

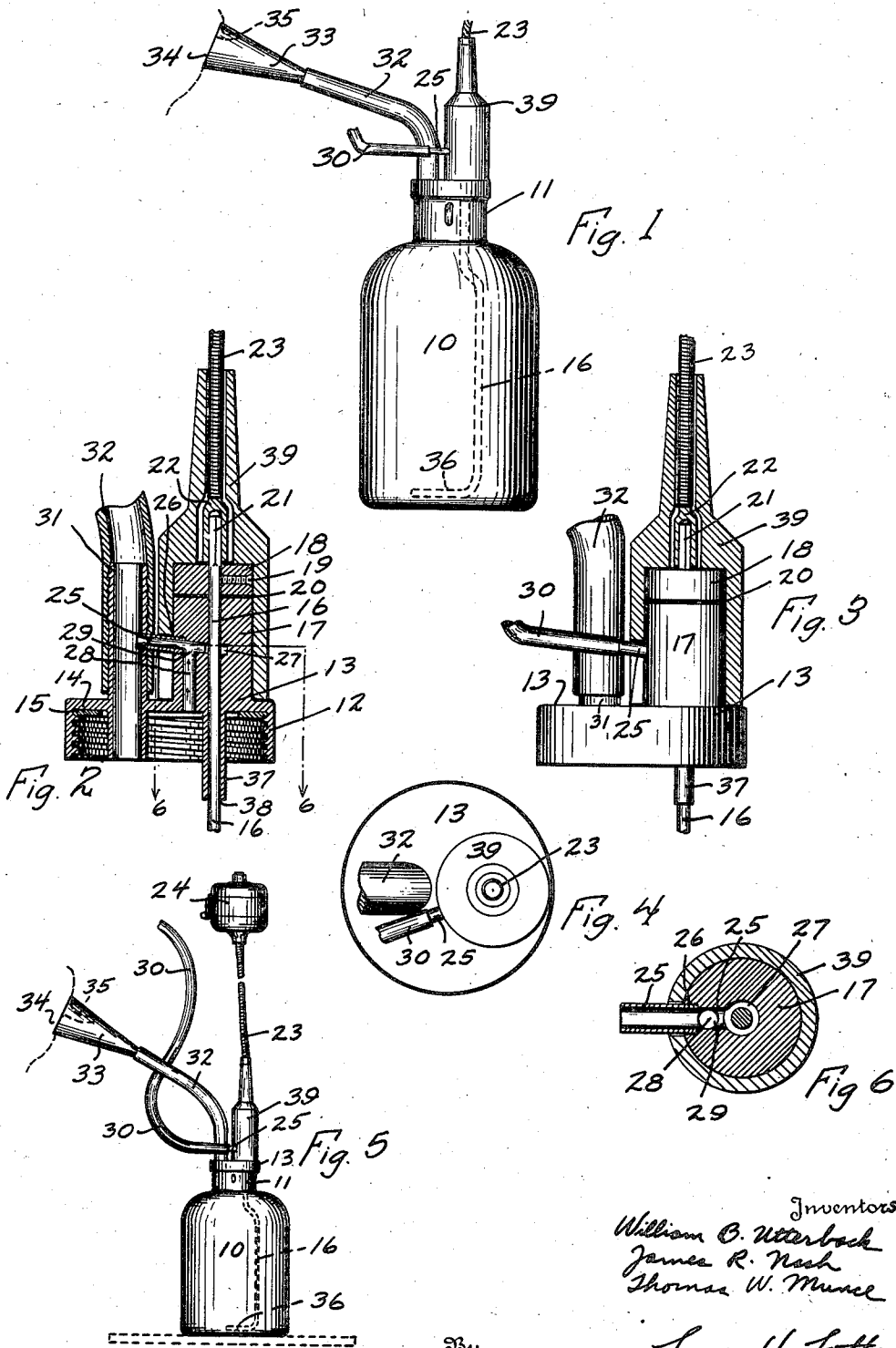
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DEVICE FOR IMPROVING THE USE OF VACUUM IN THE BLEEDING OF ANIMALS

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DEVICE FOR IMPROVING THE USE OF
VACUUM IN THE BLEEDING OF ANIMALS

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1 Claim. (Cl. 128—276)

Our invention relates to a device for use in the bleeding of animals.

An object of our invention is to provide such a device which will efficiently create and maintain a vacuum in the blood collecting container.

A further object of our invention is to provide means for immediately withdrawing air from the container and about the rotatable parts thereof before the air has a chance to contaminate the collected liquid in the container.

A further object of our invention is to provide means for withdrawing such air and for forming a vacuum within the container in a common arrangement.

A further object of our invention is to provide the above mentioned objects in a construction of great simplicity which can be manufactured at a very reasonable cost.

With these and other objects in view, our invention consists in the construction, arrangement and combination of the various parts of our device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in our claims, and illustrated in the accompanying drawing, in which:

Figure 1 is an external elevation of the unit,
Figure 2 is an enlarged detail section of the cover showing the principal elements of our invention,

Figure 3 is a partially sectional and external view of Figure 2,

Figure 4 is a plan view,

Figure 5 is an external elevation of the unit in operation, and

Figure 6 is a detailed section taken along the lines 6—6 of Figure 2.

Our present device is applicable to the vacuum method of bleeding animals whose blood is ordinarily employed for the production of anti-sera, antitoxins, viruses, and other analogous products, especially when it is desirable to stir or defibrinate the blood as it is being collected.

The device is especially adaptable for the bleeding of swine when the blood is to be used for the production of antihog cholera serum. It is necessary in the production of such serum to collect blood from the swine. The usual method is bleeding the swine from the tail. Before bleeding, the tail and area around the base of the tail are shaved and disinfected. About one inch of

the tail is then cut off, after which procedure blood flows from the cut end due to the severance of the blood vessels therein. This flow of blood is rather slow and frequently ceases due to clotting of the blood on the cut end of the tail. To increase the speed of flow of blood and to assist in preventing such clotting, a partial vacuum is applied about the tail. This is done by placing a cylindrical or conical metal or rubber tube commonly called a "bleeding horn" around the tail. This "bleeding horn" at one end conforms closely to the shaved skin around the base of the hog's tail, the other end of the "bleeding horn" is attached in an air tight manner to the container in which the blood is collected.

A nipple is usually employed which perforates either the wall of the "bleeding horn" or the lid of the collecting container. This nipple communicates with a vacuum line on a vacuum pump, and a certain vacuum is drawn. By means of this method, a partial vacuum forms in both the collecting container and the "bleeding horn", and the open end of the latter is closed due to its contact with the shaved skin around the base of the tail.

During the collection of the blood, the same is agitated by a suitable mechanical arrangement. The blood often flows into a container into which a solution has been placed to prevent coagulation of the same, and in order to mix the anticoagulant with the blood, the aforesaid agitating means is employed. In some cases the anticoagulant is not used, but the blood is agitated while it is being drawn in order to obtain a desirable "fibrin" which prevents a material loss of a valuable constituent of the blood which can be recovered later by other procedures.

It will thus be seen that the blood must be properly agitated during the bleeding procedure.

Many types of devices have been used, but the most satisfactory is that type in which a container for receiving the blood is employed, the "bleeding horn" and a "defibrinating rod", which rod is a rod or shaft which perforates the lid and extends almost to the bottom of the container. This rod is turned at the proper speed by means of a motor and flexible cable, and the lower portion is suitably bent or arranged to cause the desired type and degree of agitation in the blood when the mechanism is in operation.

The principal difficulty encountered during this procedure has been that although a partial vacuum is formed within the container and the bleeding horn, it has been found that air enters along the bearings, which are of course necessary, follows downwardly between the shaft and the bearing surfaces and enters the receiving container. This is bound to occur on account of the partial vacuum in the receiving container and also since it is mechanically impossible to construct relatively rotating surfaces insuring a constant tight joint. The entrance of air into the receiving container is an extremely undesirable feature and must be eliminated, because all laboratory air contains a great number and variety of bacteria, and the entrance thereof into the container would result in a bacterial contamination of the blood.

We will proceed to show in our invention where we have developed a device, which, although it does not overcome and prevent the leaking of air downwardly, does however conduct the inflowing air to an exit from the apparatus in such a manner and at such a point that it will not enter the receiving container, thereby preventing bacterial contamination of the blood product.

We have used the character 10 to designate generally the collecting container which is used for collecting the blood drawn from the animal, which in the present case will apply to swine. The container 10, which is a glass jar, includes the neck 11, which further includes a threaded upper portion which is threadedly engaged with the threads 12 of the lid. The lid itself, which will be indicated by the character 13, includes the horizontal flange 14 which is adapted to be seated against the rubber gasket 15 when the member 13 is screwed downwardly upon the container neck 11, thereby providing an air tight joint.

The defibrinating shaft is indicated by the character 16, which shaft passes through the cylindrical lid bearing 17. A further bearing 18 is provided which is rigidly attached to the defibrinating shaft 16 by means of the flat head machine screw 19, and this member, of course, will rotate together with the shaft 16. A fiber disc 20 is interposed between the members 17 and 18, and the principal function of the member 18 will be to support the shaft.

The shaft 16 includes at its upper end the squared portion 21 which is received by the further squared female member 22 which is attached to the usual flexible shaft passing through the cable 23, the shaft of which is attached to the motor 24 which can be mounted at any convenient location such as on the wall, etc.

Entering through one side of the lid bearing 17 is the tube 25. This tube is either threadedly engaged at 26 or is brazed or affixed in an air tight manner thereto. The tube 25 communicates with the hollow ring 27 which is shown sectionally in Figure 6. The ring 27 passes completely about the shaft as shown clearly, and the tube 25 provides a direct exit communication thereto. A further tube is provided in the member 17 at 28 which branches from the tube 25 at 29 and communicates directly thereto. The tube 25 is connected suitably to the further flexible or other tube 30 which passes to the usual vacuum pump for forming the partial vacuum within the container 10.

The lid 13 also includes the vertical extension 31 which is connected to a stiff rubber hose 32, which in turn is connected to the usual "bleeding horn" 33, the circular extremity 34 of which

is firmly pressed against the shaved portion about the base of the cut tail 35.

The blood from the animal flows downwardly through the tube 32, and thence into the receiving container 10. While the blood is flowing into the container, the same is being agitated by virtue of the rotation of the shaft 16 which terminates in the outwardly bent extremity 36 which causes thorough mixing of the blood in the container.

It will now be seen that if the ring shaped hollow element 27, which communicates with the tube 25, were not provided that leakage of any of the outside air which would be assisted by the external pressure would tend to flow downwardly along the shaft 16 between it and the bearings and into the receiving container, thereby contaminating the blood therein. However, as soon as any of this air which necessarily would enter above the member 17, reaches the ring 27 it will be immediately drawn through the tube 25, through the exhausting tube 30, and thence outwardly so that this air could not possibly pass downwardly into the container.

The essential feature then of our invention, as described, is in drawing off the air just below the weakest mechanical point of the arrangement as far as leakage is concerned and conducting the same directly away from the danger point.

The branch tube 28 is provided to expedite the establishment of the desired degree of partial vacuum in the receiving container. Without this branch, several minutes might be required to establish the desired degree of vacuum in the receiving container because of the small clearances between the defibrinating shaft and the wall of the channel in the bearing base. This branch in this way provides the principal medium for creating the partial vacuum and also, by this close arrangement, would tend to draw off leaked air which may possibly get past the ring 27 and pass through the sleeve 37 at 38, although such leakage would be practically impossible.

An external casing 39 is used to cover the upper arrangement of bearings and flexible cable and to maintain rigidity in the cable and is formed approximately as shown.

It should be noted here that the set screw 19 can be used to permit adjustment of the defibrinating rod to a proper height in the receiving container and also to permit of disassembling the equipment for cleaning, etc.

It will be understood further that our construction can be employed for other purposes wherein it is necessary to draw off gases in a similar arrangement before they can reach a container where the presence of the same is not desired.

It will now be seen from the foregoing description that we have provided means for insuring the non-entrance of injurious air to a blood collecting container.

It will also be seen that we have provided such means in a common arrangement which will efficiently create and maintain a vacuum or partial vacuum in the container.

It will also be seen that we have provided the above mentioned objects in a construction of great simplicity which can be manufactured at a very reasonable cost.

Some changes may be made in the construction and arrangement of the parts of our invention without departing from the real spirit and purpose of our invention, and it is our intention to cover by our claim any modified forms of structure or use of mechanical equivalents, which may be reasonably included within its scope.

We claim as our invention:

In combination with a blood collecting container, a lid attached to said container including a lid bearing, a rotating defibrinating shaft rotating
5 within said lid bearing and supported thereabove, a hollow ring formed within said bearing and adapted to surround said shaft, an opening passing through the bearing and communicating with said hollow ring, suction means attached to said

opening for drawing off gases carried along said shaft, a bifurcating tube communicated with said opening and said container adapted to cause withdrawal of gases from the container by said suction means.

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