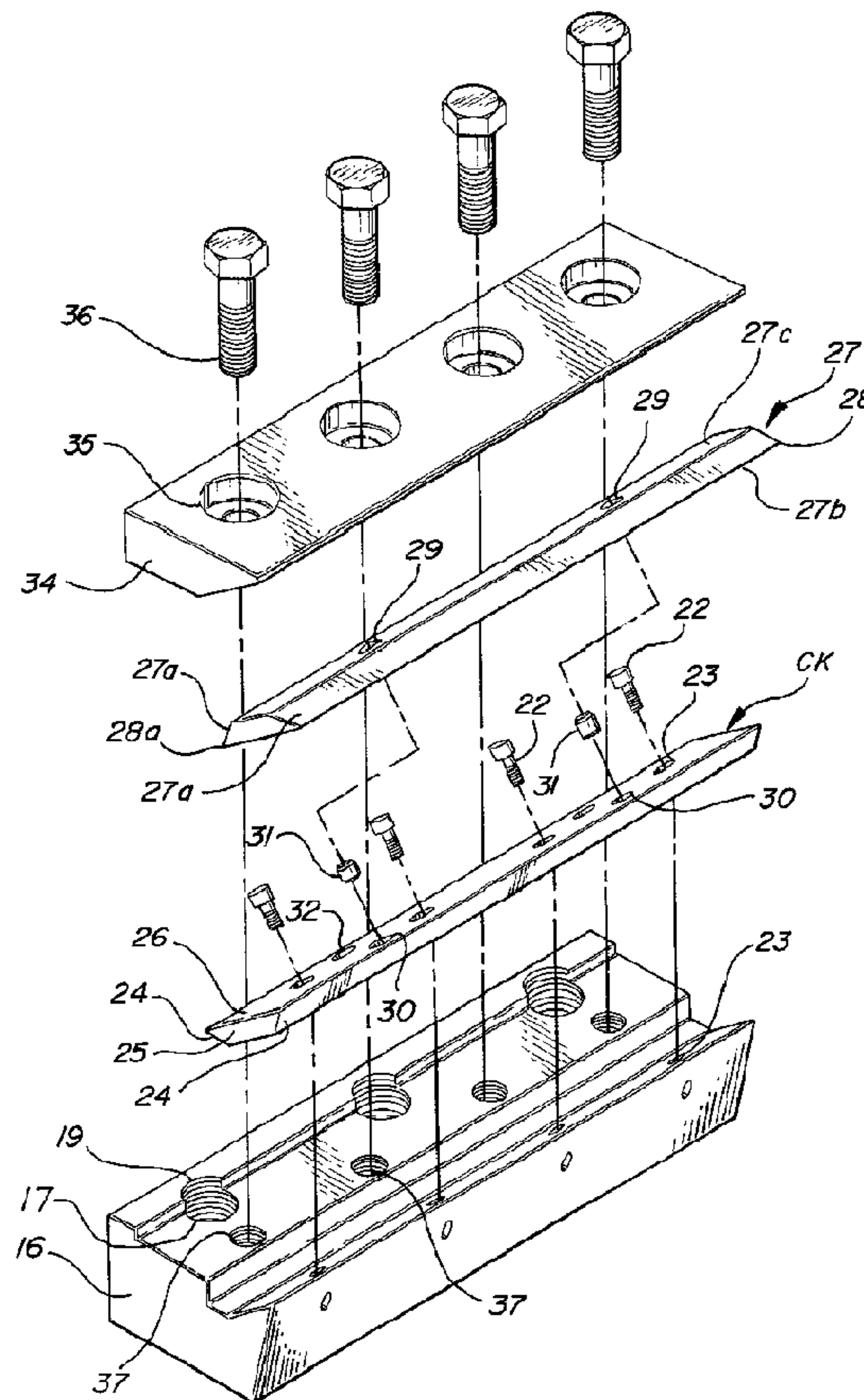




(22) Date de dépôt/Filing Date: 1998/06/05
 (41) Mise à la disp. pub./Open to Public Insp.: 1998/12/17
 (45) Date de délivrance/Issue Date: 2003/12/16
 (30) Priorité/Priority: 1997/06/17 (08/877,232) US

(51) Cl.Int.⁶/Int.Cl.⁶ B27G 13/10, B27L 11/02
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(54) Titre : PORTE-COUTEAU ET COUTEAU POUR DISQUE DE TETE DE DECHIQUETEUSE
 (54) Title: WOOD CHIPPER ROTOR HEAD KNIFE HOLDER AND KNIFE ASSEMBLY



(57) Abrégé/Abstract:

A wood chipper knife holder assembly for a power driven rotor head has at least one opening in its wood confronting surface for the knife holder assembly which includes a mount block. A counter-knife receiving surface opposite the wood confronting surface of the rotor head is provided on the mount block for a counter-knife and a reversible knife blade with cutting surfaces

(57) Abrégé(suite)/Abstract(continued):

along opposite transverse edges is received on the counter-knife. A clamp plate secures to clamp the knife in a projecting cutting position. The counter-knife has at least one pair of spaced apart pin openings and the knife blade has at least one pair of complementary pin openings, and pins are received in the knife blade openings and counter-knife pin openings to permit 180° relocation of the knife.

ABSTRACT

A wood chipper knife holder assembly for a power driven rotor head has at least one opening in its wood confronting surface for the knife holder assembly which includes a mount block. A counter-knife receiving surface opposite the wood confronting surface of the rotor head is provided on the mount block for a counter-knife and a reversible knife blade with cutting surfaces along opposite transverse edges is received on the counter-knife. A clamp plate secures to clamp the knife in a projecting cutting position. The counter-knife has at least one pair of spaced apart pin openings and the knife blade has at least one pair of complementary pin openings, and pins are received in the knife blade openings and counter-knife pin openings to permit 180° relocation of the knife.

WOOD CHIPPER ROTOR HEAD KNIFE HOLDER
AND KNIFE ASSEMBLY

5

The present invention relates to improvements in chipper knife and counter knife assemblies in knife holders which are housed in openings provided in rotor heads such as chipper discs. Typically, apparatus of the character to be described is utilized in circumferentially spaced relation on the chipper disc of a chipping machine which chips wood into chips. Such chippers are used to chip a wide variety of wood, ranging from whole logs and trees to saw mill residual wood and recyclable wood resulting from the demolition of old buildings, for example.

10

The present invention is concerned with the utilization of relatively low cost, disposable, reversible knives, clamped to a counter-knife which is secured within a knife holder assembly. Typically, the chipping disc employed has a plurality of such knives and knife holders, as disclosed, for example, in United States Patent Nos. 3,661,333; 4,057,192; and 4,078,590.

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While reversible knife blades are well known, none of the known systems have overcome all of the problems incident to their use, and

none compositely have all of the advantages of the system to be disclosed herein.

5 The invention is concerned with the
employment of a double-edged reversible knife
which is removably mounted on the counter-knife
by pins which project into pin openings in the
10 counter-knife. A clamp plate is in engagement
with the outer knife blade surface. With the
present system, one individual can change the
knives from the wood confronting front of the
disc by simply backing off the clamp plate,
15 lifting the knife plate with its pins off the
counter-knife, turning it end for end to reengage
it via its pins, and then resecuring the clamp
plate. When the counter knife as well as the
knife blade is worn, it is a relatively simple
20 matter to further back off the fasteners holding
the counter knife in the knife holder assembly as
well, and reverse the counter-knife before
replacing and reinstalling the knife blade via
alternative pin openings in the reversed counter-
25 knife.

One of the prime objects of the present invention is to provide a knife system permitting

changing of the knives from the front of the disc
in a much faster and safer manner.

5 A further object of the invention is to
provide a system effecting labor savings for the
customer in the replacement of the throwaway
knives and counter-knives as they become unduly
worn.

10 Another object of the invention is to
very efficiently mount the lift-off knife blades
in a manner to prevent them from slipping,
without fixing them in position with fasteners
which need to be backed off before the change can
be effected.

15 Still a further object of the invention
is to provide a reliable knife and counter-knife
blade system of a simple nature which is
economical to install and to use, and which can
be easily retrofitted in chippers which are
already in the field.

20 Other objects and advantages of the
invention will become apparent with reference to
the accompanying drawings and the accompanying
descriptive matter.

In the drawings, Figure 1 is a
schematic perspective elevational view of a
5 typical rotor head disc;

Figure 2 is a considerably enlarged
fragmentary transverse sectional view taken on
the line 2-2 of Figure 1; and

Figure 3 is an exploded view
10 illustrating the knife holder assembly
componentry.

15 Referring now more particularly to the
accompanying drawings, and in the first instance
to Figures 1 and 2 particularly, it is to be
understood that the rotor head or chipper disc,
generally indicated at D, is fixed to the flange
20 of a motor driven drive shaft (not shown) in the
usual manner, such as by extending bolts or other
fasteners through the openings 10 which are
provided through the disc D. Provided in the disc
D, are a trio of circumferentially spaced
25 openings, generally designated O, which are
internally configured in the manner indicated in
Figure 2 to each fixedly mount a tool holder
assembly, generally designated TH, which
presently will be described in detail. The disc

D, it will be noted, has a central opening 11 which snugly receives the drive shaft and the wood confronting surface of the disc D may be provided by wear resisting segment covers 12
5 which are formed with openings 13 generally conforming compositely to the openings O.

It will be observed that each opening O has a generally radially extending leading marginal wall 14 which is circumferentially
10 spaced from the tool holder assembly TH sufficiently to form a chip expressing passage 14a through which the chips cut pass from the wood confronting front of the disc D to the rear of the disc D in the usual manner. The opening O
15 further has a trailing stepped wall 15 which includes an inner shouldered surface 15a and an outer shouldered surface 15b. A wall 15c connects the shouldered surfaces 15a and 15b and, together, the walls 15a and 15c provide a seat
20 for a mount block, generally designated 16, which is configured in the manner more specifically illustrated in Figure 3. Bolt openings 17 can be provided, as shown in Figures 2 and 3, for bolts 18 which extend into threaded openings 19 in the
25 mount block 16 to releasibly fix the tool holder assembly in place. It will be seen that the inclined front face of mount block 16 is cut away

as at 20, and provides a counter-knife receiving surface 21 at an acute angle relative to the direction of rotation of the cutter disc D and its frontal wood confronting surface. Received on the surface 21 is a counter-knife, generally designated CK, which has a series of fastener or screw openings 22 for cap screws which extend into threaded openings 23 to releasably secure the counter-knife CK in position. The opposed edges of the counter-knife are acutely oppositely beveled as at 24 in a manner which permits them to be turned 180°, or end for end, and the cutaway portion 20 is configured to accommodate this, as shown in Figure 2. The inner surface of the blade-like counter-knife CK is flatted to conform to the receiving surface 21 and its outer surface 26 is parallelly flatted to receive the cutting knife or blade, generally identified by the numeral 27.

As will be seen, the cutting knife 27, which has a leading cutting edge 28 in Figure 2, has acutely oppositely beveled portions 27a so that the knife can be turned 180° or end for end, to present a fresh cutting edge 28a to the wood confronting side of the disc D at the appropriate time. The flat inner face of the knife 27 may be

identified as 27b and the parallel outer surface
of the knife 27 is identified by the numeral 27c.
It will be observed that the knife blade 27 is
provided with a pair of cylindrical, through
5 openings 29 which are centrally located in the
surface 27c along an end to end longitudinal
centerline and are equally spaced from the ends
of the blade.

The counter-knife CK has a pair of
10 complemental cylindrical pin openings 30 which,
when the knife blade 27 and counter knife CK are
in the operating position shown in Figure 2,
receive the cylindrical pins 31 carried normally
but releasably by knife blade 27. It will be
15 observed that the openings 30 are not
longitudinally centrally located but are
forwardly, transversely displaced relative to the
cutting edge 28 in Figure 2. Provided in
transverse parallelism with the openings 30 are
20 alternative cylindrical pin openings 32 which are
equally transversely displaced from a
longitudinal centerline taken through counter-
knife CK. The disposition of alternative
openings 32 is such that they will receive the
25 pins 31 when the position of the counter knife CK
is reversed due to wear.

5 Provided in the mount block 16 is a
recess 33 for receiving and seating a knife
clamp, generally designated 34, which is provided
with counterbored openings 35 for receiving bolts
6 36 which extend down into threaded openings 37
provided in the mount block 16 to secure the
clamp 34 in the position indicated in Figure 2.
The clamp plate 34 has an under-beveled clamp
surface 34a, which covers the pin openings 29.
10 It will further be observed that a plate 38 is
fixed in position as by welding it in position,
as at 38a, or bolting it, for example, and that
the trailing upper corner of mount block 16 is
received thereunder.

15

In practice, the chips which are cut by
the cutting edge 28 in Figure 2 move through the
openings 13 and O to the rear of disc D in the
usual manner. The degree of projection of the
20 knife 27 from the wood confronting surface of the
disc D and the counter knife leading edge 24
determines the size of the chips which are
produced. It is desirable that uniform size
chips be produced, when these chips are to be
25 used in the paper making industry, for example.
The present invention therefore contemplates the
use of relatively inexpensive blades 27 which,

when dulled, are normally reversed end for end.
It further contemplates the end for end reversal
of the counter-knife 21 when the leading surface
24 of the counter-knife becomes worn. Normally,
5 the knife 27 will wear somewhat more rapidly so
that knife changes will need to be effected
somewhat more frequently than counter-knife
changes. Because of the acute angulation of
surface 21, both the counter-knife CK and knife
10 blade can be relatively economically produced,
rapidly reversible blade-like components.

In practice, to reverse the knife 27,
it is merely necessary to back off the bolts 36
and remove the clamp 34. The pins 31 are more
15 snugly carried with a tighter tolerance in
openings 29 than in openings 30 or 32 so the
knife 27, carrying pins 31, may simply be lifted
off and reversed to present the opposed cutting
edge 28a to the wood confronting surface, after
20 which the clamp plate 34 may be replaced. If, at
the same time, it is desired to reverse the
position of the counter-knife blade 21, it is
merely necessary to remove the allenhead cap
screws 23, once the knife blade 27 is removed,
25 and to then replace the blade 27 such that the
pins 31 seat in the other, now leading, openings
32. Then, cap screws 22 may be replaced, the

knife blade 27 reversed if necessary, and finally
the clamp plate 34 reapplied. Because the mount
block surface 21 is acutely angled to be parallel
with the counter-knife parallel surfaces, and the
5 inner and outer surfaces of the knife 27, the
counter-knife CK can be provided with edges 24
which can be readily interchanged.

The system which has been disclosed and
claimed will work very well in chipping whole
10 trees and, of course, if debris is encountered
which breaks off an edge 28, the knife blade 27
can be easily reversed in the manner indicated.
Basically, all the knives 27 and counter-knives
CK are reversible, throw away blades. Some
15 sharpening may be feasible, if it is such as not
to affect the size of the chips which are being
cut in an unacceptable manner. Also, with the
system described, the counter-knife configuration
can be varied in terms of the angularity of its
20 leading face 24, or its width to move the face 24
closer to or further from the knife cutting edge
28 or 28a, to accommodate to the various wood
types to be cut, and the climactic conditions
where cutting is taking place.

25 The disclosed embodiment is
representative of a presently preferred form of
the invention, but is intended to be illustrative

rather than definitive thereof. The invention is defined in the claims.

THE EMBODIMENT OF THE INVENTION IN WHICH
AN EXCLUSIVE PROPERTY OR PRIVILEGE IS
CLAIMED ARE DEFINED AS FOLLOWS:

1. In a wood chipper knife holder assembly for a power driven rotor head having at least one opening in its wood confronting surface in which the knife holder assembly is fixedly mounted, the knife holder assembly including a mount block, received within the said rotor head opening, which has an inclined surface acute to and angularly facing the wood confronting surface, the rotorhead leaving a chip passage for receiving the chips cut, a counter knife blade received on said inclined surface of the mount block, a reversible knife blade with cutting surfaces along opposed edges received on said counter knife, and a clamp plate secured to clamp the knife in a cutting position in which one of its cutting edges projects beyond the counter-knife and wood confronting surface in cutting position; the improvement wherein:

a. the counter-knife is an endwisely reversible counter-knife having inner and outer surfaces parallel to said mount block inclined surface, the outer surface of the counter-knife having at least a pair of transversely spaced apart alternative pin openings;

b. the knife blade has inner and outer surfaces parallel to said surfaces of the counter-knife, and at least one pin opening; and

c. a pin is received in said knife blade opening, and also one of said alternative counter-knife openings with which it aligns, which permits placement of said knife at 180° rotated positions, the said pin being selectively receivable in one of the alternative pin openings in said counter knife which are so spaced as to dispose the other knife edge in a cutting position projecting from the wood confronting surface when the counter-knife is endwisely reversed as well.

2. The assembly of claim 1 wherein the clamp plate has a seat provided in said knife holder and seats therein, and has a beveled surface overlying and bearing on said knife outer surface, there being a fastener extending through said clamp plate to said knife holder mount block to exert a clamping force on said knife.

3. The assembly of claim 1 wherein said counter-knife has counterbores transversely intermediate said pin openings, and fasteners extend therethrough to releasibly anchor said

counter-knife to said inclined surface of the mount block.

4. The assembly of claim 1 wherein said counter-knife has a pair of transversely spaced apart pin openings adjacent each of its ends, said knife has a pair of transversely central pin openings in longitudinal alignment, and a pin is received in each of the pin openings in said knife blade and also one of said counter-knife openings at each end of the counter-knife.

5. A method of making a wood chipper knife holder assembly for a power driven rotor head having at least one opening in its wood confronting surface in which the knife holder assembly is fixedly received, and the knife holder assembly includes a mount block received within the said opening and having a counter-knife receiving surface opposite the wood confronting surface, a counter-knife received on said surface of the mount block, a double edged knife blade is received on the counter-knife, and a clamp is secured to clamp the knife blade and hold it in a position in which it projects beyond the wood confronting surface in cutting position, comprising the steps of:

a. providing the counter-knife with at least one pair of spaced apart pin openings and

removably mounting it on said counter-knife receiving surface of the mount block;

b. providing the knife blade with pin receiving openings;

c. inserting pins in said knife blade pin openings and extending them into said counter-knife openings to permit 180° relocation of said knife blade with respect to said counter-knife; and securing said clamp plate in a position to overlie and bear on said knife outer surface to exert a clamping force thereon.

6. The method of claim 5 wherein the clamp plate has a seat provided in the mount block and further has a beveled surface for overlying and bearing on the knife blade outer surface, and clamping fasteners to extend through the clamp plate to the mount block and clamp the knife blade in position.

7. The method of claim 5 wherein counter-bores are provided in said counter-knife intermediate said pin openings, and extending fasteners therethrough to releasibly anchor said counter-knife to said counter-knife receiving surface of the knife holder assembly.

8. The method of claim 5 wherein the knife blade has a pair of transversely spaced pin

openings near its ends and said counter-knife is provided with a pair of pin openings near each of its ends spaced so that the knife blade, upon release of the clamp plate, can simply be lifted off the counter-knife, the counter-knife is then turned end to end, and the knife blade is reinserted with said pins received in a different set of counter-knife openings to expose a new knife edge in cutting position.

9. In a wood chipper knife holder assembly for a power driven rotor head having at least one opening in its wood confronting surface for the knife holder assembly, the knife holder assembly including a mount block to be received within the said rotor head opening, having a counter-knife receiving surface opposite the wood confronting surface of the rotor head, a counter-knife received on the mount block receiving surface, a reversible knife with cutting surfaces along opposite transverse edges received on the counter-knife, and a clamp plate secured to clamp the knife in a cutting position in which one of its cutting edges projects beyond the counter-knife; the improvement wherein:

(a) the counter-knife is endwisely reversible and removably mounted on the counter knife receiving surface of

the mount block and provided with at least one pair of spaced apart pin openings;

(b) the knife blade has at least one pair of pin openings; and

(c) pins are received in the knife blade openings and counter-knife pin openings to permit 180° relocation of said knife with respect to said counter-knife.

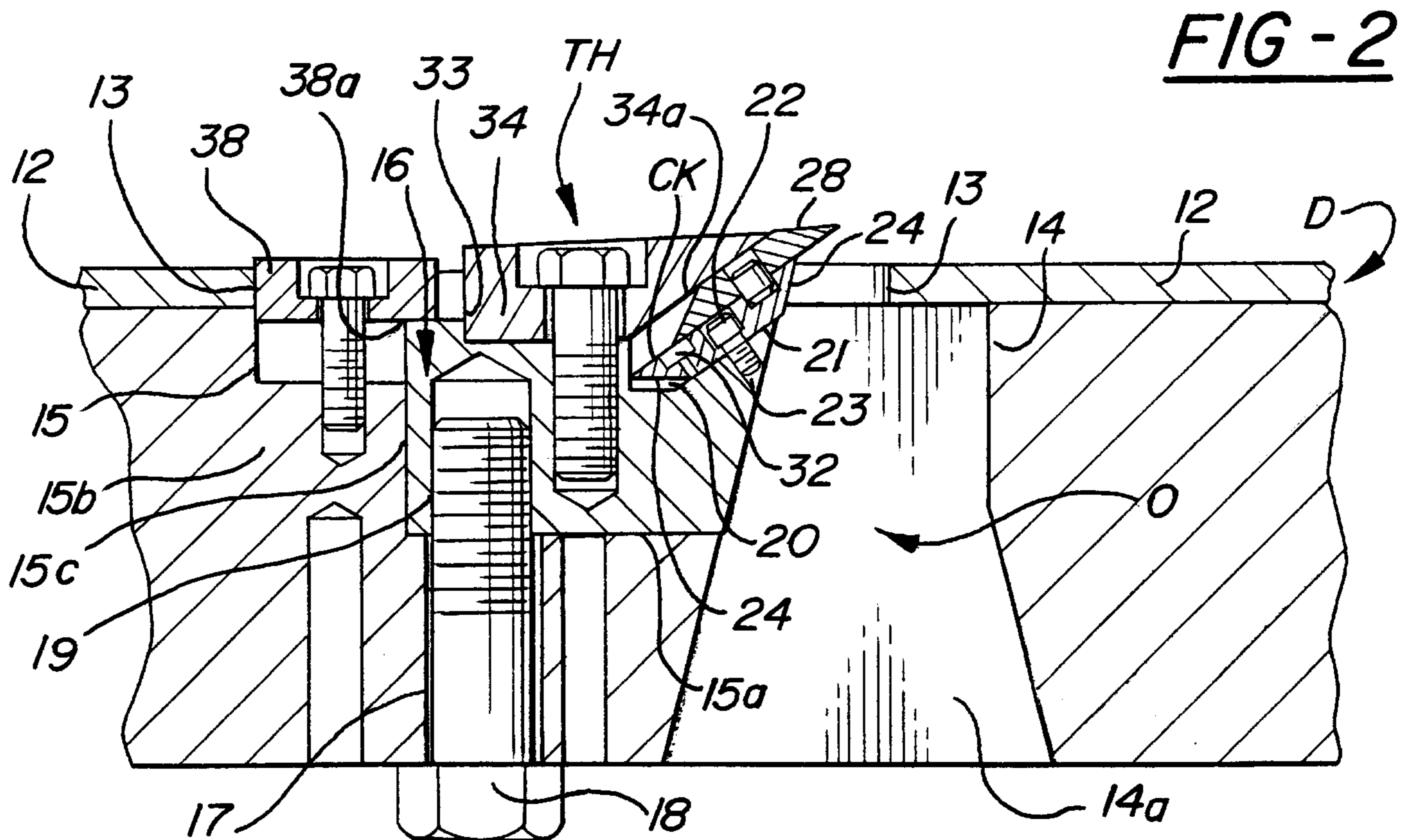
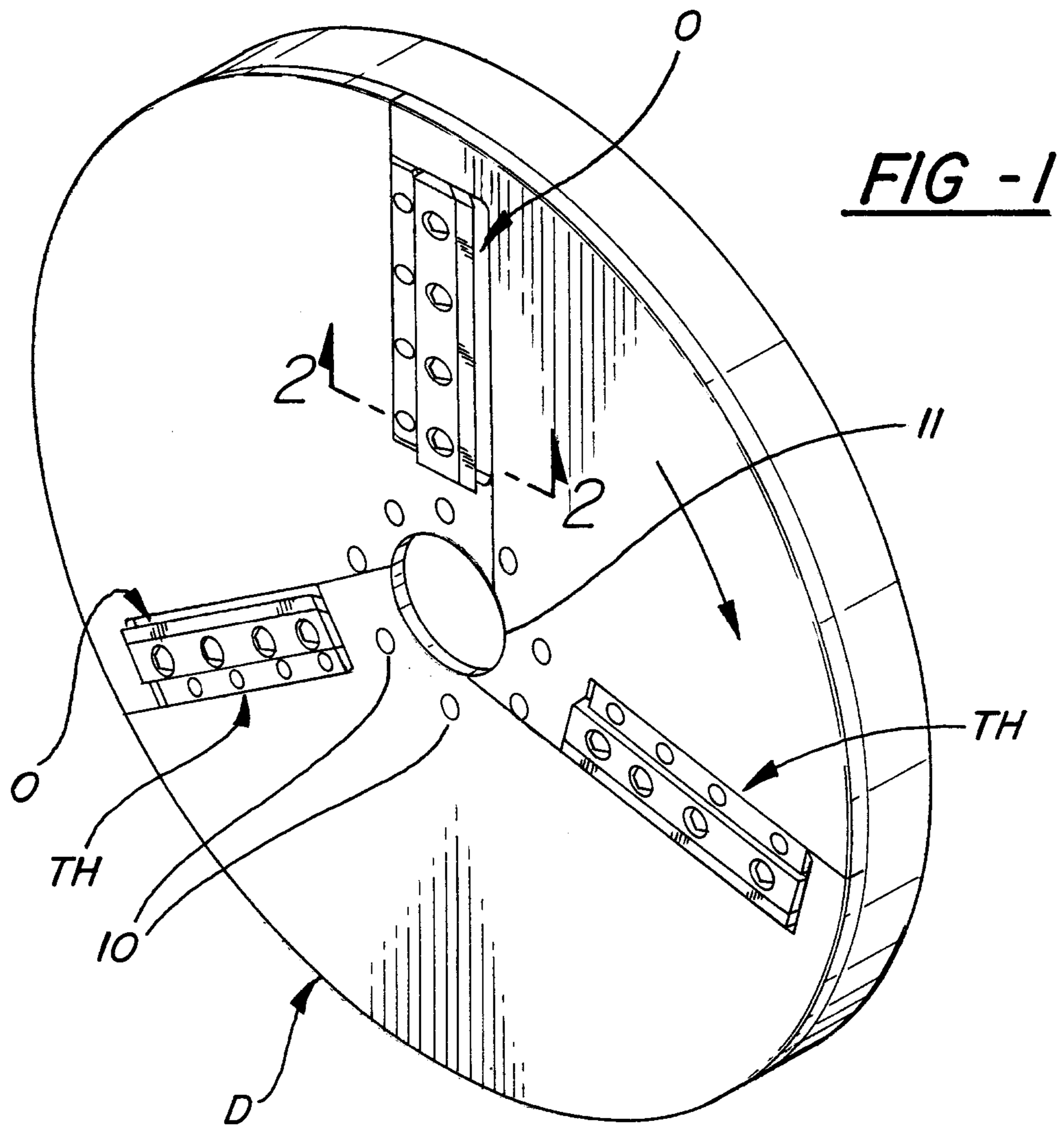


FIG -3

