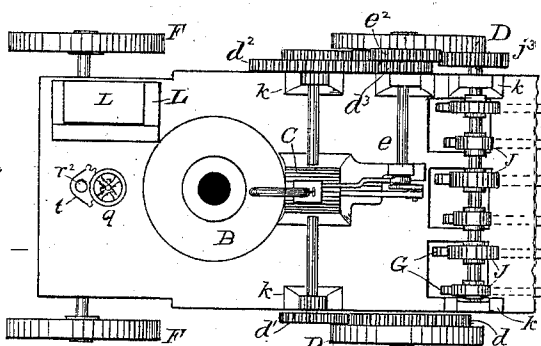
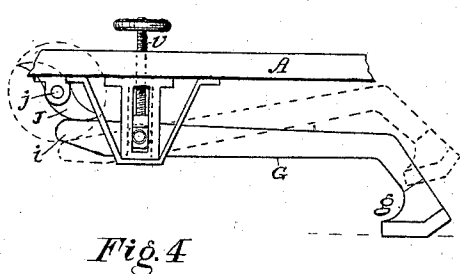
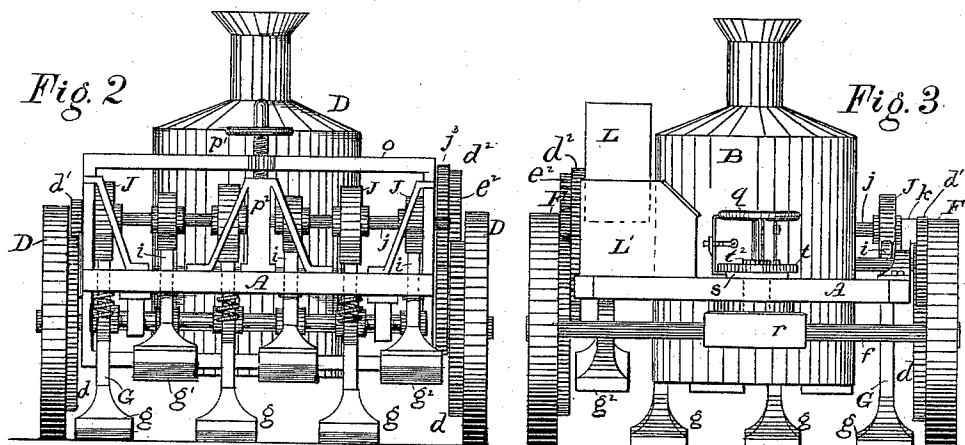
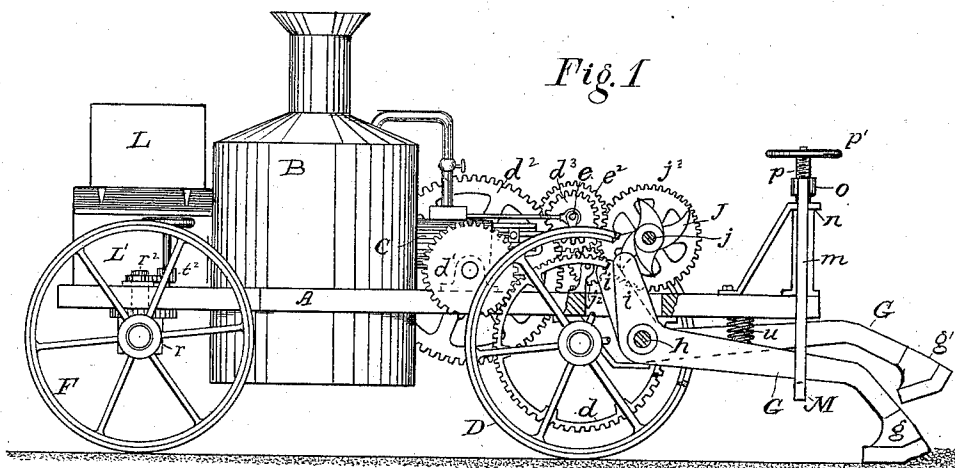


(No Model.)

L. W. BROWN.
ROAD OR PAVEMENT RAMMER.

No. 535,527.

Patented Mar. 12, 1895.



WITNESSES
Chas. W. Dunham
Sam. Smith

INVENTOR
Leroy W. Brown
by *M. Vorce*
Attorney

UNITED STATES PATENT OFFICE.

LEROY W. BROWN, OF CLEVELAND, OHIO, ASSIGNOR OF TWO-THIRDS TO
MARY J. BROWN AND ALFRED L. BROWN, OF SAME PLACE.

ROAD OR PAVEMENT RAMMER.

SPECIFICATION forming part of Letters Patent No. 535,527, dated March 12, 1895.

Application filed April 10, 1893. Serial No. 469,678. (No model.)

To all whom it may concern:

Be it known that I, LEROY W. BROWN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Road or Pavement Rammers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machines for ramming and consolidating the materials of roads and pavements. Its object is to secure increased efficiency of operation combined with simplicity of construction and facility of management and regulation, and it consists in the construction, arrangement and combination of parts to effect the objects aforesaid.

In the drawings Figure 1 is a side view in elevation of a machine embodying my invention. Fig. 2 is a front end view, and Fig. 3 a rear end view, both in elevation. Fig. 4 is a detail showing a modification of the rammer arms, also a method of adjusting the amount of their movements. Fig. 5 is a plan view showing the arrangement of the gearing, &c.

A represents the bed or frame of the machine.

B is a boiler, and C an engine, mounted thereon.

D D are the driving wheels, driven by gears, d, d', d^2, d^3 from the main shaft e of the engine.

F F are bearing wheels which act also as guiding or steering wheels, and may, with advantage, be considerably wider than the driving wheels, so as to distribute the weight of the machine over a greater surface and act as rollers, and in any case are set so as to cover more or less ground outside the track of the driving wheels.

G G are rammer arms, mounted on a shaft h and carrying at their lower extremities rammers g, g', g^2 . The rammer arms G have each a projection or short arm i extending laterally or rearwardly from the shaft h and adapted to be engaged by a series of revolving cams J J secured to a shaft j which extends across the machine in such relative position to the shaft h that the cams J will strike the projec-

tions i and move the same backward or downward, thus lifting the forward ends of arms G, until the highest point of the cam passes the projection i when arm G is left free to fall, and deliver the blow of its rammer g upon the material to be rammed. The cam shaft j is driven by gears e^2, j^2, j^3 from shaft e , and the shafts h and j are each supported in suitable bearings, as $k, k',$ &c., secured to the frame A, upon which also a suitable floor is laid, and if preferred a cab or other suitable inclosure may be erected thereon to cover or inclose the engine and boiler. This I prefer to do but it is not essential.

L represents a water tank, and L' a fuel box. These may be placed beside each other if preferred, and in cities where water is readily obtainable from street hydrants, &c., the water tank may be dispensed with.

M is a check-bar extending across below the arms G, and having at each end an upright guide m which slides in the ways n . The guides m, m are joined at their upper ends by a cross bar o through which a screw p is threaded having a hand wheel p' at its upper end. A rigid bearing p^2 secured to the frame A forms a bearing for the lower end of the screw, so that by turning the screw p the bar o and check-bar M are raised or lowered. By this means the arms G can be lifted and held clear of obstructions when the machine is to be transported from place to place. The bar M can also be used to limit the drop of the arms G in ramming, and thus the weight of the blow delivered by the rammers $g, g',$ &c., can be very exactly regulated.

The guiding of the machine by the wheels F is effected as follows: The axle f passes through a housing r , which incloses the middle part of the axle extending some distance each side of the center, and carries at each end a bearing for the axle. From the center of the housing r a strong king-bolt r^2 extends up through a bearing s secured to the frame A, and is provided at its upper end, above the floor of the machine, with a segment gear t , with which a gear t^2 on the stem of a hand wheel q is engaged, so that by turning the wheel q the axle f can be turned in either direction to guide the machine as desired.

The rammers, $g, g',$ &c., are preferably formed

with the forward portion of their under surface inclined upward at a slight angle, say fifteen degrees, the purpose of this being that the road material to be rammed and consolidated shall first receive a comparatively light blow from this inclined portion of the face of the rammer, whereby the material will be settled and so far compacted that the subsequent heavy blows of the flat face of the rammer will consolidate the material without displacing it, since it is well known that a heavy blow delivered upon uncompacted material tends rather to scatter and disperse it than to consolidate it. It is equally well known that a number of moderate or comparatively light blows successively delivered upon the same spot will more thoroughly compact and consolidate loose material, such as broken stone, sand, gravel, cinders, &c., than a fewer number of heavier blows, this principle being applied in the common operation of tamping. I therefore prefer to gear the machine so that the rammers *g g'*, &c., shall make at least two full blows on each part of the surface traversed, and to do this I gear the machine so that the driving wheels shall advance a space about equal to the longitudinal dimension of the flat face of the rammers with each revolution of the cam shaft *j*, and as the cams cause the arms *G* to deliver two blows at each revolution of the shaft *j*, it follows that every portion of the surface rammed will receive three blows, one moderate blow from the inclined part of the face and two full blows from the flat face of the rammer.

The cams *J* are preferably separable from their shaft *j* and adjustable thereon, and may be set to lift the rammer arms, simultaneously, alternately, or in any preferred order. Thus, in ramming roads or drives that have considerable crown the outer rammers on each side may be made to strike before the central rammers, which will better preserve the crown of the surface. Conversely when ramming a flat surface the rammers may be made to fall alternately, or in ramming concave surfaces, as in alleys or gutters, the central rammers may be made to strike first and the outer ones last.

Although the blow delivered by the fall of the rammer and rammer arm is ordinarily sufficient, it may be aided by the action of a spring *u* interposed between the arm *G* and the bed of the machine. In order to regulate the force of the blow delivered by the rammers I adjust the amount of lift, as it is obvious that the blow will be the heavier the farther the rammers fall. This adjustment I prefer to make by moving the shaft *h*, as this does not interfere with the gearing by which shaft *j* is operated, although the adjustment may be effected by moving shaft *j* instead of *h*. To effect such adjustment I make the boxes which carry shaft *h* movable in their hangers and arrange a screw *v* to cause the boxes to traverse, so that by turning this screw the boxes may be moved farther from

the cam shaft *j*, when the blow will of course be lighter, or if moved nearer to the cam shaft the lift will be greater and the blow heavier. I prefer to adjust the shaft *h* vertically, but it may equally well be adjusted horizontally, though less conveniently.

Although I have shown the rammer arms *G* formed like bell-crank levers, and placed below the bed of the machine, I do not limit myself to such construction, as they may equally well be formed straight, the short arm or projection *i* extending back in line with the forward part, as shown in Fig. 4, and they can also be placed above the bed of the machine instead of below it. Neither do I limit myself to the exact arrangement of gearing, shafts, &c., shown, as the essential spirit of my invention consists in arranging the rammers on a series of lever arms to be operated by cams or equivalent means so as to lift the levers and allow the rammers to strike by gravity, and in arranging the same to be operated by the same power which advances the truck or carriage upon which they are borne, and various modifications of the mechanism can be made, without departing from my invention.

Obviously where electric power is conveniently obtainable it may be used instead of steam or other power.

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

1. In a road and pavement rammer the combination of a truck, a source of power mounted thereon and arranged to impart motion to said truck, a laterally arranged series of horizontally disposed lever arms carrying rammers at their outer ends, and a series of cams arranged to engage the inner ends of said lever arms and receiving motion from the same source of power as the truck, substantially as specified.

2. In a road and pavement rammer the combination of a truck, an engine mounted thereon and imparting motion to said truck, a series of horizontally disposed levers arranged upon a transverse shaft, and carrying rammers at their outer ends, and a series of cams arranged upon a shaft and engaging the inner ends of said levers, said cams receiving motion from said engine, substantially as described.

3. In a road and pavement rammer the combination of a truck, an engine mounted thereon and imparting motion thereto, a series of rammer arms mounted on a shaft and carrying at their outer ends rammers having a flat and an inclined face, a series of cams arranged upon a shaft and engaging the inner ends of the rammer arms, a check bar arranged transversely beneath said rammer arms, and means for lifting said check bar to raise the rammer arms clear of obstructions, substantially as described.

4. In a road and pavement rammer the combination of a truck having motive power thereon arranged to propel said truck, a series of horizontally disposed rammer arms

mounted upon an adjustable shaft and carrying rammers at their outer ends, and a series of cams mounted upon a shaft which receives motion from the propelling mechanism of said truck, said cams engaging the inner ends of the rammer arms, substantially as described.

5. In a road and pavement rammer the combination with a truck having motive power of a series of rammers arranged on the ends of horizontally disposed lever arms, a series of cams engaging the rammer arms and mounted on a shaft which receives motion from the motive power of the truck, and means for varying the distance between the cams and the rammer arms to regulate the force of the blow delivered by the rammers, substantially as described.

6. In a road and pavement rammer the ram-

mers *g* having a flat face and an inclined face, substantially as described and for the purpose set forth.

7. In a road and pavement rammer the combination with a truck having motive power of a series of rammers arranged on the ends of horizontally disposed lever arms, and a series of cams engaging the rammer arms and receiving motion from a source of power mounted on said truck, substantially as described.

In testimony whereof I hereto affix my signature in presence of two witnesses.

LEROY W. BROWN.

Witnesses:

L. PRENTISS,
P. PRENTISS.