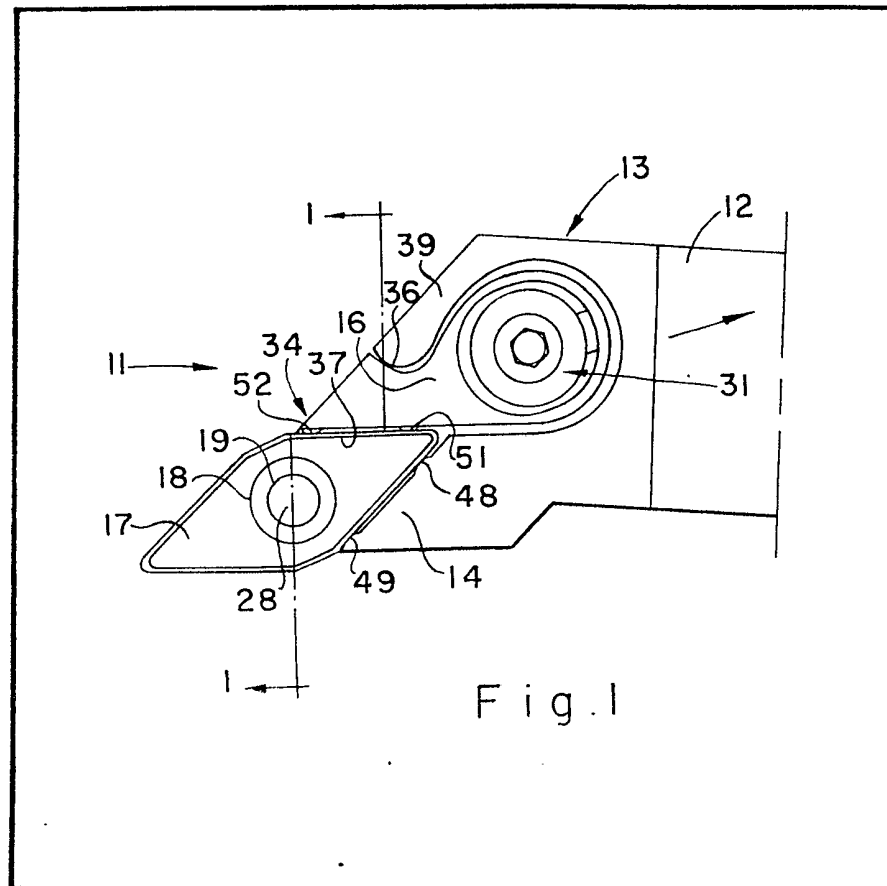


(21) Application No 8130210
(22) Date of filing 7 Oct 1981
(30) Priority data
(31) 61368
(32) 29 Oct 1980
(33) Israel (IL)
(43) Application published
12 May 1982
(51) INT CL³
B23B 27/16
(52) Domestic classification
B3B 20D2 20D3 20D4
20DY 20F
(56) Documents cited
GB 2059821A
GB 1516398
GB 1357768
GB 1287351
(58) Field of search
B3B
B3K
(71) Applicant
Iscar Ltd,
P.O. Box 34, Industrial
Zone North, Nahariya,
Israel
(72) Inventors
Amir Satran,
Shmuel Elka
(74) Agents
J. Miller & Co.,
Lincoln House, 296—302
High Holborn, London,
WC1V 7JH

(54) **Tool Holder Assembly**

(57) A tool holder assembly for retaining a removable cutting insert 17 on a tool holder, includes a recess on the holder for receiving the insert, a side clamp 16 juxtaposed to the insert and movable in the recess, means e.g.

pin 19 and abutments 48, 49 for positioning the insert and means e.g. laterally affecting screw 31 for moving the clamp translationally into contact with a portion of the access and thereby to rotate it and clamp the insert against the insert positioning means.



GB 2 086 273 A

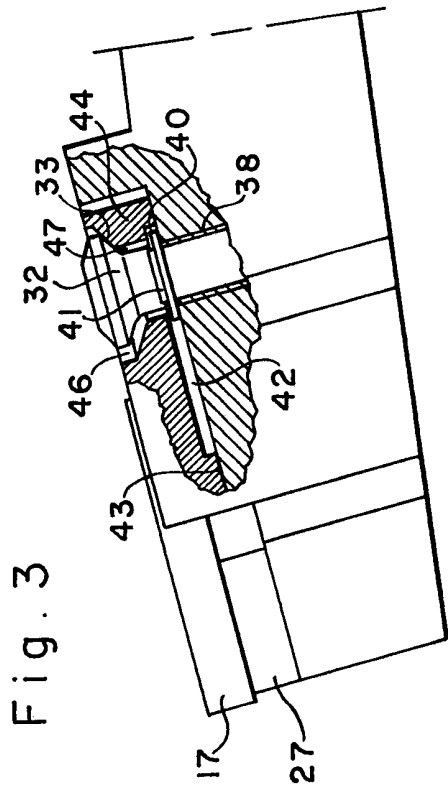


Fig. 3

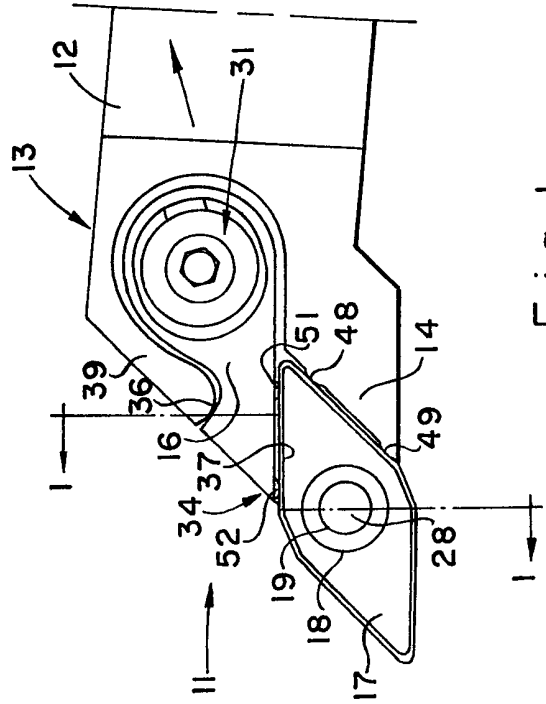


Fig. 1

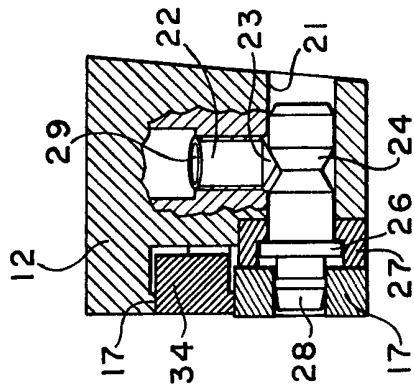


Fig. 2

SPECIFICATION

Tool Holder Assembly

The present invention relates to tool holder arrangements and more particularly to tool holders for clamp and pin held apertured cutting inserts.

Cutting inserts are now widely used as the part of the tool that does the actual cutting. The cutting inserts are held on recesses or seat portions of the shank of the tool holder in a manner facilitating their replacement as they are worn.

Many holding devices have been tried since the first use of cutting inserts. Among the classic cutting insert holding devices are external clamps and internal screw holders.

Clamping arrangements must hold the insert tightly and reliably in place overcoming the stresses and strains of the cutting operation. Ideally an insert clamping arrangement should also enable precise replacement of the removed insert without requiring precision measurements. The insert clamping means should be designed to minimize interference with the flow of chips generated during the cutting operation. Present day tool insert holding arrangements lack some or all of the above named features. For example, some of the tool holder arrangements use clamps which interfere with the flow of the chips. Other of the tool holder arrangements use clamps which cannot reliably hold the cutting insert against the stresses and strains of the cutting operation. Some of the tool holder arrangements for cutting inserts only apply pressure on two sides of the inserts and therefore the tool inserts often come loose during the cutting operation. Other arrangements hold the inserts reliably; however, when these holding mechanisms are loosened then precise and rigorous measurements are required to replace the insert on the seat indexed into the position prior to removal. This is time consuming and therefore expensive.

It is an object of the present invention to provide new and improved clamping tool holder arrangements for cutting inserts in which the above referred to adversities and disadvantages are substantially reduced or overcome.

According to the present invention a tool holder assembly for retaining a cutting insert on a tool holder comprises a recess for receiving said insert on said holder, side clamp means juxtaposed to said insert and movable in said recess, insert positioning means for positioning said insert in said recess for cutting operations, and means for displacing said side clamp means translationally and rotationally to clamp said insert against said insert positioning means.

The invention will be more fully understood and appreciated from the following detailed description taken in conjunction with the drawings in which:

Fig. 1 is a plan view of the tool holder with an indexable insert thereon.

Fig. 2 is a sectional view of the tool holder

65 taken along the planes defined by line 1—1 and looking in the direction of the arrows 1—1; and Fig. 3 is a side view of the tool holder with an indexable insert thereon.

The tool holder assembly 11 shown in Fig. 1 includes the shank or tool holder 12 having a recess portion 13 at the front end thereof. The recess portion is shown with a fixed wall 14 at one side thereof. Spaced apart from the fixed wall is a side clamp 16, whereby between the wall 14 and the clamp 16 there is a substantially V-shaped section designed to receive cutting inserts, such as insert 17. It should be understood that the section is not necessarily limited to V-shapes.

80 The insert 17 has an aperture 18 therethrough for receiving a pin 19 thereat. Pin 19 as best seen in Fig. 2 is retained in aperture 21 in the tool holder 12.

Means are provided for securing the pin to the tool holder. More particularly as best seen in Fig. 2 a set screw 22 is provided. The set screw 22 is located so that its conical tip 23 abuts a groove 24 in the pin 19. The set screw 22 has an extended ring portion 26 which abuts against an anvil 27 forcing the anvil against the tool holder. The head of the pin 28 extends into the aperture in the insert 17 and is one of the locating points that sets and retains the insert in its position. The set screw 22 is shown having a characterized socket section 29 for receiving a wrench to tighten and loosen the set screw.

Means are provided for displacing the clamp member 16. The means includes a locking screw 31 which extends through elongated bore 47 in the clamp member. The locking screw has a conically shaped head 32 which matches the inclined surface 33 in the countersunk portion of the clamp 16. Disposed opposite of the inclined plane 33 is a release recess, providing room between the head 32 and the countersunk portion of the clamp. When the locking screw is tightened into the tool holder body the opposing conical sections 32 and 33 force the clamp 16 to move longitudinally in the direction of the arrow "A".

110 Means are provided for converting the longitudinal displacement of clamp 16 to rotational displacement. More particularly, in a preferred embodiment, the clamp member 16 has a wedge portion 34 defined by the walls 36 and 37 of the clamp 16 which are widest at the outermost portion and become narrower in the direction of the locking screw 31. The wedge portion 34 in cooperation with a support wall section 39, which is shown as accurately shaped, forces the clamp 16 into rotational motion to abut the insert 17 when the locking screw 31 is tightened into a threaded bore 38 in the body of the tool holder 12.

120 A spring washer 40 is provided, in a preferred embodiment. The spring washer 40 fits into a slot 41 in locking screw 31. Also a cutaway section 42 is cut on the underside of the clamp 16 to provide room for the washer 41. The cutaway section is defined by the support surfaces 43 and

Claims

1. A tool holder assembly for retaining a cutting insert, comprising:
 a tool holder,
 5 a recess on said tool holder for receiving said insert,
 side clamp means juxtaposed to said insert movable in said recess,
 insert positioning means for positioning said
 10 insert in said recess for cutting operations, and means for displacing said side clamp means translationally and rotationally to clamp said insert against said insert positioning means.
2. The assembly of Claim 1 wherein said insert
 15 is apertured and pin held, and said positioning means comprises pin means extending from said tool holder into said aperture of said insert.
3. The assembly of Claim 1 wherein said
 20 positioning means includes a fixed wall portion spaced apart from said side clamp means.
4. The assembly of Claim 1 wherein said means for displacing said side clamp means include a support wall portion defining said
 25 recess, said side clamp means being juxtaposed to said support wall portion between said support wall portion and said insert.
5. The assembly of Claim 4 wherein said means for displacing said side clamp means
 30 include shaping said side clamp means as a wedge whereby when said side clamp is moved as it abuts said support wall means it is forced against said insert means to clamp said insert means against said insert positioning means.
6. The assembly of Claim 1 wherein said
 35 means for displacing said side clamp means includes first means for causing said side clamp means to move longitudinally.
7. The assembly of Claim 6 wherein said
 40 means for displacing said side clamp means includes second means for causing said side clamp means to move rotationally.
8. The assembly of the previous Claim 1
 45 wherein said side clamp means includes a wedge-shaped portion, said means for displacing said side clamp means includes a support wall means defining said recess and cooperating with said wedge-shaped portion for causing said clamp means to move rotationally.
9. The tool holder assembly of Claim 1 wherein
 50 means for displacing said side clamp means includes locking screw means, a threaded aperture in said tool holder for receiving said locking screw means, and an elongated bore in
 55 said side clamp means through which said locking screw extends.
10. The assembly of Claim 9 wherein said
 60 locking screw means includes a conical head, counter inclined plane means on said clamp means for receiving said conical head to cause the clamp means to move longitudinally

responsive to tightening said locking screw in said threaded aperture.

11. The tool holder assembly of Claim 9
 65 wherein spring washer means are provided in conjunction with the locking screw means for aiding in releasing said side clamp means when said locking screw means is loosened.
12. A tool holder assembly for retaining a
 70 cutting insert substantially as hereinbefore described with reference to and as shown in the accompanying drawings.
 44 on which the clamp abuts the top surface of the recess of the tool holder 12.
- 75 In a preferred embodiment abutting points 48 and 49 are shown extending from fixed wall portion 14. Similarly abutting points 51 and 52 are shown extending from the clamp 16 to abut against the insert.
- 80 In operation the tool holder assembly 11 is prepared by first tightening the set screw 22 to properly position the pin 19 with the extended ring 26 firmly abutting against the anvil 27. It should be noted at this point that in another
 85 embodiment, the invention could operate just as effectively without an anvil. Additionally it is within the scope of the invention to have the side clamp cooperate with pin 19 for retaining an indexable insert in an open pocket seat, i.e.
 90 without a fixed wall.
- The insert 17 is then set over the pin 19, where it fits rather loosely in the seat or recess 13. At this point the locking screw 31 is turned to tighten it in threaded bore 38. Tightening the
 95 locking screw 31 forces the conically shaped head 32 against the inclined plane portion 33 of the clamp 16. This forces the clamp 16 to move longitudinally towards the rear of the recess. The wedge shape portion of the clamp 34 in
 100 cooperation with the fixed supporting wall portion 39 causes the clamp 16 to rotate around the locking screw with the abutting points 51 and 52 pushing against the insert and causing the insert to push against wall portion abutting points 48
 105 and 49 and also forcing the inner wall of the aperture 18 of the insert 17 against the pin 19.
- There are thus three surfaces on the insert used for positioning and retaining the inserts. They are the surface contacted by the clamp 16,
 110 the surface contacted by the wall portion 14 and the surface contacted by the pin 19.
- Loosening the clamp screw 16 enables removal of the insert and replacing the insert easily. Nonetheless the insert is solidly held and
 115 properly reliably positioned. The spring washer 40 aids in releasing the clamp abutting the insert for the removal of the insert.
- The clamp is a side clamp, not in the path of the chips, which nonetheless reliably positions and retains the insert during the entire cutting
 120 operation.
- While the principles of the invention have been described above in connection with specific

apparatus and applications, it is to be understood
that this description is made by way of example

only and not as a limitation on the scope of the
invention as defined by the claims below.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1982. Published by the Patent Office,
25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.