Jan. 15, 1952 C. JACKSON 2,582,486

CONCRETE PLACEMENT MACHINE

Filed Jan. 2, 1947 2 SHEETS—SHEET 1

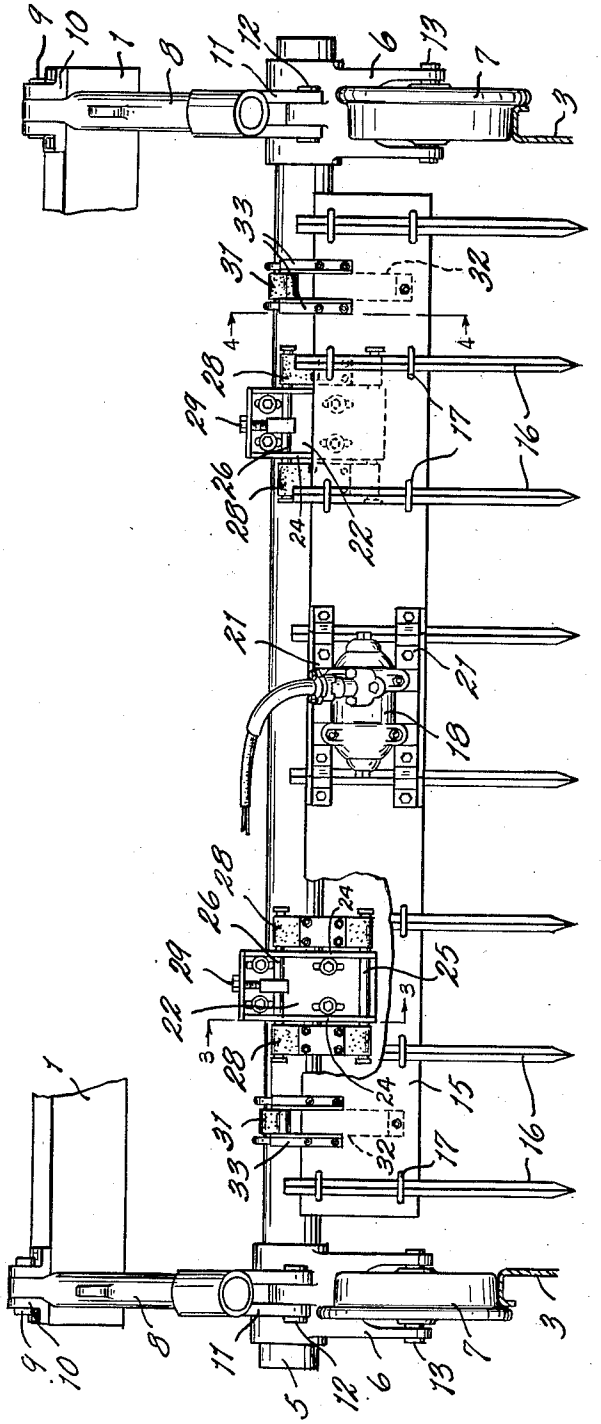

FIG. 1.

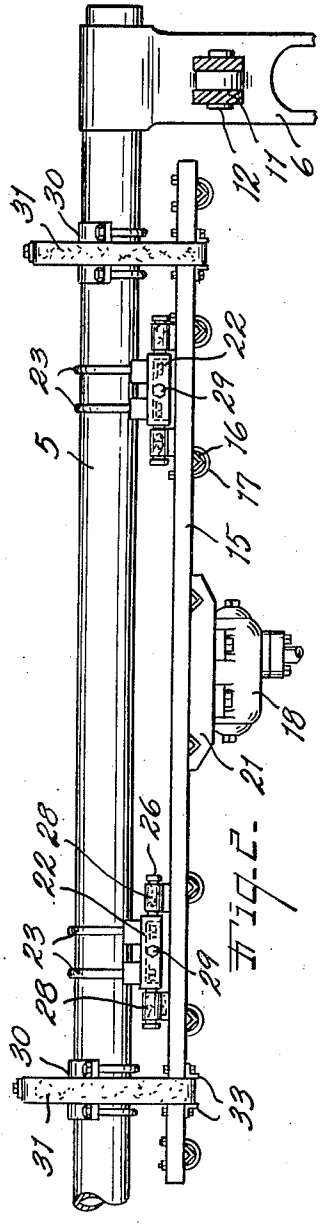

FIG. 2.

INVENTOR.
Corwill Jackson
BY Otis A. Earl
ATTORNEY.

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CONCRETE PLACEMENT MACHINE

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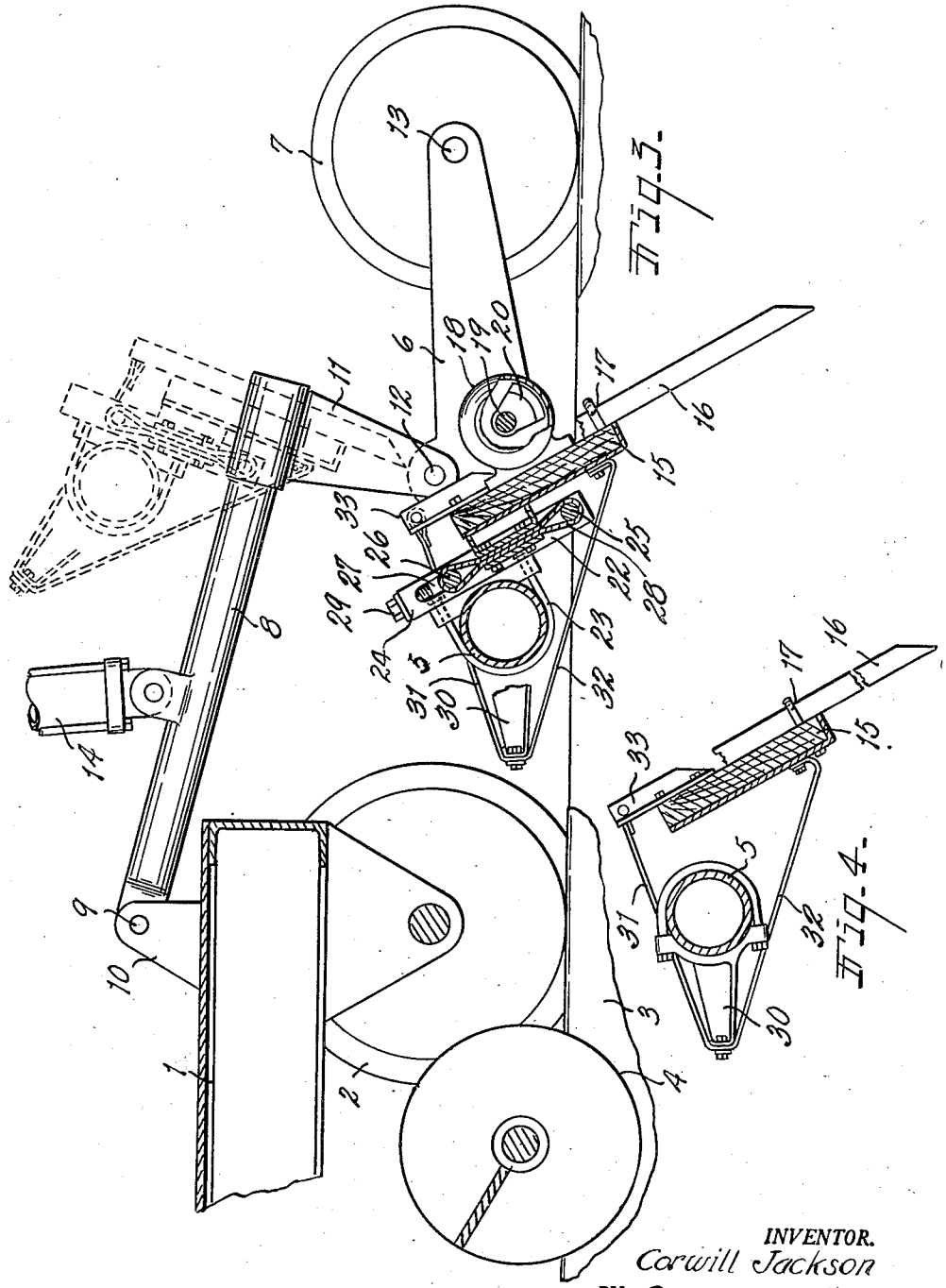

INVENTOR.
Carwill Jackson
BY Otto A. Earl
ATTORNEY

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CONCRETE PLACEMENT MACHINE

Corwill Jackson, Ludington, Mich.

Application January 2, 1947, Serial No. 719,795

10 Claims. (Cl. 94—48)

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This invention relates to improvements in concrete placement machines.

The main objects of this invention are:

First, to provide a concrete placement machine which is well adapted for the placement of concrete in slabs or beds of considerable depth and to subject the deep bed or mass of concrete to effective high frequency vibrations.

Second, to provide a machine of this character which is of large capacity and at the same time highly efficient and at the same time one which greatly reduces manual labor.

Third, to provide a concrete mass vibrating machine or apparatus which may be readily applied to a spreader.

Fourth, to provide an apparatus of this character which is simple and economical in structure and at the same time very strong and durable and capable of performing heavy work.

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

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

Fig. 1 is a fragmentary rear elevation of a concrete placement machine embodying the features of the invention.

Fig. 2 is a fragmentary plan view thereof, parts being shown in section.

Fig. 3 is a fragmentary view partially in vertical section of a machine embodying the invention, the vibratory means being illustrated in a lowered position or operative position by full lines and partially illustrated in an elevated position by dotted lines, the parts sectioned being on sectioned lines 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmentary view in section on a line corresponding to line 4—4 of Fig. 1.

While the machine of the invention is desirable for the placement of slabs or beds of concrete of a thickness ordinarily used in pavement for example, it is also well adapted for use in the placement of concrete in thick slabs or beds such as are in some instances required for airports designed for the use of heavy planes and it is desirable that this bed of concrete should be subjected to high frequency vibrations as it is placed. It is usual however to place it in at least two layers and frequently with a reinforce material between the layers. Also it is desirable to minimize hand labor and to lay the slabs with a maximum of speed as the preparation of the field for use is frequently urgent.

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The embodiment of the invention illustrated comprises a carriage 1 conventionally shown provided with wheels 2 adapted to travel on the forms 3. The carriage is provided with a spreader 4 shown conventionally and this is desirably of the screw or worm type. These parts are shown conventionally as they constitute no part of the present invention.

I provide a supporting beam 5 which in the embodiment illustrated is formed of a piece of pipe of suitable diameter. Supporting arms 6 are secured to this beam at the ends thereof, the arms being forked and provided with wheels 7 adapted to travel on the forms 3. The supporting arms 8 are pivotally mounted at 9 on the upwardly projecting brackets 10 on the carriage 1. At their rear ends, these arms are provided with hangers 11 which are pivoted at 12 to the supporting arms 6, the pivots 12 being intermediate the wheel axles 13 and the supporting beam.

Hydraulic means indicated by the numeral 14 are provided for raising and lowering the arms 8 and supporting them in their adjusted position. Other means might be used for this purpose but as there is considerable weight, the hydraulic means is particularly suitable as it minimizes effort on the part of the operator.

The beam 5 serves as a support for the vibratory crosshead 15 which, in the embodiment illustrated, is in the form of a plank. Vibratory bars 16 preferably triangular in shape are rigidly secured to the vibratory crosshead by means of the U-bolts 17 so that the bars are vibrated with the crosshead, the bars and crosshead in effect constituting a unit.

In the embodiment illustrated, the crosshead is vibrated by means of an electric motor 18 having a rotor 19 provided with an unbalancing weight 20. This motor is secured to the base 21 provided therefor with the axis of the rotor longitudinally of the vibratory member. The two bars adjacent the motor are secured by the motor base.

The beam 5 is provided with longitudinally spaced brackets 22 secured to the beam by the U-bolts 23. These brackets are frame-like or provided with forwardly projecting flanges 24 through which the cross rods 25 and 26 are arranged, the rods 26 being arranged through longitudinal slots 27. The hanger straps 28 engage the end of these rods, the rod 27 being adjustable by means of the screw 29 so that the tension on the hanger straps may be adjusted. These hanger straps serve as shock absorbers or vibration absorbing means so that the vibrations of the cross-

head are not transmitted to the supporting beam and other parts of the carrying and adjusting mechanism.

To take the draft load or stresses on the vibratory crosshead, the beam 5 is provided with forwardly projecting arms 30 to which the rearwardly diverging stay or draft straps 31 and 32 are secured, the rear ends of these straps 31 being secured to the upwardly projecting arms 33 on the crosshead and the lower straps 32 being secured to the crosshead adjacent the lower edge thereof.

The crosshead is desirably in the form of a wood plank of suitable width and thickness. This is found advantageous in transmitting vibrations of the vibrating means throughout the length of the vibratory member. The bars 16 are of substantial length and adapted to penetrate into a mass of concrete. In the lowered position they are desirably inclined forwardly as shown, their angle relative to the work varying somewhat as they are lifted. This mounting enables the adjustment of the machine through a wide range—that is, so that the bottom layer of a concrete slab may be effectively vibrated as well as the top or superimposed layers. As stated, it is usually the practice in the thick slabs to lay the bottom layer upon the foundation, superimpose a reinforcing on the bottom layer and then lay another layer on the pre-laid layer and the reinforcing. The machine can be adjusted to meet the considerably varying working conditions incident to the placement of these layers. The weight of the arms 6 and the parts supported thereby is so distributed relative to the pivots 12 of the arms 6 that the bars 16 counteract the tuning moment exerted by the force of the concrete against the bars 16 when the bars are dragged through the concrete.

The vibratory bars are suitably spaced longitudinally of the vibratory crosshead so that the entire mass of concrete is vibrated—that is, the vibrations of the material vibrated by one bar merge into the vibrations of the material vibrated by the adjacent bar or bars.

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

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

1. The combination with a carriage, of a supporting beam having rearwardly projecting wheel supports provided with wheels, supporting arms for said beam pivotally mounted on said carriage and pivotally connected to said wheel supports at the rear of the beam, means for vertically adjusting said supporting arms, a plank-like vibratory member crosshead, a plurality of vibratory bars rigidly secured to said crosshead in longitudinally spaced relation, an unbalanced rotor mounted centrally on said crosshead with its axis longitudinally thereof to vibrate said crosshead and said bars secured to the crosshead, crosshead supporting brackets mounted in longitudinally spaced relation on said beam, flexible non-extensible straps mounted at their ends on said brackets, said brackets being provided with means for tensioning said straps, said crosshead being secured to said straps intermediate their ends, draft arms projecting forwardly from said beams, and rearwardly diverging stay straps secured to said arms and to said crosshead adjacent the top and bottom edges thereof.

2. The combination with a carriage, of a supporting beam adjustably carried thereby, a plank-like vibratory member crosshead, a plurality of vibratory bars rigidly secured to said crosshead in longitudinally spaced relation, an unbalanced rotor mounted centrally on said crosshead with its axis longitudinally thereof, to vibrate said crosshead and said bars secured to the crosshead, crosshead supporting brackets mounted in longitudinally spaced relation on said beam, flexible non-extensible straps mounted at their ends on said brackets, said brackets being provided with means for tensioining said straps, said crosshead being secured to said straps intermediate their ends, draft arms projecting forwardly from said beam, and rearwardly diverging stay straps secured to said arms and to said crosshead adjacent the top and bottom edges thereof.

3. The combination with a carriage, of a supporting beam having rearwardly projecting wheel supports provided with wheels, supporting arms for said beam pivotally mounted on said carriage and pivotally connected to said wheel supports at the rear of the beam, said beam and wheel supports being fixedly connected to swing as a unit relative to said supporting arms, means for vertically adjusting said supporting arms, a vibratory member crosshead, a plurality of vibratory bars rigidly secured to said crosshead in longitudinally spaced relation, an unbalanced rotor mounted centrally on said crosshead with its axis longitudinally thereof to vibrate said crosshead and said bars secured to the crosshead, and vibratory absorbing means mounting said crosshead on said beam.

4. The combination with a carriage, of a supporting beam having rearwardly projecting wheel supports provided with wheels, supporting arms for said beam pivotally mounted on said carriage and pivotally connected to said wheel supports at the rear of the beam, said beam and wheel supports being fixedly connected to swing as a unit relative to said supporting arms, means for vertically adjusting said supporting arms, a vibratory member crosshead, a plurality of vibratory bars rigidly secured to said crosshead in longitudinally spaced relation, an unbalanced rotor mounted on said crosshead to vibrate the same and said bars secured thereto, said vibratory member crosshead being mounted on said beam for movement therewith.

5. In combination with a carriage, of a supporting beam, means connected to said beam and carriage for raising and lowering the beam relative to the carriage, a vibratory member crosshead, a plurality of vibratory bars projecting downwardly from said crosshead in longitudinally spaced relation, an unbalanced rotor mounted centrally on said crosshead with its axis longitudinally thereof to vibrate said crosshead and said bars secured to the crosshead, crosshead supporting brackets mounted in longitudinal spaced relation on said beam, flexible nonextensible straps mounted at their opposite ends on said brackets, said brackets being provided with means for tensioning said straps, said crosshead being secured to said straps intermediate their opposite ends, draft arms projecting forwardly from said beam, and rearwardly diverging stay straps secured to said arms and to said crosshead adjacent the top and bottom thereof.

6. The combination with a carriage, of a supporting beam, means for swingably adjustably

connecting said beam to said carriage for raising and lowering adjustment and supporting it in its adjustable positions, said means including rearwardly projecting supporting arms on said beam provided with wheels and including arms pivotally mounted on said carriage and pivotally connected to said supporting arms rearwardly of said beam, a vibratory member having a plurality of elongated vibratory bars disposed thereon in longitudinally spaced relation to project with their longitudinal axis extending at a substantial angle downwardly therefrom, and vibration absorbing means mounting said vibratory member on said beam, means on said vibratory member for vibrating the same and the bars disposed thereon.

7. The combination with a carriage, of a supporting beam, means for swingably adjustably connecting said beam to said carriage for raising and lowering adjustment, said means including rearwardly projecting wheel supports on the beam provided with wheels adjacent the rear ends thereof and including arms pivotally mounted on said carriage and pivotally connected to the wheel supports intermediate said beam and wheels, a plank-like vibratory member having a plurality of elongated vibratory bars disposed thereon in longitudinally spaced relation to project with their longitudinal axis parallel to the plane of the plank-like member and to extend at a substantial angle downwardly therefrom, vibration absorbing means for mounting said vibratory member on said beam, and means for vibrating said vibratory member at high frequency carried thereby.

8. The combination with a carriage, of a support mounted thereon, means for adjustably supporting said support, said means including arms pivotally mounted on said carriage and including means pivotally supporting said support on said arms, a vibratory member, vibration absorbing means for mounting said vibratory member on said support, a plurality of spaced elongated vibratory bars mounted on said vibratory member to project with their longitudinal axis extending at a substantial angle downwardly therefrom, and means for vibrating said vibratory member at high frequency.

9. The combination with a carriage, of a plank-like vibratory member, a plurality of spaced elongated vibratory bars mounted on said vibratory member to project downwardly therefrom, means for mounting the vibratory member on the carriage so that the angle at which the vibratory bars are presented to the work is varied with the raising and lowering of the vibratory member, said means including a first support vertically adjustable on said carriage, a second support on which said vibratory member is mounted and means for pivotally connecting said second support to said first support for swinging movement of said second support and vibratory member relative to said first support, and means for vibrating said vibratory member at high frequency supported thereby.

10. The combination with a carriage of a supporting beam member disposed transversely the path of travel of the carriage, means for adjustably supporting said beam on said carriage, an elongated crosshead member disposed adjacent and parallel to said beam member, means mounted on said crosshead member to vibrate the same at a high frequency, means mounted on said crosshead member to vibrate therewith in engagement with a concrete mass beneath the crosshead member, means for supporting the crosshead member on the beam member, said last named means including crosshead member supporting brackets disposed transversely of said beam member and mounted in longitudinal spaced relation on said beam member, flexible straps, strap attaching members on said brackets spaced in a direction transversely of said beam for attaching said straps to said brackets, said crosshead member being supported by said straps intermediate said spaced attaching members, and means including said attaching members for adjusting the tension of said straps.

CORWILL JACKSON.

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