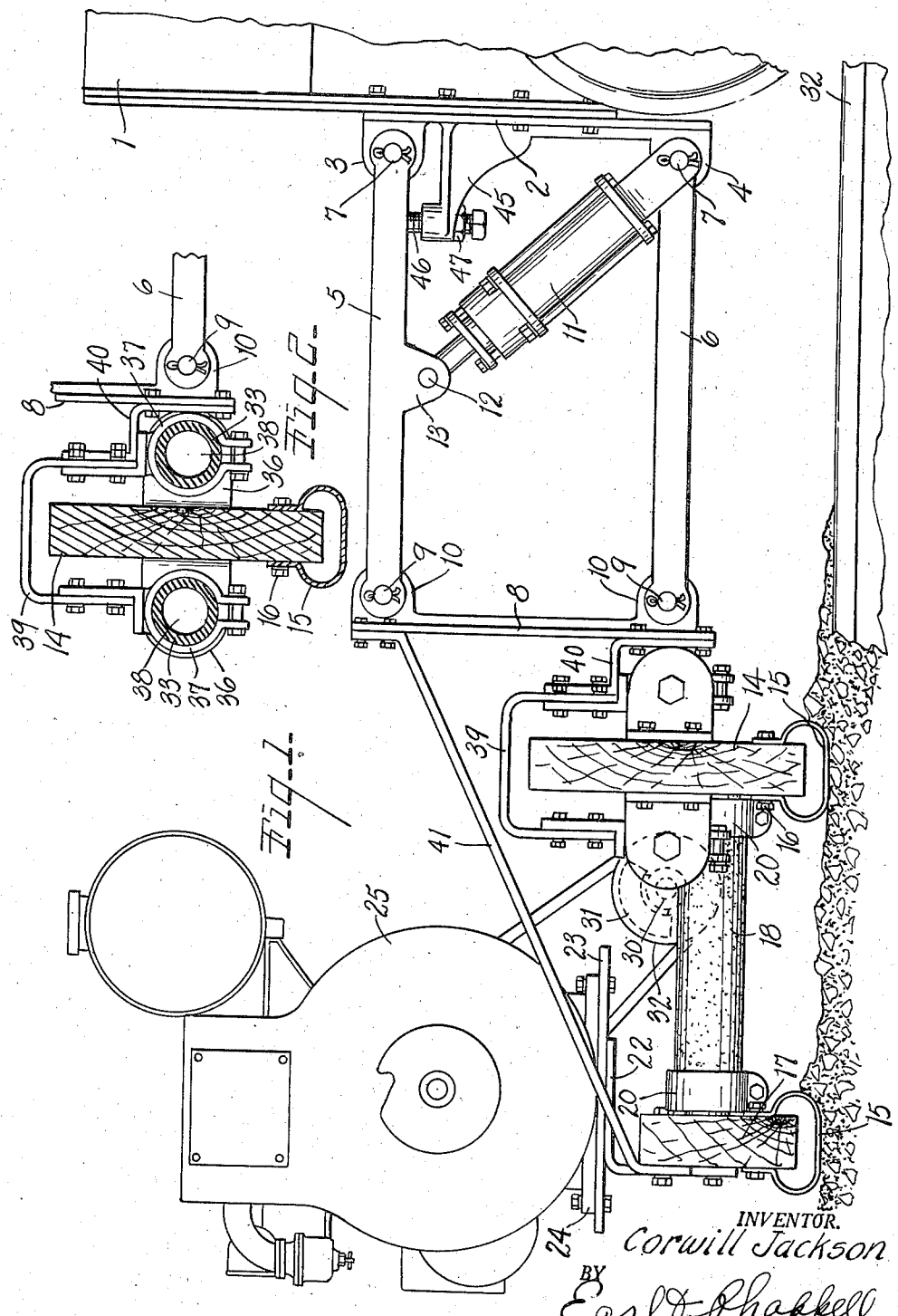
Nov. 9, 1948. C. JACKSON 2,453,510

SCREEDING AND COMPACTING MACHINE FOR CONCRETE SLABS AND THE LIKE

Filed Sept. 17, 1945

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

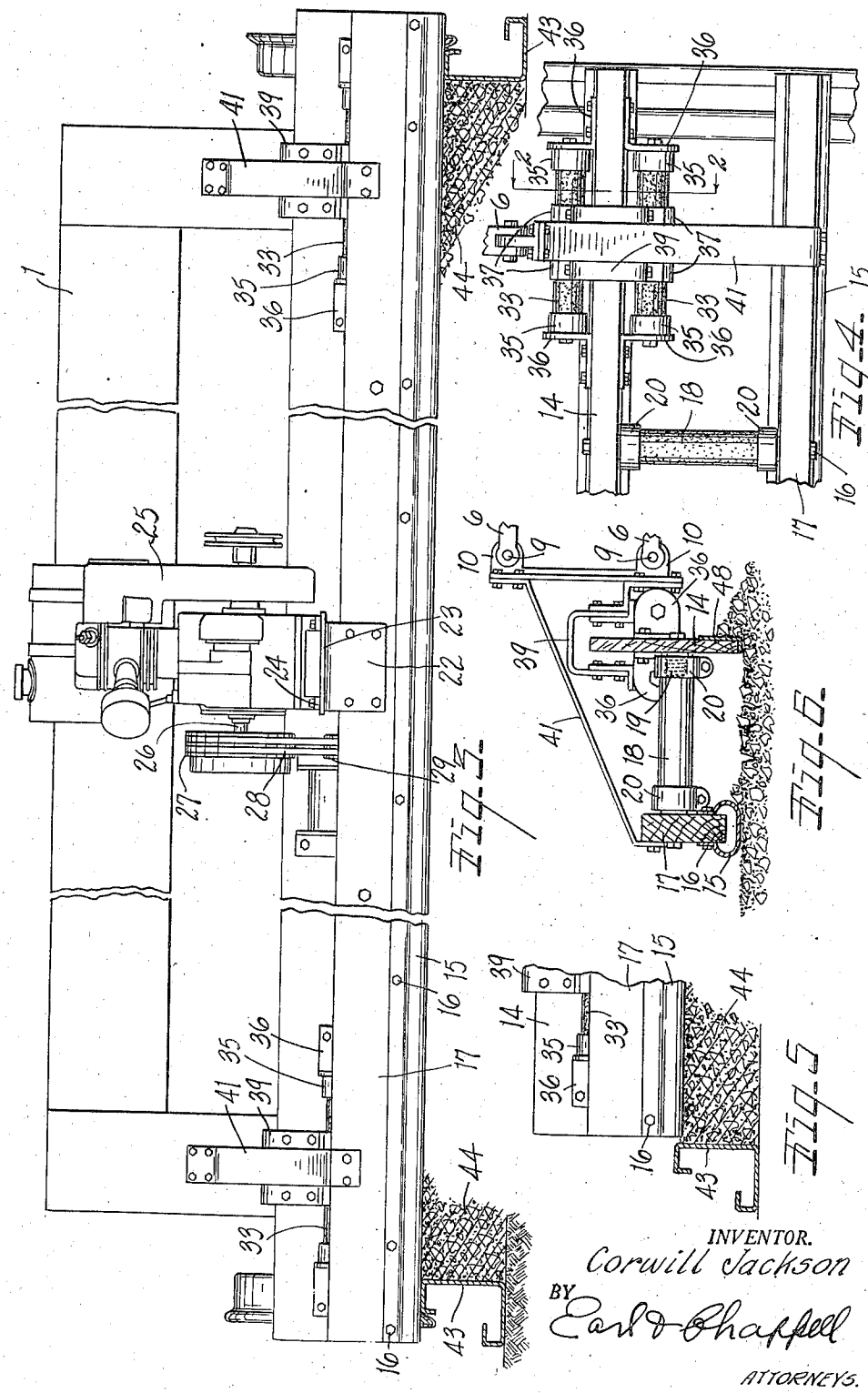

FIG. 1.

FIG. 4.

FIG. 6.

FIG. 5

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4 Sheets-Sheet 3

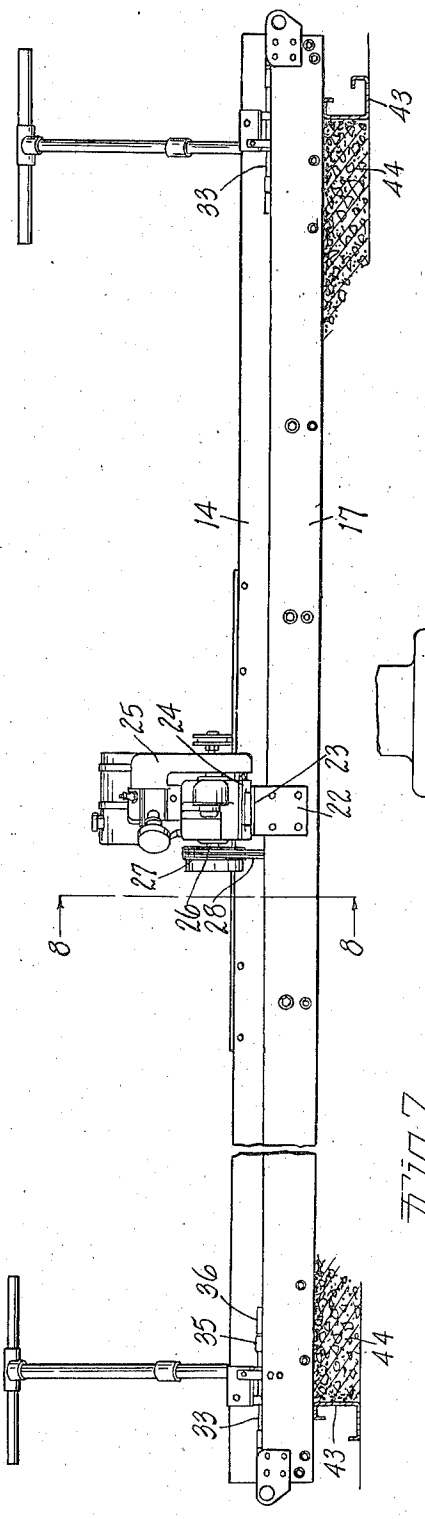

FIG. 7.

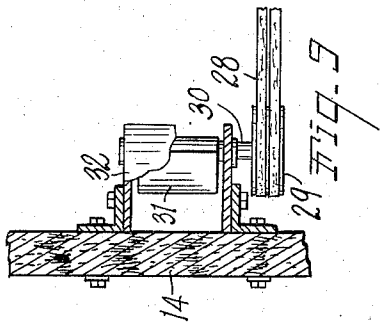

FIG. 9.

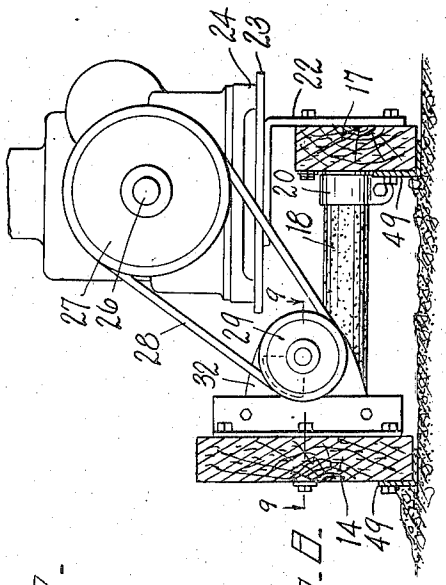

FIG. 8.

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4 Sheets-Sheet 4

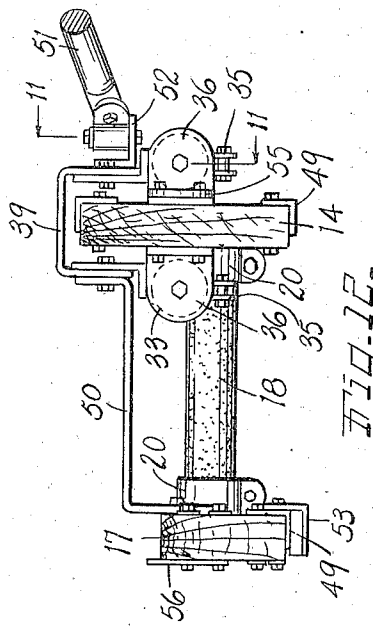

FIG. 12.

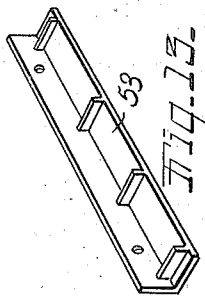

FIG. 13.

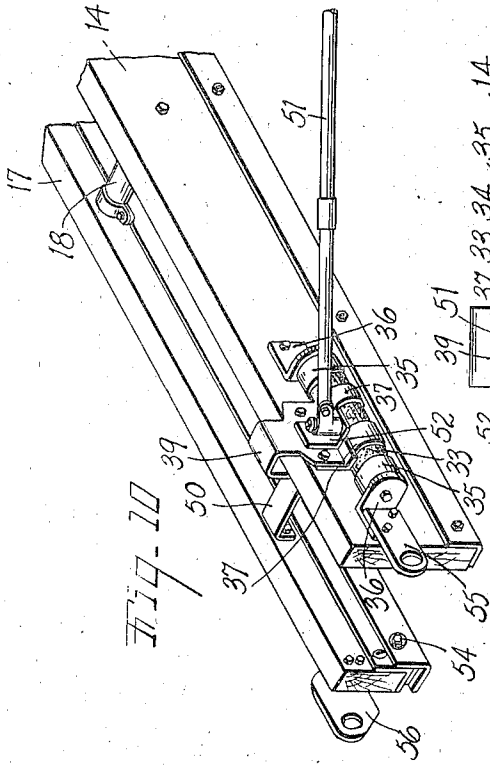

FIG. 10

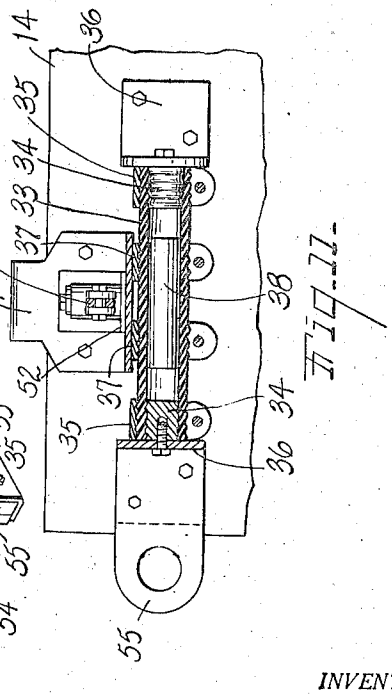

FIG. 11.

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2,453,510

SCREEDING AND COMPACTING MACHINE FOR CONCRETE SLABS AND THE LIKE

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Application September 17, 1945, Serial No. 616,837

15 Claims. (Cl. 94—48)

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This invention relates to improvements in screeding and compacting machine for concrete slabs and the like.

The main objects of this invention are:

First, to provide a machine or apparatus for the screeding and compacting of concrete in pavements or the like which is comparatively economical in structure, may be embodied as an attachment for a concrete distributing machine, and one which is practical to manipulate by hand.

Second, to provide a vibrated screeding and compacting machine which though simple and economical in structure is highly efficient both in screeding and in compacting of the concrete.

Third, to provide a machine or device of this character which may be effectively used in the placing of concrete mixtures of low water content.

Fourth, to provide a machine of this character in which an internal combustion engine may be employed as a source of power for the vibrated elements, the engine being supported so that it is not subject to objectionable vibrations.

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.

Preferred embodiments of the invention are illustrated in the accompanying drawings, in which:

Fig. 1 is a fragmentary side elevation of a structure embodying my invention shown in operative relation to a concrete distributing machine, only a fragment of which is illustrated.

Fig. 2 is an enlarged fragmentary view in section on line 2—2 of Fig. 4.

Fig. 3 is a fragmentary rear elevational view of the embodiment of my invention shown in Figs. 1 and 2.

Fig. 4 is a fragmentary plan view illustrating the relation of the front and rear screeding and vibrating members showing the relation thereof to concrete to be treated.

Fig. 5 is a fragmentary view in vertical transverse section through the bed of concrete and one of the forms, showing a modified relationship of the parts with respect to the forms, the view being similar to the left side of Fig. 3.

Fig. 6 is a fragmentary end elevation of a modified form of structure showing the relationship of the screeding and vibratory members to the bed of concrete.

Fig. 7 is a rear elevation of a modified form or embodiment of the invention as embodied in a structure designed to be manipulated by hand or as a hand screeding machine.

Fig. 8 is an enlarged sectional view on line 8—8 of Fig. 7.

Fig. 9 is a fragmentary view partially in horizontal section on line 9—9 of Fig. 8.

Fig. 10 is a fragmentary perspective view illustrating further details and adaptations of my invention in which the rear vibratory member is provided with shoes for supporting it in elevated position relative to the concrete to be treated in which position it merely serves as a supporting bridge-like supporting member for the internal combustion motor or engine.

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Fig. 11 is an enlarged fragmentary view partially in section on the broken line 11—11 of Fig. 12.

Fig. 12 is a fragmentary end view of the embodiment shown in Fig. 10.

Fig. 13 is a perspective view of an elevating shoe for the rear vibratory member adapted to convert the member to a bridging support member.

In the embodiment of my invention illustrated in Figs. 1 to 5 inclusive of the accompanying drawings, 1 represents a concrete spreading machine or other suitable tractor means provided with a draw head 2 having pairs of rearwardly projecting ears 3 and 4 to which the combined draft and supporting bars 5 and 6 are connected by means of pivot bolts 7. The rear ends of these bars 5 and 6 are connected to the crosshead 8 by means of the bolts 9, the crosshead having forwardly projecting ears 10. The draw bars in this arrangement have a parallel movement. A hydraulic lift 11 is provided, one member of this being connected to the lower draw bolt 7 while the other member is connected at 12 to a central ear 13 on the upper draw bar.

In the embodiment illustrated in these Figs. 1 to 5, the front or main vibratory strike-off 14 is provided with a shoe 15, the vibratory member 14 being preferably in the form of a plank disposed vertically on edge, the shoe being of general U-shape and receiving the lower edge of the vibratory member and secured thereto by the bolts 16.

The rear combined vibratory member and bridging member 17 is spaced rearwardly of the front member, at least to such an extent as to provide a stable structure—that is, one that remains in upright position. This member 17 is preferably of substantially less depth than the front member, being also formed of a plank or piece of timber arranged vertically on edge and provided with a shoe 15. The front and rear edges of the shoe 15 are shown as rounded.

The front and rear members are connected by sections of reinforced tubing 18, the ends of this tubing being secured to the adjacent sides of the front and rear members which have studs 19 projecting therefrom to receive the ends of these members 18, the ends being clamped upon the studs by means of clamps 20.

The rear member 17 is provided with a bracket 22 provided with a platform 23 to which the base 24 of the internal combustion engine 25 is secured. The shaft 26 of the engine 25 is provided

with a pulley 27 connected by the belts 28 to the pulley 29 on the shaft 30 (see Fig. 9), this shaft being provided with an unbalancing weight 31 arranged in a suitable housing 32 rigidly bolted to the rear side of the front vibrating and screeding member 14. With this arrangement the main force of the vibrations are imparted to the front member 14, the only vibrations imparted to the rear member 17 being such as are transmitted through the yieldable connections 18, and in the commercial embodiment about 90% of the vibrations are imparted to the front member as compared to 10% to the rear member. This amount of vibration in the rear member is not objectionable so far as vibrating the engine is concerned.

This assembly is connected to the draw bar crosshead 8 through vibration absorbing means—that illustrated comprising pairs of resilient tubular members 33, see Figs. 2, 4, and 11, arranged on opposite sides of the member 14 and secured at their ends thereto by means of studs 34 and clamps 35, the studs being carried by brackets 36 bolted to the sides of the member 14, see Fig. 11, which shows part of the connection in detail.

Couplings 37 are clamped to the members 33 intermediate the ends thereof, reinforcing inserts 38 being provided within the tubes to prevent the collapsing thereof. These couplings are connected by a yoke-shaped bridging member 39 extending over the member 14, these members being connected by the brackets 40 to the draw bar crossheads.

Bracing bars 41 extend from the upper ends of the draw bar crosshead to the member 17 but these are of steel of such flexibility as to permit such vibrations of the rear member 17 as is desired. This connection to the draw bar crosshead permits the raising and lowering of the unit to the desired position and the supporting of it in elevated position through the hydraulic lift means 11.

It is sometimes desired to support the unit to ride upon the side or form rails 43, as is shown in Fig. 3, and it is sometimes desired to support it between these rails or form members as is shown in Fig. 5, the mass of concrete being indicated at 44. To support it in a predetermined position relative to the material to be treated, I provide supporting brackets 45 having adjustable rests 46 for the upper draw bars 5, these rests having threaded engagement with the brackets 45 and being secured in their adjusted position by the lock nuts 47.

This embodiment illustrated is, as stated, designed as an attachment to a suitable tractor means desirably a concrete distributor. The front member 14 acts as a strike-off and compacting member and transmits the mainpart or volume of the vibrations to the material treated. The trailing member 17 serves as a finishing screed. As stated, it is subjected to relatively light vibrations, a part of its main function being to provide stability to the structure—that is, to keep it upright and to provide a bridging support for the engine. While the structure is quite economical to produce it is highly efficient and enables the use of an internal combustion engine as a source of power for the vibrating means.

In the embodiment shown in Fig. 6, the front member 14 is provided with an angled wear plate 48 in lieu of the shoe 15 shown in the embodiments of Figs. 1 to 5 inclusive. This presents a relatively narrow edge to the concrete surface which is effective as a strike-off and has some advantages as a strike-off.

In the embodiment shown in Figs. 7 to 13 inclusive, wear plates 49 similar to the wear plate 48 are substituted for the shoes 15. In these embodiments the front and rear members are resiliently connected in the manner described, the tie bars 50 being connected at its front end to the yokes 39, otherwise the connections for the parts are substantially as described. Instead of connecting the unit to the crosshead 8 of the draw bars I provide handles 51 which are pivotally connected to the brackets 52 projecting forwardly from the yoke 39. This enables the swinging of the handles to the position shown in Fig. 7 as draft members or they may be swung in a lateral direction to facilitate the reciprocation of the screed unit back and forth with both members supported by the forms 43.

Sometimes it is desired to elevate the rear member 17 above the concrete mass and to accomplish that I provide the shoes 53 which are of substantial length so that the structure may be reciprocated back and forth on the supporting rails. These shoes are detachably secured to the rear member by means of the bolts 54, see Figs. 10 and 12. In this embodiment, the rear or trailing member serves as a support for the engine, the support bridging across from one form to the other and keeping the structure in upright position as it is manipulated by the handles.

To facilitate the handling of the unit, I provide the members 14 and 17 with brackets 55 and 56 respectively projecting from the ends thereof and having holes therein adapted to receive bars or rods which constitute handles for transporting or carrying the unit or positioning it on the form members.

I have illustrated and described my invention in practical commercial embodiments as a power operated unit and also as a hand operated unit. I have not attempted to illustrate or describe other embodiments or adaptations which I contemplate 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 for screeding and compacting concrete, the combination of a plank-shaped front vibratory screed member disposed vertically edgewise, a plank-like rear motor support and vibratory member disposed vertically edgewise in substantially rearwardly spaced relation to said front member, resilient non-extensible connections between said front and rear members whereby they coact to mutually support each other in upright position, an unbalanced rotor mounted on said front member, a motor mounted on the rear member and having a flexible driving connection to said rotor, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear member are relatively slight as compared to the vibrations of the front member, a draw head, pairs of draft bars pivotally connected to said draw head for vertical swinging movement, crossheads for the rear ends of said pairs of draw bars, vibration absorbing means supportingly connecting said front vibratory screed member to said crossheads for raising and lowering said front vibratory member with said crossheads, a resilient brace connecting the upper ends of said crossheads to the rear member, means for raising and lowering the swinging ends of said draw bars, and adjustable stop means on said

draw head for limiting the downward movement of said draft bars.

2. In a machine for screeding and compacting concrete, the combination of a plank-shaped front vibratory screed member disposed vertically edgewise, a plank-like rear motor support and vibratory member disposed vertically edgewise in substantially rearwardly spaced relation to said front member, resilient non-extensible connections between said front and rear members whereby they coact to mutually support each other in upright position, an unbalanced rotor mounted on said front member, a motor mounted on the rear member and having a flexible driving connection to said rotor, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear member are relatively slight as compared to the vibrations of the front member, a draw head, pairs of draft bars pivotally connected to said draw head for vertical swinging movement, crossheads for the rear ends of said pairs of draw bars, vibration absorbing means supportingly connecting said front vibratory screed member to said crossheads for raising and lowering said front vibratory member with said crossheads, means for raising and lowering the swinging ends of said draw bars, and adjustable stop means on said draw head for limiting the downward movement of said draft bars.

3. In a machine for screeding and compacting concrete, the combination of a solid plank-shaped front vibratory screed member of substantially greater depth than the thickness disposed vertically edgewise, a solid plank-like rear motor support and vibratory member of substantially greater depth than thickness disposed vertically edgewise in substantially rearwardly spaced relation to said front member, said front and rear members being provided with shoes of a width substantially exceeding the thickness of said members and having curved edges, resilient non-extensible connections between said front and rear members whereby they coact to mutually support each other in upright position, an unbalanced rotor mounted on said front member, a motor mounted on the rear member and having a flexible driving connection to said rotor, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear members are relatively slight as compared to the vibrations of the front member.

4. In a machine for screeeding and compacting concrete, the combination of a plank-shaped front vibratory screed member of substantially greater depth than thickness disposed vertically edgewise, a plank-like rear motor support and vibratory member of substantially greater depth than thickness disposed vertically edgewise in substantially rearwardly spaced relation to said front member, resilient non-extensible connections between said front and rear members whereby they coact to mutually support each other in upright position, an unbalanced rotor mounted on said front member, and a motor mounted on the rear member and having a flexible driving connection to said rotor, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear member are relatively slight as compared to the vibrations of the front member.

5. In a machine for screeding and compacting concrete, the combination of a front vibratory screed member of substantially greater depth than thickness, a rear vibratory member disposed in rearwardly spaced relation to said front member, vibration absorbing connections between said front and rear members, means for vibrating said front member at high frequency, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear member are substantially less than the vibrations of the front member, a draw head, pairs of draft bars pivotally connected to said draw head for vertical swinging movement, crossheads for the rear ends of said pairs of draw bars for raising and lowering said front vibratory member with said crossheads, vibration absorbing means supportingly connecting said front vibratory screed member to said crossheads, a resilient brace connecting the upper ends of said crossheads to the rear member, means for raising and lowering the swinging ends of said draw bars, and adjustable stop means on said draw head for limiting the downward movement of said draft bars.

6. In a machine for screeding and compacting concrete, the combination of a front vibratory screed member of substantially greater depth than thickness, a rear vibratory member of substantially greater depth than thickness disposed in rearwardly spaced relation to said front member, vibration absorbing connections between said front and rear members, means for vibrating said front member at high frequency, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear member are substantially less than the vibrations of the front member, a draw head, pairs of draft bars pivotally connected to said draw head for vertical swinging movement, crossheads for the rear ends of said pairs of draw bars, vibration absorbing means supportingly connecting said front vibratory screed member to said crossheads for raising and lowering said front vibratory member with said crossheads, means for raising and lowering the swinging ends of said draw bars, and adjustable stop means on said draw head for limiting the downward movement of said draft bars.

7. In a machine for screeding and compacting concrete, the combination of a relatively thin front vibratory screed member, a relatively thin rear vibratory member disposed in rearwardly spaced relation to said front member, vibration absorbing connections between said front and rear members, and means for vibrating said front member at high frequency, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear member are substantially less than the vibrations of the front member, an unbalanced rotor mounted on the front vibratory member, a motor mounted on the rear vibratory member, and a flexible driving connection from said motor to said rotor, said unbalanced rotor being disposed at the rear of the front vibratory member to facilitate said flexible driving connection being connected directly thereto.

8. In a machine for screeding and compacting concrete, the combination of a plank-shaped front vibratory screed member of substantially greater depth than thickness disposed vertically edgewise, a plank-like rear motor support and vibratory member of substantially greater depth than thickness disposed vertically edgewise in

substantially rearwardly spaced relation to said front member, resilient non-extensible connections between said front and rear members whereby they coact to mutually support each other in upright position, an unbalanced rotor mounted on said front member, and a motor mounted on the rear member and having a flexible driving connection to said rotor, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear member are relatively light as compared to the vibrations of the front member.

9. In a machine for screeding and compacting concrete, the combination of a front vibratory screed member of substantially greater depth than thickness, a rear motor support member of substantially greater depth than thickness adapted to be slidably supported by the forms and disposed in rearwardly spaced relation to said front member, vibration absorbing connections between said front and rear members whereby they coact to mutually support each other in upright position, detachable shoes for said rear member whereby it may be supported in elevated position above the surface of the material at the rear of said front member or by detaching said shoes adjusted to act on the material that has been acted upon by the front member, an unbalanced rotor mounted on said front member, and a motor mounted on the rear member and having a flexible driving connection to said rotor, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear member are relatively light as compared to the vibrations of the front member.

10. In a machine for screeding and compacting concrete, the combination of a front vibratory screed member of substantially greater depth than thickness, a rear motor support member of substantially greater depth than thickness adapted to be slidably supported by the forms and disposed in rearwardly spaced relation to said front member, vibration absorbing connections between said front and rear members whereby they coact to mutually support each other in upright position, an unbalanced rotor mounted on said front member, a motor mounted on the rear member and having a flexible driving connection to said rotor, said connections between said front and rear members constituting a vibration dampening means whereby the vibrations of the rear member are relatively light as compared to the vibrations of the front member, and handles mounted on vertical pivots having vibration absorbing connections to said front member.

11. In a machine for screeding and compacting concrete, the combination of a front vibratory screed member of substantially greater depth than thickness, a rear member of substantially greater depth than thickness adapted as a vibratory member and as a motor supporting member, vibration absorbing connections between said front and rear members, an unbalanced rotor mounted on said front member, a motor mounted on said rear member and having driving connection with said rotor, and handles having vibration absorbing connections to said front member, said handles being swingable to different positions relative to said front member.

12. In a machine for screeding and compacting concrete, the combination of a plank-shaped front vibratory screed member of substantially

greater depth than thickness disposed vertically edgewise, a plank-like combined rear motor support and vibratory member of substantially greater depth than thickness disposed vertically edgewise in spaced relation to said front member, resilient non-extensible vibration absorbing connections between said front and rear members, and means for vibrating the front member at high frequency, an unbalanced rotor mounted on the front vibratory member, a motor mounted on the rear vibratory member, and a flexible driving connection from said motor to said rotor, said unbalanced rotor being disposed at the rear of the front vibratory member to facilitate said flexible driving connection being connected directly thereto.

13. In a machine for screeding and compacting concrete, the combination of a front vibratory screed member of substantially greater depth than thickness, a combined rear motor support and vibratory member of substantially greater depth than thickness in spaced relation to said front member, vibration absorbing connections between said front and rear members, means for vibrating the front member at high frequency, and handles mounted on vertical pivots having vibration absorbing connections to said front member.

14. In a machine for screeding and compacting concrete, the combination of a front vibratory screed member of substantially greater depth than thickness, a rear screed member of substantially greater depth than thickness adapted to be supported by the side forms of the material treated, vibration absorbing connections between said front and rear members, an unbalanced rotor mounted on said front vibratory screed member, and a motor mounted on said rear vibratory screed member and having a driving connection with said rotor.

15. In a machine for screeding and compacting concrete, the combination with a front vibratory screed member of substantially greater depth than thickness, a rear screed member of substantially greater depth than thickness disposed in rearwardly spaced relation to said front member, vibration absorbing connections between said front and rear member, a motor mounted on said rear vibratory screed member, a vibrating unit on said front vibratory screed member, flexible belt driving connection between said motor to said vibratory unit on said front member, and propelling means having vibration absorbing connection to said front member.

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