H. S. JULIAN AND G. F. HUTCHINGS.

APPARATUS FOR MIXING ROAD OR OTHER MATERIAL.

APPLICATION FILED APR. 24, 1917.

1,332,987.

Patented Mar. 9, 1920.

2 SHEETS—SHEET 1.

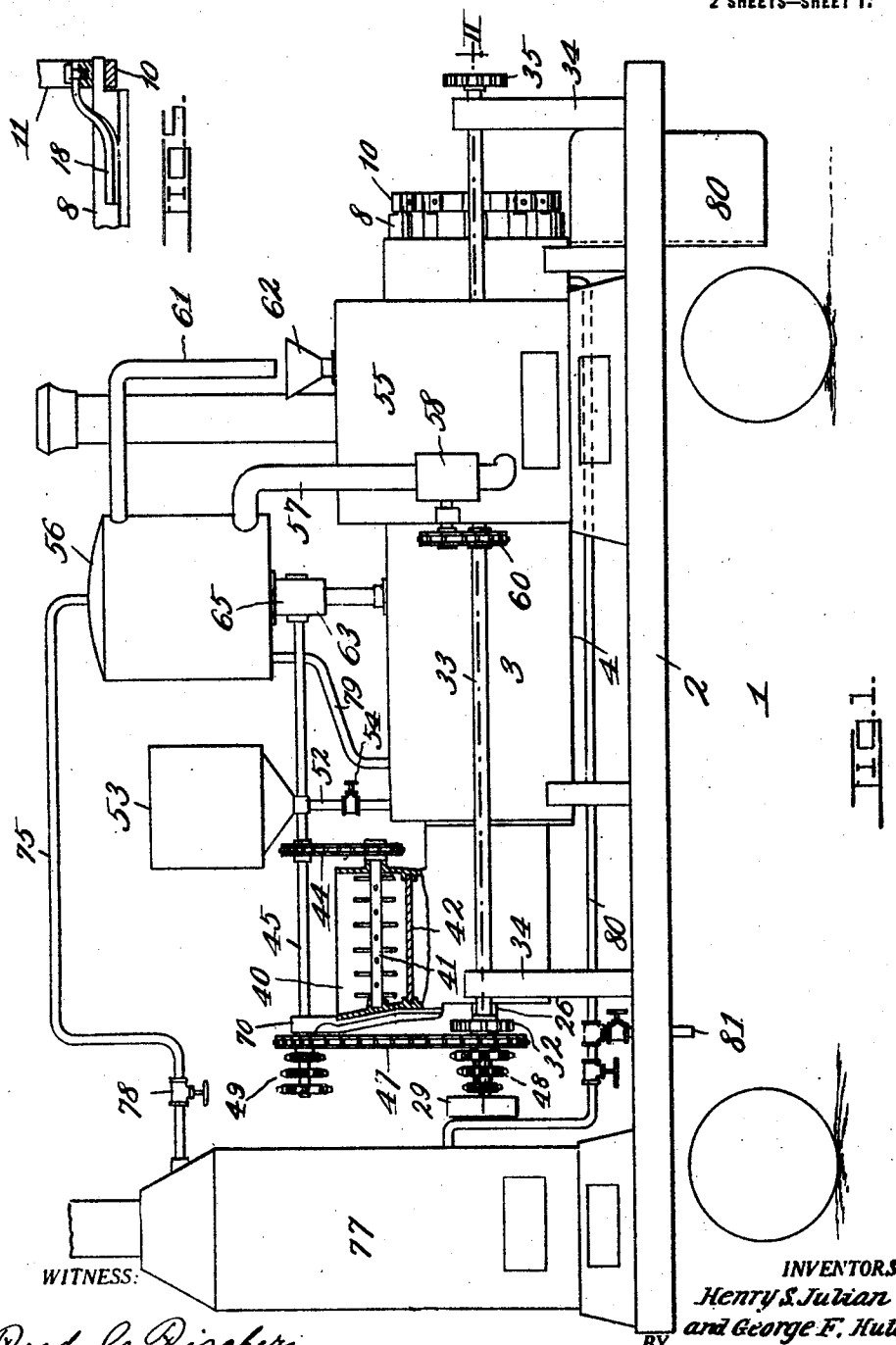


FIG. 1.

FIG. 5.

WITNESS:

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INVENTORS:
Henry S. Julian
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BY

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2 SHEETS—SHEET 2.

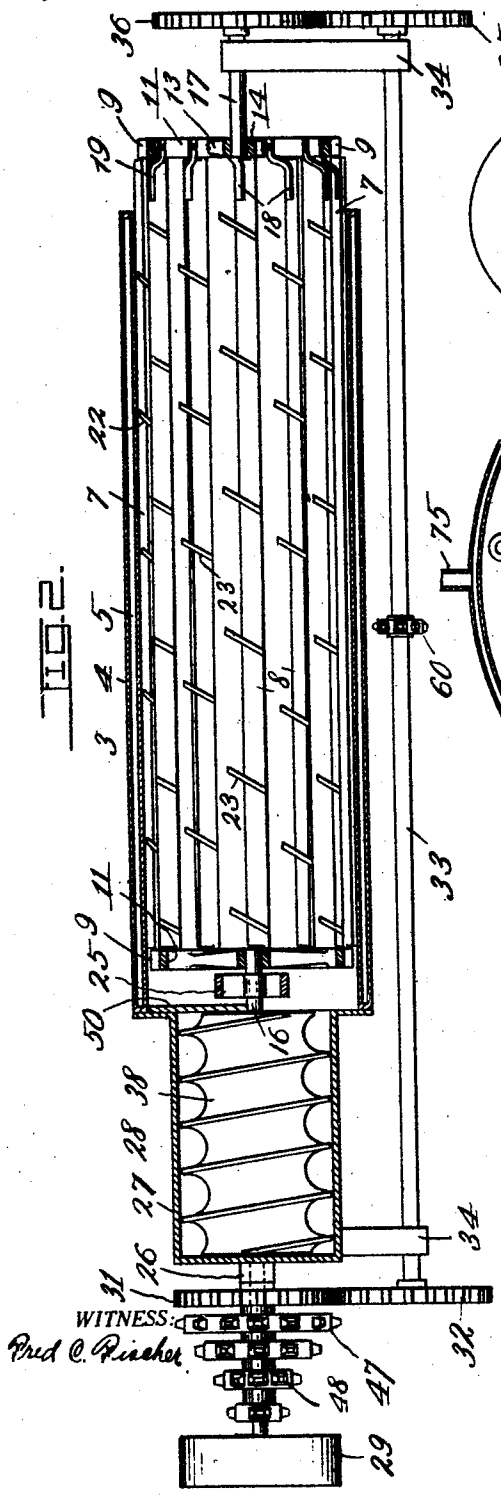


FIG. 2.

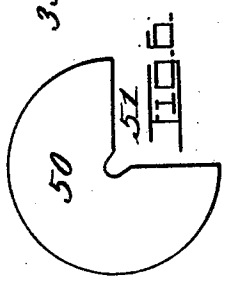


FIG. 6.

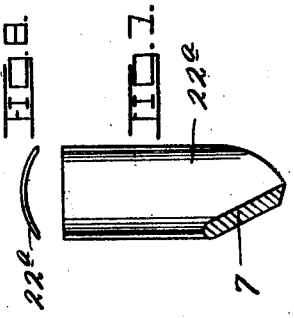


FIG. 8.

FIG. 7.

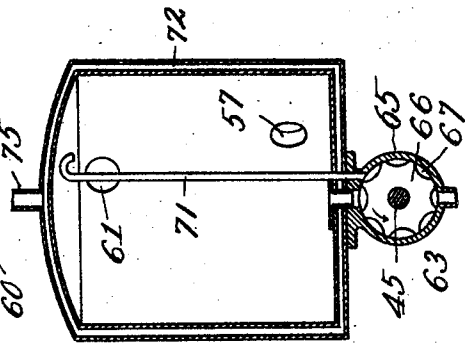


FIG. 4.

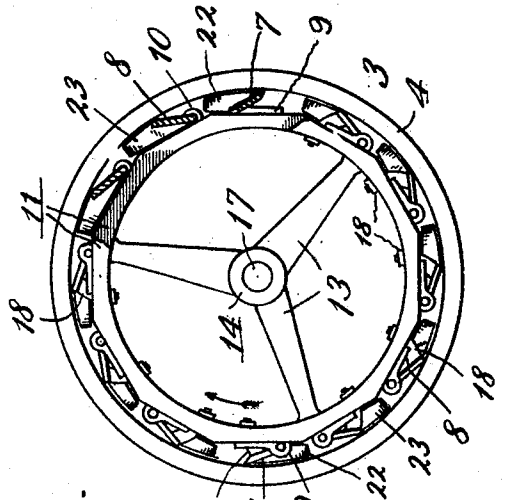


FIG. 3.

WITNESS:
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UNITED STATES PATENT OFFICE.

HENRY S. JULIAN AND GEORGE F. HUTCHINGS, OF KANSAS CITY, MISSOURI.

APPARATUS FOR MIXING ROAD OR OTHER MATERIAL.

1,332,987. Specification of Letters Patent. Patented Mar. 9, 1920.

Application filed April 24, 1917. Serial No. 164,118.

To all whom it may concern:

Be it known that we, HENRY S. JULIAN and GEORGE F. HUTCHINGS, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Apparatus for Mixing Road or other Materials, of which the following is a specification.

Our invention relates to apparatus for mixing road materials, such for instance as earth and a suitable binder, as for example, asphaltum. We find that the best results are obtained by first saturating the earthy material with water, then mixing it with the binder which has been previously heated and is maintained in a heated condition with the earthy material during the mixing operation. We also find it best to combine the materials in certain proportions, so that the resultant composition will be of uniform quality throughout.

Generally stated the object of our invention is to provide new and useful apparatus for preparing, proportioning and heating the different materials preparatory to combining them and whereby the necessary steps are all combined in a unitary apparatus, preferably, mounted upon a truck, so that said apparatus can be readily moved forward from time to time, as the work of surfacing a road with the composition progresses.

Other objects of the invention will hereinafter appear, and in order that said invention may be fully understood, reference will now be made to the accompanying drawings, in which:

Figure 1 is a side elevation, partly in section of the apparatus, constructed in accordance with our invention.

Fig. 2 is a horizontal section on line I—I of Fig. 1, of the mixer and a feeder for conducting a portion of the material to said mixer.

Fig. 3 is an elevation, slightly enlarged and partly in section, of the discharge end of the mixer.

Fig. 4 is a vertical sectional view of a measuring tank employed in carrying out the invention.

Fig. 5 is an enlarged broken detail of one end of a spreader and associated elements constituting part of the mixer.

Fig. 6 is a detail elevation of a partition interposed between the feeder and the mixer.

Fig. 7 is a cross section of a scraper and a modified form of flight thereon.

Fig. 8 is an end view of said flight.

When the apparatus is to be moved over a road to be surfaced with the composition, we prefer to employ a wheeled vehicle 1, provided with a platform 2 upon which the apparatus is mounted.

3 designates the mixer in which the different materials are thoroughly intermixed. Said mixer embodies a horizontal tubular jacket 4, having a chamber 5 for the introduction of a suitable heating agent, such for instance as steam, whereby the materials are maintained in a heated state while being mixed and during their passage through the mixer. Said mixer 3 also embodies a plurality of scrapers 7 and spreaders 8 pivotally mounted at their ends in bearings 9 and 10, respectively, secured to annular heads 11 provided with spokes 13 radiating from hubs 14, one of which is fixed upon a drive shaft 16 and the other upon a stub shaft 17. The scrapers 7 and the spreaders 8 are, preferably, in the form of longitudinal bars, the free sides of which are yieldingly held in contact with the interior surface of the jacket 4 by springs 18 and 19, respectively. The rear ends of the scrapers 7 and the spreaders 8 project beyond the discharge end of the jacket 4, so that the rear head 11 will not impede the discharge of the composition which is free to pass through the spaces between the scrapers and the spreaders. This arrangement also gives ready access to the rear bearings 9 and 10, so that the scrapers 7 and the spreaders 8, can be readily removed in case of damage thereto.

Suitable flights 22 and 23 are applied to the scrapers 7 and the spreaders 8, respectively, to coact therewith in mixing the materials, and said flights are disposed at an angle so as to gradually force the materials toward the discharge end of the mixer 3.

The drive shaft 16 is journaled near one end in a bearing 25 depending from the upper interior portion of the jacket 4, and near its other end in a bearing 26 at one end of a casing 27 of a feeder 28. The outer end of the shaft 16 is provided with a pulley 29, whereby it is driven. Said drive

shaft 16 is also provided with a cog wheel 31, which drives a cog wheel 32 fixed upon one end of a countershaft 33 journaled in bearings 34 and provided at its opposite end with a cog wheel 35, which intermeshes with a cog wheel 36 fixed upon the stub shaft 17. By providing the counter shaft 33 and its cog wheels, the rotary portion of the mixer 3 is relieved of torsional stresses while in operation. This arrangement also obviates the necessity of extending the drive shaft 16 through the mixer and having it clog or interfere with the passage of the materials.

The feeder 28 embodies the casing 27 and a worm 38 whereby the earthy or other suitable material is fed to the mixer. The earthy material is supplied to the feeder 28 through a hopper 40, superimposed on the casing 27 and provided with an agitator 41 embodying spaced fingers to prevent the material from banking in the hopper 40. A slide 42 in the bottom of the hopper 40 regulates the passage of earthy material to the feeder, so that it will be supplied to the latter in proper proportion to the other materials which enter into the composition. The agitator 41 is driven by sprocket gearing 44 driven by a shaft 45 which in turn is driven from the drive shaft 16 through the intermediacy of sprocket gearing 47. The shafts 16 and 45 have sprocket wheels 48 and 49, respectively, so that the shaft 45 can be driven at different speeds when desired.

A partition 50 is placed at the discharge end of the feeder 28 and has an opening 51 through which the earthy material passes into the mixer 3. As the earthy material enters the mixer 3 from the feeder 28 it is reduced to a soft plastic state, so that it can more readily intermix with the binder. The reduction of the earthy material is accomplished with a suitable liquid, such as water, which is introduced into the forward end of the mixer through a pipe 52 leading from a supply tank 53. A valve 54 fitted to the pipe 52 serves to regulate the quantity of water introduced into the mixer.

55 designates a melting tank in which the asphaltum or other binder is reduced to a fluid state, so that it may be intimately intermixed with the earthy material. The melted binder may, if desired, be introduced directly into the mixer 3 from the melting tank 55, but it is preferable to first conduct it to a measuring tank 56, which is accomplished through the intermediacy of a pipe 57 and a pump 58, which latter is driven from the countershaft 33 by means of a sprocket gearing 60.

In order that an attendant may readily determine if the measuring tank 56 is being supplied with binder an overflow pipe 61 leading from the upper portion of said measuring tank 56 is provided and discharges into a funnel 62 communicating with the melting tank 55. A space is left between the discharge end of the overflow pipe 61 and the top of the funnel 62, so that the binder may be observed as it discharges from said overflow pipe.

A measuring device 63 leading from the lower portion of the tank 56 to the interior of the mixer 3 is provided for introducing the proper quantity of binder to the mixer. Said measuring device embodies a casing 65 and a rotary member 66 having pockets 67 which hold a predetermined quantity of binder. The rotary member 66 is mounted upon and driven by the shaft 45, which is journaled in the casing 65 and a bearing 70 fixed to the hopper 40. An air pipe 71 leads upwardly through the tank 56 from the casing 65 to carry off any air which may become entrapped in the pockets 67 and thus interfere with the free flow of asphaltum into said pockets.

The measuring tank 56 has a surrounding chamber 72 for the introduction of a heating agent whereby the binder in said tank is maintained in a fluid state. Any suitable heating agent may be employed, but we find that steam introduced through a supply pipe 75 from a boiler 77 is satisfactory as it can be easily regulated by a valve 78 fitted to the pipe 75. For the sake of economy, the steam utilized in heating the measuring tank 56 is introduced through a pipe 79 into the chamber 5, for heating the mixer 3. After circulating through the chamber 5 the steam returns to the boiler 77 through a pipe 80. Should the return pipe 80 become clogged with the water of condensation it can be blown out into the atmosphere through a valve controlled pipe 81.

The operation briefly stated is as follows: The melting tank 55 is supplied with a binder which is normally in the form of a solid, and the hopper 40 is supplied with earthy matter or other suitable material, which is fed by the feeder 28 into the receiving end of the mixer 3, where it is reduced to a plastic state by water from the supply tank 53. The plastic material is then spread out over the interior surface of the jacket 4 by the spreaders 8 and carried through the mixer by the flights 22 and 23. In its passage to the discharge end of the mixer the plastic material is treated with the binder received from the measuring tank 56, and is thoroughly intermixed with said binder through the action of the spreaders 8 and the flights 22 and 23. All materials which adhere to the interior of the jacket 4 is removed by the scrapers 7, two of which are preferably employed. As the spreaders 8 trowel or spread the material over the interior surface of the jacket 4 their free margins may yield and release any gravel or small stones which may enter with the earthy material. The scrapers 7 may like-

wise free themselves of any gravel which may pass between them and the interior surface of the jacket. As the materials become intimately mixed into the desired composition the same is discharged from the rear end of the mixer and drops through a delivery chute 80, upon the surface of the road or into a suitable receptacle whereby it may be transported to any portion of the road.

The modified flight 22^a is somewhat similar to the flights 22, except that it is slightly concaved as disclosed by Fig. 8.

The term earthy material used throughout the specification refers to sand, clay, loam, etc.

From the foregoing description it is apparent that we have provided a unitary and highly efficient machine for intermixing difrenent kinds of materials in predetermined quantities in a manner to reduce the cost of preparing a composition which is impervious to water and will form a durable wear-resisting road surface, and while we have shown and described the preferred form of our invention, we reserve the right to make such changes in the construction, proportion and arrangement of parts as properly fall within the spirit and scope of the claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent, is:

1. In an apparatus of the character described, a mixer having an inlet opening at one end and a discharge opening at its opposite end, means for supplying said mixer at its inlet end with earthy material, means for regulating such supply to the mixer, means adjacent the inlet end of the mixer for wetting said earthy material, and means for supplying the mixer adjacent its outlet end with a binder to be intermixed with the wet earthy material.

2. In an apparatus of the character described, a mixer, means for supplying said mixer with earthy material, means for saturating said earthy material, means for supplying said mixer with a binder to be intermixed with the saturated earthy material, means for heating the binder supply means, and means leading from said binder supply means to the mixer to heat the same.

3. In an apparatus of the character described, a hopper to receive material, a rotary agitator embodying spaced fingers in said hopper to prevent the material therein from packing, a mixer, a worm feed for receiving the material and forcing it into the mixer, a slide to regulate the passage of material from the hopper to said worm feed, and means adjacent the discharge end of the mixer for supplying the same with a binder to be intermixed with the aforementioned material.

4. In an apparatus of the character described, a mixer, means for supplying said mixer with earthy material, a melting tank for melting a binder to be intermixed with the material, a measuring tank for supplying the binder to the mixer, means for forcing the binder from the melting tank to said measuring tank, and means for conducting a portion of the binder from the measuring tank back into the melting tank, said means having an opening whereby the binder passing back into the melting tank may be observed.

5. In an apparatus of the character described, a mixer, means for supplying said mixer with material, means for supplying the mixer with a binder to be intermixed with the afore-mentioned material, rotary heads mounted in the mixer, spreaders pivotally-mounted on said rotary heads to spread and intermix the material and the binder, and flights on said spreaders to coact therewith in mixing the material and the binder and also to discharge the resultant composition from the mixer.

6. In an apparatus of the character described, a mixer, rotary means in said mixer to intermix materials therein and discharge them from the mixer, rotary scraper means for scraping the materials from the inner surface of the mixer, and resilient means for yieldingly holding said scraper means against the inner surface of the mixer.

7. In an apparatus of the character described, a mixer, rotary means in said mixer to intermix materials therein and discharge them from the mixer, pivotally-mounted rotary scrapers in the mixer to scrape the materials from the inner surface thereof, and flights on said scrapers to assist in intermixing the materials and discharge the resultant composition from the mixer.

8. In an apparatus of the character described, a mixer, rotary means in said mixer to intermix materials therein and discharge them from the mixer, a pivotally-mounted scraper mounted to rotate with the rotary mixing means in the mixer to scrape the material from the interior thereof, and resilient means to yieldingly-hold said scraper against the interior of the mixer.

9. In an apparatus of the character described, a mixer embodying a cylinder open at both ends, pivotally-mounted rotary spreaders in said cylinder, and means to yieldingly-hold said spreaders against the interior surface of the cylinder.

In testimony whereof we affix our signatures, in the presence of two witnesses.

HENRY S. JULIAN.
GEORGE F. HUTCHINGS.

Witnesses:
F. G. FISCHER,
L. J. FISCHER.