

F. B. GRAHAM.
 IMPREGNATOR.
 APPLICATION FILED JAN. 2, 1908.

899,728.

Patented Sept. 29, 1908.

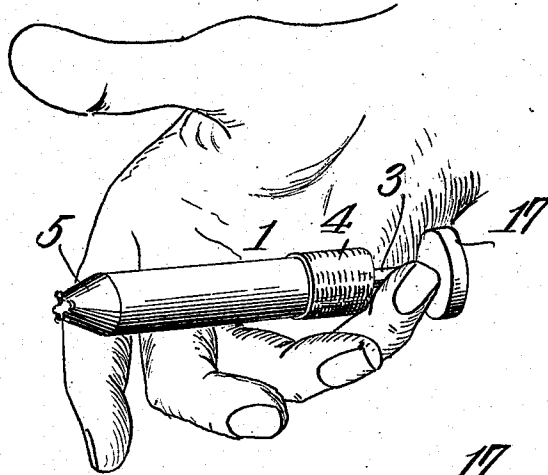


Fig. 1.

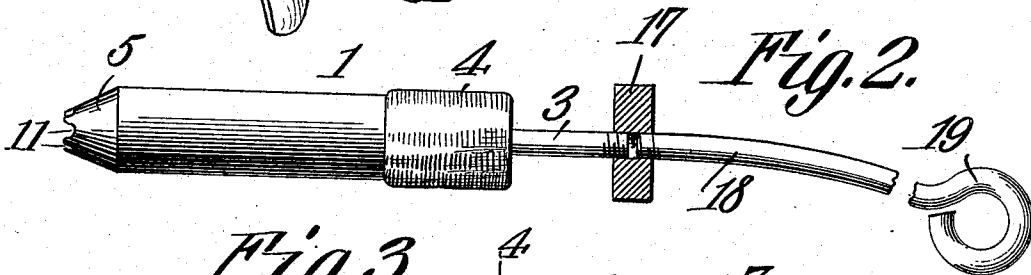


Fig. 2.

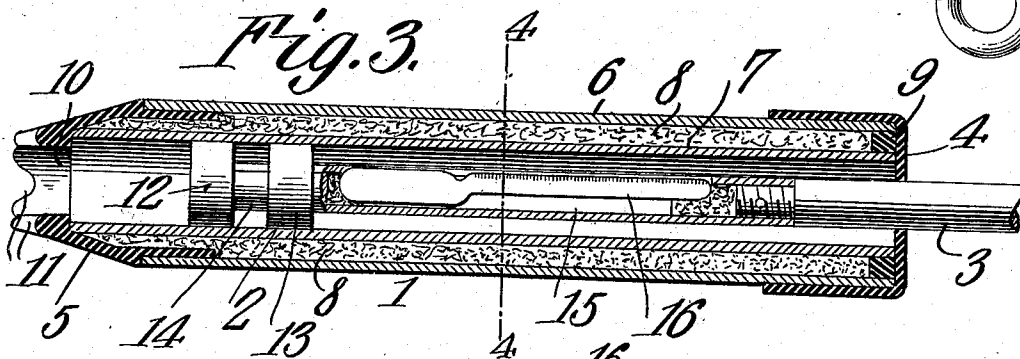


Fig. 3.

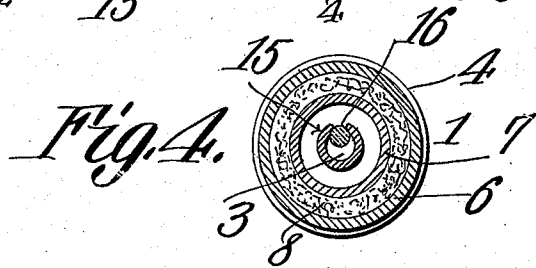


Fig. 4.

Witnesses

E. J. [Signature]
J. P. [Signature]

Inventor
Frank B. Graham.

By *C. Snow & Co.*
 Attorneys

UNITED STATES PATENT OFFICE.

FRANK BRUCE GRAHAM, OF GARNETT, KANSAS.

IMPREGNATOR.

No. 899,728.

Specification of Letters Patent.

Patented Sept. 29, 1908.

Application filed January 2, 1908. Serial No. 408,951.

To all whom it may concern:

Be it known that I, FRANK BRUCE GRAHAM, a citizen of the United States, residing at Garnett, in the county of Anderson and State of Kansas, have invented a new and useful Impregnator, of which the following is a specification.

This invention relates to an instrument of the syringe type for artificially impregnating the females of various animals; and has for one of its objects to provide an instrument of such form and size that it may be wholly inserted into the vagina of an animal and be permitted to remain there without great inconvenience to her until it has been raised to the normal temperature of the animal's body. The impregnator is then removed from the vagina, charged with seminal fluid and introduced into the uterus of an animal to be impregnated and the contents injected thereinto.

Another object of the invention resides in the construction of the impregnator barrel or cylinder which is made double and the space between filled with a non-conductor of heat to preserve the temperature within the cylinder as uniform as possible. To further assist in maintaining an equal temperature, the piston is made with two heads having a dead air space between them, the nozzle is of rubber as is the cap closing the opposite end of the cylinder.

A further object of the invention is to provide a means for determining the temperature of the interior of the impregnator and for this purpose a thermometer is applied to the piston rod in such manner that it will not interfere with the movement of the piston rod as it travels in and out through the opening in the end cap.

With these and other objects in view, the invention consists of the novel construction, combination and arrangement of parts hereinafter described and claimed and illustrated in the accompanying drawing, in which

Figure 1 is a perspective view of the impregnator held in a hand to indicate its relative size; Fig. 2 is an outside view of the instrument attached to the inserting rod; Fig. 3 is a longitudinal central sectional view of the impregnator on an enlarged scale; and Fig. 4 is a cross section of Fig. 3 on the line 4—4.

Similar reference numerals are used for the same parts in all the figures.

The impregnator consists essentially of a cylinder or barrel 1 in which is a piston 2

moved longitudinally in the barrel 1 by a piston rod 3, passing through a cap 4 on one end of the cylinder, the opposite end having an open nozzle 5.

The cylinder 1 of the instrument is made of two spaced concentric tubes 6 and 7 of metal or hard rubber, between which tubes is placed a filling or packing 8 of vulcanized rubber, mineral wool, asbestos or some other equally good non-conductor of heat. At one end of the cylinder a rubber ring 9 is inserted between the tubes 6 and 7 to retain the filling 8 in place. The soft rubber cap 4 is fitted tightly over this end of the tube, through the head of which is made a central perforation for the piston rod 3 and, if retracted too far, the piston 2 can also pass through the perforation which will enlarge under pressure. At the opposite end of the cylinder is the nozzle 5, tapered as shown and having an outlet 10 smaller than the bore of the cylinder to prevent the seminal fluid escaping unintentionally therefrom. The nozzle extends between the tubes 6 and 7 and is securely fastened to one or both tubes, and the end of the inner tube 6 extends into the nozzle beyond the end of the outer tube. The end of the nozzle 5 is formed with a series of notches 11 to prevent the folds of the vagina closing the end when suction is induced in the cylinder for the purpose of gathering semen from the floor of the vagina. It is necessary to remove all edges and sharp projections on the nozzle as they are injurious to the animal and destroy the germs of reproduction in the seminal fluid.

The piston rod 3 which may be solid, has two spaced pistons 12 and 13 secured thereto a short distance apart to form a dead air space 14 at the outer end of the bore of the cylinder to assist in preventing the loss of heat by radiation and conduction when the instrument is charged. It is preferred however to construct the piston rod as shown, or in some equivalent manner. Referring to Fig. 3, it will be seen that the piston rod 3 is made partly of a tubular section 15 within which is placed a small thermometer 16, secured against movement in any suitable manner. Both the bulb and stem of the thermometer are placed below the periphery of the piston rod for protection and to permit uninterrupted movement of the rod through the cap. The outer end of the piston rod carries a disk 17 having a central threaded perforation for fastening the disk

to the piston rod 3, and for attaching thereto a curved inserting rod 18 which after introducing the impregnator into the vagina, may be removed by unscrewing it from the disk.

- 5 The inserting rod is suitably curved so that an operator may, without trouble, place the instrument in the uterus when a charge is to be injected therein. For convenience of manipulation, the outer end of the inserting
10 rod is formed into an eye 19 or has attached thereto some other form of handle.

Experiments in artificial impregnation of animals have been carried on for a number of years with more or less satisfactory results. Among the principal causes for failure one has been due to contact of chilled instruments with the semen; another, by failing to inject directly into the womb the small amount of seminal fluid necessary for vitalizing the ovum. To overcome these objections and increase the percentage of successful operations, the impregnator is preferably made no longer than the width of the hand, as represented in Fig. 1, so that it may be placed within the vagina of the animal to be impregnated by means of the inserting rod and allowed to remain there a suitable time. The rod may be removed if desired. In this manner the instrument is heated to the exact temperature of the animal's body and when charged, the seminal fluid can be kept at the proper temperature outside the body for several minutes by holding the impregnator in the closed hand, the time being sufficient for an experienced person to impregnate one or more animals without artificial heat or reheating the instrument in the vagina.

Placing the impregnator wholly within the vagina of an animal to be bred and permitting it to remain there a sufficient length of time has been found by experience to be the only way to heat the instrument to the proper temperature as there is no exact degree of temperature suitable for all animals, nor for all animals of the same kind. Different seasons of the year, change of climate and latitude, change of feed are some of the causes which produce a change of temperature in animals. It follows, therefore, that artificial means for heating the impregnator are uncertain and can never be depended on, and the only safe way to heat the instrument is by the natural heat of the animal in the
55 manner described.

That a small impregnator is sufficient for the purpose will be understood when it is known that in about twelve to fifteen drops of semen there are between forty-thousand and fifty-thousand spermatozooids or sperm cells and but one spermatozoid is necessary to cause fertilization. It can be seen, therefore, that six or more animals, such as mares, can be bred with convenience and safety in a
65 short time by one service of the horse if the

instrument be kept at the proper temperature. If an animal that has known the male is to be bred by the impregnator, as is necessary at times, it is best to heat the instrument by filling it with warm air before placing it in the vagina to receive the exact temperature. This will prevent the destruction of spermatozooids by the cold instrument.

To use the impregnator, in breeding horses for instance, after it has been heated in the manner hereinbefore described, it is withdrawn and inserted in the uterus of a mare which has just been served and the cylinder filled by pulling the inserting rod, the walls of the vagina holding the cylinder until it has been filled. Continued pulling of the rod withdraws the impregnator which is immediately introduced into the uterus of a mare to be bred and its contents discharged. This action is repeated with other mares until the seminal fluid is exhausted. By partly withdrawing the impregnator at the time its temperature is being raised and reading the thermometer, the operator can positively determine when the maximum degree of heat has been reached. Also, while using the instrument for impregnating, a glance at the thermometer will show when the temperature in the cylinder has fallen too low for success and reheating is necessary.

On some occasions in extreme cold weather after the impregnator has been heated in the vagina, the outer tube 6 cools sooner than the inner one; it therefore becomes necessary to reheat the outer tube by some artificial means without affecting the inner tube 7 to any extent or the bore thereof. To accomplish this result the outer tube 6 must be made of metal or other good conductor of heat and the inner tube 7 of a non-conductor. A small quantity of oil and acid may then be mixed and introduced between the two tubes. The heat generated by the mixture heats the outer tube of conductor material but not the inner one of rubber or other heat resisting material. Preferably the oil should be in the space between the tubes so that a small quantity of acid could be added quickly by removing the rubber ring 9 for instance or by any other approved means, and the space be kept tightly closed so as to cause no injury to the operator or the animal. This means of reheating should not often be necessary.

What is claimed is:

1. An impregnator comprising a syringe adapted to be placed wholly within the vagina of an animal there to be heated, and a rod attached to the piston rod of the syringe for inserting and withdrawing the syringe and operating the piston thereof.

2. An impregnator comprising a syringe adapted to be placed wholly within the vagina of an animal there to be heated, and a rod removably attached to the piston rod of

the syringe for inserting and withdrawing the syringe and operating the piston thereof.

3. An impregnator comprising a syringe having a heat insulated bore adapted to be placed wholly within the vagina of an animal there to be heated, and a removable inserting rod attached to the piston rod of the syringe for operating said syringe.

4. An impregnator comprising a syringe, a heat insulating cover therefor, a soft resilient nozzle on one end of said syringe, two spaced pistons with a dead air space between, and a piston rod.

5. An impregnator comprising a syringe having a heat insulated cylinder, a soft rubber nozzle on one end and a cap of similar material on the opposite end, a piston, a piston rod having a groove on one side adapted to carry a thermometer, and an inserting rod.

6. An impregnator comprising a syringe having a double tubed cylinder, a lining of heat insulating material between the tubes, a soft resilient nozzle at one end of said syringe, and an annular closure at the opposite end between said tubes for retaining said insulating material in place.

7. An impregnator comprising a syringe having a cylinder formed of two concentric tubes, a heat insulating material between said tubes, a double piston, and a piston rod provided with a longitudinal groove in one side adapted to carry a thermometer.

8. An impregnator comprising a syringe having a cylinder formed of two concentric tubes, a heat insulating material between said tubes, a tapered nozzle having a notched inlet, a double piston, a piston rod adapted to contain a thermometer, and an inserting rod removably attached to the piston rod.

9. An impregnator comprising a syringe having a heat insulated cylinder, a removable cap therefor having a soft rubber head with a central perforation, a piston rod slidable through said perforation in the rubber head, and a piston on said rod adapted to pass through said opening when expanded.

10. An impregnator comprising a syringe having a cylinder formed of two concentric tubes, a heat insulating material between said tubes, a tapering nozzle fastened on one end of the cylinder between the tubes and having a notched inlet, a cap on the opposite end of said cylinder having a soft rubber head, a piston fastened to a piston rod the latter slidable through a perforation in said head and adapted to carry a thermometer, and an inserting rod removably secured to the piston rod for placing the syringe wholly into the vagina of an animal.

11. An impregnator comprising a syringe having a heat conducting outer tube, a concentric heat resisting inner tube and a heat producing chemical adapted to be placed between the two tubes for raising the temperature of the outer tube.

12. An impregnator comprising a syringe having a heat conducting outer tube, a concentric heat resisting inner tube and a combination of oil and acid adapted to be placed between the two tubes for increasing the temperature of the outer tube.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

FRANK BRUCE GRAHAM.

Witnesses:

R. C. FORD,
F. A. DOTTS.