G. F. RICHTER.

WOUND CLIP FORCEPS.

APPLICATION FILED NOV. 11, 1914.

1,203,270. Patented Oct. 31, 1916.

Fig. 1.

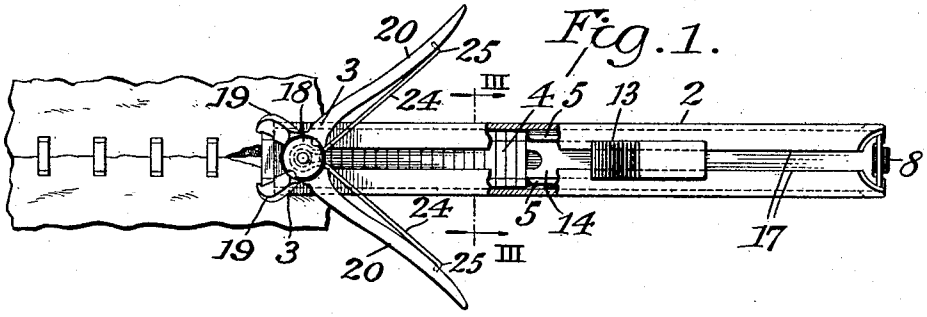


Fig. 2.

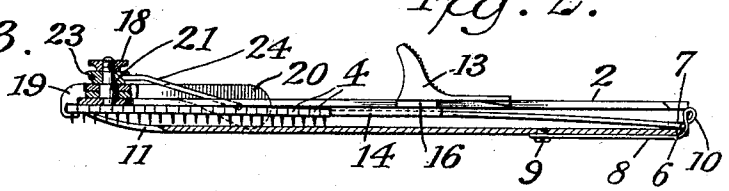


Fig. 3.

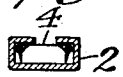


Fig. 4.

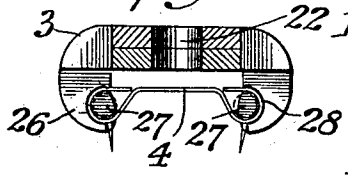


Fig. 7.

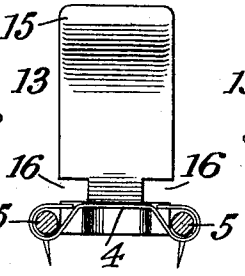


Fig. 9.

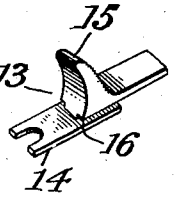
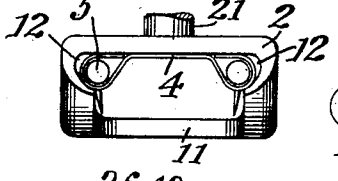


Fig. 5.



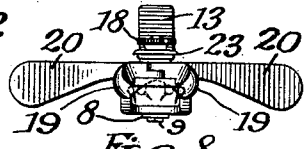


Fig. 8.

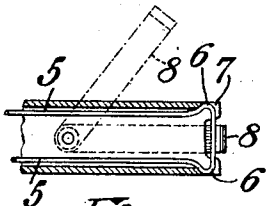


Fig. 10.

Fig. 6.

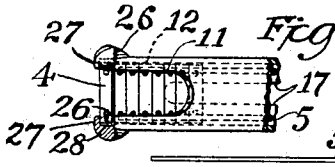


Fig. 11.

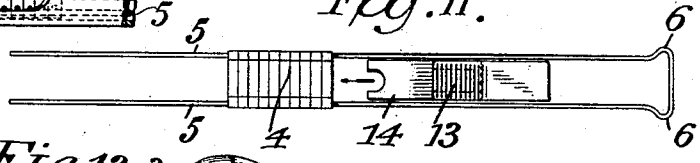
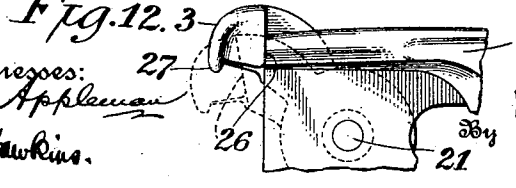


Fig. 12.



Witnesses:
A. R. Appleman
W. H. Hawkins.

Inventor
Gustav F. Richter
By
Attorney
H. G. Kimball

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C

UNITED STATES PATENT OFFICE.

GUSTAV F. RICHTER, OF BROOKLYN, NEW YORK.

WOUND-CLIP FORCEPS.

1,203,270. Specification of Letters Patent. Patented Oct. 31, 1916.

Application filed November 11, 1914. Serial No. 871,438.

To all whom it may concern:

Be it known that I, GUSTAV F. RICHTER, a citizen of the United States, residing in the borough of Brooklyn, city, county, and State of New York, have invented the following-described new and useful Improvements in Wound-Clip Forceps.

The invention relates to wound clip forceps and the object is to provide an instrument combining in a superior manner simplicity of construction, convenience and reliability of operation, freedom from derangement, ease in loading with clips, and thorough sterilizability.

The invention comprises a number of novel features, which will now be described, and while the best results are obtained when all are used in conjunction, as herein illustrated, certain of the improvements may be used without others, or in specifically different combinations.

In the accompanying drawings, Figure 1 is a plan view of the device in position for use; Fig. 2 is a vertical longitudinal section, with parts in elevation; Fig. 3 is a cross-section on line III—III; Fig. 4 is a cross-section, enlarged, through the pivotal portions of the forceps members, and looking forward toward the jaws, the pivot pin being omitted; Fig. 5 is an enlarged front or end view of the magazine showing a clip at the end thereof; Fig. 6 is a fragmentary bottom plan view, with the jaws partly in section, showing the foremost clip held by the jaws preparatory to its bending; Fig. 7 is an enlarged view showing a clip and the pusher in front elevation and the clip-bearing wire in cross section; Fig. 8 is a front view of the forceps, on the scale of Figs. 1 to 3, illustrating the bending of a clip by dotted lines. Fig. 9 is a perspective view of the pusher alone; Fig. 10 is a horizontal sectional view taken at the rear of the magazine, the gate being shown closed in full lines and open in dotted lines; Fig. 11 is a plan view illustrating a few of the clips on the guide wire and the pusher in its relation thereto; and Fig. 12 is a bottom plan detail of one of the clip-applying jaws and its abutment stop 26.

The body member of the device is a magazine designated 2, preferably substantially straight and of boxed form in section, and also open at its front and rear ends, the rear end being the entrance into which the clips are introduced and the forward end being the delivery end from which the successive foremost clips are fed to the forceps members 3 in the manner presently to be described. In this magazine the clips 4 are received without necessity of removal from the supporting wire 5, on which they are furnished, and which when in place in the device performs the function of an auxiliary guide for the clips in their feeding movement, thus becoming a part of the apparatus. The wire, however, is not a necessary part of the feeding means and may be omitted since the interior formation of the magazine could be such as to accommodate the clips without it. It is, however, an important advantage to be able to charge the magazine by a single operation and the wire-receiving magazine therefore forms a correspondingly important part of the invention. As clearly shown in Fig. 11, the said wire is of substantially elongated hair-pin form with a laterally projecting head 6, adapted to enter the slots 7 (see Figs. 2 and 10) cut in the rear ends of the side walls of the magazine, near the bottom, and affording means for positioning the wire and holding it with its free ends within the magazine. A gate 8, conveniently in the form of a spring strip pivoted at 9 to the bottom of the magazine and having its rear end 10 upturned, engages behind the end of the wire and confines the head 6 thereof in the recesses 7, whereby displacement of the wire is prevented. As indicated in Fig. 10, this gate may be swung to one side, being first bent down for the purpose, in order to permit an empty wire to be removed and a full one, loaded with clips, to be inserted.

The magazine or inclosure proper is of appropriate width and depth internally to take the series of clips, in edgewise alinement on the wire, that is to say, with their backs in the same plane, parallel to the general plane of the magazine. At its forward end the bottom wall is cut away for a substantial distance, leaving an opening or hollow 11 which will accommodate the lips of the wound, and this cutaway portion is beveled upward, as shown more particularly in Fig. 2, to provide further clearance. The margins of the opening 11 coöperate with the side and top walls of the magazine to form narrowing channels 12, which, as shown in Fig. 5, afford ex-

ternal guides for the ends or eyes of the clips, insuring delivery thereof in fixed relation to the clip-applying members, presently described. While these guiding channels are shown only at the forward end of the magazine, they might obviously extend farther rearward if desired.

The means for feeding the clips lengthwise of the wire and of the magazine comprises a thumb push formed by a clip-engaging slide-plate 14 disposed immediately below the top wall of the magazine and a thumb projection 15 above the same, the two being joined by a reduced portion, leaving grooves 16 between the two said portions, which grooves fit over the edges of the longitudinal slot 17 in the top wall of the magazine. The pusher is inserted in the slot after the wire-full of clips has been introduced and before closing the gate, and its forward end engages the rearmost clip on the wire, and is capable of advancing the line of clips the full length of the magazine.

The clip-bending or applying devices comprise crossed forceps members 3, which are fulcrumed as levers of the first class at a point very near their forward ends and on top of the forward portion of the magazine. Each member consists of a short jaw portion or nib 19, and a relatively long grip portion or handle 20, the nibs being extended downward in front of the forward end of the magazine, as shown in Figs. 2 and 8, and the grips diverging rearwardly at opposite sides of the magazine. In the particular construction shown, the pivot 21 for the levers rises from the forward portion of the top wall of the magazine, at the end of the slot 17, and has a relatively large base to engage the bearings 22 of the levers. A washer 23 is placed above the jaw members, embracing the portion of the pivot of reduced diameter, just above the base, while a nut 18 screwed to the end of the pivot, holds the parts together but so that they can be disassembled in the obvious manner.

A spring 24 held by a groove in the washer 23, and with its ends 25 held in holes in the grips 20, serves to urge the latter to their extreme divergent positions. These positions are determined for each member by the engagement of the rear side of the nib 19 with the front face 26 of the magazine, as illustrated more clearly in Fig. 12. When holding this normal position, the lips 27 on the nibs occupy positions in which they serve as stops to limit the advance of the foremost clip under the action of the thumb push. In rear of each lip 27, the nib is concaved to form a virtual extension of the channels in the magazine and of appropriate depth to receive but a single clip, which will be retained therein until the nibs are forced together by the operator. After the clip has been bent in this manner, its shortened length will permit it to separate readily from the nibs as soon as the latter are again opened. The return of the nibs to the position in which they abut against the faces 26, brings them in proper alinement to receive the next successive clip, and the advance of the latter is definitely and positively limited by the abutment stops or lips 27.

In use, the magazine is relatively stationary in the hand of the operator, and the grip portions of the forceps are compressed by the thumb and forefinger to bend and apply the clips. After each application the pusher is pressed forward by the thumb, to advance a fresh clip into place between the jaws, and when the series of clips is exhausted, the gate at the back is opened, the wire and thumb push removed, and a fresh wire with clips thereon is inserted. The easy disassemblage of the parts, as well as the open character of the magazine, enable the instrument to be quickly and thoroughly sterilized, as will be evident. It will be observed, moreover, that the construction is such that clearance is provided at the back and under side of the foremost clip between the nibs at the end of a stationary magazine wherein the clips are guided in edgewise alinement, the said clearance space permitting the bending and application of the clip without the necessity of any movement on the part of the magazine and in plain view of the operator, and in this respect the invention constitutes an embodiment of the construction broadly claimed in my prior application filed July 22, 1913, Serial No. 780,483, which differs specifically from the present case in that the forward clip-retaining instrumentalities are therein carried by the magazine part, instead of being formed on the forceps members as illustrated herein. By the employment of lever members of the first class, and having a considerable leverage as indicated, a new and important result is also attained in magazine forceps. This arises from the ability given the operator to control accurately the extent to which the clips are bent, when applied, so that he can bend the clips slightly or greatly, as preferred, and bend some clips more than others if necessary, and exactly in accordance with the needs of the case, these being results that cannot be attained where the lever system is not of the first class, or where the device operates with a spring action, since the movement of the parts in such devices precludes the steady application of power to the bending of the clip.

I claim:

1. Wound clip forceps comprising a central longitudinal clip magazine and means to advance the clips therein, in combination with clip-applying members thereon having clip-abutment and clip-holding formations

normally placed to arrest and receive the successive foremost clips as they are advanced from the magazine.

2. In wound clip forceps, the combination of a central longitudinal clip magazine adapted to hold a series of clips in edgewise alinement, means for advancing the clips for use, and clip-applying members mounted on the magazine and formed with abutment means for arresting and retaining the foremost clip preparatory to bending.

3. Wound clip forceps, comprising a central longitudinal magazine adapted to hold a series of clips in edgewise alinement, and clip-applying members, the latter having stops for arresting the advancing movement of the clips relative to the magazine.

4. In wound clip forceps, a central longitudinal magazine part having means for guiding a series of clips in edgewise alinement, in combination with clip-applying members having their working portions normally disposed in position to be encountered by each successive foremost clip, said working portions having seats to receive the ends of said clip and stop surfaces limiting forward movement thereof.

5. Wound clip forceps, comprising the combination of a central longitudinal relatively stationary magazine part having means for holding and guiding a plurality of clips in edge to edge series with their prongs at the under side of the series, and clip-applying levers of the first order disposed on the magazine at the opposite side of the series of clips and operating in fixed relation to the forward end of the magazine in planes parallel with the back of the foremost clip.

6. In wound clip forceps, the combination of a stationary central longitudinal straight clip magazine having means for holding and guiding the clips in edgewise alinement, clip-applying members mounted on said magazine with clip-receiving jaws normally disposed at the forward end of the magazine in position to retain the foremost clip, and a thumb-push slidable on the magazine to advance the foremost clip into said jaws.

7. In wound clip forceps, a central longitudinal stationary clip magazine adapted to receive a series of clips in edgewise alinement, combined with clip-bending levers having nibs formed for the reception of the ends of a clip, and abutment means for positioning said nibs with their clip-engaging portions in alinement with the forward end of the magazine to receive the foremost clip therefrom.

8. Wound clip forceps comprising central longitudinal means for holding and guiding a series of clips in edgewise alinement and means for feeding the clips forward, in combination with spring-separated forceps members having clip-retaining portions, and abutments normally holding the spring-urged forceps members with their retaining portions in fixed relation to the end of said guiding means.

9. In wound clip forceps, a central longitudinal magazine part adapted to hold a series of clips in edgewise alinement and having lateral guiding channels for the ends of the clips, in combination with clip-applying members having clip-receiving cavities normally substantially in alinement with and immediately at the ends of said channels in such relation thereto as to arrest and hold each foremost clip preparatory to bending.

10. Wound clip forceps, comprising a stationary central longitudinal boxed magazine adapted to hold a series of clips in edgewise alinement, a pusher for advancing the clips therein, and clip-applying members mounted on the magazine and having clip-stops 27 at their forward portions projecting inward of the lines of the sides of said magazine.

11. Wound clip forceps comprising a central longitudinal magazine part having means for holding and guiding a series of clips in edgewise alinement, lever members of the first class having working portions located immediately at the forward end of the clip guide and formed and arranged to receive and hold each successive foremost clip and to afford clearance above and below the same to permit its bending and application to the wound, and means for feeding the clips so as to advance the foremost thereof from the magazine part into the said working portions of the forceps members.

12. In wound clip forceps, the combination of a central longitudinal, relatively stationary body part embodying a magazine constructed to hold and guide the clips in edge to edge series with their prongs at the under side of the series, and forceps members fulcrumed intermediate their ends on the body part at the opposite side of the series of clips, said members being in crossing relation and having clip-engaging formations at their forward ends and rearwardly-projecting and relatively long compressible grip portions.

13. Wound clip forceps, comprising a central longitudinal magazine part having means for receiving and guiding a series of clips in edgewise alinement, and means for feeding the clips forwardly thereof, in combination with crossed forceps members fulcrumed near their forward ends on the forward portion of the said magazine part and having short nibs and relatively long rearwardly-diverging grips, and a spring acting to open said forceps members and maintain the said nibs in clip-receiving position directly at the forward end of the magazine.

14. Wound clip forceps, comprising a

central longitudinal magazine part adapted to hold a series of clips in edgewise alinement, clip-feeding means, and crossed forceps members fulcrumed intermediate their ends on the forward portion of the magazine part and having jaws formed with retaining seats located immediately at the forward end of the magazine and adapted to receive the successive clips direct therefrom, a spring for opening said forceps members, and abutments for limiting said movement of said members so as to hold said jaws in position to be engaged by and to arrest said foremost clip.

15. Wound clip forceps, comprising a boxed magazine, combined with crossed forceps members fulcrumed near their front ends on top and near the front of said magazine, with jaw portions extended down in front of the magazine and rearwardly extending grip portions.

16. Wound clip forceps, comprising a magazine part having clip-guiding means beneath its top, a pivot rising from the forward portion of said top, crossed forceps members pivoted thereon, and means for removably confining said members on said pivot.

17. Wound clip forceps, comprising a magazine part, a pivot on the forward portion thereof, crossed forceps members fulcrumed on the pivot, a spring-holder also mounted on said pivot, and a spring held in said holder having limbs engaging the grip portions of said forceps members.

18. In wound clip forceps, the combination of a central longitudinal boxed clip magazine adapted to receive a series of clips in edgewise alinement and having a longitudinal slot in its top wall, forceps members operative at the front of the magazine, and a feeding device having lateral grooves in guiding engagement with the edges of said slot and comprising a clip-engaging portion beneath said top and a thumb push portion above the same.

19. Wound clip forceps, comprising a magazine having means for receiving a wire bearing a series of clips thereon, means for feeding the clips from the wire, and means for successively bending and affixing the clips.

20. In wound clip forceps, a magazine and a hair-pin clip-bearing and guiding wire removably held therein, in combination with suitable means for advancing the clips off the wire and for bending and affixing the same to the wound.

21. In wound clip forceps, a magazine adapted to receive a series of clips with a supporting wire on which the clips are strung, and means for positioning the wire, in combination with suitable means for advancing the clips and for bending and affixing the same to the wound.

22. In wound clip forceps, a magazine adapted to receive a charge of clips by a single charging operation, a support for said clips and on which they are introduced bodily into the magazine and means for confining the clips in the magazine, in combination with suitable means for advancing the clips and for bending and affixing the same to the wound.

23. In wound clip forceps, a boxed magazine having an entrance at its rear end and adapted to receive a series of clips with a supporting wire therefor having a head portion, the entrance portion of the magazine having recesses for receiving the head of said wire, and a gate member for holding the wire therein, in combination with suitable means for bending and affixing the same to the wound.

24. In wound clip forceps, a boxed magazine having an entrance at its rear end adapted to receive a series of clips with a supporting wire on which the clips are strung, said magazine having lateral guide channels for the ends of the clips leading to the front of the magazine and means at the entrance end for positioning the rear portion of the wire, in combination with means for feeding the clips, and forceps members operative at the front of the magazine to apply the same.

25. In wound clip forceps, a boxed magazine adapted to receive a series of clips in edgewise alinement and having the forward portion of its bottom open and tapered upward, in combination with means for feeding the clips forward in the magazine, and first class lever members operative at the front of the magazine to apply the clips.

26. In wound clip forceps, a boxed magazine having an entrance at its rear end, a gate therefor, means for bodily introducing a charge of clips into the magazine, and a removable pusher, in combination with forceps members for bending and applying the clips at the forward end of the magazine.

27. Means for applying wound clips having terminal eyes, comprising, in combination, a support, forceps members thereon, a removable holder for the clips comprising parallel rods on which the clips are strung, said holder being carried by the support while the device is in use and having the forward ends of its rods unobstructed, and means for advancing the clips toward the front of the support off the rods.

28. Means for applying wound clips having terminal eyes, comprising, in combination, a hollow magazine, forceps members united therewith, and rods insertible in and removable from the magazine to carry the clips, the forward ends of the rods being unobstructed so as to permit the clips to be advanced successively therefrom into operative relation to the forceps members.

29. In combination with a series of clips having terminal eyes and a pair of spaced rods passing through said eyes, a support adapted to accommodate said rods, a slide to advance the clips, and means for positioning and bending successive clips at the forward end of the support.

In testimony whereof, I have signed this specification in the presence of two witnesses.

GUSTAV F. RICHTER.

Witnesses:
JOHN T. CROWLEY,
K. L. GRANT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."