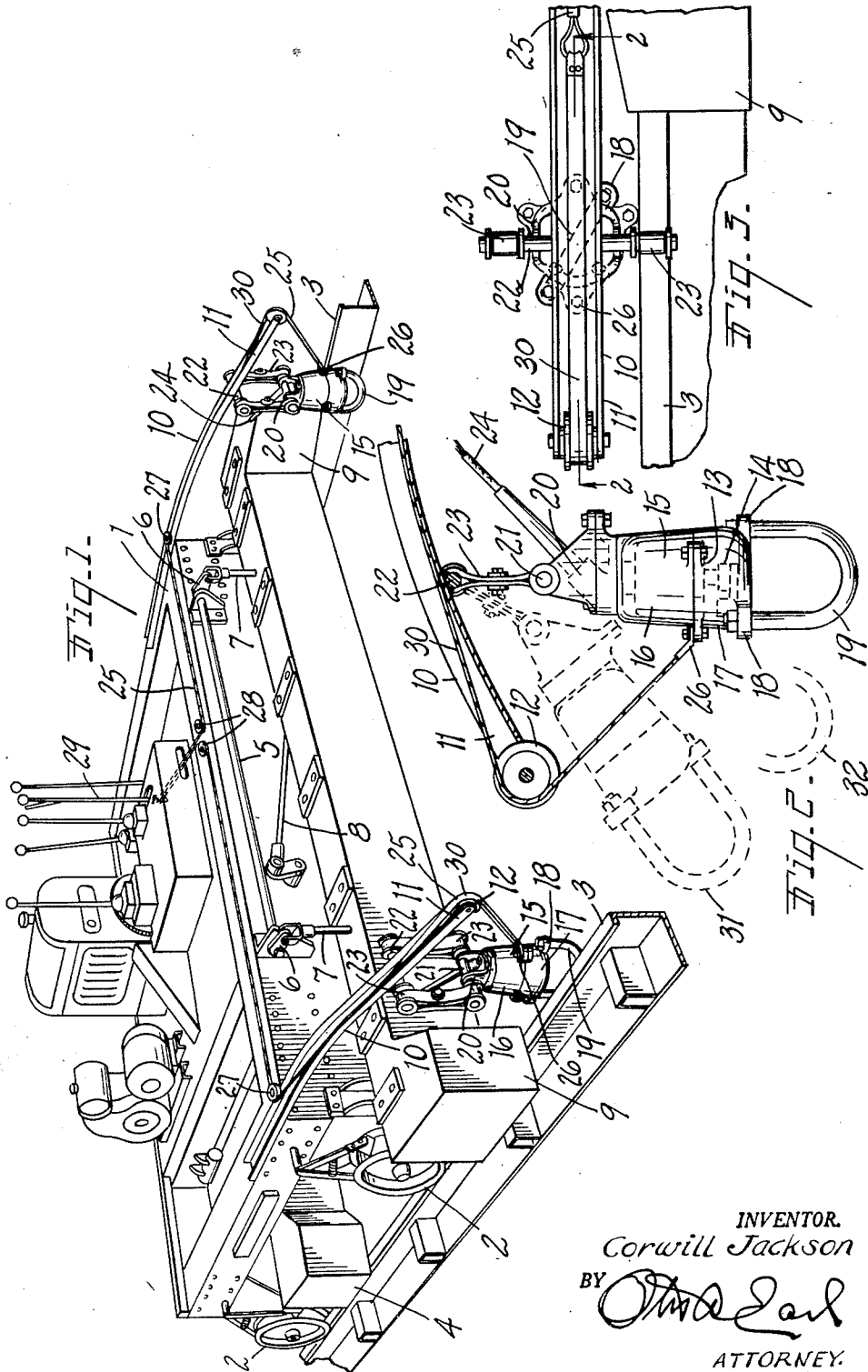


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PAVING MACHINE, INCLUDING MEANS FOR
SPADING AT THE SIDES OF THE FORMS
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PAVING MACHINE, INCLUDING MEANS FOR
SPADING AT THE SIDES OF THE FORMSCorwill Jackson, Ludington, Mich., assignor to
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This invention relates to improvements in paving machines including means for spading at the sides of the forms.

The main objects of this invention are:

First, to provide a paving machine for placement of pavement or concrete slabs having means for efficiently "spading" the concrete along the inner sides of the forms as the machine is advanced.

Second, to provide a machine of this character which is of large capacity and at the same time, effectively works or spades the concrete along the sides of the forms.

Third, to provide a machine of this character in which the vibrated spading units may be easily adjusted to operative position for the initial pass of the machine and may be lifted or will automatically swing to inoperative position on the retracting or rearward movement of the machine for a second pass.

Fourth, to provide spading means which can be readily mounted or associated with concrete placement and screeding machines substantially differing in structure.

Further objects relating to details and economies of the invention will appear from the description to follow. The invention is pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a front perspective view of a concrete placing or screeding machine embodying my invention various parts of the general structure being shown conventionally.

Fig. 2 is an enlarged fragmentary view on a line corresponding to line 2—2 of Fig. 3, the vibrating unit being shown in operative position by full lines and its swinging movement being illustrated by dotted lines.

Fig. 3 is a fragmentary plan view.

Reference being had to the accompanying drawing, 1 represents a carriage provided with wheels 2 adapted to travel on the side forms 3. The machine illustrated is provided with a front screed 3 and a rear finishing screed 4. The screed 3 is supported for vertical adjustment by means of the rock shaft 5 having arms 6 connected to the screed by the hangers 7 which are designed to permit reciprocatory movement of the screed while it is commonly supported by the forms. Means for reciprocating is indicated at 8. The details of these parts are not illustrated as they form no part of my present invention but the reference is made to Patent No. 55

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2,219,246, issued October 22, 1940, as illustrating a desirable structure where vibratory screeds are employed.

The machine illustrated in the drawing is known as the "Jaeger" paving machine and it being self-propelled and adapted to be driven forwardly and rearwardly permitting a second pass over the slab. The screed 3 is provided with forwardly projecting wings 9 which are designed to prevent the concrete, which may be stacked up in front of the screed, from flowing over the forms at the ends of the screed.

In the embodiment of my invention illustrated I mount a pair of forwardly projecting arms 10 on the carriage these being of upwardly facing channel section and having downwardly inclined front portions 11. The arms overhang the screed 3 and are provided with guide pulleys 12 at their front ends.

Each arm carries a vibrating unit comprising a motor 13, designated conventionally by dotted lines Fig. 2, having an unbalanced rotor 14 disposed with its axis longitudinally of the housing 15 which completely encloses the motor and its rotor.

The motor housing is formed of upwardly tapering cross sections and comprises an upper section 16 and a lower section 17, the sections being bolted together for providing access to the motor. The lower section of the housing is provided with laterally projecting ears 18 in which the U-shaped vibratory element 19 is mounted. This vibratory element is formed of a rod bent into a U-shape. The motor housing is provided with supporting ears 20 which pivotally or swingably engage the hanger rod 21.

The arms 10 are provided with cross pieces 22 to which the hanger rods 21 are connected by means of the flexible non-extensible hanger straps 23. These straps permit the swinging of the vibratory units in a plane parallel to the side forms and are of such length that the vibratory units are suspended in a vertical position at the inner sides of the forms and with their vibratory or "spading elements" 19 in a forwardly diverging relation to the side forms.

The electrical connections for the motors are indicated at 24.

The adjusting and draft cables 25 are passed over the guide pulleys 12 and connected to the front sides of the housings at 26. These cables extend over the pulleys 27 and 28 to an operating lever 29. Both cables are connected to the same operating lever. In the embodiment illustrated

the front sections 20 of the cables are in the form of flat straps.

In operation the vibrating units are lowered or adjusted to the operative position, shown in Figs. 1 and 2, the motors being supplied with current as the machine is advanced on the first pass over the concrete which has been placed within the forms. The weight of the motor and motor housings and the draft cables maintain the vibrating units in their operative position with the vibratory elements at the inner sides of the forms and quite closely adjacent thereto and desirably in a diverging relation to the forms as is illustrated. This results in effective "spading" of a substantial strip along the inner sides of the forms.

It has been the common practice in the use of paving machines of the type illustrated to provide two workmen with spading implements to work or "spade" the concrete along the sides of the forms, this has been the practice even when vibrating screeds are used. When a second pass over the material is taken it may be unnecessary to use the vibrating spading units on the second pass. Also when the machine is being transported generally it is desirable to support the vibrating units in inoperative position, as indicated by dotted lines 31 in Fig. 2. Should the operator neglect to adjust the vibrating to inoperative position, as indicated at 31, for the rearward movement of the machine the vibrating units are supported so that they can swing to an intermediate position to pass over the placed concrete, as is indicated at 32.

In the embodiment illustrated, the entire housing and vibratory element 19 is vibrated at high frequency which results in an effective working or spading of the concrete along the forms and also results in the vibratory elements remaining submerged within the concrete even where it is relatively dry or what is known as a non-slump mixture. The particular form of U-shaped vibratory element disposed at an angle or inclined relation to the forms results in the effective spading of a substantial strip along the form with a minimum of strain on the parts.

The vibratory elements have the further advantage that clogging or wedging of aggregate between the forms and the vibratory elements is eliminated; however, the vibrating units are so supported that they can swing to pass any unusual obstruction such as a reinforcing element or the like, which may be above its intended position. In practice, machines embodying my invention eliminate the work of two men and their spading equipment and results in a very uniform spading along the forms.

I have illustrated and described my invention in a highly practical commercial embodiment. I have not attempted to illustrate or describe other adaptations or embodiments as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a machine of the class described the combination with a carriage adapted to travel on forms, of a screed, an arm of upwardly facing channel section mounted on said carriage and projecting forwardly in overhanging relation to the screed, said arm having a downwardly inclined front portion and being provided with a guide roller at its front end, a vibrating unit comprising a motor provided with a housing and

having an unbalanced rotor disposed with its axis vertically, a U-shaped vibratory member mounted on the motor housing to project downwardly therefrom, a hanger rod on which said vibratory unit housing is pivotally mounted, a cross rod on said arm spaced rearwardly from the front end thereof, flexible non-extensible hangers depending from said cross rod and engaged with said hanger rod whereby said vibrating unit is supported for swinging adjustment in a plane parallel to the path of travel of the carriage, the U-shaped vibratory member being inclined relative to the vertical plane of the hanger rod, and a cable connected to said vibrating unit and guided over said guide roller and extending longitudinally within the channel of the arm to constitute an adjusting and draft means for said vibrating unit.

2. In a machine of the class described the combination with a carriage adapted to travel on forms, of a screed, an arm mounted on said carriage and projecting forwardly in overhanging relation to the screed and provided with a guide roller at its front end, a vibrating unit comprising a motor provided with a housing and having an unbalanced rotor, a vibratory member mounted on the motor housing to project downwardly therefrom, a hanger rod on which said vibratory unit housing is pivotally mounted, a cross rod on said arm spaced rearwardly from the front end thereof, flexible non-extensible hangers depending from said cross rod and engaged with said hanger rod whereby said vibrating unit is supported for swinging adjustment in a plane parallel to the path of travel of the carriage and to position the vibratory member at the side of the form, and a cable connected to said vibrating unit and guided over said guide roller to constitute an adjusting and draft means for said vibrating unit.

3. In a machine of the class described the combination with a carriage adapted to travel on a form, of a screed translated with the carriage, an arm on said carriage projecting forwardly in overhanging relation to the screed and having a guide pulley at its front end, a vibrating unit provided with a submersible vibratory member, a hanger supported by and swingably connected to said arm, the axis of swinging movement of the hanger to the arm being disposed transverse to the direction of travel of the carriage on the form, said hanger swingably suspending said vibrating unit from said arm for swinging movement at the front of the screed and in a plane approximately parallel of the path of travel of the carriage and at the inner side of and adjacent to the form on which the carriage is traveling, and means adjustably limiting the rearward swinging movement of the vibrating unit on said hanger, including a flexible cable connected to said vibrating unit and supportingly guided by said pulley, said pulley being disposed forwardly of the point of connection of said cable to said vibrating unit.

4. In a machine of the class described the combination of a carriage adapted to travel on a form, an arm on said carriage projecting forwardly therefrom and having a guide pulley at its front end, a vibrating unit provided with a submersible vibratory member, a hanger supported by and swingably connected to said arm, the axis of swinging movement of the hanger to the arm being disposed transverse to the direction of travel of the carriage on the form, said hanger swingably suspending said vibrating unit from said arm for swinging movement in a plane approximately

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parallel of the path of travel of the carriage and at the inner side of and adjacent to the form on which the carriage is traveling, and means adjustably limiting the rearward swinging movement of the vibrating unit on said hanger but permitting free forward swinging movement of the vibrating unit on said hanger on the rearward movement of the carriage, including a cable connected to said vibrating unit and supportingly guided by said pulley, said pulley being disposed forwardly of the point of connection of said cable to said vibrating unit.

5. In a machine of the class described, the combination with a carriage adapted to travel on a form, of a screed translated with said carriage, a vibrating unit comprising, a motor provided with a housing and having an unbalanced rotor disposed with its axis vertically, a submersible vibratory member fixedly mounted on said motor housing to project a substantial distance downwardly therefrom, the dimension of the vibratory member beneath the housing and in a horizontal direction at right angles to the direction of travel of the carriage on the form being substantially less than the corresponding dimension of the housing, a hanger, means on said carriage supporting said hanger, said hanger being swingably connected to said supporting means, the axis of swinging movement of the hanger being disposed transverse to the direction of travel of the carriage on said form, said hanger supporting said vibratory unit for swinging adjustment in a plane approximately parallel to the path of travel of the carriage and in front of said screed adjacent one end thereof and within and adjacent to the form on which the carriage is traveling, and adjustable means operatively connected to said vibrating unit to adjust the same only forwardly about its said axis of swinging movement on said hanger supporting means and to hold the same against only rearward movement when in adjusted position, said adjustable means including flexible means connected to said vibrating unit and including a support movable as a unit with said carriage and hanger supporting means, said flexible means extending forwardly from its point of connection with said vibrating unit to said support to be supported thereby forwardly of its point of connection with said vibrating unit, to permit forward swinging movement of the vibrating unit on said hanger supporting means on the rearward movement of the carriage.

6. In a machine of the class described, the combination with a carriage adapted to travel on a form, of a screed translated with said carriage, a vibrating unit provided with a submersible vibratory member fixedly mounted on said vibrating unit to project downwardly therefrom, a hanger, means on said carriage supporting said hanger, said hanger being swingably connected to said supporting means, the axis of swinging movement of the hanger being disposed transverse to the direction of travel of the carriage on said form, said hanger supporting said vibratory unit for swinging adjustment in a plane approximately parallel to the path of travel of the carriage and in front of said screed adjacent one end thereof and within and adjacent to the forms on which the carriage is traveling, and translated by the carriage, and adjustable means operatively connected to said vibrating unit to adjust the same only forwardly about its said axis of swinging movement on said hanger supporting means and to hold the same against only rearward movement when in adjusted position, said adjust-

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able means including flexible means connected to said vibrating unit and including a support movable as a unit with said carriage and hanger supporting means, said flexible means extending forwardly from its point of connection with said vibrating unit to said support to be supported thereby forwardly of its point of connection with said vibrating unit, to permit forward swinging movement of the vibrating unit on said hanger supporting means on the rearward movement of the carriage.

7. In a machine of the class described, the combination with a carriage adapted to travel on a form, of a vibrating unit provided with a submersible vibratory member fixedly mounted on said vibrating unit to project downwardly therefrom, a hanger, means on said carriage supporting said hanger, said hanger being swingably connected to said supporting means, the axis of swinging movement of the hanger being disposed transverse to the direction of travel of the carriage on said form, said hanger supporting said vibratory unit for swinging adjustment in a plane approximately parallel to the path of travel of the carriage, and translated by the carriage, and adjustable means operatively connected to said vibrating unit to adjust the same only forwardly about its said axis of swinging movement on said hanger supporting means and to hold the same against only rearward movement when in adjusted position, said adjustable means including flexible means connected to said vibrating unit and including a support movable as a unit with said carriage and hanger supporting means, said flexible means extending forwardly from its point of connection with said vibrating unit to said support to be supported thereby forwardly of its point of connection with said vibrating unit, to permit forward swinging movement of the vibrating unit on said hanger supporting means on the rearward movement of the carriage.

8. In a machine of the class described, the combination with a carriage adapted to travel on a form, of a vibrating unit provided with a submersible U-shaped vibratory member fixedly mounted on said vibrating unit to project a substantial distance downwardly therefrom and comprising vertically extending leg-like members and a member connecting the lower ends of said leg-like members, a hanger, means on said carriage supporting said hanger, said hanger being swingably connected to said supporting means, the axis of swinging movement of the hanger being disposed transverse to the direction of travel of the carriage on said form, said hanger supporting said vibratory unit for swinging adjustment in a plane approximately parallel to the path of travel of the carriage, the U-shaped vibratory member being disposed in a plane at an angle relative to the plane in which the vibrating unit swings and translated by the carriage, and adjustable means operatively connected to said vibrating unit to adjust the same only forwardly about its said axis of swinging movement on said hanger supporting means and to hold the same against only rearward movement when in adjusted position, said adjustable means including flexible means connected to said vibrating unit and including a support movable as a unit with said carriage and hanger supporting means, said flexible means extending forwardly from its point of connection with said vibrating unit to said support to be supported thereby forwardly of its point of connection with said vibrating unit, to permit forward swinging movement of the vibrating unit

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on said hanger supporting means on the rearward movement of the carriage.

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