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LAND LEVELER

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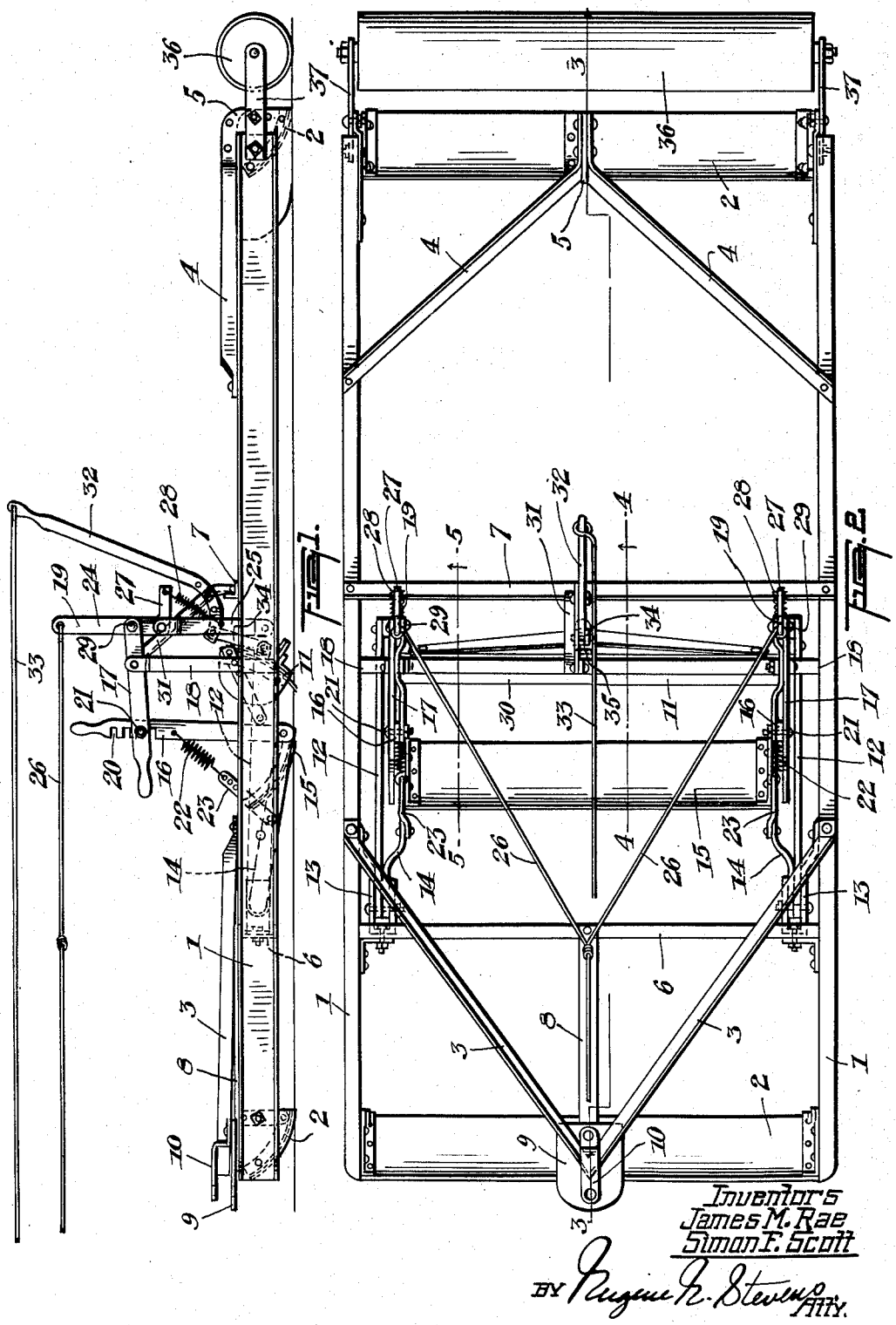


Fig. 1.

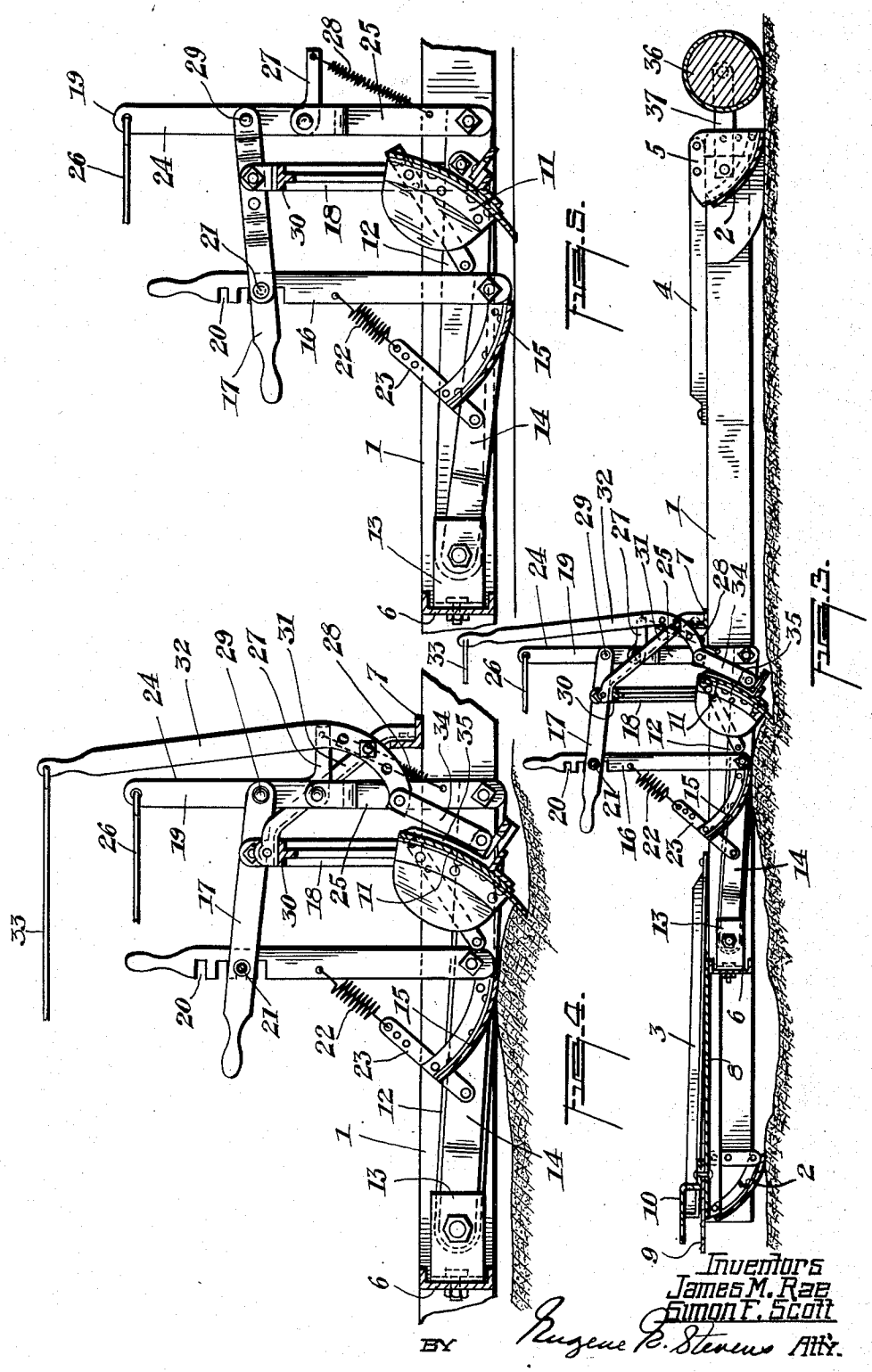
Fig. 2.

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2,189,962

LAND LEVELER

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3 Claims. (Cl. 37—146)

This invention relates to a land leveler of the type in which a scraper is drawn over the land and the action of the scraper results in the irregularities being smoothed out.

In a leveler of this kind the scraper is generally adjusted to such a height as to remove or disturb a given surface layer of land. This is necessary if all the holes are to be filled by one passage of the scraper. On the other hand, this results in a large amount of waste energy, since in most cases a large portion of the land is already level. Attempts have been made to overcome this by providing the leveler with an adjustable scraper which can be moved up or down by an operator stationed on the leveler, this movement being accomplished either manually or in the case of large scrapers by a motor.

It is an object of the present invention to overcome these disadvantages of known levelers and to provide a scraper which is raised and lowered automatically as holes or bumps are respectively transversed by the leveler. It is also an object of the invention to adapt an automatic leveler of this kind to manual, as distinguished from automatic adjustment, of the scraper so that the latter can be raised or lowered independently of its automatic action when extreme conditions are encountered.

According to the present invention, a leveler consists essentially of two longitudinal members and a scraper mounted between and at right angles to them, the scraper being movable substantially vertically with respect to the frame and having its vertical movement controlled by means which is responsive to irregularities in the land. The responsive means is operatively connected to the scraper and positioned in front of it so that when a bump is encountered the scraper is lowered, and conversely for a hole or declevity the scraper is raised.

The invention will be further understood by reference to the accompanying drawings which illustrate one embodiment thereof.

In the drawings:

Figure 1 is a side elevation of a land leveler according to the invention.

Figure 2 is a plan view of the leveler illustrated in Fig. 1.

Figure 3 is a sectional elevation taken along the line 3—3 of Fig. 2.

Figure 4 is an enlarged sectional elevation taken along the line 4—4 of Fig. 2 and showing particularly the manual means for lowering the scraper, and

Figure 5 is a sectional elevation taken along the line 5—5 of Fig. 2 showing the arrangement for automatically controlling the action of the scraper and illustrating the manual means for raising it.

The frame of the scraper is made up of two longitudinal channel members 1, connected at either end by shoes 2 which carry the weight of the leveler, the one at the rear end of the leveler serving also to smooth out the ground disturbed by the scraper. As shown in Fig. 1 the convex surface of the shoes faces towards the forward end of the machine.

The frame is stiffened by front struts 3 and rear struts 4 which cut diagonally across the corners formed by the shoes in the longitudinal members. The struts of each pair meet at the longitudinal centre line of the leveler, the rear pair being riveted to a vertical plate 5 extending upwardly from the rear shoe. The frame further includes a transverse channel member 6 towards its forward end and a lighter cross member 7 slightly behind the mid portion of the leveler. A longitudinal member 8 extends from the transverse member 6 to the forward shoe 2. The member 8 and the two forward struts 3 are riveted to a plate 9 carried by the shoe 2. This plate 9 includes a tongue 10, the leveler being attached by the plate and tongue to the tractor or horses which are to draw it over the ground.

A scraper 11 and means operatively connected to it and responsive to the irregularities in the ground are mounted on the frame between the transverse members 6 and 7. The scraper is supported by two arms 12 pivoted in yokes 13, the latter extending from and carried by the member 6. The outer leg of each yoke is also riveted to its adjacent longitudinal member. This mounting of the scraper permits it to move substantially vertically in a slight arc so that as it moves upwardly, it moves at the same time slightly rearwardly.

Two second arms 14 are also pivoted in the yokes. These latter arms are on the inside of the arms 12 and carry at their free end a shoe 15 which is the means responsive to the irregularities in the ground. When the scraper is drawn over the ground the shoe 15 by reason of the pivotal mounting of the arms carrying it is free to move up or down depending upon the profile of the ground passed over by the leveler. This shoe is operatively connected to the scraper by vertical members or links 16 which are pivotally attached to the arms 14 adjacent the shoe. At the upper end the vertical members are pivot-

ally connected to lever 17 carried by and fulcrumed on columns 18, the latter being rigidly mounted on the longitudinal members of the frame. The other end of the levers 17 is pivotally connected to a vertical member or link 19 similar to the one connected to the shoe, but attached to the scraper. The member 19 is pivoted to the arm 12 carrying the scraper. By this arrangement of the pivotally connected members the shoe, being raised as the leveler passes over a bump in the ground, forces the link 16 upward and the movement of the latter causes the opposite end of the lever 17 to be depressed so that the link 19 is also moved downwardly and the scraper made to bite into the ground as shown in Figs. 3 and 4.

The vertical member 16 has its forward edge provided with teeth or indentations 20 which engage a pin 21 carried by the lever 17. The pin 21 can be selectively placed in any one of the teeth 20. In this way the effective length of the member 16 is altered and the cut made by the scraper for a given position of the shoe is deeper or shallower. A spring 22 attached at one end to the link 16 and at the other end to an extension 23 of the arm 14 maintains a positive engagement between the pin and the teeth so that there is no possibility of them slipping out of engagement.

Referring to Figure 5, it will be seen that the member 19 is made up of two pivotally connected parts 24 and 25, the upper one extending above the lever 17 and having a rope 26 attached to it. The upper end of the lower part is forked and the upper part is pivoted to the lower between the forks. The upper part also carries at its pivot point an extension 27 to the end of which a spring 28 is connected and also connected to the lower part 25. Tension on the rope 26 causes the member 24 to pivot about the point 29 at which it is joined to the lever 17. As a result the lower part 25 is drawn upward and with it the scraper so that any earth carried by the scraper is unloaded. The spring 28 serves to bring the scraper and the member 19 back into the automatic acting position while the member 27 effectively prevents any bending of the member 19 in the opposite direction.

The posts 18 which carry the main lever of the automatic mechanism are rigidly connected by a transverse member 30. At approximately mid point of the latter, there is a strut 31 between it and the member 7. An enlongated curved lever 32 is pivoted on this strut and has a tension member 33 which may either be wire or rope, attached to its upper end. The lower end is pivotally connected to a link 34 which in turn is pivotally connected to a reinforced rib 35 on the back of the scraper. The curve on the lower portion of the lever 32 is such that tension on the member 33 forces the lever 34 downward and makes the scraper bite deeper into the ground.

At the rear end of the leveler there is a roller 36. This roller is carried by two arms 37 extending rearwardly from the longitudinal members of the frame and bolted to said members. This roller may be used in combination with the rear shoe 2, or it may be mounted directly between the longitudinal members and replaces the shoe so that it carries the weight of the rear portion of the frame. As shown in the drawings the members 37, as well as the shoe 2 are mounted on the frame by nut and bolt connections to permit this replacement.

In operation the connection between the lever 17 and the link 16 is set at such a point as to provide the desired cut. The leveler is then dragged over the ground. When a bump is encountered the front part of the frame is raised and the scraper is correspondingly raised so that the cut made by it is shallower. However, as the bump is approached it acts upon the movable shoe 15 so that this shoe is raised and the scraper correspondingly lowered. Thus the cut made by the scraper is kept even. On the other hand when a declevity in the ground is reached the rear of the frame has a tendency to make the cut of the scraper deeper. However, here again as the movable shoe drops into the declevity the scraper is raised and the soil carried by the latter is dropped into the hole. From the arrangement of the arms carrying the movable shoe and the scraper, it will be seen that while the shoe on encountering a bump moves in an upward and rearward arc the scraper which is descending is moved downwardly and forwardly so that its cut is made at approximately that point which causes it to be lowered.

Various modifications may be made in this invention without departing from the spirit thereof or the scope of the claims, and therefore the exact forms shown are to be taken as illustrative only and not in a limiting sense, and it is desired that only such limitations shall be placed thereon as are disclosed in the prior art or are set forth in the accompanying claims.

We claim:

1. A land leveler comprising a frame including two longitudinal members, an arm pivoted on the frame inwardly of each member, a scraper positioned between the members at right angles thereto and supported by the arms, a second arm pivoted at each side of the frame, a shoe adapted to follow the elevation of the ground joining said second arms and being in front of the scraper, a lever pivotally mounted on each longitudinal member at a point between the shoe and the scraper, a link pivotally connected to one end of each lever and pivotally connected to the scraper, a second link pivotally connected at each end of the shoe and cooperating means for providing adjustable pivotal engagement between said second link and the lever.

2. A land leveler comprising a frame including two longitudinal members, an arm pivoted on the frame inwardly of each member, a scraper positioned between the members at right angles thereto and supported by the arms, a second arm pivoted at each side of the frame, a transverse member adapted to follow the elevation of the ground, joining said second arms and being in front of the scraper, a lever pivoted on the frame intermediate its ends and extending between the scraper and the transverse member, a link pivoted to the end of the lever adjacent the scraper and having its lower end pivotally connected to the scraper, said link being composed of pivotally connected upper and lower portions, an extension on one portion, a spring between the extension and a point intermediate the ends of the other portion, the upper portion of said link extending upwardly beyond its pivotal connection to the lever and a second link pivotally connected to the remaining end of each lever and the transverse member.

3. A land leveler comprising a frame including two longitudinal members, an arm pivoted at the frame on each side thereof, a scraper positioned between the members at right angles thereto and

supported by the arms, a second arm pivoted at each side of the frame, a transverse member adapted to follow the elevation of the ground joining said second arms and being in front of the scraper, a lever pivotally mounted on each longitudinal member between the scraper and the transverse member, a link pivotally connected to the end of each lever adjacent the scraper, a second link pivotally connected to the end of each lever adjacent the transverse member, and a manually operable lever pivoted on the frame adjacent and movably connected to the scraper.

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