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INDICATOR.

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1,234,021.

Patented July 17, 1917.

Fig. I

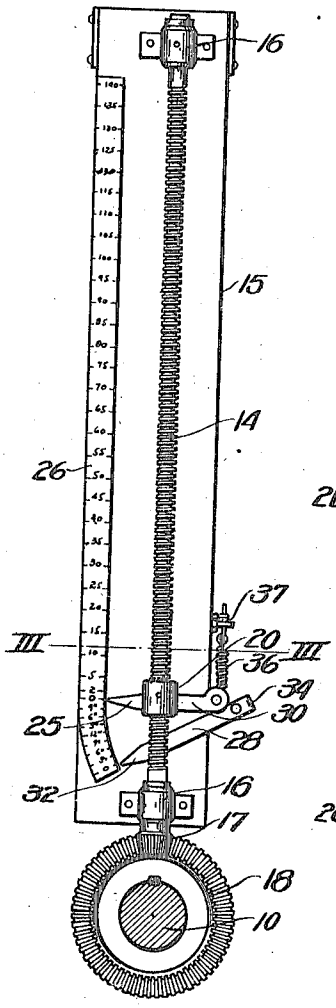


Fig. III

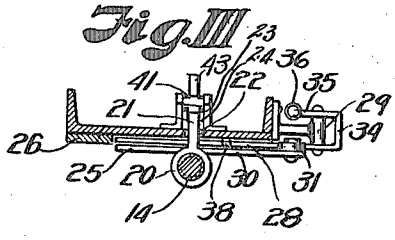


Fig. IV.

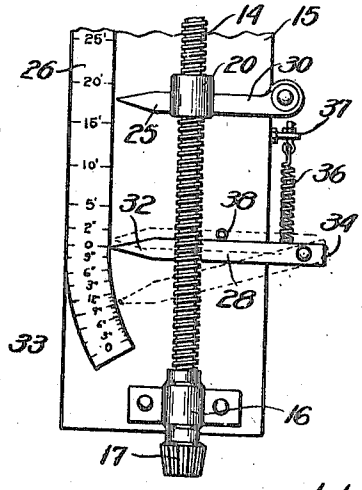
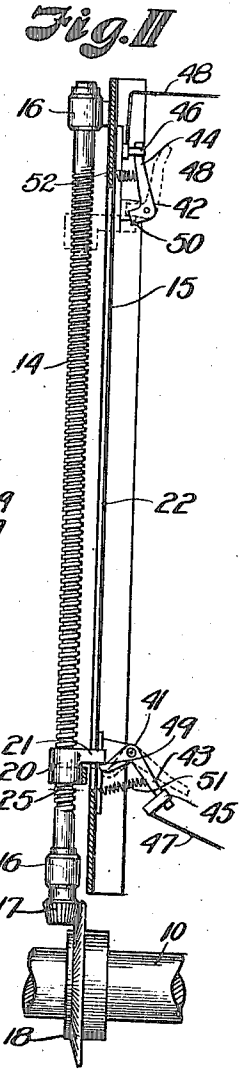


Fig. II



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INDICATOR.

1,234,021. Specification of Letters Patent. Patented July 17, 1917.

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To all whom it may concern:

Be it known that we, JOHN LYLE HARRINGTON, ERNEST E. HOWARD, and LOUIS R. ASH, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Indicators; and we do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to indicators, and more particularly to a device of this character for use on lift bridges; the principal object of the invention being to provide means for indicating the position of the lift span, comprising an accelerative member whereby position of the span may be indicated with greater precision as the span nears the limit of its travel.

It is well known that bridges of the lift type are usually operable from a motor that is carried on the span, and as it is necessary, in order that the span may be brought gently to its bearings, that the operator should be able to know, with accuracy, the position of the span as it nears its seat, an indicator is usually provided whereby the operator may be informed of the position of the span at any time during its movement.

It is, therefore, the principal object of the present invention to provide an indicator of this character, which is simple and economical in construction and operation.

It is also an object of the invention to provide means, in combination with the indicator, for automatically breaking the power controlling circuit of the motor whereby the span is actuated as the span reaches the limit of its travel.

In accomplishing these and other objects of the invention, we have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:—

Figure I is an enlarged elevation of an indicator, embodying our improvements showing its connection with the drive shaft of a motor.

Fig. II is a central, vertical section of the indicator illustrating the automatic switches.

Fig. III is a horizontal section on the line III—III, Fig. I.

Fig. IV is a further enlarged elevation of the lower portion of the indicator.

As the operator in charge of a bridge of the lift type, to which our improvements are particularly adapted, must remain practically in one position, and as the ends of the span may not be visible to him, it is essential that there be provided, in connection with the driving mechanism, some form of indicator which will inform the operator of the position of the span so that he may bring the span gently to its supports and avoid damaging impact. An indicator which may be used in combination with the driving machinery of this character consists, as shown in the accompanying drawings, of a screw 14, which is arranged vertically on a board 15 and rotatably mounted in bearings 16 that are carried by the board; the lower end of the screw being provided with a beveled pinion 17 that meshes with a beveled gear wheel 18 that is fixed on the driving shaft 10, so that when the motor is in operation, and the cable drums in motion, the screw will be revolved through its connection with the driving shaft.

The screw 14 carries a threaded collar 20, having an ear 21 projected through a slot 22 in the board 15, so that rotation of the sleeve is prevented by contact of the ear with the board at the edge of the slot, the board being preferably reinforced by angle irons 23 that are fixed thereto forming a guideway 24 through which the ear may travel. The collar 20 is provided with an indicator arm 25, having a pointer arm located adjacent and adapted for travel along a scale 26 bearing graduations for indicating the height of the span, as the latter moves upwardly or downwardly; it being apparent that as the driving shaft rotates in one direction it will turn the screw to raise the collar 20, and carry the collar and its indicator arm synchronously with the span and in a direct ratio to the span movement, so that if the scale is in a proportion of—say one inch to the foot—relative to the vertical movement of the span, the indicator point upon mov-

ing an inch will indicate a foot of movement of the span. It is apparent that with this limited movement of the indicator arm it would be very difficult to gage a limited movement of the span, as, for instance, the last two feet of its travel, because of the relatively slight movement of the indicator arm along the scale. As it is important to clearly gage such final movement of the span in order to prevent the span from forcibly contacting its support or stops, we have provided what we term an accelerator for the indicator, whereby a slight movement of the main indicator arm will impart an accelerating movement to a supplemental member, so that a slight movement of the arm will impart a greater movement to the supplemental member, whereby the movement of the span may be indicated to a nicety on the scale.

This supplemental member comprises an arm 28 which is pivotally mounted on a bracket 29 and is attached to the edge of the board 15 and projected therefrom to locate a pivotal point at a distance from the scale and thereby increase the length of the arm, so that it may have an extended movement; the body of the arm lying beneath an extension 30 of the indicator arm 25, so that a roller 31 (Fig. V) on said extension 30 may engage the edge of the member 28 to rock the same on its pivotal mounting.

The end 32 of the supplemental indicator arm 28 lies closely adjacent the scale 26, and the latter is curved concentrically with the pivotal mounting on the supplemental arm, so that the pointer of the latter may travel adjacent the markings on the extension to facilitate the reading on the scale.

The supplemental arm 28 has a U-shaped base 34, both arms of which are pivotally mounted on a bracket 29, and the rear arm 35 is connected with a spring 36 that is supported from the bracket 37 on the board 15; the spring being tensioned to hold the arm 28 against a pin 38 on the board to maintain an initial position wherein the point of the supplemental arm registers with the zero position on the scale.

The parts are so arranged that when the indicator arm 25 is lowered to a position where its point registers with a determined mark on the scale (here shown to be the two-foot mark), the roller 31 will engage the upper edge of the supplemental arm and move the latter on its pivotal mounting, so that its point travels along the supplemental or extended scale portion 33; the movement of the supplemental arm being proportionate to that of the main pointer but accelerated so that while the main arm may move but a fraction of an inch the supplemental arm will move several inches and is capable of indicating the finer graduations that are marked on the extension of the scale; the scale here shown having the extended part marked for three inch graduations and divisions thereof, so that the operator may know to an inch or less the position of the lift span.

It is further apparent that when the span starts to move from one limit of its travel and the sleeve 20 is moved along the screw, the indicator arm 25 will move away from the supplemental arm, so that the latter may be drawn back by its spring to the zero position on the main scale, where it is ready to again indicate the final movement of the span when the latter returns to the limit indicated by the supplemental arm.

As it is desirable to provide automatic means for opening the circuit that controls the motor, at the limits of travel of the span, in order to cut off the power and stop such movement, we have provided a simple and effective means for securing this result, and which is operable from the indicator heretofore described.

This automatic mechanism comprises switch levers 41—42, which are pivotally mounted on the board 15 near opposite ends of the screw 14, and comprise contact arms 43—44 which are adapted for engagement with stationary contact members 45 and 46 respectively that are connected with the circuit wires 47—48 that lead to the motor 9.

The levers 41—42 are also provided with arms 49—50, which are adapted for engagement by the ear 21 on the indicator sleeve 20 as said sleeve approaches the respective limits of its travel, so that when the ear engages a switch arm it will move the switch away from its contact member and break the circuit controlling the motor; the said levers being provided with springs 51—52 for automatically returning the switches to operative position when relieved by the sleeve, and the circuit comprising a master switch (not shown), whereby the circuit may be closed to start the motor prior to the relief of the switch, whereby the circuit was automatically opened.

Assuming a bridge of the character described, to be equipped with our improved indicator, it is apparent that an operator may read thereon the exact elevation of the span throughout the limits of its travel, and that as the span approaches the limit indicated by the supplemental indicator, the nicety of the indication provided by the supplemental member will enable him to stop the span gradually and at the proper elevation to avoid damaging impact or jar of the span against its support or upper stop.

It is also apparent that with the indicator equipped with the automatic switches, the power is cut off from the motor as it approaches the limit of its travel to prevent the

span from moving beyond the safe limit or driving the span against its support or stops.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters-Patent, is:—

1. The combination with a scale comprising major and supplemental portions, of a main indicator member movable along one of said portions, and a second indicator member movable along the other scale portion and acceleratively operable from the main indicator member.

2. The combination with a scale comprising a major portion and a supplemental portion bearing graduations of the same nature as, but of more specific measurements than the graduations of the major portion of the scale, a main indicator movable along the major portion of the scale, and a supplemental indicator movable along the supplemental portion of the scale and acceleratively operable from said main indicator.

3. In an indicator, a scale comprising a straight major portion and a curved supplemental portion, a main indicator member movable along the straight scale portion and a pivotally mounted second indicator member movable along the supplemental scale portion and engageable by the first named indicator as the latter reaches the limit of indicating travel to move the second indicator on its pivotal mounting.

4. The combination with a scale, of a slotted member, an indicator movable along the scale and having a guide projected through the slotted member, a supplemental scale, a pivotally mounted indicator adapted for movement in functional relation to the supplemental scale and adapted for actuation by the first named indicator, a stop for limiting movement of the pivotally mounted indicator and a spring for yieldingly urging said indicator toward said stop.

5. The combination with a driving shaft, of a screw operable from the driving shaft, a scale extending parallel with said screw, a collar threaded on said screw and having an indicator arm movable in functional relation to said scale, a supplemental scale at one end of the main scale, an indicating arm pivotally mounted and adapted for movement in functional relation to the supplemental scale, yielding means for urging the pivotally mounted arm toward initial position, the pivotally mounted arm being adapted for actuation against tension of said yielding means by contact of the first named indicator arm therewith.

6. The combination of a slotted member, of a scale extending parallel with the slot in said member, a screw extending parallel with said slot, a driving shaft in operative relation to said screw, a supplemental scale, a pivotally mounted indicator arm adapted for travel in functional relation to the supplemental scale, means for limiting movement of the pivotally mounted arm in one direction, yielding means for urging said arm toward the stop, a collar threaded on said screw, an arm on said collar adapted for engaging the pivotally mounted arm to move the same against the tension of its spring, an ear on said collar in guided relation to the slotted member, and a pointer on said collar movable along the major portion of said scale.

In testimony whereof we affix our signatures.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."