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Von Beckmann

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[54] TIE INDEXERS

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[51] **Int. Cl.** **E01b 37/00**

[58] **Field of Search** 104/1, 2, 6, 9, 10–13

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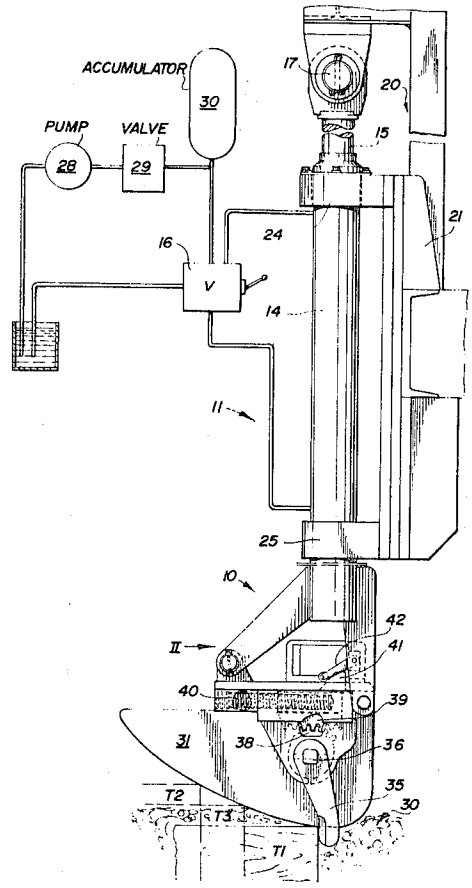
[57] **ABSTRACT**

A tie-indexing device suitable for use on tamping machines, which projects beneath the machine and is biased downwardly into the ballast by hydraulic pressure so that the indexer plows through the ballast. A profiled edge is provided on a ballast-engaging shoe at the bottom of the indexer such that as the machine moves forward and the indexer plows through the ballast the profiled edge engages a tie and climbs up and over the tie against the biasing action of the hydraulic pressure. An indexing finger is pivotally mounted on the side of the shoe and projects beneath the bottom profiled edge such that on encountering the edge of a tie during forward motion of the vehicle the indexer is pivoted and trips a switch which provides a command signal to terminate the forward travel of the workhead. The fact that the profiled edge will have climbed on to the tie insures that the finger is always encountered at a uniform position from its pivot point resulting in a uniform distance of travel of the workhead prior to tripping the switch. This insures that the workhead will be stopped at a uniform distance from the edge of the tie regardless of the vertical height of that tie on the roadbed.

6 Claims, 2 Drawing Figures



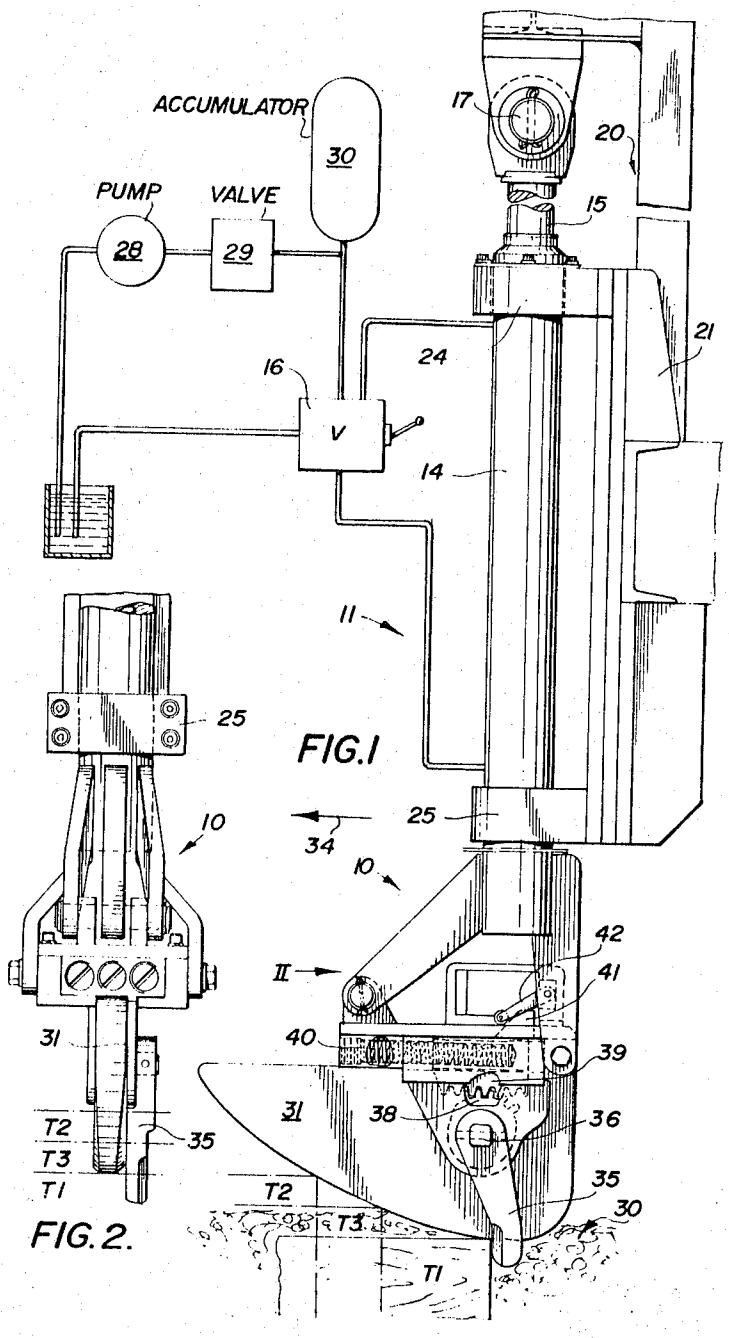


FIG. 1

FIG. 2.

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TIE INDEXERS

BACKGROUND OF THE INVENTION

This invention relates to a railway tie and like indexing devices particularly those used with railroad maintenance machines.

In an attempt to automate the functions of railroad maintenance machinery, particularly tamping machines, indexers have been provided which project beneath the front of the tamping machine so as to encounter a tie or a tie plate during passage of the tamping machine along the track and operate to automatically arrest the forward movement of the machine so that it will be stopped over a work station, in the case of a tamping machine, a tie to be tamped.

Several types of indexers have been proposed, some of them operating a valve device to apply the vehicle brake others tripping an electrical switch to cause braking electrically. Amongst the operationally successful types of tie indexers has been the long-lever arm-type which is mounted beneath the front of a tamping machine and which, as the machine moves along the track and the indexer engages a tie, pivots in its mountings to trip a switch and apply the brakes to stop the machine with the tamping heads located above the tie to be tamped. However, one of the drawbacks with this type of indexing device has been that it requires substantially uniform vertical spacing of the ties in order to be able to repeatedly stop the machine at the same point over its work station. In a situation where the track being operated upon is in relatively good condition and the ties are at the same height above the ballast then the tie indexer will be encountered by the edge of each tie at roughly the same height along its depending shank. Thus, the forward movement of the vehicle, after the point of encounter of the indexer with the tie edge, necessary to pivot the indexer through the angle necessary for it to trip the switch to stop the machine will be uniform. In poor track, however, high ties can be up to 2 inches higher than the normal tie height and low ties can be as much as 2 inches below normal. In a very bad track section, therefore, this can produce a variation in height of the order of 4 inches between tie tops. In the worst instances the known type of indexer could travel right over the top of a very low tie without detecting it at all, or, on detecting the tie (because only the tip of the indexer would be encountered) would permit the machine to move forward a relatively long distance before pivoting the indexer through the angle necessary for it to trip the brake switch. On the other hand the extremely high tie would encounter the indexer some 4 inches further up its shank, resulting in a much shorter distance of machine travel before the indexer pivoted sufficiently to trip the brake switch. Consequently, a different application point for the brakes exists for the same machine depending on the height of the tie. This gives rise to a lack of uniformity in positioning of the machine above successive work stations if the track is bad and the ties are of varying heights.

With the advent of multiple headed machines, that is to say the type of tamping machine where a fixed tamping head is provided at the front of the machine and a second tamping head is spaced therefrom on, and mounted for movement along, the chassis of the machine relative to the first tamping head, the accuracy of positioning of the tamping heads independent of tie height became more important than with the single-headed-type machine.

It is an object of the present invention to provide a device whereby the generation of a control signal to stop the forward motion of the workheads at a substantially uniform distance of workhead forward travel after the indexer has encountered the tie edges, is obtained.

SUMMARY OF THE INVENTION

According to the present invention a railway tie indexing device for locating a track maintenance workhead, mounted on a vehicle chassis for movement along the track, above a work station; comprises a ballast-engaging shoe mounted for movement with said workhead; means for operatively resiliently biasing said shoe downwardly into the ballast; a profiled lower edge on said shoe adapted to ride up and over a tie encountered in its path of movement along the track against the action of said biasing means; an indexing finger mounted on said shoe for movement relative thereto and projecting beneath said lower edge; and switch means activated by the movement of the finger relative to the shoe to terminate workhead forward movement.

According to a feature of the invention the indexing finger is pivotally mounted on the shoe for pivotal movement thereon and the switch means is activated by the pivotal movement of the finger.

According to a further feature of the invention the pivotal movement of the finger moves a cam which trips the switch.

According to a preferred embodiment of the invention the shoe is mounted on a cylinder of a piston and cylinder device, the piston of which is fixed relative to the chassis, the shoe being vertically reciprocable on the cylinder in guides fixed to the chassis.

Preferably, the resilient biasing of the shoe into engagement with the ballast is achieved by a source of hydraulic pressure, including an accumulator which acts on said piston and cylinder device.

BRIEF DESCRIPTION OF THE DRAWINGS

The following is a description by way of example of one embodiment of the invention, reference being had to the accompanying drawings in which:

FIG. 1 is a detail in side elevation of an indexer attached to the front of the chassis of a railroad maintenance vehicle; and

FIG. 2 is a detail looking in the direction of the arrows II—II of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning now to the drawings, 10 indicates, generally, a ballast engaging shoe of a tie-indexing device 11. The shoe 10 is mounted on the lower end of an hydraulic cylinder 14 in which is provided a standard hydraulic piston (not shown). The piston rod 15 attached to the piston extends upwardly and outwardly of the cylinder 14 and is pivotally attached by a clevis 17 to the chassis 20 of a railroad maintenance vehicle, say a tamping machine. Mounted on the chassis 20 of the vehicle is a bracket 21 carrying upper and lower guides 24, 25 respectively in which the cylinder 14 is free to reciprocate. Admission of hydraulic fluid from a hydraulic pump 28 through a valve 29 and an accumulator 30 to the cylinder 14 at the underside of the piston resiliently forces the cylinder 14 and the shoe 10 thereon downwardly into the ballast 30. The shoe carries at its end a profiled lower edge 31 which is substantially curved in a wedge-shaped fashion so that as the machine moves forward through the ballast in the direction of the arrow 34 the profiled lower edge 31 acts as a plow through the ballast and on encountering a tie rides up onto that tie pushing the shoe 10 and its cylinder 14 upwardly in the guides 24, 25 against the bias of the hydraulic pressure provided in the cylinder by the accumulator 30. The upward movement of the cylinder 14 and the oil displaced as a result thereof is accommodated by the accumulator 30.

In FIG. 1 a low tie T1 is well sunk into the ballast whereas a tie T2, a high tie, extends well out of the ballast, the tie T3 indicates a "normal" or usual position of a tie in the ballast.

Pivotally mounted to the shoe 10 is an indexing finger 35 which is spring loaded against a stop so as to be capable of being pushed through the ballast without pivoting. On contacting a tie the finger 35 is caused to rotate about its pivot point 36 by the forward movement of the head in the direction of the arrow 34. Rotation of the finger 35 causes the segment of the pinion 38 attached thereto to move the pinion 39 to which it is engaged from right to left as seen in FIG. 1 against the loading action of the spring 40 which maintains the finger 35 in normal operative position against it stop. On overcoming

the loading of the spring **40** a cam **41** which is attached to the rack is moved forward and trips the switching means **42** (a microswitch) and a command signal is sent, in a manner well known in the art, to terminate the forward motion of the workhead, say by applying the brakes to stop the movement of the vehicle along the track or stop the stroking of an actuating piston in the case of a second head movable on the chassis.

Because the edge **31** climbs onto a tie in its path it will be noted that the tie edge of low tie **T1**, or high tie **T2**, or normal tie T3, will always contact the finger **35** at substantially the same distance from its pivot point **36**. Thus no matter if a high or a low tie is encountered, the angular motion of the finger **35** necessary to move the cam **41** to trip the switch **42** will be obtained by the same amount of forward travel of the vehicle after the finger **35** encounters the tie.

For inoperative travel the valve **16** is manually operated to apply hydraulic fluid to lift the cylinder **14** and with it is ballast engaging shoe **10** clear of the track.

Although the invention has been described largely with reference to the stopping of a tamping machine it will be understood that a number of application and variations of this device are envisaged, for example to control the position of a spike-driving machine or a rail bolter or the like.

What I claim as my invention is:

1. A railway tie indexing device for locating a trade maintenance workhead, mounted on a vehicle chassis for movement along the track, above a work station; comprising a ballast-engaging shoe mounted for movement with said workhead; means for operatively resiliently biasing said shoe downwardly into the ballast; a profiled lower edge on said shoe adapted to ride up and over a tie encountered in its path of movement along the track, against the action of said biasing means; a loaded indexing finger mounted on said shoe for movement relative thereto and projecting beneath said lower edge; and switch means actuated by the movement of the finger relative to the shoe, to terminate workhead forward movement.

2. A device as claimed in claim **1** in which the loaded indexing finger is spring loaded for movement through railway track ballast.

3. A device as claimed in claim **1** in which the shoe is mounted on a cylinder of a piston and cylinder device, the piston of which is fixed relative to said chassis, the shoe being vertically reciprocable on said cylinder in guides fixed to said chassis.

4. A device as claimed in claim **3** in which the resilient biasing of the shoe into engagement with the ballast is achieved by a source of hydraulic pressure, including an accumulator, acting on said piston and cylinder device.

5. A railway tie indexing device for locating a track maintenance workhead, mounted on a vehicle chassis for movement along the track, above a work station; comprising a ballast engaging shoe mounted for movement with said workhead; means for operatively resiliently biasing said shoe downwardly into the ballast; a profiled lower edge on said shoe adapted to ride up and over a tie encountered in its path of movement along the track, against the action of said biasing means; a loaded indexing finger pivotally mounted on said shoe for pivotal movement thereon and relative thereto, said finger projecting beneath said lower edge; and switch means actuated by the pivotal movement of the finger to terminate workhead forward movement.

6. A device as claimed in claim **2** in which the pivotal movement of the finger moves a cam which trips the switch means fixed to the shoe.

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