

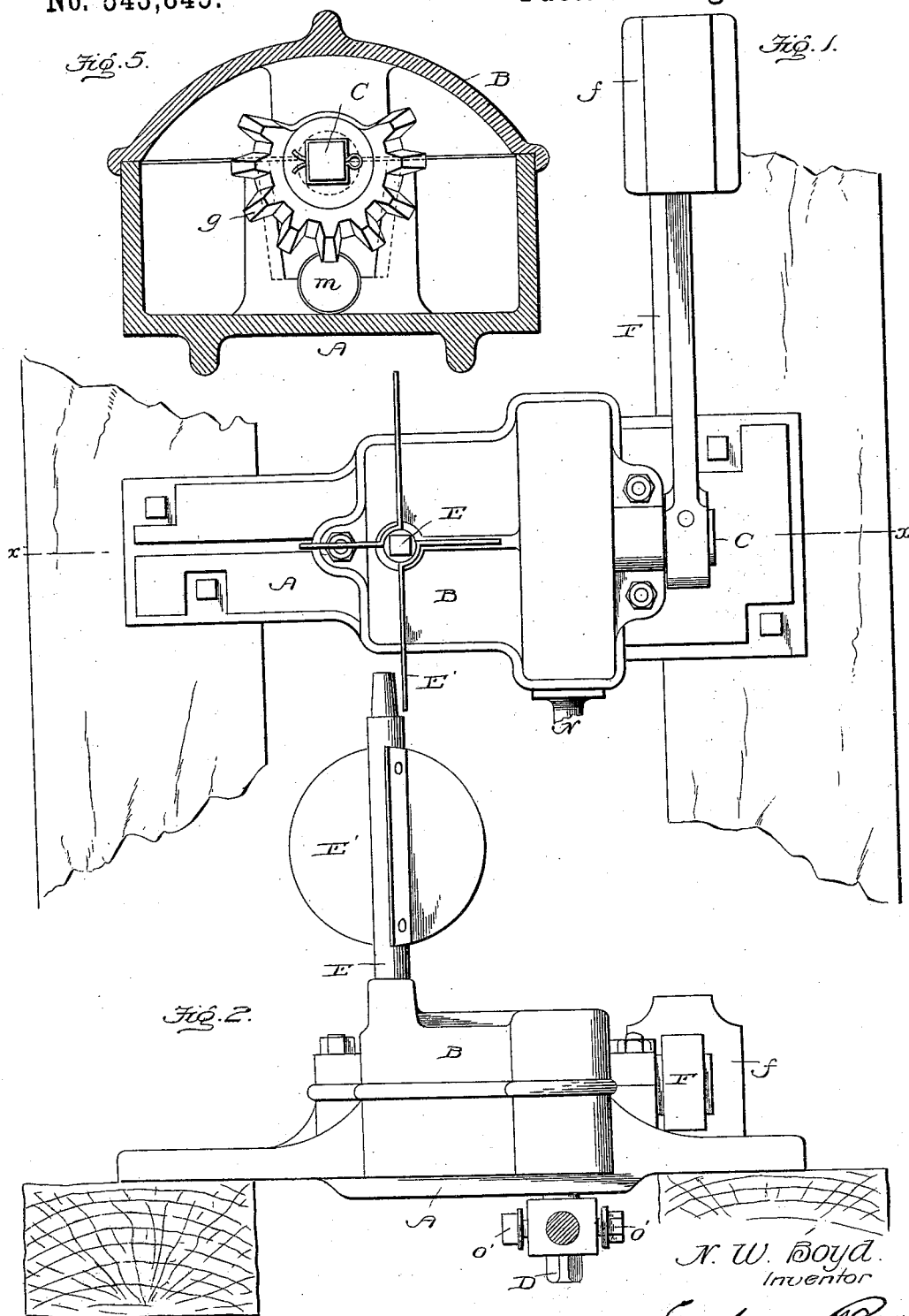
(No Model.)

2 Sheets—Sheet 1.

N. W. BOYD.
AUTOMATIC SWITCH STAND.

No. 543,845.

Patented Aug. 6, 1895.



Witnesses

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H. E. Burkhead

N. W. Boyd.
Inventor

By

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Attys

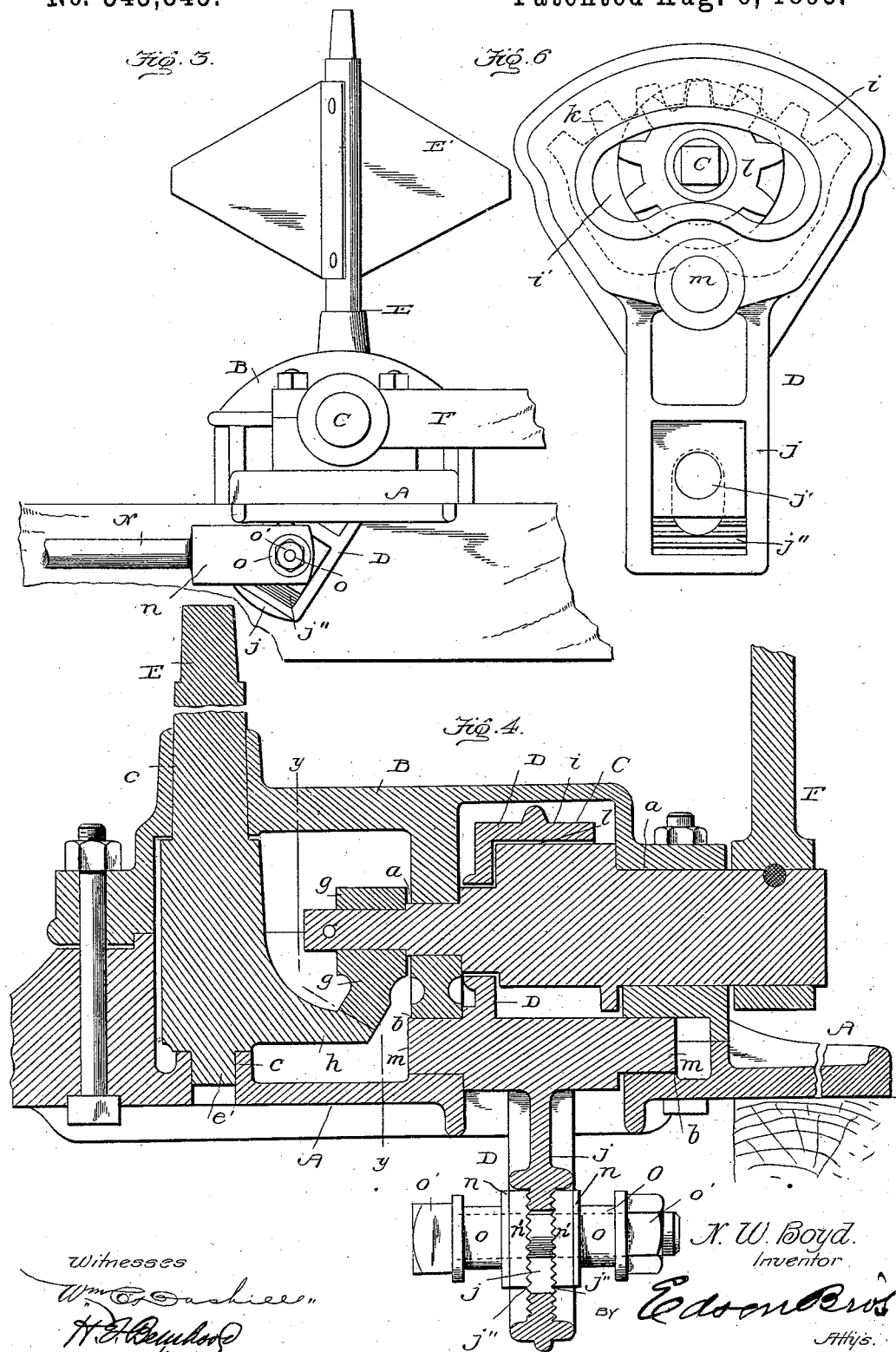
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UNITED STATES PATENT OFFICE.

NATHANIEL W. BOYD, OF CARLISLE, PENNSYLVANIA.

AUTOMATIC SWITCH-STAND.

SPECIFICATION forming part of Letters Patent No. 543,845, dated August 6, 1895.

Application filed May 23, 1895. Serial No. 550,415. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL W. BOYD, a citizen of the United States, residing at Carlisle, in the county of Cumberland and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Switch-Stands; 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.

The present invention is an improvement in automatic switch-stands, and it is designed more particularly for use in that class of switches known as a "split" switch, or a "point-switch," or a "needle-switch."

It is well known to those skilled in this art that switches of the class named do not all have the same throw or movement, and to overcome this variability in switches of this character, as well as to provide for the wear of the switch-point, the spread of the stock-rail, or any other variation in the throw of the switch, I construct my improved stand with a compensating or adjusting contrivance whereby variations in the switch-throw are compensated for.

A further object of my invention is to provide a simple, strong, and compact switch-stand which will be entirely automatic in its operation as well as more efficient and reliable in service than the ordinary kinds of stands.

The leading features of my invention consist, first, of a rocking lever fulcrumed at an intermediate point of its length and having a slotted end formed with an internal gear combined with a segmental pinion carried by a rock-shaft and meshing with the internal gear of the rocking lever; and, secondly, of a switch-rod adjustably connected, as hereinafter set forth, to the lower end of said rocking lever, in a manner to permit the jaw of said rod to be connected to said lever at variable distances from the center of oscillation of the segmental pinion and thereby compensate for variations in the switch-throw.

The invention further consists in the novel combination of devices and in the peculiar construction and arrangement of parts, which will be hereinafter fully described and claimed.

Among other advantages, my improved stand provides for the compact arrangement of the various operative parts on a single bed-plate and within a single cast cap, for a journal at each end of the rock-shaft and the shaft of the rocking lever, and for the proper support of the signal-staff. The employment of an internal gear on the rocking lever in combination with a segmental or rocking pinion on the rock-shaft renders the device much stronger and more compact than attends the use of ordinary gears, because there are more teeth engaged at one time between said internal gear and its actuating-pinion. The adjustable connection between the switch-rod and the rocking lever, for the purpose of connecting the switch-rod at variable distances from the center of oscillation and thus providing for variations in switch-throw, is effected by simple devices which serve to hold the parts securely together while permitting the connection to be adjusted by the simple act of loosening and tightening one or two nuts on the pivotal bolt.

To enable others to more readily understand my invention, I have illustrated the preferred embodiment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a plan view of my improved switch-stand. Fig. 2 is a side elevation of my switch-stand. Fig. 3 is an end elevation of the same. Fig. 4 is a vertical sectional view on the plane indicated by the dotted line *xx* of Fig. 1. Fig. 5 is a sectional view at right angles to Fig. 4, on the plane indicated by the dotted line *yy* of Fig. 4; and Fig. 6 is an enlarged detail view of the slotted rocking lever, showing its internal gear and the segmental pinion which meshes therewith.

Like letters of reference denote corresponding parts in all the figures of the drawings.

My improved switch-stand is to be applied and spiked or otherwise fastened to and between the ties of a railway-track. I therefore provide a bed-plate A, suitably flanged at its ends to rest upon two adjacent ties and to be spiked in the usual way thereto. This bed-plate has rising walls at its sides to meet the edges of a top plate B, said bed and top plate forming a housing or casing for the operative parts of the switch-stand. This bed-plate is

formed with stout bearings *a a* for the ends of the rock-shaft C, with another set of bearings *b b* for the ends of the shaft or for the journals of the rocking lever D, and the bed and cap are formed with vertically-aligned bearings *c c* for the foot of the signal-staff E, whereby all of the operative parts of the signal-staff are securely mounted in the bed and cap.

One end of the rock-shaft C is extended through or beyond the bed and cap, and on this protruding end of the rock-shaft is fitted and keyed or otherwise substantially secured a lever F, which carries a weight *f*. The other end of this rock-shaft C is extended through its bearing in the bed-plate into the compartment or space provided in the bed and cap for the lower end of the signal-staff E, and to said end of the rock-shaft is fastened a bevel-gear *g*, which meshes with the teeth of a corresponding gear *h*, secured to or made integral with the lower extremity of the signal-staff E, whereby the rock-shaft and signal-staff are geared directly together for simultaneous operation. The lower extremity of the signal-staff has a tenon *e'*, which is stepped in the bearings *c* provided for it in the bed A, and said signal-staff passes through the bearing *c* in the cap B, and it rises a suitable distance above the cap B to carry and display the the signal E'; the latter being of the usual or any preferred height or construction.

The rocking lever D is preferably cast or otherwise made of a single piece, with a slotted head *i* and a straight slotted shank *j*. The head *i* of the lever D is made in the segment of a circle, and it is flanged, as shown. This head *i* is furthermore formed with a segmental slot *i'*, through which is passed the rock-shaft C, and on the upper edge or boundary wall of this slot *i'* in the head of the lever is cut a series of gear-teeth *k*, constituting an internal gear on the rocking lever. The rock-shaft has a segmental gear *l*, which may be made integral with the shaft by cutting teeth part way around the same or by fastening a mutilated gear to said shaft, and said gear on the rock-shaft meshes directly with the internal gear on the rocking lever, whereby said shaft and lever are geared directly together for conjoint simultaneous operation. The rock-shaft C does not serve as the support for the rocking lever, but said lever D has a shaft or journals *m* below its slotted gear-formed head *i*, which journals are fitted in the bearings *b b* in the bed A, whereby the lever is fulcrumed in the bed below the rock-shaft, and said rocking lever is thus compactly disposed with the rock-shaft in the housing or casing, and it is arranged or fitted with relation to the shaft so that the lever D and shaft C can be geared together, as described. The shank *j* of the rocking lever extends a suitable distance below the fulcrum or pivotal point of the lever in the bed A, said bed being slotted to permit the shank *j* to pass there-through and to freely operate in the same, as

shown by Fig. 4. This shank *j* of the lever has a longitudinal slot *j'*, and the faces of the shank are corrugated or roughened, as at *j''*. The switch-rod N has its end formed into a jaw *n*, adapted to embrace the slotted serrated shank *j* of the rocking lever, and between the sides of the jaw and the serrated faces of the lever is interposed the corrugated or serrated washers *n' n'*, the serrations of which washers interlock with the serrations on the shank *j* of the lever. A pivotal bolt O passes through the slot *j'* in the shank of the lever, the washers, and the jaw of the switch-rod, and thimbles *o o* and nuts *o' o'* are fitted on the ends of this pivotal bolt O, said nuts being screwed on threaded ends of the bolt, in order to tightly bind the several parts together and provide a secure fastening between the switch-rod and the rocking lever.

The adjustment between the switch-rod and the rocking lever is effected by slackening one or both of the nuts *o* on the pivotal bolt sufficiently to permit the serrated washers to be released from the serrated faces of the rocking lever and then moving the bolt in the slot *j'* toward or from the center of oscillation of the lever, according as the throw of the stand and switch are to be increased or diminished. During this adjustment of the bolt O the washers, thimbles, and jaw of the rod are moved with the bolt, and when the bolt has reached the proper position it is tightened by screwing up the nuts to force the serrated washers into rigid engagement with the serrated faces of the rocking lever.

It will be seen that when the weighted lever is thrown from one side to the other of the switch-stand the rock-shaft is turned in its bearings, and that it operates directly on the rocking lever and the signal-staff, which parts are geared directly to the rock-shaft, whereby a single movement of the rock-shaft operates to set the signal and to set the switch, the latter being connected to the switch-rod N, which is actuated by the rocking lever D.

The ratio between the gears that connect the signal-staff is such as to give the staff one quarter revolution when the rock-shaft is turned.

My improved construction of switch-stand renders it possible to have a bearing for both ends of the rock-shaft, which bearings are on opposite sides of the segmental pinion on the shaft, and the rocking lever is also journaled on both sides of the vertical line or plane of the internal gear, thus insuring the necessary strength to the parts which are subject to the greatest strain. By making the rocking lever with a segmental slot to accommodate the rock-shaft and to enable the pinion on the rock-shaft to mesh with the internal gear of the rocking lever, the parts are disposed compactly together, and the simplicity, strength, and efficiency of the switch-stand is promoted, because the construction enables more teeth

of the internal gear and segmental pinion to be in mesh than can be secured by other styles of gearing.

One of the important features of my improved stand is the adjustable connection between the switch-rod and the rocking lever, which construction provides for connection of the switch-rod to the rocking lever at variable distances from the center of oscillation of the lever, according as the throw of the switch-stand is to be increased or diminished and to compensate for variability in the throw of the switch, the spread of the switch-stock rail, or any other variation in the switch.

It is thought that the operation and the advantages of my improved switch-stand will be readily understood by those skilled in the art from the foregoing description, taken in connection with the drawings.

I am aware that changes in the form and proportion of parts and in the details of construction of the mechanisms herein shown and described as an embodiment of my invention can be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of my invention, and I therefore reserve the right to make such changes and alterations as fairly fall within the scope of my invention.

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

1. The combination with a horizontal, weighted rock-shaft, of a rocking lever geared to said shaft, a switch rod, and mechanism for connecting the switch rod to said rocking lever at variable distances from its fulcrum, substantially as and for the purposes described.

2. The combination with a rock shaft, of a rocking lever fulcrumed independently of the rock shaft and geared to said rock shaft, and a switch rod coupled to the rocking lever by an adjusting device which permits the point of connection to be changed at variable distances from the center of oscillation of said rocking lever, substantially as and for the purposes described.

3. The combination with a rock shaft, and a rocking lever geared therewith and provided with a slotted roughened shank, a switch rod having a jaw, roughened washers fitted against the roughened faces of the shank, and a pivotal bolt, substantially as and for the purposes described.

4. A rocking lever provided with an internal gear, in combination with a shaft having a pinion which meshes with the internal gear of said rocking lever, and a switch rod coupled to the rocking lever, substantially as described.

5. The rocking lever provided with a slotted head and an internal gear; in combination with a shaft which passes through the slot in the lever and carrying a pinion which meshes with the internal gear of the lever, and a switch rod coupled to the lever, substantially as and for the purposes described.

6. The combination with a bed, of a rock shaft journaled therein and provided with a segmental pinion, a slotted rocking lever which is fulcrumed at one side of and parallel to the axis of the shaft and provided with an internal gear which meshes with the pinion of the rock shaft, and a switch rod which is coupled adjustably to the rocking lever, substantially as and for the purposes described.

7. The combination with a bed, of an upright rocking lever fulcrumed in the bed and provided with an internal gear at its upper slotted end and with a pendent shank, a rock shaft passing through the slotted end of the rocking lever and carrying a pinion which meshes with the internal gear of said lever, and a switch rod coupled to the pendent shank of the rocking lever, substantially as and for the purposes described.

8. The combination of a rock shaft provided at an intermediate point of its length with a segmental pinion and at one end with a beveled gear, a signal staff carrying a gear which meshes with the bevel gear on the rock shaft, a slotted rocking lever provided with an internal gear and said lever fitted on and arranged in relation to the rock shaft to have its internal gear mesh with the pinion on said rock shaft, and a switch rod coupled to the rocking lever, substantially as described.

9. The combination with a bed and a cap forming the housing, of a rock shaft journaled therein and provided with a segmental pinion at an intermediate point of its length and with a beveled gear at one end, a signal staff stepped in the bed and fitted in the cap and provided with a beveled gear which meshes with the corresponding gear on the end of said rock shaft, a rocking lever fulcrumed below the rock shaft and having a slotted internally geared head which is fitted around the rock shaft to have the segmental pinion thereon mesh with the internal gear, and a switch rod coupled to a pendent shank on the rocking lever, substantially as and for the purposes described.

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

NATHANIEL W. BOYD.

Witnesses:

JOHN R. NEILLSON,
JACOB S. SNIVELY.