G. BURWELL.

SURFACING MACHINE.

APPLICATION FILED SEPT. 10, 1908.

1,033,872.

Patented July 30, 1912.

5 SHEETS—SHEET 1.

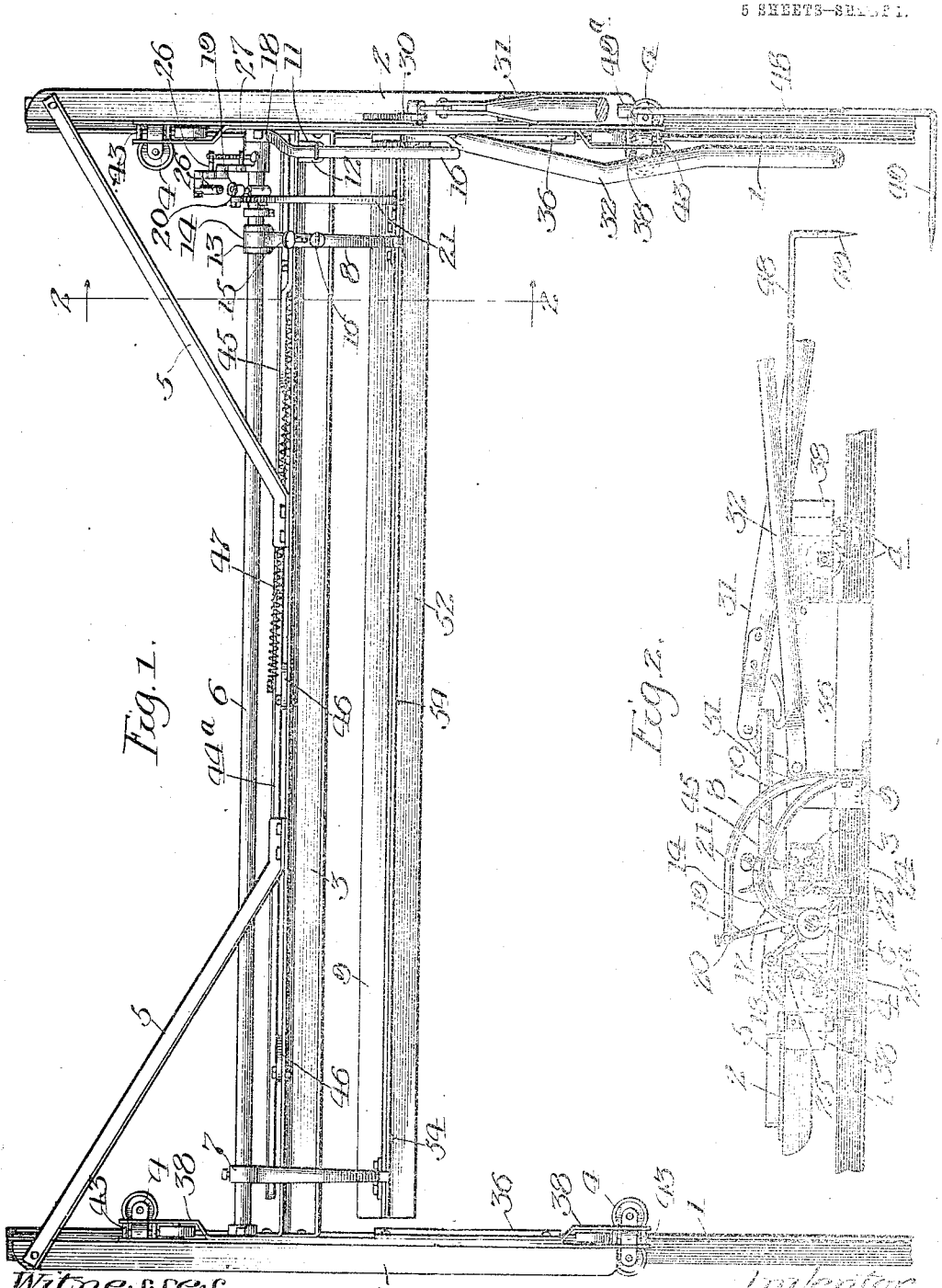

Fig. 1.

Fig. 2.

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5 SHEETS—SHEET 2.

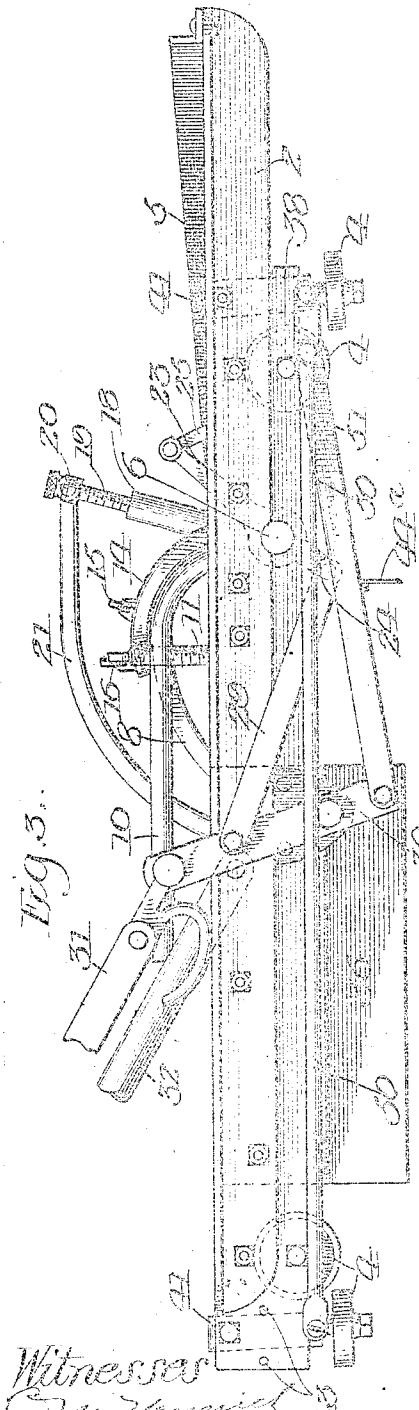

Fig. 3.

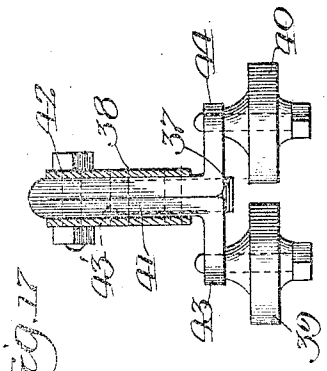

Fig. 17

Witnesses:
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5 SHEETS—SHEET 3.

Fig. 4.

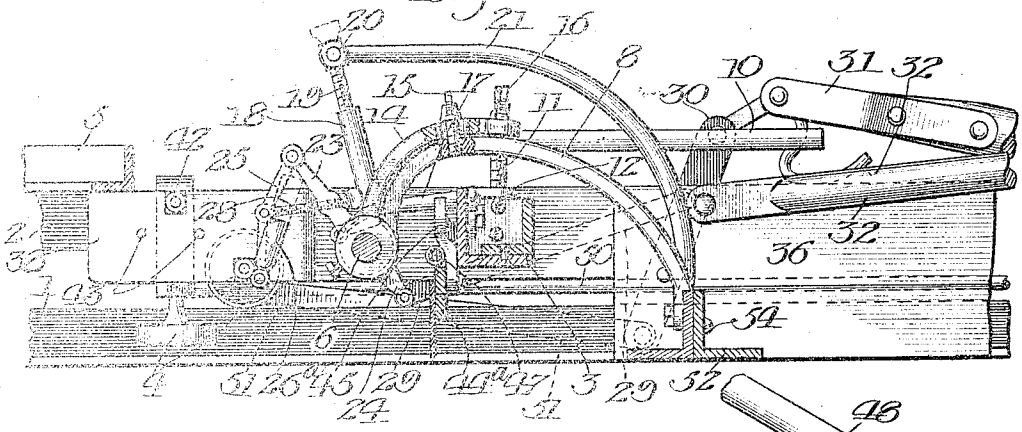


Fig. 6.

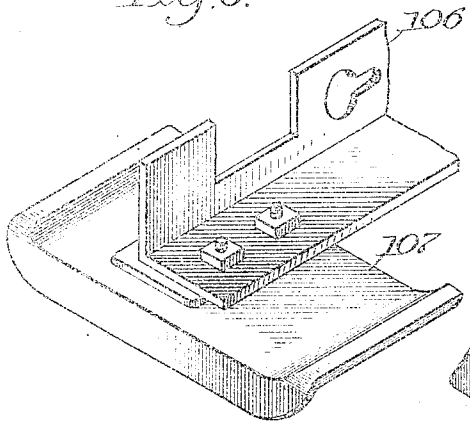


Fig. 5.

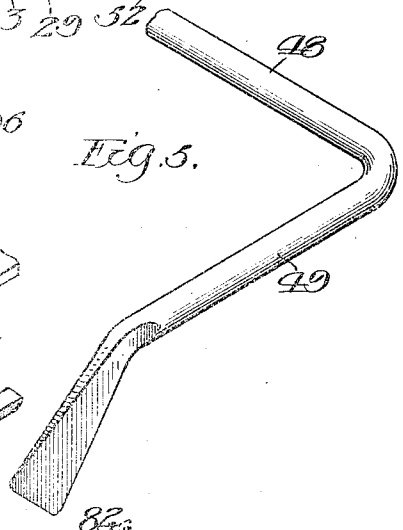
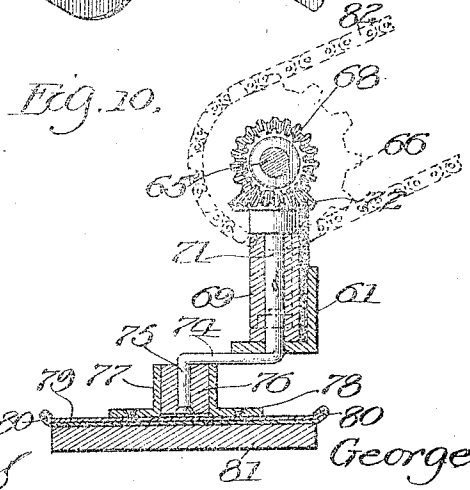


Fig. 10.



Witnesses

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3 SHEETS—SHEET 3.

Fig. 7.

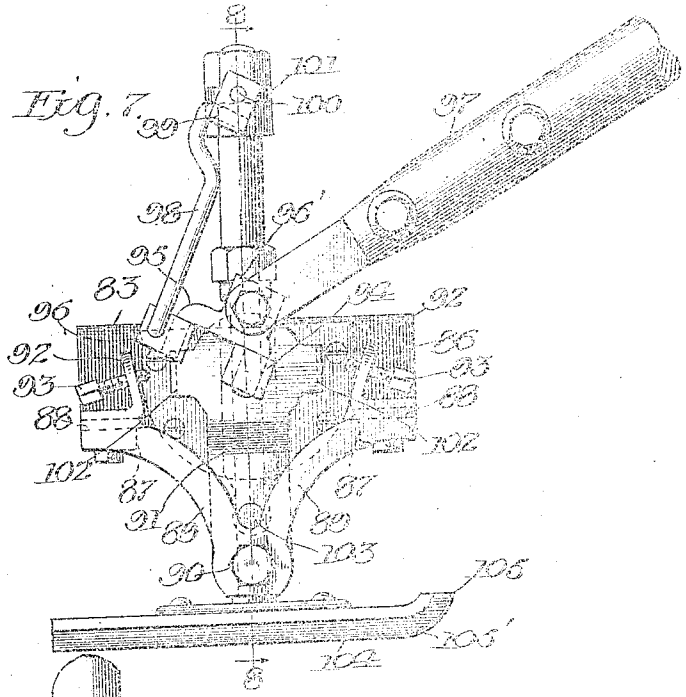


Fig. 8.

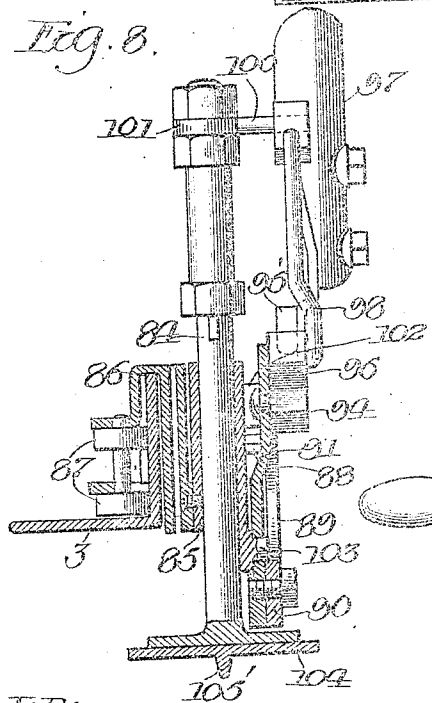
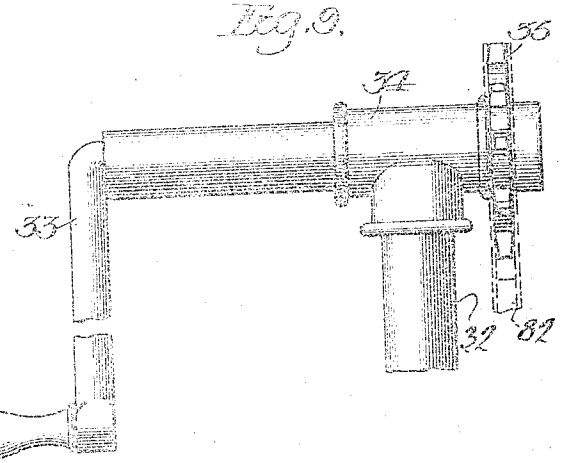


Fig. 9.



Witnesses

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by Allen Bryan atty

G. BURWELL.

SURFACING MACHINE.

APPLICATION FILED SEPT. 10, 1908.

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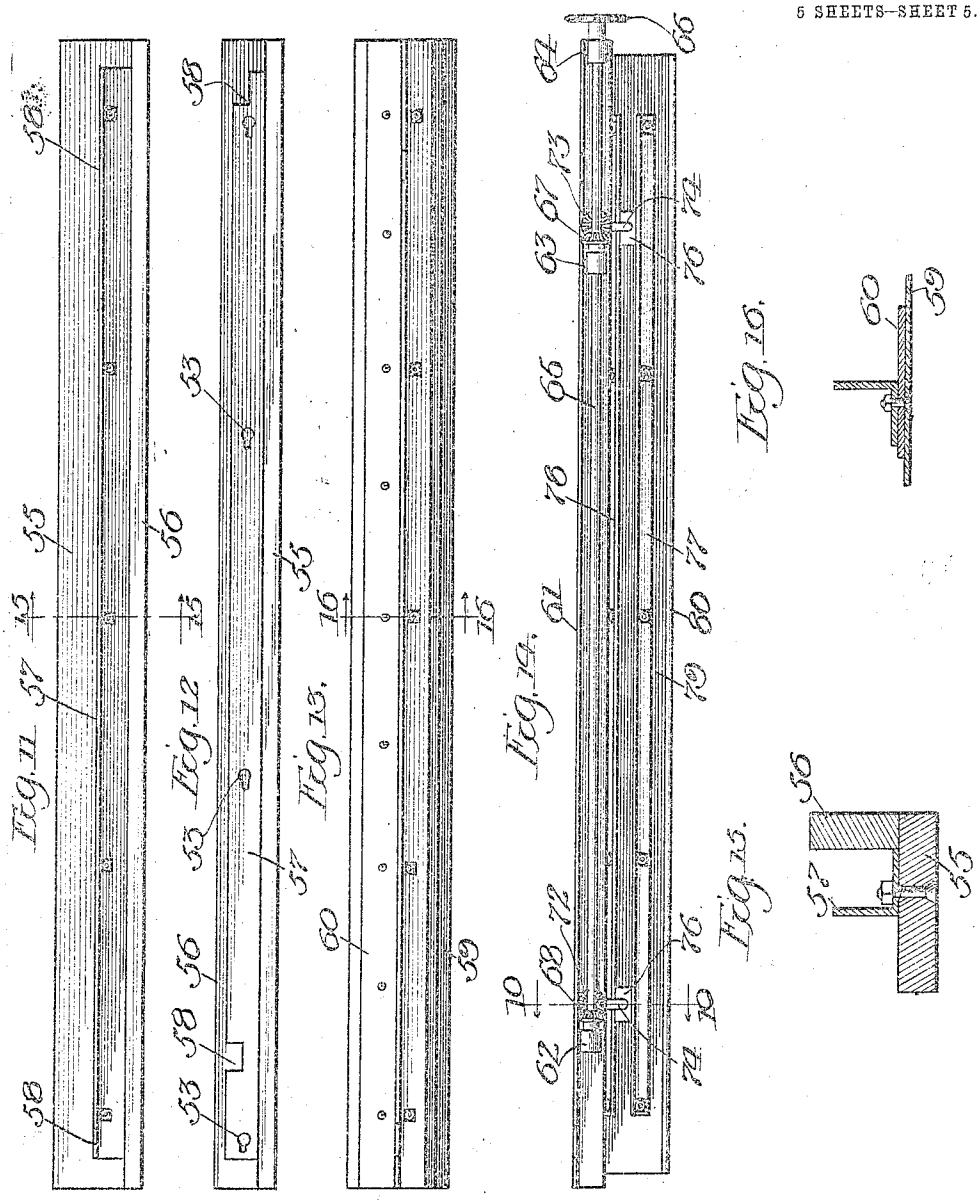
5 SHEETS—SHEET 5.



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by A. Tilden Bryan Atty.

UNITED STATES PATENT OFFICE.

GEORGE BURWELL, OF LANSING, MICHIGAN.

SURFACING-MACHINE.

1,033,872. Specification of Letters Patent. Patented July 30, 1912.

Application filed September 10, 1908. Serial No. 452,472.

To all whom it may concern:

Be it known that I, GEORGE BURWELL, a citizen of the United States, residing at Lansing, in the county of Ingham and State of Michigan, have invented a certain new and useful Improvement in Surfacing-Machines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to surfacing machines, and is particularly adapted to more economically distributing, laying, smoothing and finishing surfaces, both of coarsely and finely divided material.

The preferred form of my machine lends itself more particularly to the laying of concrete, cement, crushed stone, or other finely divided material.

Generally speaking, the embodiment of my invention shown herein comprises a frame work, which is so constructed as to allow it to be moved along over the surface to be worked upon, either manually or otherwise, and is furthermore supplied with rollers at either end thereof which ride on rails, so as to guide the machine over the material to be worked, and also to allow the machine to be moved back and forth with greater ease.

When my machine is applied to the laying of cement sidewalks, the first operation after the bed of cinders has been laid is to apply a mixture of crushed stone, sand and cement, which has to be smoothed evenly over the surface of the bed of cinders. This I accomplish by means of a smoothing bar, which is removably fastened to the machine, and as the machine is pushed along over the surface of the mixture, this smoothing bar tends to distribute the material evenly over the surface. To further accomplish this result, the bar is removed and another applied, which is so constructed as to more thoroughly smooth the surface of the crushed stone, etc. After the grading, a layer of cement is applied over the surface of the aforesaid material. In order to spread this mixture, I apply the spreader bar to the machine, which spreads the cement over the surface of crushed stone, etc. After this operation is completed, a further smoothing bar is applied to the machine, which is so constructed as to give the material a finished surface. This I accomplish by means hereinafter more fully described. After these operations have been gone through with the sidewalk or floor is practically finished, with the exception of edging and grooving. These operations are accomplished by means of new and novel means to be described.

In the accompanying drawings Figure 1 is a top plan view; Fig. 2 is a section on line 2—2 of Fig. 1; Fig. 3 is an end elevation; Fig. 4 is an enlarged detail view of Fig. 2; Fig. 5 is a perspective detail of the marking bar; Fig. 6 is a perspective view of one end of the edger; Fig. 7 is a front elevation of the groover; Fig. 8 is a section on line 8—8 of Fig. 7; Fig. 9 is an enlarged detail view of the crank arm and sprocket wheel, which are used in connection with the surfacer; Fig. 10 is a section on line 10—10 of Fig. 14; Fig. 11 is a top plan view of one of the smoother bars; Fig. 12 is an end view of the smoother bar shown in Fig. 11; Fig. 13 is a top plan view of one of the cement surfacing bars; Fig. 14 is a top plan view of the finishing bars; Fig. 15 is a section on line 15—15 of Fig 11; Fig. 16 is a section on line 16—16 of Fig. 13; Fig. 17 is a detailed view of the roller bearings 4—4.

Referring more specifically to the drawings, I provide the tracks or guide rails 1—1, upon which the machine is adapted to slide. The machine herein shown is provided with side frames 2—2, preferably made of angle iron, which are held rigidly together by means of a bolster, 3, which extends throughout the width of the machine. This bolster is also preferably made of angle iron. The side frames 2—2 are provided with antifriction bearings 4—4, which ride on and slide against the guide rails 1—1, thereby allowing the machine to be operated with greater ease. I also provide the bracing members 5—5, which are fastened to the side frames and to the bolster, thereby giving the machine more stability and rigidity. The machine is also provided with a rocking bar 6, which extends the full width of the machine and has its ends journaled in the side frames. Connected to this rocking bar 6 are the arched supporting members 7—8, one of which is fastened rigidly to said rocker bar. These supporting members 7—8 are pivotally connected to the right angle shaped support 9, adapted to carry the smoother and finishing bars. The rocker arm also carries upon it the rigidly fastened lifting arm 10, which is

provided for the purpose of lifting the right-angle shaped support 9 out of operation when not in use. This arm 10 has threaded into it the set screw 11, which bears upon the lug 12, which is fastened to the bolster 3 for the purpose of adjusting the support 9 to its proper height according to the thickness of the flooring.

The arched supporting member 8, which is carried by the rocker bar 6, is bifurcated at 13. Between the bifurcations is rigidly mounted the adjusting arm 14, which is provided with two thumb screws 15 and 16. These thumb screws are for the purpose of adjusting the support 9 to a perfect level transversely of the machine. It is obvious, by referring to the drawings, that by turning the thumb screw 15 that the supporting members 8 will be raised or lowered. The thumb screw 16 is for the purpose of assisting the screw 15 in keeping the arm 8 in a given position. This adjustment is due to the fact that the adjusting arm 14 is rigidly fastened to the bar 6, while the supporting arm 8 is loosely mounted thereon, and is held in position by the thumb screw 15, which threads itself into the member 14.

Permanently fastened to the bolster 3 is the rearwardly projecting bracket 17, one end of which is provided with means for pivoting the screw threaded member 18, into which is threaded the adjusting screw 19. This adjusting screw is supplied with a journal 20, which in turn is pivotally connected with the tilting arm or lever 21. Said arm or lever 21 has permanently fastened to its forward extremity the supporting member 9, and through its rearward end passes the journal 20. It will be seen that by operating the adjusting screw 19 either to the right or left the arm or lever 21 will be raised or lowered. This will tilt the supporting member 9, thereby presenting an inclined surface to the material to be worked. This is due to the fact that the arm or lever 21 is rigidly fastened to the support 9, and the arched members 7—8 are pivotally mounted on the rod 6.

Upon the rocker bar 6 is loosely journaled the sleeve or collar 22. Said collar 22 is provided with the upwardly extending arm 23, and a downwardly projecting arm 24. At the upward extremity of the arm 23 is pivoted the downwardly projecting arm 25, at the lower extremity of which is loosely mounted the internally screw-threaded member 26^a, which is adapted to receive the adjusting screw 19. The arms 23 and 25 are provided near their centers with bosses, which are adapted to receive the outwardly projecting lugs 26—27 respectively. These lugs are for the purpose of receiving the screw-threaded member 28, which by turning one way or the other determines the degree of inclination of the supporting bar 9, the use of which will be described later. The downwardly projecting arm 24 is pivotally connected to the link 29, which in turn is connected to the operating lever 30. Said lever 30 is pivoted near its center, and is supplied with the handle 31, by which means the machine is operated.

When the machine is in operation it is necessary to work back and forth upon the surface of the material that is being laid, and this necessitates a tilting motion to the bar 9, so as to present an inclined face on the forward movement, so that it will have a troweling effect upon the material, and on the return movement the bar 9 will assume a horizontal position, so as not to touch or injure the material which has already been laid. This I accomplish by means of the tilting mechanism hereinbefore described. In this manner the bar 9 may be set to a permanent inclination, or the screw 19 may be moved into its alternate socket so that the said bar 9 may be tilted by the handle 31 as the machine moves. Upon one of the side frames 2 I furthermore provide the rod, or support, 32, one end of which is pivotally connected to said side frame. At the opposite end of said supporting rod 32 I provide means for operating the surfacing mechanism. This means comprises a crank handle 33, journaled in the member 34. Fastened rigidly to the opposite end of the crank handle 33 is provided the gear wheel 35, which, when a chain or belt 82 is applied, will impart motion to the surfacing mechanism when the crank handle 33 is operated. The side frames 2—2 are also provided with downwardly projecting plates 36, which are of sufficient length to extend below the surface of the concrete, cement, etc. These plates 36 are for the purpose of evenly cutting away the superfluous material along the edges as the machine is drawn along over the sidewalk.

Referring more specifically to the anti-friction bearings 4—4, which are mounted near the ends of the side frames 2—2, these bearings form the main supports for the machine, and are for the purpose of operating the machine with greater ease. To accomplish these results, I provide the roller bearing 37, which bears upon the upwardly extending flange of the angle-iron 1—1, and is journaled in bearing plates 38, which are fastened to the side frames 2—2. I also provide the horizontally disposed rollers 39—40, which are adapted to bear upon the sides of the upwardly extending flange of the track 1. These bearings 39—40 are mounted in the support 41. Said support is pivoted in the bearing plate 38 at 42, and is so constructed as to carry said rollers 39—40 upon the outwardly extending lugs 43—44, which are disposed at right angles to the piece 41. It will be evident that as

the machine is operated to and fro the support 41 will have a swinging motion, owing to the fact that it is pivoted at 42 for the purpose of affording a little lost motion at the end of each stroke of the machine. I also provide the stop-pins 43′, which limit the movement of the support 41. The roller bearings 4—4 are connected together by means of a connecting rod 50, which carries a connecting link 51, one end of which is fastened to the rod 50, and has its opposite end connected to the operating link 30, thereby imparting a rocking motion to the roller bearings 4—4, the purpose of which has hereinbefore been described.

I provide a cutting bar 44ª upon the bolster, which is adapted to be raised and lowered by means of the handle 45, which is pivoted to the bolster 3, the opposite end of which is loosely fastened to the cutting bar 44ª. The links 46 are also connected to the bolster 3 and the bar 44ª to assist in supporting said bar 44ª. I also provide the tension coil spring 47, one end of which is fastened to the bolster 3, and has its other end fastened to the bar 44ª, so as to keep said bar up and out of the way when not in use. The object of the cutting bar is to mark a given point so that it will be known when to operate a groover, which is hereinafter to be described.

The marking bar 48 is mounted upon the side frames 2—2 at the forward end thereof, and is for the purpose of marking at a given point where the cutting bar 44ª should be brought into operation. Said bar 48 is provided with an inwardly projecting member 49, whose end is turned downwardly and shaped so as to present a sharp edge to the material. I also provide the supporting member 49ª, into which the marking bar 48 is slidably mounted for the purpose of determining the distance between the cutting bar 44ª and the marking bar 48.

Having thus described my machine, I will now describe more in detail the functions of the different parts which are used to accomplish the different results.

The first result to be accomplished is to spread evenly the cinders which form the bed for the other mixtures. This is done by means of attaching the right angular shaped bar 52 to the supporting member 9 by means of the apertures 53, which are adapted to receive the lugs 54, which are integral with the bar 9. Thus by operating the machine back and forth the bed will be prepared for the next layer, which is a combination of sand, crushed stone and cement. When this layer is ready to be distributed over the bed of cinders, I apply the spreading means shown in Fig. 11, which is preferably made of two pieces of wood 55—56, placed at right angles to each other. The angular shaped bar 57 is fastened to the part 55 by means of screws, or any other suitable way, and which is in turn fastened to the supporting bar 9, and is supplied with the same means as the bar 52 for attaching it to the supporting bar 9. The member 57 is cut away at 58 to allow the same to be adjusted to the bar 9 without the interference of the arched supporting members 7—8. It is evident that when the machine is pushed along, the material will come in contact with the face 56, and will be spread or distributed evenly over the surface of the bed of cinders.

In Figs. 13 and 16 I show the means whereby the surface, which is a coating of cement, is evenly distributed. This device is also supplied with the same means for attaching it to the supporting bar 9, and is made up of laminated pieces of metal, 59—60, for strength and to present as smooth a face to the material as possible.

In Figs. 10 and 14 I show the means employed for finishing the surface of the coating of cement. It is found necessary to present a circular motion to this face, so as to further smooth its surface. This I accomplish by attaching the bar 61 to the supporting member 9. For doing so I supply the same means as previously used. The bearings 62, 63 and 64 are rigidly fastened to the bar 61, and carry the shaft 65, having the gear wheel 66 mounted at one end thereof for the purpose of operating the beveled gears 67—68. The standards 69 and 70 are also fastened to the bar 61 at their lower ends, and through which passes the crank shaft 71, having fastened to their upper ends the beveled gears 72 and 73, and having their lower ends bent at right angles to the shaft 71, so as to form a crank arm 74, whose end terminates with a downwardly projecting member 75 adapted to rotate in the journal 76, which is held rigidly between the longitudinal angle iron bars 77—78, which in turn are fastened to the plate 79. The ends of said plate 79 are turned upwardly at 80, so as to be able to carry the smoothing member 81. It is obvious that when the gear wheel 66 is rotated, it will rotate the beveled gears 67—68, and thereby impart motion to the beveled gears 72—73, which being fastened to the shaft 71 causes the plate 79 to have a circular motion. As the smoothing member 81 is fastened to the plate 79, it will also receive a circular motion, thereby giving the material a highly finished surface. In order to operate this mechanism, I employ the means shown in Fig. 9, which constitute a gear wheel 35, and is journaled in the member 34, which is also supplied with the crank handle 33. A link chain 82 is operated by means of the gear 35, which also operates the gear wheel 66, thereby imparting motion to the mechanism hereinbefore described. I furthermore pro-

vide a novel means for grooving the cut made by the cutting bar 44ª, one purpose of which is to give the surface of the walk the appearance of being made of a solid block of stone. To accomplish this, I slidably mount the groover 83 upon the bolster 3, said groover being removable at will. The upwardly extending support 84 has slidably mounted thereon the collar 85. Said collar 85 is pivotally mounted on the supporting yoke 86, which is adapted to slide upon the bolster 3. The yoke 86 is preferably made V-shaped, and is adapted to straddle and ride upon the bolster 3. Said supporting yoke is provided with the antifriction rollers 87, which bear upon the faces and upper edge of said bolster 3. The outer face of said yoke is provided with the outwardly projecting lugs 88, to which are fastened the downwardly projecting arms 89, whose lower ends terminate in a bearing 90, to which is pivotally connected, by means of a bolt or pin, the upwardly projecting member 91. To the upper ends of said arms 89 I provide the upwardly projecting lugs 92, which are supplied with the set screws 93, the functions of which will hereinafter be described.

The arm 91 has journaled near its upper end the lug 94, into which is adapted to be fitted the double bell crank lever 95, one end of which is loosely mounted into the swivel 96, and has its opposite end loosely journaled into the lug 94. Said bell crank lever 95 has an upwardly extending member 96′, to which is fastened the operating handle 97. To the swiveled member 96 the connecting link 98 is mounted, whose upper end terminates in the hanger 99, which in turn is mounted upon the forwardly extending arm 100. Said arm is provided with the collar 101, which is loosely mounted upon the supporting rod 84, to thereby provide a support for members 98 and 99. The upwardly extending arm 91 is provided with the inwardly extending lugs 102, and is also adapted to receive the outwardly extending pin 103, which is fastened integrally with the sliding collar 85, the object of which will be described in the following.

The shoe 104 is fastened at the lower extremity of the rod or support 84, and has for its object the purpose of smoothing the cut made by the cutter bar 44ª. To accomplish this, I provide upon the lower face of said shoe the downwardly extending rib 105′ which is of such shape that it will give to the cut a rounded edge. The heel of said shoe 104 is slightly rounded upward at 105. This is done to prevent the shoe from injuring the surface of the material on its backward, or return, stroke.

It is obvious that when power is applied, either back or forth, to the handle 97, it will impart a rocking motion to the member 91, by reason of the fact that said member is pivoted in the bearing 90. This will tilt the direction of the shoe either upwardly or downwardly. This is accomplished by the pin 103, which is inserted in the member 91, and is integral with the collar 85, said collar 85 being pivotally fastened to the yoke 86. It will be seen that when the member 91 is operated, it will describe an arc of a circle, and the pin 103 being inserted into member 91 will ride with the said member and tilt the shoe either upwardly or downwardly when the pin passes the center of said arch described by the member 91. After these operations have been gone through, the walk is practically finished, with the exception of finishing the edges. To accomplish this, I provide the bar 106, which carries upon its ends the shoes 107. These shoes are provided with the downwardly projecting flange 108, which extends over the edge of the material, and is so constructed on its inner face that it will give to the edge of the walk a slightly rounded contour. When this result is desired to be accomplished, the bar 106 is attached to the supporting member 9 of the machine, and the whole is slid along upon the tracks 1—1 from one end of the walk to the other.

Having thus explained my invention, what I claim as new and desire to cover by Letters Patent is:

1. In a device of the class described, the combination with rails, of a framework movable to and fro along said rails, means mounted on said framework for smoothing material over which said framework is moved, both backwardly and forwardly and a device for tilting said means when said framework changes its direction of motion.

2. In a device of the class described, the combination with rails, of a framework movable to and fro along said rails, means mounted on said framework for smoothing material over which said framework is moved, a device for tilting said means when said framework changes its direction of motion and an operating handle mounted on said framework for moving same, both backwardly and forwardly.

3. In a device of the class described, the combination with rails, of a framework movable to and fro along said rails, means mounted on said framework for smoothing material over which said framework is moved, a device for tilting said means when said framework changes its direction of motion, an operating handle mounted on said framework for moving same both forwardly and backwardly, and rollers interposed between said framework and said rails.

4. In a device of the class described, the combination with rails, of a framework movable to and fro along said rails, a hori

zontal tool mounted upon said framework for operating upon material over which said framework is movable, a device for tilting said tool when the motion of said framework is reversed, said tool serving to smooth the surface of the material over which it is moved, both backwardly and forwardly.

5. In a device of the class described, the combination with rails, of a movable framework mounted on said rails, a removable tool transversely mounted on said framework for smoothing material over which said framework is movable both backwardly and forwardly and a device for tilting said tool when the motion of said framework is reversed.

6. In a finishing machine, the combination with rails, of a framework movable thereon to and fro, a roughing tool adapted for transverse mounting on said framework for smoothing rough material over which said framework is movable both in its forward and backward movement together with means for tilting said tool when the direction of motion of said framework is reversed.

7. In a machine of the class described, the combination with rails of a movable framework operating upon said rails, means whereby said framework may be propelled, a transverse tool for operating upon material over which said framework is movable mounted transversely to the direction of motion thereof, and means for imparting a circular motion to said tool substantially in the plane of the framework for smoothing material over which said framework is movable.

8. In a machine of the class described, the combination with rails of a movable framework operating upon said rails, means through which the framework may be propelled, a transverse tool for operating upon material over which said framework is movably mounted transversely to the direction of motion thereof, and a handle for imparting a circular movement to said tool substantially in the plane of travel of the framework for smoothing material over which said framework is movable.

9. In a machine of the class described, the combination with rails of a movable framework operating upon said rails, means through which the framework may be propelled, a transverse tool for operating upon material over which said framework is movably mounted transversely to the direction of motion thereof, a handle for imparting a circular motion to said tool substantially in the plane of the framework for smoothing material over which said framework is movable, and a sprocket chain and sprocket wheels interposed between said handle and said tool.

10. In a machine of the class described, the combination with rails of a movable framework operating upon said rails, means through which the framework may be propelled, a transverse tool for operating upon material over which said framework is movably mounted transversely to the direction of motion thereof, a handle for imparting a circular motion to said tool substantially in the plane of the framework for smoothing material over which said framework is movable, a sprocket chain and sprocket wheels interposed between said handle and said tool for imparting the movement of said handle to said tool, and a bar mounted on said framework on which said handle and sprocket wheel is mounted.

11. In a device of the class described, the combination with rails, of a movable framework operating along said rails, a tool adapted for mounting in said framework transversely of the direction of motion thereof to operate upon material over which said framework is movable, and means interposed between the tool and the same framework to tilt the said tool the operation of said means depending upon a change in the direction of motion of the said framework.

12. In a device of the class described, the combination with rails, of a movable framework operating along said rails, a tool adapted for mounting on said framework transversely of the direction of motion thereof to operate upon material over which said framework is movable, means interposed between the tool and the said framework to tilt the said tool, depending on a change of direction of the said framework, and means through which the framework may be propelled.

13. In a device of the class described, the combination with rails of a framework movable to and fro over said rails, means through which the framework may be propelled, a tool mounted on said framework for operating upon material over which said framework is movable both forwardly and backwardly, a device for tilting said tool when the motion of said framework is reversed, and side cutting members mounted in said framework for defining the width of the material to be operated upon.

14. In a device of the class described, the combination with rails, of a framework movable along said rails, means through which the framework may be propelled, a tool for operating upon material over which said framework is movably mounted in said framework, means interposed between said framework and said tool for tilting same at will, and means interposed between the tool and said framework for at will rigidly securing said tool to the framework to prevent said tilting.

15. In a machine of the class described, the combination with rails, of a framework

movable to and fro along said rails, means through which the framework may be propelled, a tool adapted for mounting upon said framework, pivotally mounted means on said framework for supporting said tool and adapted for operating upon material over which said framework is movable both forwardly and backwardly, and a handle for raising and lowering said tool away from said material for inspecting said tool and removing same without disturbing the position of said framework.

16. In a machine of the character described, in combination with rails of a framework movable to and fro along said rails, said rails being on opposite sides of said framework, a tilted tool adapted for transversely mounting on said framework for operating upon material between said rails over which said framework is movable both forwardly and backwardly, means for varying the tilt of said tool and adjustable supporting means for leveling said tool transversely of the framework.

17. In a machine of the class described, in combination with rails, of a framework movable to and fro along said rails, said rails being on opposite sides of said framework, a tilted tool adapted for transversely operating upon material between said rails over which said framework is movable both backwardly and forwardly, means for varying the tilt of said tool and adjustable supporting devices for leveling said tool transversely of the framework.

18. In a machine of the class described, the combination with rails, of a movable framework operating along said rails, a tool transversely mounted on said framework for operating upon material over which said framework is movable, means for propelling said framework, and devices interposed between said means and said tool to tilt said tool the operation of said devices depending upon a change in the direction in which said framework is movable.

19. In a machine of the class described, the combination with rails, of a movable framework operating along said rails, a tool transversely mounted on said framework for operating upon material over which said framework is movable, means for propelling said framework, and a handle interposed between said means and said tool to tilt said tool the operation of said devices depending upon a change in the direction in which said framework is movable.

20. In a machine of the class described, the combination with rails of a framework movable along said rails, a tool adapted for mounting on said framework for operation transversely of the framework for grooving the material over which said framework is passed, a handle for operating said tool transversely of the machine, and means interposed between said handle and said tool for tilting said tool, depending on a change of direction of said tool.

In witness whereof, I hereunto subscribe my name this twenty-ninth day of August A. D., 1908.

GEORGE BURWELL.

Witnesses:
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LUCY J. BURWELL.