Feb. 9, 1932. G. E. DEAN 1,844,058

HYDRAULICALLY OPERATED ROAD SCRAPER

Filed Jan. 14, 1931 2 Sheets-Sheet 1

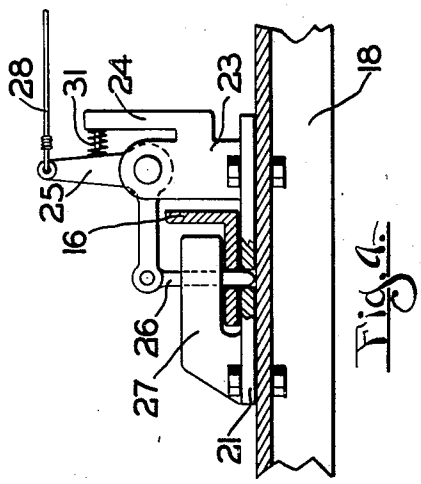


Fig. 4.

Fig. 1.

Inventor
George E. Dean
By Lawrence and Van Antwerp
Attorneys

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HYDRAULICALLY OPERATED ROAD SCRAPER

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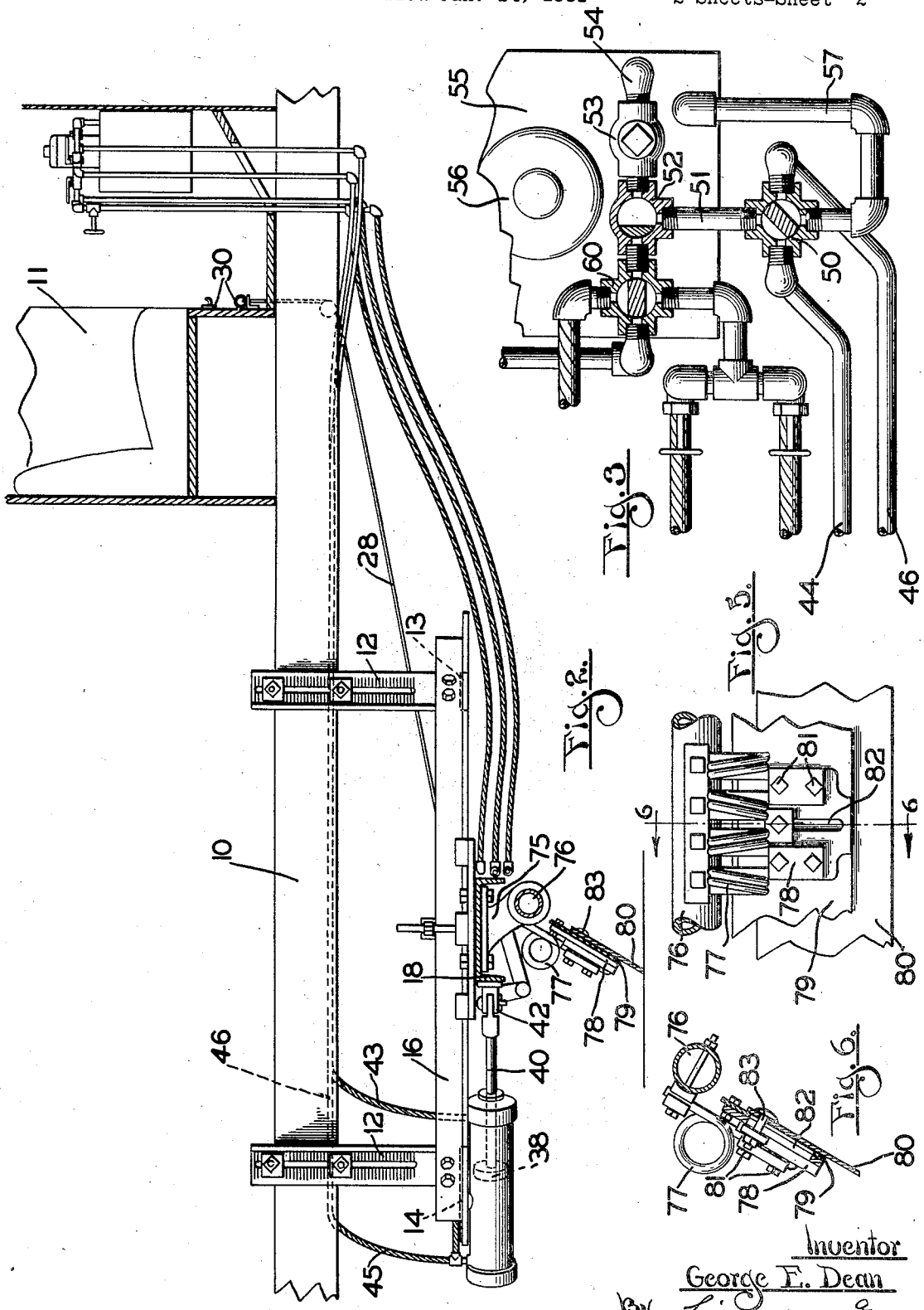


Fig. 3

Fig. 5.

Fig. 2.

Fig. 6.

Inventor
George E. Dean
By Livingston and VanAntwerp
Attorneys

Patented Feb. 9, 1932

1,844,058

UNITED STATES PATENT OFFICE

GEORGE E. DEAN, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO CHARLES G. WILLETT, OF GRAND RAPIDS, MICHIGAN

HYDRAULICALLY OPERATED ROAD SCRAPER

Application filed January 14, 1931. Serial No. 508,653.

This invention relates generally to road scrapers and more particularly to means for mounting the usual cross beam, this cross beam carrying the operative blade pivotally connected thereto.

One difficulty experienced in devices of this character resides in the fact that the cross beam is usually encumbered with appurtenances which render it extremely heavy and difficult to swing to proper position for its particular job. I overcome the above difficulty by so arranging the parts of my invention that the cross beam, together with its depending blade, is the only unit which needs to be swung during its adjustment and furthermore I provide means acting directly upon the cross beam to turn it to position. That is, there is no inefficient linkage or gearing connections between the prime mover and the cross beam with consequent loss of power through friction but on the other hand the piston rod is directly pivoted onto the cross beam.

A further advantage or feature which is in line with the advantages previously mentioned, resides in my novel means for turning the cross beam. This means consists of a double set of cylinders and pistons, one piston rod acting upon the cross beam at one side of the cross beam pivot, and the other piston rod acting at the opposite side of the main pivot point of the cross beam. By this construction I am able to obtain a proper turning moment on the cross beam regardless of its angular position. In other words as the leverage or moment due to one cylinder and piston decreases, the leverage or moment of the other prime mover increases slightly. Thus sufficient power is had at all times to easily swing or rotate the cross beam to its chosen position.

Still another advantage which I obtain is the equalization of the pressures within the respective cylinders. This is accomplished by the flexible cross conduits between the ends of either cylinder and the opposite end of the other cylinder. Thus, the cylinder, piston, etc., of each prime mover are under exactly the same pressure and hence may be economically designed.

Yet another minor but very important feature of my invention lies in my blade construction and arrangement. A supporting element or moldboard is positioned back of the scraper blade and serves two purposes, first, this moldboard prevents overflow of dirt or gravel or the like over the top of the blade, and, second, this moldboard serves as a backing or reinforcing member for the blade whereby the blade may be used until its height is much less than that of blades hitherto discarded.

Still further objects or advantages subsidiary or incidental to the aforesaid objects, or resulting from the construction or operation of the invention as it may be carried into effect, will become apparent as the said invention is hereinafter further disclosed.

Fig. 1 is a plan view of my invention applied to the side frame members of a truck chassis.

Fig. 2 is a side view of Fig. 1.

Fig. 3 is an enlarged plan view illustrating my novel hydraulic control system together with the pumping unit.

Fig. 4 is a view in cross section disclosing the cross beam locking unit.

Fig. 5 is a back view of a portion of the mounting for the scraper blade and its moldboard.

Fig. 6 is a view in cross section taken along the plane of the line 6—6 of Fig. 5.

Similar numerals refer to similar parts throughout the several views.

Referring particularly to Figs. 1 and 2, 10 designates the side frame members of a truck chassis, the chassis being equipped with the usual cab 11.

Vertical adjustable brackets 12 depend from the side frame members 10 and a member 13 connects the front set of brackets at their lower ends while a supporting element 14 connects the rear brackets similarly.

As clearly shown in Fig. 1, segment or track members 15 and 16 of angular cross section are bolted to and supported by the depending brackets 12. These track members are concentrically curved. The track element 16 has a number of holes 17 formed therein for the purpose of locking the cross

beam 18 in a chosen position as will later be described.

A shoe or slide member 19 is bolted to the beam at one end and has lugs overhanging the track element and an abutment 20 riding against the inner face of the track element. See Fig. 1. At the other end of the beam a similar member 21 functions similarly. A boss 23, see Fig. 4, is integrally formed with the abutment 22, and a bell crank 25 is pivotally mounted thereon.

A plunger 26 is pivoted to the horizontal arm of the bell crank and passes through the lug 27 which serves to guide the plunger vertically whereby its free end, tapered slightly, will be properly alined for entry into the desired one of the slots 17 previously referred to. An arm 24 extends upwardly from the abutment member 22 and a spring 31 between this arm and the vertical arm of the bell crank yieldingly holds the plunger against the track element. A flexible cable element 28 leads from the vertical arm of the bell crank 25, passes around the anti-friction idler pulley 29, and then leads to manual control means 30 located in the cab of the truck. See Fig. 2.

By pulling upon the cable 28 the plunger is withdrawn upwardly from the particular hole 17 in which it was engaged and the beam 18 is free for movement. When the beam has been moved to its desired position the control means 30 is released and the spring 31 presses the plunger downwardly against the track element and then the beam is again rotated until the plunger snaps into one of the holes 17. This last movement of the beam is through a very small arc.

The beam 18 has a link 32 pivoted thereto at 33, this link being of considerable length and pivoted at its other end about centrally of the cross member 13, previously mentioned. Numeral 34 indicates this last referred to pivotal connection.

The mechanism just set forth prevents the beam 18 from shifting longitudinally of the chassis and compels it to turn or rotate about its true center of rotation thereby rendering its movement extremely easy and free from any binding whatsoever.

Cylinders 34 and 35 are pivotally mounted at 36 and 37, respectively, upon the supporting element 14, previously referred to, and pistons 38 operate therein. Piston rods, 39 and 40, are pivotally connected to the cross beam 18 on opposite sides of the cross beam's pivot point 33 as indicated at 41 and 42, respectively.

A flexible conduit or hose 43 leads from the rear of the cylinder 34 to the front of the other cylinder 35 and continues to connect to the pipe 44. Another flexible connection 45 leads from the front of the cylinder 34 to the rear of the cylinder 35 and continues into a pipe 46.

Pipes 44 and 46 lead from opposite ports of the four-way valve 50 whereby they may alternately be supplied with hydraulic pressure through pipe 51, three-way valve 52, check valve 53, and outlet pipe 54. A pump unit 55 is driven by a motor 56 to supply suitable fluid under suitable pressure to actuate the pistons 38 in their respective cylinders. A return pipe 57 leads from the remaining port of the four-way valve 50 and serves to carry the fluid from the "dead" sides of the pistons as pressure is applied to the other "live" sides thereof.

The three-way valve 52 has a port leading to another four-way valve 60. This four-way valve 60, together with various other connections, serves to operate the blade structure through hydraulic means 71 but as such operating means is fully described and claimed in my application filed January 2, 1931, Serial No. 506,152, no detailed description will be set forth herein.

The cross beam 18 has depending brackets 75 which revolubly support the cross shafts 76 which in turn carry coiled springs 77. A cast plate 78, see Figs. 5 and 6, grips or clamps the lower ends of the coiled springs 77 by means of bolts 81, these bolts passing into a moldboard 79. The moldboard extends lengthwise a distance corresponding to the blade 80 and is installed at such a height as to prevent any overflow of dirt or the like thereover.

A slot 82 is formed through the cast plate and the moldboard and an adjusting means 83 passes therethrough and also through the plate as clearly shown in Fig. 6. Thus vertical adjustment of the plate may be had without movement of the moldboard thus obtaining the advantages previously stated.

The operation is readily understood. The cable 28 is first tensioned by the means 30 and locked in such tensioned condition.

Next, the motor 56 is operated, as by the usual storage battery of the truck, thereby supplying fluid under pressure. This fluid passes through the check valve 53 and into the three-way valve 52.

The three-way valve may be so operated as to prevent any fluid from passing therethrough, in which no operation of either of the hydraulic means occurs, or it may be turned so as to allow pressure fluid to flow to the blade operating mechanism, in which such operation will be had upon proper manipulation of the several controlling devices therefor, or thirdly, it may be located as shown in Fig. 3 of the drawings wherein pressure fluid is transmitted to the four-way valve 50.

The pressure is led through the pipe 44 to the front of cylinder 35 and the rear of cylinder 34. Simultaneously the opposite ends of the cylinders are connected through the hose 45 and this provides a common out-

let through the pipe 46, valve 50 and outlet pipe 57 into the pump unit 55.

The pressure fluid is equalized in both of the cylinders and remains equalized at all times thus giving a smooth and even flow of power to the pistons and their rods, these rods moving in opposite directions due to their connections being at opposed sides of the pivot point of the cross beam.

Having thus revealed this invention, I claim as new and desire to secure the following combinations and elements, or equivalents thereof, by Letters Patent of the United States.

I claim:

1. In a device of the class described, a pivotally mounted cross beam, a support, two cylinders pivotally mounted upon the support, pistons operating in either cylinder, interconnecting means between the respective pistons and the cross beam, said connections being made to the cross beam on opposite sides of its pivot point whereby movement of the pistons in opposite directions will cause movement of the cross beam in one direction and means for simultaneously moving the pistons in opposite directions.

2. A device comprising the elements as set forth in claim 1 in which the last mentioned means consists of a fluid under pressure and means to admit the same to opposite ends of the respective cylinders.

3. A device comprising the elements in combination of claim 1 and also having means for equalizing the pressure for moving one piston in one direction with the pressure for moving the other piston in the opposite direction.

4. A road scraper consisting of parallel frame members, track segments fixed to the said frame members, said track segments being curved concentrically, a cross beam, shoes rigid with the cross beam and riding upon the respective track segments, a member extending across the frame members, a link pivotally connected to the last mentioned member, means pivoting the free end of the link to the cross beam and means adapted to turn the cross beam about its mounting.

5. A road scraper comprising the elements in combination as recited in claim 4 in which the last mentioned means includes two pivotally mounted cylinders, pistons therein, means connecting the pistons and the cross beam and means to operate the pistons.

6. In a scraper having a pivotally mounted cross beam with a pivotally mounted blade thereon, the combination of hydraulic means to operate the blade, hydraulic means to operate the cross beam, a pressure pump, a three-way valve, pipes between two of the outlets of the valve and the two hydraulic means, and another pipe between the other outlet of the valve and the pressure pump.

7. A scraper as set forth in claim 6 in which the last mentioned pipe has a check valve therein.

8. In combination with a road scraper, a frame, a beam pivotally mounted thereon, locking means mounted upon the beam, means on the frame adapted to cooperate with the locking means whereby the beam may be locked in position, a flexible element leading from the locking means, and anti-friction means located substantially at the beam pivot, said flexible element passing around said anti-friction means.

9. In combination, a cross beam, means to pivotally mount the cross beam, a supporting element, a cylinder pivotally mounted upon the supporting element, a piston operating in said cylinder and means interconnecting the piston and the cross beam whereby movement of the piston causes movement of the cross beam about its pivot.

10. In a combination, a cross beam, means to pivotally mount the cross beam, a supporting element, two cylinders pivotally mounted at spaced points upon the supporting element, pistons operating in said cylinders, and means interconnecting each of the pistons to the cross beam whereby movement of the pistons causes movement of the cross beam.

11. In a road scraper the combination of a pivotally mounted cross beam, a support, two cylinders pivotally mounted upon the support, pistons operating in said cylinders, piston rods rigid with and extending from said pistons, and means for pivotally connecting the ends of the respective piston rods to the cross beam, said last mentioned pivotal connections being on opposite sides of the pivotal connection about which the cross beam swings.

12. In combination with a road scraper, a frame consisting of parallel side members, track members rigid with and extending from said side members, said track members being curved concentrically, a beam, shoes upon the beam riding upon the respective track members, a link pivoted to the beam intermediate the shoes and supporting means to pivotally engage the link at a point spaced from its beam pivot.

In testimony whereof I affix my signature.

GEORGE E. DEAN.