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SYSTEM FOR PREPARING BITUMINOUS CONGLOMERATES

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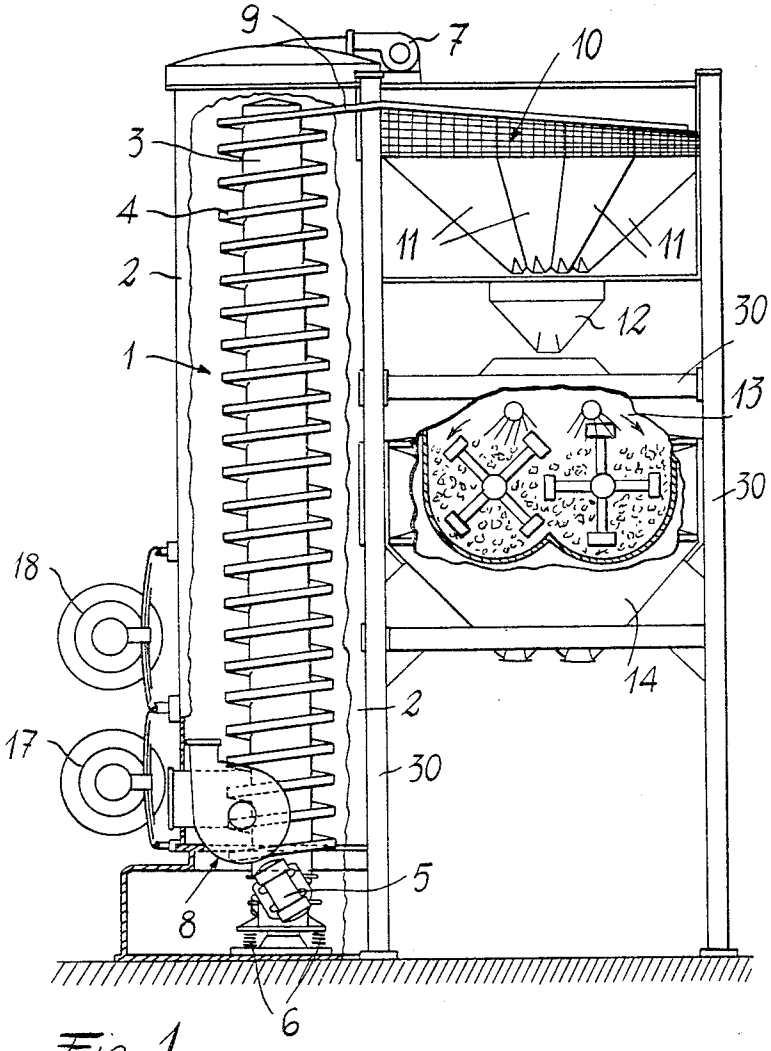


Fig. 1

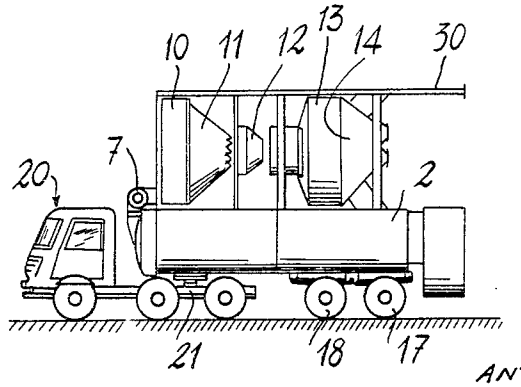


Fig. 2

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SYSTEM FOR PREPARING BITUMINOUS CONGLOMERATES

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ABSTRACT OF THE DISCLOSURE

A system for preparing bituminous conglomerates, comprising a spiral elevator subjected to controlled vibrations. The material designed to form the conglomerate is loaded at the bottom of the elevator spiral and due to vibrations thereof ascends to its top being counter-current striken by the hot gases of a fuel burner. From the top of the spiral elevator the material is moved to a screen and therefrom to a metering device and hence to a mixer where it is washed down with bitumen, and finally unloaded.

This invention relates to an automatic system for preparing bituminous conglomerates, such as those used for forming featheredges or the like.

Present known systems for preparing such bituminous conglomerates substantially comprise a bucket elevator carrying inert materials (pebble gravel, crushed stones and the like) to the top of a stationary installation, where there are located a drying oven, a rotating screen for material selection and, below the latter, bitumen weighing and spraying devices and finally a store magazine provided with a hopper for conglomerate unloading on lorries or the like.

Known systems are stationary, particularly owing to the provision of the drying oven which is heavy and bulky and is located at the top of each system. Moreover, such systems require frequent servicing, particularly as to the bucket elevator which undergoes a substantial wear, as a result of the very hard type of material (pebble gravel and crushed stones) violently contacting the buckets.

A serious drawback in known systems also consists in that the material (pebble gravel, crushed stones and the like) is exposed in the drying oven they are provided with to the direct contact of a burner flame, in many cases (depending on the nature of said material) this material causing the flaking of the inerts, with a resulting undesirable increase in filler and sand.

It has also been found that often the combustion occurring in the drying oven of each system is not perfectly effected, and this because of the particular environment in which the fuel is burning, so that deposits of carbonaceous residuals and fatty particles peculiar to combustion on the material to be dried; such deposits would successively prevent the bitumen from contacting and binding with the material to form the conglomerate.

A still further drawback occurring in known systems is in that the oven walls forming the same have to be made of special steel and of a high thickness in order to resist the high mechanical stress occurring therein at an operating temperature of about 500–600° C.

A last or final drawback in known systems is in that the heating therein of the material to be dried occurs while said material travels a short transfer path, so that the operating temperature in the oven has to be very high, such as in the order of 500–600° C., and fuel consumption and running costs are as much high.

It is the object of the present invention to overcome the above mentioned drawbacks.

Particularly, it is an object of the invention to provide a system in which the material to be dried travels at a substantially evenly distributed state a very long path during its movement from bottom to top of the system, on this movement the material being progressively heated to complete drying and never coming to directly contact the heating flame.

Further objects are to provide a system devoid of the usual heavy and expensive drying oven, which can be made of ordinary steel and having walls of a normal thickness, forming an integral unit and finally capable of being easily and readily transported from one location to another.

These and other objects are attained in a system comprising a rigid framework, a spiral elevator having a substantially vertical axis, a housing enveloping said elevator, at the bottom of the elevator means for loading granular material or the like, a fuel burner adjacent the upper end of the elevator, means for moving said material from the upper end of the elevator to said screen, material collecting chambers located below said screen, an apparatus for drawing metered amounts of material from said chambers and introduction thereof into a mixer, means for washing down the material with bitumen, and means for unloading the material as washed down with bitumen and mixed from the system.

In order that the structure and characteristics of the system be more clearly disclosed, an embodiment thereof will now be described, as shown by mere way of example and not in a limiting sense, reference being made to the accompanying drawing, in which:

FIGURE 1 is an elevational, partly sectional, and schematic view of a system at utilization position; and

FIGURE 2 is a schematic view of the system at a rest position and as hooked to a motor vehicle for transportation thereof.

First referring to FIGURE 1, it will be seen that the system comprises a rigid framework **30**, a spiral elevator, designated as a whole at **1**, being restrained thereto and enclosed within a cylindrical casing **2** and substantially formed of a large central tube **3** provide with an external spiral **4**, along which the material to be dried ascends (such as pebble gravel, crushed stones and the like), said material being loaded as usual through a hopper located at the bottom of the elevator and not shown for sake of simplicity, the upward movement of the material along spiral **4** occurring by the action of vibrations imparted to the elevator by eccentric weight vibrators **5**, acting on said tube which is mounted to a stationary base on springs **6**.

The structure and operation of the spiral elevator are not described in detail as being of a well known type, although never used in systems similar to that herein described: for example, many elevators of the spiral vibrating type are manufactured and marketed in Italy by Venanzietti Vibrazioni S.A. in Milan.

The material slowly upward carried by the spiral elevator is counter-current striken by hot combustion gases generated by an ordinary burner **7** disposed forwardly of casing **2**. The combustion gases of said burner **7** are intaken by an intake fan wheel **8** at the bottom of casing **2**.

The upper end of spiral **4** of the elevator has an extension **9** connecting said spiral **4** with a screen **10** located at the top of framework **30**, said screen being caused to permanently vibrate either by a rigid connection to spiral **4**, or by a quite self-contained and ordinary vibrator, not shown in the drawing for sake of simplicity. As usual, said screen **10** is divided into a plurality of sectors of different meshes, each of the sectors overhanging independent hopper storing chambers **11** allowing the metering of the several material sizes as desired. Mate-

rial metering is provided at a well known type of ordinary station, designated by numeral **12**. Below said station **12** there is provided a well known device **13** for mixing the various aggregates of different sizes and in which the washing down of the mixed material is accomplished, said washing down being effected with bitumen as drawn by autoclave, not shown for sake of simplicity. Finally, the system is completed by a storing chamber **14** provided with an unloading hopper.

The structure and operation for the elements of the system which are fast with framework **30**, that is screen **10** and elements underlying thereto, have not been described in detail as already well known. They are disclosed, for example, at page 34 of the Italian translation of the text "Asphaltic Concrete" published by Shell; at page 172 of the Italian translation of U.S. text, "The Asphalt Handbook," published by Shell; at pages 322–323 of text, "Pavimentazioni Stradali," by Ingg. Bruno Bolis and Aldo Di Renzo, published by Hoepli, etc.

According to a preferred embodiment, the system is provided at the side related to said spiral elevator with pairs of wheels **17** and **18** mounted on two axes supported, as usual, by leaf springs.

The operation of the system as described may be summarized as follows: the material, designed to form the bituminous conglomerate, is loaded at the bottom of elevator **1** and lifted by said spiral elevator due to vibrations resonantly imparted to springs **6** by said vibrators **5**. On ascending along said elevator, the material is counter-current striken by combustion gases and heat generated by burner **7**, such gases being downward intaken by intake fan wheel **8**. Thus, the material reaches the top of the elevator, being unloaded therefrom into said vibrating screen **10** and divided thereby into the respective chambers **11**, then being weighted and metered, mixed and washed down with bitumen within device **13** and stored within chamber **14**, from which it can be directly unloaded onto lorries or the like.

The whole system can be easily and readily transported (see FIGURE 2) with the aid of an ordinary driving means provided with a truck **21**, after being overturned to rest on the ground through said pairs of wheels **17** and **18**.

It should be noted that the length of elevator spiral **4** is very considerable, such as of about 140 meters, so that the material ascending therealong from bottom to top ends in an interval of about 5–8 minutes, is capable of gradually and progressively heating, letting time for the moisture within said material to evaporate, thus enabling a thorough drying of the material, thus providing, on the other hand, for a substantial reduction in fuel consumption.

The material ascending along the elevator does not directly contact the burner flame and is at a quite moderate temperature environment, thus avoiding flakings in the material with formation of filler and sand. For this purpose, it should be reminded that in known systems the material often suddenly directly contacts the flame which has a temperature of about 1200–1400° C., which would cause the above mentioned drawbacks.

Since, as already stated, the maximum operating temperature of the system is rather low, the system itself can be made of ordinary steel and walls of a normal thickness, which is not the case in known systems.

Finally, it will be appreciated that the system, owing to its structural simplicity, can be carried out to form an integral unit which, as already stated, can be easily and readily transported from one location to another.

What I claim is:

1. A system for preparing bituminous conglomerates, comprising a rigid framework, a spiral elevator having a substantially vertical axis, a casing enveloping said elevator, means for loading granular material or the like at the bottom of said elevator, a fuel burner, adjacent one end of the elevator, a screen adjacent the top end of the elevator, means for moving said material from said top end of the elevator to said screen, means for imparting a vibration to said elevator and screen respectively, material storing chambers below said screen, an apparatus for a metered drawing of the material from said chambers and introduction thereof into a mixer, means for washing down the material with bitumen, and means for unloading the mixed and washed down material with bitumen from the system.

2. A system according to claim **1**, wherein said burner is located adjacent the top of the elevator and wherein an intake fan wheel is provided at the bottom of said elevator.

3. A system according to claim **1**, wherein at least one pair of wheels are supported at a side of said system.

References Cited

UNITED STATES PATENTS

1,007,689	11/1911	Guelich	259—156 X
2,805,052	9/1957	Preeman	259—159
2,945,683	7/1960	Martinson	259—159
3,347,533	10/1967	Maudlin	259—156

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259—164