March 29, 1932. L. W. SIEGEL 1,851,875

POWER ROLLER AND SURFACER

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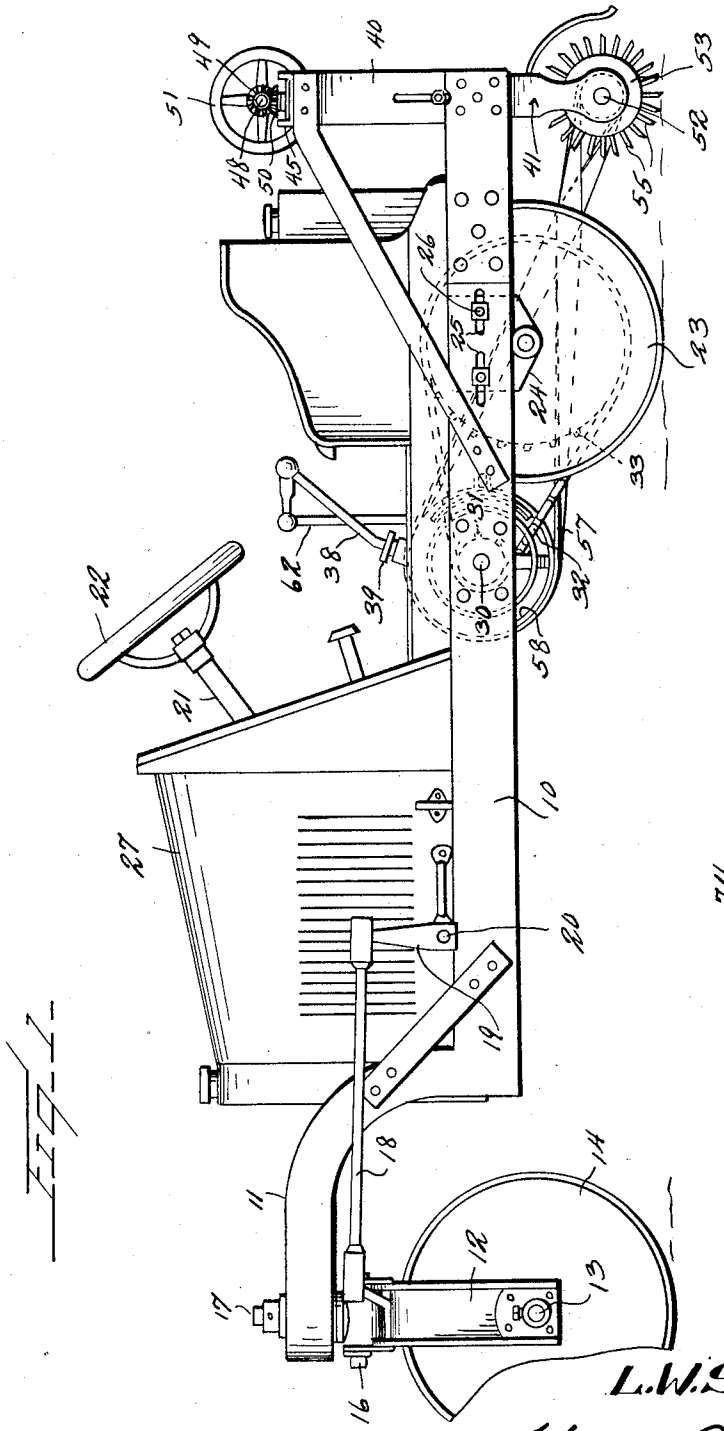

FIG. 1.

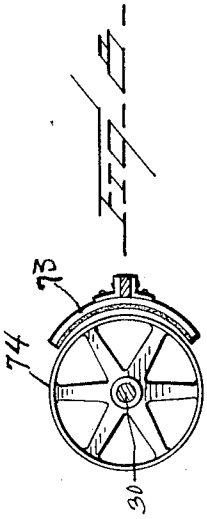

FIG. 2.

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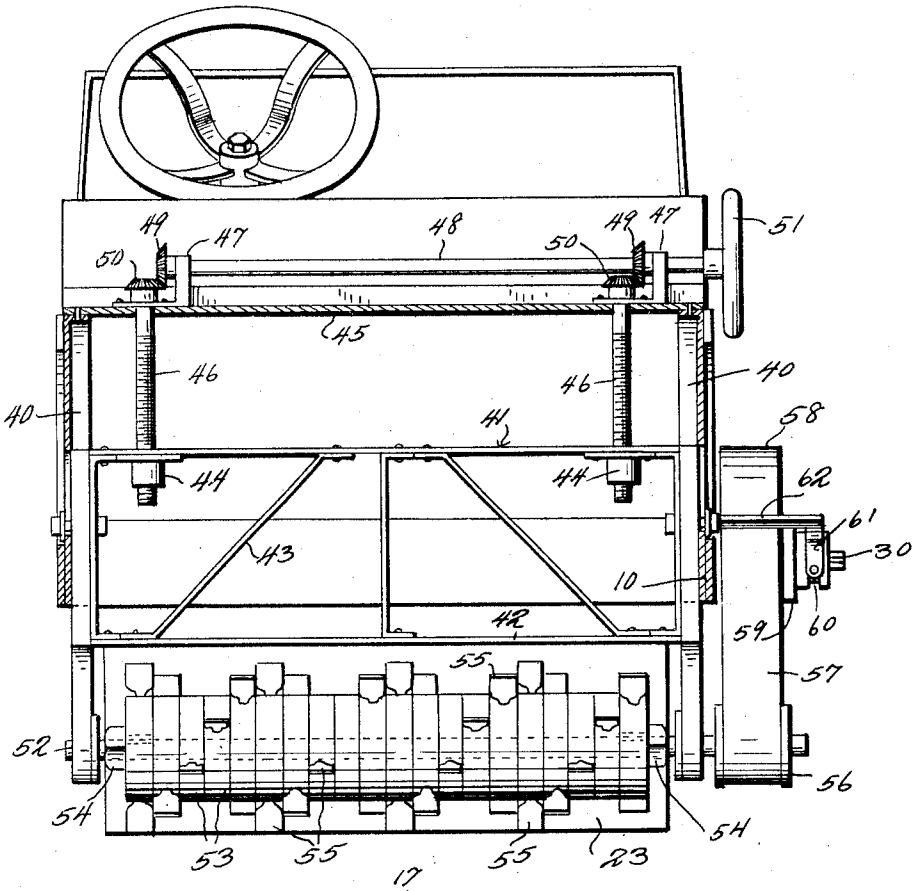
Fig. 2.



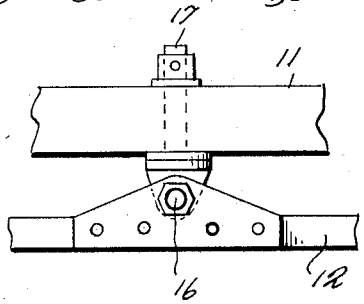


Fig. 4.

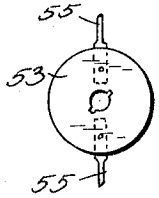


Fig. 5.

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POWER ROLLER AND SURFACER

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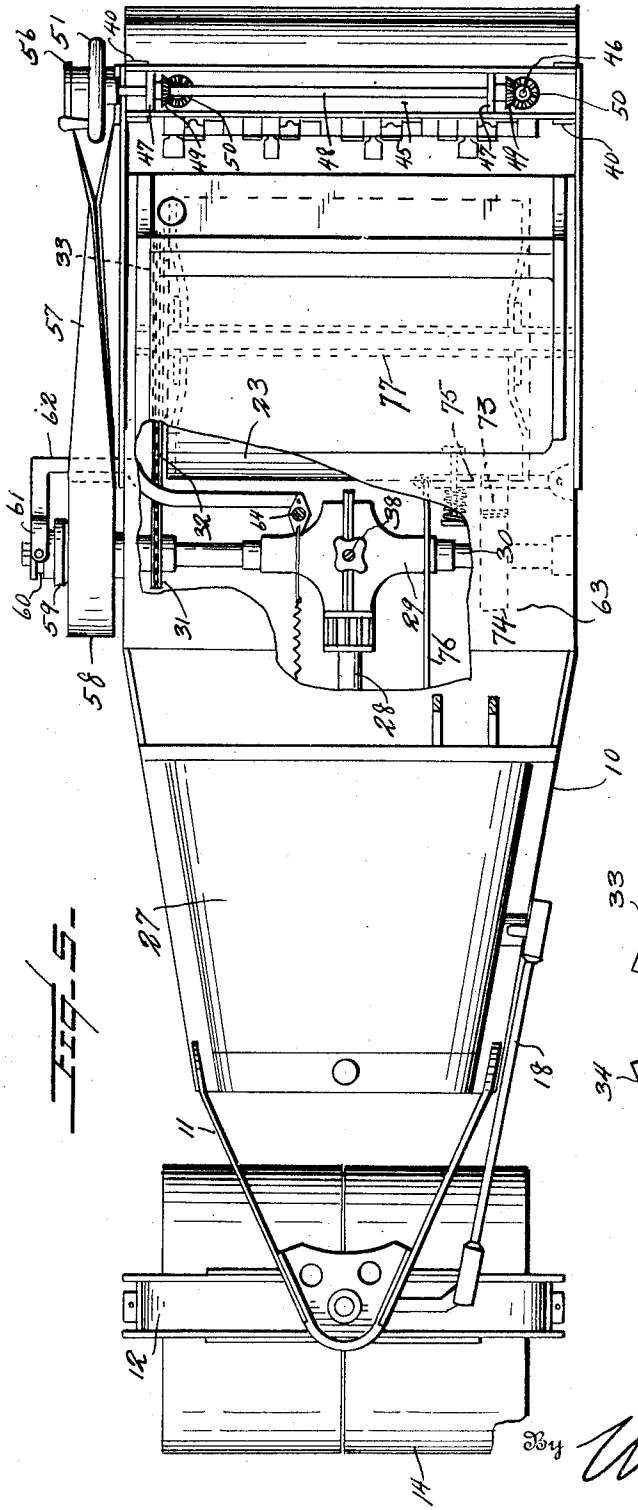

Fig. 5.

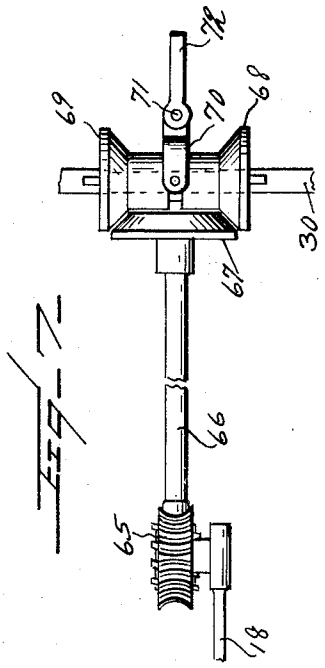

Fig. 7.

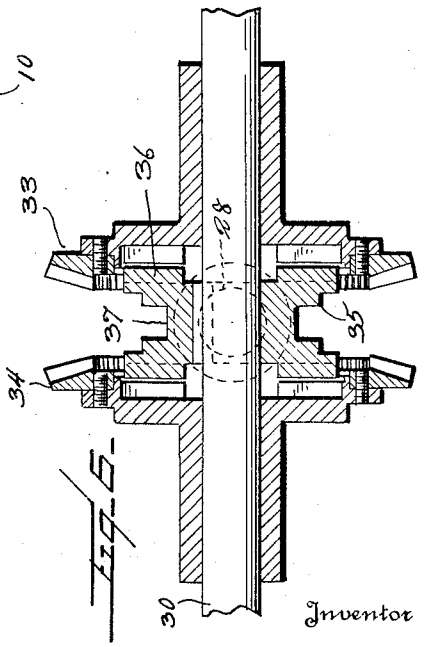

Fig. 6.

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UNITED STATES PATENT OFFICE

LEE W. SIEGEL, OF ELGIN, ILLINOIS

POWER ROLLER AND SURFACER

Application filed March 28, 1931. Serial No. 526,109

This invention relates to machines for rolling lawns of golf courses, cemeteries, parks, athletic fields, etc., and particularly to a roller of this character of a very simple, cheap and compact construction, and which is operated by automotive power.

One of the objects of the present invention is to provide a small, compact and easily handled combined roller and scarifier which is particularly adapted for rolling and leveling lawns, fairways, tennis courts and the like, but which is also adapted to be used by contractors and others in rolling and leveling roads or other surfaces.

A further object of the invention is to provide a construction of this character having rollers which may be more or less filled with water to thus give a proper weight to the rollers for the work to be done and provide simple means whereby the machine may be caused to travel forwardly or reversed.

Another object is to provide a scarifier or surface mounted upon the rear of the machine and capable of being vertically adjusted and provide means whereby the power unit of the machine may be connected to or disconnected from the scarifier at the will of the operator.

A further object is to provide means whereby the machine may be steered by power if desired, the steering, of course, being under the control of the operator.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of a power roller and surfacer constructed in accordance with my invention;

Figure 2 is a vertical section through the rear of the machine;

Figure 3 is a fragmentary detailed view showing the manner of connecting the front roller yoke to the frame of the machine;

Figure 4 is an elevation of one of the scarifier disks;

Figure 5 is a top plan view of the structures shown in Figures 1 and 2;

Figure 6 is a section through the transmission gearing;

Figure 7 is a top plan view of a power operated steering mechanism.

Figure 8 is a transverse sectional view through the shaft 30 showing the braking mechanism therefor.

Referring to these drawings, 10 designates the frame of the machine, which frame is supported upon a rear roller and upon a forward roller. The forward end of the frame, which frame is preferably of angle iron or channel iron, is upwardly extended to provide a goose neck 11 which is V-shaped in plan and which supports the bearing for a vertically disposed yoke 12. This yoke is bifurcated to provide two downwardly extending arms through which the shaft 13 of the forward roller 14 passes.

This yoke is pivotally connected at 16 to the vertical pin 17 passing through the yoke. Thus the yoke 12 may oscillate upon the pivot 16, but any rotation of the yoke will cause a rotation of the roller to steer the machine.

As illustrated in Figure 1, the yoke 12 is oscillated by means of the longitudinally extending rod 18 which, at its rear end, is connected to an oscillating arm 19 mounted upon a transverse shaft 20 in turn connected in any suitable manner to the steering shaft 21 which is mounted in the usual steering post and has the usual steering wheel 22. I have provided means, as will be later described, however, whereby the machine may be steered by power. The rear end of the machine is supported upon a rear roller 23, the shaft of which is supported in bearings 24. These bearings are slotted at 25 and are mounted upon the lateral frame beams of the machine by means of bolts 26 passing through said slots so that these bearing brackets 25 may be shifted longitudinally upon the frame of the machine.

Mounted beneath the hood 27 is an engine of any suitable construction and power. This engine has extending rearward from it the usual drive shaft 28 which extends into a housing 29. Extending laterally through this housing is a jack shaft 30, this shaft carrying upon it the sprocket wheel 31 over which a sprocket chain 32 passes, this sprocket chain extending over a sprocket wheel 33 mounted

upon the shaft of the roller 23. Loose upon this shaft 30 are the opposed beveled gear wheels 34 and 34a.

Splined upon the shaft 30 is the intermediate double clutch designated generally 35 provided with the opposed clutch faces 36 adapted to engage frictionally or otherwise with coacting clutch faces formed upon the beveled gear wheels 33 and 34. The middle of this double clutch is formed with an annular recess 37 to receive the usual shipper ring or fork and is operatively connected to a shift lever 38 extending downward through an opening in the housing 29. In this construction, the transmission lever controls the direction of movement of the machine. When the lever is shifted to the right, the machine is in reverse and moves rearward and when the transmission lever is toward the left, the machine will move forward. When the transmission lever is in the middle and the clutch is in the middle, the machine is in neutral. Where the lever enters the jack shaft housing 29, there is provided a packing nut 39 which makes an oil-tight joint. The friction of the packing holds the shift lever in either one of its three positions. The housing 29 is to be filled with oil so that the transmission gears will run in oil.

The rear end of the machine is formed with opposed vertical guides 40 which form part of the frame of the machine. Operating within these guides is a rectangular frame designated generally 41 formed of the upper and lower cross bars 42 and the braces 43. The upper cross bar 41 carries upon it the fixed nuts 44. Extending vertically downward through a fixed cross bar 45 are the two opposed screws 46 which engage the nuts 44. Mounted in bearing brackets 47 upon the cross bar 45 is a shaft 48 carrying beveled pinions 49 engaging beveled pinions 50 on the screws 46.

This shaft 48 is provided with a hand wheel 51. In turning this wheel, the frame 41 may be raised or lowered within its guides. The lower end of the frame extends down below the guides and carries bearings for a transverse shaft 52. Mounted upon this shaft are a plurality of disk-like rollers 53 held in place upon the shaft by the nuts 54 engaging the shaft. Each of these rollers carries one or more knives or blades 55, the blades of the several rollers being arranged to describe a spiral around the roll formed of the separate rollers 55. These knives act as scarifying knives and when the frame 41 is lowered, the knives cut into the ground and scarify or cut away any projection, thus leveling the ground.

This scarifier or surfacer is driven by means of band wheel 56 mounted upon the shaft 52 and over which a band 57 passes. The band 57 passes around a relatively large band wheel 58 loosely mounted upon the jack shaft 30. Suitable means is provided whereby this pulley may be clutched to the jack shaft or unclutched therefrom. To this end, I have shown a clutch member 59 mounted upon the jack shaft 30 to rotate therewith and have shown the opposed face of the band wheel 38 as being provided with clutch teeth. I have also shown the hub of this band wheel as being formed with an annular groove 60 with which a yoke 61 engages, this yoke being part of an operating rod 62 extending laterally beneath the floor 63 of the machine to a vertical shaft 64 having a crank connected to the rod 62 and having a handle whereby it may be operated.

It will thus be seen that the scarifier may be operated or not as the operator desires and that the scarifier may be raised or lowered either to raise it entirely above the ground so that it will not under any circumstances touch anything or may be lowered to different degrees to cut either deeper or shallower as desired.

In Figure 7, I have illustrated means whereby the power of the engine may be used for steering the machine. To this end, the shaft 20 is shown as carrying upon it the worm wheel 65 which in turn is connected to a longitudinally extending shaft 66. This carries upon it the friction cone 67. Mounted upon the shaft 30 are the opposed connected friction cones 68 and 69. An operating yoke 70 is engaged with the hubs of these cones so that when the yoke is shifted in one direction, the cone 68 will be brought into engagement with the cone 67 and when in the opposite direction, the cone 69 will be brought into engagement with the cone 67. This yoke 70 may be connected to a vertical operating shaft 71 having a handle 72 at its upper end. Thus the power of the transmission shaft may be used for operating the steering mechanism of the machine which is sometimes necessary where the rollers are very heavy and where it is, therefore, difficult for the operator to exert sufficient power to turn the front roller. Of course, when the friction wheel 67 is out of engagement with either of the friction wheels 68 or 69, the machine will travel in a straight path but when it is desired to turn the front roller to the right or to the left, the manually controlled means is operated to shift one or the other of the wheels 68 or 69 into engagement with the driving wheel 67.

From Figures 5 and 8, it will be seen that I have provided a brake in connection with the shaft 30, this brake being designated 73 and operating against a brake wheel 74. The brake may be mounted in any suitable manner as for instance upon the lever 75 operated by means of a rod 76 and the usual brake pedal. The brake holds the machine while shifting gears, thereby avoiding clashing of the clutches. As will be seen from Figure 5, the front and rear rollers are carried by a

tubular sleeve 77 through which the shaft for the roller passes, the purpose of this being to keep the water from contact with the driving shaft upon which the rollers are mounted. The knives 55 are preferably forced into the disks 53 and held in place by a pin passing through the disk and into the shank of the knife as illustrated in Figure 4. The end disks on shaft 52 are splined on the shaft. The remainder of the disks, however, are not splined upon the shaft. By adjusting the disks in staggered relation upon the shaft, the cylinder formed of the disks is balanced. Furthermore if a knife should strike any movable object, this disk is permitted to slip thereby preventing damage to the cylinder or the machine. This also is permitted by the belt drive 57.

It will be seen that I have provided a mechanism of this character which is very simple, strong, compact and particularly adapted for use where a relatively light power operated roller is necessary and is, therefore, particularly adapted for use on golf courses, on large lawns, in parks and in like situations. The weight of the machine may be increased or decreased by adding water to the forward and rear rollers or taking water therefrom. When it is desired to use the scarifier, the transmission is put in reverse and the machine backed toward the hump or other part which is to be cut away. The scarifier having been thrown into action, it will cut off this offending hump or protuberance and then the area so acted upon will be rolled. Of course, the scarifier will also operate upon a forward movement of the machine. If rolling is to be done immediately after the scarifying operation, the machine must be reversed.

I claim:—

1. A ground rolling and scarifying machine comprising a supporting frame, a front roller mounted beneath the forward end of the supporting frame for movement in a horizontal plane, manually operable means for rotatively shifting the roller to steer the machine, a rear roller mounted in bearings in the rear end of the machine, an engine, a jack shaft extending across the machine and operatively engaged with the engine, manually controlled means for transmitting the power of said jack shaft to the rear roller and cause either the forward or rearward movement thereof, a scarifying roller having scarifying teeth, means for rotatably supporting said scarifying roller from said frame rearwardly of said rear roller, said supporting means including guides fixedly secured to said frame rearwardly of the rear roller, a slide positioned in said guides, manually operable means supported by said guides for vertically adjusting the scarifying roll, and manually controllable means for driving the scarifying roll from said jack shaft, including coacting clutch members mounted upon the jack shaft, one of said members being operatively connected to the scarifying roll, and manually operable means for shifting said clutch members into or out of coactive engagement.

2. A ground roll and scarifier comprising a supporting frame, a front roller mounted beneath the forward end of the supporting frame for movement in a horizontal plane, manually operable means for shifting the front roller in a horizontal plane to steer the machine, a rear roller mounted beneath the rear end of the machine, an engine including a drive shaft, a transversely extending jack shaft mounted on the frame and adapted to be driven from the driving shaft, manually operable power transmission means for driving the jack shaft either forward or reversely, a driving connection between the jack shaft and the rear roller, a scarifier carrying frame mounted upon the main frame for vertical movement, guide means for the scarifier frame mounted on said supporting frame rearwardly of said rear roller, manually controllable means for vertically adjusting the scarifier frame, and a scarifier roller carried by the scarifier frame and having scarifying teeth, a band wheel loosely mounted upon the jack shaft, a band operatively engaging the scarifying roll with said band wheel, and a clutch for engaging the band wheel or disengaging it from the jack shaft.

3. An earth working machine comprising a main supporting frame, rollers journaled in said frame, a power member operatively engaged with one of said rollers for moving the frame, a pair of vertical guide members fixedly mounted on one end of the frame outwardly of one of the rollers, a slidable member engaging said guide members, means for adjusting said slidable member within said guide members, and a scarifying roller journaled in said slide member and operatively connected with said power member for rotation.

4. An earth working machine comprising a horizontal main frame, front and rear rollers journaled in said frame, a power member operatively engaged with one of the rollers, a pair of guide members mounted in fixed vertical position on said horizontal frame outwardly of one of the rollers, a scarifying member, a frame slidably mounted in said guides and rotatably supporting said scarifying member adjacent one end of the horizontal frame, means for operatively connecting said scarifying roller to said power member, and adjusting means carried by said guides and engaging said scarifying frame for vertically adjusting the scarifying roller.

In testimony whereof I hereunto affix my signature.

LEE W. SIEGEL.