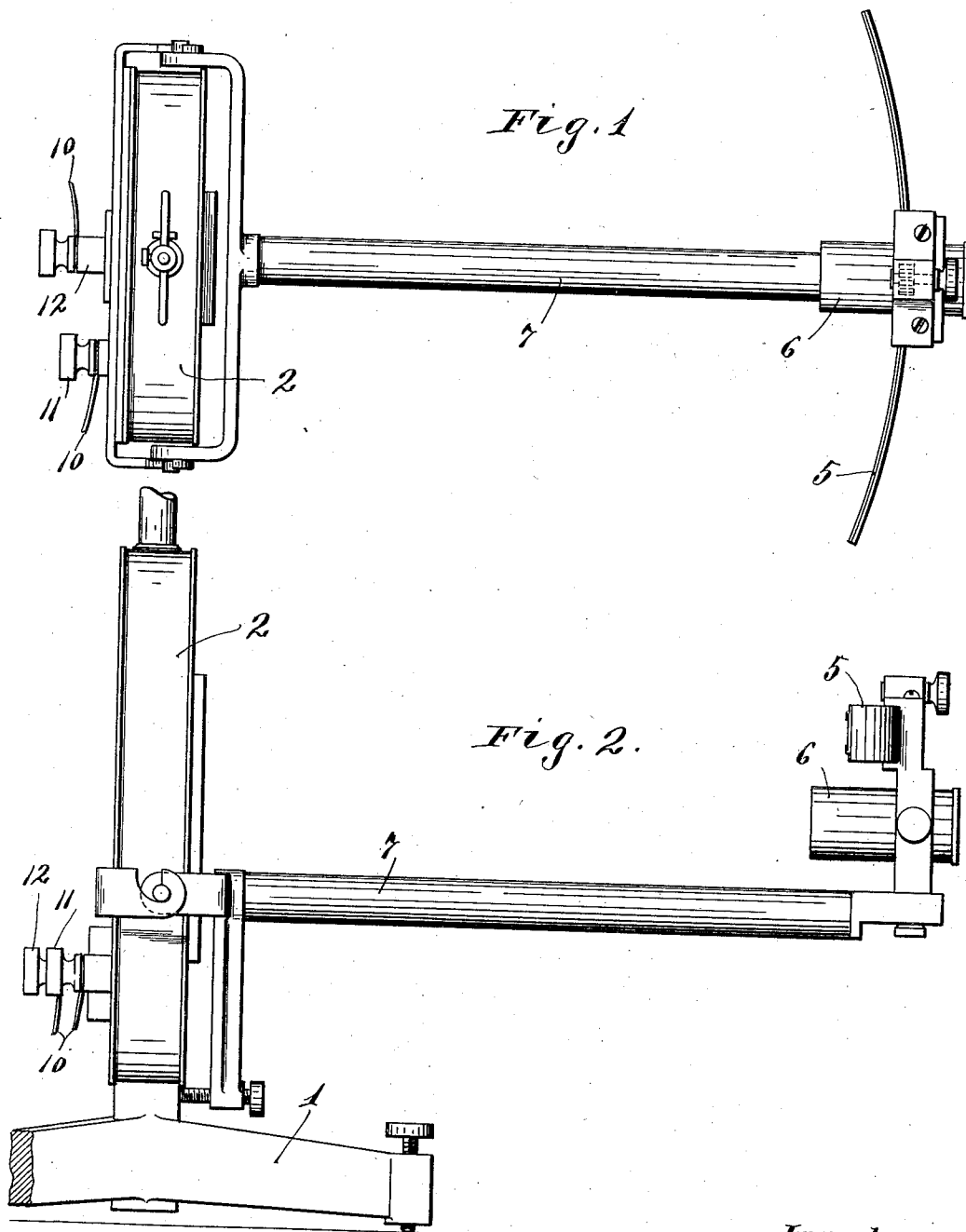


A. ZELENY.
DEVICE FOR INDICATING MOISTURE IN GRAIN, &c.
APPLICATION FILED NOV. 20, 1908.

1,059,099.

Patented Apr. 15, 1913.

2 SHEETS—SHEET 1.



Witnesses:
L. L. Simpson,
A. H. Opsahl.

Inventor:
Anthony Zeleny
By his Attorneys:
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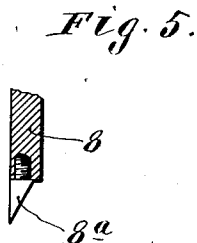
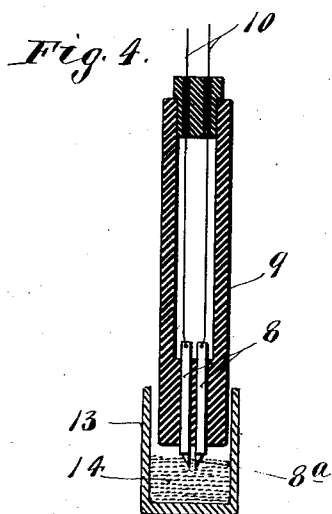
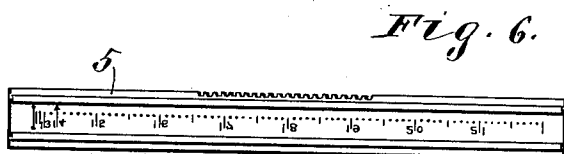
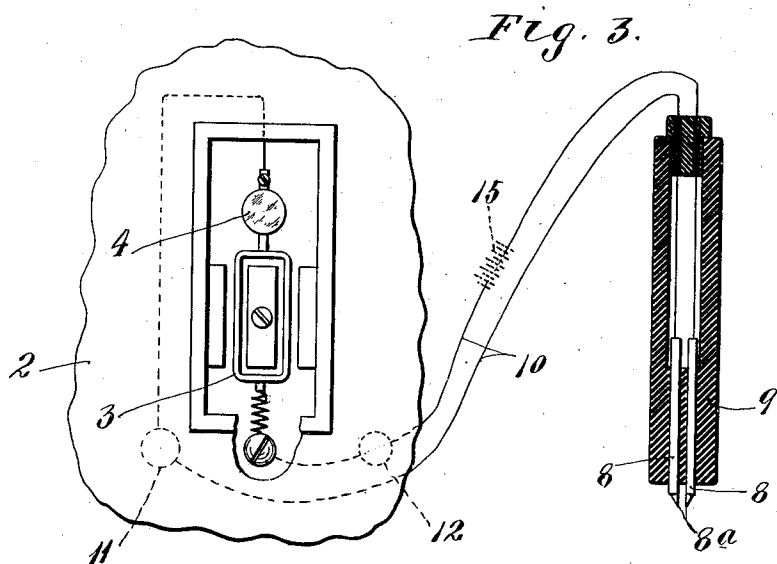
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

ANTHONY ZELENY, OF MINNEAPOLIS, MINNESOTA.

DEVICE FOR INDICATING MOISTURE IN GRAIN, &c.

1,059,099.

Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed November 20, 1908. Serial No. 463,596.

To all whom it may concern:

Be it known that I, ANTHONY ZELENY, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Devices for Indicating Moisture in Grain and other Materials; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its especial object to provide an improved apparatus for determining the amount of moisture in grain, seeds, flour and various other materials.

To the above ends, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The improved apparatus includes a source of electrical energy, a galvanometer and a pair of separated electrodes, which latter, when brought into contact with the material in which the amount of moisture is to be determined, complete an electric circuit through the galvanometer and cause a deflection to be produced on the galvanometer, the magnitude of which, on a properly graduated scale, indicates the amount of moisture in such material.

The electrodes are preferably provided with sharp points, which adapt them to be readily inserted into a hard body such, for instance, as a kernel of corn. The galvanometer may be of any form which will indicate a variation in current flow. In fact, the expression "galvanometer" is herein used in a very broad sense and is intended to include instruments such as ammeters, voltmeters and electrometers, for example.

When the electrodes are of the same material, a battery or other independent source of electrical energy must be relied upon to supply the current necessary to produce the variable deflections on the galvanometer.

The accompanying drawings illustrate the improved apparatus in the form which, in actual practice, has been found efficient for the purposes had in view.

In the said drawings, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a plan view of the galvanometer; Fig. 2 is a side elevation of the galvanometer, some

parts being broken away; Fig. 3 is a view partly in diagram and partly in vertical section, showing the apparatus, some parts being broken away; Fig. 4 is a sectional view showing the electrode inserted into a cup containing ground material; Fig. 5 is an enlarged detailed view, partly in section and partly in side elevation, showing an electrode with a detachable point; and Fig. 6 is a face view of the adjustable scale of the galvanometer.

The galvanometer, which is preferably employed, is of the type disclosed and claimed in my prior Patent No. 705,186, issued of date, July 22, 1902, and of the parts thereof, it is only necessary for the purposes of this case to note the tripod 1, the bifurcated frame 2 which serves as the permanent field magnet, the loosely suspended oscillatory coil 3, the mirror 4 which is carried by the coil 3 and the adjustable scale 5 and telescope 6, both of which are supported from the frame 2 by projecting arm 7. In arranging this galvanometer for use in my improved apparatus, the size of the scale divisions or graduations, in the first instance, is determined experimentally by observing the deflections obtained from grain or other material containing known amounts of moisture or other conducting impurities and in marking the scale accordingly. Different kinds of materials will generally require different graduations.

The electrodes 8 are preferably mounted in, and project from, the end of a tubular hand piece or body 9 of insulating material, such as vulcanized rubber or wood fiber, and also they are preferably formed with detachable points 8^a which, as shown in Fig. 5, are provided with threaded shanks screwed into the bodies of the respective electrodes. These electrodes are thus spaced apart the desired distance, but their points will usually be in very close proximity. The electrodes are connected by wires 10 to binding posts 11 and 12 of the galvanometer, which binding posts are connected in the usual way to the opposite terminals of the coil 3.

In Fig. 4 the numeral 13 indicates a cup which contains tightly packed ground material 14, into which the points of the electrodes 8 are inserted for the purpose of determining the amount or percentage of moisture contained in such material.

In Fig. 3, the numeral 15 designates a battery which is indicated by dotted lines

only and which affords a source of electrical energy.

As a preliminary to determining the amount of moisture contained in wheat and small seeds, such as flax seed, for example, such materials are preferably first ground and then tightly packed into a suitable receptacle and the electrodes are then inserted into this ground and packed material. When the points of the electrodes are inserted into such moist material, an electric circuit will be established through the galvanometer and the current will then flow through the galvanometer from the battery or other source of electrical energy and cause a deflection of the galvanometer. Obviously, the amount of deflection of the galvanometer will depend on the amount of moisture in the material to which the electrodes are applied.

In determining the amount of moisture in larger materials, such as corn, the points of the electrodes are inserted directly into the kernel. It has been found that the germ of the corn kernel will contain a greater amount of moisture than the body of the kernel, which amount, however, has a definite proportionate relation to the moisture in the body of the kernel. Hence, in practice, the points of the electrodes are advisedly inserted into the germ of the kernel and the scale is graduated so that the deflection produced will indicate the percentage of moisture in the whole kernel.

What I claim is:

1. An apparatus for determining the amount of moisture in different materials, comprising a source of electrical energy, a galvanometer connected to said source and having a scale graduated to indicate percentages of moisture, and a pair of separated electrodes connected to said galvanometer, and which electrodes, when brought into contact with the material in which the

amount of moisture is to be determined, complete an electric circuit through the galvanometer and cause a deflection to be produced on the galvanometer, the magnitude of which indicates the amount of moisture in such material.

2. An apparatus for determining the amount of moisture in different materials, comprising a source of electrical energy, and a galvanometer connected to said source and having a scale graduated to indicate percentages of moisture, and a pair of separated pointed electrodes connected to said galvanometer, and which, when inserted into the material in which the amount of moisture is to be determined, complete an electric circuit through said galvanometer and cause a deflection to be produced on the galvanometer, the magnitude of which indicates the amount of moisture in such material.

3. An apparatus for determining the amount of moisture in different materials, comprising a source of electrical energy, a galvanometer connected to said source and having a scale graduated to indicate percentages of moisture, a portable hand piece, and a pair of separated electrodes mounted in said hand piece and provided with detachable points, and which electrodes are connected to said galvanometer and when brought into contact with the material in which the amount of moisture is to be determined, complete an electric circuit through said galvanometer and cause a deflection on said galvanometer, the magnitude of which indicates the amount of moisture in such material.

In testimony whereof I affix my signature in presence of two witnesses.

ANTHONY ZELENY.

Witnesses:

HARRY D. KILGORE,
F. D. MERCHANT.