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2,584,459

MACHINE FOR PLACING CONCRETE AND THE LIKE

Filed Jan. 6, 1947

2 SHEETS—SHEET 1

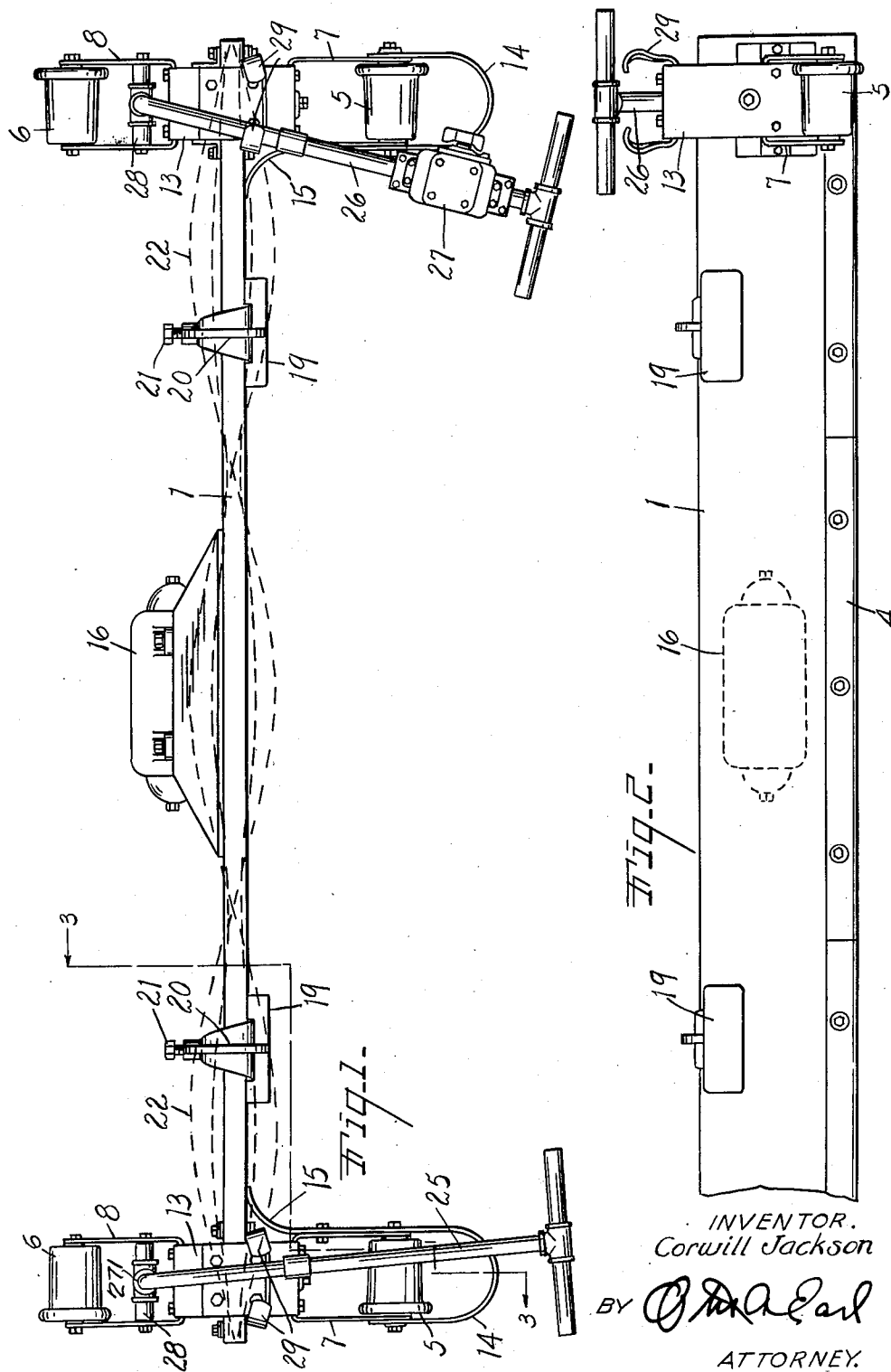


Fig. 1.

Fig. 2.

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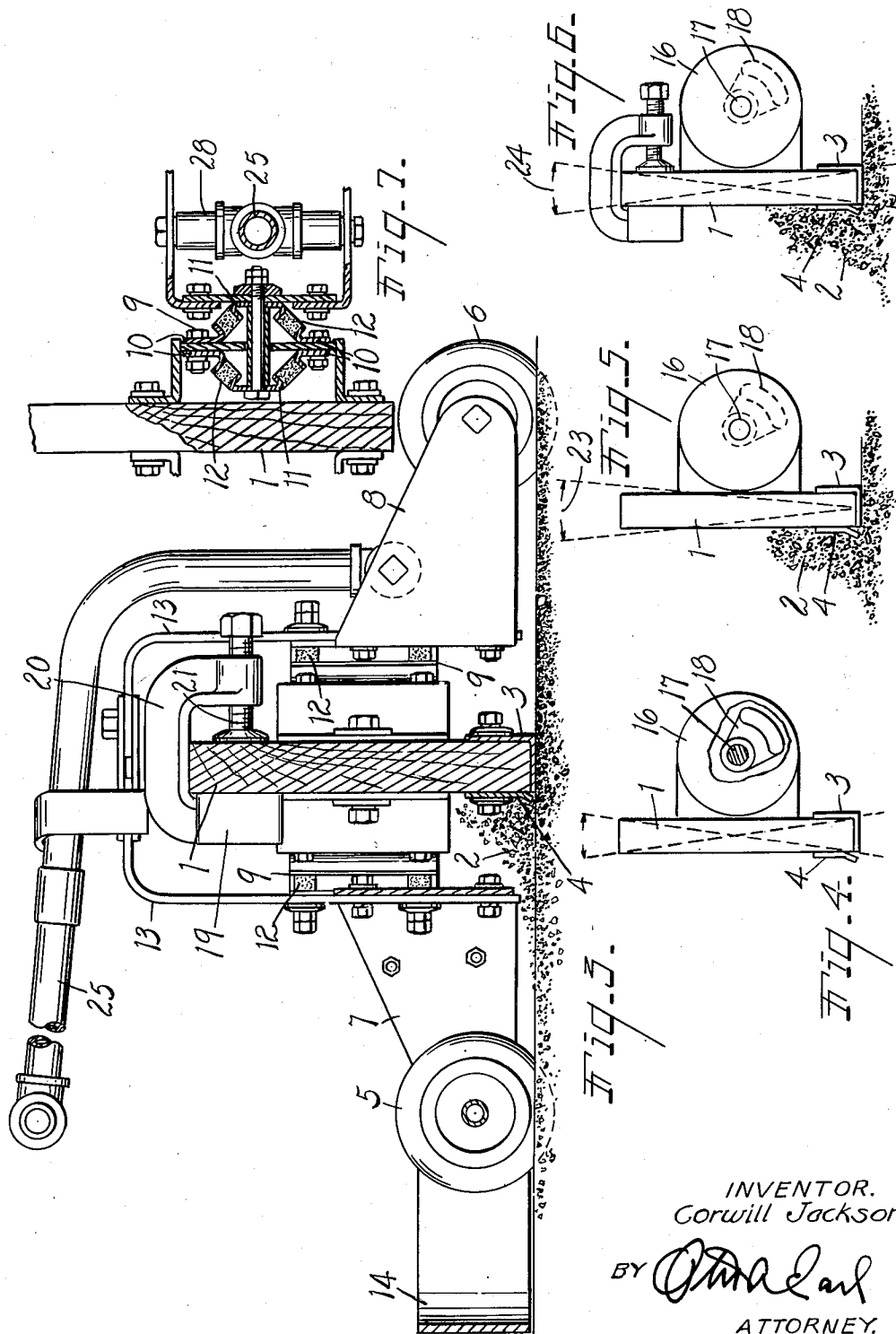
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MACHINE FOR PLACING CONCRETE AND THE LIKE

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2 SHEETS—SHEET 2



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MACHINE FOR PLACING CONCRETE
AND THE LIKECorwill Jackson, Ludington, Mich., assignor to
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corporation of Michigan

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13 Claims. (Cl. 94—48)

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This invention relates to machines for placing concrete and the like.

The main objects of this invention are:

First, to provide a machine for placing concrete and other materials by vibration and for screeding the same which is highly efficient and at the same time adapted for manual manipulation with a minimum of effort on the part of the operator.

Second, to provide a machine having these advantages in which the vibratory screed member is vibrated with substantially uniform amplitude throughout the length thereof.

Third, to provide a placement machine adapted for the subjection of concrete at high frequency vibration and the effective screeding thereof.

Fourth, to provide a machine having these advantages in which the vibratory member is adapted to rearwardly support a substantial mass of concrete as it is advanced against the same and one in which the vibrations act to automatically advance the machine.

Fifth, to provide a machine of the class described employing a relatively long thin vibratory member, such for example as a wood plank in which the vibrations are of substantially uniform amplitude throughout the vibratory member.

Sixth, to provide a simple and effective means for harmonizing the vibrations throughout the length of the vibratory member and counteracting the damping effect which tends to reduce the vibrations in the lower portion of the vibratory member as it is advanced against the material treated.

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 plan view of a machine embodying the invention, the tendency for portions thereof to vibrate at different amplitudes as compared to other portions being indicated by dotted lines.

Fig. 2 is an enlarged fragmentary front elevation.

Fig. 3 is an enlarged fragmentary view partially in section on the broken line 3—3 of Fig. 1.

Fig. 4 is a fragmentary end elevation of the vibratory member and the vibration producing motor with a portion of the motor broken away and sectioned to show the unbalanced rotor, the desirable uniformity of vibrations at the top and bottom being indicated by the dotted crossed lines.

Fig. 5 is a view corresponding to that of Fig. 4, the dotted lines indicating the tendency of the top portion of the vibratory member to vibrate with excessive amplitude while the vibra-

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tions in the lower portion thereof are dampened or the amplitude reduced very materially by the load of the material treated as the vibratory member is advanced against the same.

Fig. 6 is a view corresponding to that of Fig. 5 with the counterweight or synchronizing weight applied to the vibratory member to counteract the tendency of the upper part of the vibratory member to vibrate with undesired amplitude or while the lower portion has insufficient amplitude of vibration.

Fig. 7 is a fragmentary plan view illustrating details of the mounting of the wheel supports or wheel carrying brackets on the vibratory member.

It is frequently desirable to provide vibratory screeds of the type illustrated of considerable length, running up to twenty feet or more. It involves quite an expense to crate a machine having a screed of this length or even of substantially less length for shipment. Wood planks may be used and these are usually available where the machine is to be used. However, these planks differ not only in dimensions but in quality and it is found that there is a substantial variation in the amplitude of the vibrations between the vibration producing means of the screed and also that when the vibratory screed is advanced against a mass of concrete, for example, the mass deadens or dampens the vibrations at the bottom of the screed where it is required for efficient operation, the top of the screed in effect pivotally vibrating around the lower portion thereof.

One of the main objects of this invention is to provide a structure of this character in which the amplitude of vibrations is substantially uniform throughout the length of the screed and also from top to bottom thereof resulting in vibration of the bottom portion of the screed with sufficient amplitude to effectively vibrate the material that is being placed. As shown in Fig. 1 in which the vibration indicating lines are greatly exaggerated it will be seen that there are relatively dead zones between the vibrating means and the zones of greater vibration and in Fig. 5 I have illustrated by dotted lines the dampening effect on the vibrations at the bottom of the screed when it is advanced against the mass treated.

Another advantage of the structure is that the machine is automatically advanced—that is, the vibrations of the screed propel the machine forwardly. There is some tendency for that to occur even where the vibrations are not equalized but the forward traveling of the machine is greatly enhanced by the structure which results in producing vibrations of uniform amplitude throughout the vibratory member.

The embodiment of the invention illustrated in the accompanying drawings comprises the vi-

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bratory member 1 which is formed of a wood plank disposed edgewise vertically and which is of substantial width so that it is adapted to support a substantial mass of material treated, indicated at 2, as it is advanced against the same. The screed member is preferably provided with a shoe 3 of angle section disposed with its vertical leg on the rear side of the screed member and bolted thereto. The nose piece 4 has its lower edge forwardly directed and it is secured on the front side of the vibratory member. The forwardly directed edge of the nose piece tends somewhat to shear off the concrete or other material placed and minimizes the tendency to lift the vibratory screed.

The vibratory screed is supported in an upright position by means of the pairs of front and rear roller-like wheels 5 and 6 which are adapted to travel on forms, not illustrated. The front wheels are carried by the wheel supporting brackets 7. The rear wheels are carried by the wheel supporting brackets 8. These brackets are resiliently connected to the vibratory member by shock absorbing or vibration absorbing connections designated generally by the numeral 9 which consist of the pairs of lugs 10 and 11 having resilient blocks 12 secured thereto, the purpose being to provide effective supporting means for the wheel supporting brackets while minimizing the vibrations transferred thereto from the vibratory member.

To relieve these vibration absorbing connections of a considerable portion of torsional stress, the front and rear wheel supporting brackets are connected by the arms 13, the arms of which are secured to the wheel supporting brackets, the yokes extending above the vibratory member. The details of bolting the several parts together are not described as it is believed that it will be clear from the drawings.

The front wheels are provided with a U-shaped guard 14 of substantial rigidity, the arms of the guard being secured to the front wheel brackets 7 with the bight substantially spaced in advance of the front wheel 5, the inner arm 15 of the guard being extended rearwardly to lap upon the front side of the vibratory member, see Fig. 1.

In the embodiment illustrated, the motor 16 is mounted on the rear side of the vibratory member and is provided with a rotor 17 having an unbalancing weight 18, the axis of the rotor being disposed longitudinally of the vibratory member. This motor 16 is disposed centrally relative to the length of the vibratory member and also centrally relative to its vertical dimensions.

It will be understood that I do not in Fig. 1 make any attempt to show the parts in their relative dimensions or proportions and, as a matter of fact, the vibratory member would be much longer in proportion to the other parts than is illustrated. The electrical connections for the motor are not illustrated.

As stated, the vibratory member may be formed of a wood plank and if it is of sufficient and uniform width and thickness and of moderate length the vibrations from end to end are of substantially uniform amplitude. However, as stated, it is frequently desirable to provide vibratory members of considerable length, eighteen to twenty feet or more, for example, and the most satisfactory material is not usually available. The result is that in use the vibratory member does not vibrate with uniform amplitude from end to end and there are usually what might be called dead zones between the vibrating means

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and the ends of the screeds, other zones perhaps having an excessive amplitude of vibration. I have attempted to illustrate that by dotted lines in Fig. 1. Further than that, the load of the material treated bearing on the lower portion of the vibratory screed dampens the amplitude of vibration of the lower part thereof so that the upper part vibrates with excessive amplitude, as illustrated in Fig. 5.

To counteract this advance in amplitude of vibration from both causes and to synchronize or equalize the vibrations throughout the vibratory member, I provide two or more counterbalancing weights 19 which are securely clamped upon the vibratory member adjacent the top thereof by means of the clamps 20 which are in the form of angled arms extending from the weights and carrying the clamping screws 21 which are adjusted to clamp the vibratory member opposite the weights, as shown in Fig. 3. These weights are desirably mounted in longitudinally spaced relation relative to the vibrating motor and desirably somewhat short of the point of greatest amplitude of vibration in the zones indicated by the dotted lines 22 in Fig. 1, these being mounted at the top of the vibratory member throughout the tendency for excessive amplitude vibration indicated by the dotted lines 23 in Fig. 5 which, as stated, results from the dampening of the vibrations in the lower part of the screed member by the material treated so that the vibrations become substantially of uniform amplitude from top to bottom as is indicated by the dotted lines 24 in Fig. 6. This results in a highly satisfactory vibratory member even when formed of relatively light stock and as the vibration counterbalancing weights are adjustable they may be located in the position to get the most effective results and in position required by the particular vibratory member, considering its length and inherent qualities.

The vibratory member is held in its upright position by the wheels and is free to travel along the forms under its own impetus. However, it is desirable to control the same and move it back and forth or to control its speed of advancement and perhaps add manual power to its advancement under certain conditions. To accomplish this, I provide the handles 25 and 26 which are the same except that the handle 26 has a control switch 27 mounted thereon. The connections from the control switch to the motor are not illustrated.

The handles 25 and 26 are swivelly mounted at 271 on the supports 28 which are in turn rotatably mounted on the rear wheel brackets or supports 8. This permits the positioning of the handles as may be desired for convenient manipulation.

Sometimes it is desired to tilt the machine on the rear wheels 6 and to accomplish this I provide pairs of facing hooks 29 with which the handle may be selectively engaged to permit the lifting of the machine or tilting of the machine on the rear wheels and the manipulation of the machine while so tilted. The hooks are fixedly secured to the arms 13 extending upwardly from the wheel supporting brackets 7 and 8 as shown in Figs. 1, 2 and 3.

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

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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 of an elongated plank-shaped vibratory member of wood disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, a motor provided with an unbalanced rotor mounted on the rear side and centrally of the vibratory member with its axis disposed longitudinally thereof, front and rear wheel supporting brackets resiliently mounted on the front and rear sides of said vibratory member adjacent the ends thereof, wheels carried by said brackets and acting to support said vibratory member in upright position, and weights disposed adjacent the upper edge of the vibratory member provided with clamps for adjustably securing them adjacent the upper edge of the vibratory member, the weights being supportingly carried by said vibratory member between the rotor and the opposite ends of the vibratory member and in substantially spaced relation from said rotor and opposite ends to counteract the tendency of portions of the vibratory member to vibrate with greater amplitude than other portions thereof and to counteract the vibration dampening effect of the material treated as the vibratory member is advanced against the same.

2. In a machine of the class described, the combination of an elongated plank-shaped vibratory member of wood disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, a motor provided with an unbalanced rotor mounted on the rear side and centrally of the vibratory member with its axis disposed longitudinally thereof, front and rear wheel supporting brackets resiliently mounted on the front and rear sides of said vibratory member adjacent the ends thereof, wheels carried by said brackets and acting to support said vibratory member in upright position, handles, means swingably connecting said handles to the rear brackets for vertical and horizontal swinging adjustment of said handles, and pairs of oppositely facing upwardly projecting hooks beneath which said handles may be selectively engaged for tilting the assembly rearwardly on the rear wheels, said hooks being supportingly carried by said wheel supporting brackets.

3. In a machine of the class described, the combination of an elongated plank-shaped vibratory member of wood disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, said vibratory member being provided with a shoe of angle section secured to the lower edge thereof with the vertical arm of the shoe on the rear side of the vibratory member, said vibratory member also having a metal nose piece separate from said shoe secured to the front side of the vibratory member adjacent its lower edge, the lower portion of the nose piece extending downwardly and forwardly, the lower edge of the nose piece being disposed forwardly of the forward edge of the horizontal arm of the shoe to provide a shearing edge, a motor provided with an un-

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balanced rotor mounted on the rear side and centrally of the vibratory member with its axis disposed longitudinally thereof, front and rear wheel supporting brackets resiliently mounted on the front and rear sides of said vibratory member adjacent the ends thereof, and wheels carried by said brackets and acting to support said vibratory member in upright position.

4. In a machine of the class described, the combination of an elongated plank-shaped vibratory member of wood disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, a motor provided with an unbalanced rotor mounted on the vibratory member with its axis disposed longitudinally thereof, front and rear wheel supporting brackets resiliently connected to said vibratory member adjacent the ends thereof, wheels carried by said brackets and acting to support said vibratory member in upright position, and weights mounted on the vibratory member adjacent the upper edge and between the rotor and the opposite ends of the vibratory member and in substantially spaced relation from said rotor and opposite ends to substantially counteract the tendency of portions of the vibratory member to vibrate with greater amplitude than other portions thereof and to counteract the vibration restraining effect of the thrust of material treated as the vibratory member is advanced against the same.

5. In a machine of the class described, the combination of an elongated wood plank-shaped vibratory member disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, a rotor provided with an unbalancing weight mounted on the rear side of said vibratory member centrally thereof and with its axis disposed longitudinally thereof, front and rear wheel supporting brackets mounted on said vibratory member adjacent the ends thereof, there being vibration absorbing means between said brackets and said vibratory member, wheels on said brackets, and handles swingably mounted on the rear wheel brackets, said vibratory member having hooks fixedly associated therewith, said handles being swingable to a position beneath said hooks for retaining engagement therewith for tilting the apparatus on the rear wheels.

6. In a machine of the class described, the combination of an elongated plank-shaped vibratory member disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, a rotor provided with an unbalancing weight mounted on said vibratory member with its axis disposed horizontally thereof, means for supporting said vibratory member in upright position whereby it tends to travel forwardly under the impulses of its vibration, said supporting means including traveling supports and means connecting said traveling supports to said vibratory member, and weights adjustably secured to the vibratory member adjacent the upper edge thereof between said rotor and the opposite ends of the vibratory member and in substantially spaced relation from said rotor and opposite ends for reducing the tendency of the upper portion of the vibratory member to vibrate with greater

amplitude than the lower portion thereof when the lower portion is subject to the thrust of the material treated.

7. In a machine of the class described, the combination of an elongated plank-shaped vibratory member disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, a rotor provided with an unbalancing weight mounted on said vibratory member with its axis disposed horizontally thereof, means for supporting said vibratory member in upright position whereby it tends to travel forwardly under the impulses of its vibration, said supporting means including traveling supports and means connecting said traveling supports to said vibratory member, and weights mounted on the vibratory member between said rotor and the opposite ends of the vibratory member and in substantially spaced relation from said rotor and opposite ends to reduce tendency of portions of the vibratory member to vibrate with greater amplitude than other portions thereof.

8. In a machine of the class described, the combination of an elongated relatively thin vibratory member disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, means for vibrating said vibratory member at high frequency, means for supporting said vibratory member in upright position whereby it tends to travel forwardly under the impulses of its vibrations, said supporting means including traveling supports and means connecting said traveling supports to said vibratory member, and a weight adjustably secured to the vibratory member and disposed adjacent the upper edge thereof for reducing the tendency of the upper portion of the vibratory member to vibrate with greater amplitude than the lower portion thereof when the lower portion is subject to the thrust of the material treated.

9. In a machine of the class described, the combination of an elongated relatively thin vibratory member disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, means for vibrating said vibratory member at high frequency, means for supporting said vibratory member in upright position whereby it tends to travel forwardly under the impulses of its vibrations, said supporting means including traveling supports and means connecting said traveling supports to said vibratory member, and weights mounted on the vibratory member between said vibrating means and the opposite ends of the vibrating member and in substantially spaced relation from said vibrating means and opposite ends to reduce tendency of portions of the vibratory member to vibrate with greater amplitude than other portions thereof.

10. In a machine of the class described, the combination of an elongated vibratory member disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, means for vibrating said vibratory member at high frequency, means for supporting said vibratory member in upright position whereby it tends to travel forwardly under the impulses of its vibrations, said supporting means including traveling

supports and means connecting said traveling supports to said vibratory member, and a weight adjustably secured to the vibratory member in spaced relation from said vibratory means and one of the opposite ends of said vibrating member at a zone thereof tending to vibrate at an amplitude substantially exceeding the amplitude of another portion, the weight serving to dampen the vibrations of excessive amplitude in the portion of the vibrating member to which the weight is secured.

11. In a machine of the class described, the combination of an elongated relatively thin vibratory member disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, an unbalanced rotor mounted on the vibratory member with its axis disposed longitudinally thereof, form engaging members connected to said vibratory member and acting to support said vibratory member in upright position, and a weight mounted on the vibratory member adjacent the upper edge to substantially counteract the tendency of the portion of the vibratory member on which the weight is mounted to vibrate with greater amplitude than the lower portion of the vibrating member beneath the portion on which the weight is mounted under restraining effect of the thrust of material treated against the lower portion of the vibratory member as it is advanced against the material.

12. In a machine of the class described, the combination of an elongated vibratory member disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, an unbalanced rotor mounted on the vibratory member with its axis disposed longitudinally thereof, and a weight mounted on the vibratory member in substantially spaced relation from said rotor and one of the opposite ends of the vibrating member to substantially counteract the tendency of the portion of the vibratory member on which the weight is mounted to vibrate with greater amplitude than adjoining portions thereof.

13. In a machine of the class described, the combination of a plank-shaped vibratory member disposed vertically edgewise, said vibratory member constituting means for supporting forwardly thereof a substantial mass of material treated as it is advanced against the same, means for vibrating said vibratory member, and means for harmonizing the vibrations of the vibratory member substantially throughout comprising weights adjustably mounted on the vibratory member between said vibrating means and the opposite ends of the vibratory member and in substantially spaced relation from said vibrating means and in zones thereof tending to vibrate with greater amplitude than other zones.

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