Feb. 22, 1955 K. R. ROWE 2,702,550

SURGICAL INSTRUMENT

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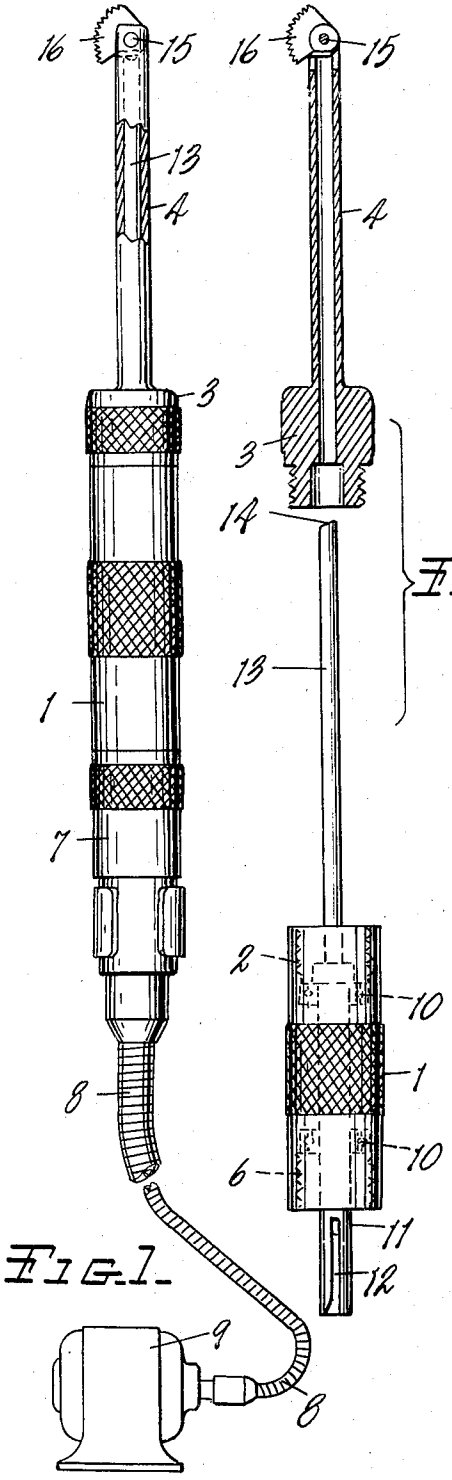


Fig. 1.

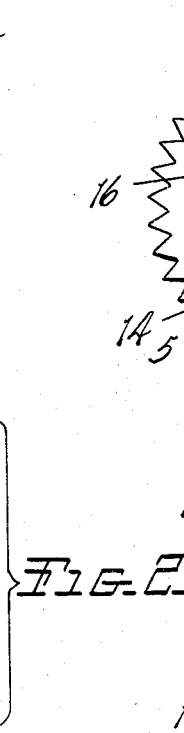


Fig. 2.

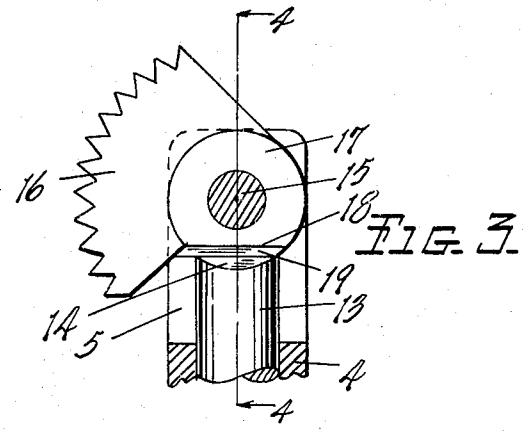


Fig. 3.

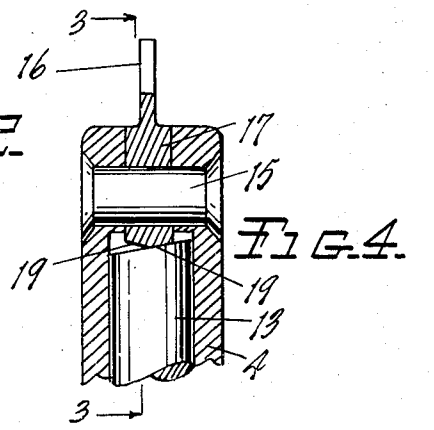


Fig. 4.

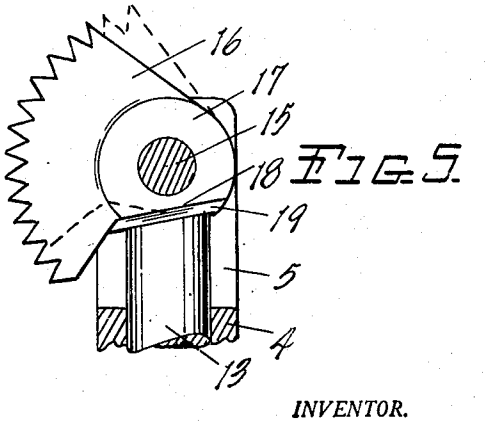


Fig. 5.

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SURGICAL INSTRUMENT

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8 Claims. (Cl. 128—317)

This invention relates to improvements in surgical saws or implements.

The principle objects of this invention are:

First, to provide a power driven oscillating cutting implement of such small size as to be highly practical in performing surgery in confined spaces.

Second, to provide a rapidly oscillating saw on a long narrow mounting that permits the saw to be inserted into the nasal passages for cutting boney structure of the nose without damaging the soft membranes of the nose.

Third, to provide a surgical implement which is simple to construct and use and which is light and small enough for its intended purpose.

Fourth, to provide a novel oscillating drive for the blade of a surgical implement.

Other objects and advantages of the invention will be apparent from the consideration of the following description and claims.

The drawings, of which there is one sheet, illustrate a highly practical form of the implement.

Fig. 1 is a fragmentary side elevational view of the implement with portions broken away in cross section.

Fig. 2 is a fragmentary exploded view of elements of the implement with the elements shown in longitudinal cross section.

Fig. 3 is an enlarged fragmentary longitudinal cross sectional view through the outer end of the implement taken along the plane of the line 3—3 in Fig. 4.

Fig. 4 is an enlarged fragmentary longitudinal cross sectional view taken at right angles to Fig. 3 and along the plane of the line 4—4 in Fig. 3.

Fig. 5 is an enlarged view similar to Fig. 3 but illustrates the implement blade in its extreme oscillated positions.

The implement comprises a cylindrical body **1** having an internally threaded outer end **2** which receives a head **3**. A long narrow tubular neck **4** is formed on the outer end of the head and is diametrically and longitudinally slotted as at **5**. The inner or lower end of the body as illustrated in the drawings is internally threaded as at **6** to receive a coupling member **7** for a flexible drive shaft **8** which extends to and is driven by a high speed motor **9**.

The interior of the body **1** is provided with bearings **10** which rotatably support a drive shaft **11** extending axially through the body. The inner or lower end of the drive shaft extends from the body and is longitudinally slotted as at **12** to be received in the coupling **7** and be connected to the rotating element of the flexible shaft **8**. The opposite end of the drive shaft **11** consists of an elongated rotating rod **13** having an axially beveled outer end **14**. The rod **13** extends in laterally supported relation through the elongated neck **4** and projects into the slot **5** as is most clearly illustrated in Figs. 3 to 5.

The sides of the tube **4** on opposite sides of the slot **5** are pierced to receive a hardened rivet **15** that is permanently fixed in the sides of the tube and bridges the slot **5**. The rivet **15** intersects the axis of rotation of the rod **13** at right angles and forms a pivotal support for a segmental saw blade **16**. The sides of the blade **16** have thickened hub portions **17** which laterally support the blade from the inner sides of the slot **5**. The inner side edge of the blade **16** is provided with a chordally extending portion **18** disposed generally perpendicular to the axis of the neck **4** and rod **13**. This edge **18** is further axially beveled on each side as at **19** as is best illustrated in Fig. 4. The edge **18** is positioned by the pivot **15** in engagement with the beveled end of the rod **13**.

When the beveled end of the drive rod **13** is disposed with the bevel facing to either side of the plane of the blade **16** the bevel of the drive rod meets with the bevel **19** of the chordal edge of the blade and the blade assumes a neutral or immediate position as is illustrated in Figs. 3 and 4. However, as the projecting tip of the beveled end of the drive rod rotates into upwardly or downwardly facing position the projecting edge of the drive rod moves across the chordal edge **18** of the blade and tilts the edge forwardly or backwardly as is shown in Fig. 5 to oscillate the blade.

Desirably the motor **9** or other driving element for the shaft **11** is designed to operate at 12,000 R. P. M. so that the blade will oscillate or reverse its direction of movement 24,000 times per minute. The relatively short stroke of the oscillating blade when the blade is toothed prevents it from cutting or damaging the soft tissues which yield or move with the teeth rather than being cut by the teeth. However, the rapidly oscillating movement of the blade functions to cut solid boney structure with ease when the blade is pressed against the hard surface.

It is deemed desirable that the shaft **11** should rotate at least 6,500 R. P. M. when the implement is used to cut bone or boney structure.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A surgical saw comprising, a tubular body having a shaft journaled therein and projecting from each end thereof, a coupling member threaded into one end of said body and adapted to facilitate connection of a rotating drive shaft to said first shaft, a head threadedly engaged with the other end of said body and having an elongated narrow tubular neck embracing and laterally supporting the projecting other end of said first shaft, the outer end of said neck being axially slotted and having a fixed pivot extending between the sides of the slot, said other end of said first shaft being axially beveled and projecting into said slot, and a segmental saw blade rotatably mounted on said pivot and having a toothed portion projecting from the side of said neck, said saw blade having a chordally extending edge opposed to and engaging the end of said first shaft, said chordal edge being beveled on opposite sides axially of said neck.

2. A surgical saw comprising, a tubular body having a shaft journaled therein and projecting from each end thereof, a coupling member connected to one end of said body and adapted to facilitate connection of a rotating drive shaft to said first shaft, a head engaged with the other end of said body and having an elongated narrow tubular neck embracing and laterally supporting the projecting other end of said shaft, the outer end of said neck being axially slotted and having a pivot extending between the sides of the slot, said other end of said first shaft being axially beveled and projecting into said slot, and a segmental saw blade rotatably mounted on said pivot and having a toothed portion projecting from the side of said neck, said saw blade having a chordally extending edge opposed to and engaging the end of said first shaft, said chordal edge being beveled on opposite sides axially of said neck.

3. A surgical saw comprising, a tubular body having a shaft journaled therein and projecting from each end thereof, means for connecting of a rotating drive shaft to said first shaft, a head on the other end of said body and having an elongated narrow tubular neck embracing and laterally supporting the projecting other end of said first shaft, the outer end of said neck being axially slotted and having a pivot extending between the sides of the slot, the other end of said first shaft being axially beveled and projecting into said slot, and a segmental saw blade rotatably mounted on said pivot and having a toothed portion projecting from said neck, said saw blade having a chordally extending edge opposed to and engaging the end of the first shaft, said chordal edge being beveled on opposite sides axially of said neck.

4. An instrument comprising, a tubular body having a shaft journaled therein and projecting from each end thereof, means for connecting a rotating drive shaft to said first shaft, a head on the other end of said body and having an elongated narrow tubular neck embracing and laterally supporting the projecting other end of said first

shaft, the outer end of said neck being axially slotted and having a pivot extending between the sides of the slot, the other end of said first shaft being axially beveled and projecting into said slot, and a blade rotatably mounted on said pivot and having a toothed portion projecting from said neck, said blade having a chordally extending edge opposed to and engaging the end of said first shaft.

5. An instrument comprising, a body having a driven shaft journaled therein, an elongated narrow tubular extension on said body embracing and laterally supporting said shaft, the outer end of said extension being axially slotted and having a pivot extending between the sides of the slot, the outer end of said shaft being axially beveled and projecting into said slot, and a blade rotatably mounted on said pivot and having a toothed portion projecting from the side of said extension, said blade having a chordally extending edge opposed to and engaging the end of said first shaft, said chordal edge being beveled on opposite sides axially of said extension.

6. An instrument comprising, a body having a driven shaft journaled therein, a tubular extension on said body embracing and laterally supporting said shaft, the outer end of said extension being axially slotted and having a pivot extending between the sides of the slot, the outer end of said first shaft being axially beveled and projecting into said slot, and a blade rotatably mounted on said pivot and having a toothed portion projecting from said neck, said blade having a chordally extending edge opposed to and engaging the end of said shaft.

7. An instrument comprising, a body, a shaft journaled in said body, a flexible drive shaft connected to one end of said first shaft, a motor connected to said flexible shaft to drive said first shaft at about 12,000 R. P. M., an elongated narrow neck on said body embracing the other end of said first shaft, the outer end of said neck on said body having a transversely and longitudinally extending slot formed therein, the other end of said first shaft being axially beveled and extending into said slot, a pivot in said slot disposed in transversely intersecting relation to the axis of said first shaft, a blade rotatable on said pivot, and a chordally extending edge on said blade opposed to and engaged by the beveled end of said first shaft, said chordally extending edge being beveled axially of said body.

8. An instrument comprising, a body, a shaft journaled in said body, a motor connected to drive said shaft in excess of 6,500 R. P. M., the outer end of said body having a transversely and longitudinally extending slot formed therein, the other end of said shaft being axially beveled and extending into said slot, a pivot in said slot disposed in transversely intersecting relation to the axis of said shaft, a blade rotatable on said pivot, and a chordally extending edge on said blade opposed to and engaged by the beveled end of said shaft.

No references cited.