Sept. 20, 1960 R. H. LINDBERG 2,952,929

RIPPER TOOTH

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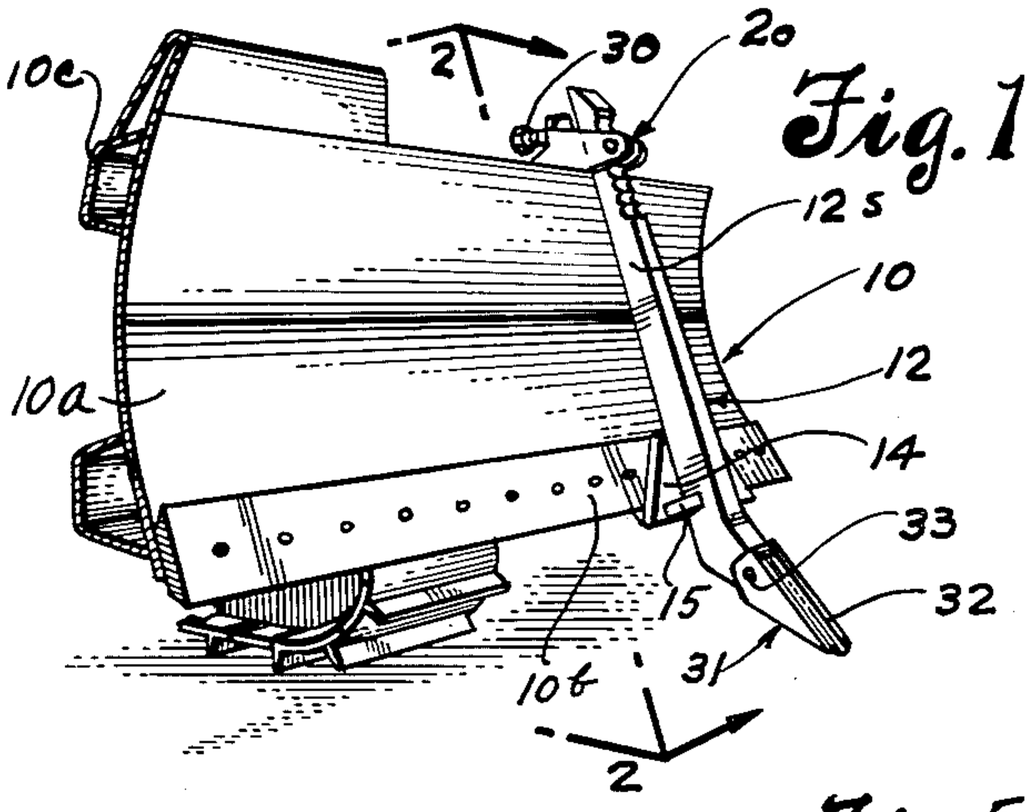

Fig. 1

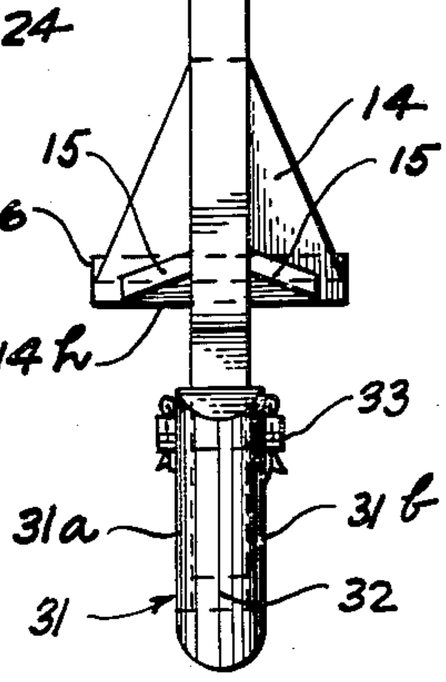

Fig. 3

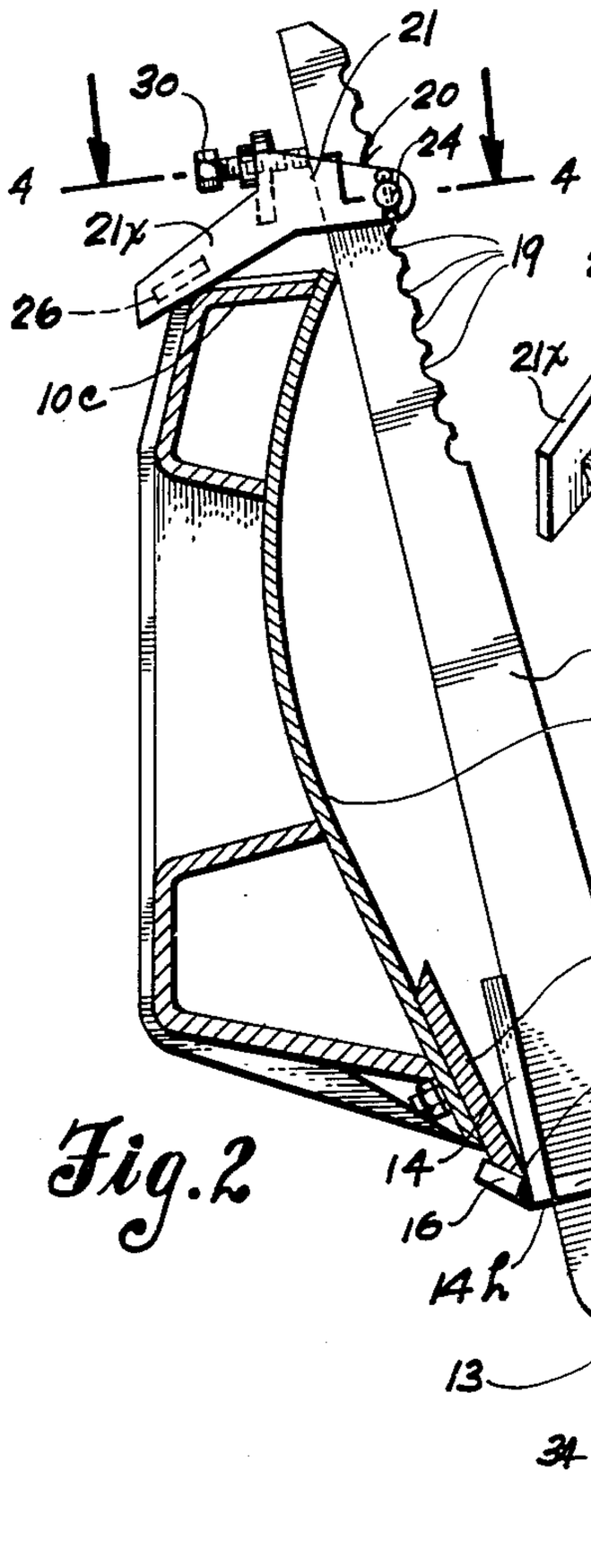

Fig. 2

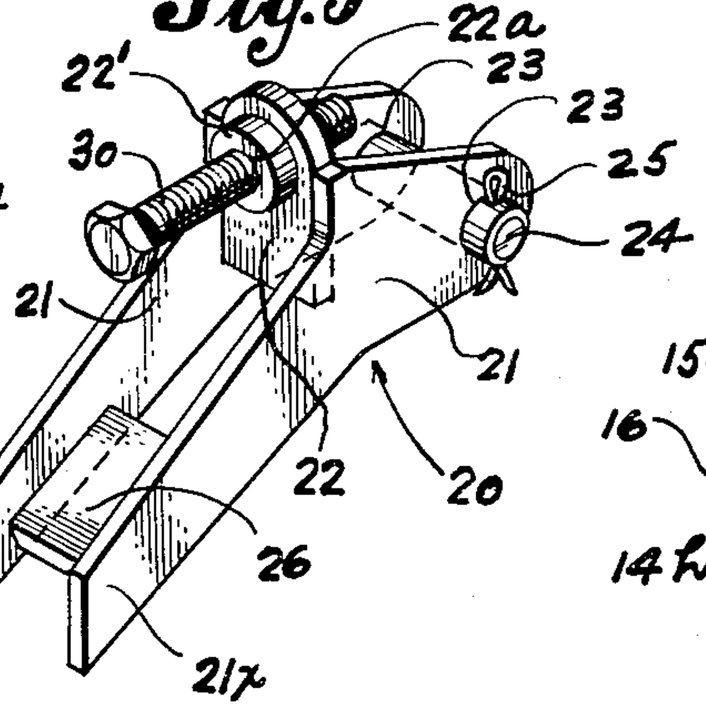

Fig. 5

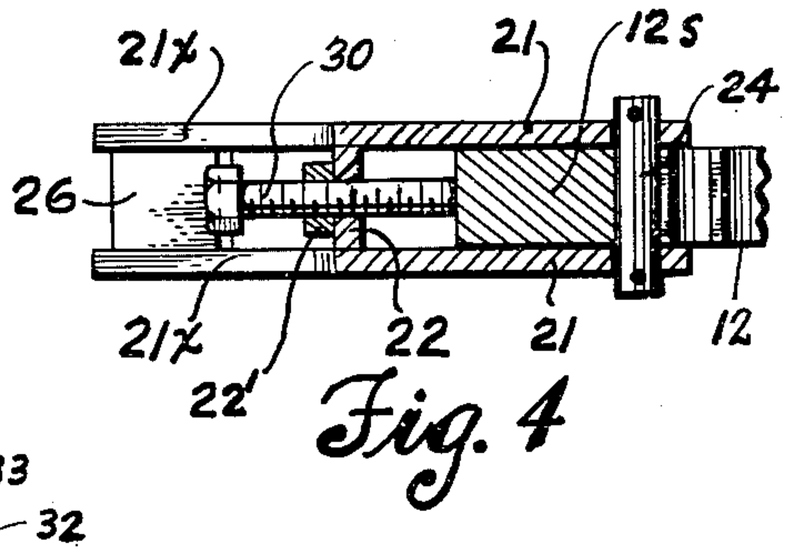

Fig. 4

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RIPPER TOOTH

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4 Claims. (Cl. 37—145)

This invention relates to ground ripper teeth as applied to bulldozer blades, and more particularly to an improved form of ripper tooth and adjustable clamping means for its mounting on a blade.

It is the principal object of this invention to provide a ripper tooth that is easily applicable to or removable from a blade structure and which has new and novel forms of securing clamp jaws for holding it in its functional position on a blade.

More specifically stated, the primary object of this invention resides in the provision of a ground ripper tooth that is applicable vertically across the face of a bulldozer blade structure and is equipped with coacting securing clamp jaws or devices whereby it can be readily applied to bulldozer blades of various heights.

The invention also anticipates a ripper tooth having a mounting shank to which the lower jaw of the present tooth clamping means is permanently fixed in position to establish the predetermined working depth of the tooth, and to which tooth the upper clamping jaw or member is adjustably and tiltably applied for the securement of the tooth to blades of various heights.

It is a further object of the invention to provide an adjustable clamp jaw of novel form and to provide the tooth with a grooved surface that coacts with a part of the adjustable clamp jaw for holding the position of the adjustable jaw when tightened to holding or clamping position.

It is also an object of this invention to provide clamping means that exerts lifting force against the tooth to seat the lower clamp jaw firmly against and holdingly engaged with the cutting bar of the blade and also to hold the shank of the tooth tightly against the top edges of the blade structure.

In accomplishing the above mentioned and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view illustrating the attachment of a ripper tooth embodied by this invention to one end portion of the blade structure of a bulldozer.

Fig. 2 is a vertical cross-sectional view of the blade structure of a bulldozer, taken on line 2—2 in Fig. 1, showing a tooth as clamped to the blade structure.

Fig. 3 is a front view of the tooth, with the adjustable upper clamp member applied thereto.

Fig. 4 is a horizontal cross-section taken substantially on line 4—4 in Fig. 2.

Fig. 5 is a perspective view of the upper or adjustable clamp member or jaw.

Referring more in detail to the drawings:

In Fig. 1, **10** designates the blade structure of a bulldozer; this comprises the usual curved moldboard portion **10***a* which has a cutting bar **10***b* fixed thereto along its lower edge and a bracing or backing bar **10***c* fixed to the back face along its top edge.

The ripper tooth of this invention, designated in its entirety by reference numeral **12**, comprises an elongated shank portion **12***s* that preferably is slightly tapered in an upward direction and is rectangular in cross-section. At its lower end the tooth shank terminates in a forwardly and downwardly directed ground ripping foot **13** which tapers forwardly to a point. This tooth, in use, is disposed vertically across the forward face of the moldboard as shown and bears against the lower edge of the cutting bar **10***b* and also against the top edge of the moldboard.

Adjacent the lower end portion of the shank of the tooth is a fixed clamp jaw. This jaw is made up of a flat, substantially triangular plate **14** welded to the back side of the tooth shank a few inches above the heel of the pointed foot portion **13**. The horizontal base edge **14***h* of this plate extends equally to opposite sides of the toothshank. Ordinarily this plate is approximately nine inches wide across its lower edge and about nine inches high. Welded to the plate **14** at opposite sides of the tooth and also welded to the tooth shank are bracing plates **15**, as best shown in Fig. 3. Welded to the back side of the triangular plate **14** adjacent its lower edge **14***h* is a transversely directed, horizontal bar **16**. This bar **16**, which is a part of the lower clamp jaw, is set at an upward incline of about 45° to form a wedge shaped seat **17** between its forward face and the back face of plate **14** wherein the lower beveled edge of cutting bar **10***b* is seated when the tooth is assembled with the bulldozer blade structure for use. The bar **16** as fixed to the tooth shank constitutes the fixed lower jaw of the tooth securing clamp.

It is shown in Fig. 2 that the upper end portion of the tooth shank is not tapered and it is formed transversely across the forward face thereof with a succession of semi-cylindrically formed grooves or notches **19** to adapt the positioning of the adjustable clamping jaw designated in its entirety by reference numeral **20**, to blades **10** of different height. This clamp jaw **20** is preferably of the irregular form shown best in Figs. 2 and 5. It comprises opposite, triangular face plates **21—21** that are joined across their rearward ends in spaced relationship by a transversely and vertically disposed plate **22**. Affixed to the plate **22** medially of the side plates, is a collar **22′** and a threaded hole **22***a* is provided through the collar and plate. The spaced plates **21—21** are drilled through their forward end portion to provide holes **23** to receive a clamp holding pin **24** that is applied to and secured therein by keys as at **25**, applied through its opposite end portions. The rear end portions of the spaced plates are formed with downwardly directed extensions **21***x* which are joined between their rearward end portions by a plate **26** to provide rigidity and fixed spacing.

A clamping bolt **30** is threaded forwardly through the hole **22***a* of plate **22** and collar **22′** and the bolt is adapted to engage at its forward end against the tooth, thus when tightened to draw the pin **24** tightly into the selected shanks notch **19** and at the same time tilt the clamp downwardly at its rear end.

Applied to the lower end of the tooth shank, that is, to its forwardly and downwardly tapered foot portion, is a boot **31**. This boot comprises opposite face plates **31***a*—**31***b* joined in spaced relationship by a longitudinally extending and transversely rounded top plate **32**. At their upper ends the opposite face plates are bored to receive a pin **33** transversely therethrough, and along their lower edges, these plates are joined by a plate **34**. To secure the boot when needed, it is applied to the pointed toe of the tooth, as in Fig. 2, and then the pin **33** is applied through the holes in its side plates and a hole in the foot portion of the tooth.

Assuming that the ripper tooth is so formed and that it is equipped with the clamping means as described, its use

is as follows: To apply a tooth to a blade, the blade is first lifted above ground level as in Fig. 1, then the tooth shank is applied vertically across the front face of the blade, and lifted so as to seat the beveled lower edge of the cutting bar **10***b* in the V-shaped notch or seat **17** of the jaw. Then the adjustable coacting or upper jaw of the clamp is applied to the upper end portion of the shank and adjusted downwardly therealong to rest the extension members **21***x* pivotally against and in holding contact, as in Fig. 2, with the top rear edge of the box structure **10***c* on the back side of the blade with the pin **24** seated in the proper notch **19** of the tooth shank. Then the previously loosened bolt **30** is tightened against the back face of the tooth shank, thus to tightly seat the pin **24** and secure the tooth **12** against any movement relative to the blade structure **10**. In this bolt tightening or clamping operation, the upper clamp jaw exerts an upwardly directed force on the tooth shank and firmly seats the bottom edge of the bar blade **10***b* in the seat **17**. Also, the tooth shank is pulled rearwardly to firmly engage with the top edge of the moldboard due to the provision for downward tilting of the extension of plates **21—21** which engage the portion **21***x*—**21***x* the back edge of the top of the backing bar **10***c* of the moldboard. This clamping action also retains the upper end of the tooth firmly against the moldboard in opposition to the rearward forces on the tooth foot when ripping.

As is readily apparent, such ripper teeth must be of rugged construction and the parts must be capable of withstanding substantial forces. The present invention provides a relatively simple and inexpensive clamping mechanism which permits the quick application of ripper teeth in desired numbers to the bulldozer blade structure.

The use of the boot **31** is optional, that is, it may be applied when necessary or desirable by slipping it onto the previously described foot portion of the tooth.

The particular means for securing the tooth to the lower end of the blade may be altered if desired without departing from my invention. It is only desired to use a simple and easily applied means for holding the tooth in position relative to the cutting edge.

What I claim as new is:

1. A ripper tooth for a bulldozer blade comprising a moldboard having a cutting bar along its lower edge and a backing beam along the back side of its top edge; said ripper tooth comprising a shank that extends vertically across the face of the moldboard, said shank having a ground ripping lower end portion projecting below said cutting bar and an upper end portion extending above said backing beam, means fixed to the back side of the shank, above the ground ripping portion thereof, to holdingly engage with the moldboard adjacent its lower edge,

an adjustable clamp jaw pivotably applied to the extended upper end portion of the shank, a shank engaging pin positioned on the forward end of said clamp jaw and adapted to pivotably engage said upper end portion of the shank, an upstanding plate on said clamp jaw rearwardly of said pin and intermediate the ends of said clamp, and a clamp bolt threaded through said plate and adjustable to engage the shank at a level above that of said pin whereby the tightening of the clamp bolt effects the application of lifting force to the shank and securing pressure against the pin.

2. A ripper tooth for a bulldozer blade comprising a moldboard having a cutting bar along its lower edge and a backing beam along the back side of its top edge; said ripper tooth comprising a shank that extends vertically across the face of the moldboard and which has a ground ripping lower end portion projecting below said cutting bar and has an upper end portion extending above said backing beam, means fixed to the back side of the shank, above the ground ripping portion thereof, to holdingly engage with the moldboard adjacent its lower edge, an adjustable clamp jaw applied to the extended upper end portion of the shank for forward and rearward tilting action, said adjustable clamp jaw comprising opposite side plates receiving the upper end of the shank between them, a pin joining said plates across their forward ends adapted to be holdingly engaged with the forward face of the shank, a tie plate joining said side plates rearwardly of the shank, downwardly and rearwardly directed lever arms extended from said side plates to rest on the top, rear edge of said backing beam and a clamp bolt threaded through the tie plate and inwardly adjustable to contact the rear face of the shank at a level above that of said pin whereby the tightening of the clamp bolt effects the application of lifting force to the shank and securing pressure against the pin.

3. The tooth of claim 1 wherein said means fixed to the back side of the shank comprises a plate, a horizontal bar fixed to said plate angularly with respect to its back face to define therewith a wedge shaped seat to receive and retain the lower edge of the cutting bar therein when said tooth is clamped in functional position.

4. The device of claim 1 wherein the extended upper end portion of said shank is formed across its forward face with a succession of transversely directed notches adapted to selectively receive said pin.

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