Jan. 29, 1935. E. P. STAMM 1,989,431

SCRAPER

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FIG. 1.

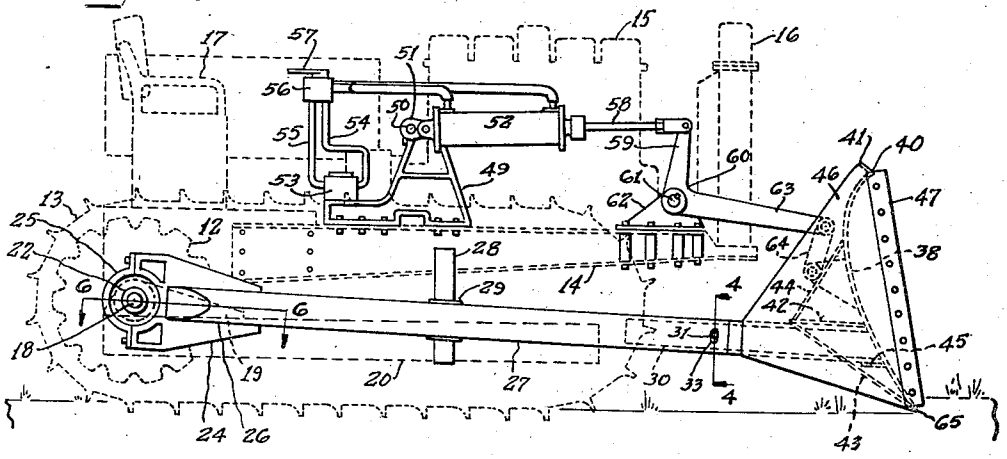


FIG. 2.

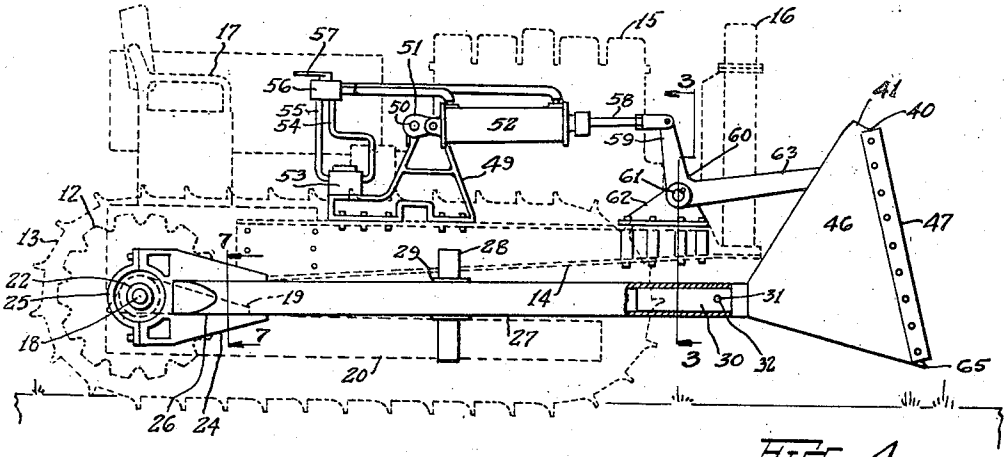


FIG. 3.

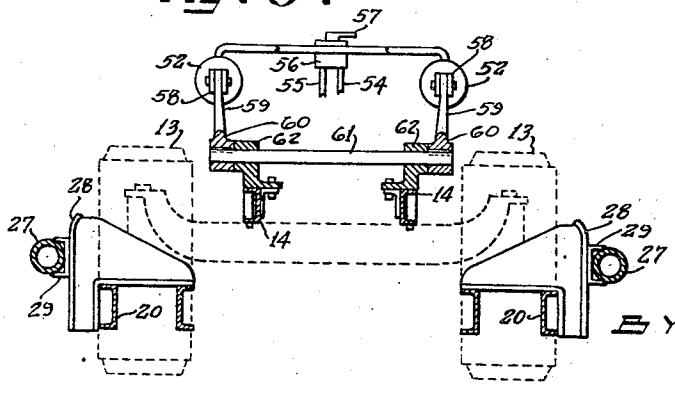
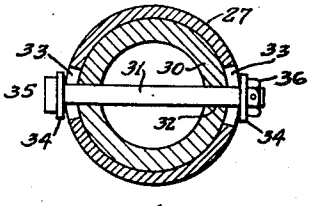


FIG. 4.



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FIG. 5.

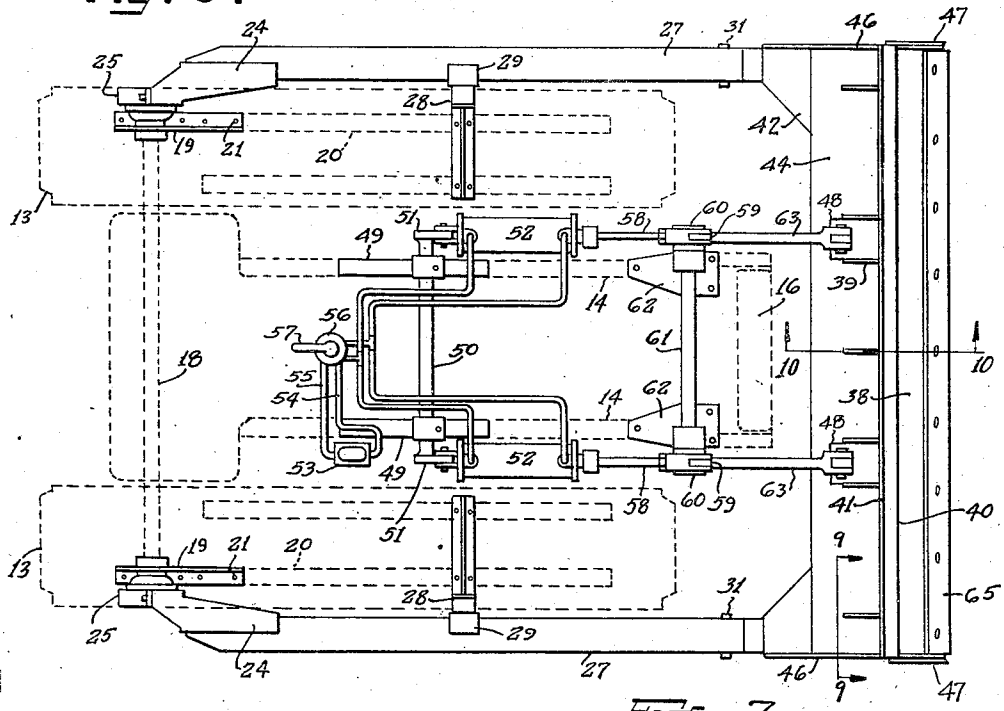


FIG. 6.

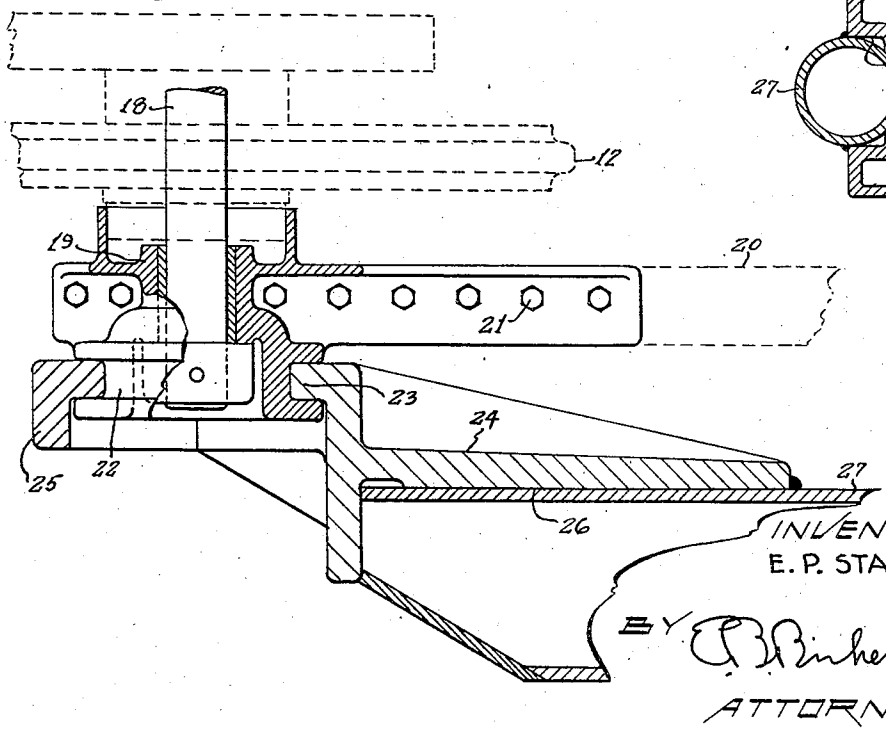


FIG. 7.

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FIG. 8.

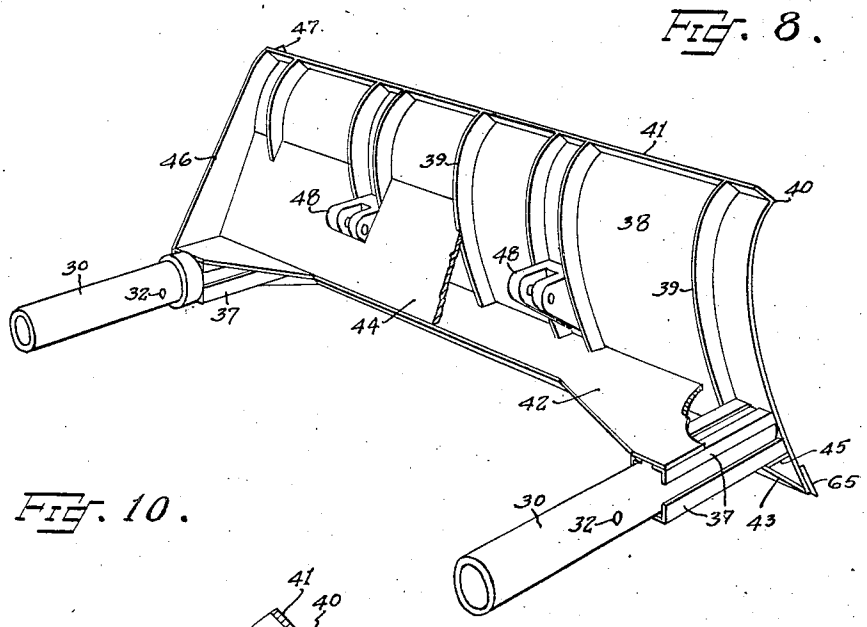


FIG. 10.

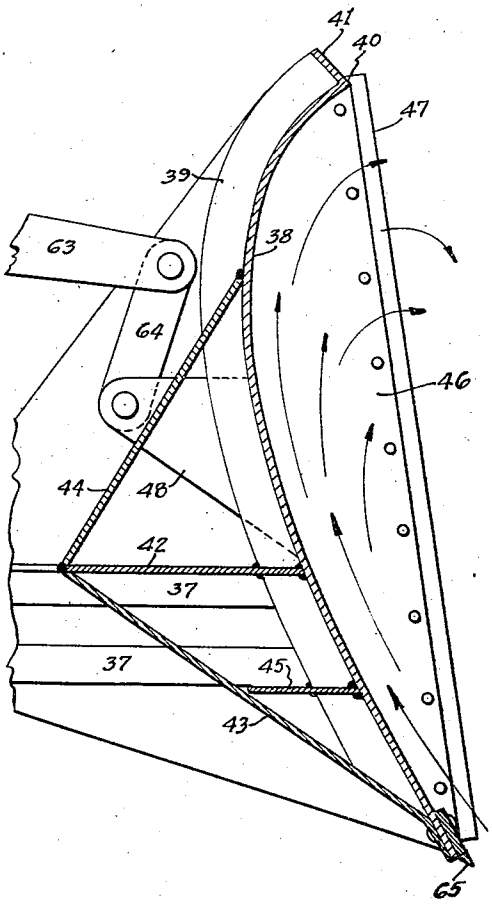
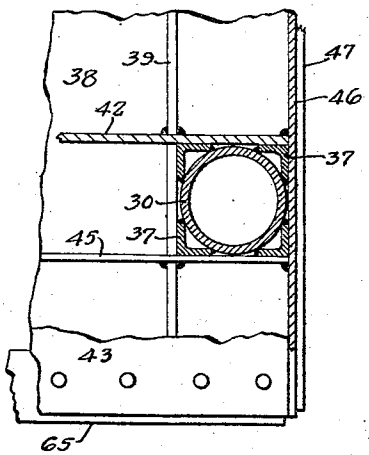


FIG. 9.



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UNITED STATES PATENT OFFICE

1,989,431

SCRAPER

Edward Philip Stamm, Cathlamet, Wash.

Application March 20, 1933, Serial No. 661,668

5 Claims. (Cl. 37—180)

This invention relates generally to excavating machinery, and particularly to scrapers.

The main object of this invention is the provision of an improved form of scraper of the pusher type adapted to be mounted on the forward end of a tractor.

The second object is the provision of an improved form of parabolic mould board for the purpose of moving dirt by a rolling action as opposed to a sliding action making same self-cleaning and permitting the movement of greater loads.

The third object is the provision of an improved form of mould board which will be extremely rigid in proportion to its weight.

The fourth object is to construct a scraper which will not foul with trash or rubbish.

The fifth object is to provide a scraper having side cutters adapted to reinforce the ends of the scraper mould board and improve the action thereof.

The sixth object is to so construct the scraper that it may be hydraulically operated and that it may be easily attached to or removed from a tractor thereby increasing the usefulness of the tractor itself.

The seventh object is to provide an improved form of pusher arms whose rear ends are pivoted concentrically with the rear shaft of the tractor.

The eighth object is to provide a scraper of the pusher type which will be exceeding flexible in its operation and not subjected to racking and twisting strains which such devices normally experience in ordinary operations.

The ninth object is to provide a form of lift for the scraper which will have a maximum amount of power at the time when the maximum amount of work must be performed.

These, and other objects, will become more apparent from the specification following as illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevation of the device showing the scraper in a lowered position.

Fig. 2 is a view similar to Fig. 1 but showing the scraper in a raised position.

Fig. 3 is a section taken along the line 3—3 in Fig. 2.

Fig. 4 is a section taken along the line 4—4 in Fig. 1.

Fig. 5 is a plan of the scraper.

Fig. 6 is a section taken along the line 6—6 in Fig. 1.

Fig. 7 is a section taken along the line 7—7 in Fig. 2.

Fig. 8 is a perspective view of the scraper with one of the end plates or side cutters removed and other portions broken away in section.

Fig. 9 is a section taken along the line 9—9 in Fig. 5.

Fig. 10 is a section taken along the line 10—10 in Fig. 5.

Similar numbers of reference refer to similar parts throughout the several views.

Referring in detail to the drawings, there is shown a common form of the crawler type of tractor whose wheels 12 are encircled by an endless track 13 which supports the tractor. The position of the main tractor frame 14, the engine 15, radiator 16 and driver's seat 17 are also indicated. The ends of the rear axles 18 journal in the sprocket bearings 19 which are secured to the track frame 20 by means of the bolts 21.

The sprocket bearings 19 have formed around their outer sides a grooved hub 22 each of which receives the flange 23 which forms a portion of the foot 24. Each foot 24 is provided with a removable cap 25. Each foot 24 is also provided with a channel 26 within which is welded, or otherwise secured, a tubular push arm 27 preferably of circular cross section. Each track frame 20 carries a vertical rub iron 28 which engages a rubbing plate 29 secured to the inner side of the push arm 27.

The forward end of each push arm 27 contains a tubular shank 30 which is capable of a limited rotary motion with relation to the arm 27, by reason of the fact that the bolt 31 which secures the members together passes through the holes 32 in the shank 30 and through the slots 33 in the arms 27. Suitable washers 34 are placed against the inner sides of the bolt head 35 and nut 36.

On each shank 30 are secured the four angle bars 37 which form the means for attaching the shanks 30 to the mould board 38 of the scraper. This board is in the form of a parabolic curve (as shown in Fig. 10) and is reinforced in a vertical direction by means of the curved ribs 39 which extend from the lower portion of the mould board 38 to its upper end 40 where they merge into a flange 41. The mould board 38 is reinforced longitudinally by a central plate 42 which is substantially horizontal when the scraper is in an operating position, and also by the two sloping plates 43 and 44, the former of which extends from the lower edge of the mould board 38 to the rearmost edge of the plate 42. The plate 44 extends from the rearmost edge of the plate 42 to a line along the rear of the mould

board 38 between the flange 41 and that portion of the mould board to which the plate 42 is attached. Directly below the plate 42 is an intermediate horizontal plate 45 which further reinforces the mould board 38 near its cutting edge. The central plate 42 is preferably cut out along its middle portion (as clearly shown in Fig. 8).

An end plate 46 covers each end of the mould board 38 maintaining its curved shape at its weakest portion and also holding it in its proper relation to the shank 30. Side cutters 47 are attached to each of the end plates 46. Between two pairs of ribs 39 are placed the link connections 48.

Mounted on the main frame 14 are the upright brackets 49 across which is placed a stationary non-rotatable cross tie 50 on whose outer ends 51 are attached the hydraulic cylinders 52 which are substantially in alignment with the link connections 48. A pump 53 has its pressure and suction lines 54 and 55 connected with the cylinders 52, under the control of a valve 56, which valve is of the type now in common use whereby fluid pressure from the pump 53 may be admitted to either end of the cylinders 52, and exhausted from the discharge end by the simple employment of the valve handle 57.

Each cylinder 52 is provided with a piston (not shown) whose rod 58 is connected to one arm 59 of a bell crank 60 which is pivotally mounted on a shaft 61 supported by brackets 62 on the forward end of the main frame 14. Each bell crank arm 63 is joined by a link 64 to its respective link connection 48.

Along the lower edge of the mould board 38 is secured the horizontal cutting blade 65.

The bell cranks 60 are securely keyed on the shaft 61 and operate in unison at all times

The operation of the device is as follows. Assuming that the scraper is in the position shown in Fig. 2 and it is desired to operate same in the position shown in Fig. 1, it is only necessary for the operator to manipulate the handle 57 which will permit a fluid pressure to be admitted to the rearmost end of both of the cylinders 52, moving the rods 58 forwardly and of course the bell crank arm 63 downwardly allowing the mould board 38 to be lowered. A reverse movement of the handle 57 will of course bring about a lifting movement of the mould board 38.

Owing to the arrangement of the push arms with relation to their point of hinging and the mould board itself it is clear that very little power is required to cause the blade 65 to bite into the soil the desired amount, and what power is required can be exerted under the most favorable position of the bell crank levers 60.

Obviously, it is seldom that the digging action is uniform along the length of the mould board 38 and there must be a slight yielding action of the scraper itself. In order to prevent this yielding action from becoming detrimental to the structure and in order to prevent any twisting strains from being imposed on the push arms 27 a limited rotation is permitted between the shank 30 and the arms 27 by the construction illustrated in Fig 4. It must be clearly understood that this scraper is not intended to be operated at any appreciable transverse slope relative to the tractor wheel axes, since this feature is not desirable in the class of machines in which this device belongs.

It will also be noted that the raising and lowering movements of the scraper are positively controlled, making it possible not only to obtain a better spreading action for the moved earth but also an increased digging action in difficult situations where the weight of the scraper is itself insufficient.

One of the outstanding advantages gained from the above described invention arises from the particular shape of the mould board itself whereby the dirt, instead of being pushed along in front of the mould board, actually rolls in the direction indicated by the arrows in Fig 10, making it possible to move greater quantities of dirt with less driving effort than was hitherto regarded as possible.

I claim:

1. A mould board for scrapers of the class described comprising a parabolically curved plate having its shortest radii uppermost and having projecting from the ends of its convex side nearest the cutting edge thereof, tubular shank members, a central longitudinal tie member secured to the rear side of said mould board and on the top side of said tubular shanks, inclined longitudinal tie members extending from the rearmost edge of said central tie toward portions of said mould board above and below said central tie, end plates forming chords across the ends of said mould board, and braces between same and said shank members, said end plates having side cutters on the forward edge thereof, said mould board having a cutter extending along the length of its lower edge, means for elevating said mould board with its lowermost cutter substantially parallel to the transverse wheel base of the propelling vehicle, and pusher arms extending between said shank members and the rearmost axle of said propelling vehicle about whose axis said pusher arms are pivotally connected, and means for preventing lateral movement of said pusher arms and the supported mould board with relation to the propelling vehicle.

2. A scraper of the class described comprising a parabolically curved mould board having its shortest radii nearest its uppermost edge and having said uppermost edge turned backwardly, said mould board having a bottom cutting edge along the length thereof, said mould board having a closed plate truss formed on the rearmost and lower portion of said mould board, said rearmost portion constituting the convex side, and end plates secured at opposite ends of said mould board covering said truss, and fastening means at each end of said truss for the connection of pusher arms.

3. A scraper of the type described comprising a mould board in the form of a parabolic curved plate having upright stiffening ribs disposed along the rear side thereof, and longitudinal stiffening plates also disposed along the rear side thereof, said longitudinal stiffening plates terminating at each end at a tubular shank having a rigid relationship to said plates, each of said shanks having a tubular push rod mounted thereon capable of a limited rotative movement with relation thereto, the opposite end of each push rod having means for pivotally attaching same at each end of the rear axle of the tractor and substantially concentric therewith.

4. The substance of claim 3, together with hydraulic means for positively moving said mould board in an upward or downward direction for the purpose of maintaining its cutting edge close to a plane passing through the rear axle of the tractor.

5. A scraper including a tractor of the crawler type having a mould board disposed in front thereof, said mould board being carried by a pair of pusher arms which are pivotally attached at the ends of the rear axle and pivotally connected to the mould board along the axes of the pusher arms, in combination with a pair of transversely spaced bell crank levers securely mounted on a common transverse shaft supported by the tractor frame, the forward end of each bell crank lever being joined by a link to the mould board and the upper end of each bell crank having a double acting hydraulic cylinder with connections thereto, said cylinders being mounted on the tractor frame, and means for admitting fluid under pressure to either end of said cylinders in unison whereby the cutting edge of said mould board will be held substantially in parallelism with the rear axle of the tractor.

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