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A. J. KAYSER

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MOBILE CONCRETE BATCHER

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3 Sheets-Sheet 1

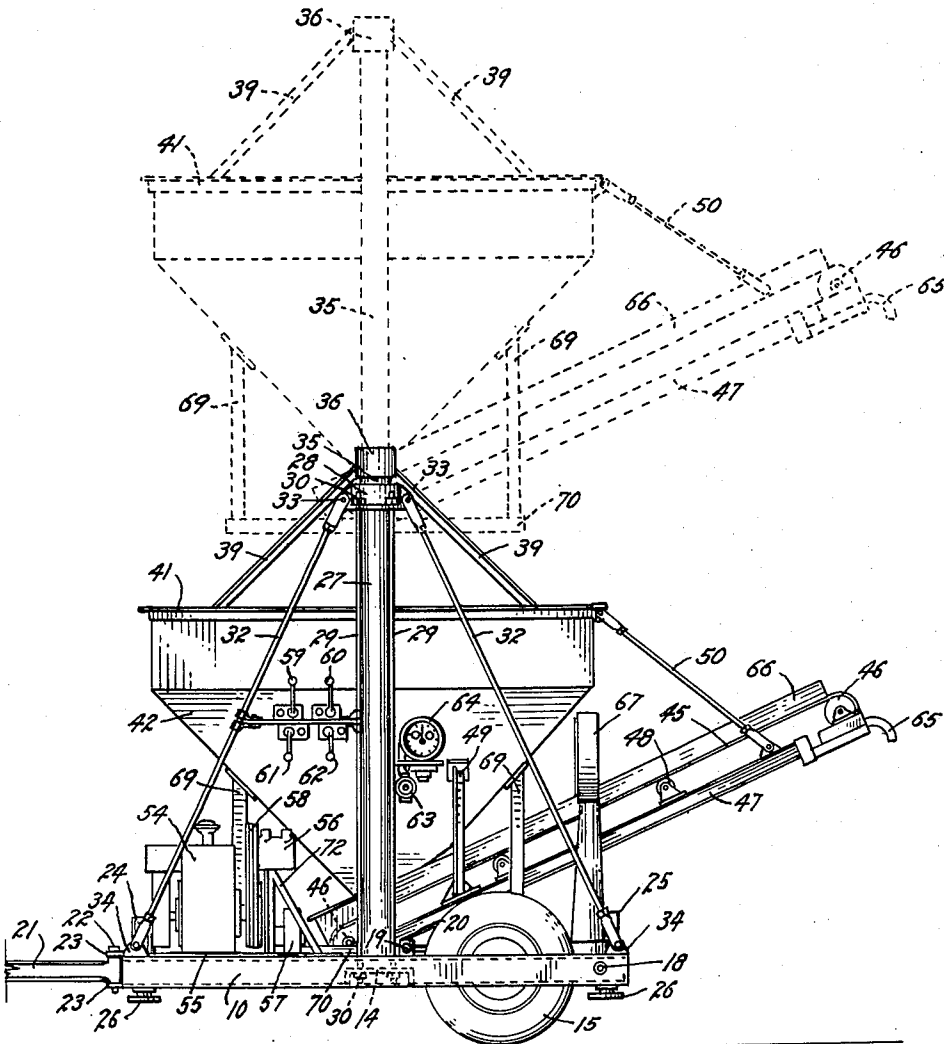


FIG. 1

INVENTOR.
ALLAN J. KAYSER
BY

W. H. Hall
ATTORNEY

Oct. 29, 1957

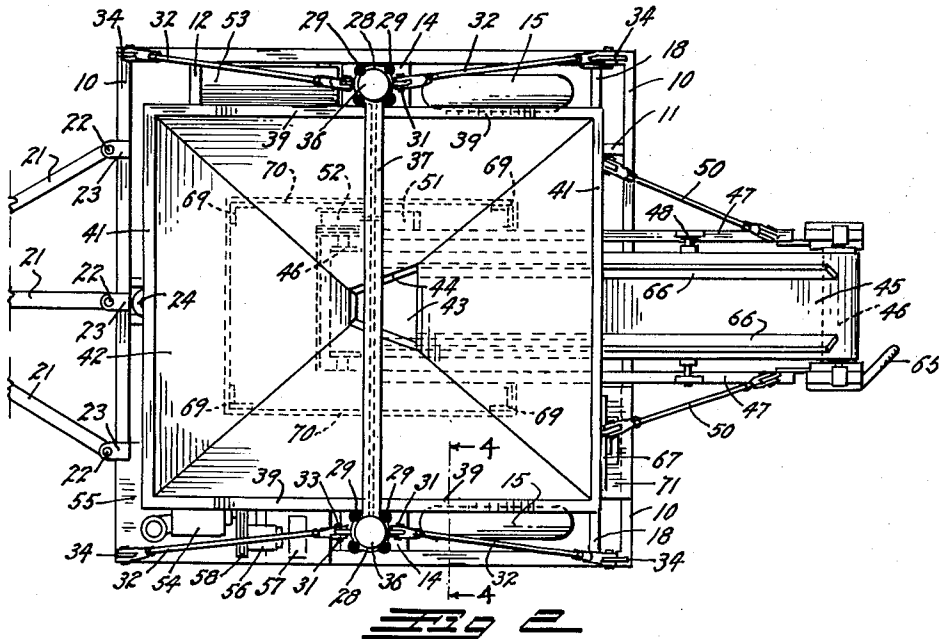
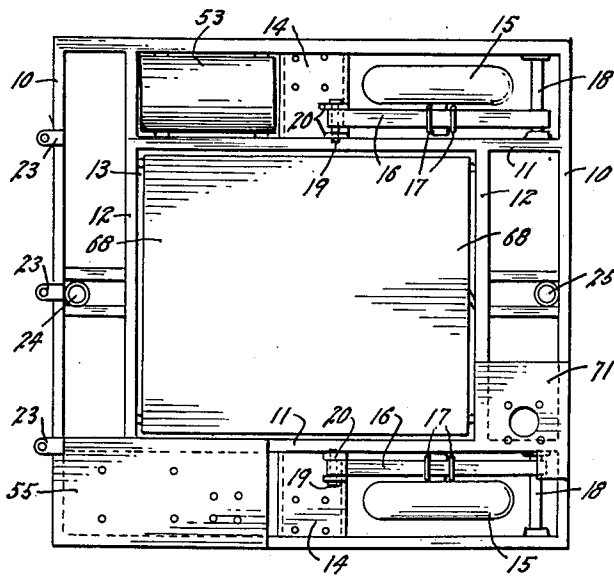
A. J. KAYSER

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3 Sheets-Sheet 2



INVENTOR.

ALLAN J. KAYSER
BY

Attorney
ATTORNEY

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MOBILE CONCRETE BATCHER

Allan J. Kayser, Denver, Colo.

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5 Claims. (Cl. 214—512)

This invention relates to a concrete batcher, that is, to a device for receiving the proportioned ingredients for a concrete mixture and delivering the said ingredients as a completely proportioned batch to a mobile concrete mixer. Concrete batchers are usually rather large, heavy, fixed structures located at central points from which the mobile mixers receive, mix and distribute the concrete. Jobs are often encountered which are not of sufficient magnitude to warrant the expenditure of the time and money required in erection of the usual fixed type of batcher, yet transportation of the concrete from the nearest fixed batcher would be impractical due to distances involved.

The principal object of the present invention is to provide a highly efficient, portable concrete batcher which can be quickly, easily and economically taken to widely separated jobs which can be placed into immediate use upon arrival at the job and which will rapidly and efficiently deliver proportioned batches to the mixers in close proximity to the job.

Another object of the invention is to provide a portable batcher which can be trailed behind any towing vehicle, and which, upon arrival at the job, can be easily and safely lowered to the ground for firm, substantial support.

A further object is to provide a unitary batcher with the use of which sand, gravel, cement, and any other dry ingredients can be accurately weighed to properly proportion the batch and which will elevate the proportioned batch sufficiently high for rapid delivery into the receiving chute of a conventional mobile concrete mixer and to provide means for delivering the exact necessary water to the mixer simultaneously with the delivery of the batch.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a side elevational view of the improved concrete batcher, illustrating it in solid line in the lowered, portable position, and in broken line in the elevated, delivery position;

Fig. 2 is a plan view of the improved batcher;

Fig. 3 is a plan view of the supporting frame of the improved batcher with the superstructure removed;

Fig. 4 is an enlarged, fragmentary, detail, sectional view, taken on the line 4—4, Fig. 2;

Fig. 5 is a similar enlarged, fragmentary, detail, sectional view, taken on the line 5—5, Fig. 4; and

Fig. 6 is a schematic piping diagram illustrating the flow of hydraulic fluid in the improved batcher.

The improved batcher is mounted on a substantially

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rectangular support preferably formed from structural channel iron welded into rectangular relation, with the open channels facing inwardly to form an outer supporting frame 10 containing two longitudinally extending frame members 11 and two transversely extending frame members 12. The members 11 and 12 are welded to and positioned within the outer frame 10 in the plane of the latter and in spaced relation to the sides thereof to form a medial rectangular scale opening 13. A channel-shaped, platform plate 14 extends between each of the longitudinal frame members 11 and the adjacent side of the frame 10.

A retractable ground-engaging wheel 15 is positioned between each longitudinal frame member 11 and the adjacent side of the frame 10. Each wheel 15 is mounted in a suitable axle fitting secured to the mid-portion of a leaf spring 16 by means of suitable spring shackles 17. The rear extremity of each leaf spring 16 is hingedly mounted on a spring hinge shaft 18 affixed to and extending between a longitudinal frame member 11 and one side of the frame 10. The forward extremity of each spring 16 is detachably mounted upon a removable spring pin 19 extending through spring ears 20 welded or otherwise secured to the adjacent platform plate 14.

It can be seen that when the spring pins 19 are in place, the wheels will be in the traveling position of Fig. 1 and the supporting frame will be resiliently supported on the springs 16. If the pins 19 are withdrawn, however, the frame 10 can descend, due to the hinge mountings of the springs 16 upon the hinge shafts 18 until it rests flat upon the ground.

During transportation, the forward extremity of the frame 10 is supported from the towing vehicle by means of a suitable A-shaped tongue structure 21 which is removably mounted on withdrawable tongue pins 22 extending through tongue clips 23 welded to the front of the frame 10. A forward hydraulic jack 24 and a rear hydraulic jack 25 are mounted on the front and rear, respectively, of the frame 10. These jacks are arranged to force plungers 26 downwardly into contact with the ground surface.

The supporting frame is transferred from the portable position to the fixed position by first actuating the forward jack 24 to cause its plunger 26 to engage the ground so as to relieve the load on the tongue structure 21. The tongue pins 22 are then withdrawn and the tongue structure 21 is removed. The forward extremity of the frame 10 is now lowered to the ground by reverse actuation of the jack 24. The rear jack 25 is now actuated to cause its plunger 26 to engage the ground so as to relieve the load on the wheels 15. The spring pins 19 are now withdrawn and the rear jack 25 is reversely actuated to lower the rear extremity of the frame 10 to the ground.

A vertical hydraulic cylinder 27 is supported on each platform plate 14. Each hydraulic cylinder is provided with an upper flanged collar 28 which is welded or otherwise secured thereto adjacent the top thereof. Four elongated tie bolts 29 provided with the usual nuts 30 extend between the flange of each collar 28 and the platform plate therebelow, by means of which the hydraulic cylinders are fixedly clamped against the platform plates 14.

Each of the collars 28 is provided with two oppositely-projecting stay rod ears 31 and an inclined turnbuckle-type stay rod 32 is mounted on each ear 31 by means of a mounting bolt 33. The inclined stay rods 32 extend downwardly to attachment ears 34 formed on the forward and rear extremities of each side member of the frame 10 and act to rigidly maintain the hydraulic cylinders 27 in fixed vertical positions.

A tubular hydraulic plunger 35 is slidably mounted in

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each hydraulic cylinder 27 and extends thereabove to receive a removable, inverted, cup-shaped cap 36. A cross beam 37, preferably T-shaped in cross-section, extends between the two caps 36 and is welded to the latter at its extremities. The cross beam 37 is rigidly braced at each of its extremities and at an angle of 90° to the axis of the caps 36 by means of a first pair of gusset plates 38 which are welded to both sides of the cross beam 37 and to the adjacent cap 36.

An inclined hanger bar 39 is welded at its upper extremity to each gusset plate 38 and extends outwardly and downwardly therefrom. Each hanger bar 39 is rigidly fixed at an angle of substantially 45° with the plane of the plates 38 by means of a second pair of gusset plates 40 welded to both sides of the hanger bar and to the adjacent gusset plate 38, and the beam 37. It can be seen that the above structure provides two hanger bars extending oppositely outward in A-shaped relation from each extremity of the cross beam 37.

The lower extremities of the four hanger bars are welded or otherwise fixedly secured to a rectangular, horizontal hopper frame 41. A triangular hopper plate is secured to and extends downwardly and inwardly from each side of the hopper frame 41 to form an inverted, pyramidal hopper 42. The rear hopper plate is cut back to form a four-sided throat opening 43 in the bottom of the hopper 42, from the two sides and front of which skirt plates 44 depend to direct and confine discharging material.

The material discharging through the throat opening 43 piles upon an inclined conveyor belt 45 positioned therebelow. The conveyor belt is trained between terminal conveyor rollers 46 mounted in the extremities of an inclined conveyor frame 47. The midportion of the upper reach of the conveyor belt 45 is supported upon suitable idler rollers 48 journaled in the conveyor frame 47.

The conveyor frame is fixedly supported and suspended from the hopper frame 41 and its hopper 42 at an angle of substantially 30° in any desired manner. As illustrated, the forward extremity of the conveyor frame 47 is supported from the hopper 42 upon suitable hanger struts 49, and the rear extremity of the conveyor frame 47 is supported from the hopper frame 41 through the medium of suitable turnbuckle rods 50.

The conveyor belt 45 can be driven in any desired manner. It is preferred, however, to employ a conventional hydraulic motor the position of which is indicated at 51 in Fig. 2, provided with a conventional speed reducer positioned at 52, to deliver power to the lower conveyor roller 46. The hydraulic motor 51 and the speed reducer 52 are conventional and are fixedly mounted on the conveyor frame 47 in any desired manner so as to move integrally therewith. Hydraulic fluid for operating the motor 51 is conducted thereto by means of flexible hoses, such as illustrated diagrammatically at 73 in Fig. 6, to allow freedom of movement.

Hydraulic pressure for actuating the plungers 35 in the hydraulic cylinders 27, the jacks 24 and 25, and the hydraulic motor 51 can be supplied from any suitable source. For convenience in portability, the hydraulic fluid is preferably supplied from a hydraulic fluid reservoir 53 mounted in the frame 10, and the pumping power is supplied from a portable gas engine, as indicated at 54, secured on an engine platform plate 55 mounted on the frame 10. The engine 54 drives two hydraulic pumps 56 and a water pump 57 through the medium of conventional V-belts 58.

For clarity of illustration the various hydraulic and water pipes, tubes and hoses have been omitted from the illustrations and are shown diagrammatically in Fig. 6. The flow of hydraulic fluid is controlled by means of suitable conventional hydraulic valves positioned conveniently for the operator. As illustrated, a hydraulic valve 59 controls the flow to and from the forward jack 24; a

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valve 60 control the flow to and from the rear jack 25; a valve 61 controls the flow to and from the hydraulic cylinders 27; and a valve 62 controls the flow to and from the hydraulic motor 51. Hydraulic fluid is returned to the reservoir from the valves 59, 60, 61 and 62 through a return conduit 74 see Fig. 6. The water pump 57 supplies water from any suitable source of supply through a water valve 63 and a water meter 64 to a discharge nozzle 65 supported at the upper rearward extremity of the conveyor frame 47.

It can be seen that if concrete-forming ingredients are dumped into the hopper 42, they will pile upon and will be prevented from flowing through the throat opening 43 by the conveyor belt 45 positioned therebelow. If, however, hydraulic fluid be admitted to the hydraulic motor 51, the upper reach of the conveyor belt 45 will travel from below the throat opening 43 to carry the material upwardly and rearwardly on the conveyor belt 45, from which it will be discharged over the upper conveyor roller 46.

The weight of the ingredients in the hopper is indicated at all times upon a conventional dial-type weighing scale 67 mounted upon a scale plate 71 at the rear of the frame 10 within easy view of an operator stationed at the hydraulic control valves. The scale 67 indicates weight placed upon a scale platform 68 which is mounted within the platform scale opening 13. The operating connections between the scale platform 68 and the scale 67 are any of the conventional platform scale mechanisms presently in use and need not be described in detail here.

The weight of the hopper 42 and its contents is transferred to the scale platform 68 by means of hopper-supporting legs 69 which extend downwardly to a rectangular base frame 70 below the hopper. Thus, when the hopper is in its fully lowered position, the base frame 70 will rest on the scale platform 68 so that the weight of the ingredients being placed in the hopper will be indicated upon the dial scale 67.

It will be understood that for charging the hopper with its properly proportioned ingredients the valve 61 is operated to release the pressure in hydraulic cylinders 27 to permit the plungers 55 to descend so that the base plate of the hopper rests on scale platform 68. In this position the hopper is free from support by plungers 35 by reason of the loose mounting of caps 36 over the tops of the plungers.

In use, the improved batcher is positioned below any suitable ramp or loading platform which will enable the delivery vehicles to deliver the sand, gravel, cement, and any other ingredients into the hopper. As each ingredient is being supplied to the hopper, the operator watches the dial scale 67 and stops the supply in the proper proportion. When all of the ingredients have been placed in the hopper, the valve 61 is operated to admit hydraulic fluid to the hydraulic cylinders 27 to force the plungers 35 upwardly therein to elevate the hopper and its connected conveyor mechanism to the broken line position of Fig. 1.

The feed hopper of a conventional mobile concrete mixer is positioned below the discharge extremity of the conveyor belt 45, and the valve 62 is actuated to admit hydraulic fluid to the hydraulic motor 51 to initiate operation of the conveyor belt 45 to deliver the batch to the concrete mixer in a continuous stream. The water valve 63 is then opened and a predetermined amount of water, metered by the water meter 64 is delivered to the mixer through the discharge nozzle 65. The mobile concrete mixer is then driven away and the valves 61 and 62 are operated to stop the conveyor and to lower the hopper onto the scale platform 68 to receive the next succeeding batch.

It is desired to call attention to the fact that the hopper and conveyor structure are not attached to the plungers 35, and a hoist can be attached to the cross beam 37 to lift the caps 36 from the plungers 35 so that the entire

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hopper and its attached structure may be set aside, supported on the base frame 70, or it may be handled and transported separately from the frame 10 and its superstructure. With the hopper removed, the platform scale can be used for any desired weighing purposes independently of the batching mechanism.

It is preferred to provide side boards 66 for the conveyor belt 45 to prevent materials from over-flowing the sides of the conveyor.

For convenience, it has been found advisable to support the hydraulic pump 56 above the water pump 57 upon a pump supporting bracket 72.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A concrete batching device comprising: a horizontally positioned supporting frame; means for connecting the forward extremity of said frame to a towing vehicle; wheels supporting the rear extremity of said frame; a hydraulic cylinder vertically supported at each side of said frame; a hydraulic plunger slidably mounted in each cylinder; a batch hopper positioned between said cylinders; means supporting said hopper from said two plungers; means for admitting hydraulic fluid into said cylinders to cause said plungers to elevate said hopper; means for delivering material from said hopper when the latter is in the elevated position; two hydraulic jacks mounted respectively centrally fore and aft on said frame, means for adjusting the forward jack to lower the forward side of the frame to the ground, means for admitting hydraulic fluid to the rear jack to raise the rear side of the frame so as to lift the wheels free from the ground, and means for releasing said wheels to move upwardly freely relative to said frame so that the latter may rest upon the ground when the hydraulic pressure is released from the rear jack.

2. A concrete batching device comprising: a horizontally positioned supporting frame; a hydraulic cylinder vertically supported at each side of said frame; a hydraulic plunger slidably mounted in each cylinder; a batch hopper positioned between said cylinders; means supporting said hopper freely from said two plungers; means

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for admitting hydraulic fluid simultaneously into said cylinders to cause said plungers to elevate said hopper; means for delivering material from said hopper when the latter is in the elevated position; a weighing scale platform supported in said supporting frame; and means for transmitting the weight of said hopper to said scale platform free from supporting engagement by said plungers when said hopper is in the lowered position to weigh the ingredients within said hopper.

3. A concrete batching device as described in claim 2 having an inclined belt conveyor device; and means suspending said conveyor device from and below said hopper so as to move as a unit therewith, said hopper having a discharge throat positioned to deliver material to the lower extremity of said conveyor.

4. A concrete batching device comprising: a horizontally positioned supporting frame; a hydraulic cylinder vertically supported at each side of said frame; a hydraulic plunger slidably mounted in each cylinder; a batch hopper positioned between said cylinders; means supporting said hopper from said two plungers; means for admitting hydraulic fluid simultaneously into said cylinders to cause said plungers to elevate said hopper; means for delivering material from said hopper when the latter is in the elevated position; a base frame mounted on said hopper and extending downwardly therefrom; a weighing scale supported in said supporting frame upon which said hopper base frame rests free from supporting engagement by said plungers when said hopper is in its lowered position; and weight-indicating means actuated in consequence of said weight-supporting means.

5. A concrete batcher as defined in claim 1, in which said batch hopper is removable from said device by lifting said cross beam off said plungers.

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