

April 14, 1942.

G. R. HOUSTON

2,279,869

COMBINATION BULLDOZER AND RIPPER

Filed June 15, 1940

2 Sheets-Sheet 1

Fig. 1

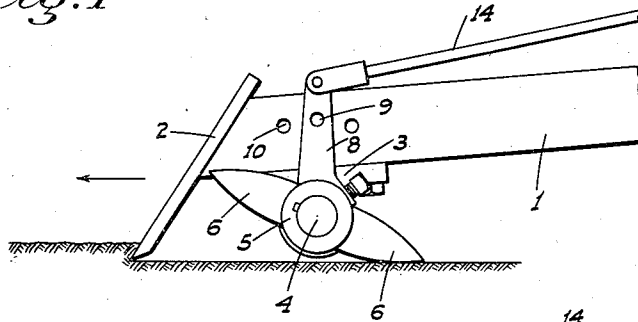


Fig. 2

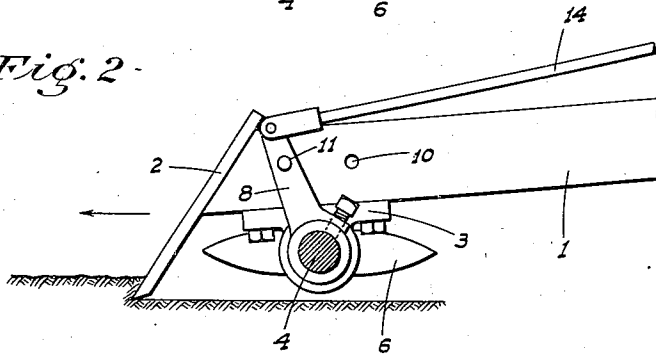


Fig. 3

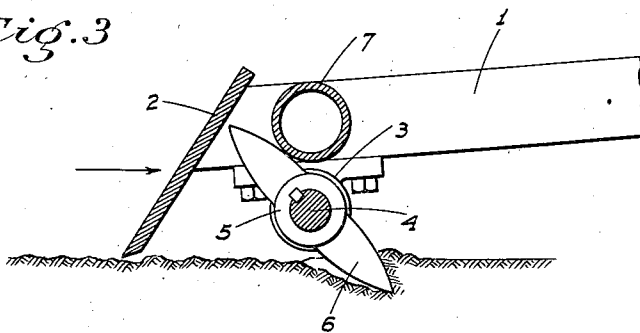
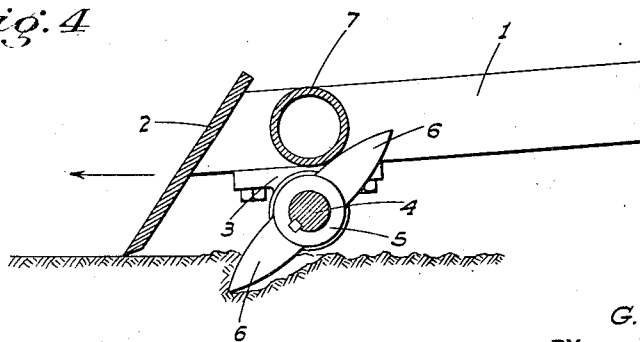


Fig. 4



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Fig. 5

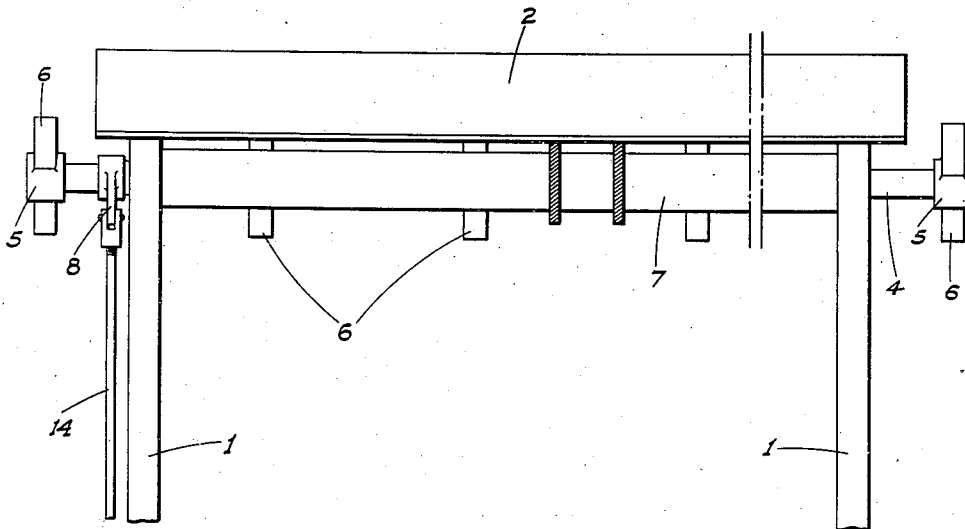
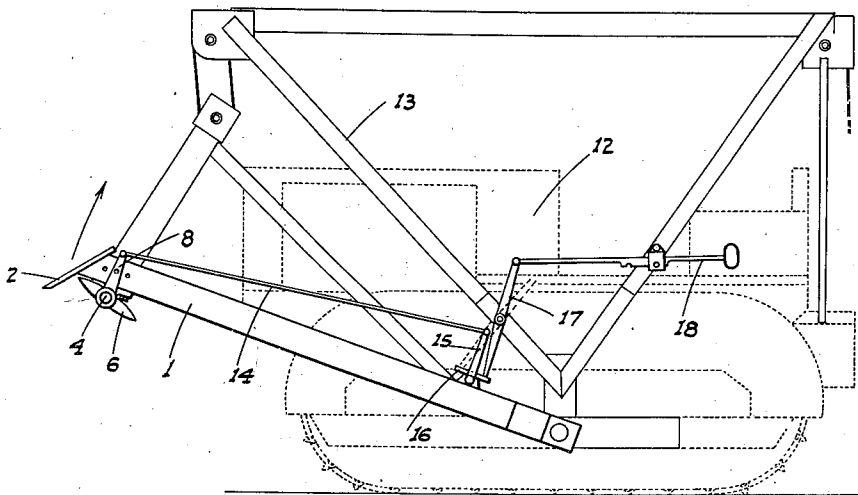


Fig. 6



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COMBINATION BULLDOZER AND RIPPER

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3 Claims. (Cl. 37-145)

This invention relates to ground ripping tools or scarifiers, and particularly to one initially designed to be mounted in connection with the bulldozer directly behind the blade thereof, since the two operations very frequently go together.

The principal object of my invention is to provide a ripper having teeth so arranged that they will dig with the rearward movement of the bulldozer and yet will merely drag along the ground when the bulldozer moves forwardly.

A further object is to mount the teeth so that they may be positioned if desired so as to dig with the forward as well as the backward movement of the bulldozer, or may be held from any contact with the ground.

Still another object is to provide double ended reversible teeth, so that any one tooth unit will give double the service of a single tooth before having to be replaced.

The teeth are arranged so that they will normally turn to a digging position of themselves, after dragging, when the direction of movement of the implement is reversed. The teeth may at times stick, however, due to accumulations of dirt, and another object of my invention is to provide a means to positively shift the teeth to a digging position if necessary.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

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:

Figure 1 is a fragmentary side view of a bulldozer, showing my improved ripper mounted thereon and with the teeth dragging.

Figure 2 is a similar view, with the end tooth removed and with the teeth held clear of the ground.

Figure 3 is a fragmentary sectional elevation showing the ripper teeth in position to dig with the backward movement of the implement.

Figure 4 is a similar view showing the teeth set to dig with the forward movement of the implement.

Figure 5 is a fragmentary plan view of the implement.

Figure 6 is a side outline of a tractor and a bulldozer mounted thereon, showing a means to effect positive movement of the teeth to a digging

position with the raising of the bulldozer to a predetermined height.

Referring now more particularly to the characters of reference on the drawings, the bulldozer with which my ripper unit is preferably associated comprises side beams 1 which at their front end support a transverse blade 2 which depends some distance below the beams.

Turnable on bearing boxes 3 mounted on and under the beams behind the blade is a transverse shaft 4. A plurality of double ended tooth units are fixed on this shaft, each unit comprising a shaft engaging hub 5 and teeth 6 extending in diametrically opposed relation from the hub. The length of the teeth relative to the lower edge of the blade is such that when the teeth are disposed at a suitable working angle, they will project below the edge of the blade some distance, as shown in Figs. 3 and 4.

If the teeth are set so that they project at a rearward acute angle to the ground, they will drag along the ground with the forward movement of the blade, as shown in Fig. 1, and will not destroy or cut into the desired finish formed by the blade. When the implement is backed up, however, the weight and drag of the teeth against the ground will normally cause the same to turn to a steeper angle, or so that they penetrate the ground as shown in Fig. 3. In order to prevent excessive turning of the teeth and to maintain them in such digging position as long as the implement is backing up, a cross beam 7 extends between beams 1 above shaft 4 in position to engage the upper teeth of the tooth units.

If the lower teeth are disposed with a rearward angle, the upper teeth will bear against the forward side of the cross beam, while if the lower teeth are set with a forward angle to the ground as in Fig. 4, the upper teeth will engage the rear face of the cross beam with the increase in angle of the teeth as the implement moves forwardly. This latter arrangement is particularly useful when a scraper is pulled behind the bulldozer.

To invert the teeth it is only necessary to drop the boxes 3 sufficiently to enable the teeth to turn clear of the cross beam.

In order to hold the teeth units in a raised inoperative position, an arm 8 projects upwardly and is adjustably secured on the shaft alongside one of the beams 1. A hole 9 in the arm is adapted to register with holes 10 in the beam so that a retaining pin 11 or the like may be placed through matching holes, depending on the initial angled direction of the teeth.

The automatic movement of the teeth from

dragging to digging positions as above described depends on the shaft being free to rotate, and in order to positively turn the teeth, I have provided a means operable from the tractor on which the implement is mounted.

One way of attaining the desired result is shown in Fig. 6. In this showing, the side beams 1 of the bulldozer are pivoted on the sides of the tractor 12, on which a cable supporting frame 13 for lifting the bulldozer is also mounted. The arm 8 is connected by a link 14 with another arm 15 pivoted on the adjacent beam 1 near its rear end, a cross bar 16 being fixed with pivot of arm 15 and projecting both ahead and rearwardly of said pivot.

A stop lever 17 is pivoted intermediate its ends on frame 13 in position to overhang crossbar 16 and to engage the same when the beams 1 have been raised a predetermined distance short of their limit of upward movement. The lever is connected to an operating rod 18 whose rear end is convenient to the operator of the tractor, so that the lever may be swung with its lower end overhanging the crossbar ahead or to the rear of the pivot of arm 15, as the case may be.

If the lever and teeth are set as shown, engagement of the crossbar by said lever will cause arms 15 and 8 to turn so that the teeth are lowered to a digging position in a rearwardly facing direction.

If, on the other hand, the teeth are to be set to dig at a forward angle, the lever is swung so as to engage the crossbar ahead of its pivot, thus swinging arms 15 and 8 forwardly and lowering the teeth to a digging position. Positive movement of the teeth from a dragging to a digging position is thus effected merely by raising the beams 1, but the link 14 may also be shifted if desired by hand by a person standing alongside the tractor, without lifting the bulldozer very high.

It will be understood that when the teeth are either reversed or inverted in position, the arm 8 is first loosened from the shaft 3 so that said arm will always occupy the same position relative to the beams 1, regardless of the tooth position.

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 ripper structure comprising spaced supporting beams movable lengthwise along the ground, a transverse shaft turnably mounted on the beams and ripper teeth fixed on the shaft at intervals along the same and disposed at an acute angle to the ground, said teeth, when the beams are disposed at a predetermined level relative to the ground and moving in one direction, dragging on the ground in trailing relation to the direction of movement, means pivotally mounting the beams on a draft vehicle for swinging movement in a vertical plane, and means between the shaft and vehicle and functioning upon upward swinging of the beams to a predetermined position to positively lower the teeth for penetration into the ground upon the lowering of the beams to said predetermined level.

2. A ripper structure comprising spaced supporting beams movable lengthwise along the ground, a transverse shaft turnably mounted on the beams and ripper teeth fixed on and depending from the shaft at intervals along the same, said teeth, when the beams are moving in one direction, dragging on the ground in trailing relation to such direction, an element rigid with each tooth and projecting above the shaft, a crossbeam extending between and rigid with the first named beams in position to be engaged by said element when the teeth have turned down to a digging position and mounting means for the shaft adapted to be lowered sufficiently relative to the cross beam for said element to clear the cross beam whereby to enable the direction of the angle of the teeth to the ground to be reversed.

3. A structure as in claim 1, in which said last named means comprises an arm upstanding from the shaft adjacent one beam, a rearwardly projecting link connected to said arm, another arm pivoted on said beam substantially parallel to said first named arm and to which the rear end of the link is connected, a crossbar fixed with said last named arm adjacent its pivot, and a stop member movably mounted on the vehicle in position to abut against either end of the cross bar upon upward movement of the beam to said predetermined position.

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