

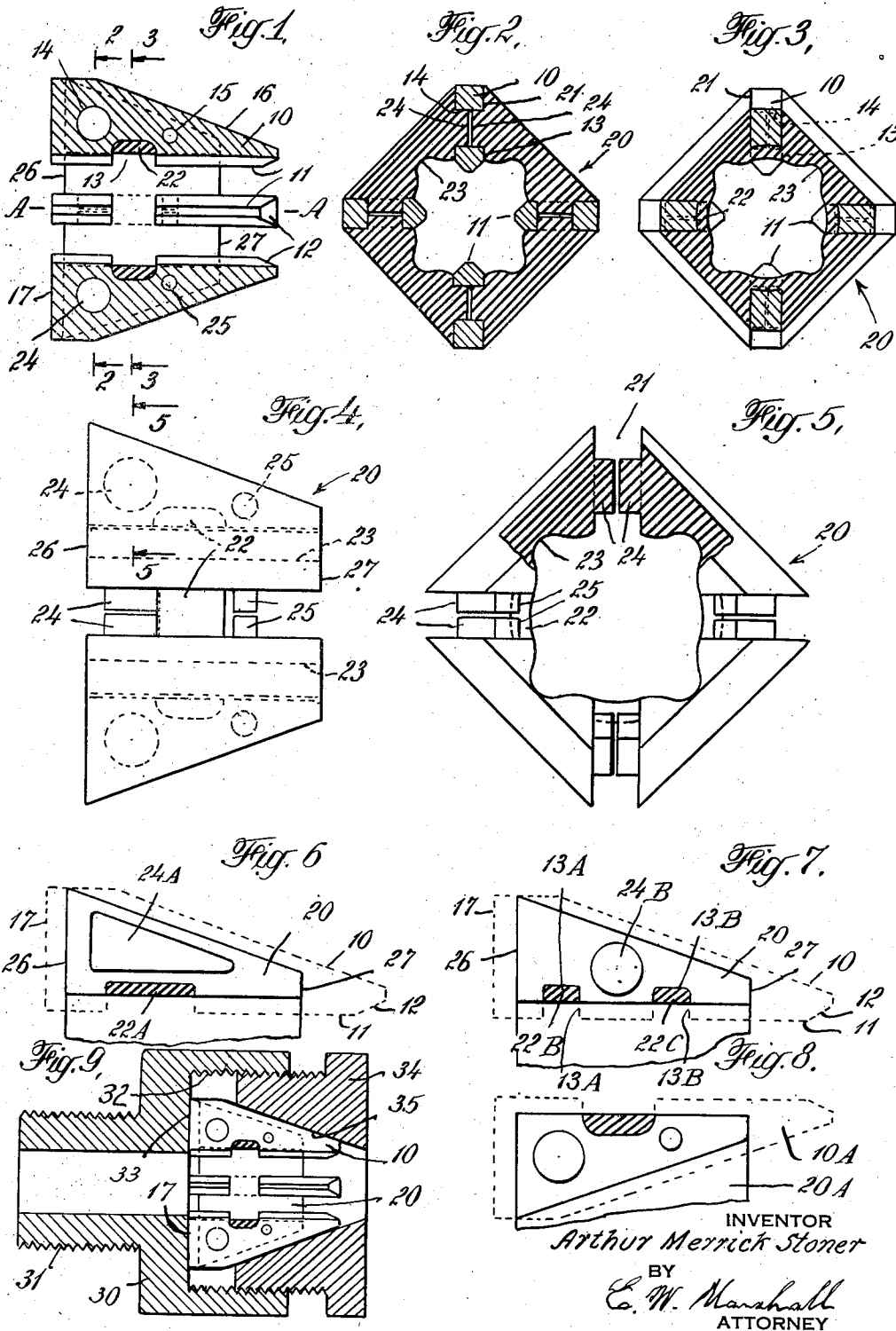
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COLLET

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2,403,136

COLLET

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4 Claims. (Cl. 279—54)

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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 Patent No. 2,346,706, issued April 18, 1944, and on those shown in my co-pending application, Serial No. 521,097, filed February 4, 1944.

More specifically, its object is to provide a collet of the type shown in the aforesaid patent and application in which the rigid gripping members are inserted in a resilient retainer molded 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 my invention.

Figs. 2 and 3 are transverse sectional elevations of the structure shown in Fig. 1, the sections being taken respectively on the lines 2—2 and 3—3 of the latter figure.

Fig. 4 is a side elevation of a body of resilient material which forms a part of the collet illustrated in the preceding figures.

Fig. 5 is a front elevation of the body shown in Fig. 4 with a part broken away and shown in a section taken on the line 5—5 of Fig. 4.

Figs. 6, 7 and 8 are sectional elevations of a part of resilient bodies of modified forms. The position of one of the gripping members is represented in these figures in dotted lines.

Fig. 9 is a central sectional side elevation of a chuck of which a collet of the novel construction disclosed herein is a part. This figure is included to show a way in which the collet may be used.

The collet comprises a plurality of gripping members 10 of rigid material, such as hardened steel. These are angularly disposed about a common axis A—A with their inner edges 11 equidistant from and parallel therewith. Their forward ends may be chamfered as at 12. A notch 13 is cut in the inner edge of each of the gripping members intermediate its ends. 14, 15 designate spaced perforations through the gripping members. The major portion of the outer edges 16 are beveled and lie in a frustroconical surface. The rear end of the gripping members is designated by the numeral 17.

20 is a retainer in the form of a hollow externally tapered body of resilient material, such as oil resistant synthetic rubber. This is molded with radially disposed longitudinal slots 21 for receiving and positioning the gripping members.

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The slots extend through the body except for portions 22 across the bottoms of the slots. The longitudinal width of the portions 22 corresponds to that of the notches 13 and they have preferably a cross-sectional form to fit these notches. The inner and outer surfaces of these portions are substantially circular but between them longitudinal grooves 23 are formed in the inner surface of the retainer to facilitate the folding operation of the parts of the body between adjacent gripping members which is particularly described in the aforesaid application Serial No. 521,097. Bosses 24 and 25 project inwardly in mutual alignment from opposite sides of the slots 21. The rear end of the body is designated by 26 and its front end by 27.

In assembling the collet the body is bent to spread the bosses 24, 25 apart sufficiently to permit the gripping members 10 to pass them. The gripping members are inserted with their notches straddling the portions 22 of the body. Then when their inner edges 11 are moved into parallelism with the axis A—A, the perforations 14 and 15 are in alignment with the bosses 24, 25 and when the body is allowed to resume its normal position the bosses enter the perforations from opposite sides of the gripping members and hold the latter in desired positions.

The chuck shown in Fig. 9 comprises a hollow body 30, the rear portion of which is threaded at 31 for attachment to a machine tool. The forward portion of the body is internally threaded, as at 32. A transverse abutment 33 is formed back of this internally threaded portion.

The rear ends 17 of the gripping members of the collet are seated on the abutment surface 33. 34 is a pressure member externally threaded to fit the threads 32. This member has a conical cam surface 35 having an angularity which corresponds to that of the outer edges 16 of the gripping members and is adapted to engage these edges. When the pressure member is screwed into the body 30, the gripping members are forced inwardly. It will be noted that all sides of the gripping members extend beyond the corresponding sides of the resilient body 20 so that clearance spaces are provided to allow for the displacement of the body 20 when the gripping members are forced inwardly.

In the modification illustrated in Fig. 6, an elongated lug 24A is shown instead of the bosses 24, 25. Openings of similar size and shape are with this construction provided in the gripping members. The portions 22A are symmetrically disposed in relation to the lug 24A.

Another construction is shown in Fig. 7 in which there are two longitudinally spaced portions 22B, 22C across the bottoms of the slots in the resilient body and similarly spaced notches 13A and 13B are formed in the inner edges of the gripping members. A single boss 24B is provided positioned between the portions 22B and 22C and laterally offset from them.

If the collet is arranged to have its gripping members forced outward, the position of the latter is reversed as shown at 10A in Fig. 8 and the body 20A made with a cylindrical exterior and a frustro-conical interior.

If desired the gripping members may be cemented or otherwise affixed to the body.

Various modifications in construction, mode of operation, method and use of an invention may and do occur to others, especially after benefitting from knowledge of such a disclosure as that herein presented of the principles involved, but the invention itself is not confined to the present showing.

I claim:

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 and having a plurality of angularly spaced radially disposed slots extending from said opening to the outer periphery of the body, said slots being open at one transverse edge and open at the other transverse edge throughout the major portion of the length of the body and portions of the body across one of the transverse edges of the slots intermediate the longitudinal ends of the body closing short parts of the slots, and aligned bosses spaced from said portions of the body, projecting from the sides of the slots, and rigid gripping members in the slots having tapered edges projecting from the body and arranged to be engaged by said cam surface, notches in the opposite edges of the gripping members engaging the portions of the body which are across the slots, said gripping members being provided with orifices for receiving the lugs.

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 and having a plurality of angularly spaced radially disposed slots extending from said opening to the outer periphery of the body, said slots being open to said periphery and open at their inner edges throughout the major portion of the length of the body and portions of the body across the inner edges of the slots intermediate the longitudinal ends of the body closing

short parts of the slots, and aligned bosses laterally offset from said portions of the body projecting from the sides of the slots, and rigid gripping members in the slots having tapered outer edges projecting from the body and arranged to be engaged by said cam surface, notches in the inner edges of the gripping members engaging the portions of the body which are across the slots, each of said gripping members being provided with an orifice for receiving the lugs.

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 and having a plurality of angularly spaced radially disposed slots extending from said opening to the outer periphery of the body, said slots being open to said periphery and open at their inner edges throughout the major portion of the length of the body and portions of the body across the inner edges of the slots intermediate the longitudinal ends of the body closing short parts of the slots, and aligned bosses longitudinally spaced and laterally offset from said portions of the body, projecting from the sides of the slots, and rigid gripping members in the slots having tapered outer edges projecting from the body and arranged to be engaged by said cam surface, notches in the inner edges of the gripping members engaging the portions of the body which are across the slots, said gripping members being provided with orifices for receiving the lugs.

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 and having a plurality of angularly spaced radially disposed slots extending from said opening to the outer periphery of the body, said slots being open to said periphery and open at their inner edges throughout the major portion of the length of the body and longitudinally spaced portions of the body across the inner edges of the slots intermediate the longitudinal ends of the body closing short parts of the slots, and aligned bosses longitudinally spaced and laterally offset from said portions of the body, projecting from the sides of the slots, and rigid gripping members in the slots having tapered outer edges projecting from the body and arranged to be engaged by said cam surface, longitudinally spaced notches in the inner edges of the gripping members engaging the portions of the body which are across the slots, each of said gripping members being provided with an orifice for receiving the lugs.

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