Sept. 18, 1934. W. J. TOMKIN 1,973,830

SAFETY TRIP RIDGE BREAKER

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Fig. 1

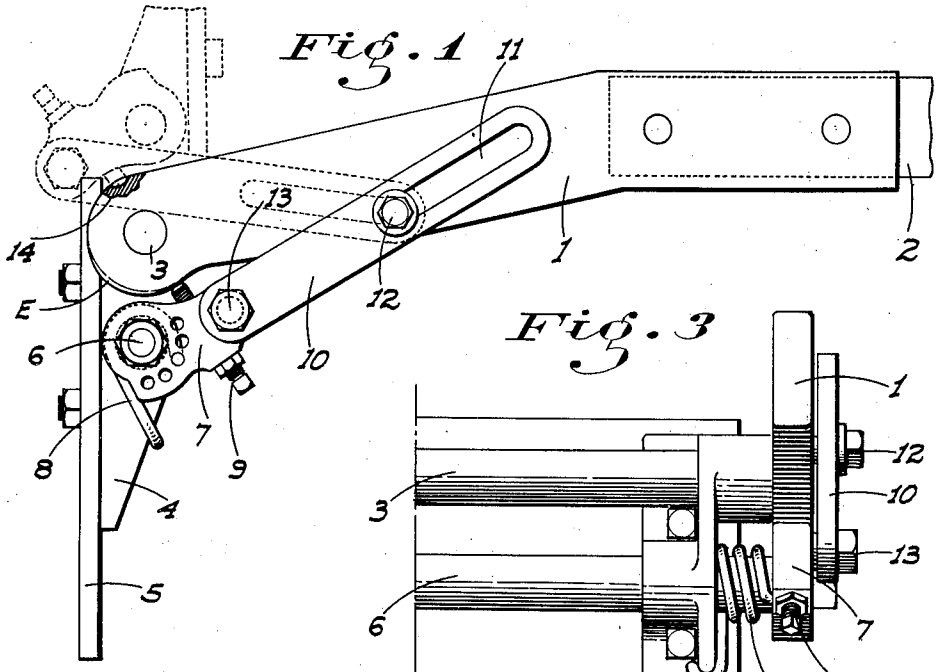
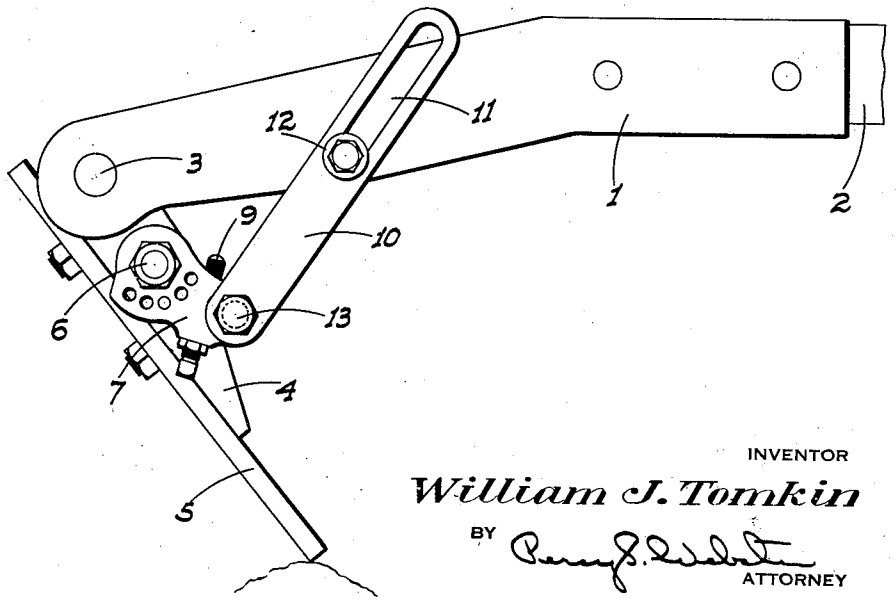


Fig. 3

Fig. 2



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Fig. 4

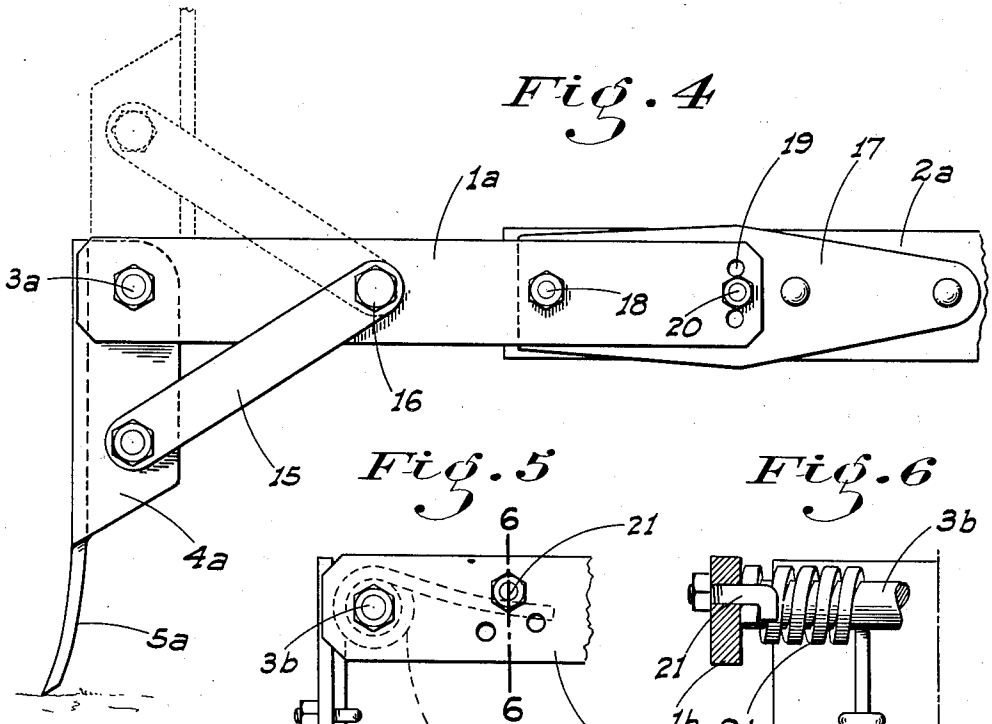


Fig. 5

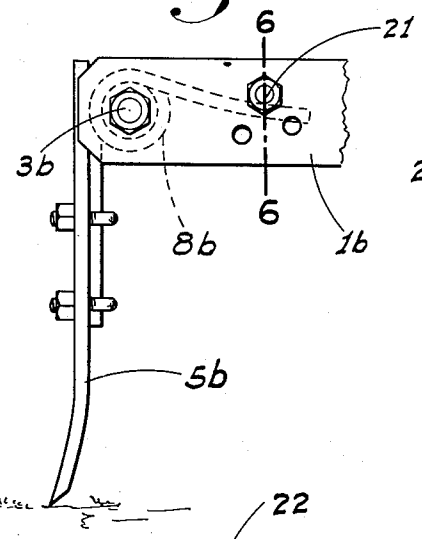
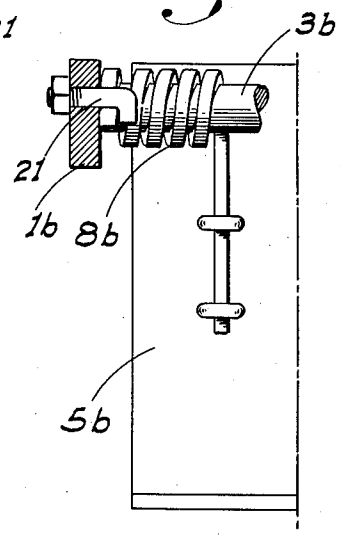


Fig. 6



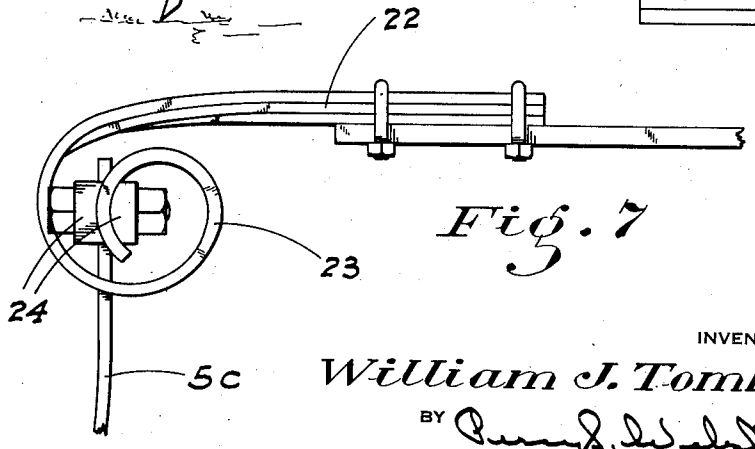


Fig. 7

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UNITED STATES PATENT OFFICE

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SAFETY TRIP RIDGE BREAKER

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Application August 24, 1931, Serial No. 559,000

16 Claims. (Cl. 280—160)

This invention relates to ridge leveling or breaking devices for attachment to the front of endless track tractors of the rearwardly yieldable type such as is shown in the patent of E. J. Rimple and Manuel Vargas, No. 1,744,801 dated January 28, 1930.

The main objects of the present invention are to improve the construction of the device so as to provide for the easy adjustment of the leveling or breaking blade in order that the pressure under which it will yield may be varied according to different conditions of operation, and to enable the blade to be easily moved up out of the way when its use is not necessary.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a side elevation of one form of the breaker as in its normal position.

Fig. 2 is a similar view showing the blade as deflected by contact with a rigid obstruction.

Fig. 3 is an end view of the device.

Fig. 4 is a side elevation of another type of breaker.

Fig. 5 is a side elevation of still another type of breaker.

Fig. 6 is a fragmentary cross section on the line 6—6 of Fig. 5.

Fig. 7 is a side view of a further modified form of breaker.

Referring now more particularly to the characters of reference on the drawings, and particularly at present to Figs. 1 to 3, the attachment comprises side frame bars 1 adapted to be secured to and extend ahead of the track frames 2 of a tractor, which as usual in endless track tractors are arranged on both sides of each track. At their forward ends the bars are tied together and braced by a shaft 3 on which depending brackets 4, disposed inwardly of the adjacent bars, are pivotally mounted. A ground engaging blade 5 extends between and is rigidly secured to the front faces of the brackets, so as to depend to the ground and project in front of the path of movement of the corresponding track of the tractor.

Extending between and journaled in the brackets below the shaft 3 is another shaft 6. On the ends of this shaft outwardly of the brackets and directly under the bars 1, short rearwardly projecting arms 7 are fixed. Spiral torque springs 8 are disposed about the shaft 6 between the brackets and arms. The springs at one end engage brackets or blade and at the other end adjustably engage the arms at different points concentric with the shaft 6.

The springs exert a pressure on the arms tending to rotate the same upwardly, the upward movement being limited by set screws 9 adjustably mounted in the arms and disposed radially of the shaft 3. The ends of these set screws bear against the edges of the bars which are substantially concentric with the shaft 3 except as stated later. The arms are both preferably rigid with the shaft 6, so that both arms will then positively work in unison.

Pivoted on the rear ends of the arms 7 are links 10 which extend rearwardly and upwardly alongside the bars and toward their rear ends are provided with longitudinal slots 11. Pins, preferably in the form of cap screws, 12 are fixed in and project outwardly from the bars and ride in the slots. These pins are disposed so that they are at the forward end of the slots when the blade is in its normal position and the set screws are bearing against the bars. In this position of the parts the pivotal pins 13 which connect the arms and links are below a straight line projected between the shaft 6 and the pins 12.

In operation as long as the blade engages the ground or obstructions of less resistance than that of the spring 8 said blade will act to level off the ground without any deflection of the blade. When an obstruction offering excessive resistance is encountered the resistance of the springs is overcome and the arm and link units break down at the pins 13 as shown in Fig. 2. This will allow the blade to swing rearwardly and upwardly and pass over the obstruction without damage to the attachment or tractor. The resistance necessary to thus enable the blade to swing back may be altered by adjusting the tension of the spring or by adjusting the set screws so that the pins 13 of the arm and link units are normally nearer to or further from a dead center position relative to the shaft 6 and pins 12. The blade is always free to deflect forwardly if the tractor is backed up, and its weight will return it to a normal working position when the backing up movement ceases.

When it is desired to hold the blade out of operation it is only necessary to raise the same forwardly and upwardly as shown in dotted lines in Fig. 1. The links then shift forwardly so that the pins 12 are adjacent the rear ends of the slots and the set screws are moved around until their ends are alined with sockets or depressions 14 in the periphery of the bars 1. When such aline-

ment is had the spring pressure constantly acting on the arms 7 causes the same to turn sufficiently so that said ends of the set screws will drop into the sockets, holding the blade in that position until again forced down.

When the set screws are pulled out of the sockets by a forward pressure exerted against the blade, the blade will drop down into place of its own weight. This movement will be aided if the edges of the bars for a certain distance in front of the normal position of the set screws are made somewhat eccentric to the shaft 3 as indicated at E. The added tension of the springs had by the movement of the set screws over the raised eccentric portion will cause the set screws to snap into place when the rear end of the eccentric portion has been reached.

In Fig. 4 a simplified and rigid type of breaker is shown which may be used under conditions where no non-yielding objects will be encountered and the release or safety feature is not essential. In this type the blade 5*a* is provided with rearwardly projecting brackets or ears 4*a* at the sides which are pivoted on the supporting bars 1*a* by a shaft 3*a*. Diagonally extending links 15 are pivoted on the ears 4*a* below the shaft and are detachably connected to the bars 1*a* rearwardly of the shaft by removable bolts 16. In this manner the blade is normally held in a rigid working position, but when it is desired to move the blade out of the way without detaching the structure from the tractor, this can be done by temporarily removing the bolts 16, swinging the blade up to a vertical position and reconnecting the links by means of the bolts 16.

To enable the working angle or level of the blade to be altered the bars 1*a* are pivoted intermediate their ends on bracket plates 17 by means of bolts 18; these plates being secured to the track frames 2*a*. The bars 1*a* have a plurality of holes 19 disposed on an arc concentric with the bolt 18, through any one of which bolts 20, secured in the plates 17, project. The angle of bars 1*a* relative to the horizontal plane and consequently the angle of the blade and the level of the bottom of the blade may thus be altered.

In the structure shown in Figs. 5 and 6 the torque springs 8*b* are disposed about the shaft 3*b* which connects the bars 1*b*. The springs at one end are strapped against the back of the blade, while the other ends of the springs releasably engage the under side of hook lugs 21 adjustably mounted in the bars 1*b*. The springs are normally slack and the working angle of the blade relative to the ground may be altered by altering the vertical position of the lugs in the bars. At the same time regardless of the position of the lugs no interference with the vertical forward movement of the blade to a non-working position is had. Said springs however in all cases yieldably resist the backward turning movement of the blade as will be evident. This device thus also has the safety feature as in the first described type but is of a cheaper and somewhat less substantial construction.

In Fig. 7 the supporting means for the blade 5*c* comprises substantially horizontal quarter elliptical leaf springs 22 clamped at their rear ends in connection with the track frames, and terminating at their forward ends in downwardly and rearwardly bent spirals 23. Transversely extending bars 24 between which the blade is clamped, also clampingly and releasably engage one of the turns of the spirals.

The angular setting of the blade therefore for working or non-use may be adjusted by shifting the position of the bars 24 about the spirals.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A ridge breaker including a supporting bar, a blade pivoted in connection with and depending from the bar, linkage connections between the blade and bar arranged to be deflected from a predetermined normal position by a backward or forward turning of the blade and spring means arranged to offer resistance only to the deflection of the linkage in the direction controlling the backward movement of the blade.

2. A ridge breaker including a supporting bar, a blade depending from the bar, a pivot connection between the blade and bar, means between the blade and bar arranged to yieldably resist backward movement of the blade from a normal position and means incorporated with said first named means to permit the blade to be freely swung forwardly and upwardly about its pivot to a non-operative position.

3. A ridge breaker including a supporting bar, a blade pivoted in connection with and depending from the bar, means between the blade and bar arranged to resist backward movement of the same from a normal position while permitting the blade to be freely swung forwardly and upwardly to a non-operative position, the forward edge of the bar being concentric with the blade-pivot, a member mounted in connection with the blade radially of the bar pivot to engage said edge with the forward turning of the blade; said edge having a depression to receive the end of the member when the blade is moved to a non-operative position; said first named means functioning to yieldably hold said member in the depression.

4. A ridge breaker comprising a substantially horizontal bar, a blade-supporting bracket pivoted in connection with and depending from the bar, an arm pivoted on and projecting rearwardly from the bracket, a link pivoted on and projecting rearwardly from the arm, a pivot for the link mounted on the bar, said link and arm being normally deflected a predetermined amount from a straight-line or dead center position, and means resisting further deflection of said link and arm.

5. A structure as in claim 4, with means to alter the amount of normal deflection of the arm and link at will.

6. A ridge breaker comprising a substantially horizontal bar, a blade-supporting bracket pivoted in connection with and depending from the bar, an arm pivoted on and projecting rearwardly from the bracket, a link pivoted on and projecting rearwardly from the arm, a pivot for the link mounted on the bar, said link and arm being normally deflected a predetermined amount from a straight-line or dead center position, a spring acting on the arm tending to move the same and the link to such dead center position, and means between the bar and arm to prevent said tendency

of the spring from being effective without interfering with a greater deflection of the arm.

7. A structure as in claim 6 in which said means comprises a set screw mounted in the arm and normally engaging the adjacent edge of the bar.

8. A ridge breaker comprising a substantially horizontal bar, a blade-supporting bracket pivoted in connection with and depending from the bar, an arm pivoted on and projecting rearwardly from the bracket, a link pivoted on and projecting rearwardly from the arm, a pin mounted on the bar, the link being provided with a longitudinal slot in which said pin rides, said pin being normally at the forward end of the slot and the arm and link being then deflected a predetermined amount from a dead center alinement, a spring acting on the arm and tending to move said arm and link to a dead center position, and a member mounted on the arm and movably engaging the adjacent edge of the bar to prevent such tendency of the spring from being effective.

9. A ridge breaker comprising a substantially horizontal bar, a blade-supporting bracket pivoted in connection with and depending from the bar, an arm pivoted on and projecting rearwardly from the bracket, a link pivoted on and projecting rearwardly from the arm, a pin mounted on the bar, the link being provided with a longitudinal slot in which said pin rides, said pin being normally at the forward end of the slot and the arm and link being then deflected a predetermined amount from a dead center alinement, a spring mounted in connection with the bracket and acting on the arm and tending to move the arm and link to a dead center position, and a member mounted on the arm and engaging the edge of the bar to prevent such tendency of the spring from being effective; the edge of the bar, forwardly of the normal point of engagement of the member therewith, being substantially concentric with the axis of the bracket pivot whereby the bracket may be swung upwardly and forwardly to a non-operative position without the spring tension being appreciably altered.

10. A structure as in claim 9, with a socket in said edge of the bar to receive the adjacent end of the member therein when the bracket has been raised to said position.

11. A ridge breaker comprising a substantially horizontal bar, a blade-supporting bracket pivoted in connection with and depending from the bar, an arm pivoted on and projecting rearwardly from the bracket under the bar, a link pivoted on and projecting rearwardly from the arm and alongside the bar, said arm and link being normally disposed in non-straight and downwardly deflected relation to each other, a spring mounted in connection with the bracket and arm tending to turn the arm toward the bar, a member mounted on the arm and bearing against the under edge of the bar, and means connecting the link and bar in a manner to permit of unrestrained upward and forward turning movement of the bracket while causing a greater deflection of the arm and link to be had when the bracket is moved rearwardly from its normal position.

12. In a ridge breaker, a substantially horizontal supporting bar member, a blade member depending from the bar adjacent its forward end, a pivot connection between the blade and bar, a link extending diagonally between the blade and bar, and means detachably connecting the link at one end to the adjacent member.

13. In a ridge breaker, a supporting bar, a member connected to said bar adjacent one end thereof, a normally slack torque spring about said member, a blade depending from the bar in front of said member, an extension on one end of the spring depending and strapped against the blade, an extension on the other end of the spring, and means engaging said last named extension to cause the spring to be placed under tension by a backward turning pressure against the blade while permitting of a forward and upward turning of the blade.

14. A ridge breaker including a supporting member, a blade depending therefrom, a pivot connection between said blade and member, spring means resisting rearward deflection of the blade, means mounting said spring means to permit of upward and forward turning movement of the blade about its pivot while maintaining the spring means idle, and means to yieldably hold the blade against return movement only after it has been turned forwardly to a predetermined position.

15. In a ridge breaker a substantially horizontal supporting member, a blade pivoted directly to such member adjacent the outer end of the latter, linkage connections between the blade and supporting member and pivoted to each independently of the blade pivot on the member, such linkage being arranged to move from a predetermined normal position as the blade moves backward about its pivot on the supporting member, and means resisting such movement.

16. In a ridge breaker a substantially horizontal supporting member, a blade pivoted to the supporting member adjacent the outer end of the latter, a jointed link pivoted to the blade and supporting member, the link joint being so arranged as to break when the blade moves backward about its pivot, and yieldable means resisting such breaking of the joint.

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