

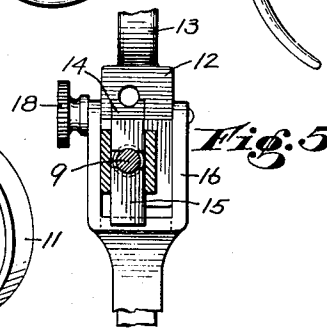
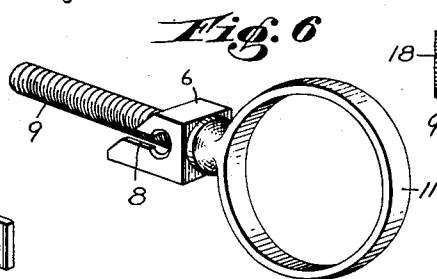
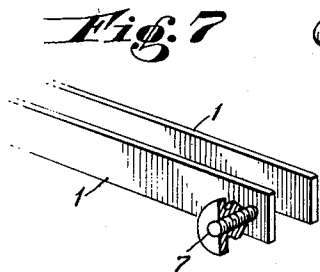
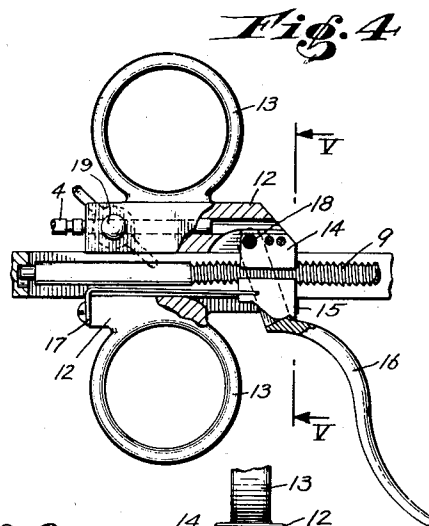
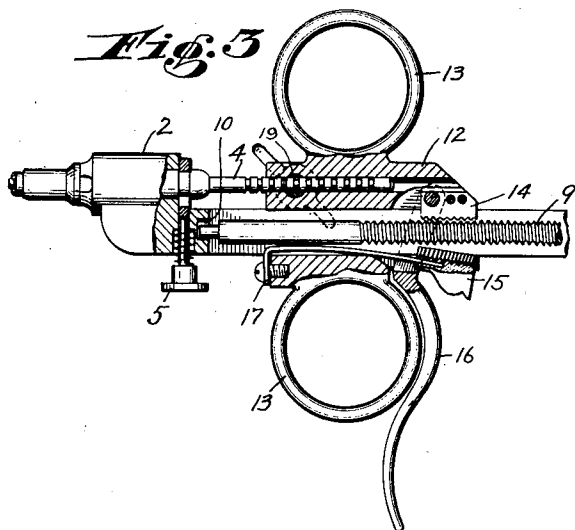
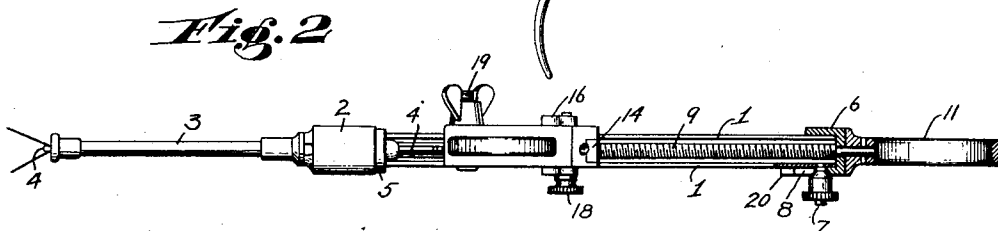
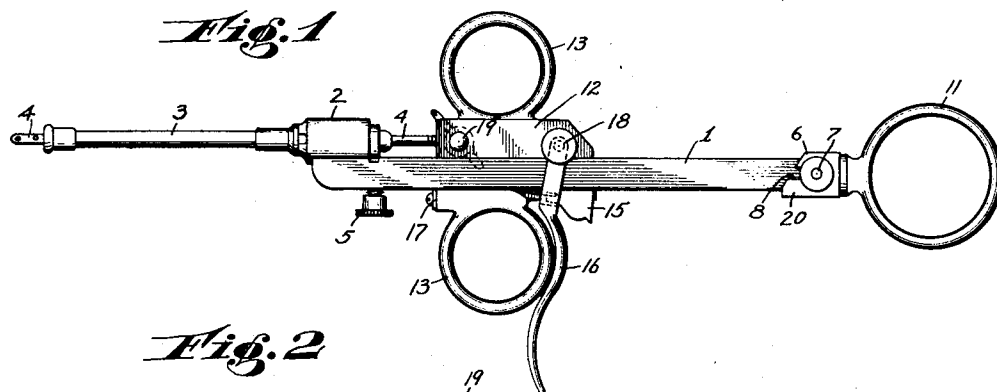
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1,934,818

SURGICAL INSTRUMENT

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UNITED STATES PATENT OFFICE

1,934,818

SURGICAL INSTRUMENT

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13 Claims. (Cl. 128—320)

The invention relates to instruments of the kind adapted to be operated with two degrees of force and such for example as a tonsil snare, in which a preliminary direct pull, done by the fingers, serves to make the initial contraction of the snare and is followed by the stronger pull of a power screw which completes the action. The object is to simplify and improve the durability and the reliability of instruments of this class and to make them capable of easier cleansing and more easily taken apart and reassembled, and the invention consists of several features, which are preferably conjointly embodied but are also capable of independent use with advantage as will be made apparent below and as defined in the appended claims.

The drawing shows the several improvements in the form preferred, Fig. 1 being a side elevation:

Fig. 2 a top plan.

Fig. 3 a larger scale longitudinal section of the carriage.

Fig. 4 a similar view with half-nuts closed.

Fig. 5 a cross section on V—V, and

Figs. 6 and 7 are details.

The frame of the instrument comprises two similar slide bars 1, each of flat cross-section, united at their forward ends by the head 2 which forms a supporting means for the tubular tip 3 for guiding the snare wire or the stilette 4, such tip being removable by releasing the latch 5. The two slide bars 1 are disposed parallel to each other and with the space between them open top and bottom and are connected at their rear ends by a cap or socket 6 in which they are held by a lock screw 7, tapped into one of the side bars and fitting a countersink in the end of the slot 8 in the socket wall. By backing out the screw the socket can be pulled off the bars.

The socket member 6 forms the rear bearing for the power screw 9, the forward end of which is journaled in a bearing 10 in the head 2, so that the body of the screw lies between the two side bars, occupying substantially the full width of the space between them. The bearing 10 is constituted by a hole slightly larger than the reduced end of the screw which rests therein. A thumb ring 11 on the end of the screw serves as a handle by which it may be rotated and the socket member is desirably secured to the screw or handle so it will not drop off when the screw is separated from the frame.

The carriage 12, provided with top and bottom finger holds 13, embraces and slides on the two bars, being introduced thereon when the end cap 6 has been removed. It is provided with a half-

nut 14 extending into the space between the bars and for engagement with the power screw 9 but is normally clear of such screw. This half-nut is a rigid part of the carriage. The carriage also has a second half-nut 15, movably supported thereon, on the opposite side of the power screw, and a cam lever 16 by means of which this latter half-nut can be advanced upon the screw with a sufficient movement to shift the latter into engagement with the carriage half-nut 14, either by displacing it in its loose bearings, 10 and 6, or by simply flexing it, or both, thus clamping the screw by and between the two half nuts. By such engagement the carriage becomes connected to the screw with less tendency to wear of the screw than if only a single half-nut were employed and with special security due to the important fact that half-nut 14 is a fixed or rigid part of the carriage. The manner of mounting the moving half-nut 15 on the carriage is subject to preference; as herein shown, it is carried on the end of a substantial flat spring 17 secured by a screw at the front end of the carriage body, the spring bias serving to separate the half-nut from the screw. The operation of the half-nut by the lever 16 is also a subject of preference; as shown, the lever is of yoke-form, separably pivoted at 18 to the carriage and engages a cam contour on the back or lower side of the half-nut 15, and it is provided with a trigger end extending below the lower finger hold 13 and so that when the trigger is pulled it causes engagement of the screw with both half-nuts.

It will be understood that the stilette 4 is fastened in its hole or socket in the upper part of the carriage by the set screw 19, so that by pulling back on the carriage, with the fingers, the snare can be preliminarily contracted down to the point where multiplication of power is needed for further contraction. The trigger is then pulled back, clamping the screw into threaded engagement with the carriage and then, by rotation of the thumb ring 11, the carriage can be further retracted as desired. Over-screwing is prevented by the projection 20 on the socket 6 which is encountered by the trigger as the carriage approaches the end of the slideway and throws the latter out of its cam notch on its half-nut, snapping it to open position.

It will be observed that the construction of the frame with two side bars whose proximate faces are flat, or at least not concaved, adapts it to be readily flushed out clean under a faucet and that the connection of the bars at their rear ends by a socket, which is of square cross section, serves to stiffen the frame against the torsional

strain incident to the use of the screw and that the design thus produced is capable of inexpensive manufacture, these being features of this invention independent of the power screw organization as will be apparent and further, that the special security of the threaded engagement between screw and carriage is the result of the rigidity of the half-nut 14 with the carriage and the provision of relative movement between these parts whereby they may be brought or clamped together, these being features independent of the mounting or character of the power screw and of the construction of the frame.

It will be observed furthermore that while the invention has been exemplified and described as embodied in a tonsil snare, the same principle of construction and operation is applicable to any surgical instrument wherein a carriage is subject to preliminary direct and subsequent power operation and there is therefore no limitation to be implied to the particular use in which the invention is shown.

I claim:

1. In an instrument adapted for direct and power operation, the combination of a sliding carriage, a power screw, and means for shifting the screw into threaded engagement with threads on the carriage.

2. In an instrument adapted for direct and power operation, the combination of a sliding carriage having a half-nut, a power screw, an opposing half nut and means causing the latter to shift the screw into engagement with the carriage half-nut.

3. In an instrument adapted for direct and power operation, the combination of a sliding carriage having a finger grip and a half-nut formed rigidly therewith, a power screw, an opposite half-nut and means on the carriage for clamping the latter upon the screw and thereby clamping the screw into the carriage half-nut.

4. In an instrument of the kind described, a frame comprising a slideway, a carriage thereon having a half-nut, a power screw having journals in the frame permitting movement thereof laterally of the slideway, a second half-nut and means for clamping the latter half-nut against the screw and thereby shifting the latter into engagement with the carriage half-nut.

5. In an instrument of the kind described, a frame comprising side bars, a power screw between said bars, a carriage on the bars having a half nut between them and means on the carriage for laterally shifting the screw into engagement with said half-nut.

6. In an instrument of the kind described, a frame comprising two side bars having substantially flat opposing faces and connected only at their ends, a power screw confined between said opposing faces, a carriage sliding on the upper and lower edges of said bars and means on the carriage for connecting the same to said screw.

7. In an instrument of the kind described, a frame comprised of two spaced-apart side bars connected only at their ends and confining a power screw between them, a socket member forming the rear connection between said bars, a set screw in one of the bars engaging a slot in said member, whereby said member is removably secured to said bars, a carriage on said bars and means on the carriage for connecting it to said screw.

8. In an instrument of the kind described, a frame comprising two spaced-apart side bars each of substantially flat cross-section, a head uniting the forward end of said bars, a socket connecting the rear ends, a power screw journaled in the head and socket respectively and open to view top and bottom between said bars, a carriage sliding on the upper and lower edges of said bars and means on the carriage for connecting it for operation by said screw.

9. In an instrument of the kind described, a frame comprising two spaced-apart side bars, each of substantially flat cross-section, connected only at their ends and confining a power screw between them, a carriage on said bars, means for connecting the carriage to the screw, a socket forming the rear connection between said bars and a member on said socket for engaging said connecting means to disengage the screw and carriage.

10. In an instrument of the kind described, a frame comprising two side bars, a head uniting their forward ends, a power screw loosely journaled in the head and confined between said bars, a removable socket forming a journal seat for the screw and uniting the rear ends of said bars, a carriage and means for shifting the screw relatively to said bars and into threaded engagement with the carriage.

11. In an instrument of the kind described, a frame comprising two side bars supporting a sliding carriage, a half-nut formed thereon between said bars, a power screw between said bars, and a movable half-nut on the carriage adapted for deflecting the power screw into engagement with said first-mentioned half-nut.

12. In an instrument of the kind described, a frame comprising two side bars having a power screw journaled between them, a carriage embracing the opposite edges of said bars and having a half-nut formed thereon, a second half-nut movably mounted on said carriage and a lever for causing joint engagement of said half-nuts with the power screw.

13. In an instrument of the kind described, a pair of side bars confining a power screw between them, a socket constituting a journal-bearing for the screw and fitting over the ends of the bars, a lock screw in one side bar and a countersink in the socket engaged by the screw for securing the socket to the bars.

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