

A SIMPLE ARTIFICIAL RESPIRATION APPARATUS FOR LABORATORY ANIMALS

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Much of the physiological and pharmacological research carried out at the present time necessitates the use of artificial respiration. We have constructed an artificial respiration apparatus which is as simple as possible yet, at the same time, ensuring adequate ventilation for the principal species of laboratory animals.

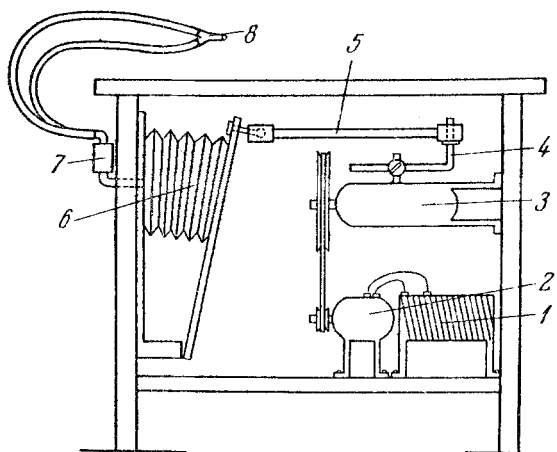


Fig. 1. Construction of the artificial respiration apparatus for laboratory animals. Description in text.

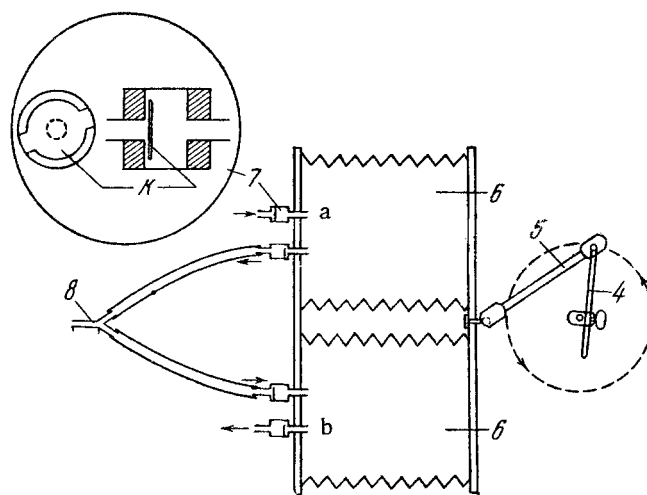


Fig. 2. Scheme of regulation of the rate of artificial respiration and of the respiratory volume. Description in text.

The apparatus has been in use for more than one year. It is mounted on a small table designed for operations on small experimental animals, and it consists of a rheostat 1, an electric motor 2, a reducing gear 3, an L-shaped arm 4, a rod 5, bellows 6, a valve system 7 and rubber tubes 8 with a 3-way tube, connected to a tracheal cannula or introduced directly into the animal's trachea (Fig. 1).

We have used an electric motor with a power of 100 w and giving up to 6000 rpm. The reducing gear system (the appropriate parts from a hand centrifuge were used) lowers the number of revolutions in the ratio 64:1. The volume of each chamber of the bellows is roughly 0.7 liter. The valve system consists of hermetically closed glass cylinders with tightly stretched elastic rubber membranes K (Fig. 2).

The construction of the apparatus makes it possible to regulate the frequency of artificial respiration (between 10 and 100 times per minute), the respiratory volume (from 5 to 500 ml) and the magnitude of the negative pressure in the animal's respiratory passages at the stage of forced expiration, as well as the magnitude of the positive pressure at the stage of inspiration (within limits of 2-20 mm Hg). The frequency is regulated by adjusting the movable contact of the rheostat, and the respiratory volume by altering the length of the arm 4. An increase in pressure at expiration and inspiration is achieved by increasing the degree of stretching of the membranes K and the inspiratory

and expiratory valves a and b respectively.

Because the performance of the apparatus can be regulated, it may be used for artificial respiration in various species of laboratory animals. The apparatus as described has been used in experiments on cats and dogs.

SUMMARY

A simple apparatus for induction of artificial respiration in laboratory animals is described. The apparatus is supplied with an open system of air circulation and provides forced inhalation and exhalation. The apparatus permits a separate control of the respiratory rhythm (from 10 to 100 p per minute), respiration volume (from 5 to 500 ml) and pressure in the respiratory tract (from 2 to 20 mm Hg). The unit was tested in experiments on cats and dogs.