

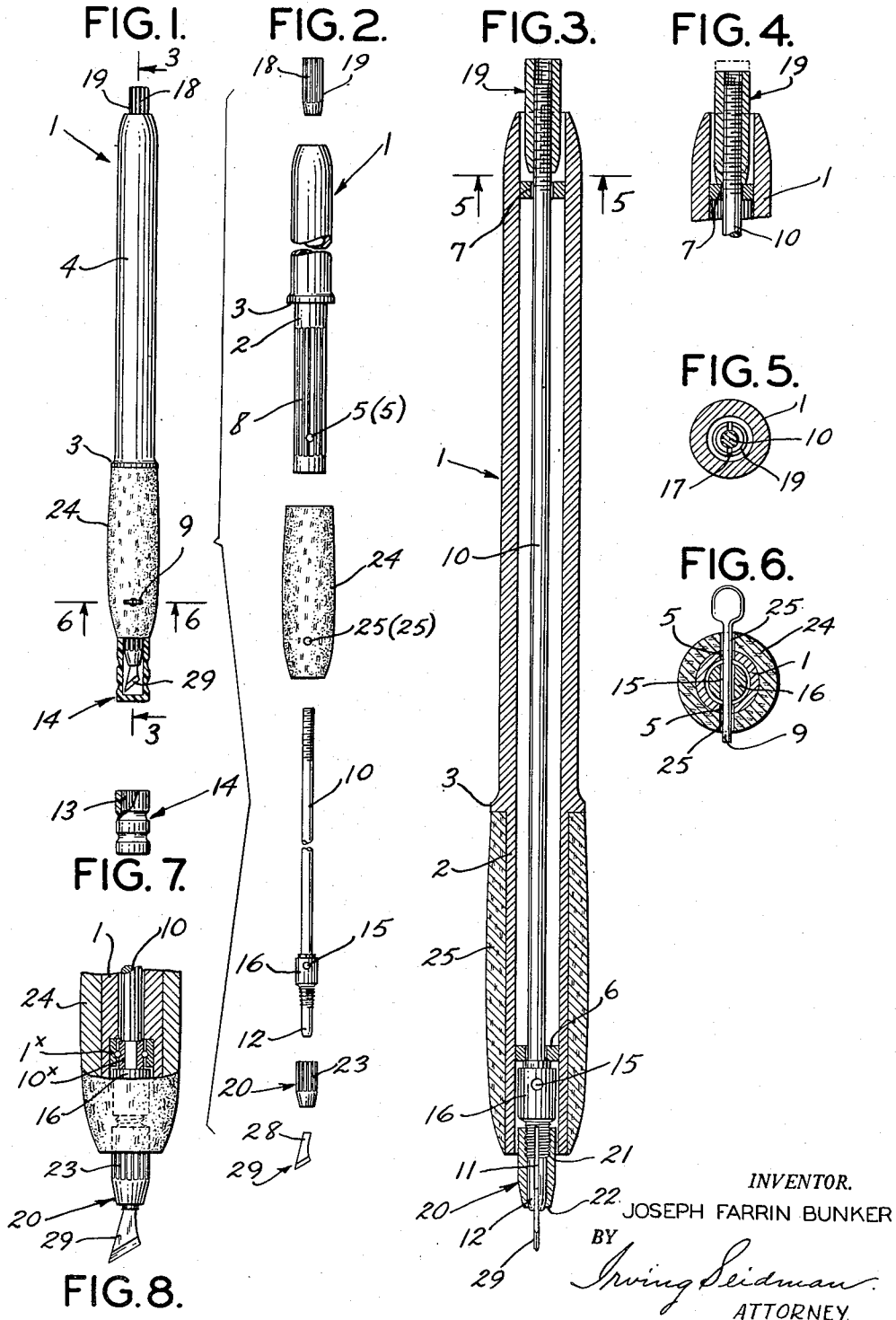
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SWIVEL KNIFE

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SWIVEL KNIFE

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This invention relates to a cutting instrument, more particularly, to an instrument for use in the graphic arts for manually cutting around designs and parts of pictorial illustrations for the object of removing such parts from its surroundings. One field of use is in making separation plates, but, of course, the instrument has many other uses in the graphic arts and elsewhere. The material cut away may be acetate sheets or other plastic sheets, or it may be paper or Bristol board or other such media used in the graphic arts.

In any event, such parts, designs or the like to be cut out, and removed, from its surroundings may be either of substantially straight lines (or partly so) or of curved lines of small or large radius of curvations (or partly so). The prime object of this invention is to provide a cutting instrument of the character described which will be adapted for either rectilinear cutting (by which is meant, substantially straight lines) or for curvilinear cutting (by which is meant, curved lines of varied radii of curvature). Rectilinear cutting is best done by a blade which is rigid relatively to the holder, while curvilinear cutting is facilitated by permitting the blade to rotate freely with respect to the handle—to be, what might be aptly termed “free wheeling.” In the improved cutting instrument of this invention, means are provided for permitting the blade to rotate freely relative to the handle.

An allied object is to provide an instrument as described which may be adjusted to provide either a rigid blade or a freely rotating blade, as desired.

Other objects are to provide in a cutting instrument of the character described, means for readily changing blades, which means may also be used for varying the angularity of the blade, or rather its cutting edge. A further object is to provide a cap for the blade, which cap also functions in the adjusting operations (as will be described).

For the attainment of the foregoing and such other objects as may appear or be pointed out herein, I have shown a preferred embodiment of my invention in the accompanying drawings, wherein:

Fig. 1 shows the complete cutting instrument of this invention, with its cap in place, the latter being cut away to reveal the blade.

Fig. 2 is an exploded view of the improved instrument of Fig. 1.

Fig. 3 is a longitudinal sectional view through

the instrument, on the line 3—3 of Fig. 1 and on an enlarged scale.

Fig. 4 is a fragmental view, also in longitudinal section, of the end opposite the blade, showing the adjusting thimble in position changed from that shown in Fig. 3.

Fig. 5 is a cross-section on the line 5—5 of Fig. 3.

Fig. 6 is a cross-section on the line 6—6 of Fig. 1, showing a holding pin in place.

Fig. 7 shows the blade cap partly broken away to reveal its internal serrations, and

Fig. 8 is a fragmental view, in longitudinal section, of the blade end of the instrument, showing the use of ball bearings.

The improved instrument comprises a hollow holder 1, the portion thereof at the blade end (lowermost in all figures) being reduced as indicated at 2, Fig. 2, a shoulder 3 being thus provided between the holder proper 4 and its reduced portion 2. Reduced portion 2 is provided with longitudinal serrations 8, Fig. 2, for frictionally holding a cork sleeve 24. Holder 1 is provided, as best seen in Fig. 3, with an apertured disc 6 near the blade end (lowermost in the figure) and a similar apertured disc 7 at the other end (uppermost) both discs being securely held in place.

A long slender rod 10 is disposed within the hollow holder 1, and rotatably held in the apertured discs 6, 7. The upper end of rod 10 is threaded at its upper end, Fig. 3, for an adjusting thimble 19, having external serrations 13 to enable it to be turned by the fingers (as will be subsequently explained). Near its lower end, rod 10 has a cylindrical enlargement 16, which, as seen in Fig. 3, abuts the lower ring 6. Rod 10 is thus held in place by enlargement 16 at its lower end and by thimble 19 at its upper end.

The lowermost portion of the rod, i. e. between enlargement 16 at its lower end, is slit, as indicated at 11, Fig. 3. The portion next to enlargement 16 is threaded, while the end is slightly tapered, at 12. A small bushing 20 is slipped on this end of rod 10 and is internally threaded at 21, Fig. 3, to screw on the aforesaid threads of rod 10. The internal diameter of bushing 20 is slightly reduced at its tip end, as indicated at 22, Fig. 3. The bushing 20 and the slitted (11) end of rod 10 functions as a collet to secure a very small interchangeable blade 29, or rather its reduced shank 28, see Fig. 2.

As best seen in Fig. 2, the outer surface of bushing 20 is provided with longitudinal serra-

tions 23, which serve a dual purpose. Serrations 23 provide a roughened surface enabling the fingers to turn the rather small bushing in making adjustments and changing the blade (as will be more fully explained presently). The longitudinal serrations 23 of the bushing also co-operate with a small cap 14 which is placed over the bushing to cover and protect the blade when not in use. Cap 14, which is preferably made of a translucent plastic, such as Lucite, is provided internally, see Fig. 7, with longitudinal serrations 13, which mate with the external serrations 23 of bushing 20.

The thimble 19 not only serves to retain the inner rod 10 in place within the hollow holder 1 but also functions to make the blade (29) rigid with respect to holder 1 or to permit the blade to rotate freely with respect to the holder. By screwing thimble 19 down tightly, abutting upper disc 7, see Fig. 4, rod 10 is held against rotation, thus maintaining knife blade 29 rigid. By screwing thimble 19 to loosen it, as in Fig. 3, the rod 10 is free to rotate (in apertured discs 6, 7) so that the blade now becomes "free wheeling" (as explained in statement of invention). This end of thimble 19 is slitted at 17, Fig. 5, to receive a thin blade or the like for increased leverage in locking or loosening the thimble.

The blade 29 is removed or inserted by manipulation of bushing 20, as explained above. During this manipulation it is undesirable that the inner rod 10 be free to turn. For this reason a small hole 15 is provided diametrically through cylindrical enlargement 16 of the inner rod 10. The holder 10 also has diametrically opposed apertures 5, 5, Fig. 2, as does the cork sleeve 24, which apertures are designated 25, 25, Fig. 2. When the parts are properly assembled, the hole 15 and the holder apertures 5, 5 and the cork sleeve apertures 25, 25 are aligned, as shown in Fig. 6. A pin 9 may be passed therethrough to hold the inner rod against rotation.

The bushing 20 may then be loosened so that the blade 29 can be removed, or the bushing may be tightened to secure the shank 23 of the blade in collet slit 11. These, particularly the blade and exposed end of bushing 20, are small parts difficult to grasp with the fingers. But the cap 14 may be used for this purpose. When it is desired to loosen or tighten the bushing 20, cap 14 is fitted in place, as shown in Fig. 1. The internal serrations 13 of cap 14 interlock in the external serrations 23 of bushing 20 so that turning of the cap will turn the bushing.

The bearing between apertured discs 6, 7 and inner rod 10 may be an anti-friction or ball-bearing, as is shown in Fig. 8 in connection with the lower bearing. The inner (smaller diameter) race 13^x of the ball-bearing is secured to inner rod 10 and the outer (larger diameter) race 1^x is secured to the holder 1.

I claim:

1. In a cutting instrument of the type having a holder and a blade with a reduced shank for reception in the holder, that improvement which comprises a hollow holder, a rod rotatably held therein, one end of said rod being threaded and the other end being slitted, the rod being provided near its said slitted end with a cylindrical enlargement, a thimble internally tapped for said threaded end of the rod, said thimble serving to retain the rod in the holder, said slitted end being threaded and slightly tapered, a bushing tapped for said slitted end of the rod and slightly reduced internally near its tip end, said slitted end and said bushing serving as a collet to hold said blade, said thimble being tightened to prevent rotation of the rod so that the blade is rigid relative to the holder, and loosened to permit rotation of the rod so that the blade is freely rotatable relative to the holder, said bushing having longitudinal serrations on its outer surface, and a cap having internal longitudinal serrations mating those of the bushing so that the cap is frictionally retained in place and so that said cap serves for turning and tightening the bushing.

2. In a cutting instrument of the type having a holder and a blade with a reduced shank for reception in the holder, that improvement which comprises a hollow holder, a rod rotatably held therein, one end of said rod being threaded and the other end being slitted, the rod being provided near its said slitted end with a cylindrical enlargement, a thimble internally tapped for said threaded end of the rod, said thimble serving to retain the rod in the holder, said slitted end being threaded, a bushing tapped for said slitted end of the rod, said slitted end and said bushing serving as a collet to hold said blade, said thimble being tightened to prevent rotation of the rod so that the blade is rigid relative to the holder, and loosened to permit rotation of the rod so that the blade is freely rotatable relative to the holder, said bushing having longitudinal serrations on its outer surface, said cylindrical enlargement having a diametrically disposed hole and said hollow holder having a pair of diametrically opposed apertures, said hole and apertures being aligned to receive a pin to hold the inner rod against rotation.

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