Jan. 18, 1938. L. A. HATHAWAY ET AL 2,105,592

EDUCATIONAL DEVICE

Filed March 27, 1937 2 Sheets-Sheet 1

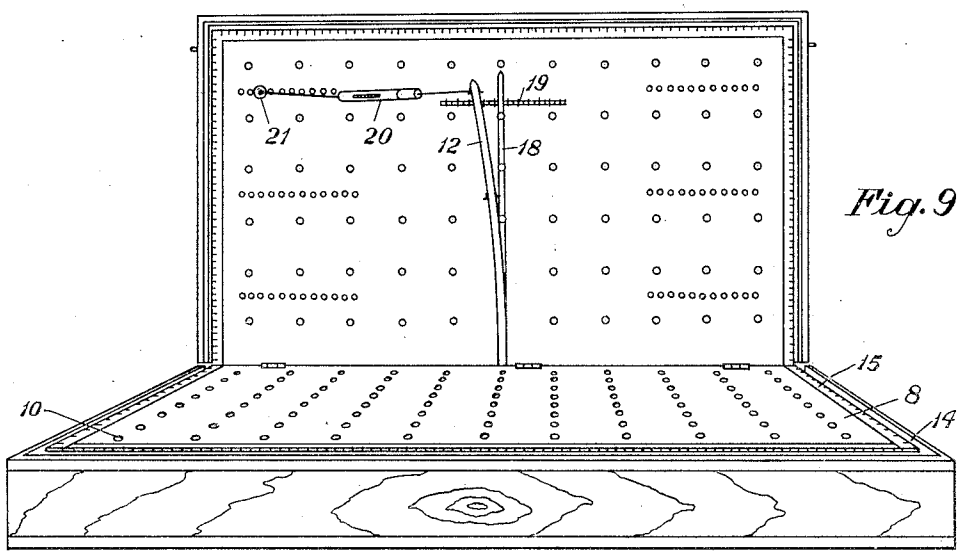


Fig. 9

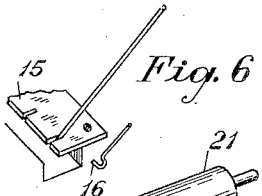


Fig. 6

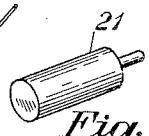


Fig. 7



Fig. 5

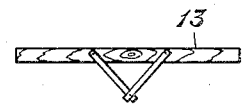


Fig. 4



Fig. 3

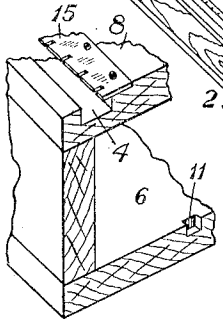


Fig. 2

Fig. 1

Fig. 8A

Fig. 8

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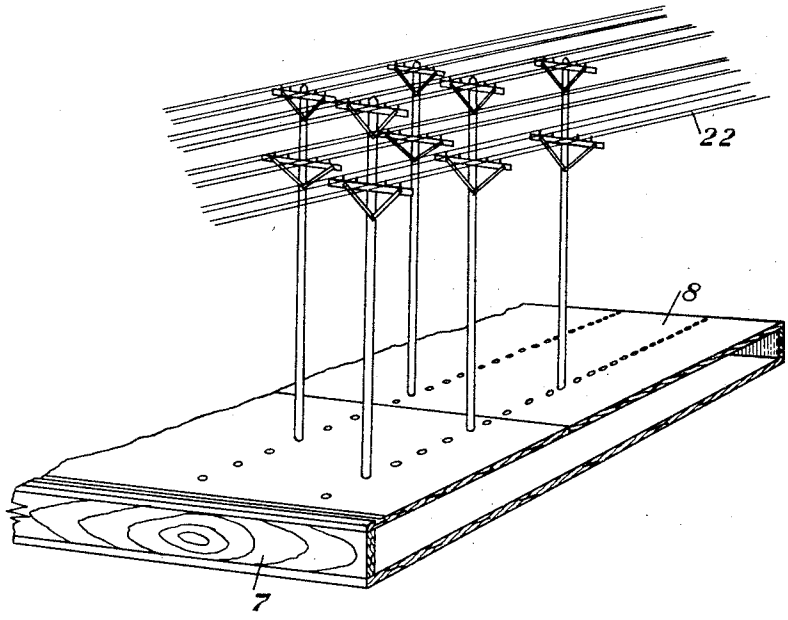


Fig. 10

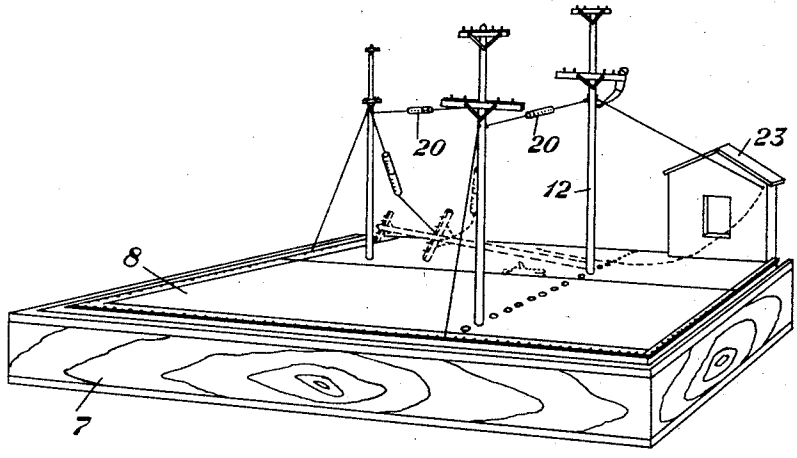


Fig. 11

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UNITED STATES PATENT OFFICE

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EDUCATIONAL DEVICE

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Application March 27, 1937, Serial No. 133,440

1 Claim. (Cl. 35—1)

This invention relates to educational devices, and more particularly to devices of this character which are used in connection with the demonstration and instruction of guying, rigging and other subjects relating to poles and pole line construction and maintenance.

It is important that linemen, workmen and others engaged in the construction and maintenance of poles and pole lines be informed and familiar with the fundamentals of such work. This work requires knowledge on the part of employees which will prevent accidents caused by falling poles due to unbalanced loads, improper rigging, guying, strains from a lineman's weight on the pole, or from the attachment which he may be placing or removing from the pole. It has been difficult to present or convey in words, or even graphically to a lineman or others interested in pole line construction and maintenance, a clear conception as to the proper manner of performing this work.

Accordingly it is an object of this invention to provide a portable educational device by means of which all conditions involved in the construction and maintenance of typical pole lines may be simulated in miniature. This and further objects will be apparent from the following description, when considered in connection with the accompanying drawings.

Referring to the drawings, Figure 1 is a perspective view of the improved device showing a panel, the hinged lid of which is disposed in angular relation to the other portion of the panel; Fig. 2 is a section taken on the line 2—2 of Fig. 1; Fig. 3 is a view of one of the miniature poles forming part of the equipment for this device; Fig. 4 is an elevational view of one of the cross-arms adapted to be mounted on a pole; Fig. 5 is a perspective view of a hook which is adapted to be applied to a pole and to which a guy wire may be attached to provide an anchorage for the pole; Fig. 6 shows an anchor guy attached to a slot in the metal edge provided for the panel and also the broken away hooked end of the anchor guy; Fig. 7 is a perspective view of a plug adapted to be inserted in an aperture in the panel and to which spring scales may be attached; Figs. 8 and 8A are views of sections of poles secured together by a dowel pin; Fig. 9 is a front elevation of the panel illustrated in Fig. 1 with certain equipment in place thereon; Fig. 10 is a perspective view of a broken away portion of the panel showing the lids in co-planar relation and with poles mounted thereon in staggered relation; and Fig. 11 is a perspective view of the lids in co-planar relation and showing equipment mounted thereon simulating certain line conditions.

The improved device and equipment as disclosed in the drawings include a rectangular casing of suitable size, and this casing is provided with a flat bottom 6 having vertical walls 7 about its edges. A panel 8 is seated on these walls and is divided into two sections, one of which is fixed. The other section is hinged to the fixed section and is also hinged at each side to the vertical walls of the casing, as shown at 9 in Fig. 1, to permit the hinged section to be raised, and if desired maintained in a vertical or angular position with respect to its associated section. The casing and panel are made of suitable wood, and the panel may be of any desired ply. Equidistant holes 10 are bored through the panel, and directly beneath each hole a square recess 11 is cut in the bottom of the casing to any desired depth. Miniature poles 12 having square bottoms are adapted to be inserted through the holes in the panel and stepped in the recesses 11. A rigid support is thus provided for the poles and when mounted, they are prevented from turning.

The miniature poles 12 may be made from straight grain wood and ash has been found suitable for this purpose. The poles may be turned in a lathe to taper them symmetrically and cuts are provided therein to carry cross-arms 13. These cross-arms may be equipped with pins, and said arms are secured to the miniature poles by bolts, braces and the like in a manner similar to the practice followed in actual pole line construction.

In addition to the straight poles, other sets of poles are provided, to simulate defects in the poles, such as knot poles, or the like, or to simulate rot at the ground line. These poles may be prepared by cutting them at an angle and boring longitudinal holes in each section for the accommodation of connecting dowels, as indicated in Fig. 8, or the poles may be cut at the ground line, as shown in Fig. 8A and prepared as just described in connection with Fig. 8. The preparation of poles as described and shown in Figs. 8 and 8A permit them to be more easily broken at points where it is desired to demonstrate breakage may occur under actual conditions.

A channel 14 is provided about the panel 8 near its edges and a flat metal strip 15 attached to the panel slightly overhangs this channel, as more clearly shown in Fig. 2. Suitably spaced slots are cut in the overhanging portion of the strip 15 for the reception of bent metal hooks 16 (Fig. 6) which provide anchorages for the guy wires at-

tached to the poles. These wires are attached to the poles by means of the bent strap 17, illustrated in Fig. 5, which is secured to the pole.

In Figs. 1 and 9 the panel 8 is shown as having its hinged section raised to an angular or vertical position with respect to its companion fixed section. In Figs. 10 and 11 the sections are shown in co-planar relation.

In the first mentioned or angular relation of the sections, the pole 12 is shown as being subjected to a horizontal pull or to a simple unbalanced load which causes it to be displaced from the silhouette 18 painted or otherwise portrayed on the vertically positioned lid. Calibrations 19 also appearing on this lid permit a measurement of the bend of a pole from the silhouette to the particular calibration to which the pole is moved. Cylindrical spring scales 40 may be used to provide the necessary horizontal pull simulating loads to which the poles may be subjected, and one end of these scales may be attached by a wire to the top of a mounted pole and the other end to a plug 21 inserted in one of the holes 10 of the vertically positioned section (Fig. 9).

In Fig. 10 the companion sections of the panel 8 are shown in co-planar relation and a series of miniature poles are mounted therein. These poles are shown in staggered relation for the purpose of illustration, and wires 22 are interconnected to the cross-arms of these poles in a manner similar to that existing under typical pole line conditions. The poles are guyed as in practice to show the fundamentals of balanced loads and proper construction whereby accidents due to falling poles may be prevented.

Fig. 11 depicts the companion sections of the panel 8 in similar relation to that shown in Fig. 10, but with the poles and other equipment mounted to indicate a different line condition. A miniature house 23 is shown mounted on one corner of the panel. This house is connected by a loop to one of the poles and line wires and their associated spring scales 20 connected to the other poles, normally balance the pull of the loop connection. However, when the loop connecting the house and pole is cut, for instance, by a lineman on the pole, it is caused to fall with the lineman to the ground. A pole may also fall under the weight of a lineman should the pole be rotted at the ground line. To more easily and clearly demonstrate these two latter line conditions, the pole may be prepared as previously outlined in connection with Figs. 8 and 8A.

While certain examples simulating typical pole line construction and conditions have been herein described and illustrated, it will be understood that by means of the present invention any pole line condition may be simulated and erected in miniature and the theory of guying or other pole line problems may be readily demonstrated. It will be further understood that a series of actual cases of how poles have fallen may be demonstrated, and also the precautions which should be taken to prevent these accidents.

What is claimed is:

An educational device including a perforated panel having two sections, one of the sections being adjustable from a co-planar position to an angular position with respect to its associated section, said sections in the first mentioned position being adapted to carry equipment simulating typical pole line construction, said equipment including miniature poles removably mounted in the panel apertures and connected by wires to provide horizontal pulls thereon, said poles being guyed, the hinged section in the second mentioned position being adapted to carry equipment simulating the effect on poles when subjected to stresses under typical line conditions, said equipment including a pole mounted on the horizontally disposed section and having its top connected to tension means carried on the associated vertical section, said vertically disposed section having calibrations thereon to indicate the amount of bend of the pole.

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