

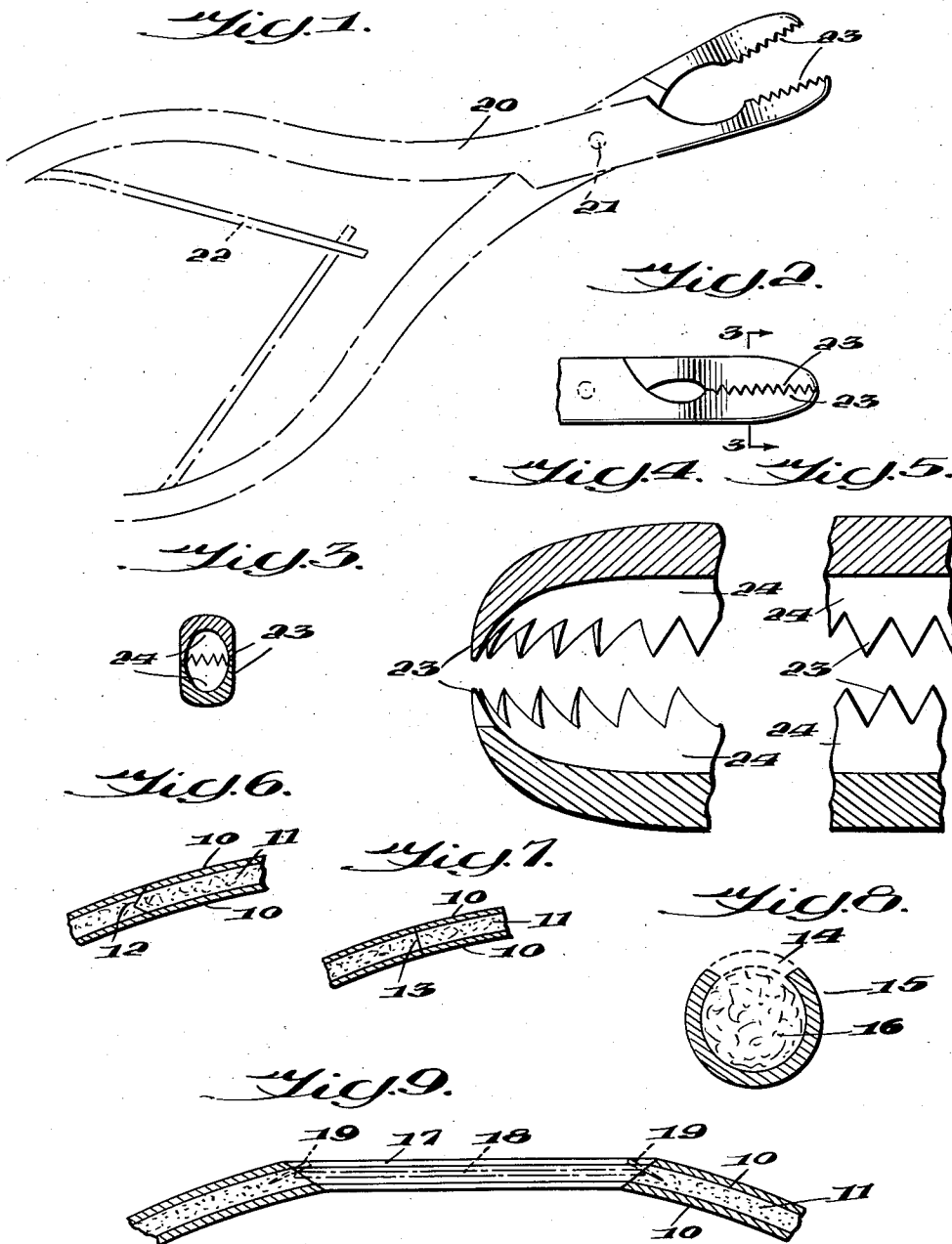
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RONGEUR

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RONGEUR

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This invention relates to rongeurs employed for the cutting away of bone edges in the art of surgery and aims to provide an improved device of this character.

The invention has for its objects, severally and interdependently, to provide a rongeur adapted to cut osseous tissue squarely in the intended plane, without backing off of the cutter, or need to forcibly resist backing off tendency thereof, during the cutting operation; to provide a rongeur capable of bevelling the edges of osseous tissue at desired angles without slippage as aforesaid; to provide a rongeur adapted to make a complete and clean cut in osseous structures and at the same time to be self-retaining in the selected cutting position; to provide a rongeur capable of nipping off accurately extremely small protruding points or edges of bone and the like; and generally to improve the effectiveness and utility of such devices without unduly complicating the structure thereof.

Other objects and advantages of the invention will be apparent from the following description of a preferred embodiment thereof. The invention resides in the nature of the cutting edges of the rongeur, as distinguished from the leverage system or general form thereof and more especially in the arrangements and features of construction hereinafter described and claimed.

In the accompanying drawings illustrative of the invention.

Fig. 1 is a side elevation of a rongeur, partly in phantom view, in open position.

Fig. 2 is a similar view of the cutting jaws closed.

Fig. 3 is a sectional detail taken on the line 3—3 of Fig. 2 looking in the direction of the arrows.

Figs. 4 and 5 are enlarged details showing a preferred arrangement of the occluding cutting teeth.

Figs. 6 to 9 are diagrammatic detail bone sections illustrating uses of the invention.

Rongeurs as heretofore constructed have had various types of fulcrumed handles, single action, multiple action, etc., various shapes of cutting heads, and various depths and shapes of cusps therein, but in all instances the meeting edges of the jaws thereof have been in the form of continuous linear-edged blades. With such constructions it has been found that in cutting skull or other osseous structure, the cutting jaws, during closing thereof, tended to slip or back away from the intended cutting plane.

In other words, as illustrated diagrammatical-

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ly in Fig. 6, such linear blade edges cutting into the cortical portions 10 and interposed marrow portions 11 of a skull, for example, have tended to back off from the intended cutting plane and thus to double-bevel the cut edge thereof, as indicated at 12. In order to try to prevent such backing off, and produce cutting on the intended plane, as plane 13, Fig. 7, it has been necessary for the surgeon to push forwardly or sidewise on the instrument while closing it, with quite a good deal of force, with consequent danger of slippage of the instrument and damage to underlying nerve structures and the like.

The tendency of such prior devices to slip away from the intended line of cutting has also made it difficult to use the prior devices for removal of tiny spicules of bone to smooth bone edges, in operations of the character illustrated in Figs. 6 and 7; in removal of wall sections of large bones, such as a section 14 of the femur 15, Fig. 8, to expose a portion of the marrow 16 thereof for removal; or in beveling the edges of openings 17 in osseous structures to enable securement of a tantalum or other plate 18 therein, as by pins 19, as exemplified in Fig. 9.

By the construction of the present invention, the tendency of the rongeur to back off, as in Fig. 6, is obviated, and without necessity for the pushing above mentioned, the rongeur itself is made to avoid slipping and to cut true to the desired plane, as plane 13 in Fig. 7, for example. Thus possibility of damage to underlying tissues and nerve structures such as the brain or spinal cord is minimized. Moreover, the absence of tendency to slip, in the case of the new structure, enables the cut to be made very close to bone edges, and at relatively flat angles to bone surfaces, so that very tiny spicules of bone may be removed and the leveling of the bone edges is easily and accurately effected.

In accordance with the present invention, these results are achieved by providing the cutting jaws of the rongeur with complementary mutually nesting serrations or teeth which on closure meet in an occluding position. As shown in Figs. 1 to 5, the rongeur, which may comprise any type of handles 20, fulcrumed in any suitable way, as at 21, and provided, if desired, with jaw-opening spring means 22, has cutting edges 23 which meet in exact opposition, but which, instead of having linear blade edges, have toothed or serrated blade edges that are complementary and fit into one another. Thus in the closed position of the jaws, as shown in Figs. 2 and 3, the teeth of one jaw enter between the teeth of

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the other and fill the spaces therebetween. Preferably, as shown, the outer, or bone-facing, walls of the serrated cutting teeth are substantially vertical, and the teeth are bevelled away from their outside wall faces, i. e. inwardly toward the cusps 24 in the form of cutting head shown.

With this form of construction, as the cutting jaws are closed on an area of bone, the tips of the teeth bite into the cortical structure on the line of severance desired and obtain a firm non-slipping grip thereon. As the jaws close, the bevelling of the backs of the teeth tends to hold the forward faces of the teeth tightly against the edges from which the section is being severed, so there is no tendency for the cutters to slip or back away from such edges. The entire effort of the surgeon may thus be directed to firmly closing the rongeur and no pushing is necessary to hold the instrument in position. Thus all danger of slippage of the instrument under such pushing force is avoided, and the danger of damaging underlying brain tissues or nerve elements is minimized. Moreover, in cutting away of dorsal lamina of the spine, for example, the ability to perform the work without exerting lateral force, is of great importance to avoid damage to the spinal cord.

Furthermore, because the initial penetration of the osseous structure is effected at the relatively small spaced points of tooth contact, or by the contact of a tooth tip between two spaced supporting points, tiny spicules of bone are readily removed, and tiny oblique corners are readily trimmed. Thus smoothing and bevelling of the edges of bone openings, as in Figs. 8 and 9 is facilitated, and as the bone does not have to be cut nearly normal to its surface, as with linear edged rongeurs, it is possible easily to cut away the outer cortical layer and part of the marrow layer of the skull to a greater extent than the inner cortical layer, so that the latter will remain to support a tantalum plate 18 or the like inserted through the larger opening in the outer cortical layer, and held by tantalum points 19 entered marginally into the marrow stratum, so that danger of pressing of the plate against the underlying tissues is avoided.

It is to be understood that the specific embodiment herein described is illustrative and not restrictive of the invention, the scope of the invention being defined in the appended claims. All modifications which come within the meaning or range of equivalency of the claims are therefore intended to be included therein.

I claim as my invention:

1. A rongeur for cutting of osseous structures comprising opposed cutting jaws, said jaws when closed having their outer wall faces meeting in a common vertical surface, said jaws having

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toothed edges with their outer wall faces lying in said common surface and with the tips of the teeth of one jaw entering between the teeth of the other jaw in an occluding manner, said teeth being beveled inwardly away from their outer wall faces.

2. A rongeur for cutting of osseous structure comprising opposed internally cusped cutting jaws, said jaws having toothed edges closing against each other with the tips of the teeth of one jaw entering between the teeth of the other jaw, the outer faces of said teeth in closed position forming a substantially vertical surface, and the tips of said teeth being beveled away from said vertical surface toward the cusps of said jaws.

3. A rongeur for cutting of osseous structures comprising a pair of opposed cutting members, said cutting members having interengaging serrated edges meeting in an occluding fashion, said serrated edges having exterior working faces meeting in a common vertical surface and having their rear surfaces bevelled away from said external working faces.

4. A rongeur for cutting osseous structures having a pair of opposed cutting members provided with toothed edges meeting in an occluding manner, the teeth of said edges being individually tapered to a point for piercing the osseous tissue.

5. A rongeur for cutting osseous structures having a pair of opposed cutting members provided with toothed edges meeting in an occluding manner, said toothed edges being substantially vertical on one side and beveled on the other side.

6. A rongeur having opposed cusped cutting jaws provided with toothed edges meeting in an occluding manner, said teeth having their outer faces substantially vertical, and having their tips bevelled away from said outer surfaces.

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