

(No Model.)

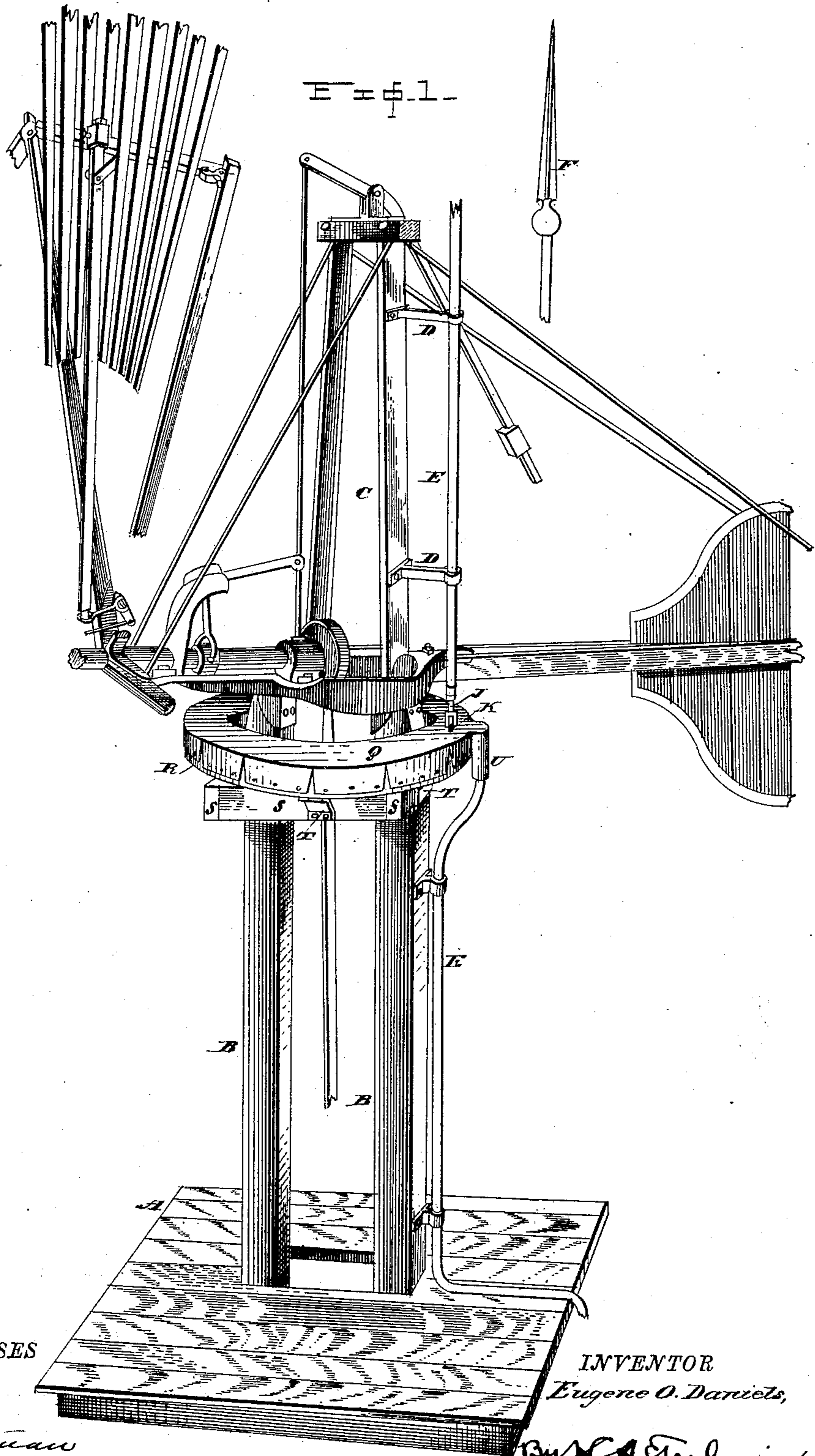
2 Sheets—Sheet 1.

E. O. DANIELS.

LIGHTNING ROD ATTACHMENT FOR WINDMILLS.

No. 377,742.

Patented Feb. 14, 1888.



WITNESSES

A. M. Leachman
Jas. H. Mahan.

INVENTOR

Eugene O. Daniels,

By S. A. Foulmin,
his Attorney.

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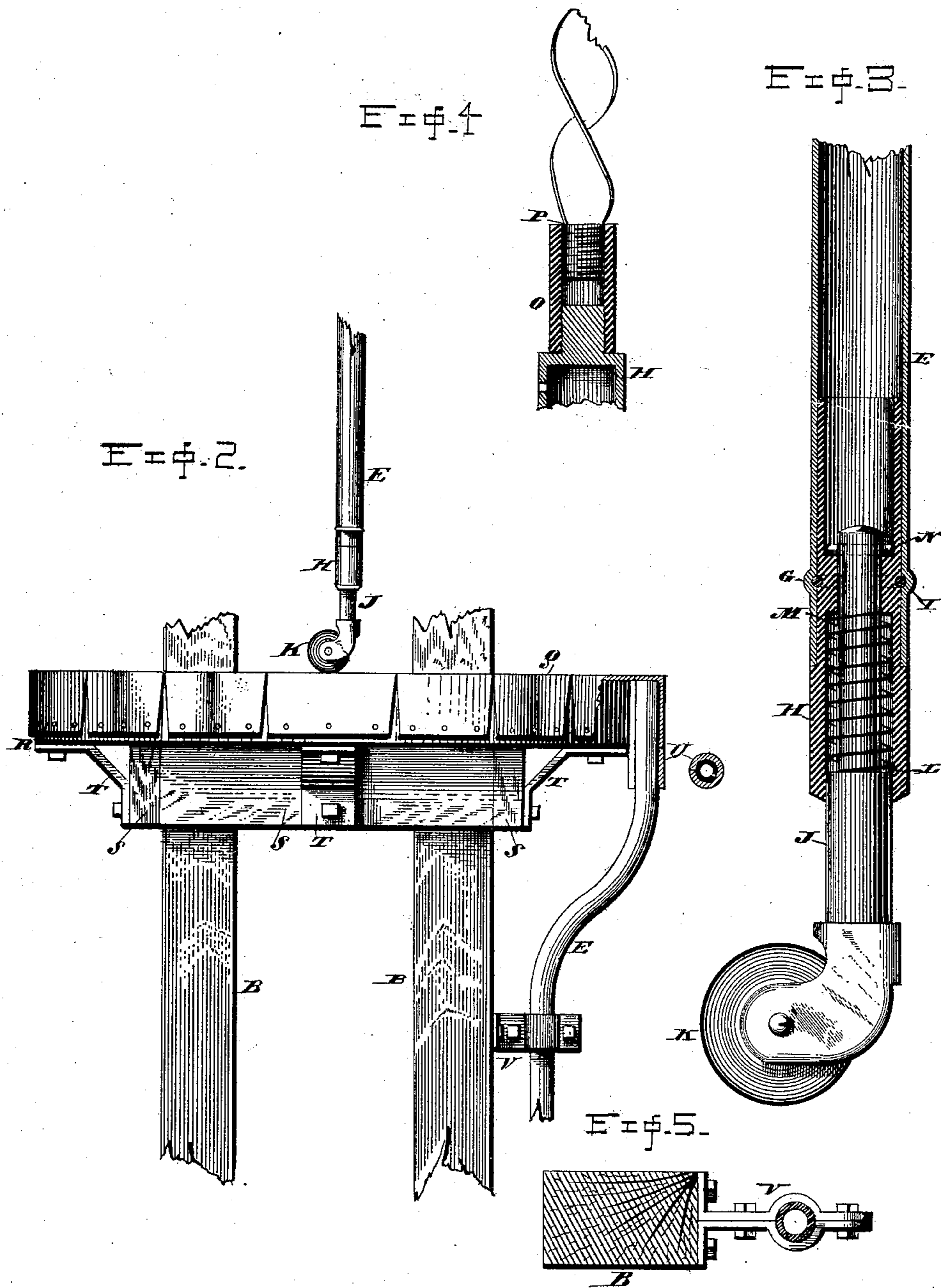
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UNITED STATES PATENT OFFICE.

EUGENE O. DANIELS, OF SPRINGFIELD, OHIO.

LIGHTNING-ROD ATTACHMENT FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 377,742, dated February 14, 1888.

Application filed August 25, 1887. Serial No. 247,853. (No model.)

To all whom it may concern:

Be it known that I, EUGENE O. DANIELS, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Lightning-Rod Attachments to Windmills, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to improvements in lightning-rods for windmills; and the invention consists, in a broad sense, of means for securing a proper constant and yielding electrical contact between that portion of the lightning-rod
15 which is secured to the stationary part of the windmill structure and that portion which is carried by the movable portion or the mechanism of the windmill.

20 The invention also consists of an annular track or table composed of or covered with an electrical conductor with which that portion of the lightning-rod which runs to the ground is connected, and of a spindle yieldingly and rotatably connected with that portion of the rod which is secured to the movable
25 portion of the windmill, and having a contact-wheel adapted to run upon the said track and maintain contact therewith irrespective of the movements of the upper mechanism of the
30 mill.

In the accompanying drawings, forming a part of this specification, and on which like reference-letters indicate corresponding features, Figure 1 represents a perspective view of the upper end of a windmill-tower and the essential portion of the windmill proper, showing my improvements applied thereto; Fig. 2, an enlarged detail side elevation of the upper end of the tower and the contact-track, showing the sections of the rod respectively connected with the track and running upon it; Fig. 3, an enlarged detail vertical sectional view of the lower end of the section of a tubular lightning-rod and the coupling-sleeve
40 and a side elevation of the spindle and contact-wheel, showing the pressure-spring in the interior; Fig. 4, a detail sectional view showing the arrangement of the sleeve and coupling used with the ordinary spiral or other solid rod; Fig. 5, a transverse sectional view of a tower-beam and the tubular rod, showing a connecting-bracket in plan view.
50

The letter A designates the platform, and the letter B the upper beams, of a windmill-tower, upon which latter is mounted the mechanism of the windmill proper, which may be of any of the known styles. In the style shown, which is essentially like a windmill now on the market, the letter C designates one of the uprights, which extends from the upper
55 portion of the turn-table and forms a part of the upper structure or frame of the mill. It is to this upright that I preferably secure in any convenient manner, as by the brackets D, the upper section or sections E of the lightning-rod, which terminates in the usual point,
60 F. The lower end of the section or sections E is provided with an annular groove, G, and a coupling-sleeve, H, is fitted into it and provided with a coincident groove. In these
65 grooves an annular locking-wire, I, is inserted to secure the sleeve and section together.

A contact device is fitted to work up and down and rotatably in the sleeve H, and in the present instance this device consists of a spindle, J, carrying the contact-roller K at its
70 lower end, which is adapted to travel upon the contact-track presently to be described. The spindle J is shouldered at L and a spiral spring fitted over the reduced portion and between said shoulder and a shoulder, M, in the sleeve H. This latter shoulder is bored centrally to receive and guide the upper end of the spindle, which is provided with a pin, N, or other enlargement, to prevent its being
75 forced entirely out of the sleeve by the action of the spring. The tendency of the spring is to project the contact device constantly against the contact-track and to allow said device to yield to any obstructions upon the surface of
80 the said track—as, for instance, twigs, accumulations of dirt, ice, &c., at different places along the track, as the case may be—and also to any inaccuracy in the face of the track. The freedom of the spindle to rotate allows the
85 contact-wheel to readily follow as the sleeve is carried back and forth round the track by any change in the position of the mechanism of the windmill due to a change in the direction of the wind. I have termed the spindle
90 and roller as the "contact device," because I wish to be understood as not confining myself to this particular form of construction, although I prefer it; nor do I confine myself to the use
100

of a tubular lightning-rod, as I have illustrated another form in Fig. 4; nor yet is the form of locking device between the coupling H and the tubular rod the only form that I contemplate using.

In Fig. 4 it will be observed that the sleeve H has a threaded tenon on the upper end, which enters a coupling, O, which in turn receives a similar tenon, P, of a twisted or other form of lightning-rod.

The letter Q refers to the contact-track, the detail construction of which is a matter largely within the discretion and choice of the mechanic or builder. The construction I prefer, however, is that shown, which consists of a sheet of copper cut in the form of an annulus with its outer edges turned down, as seen in Figs. 1 and 2, and secured to a circular framework, R, supported by four cross-pieces, S, secured to the tower-beams, and by the brackets T, secured to said cross-pieces. In cutting the sheet Q, I prefer to cut one of the outer edges or pieces somewhat larger than the others and to bend it into a sleeve, U, as seen in Figs. 1 and 2, for the purpose of forming a pocket into which the upper end of the upper section of the stationary portion of the rod is fitted. This forms a cheap and ready means of securing a long and intimate contact between the said section and the track. The altitude of the track with respect to the turntable of the mill may be varied at pleasure, though I prefer to locate it comparatively near the turn-table, as suggested in Fig. 1. All matters of relative arrangement, however, and largely that of the detail construction, must vary according to the individual construction of the different mills to which my invention is applied.

In Fig. 5 I have illustrated a convenient form of the bracket for securing the rod to the mill structure, the same consisting of two plates, V, bolted to the structure and to each other and having coincident semicircular depressions, which together form a seat for the rod. A hole may be made through the wall of the sleeve H in the form shown in Fig. 4 for the passage of the pin N when inserting it into the upper end of the spindle J.

I would observe that while it is desirable to protect windmills located in the open fields against the destructive effects of lightning, it

is more particularly desirable that they should be protected with lightning-rods when located in close proximity to dwellings or barns, and especially so when placed upon barns, as is now very commonly done. It will be noticed that to rod the barn and then place a windmill upon it, about which there is a great deal of iron-work, portions of which (for instance, the vertical shaft) often run down into the barn, is comparatively useless unless the mill also were provided with a lightning-rod. Hence it will be seen that in protecting the windmill I also protect the barn.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the stationary structure of a windmill and an annular track of conductive material and a portion of a lightning-rod electrically connected with the said track, of the movable or turning portion of the windmill, a portion of a lightning-rod connected thereto, and a spindle connected with the said portion by a yielding joint, and a contact-wheel carried by the spindle and in engagement with the track.

2. The combination, with a lightning-rod section, of a sleeve connected thereto, and a contact device consisting of a spindle rotatably mounted in the sleeve and spring which projects the spindle away from the rod, and the contact roller carried by the spindle.

3. The combination, with the stationary structure of a windmill, a contact-surface supported thereby, a portion of a lightning-rod electrically connected with said surface, the movable or turning portion of the windmill, and a portion of a lightning-rod secured thereto, of a distinct yielding contact device connected to the latter portion of the said rod and normally projected against the said contact-surface, whereby electrical contact is maintained when the movable portion of the mill changes to the direction of the wind, and whereby the contact yields to accumulations upon said surface, substantially as described.

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

EUGENE O. DANIELS.

Witnesses.

W. A. STOUT,
J. C. PARSONS.