July 28, 1959 F. J. MECHAM 2,896,771

PORTABLE CONCRETE BATCHER

Filed July 3, 1957 2 Sheets-Sheet 1

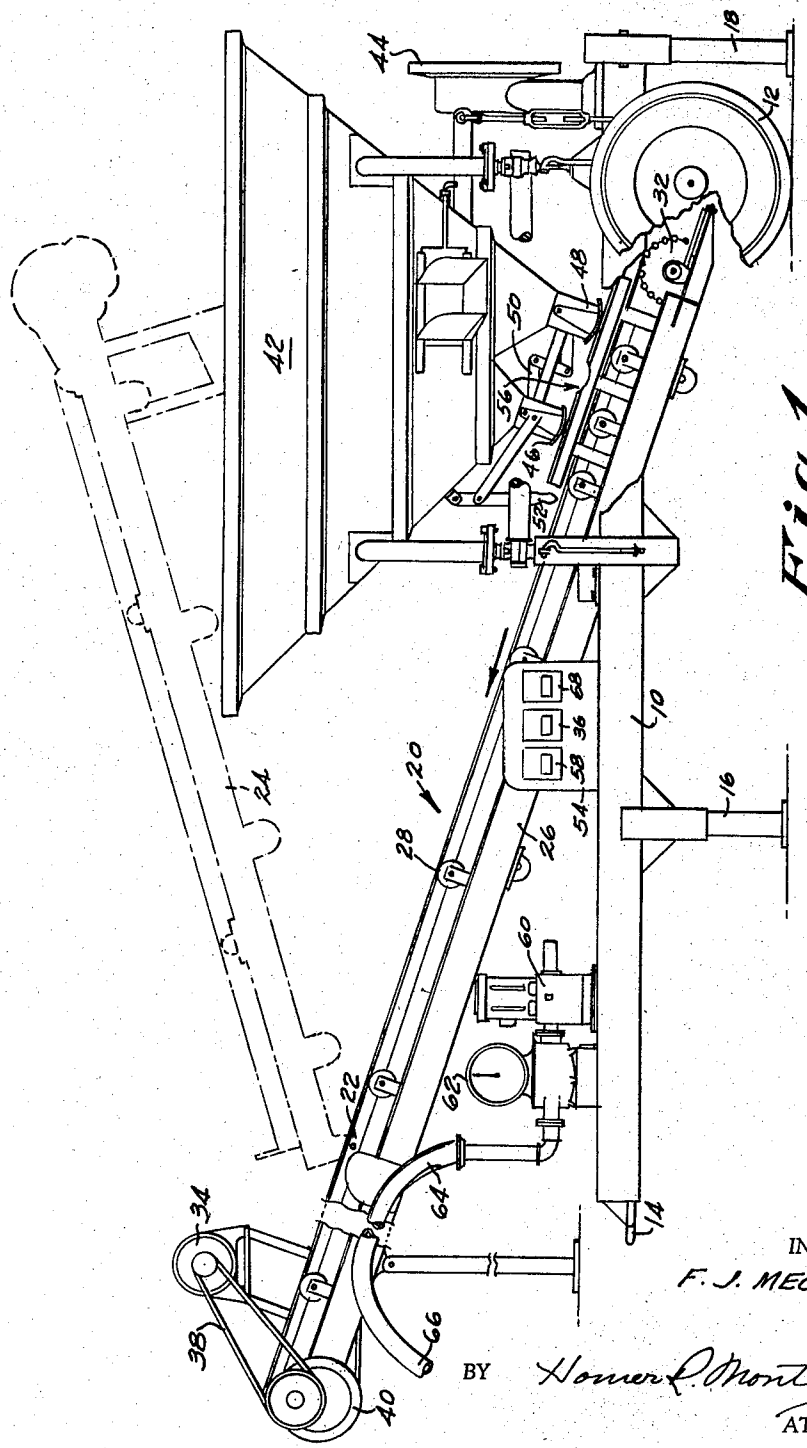


Fig. 1

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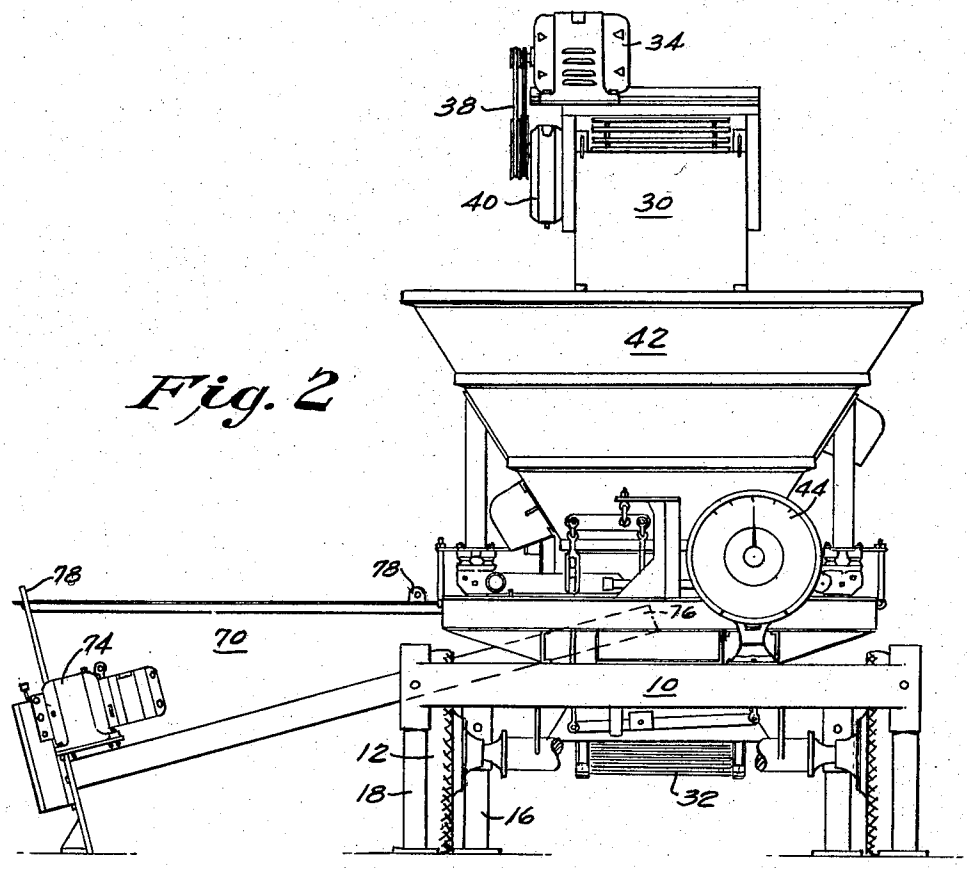


Fig. 2

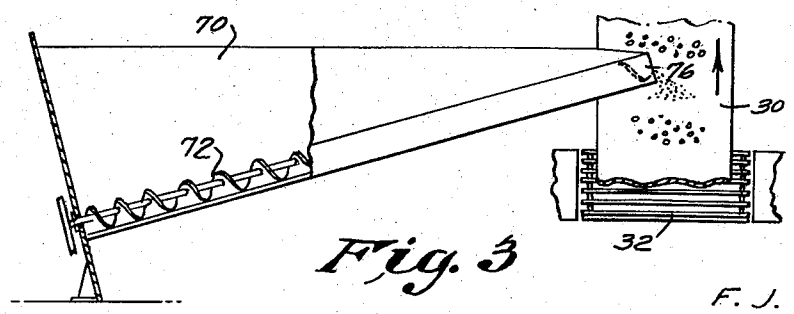


Fig. 3

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PORTABLE CONCRETE BATCHER

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3 Claims. (Cl. 198—54)

This invention pertains to batching equipment, and in particular to a batcher for preparing and delivering properly measured ingredients to vehicular concrete mixers.

The use of ready-mixed or transit-mixed concrete has become a commonplace in the construction industry. Conventionally, construction jobs within a given region are served by one or more plants, usually centrally located, at which the necessary ingredients for the desired concrete specifications are delivered into the mixing trucks, which are then dispatched to the construction job, the mixing taking place during transit. Such plants are of course fairly extensive and well-equipped, and to the extent that the delivery radius is not too great, such operations are relatively economical and efficient. However, it is a fact that a large percentage of the mass of finished concrete is plain water, and for jobs located remote from the central batching plant, the delivery cost (and time) may rise to prohibitive levels. This is true not only for construction work which may be going on in an intensified way in a suburban or remote area some distance from the batching plant, but is of course always a factor in road construction and similar projects. Except for the very largest jobs, dam construction or the like, the establishment of a complete fixed batching plant near the site is also prohibitive.

The present invention has for its principal object the provision of a portable batching plant for such transit-mixed concrete production, which is arranged to be driven or usually towed, by a truck, tractor or other prime mover, to a location which will be "central" with reference to a particular construction job, and which will bring to such operations the accuracy, convenience and economy of the usual batching plant, but without requiring the actual building of such an elaborate installation, or the acquiring of a suitable fixed site for the batcher. Aggregate, cement and water are delivered to the portable batcher at its spotted location, either by roadway vehicles, rail spurs, pipe lines or the usual facilities, and the batcher receives such materials and provides a convenient, fast and accurate means for depositing the proper quantities of such ingredients into the mixing and delivery trucks.

Another object of the invention is to provide a portable or roadable concrete batcher of the type described, in which special provision is made for its intended operation in locations exposed to the weather, particularly to the wind, which would tend to blow away the finely ground cement in particular.

Still another object of the invention is to provide a batcher having the above features and including powered means for elevating and lifting the desired ingredients directly into the mixing truck, but in which the size of the necessary conveyor for this purpose does not preclude the ready movement of the plant itself, when required, to a new location over existing roads with normal clearances.

The above and other objects and advantages of the

invention are in general achieved by providing a wheeled vehicle with a hopper of the weighing type arranged to receive sand, gravel or other ingredients suitable for the aggregate, and provided with spaced discharge gates for directing the hopper contents onto an upwardly traveling belt conveyor, together with an auxiliary cement hopper and conveyor arranged to receive the contents of bags of cement and to deliver them onto the same belt conveyor, but between the discharge gates of the aggregate hopper, whereby the ingredients can then be elevated to the mixing truck hatch without any danger of loss of the finely powdered cement in the wind. Provision is also made for metering an exact quantity of water into the mixing truck, at the point of discharge of the belt conveyor, so that the entire operation can readily be controlled by a single operator at a control station.

The preferred apparatus constituting the invention, and its manner of operation, will best be understood by referring now to the following detailed specification, taken in connection with the appended drawings, in which:

Fig. 1 is a side elevational view, partly broken away, of a portable batcher in accordance with the invention.

Fig. 2 is a rear elevation of the same.

Fig. 3 is schematic view, oriented the same as Fig. 2, but more clearly illustrating the transfer of materials onto the main conveyor belt.

In Fig. 1, numeral **10** designates the main horizontal framework of a batcher in accordance with the invention, the framework or chassis being provided with road wheels of which one is indicated at **12**, and a tow hitch as at **14**. When located for actual operations, the framework or chassis is supported from the ground by auxiliary jack legs such as at **16** and **18**, these of course being duplicated at the opposite side of the frame. Suitably carried by the chassis **10** is a slanting belt conveyor or elevator generally indicated by **20**, preferably hinged as at **22** so that the upper part **24** may be swung back to the position indicated in dash lines whenever the machine is to be moved as by a towing vehicle attached to hitch **14**. The belt conveyor **20** is itself wholly conventional, including frame members **26** carrying rollers **28** which support the canvas or like flexible belt **30** passing at its ends over suitable face or slat pulleys (such as **32**), the upper pulley being power driven as by an electric motor **34** mounted on the belt conveyor frame and controlled as by a pushbutton station **36**. A belt drive **38** and gear reducer **40** are indicated in Fig. 1, but any equivalent belt powering means may be substituted.

Also carried upon the chassis **10** is a weighing hopper **42**, mounted for limited vertical motion under the load of aggregate (sand, gravel or the like) which it contains, and provided with a weighing scale **44** to enable the operator to determine the amount discharged or on hand. At its lower end, hopper **42** is provided with a pair of discharge gates **46**, **48**, linked together by links **50** and jointly controlled by an operating handle **52** located conveniently for an operator at the control station **54** having the pushbutton control **36** as well as others to be described.

As the main conveyor belt travels upward in the direction of the arrow in Fig. 1, opening of gates **46** and **48** permits two streams of aggregate to discharge onto belt **30** at points spaced along its travel direction. In a manner to be described below, the finely ground or powdered Portland cement will be discharged onto the belt **30** at a point **56** disposed between the discharge points of the gates **46** and **48**. This arrangement provides two important advantages: first, the fact that the cement is immediately covered over by a layer of aggregate discharged from the upper one of the two gates, eliminates any possibility that the cement will be lost due

to wind action, with consequent deviation of the finished concrete from the desired formula, and second, the placement of the cement in effect in the central stratum of the aggregate aids in the desired thorough distribution of the cement through the aggregate.

While it might seem that wind protection could be achieved merely by depositing the cement on the belt first, and then covering it with a single stream of aggregate, the present invention takes advantage of the more thorough preliminary distribution obtained by the arrangement as described. Moreover, in wet weather, the canvas belt **30** will become saturated, and if fresh cement were to be deposited thereon, considerable quantities of it might be retained thereon instead of being delivered into the mixing truck. The arrangement described is considered optimum for the intended purposes.

The control station **54** includes an additional start-stop pushbutton control **58** by which the operator controls the operation of a water pump **60** connected to any suitable water supply, as by a hose not shown, and delivering water through an indicating meter **62** to a hose **64** secured to the side of conveyor frame **26**, its discharge end at **66** being disposed to enter the transit mixer hatch into which the belt conveyor also discharges. Finally, control station **54** includes a push-button control **68** for controlling the motor of a cement feeding auxiliary conveyor now to be described.

Fig. 2 of the drawings shows a rear view of the entire machine, including an outrigged hopper **70** to receive cement from bags as they are manually dumped therein, although bulk cement could equally be used. The lower portion of hopper **70** is formed as a trough in which operates a conveyor such as the screw conveyor **72**, operating to raise the cement upwards and towards the centerline of the batcher; i.e., to the right in Fig. 2. A motor **74** drives the conveyor screw, and as mentioned above is controlled from the central control panel **54** of Fig. 1. As shown in dash lines in Fig. 2, the discharge end at **76** of the cement hopper conveyor lies over main conveyor belt **30**, and in the fore-and-aft direction is placed between the discharges of the aggregate hopper gates as already described. This relationship is more clearly shown in Fig. 3, which shows the positions of the cement hopper, the main belt **30**, and its lower pulley **32**.

Preferably, the cement hopper is arranged to be disconnected from the rest of the vehicle during its movements from place to place. While it could be pivoted in place, it is preferably made to slide in and out of its position of use, and lifting hooks **78** are preferably provided so that it can easily be elevated and placed upon hopper **42** or other convenient place.

It will be seen from the above that the construction illustrated and described satisfies the objects of the invention in an efficient and desirable way, but it is to be understood that the principles of the invention can be carried out by apparatus of other forms. The invention is therefore not to be considered as limited to the details shown and described, except as may be required by the scope of the appended claims.

What is claimed is:

1. A portable concrete batching plant comprising a wheeled framework, a power-operated elevating belt conveyor mounted on said framework, a hopper for aggregate carried by said framework with its lower discharge end disposed above a lower portion of said conveyor, a pair of flow-controlling discharge gates at the bottom of said hopper spaced from one another in the direction of belt movement to deposit aggregate thereon from said hopper in two layers, a second hopper for pulverulent cement, and a cement conveyor positioned to receive cement from said second hopper and having its discharge end between said gates to deposit cement upon the aggregate issued from one gate and beneath the aggregate issuing from the other gate; whereby the pulverulent cement is protected from wind action during transport of the mixture by said elevating belt conveyor.

2. A batching plant in accordance with claim 1, including means under the control of an operator for concomitantly opening and closing said gates.

3. A batching plant in accordance with claim 1, in which said cement conveyor is disposed with its cement-receiving end lower than the lowermost point reached by said belt conveyor, to elevate cement for discharge at the stated point on the belt conveyor.

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