Dec. 6, 1966 D. E. JONES 3,289,954

DISK REFINER

Filed March 17, 1964 2 Sheets-Sheet 1

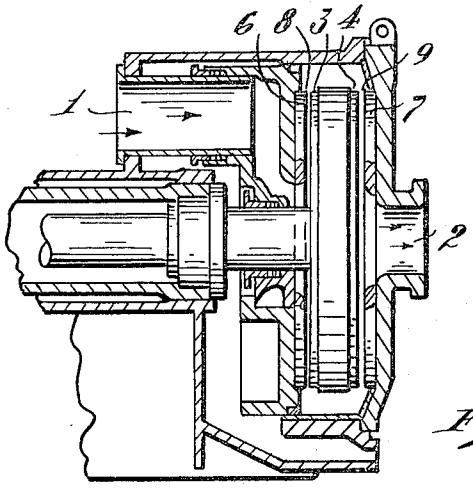


Fig. 1

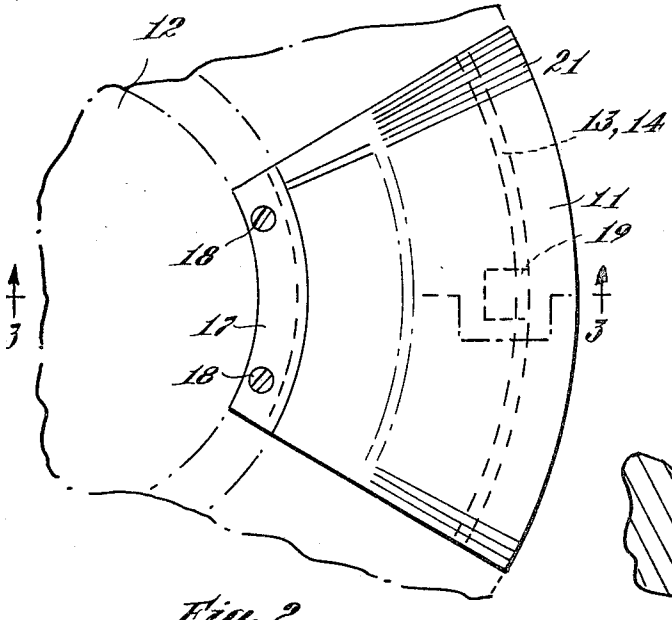


Fig. 2

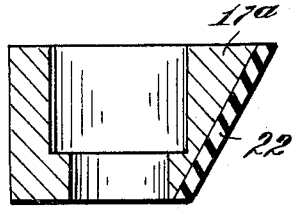


Fig. 4

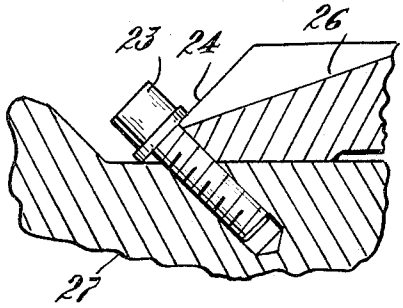


Fig. 5

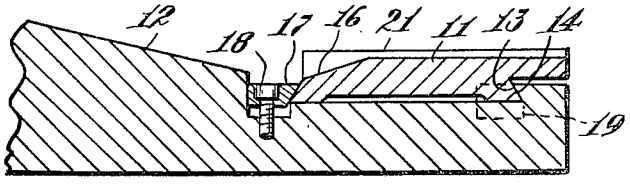


Fig. 3

INVENTOR.
Dwight E. Jones
BY
Roberts, Cushman & Grover
ATT'YS

Dec. 6, 1966 D. E. JONES 3,289,954

DISK REFINER

Filed March 17, 1964 2 Sheets-Sheet 2

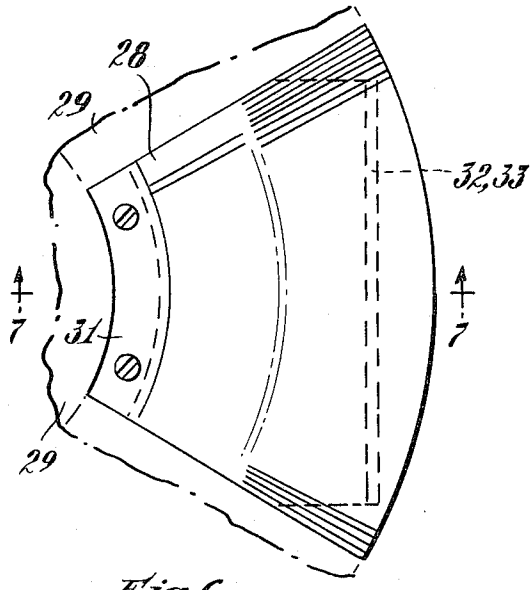


Fig. 6

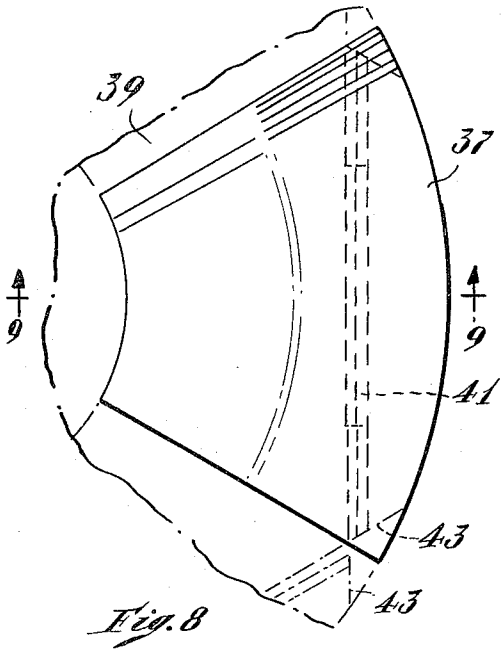


Fig. 8

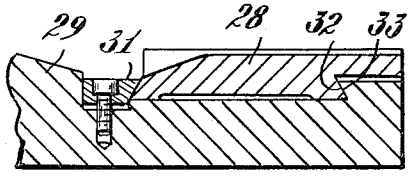


Fig. 7

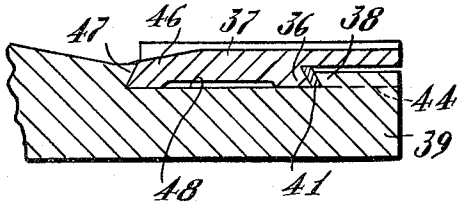


Fig. 9

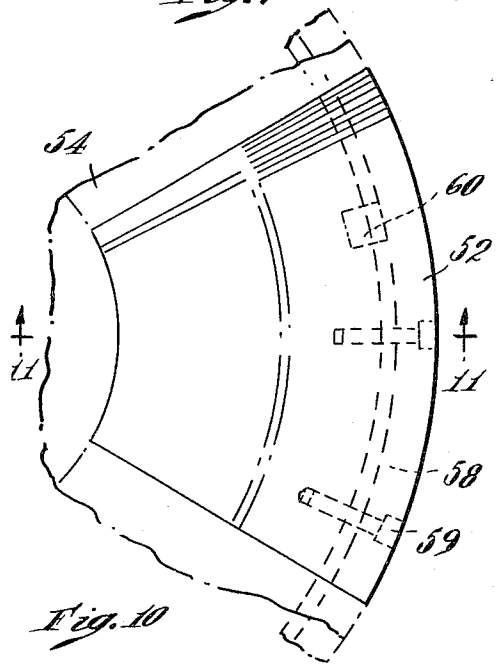


Fig. 10

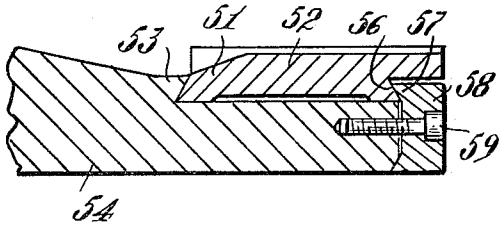


Fig. 11

United States Patent Office 3,289,954 Patented Dec. 6, 1966

3,289,954

DISK REFINER

Dwight E. Jones, Pittsfield, Mass., assignor to E. D. Jones Corporation, Pittsfield, Mass., a corporation of Delaware

Filed Mar. 17, 1964, Ser. No. 352,946
4 Claims. (Cl. 241—298)

This invention relates to apparatus for refining fibrous material and more particularly to refiners of the type having juxtaposed disks with refining blades on their opposed faces, one disk rotating relatively to the other disk to work on pulp or other material therebetween. While this invention is applicable to various types of refiners, including single rotating disk refiners and counter rotating disk machines, a typical refiner of this type is disclosed in Patent 3,049,307, granted August 14, 1962. Owing to the fact that the blades wear out and must be replaced, it is customary to form them on segments which are detachably mounted on the faces of the disks. Heretofore it has been proposed to mount the segments by bolts extending through the segments but this reduces the area of the bladed surfaces and reduces the efficiency of the apparatus. It has also been proposed to mount the segments by means of bayonet lugs on the back of the segments sliding into T-shaped slots in the disks but this construction involves considerable breakage.

The object of the present invention is to provide means for mounting the segments on the disks which do not reduce the bladed area of the segments, which are simple and economical to produce, which can be assembled and disassembled quickly and easily, and which are durable and reliable in use.

In one aspect the present invention involves a refiner comprising a backing disk, refining segments distributed around one side of the disk, and means to hold the segments on the disk, said means including pairs of interlocking dovetail faces on the disk and segments, one face of each pair being on the disk and the cooperating face of each pair being on a segment, the dovetail faces extending transversely of radii of the disk. Preferably the refiner has means to detachably fasten one face of each pair to the disk, and the faces on the disk face toward the center of the disk and faces on the segments face away from the center of the disk. In a more specific aspect the disk and segments have second pairs of faces in which the faces on the disk face toward the periphery of the disk and the faces on the segments face toward the center of the disk. The dovetail faces may be concentric with the center of the disk or straight. Preferably the faces of one pair are concentric with the center of the disk and the faces of the other pair are perpendicular to radii of the disk.

As a sub-combination the apparatus involves a segment comprising refining blades on one side and, on the other side, means for mounting the segment including a dovetail face extending transversely of radii of the segment. Preferably the segment has a second pair of dovetail faces one face facing inwardly and one face facing outwardly. The dovetail faces may be concentric with the segment or straight. In the preferred embodiment one face of each segment is concentric wtih the segment and the other is straight.

For the purpose of illustration typical embodiments of the invention are shown in the accompanying drawings in which:

FIG. 1 is an axial section of a refiner such as described and claimed in the aforesaid patent;

FIG. 2 is a face view of a portion of a disk showing one segment mounted thereon;

FIG. 3 is a section on line 3—3 of FIG. 2;

FIG. 4 is a detail section like FIG. 3 showing a slight modification;

FIG. 5 is a similar section showing a modification;

FIG. 6 is a view like FIG. 2 showing a modification;

FIG. 7 is a section on line 7—7 of FIG. 6;

FIG. 8 is a face view like FIGS. 2 and 6 of another modification;

FIG. 9 is a section on line 9—9 of FIG. 8;

FIG. 10 is a face view of another modification; and

FIG. 11 is a section on line 11—11 of FIG. 10.

The refiner shown in FIG. 1 comprises an inlet 1, an outlet 2, a rotor having refining blades 3 and 4 on its opposite faces and two stationary disks 6 and 7 having refining blades opposed to the rotor blades 3 and 4 across radial passageways 8 and 9. The material to be refined feeds outwardly through the passageway 8 and inwardly through the passageway 9. Details of the apparatus are more fully described in the aforesaid patent.

In the embodiment shown in FIGS. 2 and 3 segments 11 are mounted around the face of a disk 12 which may be either a rotary or a stationary disk of FIG. 1. Near its periphery each segment has a dovetail face 13 engaging under a dovetail face 14 on the disk. At its inner periphery each segment has a dovetail face 16 engaging under a dovetail face 17 mounted on the disk by means of screws 18. Relative movement of each segment relative to the disk is prevented not only by the screws 18 but also by a cubical key 19 fitting into recesses in the opposed faces of the segment and disk. On the face of each segment are integral refining blades 21 of suitable configuration, as for example as disclosed in the aforesaid patent. To assemble the parts the dovetail face 13 is slipped outwardly under the dovetail face 14 and the dovetail face 17 is then secured in position by means of the screws 18. In the modification shown in FIG. 4 the dovetail face 17*a*, corresponding to 17 of FIGS. 2 and 3, is provided with a resilient facing 22 to permit expansion of the segment as it heats up in use.

The modification shown in FIG. 5 is like that of FIGS. 2 and 3 except in that the dovetail face 17 is replaced by screws 23 which have heads bearing on the dovetail face 24 of the segment 26, the screws threading into the disk 27.

The modification shown in FIGS. 6 and 7 is like that shown in FIGS. 2 and 3 in that the segment 28 is secured on the disk 29 by a dovetail 31 which is concentric with the axis of the disk. However, instead of being concentric with the axis of the disk, the outer dovetail faces 32 and 33 are straight as shown in FIG. 6. To assemble the parts the dovetail face 32 is slipped under the dovetail face 33 and the dovetail 31 is then applied. In this embodiment of the invention the dovetail serves not only to hold the segments on the disks but also to prevent relative rotation of the segments relative to the disk.

The modification shown in FIGS. 8 and 9 is like that shown in FIGS. 6 and 7 in that the outer dovetails are straight. However, the dovetail face 36 on the segment 37 is spaced from the dovetail face 38 on the disk 39 and a key 41 is slipped endwise into the space between the two faces. To permit access to the ends of the key space the disk 39 is cut away at the outer corners of the segments back to the lines 43 in FIG. 8 and down to the line 44 in FIG. 9. The inner dovetail face 46 of each segment seats under the dovetail face 47 on the disk. To assemble the parts each segment is seated in the recess 48 in the disk and then moved inwardly until the dovetail face 46 seats under the dovetail face 47. Then the key 41 is driven in lengthwise as aforesaid.

The modification shown in FIGS. 10 and 11 is like that shown in FIGS. 8 and 9 in that the dovetail face 51 on the inner edge of each segment 52 seats under a dovetail face 53 on the disk 54. However, the outer dovetail face

56 of each segment seats under a dovetail face 57 on a ring 58 secured in position by means of screws 59. In each embodiment each ring may extend any desired distance around the periphery of the disk but as shown in the drawings it preferably extends 60° so that six segments fill a disk. In the embodiment shown in FIGS. 10 and 11 each of the retaining rings 58 preferably extends through 180° around the periphery of the disk and is keyed to the disk by keys 60.

From the foregoing it will be evident that according to the present invention the blades are not interrupted by the fastening means but cover the entire area of the segment. Moreover the novel mounting means are simple and economical to produce, they can be assembled and disassembled quickly and easily and they are durable and reliable in use.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. A refiner comprising a backing disk, refining segments distributed around one side of the disk, and means to hold the segments on the disk, said means including pairs of interlocking dovetail faces on the disk and segments, the faces extending transversely of radii of the disk, one pair of said faces being straight so as to prevent relative rotation of the segments relative to the disk.

2. A refiner according to claim 1 wherein the disk and segments have a second pair of dovetail faces in which the faces on the disk face toward the periphery of the disk and the faces on the segments face toward the center of the disk, and wherein the faces of one pair are concentric with the center of the disk and the faces of the other pair are perpendicular to radii of the disk.

3. For use in a disk refiner, a segment comprising refining blades on one side and, on the other side, means for mounting the segment including a pair of dovetail faces extending transversely of radii of the segment, the dovetail faces being straight.

4. For use in a disk refiner, a segment comprising refining blades on one side and, on the other side, means for mounting the segment including a pair of dovetail faces extending transversely of radii of the segment, having a second pair of dovetail faces, one face facing inwardly and one face facing outwardly, and wherein one dovetail face is concentric with the segment and the other is straight.

References Cited by the Examiner

UNITED STATES PATENTS

1,063,688	6/1913	Hull	51—209
1,593,153	7/1926	Ambler	241—298 X
2,778,282	1/1957	Sutherland	241—296 X
3,104,837	9/1963	Steiniger	241—296

ROBERT C. RIORDON, *Primary Examiner.*

D. KELLY, *Assistant Examiner.*