Nov. 4, 1930. J. E. KIRKHAM 1,780,427

TROWELING MACHINE FOR CONCRETE OR OTHER PLASTIC MATERIAL

Filed June 22, 1928 2 Sheets-Sheet 1

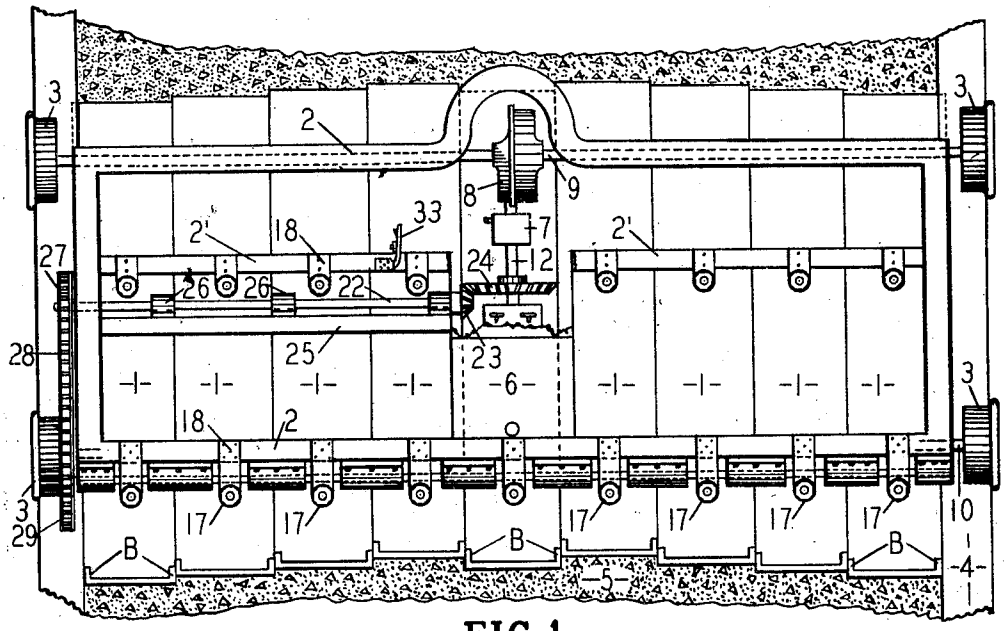


FIG. 1

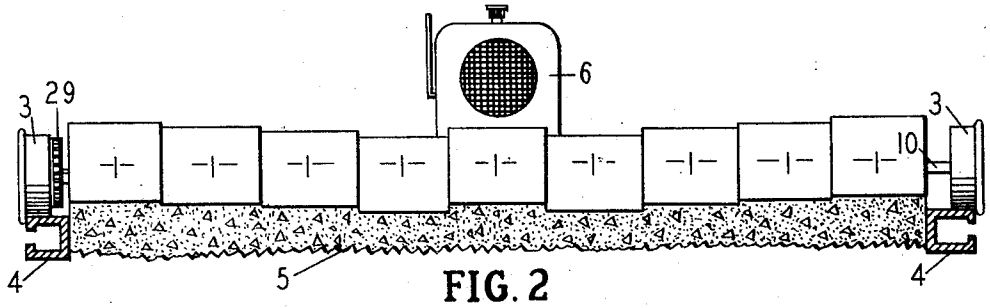
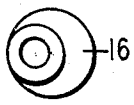


FIG. 2

FIG. 7



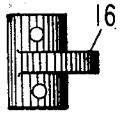


FIG. 8

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TROWELING MACHINE FOR CONCRETE OR OTHER PLASTIC MATERIAL

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FIG. 10

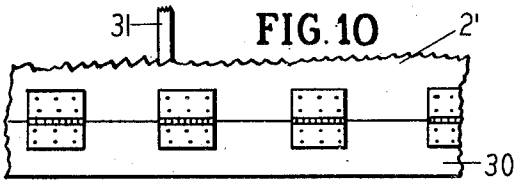


FIG. 3

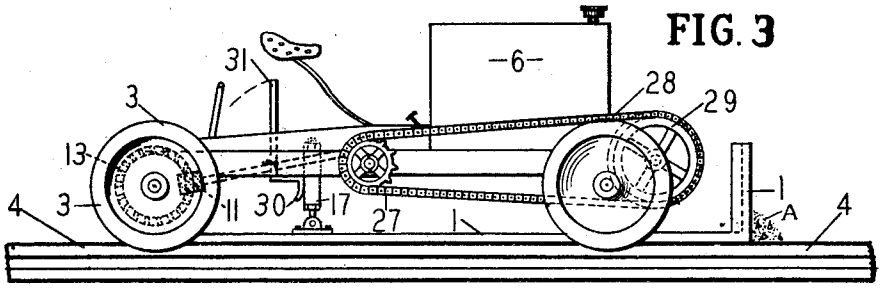


FIG. 6

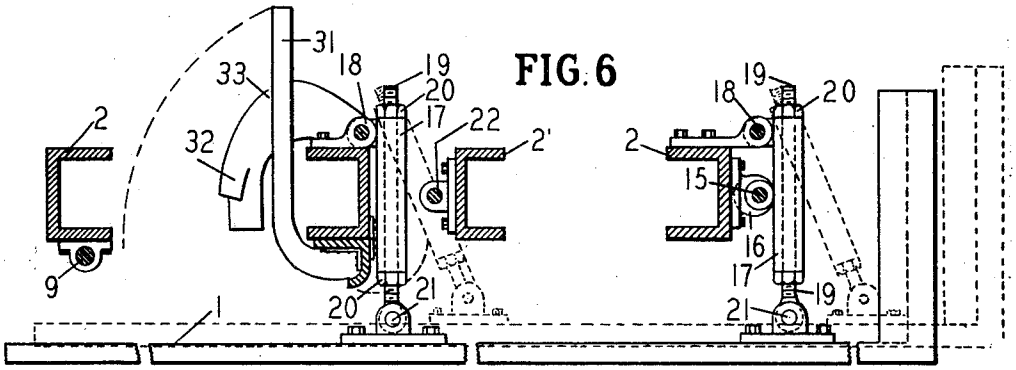




FIG. 4

FIG. 5

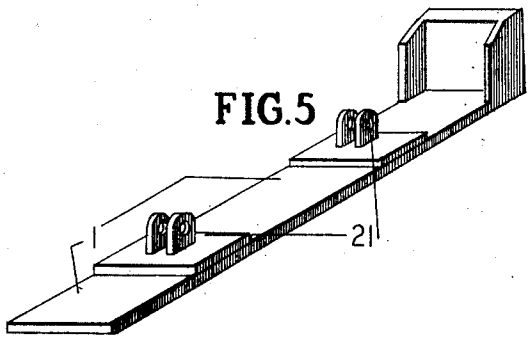
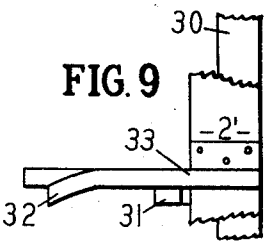


FIG. 9



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UNITED STATES PATENT OFFICE

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TROWELING MACHINE FOR CONCRETE OR OTHER PLASTIC MATERIAL

Application filed June 22, 1923. Serial No. 287,476.

My invention relates to a troweling machine for concrete or other plastic material.

The object of my invention is to provide a troweling means for plastic concrete, the said means agitating the mass during the process of floating or troweling to a true and finished surface, eliminating longitudinal and transverse waves.

A further object of my invention is to provide a series of adjustable floats or trowels carried by a frame supported by forms, by which means the finished surface of the concrete may be crowned, or finished in straight alignment horizontally or inclined.

A still further object of my invention is to provide a troweling means power actuated in such a way that the floats or trowels will function in any sequence, the reciprocating motion being longitudinal with the mass or road to be laid.

A still further object of my invention is to provide a series of floats or trowels parallel to longitudinal axis of the road and positioned in close proximity, but working independent of each other in their reciprocating movement.

These and other objects will hereinafter be more fully explained, reference being had to the accompanying drawings forming a part of this specification, wherein like characters will apply to like parts throughout the different views.

Briefly referring to the drawings:

Fig. 1 is a plan view of the mechanism, showing its position on a fragmentary length of concrete road bed.

Fig. 2 is a front elevation, the road bed and forms being in cross section.

Fig. 3 is a side view of Fig. 2.

Fig. 4 is a view of the cam shaft.

Fig. 5 is a perspective view of one of the float or trowel members.

Fig. 6 is an enlarged detailed cross-sectional view.

Fig. 7 is an enlarged end view of the cam shaft.

Fig. 8 is a top view, the shaft being broken away.

Fig. 9 is a fragmentary plan view of the sector and its connection to the frame. Fig. 10 illustrates the manner in which the lever actuated bar is hinged to the frame.

My invention herein disclosed consists of a plurality of float or trowel members 1 pendently supported on a frame 2 by means hereinafter described, the frame being mounted on wheels 3, the said wheels being flanged and adapted to rotatably engage along track members 4, the said track members functioning as forms for concrete 5 poured therebetween and brought to a uniform surface by the action of the trowels, as hereinafter described.

As a power actuating means, I have positioned on the said frame an engine 6 as means to convey the mechanism along the track and actuating means for the reciprocation of the trowels simultaneously or independent of the travel along the track. The engine is equipped with the usual controlling means to govern, a clutch, transmission, and driving means, the position of the transmission being shown at 7, and the driving means at 8, the latter being connected to a rearwardly positioned drive shaft 9 the said shaft having flanged wheels 3 rigidly attached to the outer ends thereof. The forward portion of the frame is carried on the shaft 10 having similar wheels securely attached to the outer ends thereof.

As a means to convey the mechanism along the track, a worm 11 is securely attached to the outer end of the drive shaft 12, the worm being in mesh with a worm gear 13, the worm and its respective gear being housed as shown by dotted lines 14.

As an operating means for the forward movement of the trowels alternately, I have trunnioned a shaft 15 to the front member of the frame 2; and adjustably arranged on the shaft is a plurality of cam members 16, by which means the trowel members are driven forward through the medium of a pendent supporting means consisting of a sleeve 17 carried by a hinge member 18, the said member being rigidly attached to the front member of the frame, as shown in Figs. 1 and 6. Axially positioned in the sleeve is a rod 19 having threads on the opposite ends to engage nuts 20 as longitudinal adjusting means therefor, the nuts tightly engaging on their re-

spective ends of the sleeve, by which means the trowel members are raised and lowered. It will be understood that the said shaft is pivotally connected to the trowel, as shown at 21. The rear end of the trowels are pendently supported in a similar way, but are positioned to engage snugly against the vertical side of an intermediate beam member 2′, the said member being carried by the end members of the frame respectively.

By the arrangement and position of the latter mentioned pendent supports, the trowels are driven forward as the frame is conveyed, but advanced in sequence by the cam shaft rotation heretofore described, the rotation of said shaft being actuated through the medium of a shaft 22 having a beveled gear 23 on the inner end thereof in mesh with a beveled gear 24 securely attached to the engine drive shaft 12. The shaft 22 is trunnioned to a beam 25 in bearings shown at 26. On the outer end of the shaft is a sprocket wheel 27 having a sprocket chain 28 in mesh therewith, the chain also being in mesh with a sprocket wheel 29, the last said sprocket wheel being firmly attached to the outer end of the said cam shaft.

It is now readily seen how the rotation of the cam shaft is actuated independent of the forward travel of the machine, this being accomplished by disengaging the shaft at the transmission 7, until all of the trowels have been moved forward; then by advancing the machine, the trowels not in contact with their respective cams will be free to retract. It will be understood that the trowel members will retract by gravity when driven forward as indicated by dotted lines in Fig. 6, the trowels being raised from contact with the surface of the concrete.

As a means to elevate the trowels simultaneously, a bar 30 longitudinally extending from near one end to the opposite end is hingedly connected to the intermediate frame member 2′, as shown in Fig. 6 and Fig. 10; and to rock the bar forward, a lever 31 is attached thereto, and when rocked downward as shown by dotted lines the outer edge of the bar will frictionally engage against the sleeve members, holding them forward, as shown by dotted lines in Fig. 6. The lever, when driven downward, will engage with a stop 32 as securing means therefor, the said stop being integral with a sector 33, the sector being rigidly attached to the frame member 2′; and being so arranged, the lever will spring as it passes thereover.

The operation of the machine is as follows:

In preparing to lay concrete on a highway or other place, the earth or sub-grade on which the concrete is to be laid is brought to a uniform surface and cross-section required. Forms are then placed on each side of the roadbed for three purposes: first, to align and close the sides while the concrete is being poured; second, as a governing means for the depth of the slab; and third, as a track for the wheels of the machine. As the concrete is poured, the machine, through the agency of the motor carried thereby, is driven along the rails or forms; and during the time of travel the trowels are driven forward in sequence. At each swing of the trowels, they are raised slightly from the surface, by which means the aggregate concrete is worked to a uniform and smooth surface. The forward ends of the trowels, being vertically positioned, will carry the surplus concrete before them, as shown at A in Fig. 3, by which means voids or low places in the concrete will be filled. To avoid the concrete passing between the vertically positioned ends in their reciprocations, a web B is provided on each side of said vertical portion.

It will be understood that the machine, while standing still, may continue to reciprocate the trowels, each member thereof retracting by means of gravity. This arrangement is found very useful should the aggregate partially set or become rather dry in its mixture. The agitation of the trowels at all times tends to cause the fluid in the concrete to rise, carrying with it the cement. Therefore, the surface is rendered more smooth than it would otherwise be.

Such modifications may be employed as lie within the scope of the appended claims.

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

1. In a troweling machine for concrete and other plastic material, a machine of the kind described comprising a rectangular frame and wheels to carry the same, a plurality of longitudinal trowels each having an upward extension at its forward end, two rods threaded at their ends and pivotally connected to each trowel, sleeves hinged to the frame and arranged to accommodate the said rods, means to adjust and lock the rods to the sleeves and means to reciprocate the trowels.

2. In a troweling machine for concrete and other plastic material, a rectangular frame having a pair of wheels to carry the front side thereof and a pair of wheels connected by a shaft for the rear side, the frame having an engine positioned thereon and means to drive the shaft to propel the machine, a shaft rotatably carried by the frame and having a plurality of cams spaced therealong, means to rotate the shaft, a plurality of trowels pendantly positioned on the frame and engaging the road material, the cams engaging the pendant supporting means of the trowels for reciprocation of the latter, means to disengage the supporting means of the trowels from the cams.

3. In a troweling machine for concrete and other plastic material, a machine of the kind described having a frame and wheels

as carrying means therefor, a plurality of trowels connected to the frame by adjustable pendant supporting means comprising threaded rods pivotally connected to the trowels and positioned in sleeves pivotally connected to the frame, there being a front and a rear set of said means, a bar hingedly connected to the frame and a lever as rocking means therefor, the bar to engage on the rear set of pendent supporting means to move the trowels forward and upward, rendering them inactive while the machine is being transported.

In testimony whereof I affix my signature.

JOSEPH E. KIRKHAM.