Jan. 5, 1943. B. F. ARPS 2,307,655

SNOW AND DIRT MOVING ATTACHMENT FOR TRACTORS

Filed Aug. 2, 1940 4 Sheets-Sheet 1

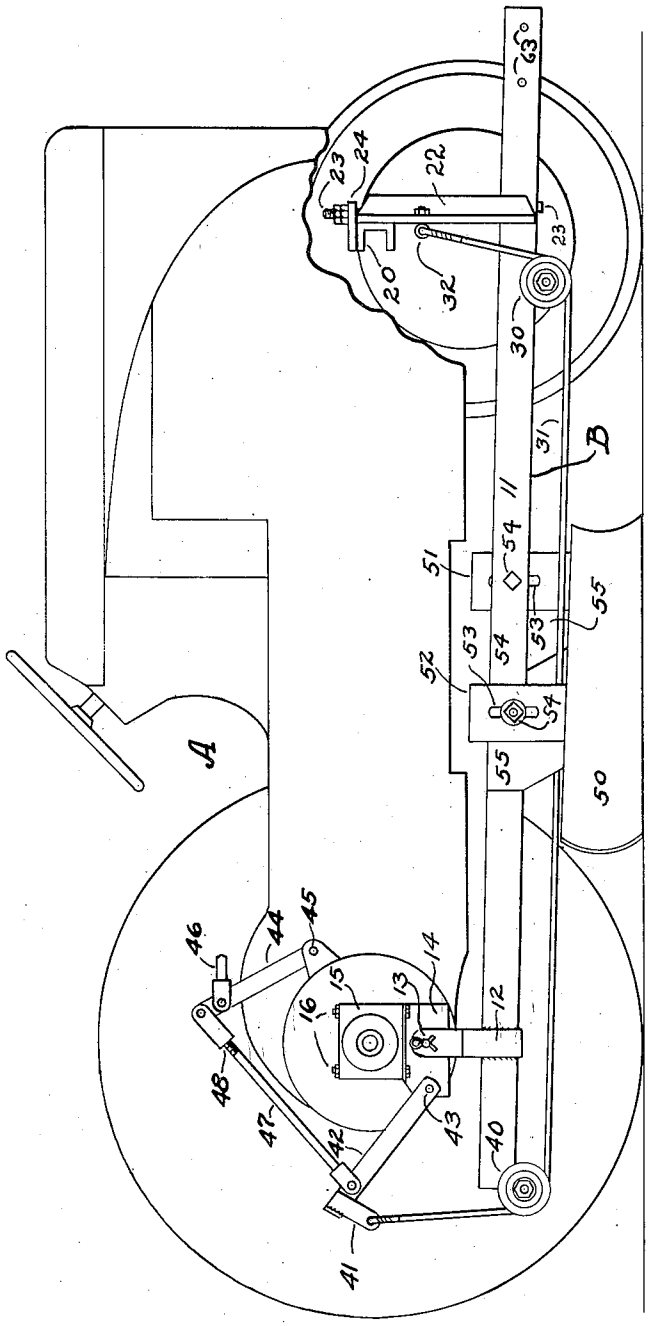


FIG. 1

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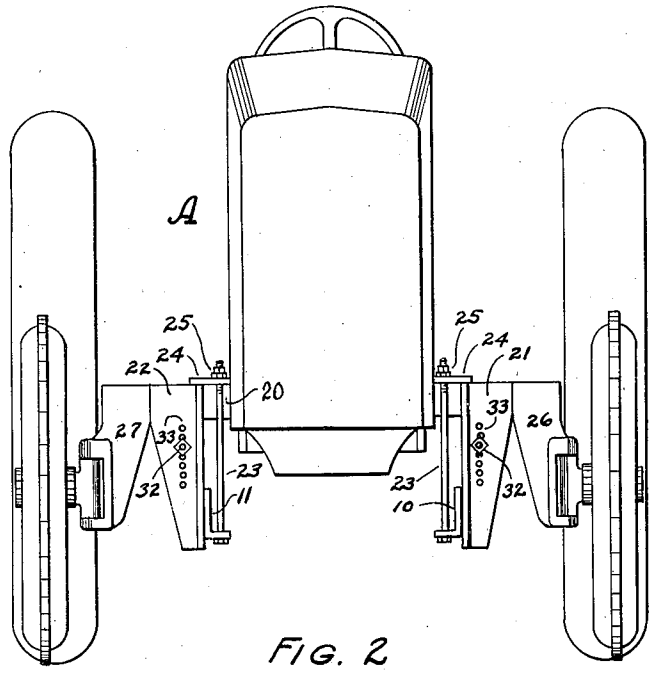


FIG. 2

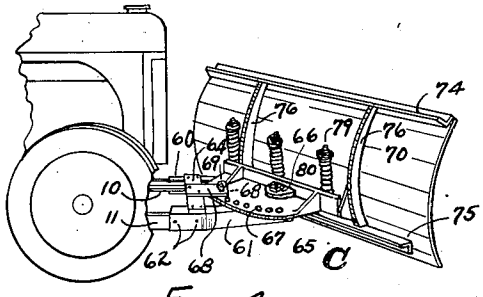


FIG. 4

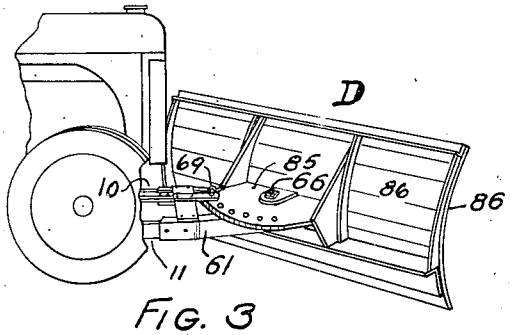


FIG. 3

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SNOW AND DIRT MOVING ATTACHMENT FOR TRACTORS

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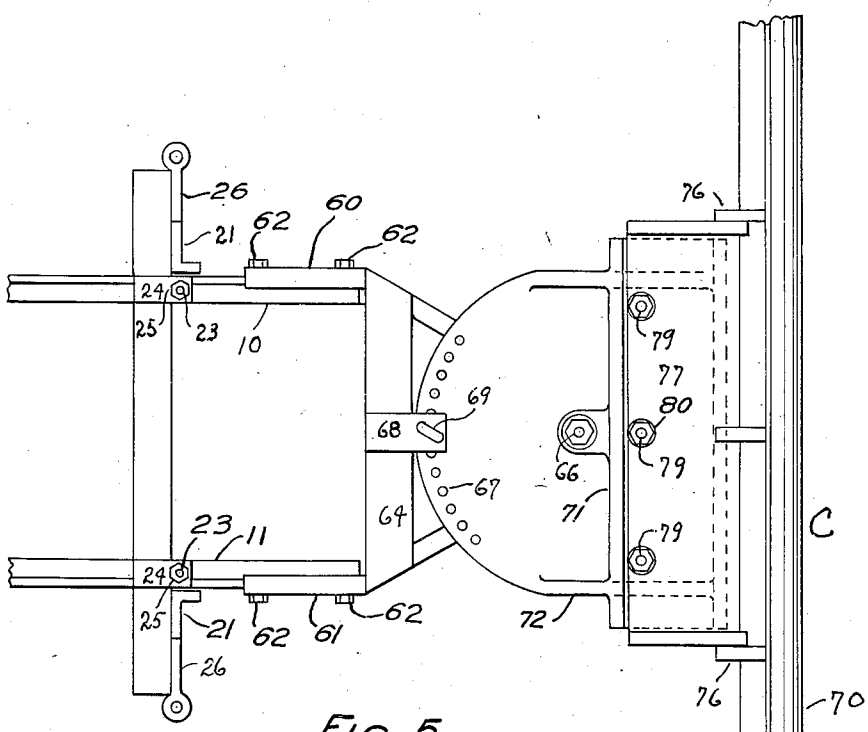


FIG. 5

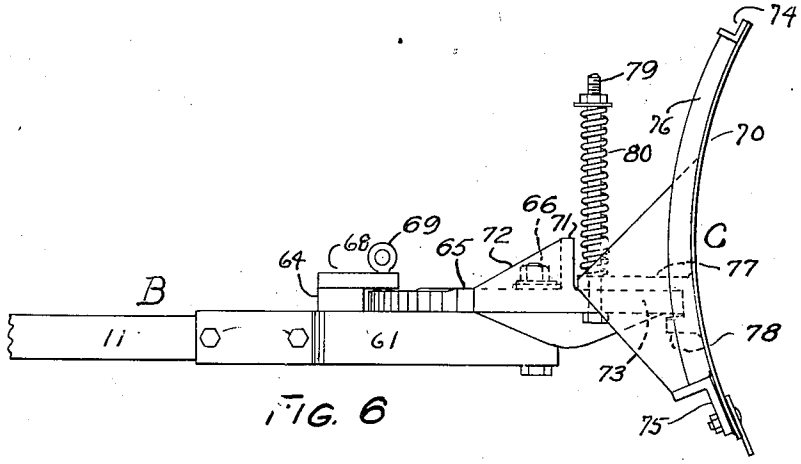


FIG. 6

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SNOW AND DIRT MOVING ATTACHMENT FOR TRACTORS

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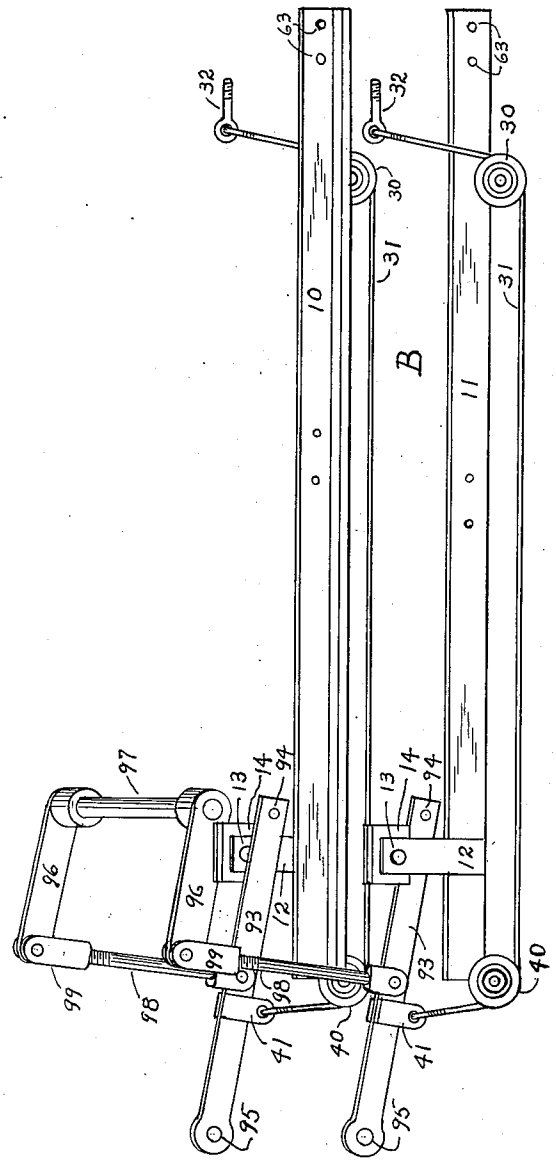


FIG. 7

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UNITED STATES PATENT OFFICE

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SNOW AND DIRT MOVING ATTACHMENT FOR TRACTORS

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Application August 2, 1940, Serial No. 349,804

9 Claims. (Cl. 37—42)

The present invention relates to attachments to tractors for removing snow from highways and the like and attachments commonly called "bull dozers" for moving dirt.

In the present invention, the main frame of the attachment is hingedly connected near its rear end to the rear end of the tractor and the front end is arranged to be vertically movable.

An object of the present invention is to provide blade adapters, whereby the different kinds of blades are provided with adapters arranged to be easily attached or removed from the front end of the main frame which extends a short distance forward of the front axle of the tractor.

Another object of the present invention is to provide means whereby the front end of the frame will be free to raise, when necessary, and then drop back to its original position automatically.

An object of my invention is to provide means whereby the low position of the front ends of the frame bars may, when desired, be defined by a manually adjustable stop which will not, in any way, interfere with the successful operation of the device.

Another object of the present invention is to provide guideways which depend from the front axle of the tractor and slidably engage the frame bars, thereby to definitely control the transverse position of the frame, relative to the tractor.

Another object of the present invention is to provide a lifting means which may, when desired, be powered hydraulically and therefore easily controlled by the operator.

An object of the present invention is to provide spaced bars as a frame, having their front ends adapted to receive blade adapters, whereby various types of blades may be easily attached and removed from the frame.

A further object of my invention is to provide vertical pivotal means between the blades and their adapter frame whereby the blades may be turned to and held in any transverse angle.

A still further object of the present invention is to provide the snow moving blade connection to its adapter frame with a spring controlled hinge, whereby the bottom of the blade may yieldingly ride over immovable obstructions.

From the foregoing, it is clearly an object of the present invention to provide a strong, easily manufactured, and easily attached and detached blade carrying frame and easily attached and detached blades therefor.

To these and other useful ends, my invention consists of parts, combinations of parts, or their equivalents, and mode of operation, as hereinafter described and claimed and shown in the accompanying drawings, in which:

Fig. 1 is a side view of a tractor equipped with the main frame of my invention, having the near wheels, a portion of the front end of the tractor, and the near wheel steering bracket removed.

Fig. 2 is a front view of the tractor illustrated in Figure 1.

Fig. 3 is a perspective view of my "bull dozer" attachment secured to the frame attachment, showing a fraction of the frame and tractor.

Fig. 4 is a perspective view of the snow moving blade secured to the attachment frame, showing a fraction of this frame and tractor.

Fig. 5 is an enlarged top view of the front end of the frame attachment and the adapter, showing the front axle and a fraction of the blade.

Fig. 6 is an enlarged side elevation of the device as shown in Figure 5, less the axle.

Fig. 7 is a diagrammatic drawing of the power controlling connecting parts of a well known tractor when adapted for controlling my attachment, as illustrated in Figures 1 and 2.

As thus illustrated, the tractor in its entirety is designated by reference character A, the main frame of the attachment is designated in its entirety by reference character B, the snow moving blade and its adapter frame is designated in its entirety by reference character C and the dirt moving blade and its adapter is designated in its entirety by reference character D.

Frame B comprises two spaced bars 10 and 11. These bars are provided at their rear ends with upwardly extending brackets 12—12 (see Figure 7), these brackets being preferably electric welded to members 10 and 11 and pivoted as at 13—13 to brackets 14—14 which are removably attached to the rear axle housing 15, by means of bolts 16—16.

The front ends of members 10 and 11 extend a distance in front of the front axle 20 of the tractor, as illustrated in Figure 1. I secure to axle 20 depending arms 21 and 22, the inner edges being parallel and adapted to slidably contact members 10 and 11 for free vertical movement of the bars.

Under some conditions, it is desirable to provide an adjustable stop for the lowest position of members 10 and 11. For this purpose, I provide preferably bolts 23—23, each being secured to members 10 and 11, as illustrated in Figure 2 and passing upwardly and freely through openings in plates 24—24.

The upper ends of bolts 23 are threaded and

provided with nuts 25, whereby the lowest position of members 10 and 11 may be determined but these members are permitted to freely move vertically.

For reasons which will be apparent, front axle 20 must be positioned a considerable distance above the front wheel axis. For this purpose, I provide depending brackets 26 and 27 to which the front wheels are pivoted automobile fashion.

I provide means for raising and lowering member B at its front end as follows:

Sheave pulleys 30—30 are rotatably mounted on the front ends of both of the frame members, as illustrated in Figures 1 and 7. Cables 31—31 extend under these sheave pulleys and upwardly to I-bolts 32—32, to which the cables are secured. Members 21 and 22 are provided with a series of apertures 33 for the reception of member 32 and by means of which the position of the front ends of members 10 and 11 may be adjusted relative to the lifting device, or raised or lowered relative to each other.

Cable sheaves 40—40 are rotatably mounted preferably on the rear ends of members 10 and 11 and are adapted to receive cables 31 which extend upwardly and are rigidly attached to brackets 41, the brackets being secured to the rear ends of arms 42—42. These arms are preferably pivoted to bracket 14, as at 43—43 (one not shown) whereby arms 42 may be oscillated on their pivots so as to raise or lower the front end of the frame, when required.

I provide arms 44 (one not shown) which are pivotally mounted to the body of the tractor, as at 45 and having a pivotally mounted link 46 which extends to the lifting mechanism of the device (not shown). This lifting mechanism is preferably a hydraulic device which is too well known to require further description, or it may be a lever or screw threaded affair by means of which the operator may oscillate arm 44 which is operatively connected to arm 42 by means of a link 47. This link is adjustable as to length as at 48, so the relative position of the front end of the frame to the lifting device may be adjusted.

It will be seen that the lifting device, whether mechanical, hydraulic or manually operated, may be positioned within convenient reach of the operator so the front end of the frame may be adjusted at will and either raised or lowered for bull dozing or raised from the limit stops 23.

My frame is primarily designed for carrying blades on the front end suitable for snow moving or bull dozing work. However, I may elect to mount a scraper blade 50, on members 10 and 11, midway the tractor longitudinally, as illustrated in Figure 1. This scraper blade is provided with spaced posts 51 and 52, each having means for vertical adjustment.

In the figures, I illustrate slots 53 and bolts 54 which are positioned in the slots, whereby the blade may be adjusted vertically, relative to members 10 and 11.

Devices of the class are subjected to considerable thrust. I therefore provide brackets 55—55 against which members 51 and 52 rest, at various adjustments.

Referring now to Figures 3, 4, 5 and 6. Unit C comprises an adapter frame consisting of side members 60 and 61 which are detachably secured to members 10 and 11 by means of spaced bolts as at 62, the bolts extending through openings 63 of members 10 and 11.

Members 60 and 61 converge forwardly as illustrated and are secured together by means of a bar 64, their converging ends forming a support for a pad 65, the pad being rotatably secured to the front ends of members 60 and 61 by means of a bolt 66 which extends through a pad or block (not shown) which forms a connection between the front ends of members 60 and 61.

Member 65 is provided with a series of apertures 67 which are on a radius with bolt 66. A clevice plate 68 is secured to member 64, midway its length and extends forwardly over apertures 67 and having a registering opening for the reception of a linchpin 69. Thus pad 65 may be turned on member 66 as an axis to various angles.

A blade 70 is yieldingly mounted on member 65 as follows:

Member 65 is provided with a transverse flange 71, having braces 72 and a forwardly extending plate 73. Blade 70 is provided with stiffening angles 74 and 75 and transverse braces 76—76.

A suitable plate 77 is secured to blade 70 and at its ends to members 76 by means of suitable braces. A narrow flange 78 is integral with and spaced from plate 77 a suitable distance so a trench is formed for the loose reception of the front end of member 73.

I provide preferably three bolts 79 which extend loosely through openings in members 73 and 77. These members are held tightly together by means of springs 80. Thus the action of the springs will hold plates 73 and 77 together.

If the lower edge of blade 70 contacts an immovable object, then the front end of member 73 will act as an axis or hinge so the pressure against the blade, if great enough, will overcome the pressure of springs 80, and cause the blade to rock on its axis far enough so it will normally ride over such objects.

It will be seen that linchpin 69 may be removed and member 70 turned to a transverse angle in either direction, or it may be held at right angles to the direction of travel, as illustrated in Figures 5 and 6. Thus member C is suitable for moving snow from highways in either direction and it can be readily removed or attached to frame bars 10 and 11 or from the adapter frame.

Clearly the adapter frame will act as a spacing member for the front end of members 10 and 11 and cooperate with these members to form a rigid frame capable of resisting side and end thrusts.

Member D is somewhat similar to member C. The frame part of the adapter may be exactly like the frame of member C and therefore the members of this frame bear the same part numbers as given to the parts in member C. The blade however differs in that it is secured directly to a plate 85 which is suitably rigidly secured to the bull dozer blade 86.

In moving dirt, it is seldom an immovable object is met with and it is the custom in such work to drive the tractor at low speed, particularly when the blade is in the dirt, therefore the spring releasing means as in unit C is unnecessary and perhaps not desirable because when there is no danger of meeting immovable objects, it is desirable to provide a fastening which is unyielding. The operator is then able to use all of the power of the tractor for moving the dirt.

It will be noted that plate 85 is provided with side braces and the entire structure suitably secured to the blade by electric welding, or other-

wise, similar to the fastening of member 77 of unit C.

It will be seen that I have provided a light, easily adjusted and handled frame and blades which are suitable for removing snow from highways or for bull dozing. In either event, the blades and their adapters are easily removed and replaced.

Clearly a single adapter frame may be used for blades 70 and 86, in which case either may be removed by loosening bolt 66 and removing linchpin 69. In other words, since the adapters are duplicates, if, for example, a highway department purchased the device as illustrated in Figures 1, 2 and 3, they may, later on, purchase a blade 70 and parts 65, 73, 77, etc., and mount them on the adapters after removing blade 86 and its connected parts.

Referring now to Figure 7. The design of frame B is similar to that shown in the other figures. The connections from the cables to the hydraulic lift are similar to the standard equipment of a well known tractor, wherein arms 93—93 are pivotally mounted at their front ends to the tractor as at 94—94. These arms are shown in a medial position and have an operating connection to cables 31 by means of brackets 41 so the arms are oscillated for raising or lowering the front ends of members 10 and 11.

Arms 93 are heavy and provided with openings 95—95 to which other devices may be attached, controlled as to height, and pulled.

Arms 96—96 are provided and rigidly secured to a shaft 97 which is rotatably mounted on the body of the tractor and having operatively connected thereto a hydraulic lifting and controlling device (no shown).

Links 98—98 form operating connections between arms 93 and 96, as illustrated, and are preferably screw threaded into forked brackets 99—99 so the front ends of members 10 and 11 may be adjusted relative to the power lift and to each other.

It will be seen that my attachment may be secured directly to a standard tractor and be controlled hydraulically by means already provided on the tractor for pulling and controlling plows, scrapers and the like.

Clearly many minor detail changes may be made in the device, as illustrated in the various drawings, without departing from the spirit and scope of the present invention, as recited in the appended claims.

Having thus shown and described my invention, I claim:

1. A device of the class described, comprising a tractor, a longitudinal frame comprising spaced side bars hingedly connected near their rear ends to the rear axle housings of said tractor, depending guiding means secured to the front axle of the tractor and having parallel surfaces adapted to loosely contact said spaced bars for vertical movement and adapted to prevent the frame from moving sidewise relative to the front end of the tractor, the front end of said side bars adapted to carry a scraper or a bull dozer blade, a sheave pulley rotatably mounted on each of said bars adjacent said front axle, cables secured to said guides and engaging the under side of said pulleys, sheave pulleys rotatably secured to the other ends of said bars and adapted to receive said cable the rear end of said cables extending upwardly and having operating connections to a lifting and height regulating device for the front end of said frame.

2. A device as recited in claim 1 including; means whereby the height of the front ends of said spaced bars may be adjusted individually and independent of said raising and regulating device.

3. A device as recited in claim 1 including; said scraper blade connection comprising an adapter permanently secured to the blade and removably secured to said frame, means on said adapter whereby said blade may be moved to and locked at any desired transverse angle.

4. A device as recited in claim 1 including; an adjustable stop adapted to define the lowest position of the front ends of said frame bars.

5. A device as recited in claim 1 including; the connection between said frame and blades comprising a rearwardly extending normally horizontal pad secured to said blades and being vertically pivoted to said frame at its front end, the rear edge being formed on a radius with said pivot and having a number of spaced openings arranged on a radius with said pivot, a plate anchored to said frame and overhanging said openings and having a registering opening with a linchpin adapted to anchor said pad at any one of said first apertures, whereby said blade may be positioned and locked at various transverse angles.

6. A device of the class described, comprising a carrying frame, a blade having a longitudinal plate secured thereto midway its width and having a trench below the front end thereof, a second plate adapted to lie under said first plate and extend into said trench, bolts having springs adapted to hold said plates together but permit the bottom edge of the blade to move rearwardly on the front edge of said second plate as an axis, said second plate having a vertical pivotal connection to the forward end of said frame, the rear edge being formed on a radius with said pivot and having a number of spaced apertures also on a radius with said pivot, a plate secured to said frame and adapted to overlie said apertuers and having a registering aperture, a linchpin adapted to extend through said second apertures and one of said first apertures, whereby said blade may be moved and locked at various transverse angles.

7. A device of the class described, comprising a frame attachment for a tractor having mounted thereon a normally horizontal forwardly extending pad, a scraper blade having mounted thereon a medially positioned pad adapted to lie on said first pad and having a flange forming a trench for the loose reception of the front edge of said first pad, a number of spaced bolts extending loosely through openings in the rear of said second pad and through registering openings in said first pad, springs mounted on said bolts adapted to tightly press said pads together whereby the lower edge of said blade may move rearwardly against the front edge of said first pad as an axis and against the pressure of said springs.

8. A device of the class described, comprising a tractor, a longitudinal frame comprising spaced side bars hingedly connected near their rear ends to the rear end of said tractor, depending guide means secured to the front axle of the tractor and having parallel surfaces adapted to loosely contact said bars for vertical movement of the bars and adapted to prevent the bars from moving sidewise relative to the front end of the tractor, a scraper blade mounted on said bars at a transverse angle and between the wheels of said tractor having independent vertically adjustable connections to said bars, sheave pulleys

rotatably mounted on said bars adjacent said front axle, cables secured to said guides and engaging the under side of said pulleys, sheave pulleys rotatably mounted on the rear ends of said bars adapted to receive said cables, the rear end of said cables extending upwardly and having operating connections to a power lifting and height regulating device.

9. A device of the class described, comprising a tractor having front and rear carrying wheels, bars positioned on opposite sides of the frame of the tractor each being transversely hinged at its rear end to the rear end of the tractor frame, depending guides secured to the front end of the tractor adapted to slidably engage said bars and prevent their front ends from transverse movement relative to the front end of the tractor, a power lift mounted on the rear end of said tractor having transversely spaced arms, sheaves rotatably mounted on the forward end of said bars adjacent said guides, cables having at their rear ends an operating connection to the free ends of said arms, their forward ends engaging the under side of said sheaves and extending upwardly and being anchored at fixed points relative to said tractor whereby a movement of said arms will cause the front ends of said bars to raise or lower, a scraper blade mounted on said bars a considerable distance forward of said hinges.

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