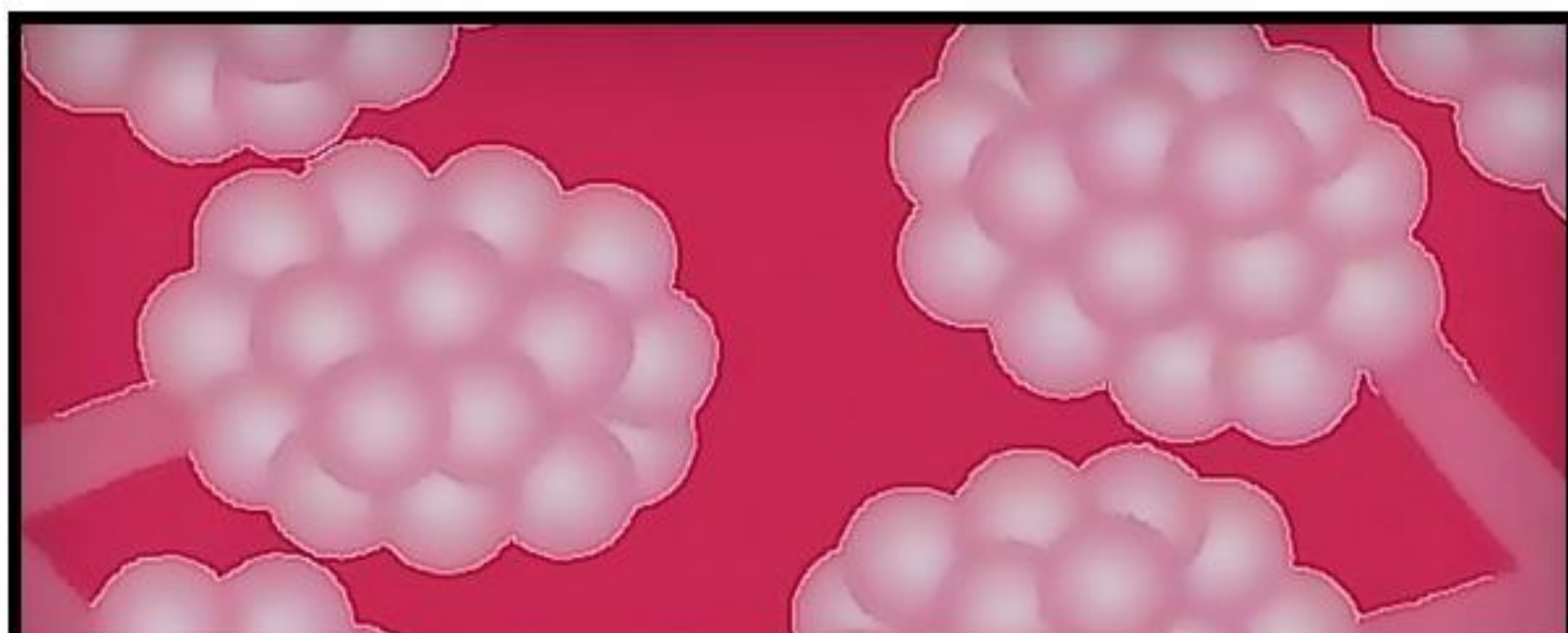
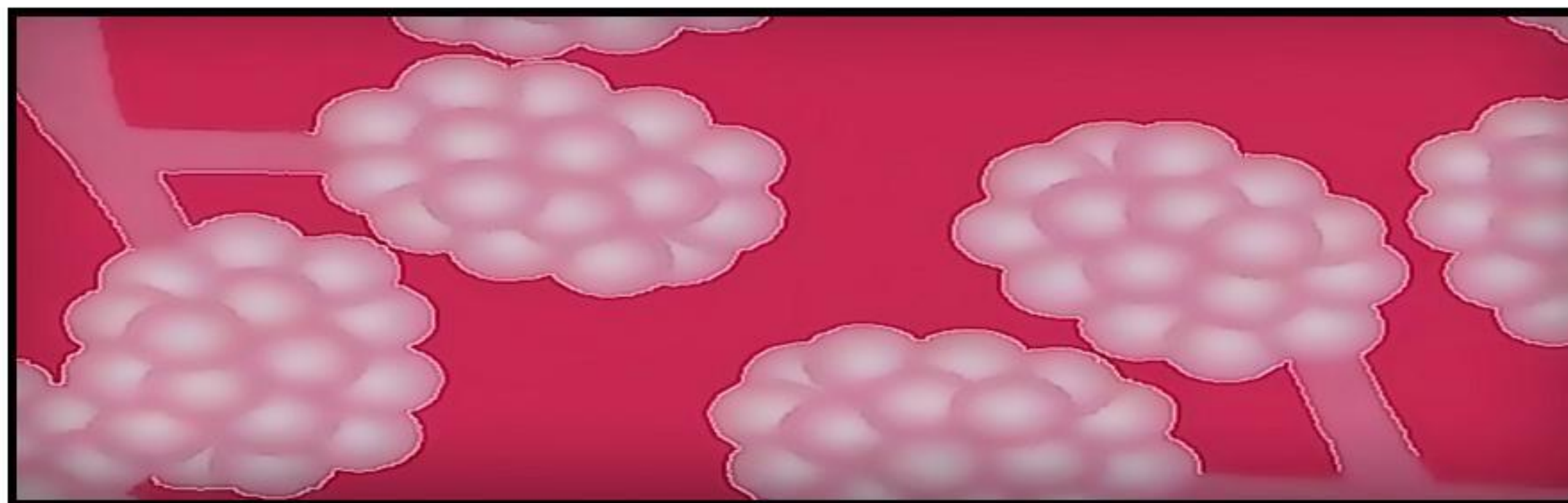




IN 1555, VESELIUS' TREATISE IS RECOGNISED AS THE FIRST DESCRIPTION OF MECHANICAL VENTILATION, A CRUCIAL PRACTICE IN MODERN MEDICINE. WE BREATHE BY CONTRACTING OUR DIAPHRAGMS, WHICH EXPANDS OUR CHEST CAVITIES.

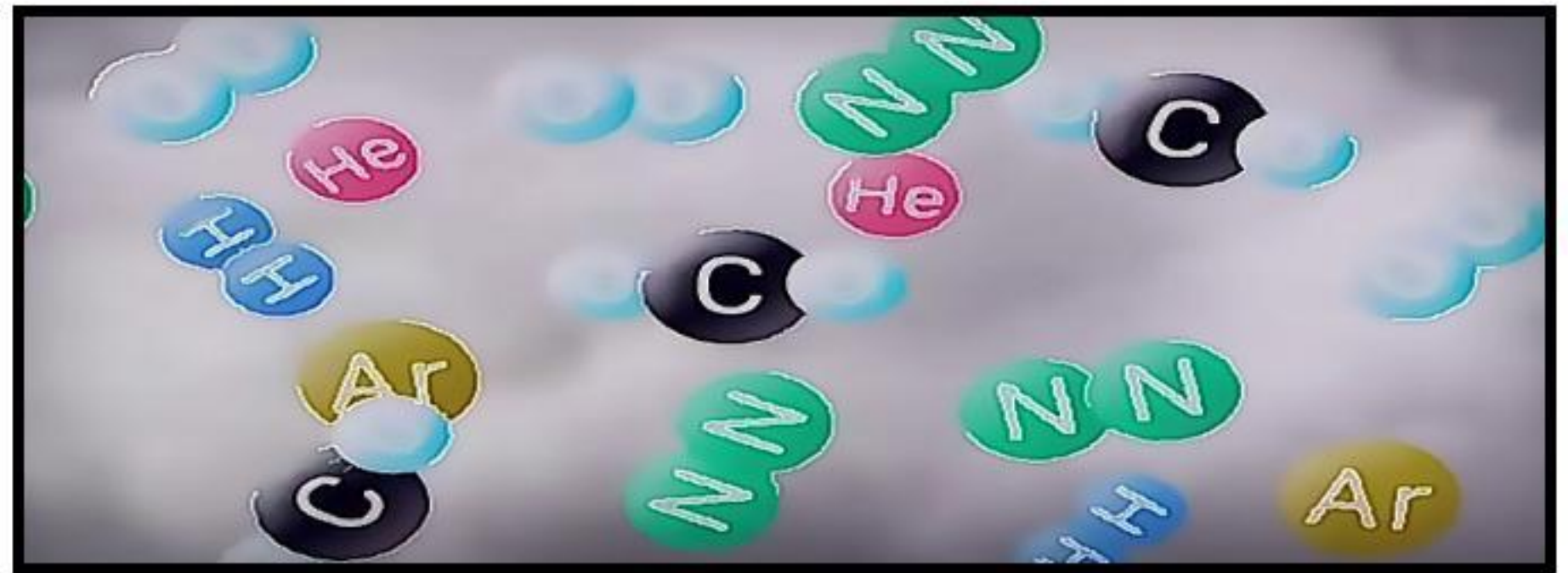
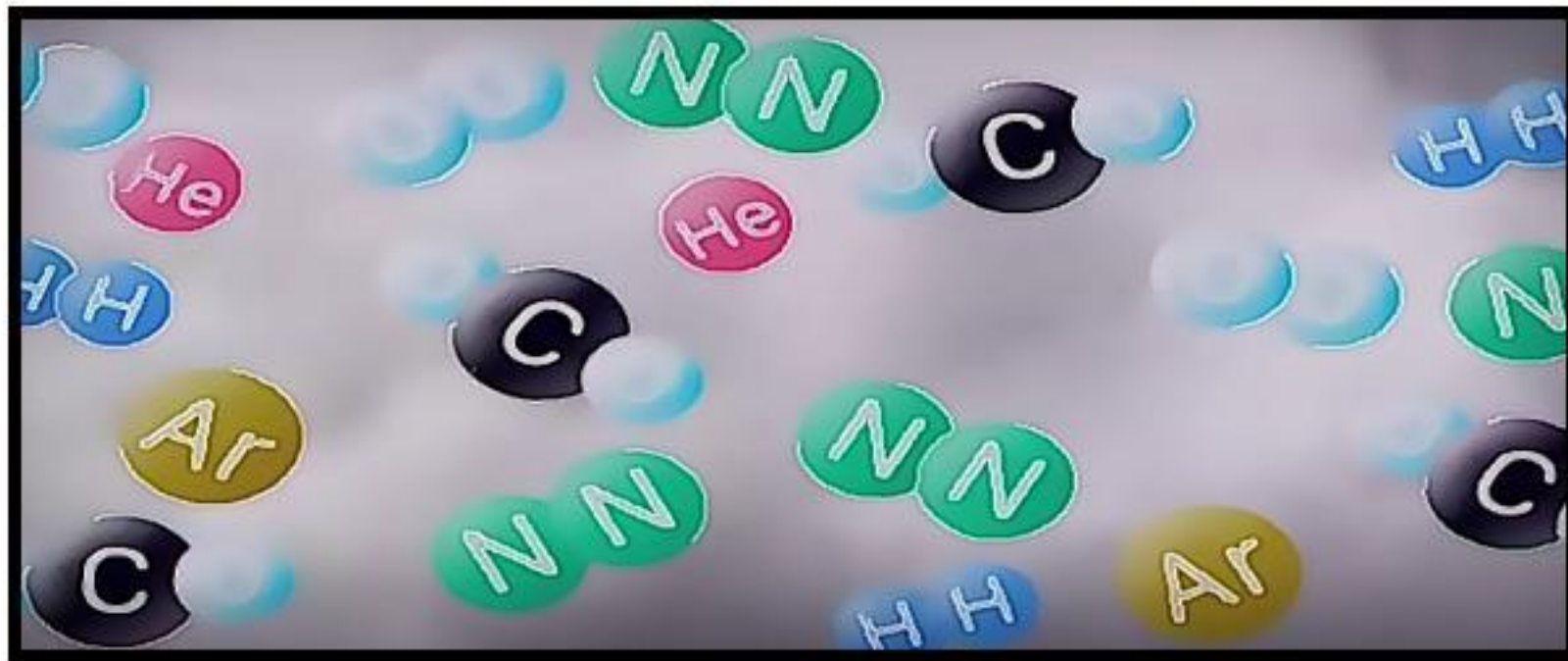


THIS ALLOWS AIR TO BE DRAWN IN, INFLATING THE ALVEOLI, MILLIONS OF SMALL SACKS INSIDE.



EACH OF THESE TINY BALLOONS IS SURROUNDED BY A MESH OF BLOOD-FILLED CAPILLARIES.

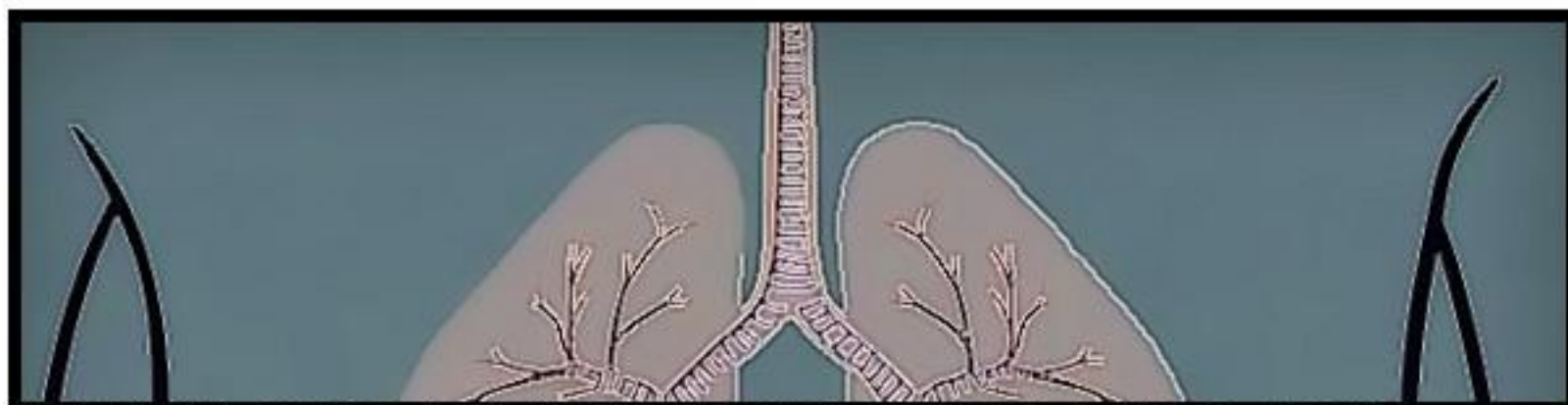




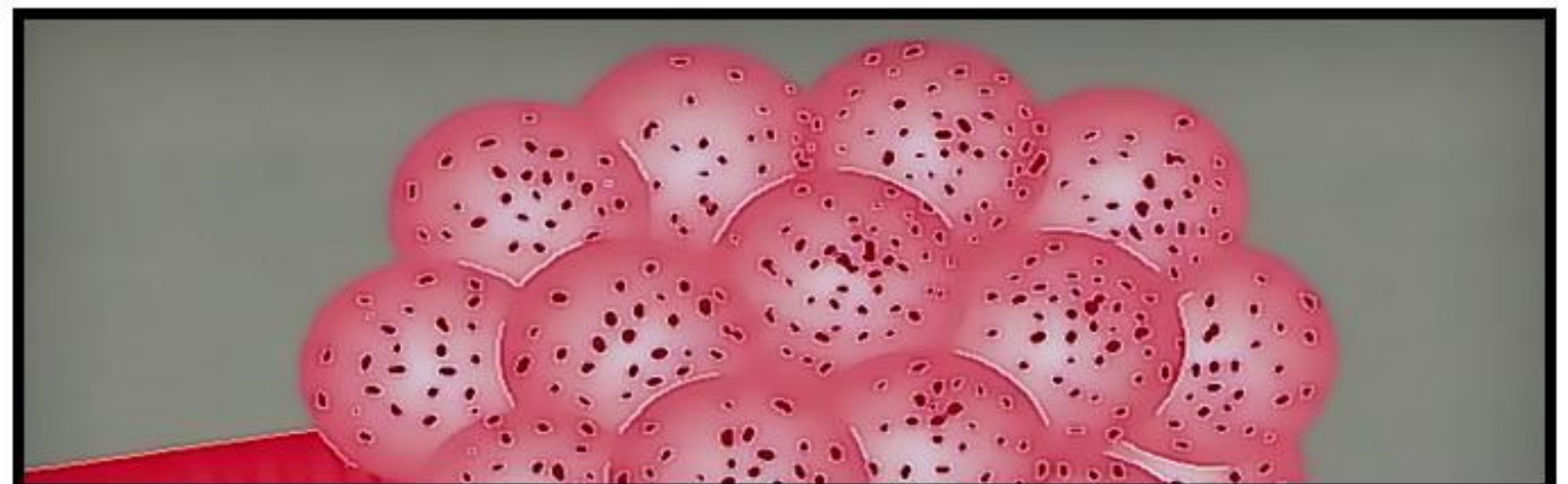
THIS BLOOD ABSORBS OXYGEN FROM THE INFLATED ALVEOLI AND LEAVES BEHIND CARBON DIOXIDE. THIS BLOOD ABSORBS BLOOD FROM THE LUNGS TO CREATE OXYGEN IN THE LUNGS.



WHEN THE DIAPHRAGM IS RELAXED, THE CO2 IS EXHALED ALONGSIDE A MIX OF OXYGEN AND OTHER GASES.

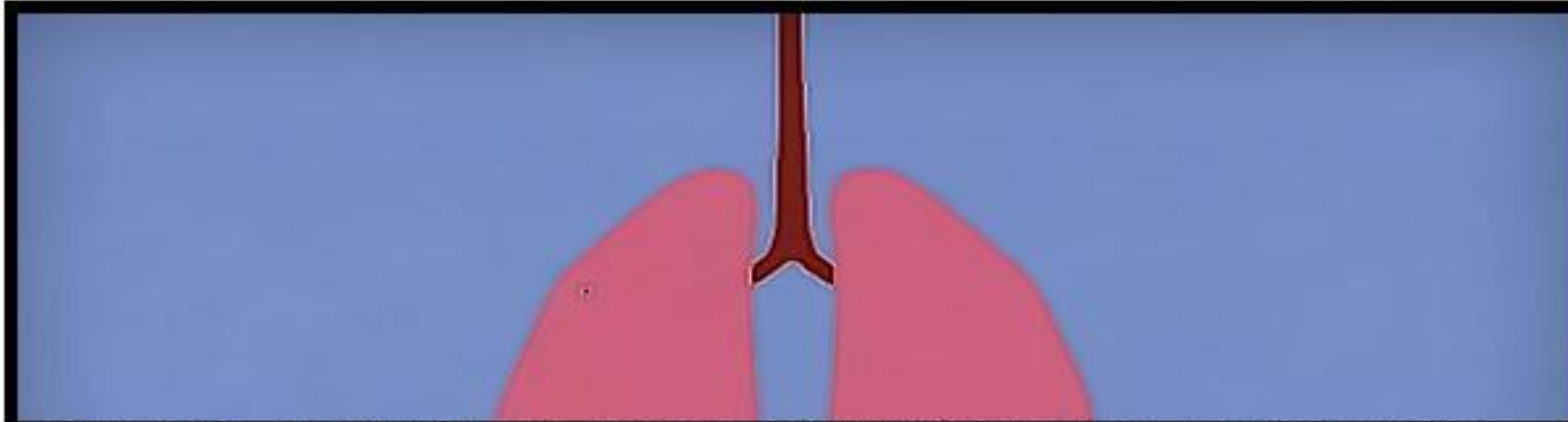


WHEN OUR RESPIRATORY SYSTEMS ARE WORKING CORRECTLY, THIS PROCESS HAPPENS AUTOMATICALLY. WHEN OUR RESPIRATORY SYSTEM IS NOT WORKING PROPERLY, IT CAN BE DIFFICULT TO BREATHE.



RESPIRATORY SYSTEM CAN BE INTERRUPTED BY A VARIETY OF CONDITIONS. BUT THE RESPIRATORY SYSTEM CAN ALSO BE STOPPED BY A NUMBER OF THINGS.

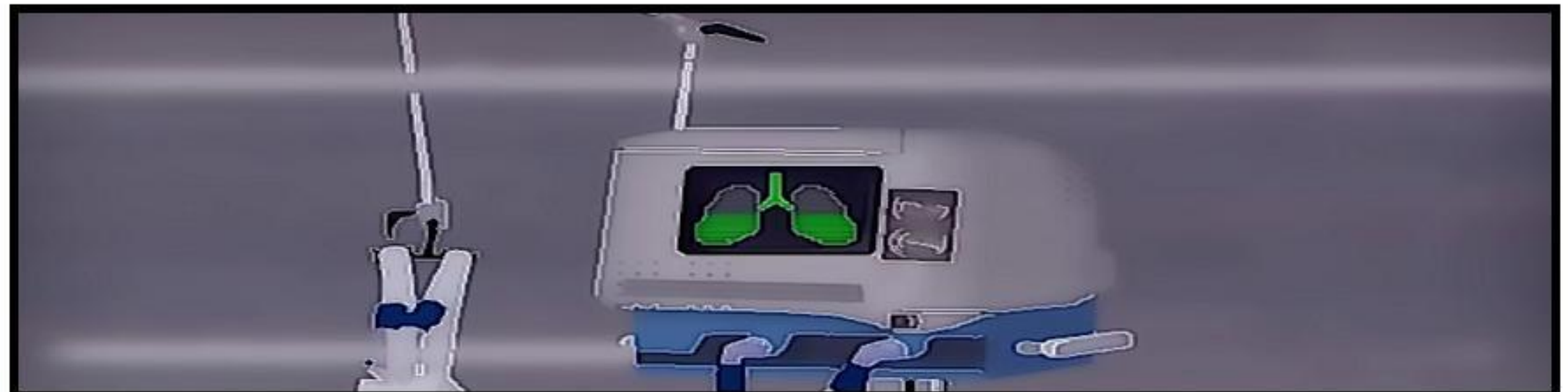




SLEEP APNEA STOPS DIAPHRAGM MUSCLES FROM CONTRACTING. SLEEP APNEA IS A TYPE OF SLEEP APNEA.



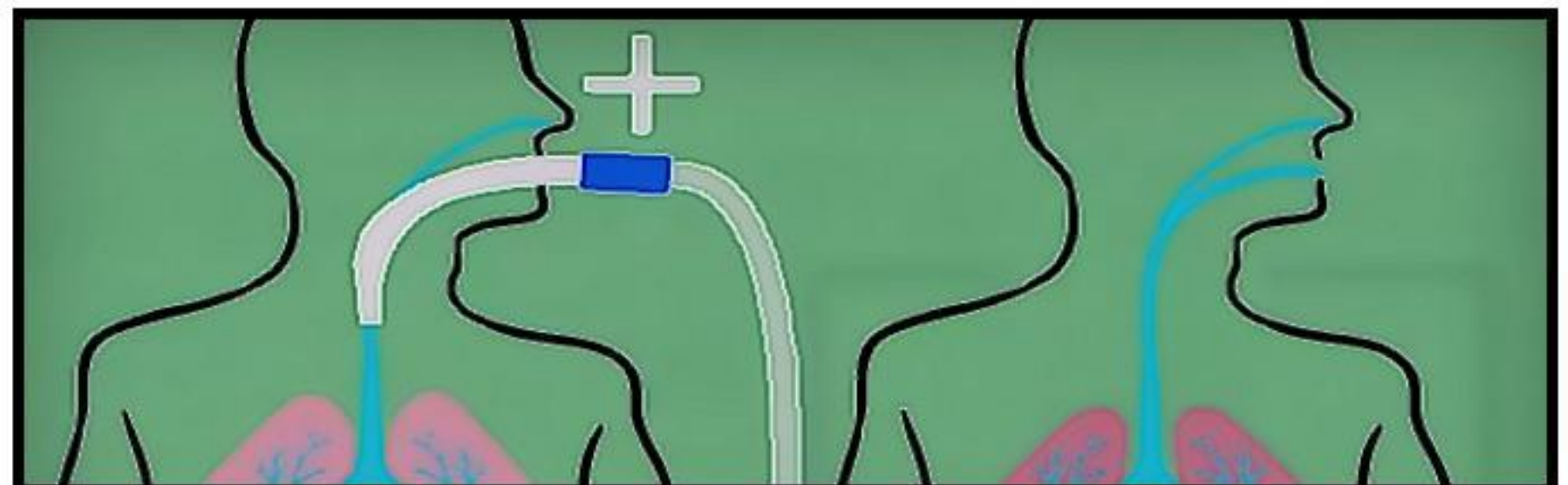
ASMA CAN LEAD TO INFLAMED AIRWAYS, WHICH OBSTRUCT OXYGEN. ASMA CAN ALSO LEAD TO ANEMIA, WHICH CAN CAUSE BREATHING PROBLEMS.



PNEUMONIA IS OFTEN TRIGGERED BY BACTERIAL OR VIRAL INFECTIONS. IT ATTACKS THE ALVEOLI THEMSELVES.

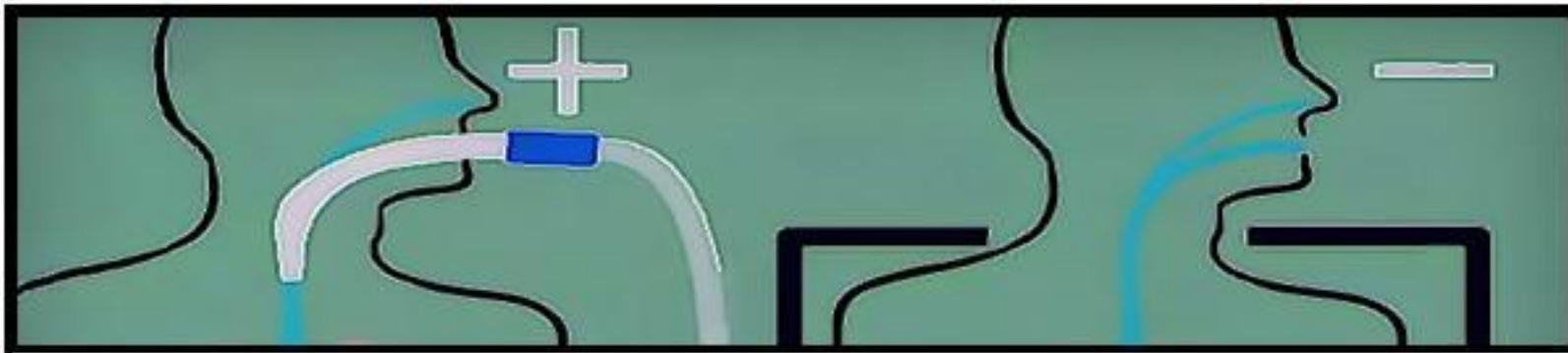


INVADING PATHOGENS KILL LUNG CELLS, TRIGGERING AN IMMUNE RESPONSE THAT CAN CAUSE LETHAL INFLAMMATION AND FLUID BUILDUP. ALL THESE SITUATIONS RENDER THE LUNGS UNABLE TO FUNCTION NORMALLY.

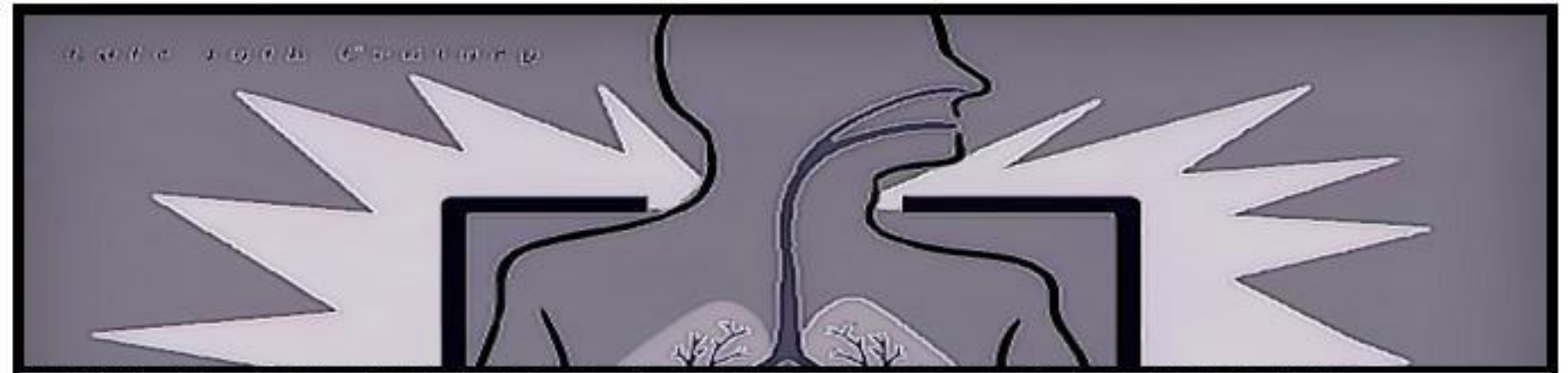


VACUUM MACHINES ARE USED TO VENTILATE THE AIR FROM INSIDE THE HOSPITAL. BUT MECHANICAL VENTILATORS TAKE OVER THE PROCESS WHEN A PATIENT IS ADMITTED.

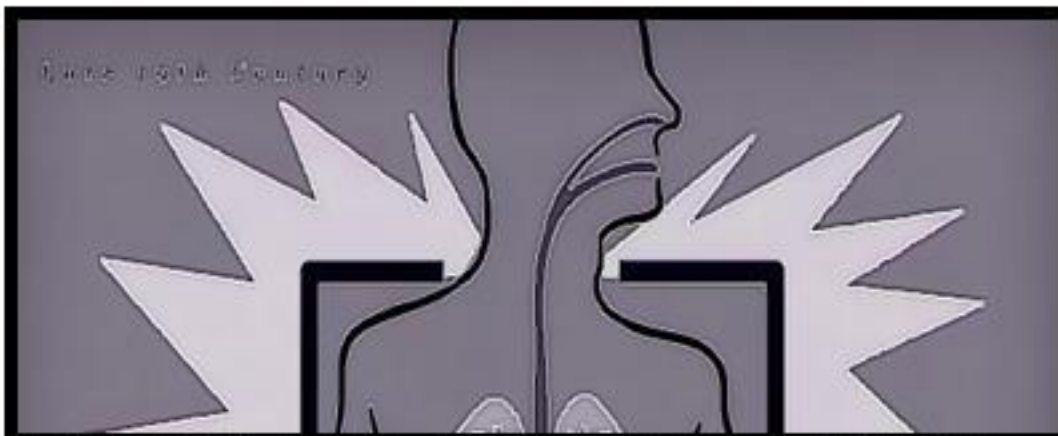




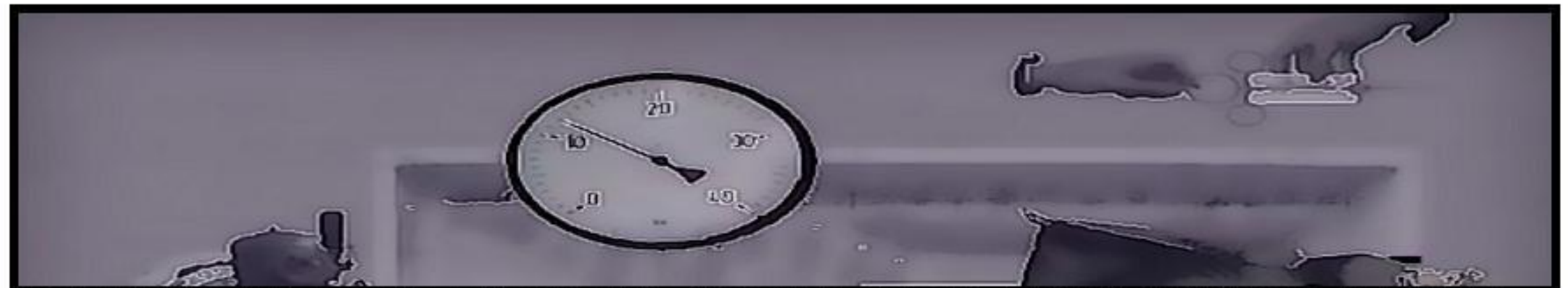
GETTING OXYGEN INTO THE BODY WHEN THE RESPIRATORY SYSTEM CANNOT. GETTING OXYGEN IN WHEN THE BODY CAN'T GET IT.



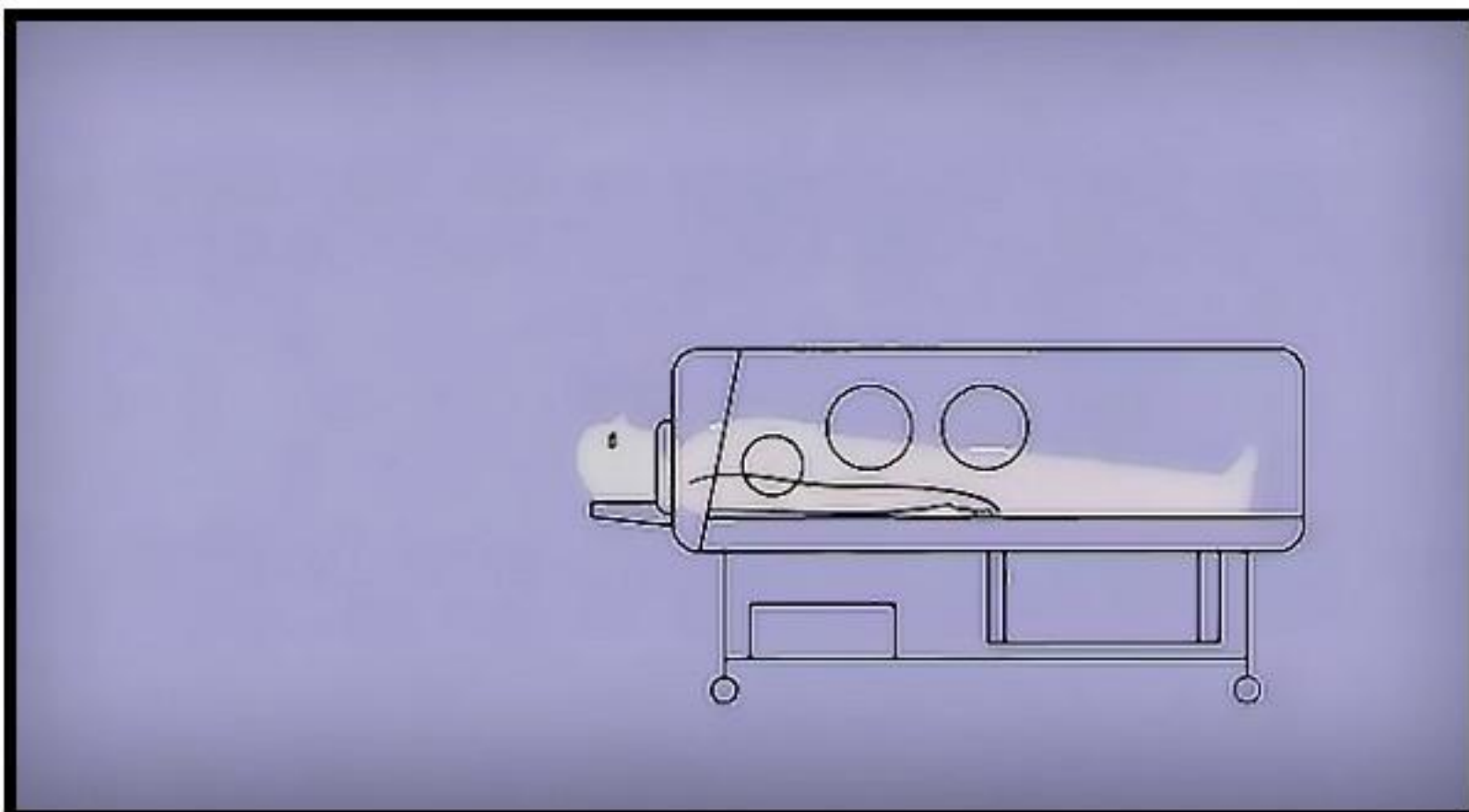
THESE MACHINES CAN BYPASS CONSTRICTED AIRWAYS AND DELIVER HIGHLY OXYGENATED AIR TO HELP DAMAGED AIRWAYS.



THERE ARE TWO MAIN WAYS VENTILATORS CAN WORK. LUNGS DEFUSE MORE OXYGEN.



IN THE LATE 19TH CENTURY, VENTILATION TECHNIQUES LARGELY FOCUSED ON NEGATIVE PRESSURE. NEGATIVE PRESSURE CLOSELY APPROXIMATES NATURAL BREATHING AND PROVIDES AN EVEN DISTRIBUTION OF AIR IN THE LUNGS.



DOCTORS CREATED A TIGHT SEAL AROUND THE PATIENT'S BODY, EITHER BY ENCLOSING THEM IN A WOODEN BOX OR A SPECIALLY SEALED ROOM. AIR WAS THEN PUMPED OUT OF THE CHAMBER, DECREASING AIR PRESSURE AND ALLOWING THE PATIENT'S CHEST CAVITY



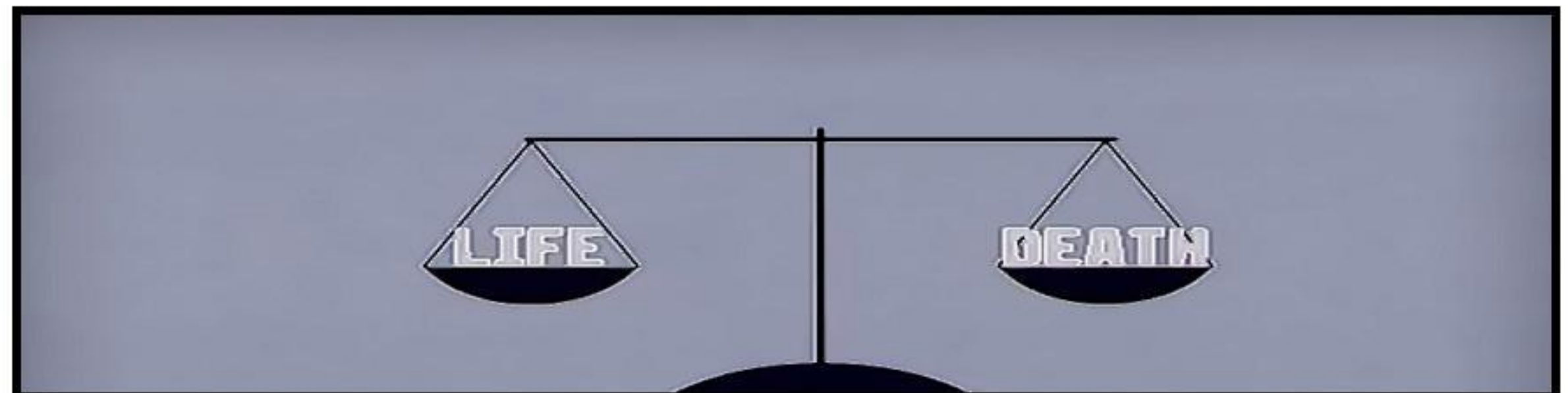


IN 1928, DOCTORS DEVELOPED A PORTABLE METAL DEVICE WITH PUMPS POWERED BY AN ELECTRIC MOTOR. THE DEVICE WAS USED TO

EVEN THE MOST COMPACT NEGATIVE PRESSURE DESIGNS HEAVILY RESTRICTED A PATIENT'S MOVEMENT AND OBSTRUCTED ACCESS FOR CAREGIVERS. THIS LED HOSPITALS IN THE 1960S TO SHIFT TOWARDS POSITIVE PRESSURE VENTILATION. FOR Milder CASES, THIS CAN BE DONE NON-IN



THE IRON LUNG BECAME A FIXTURE IN HOSPITALS THROUGH THE MID-20TH. THIS MACHINE, KNOWN AS THE IRON LUNG, WAS USED TO PERFORM LUNG TRANSPLANTS.



AN AFACE MASK IS FITTED OVER THE MOUTH AND NOSE AND FILLED WITH PRESSURIZED AIR.



MORE SEVERE CIRCUMSTANCES REQUIRE A DEVICE THAT TAKES OVER THE ENTIRE BREATHING PROCESS. A TUBE IS INSERTED INTO THE PATIENT'S TRACHEA TO PUMP AIR DIRECTLY INTO THE LUNGS. A SERIES OF VALVES AND BRANCHING PIPES FORM A CIRCUIT FOR INHALATION AND

