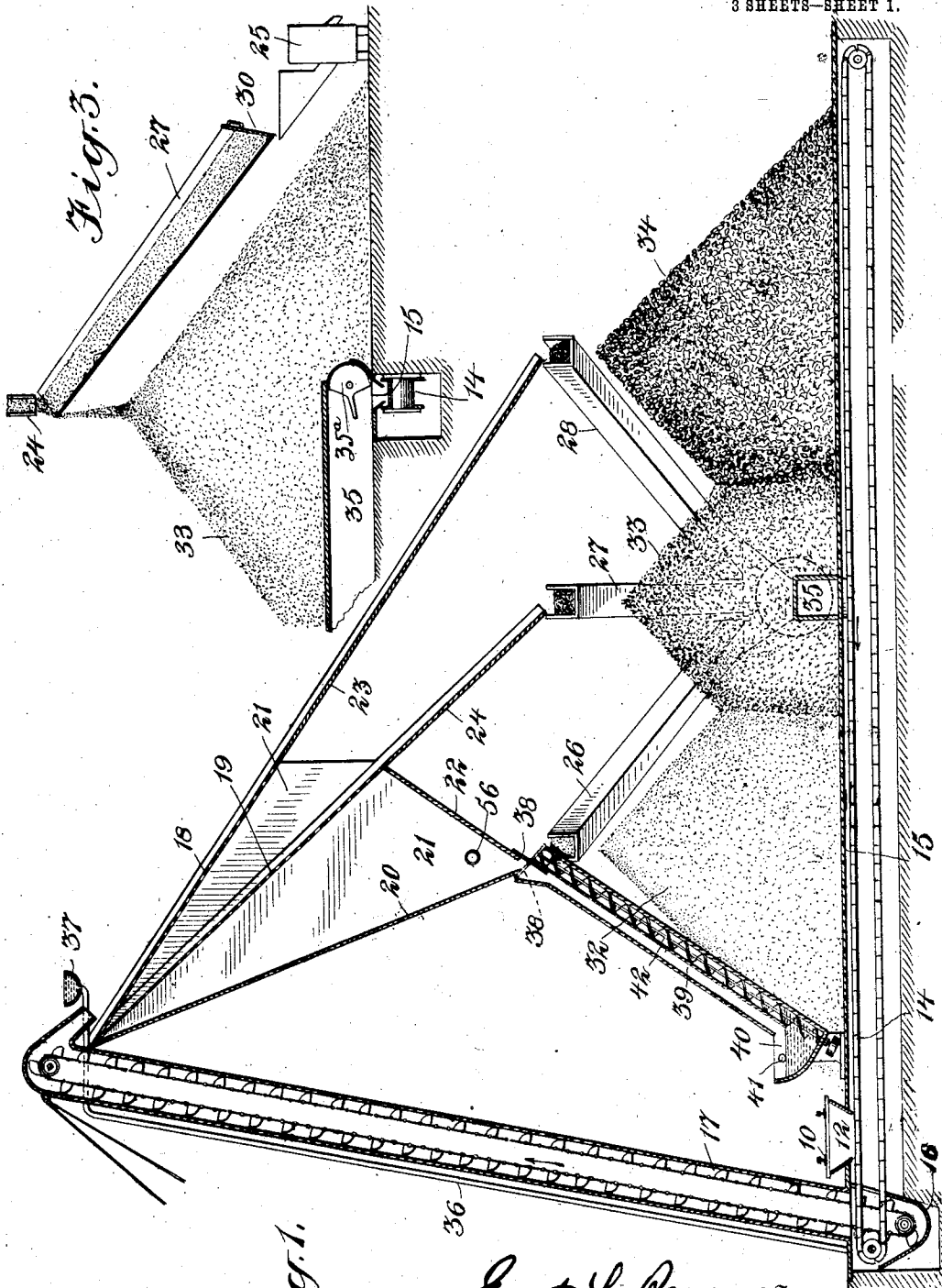


E. L. RANSOME.
CONCRETE PLANT.
APPLICATION FILED JAN. 24, 1908.

947,599.

Patented Jan. 25, 1910.

3 SHEETS—SHEET 1.



Witnesses
J. H. Howell
A. Miller

Fig. 1.

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By his Attorney Jacob B. Owens.

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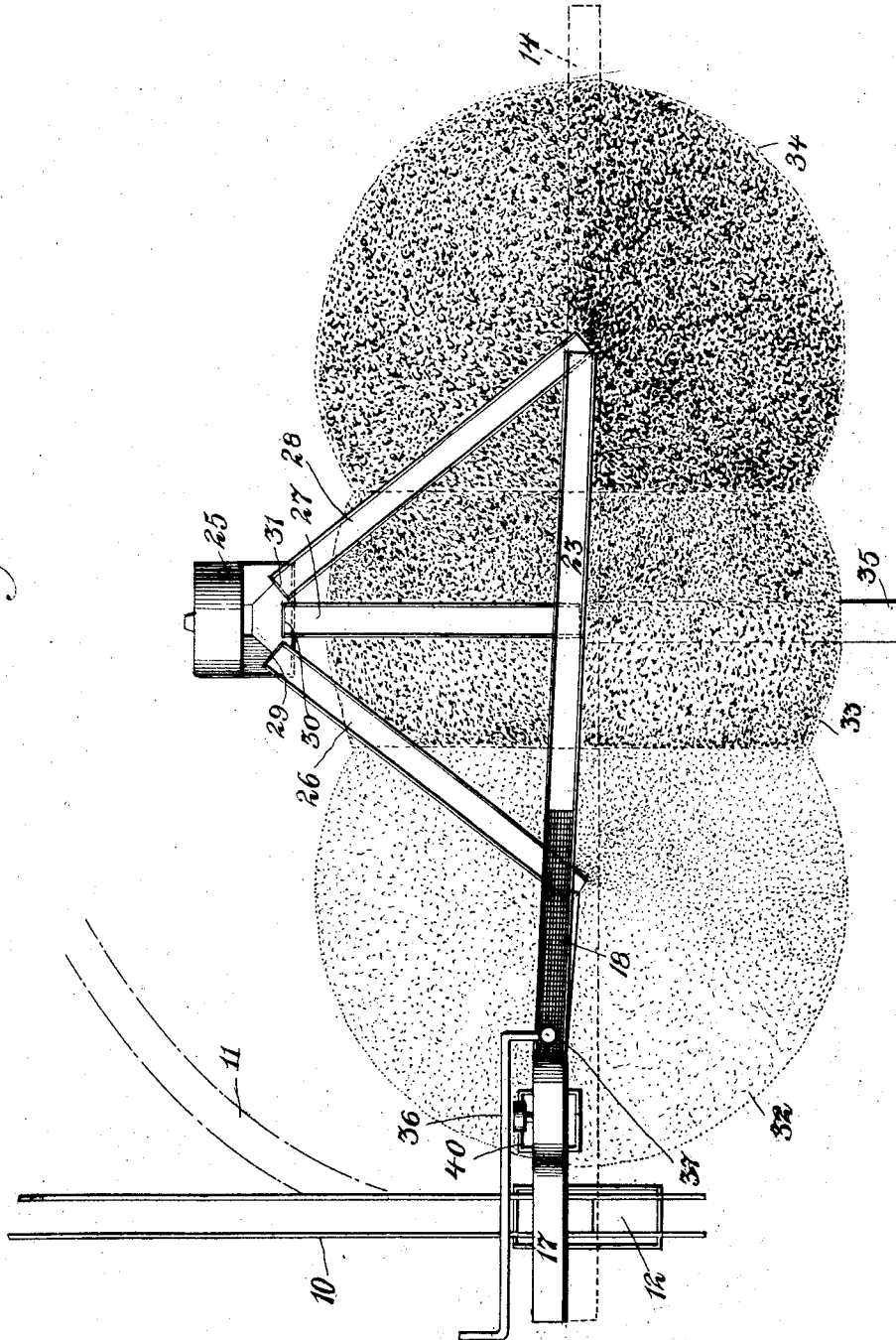
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

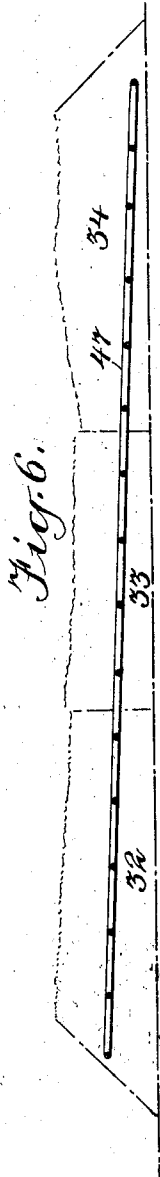


Fig. 6.

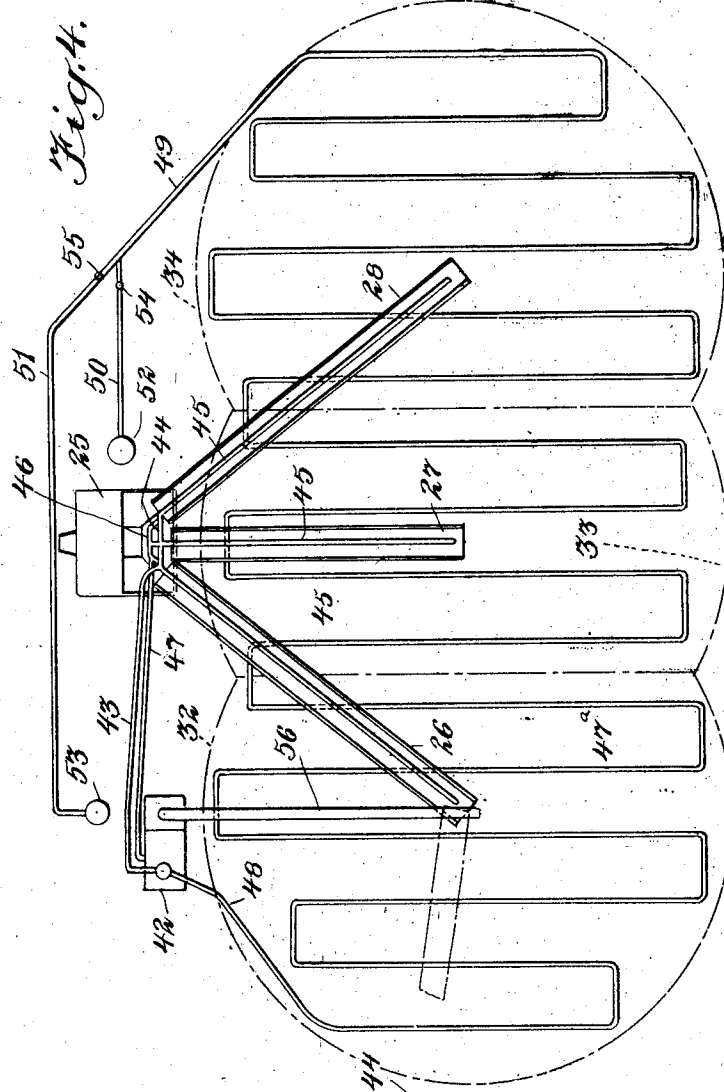


Fig. 4.

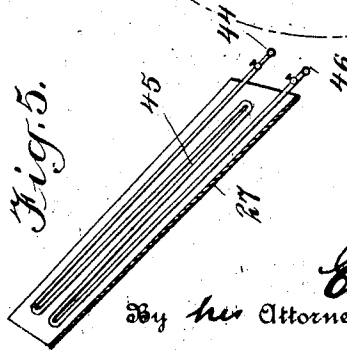


Fig. 5.

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UNITED STATES PATENT OFFICE.

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CONCRETE PLANT.

947,599.

Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed January 24, 1908. Serial No. 412,442.

To all whom it may concern:

Be it known that I, ERNEST L. RANSOME, of the city of New York, borough of Richmond, county and State of New York, have invented certain new and useful Improvements in Concrete Plants, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an apparatus for handling and storing the materials from which concrete mixtures are formed and it is especially adapted to be erected at large concrete works to aid in their construction. It is so arranged that it may be readily dismantled and transported, so that after the "job" is finished, the apparatus may be removed to and erected at a second job.

In the construction of concrete works, such as the erection of concrete buildings, much inconvenience and expense is experienced in the supply and handling of the sand, grit, gravel or stone which are necessary parts of the concrete mixture. Heretofore it was the general practice to dump these materials in several distinct piles and shovel and wheel them to the concrete mixer as required. Not only did this practice involve the expenditure of a great deal of labor, but, owing to the difficulty of piling and storing the materials, the accumulation of large supplies was impracticable. The result of this was that there was always danger of the supply becoming temporarily exhausted, and a complete stoppage of the work occasioned. To thus stop the operations on a large "job" often results in a great loss to the contractor.

It is, therefore, the underlying object of my present invention, to provide a plant which will insure overcoming these difficulties and enable large supplies of the materials named to be stored and handled cheaply and expeditiously. In accomplishing this end, I provide for the materials being delivered to the plant in railway cars, wagons or the like, dumped and carried indiscriminately into the boot of an elevator, whether the material be sand, grit, gravel or stone. By this elevator the various materials are raised to distributing screens which separate or sort the materials and from these screens the materials are separately discharged into bins. The bins are adapted to

supply the mixer and are so arranged that when full, the materials are caused to overflow into separate juxtaposed piles. Beneath these piles a conveyer runs horizontally to the boot of the elevator, and this conveyer is covered by removable planks or the like which may be displaced at will to allow one or the other of the materials to fall on the conveyer by which it is carried to the elevator. With such a plant the necessary materials may be delivered in any quantity and will be first elevated to the distributing or separating screens and from thence discharged into the bins. If these are full, the materials will overflow into the respective storage piles. The stock is drawn at will from the bins to supply the mixer and should any one of the bins become empty, a certain quantity of the stock is allowed to drop from the desired storage pile on to the conveyer by which it is carried to the elevator and then raised to the screens which direct the material thus selected to its proper bin, replenishing the supply therein.

Contractors in concrete work seek to secure their stock from the points nearest the "job" to save in transportation charges. Frequently, however, the most available stock is not of the best quality in that it requires washing to free it of loam and soluble and impure matter. This requires that the stock be washed before using it; and it is, therefore, a further object of my invention to provide for the easy and inexpensive cleansing of the sand and other materials. For this purpose I provide means for discharging a supply of water on the screens which flushes the stock, particularly the sand, as it passes over the screens, thoroughly washing the same. The rock, grit and gravel freely separate themselves from the water, but the sand tends to flow with the water and to provide for this I furnish at the sand discharge a reversible gate by which the sand and water instead of passing directly into the sand bin are caused to flow down a flume into a settling tank, in which the sand is precipitated and from which the water overflows. Beneath the bottom of the flume, an elevator operates by which the sand is raised from the tank and discharged into the sand bin as explained.

In winter work, precaution must be taken

to prevent the moisture in the bins and storage piles from freezing and I accomplish this by utilizing steam from a boiler of the plant to heat peculiarly arranged coils in the bins and under the storage piles. Water of condensation from these is partly passed back into the boiler and partly to the mixer, the warm water of condensation in the mixer acting to prevent freezing therein as well as furnish the water necessary to the concrete mixture.

My invention involves various other features of importance, which will clearly appear from the following description and all will be fully set forth hereinafter and be particularly pointed out in the claims.

Reference is had to the accompanying drawings, which illustrate, as an example, one manner of embodying the principles of my invention, in which drawings,

Figure 1 is an elevational section showing in general outline the arrangement of the plant; Fig. 2 is a diagrammatic plan view of the same; Fig. 3 is a cross section taken through the middle storage pile, showing one of the bins and the manner in which the material overflows therefrom onto the pile and also showing the tunnel in the central pile to facilitate reaching the removable cover of the conveyer. Fig. 4 is a diagrammatic plan view of the heating system; Fig. 5 is a section through one of the bins showing the heating coil therein; and Fig. 6 is a diagrammatic section to show the incline in the coil for heating the storage piles.

In Figs. 1 and 2, 10 indicates a railway track on which dumping cars may be run to deliver the stock; and the broken lines 11 indicate that a driveway may be built to allow teams and wagons to approach for delivering their contents. The materials thus delivered are dumped into an open bottom hopper 12 which discharges upon the horizontally disposed conveyer 14. The conveyer is preferably arranged in a trench below the grade line and is covered by removable boards 15 or other equivalent means. Said conveyer, running in the direction of the arrow in Fig. 1, delivers the material into the boot 16 of an elevator 17. The details of the elevator boot and indeed of various other elements of the apparatus are not illustrated further than is necessary to an understanding of my invention by persons skilled in the art. The elevator 17 is preferably, though not necessarily, of the bucket type and discharges its contents onto two screens 18 and 19 and a chute 20. These elements 18, 19 and 20 are inclined and superimposed in the order named and by preference have curtains 21 of sheet metal or other material to prevent escape of the stock between the screens and chute. At the lower or discharge end of the chute 20

is arranged an upwardly and outwardly inclined wall 22 which extends to the outer end of the screen 19. From the ends of the screens 18 and 19 chutes 23 and 24 lead as shown. The screen 18 is of larger mesh than the screen 19 and is adapted to carry the rock and gravel into the chute 23, while the sand and grit are allowed to fall through the screen 19. This latter screen carries the grit to the chute 24, but allows the sand to fall through to the chute 20. It will, therefore, appear that by this arrangement the indiscriminately mixed materials raised by the elevator 17 are automatically separated and each directed to their respective chutes.

The position of the concrete mixer 25 is shown in Figs. 2 and 3 and in all of the views the bins 26, 27 and 28 are shown. These bins are, according to the specific embodiment of the invention here shown, adapted respectively for the sand, grit and stone or gravel and are so placed that the inclination of their bottoms is such that the materials will always run down the bins under the most adverse conditions. At their lower ends the bins are provided with gates 29, 30 and 31 which when closed will retain the various materials in the bins in the place of one side of the angle of repose, while the chutes 23, 24 and 20 are arranged to discharge into the bins at the opposite side of the said angle. This is shown in Fig. 3, and from such arrangement it follows that the material falling from the chute will first enter exclusively into the bin, filling the same to the angle of repose after which the material falling on the other or left hand side of the angle (see Fig. 3) is deflected or caused to flow along said left hand side of the angle and overflow from the bin to form the storage pile below the receiving or upper end of the bin. These piles are indicated in the drawing at 32, 33, and 34. In this manner the bins are kept filled and the surplus is automatically discharged onto the storage piles. 35 indicates a tunnel which is formed under the central pile 33 to facilitate access to the interior and allow removal of the planks 15 to drop the grit onto the conveyer 14. A gate 35^a of any desired sort may be provided at the inner end of the tunnel to prevent excessive flow of the grit and by means of which the operator may drop the quantity of grit desired. The planks for the sand and gravel or rock are removed respectively from the outer sides of the piles 32 and 34. When, therefore, the material whatever it may be, is delivered to the plant, it is dumped into the hopper 12 and from this falls upon the conveyer 14, which in turn discharges into the boot 16 of the elevator 17. By means of the elevator the material is raised to the screens and automatically separated. The chutes carry the stock to the bins and the surplus is deposited onto the

storage piles. Should the delivery be delayed or fall short and the bins become empty, it is only necessary to remove one or more of the planks 15 or other covers of the conveyer, allowing the stock to fall to the 5 conveyer 14 which carries it to the boot of the elevator and distributes it as before explained.

For washing the stock, particularly the 10 sand, a water pipe 36 is run up alongside the elevator 17 and provided at its upper end with a spray head 37 from which the water overflows onto the screens 18 and 19 and the chute 20. The water falls with the materials 15 and washes the same. The grit and gravel separate themselves from the water by the nature of things, but the sand washes down the chute 20 with the water. At the discharge end of the chute is arranged a gate 20 38 which is reversible from the position shown in broken lines in Fig. 1 to that shown by full lines. When in the position shown by broken lines, the sand is discharged directly into the bin 26, but when in 25 the position shown by full lines the gate deflects the sand into a flume 39. It is in this latter position which the gate is made to assume when the water is flowing, so that the sand and water flow down the flume 39 to a tank 40 in which the sand is precipitated, the water overflowing through an outlet 41. Below the bottom of the flume 39 is a conveyer 42 of any approved type by which the sand is elevated from the tank and carried 35 into the bin 26. When washing is not required, the gate 38 is turned to the dotted position and the water is cut off, whereupon the gate serves simply as a continuation of the chute 20 leading the sand to the bin 26. 40 When operating in freezing weather, particularly when washing is necessary, there is danger of the moisture in stock freezing and thereby clogging the bins, storage piles, etc. To avoid this, I utilize steam from the 45 boiler 42 shown in the diagram Fig. 4. This boiler is preferably, though not necessarily, that which supplies steam to the engine operating the various elevators or conveyers. From the boiler a steam pipe 43 passes to a 50 header 44 from which coils 45 extend into the bins, the returns of the coils passing to a return header 46 with which communicates a return pipe 47 to the boiler. Since the steam pressure is balanced on each side, the 55 water of condensation will run by gravity back into the boiler, the heating coils, return header and pipe being above the level of the boiler. By these heating coils, the materials in the bins are kept from freezing and their 60 easy movement into the mixer insured. To prevent freezing at the bottoms of the storage piles a coil 47^a is arranged therein on a slight incline as shown in Fig. 6 and connected by a steam pipe 48 with the boiler 42. 65 Owing to the inclination of the coil 47^a the

water of condensation runs to the lower end and is received by a return pipe 49 which has branches 50 and 51 leading respectively to a supply tank 52 for the mixer 25 and the feed pump 53 of the boiler. The branch 70 pipes 50 and 51 are provided with valves 54 and 55 so that either or both may be opened at will. To prevent freezing in the space inclosed by the screens 18 and 19 and chute 20, the smoke pipe 56 of the boiler furnace is 75 extended through the curtains 21 immediately above the chute 20, as indicated in Figs. 1 and 4. These devices allow of the use of ample water in freezing weather without danger of frost and the warm water of 80 condensation supplied to the mixer serves a similar purpose therein.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. The combination in a plant such as described, of an elevator, a bin of limited capacity into which material from the elevator is discharged and from which the excess material overflows into a storage pile and 90 means for conveying the material from the storage pile to said elevator.

2. The combination in a plant such as described, of an elevator, a separating means, separate bins into which the separating 95 means discharge and from which the excess materials overflow to storage piles and means for conveying the materials from the storage piles to said elevator.

3. The combination in a plant such as described, of an elevator, a bin of limited capacity into which material from the elevator is discharged and from which the excess material overflows into a storage pile and 100 means extending under the storage pile to convey the materials from the same to said elevator. 105

4. The combination in a plant such as described, of an elevator, a bin of limited capacity into which material from the elevator 110 is discharged and from which the excess material overflows into a storage pile and means extending under the storage pile to convey the material from the same to said elevator, such means comprising an endless 115 conveyer operating horizontally.

5. The combination in a plant such as described, of an elevator, a bin into which material from the elevator is discharged and from which excess material overflows into 120 a storage pile and means extending under the storage pile to convey the material from the same to said elevator, such means comprising an endless conveyer operating horizontally in a trench formed therefor. 125

6. The combination in a plant such as described of an elevator, a bin into which material from the elevator is discharged and from which such material overflows into a storage pile, means extending under the 130

storage pile to convey the material from the same to the elevator, such means comprising an endless conveyer operating horizontally in a trench formed therefor, and a sectionally removable cover over said trench for the purpose specified.

7. The combination in a plant such as described, of an elevator, a separating means, bins into which the separating means discharge and from which the materials overflow to alined storage piles and means for conveying the materials from the storage piles to the elevator, comprising a conveyer running horizontally in a trench therefor under the storage piles.

8. The combination in a plant such as described, of an elevator, a separating means, bins into which the separating means discharge and from which the materials overflow to storage piles, means for conveying the materials from the storage piles to the elevator comprising a conveyer running horizontally under the storage piles, and a sectionally removable cover over said conveyer for the purpose specified.

9. The combination in a plant such as described, of an elevator, a separating means, bins into which the separating means discharge and from which the materials overflow to storage piles, means for conveying the materials from the storage piles to the elevator comprising a conveyer running horizontally under the storage piles, a sectionally removable cover over said conveyer for the purpose specified, and a tunnel formed under one pile to enable access to be had to the said cover.

10. The combination in a plant such as described of an inclined storage bin with its bottom inclined sharper than the angle of repose and adapted to fill with the upper surface of its contents in the plane of one side of the angle of repose, the upper end of the bin being open so that materials may overflow therefrom along the opposite side of the angle of repose and means for charging the bin, such means delivering the material on said opposite side of the angle of repose.

11. The combination in a plant such as described of an inclined storage bin adapted to fill with the upper surface of its contents in the plane of one side of the angle of repose, the upper end of the bin being open so that materials may overflow therefrom along the opposite side of the angle of repose, and means for charging the bin, such means delivering the material on said opposite side of the angle of repose.

12. The combination in a plant such as described of an inclined storage bin adapted to fill with the upper surface of its contents in the plane of one side of the angle of repose, the upper end of the bin being open and its side edges disposed in the opposite

side of the angle of repose, and means above said bin and upon said opposite side of the angle for charging said bin whereby the contents of the bin overflow along such opposite side of such angle.

13. The combination in a plant such as described, of an inclined storage bin adapted to fill with the upper surface of its contents in the plane of one side of the angle of repose and the edges of walls of the bin being disposed in the opposite side of the angle of repose, and means above said bin and upon said opposite side of the angle for charging said bin whereby the contents of the bin overflow along such opposite side of such angle.

14. The combination in a plant such as described, of an inclined storage bin and charging means above the same adapted to fill said bin with the upper surface of its contents in the plane of one side of the angle of repose and the edges of walls of the bin being disposed in the opposite side of the angle of repose, whereby the contents of the bin overflow along such opposite side of such angle, said charging means delivering the material on said opposite side of the angle of repose.

15. In a plant such as described, the combination of an elevator, a horizontally disposed conveyer located in a trench and leading to said elevator, a tunnel extending transversely of the trench and means controllable from the interior of the tunnel to admit material from above the tunnel to the conveyer.

16. In a plant such as described, the combination of an elevator, a horizontally disposed conveyer leading thereto, means facilitating dumping materials onto the conveyer, a separator means and storage bins respectively supplied from the divisions of the separator means, such bins being open at their upper ends and arranged so that the materials overflow into storage piles above the said conveyer.

17. In a plant such as described, the combination of an elevator, a horizontally disposed conveyer leading thereto, means facilitating dumping materials onto the conveyer, a separator means and storage bins respectively supplied from the divisions of the separator means and from which the materials overflow into storage piles above the said conveyer, a washing flume leading from one of the divisions of the separator, an elevator serving to return the solid material from the bottom of the flume and a gate adjustable at will to connect or disconnect the flume with or from said division of the separator.

18. In a plant such as described, the combination of a chute, a washing means at the mouth thereof, a storage bin also at the mouth thereof, an elevator for returning the

solid materials to a point adjacent to the mouth of the chute and means whereby the chute may be connected with the storage bin or washing means alternately at will.

19. In a plant such as described, the combination of a chute, a washing means at the mouth thereof, a storage bin also at the mouth thereof, an elevator for returning the solid material to a point adjacent to the mouth of the chute and a reversible gate constituting means whereby the chute may be connected with the storage bin or the washing means alternately at will.

20. In a plant such as described, the combination of a chute, a washing means at the mouth thereof, a storage bin at the mouth thereof, an elevator for returning the solid materials to a point adjacent to the mouth of the chute and means whereby the chute may be connected with the storage bin or the washing means alternately at will, such washing means comprising a flume and a settling basin at the lower end thereof into which basin the said elevator extends.

21. In a plant such as described, the combination of a chute, a storage bin, a flume, a reversible gate movable alternately to connect either the bin or flume with the chute, a settling basin at the bottom of the flume and an elevator extending from the basin to the bin.

22. The combination in a plant such as described of a bin the bottom of which is inclined downward and the upper end of which is open, said bin adapted to fill with the upper surface of the material therein lying in one side of the angle of repose of such material and a charging means for the bin located wholly over the bottom of the bin at its upper end, but on the other side of the angle of repose, whereby after the bin fills to the angle of repose, it overflows along said other side of such angle.

23. The combination in a plant such as described of a bin the bottom of which is inclined downward and the upper end of which is open, said bin adapted to fill with the upper surface of the material therein lying in one side of the angle of repose of such material, a charging means for the bin located wholly over the bottom of the bin at its upper end, but on the other side of the angle of repose, whereby after the bin fills to the angle of repose, it overflows along said other side of such angle and means for returning the overflow material to the charging means.

24. In combination a plurality of bins each of limited capacity and each having a delivery outlet and a filling opening, an elevator for filling said bins and means for re-

turning to the elevator material overflowing from the filling openings.

25. In combination an inclined bin of limited capacity having a delivery outlet adjacent the bottom, an elevator delivering material to the top of said bin to fill the same to overflowing, the overflow forming a storage pile at one side of and beneath the bin and means for conveying the material from the storage pile to the elevator to refill the bin as the material is used from the latter.

26. In combination a bin, means for withdrawing from the lower portion thereof, the contained material when desired for use, an elevator operating to deliver material to said bin and means for conveying back to the elevator the material which overflows from said bin when the latter contains its limiting amount.

27. In combination a plurality of bins for different materials, an elevator, a separator receiving material from said elevator and delivering the separated materials to their respective bins and a conveyer for returning to said elevator excess material overflowing from said bins.

28. In combination a plurality of bins for different materials, a receiver and a mixer to which said bins deliver independently, an elevator, separating means for receiving materials from said elevator and delivering the separated materials to their respective bins.

29. In combination a plurality of bins for different materials, a mixer to which said bins deliver independently, a separator for receiving materials and delivering the separated materials to their respective bins and means for returning to said separator excess material overflowing from said bins.

30. In combination a plurality of bins normally storing limited quantities of different materials and all delivering to a common point, a separator for receiving material and delivering different constituents to their respective bins and means for returning to said separator excess material overflowing from said bins.

31. In combination an elevator for materials mixed in unknown or varying proportion, a separator for receiving the materials and separating them into their constituents, separate bins receiving the separate constituents and a mixer receiving and uniting material from said bins in known proportions.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNEST L. RANSOME.

Witnesses:

ISAAC B. OWENS,
E. I. McLAUGHLIN.