ABSTRACT OF THE DISCLOSURE
A device for use during a surgical procedure for removing blood and other liquid matter from a wound. The device is connected to a source of subatmospheric pressure thereby increasing the capacity and use period of the device.

BACKGROUND OF THE INVENTION
Field of the invention
A surgical device for removing blood from a wound or the like.

Description of the prior art
The usual procedure for the removal of blood from a wound or an incision is to place a gauze like material on the exposed area to absorb the blood. These sponges, as they are called, are replaced as soon as they are soaked with blood. The greater the extent of the operation and incision the greater the number of sponges that must be used. The spent sponges, upon removal from the incision, are hung up and counted after the operation to diminish the possibility of sponges being left in the incision after it is closed.

SUMMARY OF THE INVENTION
The present device provides a means whereby a suction source is combined with a sponge to permit thereby a single device to absorb all the necessary blood during a surgical procedure. This is advantageous in that it alleviates the problem of counting numerous sponges at the conclusion of the procedure.

BRIEF DESCRIPTION OF THE DRAWINGS
FIG. 1 is a perspective view showing a preferred embodiment of the present invention;
FIG. 2 is an enlarged cross-sectional view showing details of the head of the device;
FIG. 3 is a view taken along the line 3--3 of FIG. 2 showing further details of the head;
FIG. 4 is a cross-sectional view showing further details of the device of FIG. 1;
FIG. 5 is a cross-sectional view showing details of an adapter for connecting the device of FIG. 1 to a vacuum source;
FIG. 6 is a perspective view of an alternative form of the invention;
FIG. 7 is a perspective view partly broken away showing still another form of the present invention;
FIG. 8 is a perspective view of a further alternative embodiment of the invention;
FIG. 9 is a perspective view of a final alternative form of the invention;
FIG. 10 is a view taken along the line 10--10 of FIG. 9 showing the top cover removed from the device of FIG. 9; and
FIG. 11 is a view taken along the line 11--11 of FIG. 10 showing further details of the device.

DESCRIPTION OF THE PREFERRED EMBODIMENTS
The attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there are shown and described illustrative embodiments of the invention; it is to be understood, however, that these embodiments are not intended to be exhausting nor limiting of the invention but are given for purpose of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

The device shown in FIGS. 1 through 5 will now be described in detail. There is shown a device 20 having a head member 22 which is preferably circular but may be of other configurations. An elongated tubular handle member 24 extends from the head member and is secured within an aperture 26 in the head member by means of cement or a press fit or may be molded as an integral part of the head member.

Head member 22 has a lower perforated plate 28 secured thereto, said plate having multiple apertures 30. Secured to the plate 28 is an absorbent member 32 which is preferably a cellulose base sponge but may be alternatively an absorbent gelatin sponge, a synthetic resin such as foamed polyurethane, or other suitable material.

An adapter means 34 is secured to the distal end of handle member 24, the member 24 fitting snugly within an aperture 36 in the adapter 34. A second aperture 38 is disposed within the adapter and is coaxial with the aperture 36, the aperture 38 serving to receive and frictionally hold therein the end of an elongated flexible tube 40. The handle 24 will normally be held by a surgeon during use and the tube 40 will extend from the handle a suitable distance to a location remote from the operating table whereat a source of subatmospheric pressure is available.

A second adapter 42 is provided and has an aperture 44 extending entirely therethrough. A nipple 46 is formed on the end of the adapter and is receivable within the end of the tube 40. The opposite end of the adapter 42 is receivable within the end of a tube 48 leading into a liquid trap 50. A further tube 52 extends from the trap 50 and leads to a suction pump 54 suitably located within the hospital or other facility wherein the device is used.

When the device 20 is to be used during the course of a surgical procedure the pump 54 will be actuated, causing a suction force to be applied to the surface of the absorbent member 32. While grasping the handle member 24, the operator will move the device along the wound or incision causing the material 32 to absorb the blood or other liquid matter and such blood or liquid matter will be removed from the material 32 up through the apertures 30 in the plate 28 and finally will be drawn through the tubes into the liquid trap 50. The liquid will be collected in the trap 50 to be subsequently disposed of. To protect against the danger of coagulation of the blood within the member 32 and in the head member 22, there is preferably provided an anti-coagulant means which may impregnate the member 32 and be disposed within the head member. Various anti-coagulant means are suitable for this purpose and include sodium citrate, sodium heparin, sodium warfarin and bishydroxy coumarin.

Further, to insure the continued satisfactory operation of the device it is desirable to line the handle member 22 and/or the handle member 24 with a polymeric organic silicon compound which would prevent the adherence of blood or other liquid matter to the parts of the device and thereby keep all of the passageways clear so that the subatmospheric pressure is maintained for an extended period of time.

FIG. 6 illustrates an alternative embodiment of the device of FIG. 1. The handle member 24a of the device may be inserted into the adapter 34 shown in FIG. 1 to
thereby replace the device of FIG. 1 with the device of FIG. 6. Handle 24a leads into a head member 22a similar to the head member 22 previously described. The absorbent member 32a is similar to member 32 with the exception that member 32a has a generally triangular cross-sectional configuration, such configuration being advantageous for use in certain specific areas of the body and types of incisions. Included in the device of FIG. 6 is a valve means 56 which includes a pivotable cover member 58 and an aperture 60 formed in the top surface of head member 22a. With the cover 56 in the position shown in FIG. 6, suction will be applied through the absorbent member 32a as previously described. However when cover 56 is pivoted to a position wherein it no longer overlies the aperture 60 then the suction will be destroyed through the member 32a. It may be desirable to periodically remove suction from the member 32a in order to avoid removal of more blood than is necessary. Also it may occur that the body tissue will adhere to the member 32a and tube 46 thereby described. In which case the operator would wish to immediately remove the suction from the member and thereby free the flesh.

In FIG. 7 a further alternative embodiment is shown and comprises a handle member 24b leading to a head member 22b which is of cylindrical configuration and contains an aperture 60 entirely thereinaround. The absorbent member 32b completely surrounds the head member 22b whereby the device will function as previously described in connection with the device shown in FIG. 1. The device of FIG. 7 has particular application wherein it is desired to merely place the device in a deep well of blood and allow the device to remain stationary and continually absorb blood from the well.

FIG. 8 shows a still further embodiment and comprises a handle member 24c having an absorbent member 32c press fitted into the end of the handle. In this embodiment there is no head member and the liquid will be absorbed directly from the member 32c through the handle 24c. This particular configuration has particular application in confined areas where there would be insufficient room for a head member or the like shown in FIGS. 1 or 6. The handle 24c has an aperture 62 therein which is designed to be covered or uncovered by the operator's finger to thereby act as a valve similar to the valve 56 described in connection with the FIG. 6. It is to be understood that the valve 56 or 62 can be used in connection with the device shown in FIG. 1.

With reference now to FIG. 9 there is shown a device 70 which comprises upper and lower layers 72 and 74 respectively of absorbent material, such material being any of the various types described in connection with the member 32 earlier described. The layers 72 and 74 are adhesively joined around their periphery and enclose a network or grid 76 of tubular configuration having apertures 78 dispersed throughout. Extending from the grid is a tubular member 80 which performs similarly to the tube 56 previously described. The device 70 is generally applicable in situations wherein a large surface of an incision must be packed in order to keep the entire surface free from blood or other liquid matter. The device is flexible and readily conforms to the shape of the flesh within the wound and the suction applied through the grid 76 maintains the layers 72 and 74 in condition to absorb additional liquid.

It can be seen that various devices have been shown and described, the various modifications having particular use in specific situations but all having in common the constant replenishing of the surface of an absorbent means through the expediency of a source of subatmospheric pressure.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. The actual scope of the invention is intended to be defined in the following claims when viewed in their proper perspective against the prior art.

I claim:

1. A device for removing liquid matter from a wound or the like during a surgical procedure comprising tubular means adapted to be connected at a first end thereof to a source of subatmospheric pressure, said tubular means having a second end communicating with a grid means, said grid means comprising a plurality of hollow portions having apertures therein, said hollow portions being placed in a regular geometric array, and absorbent means surrounding said grid means and overlying the apertures thereof, said absorbent means comprising a pair of generally flat, sheet-like layers of material, said layers being disposed on each of opposite sides of said grid means and being adhesively joined to each other, whereby said liquid matter may be absorbed by said absorbent means and removed through said tubular means.

2. A device as set forth in claim 1 further comprising anticoagulant means impregnating said absorbent means for preventing clotting of said liquid matter.

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