

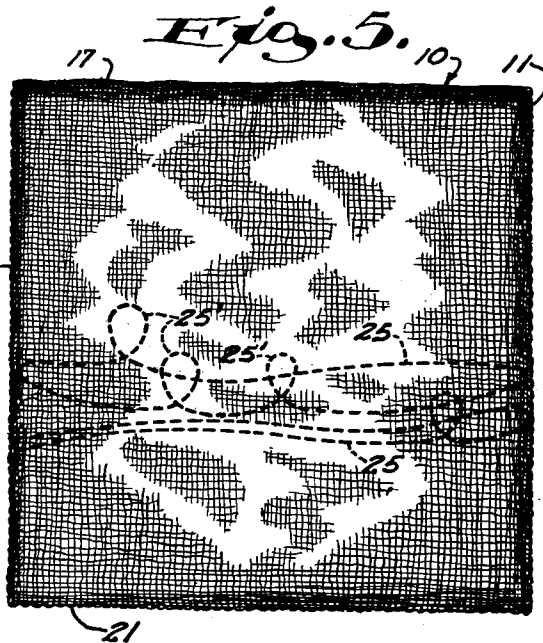
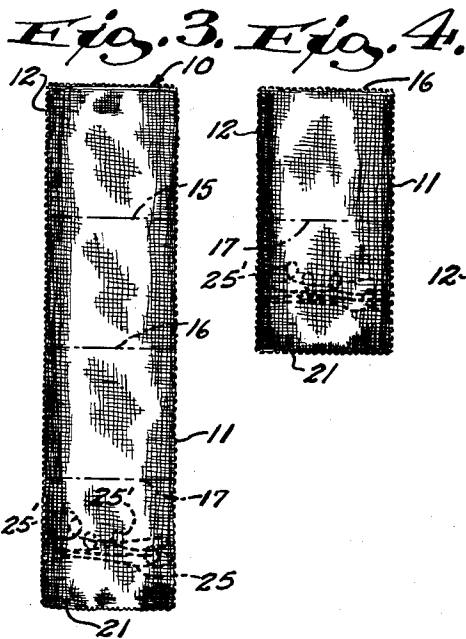
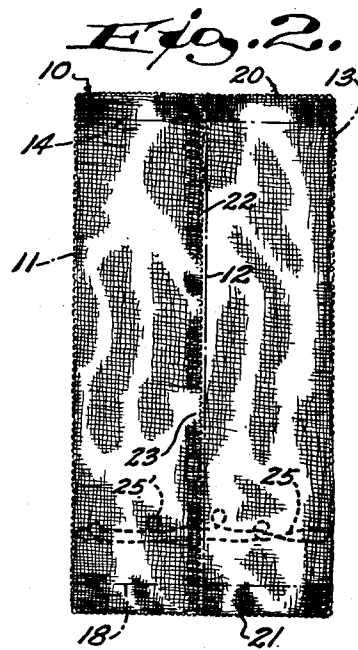
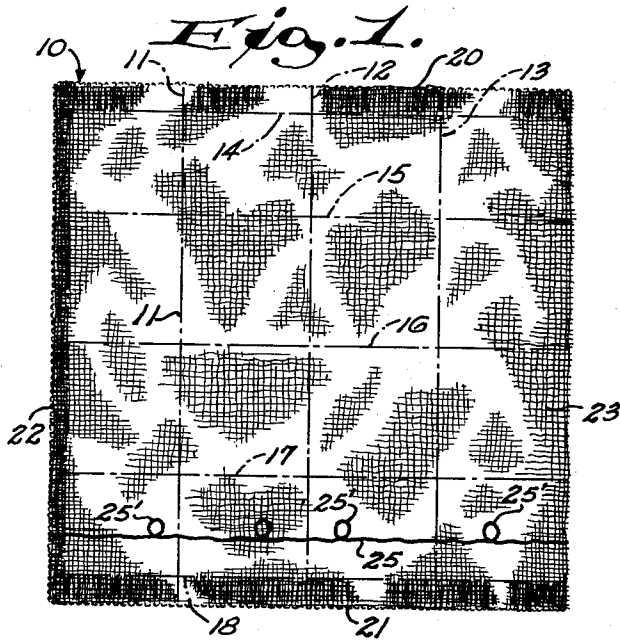
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SURGICAL SPONGES

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SURGICAL SPONGES

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2 Claims. (Cl. 128—296)

This invention relates to improvements in surgical sponges, and more particularly to an improved surgical sponge or absorbent pad which may be readily detected by postoperative X-ray in the event said sponge is inadvertently left within the wound cavity of a patient during surgery.

It sometimes happens that one of the many gauze absorbent pads or sponges employed during an operation for the purpose of packing the wound and absorbing blood, is not removed before the patient's incision is closed. This is due to the fact that the surgeon is preoccupied with the problems of the operation itself and cannot always keep an accurate count of the sponges inserted into the wound. Moreover, when said sponges become saturated they are not easily discernible from the mass of surrounding muscle and tissue. While such an oversight is not common, it is nevertheless a source of concern and if there is any doubt that all of the sponges were removed it is of obvious advantage to be able to ascertain the fact without reopening the incision and exploring the wound.

With the above in mind, several types of surgical sponges have heretofore been designed which incorporate a thin filament or tracer of a material which is impervious to radiant energy waves, thus allegedly permitting the sponge or pad to be located within a patient's body by postoperative X-ray. Such prior sponges have employed either a straight tracer thread (easily mistakable for bone), or they have utilized a wavy thread, or a series of sinuous criss-crossing threads, which sometimes merge into a shadowy image not unlike certain muscle or organ structures when viewed on an X-ray film, and especially on an imperfectly exposed film. The result is that while said prior X-ray responsive surgical sponges have been of some advantage they may be too easily confused with the internal body structure and have not, therefore, proven entirely satisfactory for their intended purpose. For this reason, the general object of the present invention is to provide a novel surgical sponge or absorbent pad having an X-ray responsive filament or tracer thread therein which is so arranged within said sponge that it cannot be mistaken for a portion of the body structure, thus insuring that a postoperative X-ray will disclose the presence of said sponge within the patient's body.

A more specific object of the present invention is to provide a surgical sponge of the character described wherein the tracer thread is arranged in a pattern having a series of distinctive loops which are entirely unlike anything in the human body, and which tracer cannot be mistaken for bone or other internal body organs even on an imperfect or shadowy X-ray picture.

A further object of the invention is to provide a surgical absorbent sponge having an X-ray responsive tracer thread therein which is integrated within the sponge in such a manner that it will not impair the softness and functional qualities of said sponge.

Still further objects of the present invention are to provide an improved surgical absorbent sponge as described which can be efficiently and economically produced, which is completely safe to use, and which sponge is otherwise particularly well suited for its intended purposes.

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With the above and other objects in view, the invention consists of the improved surgical sponge, and all of its parts and combinations as set forth in the following specification and claims, and all equivalents thereof.

In the accompanying drawing, illustrating the preferred form of the invention, and wherein the like reference numerals designate the same parts in all of the views:

FIG. 1 is a plan view of the blank of gauze material from which the sponge is formed in its initial unfolded condition;

FIG. 2 is a plan view showing the gauze blank with its outer sections folded over along vertical fold lines, illustrating the pattern assumed by the tracer thread;

FIG. 3 is a plan view showing the blank folded again, along the center vertical fold line;

FIG. 4 shows the blank folded over on the horizontal center fold line, illustrating the tracer thread pattern; and

FIG. 5 is an enlarged plan view of the completed surgical sponge in its finally folded form.

Referring now more particularly to FIG. 1 of the drawings, the improved surgical sponge comprising the present invention is formed of a large, square piece or blank 10 of cotton gauze material. Said gauze blank is normally approximately 16" x 16" in size and is provided with vertical fold lines (shown in dot and dash lines) 11, 12 and 13, spaced about 4" apart, and similarly spaced horizontal fold lines 15, 16 and 17, whereby the material can be folded into a square pad approximately 4" in size (FIG. 5). The outer edge portions of said blank 10 are preferably folded under to prevent fraying.

As is illustrated in said FIG. 1, the X-ray responsive filament or thread 25 in the present invention is disposed adjacent one margin 21 of the material and extends in an irregular path across the entire blank. Said thread is formed of a filament, preferably including barium, or any similar material which is impervious to radiant energy waves and which will provide an effective tracer when exposed to X-ray, and is, of course, non-toxic and completely harmless to the human system. Said tracer thread is applied to the surface of the gauze material in the desired pattern, which will be hereinafter described, and is either bonded thereto by means of heat or is merely pressed into place, the adhesive and cohesive qualities of the gauze maintaining said thread firmly in position when the material is folded into a multi-layered pad.

An important aspect of the present invention, of course, is the initial positioning of the tracer thread 25 on the gauze blank, said thread being so arranged that its pattern in the finished and folded sponge is entirely unlike any internal body, organ or muscle structure of the human body when viewed on an X-ray film. The actual application of said thread to the material can be accomplished either manually or by suitable mechanical means and the particular method employed is not critical to the invention.

As is shown in FIG. 1, the thread 25 may be disposed in an irregular line from one margin of the blank 10 to its opposite margin, across a series of fold lines, so that there is a pronounced loop 25' formed therein in each of the squares or sections traversed by the thread 25 in the unfolded blank. Each of said loops 25' is intentionally located in a different portion of its particular square relative to the companion squares of the series. Thus said loops are carefully arranged so that they will not be superposed upon one another when the material is folded along the aforementioned fold lines. In addition, while said thread line follows a generally rectilinear path as described, it is not only irregular but is

angled slightly toward the outer edge 23 of the blank to also prevent the straight line portions of the thread in each square from being superposed when the blank sections are folded upon each other to form a finished sponge.

As appears in FIGS. 2 through 5, after the tracer thread 25 has been arranged on the gauze blank as described, the opposite outer portions of said blank are folded forwardly along the lines 11 and 13 (FIG. 2), thus providing a thickness of gauze over the thread. Said blank is then folded along the center fold line 12 (FIG. 3), along the center line 16 (FIG. 4), and finally along the line 17 to provide a compact square, multi-layered pad as illustrated in FIG. 5.

Unlike prior surgical sponges of the general type herein concerned, the tracer thread 25 in the present invention is not exposed on the outer surface of the sponge, where it would come into direct contact with the patient's internal organs and could conceivably cause abrasion and irritation, but is covered by at least one layer of cotton gauze material. It has been found that while said tracer thread is completely covered by gauze to protect the patient as described, the presence of a layer of gauze material thereover does not affect nor minimize the X-ray responsive qualities of said thread, and the sponge thread is as readily visually discernible by X-ray as when the thread is secured on the outer surface of the material.

As will be seen from said FIGS. 2 through 5, due to the unique initial arrangement of the tracer thread 25 on the unfolded gauze piece or blank, the visual pattern produced when the blank is folded is unlike anything in the human body structure, and cannot be confused therewith in an X-ray picture, as is possible in respect to straight tracer threads or filaments employed in most prior sponges of the same general type. Moreover, due to the distinctive thread loops 25' characterizing the present invention, which are spaced from each other both vertically and horizontally and do not coincide in the folded pad, the possibility of the threads merging into a shadowy image similar to certain muscle structures as sometimes occurs with sponges having uniform sinuous thread lines, is completely eliminated. This is true even in an imperfectly exposed X-ray picture. The result is that the novel design and arrangement of the tracer thread in the present surgical sponge permits a doctor to readily discern the presence of the sponge in a patient's body by postoperative X-ray, and eliminates the necessity for a re-opening of the incision and a tedious exploration of the wound.

It is to be understood, of course, that the invention is not to be limited to a surgical sponge identical to that illustrated and hereinabove described in every detail, inasmuch as it would obviously be possible, within the purport of the present invention, to rearrange or transpose the distinctive tracer loops 25', or to employ a different arrangement of fold lines. It is to be understood,

too, that while the invention has been described as being particularly designed for detection by X-ray, it is conceivable that other radiant energy waves might be employed for the same purpose in the future, and the use of the invention and the particular composition of the tracer filament is not to be restricted in this respect.

With the above in mind, it is intended that the present invention include the embodiment illustrated and hereinabove described, and any and all modifications or changes therein as may come within the spirit of the invention, and within the scope of the following claims.

What we claim is:

1. A method of manufacturing a surgical sponge with a tracer thread therein comprising the steps of progressively extending a thread of X-ray responsive material across the surface of a blank of gauze or the like, during said extending, circling the thread back in a reverse direction and then causing it to cross itself to form a closed loop, continuing across the width of the blank while forming a few other similar closed loops and while spacing said loops relatively widely longitudinally of the thread in a predetermined manner, and folding the blank on multiple fold lines which are so spaced relative to the spacing of the loops as to form a pad wherein there are a plurality of non-superimposed closed loops.

2. A surgical sponge, comprising: a rectangular blank of gauze material having a plurality of spaced, intersecting fold lines defining rows of sections, said blank being folded along said fold lines into a compact, multi-layered pad the size of one of said sections; and a tracer thread of X-ray responsive material secured to the surface of said blank and extending across the entire width thereof and having a few relatively widely-spaced loop portions so spaced and positioned in said sections that a plurality of the loops are in non-superimposed relation relative to one another when said blank is folded into a multi-layered pad, each loop being relatively large and of complete ring form where the thread circles for a distance in a reverse direction before crossing itself, said loops being relatively few in number so that there are substantial portions of the width of the pad which are free of loops.

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