Jan. 5, 1960 L. G. HILKEMEIER 2,919,808

AGGREGATE RECOVERING MACHINE

Filed April 22, 1958

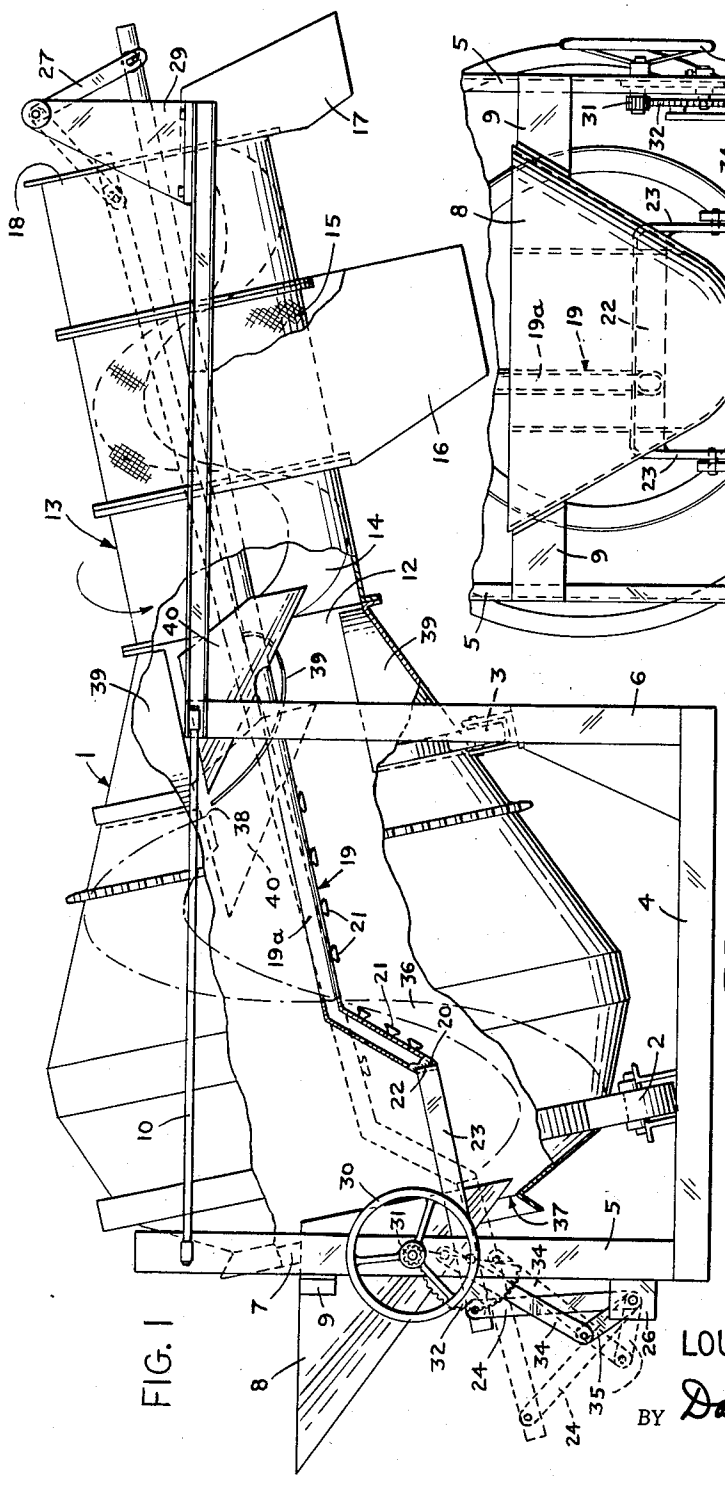


FIG. 1

FIG. 2

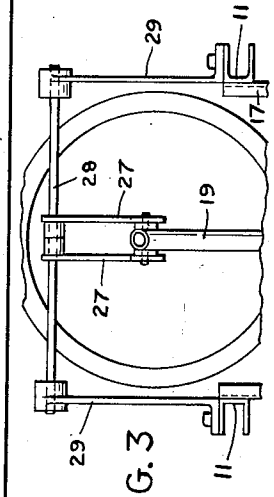


FIG. 3

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2,919,808

Patented Jan. 5, 1960

2,919,808

AGGREGATE RECOVERING MACHINE

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Application April 22, 1958, Serial No. 730,173

4 Claims. (Cl. 210—523)

This invention relates to machinery commonly known as sand and gravel washers in which a washing process is used to cause the separation of materials, and more particularly, to an improved machine of this type in which the duration of the washing process can be regulated in accordance with the nature and properties of the material being processed.

More specifically, in carrying out the present invention, it is an object to provide a conventional type sand and gravel washer with novel means for controlling discharge from the machine, whereby by delaying discharge, the effective duration of the washing process can be appropriately prolonged.

As a result, it is a further object to provide a separating machine having a greater scope of industrial application than heretofore possible with prior art separating machines. By way of illustration, it is contemplated that the machine of the present invention will be able to efficiently separate aggregate from concrete. Heretofore, however, since the washing process duration could not be adjusted in accordance with variations in the concrete consistency, the concrete was often insufficiently washed to completely separate all the aggregate therefrom.

A still further object is to provide as this means for controlling the washing process duration, one which is simple of construction and operation, and readily adapted to be made a part of sand and gravel washers as they are presently constructed.

To this end, this means consists of a discharge chute fixedly connected to the washing fluid supply conduit conventionally provided in sand and gravel washers, and which according to general practice extends into the mixing drum of the machine to supply washing fluid therein. However, in the present invention, this conduit is adapted to be axially shiftable relative to the drum, and only when it is shifted so that the chute thereon projects through the drum discharge opening, is it possible for materials to discharge from the drum. Thus, the effective duration of the washing process depends on when the chute is shifted into this discharge position, and this in turn can be regulated in accordance with the nature or properties of the material being processed in the machine.

The invention will be better understood when considered in connection with the accompanying specification and drawings forming a part thereof, in which:

Figure 1 is a side view of the separating machine of the present invention, with the mixing drum thereof partially cut away to illustrate the construction and arrangement of elements provided to control drum discharge.

Figure 2 is a fragmentary end view of the charging end of the separating machine shown in Figure 1.

Figure 3 is a fragmentary end view of the discharging end of the separating machine shown in Figure 1.

While this invention will be understood to be generally applicable to the separating of materials, for purposes of description, and as setting out a preferred embodiment thereof, it will be described particularly in connection with the process of separating aggregate from concrete. The aggregate is separated from the concrete utilizing the general practice of subjecting the concrete to a washing process, after which the aggregate is further separated by screening into various grades.

Referring to the drawings, the washing process is carried out within a conventional type inclined rotatable mixing drum 1. The low end of the drum 1 is supported by a pair of driving rollers 2 and the high end by a pair of stabilizing rollers 3, both of these pairs of rollers being suitably mounted on a base or foundation 4. Although not shown, it will be understood that the driving rollers 2 are connected to a driving prime mover which enables these rollers to rotate the drum 1 about its longitudinal axis.

Connected to extend upright at each side of the foundation 4 are two pairs of support members, the pair adjacent the low end of the drum 1 designated 5, and that adjacent the high end thereof designated 6. Extending through an opening 7 in the charging or low end of the drum 1 is an inclined charging chute 8 connected by suitable brackets 9 to each of the members 5 for support. Connected between the members 5 and 6 on each side of the drum 1 is a hand rail 10. Suitably connected to each of the members 6 to extend longitudinally on each side of the drum 1, and more particularly to extend along an extension of the drum 1 which soon will be described, is an additional support member or frame 11.

The high end of the drum 1 is the discharging end, and accordingly a discharge opening 12 is provided therein. As just indicated, connected to the drum to extend from this opening is a cylindrical member 13. The cylindrical member 13 has a conventional spiral blade 14 mounted along its interior wall, and a screened section 15 for separating out the smaller or finer particles from the mass of aggregrate discharging from the drum 1 and moved through the cylindrical member 13 by the spiral blade 14. A discharge chute 16 in the position relative to the screened section 15 shown is connected to each of the frames 11 to handle this fine grade aggregate. A similar discharge chute 17 is connected to the ends of the frames 11 at the end opening 18 of the cylindrical member 13 to handle the discharge of coarser grade aggregate.

Fluid for washing, which may be water, is delivered into the drum 1 through a conduit 19 disposed centrally of the drum 1 and cylindrical member 13. The fluid is introduced under pressure into the upper extending end of conduit 19, flows through a hollow pipe-like section 19*a* which being sealed at 20, forces the fluid to discharge into the drum interior through a plurality of nozzles 21. As most clearly shown in Figure 2, there is a transverse member 22 connected to conduit 19 at the sealed end of the pipe-like section 19*a*, and at each end of this transverse member 22, an arm 23 which extends outside the low end drum opening 7 on opposite sides of the charging chute 8. Pivotally connected to the ends of each of the arms 23 are additional arms 24, whose opposite ends are rigidly connected to a transversely disposed shaft 25 journaled at each end in a block 26. As most clearly shown in Figure 3, a pair of arms 27 are also pivotally connected to the upper end of conduit 19, and the opposite ends of these arms similarly rigidly connected to a transversely disposed shaft 28 journaled at each end in a bracket 29 connected to an end of each frame 11. As a result, when shaft 25 is turned, the arms 24 swing the lower end of conduit 19 about the axis of shaft 25 and force the upper end of conduit 19 to swing about the axis of

shaft 23. The effect on conduit 19 is thus a shift in its position relative to the drum 1 along the longitudinal axis of the drum 1.

For ease in turning shaft 25 to shift conduit 19, any one of a number of well known mechanical arrangements may be employed. The arrangement preferred, however, consists of a rotatable handwheel 30 suitably journaled in the support member 5, a small pinion gear 31 adopted to be rotated by the handwheel 30 and meshing with a large gear segment 32 also suitably journaled at its center 33 in the support member 5. A long linkage arm 34 is pivotally connected at one end to the gear segment 31 and at the other end to a short linkage arm 35 rigidly attached to the shaft 25. Depending on the direction and number of revolutions of handwheel 30, shaft 25 is turned according to a stepped down gear ratio which exists between the pinion gear 31 and gear segment 32.

Within the drum 1, and mounted to extend along a portion of the drum interior wall, is a conventional spiral blade 36 of the type commonly provided in concrete mixing drums. The blade 36 during rotation of the drum 1 moves any concrete charged into the drum 1 through the charging chute 8 up the drum incline into contact with the washing fluid being delivered through the nozzles 21. The effect of the washing fluid is to cause the concrete to separate into its components of cement and aggregate, the cement being carried out of the drum 1 by washing fluid overflowing through the clearance space 37 between the lower end of charging chute 8 and the low end drum opening 7. The blade 36 also moves the drum contents into a position from which it can more readily be discharged, but since it terminates short of the drum discharge opening 12, it cannot affect discharge. Although the length of blade 36 may vary, it is preferred to use one three-fourths the length of the drum 1. Between the terminal end 38 of blade 36 and the drum discharge opening 12, a plurality of conventional lifting blades 39 are mounted concentrically about the drum interior wall. These lifting blades 39 are also capable of only aiding discharge but not actually producing this result.

However, welded or otherwise suitably connected to the axially shiftable conduit 19 centrally of the lifting blades 39 is an inclined discharge chute 40 which does affect discharge from the drum 1. More specifically, this occurs when the conduit 19 is shifted to its extreme shiftable position to the right as illustrated in the drawing, in which position the chute 40 is projected through the drum discharge opening 12. In this position, material fed into the chute 40 by the lifting blades 39 flows down the chute inclined surface and out the drum discharge opening 12. On the other hand, in the opposite extreme shiftable position of the conduit 19 as illustrated in phantom perspective in the drawing, the chute 40 remains within the drum 1 and thus has no effect on drum discharge.

Thus, during the time the chute 40 is in the position shown in phantom perspective, the concrete within the drum 1 and continuously being moved up the drum incline by the spiral blade 36 can only overflow through the central opening of the said blade returning to the low end of the drum 1. Depending on the consistency of the concrete, this position of the chute 40 is maintained to prolong the effective duration of the washing process to which the concrete is continuously subject to. However, when there is complete separation of aggregate from the concrete, conduit 19 is then shifted to project discharge chute 40 through the drum discharge opening 12, whereupon separated aggregate will discharge from the drum 1 into the cylindrical member 13. In the manner previously described, the separated aggregate will then be moved through the cylindrical member 13 and further separated into fine and coarse grades.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown, but that they may be widely modified within the invention defined by the claims.

What is claimed is:

1. A separating machine including an inclined rotatable drum in which materials are washed to cause separation, a discharge opening in the high end of said drum, a washing fluid supply conduit extending through the discharge opening and into the drum for supplying washing fluid therein, means for supporting said conduit so it is axially shiftable relative to said drum, means mounted on the interior wall of said drum for moving said materials partially up the drum incline and into position for discharge, and an inclined discharge chute fixedly connected to said axially shiftable conduit and adapted to be shifted to project through the drum discharge opening when it is desired to discharge the drum contents.

2. An aggregate recovering machine including a base, an inclined rotatable drum mounted on said base in which concrete is washed to separate aggregate therefrom, a discharge opening in the high end of said drum, a conduit extending through the discharge opening and into the drum for supplying washing fluid therein, said conduit having pivotal supports allowing said conduit to be axially shifted relative to said drum, a spiral blade mounted along the interior wall of the low end of said drum, lifting blades mounted concentrically about the interior wall of the high end of said drum, and an inclined discharge chute fixedly connected to said axially shiftable conduit centrally of said lifting blades and adapted to be shifted to project through the drum discharge opening when it is desired to discharge the drum contents.

3. An aggregate recovering machine including a base, an inclined rotatable drum mounted on said base in which concrete is washed to separate cement and aggregate, discharge openings in the low and high ends of said drum for discharging separated cement and aggregate respectively, a washing fluid supply conduit disposed centrally through said drum and extending out of said drum discharge openings, pivotal supports for each extending end of said conduit allowing said conduit to be axially shifted relative to said drum, a spiral blade mounted along the interior wall of the low end of said drum, lifting blades mounted concentrically about the interior wall of the high end of said drum, and an inclined discharge chute fixedly connected to said axially shiftable conduit centrally of said lifting blades and adapted to be shifted to project through the high end drum discharge when it is desired to discharge the drum contents.

4. The aggregate recovery machine as claimed in claim 3 wherein said pivotal supports include at least one upstanding support member on said base located on each side of and adjacent the high end of said drum, an elongated frame extending longitudinally on each side of said drum supported by each said support member, brackets carried at the ends of said frames, and a pair of arms pivotally connected to each extending end of said conduit, the free ends of one of said pairs of arms swingingly supported on the said brackets and those of the other said pair swingingly supported on the said base.

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