To all whom it may concern:

Be it known that I, HENRY JAMES RANGER, a citizen of Great Britain, residing at 183 Hereford street, Christchurch, in the Colony of New Zealand, have invented a new and useful Improved Road-Cleaning Machine; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to machines for cleaning roads.

The main feature of the present invention consists in the use of brushes or the like which are carried at the end of rotating arms, said arms being pivoted upon a sleeve or spindle which is caused to revolve by bevel or other gearing.

By the employment of a cam-race the arms in part of their rotation sweep horizontally over the surface of the road and in the remaining part rotation are raised clear thereof. During the upward movement of the arms the brushes pass into an inclined chute, carrying with them material from the road, which at the top of said chute falls into a hopper and is elevated by buckets upon an endless chain into a road-vehicle.

Two or more sets of rotating arms referred to are employed upon each machine, the brushes or the like being arranged to overlap in their respective paths of rotation and to convey the dirt up the same chute.

The arms are driven through gearing by the forward movement of the traveling wheels of the machine.

The chute referred to is pivoted and its lower end rests upon and follows inequalities in the ground, a brush carried by the machine moving to one side the loose dirt and debris in the path of the chute.

A clutch operated by a hand-lever is used to disconnect the driving mechanism when it is desired to stop the arms, and traveling wheels upon either side of the machine are fitted with ratchet-and-pawl mechanism, by means of which either of them can revolve in one direction without giving motion to the driving mechanism.

My invention and the operation thereof will be more clearly explained by the aid of the drawings, wherein:

Figure 1 is a side elevation, and Fig. 2 a plan.

Fig. 3 is an end elevation of a brush and lifting arrangement. Fig. 4 is an enlarged side sectional elevation of part of the apparatus. Fig. 5 is a plan thereof. Figs. 6 and 7 are respectively an enlarged side elevation, partly in section and plan, showing the means of connecting brushes to the arms; and Fig. 8, a part plan of the clutch mechanism.

Similar letters of reference indicate the same parts throughout the figures.

The machine is designed for attachment to the rear of a road-vehicle for receiving mud and is drawn forward toward the left in Fig. 1.

The brushes a are clamped in the carriers b at the end of arms c, which are bifurcated and pivoted at their rear ends upon ears d, projecting from a sleeve d, revolving upon the pillar e, which is rigidly fixed between members of the frame f of the machine by lock-nuts e upon each end of the pillar. The arms c are guided laterally by curved guides e, secured upon and projecting from the sleeve, a guide passing through the bifurcation of each arm.

The upper part of the sleeve d upon one side of the machine has a bevel-wheel h fixed upon it in gear with a bevel-wheel h upon a horizontal transverse shaft h, having another bevel-wheel h upon its opposite end gear with a bevel-wheel h upon a sleeve h, similar to sleeve d and provided with arms in a similar manner. Bevel-wheel h is also geared by a bevel-wheel k upon a longitudinal horizontal shaft k, which has a bevel-pinion k upon its opposite end driven by a bevel-wheel k, carried upon the axle i of the machine, which is revolved by the traveling wheels j.

To provide for the machine turning corners and for other reasons of convenience, each of said traveling wheels is carried upon a bush j, fixed upon the axle and having ratchet-teeth, a pawl j, pivoted in a recess in the hub of the wheel, engaging said ratchet-teeth when the machine is drawn forward, the wheel being free to revolve backward when required.

The brush-carrying arms c are each provided with a roller c, traveling upon the approximately circular cam-race c, which is inclined, as shown in Fig. 1, whereby the brushes are lifted during one part of their travel. The cam-race is made in two parts, the upper part being fixed and the forward
and lower part pivoted upon both sides at 8, to a fixed support 5, carried upon the frame of the machine. A lever-arm 6, upon a rocking-shaft 7, projects beneath the lower part of the cam-race, and when the rocking-shaft is operated, the lower part of the cam-race is raised and with it the brush-carrying arms which may be upon it. The rocking shaft is operated by wire rope 8, attached to an arm 9, passing around guide-pulleys 10, and led to the operating-lever 11, which is fitted with a retaining-pawl 12, gearing with a quadrant 13 and operated by a hand-lever 14.

The chute 15 is hinged upon the hopper 16, its lower end trailing upon the ground, and the two sets of brushes, the paths of travel of which overlap in one part of their rotation, travel up the chute, carrying with them the dirt and debris brushed from the surface of the road.

Endless chains 17 for carrying elevator-buckets pass over chain-wheels 18, fixed upon a shaft 19, journaled in bearings 20, carried in guides 21, formed in an extension 22 of the frame of the machine. The chains are also carried around chain-wheels 23, fixed upon the spindle 24, journaled in bearings 25 in the lower part of the frame of the machine.

Extending between and fixed to the chains are elevator-buckets 26, which take material from the hopper 27 and convey it to the top of the machine, where it is discharged into the vehicle.

The tension of the chains is adjusted by tension-screws 28, extending from the bearings 29, passing through the frame of the machine and provided with nuts 30.

The machine is attached to the rear of the vehicle by a coupling-bar 31, which has a hole 32 to receive a pin, which also passes through an eye upon a coupling-bar extending from the vehicle.

The lower edge of the chute 15 is raised from the ground simultaneously with the lower part of the cam-race 33 by a lever-arm 34, which is fixed to the rocking shaft 35 and projects beneath the chute.

To remove loose stones and debris from the path of the lower edge of the chute as it trails along the road, a wedge-shaped brush 36 is pivoted at its forward end upon a link 37, which in turn is pivoted upon a downwardly-extending arm 38 from the frame of the machine.

The brush is raised from the ground when required by a lever-arm 39, fixed to the rocking-shaft 40 and having a swing-bar 41 pivoted upon its end. (See Fig. 3.) Connecting-rod 42 depend from either end of the swing-bar 43, the lower ends being connected to arms 44, which project one upon either side of the brush 36.

The sprocket-chains carrying the elevator-buckets are driven by the sprocket-chain 45, passing around the sprocket-wheel 46 upon the axle of the machine and another sprocket-wheel 47, fixed upon the spindle 48.

Bevel-wheel 49 is fitted with a clutch 50, one part of which slides upon the axle of the machine, which has a feather 51, (see Fig. 8,) said clutch being operated by a fork 52, working in the circumferential recess 53, the fork being fixed upon a rocking-shaft 54, operated by a lever 55. Lever 56 has a retaining-pawl 57, engaging in a notched quadrant 58 and operated by a hand-lever 59.

Sprocket-wheel 60 is fixed to or may be integral with the bevel-wheel 61, (see Fig. 8,) so that when clutch 50 is moved out of gear the brushes and the elevator-buckets simultaneously cease to operate.

A trailing wheel 62 supports the rear end of the machine.

Referring particularly to Figs. 6 and 7, the brush a is formed with a recess a at its upper end, which receives a carrier-bracket b, one end of which is hooked and takes into a hole in the end of the brush-arm c, and the other terminates in a lug 63, wherein is formed a slot 64, receiving a bolt 65, which also passes through a hole in the arm c and is provided 66 with a wing-nut 67, by means of which the brush is clamped in position.

In Figs. 4 and 5 parts previously referred to are shown to an enlarged scale. Therin it will be seen that the upper part of the cam 68 race 69 is supported by a stay-rod 70, projecting from the frame of the machine.

The brushes may be of bristle, fiber, or wire, according to the material to be treated.

When a large number of loose stones are 71 to be dealt with, the brush may be substituted by tines in the manner of a rake.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a road-cleaning machine the combination of two sets of rotating arms carrying cleaning-brushes, the arms in each set being pivoted upon a separate sleeve, means for connecting the sleeves whereby motion of one is conveyed to the other, said sleeves being caused to revolve by forward movement of the traveling wheels of the machine, an inclined cam-race beneath each set of arms, an inclined chute upon which material is conveyed by the brushes, a hopper receiving material from said chute, and an elevator removing material from said hopper, substantially as and for the purposes herein described.

2. In a road-cleaning machine the combination of rotating arms carrying cleaning-brushes and pivoted at their ends upon a sleeve, means for revolving said sleeve upon a fixed support by forward movement of the traveling wheels of the machine, an inclined cam-race beneath the arms, an inclined chute up which material is conveyed by said brushes, and a hopper receiving the material from the chute substantially as herein described.

3. In a road-cleaning machine the combination of two sets of rotating arms carrying cleaning-bristles, the arms in each set being pivoted upon a separate sleeve journaled upon a fixed vertical pillar, a bevel-wheel upon one sleeve gearing with a similar wheel.
upon one end of a spindle which has a bevel-wheel upon its opposite end gearing with a similar wheel upon the other sleeve, a main axle of the machine revolved by forward motion of the traveling wheels, a bevel driving-wheel free upon said axle, and a clutch by which it may be caused to revolve therewith, means for operating said clutch by a hand-lever, a bevel-pinion in gear with the bevel driving-wheel upon a spindle, the opposite end of which has a bevel-wheel in gear with the bevel-wheel upon one of said sleeves, substantially as and for the purposes herein described.

4. In a road-cleaning machine the combination of rotating arms carrying cleaning-brushes and pivoted at their ends upon a sleeve, means for revolving said sleeve upon a fixed support by forward movement of the traveling wheels of the machine, an inclined cam-race beneath the arms, an inclined chute up which material is conveyed by said brushes, a hopper receiving material from the chute, an elevator consisting of buckets carried upon endless sprocket-chains for removing the material from said hopper, and means for actuating said elevator from the traveling-wheel axle, substantially as herein described.

5. In a road-cleaning machine the combination of rotating arms carrying cleaning-brushes and pivoted at their ends upon a sleeve, said sleeve being supported upon a pillar fixed to the frame of the machine, a bevel-wheel upon said sleeve gearing with another bevel-wheel upon a spindle which has a bevel-pinion upon its opposite end driven by a bevel-wheel upon the axle of the traveling wheels of the machine, substantially as described herein.

6. The combination in a road-cleaning machinery of two corresponding sets of rotating arms carrying cleaning-brushes, the members of each set of arms being pivoted upon a sleeve revoluble upon a fixed support, a bevel-wheel upon one sleeve gearing with a bevel-wheel upon a spindle which has another bevel-wheel at its opposite end gearing with a bevel-wheel upon the sleeve which carries the other set of arms, with means for rotating one set of arms by forward motion of the machine, substantially as and for the purpose specified.

7. In a road-cleaning machine the combination of rotating arms carrying cleaning-brushes and pivoted at their ends upon a sleeve, means for revolving said sleeve upon a fixed support by forward movement of the traveling wheels of the machine, an inclined chute up which material is conveyed by said brushes, a hopper receiving material from the chute, and an inclined circular cam-race beneath said arms, said cam-race being in two parts the one fixed and the other pivoted, with means for operating said pivoted portion of the race whereby it is raised with the arms resting upon it, substantially as and for the purposes herein described.

8. In a road-cleaning machine rotating arms carrying brushes and pivoted at their ends, a cam-race beneath said arms whereby they are caused to rise in one portion of their path of rotation, said cam-race being in two parts, the one fixed and the other pivoted, a hinged inclined chute up which material is conveyed by the brushes, a rocking shaft having a lever-arm projecting beneath said chute and a lever-arm projecting beneath the pivoted portion of the cam-race, with means for rocking said rocking shaft and thereby simultaneously lifting the pivoted part of the cam-race and raising the lower edge of the chute, substantially as and for the purposes herein described.

9. In a road-cleaning machine a main axle of the machine revolved by forward motion of traveling wheels thereon, a bevel driving-wheel upon said axle giving motion through bevel-gearing, with rotating arms carrying cleaning-brushes, a sprocket chain-wheel by which motion is conveyed to an elevator, said chain-wheel being connected to said bevel driving-wheel and also free upon said axle, a sliding clutch upon said axle by which the bevel driving-wheel and chain-wheel may be caused to revolve therewith, a fork working in a recess in said clutch, a rocking shaft to which said fork is attached, and a lever for operating said rocking shaft, substantially as and for the purposes herein specified.

10. In a machine for cleaning roads, the means of attaching a cleaning-brush to an arm, consisting in forming a recess in the brush which receives a carrier-socket, one end of which is hooked and takes into a hole in the end of the arm, and the other termi-nates in a lug wherein is formed a slot receiving a bolt which also passes through a hole in the arm and is provided with a wing-nut, substantially as specified.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRY JAMES RANGER.

Witnesses:

ERNEST J. ANSTISS,
HEUNETT RAYWARD.