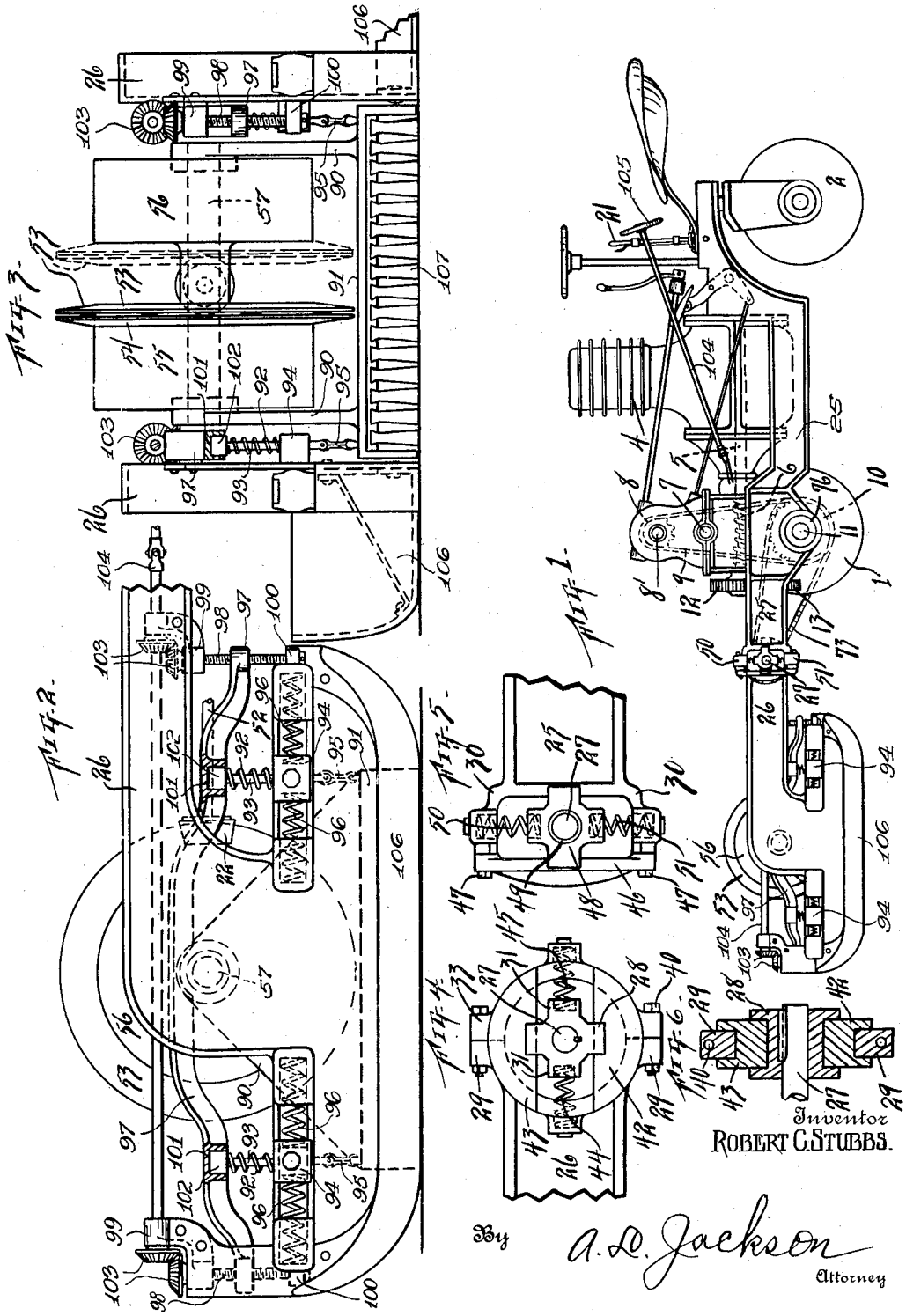
May 7, 1929. R. C. STUBBS 1,711,758

PLASTIC COMPACTOR

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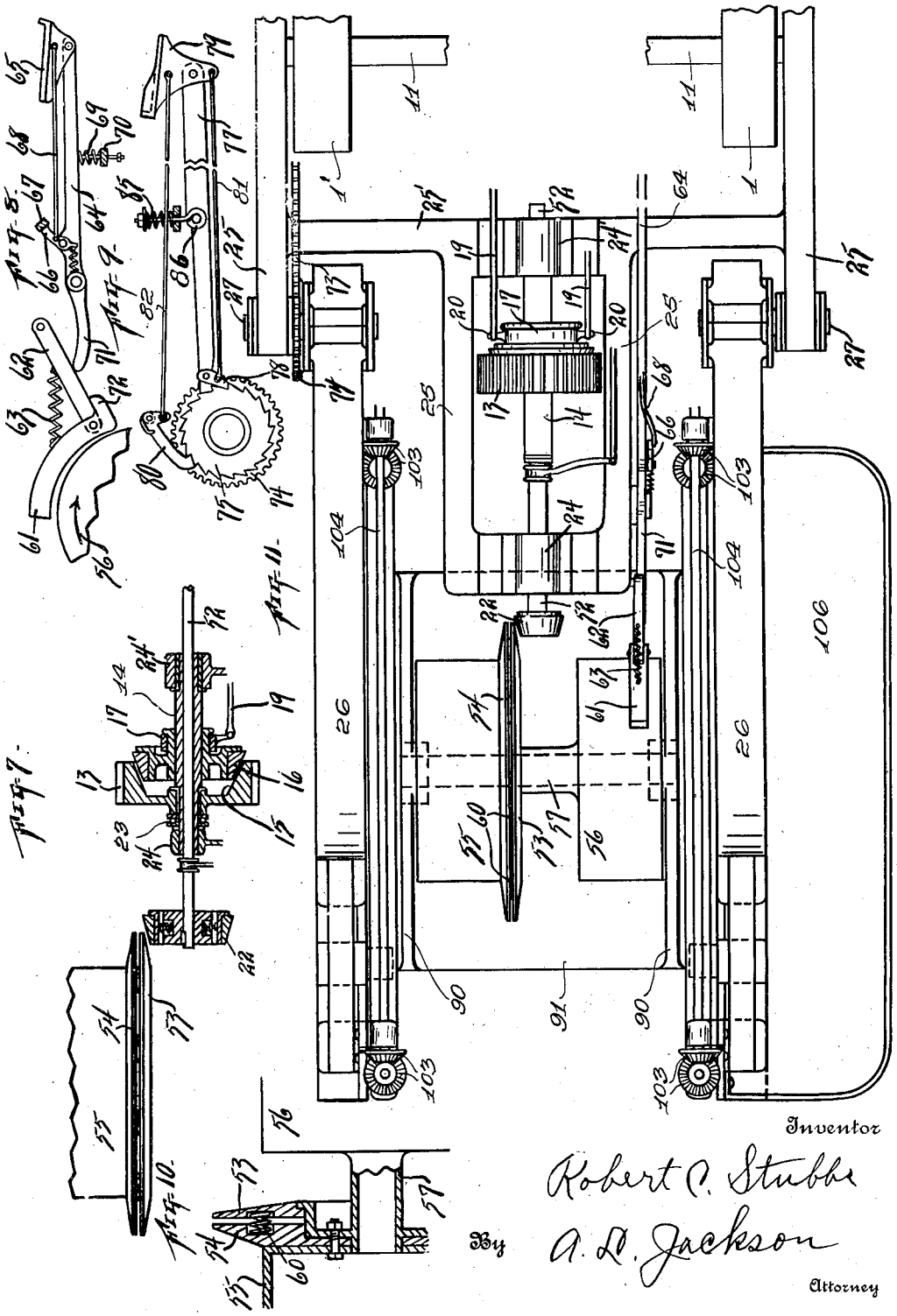
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PLASTIC COMPACTOR

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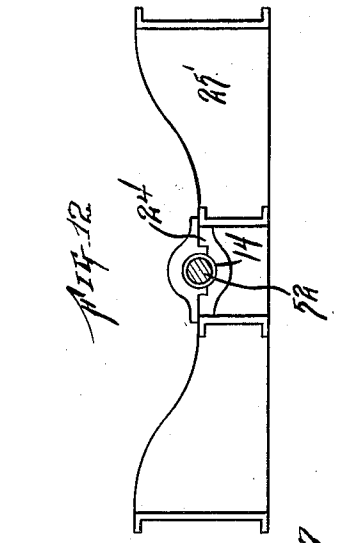
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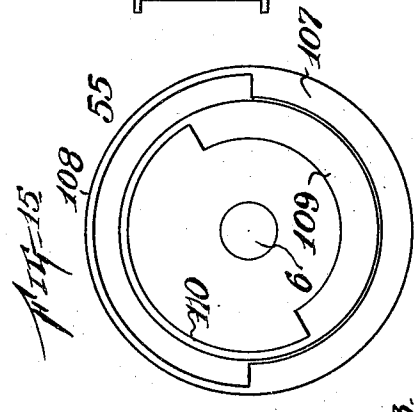
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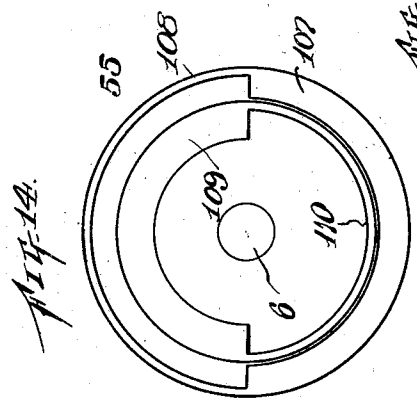
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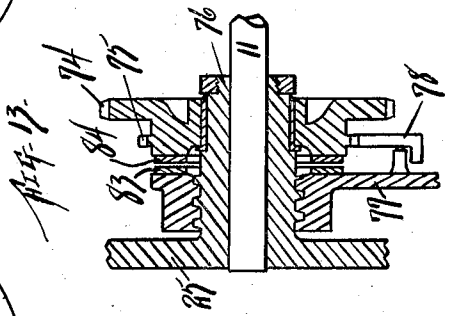
PLASTIC COMPACTOR

Filed July 18, 1927 3 Sheets-Sheet 3




Inventor

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Patented May 7, 1929. 1,711,758

# UNITED STATES PATENT OFFICE.

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## PLASTIC COMPACTOR.

Application filed July 18, 1927. Serial No. 206,696.

My invention relates to machines for compacting and solidifying concrete and other plastic compositions and the object is to provide machines which will be unitary in action and which will accomplish results which have heretofore been accomplished by devices set forth in patents issued to me, Nos. 918,388 and 1,532,843, and to provide machines which will accomplish the results more economically and at much saving of time and labor, and to secure better results. The object is to provide a combined compacting device which includes vibrating means and transmitting means and to provide a propelling tractor for operating the compacting and transmitting unit in such manner that the vibrations of the latter will not be transferred to the propelling tractor or carrier and to combine all these devices which will be under the immediate or direct control of a single person or operator. The carrier is supported by front rollers and a rear roller of light construction or suitable dimensions which will be supported on the compacted mass. In such operations, plasticity of the mass must be removed by removing the excess water by means of the compacting unit before the carrier can ride upon the surface of the compacted mass. Without such compacting the rollers would sink into any plastic mass. Several times the weight of the machine can be borne on a properly compacted mass. The combined machine not only secures nearer perfect results in compaction, but acts to prevent the passing over of any area that is not properly compacted. Unless the material is properly compacted the carrier sinks into the plastic and the condition of the interior would be immediately exposed and the efficiency of the concrete would be destroyed.

A vibratory unit provided with spaces for escape of excess liquid or semi-liquid applied to the surface of the semi-plastic mass of particles is capable of extracting the excess liquid of the commercial mixture to a determined point and moisture content less than hydrostatic, bringing the solids into close compact relation whereby such mass will be capable of sustaining the weight of the carrier unit without changing the surface line of such compacted mass whatever. In such operations, a carrier unit supplies the power to operate a vibratory unit and also supplies the power to cause the vibratory unit to travel along the surface of the loose mass, both sources of power being so applied as to prevent the forces of vibration reaching the rollers of the carrier, the carrier being connected to the compacting and transmitting unit by flexible and resilient connections.

Another object of the carrier rollers is to distribute and compact the excess mortar squeezed out of the mass by the compacting and transmitting unit. It will be understood that in most cases of mixtures there will be considerable excess mortar brought to the surface by the compacting and transmitting unit in the process of establishing the compact mass of particles.

The carrier may be made rigid with the compacting and transmitting unit if desired in compacting non-plastic material in which case a metal shoe is placed under the surface of the compacting unit.

Fig. 1 is a side elevation of the complete traveling plastic compactor.

Fig. 2 is an enlarged side elevation of the smoothing and compacting unit, showing the unbalancing cylinders or drums and showing in dotted outline the transmitting unit.

Fig. 3 is a front elevation of the smoothing and compacting unit, showing the unbalancing cylinders or drums and showing the disposition of the combined compacting and transmitting unit consisting of a plurality of bars which are rigid with a frame which is to be vibrated.

Fig. 4 is a broken side elevation of the front member of the flexible connection of the compacting and transmitting unit with the carrier unit.

Fig. 5 is a broken side elevation of the connecting member which cooperates with the member shown in Fig. 4.

Fig. 6 is a cross-section of the device shown in Fig. 4, being a vertical section.

Fig. 7 is a detail sectional plan view, illustrating the means for driving the unbalancing cylinders.

Fig, 8 is a detail view of a brake for the unbalancing cylinders.

Fig. 9 is a detail view of a ratchet mechanism for locking the combined compacting and transmitting unit at the required elevation.

Fig. 10 is a detail sectional view, illustrating the manner of making the unbalancing cylinders rigid with each other.

Fig. 11 is a diagrammatic plan view of the combined compacting and transmitting unit in part and a portion of the carrier unit.

Fig. 12 is an elevation of the frame of the carrier.

Fig. 13 is a detail sectional view of the ratchet construction for the elevating foot lever.

Fig. 14 is an end view of the unbalancing element, showing the elements balanced.

Fig. 15 is an end view of the same, showing the same with the elements slightly unbalanced.

Similar characters of reference are used to indicate the same parts throughout the several views.

The machine is provided with a truck or carrier which is preferably provided with a pair or rollers 1 and 1′ in front, one of which is the driving or tractor roller, and provided with a single idle roller 2 which serves as a steering or guiding means. The machine is provided with a motor 4 which is provided with a shaft 5 and a worm 6 rigid therewith. The worm 6 drives a co-operating worm wheel which is rigidly mounted on the shaft 7. Other gearing on shaft 7 serves to drive the shaft 8′ and sprocket wheel 8 which is rigid with shaft 8′ drives sprocket chain 9 and sprocket chain 9 drives sprocket wheel 10 which is rigid with roller 1. The shaft 11 is rigid with the tractor frame 25 and roller 1 is mounted loosely on the shaft 11. The carrier is provided with variable forward speed mechanism and reverse mechanism not shown which may be operated in the usual manner. The companion roller 1′ is loose on shaft 11 and is an idler.

The tractor mechanism of the carrier is utilized to actuate the mechanism of the compacting unit. The compacting and transmission unit is disposed in front of the carrier because the plastic mass must be solidified before the carrier or tractor can move thereon. The compacting and transmission unit mechanism is driven from the shaft 5. The shaft 5 carries a cog wheel 12 rigid therewith and drives this wheel. The cog wheel 12 is one member of the spur gearing and drives the other spur gear wheel 13. The gear wheel 13 is loosely mounted on the shaft 14 and this gear wheel is rigid with a clutch wheel 15. The other clutch member consists of a wheel 16 which is slidably mounted on the shaft 14 which is mounted in bearings 24 and 24′ and has an enlarged portion between these two bearings so that there will be no longitudinal movement, or motion. The clutch member 16 is actuated by a collar 17 which is provided with oppositely projecting pivot lugs 20 to which is connected rods 19 which are operatively connected to an operating lever 21 in such manner that the operator can operate it or not as may be necessary. The drive of the shaft 14 is thus directly under the control of the operator who can use the lever 21. A roller thrust bearing 23 is mounted on the hollow shaft 14 to relieve the thrust on the bearing 24 which is cast integral with frame 25.

There is also a flexible connection between the frame of the compacting unit and the frame of the carrier unit. The frame members 25 are connected to frame members 26 by a universal shock absorbing coupling which consists of a shaft 27 and a bearing 28 keyed thereon. The frame 26 has a frame member 29 which laps past a bearing extension 30 on frame member 25. The bearing 28 has two sockets 31 which serve as spring seats for shock absorbing springs 44 and 45, and a yoke 33 co-operates with the frame member 29 and these co-operating members 29 and 33 have spring seats for the outer ends of the springs 44 and 45. The frame members 25 are thus pivotally connected to the shaft 27 through its bearing 48.

The frame member 29 has an approximately semi-circular bearing member or yoke 33 bolted to frame member 29 by bolts 40. The shaft 27 is provided with a bearing 28 which is rigid therewith. The bearing 28 is slidably mounted in sectors 42 and 43 which are oscillatingly mounted in the members 29 and are held by bolts 40 and have peripheral grooves to receive the members 29. By reason of the construction set forth above, the frame 26 is allowed longitudinal motion. The frame 26 has a limited vertical swinging motion permitted and controlled by the springs 44 and 45. The compacting and transmitting unit is, by the mechanism above described pivotally and yieldingly connected to the frame members 25 of the carrier.

The frame 25 has a head 30 to which is bolted a cap 46 by stud bolts 47. A bearing 48 is carried in the head 30 and provision is made for this bearing 48 to slide vertically within the head 30 and the cap 46. The bearing 48 is loosely mounted on shaft 27 and a bronze bushing 49 is interposed between the bearing 48 and shaft 27. Springs 50 and 51 are mounted in seats in the bearing 48 and in the head 30. The springs 50 and 51 permit the vertical motion of the bearing 48. Provision may be made for regulating the tension of springs 44 and 45 and 50 and 51.

Shaft 52 which runs through the hollow shaft 14 is operatively connected therewith and is driven thereby and has longitudinal motion therein. The power is transmitted from the carrier by means of shaft 52 which

carries and drives a friction wheel 22 which transmits the power to the compacting cylinders. The shaft 52 is made movable axially so that friction wheel 22 may be adjusted for driving the friction disk 53 at different speeds. The disk 53 is slightly beveled similarly to the bevel of the wheel 22 and this wheel 22 drives the disk 53 by reason of the friction wheel 22 and disk 53 drives the cylinder 55 by reason of springs 60 seated between disk 53 and head 54. Cylinder 56 is made rigid with cylinder 55 by means of a sleeve 57 which is rigid with cylinder 56 and is rigid with cylinder 55.

A brake mechanism is provided for vibrating cylinder 56 and consequently cylinder 55 because these cylinders are rigid with each other. A brake shoe 61 is pivotally connected to an arm 62 which is pivotally mounted on the carrier frame 25. The brake shoe 51 is provided with a lug 72 which engages arm 62 to hold the shoe 61 and arm 62 in the normal inoperative position. An expansion spring 63 is attached to the shoe 61 and to arm 62. The arm 62 is actuated by a foot lever 64 which is fulcrumed on the frame 25 and is provided with a treadle 65. A pawl 66 is pivotally connected to foot lever 64 and engages a projection 67 which is rigid on the frame 25 to hold the brake 61 out of engagement with the cylinder 56. When the treadle 65 is operated downwardly, it moves the pawl 66 by means of a rod 68 away from the projection 67 and then foot lever 64 is forced upwardly by means of an expansion spring 69 which is supported by lug 70 which is rigid with frame 25. The operating end 71 of lever 64 will drop downwardly and so release the arm 62. This will let the arm 62 drop, carrying the brake shoe 61 down against the cylinder 56 for braking purposes.

Provision is made for elevating the compacting and transmitting unit out of operative position. A sprocket wheel 74 is rigid with frame 26 and a chain 73 is mounted on wheel 74 and chain 73 is driven by a sprocket wheel 74′ which is cast integral with ratchet wheel 75 which revolves on hub 76 which is rigid with frame 25. Ratchet wheel 75 is operated by means of a foot lever 77 through a pawl 78. Foot lever 77 is operated by a treadle 79 which is pivotally connected thereto. A pawl 80 is pivoted on frame 25 for cooperating with pawl 78 for locking ratchet wheel 75 while pawl 78 is released and adjusted to another tooth of the wheel 75. A release 81 is provided for releasing the pawl 78 and a release rod 82 is provided for releasing the pawl 80. The release rods 81 and 82 are operatively connected to the treadle 78 in such manner that the operator may release the pawls 78 and 80 whenever necessary at the same time or simultaneously. The release rods 81 and 82 are provided with slidable connections at their pawl ends. The foot lever 77 and the ratchet wheel 75 are provided with friction surfaces 83 and 84 to prevent sudden dropping of the compacting and transmitting unit. Cam threads are provided on the hub 76 and on the foot lever 77 for causing the foot lever 77 to move axially on the hub 76 so that the surfaces 83 and 84 are forced together when the foot lever 77 is pressed downwardly. A spring 85 is mounted on frame 25 and works through an eye-bolt 86 to force the foot lever 77 upwardly to normal position when the operator releases the treadle 79.

The cylinders 55 and 56 are provided with an axle 57 which is journaled in frames 90. Frames 90 are cast integral with the tamping head 91. The tamping head 91 is carried by springs 92 which are mounted on rods 93. The rods 93 move freely through blocks 94, and flexible connections 95 connect the rods 93 to the tamping head 91. The blocks 94 permit yielding forward and backward movement by reason of springs 96. The object of these movements is to prevent the vibrations of the pressure head from being transmitted back to the tractor. The blocks 94 are supported in the frame members 26, slots being provided in the frames 26 for the movements of the blocks 94. Means are provided for vertical adjustment of the tamping head 91. Bars 97 are adjustably mounted on frames 26 by screws 98. Screws 98 are journaled in lugs 99 which are cast on frames 26 and the screws 98 are threaded through bars 97 and journaled below in lugs 100. The bars 97 are provided with pockets 101 to receive the heads 102 at the upper ends of rods 93. The screws 98 are operated by mitre gearing 103 which are driven by shafts 104 through handwheel 105. The pressure head is provided with side wings 106 to aid in maintaining the grade by sliding on the surface. The tamping bar 91 may be provided with the means 107 for transmitting the vibrations to the surface. Such means may be bars or plates according to requirements of the particular work to be done.

The out-of-balance cylinders 55 and 56 are such as shown in the patent granted to me January 18, 1927, No. 1,615,052. The cylinders or drums are in two parts, an inner cylinder with a light side 110 and a heavy side 109 and outer cylinder having a heavy side 107 and a light side 108. These cylinders are driven by the gearing herein described. These cylinders, when driven, create vibrations which are transmitted to the material to be compacted and solidified by the transmitter 91.

The machine is moved along the surface of the plastic by the driven tractor wheels

1 and 1′ while the cylinders 55 and 56 are revolved or driven by the gearing described.

What I claim is—

1. A plastic compactor comprising a compacting mechanism, a tractor carrying means for actuating said compacting mechanism and moving said compacting mechanism forwardly simultaneously, and flexible and resilient means connecting said compacting mechanism and tractor in operative relation.

2. A plastic compactor comprising a movable compacting mechanism, a tractor carrying driving means for actuating said compacting mechanism and simultaneously moving said compacting means forwardly, flexible and resilient means connecting said compacting mechanism and tractor in operative relation, and means carried by said tractor for placing said compacting mechanism in and out of operative position.

3. A plastic compactor comprising a compacting mechanism provided with longitudinal frame members, a tractor provided with means for actuating said compacting mechanism and moving the same forwardly simultaneously and provided with longitudinal frame members, and flexible and resilient means for connecting the frame members of said tractor and the frame members of said compacting mechanism.

4. A plastic compactor comprising compacting mechanism including revolving out-of-balance cylinders and means for vertical adjustment of said cylinders, a tractor provided with means for actuating said mechanism and for simultaneously moving said mechanism forwardly, and means for preventing the vibrations of said mechanism to said tractor.

5. A plastic compactor comprising a compacting mechanism provided with revolving out-of-balance cylinders and with speed controlling means therefor, a tractor provided with means for actuating said compacting mechanism and provided with means for operating said speed controlling means and moving said mechanism forwardly simultaneously, and means for preventing the motions of said compacting mechanism from being transmitted back to said tractor.

6. A plastic compactor comprising a compacting mechanism, a tractor carrying means for actuating said compacting mechanism and moving said compacting mechanism forwardly simultaneously, said tractor having its tractor rollers adapted for distributing and smoothing mortar brought to the surface by said compacting mechanism, and flexible and resilient means connecting said compacting mechanism and tractor in operative relation.

7. A plastic compactor comprising a compacting and solidifying mechanism, a tractor carrying means for moving forwardly said compacting means and carrying a driving mechanism for causing said compacting mechanism to compact and solidify plastic material prior to the passage of the tractor over said material in a continual performance, and flexible and resilient means connecting said compacting mechanism and tractor in operative relation for preventing the vibrations of said compacting mechanism from being transmitted to said tractor.

In testimony whereof, I set my hand, this 27th day of January, 1926.

ROBERT C. STUBBS.