PLOW BLADE STRUCTURE

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References Cited
UNITED STATES PATENTS
3,587,751 6/1971 Schmidt, Jr. ........................172/264
3,199,234 8/1965 Ressinger .......................172/706 X
1,900,703 3/1933 Frink................................37/44

1,926,011 9/1933 Scoule..................................37/44

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ABSTRACT
The blade of a plow blade structure has a bottom section and a top section hinged together. A linkage mechanism connects the bottom section with a supporting frame to permit rearward movement of the bottom section if the force exerted on the front face thereof by an obstacle is beyond a predetermined degree. The top section is spring-biased into operative position with respect to the bottom section but is foldable forwardly against the action of the spring in response to lifting movement of the blade.

5 Claims, 3 Drawing Figures
PLOW BLADE STRUCTURE

The invention relates to plow blade structures for snow plows, scrapers and the like. It has heretofore been proposed to provide mechanism permitting rearward yielding movement of a plow blade, or a portion thereof, should the blade, in operation of the plow, encounter an obstacle which might otherwise cause damage to the plow structure. It has, however, been quite difficult to provide such a mechanism that will not interfere with the normal effective operation of the plow, that will be sufficiently rugged to ensure trouble-free operation throughout the life of the plow, and that will be effective under the varying conditions encountered in use.

The plow blade structure of the present invention has the usual supporting frame for attachment to a motor vehicle such as a truck. It is particularly, but not exclusively, adapted for underbody attachment to a truck. The blade is located forwardly of the frame and has a top section and a bottom section. The top edge of the bottom section is hingedly connected to the bottom edge of the top section. The top section has a fixed seated position on the bottom section when the plow is in use but is swingable or foldable forwardly against the action of a spring when it is desired to reduce the overall height of the structure. Means permitting rearward and upward movement of the bottom section relative to the operative position of the top section in response to a force of predetermined degree exerted by an obstacle on the forward face thereof comprises upper and lower links each having a pivotal connection at one end with the bottom section and a pivotal connection at the other end with the frame. It is important that the distance between the pivotal axes of the links on the frame is at least as great as the distance between the pivotal axes of the links on the bottom section.

The invention will be described with reference to the accompanying drawing, in which

FIG. 1 is a side elevation of a plow blade structure in operating position in accordance with the invention,
FIG. 2 is a side elevation of the structure of FIG. 1 in raised position, and
FIG. 3 is a side elevation showing the structure in tripped position.

In the drawing, 10 is a portion of the chassis of a motor vehicle such as a truck. The plow blade structure of the present invention, generally indicated at 11, is shown as having an underbody mounting, by way of example, but may be readily adapted for front end mounting if desired.

The blade itself comprises a bottom section 12 and a top section 13.

Bottom section 12, as shown, has a lower cutting plate 14 mounted on a plate 15 and angle 16 by means of bolts 17. Plate 15 has a rearwardly extending flange 18.

Top section 13 preferably has a forwardly curved contour, as shown, with end ribs or flanges 19 and a lower edge rib or flange 20 adapted to seat on flange 18 of section 12 to define the operating relation of the two sections of the blade. A hinge rod 20 on the top section is rotatably mounted in lugs 21 on flange 18 and provides forward swinging movement of the top section.

A post 22 is rigidly mounted on angle 16 and extends perpendicularly therefrom to a point approximately opposite and rearwardly of the uppermost portion of section 13. A coil spring 23 connects the top of the post with a lug 24 on the upper edge portion of section 13 and urges the section 13 rearwardly into the seated position thereof.

The blade is carried by a supporting frame 25 adapted to be fixed to the chassis 10. A normally vertical member 26 is mounted in frame 25 preferably for reciprocation therein. Means for imparting reciprocal motion to member 26 may comprise a hydraulic power cylinder 27.

Fixed to the lower end of member 26, as by a bracket 28, is a bar 29. A link 30 has one end pivotally mounted at 31 on bar 29 by means of fitting 32 and its other end pivotally connected at 33 to a lug 34 fixed to angle 16. A torsion spring 35 extending around the pivot 31 has one arm 36 fixed to fitting 32 and a second arm 37 urging the link 30 and bottom section 12 in a downward direction.

A second link 38 located in upwardly spaced relation to link 30 has a pivotal connection 39 at one end with a lug 40 fixed to member 26 and a pivotal connection 41 at the other end with post 22.

Links 30 and 38 are in substantially vertically aligned relation and, as shown, are substantially parallel to each other. However, lug 40 is preferably provided with openings 42 and 43 to permit selective positioning of the axis of pivotal connection 39 in a direction away from pivotal connection 31. It will be apparent that an equivalent effect could be achieved by providing openings in post 22 between pivotal connections 41 and 33 for selective positioning of the axis of pivotal connection 41 in a direction towards pivotal connection 33. It is important that the distance between the pivotal axes of the links on the frame be at least as great as the distance between the pivotal axes of the links on the section 12.

Preferably, blade 14, as shown, is slightly rearwardly inclined from its lower edge in normal operating position. Torsion spring 35 acts to maintain it in this position under normal operating conditions. However, should the blade encounter an obstacle of predetermined unyielding degree, the pressure on section 12 will overcome the resultant downward force created by the predetermined position of link 38 on lug 40 and the action of spring 35, and section 12 will move backwardly and upwardly and over the obstacle, as shown in FIG. 3.

Link 38, in conjunction with link 30, provides the necessary required support during the tripping movement of blade 14 to keep the upper portion of the blade structure from falling backwardly.

It will be apparent that, in the parallel relation of links 30 and 38, a force of maximum degree is required to trip bottom section 12. It will also be apparent that if the pivotal connection 39 were moved closer to pivotal connection 31, the resulting positioning of link 38 would cause such link to exert a binding effect thus making it substantially impossible for section 12 to trip. However, movement of pivotal connection 39 away from pivotal connection 31 would lessen the force required to trip bottom section 12 by lessening the downward force created by the selected positioning of link 38 on lug 40. It will be appreciated that, if so desired, link 38 could be so positioned that it applies no downward force on the tripping mechanism with only
the tension of spring 35 to be overcome. Thus, the operator may select the relative positioning of the links, in the manner described, to suit particular conditions of use. For instance, if the plow is moving at high speeds, such as 60 miles per hour, the force required to trip the bottom blade should be considerably less than that required at lower speeds. Also, if packed snow is to be cut, a lower speed of plow and greater resistance to trip should be employed.

It will be appreciated that another manner of increasing tension of spring 35 is by applying downward pressure on bar 29 by the hydraulic cylinder.

The hinged top section of the plow blade allows a larger size plow to be mounted under a truck. Means for folding the top section forwardly comprises a bracket 44 fixed to chassis 10 and depending therefrom. The bracket carries a roller 45 at its free end for peripheral engagement with the edge of a rib 19. It will thus be observed that, when lifting movement is applied to the structure as by power cylinder 27, engagement of top section 13 with roller 45 will cause forwardly folding movement of top section 13, against the action of spring 23, to the position shown in FIG. 2. Therefore, when the truck is not engaged in plowing, good road clearance is provided by such folding movement of the top section.

I claim:

1. A plow blade structure comprising
   a supporting frame for attachment to a motor vehicle,
   a blade forwardly of said frame and having a top section and a bottom section each having a forward face, a rearward face, an upper edge and a lower edge,
   means hingedly connecting the upper edge of said bottom section with the lower edge of said top section,
   said bottom section having a seat engageable by said top section and defining an operative position of said top section with respect to said bottom section,
   a first spring connecting said top and bottom sections and urging said top section into said operative position,
   said top section being swingable forwardly from said operative position against the action of said spring, means permitting rearward and upward movement of said bottom section relative to the operative position of said top section in response to a force of predetermined degree applied to the forward face of said bottom section comprising an upper link and a lower link each having a pivotal connection at one end with said bottom section and a pivotal connection at the other end with said frame, the distance between the pivotal axes of said links on said frame being at least as great as the distance between the pivotal axes of said links on said bottom section, and
   means for adjustably locating the pivotal axis of said upper link on said frame to vary the force required to effect said rearward and upward movement of said bottom section, and
   a second spring mounted in said frame urging said bottom section in a forward direction.

2. A plow blade structure as defined in claim 1, said second spring being a torsion spring surrounding said pivotal connection of said lower link with said frame.

3. A plow blade structure as defined in claim 1, including a post fixed to said bottom section and extending rearwardly of said top section towards the upper edge thereof, said spring having one end fixed to said post and its other end fixed to said top section adjacent the upper edge thereof, the pivotal connections of said links with said bottom section being located on said post.

4. A blow blade structure as defined in claim 1 including means mounted in said frame for raising and lowering the blade, and a bracket for attachment to said motor vehicle having a surface engageable by said top section for swinging said top section forwardly in response to lifting movement of said blade.

5. A plow blade structure as defined in claim 4, said top section having a curved rib on the rearward face thereof, said bracket surface comprising a roller engageable with said rib.