United States Patent [19]

Pentith

[11] **3,767,262**

[45] **Oct. 23, 1973**

[54] **ROAD CUTTING MACHINE WITH LATERALLY EXTENSIBLE DRUM AND METHOD**

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[22] Filed: **Nov. 17, 1971**

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[52] **U.S. Cl.** **299/10**, 172/122, 299/39

[51] **Int. Cl.** **E01c 23/09**

[58] **Field of Search** 299/39-41, 10; 51/176; 37/117.5; 94/50; 172/122

[56] **References Cited**

UNITED STATES PATENTS

1,883,404	10/1932	Ronning	299/39 X
2,197,549	5/1937	Hargrave et al.	299/39 X
3,560,050	2/1971	Lockwood	299/39

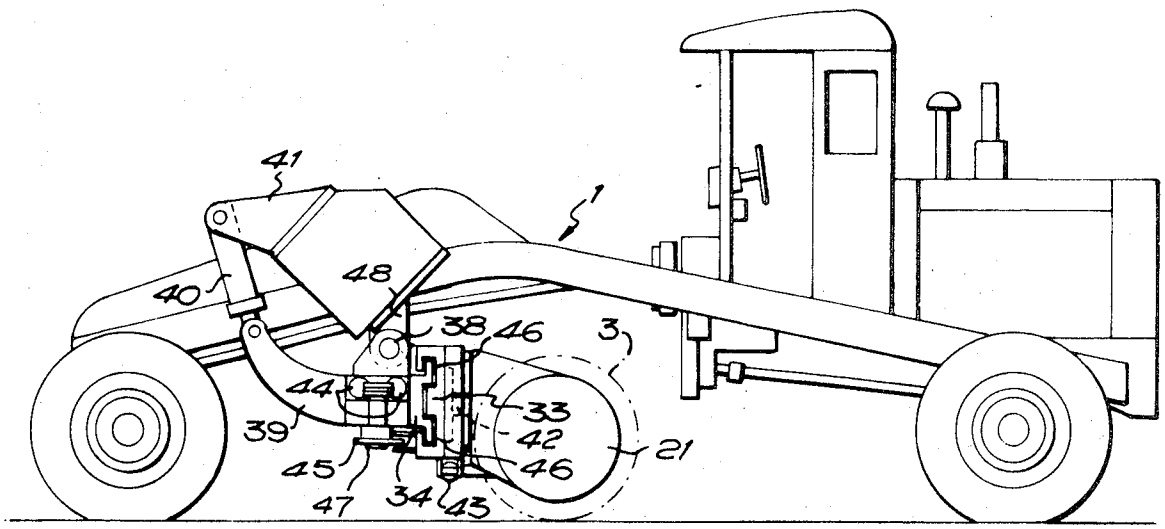
Primary Examiner—Ernest R. Purser

Attorney—C. Yardley Chittick et al.

[57] **ABSTRACT**

A machine for removing a worn road surface comprises a chassis on which is supported a rotary drum armed with cutting picks. To make possible a reduction in the inner radius of an arcuate path cut out by the rotary drum, the drum is traversable into a position lying outside the ground plan of the machine as defined by the wheels on which the machine is supported for movement.

7 Claims, 4 Drawing Figures



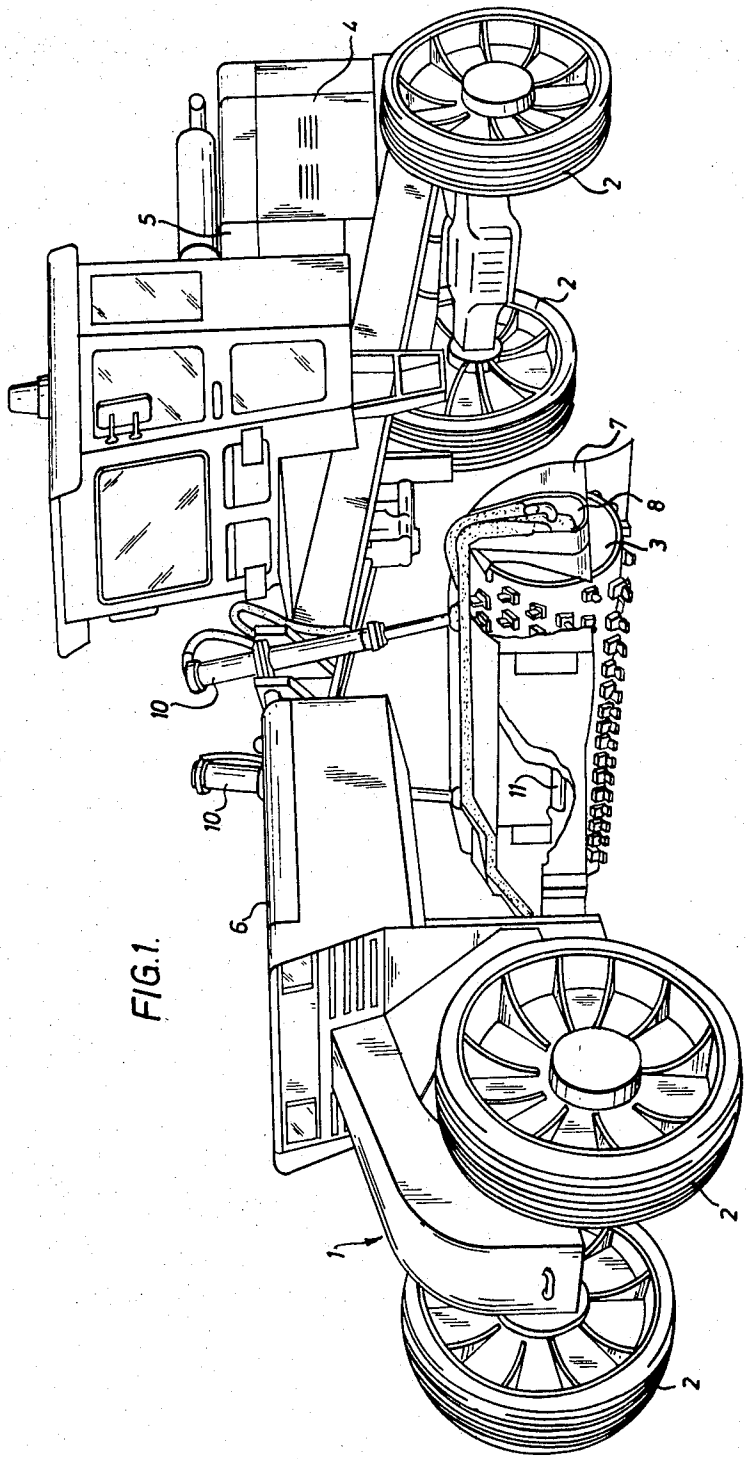
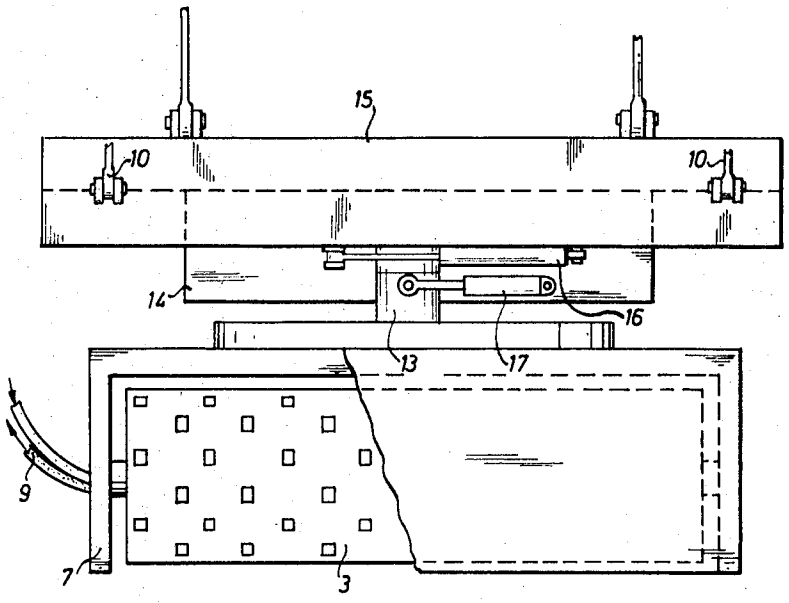


FIG. 1.

FIG. 2.



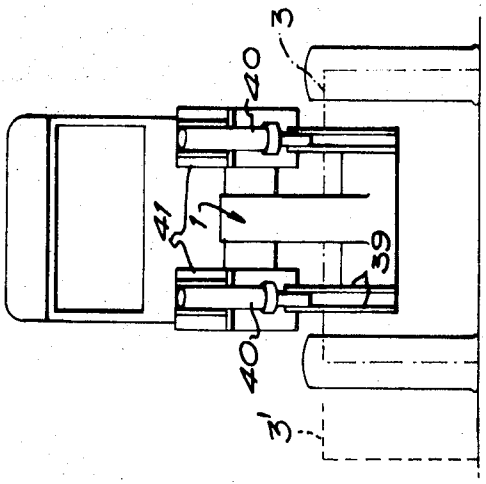


FIG. 4

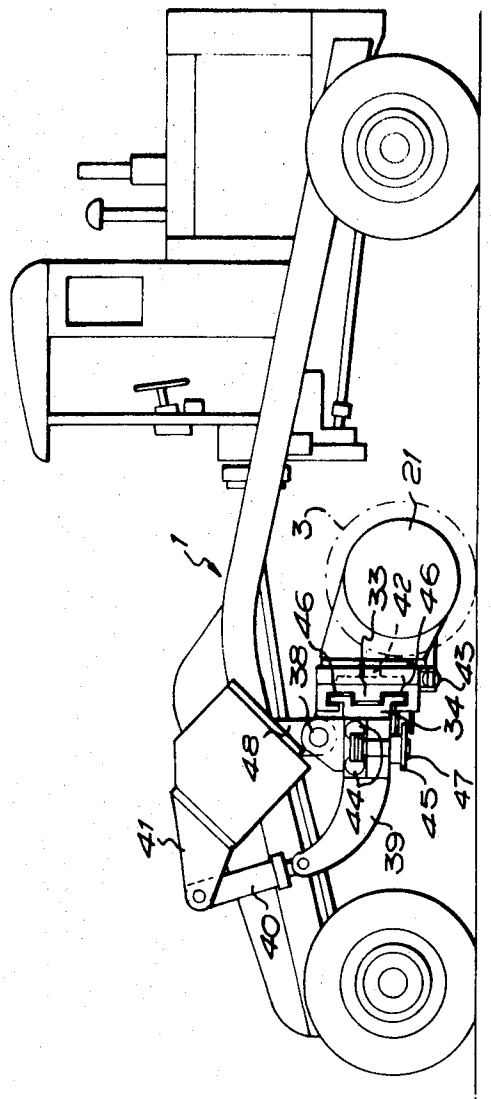


FIG. 3

ROAD CUTTING MACHINE WITH LATERALLY EXTENSIBLE DRUM AND METHOD

BACKGROUND OF THE INVENTION

Machines which make use of a rotary cutting drum to remove worn asphalt or macadam road surfaces prior to the application of a new surface are well known from patent literature dating back to the early part of this century. Practical embodiments of such machines, such as that described in U.S. Pat. No. 3,560,050 issued to P. Lockwood on Feb. 2, 1971 are inevitably of large overall size having a wheel base of, for example, twenty feet and a correspondingly large turning circle. Hitherto, the cutting drum of such a machine, although capable of being raised, lowered and inclined to set the depth of cut and adjust for the camber of the road has been supported without provision for transverse movement relative to the chassis. For example in the aforementioned patent to P. Lockwood and U.S. Pat. No. 2,062,232 issued Nov. 24, 1936 to C.N. Pogue the drum is confined to movement about horizontal pivots whereas in U.S. Pat. No. 2,027,685 issued Oct. 25, 1934 to B.H. Flynn the drum can move only in vertical guides.

With a machine having a typical prior art construction, the large turning circle makes it very difficult for the operator to follow a curve in the road having a diameter less than the turning circle without repeatedly manouvering his machine backwards and forwards.

SUMMARY OF THE INVENTION

In accordance with the present invention, the cutting drum is supported so as to be traversable in the direction transversely of the machine. Various support systems may be utilised for this purpose and will be exemplified in greater detail hereinafter. In one such system, the drum is supported by way of a parallelogram or near-parallelogram linkage, the sides of which are constituted by hydraulic piston and cylinder units, further such units being provided to swing the drum so supported to one side or the other. In other systems, the drum is supported on a block which is slidable in a guideway, once more under the action of hydraulic cylinders. In any embodiment, a compact arrangement is achieved by locating the hydraulic motor which drives the drum within the drum itself.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a machine embodying the invention,

FIG. 2 is a plan view of a second embodiment of the cutting drum assembly,

FIG. 3 is a side elevation of another embodiment of the machine,

FIG. 4 is a front-end view of the machine shown in FIG. 3.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to FIG. 1, a machine for removing worn road surfaces comprises a chassis 1 in the form of a portal-like frame which is supported on the ground by wheels 2 which for the purposes of this specification, define the ground plan of the machine. A cutting drum 3 is suspended between the forward and rearward wheels and has a cylindrical peripheral surface mounting pick-boxes in each of which is received a pick or chisel. An internal combustion engine 4 is mounted at the rear end of the machine and drives a hydraulic pump 5 which receives fluid from a tank 6 and supplies it to hydrostatic motors driving the drum 3 and the wheels 2. The fluid is distributed to the motors in the correct ratios by way of a distributor downstream of the pump.

The cutting drum 3 is partially encased within a cowl-shaped housing 7 at the ends of which are provided bearings for the drum. Two hydrostatic motors are housed within the drum and receive fluid by way of pipes 9, the motors driving the drum at speeds of up to 66 r.p.m. The housing 7 is suspended by two slightly diverging piston and cylinder rams 10 which, together with the frame 1 and the housing 7, form a trapezoidal linkage. A third ram 11 has its cylinder mounted to the housing and its piston rod connected to a part of the frame 1, the axis of the ram extending transversely of the machine.

By actuating the rams 10, the cutting drum may be raised and lowered to adjust the depth of cut up to a maximum of about 8 inches. By actuating such cylinders by different amounts, allowance may be made for the camber of the road surface. By operating the ram 11, the cutting drum may be displaced laterally with regard to the machine until part of its length is outside the ground plan of the machine, the amount of displacement in either direction being about one-third of the track width.

In the embodiment of the cutting drum assembly shown in FIG. 2, the housing 7 is pivotally supported by a bearing 13 on a slide block 14 which cooperates with a transversely extending guideway in a frame 15 which is supported by the rams 10 and by forwardly extending links connected to the frame 1. A hydraulic ram 16 (or alternatively a lead-screw) is operable to transverse the slide block in order to cause a part of the drum to project beyond a side of the machine. A further ram 17 is operable to tilt the housing by up to about 5° to the horizontal. Extension and retraction of the rams 10 increases and reduces the depth of cut as with the embodiment of FIG. 1.

FIGS. 3 and 4 show a further embodiment similar to that illustrated in FIG. 2. The drum 3 supported by brackets 21 is driven by hydraulic motors within the drum. The drum and its drive means are supported on a carriage 33 beneath the chassis 1, the carriage being movable along a transverse beam 34 which is carried by lateral pivots 38 on brackets 48 which depend from the chassis. A bracket 39 extends from each end of the transverse beam and is connected at one end to a ram 40. The other end of each ram is connected to a bracket 41 so that the transverse beam and hence the cutting drum may be rocked about the pivots 38 to effect adjustment of the depth of cut by adjusting the height of the cutting drum relative to the ground. To control the camber produced, the cutting drum is supported from the carriage on a longitudinal pivot 42 and is rockable about this pivot by a ram 43 secured at one end to the cutting device. The normal working position of the drum is where indicated by chain dotted lines 3 in FIG. 4. The carriage is traversable along the beam so as to dispose the drum in the position 3' outside the ground plan of the machine by means of two rams 44 each attached to a respective end of a chain 45 passing around a sprocket 47 at one end of the beam, the latter being provided with suitable slideways 46 for the carriage.

It will therefore be seen that in each embodiment, it is possible to make a significant reduction in the inner radius of the path cut out by the rotary cutting drum by traversing said drum to an extreme position. The traversing means may also be used to cause the drum to follow a sinuous path while the machine follows a straight course, if the operation in hand requires such a tactic.

Modifications may be made to the embodiment disclosed herein within the spirit and scope of this invention. Thus, the chassis may be supported on endless tracks instead of on wheels. The direction of rotation of the cutting drum may be clockwise or anticlockwise but is preferably such as to perform a climb-milling operation on the road surface as this operation achieves a cleaner cut. Instead of being traversable into a position outwardly of both sides of the chassis it may be sufficient to provide for this operation on the near-side only.

I claim:

1. A machine for removing road surfaces comprising a chassis, forward and rearward ground engaging travel means for supporting said chassis, a rotary pick-carrying cutting device supported by said chassis for rotation about a horizontal axis extending generally transversely of the direction of travel of said machine, means on said machine for rotating said cutting device, means on said machine for adjusting said cutting device in a substantially vertical plane to set the depth of road surface to be removed, and means on said machine to displace said cutting device transversely of said machine until at least part of said cutting device extends outside of the ground plan of said machine as defined by said ground engaging support means, thereby to reduce the inside radius of the path cut by said cutting device.

2. The machine of claim **1** further characterized by a linkage on said machine supporting said cutting device and permitting swinging movement thereof transversely of said machine, and fluid-operable ram means on said machine for driving said linkage.

3. The machine of claim **2** wherein said ram means constitutes a portion of said linkage.

4. The machine of claim **1** wherein said transverse displacement means includes a carriage supporting said cutting device, a transversely extending beam on said machine slidably mounting said carriage, and a fluid-operable ram means for transversely sliding said carriage and its supported cutting device along said beam.

5. The machine of claim **4** wherein said ram means includes an elongated flexible element carried on said beam, and a pair of rams on said machine, each said ram attached to an end of said flexible element.

6. The machine of claim **1** wherein said means for rotating said cutting device includes at least one hydraulic motor mounted within said cutting device.

7. A method of removing a road surface using a machine equipped with a cutting drum rotating about a horizontal axis wherein, while said machine negotiates an arcuate path, said cutting drum is traversed axially in a direction which is transverse to the direction of travel of said machine, said cutting drum being traversed between a position within the ground plan of said machine and a position at least in part outwardly of the ground plan on the side of the machine nearer the center of curvature of the arcuate path.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,767,262 Dated October 23, 1973

Inventor(s) Gerald R. O. Pentith

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet, in the heading insert --[30] Foreign Priority Data: Great Britain November 17, 1970 54,710 --.

Signed and sealed this 30th day of April 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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