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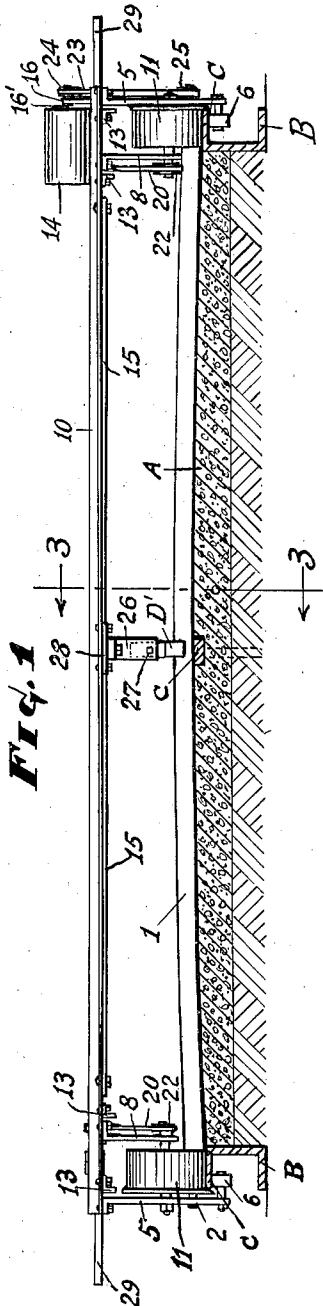
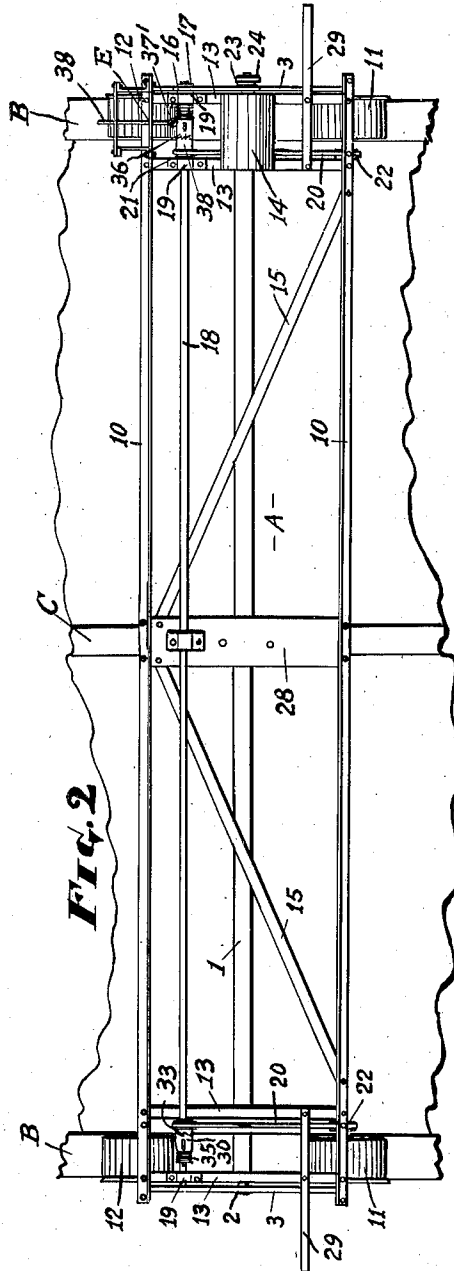
B. F. KREHBIEL

2,252,188

PLASTIC CONCRETE SURFACING MACHINE

Filed Oct. 5, 1938

4 Sheets-Sheet 1



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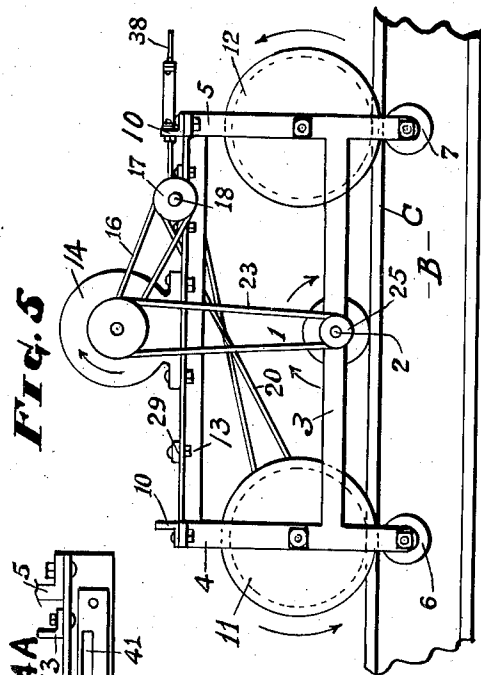
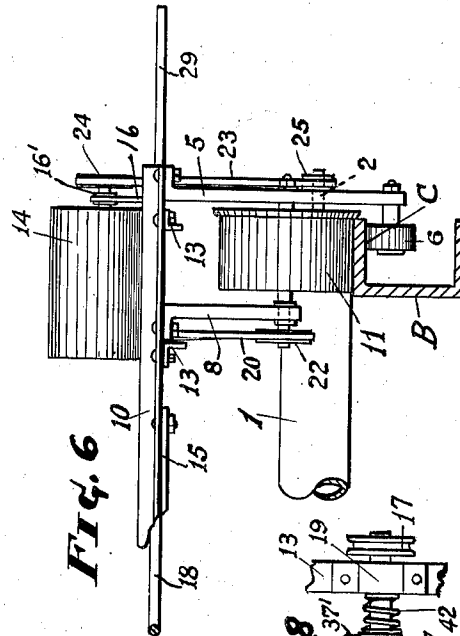
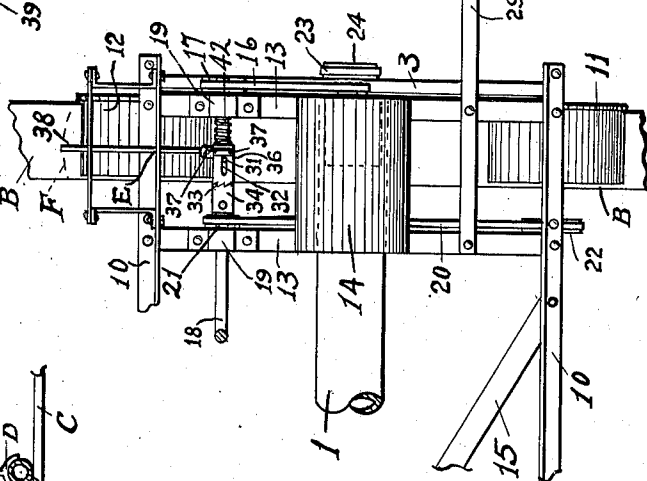
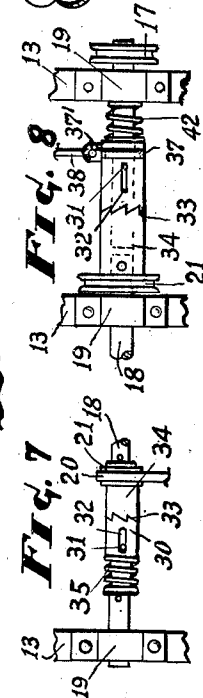
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PLASTIC CONCRETE SURFACING MACHINE

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4 Sheets-Sheet 2



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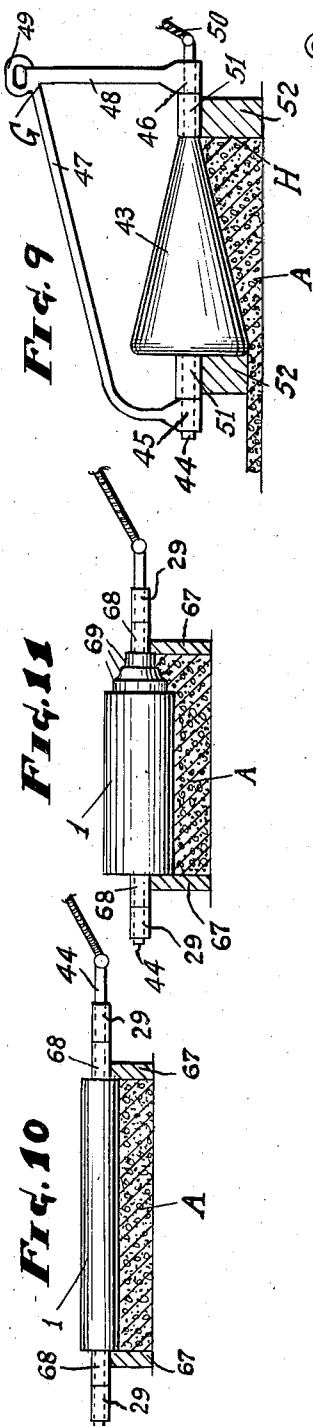
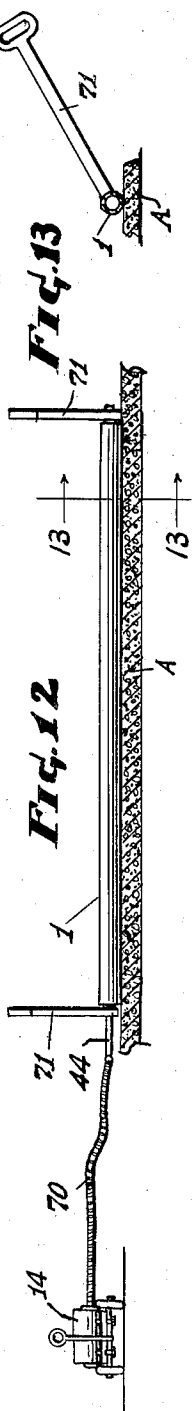
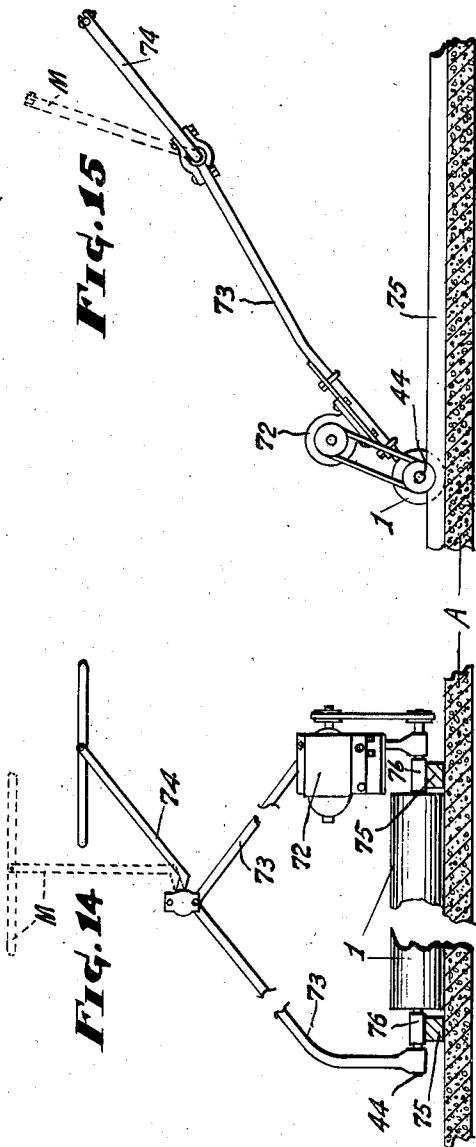
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PLASTIC CONCRETE SURFACING MACHINE

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4 Sheets-Sheet 3



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PLASTIC CONCRETE SURFACING MACHINE

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Fig. 17

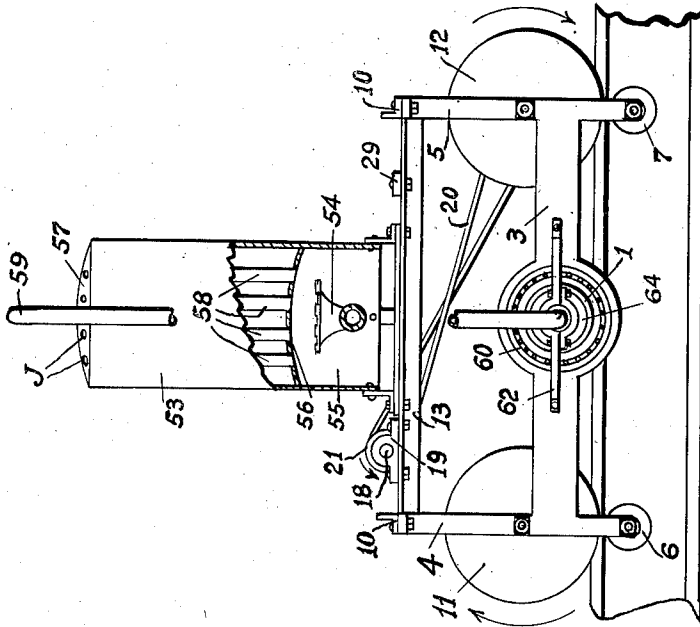
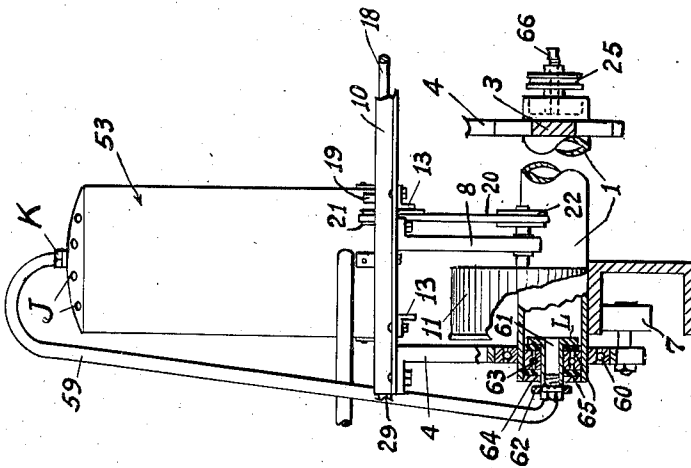


Fig. 16



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2,252,188

PLASTIC CONCRETE SURFACING MACHINE

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Application October 5, 1938, Serial No. 233,415

5 Claims. (Cl. 94-45)

My invention relates to plastic concrete surfacing machines and has for its principal object, to surface, by rotary motion, concrete while in its plastic state, the rotatable element being moved along the outer plane of the plastic body.

A further object of my invention is to provide a rotatable tubular element that will flex to the standard crown of a highway road bed while surfacing the same.

A still further object of my invention is to provide a surfacing machine that has mechanical power embodied therewith as conveying means for the machine and said power means to operate the surfacing element simultaneously with the travel of the machines.

A still further object of my invention is to provide a heating means for the flexible surfacing element whereby asphalt, or the like, may be uniformly surfaced and troweled.

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

Referring to the drawings:

Fig. 1 is a plan view of the machine seated on a road bed.

Fig. 2 is a plan view of Fig. 1.

Fig. 3 is a sectional view taken on line 3-3 in Fig. 1, said view showing the center bearing for the rotatable tube.

Fig. 4 is an enlarged plan view of the end of the machine on which the motor is positioned.

Fig. 4A is an inverted side view of the notched sector and its relation to the trucking connecting bar looking in the direction of the arrow in Fig. 4.

Fig. 5 is a side view of Fig. 4.

Fig. 6 is an end view of Fig. 5.

Fig. 7 is a view of the ratchet as positioned on one end of the drive shaft.

Fig. 8 is a view of the clutch positioned on the other end of the drive shaft as it appears in Fig. 4.

Fig. 9 is a side view of the surfacing and troweling device for the slope, inward and downward from the shoulder of the road slab.

Fig. 10 represents a short section of the tube having spindles to engage on screeds whereby concrete blocks may be faced by troweling.

Fig. 11 shows a modification for one end of the tube whereby a mould is formed along one edge of a slab or block of concrete.

Fig. 12 represents the tube as applied to large surfaces, functioning as a rod for rolled work.

Fig. 13 is a sectional view taken on line 13-13 in Fig. 12.

Fig. 14 is a front view of the tube resting on screeds as a gauge from a plastic surface, also showing the guiding and power actuating means.

Fig. 15 is a side view of Fig. 14.

Fig. 16 is a modification showing the position of a steam producing tank as heating means for the tube when asphalt as a road surface is to be troweled, partly in section.

Fig. 17 is a transverse view of Fig. 16, parts removed for convenience of illustration.

I will now describe the component parts of my invention in detail which consists of a hollow tube 1, varying in length as the nature of its work may require, for instance in Figs. 1 and 2 is shown the machine applied to a concrete slab A of a plastic road or the like, said slab being crowned medially of its width, in which case the tube will flex coinciding with the crown required.

To assist the machine in its performance, note that prior to pouring the concrete for the slab there is a channel B functioning as a track secured in parallelism with each other and spaced apart for the required width of the slab, functioning as forms for the shoulders of the said slab and the track upon which the machine will travel while centrally positioned between the said tracks is a screed C secured above the upper plane of the tracks whereby an arcuate crown is formed as the said tube is forced to engagement at its outer ends by appropriate means upon the tracks and moved therealong, while the center of said tube rides upon the screed, it being understood that upon completion of the slab the tracks and screed is removed, the screed indenture being filled with concrete, white surfaced, to mark the center of the slab as a traffic guide.

To accomplish a full and complete performance to surface a road bed slab as above described, it will be seen that each end of the said tube 1 is trunnioned on its respective frame members as at 2, the frames functioning as trucks to convey the tube along the road bed to be surfaced, and the frames each having a cross bar 3 as carrying means for their respective end of said tube 1 as above stated. Secured to each end of said bar are legs 4 and 5 at right angle thereto, the lower extension thereof having their respective rollers 6 and 7 trunnioned adjacent the lower ends of each to engage on the under side of the upper leg of the said track B as at C, to function as an anchor for the truck against an upward tension created by the tube in its crowned position.

Spaced inward of the truck frame is a similar pair of legs 8 and 9 positioned in parallelism with the first said legs, last said legs being secured at their upper end to cross bars 10 respectively that tie the trucks together, said legs extending downward to form bearings for their respective wheels 11 and 12 at one side, while the other sides have their bearings in legs 4 and 5 respectively.

Secured to the under side of the bars 10 are cross bars 13, upon which is seated an electric motor 14, said motor being on one truck only, as shown in Figs. 1 and 2.

The tie bars connecting the trucks are braced by member 15 obliquely extending thereacross to secure the said tie bar against opposite movement longitudinally.

Power is transmitted from the motor that is located on one of the trucks as shown in Figs. 1 and 2 through the medium of a belt 16 engaging motor sheaves 16' and 17 that are secured to a drive shaft 18 extending from one truck to the other, and being trunnioned on each thereof as at 19, and power being transmitted from said shaft through the medium of a belt 20, engaging sheaves 21 and 22 as driving means for wheel 11, the latter named belt having the same hook-up for the truck at the end of the machine opposite its truck carrying the motor, by which means the said machine is conveyed along the track heretofore described. Furthermore, the said tube rotation is through the medium of belt 23 extending from motor sheave 24 to sheave 25 secured to the end of said tube adjacent the motor, said tube being turned oppositely to the direction of the machine travel as shown by the arrows in Fig. 5. Being so turned, will carry the surplus aggregate of the concrete in front of the tube as conveyed thereover, the principle of which is to uniformly surface the plastic concrete and trowel the same smoothly as the machine is conveyed along and over the plastic concrete that forms the road bed slab, and inasmuch as a crown is desired with respect to cross section of the slab, the tube is arced upward as heretofore described, and to avoid lifting the truck upward by the tension of the tube thus engaged, I have positioned rollers 6 and 7 as anchoring means for each end truck to its respective track as heretofore described, but free to move therealong as conveyed.

To avoid vibration of the tube while in operation, and to cause the same to engage snugly on its respective screed, I have provided a joined leg 26 telescopically engaging as shown by dotted lines to vary the length thereof for continuous engagement of its arcuate end portion D that seats on the tube. The leg may be extended to engage the tube when the latter is in straight alignment from end to end, and the sleeve engagement will be secured at its selected extension by cap screw 27 threadedly engaging through the sleeve or upper portion of the leg as shown in Figs. 1 and 2, the upper extremity of the leg being secured to a plate 28 that is carried by bars 10, secured to their respective ends of the plate.

Oppositely and outwardly extending from each truck frame is a handle 29 as controlling means for the machine means for the machine movement, as the case may require.

Drive shaft 18 is equipped at one end with a ratchet element consisting of a toothed sleeve 30 adapted to slide on said shaft, rotatable therewith by reason of a pin 31 secured to the shaft, and outwardly extending through an elongated slot 32 passing through the sleeve to permit longitudinal sliding of the sleeve when the teeth 33

on the end thereof and end of hub 34 ratchetedly engaged by a spring 35 wound on the shaft and secured against longitudinal movement thereon, the said hub being connected to its respective sheave 21, by which means corresponding wheels of each truck may vary in their speed of travel by driving in the same direction.

In the other end of the said drive shaft is a similar ratchet arrangement to that just described, but arranged to function as a clutch to disengage the shaft, the arrangement of which is through the medium of a sliding sleeve 36, carried by a short shaft 37 that is a power driven, said shaft extending into the hub 38 of sheave 21, and rotatable therein when the clutch is disengaged, and the said sleeve 36 has an annular groove adjacent one end, in which is positioned an annular strap 37, in which the groove portion rotates, and the said strap has a pair of ears 37' radially extending outward to receive the ends of a shifting lever 38, pivotally connected to the ears and the said lever has its fulcrum point on bar 10, as at E, by extending through the vertical leg of said bar, and rockable as shown by dotted line F, as shown in Fig. 4, to engage and disengage the clutch; when disengaged, the outer end portion of said lever will enter a notch 39 and be retained therein by shoulder 40, and when removed therefrom it will enter slot 41, where it is free to move reciprocatingly as rocked by the teeth engaging and disengaging as the variable time movement of the wheels require. When the clutch lever is released from its shoulder, the teeth elements will engage by the tension of spring 42 that is wound on the said short length of shaft.

In Fig. 9 is shown a conical element 43 secured to a shaft 44 that is trunnioned in bearings 45 and 46 respectively, the bearings having their respective arms 47 and 48 integrally joined as at G, at which point a grip 49 is secured as moving means for the structure as a whole. The said conical element may be turned by a cable 50 secured to the shaft and power driven, and the said shaft has a sleeve 51 adjacent each end of the conical member to engage on screeds 52, that are in parallelism and terminating upward on the same horizontal plane. By this device an approaching slant is surfaced between the road bed and its shoulder as at H, it being understood that the conical element is rotatably arranged for a similar function to that of the said tube, but formed for certain conditions that exist along the slab of a highway road.

Figs. 16 and 17 illustrate the machine having means to heat the tube, said means consisting of a boiler 53, seated on the end of the frame structure opposite the motor, said boiler having a gaseous fuel burner 54 positioned in a cavity 55 that is surrounded by the boiler wall, and the said boiler has a head 56 upwardly positioned from the lower end thereof to permit ample overhead room for the burner. The upper end of said boiler is closed with a head 57, the said heads being connected to a series of tubes 58 passing through the boiler and outward from each head as at J, functioning as flues for the burner, through which the heated air will circulate, converting water contained in the boiler into steam, which will rise to the upper end and exhaust through pipe 59, said pipe axially connected at the upper end of the boiler as at K, extending downward and having means connecting the lower end thereof to one end of the said hollow tube, injecting the steam therethrough.

In this instance, it will be understood that the said tube has each end thereof trunnioned on its respective truck frame engaging in a ball bearing 60, and the said connecting means for the pipe consists of an injector 61, stationarily retained by the tube and arms 62, the outer ends of which are secured to the frame, while the center portion is secured to the injector, as shown in Figs. 16 and 17. The injector has preferably a ball bearing 63 medially positioned thereon, so that the tube is free to rotate, and the said tube has a head 64, fitting snugly therein and being apertured to receive the body of the injector on which it turns with a smooth running fit, and to render the connection of the injector and tube fluid tight, there is placed on each side of the bearing an annular packing 65 as sealing means for the bearing; one packing element is positioned between the head and the bearing, while the other is positioned between the bearing and the flange L that is secured to the inner end of the injector, the injector being the inlet for steam at its respective end of the tube, while the other end thereof has an ejector 66 adjustably arranged to control an outward flow of the steam by which means the tube is heated, which is a requirement when trowelling or surfacing asphalt as a top for a road bed.

Figs. 10 to 15 inclusive illustrate different applications of the rotatable tube, all of which are manually conveyed and power driven with respect to rotation of the tube, while Fig. 9 illustrates the equivalent of the tube as a conical element for its specific purpose which rotates in like manner to that of the tubes. The said tube will vary in length, adapting the same to specific purposes; for instance, Fig. 10 shows a surfacing means for a concrete block or the like having screeds 67 as a form for each edge thereof, and upon which sleeves 68 will engage, said sleeve loosely fitting.

Fig. 11 illustrates a similar application, but having a form 69 on one end thereof to produce a moulding on the face adjacent one edge of the block.

Figs. 12 and 13 illustrate the adaptation of the tube and trowelling means for large surfaces of concrete or the like. The turning means for the tube is power transmitted through a flexible cable 70, the conveying means being through handles 71.

Figs. 14 and 15 show the tube actuated by a motor 72 carried by a frame 73, to which said tube is trunnioned, and the said frame has a handle 74 pivotally arranged and rockable to a desired position, as shown by dotted line M. This arrangement provides for a trowel of considerable length, whereby speed is had when trowelling large areas of floor, walk, or paved roads, and in each instance screeds 75 are provided, and upon which sleeve 76 will rotatably engage, and the said screeds positioned to conform to a desired crown that may be required, as in the case of road beds.

While I have shown and described a steam heating method for the tube, I do not wish to be restricted to such alone, as an electrically heated coil may be inserted in the tube as heating means therefor, in which case the cable connecting the coil would extend through the hollow of the injector 61, and such other modification may be employed with respect to heating the tube, and the said tube herein set forth may be changed to a solid structure with respect to cross section, and

in some instances may be interchangeable for the purpose of heating the same alternately by an appropriate method as the case may require, and furthermore other elements of the machine may be modified 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 plastic concrete surfacing machines, a machine of the class described comprising a pair of trucks, each truck consisting of a frame, each of which has traction wheels therefor, and a legged track as a support on which the wheels will engage, other wheels carried by each frame at the lower extremity thereof, last said wheels to engage on the underside of said legs as securing means for first said wheels to contact with the legged track on the upper side thereof, bars extending from one frame to the other and secured to each thereof, a power transmitting shaft extending from one frame to the other and being trunnioned on each frame, a motor carried by one of said frames, there being a belt to connect said motor to said shaft and belts connecting said shaft to said traction wheels as conveying means for said frames simultaneously, a tube extending from one frame to the other, each end of the tube being trunnioned in its respective frame, belts means connecting the motor with the tube as rotating means therefor simultaneous with the traction of said frames, a vertically disposed leg adjustably arranged with respect to its length vertically, means to connect the leg to the connecting bars medially thereof, the leg having an arcuate seat at its lower extremity to engage on said rotatable tube to restrict the vibration thereof while in action.

2. In plastic concrete surfacing machines, as recited in claim 1 with respect to the power transmitting shaft, a clutch ratchettedly arranged and positioned in working relation at one end of said power shaft as controlling means for its rotation, and a lever to throw the clutch in and out of gear and when in gear the ratchet will function to compensate for the variable traveling speed that may occur in said trucks.

3. In plastic concrete surfacing machines, in combination, a cylindrical tube, a truck to carry rotatably each end of the said cylindrical tube, the said cylindrical tube having a pulley or the like secured to one end thereof, means to connect the trucks, spaced apart, a power transmitting shaft, each end thereof being trunnioned on its respective truck as driving means to move the trucks one direction simultaneously, a ratchet arrangement positioned adjacent one end of the shaft and a ratcheting clutch and shaft therefor, the shaft being axial with the first said shaft as power transmitting means through the medium of its clutch to turn said first shaft, and a lever to control a desired action of the clutch, a motor carried by the truck adjacent the second said shaft as turning means therefor and the said motor being connected to the pulley of the cylindrical tube to turn the same during movement of the trucks substantially as shown.

4. In plastic concrete surfacing machines, a tubular rod of an appropriate length and diameter so that the said rod will flex transversely approximately a distance of twice its diameter from the plane of its ends, a truck to rotatably carry each end of the said tubular rod, said trucks comprising a frame and wheels to carry the same, means to connect the trucks a spaced

distance from each other, a legged track for each truck, the legs upwardly positioned and outwardly extending horizontally, said tracks functioning as forms for plastic concrete placed therebetween, and means to carry the longitudinal center of the said flexible rod above the plane of the upper portion of the tracks and a leg telescopically arranged and having an arcuate seat to engage on the said tubular rod medially of its length, said leg being carried by the said connecting means for the trucks, rollers carried by each truck frame at the lower extremity thereof to engage beneath and in contact with the legs as anchoring means for the trucks to their respective tracks, and a motor as power transmitting means to drive the trucks and turn the flexible rod for the purpose specified.

5. In plastic concrete surfacing machines, a machine of the class described comprising two truck frames and a track for each, the trucks spaced apart, traction wheels to carry each truck,

means to connect the trucks for simultaneous travel, and wheels carried by each frame as anchors for the trucks to their respective tracks on which the trucks will travel to avoid disengagement therefrom during traction, a motor and a shaft extending from one truck to the other, means to connect the motor with the shaft to turn the same, means to connect the shaft to the traction wheels of each truck frame as power actuating means to turn the wheels carrying the frame therewith, a tube rotatably carried by said trucks, the tube extending from one truck to the other, and means connecting the motor to the tube as rotating means therefor while the machine travels, and a ratchet element positioned on one end of said power transmitting shaft to compensate for varying speed with respect to the travel of each truck in their simultaneous movements.

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