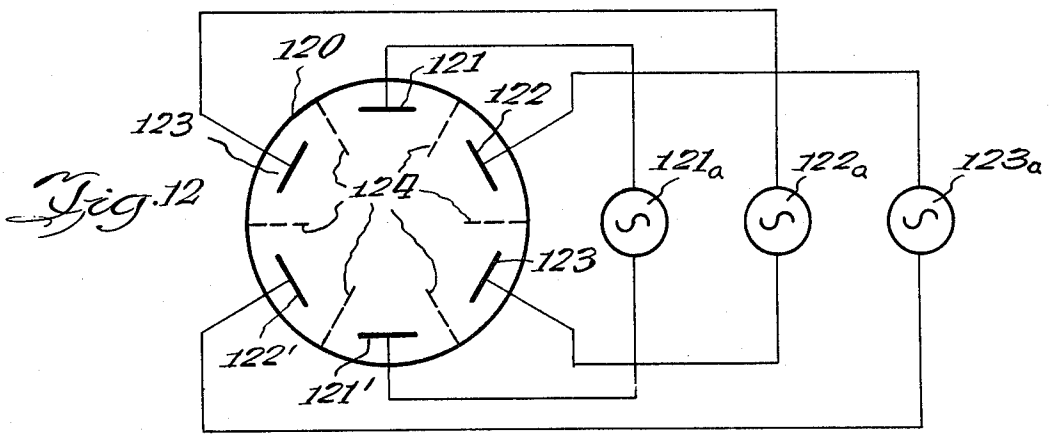


Fig. 12

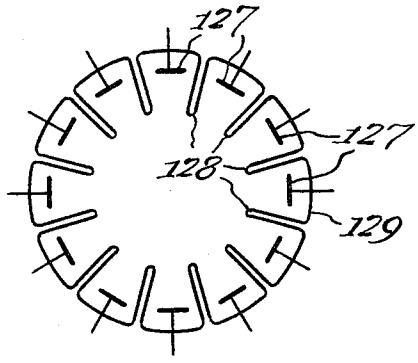


Fig. 13

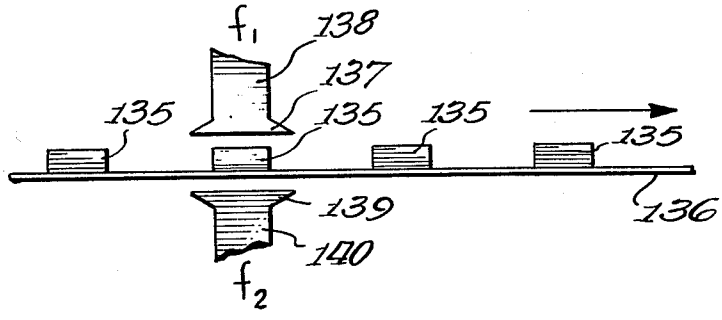


Fig. 14

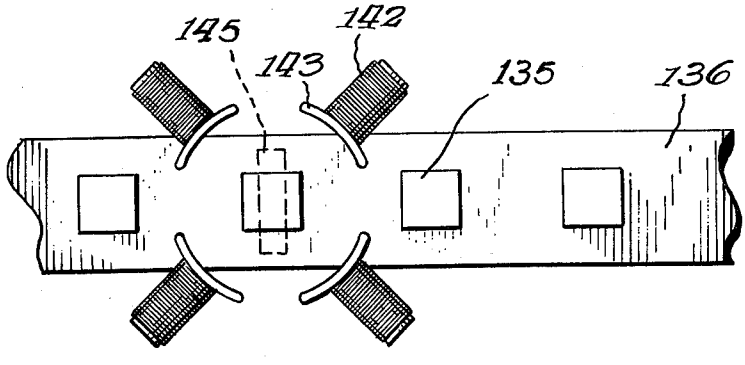


Fig. 15

Fig. 16

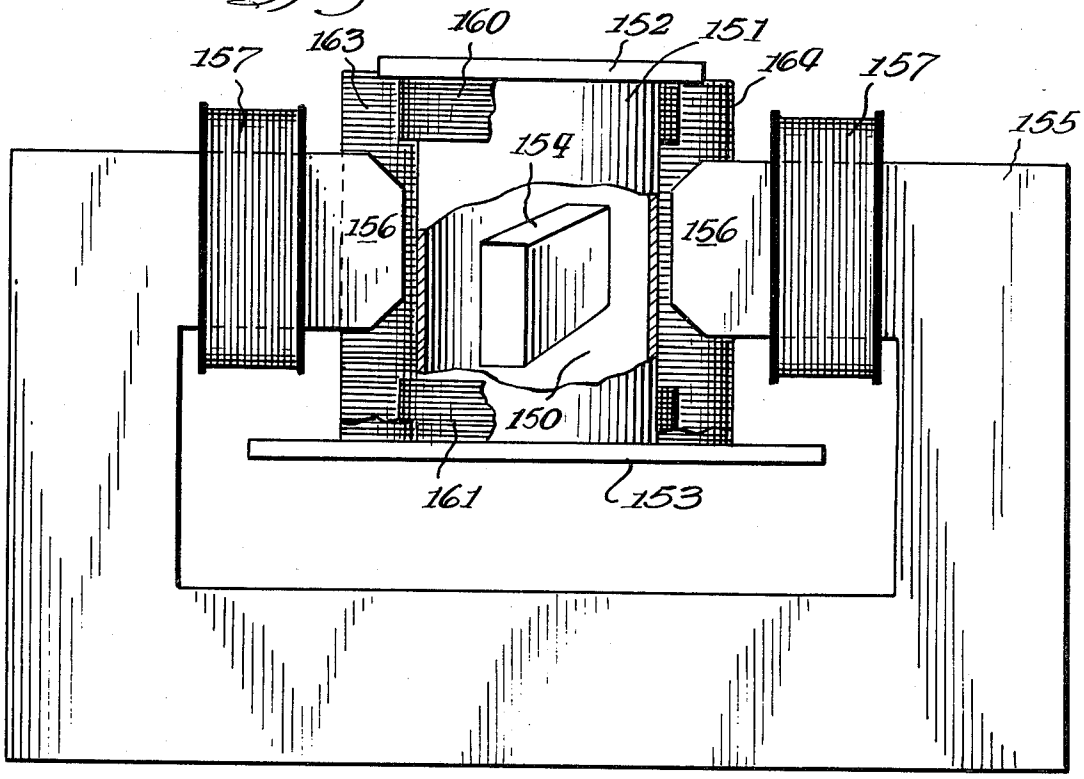

157
163
160
152
151
164
157
155
154
156
156
150
161
153

Fig. 17

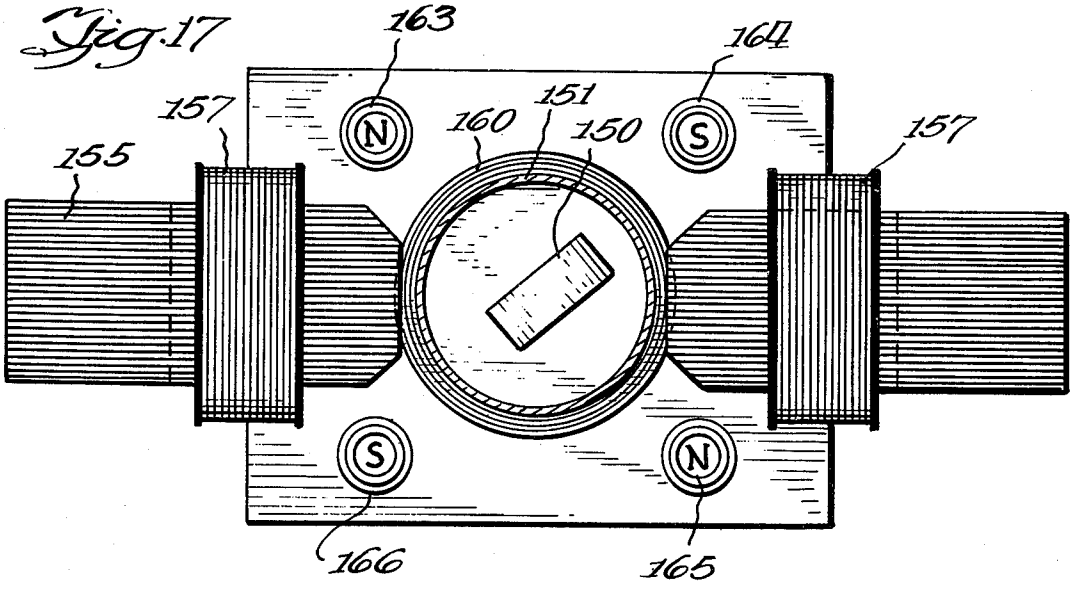

163
164
157
151
160
150
157
155
N
S
S
N
166
165

Fig. 18

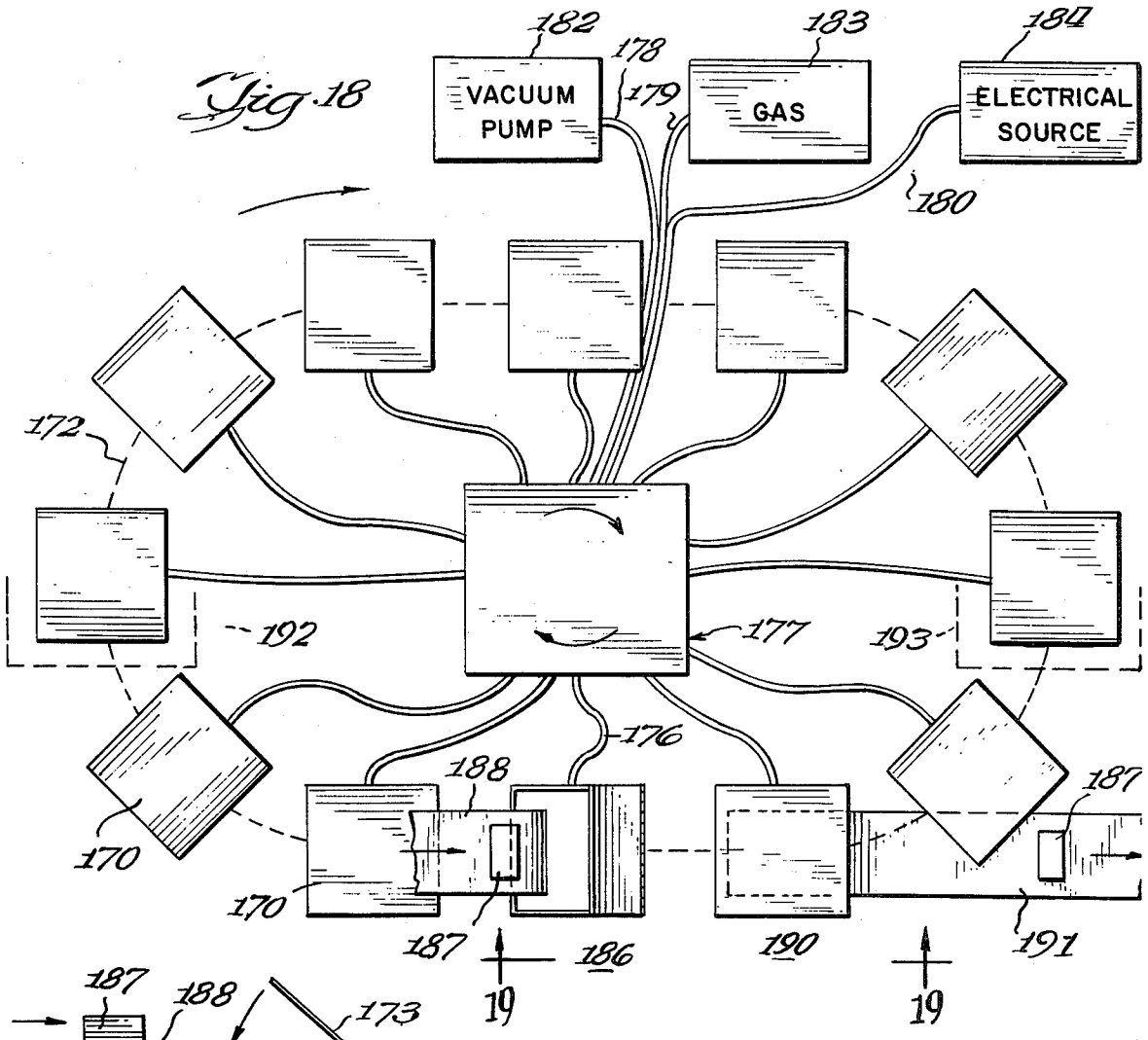
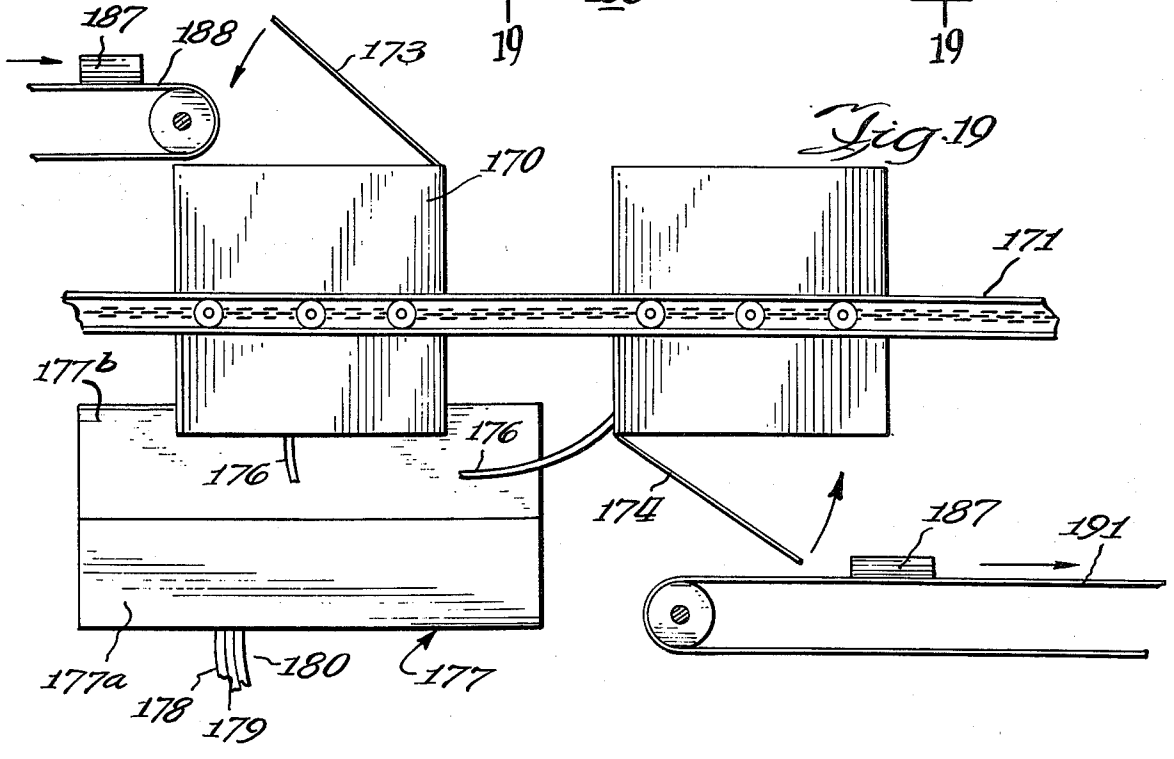

182
VACUUM PUMP
178
179
183
GAS
184
ELECTRICAL SOURCE
180
172
192
177
193
176
188
187
170
170
187
186
190
191
19
19

Fig. 19


187
188
173
170
171
177b
176
176
174
187
191
177a
178
179
180
177

METHOD AND APPARATUS FOR MODIFYING THE REPRODUCTIVE MECHANISM OF ORGANISMS

This application is a continuation of my application Ser. No. 713,912, filed Mar. 18, 1968, now abandoned.

A major aspect of this invention is concerned with a method for modifying the reproductive mechanism of organisms and with apparatus for practicing the method. More particularly, one aspect of the invention is concerned with the sterilization of matter by inhibiting the reproduction of organisms therein.

A principal feature of the invention is that organism reproduction is inhibited by subjecting the organism to a low energy excitation which, it is presently believed, alters the DNA (deoxyribonucleic) macromolecule of the cells of the organism by one or a combination of three effects:

1. circulating electric currents;
2. disruption by ionized particles;
3. hot chemical reactions.

These effects result from or are enhanced by exposure of the matter to an ionized atmosphere or plasma.

Prior sterilization methods in common use have been of three types — heat, gas or radiation. Heat sterilization generally involves exposure to steam under pressure (often superheated) for several hours. Kills have been achieved in shorter time under extreme conditions of temperature and pressure which are not suitable for general use. Gas sterilization, as with ethylene oxide, kills by alkylation of the organism and requires a long period of gas immersion, sometimes as much as 24 hours, depending on the nature of the article being sterilized. With high moisture levels, the time can sometimes be reduced to 3 hours. It is suitable only for a batch-type operation; and the long time required makes it quite expensive. Radiation sterilization, as with radio-active cobalt 60 (gamma rays), electron beam penetration or the like, is carried out at very high energy levels. Potentials of the order of 0.5 to 5 million electron volts (MEV) and currents from 0.5 to 20 milliamperes are common. Such energies require extensive shielding to protect the operator. It is not unusual to carry out the work within a concrete enclosure having walls 6 to 8 feet thick. The equipment used is expensive. The high energy levels used often alter the material being sterilized, as by changing taste or color, for example. The capability of sterilizing at low energy levels eliminates the expense and inconvenience of shielding, and side effects on the matter being treated.

A feature of one form of the invention is that the matter to be treated is exposed to a plasma, i.e., an ionized gaseous environment, in which the particles making up the environment are charged at a low energy level. More particularly, the plasma is established by exciting a rearfied atmosphere, generally by an electric field. One or a ombination of the following effects contribute to the prevention of organism reproduction:

1. the establishment of circulating alternating currents within the DNA molecule of the organism, resulting in destructive heating or disruption of its electrochemical molecular communication system;
2. disruption of the DNA molecule by the impact of a charge particle of the plasma;
3. a chemical reaction between a constituent of the atmosphere and organism which takes place very rapidly as a result of the high energy level of the plasma.

Another feature is that the atmosphere which is ionized includes gas particles which penetrate the matter and the organism therein to a greater extent than ionized air particles.

A further feature is that the plasma is excited by electric, magnetic or electromagnetic fields at one or more discrete frequencies for selective kill of undesirable organisms. By exciting the plasma with one or more specific frequencies, the energy may be concentrated in narrow portions of the specturm where it is most effective, and the total energy minimized, avoiding modification of other organisms. This selectivity permits use of the process in curing certain illnesses.

Still another feature of the invention is that the molecular structures of the organisms are oriented to enchance the selectively of the action of the discrete frequency excitation.

Yet a further feature is that the low energy charged particles of the plasma have a mean-free path substantially greater than the diameter of the DNA molecule of the organism. This characteristics of the method contributes to the efficiency of the sterilization operation.

An apparatus for practicing one form of the method includes means defining a chamber, a pair of spaced electrodes in the chamber, means for evacuating the chamber, a source of electrical energy connected with the electrodes and means within the chamber for supporting the matter to be subjected to the low energy plasma.

Another feature of the apparatus of the invention is that is includes a means for establishing plural electric and magnetic fields at plural frequencies. For example, with an electrostatically excited apparatus, a plurality of pairs of spaced electrodes are provided, having electric shields between adjacent electrodes, with different pairs of the electrodes connected with different sources of electric energy.

Further features and advantages of the invention will readily be apparent from the following specification and from the drawings, in which:

FIG. 1 is a diagrammatic illustration of an apparatus for practicing the invention;

FIG. 2 is a schematic diagram of a spark gap power supply;

FIG. 3 is a schematic diagram of a fixed frequency alternating current power supply;

FIG. 4 is a schematic diagram of a variable frequency alternating current power supply;

FIG. 5 is a plot of voltage as a function of time for the spark gap power supply;

FIG. 6 is a plot of current as a function of time corresponding with the voltage of FIG. 5;

FIG. 7 is a plot of the percentage of kill curve as a function of the dosage factor;

FIG. 8 is a diagrammatic illustration of the path of a charged particle showing several organism cells;

FIG. 9 is a simplified, diagrammatic illustration of an organism cell;

FIG. 10 is a diagrammatic illustration of the circulating currents in a DNA molecule;

FIG. 11 is an outline drawing of a modified apparatus;

FIG. 12 is a diagrammatic illustration of another modified apparatus;

FIG. 13 is a diagrammatic illustration of another modified apparatus;