

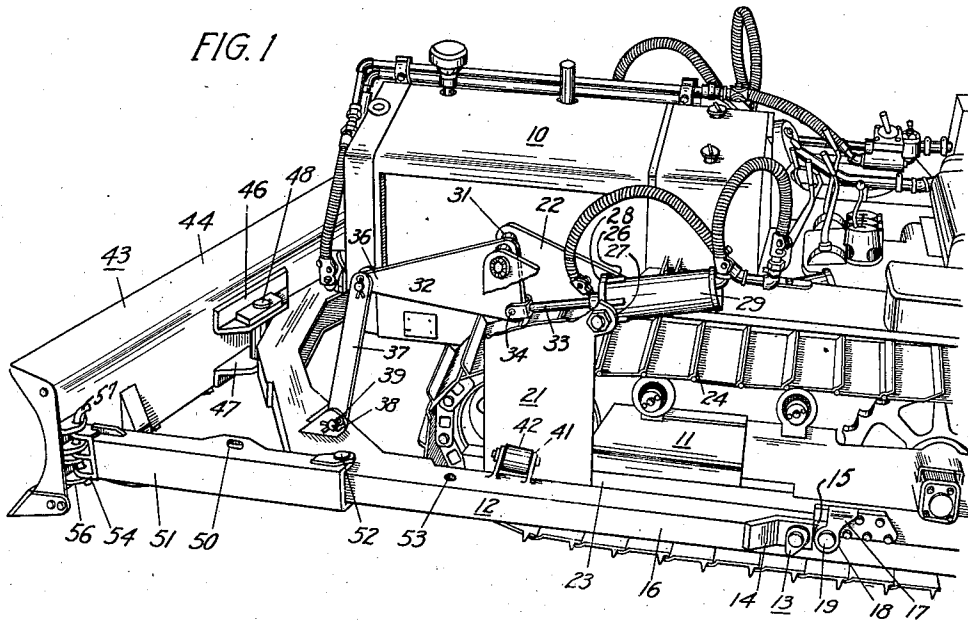
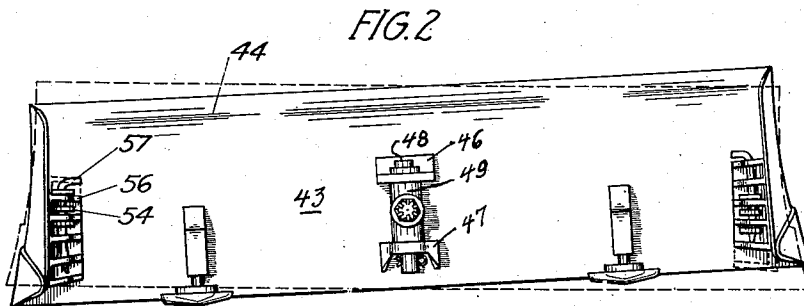
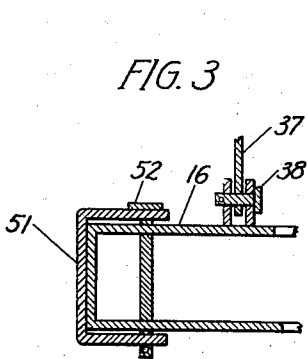
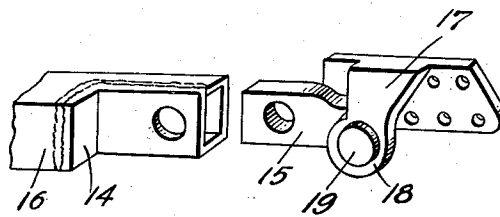
June 20, 1939.

E. W. AUSTIN

2,162,993

EARTH MOVING DEVICE

Filed June 25, 1936



INVENTOR.
ELLSWORTH W. AUSTIN

BY

Flournoy Corey
ATTORNEY.

UNITED STATES PATENT OFFICE

2,162,993

EARTH MOVING DEVICE

Ellsworth W. Austin, Cedar Rapids, Iowa, assignor to La Plant-Choate Manufacturing Company, Incorporated, Cedar Rapids, Iowa, a corporation of Delaware

Application June 25, 1936, Serial No. 87,241

7 Claims. (Cl. 37—144)

This invention relates to earth moving devices and has particular relation to means for mounting a scraper blade on a tractor or other prime mover in such manner that the blade may readily be tilted with the ends thereof up or down as in "crowning" a road or the like or with the ends forward or back in order to throw material to the right or left as desired.

Various devices have been employed for attaching a blade supporting framework to a tractor, or the like, and for providing a plurality of attaching means in order that the blade may be tilted to one side or the other or arranged for "sidecasting" to throw material to one side or the other. These devices have the disadvantage that they are relatively complicated in structure and therefore expensive to manufacture and maintain.

I have conceived of a means for mounting a blade on a blade supporting framework in such a manner that only a relatively simple structure is necessary and very little effort is required to make the necessary changes in blade angle.

An object of my invention is to provide a new and improved blade mounting for earth moving devices.

A more specific object of my invention is to provide a very much simplified mounting structure for mounting the blade of an earth moving device on the blade supporting framework.

Another object of my invention is to provide a very simple structure for mounting the blade on the blade supporting framework so that the blade may be supported in a plurality of positions without the necessity of a complicated structure.

Another object of my invention is to provide an extremely simple and sturdy blade supporting and blade mounting structure.

Another object of my invention is to provide an improved blade supporting structure and improved means for mounting this structure on a tractor or the like.

A feature of my invention is the extreme simplicity of the blade mounting structure and of the blade actuating mechanism.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawing and following specification, wherein is disclosed a single exemplary embodiment of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawing:

Figure 1 is a view in perspective of an earth moving device having a blade supporting structure and a blade mounted thereon in accordance with one embodiment of my invention.

Figure 2 is a view, partly in elevation and partly in section, of the rear of the blade and of the means for securing the blade to the blade supporting framework.

Figure 3 is a view in section of a portion of the blade supporting framework, taken in a vertical plane passing through the pin 38 of Figure 1, and

Figure 4 is a view in perspective in exploded relation of the linkage means shown in Figure 1.

Referring now to the drawing there is shown at 10 generally a prime mover such as a tractor, having endless tread running gears 11 mounted one on each side thereof and with the scraper blade supporting framework 12 or A-frame pivotally engaged to the running gears by means of pivot connections 13.

The connection between the scraper blade supporting framework 12 and the running gear 11 includes frame plates 14 welded or otherwise secured to the rearmost portions of the side frame members or channels 16 to form sockets in the rear ends of members 16, links 15 received within these sockets, and brackets 17 on the running gear frames having eyes 18 adapted to receive the pivot pins 19. This structure is an important feature of my invention and is hereinafter described in greater detail.

The forward portion of each of the running gears 11 is provided with a pair of vertically extending plates 21 and 22 which are secured to and project upwardly from the running gear frame members 23 on each side of the link belt tread 24. Rearwardly extending ears 26 and 27 of the plate members 21 and 22 are provided with openings therethrough to act as trunnions for the head ends 28 of hydraulic jacks 29, the heads 28 being adapted to pivotally rotate in the openings in the ears 26 and 27.

The uppermost forward portions of the plates 21 and 22 have openings therethrough to receive shafts 31 on which bell crank plates 32 are mounted, the shafts 31 being permitted to pivotally rotate in the plates 21 and 22. The rams 33 of the jacks 29 are pivotally engaged to lower rear corners of the plates 32, as indicated at 34. Obviously, in and out movement of the rams 33 result in lowering and raising the forward corners 36 of the crank-like plates 32 to thus lower and raise the links 37. Since the links 37 are piv-

totally engaged by means of pins 38 and ears 39 to forward portions of the side frame members 16, lowering and raising of the links 37 results in lowering and raising of the plow blade supporting A-frame 12.

The plates 21 serve not only as support for the jacks 29 and A-frame operating and actuating mechanism but pairs of brackets 41 are engaged on the upper face of the side frame members 16 and these brackets 41 carry rollers 42 adapted to roll on the outside faces of the plates 21 to act as guides for the A-frame, to assist in meeting sidewise acting forces on the A-frame, such as those encountered when the blade is set to throw material to one side or the other. The rollers roll on the plate 21 to furnish this support in any position of the A-frame.

The blade 43 is curved in section and is backed with a reinforcing plate 44, to assist the blade to meet the heavy stresses placed upon it while in use. The blade assembly thus formed is pivotally engaged, by means of bracket members 46 and 47, on a pin 48 which is in turn engaged within a pivot bearing 49. The pivot bearing 49 is T-shaped and the stem of the T extends through the nose of the A-frame 12 and is rotatably received therein. This mounting of the middle of the scraper blade on the nose of the A-frame permits the blade not only to oscillate about the pin 48 on a vertical axis for "sidecasting" but also about the stem of the T-member 49 to permit tilting about a longitudinal axis of the A-frame.

While the center pivot mounting, which is comprised of the members 46, 47, 48 and 49, is of strong, sturdy construction, it is considered advisable to additionally brace the blade by means of push arms such as the members 51. These members 51 are preferably channel sections with the inner dimension from top to bottom slightly greater than the corresponding dimension on the side frame members 16, in order that the members 51 may be received over the side frame members, as indicated in Figure 1.

The push arms 51 may be secured to the side frame members 16 in a plurality of positions by engaging the pins 52 in any one of the openings 53. In rotating about the pin 48 in a horizontal plane the front ends of the push poles 51, which are engaged to the ends of the blade 43, travel in the arc of a circle the center of which is approximately located at the pin 48. Thus, with the blade 43 in a "bulldozing" position, as in pushing material directly ahead of the tractor or "bulldozing", the front ends of the push poles 51 will be in angular positions with reference to the members 16, while in the extreme positions of the blade 43 these push poles will be in substantial alignment with the side walls of the frame members 16.

This "in-and-out" positioning of the front ends of the push poles 51 has little effect on the relationship of the parts of the structure except that in the "bulldozing" or intermediate position of the blade, the push poles 51 are not quite as closely engaged over the side frame members 16 at any point except at the pivots 52. When the blade is in either of the "sidecasting" positions the rearmost push pole may be pinned to the side frame member by means of a pin passed through the opening 58.

When the blade 43 is adjusted for digging deeper at one end than another, as in "crowning" a road, it has been the practice in structures of this kind to utilize relatively complicated fastening means for fastening the front ends of the

push poles to scraper blades to permit this tilting of the blades, but I have devised extremely simple means for securing the front ends of the push poles 51 to the ends of the blade 43, in a plurality of vertical positions of the ends of the blade. This I accomplish by providing a plurality of ears 54 on the front ends of the push poles 51 and also a plurality of ears 56 on the rear face of the blade assembly. I then provide registered openings through the ears 56 which openings are arranged in the arc of the circle with the stem of the member 49 as the approximate center. I also provide openings in the ears 54 in the same manner and provide a bent pin 57 which is formed in an arc.

Now it is apparent that, as illustrated in Figure 2, if it is desired to change the vertical position of the ends of the blade 43, it is only necessary to withdraw the pins 57 and 52, pull the push pole 51 back until the ears 54 clear the ears 56 and move the ends of the blade 43 up or down as desired until the ears 56 register in new position between the ears 54 and then secure the ears in place again by inserting the pin through the registered openings of the ears 54 and 56 and re-engage the pins 52 in the push poles and in the side frame members 16. Obviously, a number of vertical positions of the ends of the blade 43 may be secured and the blade held in these positions as desired.

Many advantages flow from the use of this simple arrangement. The complicated fastenings, different for each tilted or oscillated position of the blade, formerly considered necessary, are now eliminated. The use of short and long push poles is eliminated. Knuckle joints or ball and socket joints at the front ends of the push poles, for furnishing connection to the blade in "sidecasting" and "bulldozing" positions, are eliminated. The two "bent pins" and the ears in push poles and blade ears provide a much stiffer connection than possible with the devices of the prior art.

I have provided an improved connection of the A-frame to the running gear of the tractor. The main frame of the usual bulldozer or trail builder is mounted in such a way that one side may be raised above the horizontal of the other one, such as when the tractor passes over uneven ground one track may oscillate up or down without materially affecting the position of the main frame.

Heretofore, pivot bearings in tractor mountings of the prior art have required spool constructions, the spool being arranged to swivel on a pin projecting from the tractor track roller frame, and a jaw arranged to surround the spool. Also various types of universal connections have been made for connecting trail builder main frames to tractor mountings.

In the present device a fixed pin or shaft 19 is provided supported at both ends by the pivot bearing bracket 17. A push pole support member or link 15 is pivoted on pin 19 and arranged within the socket provided within the end of the push arm 16, and a second pin 13 is inserted through this socket member and the previously mentioned push pole support member 15. Referring to the push pole end or socket wherein the support members enter, sufficient clearance is allowed that when oscillation of the tractor occurs cramping at this point is prevented. That is, part 15 is free to turn slightly within the end of the push-arm. Pin 13 is arranged removably so that the tractor may be disengaged and

backed from the main frame. This connection of the A-frame to the running gear permits the running gear to oscillate freely in passing over uneven ground without cramping the framework.

5 Although I have described a specific embodiment of my invention it is apparent that modifications thereof may be made by those skilled in the art. Such modifications may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

I claim as my invention:

1. In an earth moving device, a tractor, a blade supporting framework, push-poles adapted to be engaged to the blade supporting framework in a plurality of positions, a scraper blade pivotally engaged at the center to the blade supporting framework and means for engaging the blade to the push-poles in a plurality of positions comprising bracket members on the push-poles and scraper blade adapted for interfitting connection and a curved pin for securing together the bracket members, other means for pivotally engaging the blade supporting framework on the running gear of the tractor comprising a bracket member on the tractor, and a link member pivotally engaged to the bracket and to the blade supporting framework, the blade supporting framework having a socket therein for receiving the link member.

2. In an earth moving device, a tractor, a blade supporting framework having rearwardly extending sockets, a bracket member secured to the running gear of the tractor, a pivot pin extending from the bracket, a link member pivotally engaged on the pin and loosely secured within one of the sockets to allow the running gear to oscillate freely in passing over uneven ground without cramping the framework.

3. In an earth moving device including a prime mover, a blade supporting member engaged on the prime mover, a scraper blade pivotally engaged to the blade supporting member for tilting movement about a longitudinal axis of the supporting member, whereby the ends of the blade move in arcuate movement with reference to the blade supporting member in tilting the blade, bracing means for bracing at least one end of the blade with reference to the blade supporting member, brackets on the end of the blade having arcuately disposed openings through several vertical portions of the brackets, the radius of which is substantially the distance from the pivotal connections to the openings, whereby, regardless of the position of tilt of the blade, the openings of the bracket are always in substantial alignment, and a pin bent in arcuate shape on substantially the same radius as the arcuate openings in the brackets to permit it to pass through the arcuate openings in the brackets, whereby the blade may be secured to the blade supporting member and braced in any position of tilt by the means including the arcuate pin passed through the arcuate openings.

4. In an earth moving device including a prime mover, a blade supporting member engaged on

the prime mover, a scraper blade pivotally engaged to the blade supporting member for movement about a longitudinal axis of the supporting member, push-poles secured to the blade supporting member and blade engaging means for engaging the ends of the blade to the push-poles comprising bracket members on the push-poles and blade ends, said bracket members having ear-like projections arranged radial to the longitudinal axis of the supporting member having openings therein arranged in an arcuate path, the radius of which is substantially the same as the distance from the pivotal connection to the openings in the brackets, and a common fastening member curved in an arc conforming substantially to the arc of movement of the blade engaging means.

5. In an earth moving device including a prime mover, a blade supporting member engaged on the prime mover, a scraper blade pivotally engaged to the blade supporting member for tilting movement about a longitudinal axis of the supporting member, whereby the ends of the blade move in arcuate movement with reference to the blade supporting member in tilting the blade, brackets on at least one end of the blade and on the blade supporting member disposed in interfitting relationship, said brackets including ear-like projections arranged radial to the pivotal connection and having openings therein arranged in an arcuate path, the radius of which is substantially identical with the distance from the pivotal connection to the opening, whereby, regardless of the position of tilt of the blade, the openings of the brackets are always in substantial alignment, and a common fastening member curved to pass through the arcuately placed openings, whereby the blade may be secured to the blade supporting member in any position of tilt by means of the brackets and common fastening member.

6. In an earth moving device, a tractor, an A-frame, and means for pivotally engaging the rear ends of the A-frame to the tractor including trunnions on the running gear of the tractor, relatively short links pivotally engaged on the trunnions and the rear ends of the A-frame having sockets for loosely receiving the free ends of the links, and pins for loosely pinning the links in place in the sockets.

7. In an earth moving device, a tractor, a scraper blade, a blade supporting framework, means for connecting the blade to the framework including a pivotal connection to permit the blade to tilt from side to side, means for supporting at least one end of the blade in a plurality of positions of tilt including interfitting members on the blade and framework to furnish a support for the blade in a plurality of positions of tilt, and a common means for pinning together the interfitting members including openings provided in the interfitting members in an arcuate path having the pivotal connection as the center and a pin bent in arcuate form to pass through the openings.

ELLSWORTH W. AUSTIN.