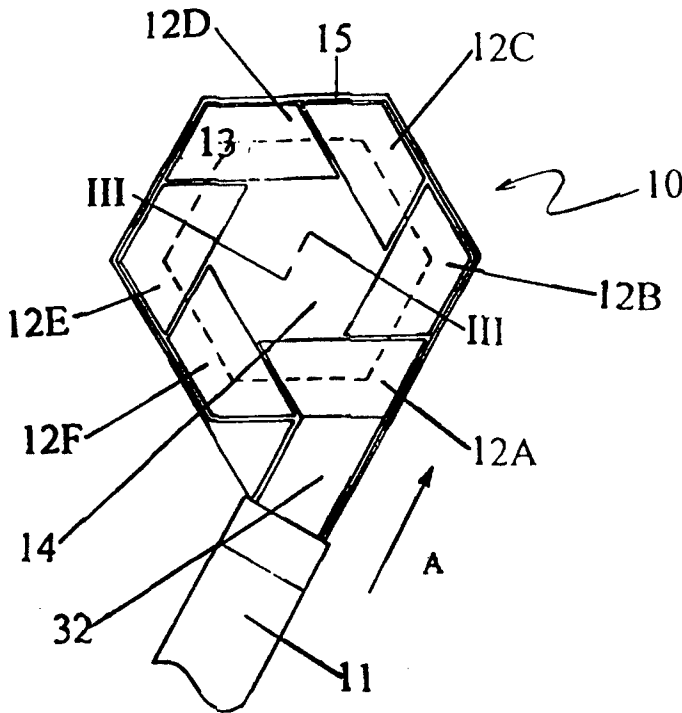


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(54) Title: ADJUSTABLE APERTURE APPARATUS

(57) Abstract

There is disclosed an iris-type arrangement providing an adjustable diameter aperture, particularly suitable for situations where a gripping arrangement is required. There is described an arrangement comprising a plurality of moveable members defining a polygonal aperture, wherein the aperture is continuously adjustable over a range between a minimum and a maximum aperture, individual members being arranged to move between their maximum and minimum aperture positions with a linear motion, with all the moveable members acting in concert. The arrangement may have a closed or open aperture.



**EDWARDS LIFESCIENCES EX. 1010**  
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## ADJUSTABLE APERTURE APPARATUS

This invention relates to an iris-type arrangement for providing an adjustable diameter aperture, suitable for use in tools and the like.

Adjustable spanners comprising a handle and two gripping jaws, one of which is fixed relative to the handle and the other of which is moveable relative to the fixed jaw are well known for loosening or tightening hexagonal-headed nuts or bolts. The provision of a moveable jaw allows a single spanner to be used with a variety of sizes of nuts or bolt heads. The provision of an adjusting mechanism also allows the spanner to be used on metric or imperial size nuts or bolts. A disadvantage of such a spanner lies in the spanner being able to grip a nut or bolt along only two edges thereof. In use, it is a common experience for the spanner to slip off the nut or bolt head. It is known that superior grip on the nut or bolt is obtained by the use of a ring spanner or socket wrench, which grips the nut or bolt on all edges. However, a separate such spanner or socket is required for every size of nut or bolt edge. This results in the need for a large tool set in order to ensure the availability of a suitably sized socket for every eventuality. This is even more the case if it is desired to provide sockets for both metric and imperial sized nuts and bolts.

Accordingly, there is a need for an adjustable ring spanner or socket wrench. Such a tool would provide greater efficiency and improved flexibility of use.

According to the present invention, there is provided an arrangement comprising a plurality of moveable members defining a polygonal aperture, wherein individual moveable members are arranged so that by movement of all the moveable members in concert the aperture is continuously adjustable over a range between a maximum aperture and a minimum aperture.

Preferably, at least one of the moveable members comprises an identical prism, the two similar, equal and parallel faces of which are trapezia and the four edges of which are parallelograms.

Preferably the trapezium faces of the prisms lie in a plane perpendicular to the axis of the aperture.

Typically, the moveable members are arranged to completely enclose the aperture thereby defining a closed aperture. Preferably the moveable members define a regular polygonal aperture. Preferably, there are six such moveable members to provide a hexagonal aperture.

Alternatively, the arrangement of moveable members may be discontinuous around the aperture, thereby defining an open aperture, being an aperture having an opening along at least one edge of the polygon.

Preferably, the moveable members are laterally retained within the arrangement by means of a retaining wall.

Preferably, the moveable members are restrained from substantial movement along the axis of the aperture by being provided with a channel in one or more of their edges, the channel being locatable over a rail extending inwardly from the retaining wall. The moveable members then slide between their maximum and minimum aperture positions along a path defined by the retaining wall.

Alternatively or additionally, the arrangement may be provided with parallel first and second cover means to restrain the moveable members from movement along the axis of the aperture. One of the cover means may include a rotatable element. One or preferably all of the moveable members may then be provided with a projection on one face thereof, the projection locating in an elongate aperture provided in the rotatable element. Rotation of the element causes linear motion of the moveable member and thus variation in the aperture dimensions.

The aperture of the arrangement may be varied by means of an external force applied to one or all moveable members.

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