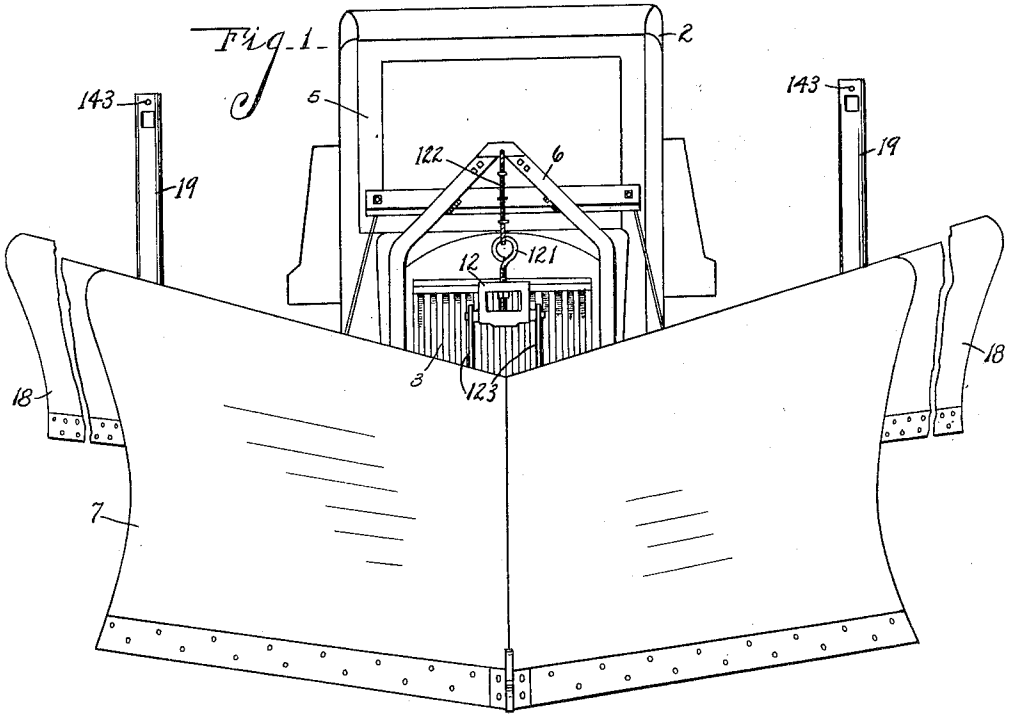
Sept. 19, 1933. E. A. WEEKS 1,927,078

SNOWPLOW

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Fig. 1.



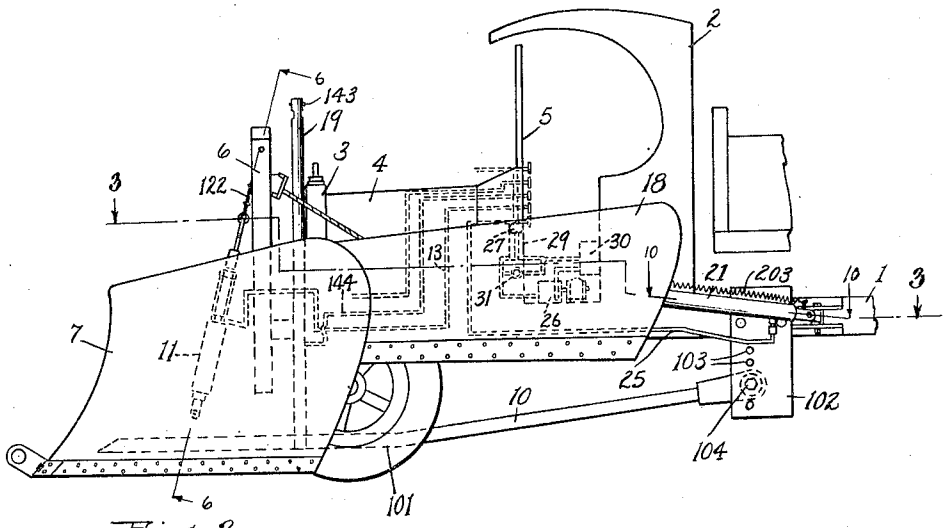


Fig. 2.

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SNOWPLOW

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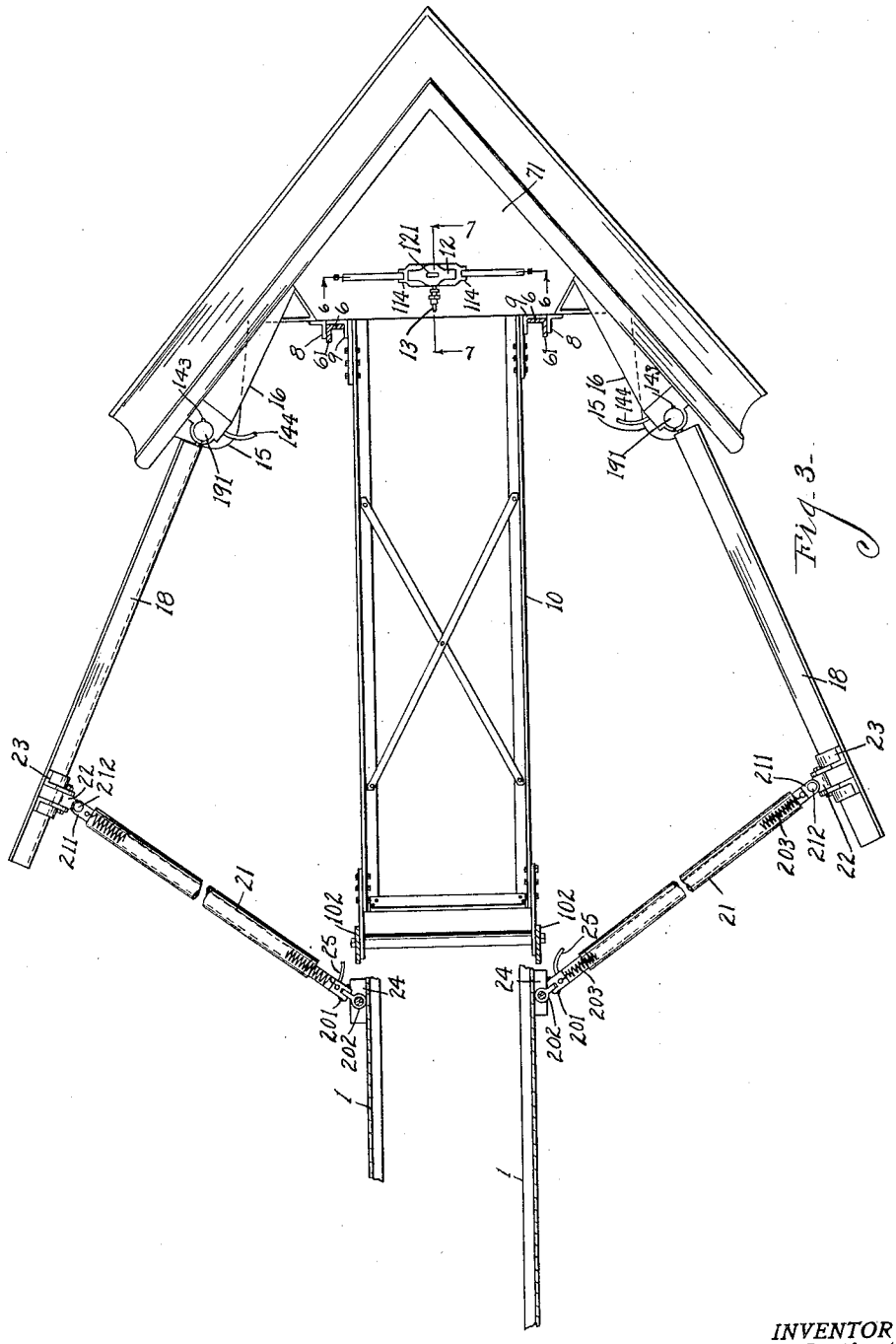


Fig. 3.

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SNOWPLOW

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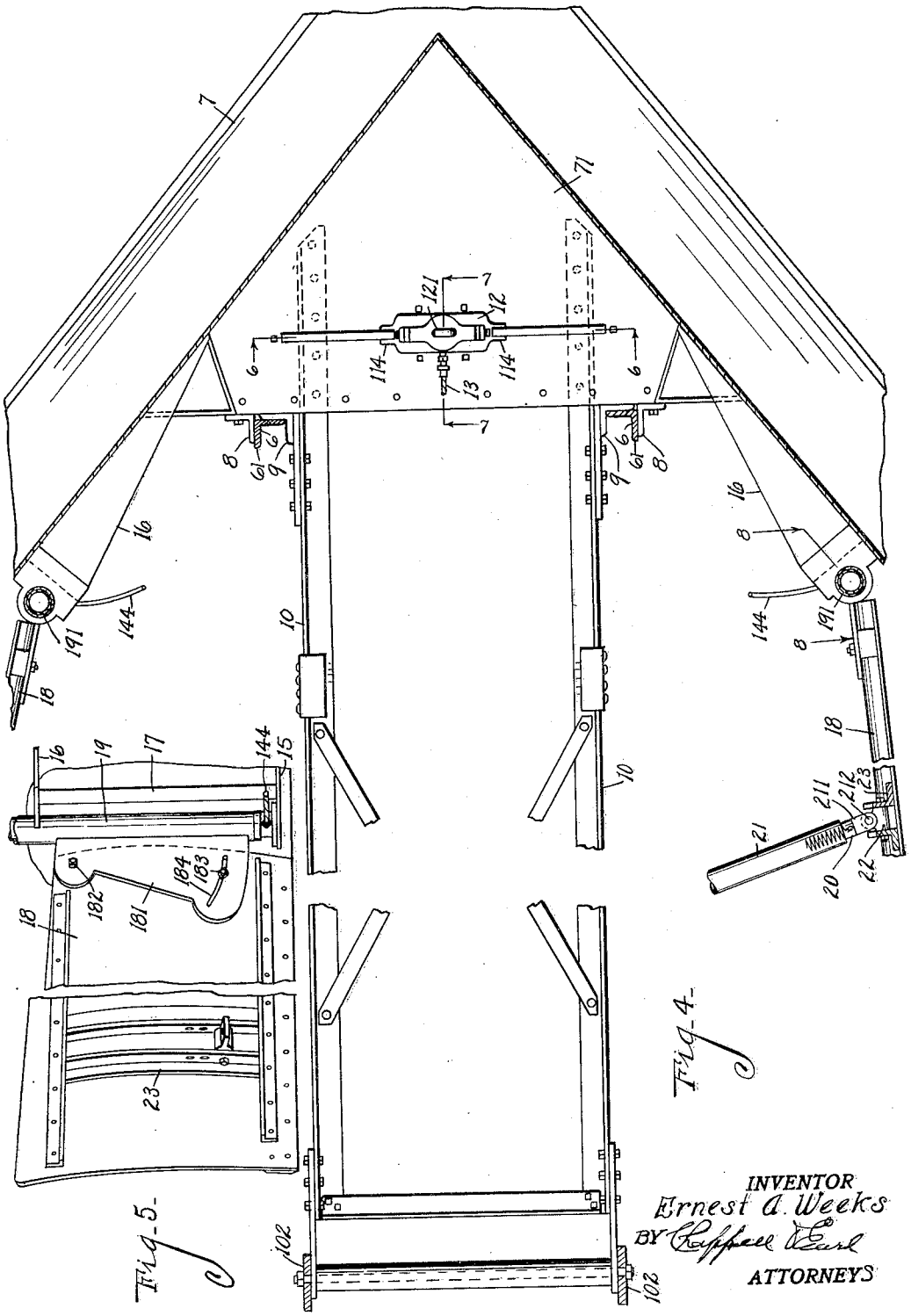


Fig. 4.

Fig. 5.

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SNOWPLOW

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Fig. 6.

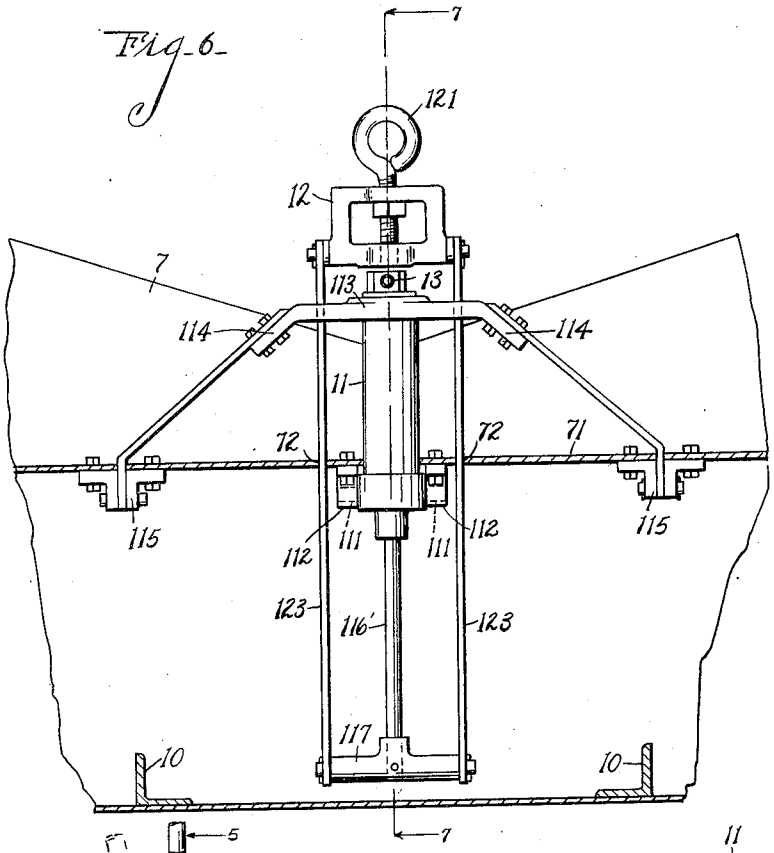
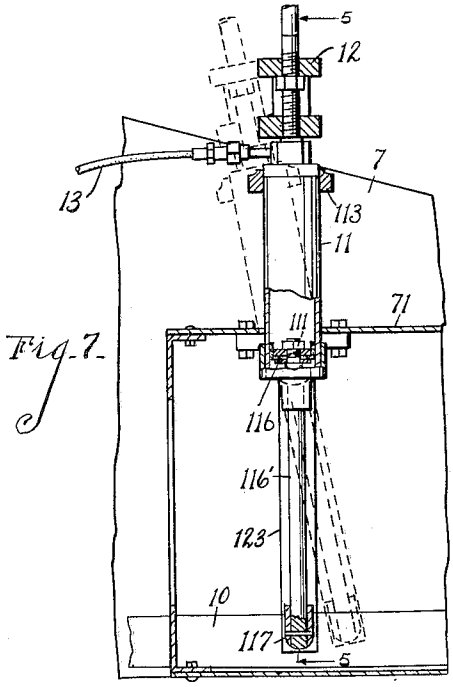


Fig. 7.



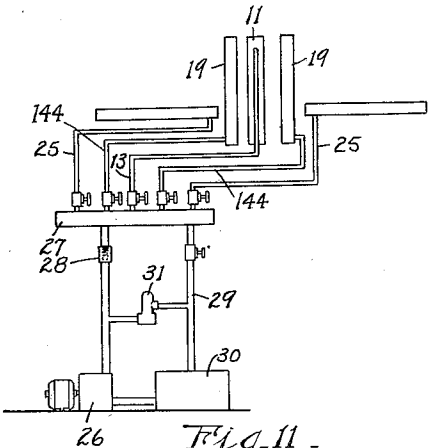


Fig. 11.

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SNOWPLOW

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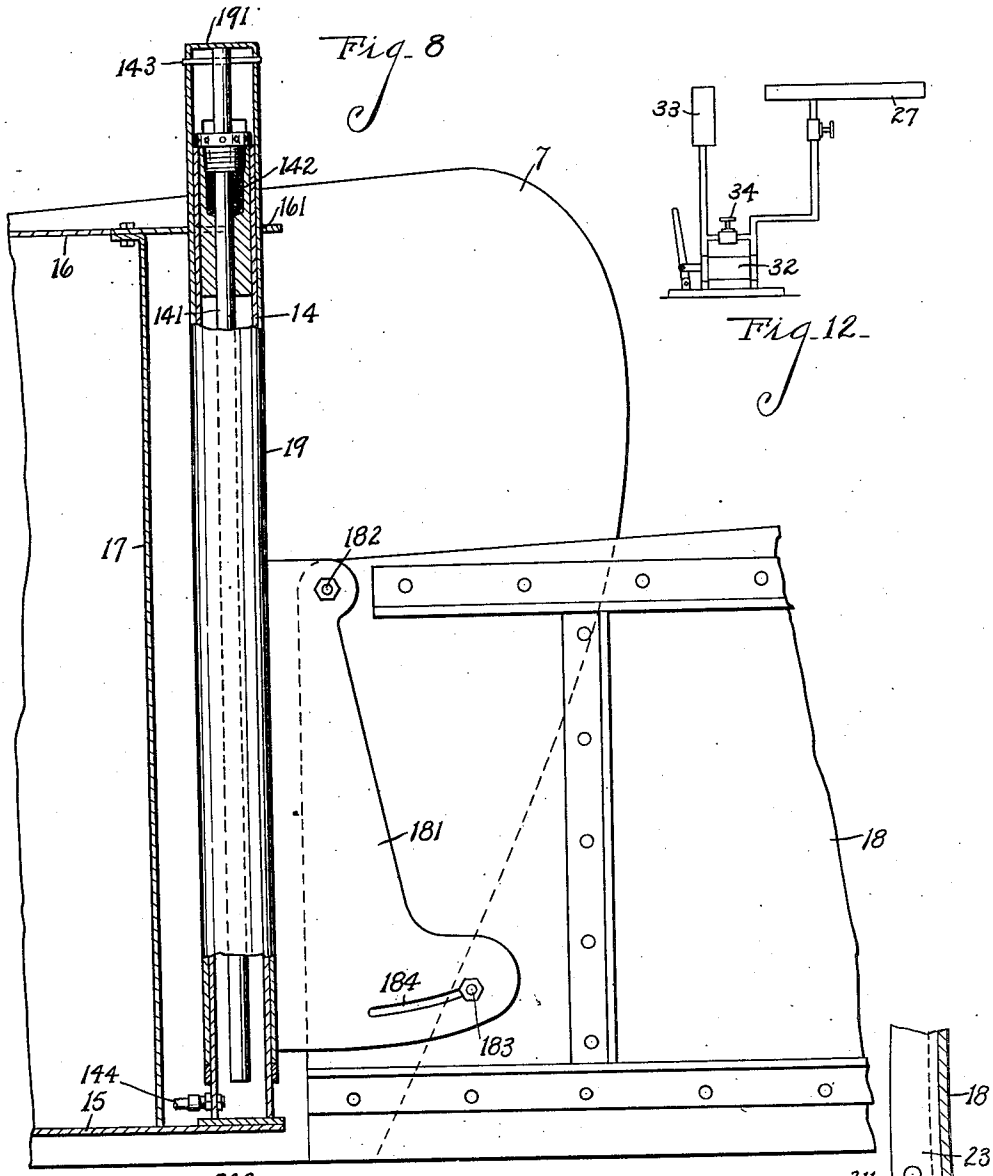


Fig. 8

Fig. 12

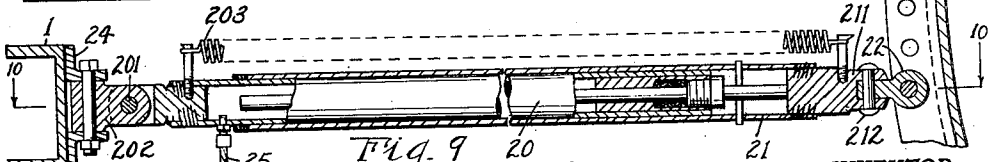


Fig. 9

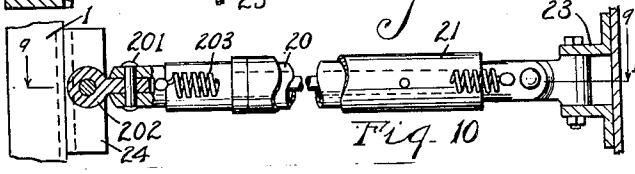


Fig. 10

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Patented Sept. 19, 1933 1,927,078

UNITED STATES PATENT OFFICE

1,927,078

SNOWPLOW

Ernest A. Weeks, Kalamazoo, Mich., assignor to Root Spring Scraper Company, Kalamazoo, Mich.

Application February 13, 1930. Serial No. 428,020

7 Claims. (Cl. 37—44)

The objects of the invention are:

First, to provide an improved snow plow adapted for motor truck or tractor use.

Second, to provide a snow plow with improved hydraulic or power control.

Third, to provide such a snow plow with convenient and effective means of raising and lowering the whole plow structure.

Fourth, to provide such a plow with improved side wings and a hydraulic or power means for controlling their elevation.

Fifth, to provide such an improved snow plow with power or hydraulic means for controlling the angle of the wings.

Sixth, to provide such a complete structure subject to hydraulic control by hand or power pump.

Objects pertaining to details of construction of the plow and economies of the structure and its operation will definitely appear from the detailed description to follow.

A preferred embodiment of my invention is fully illustrated in the accompanying drawings, in which:

Fig. 1 is a front elevation of my improved snow plow as attached to a truck, the side wings being shown in broken section and in elevated position.

Fig. 2 is a detail side elevation view of the front portion of the truck with my improved snow plow in position, certain parts being indicated by dotted lines and the snow plow being in lowered position and the wings in elevated position.

Fig. 3 is a detail plan view partially diagrammatic of my improved snow plow with the side control hydraulic means in broken section, portions only of the truck frame being indicated diagrammatically, the same being taken on a section corresponding to line 3—3 of Fig. 2. The nose of the plow is shown in full lines.

Fig. 4 is an enlarged detail sectional plan view of the nose of the plow and adjacent parts, taken on the same plane as Fig. 3, the plow itself also being shown in section and the hinged adjusting frame of the plow and hydraulic cylinders being in broken section.

Fig. 5 is a detail inside view of one of the wings in broken section.

Fig. 6 is an enlarged detail sectional elevation view taken on line corresponding to line 6—6 of Figs. 2, 3 and 4.

Fig. 7 is an enlarged detail sectional view of the main hydraulic cylinder and control for the elevation of the plow taken on line 7— Figs. 3, 4, and 6.

Fig. 8 is an enlarged detail of the hydraulic cylinder wing control with the upper and lower portions of the cylinder in section and with parts of the adjacent plow in section, taken on the irregular plane indicated by section line 8—8 in Fig. 4.

Fig. 9 is an enlarged detail view partially in section, on line 9—9 of Fig. 10 of one of the hydraulic cylinders and plungers for controlling the angle of the spread of the wing, the same being shown in broken section.

Fig. 10 is a similar sectional view on line 10—10 of Figs. 2 and 9, the same being shown in broken section.

Fig. 11 is a detail diagram of the hydraulic pump and connections for operating the various hydraulic cylinders.

Fig. 12 shows modification of the structure of Fig. 11 for the use of a hand pump.

The parts will be identified by their numerals of reference which are the same in all the views.

1, 1 are the side bars of the truck chassis or frame. 2 is the cab, 3 the radiator, 4 the hood, and 5 the dash, all of usual construction. Secured to the front of the chassis and in front of the radiator is the supporting frame 6. 7 is the main V-shaped plow. It is supported by a suitable interior framework not necessary to describe except the bracing platform 71.

The plow is provided with side guides 8, 8 and 9, 9 which embrace projections 61 of the frame 6 which serves to guide the same up and down and affords the contact means for pushing the plow. The plow is carried by the adjusting frame 10 which is secured to the base of the plow and has a slightly angular portion 101. The side bars of the frame are carried by hangers 102 secured to the sides of the frame 1. These hangers are provided with a series of holes 103 to receive the adjusting pin 104 for adjusting the elevation of the rear end of the adjusting frame 10, see Fig. 2.

Secured to the bracing deck 71 is the hydraulic cylinder 11, being carried by trunnions 111 in suitable bearing 112 on the underside of the said deck. The head of the cylinder 113 carries laterally projecting arms 114 which are secured to pivot bearings 115 at each side in alinement with the trunnion 111, so that the cylinder, while it is very firmly braced in central position, is free to oscillate back and forth.

The cylinder is provided with a piston 116 and downwardly projecting piston rod 116′ which carries a crosshead 117 at its lower end. A head 12 carries an eye-bolt 121 by which it is attached to the upper central part of the frame 6 by suitable cable 122. This head is connected by links

123 which are disposed through apertures 72 in the deck 71 to the crosshead 117. This permits the cylinder to raise and lower on the piston 116.

A supply pipe connection 13 connects to the upper end of the cylinder 11. The cylinder is shown in elevated position in Fig. 6, it having been raised by the introduction of hydraulic pressure through the connection 13.

14, 14 are the hydraulic cylinders for controlling the elevation of the wings. These are carried on projecting brace brackets 15 secured to the inside of the main plow and by brackets 16 apertured at 161 to loosely embrace and permit the reciprocation of the upper end of the hydraulic cylinder and associated parts, the whole being rigidly supported by the bracing bracket 17 at the inner portion of the rear side of the main plow.

The adjustable side wings 18 are carried on adjustable sleeves 19 which embrace the said hydraulic adjusting cylinders 14. The said sleeves are also embraced along with said hydraulic cylinders by the bracket 16 so that the sleeves reciprocate freely up and down through the apertures 161. The hydraulic cylinder 14 is provided with a plunger 141 which as here constructed is a round cold-rolled bar one and one-eight inch in diameter. This extends through a regular stuffing box 142 carried at the upper end of the hydraulic cylinder 14. The upper end of the sleeve 19 is closed at 191 and the plunger 141 abuts against the same and is retained in engagement therewith by the cross pin 143 through the wall of the sleeve 19.

The wing is provided with an attaching member 181 which is electrically welded to the side of the sleeve 19. The wing is pivoted at 182 and is held in angular adjustable relation by the bolt 183 in the slot 184, see Fig. 8. A pipe connection 144 supplies fluid, preferaby oil, to the hydraulic cylinder, putting pressure on the plunger to elevate the wing.

It will thus be seen that by introducing oil under pressure through pipe 144 the plunger 141 will be forced upwardly and because of its connection, it will carry the sleeve 19, which serves as the vertical pivot for the wing, up and down, thus raising and lowering the entire wing to any height desired by the simple expedient of introducing oil under pressure through the pipe 144. When the pressure is released, the weight of the parts causes the plunger to return and the wing to drop down.

The working angle of each wing 18 is also controlled by power means which consists of a hydraulic power cylinder 20 at each side. These are in all essential particulars the same as the hydraulic cylinders for raising the wings. This hydraulic cylinder is disposed inside of a telescopic sleeve 21. The head 211 of the sleeve 21 is provided with a vertical pivot 212 which connects to a shackle 22 carried by a bracket 23 on the inside of the wing. The inner end of the cylinder 20 is connected by pivot 201 to a shackle 202 carried by bracket 24 on the side rail 1 of the truck chassis. A supply pipe 25 leads to each power cylinder for supplying the fluid thereto.

As these cylinders 20 are operating in more nearly horizontal relation, it is necessary to provide return springs 203 which are here shown in self-contained structures. Spring means might be provided for returning the wings independent of these springs, thus avoiding the necessity of the return springs on the hydraulic cylinders.

Because these hydraulic cylinders are thus connected by universal joint at each end, the raising and lowering of the wings is not interfered with and the wings may be elevated without regard to the angle of their adjustment and the angle of their adjustment may be varied independent of the elevating means, thus providing the complete control for the wings.

The hydraulic power is preferably provided by an electric pump 26 which delivers oil to a header 27 past a check valve 28. A return 29 from the header leads to the supply tank 30 from which the pump 26 delivers the oil. A safety relief valve 31 is provided.

The pipes referred to connect to the various hydraulic cylinders and lead from the header. The central one 13 leads to the cylinder 11 for controlling the elevation of the plow. The lateral pipes 144 at each side lead to the wing elevating cylinders 14 and control the height of the wings. The side pipes 25 lead to the wing control cylinders 20 for controlling the working angle of the same.

Suitable globe valves are provided to admit the oil to any cylinder desired and to shut it off to hold the cylinder at the point adjusted.

While I have shown this with electric power pump, many trucks are provided with hydraulic dumps and in place of the electric pump, the power pump means for the hydraulic dump will then be made use of. The part referred to in Fig. 11 is diagrammatic to show details.

In Fig. 12 a hand pump 32 is shown diagrammatically with a supply tank 33 and a by-pass 34 to control the delivery of the oil to the header 27.

From this description it will be seen that the operator of this improved plow has all of the parts completely under control from the seat of the driver. He releases the pressure in the hydraulic cylinder 11 and permits his polw to drop down to any level required. By closing the valve the same can be stopped at any point desired. He then, by controlling the inlet to the cylinders, controls the elevation of the winds, and adjusts them to any height desired, closing the valves to hold them in the required position. He then admits oil under pressure through the connections 25 to the wing control cylinders and projects them to any angle desired. He is then in position to operate the plow to plow through the middle of the road and by the action of the wings cut off the banks at each side. If he comes to a high, heavy bank, he can at once raise the wings so as not to overload them. When he has passed the heavy bank he can at once lower the wings to plow off the top of the banks at lower level. After passing the plow through, if it is desired to give greater spread, he can at once adjust the angles of the wings outward and drop them down. He can do all of these operations independently, each movement of every other, by simply controlling the supply of oil to any of the various hydraulic cylinders. A wing can be collapsed into the side of the truck to conveniently pass an automobile on the highway and can be at once drawn out again into plowing position afterwards.

I have described my invention in a preferred form. I have illustrated it on a truck with various parts attached to the truck. The attachments can be variously made, but I have shown a preferred form. The whole structure may be made self-contained so that it is readily attached as a unit, although I have shown the side wing cylinders attaching independently of the plow to

the chassis frame. The structure is adapted for use on tractors by very slight change as will be obvious. The various features can be used all in combination as illustrated, or independently. They are capable of independent use, giving the benefit of each improvement to the structure to which it may be applied.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a snow plow structure, the combination of an automobile truck, a V-plow, a hinged adjustable connection frame therefrom to the chassis of said automobile truck, pusher connections at the front for advancing the same, a suspending frame at the front of the chpssis, a hydraulic cylinder mounted on suitable trunnions on the sail plow, a piston therein with downwardly extending piston rod with crosshead at the lower end, a head connected to the suspending frame and connecting links from the said head to the said crosshead whereby the plow is raised by introducing hydraulic pressure into the cylinder to control the elevation thereof, lateral wings to the said plow comprising blade portions pivoted at their upper inner angles to inner supports with means for adjusting the same, pivot sleeves for supporting the same, a hydraulic cylinder disposed within the pivot sleeve of each wing and secured to suitable bracket in the lower part of the said V-plow, a bracket loosely engaging the said hydraulic cylinder and pivot sleeve at the upper end whereby the sleeve can reciprocate therethrough, a plunger carried by the said sleeve and disposed through a suitable stuffing box within the said cylinder, connections for introducing oil under pressure into the bottom of each of said cylinders for elevating and controlling the height of said wings, hydraulic cylinder connections at each side of the snow plow connected to control the angle of said wings, pipe connections thereto for controlling the supply of oil under pressure thereto, return springs for returning the said plungers and withdrawing the said wings, and hydraulic pressure means with suitable pipes leading to the said hydraulic cylinders with valves for controlling the same.

2. In a snow plow structure, the combination of an automobile truck, a V-plow, a suspending frame at the front of the chassis of said automobile truck, a hydraulic cylinder mounted on suitable trunnions on the said plow, a piston therein with downwardly extending piston rod with crosshead at the lower end, a head connected to the suspending frame and connecting links from the said head to the said crosshead whereby the plow is raised by introducing hydraulic pressure into the cylinder to control the elevation thereof, lateral wings to the said plow, pivot sleeves for supporting the same, a hydraulic cylinder disposed within the pivot sleeve of each wing and secured to suitable bracket in the lower part of the said V-plow, a bracket loosely engaging the said hydraulic cylinder and pivot sleeve at the upper end whereby the sleeve can reciprocate therethrough, a plunger carried by the said sleeve and disposed through a suitable stuffing box within the said cylinder, connections for introducing oil under pressure into the bottom of each of said cylinders for elevating and controlling the height of said wings, hydraulic cylinder connections at each side of the snow plow connected to control the angle of said wings, pipe connections thereto for controlling the supply of oil under pressure thereto, return springs for returning the said plungers and withdrawing the said wings, and hydraulic pressure means with suitable pipes leading to the said hydraulic cylinders with valves for controlling the same.

3. In a snow plow structure, the combination of an automobile truck, a V-plow, a suspending frame at the front of the chassis of said automobile truck, a hydraulic cylinder mounted on suitable trunnions on the said plow, a piston therein with downwardly extending piston rod with crosshead at the lower end, a head connected to the suspending frame and connecting links from the said head to the said crosshead whereby the plow is raised by introducing hydraulic pressure into the cylinder to control the elevation thereof, lateral wings to the said plow, pivot sleeves for supporting the same, a hydraulic cylinder disposed within the pivot sleeve of each wing and secured to suitable bracket in the lower part of the said V-plow, a bracket loosely engaging the said hydraulic cylinder and pivot sleeve at the upper end whereby the sleeve can recprocate therethrough, a plunger carried by the said sleeve and disposed through a suitable stuffing box within the said cylinder, connections for introducing oil under pressure into the bottom of each of said cylinders for elevating and controlling the height of said wings, and hydraulic pressure means with suitable pipes leading to the said hydraulic cylinders with valves for controlling the same.

4. In a snow plow structure, the combination of an automobile truck, a V-plow, a suspending frame at the front of the chassis of said automobile truck, a hydraulic cylinder mounted on suitable trunnions on the said plow, a piston therein with downwardly extending piston rod with crosshead at the lower end, a head connected to the suspending frame and connecting links from the said head to the said crosshead whereby the plow is raised by introducing hydraulic pressure into the cylinder to control the elevation thereof, and hydraulic pressure means with suitable pipes leading to the said hydraulic cylinder with valves for controlling the same.

5. In a snow plow structure, the combination of an automobile truck, a V-plow, lateral wings to the said plow, pivot sleeves for supporting the same, a hydraulic cylinder disposed within the pivot sleeve of each wing, and secured to a suitable bracket in the lower part of said V-plow, a bracket loosely engaging the said hydraulic cylinder and pivot sleeve at the upper end whereby the sleeve can reciprocate therethrough, a plunger carried by the said sleeve and disposed through a suitable stuffing box within the said cylinder, connections for introducing oil under pressure into the bottom of each of said cylinders for elevating and controlling the height of said wings, hydraulic cylinders with pivot connections at each side of the snow plow connected to control the angle of said wings, pipe connections thereto for controlling the supply of oil under pressure thereto, return springs for returning the said plungers and withdrawing the said wings, and hydraulic pressure means with suitable pipes leading to the said hydraulic cylinders with valves for controlling the same.

6. In a snow plow structure, the combination of an automobile truck, a V-plow, later wings to the said plow, pivot sleeves for supporting the same, a hydraulic cylinder disposed within the pivot sleeve of each wing, and secured to a suitable bracket in the lower part of said V-plow, a bracket loosely engaging the said hydraulic cyl-

inder and pivot sleeve at the upper end whereby the sleeve can reciprocate therethrough, a plunger carried by the said sleeve and disposed through a suitable stuffing box within the said cylinder, connections for introducing oil under pressure into the bottom of each of said cylinders for elevating and controlling the height of said wings, and hydraulic pressure means with suitable pipes leading to the said hydraulic cylinders with valves for controlling the same.

7. In a snow plow structure, the combination of an automobile truck, a V-plow, lateral wings to the said plow, pivot means for supporting the same, hydraulic cylinders with pivot connections at each side of the snow plow connected to control the angle of said wings, pipe connections thereto for controlling the supply of oil under pressure thereto, return springs for returning the said plungers and withdrawing the said wings, and hydraulic pressure means with suitable pipes leading to the said hydraulic cylinders with valves for controlling the same.

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