

No. 778,558.

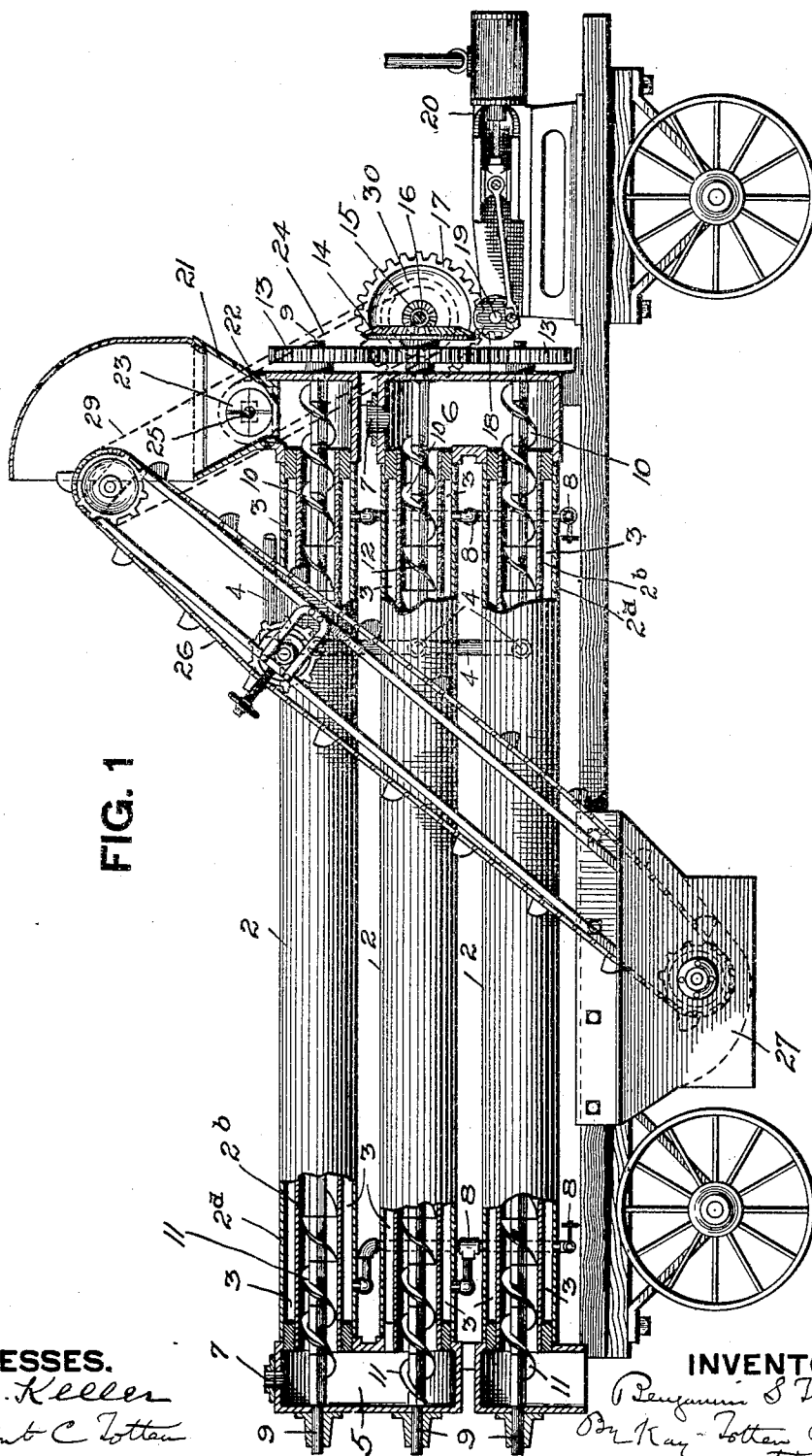
PATENTED DEC. 27, 1904.

B. S. TRUXAL.
APPARATUS FOR TREATING ASPHALT.

APPLICATION FILED MAR. 3, 1904.

4 SHEETS—SHEET 1.

FIG. 1



WITNESSES.

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Robert C. Lottan

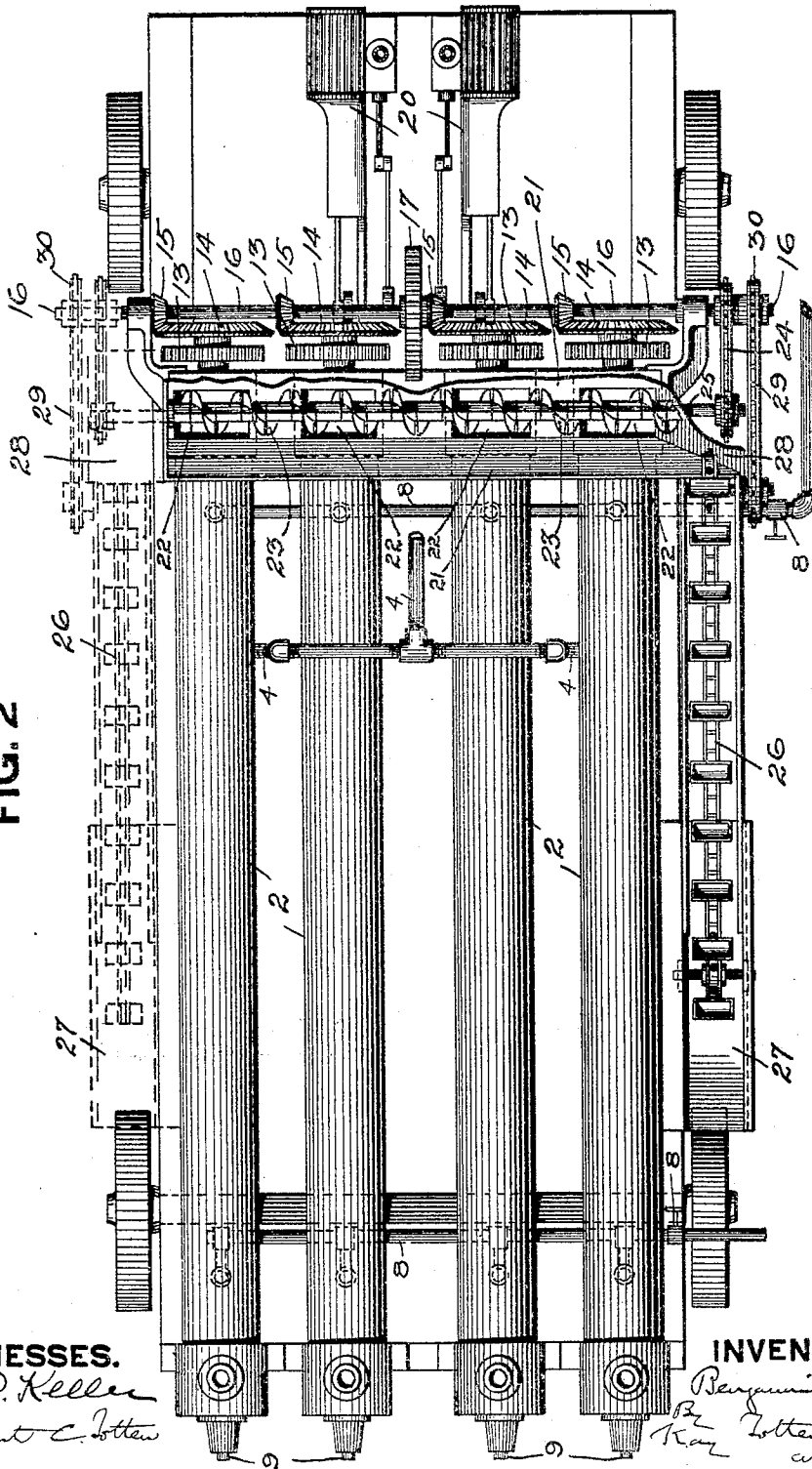
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4 SHEETS—SHEET 2.

FIG. 2



WITNESSES.

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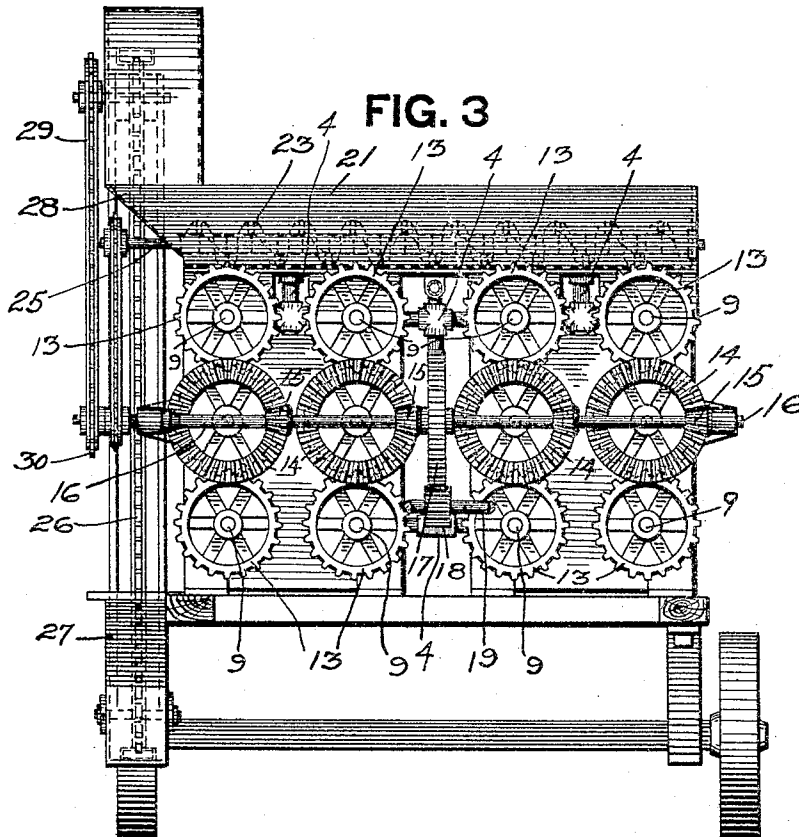
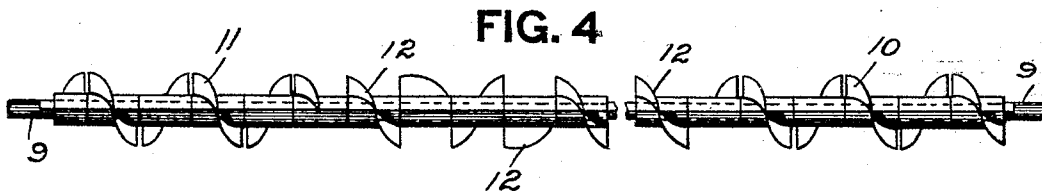
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4 SHEETS—SHEET 3.



WITNESSES.

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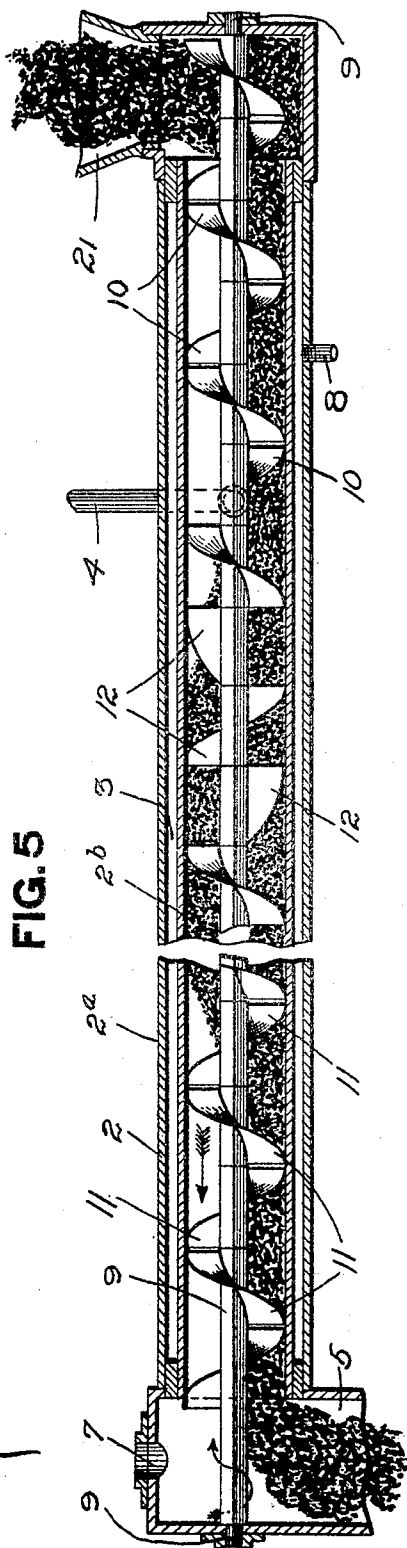
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

BENJAMIN S. TRUXAL, OF CHATTANOOGA, TENNESSEE, ASSIGNOR TO
WILLIAM C. THOMA, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR TREATING ASPHALT.

SPECIFICATION forming part of Letters Patent No. 778,558, dated December 27, 1904.

Application filed March 3, 1904. Serial No. 196,438.

To all whom it may concern:

Be it known that I, BENJAMIN S. TRUXAL, a resident of Chattanooga, in the county of Hamilton and State of Tennessee, have invented a new and useful Improvement in Apparatus for Treating Asphalt; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for treating asphalt, and more especially for what is commonly known as "rock-asphalt."

Heretofore in the treatment of rock-asphalt preparatory to its use in the paving of streets, sidewalks, &c., it has been usually customary to crush the rock to the requisite degree of fineness and then introduce the same into a large pan or vessel to which heat is applied from below for the purpose of heating the asphalt to bring it to the proper condition for use. Where the crushed asphalt is heated in a vessel or pan of this character, the heat is not evenly or uniformly distributed through the mass, so that some portions of the asphalt are overheated, while other portions are not sufficiently heated.

The object of my invention is to provide apparatus for the treating of the asphalt by means of which the heat is so applied as to uniformly heat the mass of asphalt and at the same time the asphalt so broken up or disintegrated as to provide substantial uniformity of product.

To these ends my invention comprises the novel features hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a sectional elevation of my improved apparatus. Fig. 2 is a top plan view of the same. Fig. 3 is an end elevation, on an enlarged scale, of the apparatus. Fig. 4 is an enlarged view of the conveyer removed. Fig. 5 is an enlarged longitudinal section of a tube, showing the action of the conveyer on the material therein.

Like numerals indicate like parts in each figure.

The numeral 2 designates suitable tubes or conduits, preferably arranged in columns of two or more, as indicated. The tubes 2 have hollow walls which may be conveniently formed by the use of two tubes, one inside the other, the outer one, 2^a, being of greater diameter than the inner one, 2^b, so as to leave a space 3 between said tubes. These tubes may be mounted upon a stationary frame or, as indicated, may be mounted upon a wagon-frame or other portable support, by means of which the apparatus may be transferred from one point to another. The portable construction will be found very convenient where it is desired to treat the asphalt at the point of use—as, for instance, where in the paving of a thoroughfare the asphalt may be prepared on the spot and used directly as it comes from the apparatus.

Steam or any other suitable heating medium is supplied to the space 3 between the inner and outer tubes through a system of pipes 4. As the apparatus will probably in most instances be driven by a steam-engine, the steam may also be supplied from the same boiler for heating the tubes. Heated air, however, might be used where conveniently obtained.

At their rear ends the upper and middle inside tubes are connected by a passage 5, and at the front the lower and middle inside tubes are connected by a passage 6, so that a continuous passage is formed through each column or row of tubes. In the apparatus illustrated there are four columns of tubes employed; but this number may of course be varied as the capacity of the apparatus demands. The inner tubes are provided with vents 7, which are for the purpose of permitting the escape of the volatilized light oils and moisture which are contained in the asphalt and which are given off when the heat is applied. The stop-cocks 8 are also provided for draining off any condensation from the space between the tubes. This water may be conveyed to a suitable receptacle and used again in the boiler for the generation of steam.

Within the inner tubes and journaled in suitable bearings at each end thereof are the shafts 9. These shafts 9 are provided with

spiral blades or vanes and are preferably arranged as follows: At the inner and outer ends of the shafts 9, extending for a portion thereof adjacent to the ends, the spiral blades or conveyers are continuous, as at 10 and 11, and intermediate of these continuous portions the spiral vanes or blades 12 are arranged alternately, so as to break joint with each other, and thus leave open spaces between the different vanes. By this construction the asphalt when first introduced into the tube is carried forward by the continuous spiral screw 10, and when the spiral vanes 12 are reached the progress of the asphalt through the tube is slower, and owing to the mutilated arrangement of said blades the asphalt is permitted to fill up the tube, so that it is brought into contact with the heating-surface of the tube, or its entire circumference, and at the same time is stirred up by the individual blades in such a way that the heat is permitted to attack the individual particles of the mass and act to heat and disintegrate the entire body of material, whereby a more uniform product is obtained. As the asphalt is carried through the tube at this slow rate of speed, greater opportunity is given the heat to affect the entire mass of the asphalt, and when the material reaches the continuous spiral 11 it is advanced thereby at a greater rate of speed and discharged into the passage 5 with some force, so that it drops down and is taken up by the continuous spiral at that end of the tube just below. By this construction there is no danger of crowding or jamming of the material at the entrance and discharge ends of the tube, while in the intermediate portion the mutilated conveyer retards the progress of the material and the spaces between the vanes permit of the filling up of the tube, so that, as indicated in Fig. 5, the asphalt is brought into contact with the entire circumference of the tube and a more thorough heating of the same is obtained. The outer ends of the shafts 9 are provided with the gears 13, which intermesh with each other, the middle shaft of each column being prolonged to carry the bevel-gear 14, which meshes with a suitable bevel-gear 15 on the shaft 16. Adjacent to the center of the shaft 16 is the gear 17, which meshes with the gear 18 on the engine-shaft 19. Any suitable form of engine 20 may be provided for driving the shaft 19, all as illustrated.

A hopper 21 is provided having openings 22 leading into the forward ends of the upper tubes, whereby the material is admitted from said hopper to said tubes. Within the hopper 21 is the spiral conveyer 23, which is driven by sprocket-chains 24, passing over suitable sprocket-wheels on the shafts 16 and 25. The crushed asphalt is supplied to the hopper 21 by means of a suitable chain elevator 26, which lifts the material from a boot or receptacle 27 near the bottom of the ele-

vator, and the material lifted by said elevator is deposited upon the inclined apron 28, which directs it into the hopper 21. The sprocket-chain 29, taking over a suitable sprocket-wheel 30 on the shaft 16, serves to drive the elevator 26. If desired, this elevator 26 may be constructed so that it may be shifted, if desired, to the opposite side of the machine, as indicated in dotted lines, Fig. 2.

When my improved apparatus is in use, the crushed asphalt is deposited in the boot of the elevator and conveyed thereby and deposited into the hopper 21. Steam meanwhile having been admitted by the pipes to the space 3 between the tubes, the inner tubes become highly heated. The asphalt introduced into the hopper 21 is carried by the conveyer 23 across the hopper, so that the asphalt is fed to all the openings leading to the upper row of tubes. The asphalt when introduced into the tubes is quickly taken up by the continuous spiral adjacent to the end of the tube and is carried into the tube, where the mutilated spiral permits it, as before stated, to move more slowly and to fill up the tube, so that the heat is enabled to affect the entire mass, and at the same time the spiral blades tend to mix and agitate the mass, so that the particles are broken up and disintegrated, while at the same time subjected more fully to the influence of the heat. The mass is conveyed slowly through the tube until it approaches the rear end, where the continuous spiral conveys it forward at a more rapid rate of speed and deposits it into the passage 5, where it passes down to the tube below, to be taken up and carried through by the spiral conveyer of that tube, being still further heated, mixed, and disintegrated until it is discharged into the passage 6, to continue through the same process in its passage through the lowest tube of the column. When discharged from the lowest tube of the column, the asphalt has been so treated as to be in proper condition for immediate use, when it may be used directly for purposes of paving or may be conveyed in suitable vehicles to the point of use. By the arrangement of tubes illustrated the apparatus may be condensed, so as to occupy as little space as possible, while at the same time the asphalt is exposed to the action of the heat for sufficient length of time to effect the proper treatment.

It is apparent that many changes and modifications of my improved apparatus may be made without departing from the spirit of the invention. So I do not wish to confine myself in any way to the arrangement of apparatus shown and described. Within the term "tube" as used in the claims I wish to include any suitable receptacle having a passage-way of suitable length for giving the required length of treatment to the asphalt.

What I claim is—

1. In apparatus for treating asphalt, the

combination of a suitable tube, means for conveying the asphalt through said tube at a certain rate of speed for a portion of its length adjacent to the entrance end thereof, means for conveying said asphalt beyond said first-named portion of said tube at a slower rate of speed, whereby the material is crowded so as to fill up the tube beyond said first-named portion, and means for heating the asphalt during its passage through said tube.

2. In apparatus for treating asphalt, the combination of a suitable tube, means for conveying the asphalt through said tube at a certain rate of speed for portions of its length adjacent to its ends, means for conveying said asphalt intermediate of said first-named portions of said tube at a slower rate of speed, and means for heating the asphalt during its passage through said tube.

3. In apparatus for treating asphalt, the combination of a suitable tube, a spiral conveyer in said tube having a continuous spiral blade at each end thereof for a portion of its length, said conveyer having a mutilated blade portion intermediate of said continuous blade portions, and means for heating said asphalt during its passage through said tube.

4. In apparatus for treating asphalt, the combination of a tube, a conveyer-shaft within said tube, spiral conveying-vanes arranged

on said shaft to break joint with each other for a portion of the length of said shaft, and a continuous spiral conveyer on said shaft for a portion thereof adjacent to the ends, and means for heating the asphalt within said tube.

5. In apparatus for treating asphalt, the combination of two or more tubes in substantially parallel relation to each other, and connected at alternate ends by connecting-chambers, means for conveying the asphalt through said tubes consecutively, means for heating said asphalt during its passage through said tubes, and vents formed in the connecting-chambers of said tubes.

6. In apparatus for treating asphalt, the combination of a tube, a shaft within said tube and extending longitudinally thereof, a series of spiral conveying-vanes on said shaft arranged to break joint with each other for a portion of the length of said shaft, a continuous spiral conveyer on said shaft adjacent to the entrance end of the said tube, and means for heating the asphalt within said tube.

In testimony whereof I, the said BENJAMIN S. TRUXAL, have hereunto set my hand.

BENJAMIN S. TRUXAL.

Witnesses:

ROBT. D. TOTTEN,
G. KREMER.