Nov. 8, 1966 H. W. KASEMIR ETAL 3,284,005

WEATHER CONTROL BY ARTIFICIAL MEANS

Filed Sept. 23, 1964

FIG. 1

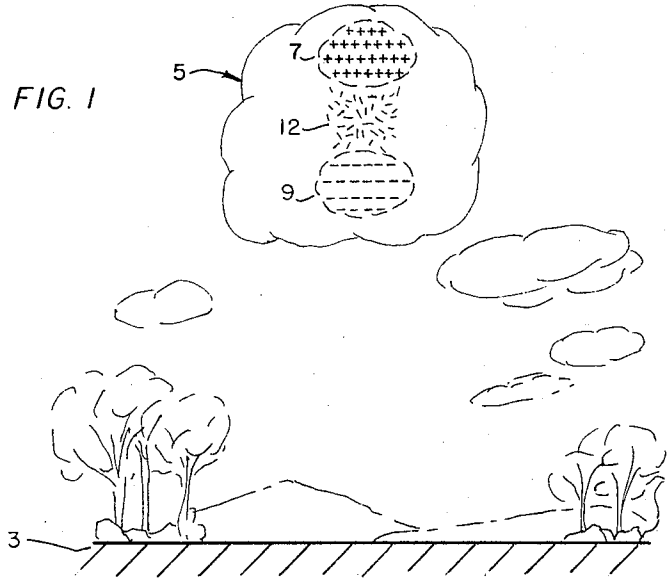
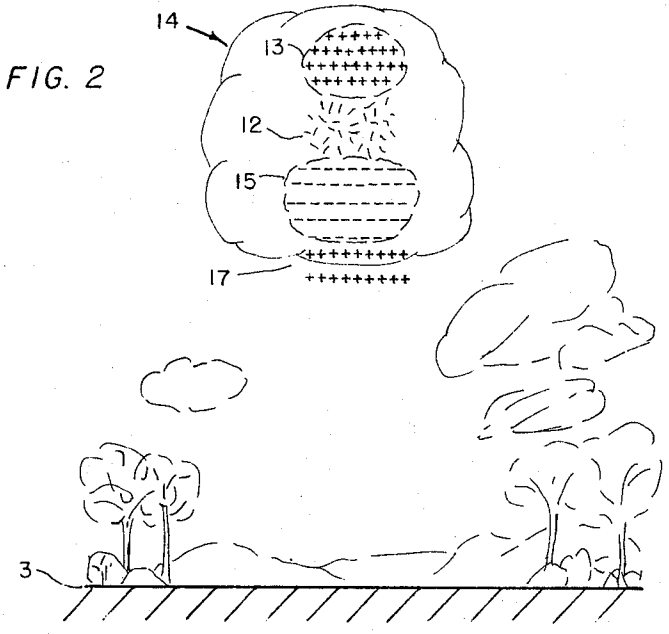


FIG. 2



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United States Patent Office

3,284,005
Patented Nov. 8, 1966

3,284,005

WEATHER CONTROL BY ARTIFICIAL MEANS

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Filed Sept. 23, 1964, Ser. No. 398,816
3 Claims. (Cl. 239—2)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment of any royalty thereon.

The present invention relates to weather control and more particularly to a method and means for changing the natural electric charge distribution or pattern of thunderstorms and thereby controlling the discharge of lightning. Depending on the way in which the charge distribution is modified, lightning strokes may be inhibited in cases where the natural conditions would normally result in lightning and in other cases the natural charge distribution which would not normally result in lightning may be modified to induce lightning discharge. According to the invention, the natural space charge distribution of the thunderstorm is modified by introducing in regions of strong electric potential gradient a plurality of needle-shaped conductors. The interaction of the electric field and the pointed conductors will produce point discharge or corona. The corona discharge produces a large number of positive and negative ions which are capable of supporting heavy currents needed to hold the electric field below that value at which lightning discharge is initiated. In other cases, the change in the natural space charge distribution caused by the introduction of these conductors can result in an increased electric field gradient in adjacent regions of the atmosphere which will tend to induce lightning discharge in these adjacent regions.

It is therefore an object of the invention to modify atmospheric electric conditions by artificial means.

It is a further object of the invention to control lightning discharge by the seeding of a selected area of the atmosphere with a plurality of needle-shaped conductors.

These and other objects and advantages of the invention will become apparent from the following detailed description and drawing, in which

FIGS. 1 and 2 are pictorial diagrams of two different types of atmospheric conditions to which the invention may be applied.

In FIG. 1, the thundercloud 5 floats in the atmosphere above the earth 3. The cloud contains areas of positive and negative electrical space charge 7 and 9, respectively. A certain electric field gradient will exist in the region between these space charges depending on the spacing thereof and the charge magnitude. Under natural conditions, prior to the lightning discharge, the electric field will cause a limited amount of ionization or glow discharge in the region between the space charges 7 and 9 by corona discharge from precipitation particles in this region. This natural ionization will support or carry electrical current between the charged areas 7 and 9 and therefore will tend to discharge or bleed off the space charge. However, because of the generally spherical shape and the small size of the precipitation particles, they are not efficient ion producers. If the natural rate of charge buildup of areas 7 and 9 is greater than the charge dissipation due to the natural ionization, the potential gradient will increase until intracloud lightning occurs which of course substantially neutralizes the space charge. In accordance with the invention, the region between the space charges 7 and 9 is seeded with needle-like conductors 12. These conductors are made at least 1 centimeter in length and are therefore substantially larger than the natural precipitation particles. The size of the conductors together with their needle-like shape make them more efficient producers of atmospheric ionization due to corona discharge than the natural precipitation particles. The increased ionization in effect raises the atmospheric conductivity to such an extent that the space charge can be bled off or neutralized as fast as it naturally builds up. The result is a slow, controlled dissipation or neutralization of the cloud space charge rather than the rapid and sometimes destructive lightning stroke.

FIG. 2 illustrates a situation in which ground lightning strokes as well as intracloud strokes are possible. In thundercloud 14 is an area 13 of positive charge, a larger area 15 of negative charge and a somewhat smaller area 17 of positive charge near the lower boundary of the cloud. Under natural conditions a small intracloud stroke may start between areas 15 and 17 and may grow until it reaches ground, becoming a ground stroke, thereby carrying negative charge from region 15 to earth and consequently tending to dissipate the area of negative charge. If, however, an intracloud lightning stroke takes place first between positive area 13 and negative area 15, the negative charge may thereby be dissipated to such an extent that no ground stroke will be possible. Thus the intracloud strokes between areas 13 and 15 will use up the negative charge of 15 and thereby lessen the probability of ground strokes. By seeding the region between 13 and 15 with a plurality of needle-shaped conductors 12, the intracloud lightning will be inhibited as explained in connection with FIG. 1 and this will leave a larger negative charge at region 15 which is then available for producing ground strokes. If it is desired to inhibit instead of induce ground strokes, the region between space charge areas 15 and 17 would be seeded with the needle-like conductors. Also, by seeding both of the above-mentioned regions, both ground and intracloud strokes would be inhibited.

The needle-like conductors 12 may comprise metallized nylon threads of from 1 centimeter to 1 inch in length. The metallized nylon is lighter than solid metal needles of the same size and therefore will have a smaller terminal velocity and will remain in the air longer than would all-metal conductors. The conductors may be dispensed at the proper place in the thundercloud by an airplane or a rocket after measurements have been made to determine the most advantageous place for seeding. In order to achieve the desired results, it is necessary that at least several million of these conductors be seeded in each thundercloud.

The present invention may be put to several practical uses. For example, forest fire prevention, reduction of radio interference due to lightning, or as a tactical military weapon for either harassing the enemy or protecting friendly forces from adverse weather conditions.

While the invention has been described in connection with an illustrative embodiment, the principles disclosed herein are of general application; hence the invention should be limited only by the scope of the appended claims.

What is claimed is:

1. The method of inhibiting lightning discharge comprising the seeding of a region between two areas of opposite type electric space charge with a plurality of metallized nylon threads, said nylon threads being at least one centimeter in length.

2. The method of controlling lightning discharge comprising increasing the natural rate of ionization in a region of high electric field by the seeding of said region with a plurality of metallized nylon threads, said nylon threads being at least one centimeter in length.

3. The method of inducing ground lightning strokes from a thundercloud which includes an area of negative electric charge with areas of positive electric charge above and below said negative electric charge, comprising, inhibiting intracloud discharge in the region between said area of negative electric charge and the upper one of said areas of positive electric charge by seeding said region with a plurality of metallized nylon threads, said nylon threads being at least one centimeter in length.

References Cited by the Examiner

UNITED STATES PATENTS

911,260	2/1909	Pennock	239—14
1,284,982	11/1918	Balsillie	239—2
3,019,989	2/1962	Vonnegut	239—2

OTHER REFERENCES

The Washington Post, Sunday August 20, 1916 "Latest Progress in Turning Rain On and Off at Will," 1 page.

Final Report of The Advisory Committee on Weather Control, vol. II, 1957, pp. 105–125 "Project Skyfire."

EVERETT W. KIRBY, *Primary Examiner.*