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TRACK LEVELLING DEVICE

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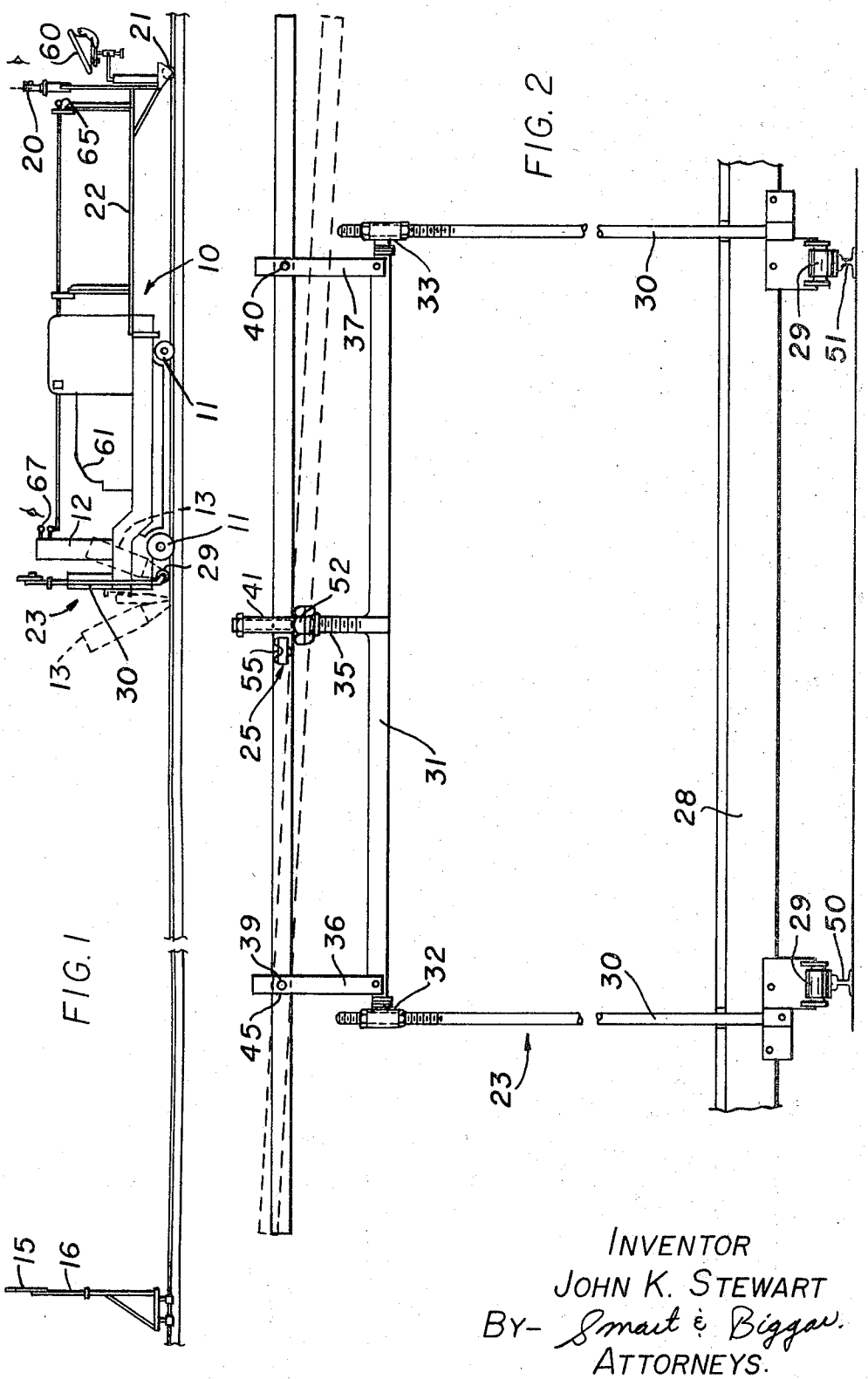

FIG. 1

FIG. 2

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TRACK LEVELLING DEVICE

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This invention relates to surveying and jacking systems for railroad tracks. In the Canadian Patent 650,557 issued Oct. 16, 1962, there is described a surveying system utilizing an infra-red beam projector mounted on a satellite car which precedes a railroad vehicle having jacking and tamping devices thereon and carrying on the rear end thereof an infra-red beam receiver, a sensor shadow device being located between the transmitter and the receiver in contact with the rails of the track at the jacking station. When the sensor element detects a dip in the track, infra-red light is received by the infra-red receiver and an automatic jacking and tamping sequence is initiated until the sensor detects that the dip in the track has been corrected and terminates the jacking and tamping operation.

Such sophisticated and completely integrated automatic systems are expensive and are not economically available to all railroads.

According to an object of the present invention a system is provided which is of a semi-automatic nature and somewhat less sophisticated in its apparatus thereby making it commercially available to a greater number of railroads than the heretofore known systems.

According to the present invention, a system for surveying and jacking a railroad track comprises a vehicle capable of movement on the railroad track and having a jacking device for independently jacking each rail of the track, a target element adapted in operation to be located on the track ahead of vehicle and above the track grade rail, a rear peep-sight attached to the vehicle and in reference contact to the grade rail and located thereabove a fore-sight element located adjacent the jacking devices, in reference contact with the rails and located above the grade rail, a visual cross level indicating device on the fore-sight element, means for operating the grade rail jack and means for operating the other rail jack.

According to a feature of the invention the fore-sight element comprises a frame mounted on rail engaging wheels, a sighting bar adapted to be pivotally attached to the frame above the grade rail of the track and a support member on the frame for supporting the sighting bar.

Preferably, the support member comprises a transversely extending crossbar carrying a height adjustable bar engaging members.

A further feature of the present invention is to mount the rear peep-sight on a frame which extends rearwardly of the vehicle and carries an operator's seat, a remote control lever for operating the grade rail jack being located adjacent the operator's seat, and a control lever for operating the other rail jack being located on the vehicle at a second operator's station adjacent the fore-sight element.

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

FIGURE 1 is a diagrammatic illustration of the system in operating position; and

FIGURE 2 is a detail of the fore-sight element looking towards the other peep-sight.

Turning now to the drawings **10** is a railroad maintenance-of-way vehicle mounted on rail engaging wheels **11** and carrying a jacking device **12** at the front end thereof. The jacking device **12** may be any suitable form of power operated jacking device. The jacking device should comprise a track clamping device and a jacking element for each rail operating independently of its fellow. The vehicle may suitably be provided with tamping heads **13** which would tamp the track when jacked.

A target element comprising a spot board **15** mounted on a collapsible aluminium frame **16** capable of being clamped to the rail provides one element of the surveying system and the other two elements comprise a rear peep-sight **20** mounted on a rail engaging wheel **21** on a rearwardly extending tubular frame **22** and the third element of the surveying system comprises a front sight mounted at the jacking station and carrying a cross level element **25**.

The fore-sight element **23** comprises a frame **28** mounted on rail engaging wheels **29** and having a pair of upright members **30**. The frame further comprises a crossbar element **31** pivotally mounted at **32** and **33** to the uprights **30** and carrying a centrally located upstanding height adjustable member **35**. A pair of wing members **36**, **37** extend upwardly from the ends of the crossbar **31** and have bearings **39** and **40** therein. A sighting bar **41** engages and rests on the centrally located upstanding member **35** and is pivoted on a pin **45** in the bearing **39** (when the rail **50** is the grade rail and pivoted on a pin in the bearing **40** when the rail **51** is the grade rail). The member **35** is provided with an adjustable nut **52**. The bar **41** moves freely relative to the member **36** when pivoted at **39** and carries thereon a visual cross level indicating device **25** such as a spirit level.

At the rear peep-sight station **20** and mounted on the tubular frame **22** is a seat **60** on which one of the operators, usually the gang foreman, may sit. A second seat **61** is provided for a machine operator adjacent the fore-sight device in such a fashion that he can observe the bubble of the spirit level. The operator at the rear peep-sight station is provided with a remote control lever **65** which in known manner operates the jacking device for the grade rail whilst the operator near the fore-sight is provided with a control lever **67** for operating the jacking of the other rail. It is to be understood that the remote control lever **65** and the frame **22** can be detached from the car **10** and moved to corresponding connections on the other side of the vehicle **10** when the grade rail changes and also that the operator near the fore-sight will be provided with two levers **67**, one of which he will select depending upon which rail is the other rail of the track.

In operation, the target device **16**, which is normally carried on the machine **10** when not in operation, is erected and clamped to the track at a selected high point remote from the point where jacking is to commence. The foreman takes his station on the seat **60**, peeps through the peep-sight **20**, and aligns the sighting bar **41** of the fore-sight element with the target device. When the wheels **29** of the fore-sight element fall into a low point in the track, the foreman can immediately see where the low point is and by operating his lever **65** cause the grade rail jack to jack the grade rail up until such time as the foreman views through his peep-sight that the sighting bar **41** is in the correct alignment wtih the target device. During the jacking operation the tamping heads will be operated to tamp the jacked track and maintain it in the jacked position. The raising of the grade rail (say the rail **50**) causes it to be higher than the rail **51** and thus an out of cross level indication is given by the bubble **55**. Now the operator on seat **61** operates his lever **67** to cause the jacks to raise the rail **51** until an in cross level indication is given by the bubble **55**. The vehicle operator now moves the

vehicle **10** along the track until such point as the jacking and tamping operation has to be repeated.

Where it is desired to bank the track, that is where it is desired to have the rail **51** in upper elevation to the grade rail **50**, this is achieved by lowering the nut **52** so that the sighting bar which rests on the member **35** will rotate about its pivot **45**. In the embodiment shown, a lowering of the nut **52** by ½" will cause a drop of 1" of the sighting bar at a point above the other rail **51**. Now it will be seen that in order to give an indication of "cross level," the rail **51** will always have to be 1" in super elevation to the rail **50**. Suitably a spirit level may be provided on the target element for reference when it is being erected for curved track.

It will be quite clear that the rear sight does not have to be mounted on an extension frame **22** but rather that the seat **60** could be provided at the rear of the vehicle **10**. However, I have found that greater accuracy is obtained when the rear peep-sight is located further away from the front sight **25**.

Suitably also the target element and peep-sight may be height adjustable to provide for a variety of surveying methods.

What I claim as my invention is:

1. A system for surveying and jacking a railroad track comprising a vehicle capable of movement on the railroad track and carrying a jacking device for independently jacking each rail of the track, a target element adapted in operation to be located on the track ahead of vehicle and above the track grade rail, a rear optical peep-sight attached to the vehicle and in reference contact to the grade rail a fore-sight element located adjacent the jacking devices, in reference contact with the rails and located above the grade rail; a visual cross level indicating device on the fore-sight element; manually operable means for operating the grade rail jack and manually operable means for operating the other rail jack.

2. A system as claimed in claim **1** in which the fore-sight element comprises a frame mounted on rail engaging wheels, a sighting bar pivotally attached to the frame above the grade rail of the track and a support member on the frame for supporting the sighting bar.

3. A system as claimed in claim **2** in which the support member comprises a transversely extending cross bar carrying a height adjustable, sighting bar engaging member.

4. A system as claimed in claim **3** in which the visual cross level indicating device is located on the sighting bar.

5. A system as claimed in claim **1** in which the rear peep-sight is mounted on a frame extending rearwardly of the vehicle and carrying an operator's seat and in which the means for operating the grade rail jack includes a remote control lever adjacent the operator's seat.

6. A system as claimed in claim **5** in which the means for operating the other rail jack comprises a control lever located at a second operator's station adjacent the fore-sight element.

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