

C. E. BATHRICK.
MACHINE FOR CHOPPING UP ASPHALT OR LIKE PAVEMENT,
APPLICATION FILED AUG. 30, 1909.

1,004,730.

Patented Oct. 3, 1911.

4 SHEETS—SHEET 1.

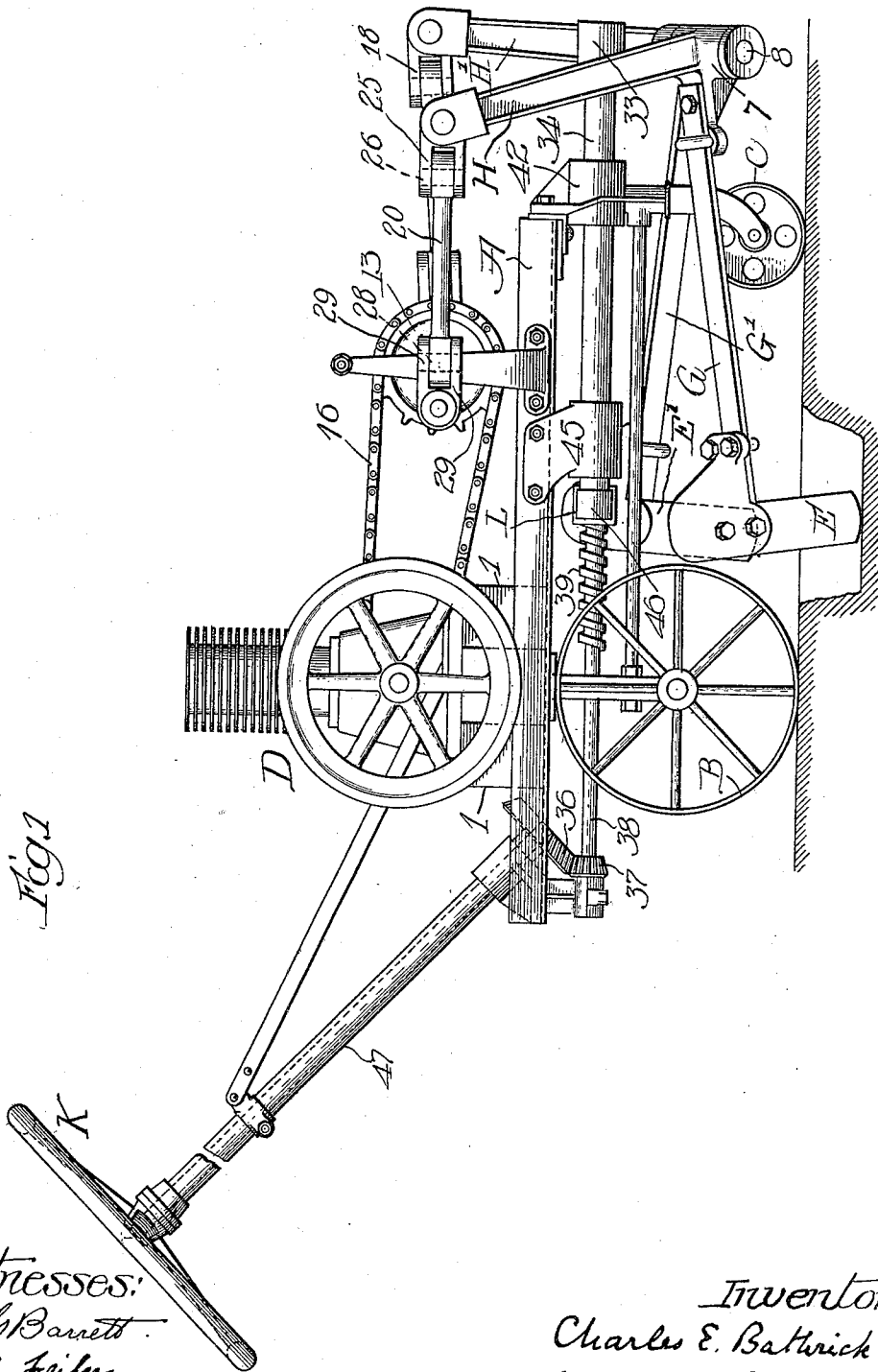


Fig. 1

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J. C. Heiberg

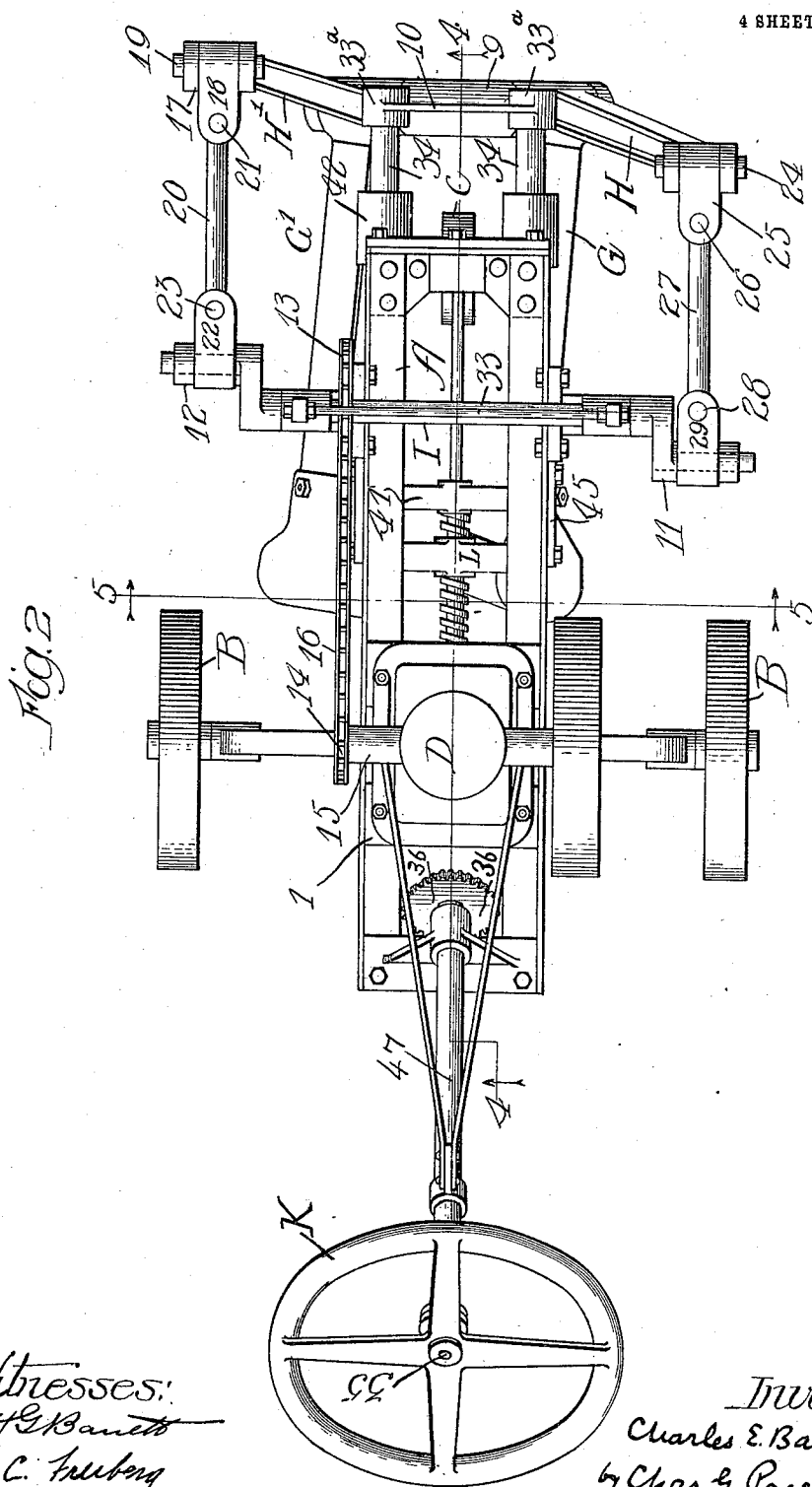
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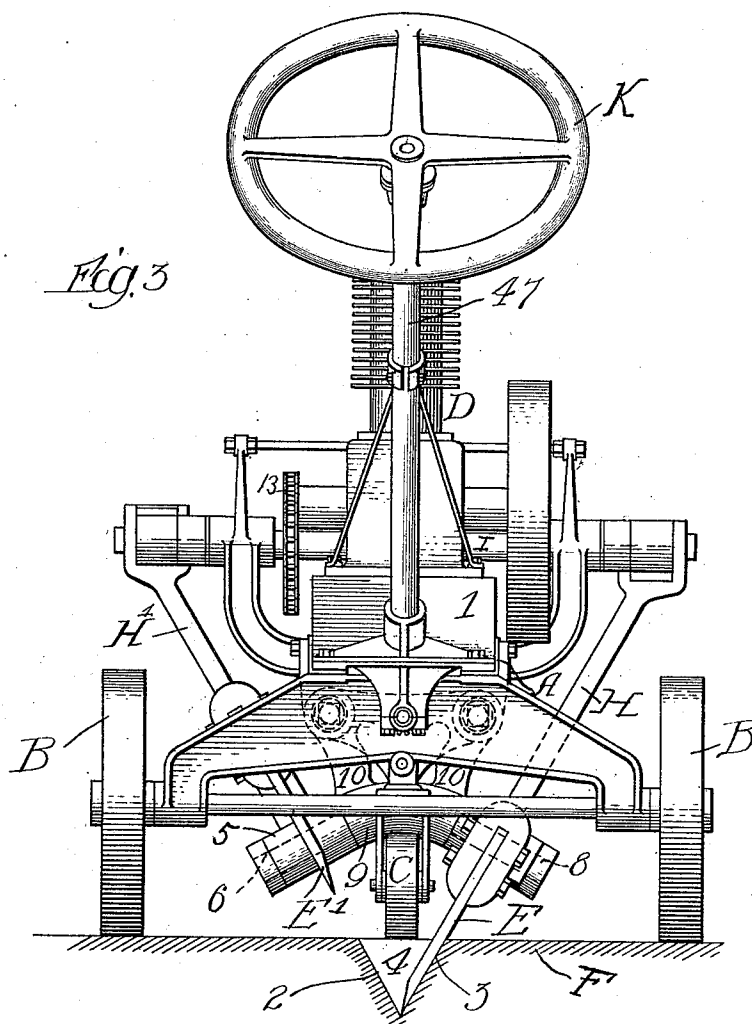
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Witnesses

J. H. Barnett
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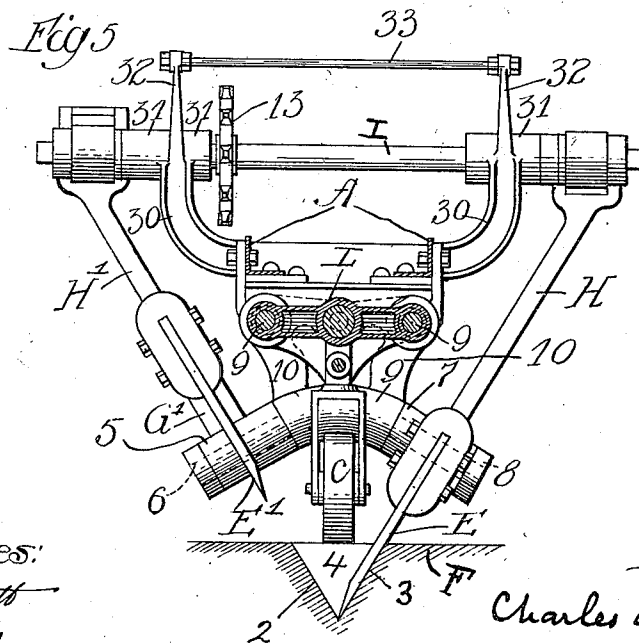
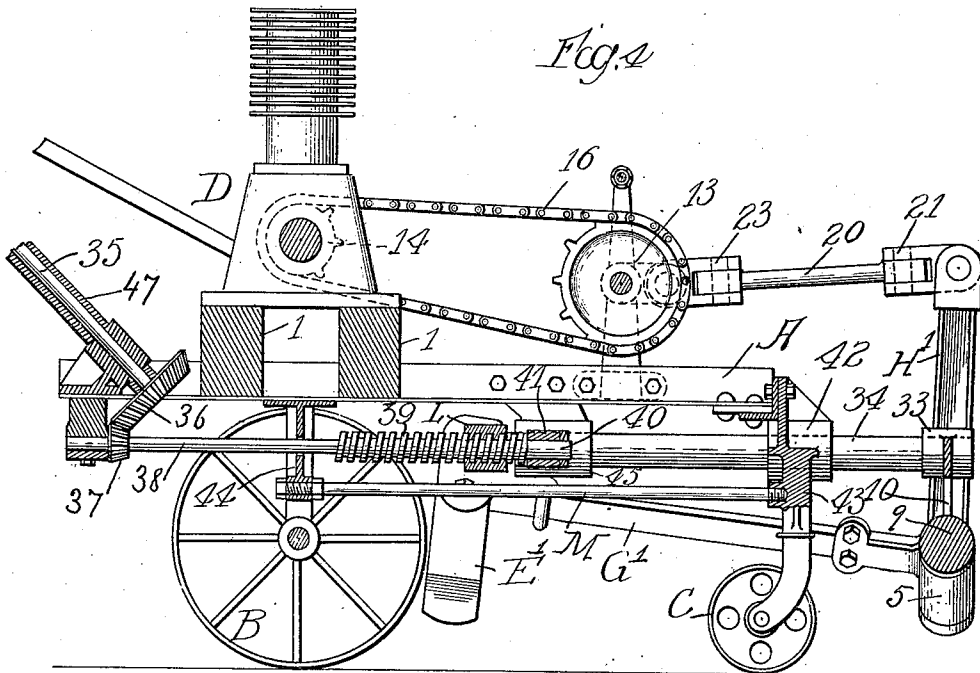
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR CHOPPING UP ASPHALT OR LIKE PAVEMENT.

1,004,730.

Specification of Letters Patent.

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Application filed August 30, 1909. Serial No. 515,293.

To all whom it may concern:

Be it known that I, CHARLES E. BATHRICK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Chopping Up Asphalt or Like Pavement, of which the following is a specification.

Where streets are paved with asphalt or the like, it occasionally becomes necessary to remove portions of the paving bed or layer of asphalt, this removal being necessary in some cases to permit the laying of pipes, and in other cases, it is desirable to remove portions of this class of paving which has been imperfectly laid, it being understood that as soon thereafter as is practical, the removed material is replaced by a new bed or layer. The common and usual way of thus removing portions of an asphalt street bed surface or layer, is to employ a number of workmen to chop up the asphalt with choppers formed like pick-axes, the work therefore being manually executed.

Objects of my invention are to provide a simple and efficient machine for chopping up the asphalt or the like at the desired point or points; to facilitate the work of thus chopping up the street asphalt; to avoid the employment and expense of a gang of men carrying chopping tools; to insure quick and efficient work; to permit the chopping means to be readily and easily shifted from place to place and to provide certain novel and improved details of construction.

In the accompanying drawings: Figure 1 is a side elevation of a machine for chopping up asphalt and like pavement and embodying the principles of my invention. Fig. 2 is a top plan view of said machine. Fig. 3 is an end elevational view from what I term the rear end of the machine. Fig. 4 is a section on a longitudinal vertical plane indicated by dotted line 4—4 in Fig. 2. Fig. 5 is a transverse section on line 5—5 in Fig. 2.

The chopping means and means for actuating the same, are supported upon a truck or run-about, which can be readily moved by an attendant from place to place, along the streets so as to bring the chopping means over such places as the chopping action is needed.

In the carriage, truck, or run-about, generally comprehended under the term carriage, A, indicates a suitable body frame

supported toward one end by running wheels B, B, and supported toward its opposite end by a caster wheel C, which is understood to have any suitable swivel connection with the body frame. By such arrangement, the carriage can be controlled by the attendant who may take hold of any suitable handle at one end of the carriage, and likewise the carriage can be moved back and forth, and turned in accordance with requirements.

A small engine or motor D, for operating the choppers is conventionally illustrated, and shown supported upon base blocks 1, 1, respectively on the body frame portion above the axis of the wheels B. The choppers comprise reciprocating blades E, E', arranged for up and down reciprocative action in inclined paths or planes whereby each blade will upon a proper extent of descent cut into the asphalt street bed, obliquely to the plane of the bed or street surface as shown in Figs. 3 and 5, in which F is understood to represent in vertical section a part of the asphalt surface portion of a street having therein a portion cut away by the action of the blades E, and E'. In these views, the blade E', which is understood to have cut into the material, so as to form the inclined wall 2, of the V-shaped cut or excavation, is raised to the limit or substantially at the limit of its up stroke, while the blade E, which has formed the upward inclined wall 3 of the V-shaped cut 4 is at or substantially at the limit of its down stroke. The blades therefore, reciprocate simultaneously in opposite directions, one descending while the other is ascending, and the converse thereof. In this way each blade shears off the material without being interfered with by the other blade, and also by reason of their arrangement the material to be removed is effectively cut away. In order to render the cutting action rapid, and highly effective, the blades are attached to reciprocating spring holders, which are operated without appreciable lost motion.

In the machine shown, the blade E is secured to one end portion of a vibratory spring arm G and in like manner the blade E' is secured to one end portion of a vibratory spring arm G'. These spring arms G and G' respectively swing about one and the other of two inclined axes at what is herein termed the forward end of the machine, the axes being relatively divergent downwardly

and laterally outward whereby the arms G and G' swing up and down in downwardly converging paths, and thereby cause the blades to move in inclined paths which diverge laterally upward and converge downward as heretofore mentioned. As a means for actuating the arm G' and G which carry the cutting blades, the arm G' is secured to a rotary sleeve or hub 5 which oscillates about an inclined pin or axle 6. The arm G which also oscillates about an inclined axis as hereinbefore mentioned, is secured to a sleeve or hub 7 which is mounted to oscillate on a pin or axle 8, it being here observed that the outer ends of the pins 6 and 8, are represented by dotted lines as in Fig. 5, and that the inner ends of the pins or axle portions are understood to be united with a central portion 9, which is supported by hangers or brackets 10, as hereafter more particularly referred to. These spring arms G and G' which carry the blades, are vibrated or swung up and down by the oscillatory action of the sleeves or hubs to which they are secured, and each of said arms is broadly subject to spring action when it is swung down to an extent to cause its blade to begin the cut, but as a matter of further improvement I make each arm of a flexible spring bar or rod, so that during operation, the chopping device comprising the blade, and spring bar, will have what may be aptly termed a whipping action, *i. e.* an action similar to whipping the ground with a whip, the elasticity of the bar serving to restore it to its normal condition when it rises. With further reference to the supports for these arms, the hub portions 5 and 7 are in effect mounted to oscillate respectively about one and the other of two inclined axes which diverge laterally outward. As a means for operating these blade arms, the hub 7 is provided with upwardly extending vibratory crank arm H and the hub 5 is provided with a like crank arm H'. These arms H and H' are respectively connected by articulated power transmitting connections with the cranks 11 and 12 (Fig. 2) of a transversely arranged rotary shaft I, supported upon the carriage and provided with a sprocket 13 which is fixed thereon and driven from a sprocket 14 on the engine shaft 15, by means of a link belt 16. The connection shown for connecting arms H and H' with cranks 12 and 11, are shown as follows, to wit: Arm H' has an upper end portion 17 (Fig. 2) attached to link block 18, by a horizontal pivot 19, and this link block is attached to one end of a connecting rod 20 by vertical pivot 21, the other end of rod 20 being attached to a link block 22, by an upright pivot 23, said link block 22 being in turn supported on crank 12 as a pitman connection. In like manner arm H is connected with crank 11 by like connecting means comprising horizontal

pivot 24, link block 25, vertical pivot 26, connecting rod or pitman 27, vertical pivot 28, and link block 29, applied to crank 11 as a pitman connection. These connections between the crank shaft I, and the vibratory arms H and H' are therefore universally jointed power transmitting connections which accommodate themselves to the swing of the arms H and H' in inclined paths. As best shown in Fig. 5, standards 30, 30, rise from the body frame, and support bearings 31, 31, for the crank shaft I, the bearings 31, 31, being further braced by arms 32, connected together at their upper ends by a tie rod 33. A further feature of the machine consists in means for raising the chopping devices to an extent to temporarily prevent them from cutting into the street or pavement although the engine may continue to operate. To the attainment of this end, I provide means whereby an attendant at the rear end of the machine can at will vertically adjust the axial support for the vibratory chopping arms. With the arrangement shown, the blade can be temporarily put out of commission by raising the supporting means for the hubs 5 and 7 of the spring cutter arms G and G'. With more specific reference to mechanism for this purpose, the bearing device adapted for supporting the hub ends 5 and 7 of the blade arms, and comprising a middle portion 9 having inclined end axles 6 and 8 for the hub ends 5 and 7, has its said middle portion 9 united with an upright plate or bracket 10, which extends upwardly and unites with heads 33^a, 33^a, on the forward ends of two parallel and horizontal slide rods 34, 34. These slide rods 34, 34, are rigidly connected together and arranged to work in suitable bearings on the body frame of the machine, and as a means for longitudinally adjusting said rods 34, 34, I provide a hand wheel K, arranged at the rear end of the machine, and fixed upon the upper end of a rotary rod (Fig. 4) having fixed on its lower end a bevel gear 36 which in turn engages a smaller bevel gear 37 fixed on the rear end of a horizontally arranged rotary screw shaft 38. The forward threaded portion of this rotary screw shaft engages a nut L, and an unthreaded end portion 40 of the shaft beyond its threaded portion 39, turns in a bearing 41, (Fig. 4), which is rigid with the body frame of the carriage.

The nut L is shown as a cross piece having between its ends a threaded bore in which the screw portion of the rotary screw rod engages, and the inner or rear ends of the rods 34, are coupled with said ends of the cross or nut piece. With this arrangement, an attendant can by turning the hand wheel K, operate the screw rod or shaft 38, in a direction to draw the nut L toward the rear end of the machine, (the nut piece being ar-

ranged to slide along, but not turn on the body frame), and this movement of the nut or nut piece as it may be indifferently termed, draws with it, the slide rods 34, the bracket 10, 10, and the member 9, which is provided with pivots or axles 6 and 8 for the hub portions 5 and 7 of the blade or cutter arms G and G'. This action therefore moves inwardly the inclined axes for the cutter arms, that is to say it shifts such axes toward what is herein termed the rear end of the machine, and as the axes are thus shifted their movement will be in a path relatively under the joints between the upper ends of arms H and H', and the articulated pitman connection between said pivots and the crank shaft I, and by thus moving said axes (or pivots 6, 8,) inwardly to a suitable extent, the low ends of arms H H' will be drawn inwardly and thereby swing such arms about pivots 19, 24, respectively. This adjustment therefore swings up the cutter arms G G' and as long as such adjustment is maintained, the down stroke of the cutter will terminate short of the bed or ground. An advantage of this, is, that the blade can be quickly brought into proper operative position, when desired, and also readily positioned so as to vertically adjust their vertical range of action in accordance with need.

The forward end portions of the slide rods 34, work through bearings 42, on the body frame, and as a compact arrangement, the upper shank portion 43, (Fig. 4), of the caster wheel C, is rigid with these bearings 42. With further reference to details, M indicates a tie or brace rod connecting part 43, with a bracket 44 (Fig. 4) which is secured on the body frame, and adapted to provide a bearing for the rear unthreaded portion of the screw shaft 38. The body frame is also provided with a bearing 45 at each side, one for each of the slide rods 34. A form of connection between the inner end of one of the slide rods 34 and the end of the nut piece L is best shown in Fig. 1, which the visible end of the nut piece L forms a socket in which a headed end 46 of the visible rod 34, engages. The hand wheel rod or shaft 35 extends through an inclined sleeve 47, providing a suitable bearing therefor and secured to, and suitably braced on the body frame of the carriage. In moving the carriage, the attendant can use the handle wheel K, as a convenient handle, and when necessary, turn the same for the purpose of vertically adjusting the range of action of the cutters.

The effective working range of action of each of the blade cutters E E', is preferably forward of the rear running wheels B, and between their lines of progression. The cutter arms G, G', are pivoted considerably forward of the zones, in which the blades

chop into a street of asphalt, whereby the pivots for such arms are suitably remote from dirt and chips from the choppers. As illustrated for example in Fig. 5, the blades cut in downwardly, converging paths, so that after one blade has made an incision in a bed of asphalt, the other blade will then make a cut which meets the cut first mentioned, thereby effectively severing from the bed all material between the downwardly convexing cuts. While therefore it is desirable that the blades shall cut in alternation, nevertheless, their cutting action may properly be said to have conjoint or coöperative functions.

What I claim as my invention is:

1. In a machine for chopping up asphalt or like pavement, a truck or carriage provided with reciprocating chopping devices, adapted for cutting into asphalt or like pavement, means for reciprocating the choppers alternately in opposite directions, and means upon the truck or carriage for actuating the chopper operating means.

2. In a machine for chopping up asphalt or like pavement, chopping devices having cutting blades which move in downwardly converging paths, and power actuated mechanism for operating the chopping devices.

3. In a machine for chopping up asphalt or like pavement, reciprocating chopping blades for cutting into the material in downwardly converging paths on intersecting planes, and means for relatively raising and lowering the blades, whereby one is raised, while another is lowered, so as to cause them to cut successively.

4. In a machine for chopping up asphalt or like pavement, swinging chopper arms having chopper blades, the arms being arranged to swing in inclined planes converging downwardly, means for reciprocating the chopping arms, and a carriage for supporting said devices.

5. In a machine for chopping up asphalt or like pavement, a pair of vibratory arms each provided with a chopping blade, said arms being supported to swing respectively about one and the other of two downwardly converging axes, whereby the chopping blades operate convergently and means for operating said arms.

6. In a machine for chopping up asphalt or like pavement, vibratory arms supported to swing about inclined axes and provided with downwardly converging chopping blades, a carriage provided with an engine or motor, and power transmitting connection between the engine or motor and said arms.

7. In a machine for chopping up asphalt or like pavement, vibratory arms provided with chopping blades and supported to swing in downwardly converging paths, a crank shaft, articulated connections be-

tween the crank shaft and the blade carrying arms, and means for operating the crank shaft.

5 8. In a machine for chopping up asphalt or like pavement, vibratory chopping blades, a carriage upon which the chopping blades are supported, means for operating the chopping blades; and means for vertically adjusting the limit of the down stroke of each blade.

10 9. In a machine for chopping up asphalt or like pavement, reciprocating blades for chopping up the pavement, a carriage upon which said blades are supported, a rotary adjusting screw and means for operating the same, a nut device operated by the rotary adjusting screw, and connecting means between the blades for raising or lowering the extent of down stroke on the part of the blades in accordance with the direction and extent of adjustment of said nut device.

15 10. In a machine for chopping up asphalt or like pavement, a carriage, a chopping device comprising vibratory arms provided with blades for cutting into the pavement, said arms being pivoted to swing about inclined axes, slide rods a nut engaging the slide rods; an adjusting screw engaging the nut, a rotary hand wheel shaft at the rear end of the carriage, and transmitting connection between said hand wheel shaft and said adjusting screw.

20 11. In a machine for chopping up asphalt or like pavement, a carriage, a vibratory arm provided with a chopping blade and supported to swing about an inclined axis, a carriage a slide supported upon said car-

riage and connected with said blade carrying arm, and a mechanism for adjusting the slide along the carriage.

12. In a machine for chopping up asphalt 40 or like pavement, a carriage provided with a motor or engine arranged thereon devices for chopping up the pavement supported to reciprocate in downwardly converging planes, power transmitting connection between the engine or motor and the chopping devices, and means for adjusting the range of the up and down stroke on the part of the chopping devices. 45

13. In a machine for chopping up asphalt 50 or like pavement, a carriage provided toward one end with a pair of axles or pivots diverging downwardly and laterally outward, blade carrying arms supported to vibrate upon these said inclined axles or pivots, blades attached to said arms and adapted for chopping up the pavement, said blades being supported for movement in downwardly converging paths, and mechanism for operating said blade carrying arms. 55

14. In a machine for chopping up asphalt or like pavement, a carriage, a pair of slide rods mounted upon the carriage, a nut piece attached to the slide rods, a screw engaging the nut piece and operative for adjusting the nut piece and slide rods, vibratory chopping devices, and connection between the chopping devices and the slide rods for adjusting the action of the chopping devices. 60 65 70

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Witnesses:

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