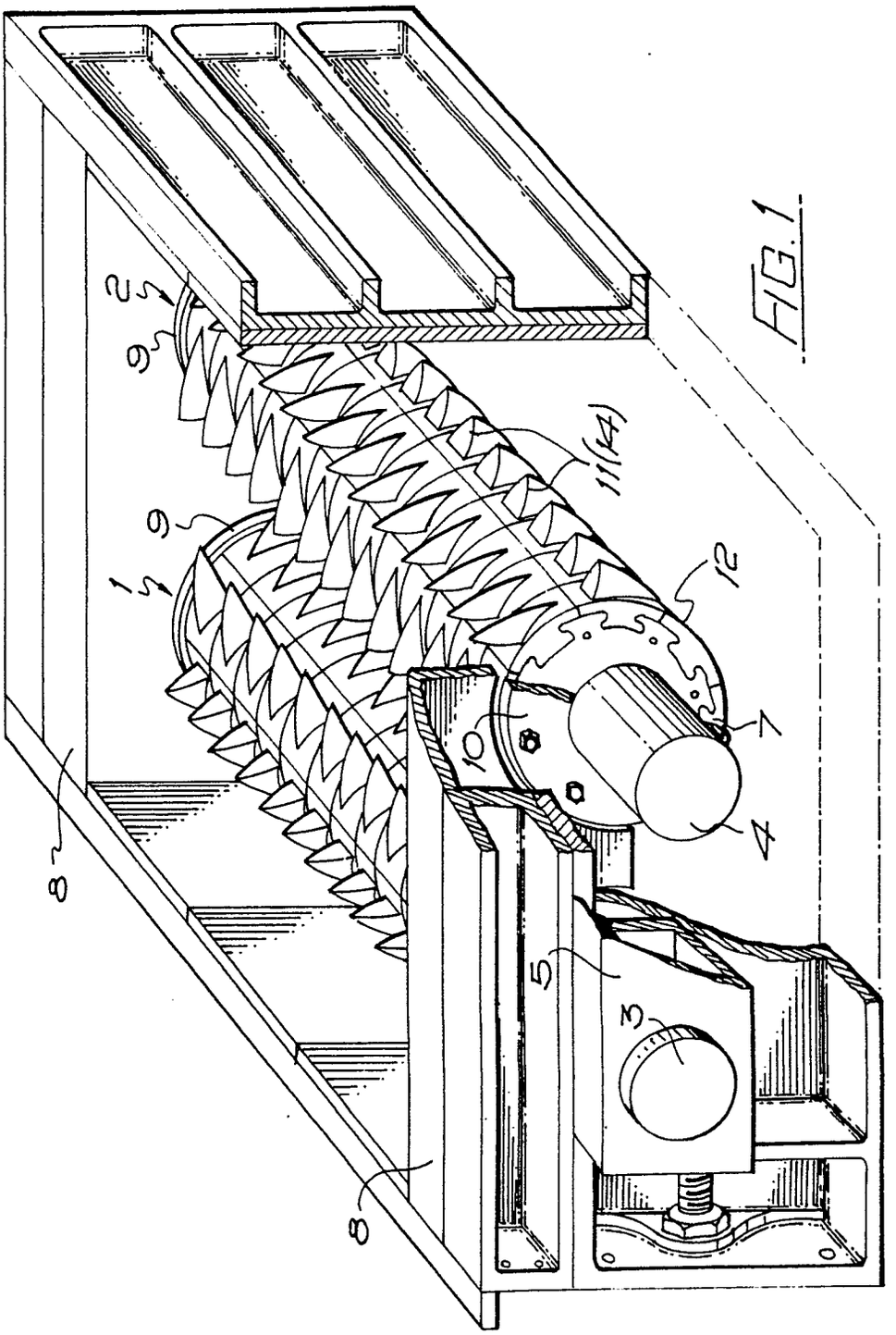

FIG. 1

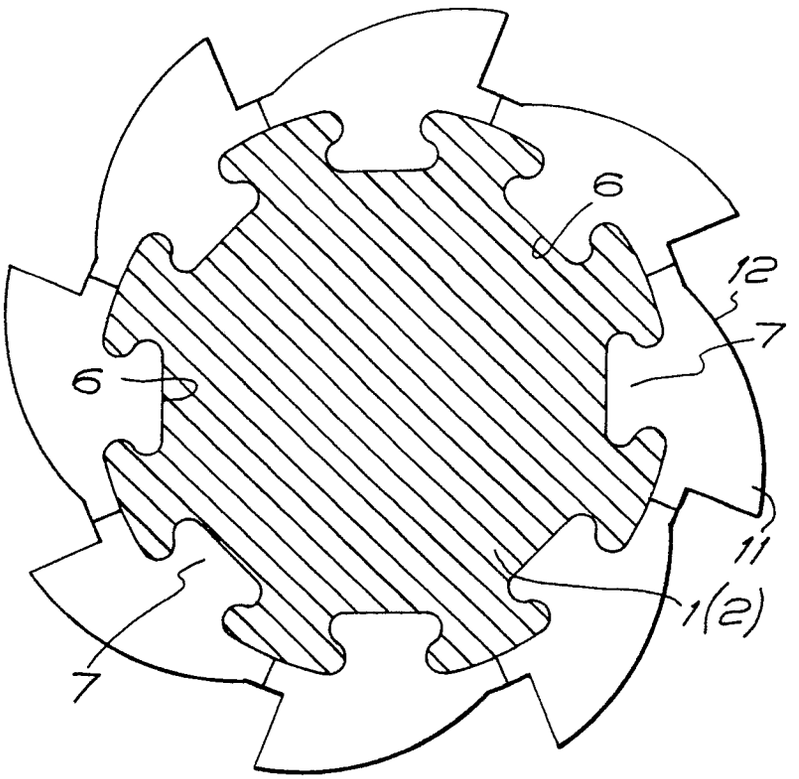

FIG. 2

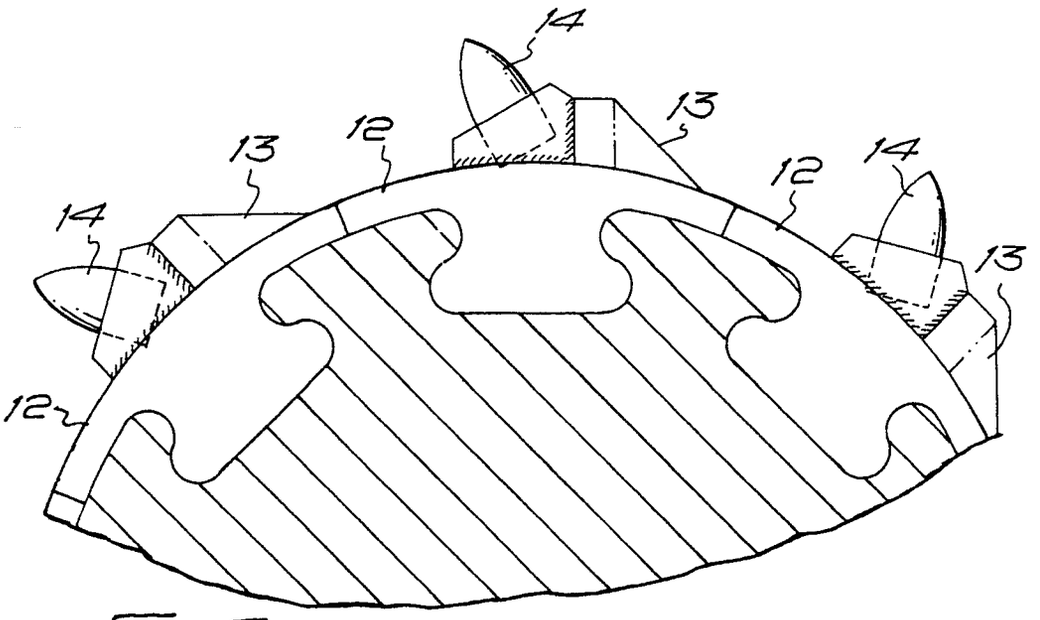

FIG. 3

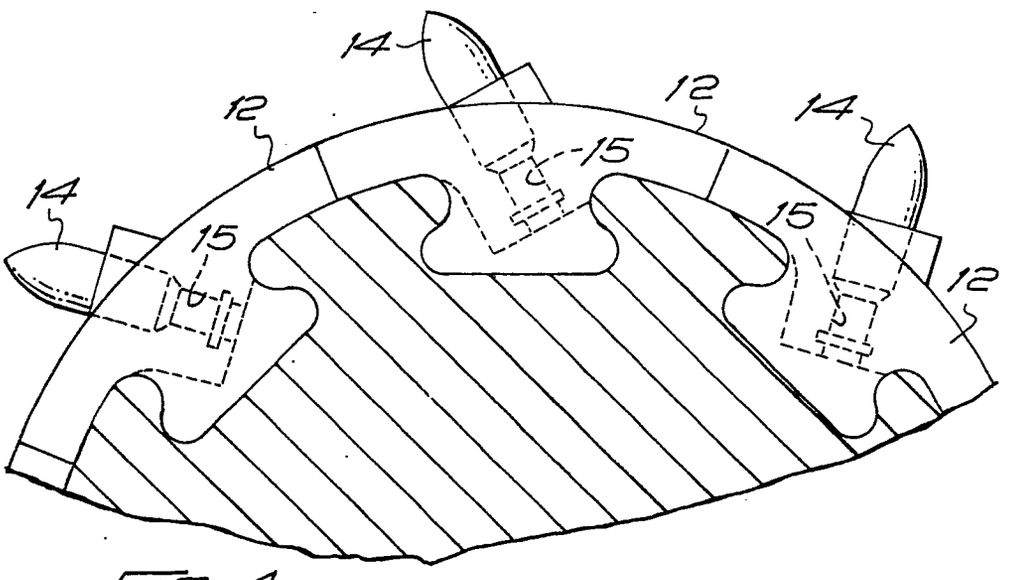

FIG. 4

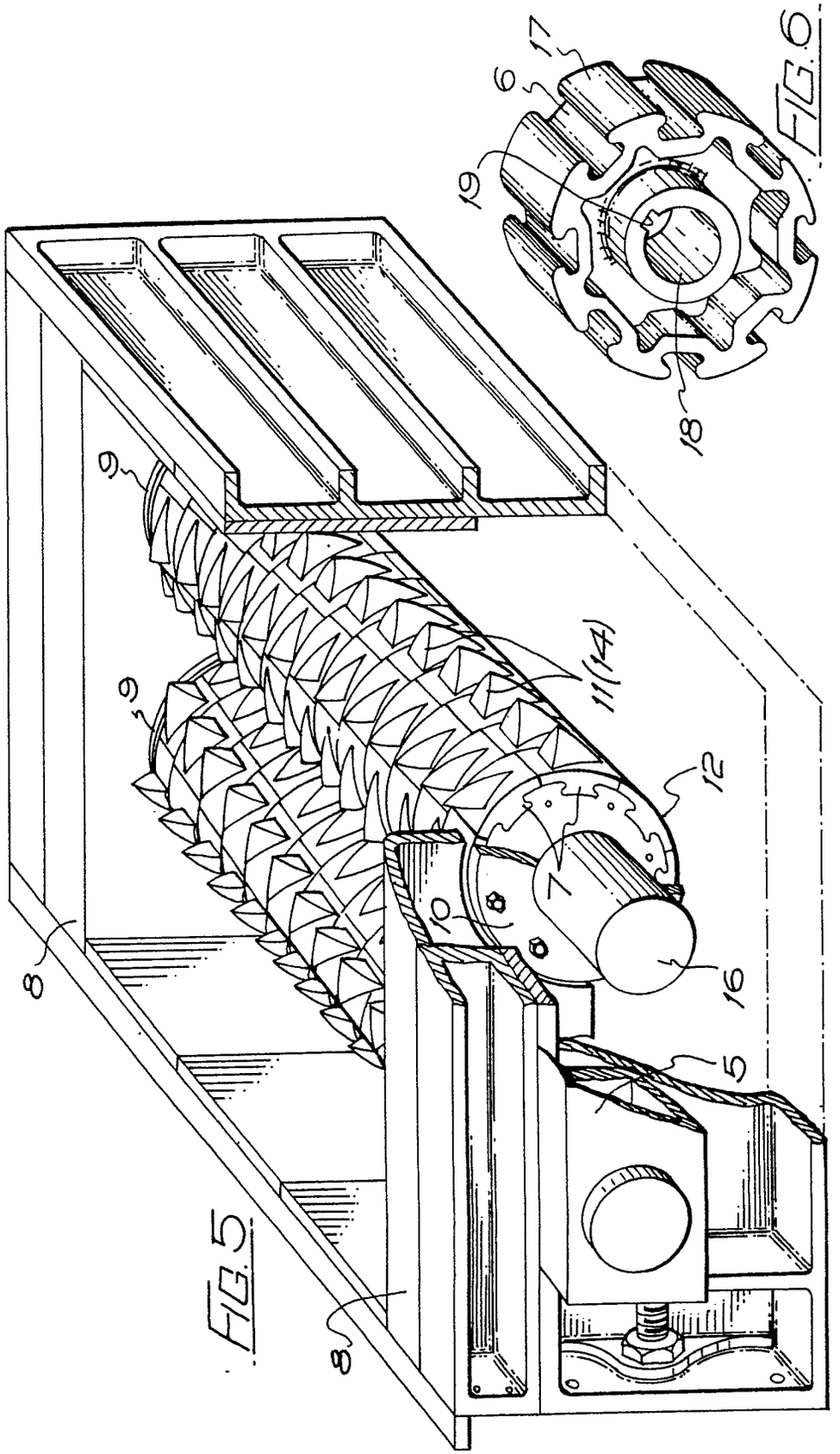

FIG.6

FIG.5