Aug. 26, 1947. B. F. OWEN 2,426,410

FARM LAND BULLDOZER, SNOW PLOW, AND ROAD MAINTAINER

Filed May 10, 1945 2 Sheets-Sheet 1

Fig. 1.

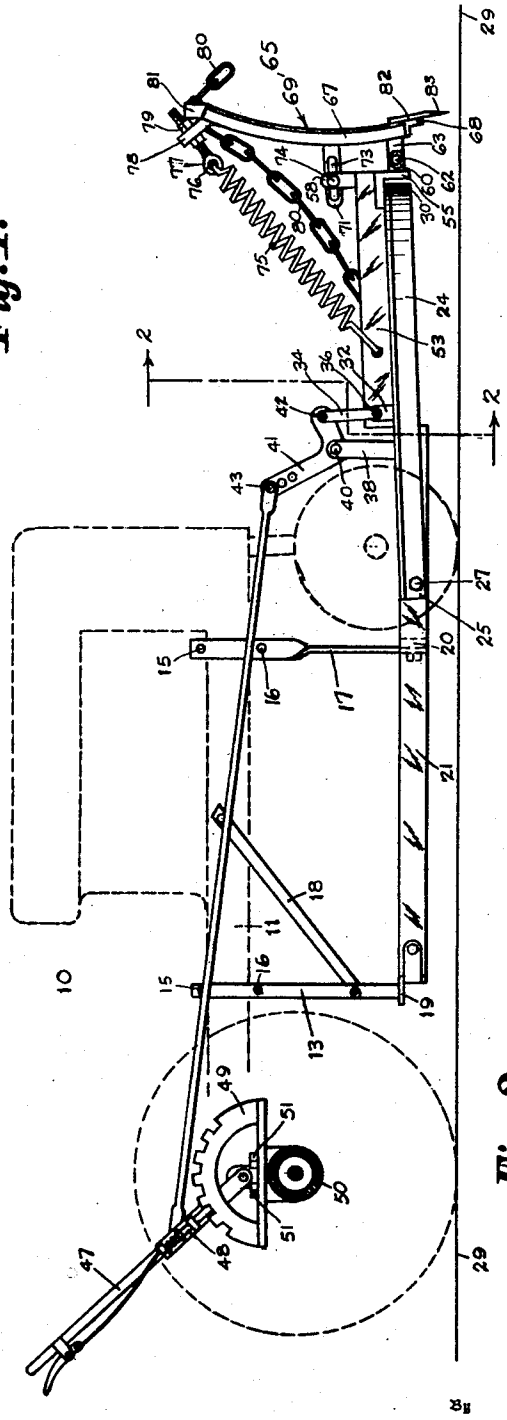
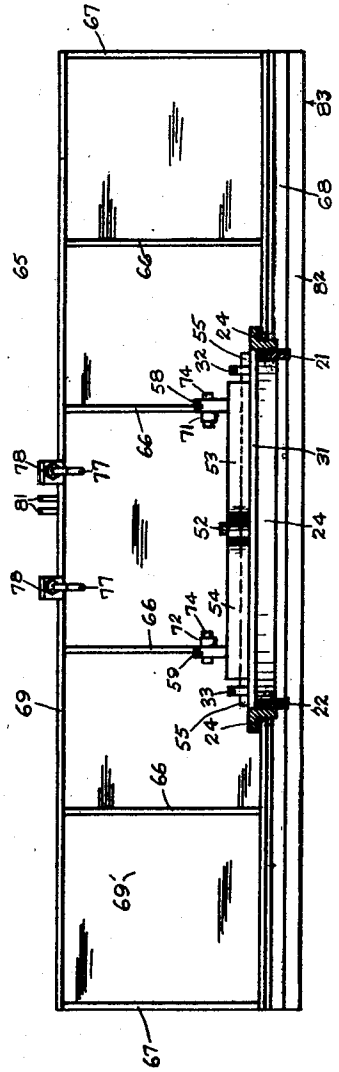


Fig. 2.



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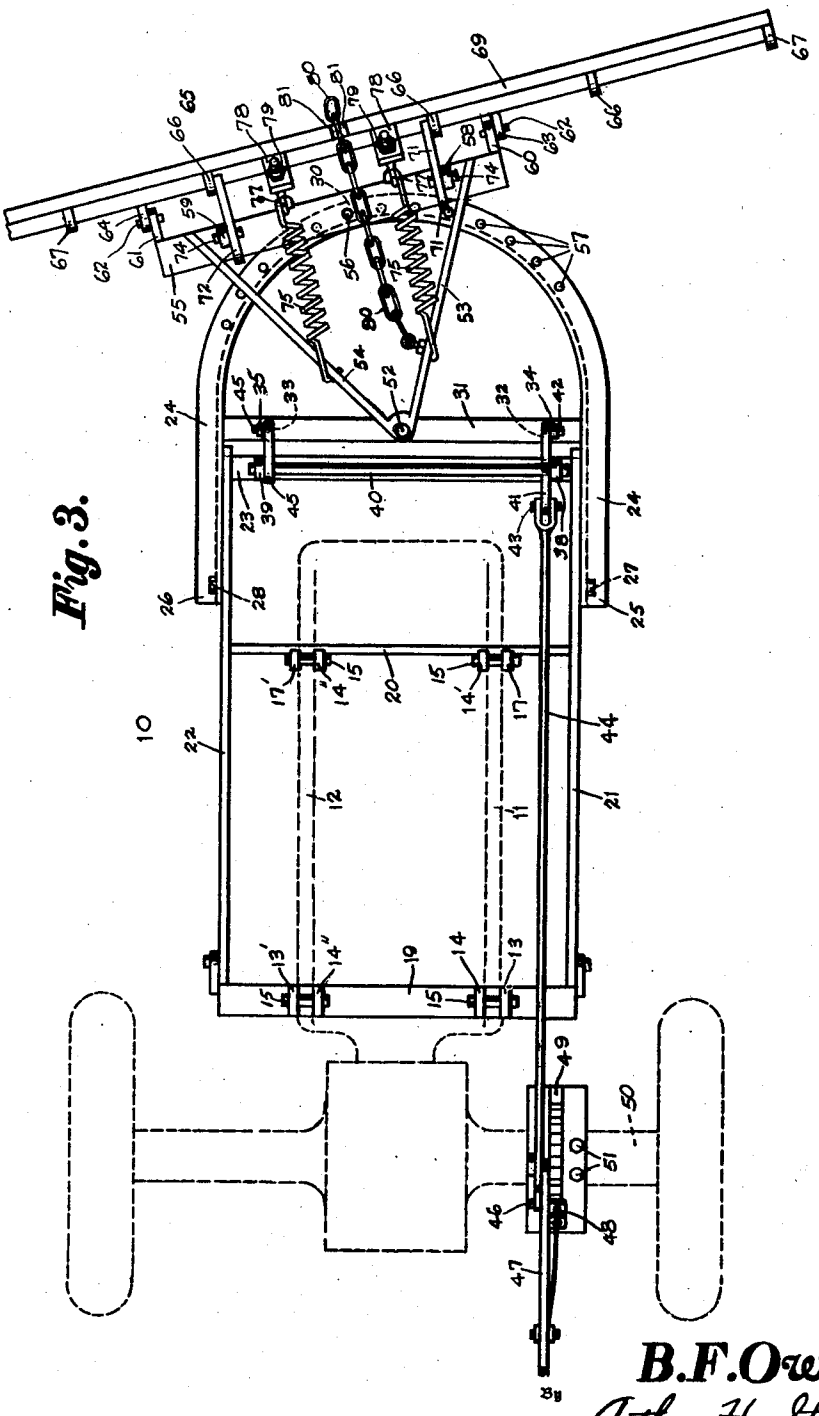


Fig. 3.

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FARM LAND BULLDOZER, SNOWPLOW, AND ROAD MAINTAINER

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2 Claims. (Cl. 37—42)

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The present invention relates to the read and farm machinery art and has for an object to provide a device which may be readily attached to and removed from several conventional types of tractors, for operation in conjunction therewith, for removing snow from the surface of roadways, for spreading materials on roadways, farm lands and the like and for scraping and treating the surfaces thereof.

A further object of the invention is to provide a mechanism for the above stated purposes having a U-shaped supporting frame for a mold-board so constructed and arranged with respect to an attaching frame employed that, in conjunction with other parts of the mechanism, the mold-board may be readily elevated and lowered with respect to the surface of a roadway or the surface of land and may be readily positioned and maintained at a selected angle of inclination with respect to the longitudinal length of said surfaces.

A still further object of the invention is to provide a mechanism for the foregoing stated purposes which includes comparatively few and simple parts, conveniently manually controllable and which adequately sustains the shocks and jars incident to use without injury or breakage of the parts thereof.

Another object of the invention is to provide a mechanism for the above stated purposes which is operable at comparatively high speeds for moving snow and other materials with a minimum of sidedraft stress.

An important object of the invention is to provide a mechanism for the above stated purposes, the mold-board of which is equipped with an arrangement of parts so constructed that an automatic trip device is provided constituting a safety factor, together with a mechanism for returning the mold-board to a normal position subsequent to a tripping operation and means for limiting a movement of said mold-board during a tripping operation.

While the drawings illustrate a preferred embodiment of the invention, it will be understood that in adapting the means to meet specific needs and requirements, the design may be varied and such other changes in minor details of construction and the number of parts employed may be resorted to within the scope of the invention as claimed without departing from the spirit thereof.

In the drawings:

Figure 1 is a side elevation of the present invention, a tractor employed being represented by dotted lines and its rear axle housing in section. A mold-board of the invention being disposed transversely with respect to the longitudinal length of said tractor.

Figure 2 is a transverse section thereof, the

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view being taken substantially on line 2—2 of Figure 1, certain springs and a detent-chain employed being removed.

Figure 3 is a top plan view of the mechanism shown in Figure 1, the mold-board being depicted inclinedly with respect to the showing thereof in Figure 1.

In the drawings, 10 generally indicates a tractor of any suitable, conventional type having front and rear wheels, an engine and a frame.

The frame includes oppositely disposed side frame rails 11 and 12. The rails, during use, are normally horizontally disposed.

Adjacent the rearward end of the rail 11, a hanger-bar 13 is provided which is disposed at approximately a right angle with respect to and against the rail 11. As best shown in Figure 3, a cleat 14 is disposed in parallelism with respect to the member 13 and at the inner side of the rail 11. A bolt or similar keeper 15 is disposed across the upper side of the rail 11 and through the members 14 and 15. A similar bolt 16 is employed beneath and against the rail 11, as shown in Figure 1, whereby the cleat 14 and bar 13 are rigidly joined together and to the rail 11.

Referring to Figure 1, a second hanger-bar 17 is similarly secured to the rail 11 adjacent the forwardly disposed end of said rail by means of a cleat 14' and bolts. An anti-sway brace 18, as best shown in Figure 1, is employed having its ends respectively secured, by any suitable means such as bolts or the like, to the rail 11 and to the rearwardly disposed bar 13.

As best shown in Figure 3, the frame rail 12 is similarly provided with vertically disposed hanger-brackets 13' and 17', cleats 14'', anti-sway brace 18' and bolts, whereby the later described mechanism may be readily attached to and removed from the tractor 10.

A transversely disposed brace-bar 19 is welded or otherwise suitably secured to the lower ends of the oppositely disposed hangers 13 and 13'. Similarly, a forwardly and transversely disposed brace-bar 20 is secured to the lower ends of the forwardly disposed hangers 17 and 17'.

The attaching frame of the present invention further includes oppositely and longitudinally disposed side rails 21 and 22 which are respectively welded or bolted to the outer ends of the brace-bars 19 and 20.

As best shown in Figure 1, the rails 21 and 22 are of equal length and extend forwardly of the front steering wheel of the tractor 10. The forward ends of the rails 21 and 22 are joined together by means of a third transversely disposed brace-bar 23, the latter being best shown in Figure 3.

A supporting frame is employed for a later described mold-board and its adjunct mechanism. The supporting frame includes a yoke 24 of U-

shape in plan and a brace 31. The ends of the brace 31 are respectively welded to the oppositely disposed side arms of the yoke. The rearwardly disposed ends 25 and 26 of the member 24 are pivotally attached respectively, as at 27 and 28, to the members 21 and 22 of the supporting frame, whereby the yoke 24 is swingable vertically.

In operation, since the major portion of the weight of the yoke 24 is disposed forwardly of the pivots or bolts 27 and 28, the yoke normally moves downwardly by operation of gravity.

Means are provided for positioning and maintaining the forward end 30 of the yoke 24 a selected distance above the surface indicated at 29 for positioning the later described mold-board operatively.

Adjacent each end of the brace 31 of the yoke 24, oppositely disposed upstanding lugs 32 and 33 are secured to the member 31 and links or chains 34 and 35 are pivotally attached, as at 36 and 37, respectively to the lugs 32 and 33. The said positioning means further includes oppositely disposed standards 38 and 39 which are secured, at their lower ends, to the transversely disposed brace-bar 23 of the attaching frame. A rod 40 extends between and through the standards 38 and 39 being journaled with respect to the standards adjacent the upper ends of the latter.

A bell-crank lever 41 is welded or otherwise rigidly secured to the rod 40 and the forward end of one of its arms is pivotally connected, as at 42, to the link 34, the other end of the bell-crank lever 41 is pivotally connected, as at 43, to the forward end of a reach rod 44.

Adjacent to the standard 39, a crank-arm 45 is welded to the rod 40. The crank-arm and the forwardly disposed arm of the bell-crank lever 41 are disposed in horizontal alignment.

The other end of the crank-arm 45 is pivotally attached to a link 35. The links 35 and 34 are alike and, as thus described, it will be seen that at times when the reach-rod 44 is moved longitudinally, a corresponding movement is applied to the links 34 and 35 for raising the U-shaped yoke 24 correspondingly.

The reach-rod 44 extends from the bell-crank lever 41 rearwardly, and the rear end thereof is pivotally attached, as at 46, to a hand lever 47. The lever is preferably provided with a conventional throttle grip for moving a detent 48 out of engagement with and from between selected teeth of a sector 49. The sector is rigidly secured to the rear axle housing 50 of the tractor 10 by any suitable means such as the studs 51.

Midway between the ends of the brace-bar 31 of the yoke, a removable king-pin 52 is provided for pivotally attaching the rearwardly disposed ends of radial arms 53 and 54 to said bar 31 and for this purpose, the converged rear ends of said arms are welded together, as best shown in Figure 3.

The forward ends of the arms 53 and 54 are divergently disposed with respect to each other and are respectively welded to opposite ends of a platform bar 55.

As best shown in Figure 3, a keeper-pin 56 is removably disposed through a hole in the bar 55 and through a selected one of a plurality of apertures 57, the latter being provided through the arcuate neck of the yoke 24, and it will be seen that the operator, by means of withdrawing the pin 56 and sliding the platform 55 upon the upper surface of the yoke, may dispose and maintain the bar 55 at a selected angle of inclination with respect to the longitudinal length of the whole machine for purposes later described.

Spaced apart standards 58 and 59 are welded to the upper surface of the platform bar 55 and extend an appreciable distance above said bar for purposes later described.

As best shown in Figure 1, the platform bar 55 is preferably formed of angle iron and to the forward vertical surface thereof, spaced apart lugs 60 and 61 are provided. The lugs are respectively pivotally attached, as at 62, to ears 63 and 64. The ears have forwardly disposed ends which are welded to the convex surface of the mold-board, the latter being generally indicated at 65.

The mold-board is arcuate in cross section and is preferably provided with a plurality of spaced apart reinforcing ribs 66 and similar end ribs 67.

The lower ends of the ribs are welded to a transversely disposed angle-iron bar 68 and the upper ends thereof are similarly secured to an upper bar 69. A comparatively thin sheet of boiler iron or the like 69' provides the working surface of the mold-board 65. Since the mold-board is pivotally attached to the platform bar 55, it is swingable in horizontal directions with said bar and movable in vertical directions with respect to the platform bar for purposes later described.

Slotted arms 71 and 72 are provided, having their forwardly disposed ends welded to certain of the ribs 66 of the mold-board. Pins 74 extend through the slots 73 of said arms, said pins 74 being respectively rigidly secured to the upstanding standards 58 and 59 carried by the platform bar 55 for preventing lateral movement of the mold-board with respect to the bar 55 while at the same time, permitting vertical swinging movement thereof.

A pair of springs 75 are employed having their rear ends respectively attached to the radial arms 53 and 54, as shown in Figure 3, the forward ends of the springs being provided with hooks which are disposed through eyes 76, as best shown in Figure 1, of the bolts 77. The shanks of the bolts 77 extend through lugs 78 and the latter are suitably secured to the mold-board 65, preferably near the upper edge of the mold-board for leverage purposes and use as later described.

Nuts 79 are provided on each side of each lug 78 for adjusting and maintaining the tension of the springs 75 and as thus described, it will be seen that the springs 75 urge the upper edge of the mold-board 65 toward the king-pin 52 at all times since the pins 74 are permitted to slide in the slots 73 of the arms 71 and 72.

Means are provided for limiting a forward swinging movement of the upper portion of the mold-board 65. The limiting means includes a chain 80 having a rear end secured to the radial arm 53 and a forward end which is disposed over the upper edge of the mold-board 65, said forward end of the chain 80 being disposed, in use, in the slot provided between oppositely disposed fingers 81, said fingers being suitably secured to the upper edge of the mold-board 65.

In operation, the operator may dispose a selected link of the chain 80 in said slot provided by and between the fingers 81 or he may, if desired, hook a link of said chain about one of said fingers for a minute adjustment.

A scraper or cutting blade 82 is secured to the lower forward surface of the mold-board 65, said blade being preferably provided with an acute edge 83, said edge being disposed towards the sur-

face 29 for contact with the latter or with materials disposed on said surface.

In operation, as the machine travels forwardly, resultant from an application of the power provided by the engine of the tractor, at times when the blade 83 contacts with a nearly immovable object upon the surface of a roadway, such as a cobblestone or the like frozen in ice to said roadway and at times when snow is being cleared from said roadway and said stone is invisible to the operator, the upper portion of the mold-board moves forwardly, the blade 82 rearwardly and against the urge of the springs 75 resultant from contact with said stone, whereby the blade 82 passes over said stone without injury to the mechanism, whereupon the springs 75 return the blade and mold-board to a normal position.

For snow clearing operations, especially a clearing of paved, comparatively smooth roadways, a tractor is operated to move forwardly at high speed. For this use, the chain 80 is slack or disconnected from the fingers 81 of the mold-board and the latter is disposed inclinedly with respect to the length of the road as shown in Figure 3.

At times when the chain is disconnected, the springs 75 cause the pins 74 to engage those end walls of the slots 73 of the arms 71 and 72 which are closest to the mold-board and the latter to be in a normal position. The said normal position is further toward the tractor than as shown in Figure 1. The said end walls of the slots 73 provide detents for limiting a movement of the mold-board in one direction.

For operations such as a removal of snow from an ice field, preparatory to harvesting ice, in instances where the snow is partially frozen to the ice, a scraping and cutting process is necessitated. For this type of work, the mold-board is disposed approximately transversely with respect to the length of the machine as shown in Figure 1, the lever 42 is manipulated to cause the edge 83 of the cutter 82 to engage snugly against the surface of the ice and the chain 80 is employed for causing the cutter 82 to remain in a selected position during a forward, comparatively slow speed, travel of the machine, the tractor thereof being in low gear for this work.

By removing and replacing the keeper-pin 56, the mold-board may be maintained transversely with respect to the roadway and at a right angle with respect to the longitudinal length of the machine or at a selected angle of inclination as may be desired complemental to the type of work encountered.

The cutting blade 82 may be raised or lowered with respect to the surface 29 for different types of work and for traveling movements going to and from work or maintained in a raised position by manipulation of the detent 48 to cause the detent to engage between selected teeth of the sector 49.

Among other advantages of the invention, it is believed pertinent to mention that manure deposited about a farm barn yard may be bulldozed or pushed into a pile for removal to farm land for fertilizing said land; that hummocks of earth on a crop producing field may be readily bulldozed and leveled; holes filled for increasing the utility and enhancing the value of farm land economically and rapidly, since the swingable feature of the mold-board of the present invention provides a factor of safety during speedy travel of the machine and said swinging may be readily prevented in accordance with conditions encountered on a farm or road during many utilitarian operations of diverse type.

From the foregoing description, it is thought to be obvious that a farm land bulldozer, snow plow and road maintainer constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled on and removed from a farm tractor or the like and rapidly operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason, I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice, except as claimed.

I claim:

1. In a machine for the purpose described; the combination of a semi-circular yoke having oppositely disposed parallel portions and a bar disposed between said portions; means for attaching the ends of said portions pivotally to the frame of a tractor for vertical swinging movements of the yoke forwardly of the tractor; means for swinging the yoke; means for preventing swinging movements of the yoke; a platform-bar mounted on said yoke, radially disposed arms having ends secured respectively to the ends of said platform, the other ends of said radial-arms being joined together; a king-pin disposed through the joined ends of said radial-arms and the medial portion of said yoke-bar to permit horizontal sliding movements of the platform on the yoke through approximately seventy degrees of a circle; means for locking said yoke and platform together; a mold-board having a pivotal connection with each end of the platform adjacent the lower longitudinal edge of the mold-board to permit vertical swinging movements of said mold-board with respect to said platform; spaced apart standards secured to said platform; arms secured to the mold-board having ends respectively disposed against the inner sides of said standards, said ends of the arms each being provided with an elongated aperture; pins disposed through said apertures and said standards for limiting swinging movements of the mold-board in one direction; resilient means for urging the mold-board to swing in the said one direction, and means including a chain for limiting a swinging movement of the mold-board in a direction opposite to the said one direction.

2. In a mold-board mechanism for a snow plow or the like comprising an elongated rectangular sheet of arcuate contour in cross section, a cutter secured to said sheet in parallelism with one of the latter's longitudinal edges, a plurality of spaced apart ribs secured to the convex surface of said sheet, spaced apart ears secured to said sheet adjacent said cutter, a bar having two spaced apart lugs outstanding therefrom, said lugs and ears being pivotally connected together to permit swinging movements of said sheet with respect to said bar, a standard secured to said bar adjacent each lug, two spaced apart arms each having an end provided with an elongated aperture, the other ends of said arms being respectively secured to certain of said ribs, the slotted ends of said arms being disposed respectively against the standards, pins secured to said standards and disposed through said apertures to limit a swinging movement of the mold-board toward said bar, arms secured to said bar, said arms

being disposed convergently and having their other converged ends joined together, said joined ends being provided with an aperture for receiving a king-pin, springs having ends secured to said arms, the other ends of said springs being attached to the mold-board for urging the latter toward said bar, a chain having an end secured to one of said arms, and a hook on said mold-board for engaging a selected link of said chain for limiting a swinging movement of the board away from said bar.

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