

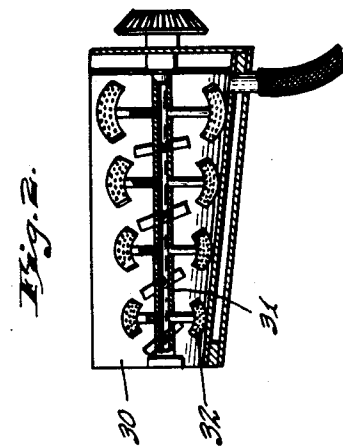
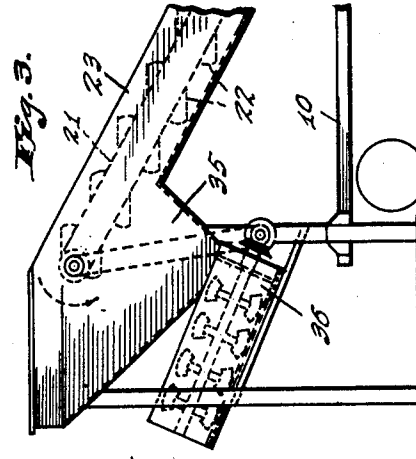
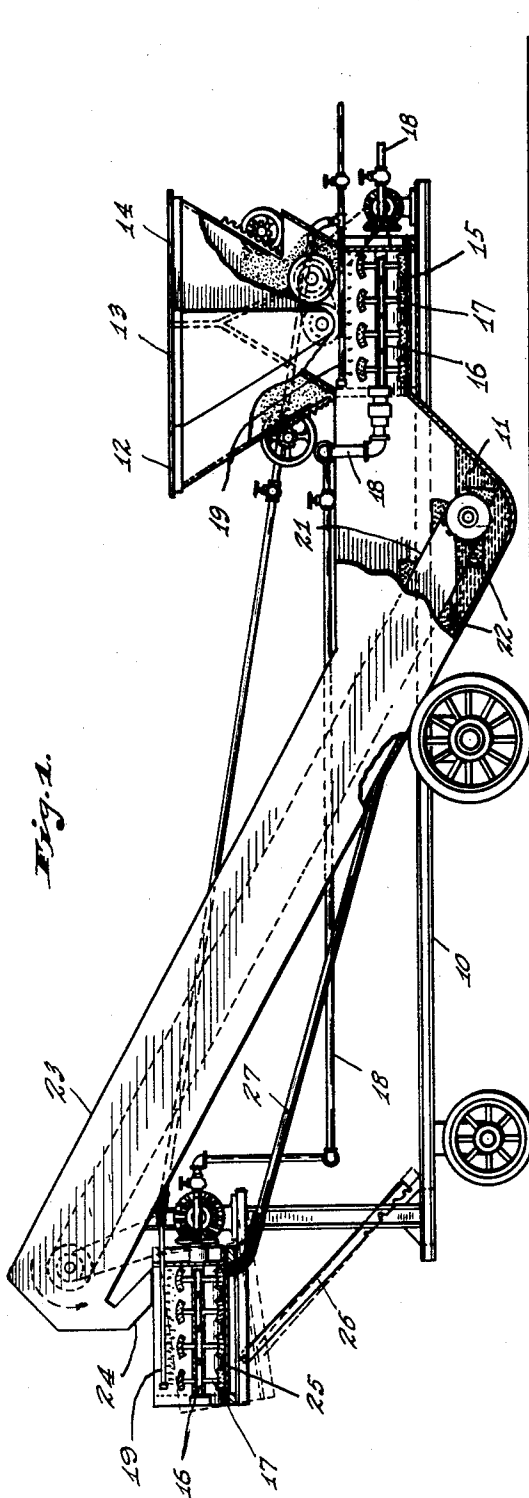
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1,964,523

APPARATUS FOR PRODUCING PAVING MATERIAL

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APPARATUS FOR PRODUCING PAVING
MATERIAL

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Application April 3, 1933, Serial No. 664,067

17 Claims. (Cl. 94—43)

The invention of this application is concerned with machines for treating aggregate with a bituminous binder to form a paving composition, and especially with aggregate-treating machines in which the aggregate is immersed in a bituminous bath and subsequently removed therefrom to permit excess bitumen to drain away. A machine of this general type is shown in my co-pending application Serial No. 617,725, filed June 17, 1932.

It is the object of my invention to improve the machine of my co-pending application just mentioned and to increase its flexibility and extend the field of its use. More specifically, it is my object to prevent the separation of bituminous binder from the aggregate discharged by the machine, to prevent the segregation of treated aggregate particles according to size, and to make possible the application to the treated aggregate, after it is discharged from the immersing machine, of any desired additional treating preparation.

In the machine of my co-pending application above referred to, the aggregate is immersed in a bath of bituminous binder and is removed therefrom by a bucket conveyor the buckets of which are perforated to permit excess bitumen to drain from the aggregate. At the top of the conveyor, the aggregate is discharged into a chute which convey it by gravity into the body of a truck or other vehicle employed to carry the paving composition to the place where it is to be used. In order to prevent the treated aggregate from sticking in the buckets at the point of discharge therefrom, it has been found necessary to so arrange the conveyor that the treated aggregate will actually be thrown from the buckets with considerable speed at the top of the conveyor. Aggregate so thrown strikes the end wall of the conveyor housing with a force sufficiently great to knock from the aggregate a portion of the bitumen which should be retained thereon if the most satisfactory paving composition is to be produced. This bitumen thus separated from the aggregate drains down through the discharge chute into the body of the truck where its presence is objectionable. Further, I find that the coated aggregate emptied into the discharge chute tends to segregate in its passage there-through, the small particles tending to pass slowly through the chute while the larger particles roll over the small particles with the result that the large and small particles are not evenly distributed throughout the paving composition.

In improving my former aggregate-treating

machine, I mount at the discharge end of the conveyor a small mixer, conveniently of the pug-mill type. This mixer serves to redistribute over the surfaces of the aggregate particles any binder which has become separated therefrom and also to prevent segregation of the large-size and small size particles. By equipping this mixer with one or more spray-pipes, this aggregate may be treated with substances not included in the bath through which it has passed.

The accompanying drawing illustrates my invention: Fig. 1 is a side elevation of a complete aggregate-treating machine with parts thereof broken away in order that the construction may be indicated more clearly; Fig. 2 is a vertical axial section through one form of mixer which may be used at the discharge end of the aggregate-treating machine; and Fig. 3 is a fragmental side elevation of the discharge end of the machine showing it equipped with a storage bin in addition to a mixer.

Except for the new equipment at the discharge end of the machine, the machine illustrated in Fig. 1 is substantially identical with that described in my co-pending application Serial No. 617,725, above referred to. This machine embodies a wheeled frame 10 which carries a vat 11 containing a supply of bituminous binder through which the aggregate to be treated is passed. Before immersion in the binder the aggregate is contained in bins 12, 13, and 14 so arranged that aggregate may be discharged either directly into the vat 11 or into a mixer 15 in which it is subjected to a preliminary treatment prior to its immersion.

This mixer 15 has been described in detail in my co-pending application Serial No. 617,725, and a detailed description of it is therefore believed to be unnecessary here. It may be noted, however, that the mixer comprises a steam-jacketed trough extending axially in which is a rotating element comprising a hollow shaft 16 and a plurality of helically disposed blades 17. As pointed out in my co-pending application the shaft 16 and blades 17 are preferably hollow and in communication with each other. By connecting the hollow shaft 16 with a supply pipe 18, and by perforating the walls of the shaft 16 and blades 17, liquid ingredients can be supplied to the aggregate during its passage through the mixer 15; or, if the walls of the shaft 16 and blades 17 are made imperforate, steam can be supplied through the pipe 18, whereby the blades will be warmed and any bituminous ingredients of the composition of the mixer prevented from adhering to the

blades. The mixer 15 may be provided with a spray pipe 19 by means of which liquid aggregate-treating preparations may be applied to the aggregate.

5 The aggregate, after passing through the mixer 15, is discharged into the vat 11, where it is immersed in the supply of bituminous binder contained therein. Aggregate is removed from the vat 11 through the medium of a conveyor comprising an endless chain 21 on which are mounted a series of spaced perforated buckets 22. The aggregate picked up by the buckets in the vat 11 is carried upwardly to the top of the conveyor, and during its upward passage excess bitumen drains from the aggregate through the perforations in the bucket-walls.

The conveyor is enclosed in a suitable housing 23 at the upper end of which I provide a chute 24 leading into a second mixer 25 which may be substantially similar in construction to the mixer 15 at the receiving end of the machine. Should any of the bituminous binder become separated from the aggregate particles at the top end of the conveyor housing 23, it would drain through the chute 24 into the mixer 25 with the aggregate particles and would become redistributed over the surfaces thereof by the action of the rotating blades 17. The mixer 25 is elevated, as indicated, in order that the material discharged therefrom may be received in the body of a truck or other vehicle.

I find it desirable to make the mixer 25 angularly adjustable so that it may be inclined either above or below the horizontal position illustrated in full-lines in Fig. 1. For this purpose, the inner end of the mixer 25 may be pivotally mounted and the outer end supported through a brace 26 the effective length of which may be varied at will. By depressing the outer end of the mixer 25 to the position illustrated in dotted-lines in Fig. 1, the passing of the paving composition through it may be speeded. This reduces the agitation to which the paving composition is subjected, as may be desirable in certain instances.

45 By elevating the outer end of the mixer 25, any excess bitumen which does not adhere to the surfaces of the aggregate particles will tend to collect in the inner end of the mixer from which it can be returned through a drain pipe 27 to the vat 11.

50 The spray pipe 19 associated with the mixer 25 permits the application to the coated aggregate of additional liquid substances not included in the bath in the vat 11. This enables a temporary variation of the composition of the paving material to be effected without the necessity for varying the mixture in the vat 11.

If conditions are such that drainage of binder from the aggregate is incomplete during upward movement of the aggregate from the vat 11. I may find it desirable to employ, at the discharge end of the machine, the mixer illustrated in Fig. 2. In this mixer, a steam-jacketed trough 30 of conical shape is employed, such trough having its larger diameter at the inner end. Like the mixers 16 and 25 previously referred to, the mixer illustrated in Fig. 2 includes a longitudinally extending hollow shaft 31 carrying a series of helically disposed blades 32. Preferably, for reasons set forth above, the shaft 31 and blades 32 are hollow and in communication with each other.

I find it convenient, in the mixer illustrated in Fig. 2, to arrange the blades 32 so that those near the inner end of the mixer will have a

greater inclination to the axis than do those near the outer end. This provides a thorough mixing of the material at the inner end and a rapid outward movement of the material at the outer end of the mixer.

To prevent the necessity for stopping the aggregate-treating machine when it is not discharging into a truck, I may mount at the upper end of the conveyor-housing 23 a small storage bin 35, as illustrated in Fig. 3. The lower end of the bin 35 discharges into the inner end of a mixer 36 which, as shown, is of the pug-mill type. The mixer 36 is inclined upwardly and outwardly in order to raise the treated aggregate to an elevation such that it may drop by gravity into a truck or other vehicle. With such an arrangement, the mixer 36 can be operated only when a truck or other vehicle is in position to receive treated aggregate from the machine. The bucket conveyor can operate continuously, the treated material discharged while the mixer 36 is at rest collecting in the bin 35.

I claim as my invention:

1. A machine of the character described, comprising a vat adapted to contain a supply of liquid bituminous binder, an upwardly and outwardly inclined bucket conveyor for elevating from said vat aggregate placed therein, and a mixer of the pug-mill type positioned to receive coated aggregate discharged from said conveyor.

2. A machine of the character described, comprising a vat adapted to contain a supply of liquid bituminous binder, an upwardly and outwardly inclined bucket conveyor for elevating from said vat aggregate placed therein, and a mixer positioned to receive coated aggregate discharged from said conveyor.

3. The invention set forth in claim 2 with the addition of means for supplying a liquid treating material to said mixer.

4. A machine of the character described, comprising a vat adapted to contain a supply of liquid bituminous binder, an upwardly and outwardly inclined means for elevating from said vat aggregate placed therein, and a mixer of the pug-mill type positioned to receive coated aggregate discharged from said elevating means.

5. A machine of the character described, comprising a vat adapted to contain a supply of liquid bituminous binder, an upwardly and outwardly inclined means for elevating from said vat aggregate placed therein, and a mixer positioned to receive coated aggregate discharged from said elevating means.

6. The invention set forth in claim 5 with the addition of means for supplying a liquid treating material to said mixer.

7. The invention set forth in claim 1 with the addition of means for varying the inclination of said mixer to control the rate at which coated aggregate passes therethrough.

8. The invention set forth in claim 4 with the addition of means for varying the inclination of said mixer to control the rate at which coated aggregate passes therethrough.

9. A machine of the character described, comprising a vat adapted to contain a supply of liquid bituminous binder, a mixer adapted to discharge aggregate into said vat, means for supplying a liquid aggregate-treating substance to said mixer, a conveyor for elevating aggregate from said vat, and a second mixer of the pug-mill type positioned to receive coated aggregate discharged from said conveyor.

10. A machine of the character described, com-

prising a vat adapted to contain a supply of liquid bituminous binder, a mixer adapted to discharge aggregate into said vat, means for supplying a liquid aggregate-treating substance to said mixer, a conveyor for elevating aggregate from said vat, and a second mixer positioned to receive coated aggregate discharged from said conveyor.

11. The invention set forth in claim 9 with the addition of means for varying the inclination of said second mixer to control the rate at which coated aggregate passes therethrough.

12. The invention set forth in claim 10 with the addition of means for supplying a liquid aggregate-treating material to said second mixer.

13. The invention set forth in claim 4 with the addition that said mixer comprises a conical trough disposed with its bottom sloping inwardly and a horizontal rotating element provided with a series of helically inclined blades, the pitch of said blades increasing toward the outer end of said trough.

14. The invention set forth in claim 9 with the

addition that said second mixer comprises a conical trough disposed with its bottom sloping inwardly and a horizontal rotating element provided with a series of helically inclined blades, the pitch of said blades increasing toward the outer end of said trough.

15. The invention set forth in claim 4 with the addition that said mixer comprises a conical trough disposed with its bottom sloping inwardly and a horizontal rotating element provided with a series of helically inclined blades.

16. The invention set forth in claim 9 with the addition that said second mixer comprises a conical trough disposed with its bottom sloping inwardly and a horizontal rotating element provided with a series of helically inclined blades.

17. The invention set forth in claim 4 with the addition of a bin positioned to receive coated aggregate from said elevating means, and a device for feeding coated aggregate from said bin.

KENNETH E. McCONNAUGHAY.

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