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TRACK SURFACING SCOPE

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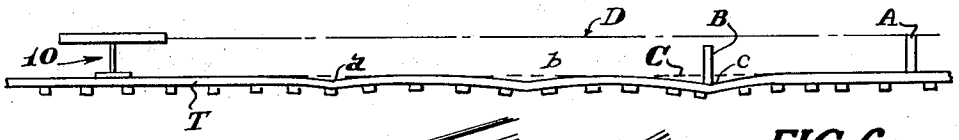


FIG.6.

FIG.1.

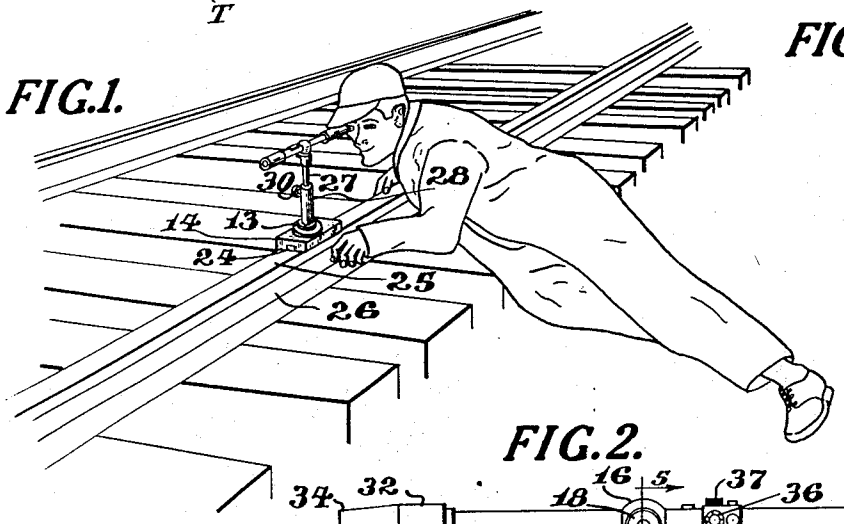


FIG.2.

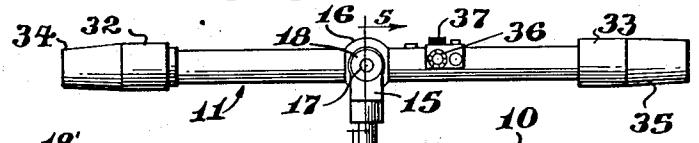


FIG.5.

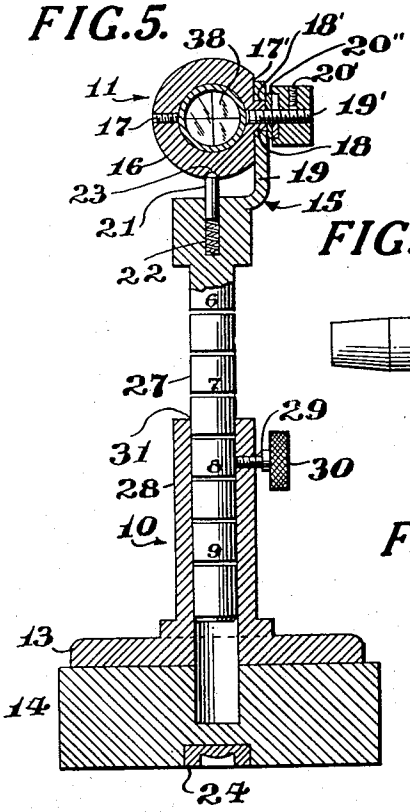


FIG.3.

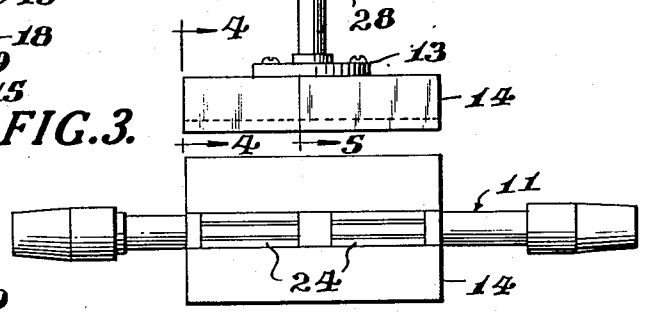
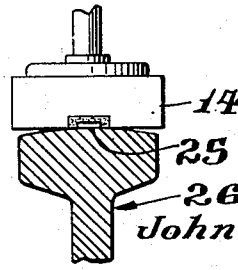


FIG.4.



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TRACK SURFACING SCOPE

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4 Claims. (Cl. 33—60)

This invention relates to optical instruments, and in particular to improvements in optical instruments used for surfacing railroad tracks.

Surveying instruments embodying telescopic sights have been used in the past for surveying railroad tracks, but these have been complicated, delicate of adjustment, expensive, and difficult to operate. The need for a simple surveying instrument which is accurate yet inexpensive and easy to use by relatively untrained employees has been a long felt need of the railroads.

Three point sighting is a method well understood and long used by railroad foremen to surface railroad tracks wherein the foreman places a spot board on one side of a dip in the track, rests a second board in the depression and then sights over a third sighting block or a peep sight which is the same level as the first mentioned block. Looking through this peepsight the foreman sights on the most distant spot board and instructs his road gang to raise the track until the top edge of the intermediate board reaches the level of his line of sight. The track is then level along these three points, and the gang then proceeds down the track to the next depression which needs surfacing.

The present invention contemplates the use of a multiple power telescope mounted on a base which is adapted to rest on the tread of a railroad track and to be used in place of the old conventional sighting block or peepsight. This telescope gives a clear view of the line on the spot board at distances well beyond the range of the unaided eye. Several advantages accrue from this application of a telescopic device. The use of this instrument insures that the most decisive spot can be picked for setting the spot board, thereby eliminating the discouragement a foreman encounters when he stands beside his track scanning the surface for the best high spot on which to place his spot board only to find that it is beyond the point at which he can see the line on his spot board distinctly. With a surfacing scope it is not necessary for a foreman to guess his way through short sags, nor does he have to set up his board so often, thereby delaying his jackmen and tampers. Furthermore, infrequent changes eliminate many mistakes made in setting the spot board, and the resulting new surface is actually smoother and not merely a replica of an old surface on a higher plane. If grade stakes are in use, fewer are needed since they can be set farther apart, and should a grade stake be knocked out or damaged, a spot board at a distant stake can be picked out with a surfacing scope thus eliminating the necessity of recalling engineers to reset the stake. Furthermore, the services of older experienced foremen can be extended in this type of work with the use of a surfacing scope, whereas normally failing vision, which sometimes occurs in older men, might force valuable employees into other areas of employment in which they are not best suited. Savings that can be realized from these important advantages very quickly pay for the cost of this track surfacing scope.

It is an object of this invention to provide a simple,

inexpensive, efficient surveying instrument for use in surfacing railroad tracks.

It is another object of this invention to provide a surveying instrument for use in surfacing railroad tracks which is quickly set up, accurate, and easy to use by relatively unskilled laborers.

It is a still further object of this invention to provide a track surfacing scope which will rest on the tread of a railroad track without the need of clamping means of any sort.

Another object of this invention is the provision of an improved track surfacing scope which will enable a road gang foreman to work over greater distances without making frequent and time consuming changes in the setting of the spot board.

A still further object of this invention is to provide an improved track surfacing scope which will enable the skilled foreman with impaired vision to continue track surfacing work with accuracy and efficiency.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application, and in which like numerals are used to designate like parts, throughout the same,

Figure 1 is a perspective view showing how this invention is used by a track foreman to sight on a spot board;

Figure 2 is a side elevation of the track surfacing scope;

Figure 3 is a bottom plan view of the track surfacing scope;

Figure 4 is a fragmentary end view of the track surfacing scope base taken along line 4—4 of Figure 2;

Figure 5 is a rear elevation of the surfacing scope with parts in section taken along line 5—5 of Figure 2, and,

Figure 6 is a side elevation showing how the surfacing scope is used with spot boards to surface depressions in a railroad track.

In the drawings, wherein for the purpose of illustration, is shown a preferred embodiment of my invention, the track surfacing scope **10**, Figures 2 and 5, comprises a telescope **11** and a vertical staff **12** which is secured to a flange like base **13** resting on a mounting block **14**.

The telescope **11** is pivotally mounted on an L shaped mounting bracket **15** which is rigidly secured to the top portion of the staff **12**.

The means for mounting the telescope **11** on the mounting bracket **15** consists of a telescope sleeve **16** which supports the telescope and secures it against movement within the sleeve by means of Allen set screw **17**. Sleeve **16** is machined flat on one side **17'**, with the exception of a circular boss **18** which is centrally disposed on this flat surface for mating engagement with a hole **18'** in the upstanding portion **19** of L-shaped bracket **15**. A threaded stud **19'** is threaded into and projects from boss **18**. The flat surface **17'** of sleeve **16** is brought into pressure contact with upstanding portion **19** of bracket **15** by means of knurled knob **20** which threads onto stud **19'** drawing sleeve **16** and bracket portion **19** together.

Knob **20** is locked against loosening by set screw **20'** which is threaded through knob **20** into contact with stud **19'**. Washers **20''**, are placed between bracket **19** and knob **20**. The washer adjacent bracket **19** is of the plain variety and the washer adjacent knob **20** is of the locking variety. These washers provide a bearing surface between bracket **19** and knob **20**, and further assist in locking knob **20** against rotation.

Although the telescope **11** is pivotally mounted for limited rotation about a horizontal pivot, in actual use the telescope must be parallel to the base **13** and the portion of the track upon which it rests. In order to maintain the telscope **11** in this working position an upstanding pin **21** is recessed in the top portion of staff **12** and spring

biased by means of coil spring 22 for engagement in the mating recess 23 in the bottom of telescope sleeve 16. When the telescope 11 is approximately parallel to the base 13, spring 22 urges pin 21 upwardly into recess 23 thereby locking the telescope 11 in parallel relationship with the base 13.

U-shaped permanent magnets 24, best shown in Figures 3 and 5, are disposed in a groove or channel in the bottom of mounting block 14 so that when the surfacing scope is placed on the center portion of the tread 25 (Figure 4) of a railroad track 26 it is held rigidly in place while the surfacing scope is being used at this station.

Inasmuch as the length of spot boards A and B (Figure 6) is not universal throughout the railroad industry, and the height of the telescope above the track must be the same as the length of the spot boards, staff 12 is made vertically adjustable so as to accommodate the telescope to the boards, whatever length they may be. As shown in Figure 5, staff 12 is comprised of a vertically adjustable post 27 and a stationery tubular sleeve 28 adapted to carry post 27. This post 27 is calibrated in inches along its vertical axis so that the telescope may be sighted on any spot board varying in height from 5½" to approximately 9". Of course it is contemplated that the length and calibrations of post 27 may be varied to suit any particular requirement. The adjustment of post 27 in tubular sleeve 28 is accomplished by backing off locking screw 29 by means of locking knob 30. The height of the telescope above the track is indicated by the reading at post portion 31 which appears in the horizontal plane intersecting post 27 at the level of the uppermost portion of sleeve 28.

The end portions of telescope 11 comprising eye piece optic 32 and object optic 33 are covered with protecting tubular segments of rubber or other resilient material 34 and 35 in order to guard the end portions of the telescope against wear and tear and adverse effects of the weather. Knurled knobs 36 and 37 shown on the forward portion of telescope 11, Figure 2, are for the purpose of adjusting the vertical and horizontal cross-hairs of the telescope. The vertical cross hair is not used in this surfacing work, but a standard four power rifle telescope has been found to be very satisfactory and the vertical cross-hair is left in the scope for whatever use may be made of it.

In operation, the surfacing scope is placed on the track (Figures 1, 4, and 6) where it is securely held by the magnets 24 in the mounting block 14. Knob 30 is backed off slightly and post 27 is raised or lowered, whichever the case may be, until the reading at the intersection of post 27 and sleeve 28 is the same as the length of the spot boards A and B (Figure 6) being used in the surfacing work. When the telescope 11 is adjusted to the level of the spot board A, Figure 6, knob 30 is rotated to bring screw 29 into contact with post 27, thereby holding post 27 and sleeve 28 securely together. Mounting block 14 may be adjusted horizontally so as to align the surfacing scope with the spot board A. After the foreman has assumed a position he finds most convenient wherein to sight through the surfacing scope, as indicated in Figure 1, telescope 11 may be rotated into position whereby pin 21 snaps into mating recess 23 thereby automatically aligning the telescope parallel to base 13. When the telescope 11 is locked in this parallel position and the base 13 and mounting block 14 are aligned so as to aim the telescope at the spot board A, horizontal cross hair 38 is the same height above the track as the top edge of spot board A and will so appear to the foreman as he looks through the eye piece of the telescope. The intermediate spot board B, which is the same length as spot board A will appear somewhat below the line of vision between horizontal cross hair 38 and the top edge of the sighting board A if the track T at this intermediate position is below the general surface C of the track. By giving his gang appropriate instructions to raise the track

at this point, the foreman will know that the track has been properly surfaced when the top of the intermediate spot board B contacts the line of vision D between the surfacing scope 10 and the spot board A. Ordinarily in the usual surfacing operation it would be necessary, after one portion of the track has been surfaced, for the foreman to then pick up his peep sight or sighting block and move down the track to some convenient place on the near side of the next low spot and repeat this operation. However, with the use of the surfacing scope it is not necessary for him to change his position at all since his range of vision has been multipled many times by use of the surfacing scope. It is merely necessary for the intermediate spot board B to be placed in the next depression in the track and spot board A some distance beyond this depression so as to give a good line of sight between the telescope and spot board A.

Alternatively, if there are multiple depressions indicated by *a*, *b* and *c* in a track within the range of the surfacing scope, the spot board A can be placed beyond the last depression *c*, and the surfacing scope 10 on the near side of the closest depression *a*, as shown in Figure 6. In this way it will be necessary to move the surfacing scope or the spot board A to surface the track between these points. Instead, the gang can start either at the farthest depression *c* (Figure 6) and work toward the foreman, surfacing depressions *c*, *b*, and *a* in this order, or the gang may start at the closest depression *a* and work away from the foreman through depression *b* and *c* toward the spot board A. In either case, it is only necessary to move the intermediate board B from depression to depression as each preceding depression is properly raised in this manner. Considerable time is saved with economy of motion wherein constant relocation of the peep sight is eliminated and the foreman can direct the surfacing of many portions of the track from one convenient location. The only limitations on the distance over which the foreman can direct his crew from one sighting station are the power of the telescope, climatic conditions and the distance from which the gang can receive understandable instructions from the foreman.

Thus it is seen that this track surfacing scope provides means for quickly and efficiently directing the surfacing work of railroad gangs, and is so simple in structure and operation that even the least skilled of laborers would be able to use it. Furthermore, it is of rugged construction, simple to adjust and not easily taken out of adjustment. Because the magnet in the center of the base securely holds the surfacing scope on the track against forces of vibration and shock, the surfacing scope is readily set up for use, and still because of the lack of the requirement for any clamping means on the track it may be readily removed from the track and replaced at the next position in the shortest possible time.

The spring biased pin locking means in addition to holding the telescope parallel with its base, serves to protect the telescope from being knocked out of alignment. If the telescope were rigidly secured to its supporting post an inadvertant blow against the telescope might knock it out of alignment, but with the present spring biased pin and recess arrangement, as above described, an impact on the telescope will cause the pin to slide out of the recess and allow the telescope to pivot slightly, thereby "riding with the blow." This is very important since it is imperative that the telescope be maintained parallel to its base, and it is well known that all instruments and tools employed on track maintenance work and subject to hard and rough usage.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred embodiment of the same and that various changes in the shape size and arrangement of parts may be restored to, without departing from the spirit of my invention or the scope of the subjoined claims.

I claim:

1. A surfacing scope for measuring vertical displacement of a railroad track comprising a base, means carried by said base for securing the latter to the tread of a railroad track, a staff rigidly secured at its lower end to said base and extending upwardly therefrom, said staff including portions movable vertically with respect to each other and means for holding said portions in vertically adjusted position, a telescope, means for mounting said telescope on the upper end of said staff for pivotal movement about a transverse horizontal axis, said telescope having a recess formed therein, and a spring biased member recessed in the upper end of said staff, the upper portion of said member being adapted to enter said recess when said telescope is positioned parallel with said base.

2. A surfacing scope as defined in claim 1 wherein said base securing means comprises a permanent magnet secured to the bottom portion of said base for contact with the center portion of said track tread.

3. A surfacing scope as defined in claim 1 wherein said staff portions include a hollow sleeve secured to said base and a post slidable in said sleeve, said post being linearly calibrated along its longitudinal axis for indicating the height of said telescope above the track.

4. A surfacing scope as defined in claim 1 wherein said telescope mounting means comprises an L-shaped offset bracket having a horizontal portion and a vertical portion, said horizontal portion being rigidly secured to the upper end of said staff, said vertical portion being offset laterally from the vertical axis of said staff and having means for pivotally supporting the telescope thereon with the longitudinal axis of said staff intersecting the longitudinal axis of said telescope.

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