ABSTRACT OF THE DISCLOSURE

A core chuck in which a cylindrical member is provided with one or more elongated slots parallel to the axis of the member, and a tooth of generally triangular cross-section is supported with one apex of the tooth projecting from the slot to engage a core or similar member. Upon relative movement in one rotative direction between the member and the core, the tooth pivots about an apex of the tooth and engages further into the core.

This invention relates to an improvement in core chuck and deals particularly with a simple and effective device for locking the core of a roll of material to a mandrel during winding and unwinding of the material from the core.

In my previous Patent 3,263,938, issued Aug. 2, 1966 for Core Clutch, I disclosed a clutch including a hub provided with a series of angularly spaced slots parallel to the axis of the hub. These slots accommodate teeth of triangular cross-section, one apex of which projects beyond the periphery of the hub. When a core was placed over the hub, and the hub was rotated relative to the core, the teeth pivoted about a second apex of each triangular tooth, this second apex acting as a fulcrum. The arrangement was such that as the teeth pivoted, the apex projecting against the core was forced more firmly against the core, effectively locking the core from further rotation relative to the hub.

This structure has been found to be extremely effective, and clutches of the type described in the patent have been sold in a very considerable volume. During use of the clutch, certain movements to the original design were found desirable. It is an object of the present invention to provide improvements to the original design.

An object of the present invention resides in the provision of a core chuck which is outwardly quite similar to those previously described, and which includes a hub having a series of angularly spaced slots generally parallel to the axis of the hub. These slots are generally rectangular in cross-section, including a base wall and a pair of parallel side walls. Teeth are positioned in these slots, the teeth being generally triangular in cross-section and including two right angular sides one of which rests upon the base of the slot and the other of which extends along one of the parallel side walls of the slot. A groove is provided in the base of each slot at the juncture between the base of the slot and the other of the parallel side walls thereof. When the teeth rotate about their axes in the slots, the apex of each triangular tooth which is adjoining the base of the slot and of the said other side walls may engage in the slot holding this fulcrum in a predetermined location.

A further feature of the present invention resides in the provision of a core chuck of the general type described in which the slots containing the teeth may taper in depth so that, if desired, one end of each tooth may project from the slot to a greater extent than the other. As a result, there is a tendency for the tooth to hold a narrow roll against a chuck shoulder without further locking.

A further feature of the present invention lies in the provision of a modified form of retainer used for holding the teeth in place in the grooves.

A still further feature of the present invention resides in the provision which includes a series of angularly spaced teeth, usually of the triangular cross-section, and which are arranged in slots extending longitudinal to the axis of a spindle or chuck. A block of rubber or other resilient means is provided between the base of each tooth and the base of the accommodating groove offset from the center of the tooth in a direction toward the shoulder against which the core is to engage. The compression spring which exerts the teeth accordingly tilts the teeth toward the end of the spindle or chuck from which the core is fed. The tilting of the teeth facilitates the threading of the core over the spindle as it starts movement over the teeth. As the core is pushed over the teeth, the rubber or other resilient means in the groove resists further movement over the teeth. When enough pressure is exerted upon the teeth, they are free to rock intermediate their ends similar to the action of a fence-toter so that the full length of the tooth firmly engages within the core.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

FIGURE 1 is a side elevational view of a core chuck with the tooth and compression spring eliminated to illustrate the body of the chuck.

FIGURE 2 is a sectional view through the body of the chuck illustrated in FIGURE 1, the position of the section being indicated by the line 2—2 of FIGURE 1.

FIGURE 3 is a longitudinal section through one of the tooth cavities, the position of the section being indicated by the line 3—3 of FIGURE 1.

FIGURE 4 is a view similar to FIGURE 3 illustrating one of the triangular teeth in place in the cavity.

FIGURE 5 is a sectional view transverseley through one of the triangular teeth in place in the cavity.

FIGURE 6 is a view similar to FIGURE 5 but showing the tooth tilted to engage into a roll core or the like.

FIGURE 7 is a view similar to FIGURE 4, showing a modified form of construction.

FIGURE 8 is a view similar to FIGURES 4 and 7, showing another modified form of construction.

FIGURE 9 is an elevational view of the compression spring used for holding the teeth in place.

FIGURE 10 is a view similar to FIGURE 9 with the ring in expanded form for attachment or removal of the ring.

The body of the core chuck A is constructed as is best illustrated in FIGURES 1 to 3 of the drawings. The chuck includes a cylindrical body portion 10 having an axial aperture 11 extending therethrough to accommodate a suitable shaft or spindle. The ends 12 of the aperture 11 are tapered as indicated to facilitate mounting the chuck upon the shaft or spindle. Similarly, one end of the cylindrical body portion 10 is rounded as indicated at 13 to facilitate the insertion of the core chuck into a core or the like.

The core chuck A is also provided with an enlarged diameter portion 14 at one end thereof which provides a shoulder 15 against which the end of a core may engage. One or more radially extending threaded apertures such as 16 may be provided for the accommodation of set screws or other fastening means to hold the unit in an adjusted position.
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As indicated, a series of equally spaced elongated slots or cavities 17 are provided extending longitudinally of the body portion 10 and terminating short of the ends 13 and 15 thereof. As indicated by FIGURE 2, the slots 17 include parallel side walls 19 and 20 which are equally spaced on opposite sides of a plane through the axis of the chuck and extending in a radial direction. The ends 21 of the slot are preferably wider than the remainder thereof, the ends of the slot thereby extending on one side of the teeth 16 accommodated in the slot. This enlarged width of the slot ends simplifies the cleaning of the slots, and permits insertion of a suitable tool into the ends of the slot to simplify the removal of the teeth from the slots.

As is indicated in the drawings, a rectangular raised area 22 extends the major portion of the length of the slot, the raised area being spaced from the slot walls 19 and 20 to provide narrow grooves 23 between the longitudinal edges of the raised area 22 and the slot walls 19 and 20. The raised area 22 preferably terminates in end edges 24 which are spaced from the ends of the slots 21 so that the wider end portions 21 of the slots are somewhat below the level of the raised area 22.

A peripheral groove 25 is provided in the body portion 10 intermediate the ends of the slots or cavities 17. The grooves 25 act to accommodate compression springs which are indicated generally at 26 in FIGURE 9 of the drawings, these compression springs being employed to hold the teeth in the slots or cavities 17 when the chuck is not in use.

The teeth 27 are right triangular in transverse section including a pair of right angular sides 29 and 30, and a connecting side 31 which forms the hypotenuse of the right triangle. The bottom side 29 is of a width substantially equal to, or slightly less than, the width of the slots or cavities 17 between the parallel walls 19 and 20 thereof. The side 30 is of a height so that the upper apex 32 of the triangular is normally slightly above the surface of the core body 10. When not in use, the teeth 27 appear as indicated in FIGURE 5 of the drawings, with the bottom side 29 of each tooth resting upon the raised surface 22 or supported slightly above the raised surface in the manner which will be described. The ends 33 of the upwardly projecting portions of the teeth 27 are preferably beveled to a point below the surface of the core body, as indicated in FIGURE 4 of the drawings. The retaining ring 26 is engaged in a central slot 34 intermediate the ends of each tooth 27, the compression springs or retaining rings 26 being located beneath the surface of the chuck body.

As indicated in FIGURE 4 of the drawings, the undersurface 29 of each tooth 27 is preferably supported somewhat above the raised surface 22 of the groove or cavity 17 by means of short cylindrical bars 35 of rubber or similar elastic means. The bars 35 are cemented or otherwise secured in semi-cylindrical grooves 36 in the undersurface 29 of each tooth 27, and these resilient bars 35, being supported near the ends of the teeth 27, rest on the full depth end portions of the cavities 17 as indicated in FIGURE 4. The diameter of the resilient bars 35 is such that the undersurfaces of the teeth are normally held slightly above the raised surface 22 of the cavity. However, the teeth 27 are resiliently supported, being inserted into the chuck body 10 when the core body 10 is engaged in the chuck. The apex 32 of each tooth is resiliently urged into contact with the core such as B when the core encircles the body portion 10 of the chuck A.

When the core B is rotated in the direction of the arrow, relative to the core body 10, each tooth 27 tends to fulcrum about the apex 39 of the tooth 27 or along the juncture between the sides 29 and 32 of the tooth. The apex 39 tends to tilt into the groove 23 between the raised area 22 and the wall 20 of the cavity, the groove 23 holding the tooth apex 39 in proper fixed relation in the groove. As the side 31 of each tooth is wider than the other sides 29 and 30, this causes each tooth to engage into the core B as indicated in FIGURE 6 of the drawing.

FIGURE 7 of the drawings shows a slightly modified form of construction which is particularly designed for use in supporting narrow rolls on the chuck and to eliminate the necessity of holding the rolls from endwise movement thereupon. The chuck body 40 includes a shoulder 41 against which the end of the roll core may engage. The teeth 27 are provided with a series of angularly spaced grooves or recesses 42, one such recess being indicated in FIGURE 7. A second series of angularly spaced tooth recesses 43 may also be provided in longitudinally spaced relation to the recesses 42. The difference between the recesses 42, 43 and the previously described tooth slots or cavities 17 lies in the fact that the bases of the cavities 42 and 43 are not parallel to the axis of the chuck but are inclined relative thereto the ends 44 of the cavities which are nearest the shoulder 41 being somewhat deeper than the ends 45 of the cavities which arc most remote from the shoulder 41. The cavities are otherwise similar to the cavities 17.

With this arrangement, the teeth 27 have a tendency to urge the roll cores axially along the chuck toward a shoulder 41. The slight slope of the teeth causes the ends of the teeth most remote from the shoulder 41 to engage into the core to a somewhat greater extent than the left hand ends of the teeth as indicated in FIGURE 7, and this action tends to urge the roll core to the left as viewed in this figure. The slope of the recesses 42 and 43 is somewhat exaggerated in FIGURE 7 of the drawings to illustrate the principle involved.

FIGURE 8 of the drawings discloses another slightly modified form of construction which is used in certain situations where the arrangement has been found to have specific advantages. The teeth 27 may be identical to those previously described, and the tooth grooves or recesses 46 may be identical to the previously described recesses 47. The structure shown in FIGURE 8 may, for example, be used on newspaper spindles where a cam drive pushes shaftless-type chucks into the ends of the cores. In the arrangement illustrated, a block 47 of rubber or other compressible resilient material rests upon the base 22 of the cavity between the longitudinal center of the tooth 27 and the end 49 of the tooth 27 which is nearest to the end of the chuck which is inserted into the core B. The chuck 50 is forced into the core B in the direction of the arrow 51. The flexible block 47 is compressed by engagement with the core B and the tooth 27 is free to pivot to some extent intermediate its ends, rocking somewhat in the manner of a teeter-totter.

FIGURES 9 and 10 of the drawings illustrate a compression spring which may encircle the various teeth in the grooves 34 thereof to hold the hub. As indicated in FIGURE 9, the spring 26 includes an arcuate wire 52 having a reversely turned hook end 53, and an arcuate resilient wire 54 having a reversely turned hook end 55. The ends of the spring wires 52 and 54 are arranged in side by side relation, and a compression spring 56 encircles the overlapping ends thereof. As will be understood, a pull upon the wires 52 and 54 will cause compression of the spring 56.

The end of the arcuate spring 54 is attached to the wire 26 bent backwardly upon itself to form a loop 57, and a hook-shaped extremity 59 on the loop 57 hooks over the wire 52, the loop 57 being elongated. The extremity of the arcuate spring wire 54 is provided with a loop 60 through which extends a loop 61 on an arcuate locking wire 62. The locking wire or lever 62 is provided with a projecting hook end 63 which hooks over one side of the loop 57. In actual practice the hook end 63 may be detached from the loop 57 by twisting the structures, but they are normally engaged. When in the position indicated in FIGURE 10 of the drawings, the periphery of the loop is increased substantially so that the ring may normally be slid over
the chuck until it is in proper location. When the wires have been engaged in the grooves 54 in the teeth and the groove 25 in the chuck body, the locking lever 62 is swung in the direction of the arrow 64 with the loop 61 serving as a pivot point. When fully contracted, the hook end 63 of the lever 62 is hooked over the wire 54 as indicated in FIGURE 9 of the drawings. When in the proper position encircling the teeth, the ring is normally under some tension, the spring 56 being somewhat pressed to resiliently hold the teeth in place.

In accordance with the Patent Office statutes, I have described the principles of construction and operation of my improvement in core chuck, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A core chuck including a cylindrical member having at least one elongated slot therein parallel to the axis of the member, said slot being substantially rectangular in cross-section including a generally flat base, and substantially parallel right angularly spaced side walls, a tooth in said slot, said tooth being substantially right triangular in cross-section with a first side normally parallel to said flat base a second side extending parallel to said side walls, and the hypotenuse side extending diagonally, the apex between said second side and said hypotenuse side projecting beyond the periphery of said member, and a groove in the base of said slot adjoining the apex between said first and said hypotenuse side and into which said last named tooth apex may extend as said tooth fulcrums about said last named tooth apex.

2. The structure of claim 1 and including resilient material between the base of said slot and said tooth to normally hold said first side of said tooth slightly spaced from the base of said slot.

3. The structure of claim 1 and including resilient means secured to said one side of said tooth to normally hold said one side of said tooth spaced from the base of said slot.

4. A core chuck including a cylindrical member having at least one elongated slot therein parallel to the axis of the member, said slot being substantially rectangular in cross-section including a generally flat base, and substantially parallel right angularly spaced side walls, a tooth in said slot, said tooth being substantially right triangular in cross-section with a first side normally parallel to said flat base a second side extending parallel to said side walls, and the hypotenuse side extending diagonally, the apex between said second side and said hypotenuse side projecting beyond the periphery of said member, said slot gradually increasing in depth from one end to the other thereof.

5. A core chuck including a cylindrical member having at least one elongated slot therein parallel to the axis of the member, said slot being substantially rectangular in cross-section including a generally flat base, and substantially parallel right angularly spaced side walls, a tooth in said slot, said tooth being substantially right triangular in cross-section with a first side normally parallel to said flat base a second side extending parallel to said side walls, and the hypotenuse side extending diagonally, the apex between said second side and said hypotenuse side projecting beyond the periphery of said member, and resilient means between the base of said slot and said tooth to normally hold said first side of said tooth slightly out of contact with the base of said slot.

6. The structure of claim 5 and in which said first side of said tooth is transversely grooved near opposite ends thereof, and including bars of resilient material secured in said grooves and projecting therefrom.

7. The structure of claim 1 including a block of resilient compressible material between said tooth and the base of said slot at a point spaced from the ends of the tooth and offset from the center thereof.

8. The structure of claim 6 and including a block of resilient compressible material between said tooth and the base of said slot at a point spaced from the ends of the tooth and offset from the center thereof, said last named block being of greater thickness than said bars near opposite ends of the tooth.

9. A core chuck including a cylindrical member having at least one elongated slot therein parallel to the axis of the member, said slot being substantially rectangular in cross-section including a generally flat base, and substantially parallel right angularly spaced side walls, a tooth in said slot, said tooth being substantially right triangular in cross-section with a first side normally parallel to said flat base a second side extending parallel to said side walls, and the hypotenuse side extending diagonally, the apex between said second side and said hypotenuse side projecting beyond the periphery of said member, said cylindrical member having a peripheral groove therein and said tooth having an aligned groove therein and said tooth having an aligned groove therein aligned with said peripheral groove, said retaining ring including a pair of arcuate wire members having overlapping ends having hook-shaped extremities a compression spring encircling said overlapping ends and engaged by said hook-shaped extremities, and means connecting the other ends of said wire members.

10. The structure of claim 9 and in which said means connecting said other ends of said wire members comprises a locking lever hingedly connected to the other end of one of said wire members and extending through a loop on the other end of the other of said wire members, said locking lever including a hook end by which it may be secured in generally parallel side-by-side relation to the said one wire member to which it is hinged.

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