No. 639,829. Patented Dec. 26, 1899.

J. C. SCHAFFER.

COMBINED LAND ROLLER AND HARROW.

(Application filed Sept. 3, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

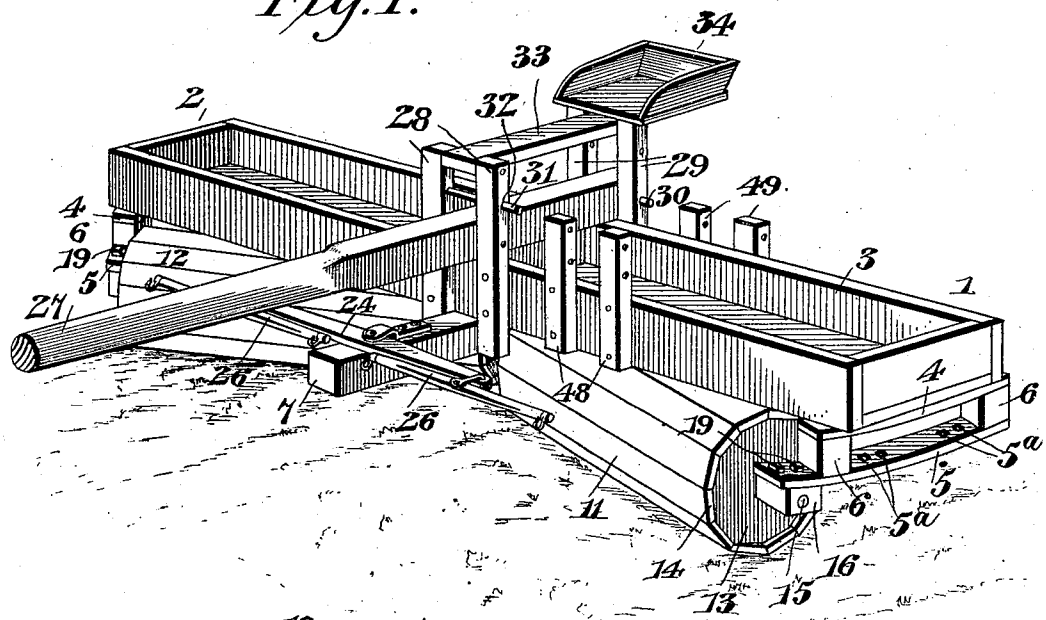


Fig. 6.

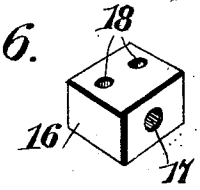


Fig. 2.

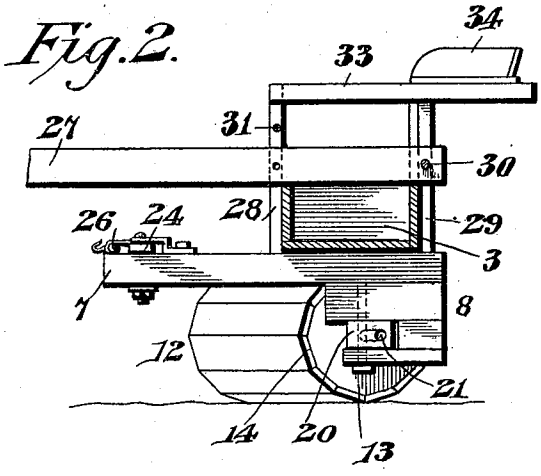
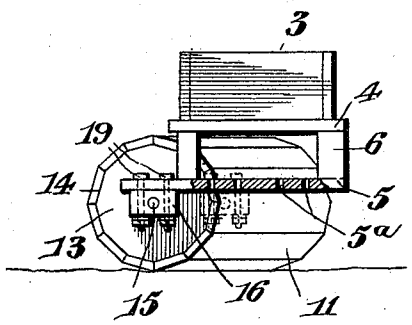


Fig. 3.



Witnesses

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No. 639,829. Patented Dec. 26, 1899.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 1.

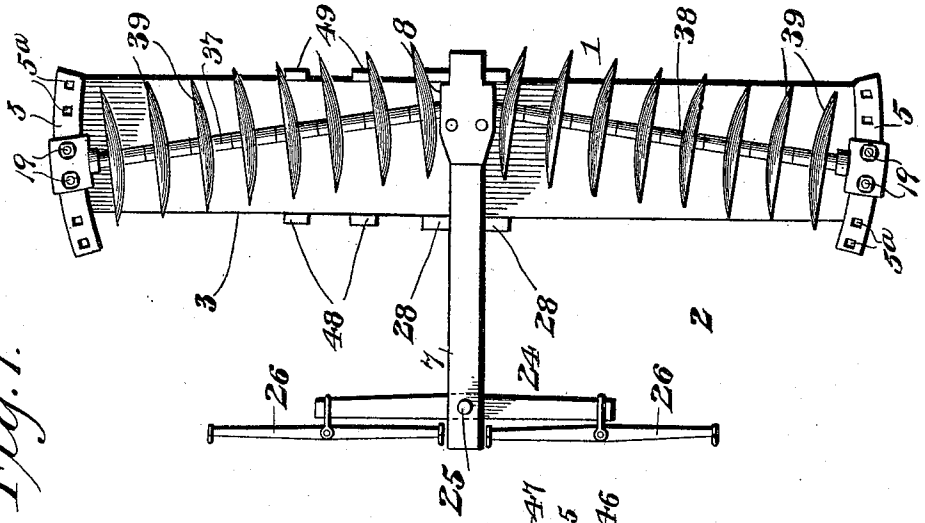


Fig. 4.

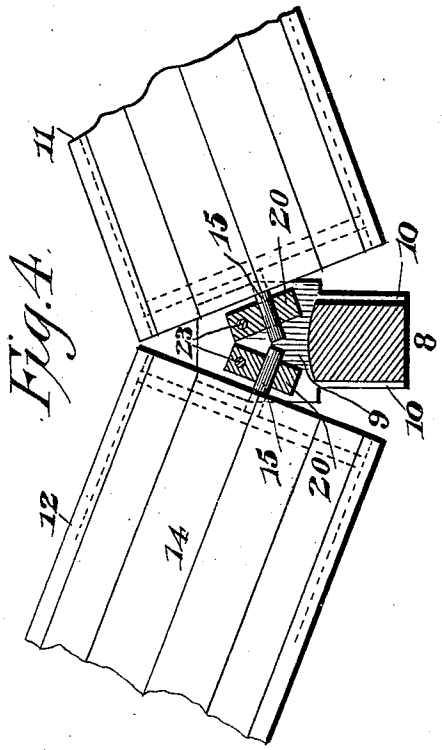


Fig. 9.

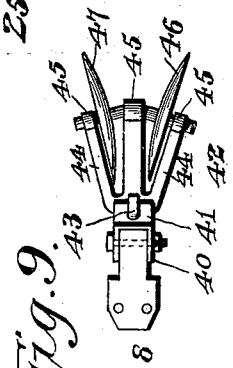


Fig. 5.

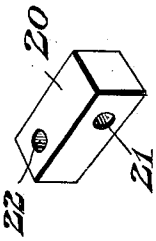
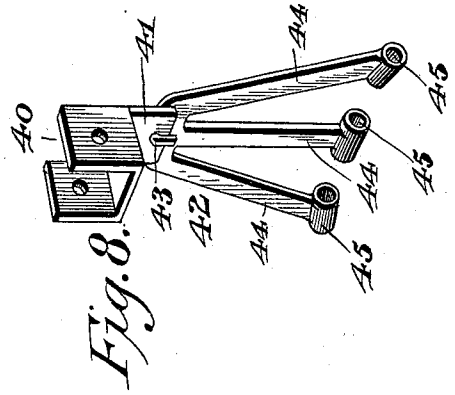


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN CARL SCHAFFER, OF PALMYRA, MISSOURI.

COMBINED LAND-ROLLER AND HARROW.

SPECIFICATION forming part of Letters Patent No. 639,829, dated December 26, 1899.

Application filed September 3, 1898. Serial No. 690,176. (No model.)

To all whom it may concern:

Be it known that I, JOHN CARL SCHAFFER, a citizen of the United States, residing at Palmyra, in the county of Marion and State of Missouri, have invented a new and useful Combined Land-Roller and Harrow, of which the following is a specification.

My invention relates to improvements in combined land-rollers and harrows; and the prime object of the invention is to provide an improved machine in which crushing rollers or drums and pulvervizing-disks may be used interchangeably to adapt the machine for service either as a roller or as a harrow.

A further object of the invention is to provide means by which the position of the rollers or drums may be changed or varied to enable them to lie at right angles to the line of draft or obliquely in oppositely-inclined directions to said line of draft, so that in the last-named positions the rollers or drums will exert a rubbing and pulverizing effect on the soil.

A further object of the invention is to provide a machine of light construction which may be weighted to the desired limit, to provide means by which the seat and the tongue may be shifted according to the number of draft-animals used to overcome the side draft and to keep the machine in balance, and to provide a draft appliance by which two, three, or four draft-animals may be used.

A further object of the invention is to provide means which may be used in rear of two series of harrow-disks to operate in the space between the same and thoroughly pulverize the ground within the limits of the machine.

With these ends in view the invention consists in the novel combination of elements and the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand the invention, I have illustrated the same in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a perspective view of the machine adjusted for service as a land-roller. Fig. 2 is a vertical transverse section taken centrally through the machine on a plane to one side of the tongue and one of the rollers or drums. Fig. 3 is an end view of the machine shown by Fig. 1, omitting the tongue, the seat, and the draft appliance and showing one of the supporting-guides partly in section. Fig. 4 is an inverted plan view, partly in section, illustrating the means by which the adjacent ends of the rollers or drums are supported on the machine-frame. Fig. 5 is a detail perspective view of one of the pivoted bearings for the inner end of one roller. Fig. 6 is a detail perspective view of one of the shiftable or adjustable shaft-bearings for the outer end of a roller or drum. Fig. 7 is an inverted or bottom plan view of the machine equipped with harrow-disks. Fig. 8 is a detail perspective view of the swiveled hanger adapted to be clamped to the rear of the machine and to carry disks which operate on the ground in the space or interval between the inner ends of the two series of harrow-disks. Fig. 9 is a detail plan view illustrating the arrangement of the swiveled disk-hanger and its supporting-clip at the rear end of a bearing-block.

Like numerals of reference denote like and corresponding parts in each of the several figures of the drawings.

The framework of my improved machine is of light and substantial construction, and it is designated in its entirety by the numeral 1 in the drawings. This framework consists of the weight-boxes 2 3, the pairs of segmental bars 4 5, arranged at opposite ends of the weight-boxes and secured rigidly in place beneath the same, and the spacing-blocks 6, which are interposed between said bars and serve to sustain the lower bars 5 at a proper distance below the weight-boxes for the support of the shafts. The segmental bars and the spacing-blocks form supporting-guides on which the outer shaft-bearings may be firmly and adjustably clamped, and the lower bars 5 are formed with series of openings 5^a; through which may be passed the bolts that serve to attach shiftable or adjustable shaft-bearings to the supporting-guides, either at the middle thereof or at opposite ends. A draft-bar 7 is secured rigidly to the under side of the weight-boxes at the middle of the machine, so as to have its front end project a suitable distance in advance of the weight-boxes, and to the rear end of this draft-bar is secured a depending bearing-block 8, the

front part of which is formed with a slot or recess 9 and which is, furthermore, provided near its rear end with the groove or recess 10, adapted to receive the clip of a swiveled harrow-disk hanger, as will be hereinafter described.

My machine when adapted for service as a land-roller is equipped with two drums or rollers 11 12, which are supported on the machine-frame on opposite sides of the draft-bar 7 and are arranged to be adjusted to assume positions oblique to the line of draft, as shown by Figs. 1, 2, 3, and 4, or to be adjusted in line with each other and at right angles to the line of draft. Each roller or drum is built up of wood or other suitable material, and it consists of heads 13, a series of staves 14, which are secured to the heads, and a central shaft 15. Each drum is supported on the machine-frame below the weight-boxes by a pair of bearings, the inner one of which is pivoted on the bearing-block 8, while the other bearing is shiftable back and forth on the supporting-guide formed by the bars 4 5 and blocks 6. The outer bearing for each drum-shaft is indicated by the numeral 16, and it has a transverse shaft-opening 17 and the vertical bolt-openings 18. (See Figs. 3 and 6.) The shaft-bearing 16 is fitted against the lower bar 5 to bring its bolt-openings coincident with the pair of the openings 5^a in the bar 5, and bolts 19 are passed through the alined openings to firmly attach the bearing 16 to the supporting-guide. The inner bearing for each roller or drum shaft is indicated at 20, and it is arranged to be fitted in the slot or recess 9 of the bearing-block 8. (See Fig. 4.) This inner shaft-bearing has a transverse shaft-opening 21 and a vertical bolt-opening 22, through which is passed the pivotal bolt 23, that is supported in the bearing-block 8 and serves to pivotally attach the inner shaft-bearing to said block 8. The shaft of the roller or drum is fitted loosely in the openings 17 21 of the shaft-bearings 16 20, respectively, and this shaft is free to rotate in said bearings. The outer bearings 16 are shiftable or adjustable on the guides 5, as shown by Fig. 3, thus permitting the rollers and their shafts to be more or less inclined and lie obliquely to the line of draft, as desired. When the outer bearings 16 are secured at rear bolt-opening 5^a on the supporting-guides 5, the rollers are at right angles to the draft-bar 7, thereby bringing the two rollers in line with each other and adapting the machine for service as a simple land-roller. In practice I prefer, however, to adjust the rollers to oppositely-inclined positions, as shown by Figs. 1 to 4, inclusive, because in these positions of the rollers or drums they lie oblique to the line of draft and have a tendency to force the soil forward and to exert an outward rubbing action on the soil, thereby pulverizing and crushing the clods and soil. This oblique adjustment of the rollers or drums is attained by shifting the bearings 16 toward the front ends of the supporting-guides and clamping said bearings firmly in place by the bolts 19. During such adjustment of the bearings and the rollers the inner shaft-bearings 20 turn on their pivot-bolts and adapt themselves to the movement of the drums and their shafts. When the rollers or drums are adjusted to positions at right angles to the draft-bar 7, the shafts of said rollers are in line with each other and rotate freely in their bearings; but when the drums or rollers are adjusted in their oppositely-inclined positions to lie obliquely to the draft-bar 7 the shafts are adapted to abut, as shown by Fig. 4, to prevent undue inward movement of the rollers.

The draft-bar 7 carries a doubletree 24, which is pivoted to said bar 7 by the usual bolt 25, and this doubletree supports the singletrees 26, to which a team of draft-animals may be hitched. The draft-tongue 27 is loosely and detachably supported on the weight-boxes between the two pairs of standards 28 and 29. The standards 28 are secured rigidly to the front sides of the weight-boxes; but the other standards 29 are fastened to the rear sides of the weight-boxes in the same planes as the standards 28, and these standards are spaced apart to accommodate the rear end of the tongue 27. The tongue is pivotally attached to the rear standards 29 by a bolt 30, (see Figs. 1 and 2;) but the tongue where it passes through or between the standards 28 may be rigidly or loosely confined therebetween by a bolt or pin 31, adapted to fit in openings 32 of the standards 28—that is to say, the pin or bolt 31 may pass through the standards 28 and the tongue 27 to hold the tongue firmly in place, or the pin may pass through other openings above the tongue, so as to allow the tongue to have a certain amount of play in a vertical direction on the bolt 30 and between the standards 28. The seat-bar 33 is secured to the standards 28 29, and on it is fitted the seat 34, which is bolted in place, so as to be adjustable back and forth on the bar 33.

My improved machine may also be used as a harrow, and in this adaptation of the invention the rollers or drums 11 12 are removed from the shaft-bearings, and in lieu thereof I employ the disk-shafts 37 38 and the swiveled hanger 42. These disk-shafts each carry a series of disks 39, which are threaded on the shaft and firmly secured thereto by any suitable means, and each shaft is journaled in a pair of the bearings 16 20, which are provided, primarily, for the support of the rollers or drums. The shafts, with the disks thereon, are arranged in the oblique positions shown by Fig. 7, so that they are adapted for operation in the well-known manner of disk harrows. The hanger 42 is designed to be attached to the bearing-block 8 in the space or interval between the innermost disks on the inclined shafts 37 38, and this hanger is adapted to carry a pair of disks which operate on the soil between the two series of disks, thus

thoroughly pulverizing the soil practically throughout the width of the machine. This hanger is attached to the block 8 by a clip 40, which is designed to be secured in the groove 10 of the block 8 by a suitable bolt or bolts, and said clip has a rearwardly-extending ear or plate 41, with which engages a pintle or hook 43 of the hanger, so that the latter is loosely or pivotally attached to the clip. This hanger is bifurcated or forked to provide the arms 44, (see Fig. 8,) and said arms are furnished with the bearings 45, in which are journaled the trunnions or short shafts of the disks 46 47. The hanger is swiveled to the clip, which is attached to the block 8, and the disks of the hanger rotate freely therein and trail in rear of the disks 39 on the inclined shafts.

From the foregoing description it will be noted that the shafts 37 38 of the harrow construction are supported by the pivoted and shiftable bearings in the same manner as the shafts 15 for the drums of the roller, and in order to generically designate the shafts they may be termed the "work-shafts," because they carry the devices which are adapted to treat the earth.

My improved machine is of such simple construction that it may be repaired advantageously by a blacksmith or wheelwright. The frame of the implement is of light construction, so that the harrow devices may be used thereon to good advantage. The machine while of light construction is exceedingly strong and is equipped with weight-boxes, so that weight of the desired ponderosity can be placed in said boxes to suit the requirements of the service. While the machine is of light construction, the addition of weight to the boxes operates to make the machine serve the purposes of a heavy roller. The tongue 27 is connected with the neck-yoke, while the draft comes on the bar 7, which is firmly fastened to the machine-frame, thus leaving the tongue free for adjustment. When two or four horses are hitched to the draft-bar, the tongue 27 may be fastened securely to the standards 28 29; but in using a team of three horses a three-horse evener is attached to the draft-bar 7 and the tongue 27 is shifted to a position between the standards 48 49, which are secured to one weight-box to one side of the center of the machine, as clearly shown by Fig. 1 of the drawings. The three-horse team pulls through the evener on the draft-bar 7 at the center of the machine, and by arranging the tongue between the standards 48 49 at one side of the draft-bar all tendency of side draft is obviated. The seat 34 may be moved forward or backward on the bar 33 to keep the machine in balance irrespective of the disposition of the weight in the boxes or the oblique positions of the crushing-drums.

I attach special importance to the means by which the crushing-drums may be arranged in oppositely-inclined positions to the draft-bar, because these drums are adapted to exert a rubbing action on the ground to thoroughly pulverize the clods and level the soil. By pivotally mounting the shaft-bearings 20 on the bearing-block 8 the inner bearings for the drum-shafts remain in line with the bearings 16, so as to insure free rotation of the drums under all adjustments thereof in the machine. I prefer to employ drums or rollers of small diameter and to construct the rollers of staves, because this construction provides a drum the working surface of which is formed with a plurality of sharp edges, which renders the drum more efficient in operation in breaking up the clods and penetrating the ground. In using the machine with the drums or rollers in their oblique positions to have the outer ends of the rollers in advance of the inner ends the tongue 27 may be omitted, or the tongue may be arranged loosely between the standards to work freely in a vertical direction. Under this adjustment of the parts the rollers are free to accommodate themselves to irregularities in the ground, particularly in passing over back furrows or dead furrows and pulverizing the ground in low places as well as in high places. A further advantage of the machine with the rollers in their oblique positions resides in the fact that it may be used to kill weeds in corn-fields, because the machine will straddle the row and operate in the spaces between the rows without contact with the corn.

The supporting-guides 5 at the ends of the weight-boxes are each reversible end for end—that is to say, either guide can be removed from the weight-box, turned around to bring its rear end to the front, and replaced on the weight-box for the end with the bearing 16 to project in rear of the weight-box. With the guides reversed as described the bearings 16 may be adjusted to occupy positions at the extreme rear ends of the guides. The rollers or drums may now be adjusted for the outer ends thereof to lie in rear of the inner ends, which are supported by the pivoted bearings, and by employing drums of large diameter the implement is well adapted for operation on the soil in a corn-field. Under this adjustment of the rollers the shafts are held in proper relation by the bearings, and the drums are free to rotate as the machine is drawn across the field.

I do not confine myself strictly to the precise construction of the drums nor to the exact proportions of the parts.

Changes may be made in the form of some of the parts, while their essential features are retained and the spirit of the invention embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described the invention, what I claim is—

1. The combination with a frame having a draft-tongue, of the weight-boxes supported by the frame, the inner bearings pivoted to the

frame, the curved guides fixed to the weight-boxes at the outer ends thereof, the shiftable bearings fastened adjustably to the curved guides, and the work-shafts journaled in said pivoted and shiftable bearings, substantially as described.

2. The combination with a frame having a draft-tongue, of the arc-shaped guides, the outer shiftable bearings adjustably fastened to the guides, the inner bearings arranged side by side and pivoted on the frame for the openings to lie substantially coincident one with the other, and work-shafts mounted in the shiftable and pivoted bearings for the inner ends of said shafts to abut one against the other and limit the endwise adjustment thereof, substantially as described.

3. The combination with a frame provided with a weight-box, a draft-bar secured to the frame, standards secured to the weight-boxes centrally of the frame, other standards secured to the weight-box on one side of the first-mentioned standards, and a draft-tongue adapted to be fitted between either set of standards, substantially as described.

4. The combination with a frame provided with a weight-box and with a supporting-block, 8, inner bearings pivoted to said supporting-block, outer bearings adjustably secured below the weight-box, and rollers having their shafts mounted in said pivoted and adjustable boxes, substantially as described.

5. The combination of a frame having a draft appliance, the pivoted bearings, the adjustable bearings secured below the frame, the disk-carrying shafts journaled in said bearings, and a swiveled hanger attached to the frame between the inner ends of the shaft-supporting disks and adapted to trail in rear of the shafts, substantially as described.

6. The combination of a frame having the supporting-guides and a bearing-block, the inner bearings supported on the block, the shiftable bearings attached to the guides, shafts journaled in said bearings, a clip fastened to the bearing-block, and a hanger swiveled on the clip and carrying disks arranged to trail in rear of the shafts, substantially as described.

7. The combination with a frame and a draft-bar, of guides applied to said frame for reversal end for end thereon, pivoted bearings on said draft-bar, shiftable bearings on the reversible guides, and rollers journaled in said bearings, whereby the rollers may be inclined in forward or backward directions to the line of draft, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN CARL SCHAFFER.

Witnesses:
F. M. STILLIAN,
W. H. CADWELL.