

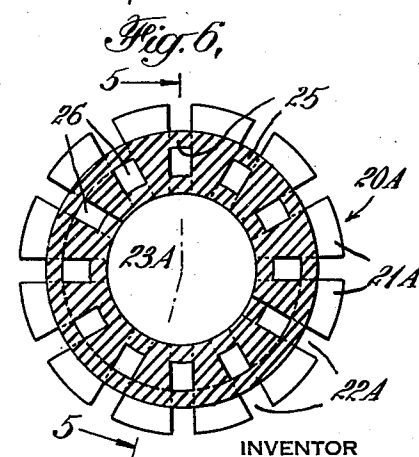
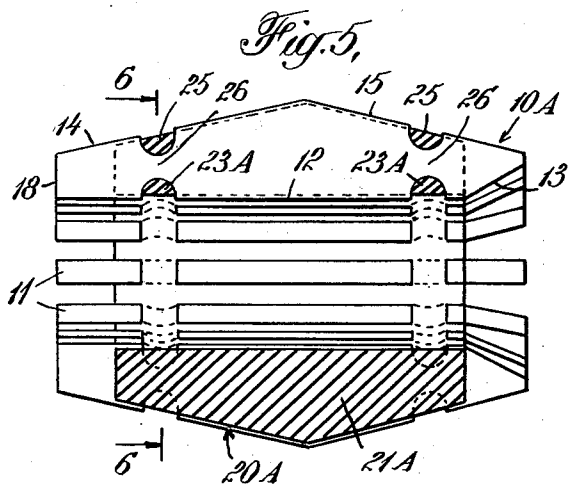
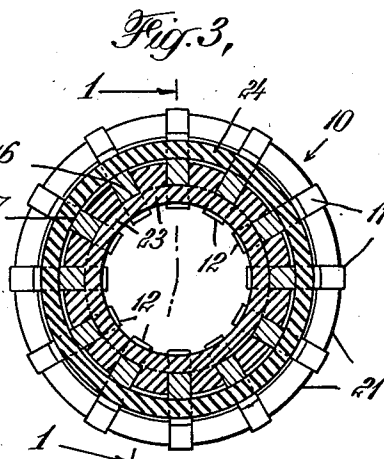
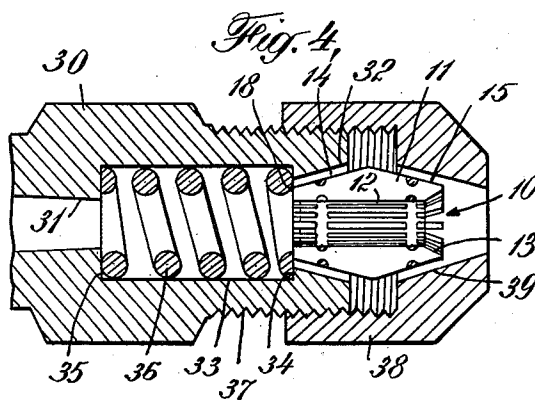
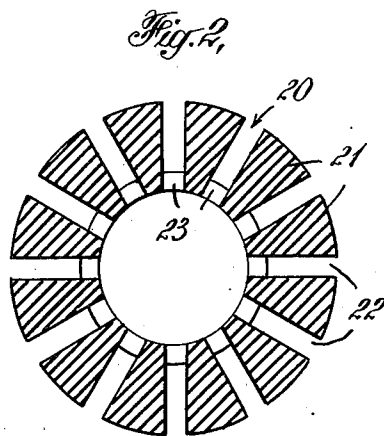
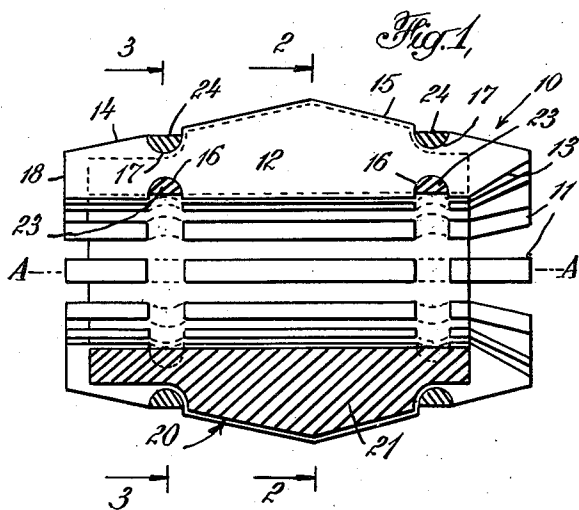
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A. M. STONER

2,374,245

COLLET

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2,374,245

COLLET

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Application September 23, 1943, Serial No. 503,576

10 Claims. (Cl. 279-46)

This invention relates to a collet of novel structure which is of simple inexpensive construction and has many advantages over such devices as have been available heretofore.

The object of this invention is to improve upon the devices shown in my Patents Nos. 2,346,706 and 2,346,707, issued April 18, 1944.

More specifically its object is to provide a collet of the type shown in the aforesaid patents in which the rigid gripping members are inserted in a resilient retainer molded with pockets to receive them, with attendant advantages which will appear in the following specification.

Referring to the drawing:

Fig. 1 is a sectional side elevation of a collet which is made according to and embodies this invention, taken on the line 1-1 of Fig. 3;

Fig. 2 is a transverse section of a resilient retainer shown in Fig. 1, the section being taken on the line 2-2 of the latter figure;

Fig. 3 is a transverse section of the collet shown in Fig. 1, the section being taken on the line 3-3 of the latter figure;

Fig. 4 is a central sectional side elevation of a chuck of which a collet of my novel construction is a part. This figure is included to show a way in which the collet disclosed herein may be used;

Fig. 5 is a sectional side elevation of a collet of modified construction which also embodies the present invention;

Fig. 6 is a transverse section of the resilient retainer which forms a part of the collet shown in Fig. 5. The section in this figure is taken on the line 6-6 of Fig. 5.

In Figs. 1, 3 and 4, 10 designates a collet which comprises a plurality of gripping members 11 of rigid material such as hardened steel. As shown in Figs. 1 and 3, the inner edges 12 of the gripping members are straight flat surfaces tangent to a circle concentric with the axis A-A. One end of the inner edge of each member may be beveled to form a chamfer 13. In the particular form illustrated the outer edges are oppositely beveled and when finished lie in frusto-conical surfaces 14 and 15. Spaced notches 16, 16 are made in the inner edges of each gripping member to form annular grooves and similar notches 17, 17 alined with the grooves 16, 16 are made in their outer edges. The rear end of the collet is designated by the reference numeral 18.

20 is a retainer in the form of a body of resilient material, such as oil resistant synthetic rubber, molded to form pockets for receiving and positioning the gripping members. This retainer

comprises a plurality of angularly spaced radially extending ribs 21, the inner edges of which lie in a cylindrical surface and the outer edges of which lie in frusto-conical surfaces which correspond in angularity to the surfaces 14 and 15. These ribs, as shown, flare outwardly and have flat sides, with the sides of each rib parallel with the proximate sides of the adjacent ribs and thus form pockets 22 which are parallel with the axis A-A. These pockets are open at their ends and at their outer edges. They are also open at their inner edges except at the parts designated by 23, 23 where the ribs 21 are interconnected by integral parts of the resilient material which correspond in longitudinal spacing and in cross sectional shape with the notches 16, 16 in the gripping members.

In assembling the collet, the gripping members 11 are inserted in the pockets 22 with their notches 16, 16 engaging the parts 23, 23 of the retainer and then bands 24, 24 of resilient material are placed around them in the grooves formed by the notches 17, 17. The diameter of the bands may be the same as that of the grooves formed by the notches 17, 17 or it may be smaller. In the latter case the bands will be under tension when they are placed around the gripping members. I have shown two external bands 24, 24 alined with the parts 23, 23 of the retainer as this is what I now believe to be a preferred arrangement, but such alinement is obviously unnecessary but the position of the outer bands should be preferably symmetrical in relation to that of the parts 23, 23. A simple modification would be to provide a single outer band intermediate the positions of the parts 23, 23 of the retainer.

In Fig. 4, 30 designates the body of a chuck which has a tapered bore 31 in its rear portion by means of which it may be mounted on a machine tool. In its forward end is a conical cam surface 32 having an angularity which corresponds to that of the surface 14 of the collet. Between the tapered bore 31 and the cam surface 32 an internal cylindrical pocket 33 is formed having shoulders 34, 35 which are normal to the axis of the chuck body. 36 is a helical spring in the pocket 33 compressed between the shoulders 34, 35. The forward part of the body is externally threaded as at 37. 38 is a collar having internal threads which fit the threads 37. A conical cam surface 39 having an angularity which corresponds to that of the surface 15 of the collet is formed in the forward part of this collar.

As shown in Fig. 4, the spring 36 abutting the

inner end 18 of the collet has pushed the latter outwardly so that there is a clearance between the cam surface 32 and the surface 14 of the collet. The collar 38 has been unscrewed to form a clearance between its cam surface 39 and the surface 15 of the collet. There is therefore no pressure exerted upon the collet and its elements will be in the relative position in which they are shown in Figs. 1 and 3.

The collet may be tightened onto the shank of a tool or other article placed within it by screwing the collar 38 inwardly on the body 30.

If the bands 24 are under tension the gripping members will be forced inwardly so that when they are in the "at rest" position their inner edges will be nearer together than the maximum capacity of the collet. Then when the shank of a tool or other article of somewhat greater diameter than the distance between opposite surfaces 12 is pushed into the collet, the gripping members 11 will be forced outwardly and will hold the article before the collet is tightened onto it by the chuck in the manner more fully described in my copending application Serial No. 503,575 filed of even date herewith.

In Figs. 5 and 6, a collet 10A is shown of modified construction. In this case the gripping members 11 may be like those previously described. 20A designates a retainer in the form of an integral body of resilient material which comprises radially extending outwardly flaring ribs 21A interconnected by spaced parts 23A. These form pockets 22A between them which are bridged at parts opposite the parts 23A by parts 25. Orifices 26 are formed between the parts 23A and 25 through which the gripping members may be inserted. The retainers shown in Figs. 2 and 6 may be molded and vulcanized before the gripping members are inserted. The operation of this device is like that previously described.

The invention herein disclosed may be embodied in collets of various forms, such for example, as those shown in the aforementioned applications, and I intend no limitations other than those imposed by the following claims.

What I claim is:

1. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening interconnecting the ribs, rigid gripping members seated in said pockets with portions of said members extending to a conical surface and arranged to be engaged by said cam surface, and a retaining member surrounding and engaging the gripping members and arranged to hold said members in the pockets.

2. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening interconnecting the ribs, rigid gripping members seated in said pockets, notches in the inner edges of said members engaging said interconnecting parts, the outer portions of the members extending to a conical

surface and arranged to be engaged by said cam surface, and a retaining member surrounding and engaging the gripping members and arranged to hold the members in the pockets.

3. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening interconnecting the ribs, flat metallic plates seated in said pockets extending to a conical surface and arranged to be engaged by said cam surface, and a retaining member surrounding and engaging the plates and arranged to hold said plates in the pockets.

4. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening interconnecting the ribs, flat metallic plates seated in said pockets, notches in the inner edges of the plates engaging said interconnecting parts, the outer edges of the plates extending to a conical surface and arranged to be engaged by said cam surface, notches in the outer edges of the plates, and a member in the notches in the outer edges of the plates surrounding the plates and arranged to hold said plates in the pockets.

5. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening interconnecting the ribs, rigid gripping members seated in said pockets with portions of said members extending to a conical surface and arranged to be engaged by said cam surface, a resilient tension retaining member surrounding and engaging the gripping members and arranged to hold said members in the pockets.

6. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening interconnecting the ribs, flat metallic plates seated in said pockets, notches in the inner edges of the plates engaging said interconnecting parts, the outer edges of the plates extending to a conical surface and arranged to be engaged by said cam surface, notches in the outer edges of the plates, and a resilient tension member in the notches in the outer edges of the plates surrounding the plates and arranged to hold said plates in the pockets.

7. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening interconnecting the ribs, and rigid gripping members seated in said pockets with portions of said members extending to a conical surface and arranged to be engaged by said cam

surface, parts of said body forming resilient members bridging the pockets over the gripping members.

8. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening, interconnecting the ribs, and flat metallic plates seated in said pockets extending to a conical surface and arranged to be engaged by said cam surface, parts of said body forming resilient members bridging the pockets over said plates.

9. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening interconnecting the ribs, and flat metallic plates, notches in the inner

edges of the plates engaging said interconnecting parts, the outer edges of the plates extending to a conical surface and arranged to be engaged by said cam surface, notches in the outer edges of the plates, parts of said body forming resilient members in the notches in the outer edges of the plates bridging the pockets over the plates.

10. A circumferentially continuous machine tool collet to be actuated by a cam surface of a chuck, said collet comprising a retainer in the form of a body of resilient material having a central longitudinal opening, a plurality of radially disposed ribs forming angularly spaced longitudinal pockets, spaced parts projecting outwardly from said opening interconnecting the ribs, and flat metallic plates, notches in the inner edges of the plates engaging said interconnecting parts, the outer edges of the plates extending to a conical surface and arranged to be engaged by said cam surface, notches in the outer edges of the plates, parts of said body forming resilient tension members in the notches in the outer edges of the plates bridging the pockets over the plates.

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