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HYDRAULICALLY OPERATED SNOWFLOW

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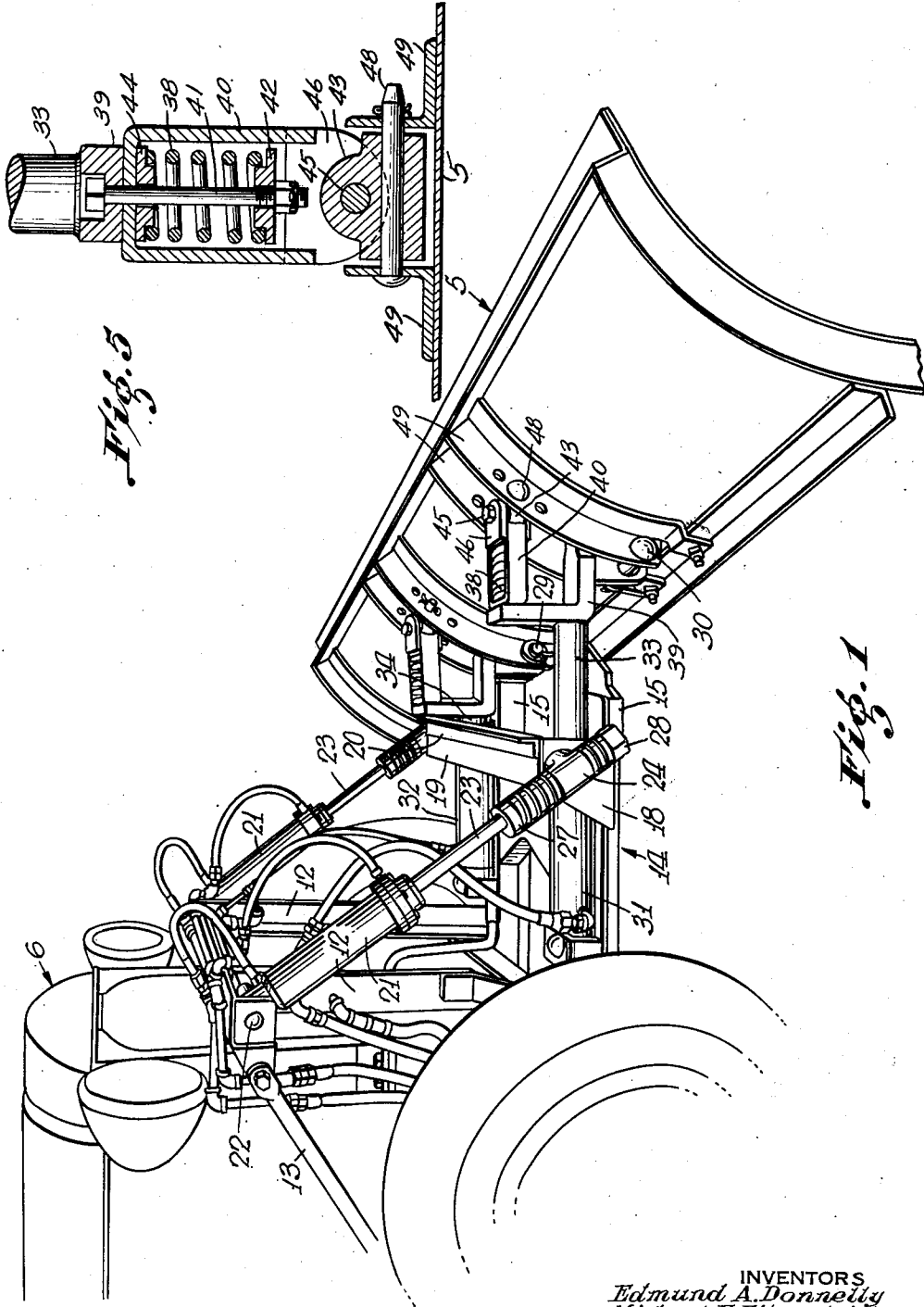


Fig. 5

Fig. 1

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HYDRAULICALLY OPERATED SNOWPLOW

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4 Claims. (Cl. 37-42)

Our invention relates to road-working devices to be carried on the front end of vehicles, and in particular to a snowplow or the like attachment.

For street-cleaning operations after a snowfall, a truck is usually equipped with a plow blade, by attachment at the front end of the vehicle. It is desirable that the blade be angularly adjustable, as when working around parked cars. In the past, it has been necessary for the operator of the vehicle to dismount from his cab, and to remove and insert adjustable pins and the like, in order to make the necessary adjustment for angularity.

It is an object of the present invention to provide an improved adjustable mechanism for application of the character indicated.

It is another object to provide a remotely controlled angling mechanism of the character indicated.

It is still another object to provide improved means for supporting a plow blade on a vehicle.

Other objects and various further features of the invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings. In said drawings, which show, for illustrative purposes only, a preferred form of the invention:

Fig. 1 is a perspective view showing a snowplow or the like, incorporating features of the invention;

Fig. 2 is a top view of the device according to Fig. 1;

Fig. 3 is a sectional view taken substantially in the plane 3-3 of Fig. 2;

Fig. 4 is another sectional view taken substantially in the plane 4-4 of Fig. 2; and

Fig. 5 is a fragmentary sectional view on an enlarged scale, taken in the plane 5-5 of Fig. 3.

Briefly stated, our invention contemplates the relatively simple remote control of means for selectively adjusting the angle of a plow blade or the like to be carried by a vehicle. The adjusting mechanism may employ hydraulic actuating means. In accordance with a feature of the invention, the plow blade is positioned at spaced points, one of which may be longitudinally adjustable, as by employment of a hydraulic actuating mechanism. Novel means may also be provided for resiliently absorbing abnormal shocks, as when the plow encounters a manhole cover or other obstruction.

Referring to the drawings, our invention is shown in application to a snowplow blade 5 to be carried on the front end of a truck or other vehicle 6. In order to provide a framework for supporting the blade 5, a system of girders and trusses may be employed. In the form shown, longitudinally extending angle irons 7-8 are fixedly carried by the front axle 9 of the vehicle, the attachment being made by means of straps 10 and bolts 11. The fixed framework may also include vertically extending members 12, which for rigidity may be trussed by means, such as a bar 13, attached at its rear end, say, to one of the frame members of the vehicle or to one of the angle irons 7-8, as will be clear.

In order that the blade 5 may be raised and lowered, the supporting framework preferably also includes a push frame or other means 14 hingedly supported by the described relatively fixed framework. The push frame 14 is shown to comprise spaced angle members 15 suitably braced by cross members 16 and attached on a horizontal pivot axis to the relatively fixed framework by means of pins 17. For raising and lowering purposes the push frame 14 may include a bracket or bridge comprising side members 18 and a cross piece or

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strap 19, reinforced, if desired, by an angle member 20. In the form shown, the raising-and-lowering mechanism includes twin double-acting hydraulic actuating means in the form of cylinders 21 pivotally supported, as at 22, at the upper part of the relatively fixed framework, and extensible piston means 23 pivotally attached to the side members 18 of the hinged framework, as by means of fittings 24. The fittings 24 may slidably embrace the piston means 23, and opposed compression springs 25-26 may cooperate with a fixed abutment or collar 27 and with an adjustable abutment or nut 28, to assure resilient support of the hinged framework or push frame 14.

In accordance with the invention, we provide remote-controlled adjustable means for the selective angular positioning of the blade 5 with respect to its supporting framework, which, in the form shown, is the push frame 14. The blade 5 is preferably attached to the push frame 14 at horizontally spaced points, as by pin means 29-30, and hydraulic actuating means may be employed for adjustably positioning one of these two spaced points of support 29-30. In the form shown, we employ hydraulic actuating means for selectively positioning both points of support 29-30, which may include cylinder members 31-32 fixedly carried by the push frame 14 and pistons or longitudinally movable members 33-34 providing the actual support at points 30-29, respectively. The two cylinders 31-32 may be of the double-acting or reversible type, but in the form shown they are single acting, that is, forcibly movable in one longitudinal direction only. In the form shown, therefore, an additional point of attachment is provided, as at the pin 35, for fixedly pivotally connecting the blade 5 to the hinged push frame 14, this connection being such however as to permit a limited tilting of the blade about a horizontal axis. This additional attachment 35 is preferably, centrally of the hydraulic actuating means 31-32 and may be provided by a plate 36 carried by the push frame 14.

It will be clear that upon actuating one of the hydraulic means, say the cylinder 31, while relieving actuating pressure from the other hydraulic means (32) the blade 5 may be forcibly actuated in a counterclockwise direction (as viewed in Fig. 2). Upon actuating the hydraulic cylinder 32 and relieving pressure from the cylinder 31, the blade 5 may be angled in the other (clockwise) direction.

In addition to providing the described means for selectively angling the plow blade 5, we provide novel means for supporting the blade 5 so as to minimize shock or other harmful effects of road encumbrances, such as manhole covers, odd cobblestones, and the like. In accordance with this feature of the invention, means are provided for the relatively fixed pivotal support of the blade 5 on a generally horizontal axis at the points of attachment 29-30 to the extensible means 33-34. This horizontal axis is preferably relatively low and in the lower half of the plow blade. The upper half of the plow blade is preferably resiliently attached to the extensible members 33-34 to permit yieldable forwardly rotational movement of the blade upon encountering said road encumbrances.

For this purpose the rearward side of the blade 5 may be provided with pairs of horizontally spaced vertical channel members 49 which are provided with suitable horizontally aligned apertures near the lower portion of the blade to receive pins 29-30 and having other horizontally aligned apertures above the first-mentioned ones to receive pins 48. Pins 29-30 are loosely received in openings provided in the depending portions of each bracket 39 fixed to the forward ends of extensible members 33-34. The upper pair of pins 48 are each received loosely in a knuckle member 43 which in turn is pivotally connected by a vertically positioned pin 45 to the forwardly projecting spaced tongues 46 of a strap member 40. These strap members are in turn connected yieldably to the upper extremity of brackets 39 by a long bolt 41, which passes horizontally through openings provided in the bracket and the rearwardly positioned portion of the strap member, and by a coil spring 38, which encircles the bolt. The head of the bolt may be retained within a recessed portion of the bracket, and the ends of the coil spring may be provided with retaining

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rings 42 and 44, one of which will bear against the inner side of the rearward portion of strap member 40, the other one being retained by engagement with a nut threaded on the end of bolt 41.

In normal operation the spring 38 is maintained under a certain amount of compression by the bolt-and-nut 41, whereby each of the strap members 40 are positioned in abutment against the upper extremities of brackets 39. However, in the event the lower edge of the blade 5 is driven forwardly against a projecting obstruction, such as an irregular cobblestone, the force of the obstruction will be transmitted to the straps 40 and coil springs 38 through the pivotally connected knuckle members 43 which will cause a momentary forward rotational movement of the blade about the axis of pins 29-30 and a forward displacement of the strap members with respect to the brackets 39. When the blade has passed over such an obstruction the springs 38 will then return the blade to the normal position as shown.

This arrangement provides a universal floating pivotal connection between the blade 5 and the extensible members 33-34. Inasmuch as lateral displacement of the blade is limited by its pivotal connection 35 with the push frame 14 and, since cylinders 31 and 32 are fixed to the frame, the members 33-34 will move forwardly and backwardly in straight parallel paths, and there will be a small relative lateral displacement between the pivotal connections of the brackets 39 and the blade when the blade is turned about its vertical pivot 35. This lateral displacement is permitted by horizontally spacing the channel members 49 sufficiently to allow slidable movement of brackets 39 and knuckles 43 along pins 29-30, and 48, respectively, during such movement.

While we have described our invention in detail for the preferred form shown, it will be understood that modifications may be made within the scope of the invention as defined in the appended claims.

We claim:

1. In a device of the character indicated, a supporting framework for attachment to the front end of a vehicle, said framework including a fixed member and means hinged on a substantially horizontal axis, first hydraulic actuating means connected between the fixed member and the hinged means for adjustably raising and lowering said hinged means, second hydraulic actuating means carried by said hinged means projecting forwardly thereof and having a thrust member operatively movable along a straight path, a plow blade pivotally attached to the hinged means for rotation about a vertical axis, and floating pivot means including a pair of horizontally disposed vertically spaced pins connected to the blade and

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a bracket connected to said thrust member, said bracket including a portion fixed to the thrust member having an opening to horizontally slidably receive one of said pins and a forwardly yieldable portion having an opening to horizontally slidably receive the other of said pins to permit lateral displacement of the thrust member relative to the blade when the blade is moved about the vertical axis by said thrust member and yieldable movement of the blade about a horizontal axis.

2. In a device of the character indicated, a plow blade, movable framework means for attaching the blade to a vehicle including two horizontally spaced hydraulically actuated means, each of said hydraulically actuated means having a member movable forwardly in a straight line with respect to the framework, and horizontally spaced universal floating pivot means including two pairs of horizontally disposed vertically spaced pins connected to the blade and a bracket connected to each of said forwardly movable members said brackets including a portion fixed with respect to said members having an opening to horizontally slidably receive the lower of each pair of pins and a forwardly yieldable element having an opening to horizontally slidably receive the upper of each pair of pins to permit limited rotation of the blade about horizontal and vertical axes and lateral displacement of the forwardly movable members with respect to the blade when the blade is moved by said members about a vertical axis.

3. A device according to claim 2, in which one of each pair of pins is disposed below the line of movement of said forwardly movable members, and the second of each pair of pins is disposed above said line of movement.

4. A device of the character defined in claim 2, having additional pivot means connecting the blade and said movable framework disposed between said horizontally spaced universal floating pivot means to limit lateral displacement of the blade when the blade is moved by said forwardly movable members.

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