

[54] JACKSCREW RETAINER

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[58] Field of Search 339/91, 92; 85/8.8;
151/69; 285/DIG. 22, 137 R

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Primary Examiner—Joseph H. McGlynn

[57] ABSTRACT

A retaining device for securing the mating portions of a connector block in an assembled condition is disclosed. The retaining device includes a jackscrew having a first portion adapted to be secured in one connector block and a second portion adapted to be secured in the mating connector block. Both portions of the jackscrew include a shaft having an annular recess and adjacent annular shoulder on one end thereof. The recess and shoulder are adapted to be engaged by a plurality of radially deflectable locking tines mounted about a bore in each block, each tine having a locking detent on the free end thereof. The jackscrew may be removed from the associated block by a tool which, through a wedging action, spreads the locking tines radially outwardly to clear the respective annular shoulders. The jackscrew may be a single member or the two portions may be formed as separate members detachably secured together by means such as screw threads.

6 Claims, 11 Drawing Figures

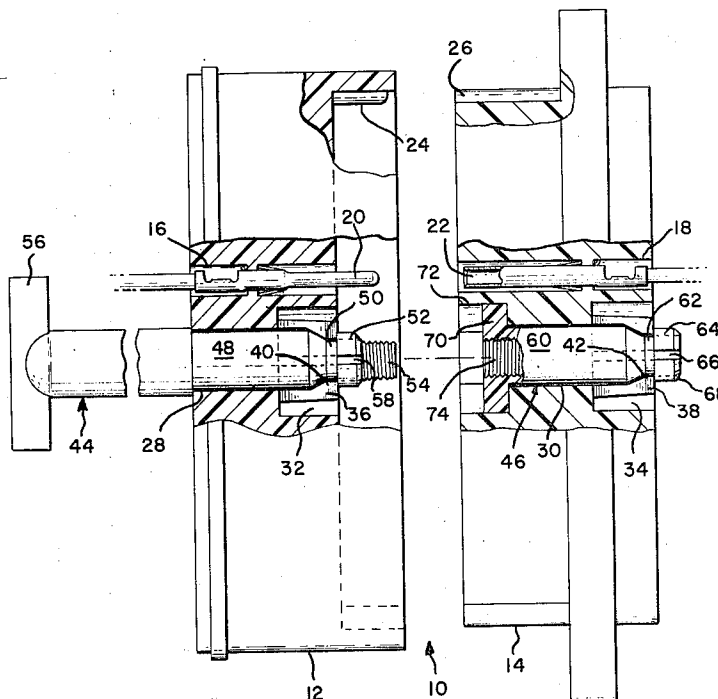


Fig. 1

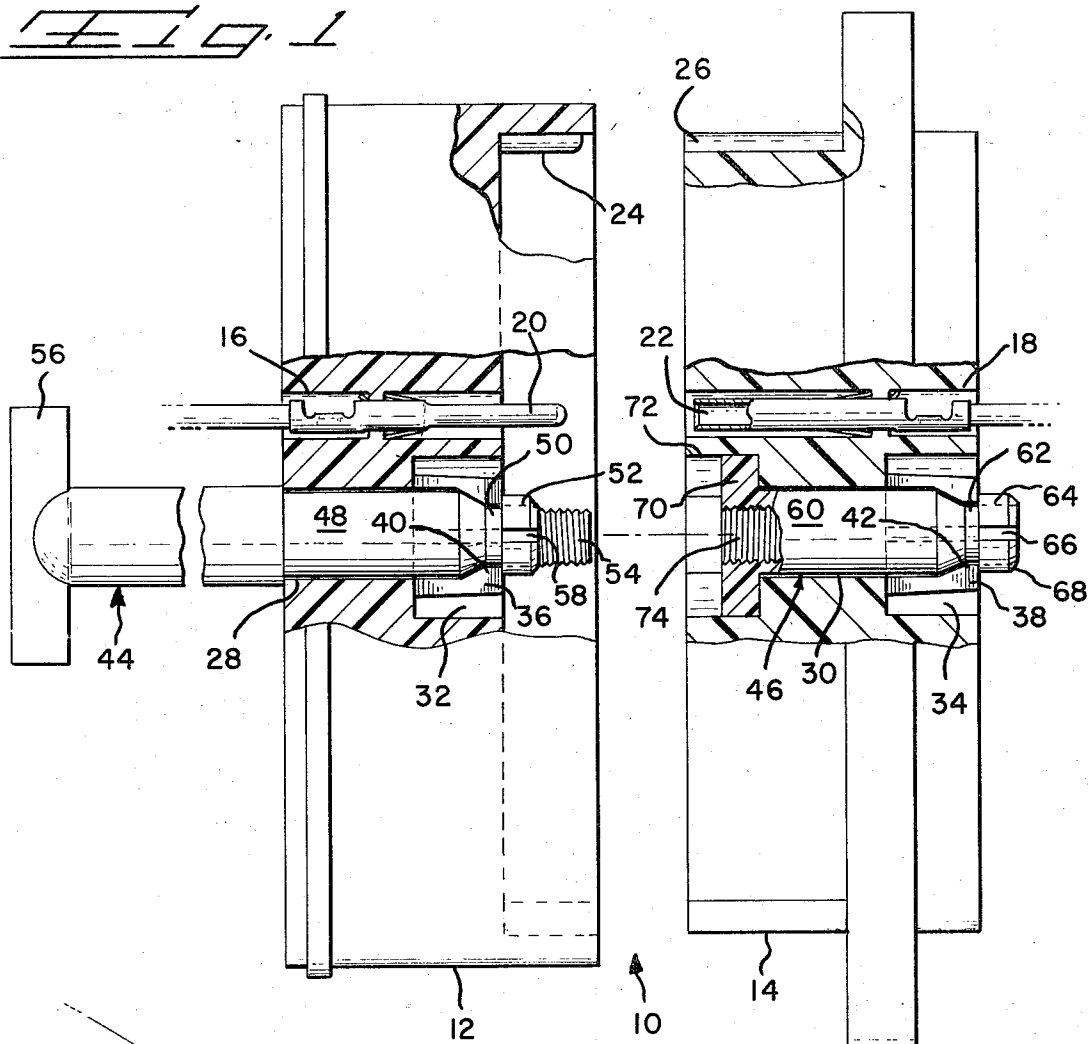
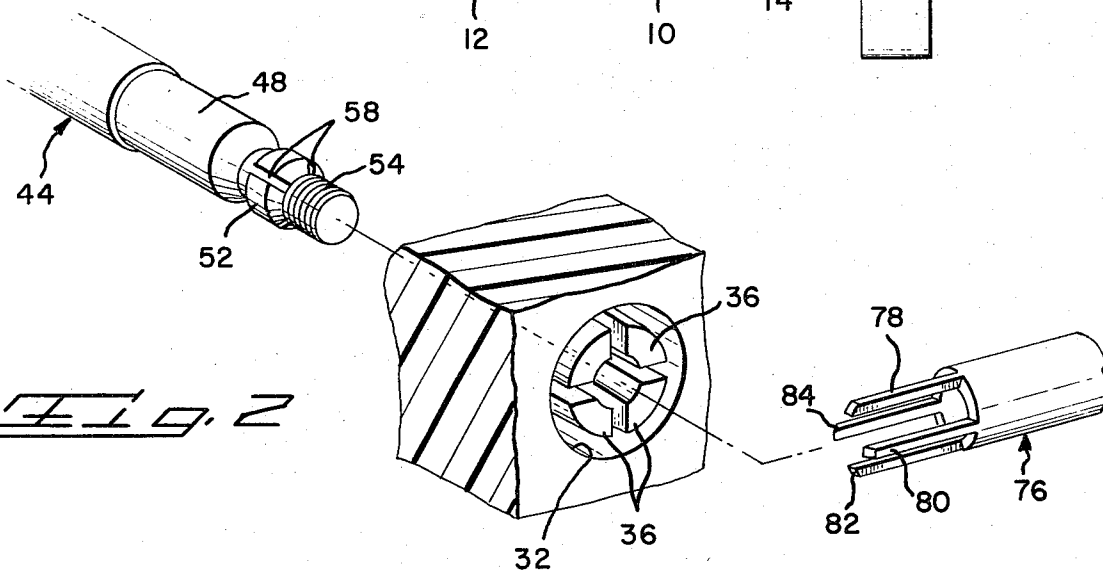


Fig. 2



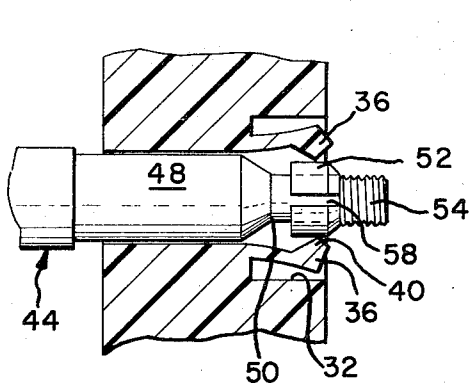


Fig. 3

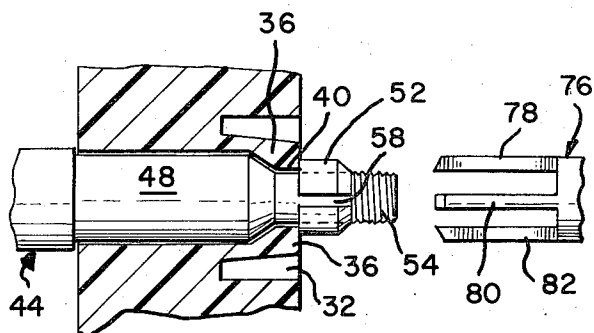


Fig. 4

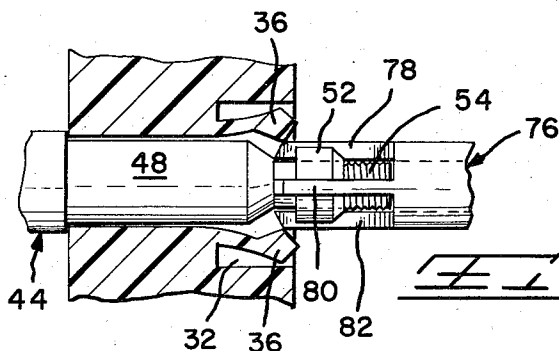


Fig. 5

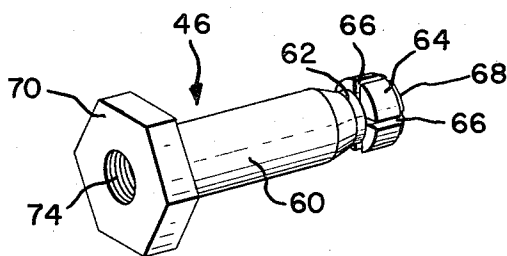
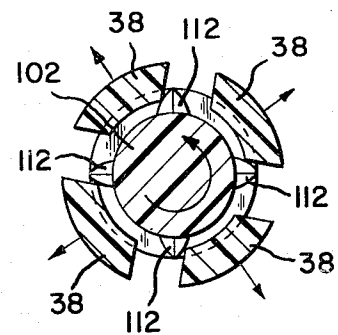
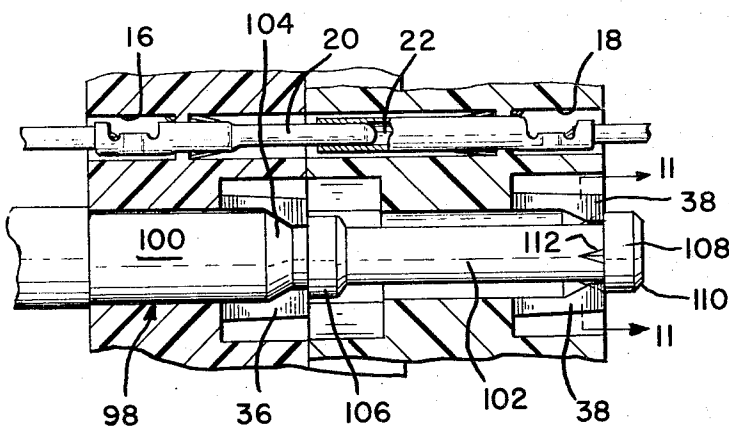
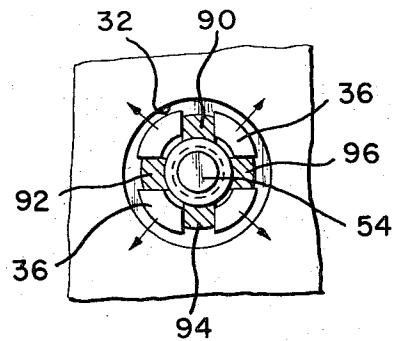
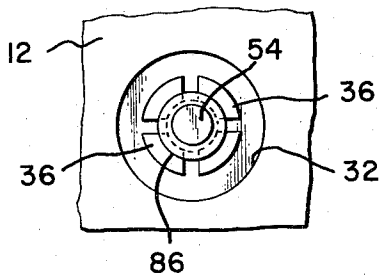
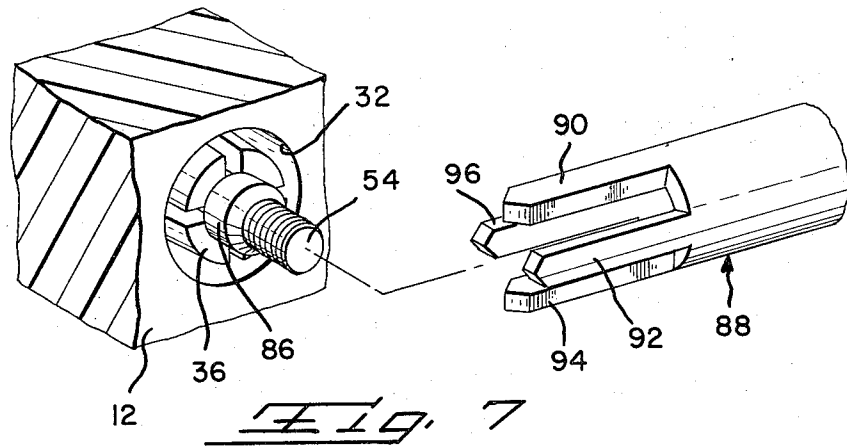


Fig. 6



JACKSCREW RETAINER

BACKGROUND OF THE INVENTION

1. The Field of the Invention

The present invention relates to a device for securing mating connector blocks together, and in particular to a jackscrew detachably secured in the block sections.

2. The Prior Art

Multi-pin connector block assemblies all require a certain amount of force to mate and hold together the associated pins and sockets, this force being directly proportional to the number of interconnecting pins and sockets. Thus it is clear that when the assembly involves, for example, fifty or more pins, then a relatively large amount of assembly and holding force will be required in order to assure proper connections between the pins and sockets.

Some attempts to solve this problem have involved the use of snaps or latches acting on the ends of the connector blocks. This has not always proved to be acceptable especially when the blocks are of substantial length. In such cases, the resistance between the pins and sockets can cause a bowing of the blocks resulting in improper mating of the contacts.

SUMMARY OF THE INVENTION

The present invention provides an improved means for securing the mating portions of a multi-pin connector block assembly and includes a jackscrew having first and second portions each adapted to be secured in the respective mating blocks. Each portion of the jackscrew has a shaft with an annular recess and annular shoulder formed adjacent one end thereof. Each of the mating block members has a through bore one end of which is in communication with a coaxial counterbore. A plurality of tines integral with the block lie within the counterbore surrounding the bore. Each tine has a radially inwardly directed detent on its free end adapted to engage the annular recess of the associated jackscrew portion to secure that portion in the block. A tool having a plurality of chisel shaped members arranged in an annulus serves to release the members by camming the tines radially outwardly.

It is therefor an object of the present invention to construct an improved jackscrew retaining means for securing together the mating members of a multi-pin connector assembly.

It is another object of the present invention to construct a jackscrew retaining means which may be economically produced and inserted into mating receptacle blocks for reliably securing the blocks together without requiring additional retaining hardware.

It is a further object of the present invention to construct a jackscrew retaining means in either a one piece or two piece embodiment, the latter being fastened together by screw threads.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation, partially in section, of a connector block assembly having a first embodiment of the subject jackscrew retaining means mounted therein;

FIG. 2 is an exploded perspective view of fragments of the jackscrew retaining means, the mating portion of

a connector block and a first embodiment of a removal tool;

FIG. 3 is a vertical section through the portion of one connector block showing a step during insertion of the jackscrew of FIG. 1;

FIG. 4 is a view similar to FIG. 3 showing the jackscrew fully inserted in the associated connector block and the removal tool aligned therewith;

FIG. 5 is a view similar to FIG. 3 showing the removal tool spreading the tines of the connector block to enable the removal of the jackscrew;

FIG. 6 is a perspective view of the nut portion of the jackscrew embodiment shown in FIG. 1;

FIG. 7 is a perspective view of a second embodiment of the jackscrew seated in a fragment of the associated connector block and a fragment of a second embodiment of the removal tool;

FIG. 8 is a detailed plan view of the seated jackscrew of FIG. 7;

FIG. 9 is a view similar to FIG. 8 showing the block after insertion of the removal tool;

FIG. 10 is a vertical section through mated connector blocks showing a third embodiment of the subject jackscrew retaining means; and

FIG. 11 is a transverse section taken along line 11-11 of FIG. 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The connector block assembly 10 is of well known type and includes a plug block 12 and receptacle block 14. Each block is provided with a plurality of passageways 16, 18 in which a plurality of connector pins 20 and connector receptacles 22, respectively, are seated. The blocks are also provided with alignment guides such as projection 24 and recess 26. Each block has a bore 28, 30 communicating with a coaxial counterbore 32, 34, respectively. A plurality of locking tines 36, 38, integral with the respective blocks, lie within the counterbores 32, 34 surrounding the bores 28, 30. Each tine has a radially inwardly directed detent 40, 42 on the free end thereof. Only four tines have been shown but any suitable number of tines may be used.

The first embodiment of the subject jackscrew retaining means includes a first or locking member 44 and a second or nut member 46. The first member 44 has a shaft 48 one end of which has an annular recess 50, an adjacent annular shoulder 58 and a screw threaded portion 54. The opposite end of the shaft 48 is provided with gripping means 56, which in this case is a T shaped handle. Any suitable gripping means may be substituted for the one shown, the only requirement being that it must facilitate imparting a rotary motion to the shaft. A plurality of longitudinal slots 58 are formed in the shoulder 52 equal in number and spacing to the gaps between the tines of the associated block.

The nut member 46 also has a shaft 60 one end of which has an annular recess 62 and an adjacent annular shoulder 64 in which there are a plurality of longitudinal slots 66. The free end of the shoulder 64 may be bevelled as at 68. The other end of shaft 60 has an integral nut profile 70, for example the hexagonal shape shown, adapted to engage in a second profiled counterbore 72 in the associated connector block 14. The shaft also has a threaded axial bore 74 in this other end. The threaded bore 74 meshes with the threaded portion 52 of the first portion and may be of any desired pitch.

Both members of the jackscrew are inserted into and retained in their respective connector blocks in the same manner. FIG. 3 shows the first member of the jackscrew 44 during insertion into connector block 12. The tines 36 are spread apart by the threaded portion 54 and shoulder 52. As soon as the shoulder 52 clears the tines 36, they rotate inwardly so that the detents 40 engage in the annular recess 50 and prevent the unintended removal of the jackscrew member.

The first embodiment of the removal tool 76, only a portion of which is shown in any of the drawings, has a plurality of chisel shaped tines 78, 80, 82, and 84 equal in number and positioning to the slots between the tines of the blocks and radially spaced from the longitudinal axis of the tool. To remove either member of the jackscrew from its associated block, the tines of the removal tool 76 are aligned with the grooves 58, 66 in the annular shoulder 52, 64 of the first and second members, respectively and the spaced between the tines of the associated connector block, see FIG. 4. The tool is then forced into the connector block to lift and separate the block tines 36 until they clear the annular shoulder 52 and allow removal of the jackscrew member, see FIG. 5.

The second embodiment of the subject jackscrew retaining means, see FIGS. 7 to 9, differs from the first embodiment in that there are no longitudinal grooves formed in the annular shoulder of either member. The second embodiment of the removal tool 88 differs from the first embodiment removal tool in the chisel shape of the tines. In this instance the free end of each tine 90, 92, 94, and 96 has a pair of diverging inclined surfaces which are adapted to engage and separate the tines of the connector block. The separation movement causes the block tines to rotate radially outwardly until the detent portions thereof clear the solid annular shoulder 86 and allow removal of the jackscrew member.

The third embodiment of the subject jackscrew retaining means is the one piece member 98 shown in FIGS. 10 and 11. The member includes a first shaft 100 which is joined to a second shaft 102 by annular recess 104 and annular shoulder 106. The free end of the first shaft, not shown, is provided with suitable gripping means while the free end of the second shaft is provided with an integral head 108. The forward edge 110 of the head 108 is bevelled and a plurality of cam ramps 112 extend from the rear of the head along the second shaft. The cam ramps are equal in number to the spaces between the tines of the connector block 14.

The single piece member is inserted into and retained in the plug block 12 in the same manner as the first two embodiments. It likewise is inserted into the receptacle block 14 by a straight thrusting motion. However, when the member is inserted into the receptacle block, the blocks 12 and 14 must be mated. The member is removed from the receptacle block by being first rotated, in either direction, so that the cam ramps 112 spread tines 38 until they clear the head 108. Thus this embodiment is capable of a rapid connecting action. The

screw threaded two piece embodiments can have a rapid connecting action by choice of thread pitch and length.

The subject jackscrew retaining means may be formed from any one of a number of materials including both plastics and metals. The primary consideration in choice of materials is in the cost and the environment of the intended use.

While the present invention has been shown and described with reference to three preferred embodiments it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit or essential characteristics of the present invention.

What is claimed is:

1. In combination with a pair of mating connector blocks, each block carrying a plurality of pins or receptacles and having a bore, a coaxial counterbore, and a plurality of cantilever locking tines in said counterbore resiliently integral with said block and disposed about said bore, each said tine having a radially inwardly directed detent on the free end thereof, a jackscrew retaining means for securing said blocks in an assembled condition, said jackscrew retaining means comprising: first and second shafts each having an annular recess and an annular shoulder adjacent one end thereof, said recesses being engaged by said detents of said tines and

gripping means on the other end of said first shaft for effecting rotation thereof.

2. The jackscrew retaining means according to claim 1 further comprising:

a plurality of longitudinal slots formed in said shoulders at least equal in number and spacing to the spaces between tines of the associated connector block.

3. The jackscrew retaining means according to claim 1 further comprising:

a threaded projection and a mating threaded recess on said one end of said first shaft and the other end of said second shaft, respectively, whereby said shafts are selectively joined together.

4. The jackscrew retaining means according to claim 3 further comprising:

a head portion integral with the other end of said second shaft, said head portion being profiled to be nonrotatably received in the associated connector block.

5. The jackscrew retaining means according to claim 50 1 wherein said first and second shafts are integral.

6. The jackscrew retaining means according to claim 5 further comprising a plurality of cams equal in number and spacing to the spaces between tines of the associated block, said cams being integral with the shoulder of said second shaft and projecting into said annular recess whereby a rotary motion of said jackscrew will radially spread the tines of the associated connector block.

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