

Sept. 10, 1940.

W. M. VENABLE
PAVING APPARATUS

2,214,093

Filed Aug. 24, 1939

2 Sheets-Sheet 1

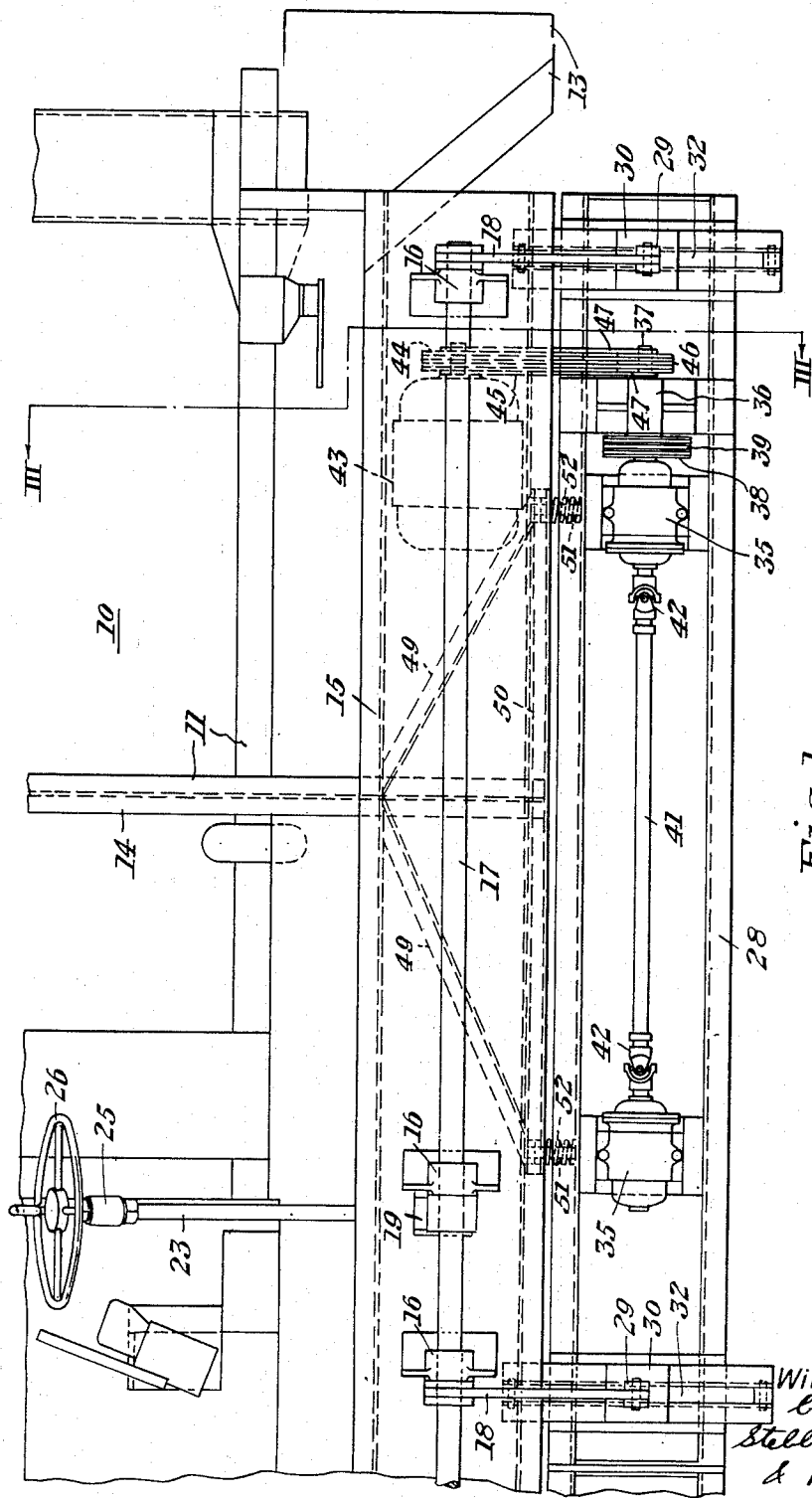


Fig. 1.

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Fig. 2.

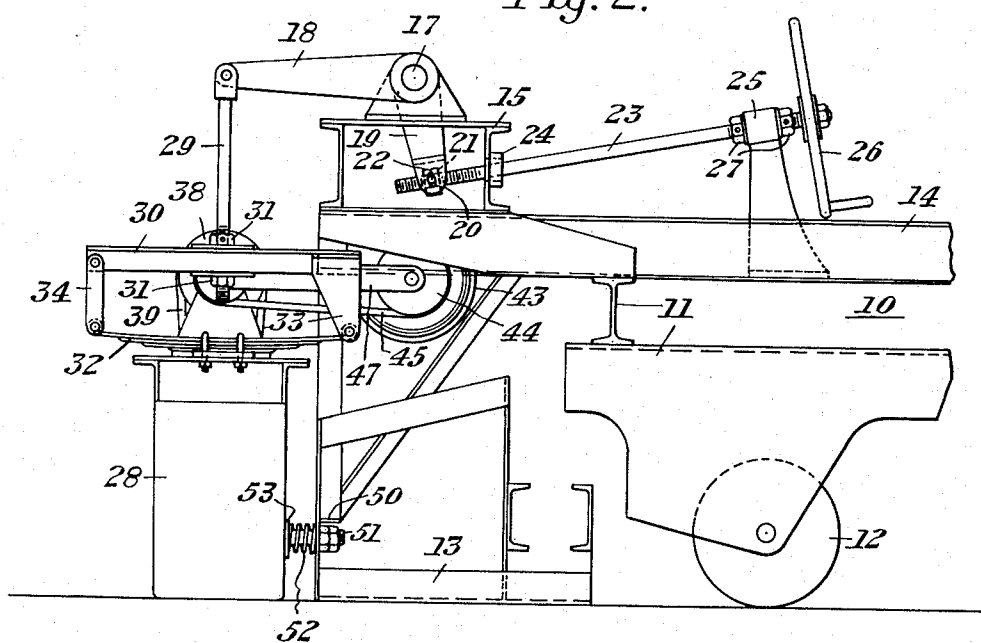
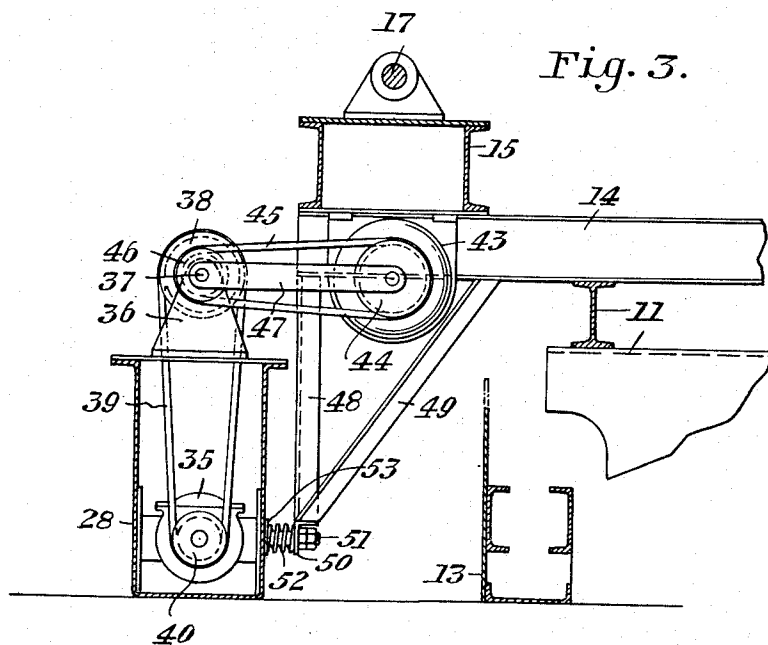


Fig. 3.



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UNITED STATES PATENT OFFICE

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PAVING APPARATUS

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3 Claims. (Cl. 94—48)

This invention relates generally to paving apparatus and, in particular, to a tamping mechanism adapted to be mounted on a car or other supporting means for traversing movement over a mass of concrete.

In the construction of concrete roads, it is customary to deposit concrete on the sub-grade and strike off the surface about $2\frac{1}{2}$ " below the desired finished surface. Reinforcing mesh is then placed on the concrete and enough additional concrete laid thereon to bring the finished surface to the desired elevation. Usually the surface layer of concrete is tamped but not the layer which is initially deposited.

I have invented a novel tamping mechanism which is capable of easy adjustment so that it can be used to strike off the concrete below the finished road surface, preliminary to the laying of reinforcing mesh, as well as to tamp the surface layer laid on top of the mesh. The invention is, furthermore, characterized by simplicity and relatively low cost and may be operated by relatively unskilled labor.

In a preferred embodiment of the invention, the tamping mechanism is mounted on the front end of a road finishing apparatus of known construction although it may be supported otherwise, as for example, on a special car or other traveling means. The tamper itself is floatingly suspended by means capable of rapid vertical adjustment to change the level of the tamper bottom as may be desired. A source of motive power is carried on the car or other traveling support and driving connections are provided between it and rotary eccentrics mounted on the tamper. By this construction the tamper may be adjusted vertically without disturbing the driving connection and the source of motive power is substantially free from the vibration set up by the eccentrics in the tamper.

Other novel features and advantages of the invention will become apparent during the course of the following detailed description in which reference is made to the accompanying drawings illustrating a present preferred embodiment. In the drawings:

Fig. 1 is a partial plan view of the apparatus installed on a road finishing machine;

Fig. 2 is a partial end elevation; and

Fig. 3 is a partial section taken substantially along the line III—III of Fig. 1.

Referring now in detail to the drawings, a road finishing machine 10 comprises a frame 11 mounted on wheels 12 adapted to traverse the

road rails or side forms between which the concrete is cast. The machine 10 is provided with a transverse screed 13 mounted for longitudinal oscillatory movement. The mounting of the screed and its drive are well-known and are not involved in the present invention so no further details thereof need be described.

Beams 14 are mounted on the frame 11 and extend forwardly thereof cantilever fashion. The beams 14 may be disposed on the frame 11 and secured thereto in any convenient manner. A transverse girder 15 is supported on the beams 14, being composed of spaced channels connected by plates welded thereto. Bearings 16 are spaced along the girder 15. A shaft 17 is journaled in the bearings 16 and is provided with crank arms 18. The shaft 17 is also provided with a crank arm 19 extending downwardly therefrom through a suitable opening in the top plate of the girder 15.

A clevis 20 is formed at the lower end of the crank arm 19 and is adapted to receive a nut 21 pivoted therein as at 22. A screw shaft 23 is journaled in a bearing 24 carried on the girder 15 and a bearing 25 secured to the beams 14 or otherwise suitably supported. The forward end of the shaft 23 is threaded through the nut 21. The other end of the shaft is provided with a hand-wheel 26. Set collars 27 serve as thrust bearings for the shaft 23.

Tampers 28 are resiliently suspended ahead of the machine 10. Each tamper is suspended from a pair of the arms 18 on hanger rods 29. The rods 29 are secured directly to yokes 30 by nuts 31. The tampers are secured directly to leaf springs 32 secured to hanger plates 33 and links 34 forming part of the yokes 30. It will be apparent from the structure described, that rotation of the hand-wheel 26 will cause angular movement of the crank arm 19, the shaft 17 and crank arms 18 whereby vertical adjustment of the neutral or initial position of the tampers 28 may be effected. The nut 21 has sufficient lost motion with respect to the clevis 20 to permit such rotation of the crank arm 19 without binding. Each end of the tamper may be adjusted individually by shifting the nuts 31 so that the tamper bottom is inclined and conforms generally to the desired curvature or crown of the finished surface.

The tampers 28 are of box section and are open at the top although they may be of any desired shape and construction. As illustrated, the front wall of each tamper is substantially vertical and the bottom wall substantially horizontal.

Rotary eccentric units 35 are secured in the tampers adjacent the bottom thereof. These units are well-known and each includes a shaft journaled in bearings and having an eccentric weight thereon. Each tamper is provided with a bearing 36 in which a jack shaft 37 is journaled. A pulley 38 on one end of the shaft 37 drives one of the eccentric units 35 through a belt 39 and a pulley 40 on the unit. The two units are connected by a drive shaft 41 and universal joints 42.

A motor 43 is mounted on the girder 15. It is provided with a driving pulley 44. The shaft 37 is driven by the pulley 44 through a belt 45 and a pulley 46 on the shaft. Links 47 are pivoted on the shaft 37 and the shaft of the motor 43 to maintain proper spacing therebetween. It will be understood that the motor 43 drives the eccentric units 35 through the belt drives and jack shaft 37. It will also be apparent that this driving relation is not disturbed by vertical adjustment of the tampers on operation of the hand-wheel 26.

The tampers 28 in normal operation, push surplus concrete ahead of them. In order to absorb the lateral thrust caused thereby, I provide vertical struts 48 extending downwardly from the girder 15 and inclined struts 49 connected thereto. A horizontal angle 50 secured to the struts is provided with guide pins 51 spaced therealong having compression springs 52 therearound which engage bearing plates 53 on the rear face of the tampers.

The partial plan view of Fig. 1 indicates that a plurality of tampers disposed end to end, are employed to span the full road width. It will be understood that the inner ends of the tampers are positioned slightly above their outer ends by properly adjusting the nuts 31 so that the tamper bottoms conform generally to the crown of the road. A single tamper may be employed for narrow slabs and more than two tampers for wide slabs. In either case, the tampers are adjusted to a horizontal or inclined position according to the road contour desired.

In operation, the machine having the invention incorporated therein is moved over a length of the roadway on which fresh concrete has been deposited, after an initial adjustment by means of the hand-wheel 26, to bring the bottoms of the tampers 28, in their neutral or normal position, about $2\frac{1}{2}$ " below the desired finished road surface. The car 10 may conveniently be provided with a power drive whereby it advances at the desired rate of speed. The motor 43, on being energized to drive the eccentric units 35, causes oscillatory movement of the tampers 28, the rate of which depends on the diameters of the pulleys included in the belt drive, and the amplitude on the adjustment of the units 35. If desired, the motor 43 may be of the variable speed type.

As already indicated, the invention subjects the initial layer of concrete to thorough tamping whereby practically all voids are eliminated. After the initial traverse of the machine, reinforcing mesh is laid on the bottom layer and additional concrete deposited to bring the surface up to the desired finished elevation. The tampers 28 are adjusted to the proper elevation for forming the finished road surface and the machine is again caused to traverse the length of the slab being formed, thus subjecting the surface layer to a thorough tamping while the

screed 13 is operated to smooth the surface of the slab.

It will be apparent that the invention is characterized by numerous advantages. In the first place, the tamping of the bottom layer of the road slab is obviously desirable but has not been possible with apparatus known heretofore. The tampers 28 actually serve the purpose of a strike-off as well as a tamper proper. I usually prefer to drive the eccentric units or vibrators in the clockwise direction, as viewed in Fig. 3, as the car moves to the left. If the weights are rotated in the direction described, the motion of the tamper counteracts to some extent a tendency for concrete to creep backward beneath the tamper as the machine advances. This is desirable when the machine is to be followed by another finishing machine.

Although I have illustrated and described but a preferred form of the invention, it will be understood that changes in the construction and arrangement disclosed may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. Means for leveling and tamping plastic concrete paving mixes, comprising a car, a tamper having a substantially vertical front face adapted to push forward surplus concrete and a substantially horizontal bottom face adapted to tamp the concrete, an eccentric weight mounted on the tamper near the bottom thereof to impart to the bottom of the tamper an oscillatory movement having both vertical and horizontal components and means for rotating the eccentric weight, means connected to the upper part of the tamper for resiliently suspending the tamper from the car permitting vertical oscillatory movement of the tamper, pusher means carried by the car and engaging the lower part of the tamper for pushing the tamper forward as the car is moved forward and permitting both vertical and horizontal oscillatory movement of the lower part of the tamper, and spacing means carried by the car and engaging the tamper above said pusher means for also pushing the tamper forward and preventing tipping of the tamper while permitting vertical oscillatory movement of the upper part of the tamper.

2. Means for leveling and tamping plastic concrete paving mixes, comprising a car, a tamper having a substantially vertical front face adapted to push forward surplus concrete and a substantially horizontal bottom face adapted to tamp the concrete, an eccentric weight mounted on the tamper near the bottom thereof to impart to the bottom of the tamper an oscillatory movement having both vertical and horizontal components and means for rotating the eccentric weight, means connected to the upper part of the tamper for resiliently suspending the tamper from the car permitting vertical oscillatory movement of the tamper, vertically adjustable means for supporting said resilient suspension means, pusher means carried by the car and engaging the lower part of the tamper for pushing the tamper forward as the car is moved forward and permitting both vertical and horizontal oscillatory movement of the lower part of the tamper, and spacing means carried by the car and engaging the tamper above said pusher means for also pushing the tamper forward and preventing tipping of the tamper while permitting vertical oscillatory movement of the upper part of the tamper.

3. Means for leveling and tamping plastic concrete paving mixes, comprising a car, a tamper having a substantially vertical front face adapted to push forward surplus concrete and a substantially horizontal bottom face adapted to tamp the concrete, an eccentric weight mounted on the tamper near the bottom thereof to impart to the bottom of the tamper an oscillatory movement having both vertical and horizontal components, means connected to the upper part of the tamper for resiliently suspending the tamper from the car permitting vertical oscillatory movement of the tamper, vertically adjustable means for supporting said resilient suspension means, mechanical driving means mounted on the car and power transmitting con-

nections between the said driving means and the eccentric weight for rotating the weight at different vertical adjustments of the tamper, pusher means carried by the car and engaging the lower part of the tamper for pushing the tamper forward as the car is moved forward and permitting both vertical and horizontal oscillatory movement of the lower part of the tamper, and spacing means carried by the car and engaging the tamper above said pusher means for also pushing the tamper forward and preventing tipping of the tamper while permitting vertical oscillatory movement of the upper part of the tamper.

WILLIAM MAYO VENABLE.