

J. HINES.
 APPARATUS FOR TREATING ROAD MAKING MATERIAL.
 APPLICATION FILED OCT. 19, 1910.

1,049,581.

Patented Jan. 7, 1913.

3 SHEETS—SHEET 1.

FIG 1

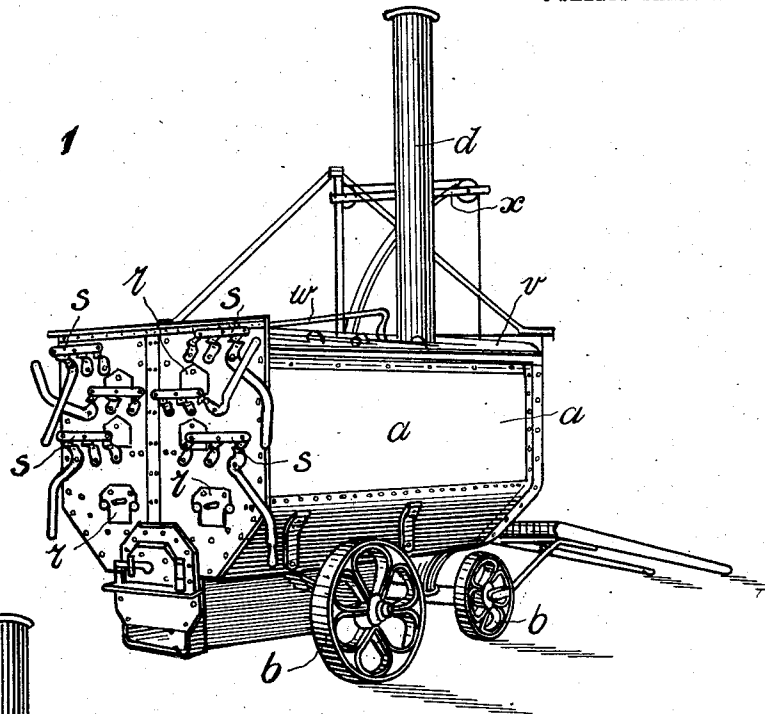
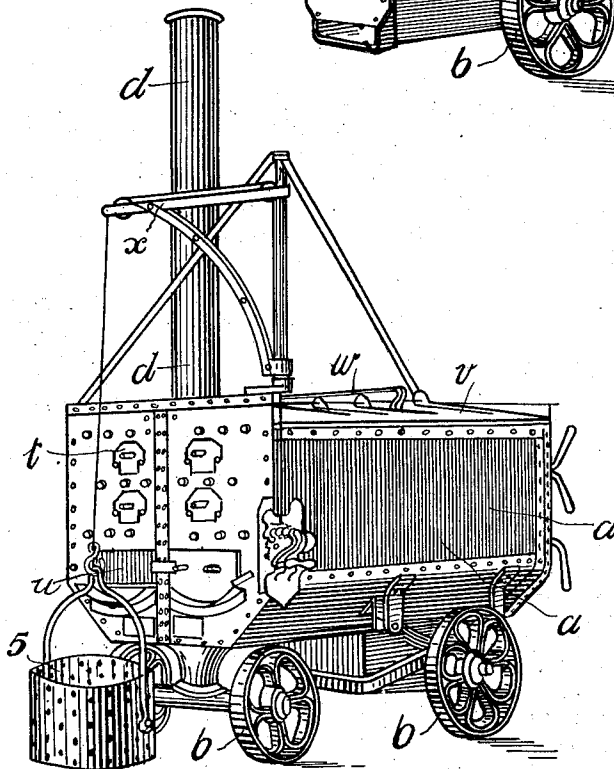


FIG 2



Witnesses
 M. Schmid.
 E. Hymann

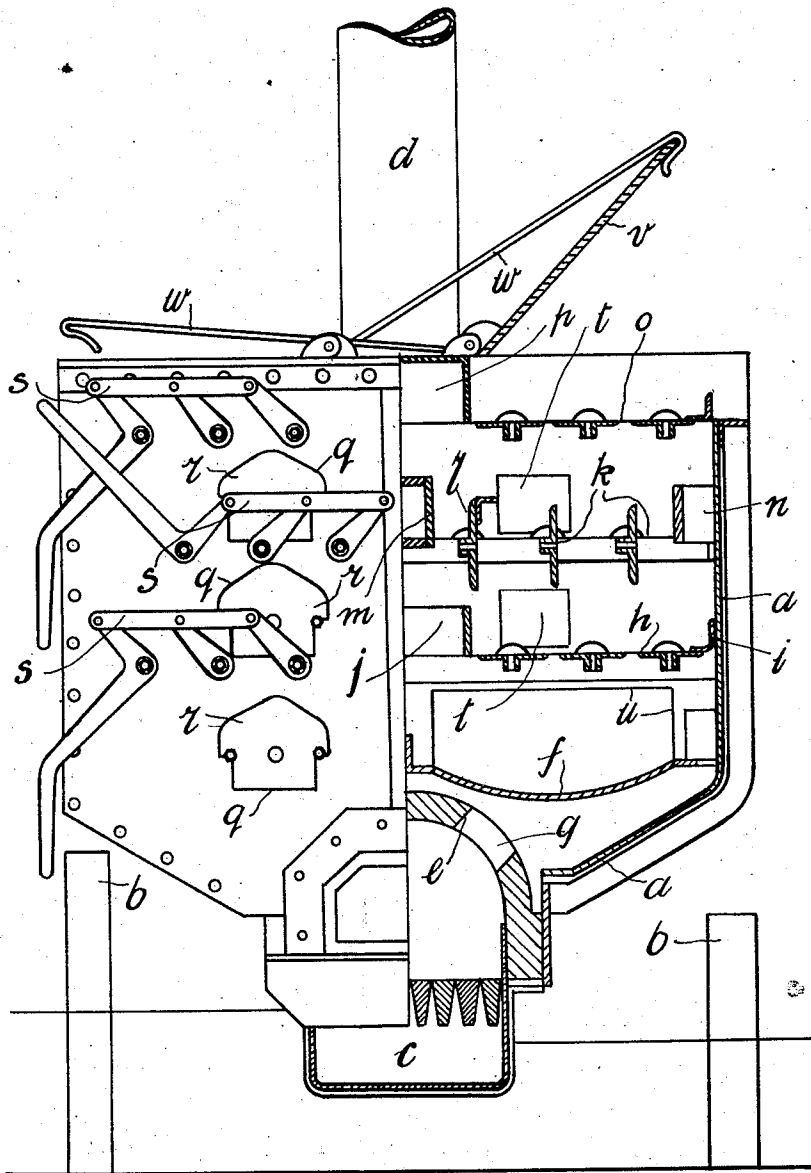
Inventor:
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FIG 3



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3 SHEETS—SHEET 3.

FIG 4

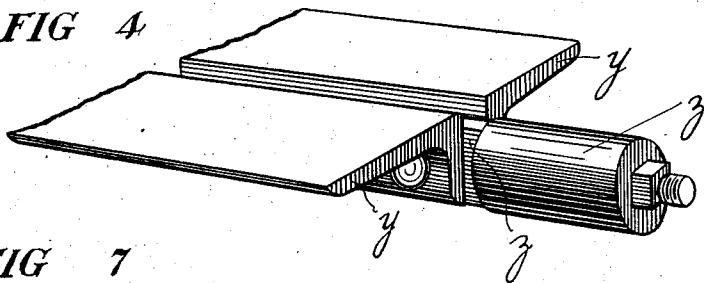


FIG 7

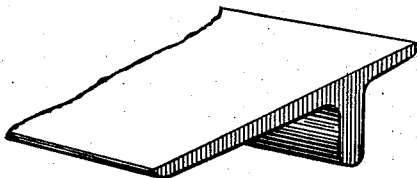


FIG 5

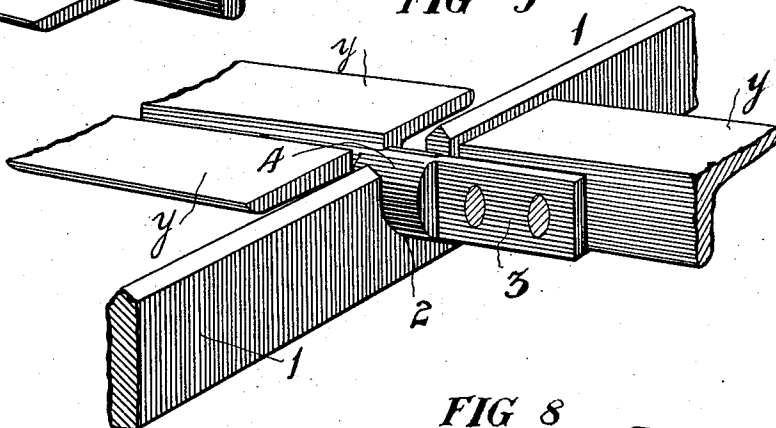


FIG 8

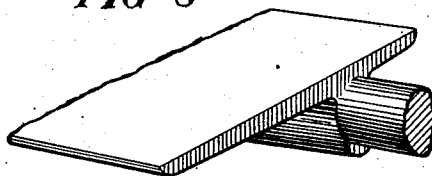
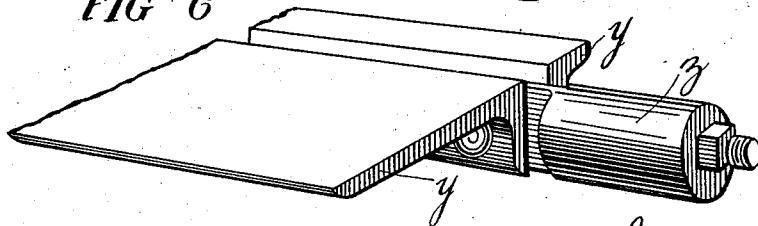


FIG 6



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN HINES, OF ST. LEONARDS-ON-SEA, ENGLAND.

APPARATUS FOR TREATING ROAD-MAKING MATERIAL.

1,049,581.

Specification of Letters Patent.

Patented Jan. 7, 1913.

Application filed October 19, 1910. Serial No. 587,982.

To all whom it may concern:

Be it known that I, JOHN HINES, a subject of the King of Great Britain, residing at Sedlescombe Lodge, Sedlescombe Road, St. Leonards-on-Sea, England, have invented certain new and useful Improvements in Apparatus for Treating Road-Making Material, of which the following is a specification.

10 As a means for preventing the formation of dust on road and like surfaces it has been the practice in some cases to build the road of stone, sometimes of various grades, which has been thoroughly coated with tar or like
15 material. A tarred macadam road is thus formed which is found to have considerable endurance owing to the binding nature of the materials used, also owing to this binding nature the road material is not crumbled
20 and broken up and ultimately powdered under heavy traffic as in the case of ordinary macadam roads and the formation of dust is thus very largely, at any rate, prevented. In building such roads at present the
25 stone or other material used is tarred in bulk at a works and conveyed to the site of the road to be built and is thus frequently exposed for a considerable time and is also subject to much shaking and rough handling
30 which tends to deteriorate the dressing or coating. The value of dressing the stone, etc., at the site of the building of the road has long been realized but although this has been frequently attempted by means of such
35 crude arrangements as open fires or fire buckets for drying the stone before coating, and although more than one special machine has been proposed, there is no practical portable apparatus known capable of rapidly
40 treating the stone, etc., either in summer or winter. The difficulty experienced has been owing to the amount of moisture to be driven out of the stone, etc., before the coating can be effectively given.

45 The present invention provides a very simple and easily handled apparatus which is portable and is adapted to rapidly heat and dry the stone, as well as handle it for conveying it to the liquid for coating and

remove it therefrom in a condition convenient for application to the road.

In the present invention I employ a suitable shell on a wheeled frame with suitable heating provision, preferably a grate supported at the underpart of the shell and
55 means for charging and discharging the material. In the shell I arrange a series of shelves which are pivotal or are built up of a series of plates each of which is pivotal. The latter is the preferred form and each
60 plate of each shelf I may pivot by means of trunnions at the end carried into bearings in the end plates of the shell. By continuing the trunnions at one end through the
65 shell and providing them with suitable operating gear I may operate the plates of each shelf simultaneously. Preferably below the tilting plates I arrange a fixed shelf which is above the grate and forms a final hot
70 plate from which the material may be withdrawn by scraping or otherwise. Such a shelf may be removable if desired so as to bodily remove the material. In one position the pivotal plates are horizontal and form
75 shelves for receiving the stone etc. with small spaces forming heat passages, and when operated the plates of each shelf may be simultaneously turned to an inclined or nearly vertical position thus discharging
80 any material resting on them through the spaces between them and onto the next shelf or onto the final heating shelf.

The plates of the shelves may be conveniently formed each of two angle-section members arranged back to back and the pivots
85 may be centrally disposed by employing tag like pieces secured between the angle section members.

In some cases it may be desirable to arrange the pivot of each plate out of center; 90 the surface of the plate then projects more on one side of the pivot than the other so that when material is resting upon it there will be more weight on one side of the pivot than the other. If the plates formed in this
95 manner are arranged for operation so that the longer surface is the side of the plate which has a downward movement in tilting,

it will be seen that the weight assists the action of tilting so that the operation of tilting several plates (forming one shelf) together may be easily operated by hand. By this arrangement the pivots are not subjected to great strain during operation.

In order that the invention may be thoroughly understood and easily carried into practical effect I have appended hereunto 3 sheets of drawings illustrating my invention.

Figure 1 is a perspective view of the apparatus in the form of a road vehicle. Fig. 2, is a similar view to Fig. 1 but looking toward the other end of the machine. Fig. 3, is a larger scale view than the previous figures and one half is shown in section. Fig. 4, is a perspective view showing the formation of one of the tilting plates and the method of providing it with a pivot. Fig. 5, is a perspective view showing a support and bearing for the center portion of a tilting plate. Fig. 6, shows the plate built up with its pivot eccentrically disposed. Figs. 7 and 8 show the plate formed in one piece.

These drawings show the preferred embodiment of the invention in which the portable apparatus is in the form of a wheeled machine or vehicle; this may be drawn by horse or tractor or may be driven by motive power and forms a very convenient machine which can readily be moved to the site of the work and during operations can follow up the work as it progresses so that hand conveying of the material may be dispensed with as much as possible.

As will be seen the machine comprises a suitable shell *a* strongly built and stayed and mounted upon wheels *b* and provided with a grate *c* and chimney *d*. It is preferred to arch over the grate with firebrick as at *e* leaving flues for the hot gases to pass up into the interior of the shell. Above the grate in this machine are two slightly dished plates *f* one on each side of the longitudinal axis of the machine. The plates *f*, only one of which is seen at Fig. 3 owing to half that figure only being shown in section, form final hot plates. Flues such as *g* at the sides enable the gases to pass these plates where the gases come in contact with a shelf composed of tilting plates *h*. The plates *h* when in horizontal position as at Fig. 3 fit up against the side wall of the shell as at *i* and at the center of the machine reach to the side of a girder member *j*. A similarly disposed set of plates are on the left hand side of the machine, Fig. 3, and the girder bordering them at the center is disposed to leave a space between it and the member *j* so that the gases may pass from the side flues *g* toward the center and up between the members *j*.

Above the shelf of plates *h* is a similar shelf *k* but the composing plates are disposed

nearer to the center of the machine so that when in horizontal position the flanged part *l* seats against the closed girder member *m* and prevents the gases passing up by this member. This disposition of the plates leaves a space at the sides and a flue *n* is thus formed at each side of the machine. Above this shelf *k* a further shelf *o* is formed of plates as before and these are arranged in the same position as the lower shelf of plates *h* so that the passage for the gases is left at the center *p* where they pass up to the chimney *d*. At one end of the machine the fire door is arranged and one or more openings *q* for inspection and like purposes are provided. The openings *q* have removable doors or covers *r* and when these are removed the openings form air inlets for admitting air over the shelves to sweep out the moisture driven out of the material treated and facilitate drying. The pivots of the tilting plates composing the shelves may be carried through this end plate and are provided with operating arms which may be coupled up in the manner shown at *s* Figs. 1 and 3, so that one hand lever may simultaneously operate a complete shelf comprised of several tilting plates.

At the other end of the machine further inspection and air inlet openings *t* may be provided and a large opening *u* is provided for each of the hot plates *f*. These openings *u* are fitted with removable or hinged covers and enable material lying on the plates to be readily scraped out.

In the machine illustrated hinged covers *v* are provided with retaining devices such as *w* for holding up the covers or lids when the machine is being charged.

The machine is provided with a jib or jibs such as *x* for facilitating handling of the material.

The construction of the composing plates of the shelves is of considerable importance and details are shown at Figs. 4 to 8 of the constructions that may be followed.

Fig. 4, shows to a larger scale the construction shown at Fig. 3. The plates are each composed of rolled flanged section members such as *y* bolted or riveted together through the flanges. To form pivots a tag like part *z* is employed and secured between the flanges of the members leaving a trunnion for working in a bearing in the end plate of the machine. This construction separates the members *y* slightly so that small spaces are formed up which the hot gases and air may pass direct to the stone or other material to be treated.

When the shelves are arranged from end to end of the machine it is preferable to provide supports to prevent sagging. A convenient arrangement is shown in Fig. 5; a transverse bearer *1* is provided with a se-

ries of bearings such as 2 and the plates are divided and connected by a bar 3 having a bearing portion 4. Although this forms a convenient arrangement other supporting devices may be followed.

At Fig. 6, is shown a manner of forming the composing plates with eccentrically disposed pivots; in this case one wide and one narrow section member are employed and are secured and provided with a pivot in the manner set forth with reference to Fig. 4.

Each plate may be formed in one piece as a rolled member as at Fig. 7. The pivots may then be formed by cutting away the body of the end parts and leaving a portion of the web projecting. The projecting part may be formed to form a trunnion as at Fig. 8.

In operation a fire is lighted on the grate and after heating up a little stone or other material to be used for forming the dustless road is shoveled or otherwise charged onto the top shelves *o*. Subsequently the plates of these shelves are tilted by the mechanism *s* and the material is dumped between the plates onto the next shelves *k*; more material is then filled in on the top shelves and the second shelves are in turn tilted (see Fig. 3) to dump onto the bottom shelves *h*. The top shelves are again operated and recharged so that all shelves are kept working. After drying on the shelves in its path down the apparatus the material is finally dumped onto the hot plates *f* where it encounters a greater heat. During operation the openings *g* and *t* and maybe *u* also may be uncovered to admit air for carrying off the moisture from the stone etc. and assisting the drying operation.

The mechanism for tilting the plate is preferably arranged so that the plates of one shelf tilt in one direction and the next move in the opposite direction so that the stone is thrown in various ways and the surfaces of the pieces constantly changed over so that they are more effectually brought into contact with the heat.

From the final hot plates the material may be scraped into a bucket or buckets such as 5 which can be readily manipulated with assistance of a jib or jibs *x* and the hot and dry stone may be dipped into tar or like material and coated in the desired manner ready for use in the road making operations proceeding at the site where the machine is working. The tar, etc., may be heated (if it is desired to heat it) in an ordinary tar boiler or a suitable tank might be carried by the apparatus for this purpose.

It will be seen that the successive beds, from the lowermost to the uppermost within the casing, are so disposed with respect to the casing structure that the entire volume of the products of combustion is limited to

the path whereby it is carried across the bottom of each bed, in one direction, and then upwardly across the top of each bed in another direction and in a successive zigzag course to the outlet. By means of this construction substantially the full efficiency is obtained from the products of combustion and the successive beds from the lowermost to the uppermost are successively heated to temperatures decreasing with respect to the general direction of flow of the products of combustion. In other words, the lowermost bed will be heated to the highest temperature and the next uppermost bed will not be heated to such a high temperature and therefore when the tiltable sections are tipped the material can be successively lowered into zones of gradually increasing temperature until the material reaches the final heating bed *f*. The arch *e*, which may be of refractory material, is provided with flues *g* for passage of the gases and the said arch functions as a protector to prevent overheating or burning of the material on the final hot bed *f*. It will thus be seen that applicant provides a final hot plate closely adjacent to the grate and which is, to a great extent, protected from direct contact with the greatest heat radiating from the fire bed, whereas above the final hot plate *f*, the remaining beds are subjected to direct action to the products of combustion which, at those points, has lost a certain percentage of heat so that there would be no danger of burning the material on the upper bed.

It will be understood that I do not wish to be limited to the specific construction shown except for such limitations as the claims enforce.

What I claim then is:

1. An apparatus for treating road making material comprising in combination, a casing structure, a grate in the lower portion of said structure and an outlet in the upper portion thereof, a plurality of superposed beds in said casing structure disposed in the path of the products of combustion passing from the grate to said outlet, devices supporting said beds in alternate spaced and closed lateral relation with said casing structure at opposite sides of successive beds thereby limiting the flow of the entire volume of the products of combustion across the bed bottoms in one direction and over the bed tops in another direction and heating the beds and their contents to temperatures gradually increasing inversely with respect to the direction of flow of the products of combustion, those beds above the lowermost beds having tiltable sections whereby the material may be dumped from bed to bed to zones of gradually increasing temperature, substantially as described.

2. An apparatus for treating road making

material comprising in combination, a casing structure having a grate in its lower portion and an outlet in its upper portion, a plurality of superposed heating beds disposed in the path of the products of combustion flowing from said grate to said outlet, the lower bed being in relatively closed relation with respect to said grate, and a protecting shield interposed between said grate

and the lowest bed, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN HINES.

Witnesses:

FRANK ASTON,

E. DAWSON HARDCASTLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."