June 26, 1934. R. G. LE TOURNEAU 1,964,359

BULLDOZER

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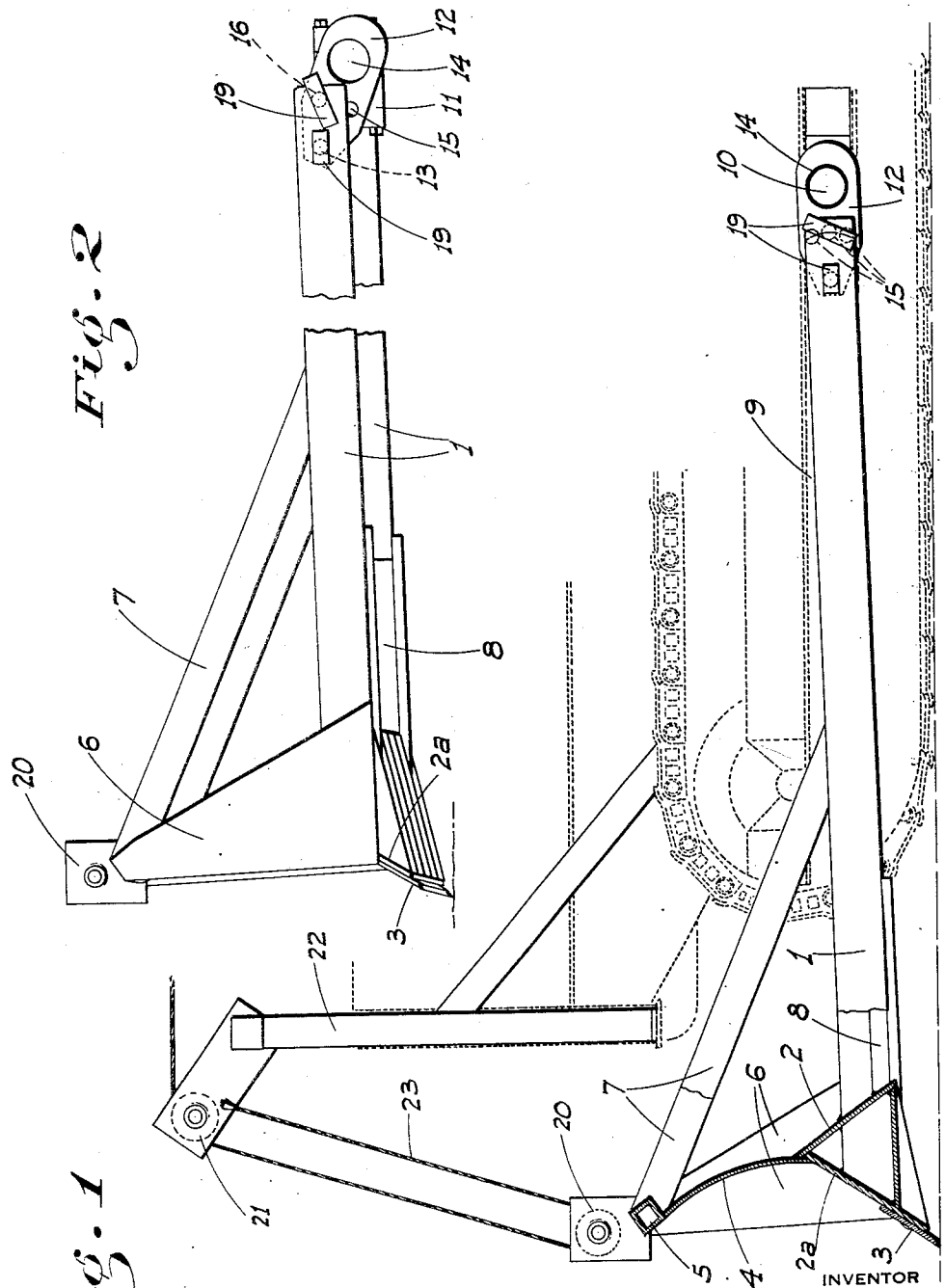


Fig. 2

Fig. 1

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Fig. 3

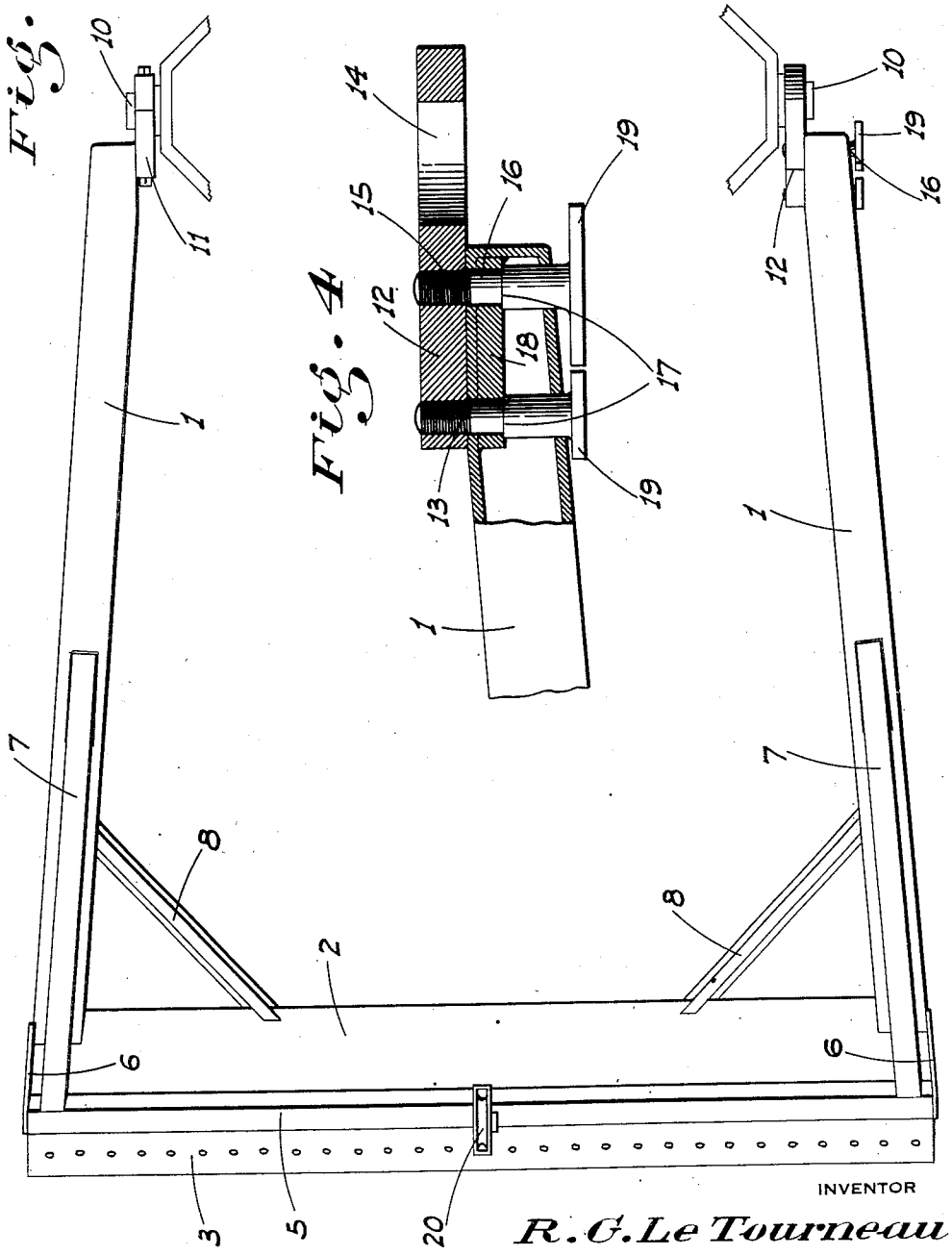


Fig. 4

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BULLDOZER

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Application January 14, 1933, Serial No. 651,707

4 Claims. (Cl. 37—144)

This invention relates to road building equipment and particularly to what is known as a bulldozer of the trail blazer type. Implements of this character are commonly used in side hill work to initially form or grade a roadway and are mounted on a tractor in front of the same to be pushed ahead by and engage the dirt ahead of the tractor. In such devices as are now in use the ground engaging blade is disposed at a considerable transverse angle to the tractor which necessitates long frames projecting from the tractor to support the blade at the necessary reversible angles. This in turn calls for heavy parts which take considerable power to handle and make the implement very cumbersome and unwieldy.

The principal object of my invention is to improve the construction of implements of this character by arranging the same so that the blade is always disposed at right angles to the movement of the tractor, thus enabling me to maintain the blade close to the front of the tractor and shortening the supporting frames correspondingly. At the same time I provide for the necessary transverse movement of the dirt from either side toward the other side as operating conditions may require. This is done by means of a simple arrangement for tilting the blade in a vertical transverse plane which avoids the use of any complicated blade hoisting mechanism in order for it to be maintained at the desired angle.

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.

Fig. 1 is a side elevation of the improved bulldozer as attached to a tractor, the front end of the implement being in section and the blade shown horizontal or on a level.

Fig. 2 is a similar view of the implement detached showing one side frame raised to impart a transverse tilt to the blade.

Fig. 3 is a top plan view of the implement.

Fig. 4 is an enlarged sectional plan of the adjustable connection unit between one side frame and the supporting trunnion.

Referring now more particularly to the characters of reference on the drawings, the implement comprises a pair of hollow rigid box beams 1, rigidly welded at their forward ends to a rigid triangular hollow cross beam 2. The front side plate 2a of this beam projects below the base of the same and is disposed on a downward and forward slant as shown. A blade 3 is secured against the lower portion of the member 2a and projects below the same some distance for engagement with the ground. A concave dirt retaining plate 4 projects upwardly from the top of the beam 2 at the front and merges into the front wall 2a of the same. A relatively small cross beam 5 extends along the top of the plate 4 being welded to said plate and to end plates 6 which depend to the beam 2 at the sides. The cross beam 5 is also braced by longitudinal diagonals 7 welded on the beams 1 some distance from their forward ends.

This construction with all parts welded together provides a unit of such rigidity that there is no noticeable sag even with only a single front support for the unit holding the same in suspended relation to the ground. Lateral distortion of the unit is prevented by transverse diagonal braces 8 between the beams 1 and 2 and welded thereon.

The beams 1 extend alongside the frames 9 of a tractor of any suitable character and converge toward their rear ends so that such ends are relatively close to the frames 9. Trunnions 10 are mounted on tractor frames in any suitable manner and project outwardly to form supporting pivots for the implement. An orifice plate 11 is rigidly welded against the inner face of and extends rearwardly from one of the beams 1 and engages the corresponding trunnion. Another orificed plate 12 similarly engages and projects rearwardly from the other beam 1 to engage the other trunnion. This latter plate however is not welded on said beam but is pivotally connected at its front end thereto by an adjustable clamping king bolt 13. Between the bolt 13 and the trunnion orifice 14 of the plate the latter is provided with a plurality of tapped holes 15 arranged on an arc construction with the bolt 13, any one at a time of which are engaged by a clamping member 16. This is in the form of a heavy cap screw turnably mounted in the beam 1 adjacent its rear end. Both the king bolt and this cap screw are threaded into the plate 12 from the opposite outer side of the beam and are freely turnable in the latter. Both have shoulders 17 intermediate their ends to abut against a reinforcing pad 18 in the beam and thus cause the plate to be clamped tightly against the beam when the members 13 and 16 are tightened up.

By means of this arrangement it will be seen that one of the beams 1 is always in longitudinal central alinement with its trunnion, but the other beam may be held in such alinement as in Fig. 1 or adjusted by engaging the pin 16 with others of the holes 15 selectively so that the beam is above or below the trunnion, as shown in Fig. 2. Since the implement is a rigid unit the raising or lowering movement of said beam 1 at its rear end is imparted to the same throughout its length, thus causing the transverse tilting of the blade in one direcion or the other. The blade may therefore be positioned so as to be higher at one end than the other and dirt engaged thereby will automatically move toward the high end of the blade with the advancing movement of the tractor. The heads 19 on the bolt 13 and pin 16 are preferably of T head form so that they may be started by a blow from a hammer etc. in the event that a wrench is not handy. The trunnions have a loose fit in their bearing plates so that there will be no binding in the bearing plate holes with the relatively slight transverse tilt imparted to the structure as a whole when the blade is disposed on a transverse tilt.

To suspend the front end of the implement from the tractor I mount a sheave 20 on the upper beam 5 centrally of its length which is alined with another sheave 21 carried by an auxiliary frame 22 mounted on and overhanging the front end of the tractor. A suitable cable arrangement 23 between the sheaves and operated from the power take-off of the tractor enables the implement to be raised and lowered at its forward end. Only one adjustable trunnion bearing plate is necessary, since if the adjustable beam 1 is to be lowered relative to the trunnions to bring the corresponding end of the blade down, the opposite end of the blade is first raised the necessary distance by the cable structure to compensate for this vertical tilting movement of the blade.

If the adjustable beam 1 is to be raised while the other end of the blade remains adjacent the ground, no manipulation of the cables or raising of the structure as a whole is of course necessary.

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 is new and useful and desire to secure by Letters Patent is:

1. A bulldozer comprising rigid spaced side beams, means for pivotally connecting the beams at their rear ends to the side frames of a tractor, a rigid blade support to which the side beams are rigidly connected at their forward ends, means to suspend the front end of the bulldozer centrally of its width from the tractor, and means whereby one of the side beams may be adjusted up or down; said adjusted beam remaining parallel to the other beam in all positions.

2. A bulldozer comprising rigid side beams, means for pivotally connecting the beams at their rear ends to the side frames of a tractor, a rigid hollow cross beam to which the side beams are rigidly connected at their forward ends, a ground engaging blade secured to said cross beam, means to suspend the front end of the bulldozer centrally of its width from the tractor, and means provided with the pivotal connection of one beam to raise and lower said beam relative to the pivotal axis without altering the parallel relationship of said one beam to the other beam.

3. A bulldozer comprising rigid side beams, a rigid blade supporting unit rigidly connecting said beams at their forward end, suspending means for the unit, lateral trunnions adapted to be mounted on a tractor, bearing plates mounted on the beams at their rear ends, and engaging the trunnions, a pivot connection parallel to the trunnions between one of the beams and the corresponding plate, and means to adjustably maintain said plate in different positions relative to the corresponding beam when turned about said pivot as an axis.

4. A bulldozer comprising rigid side beams, a rigid blade supporting unit rigidly connecting said beams at their forward end, suspending means for the unit, lateral trunnions adapted to be mounted on a tractor, bearing plates mounted on the beams at their rear ends and engaging the trunnions, a pivot connection parallel to the trunnions between one of the beams and the corresponding plate, said plate having a plurality of holes disposed on an arc concentric with said pivot, and a pin mounted in a fixed position in the beam to removably engage any hole when the plate is turned on the pivot to aline such hole with the pin.

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