Sept. 22, 1959 L. C. KRUEGER 2,904,904

ADJUSTABLE SNOW PLOW

Filed Jan. 4, 1956 4 Sheets-Sheet 1

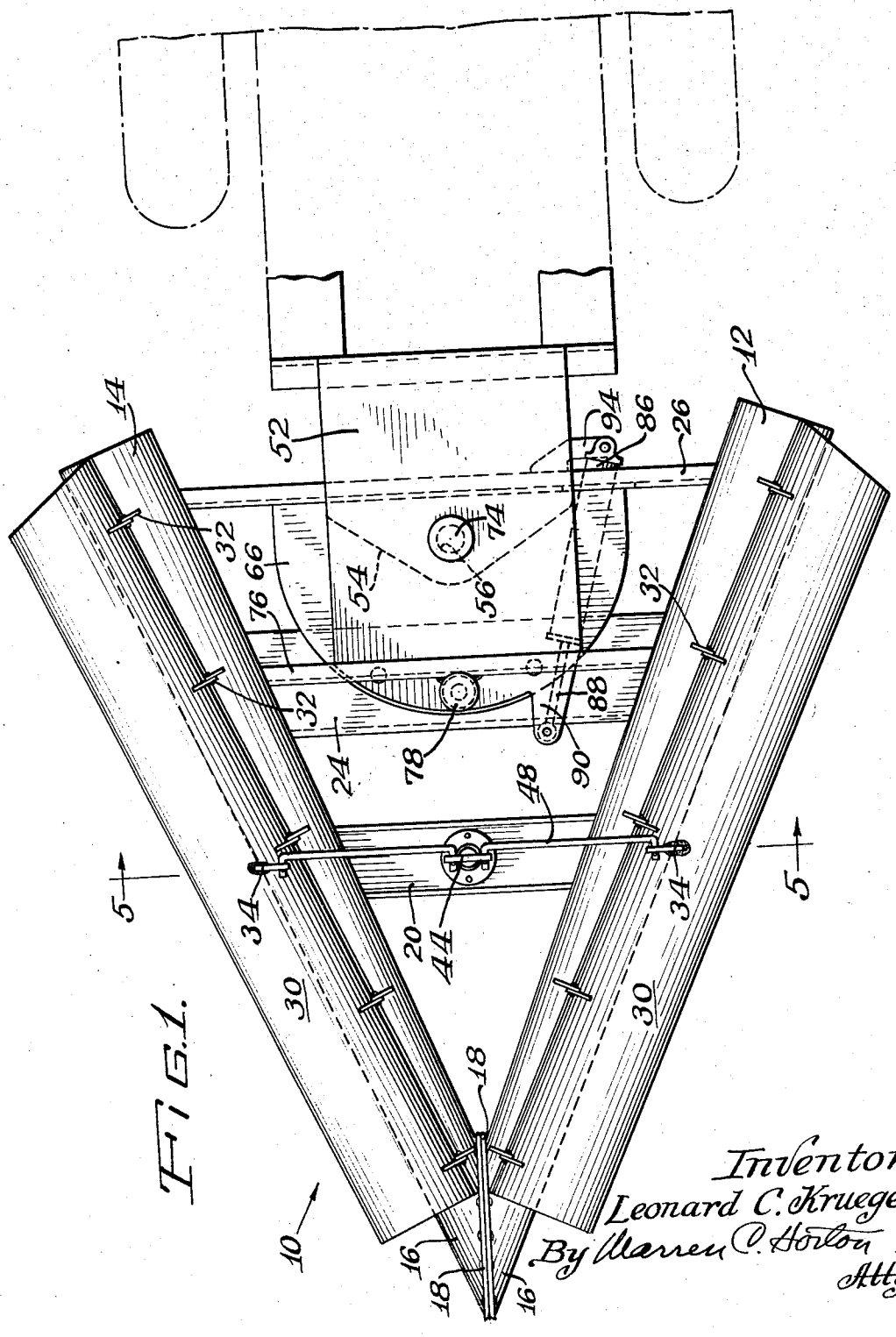


FIG. 1.

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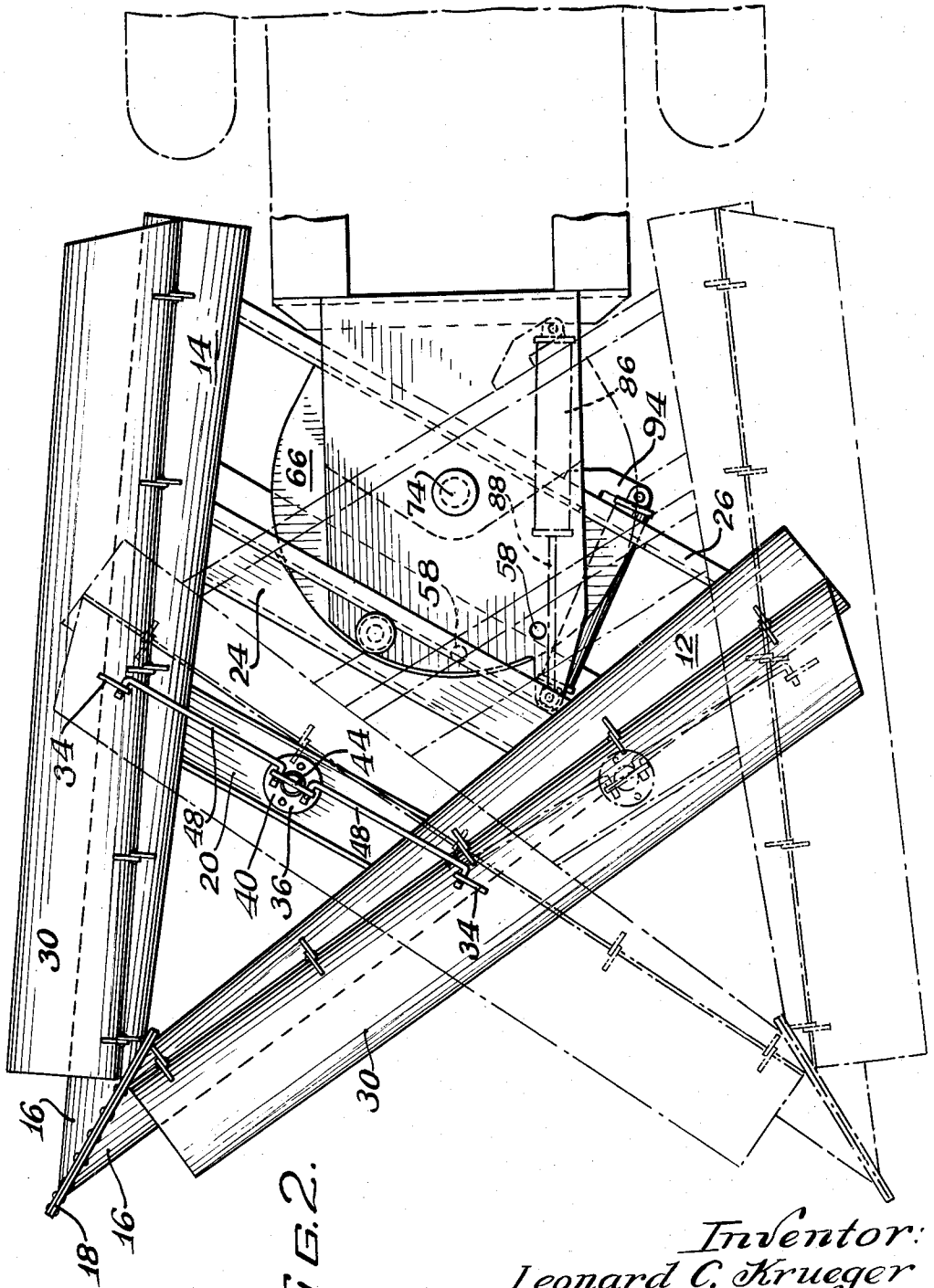


FIG. 2.

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ADJUSTABLE SNOW PLOW

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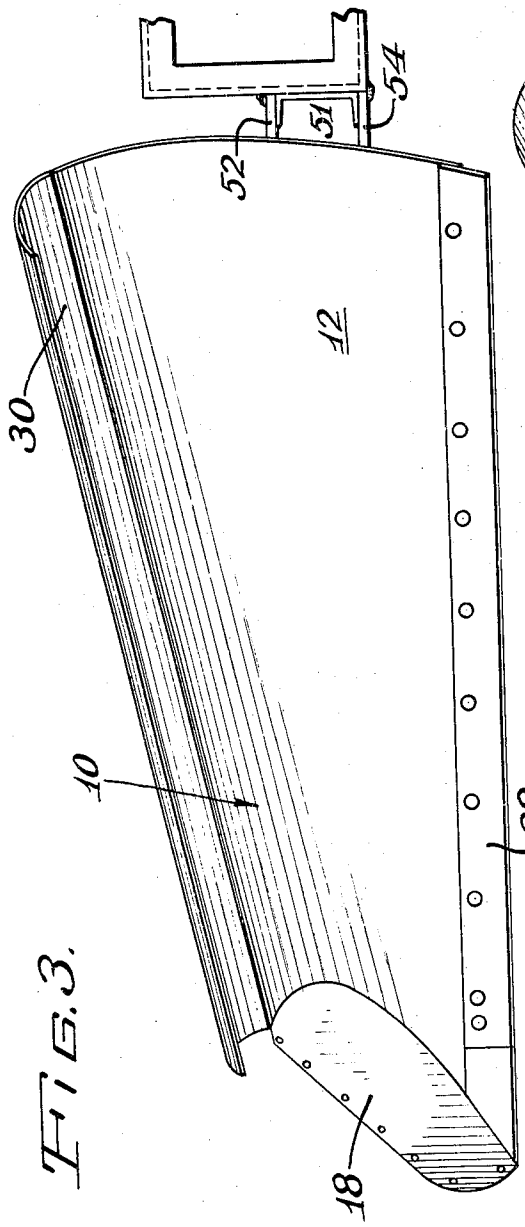


FIG. 3.

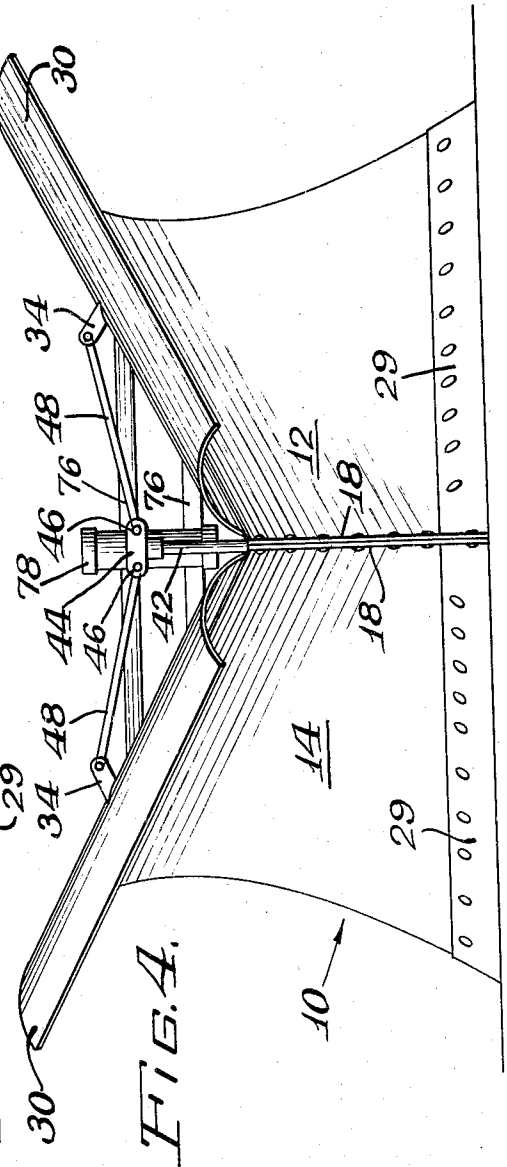


FIG. 4.

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FIG. 5.

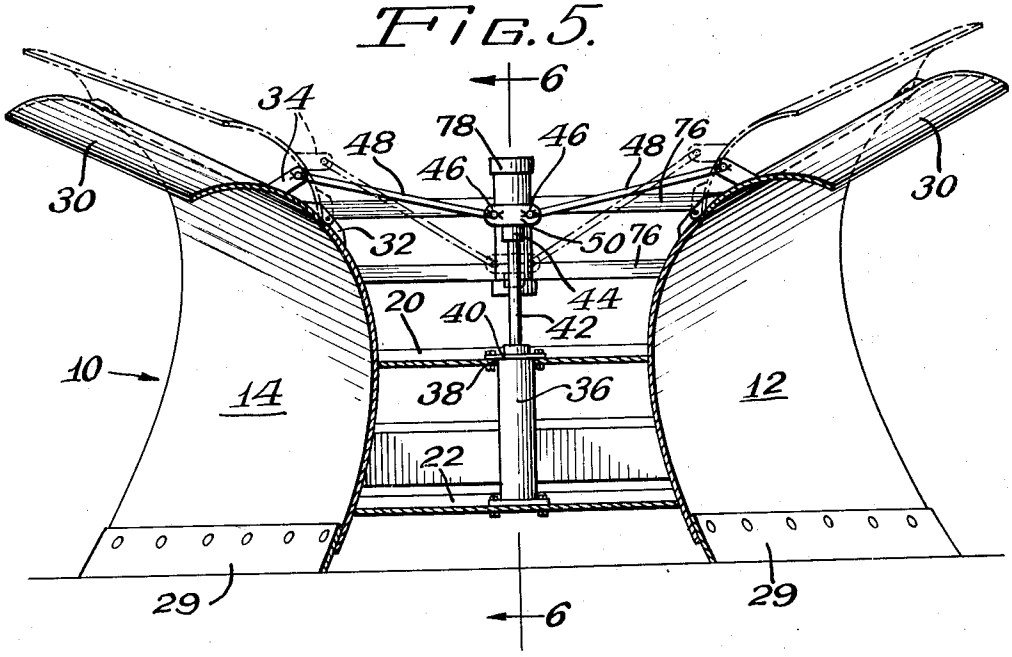
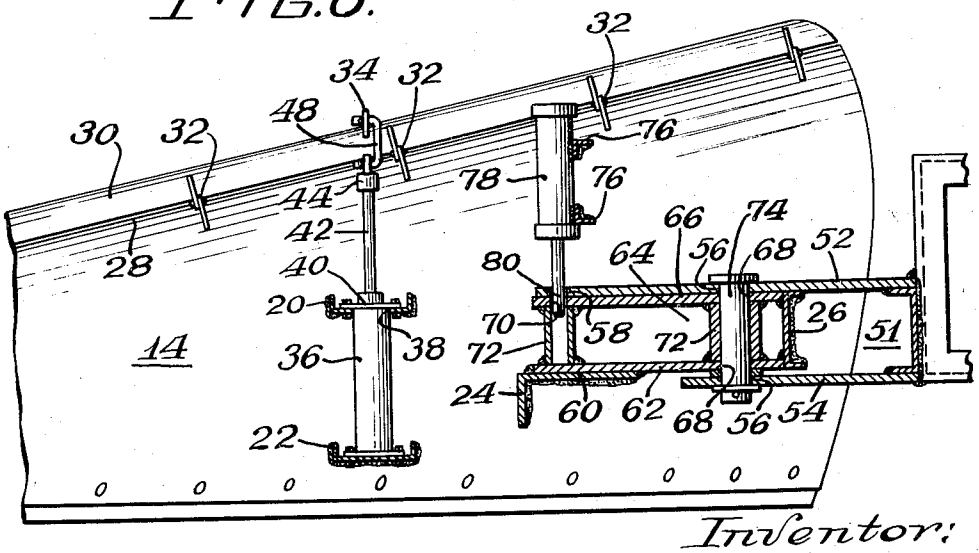


FIG. 6.



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2,904,904

ADJUSTABLE SNOW PLOW

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Application January 4, 1956, Serial No. 557,386

3 Claims. (Cl. 37—44)

This invention relates to a high speed snow plow of novel construction and adapted for control by the driver from within the cab of a propelling truck or prime mover for a wide variety of adjustments to meet various conditions which may be encountered in use.

Snow plows now in use, particularly for the clearing of highways, require relatively high speed travel due to wider highways and, hence, greater areas to be cleared and due to the great increase in hard-surfaced roads and the necessity for frequent plowing to keep road surfaces clear, to meet the increasing traffic load and increasing average speed thereof.

Various types of highway snow removal plows are necessary in a typical seasonal use in snow areas. Light, powdery snow, for example, is best removed with plowing equipment that is not satisfactorily suitable for removal of heavy, wet snow. If snow has become packed by traffic, glazed by surface freezing and the like, a heavier and more difficult problem of snow removal is presented than if light, newly fallen and unpacked snow is encountered. So too if light, powdery snow is encountered, it will, unless directed away from the driver, fly in clouds against the windshield of the truck or prime mover, obscuring the vision of the driver thereof. It is a greater problem also in snow plows, particularly those of high speed characteristics, that heavy packed snow tends to adhere to and block plow faces which are most suitable to directing light snow rapidly to the side of the plow rather than to permit such snow to fly in clouds against the windshield of the prime mover.

Under these varying conditions of the snow removal load to be encountered, it is commonly necessary to utilize different equipment or to make many manual and semi-permanent adjustments or replacements of portions of equipment when each such type of snow fall occurs or is encountered.

It is also a well-known fact that snow plow equipment which travels at high speed and must traverse considerable road mileage per day is very likely to encounter several varieties of snow load in the territory which it covers. Thus, the snow fall on a highway may be light and powdery for several miles, heavy and relatively wet in another portion, heavy drifted in certain areas, roadside drifted with clear central roadways in other portions, and so heavy and packed in other portions as to require narrower paths to be cleared and re-traversed in other areas, all within the territorial limits which may be assigned for clearance by a single piece of equipment.

The present invention is designed to meet these varied conditions with a single piece of snow removal equipment in which adjustments in the plow itself to meet such variances may be made quickly through mechanical or hydraulic means by the driver of the truck or prime mover from the cab of the propelling vehicle and with a minimum of manual adjustment.

Accordingly, it is an object of the present invention to provide a snow plow blade having a V-type moldboard which may be converted readily through mechanical and hydraulic means to a single blade right-hand throw plow blade or to a single blade left-hand throw plow blade.

It is a further object of the present invention to provide means to vary the width of sweep of the plow when used as a single direction throw blade so that it may sweep a wide variety of path widths as desired and to provide means for making such adjustments by the driver without the necessity of his leaving the cab of the propelling vehicle.

Yet another object of the present invention is to provide a three-way plow having adjustable high speed deflector plates at the tops of the moldboards which may be hydraulically raised or lowered readily by the driver of the propelling vehicle to adjust the deflectors at the depth and type of snow which he encounters.

It is a further object of the invention to provide a widely adjustable three-way high speed snow plow which has a minimum of moving parts requiring maintenance or subjected to great wear and which can be built economically to meet the desired purposes.

Other objects and advantages of the snow plow of my invention will be apparent from the accompanying drawings and description of a snow plow embodying the present invention.

Fig. 1 is a top plan view of the plow, indicating in dotted lines a portion of the lower deck plate upon which the plow is mounted;

Fig. 2 is a top plan view of the plow shown in two adjusted positions for right or left plow discharge;

Fig. 3 is a front perspective view of one side blade surface of the plow;

Fig. 4 is a front perspective view of the V-shaped plow blade unit;

Fig. 5 is a sectional view which may be regarded as being taken along the line 5—5 of Fig. 1, looking in the direction of the arrows; and

Fig. 6 is a section which may be regarded as being taken substanitally along the line 6—6 of Fig. 5, looking in the direction of the arrows.

My invention comprises generally a V-type snow plow 10 which is formed by joining together at their forward ends a left-hand discharge snow plow moldboard 12 and a right-hand moldboard 14. The moldboards have the usual transverse curvature to meet the road surface at an acute angle and upper outward flare to throw the snow away from the plow. The two plows are furnished at their forward ends 16 with fins 18 angularly disposed on the forward edge of the moldboard at the desired angles of moldboard divergence. As assembled, the fins 18 lie flat against each other and afford a means of attachment of the two moldboards at their forward ends by bolts, welding, or other appropriate means.

Rearwardly of the joined points of the moldboards, the back or convex sides thereof are supported by the structural members 20, 22, 24 and 26 which extend horizontally between the moldboards and are welded at their ends to the back sides thereof. These structural members play other parts in my invention than simply supporting the angularity of my plow and the nature of these members will be more fully described in conjunction with such other purposes.

Removable and replaceable scraping edges 29 are provided on the bottoms of the moldboards for replacement as the edges are worn.

The upper edges 28 of the moldboards have deflectors 30 secured thereto by hinges 32. The deflectors extend the length of the upper edges and have about the same transverse curvature as the upper portion of the moldboards. The deflectors 30 each have secured to the back convex side thereof an ear 34 having a hole therein.

The structural members 20 and 22 are channel members horizontally oriented and vertically aligned in the same transverse plane as the ears 34. The member 22 has a double-acting hydraulic cylinder 36 secured thereto at its head end and the other ends is secured to member 20. An appropriate bore 38 is provided in the member 20 to permit the cap 40 of the cylinder to be secured on the upper side of the member 20. The cylinder is thus arranged so that the rod 42 thereof reciprocates vertically above the cylinder.

The hydraulic hoses, controls and pumps for this cylinder and other cylinders to be later described are not shown, these being conventional components and in no need of detailed description. The significant feature of the hydraulic mechanism is that the controlling valves thereof may be situated in the cab of the truck on which the plow is mounted and the plow manipulated entirely from the cab to meet a variety of circumstances, such as the condition of the snow, the particular way the snow lies on a highway, traffic, etc.

The upper end of the shaft 42 is furnished with a fitting 44 which has two punched ears 46 thereon. Rods 48 are bent through right angles at their ends and are secured by cotters 50 to the ears 46 at one end and the ears 34 on the deflectors at the other end.

When the shaft of the cylinder 36 is in retracted position, the rods 48 have a decided upward and outward inclination thereto so that, as the shaft 42 is extended upward, an outward force is applied to the ears 34 to move the deflectors 30 into a tighter curvature with respect to the body of the moldboards 12 and 14. Similarly, a retraction of the shaft 42 imparts a more open curvature to the deflector-moldboard assembly.

When the snow is light and loose, the tighter curvature permits a more effective throwing thereof to the side and creates a more compacted accumulation which is not so likely to be blown back across the road by the wind. On the other hand, in heavy, wet snow, a blade having this tight curvature will often clog up, necessitating frequent cleaning thereof. The more open curvature minimizes this clogging.

A further feature of my invention, also subject to hydraulic control from the cab, lies in the fact that my V plow may be used as such or be swung from side to side to convert it to a one-way plow, delivering either to the right or to the left.

The truck or prime mover mounting my plow is desirably furnished with a receptacle 51 comprising a pair of forwardly extending, vertically spaced horizontal plates 52, and 54, the plate 52 overlying the plate 54 and extending substantially farther forward. The plates 52 and 54 have vertically aligned large diameter holes 56 therein and the plate 52 has three holes 58 adjacent its forward edge, arranged circumferentially with respect to the hole 56. The member 24 has an angle section and provides a broad, flat upper surface 60. The member 26 is a channel section. A plate 62 which constitutes the lower member of a tongue 64 is welded centrally to the surface 60 of the member 24 and extends rearwardly and is welded against the back side of the member 26 at its lower edge. Another plate 66 vertically spaced above plate 62 and welded to member 26 constitutes the top side of the tongue. The plates 62 and 66 have large diameter vertically aligned holes 68 adjacent their rearward ends. The plate 66 has a single smaller hole 70 forwardly of the hole 68 therein. Tubular sections 72 are welded at their ends to the plate in alignment with the holes 68 and 70 to maintain the plates in spaced relation, to provide sockets for pins hereafter described, and to secure the plate 66 to the plate 62. Plate 66 is likewise welded at its rearward end to the member 26.

The primary load-bearing connection between the receptacle mounted by the snow-plowing vehicle and the tongue secured to the plow is made by a large diameter

headed pin 74 dropped through the aligned holes 56, in the receptacle and the hole 68 in the tongue. The plow is thus secured to the vehicle for pivotal movement about the pin 74.

A pair of angles 76 span the two moldboards approximately above the hole 70 in the plate 66. A two-way hydraulic cylinder 78 is secured, as by welding, to these angles with the shaft 80 thereof extending downwardly.

A third hydraulic cylinder 86 is also provided, the rod 88 of this cylinder being connected to a bracket 90 which in turn is secured to the forward edge of the top plate 52. The other end of the cylinder is attached to a bracket 94 which in turn is connected to the member 26.

The receptacle comprised of the plates 52 and 54 is desirably connected to an elevating mechanism associated with the truck rather than directly to the truck, which may be also hydraulically operated, but since such structure is old and plays no part in my invention, it has not been illustrated. It is possible that the blade be mounted directly to the truck.

The cylinders 78 and 86 are concerned with adjusting my plow for employment either as a V-plow or as a one-way plow throwing either to the right or to the left. My plow is illustrated in Fig. 1 for use as a V-plow. In Fig. 2 is illustrated the plow adjusted to either of its one-way positions, left-hand delivery in full lines and right-hand delivery in broken lines. To move the plow from its full line position to its broken line position, the cylinder 78 is operated to retract the shaft 80 out of the socket defined by the tubular member 72 and the hole 70 in the plate 66 and the hole 58 in plate 52. Thereafter, the plow unit is free to pivot about the pin 74. Operation then of the cylinder 86 to extend the shaft thereof results in a counterclockwise turning of the plow. As soon as the plow has been rotated to nearly its desired position, the cylinder 78 may be operated to move the shaft 80 downwardly to rest and ride on the top of plate 52. As soon as the shaft 80 registers with the left-hand hole 58 in plate 52, the shaft 80 drops down through the hole 58 and into the hole and socket 70 to lock the plow in the position of right-hand delivery. At this point, the cylinder 86 is idled and the plow is firmly locked in its one-way right-hand throw position by the pin 80.

The object of the provision of cylinder 78 and its associated shaft 80 is to avoid the necessity of the cylinder 86 having to carry the load and strains of the plow in operation in any of its three positions.

To reverse the plow to a left-hand throw position, the shaft 80 is retracted from its hole, the cylinder 86 is operated to swing the plow generally to its desired position and the shaft 80 is again extended to bear against the plate 52 until it comes into registry with the hole 58 therein, at which point it falls to lock the plow in its desired position.

It will be seen from the foregoing description that I have provided a snow plow which is exceedingly versatile in operation and adapted to meet a variety of the circumstances, both as to the snow to be removed and also to the roads to be cleared. The various adjustments of the plow to accommodate it to these differing circumstances are all capable of being performed from the cab of the truck by hydraulic power and the operator of the truck need not leave the comfort of the truck cab or exert himself manually to make these adjustments.

I find it desirable that the angle of the blades with respect to each other and the angular position of the V-plow be adjusted in terms of the one-way operation.

It will be understood that there are many structural alternatives conceivable in the practice of my invention and I therefore prefer that my invention be regarded as being limited only as set forth in the following claims.

I claim:

1. A V-type snow plow comprising two one-way mold-

boards, one having a left-hand discharge and the other having a right-hand discharge, joined at their forward ends, bracing structure rearwardly of said ends between and spanning said moldboards, deflectors hingedly secured to the upper edges of said moldboards, and a remotely operable hydraulic cylinder mounted to said bracing structure and connected to said deflectors to move said deflectors between a position of tighter curvature as between said moldboard and said deflector and more open curvature.

2. A V-type snow plow comprising two one-way moldboards, one having a left-hand discharge and the other having a right-hand discharge, joined at their forward ends, said moldboards having a transverse radius of curvature, bracing structure rearward of said ends between and spanning said moldboards, deflectors having approximately the same radius of curvature as said moldboards hingedly secured to the upper edges of said moldboards and extending substantially the full length thereof, and a remotely operable hydraulic cylinder mounted to said bracing structure and connected to said deflectors to move said deflectors to a position of extending said transverse curvature of said moldboards and a position retracted from said curvature-extending position.

3. A V-type snow plow comprising two one-way moldboards, one having a left-hand discharge and the other a right-hand discharge, joined together at their forward ends, bracing structure rearward of said ends between and spanning said moldboards, transversely outwardly curving deflectors hingedly secured to the upper edges of said moldboards, a remotely operable hydraulic cylinder vertically mounted to said bracing structure and having an upwardly extending shaft, members extending from said shaft respectively to the deflector secured to each of said moldboards, reciprocation of said shaft causing said moldboards to swing outwardly to extend the transverse curvature of said moldboards and to retract said moldboards from said curvature-extending position.

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