Oct. 5, 1937. W. B. SLEMMER 2,095,086

AGGREGATE DRIER

Filed May 1, 1936 2 Sheets-Sheet 1

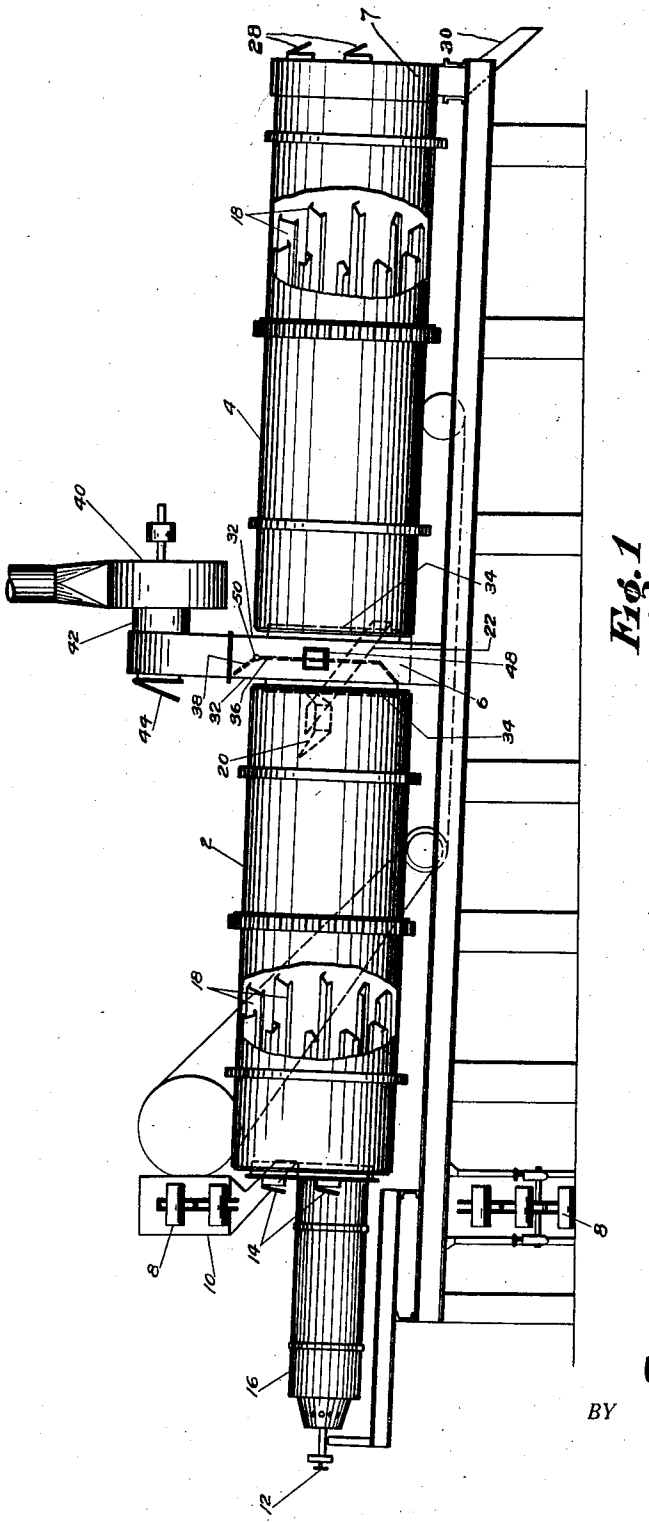

Fig. 1

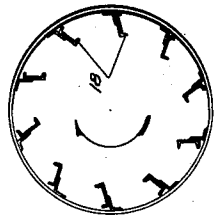

Fig. 2

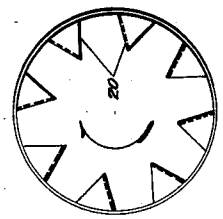

Fig. 3

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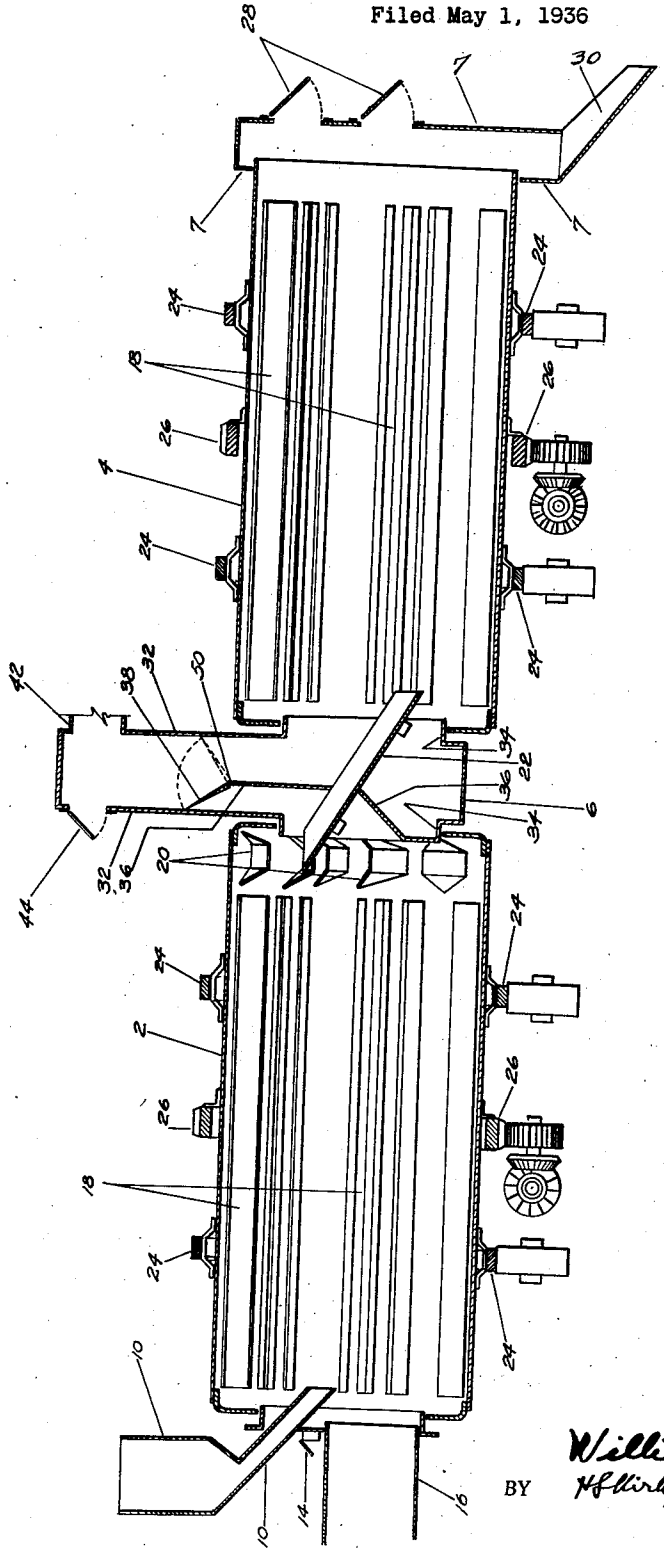

FIG. 4

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UNITED STATES PATENT OFFICE

2,095,086

AGGREGATE DRIER

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Application May 1, 1936, Serial No. 77,340

7 Claims. (Cl. 34—6)

This invention relates to an aggregate drier for use in the pavement industry in which it is necessary to dry and cool crushed rock, gravel, sand and the like, or mixtures of such aggregate material, preparatory to adding thereto asphaltic binding material in order to secure, in such aggregate material, dry surfaces to which the asphaltic binder will adhere in a proper and effective manner.

In the drawings:—

Fig. 1 is an elevation of the apparatus of this invention;

Fig. 2 is a section through a drum showing ordinary lifting flights which assist the aggregate through the drums;

Fig. 3 is a section showing the discharge troughs; and

Fig. 4 is a longitudinal cross-section through the entire apparatus.

Referring to the drawings in which like numerals represent like parts,—

The apparatus involves two separate downwardly inclined drums, 2 and 4 which, as shown, are preferably axially aligned and placed end to end adjacent one another though spaced apart by a housing 6, common to each drum, including a partition 36, as hereinafter more fully described. The rock, gravel, sand or mixture of the same, comprising the aggregate to be dried is fed to the drums by a conveyor 8 which delivers the aggregate to a chute 10, down which the material gravitates and is directed into the interior of the charging end of the drum 2 where it is subjected to the heated products of combustion from an oil burner 12, the temperature of said products being controlled by the adjustment of the burner 12 and by the adjustable cold air intake ports 14 provided at the charging end of the drying drum 2, into which are projected through the combustion chamber 16 the products of combustion from burner 12. The drying drum is mounted for rotation, as well understood in the art, and is provided internally with a series of aggregate lifting flights 18 which serve to lift and then let fall the aggregate, and which flights 18, because of the inclined axis of the drum, promote progress of the aggregate toward the outlet end through the drying drum 2. Near the outlet end of the drum 2 and in fixed relation thereto is arranged a series of discharge troughs 20 which lift the aggregate that has traversed said drum 2 and from which the aggregate is deposited on to a fixed chute 22 by reason of the lifting done by the said troughs 20. The aggregate thus deposited on to fixed chute 22 is transferred by gravity through the housing 6 by chute 22 and into the charging end of a second drum 4, normally a tempering or cooling drum. This drum 4 is equipped with flights similar to the flights 18 in drum 2 which cause the aggregate to be raised and let fall and to advance through drum 4 which is also mounted for rotation, the two drums being separately carried by the rings 24 and separately rotated through the medium of the respective gears 26. The outlet or discharge end of drum 4 is enclosed in the housing or chamber 7 which is closed except for the opening through which the aggregate discharge chute 30 passes and the adjustable air intake means 28 by which the admission of cold air into drum 4 is regulated.

The intermediate housing 6 is provided with end walls 32 closely adjacent the respective ends of the drums 2 and 4, each of said walls having a circular opening therein equipped with circular flanges 34 projecting into the opening of each drum, thus connecting the housing on one side with the drum 2 and on the other side with the drum 4. The housing 6 is divided by means of the partition 36, preferably imperforate except for the opening through which the chute 22 passes. Connected to the partition 36, however, at one edge thereof is an adjustable gate 38 pivoted on axis 50 to regulate the relative amounts of air or gas freely and axially drawn from each drum by means of an exhauster 40 connected to the housing by exhaust pipe 42. The housing 6 is also equipped with an adjustable air intake damper 44, by means of which air may be directly admitted to the exhauster 40 without first having passed through either drum. By means of the exhauster 40 the products of combustion and air are drawn straight through the revolving drying drum 2 in an unobstructed passage and axially and directly out of the drying drum 2 and out into the stationary housing 6 without interference with or from air being drawn axially and directly from drum 4. Much of the heating of the aggregate in the drum 2 is by reason of the contact of such aggregate with the hot gases being projected into and drawn through drum 2 and, similarly, much of the cooling of the aggregate after having been deposited by the trough 20 on, and passed down through the chute 22 into, the drum 4, is because of the contact of the aggregate with the cold air being drawn through the drum 4. There is therefore in the structure of this invention, an entire separation of the functions of the drums without interference with one another for there is no path by which heat

may be conducted from one drum to the other as would be the case if it were attempted, as has heretofore been proposed, to conduct both operations in a single drum, in which case the section of the single drum corresponding to applicant's drum 4 would be heated both by conduction through the metal of the shell of the drum and by more or less of the hot gases which due to their momentum would be carried into this section of the drum even though avenues of escape may have been provided at the end of the heating section of the drum. Control of the relative volumes of heated and cooled air, passing through the respective drums 2 and 4 and axially discharged therefrom, is by means of the gate 38 heretofore referred to, and further control is provided by means of the damper 44 which, for example in cold weather, when open, serves to reduce the aggregate volume of air and/or the heated products drawn through said drums 2 and 4,—particularly the latter since less cold air is required to cool the product during the prevalence of low atmospheric temperatures. An additional advantage of the structure of this invention as herein described lies in the fact that through the door 48 in the housing 6 there may be withdrawn, manually or automatically, as desired samples of the aggregate so as to immediately ascertain the temperature thereof and observe whether or not sufficient moisture has been removed therefrom as said aggregate passes into the cooling drum,—thus to make proper regulation of the heating and tempering of the aggregate by said drums.

Having described my invention what I claim is:—

1. In an aggregate drier of the kind described, a revoluble drying drum, means to charge the drying drum with aggregate, a series of flights in said drum adapted to lift and advance aggregate therein, a heater at the charging end of said drum, a closure with an air inlet at said end, an aggregate transfer device to receive aggregate dried by said drum and discharge the heated aggregate therefrom, a cooling drum separate and spaced from said drying drum and arranged to receive said heated aggregate, a closure for the discharge end of said cooling drum and an air inlet therefor, closure means for the discharge end of said drying drum and for the charging end of said cooling drum, said aggregate transfer device extending through said closure means from said drying drum to said cooling drum, and an exhauster connected through said closure means with said discharge end of said drying drum and with the charging end of said cooling drum.

2. In an aggregate drier of the kind described, a revoluble drying drum, means to charge the drying drum with aggregate, a series of flights in said drum adapted to lift and advance aggregate therein, a heater at the charging end of said drum, a closure with an adjustable air inlet at said end, an aggregate transfer device to receive aggregate dried by said drum and discharge the heated aggregate therefrom, a cooling drum separate and spaced from said drying drum and arranged to receive said heated aggregate, a closure for the discharge end of said cooling drum and an adjustable air inlet therefor, closure means for the discharge end of said drying drum and for the charging end of said cooling drum, said aggregate transfer device extending through said closure means from said drying drum to said cooling drum, and an exhauster connected through said closure means with said discharge end of said drying drum and with the charging end of said cooling drum.

3. In an aggregate drier of the kind described, a revoluble drying drum, means to charge the drying drum with aggregate, a series of flights in said drum adapted to lift and advance aggregate therein, a heater at the charging end of said drum, a closure with an air inlet at said end, an aggregate transfer device to receive aggregate dried by said drum and discharge the heated aggregate therefrom, a cooling drum separate and spaced from said drying drum and arranged to receive said heated aggregate, a closure for the discharge end of said cooling drum and an air inlet therefor, closure means including a partition separating the discharge end of said drying drum and the charging end of said cooling drum, said aggregate transfer device extending through said partition from said drying drum to said cooling drum, and an exhauster separately connected through said closure means with said discharge end of said drying drum and with said cooling drum.

4. In an aggregate drier of the kind described, a revoluble drying drum, means to charge the drying drum with aggregate, a series of flights in said drum adapted to lift and advance aggregate therein, a heater at the charging end of said drum, a closure with an adjustable air inlet at said end, an aggregate transfer device to receive aggregate dried by said drum and discharge the heated aggregate therefrom, a cooling drum separate and spaced from said drying drum and arranged to receive said heated aggregate, a closure for the discharge end of said cooling drum and an adjustable air inlet therefor, closure means for the discharge of said drying drum and for the charging end of said cooling drum, said aggregate transfer device extending through said closure means from said drying drum to said cooling drum, an exhauster connected through said closure means with said discharge end of said drying drum and with said cooling drum, and means for varying the relative volumes of gas and air withdrawn from said drums.

5. In an aggregate drier of the kind described, a revoluble drying drum, means to charge the drying drum with aggregate, a series of flights in said drum adapted to lift and advance aggregate therein, a heater at the charging end of said drum, a closure with an air inlet at said end, a fixed trough to receive aggregate dried by said drum and discharge the heated aggregate therefrom, a cooling drum separate and spaced from said drying drum and arranged to receive said heated aggregate, a closure for the discharge end of said cooling drum and an air inlet therefor, closure means for the discharge end of said drying drum and for the charging end of said cooling drum including a partition separating said drums and having said trough extending through said partition and into said cooling drum, and an exhauster connected through said closure means with said discharge end of said drying drum and with the charging end of said cooling drum.

6. In an aggregate drier of the kind described, a revoluble drying drum, means to charge the drying drum with aggregate, a series of flights in said drum adapted to lift and advance aggregate therein, a heater at the charging end of said drum, a closure with an adjustable air inlet at said end, an aggregate transfer device to re-

ceive aggregate dried by said drum and discharge the heated aggregate therefrom, a cooling drum separate and spaced from said drying drum and arranged to receive said heated aggregate, a closure for the discharge end of said cooling drum and an adjustable air inlet therefor, closure means for the discharge end of said drying drum and for the charging end of said cooling drum, said aggregate transfer device extending through said closure means from said drying drum to said cooling drum, and an exhauster separately connected through said closure means with said discharge end of said drying drum and with said cooling drum.

7. In an aggregate drier of the kind described, a revoluble drying drum, means to charge the drying drum with aggregate, a series of flights in said drum adapted to lift and advance aggregate therein, a heater at the charging end of said drum, a closure with an air inlet at said end, a fixed trough to receive aggregate dried by said drum and discharge the heated aggregate therefrom, a cooling drum separate and spaced from said drying drum and arranged to receive said heated aggregate, a closure for the discharge end of said cooling drum and an air inlet therefor, closure means for the discharge end of said drying drum and for the charging end of said cooling drum, said fixed trough extending through said closure means from said drying drum to said cooling drum, and an exhauster connected through said closure means with said discharge end of said drying drum to draw heated air and combustion products therethrough, and also connected through said closure means with said cooling drum to draw relatively cool atmospheric air therethrough.

WILLIAM B. SLEMMER.