Feb. 1, 1966 C. E. ROUSE 3,232,460

CONCRETE HOISTING AND PLACING APPARATUS

Filed Jan. 7, 1964 2 Sheets-Sheet 1

FIG. 1

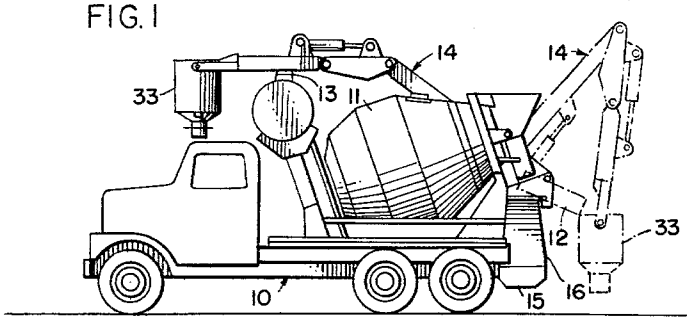


FIG. 2

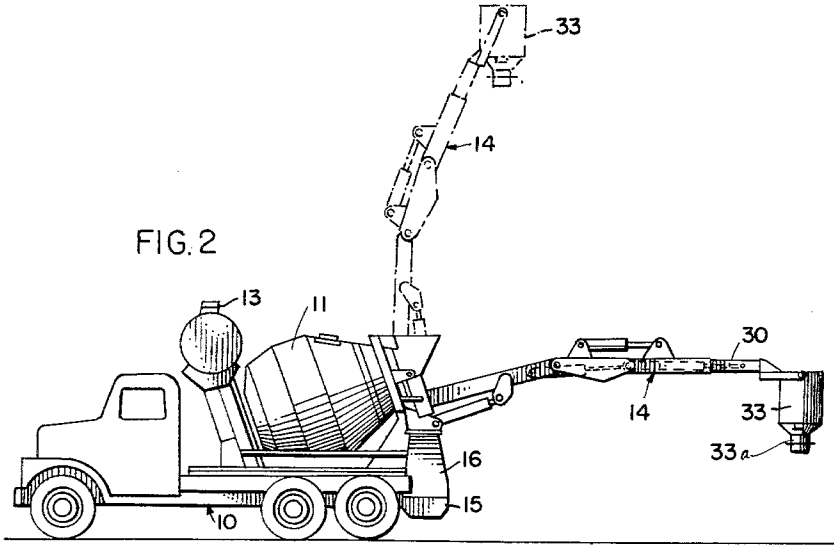


FIG. 7

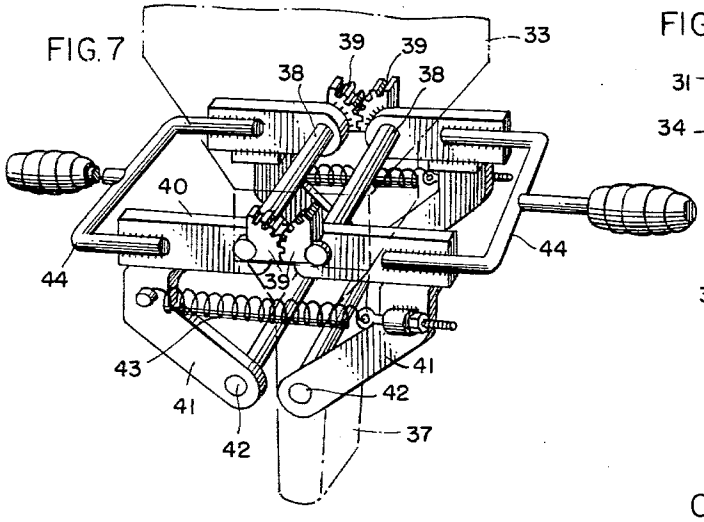
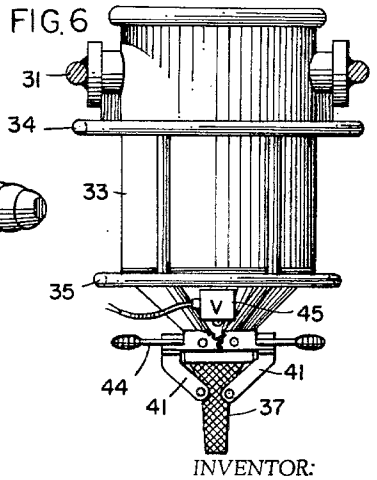


FIG. 6



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CONCRETE HOISTING AND PLACING APPARATUS

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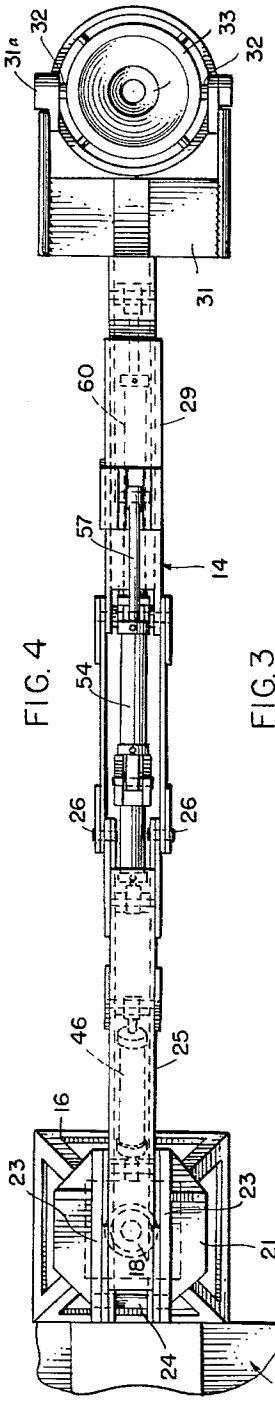


FIG. 4

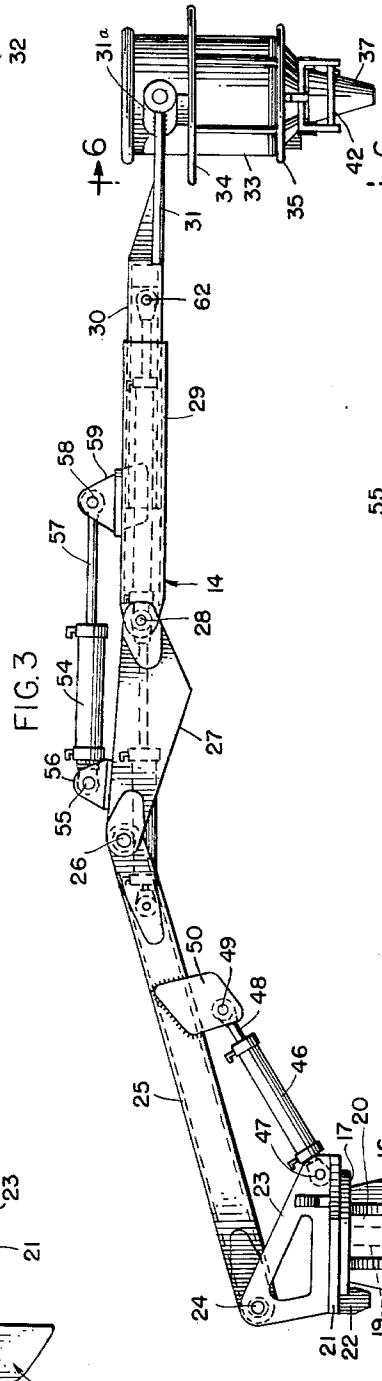


FIG. 3

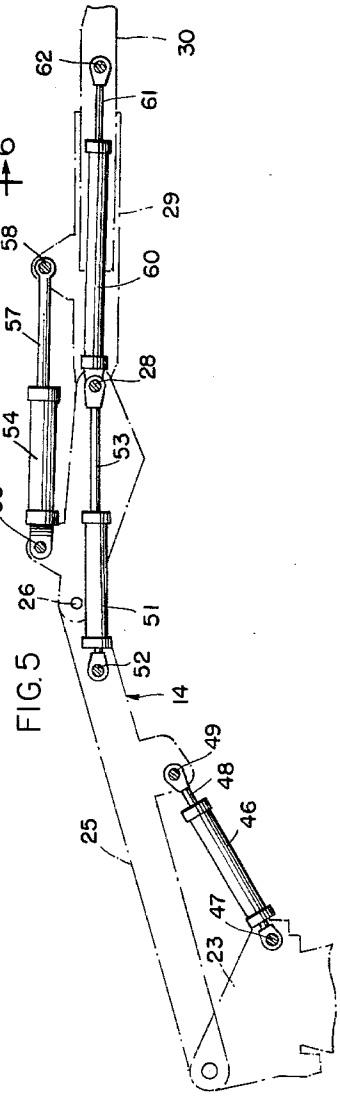


FIG. 5

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CONCRETE HOISTING AND PLACING APPARATUS

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3 Claims. (Cl. 214—77)

This invention relates to concrete hoisting and placing apparatus which is particularly effective in taking ready-mixed concrete from a truck mixer and hoisting the same for ultimate placement at locations such as lintels, pilasters, overhead slabs, etc.

An object of the invention is to provide a hydraulically-operated boom carried by transit-mix trucks for the elevation and placement of concrete. A further object is to provide mechanism for moving a hopper carrying concrete to locations heretofore requiring placement by hand-laborers or dragline-type equipment. Yet another object is to provide in combination with a transit concrete mix truck a boom and hopper structure which may be supported upon said truck for travel and which at a construction location may be readily moved into positions for receiving concrete from the mix truck and for emplacing the same at elevated locations. Yet another object is to provide improved braking means for controlling the load during deceleration and for accurate positioning of the load. A still further object is to provide a novel boom structure equipped with a telescoping section carrying a hopper for accurate and efficient placement of the hopper in the pouring operation. A still further object is to provide in combination with a hopper provided with a dispensing flexible sleeve and closure means therefor, a vibrator for causing low slump dry mixes to flow out of the hopper. Other specific objects and advantages will appear as the specification proceeds.

The invention is shown in an illustrative embodiment by the accompanying drawings, in which—

FIG. 1 is a side view in elevation of apparatus combination embodying my invention; FIG. 2, a view similar to FIG. 1 but showing the hoist and hopper equipment in different positions; FIG. 3, an enlarged side view in elevation of the boom and hopper apparatus; FIG. 4, a broken top plan view of the apparatus shown in FIG. 3; FIG. 5, a side view in elevation of the piston arrangement, the boom segments being shown in dotted lines; FIG. 6, a side view in elevation, the view being taken as indicated at line 6—6 of FIG. 3; and FIG. 7, a perpective view showing clamping means for controlling the flow of concrete through the dispensing sleeve.

In the illustration given, **10** designates a transit-mix truck equipped with a rotary mixer vessel **11** and having a discharge pipe indicated by the numeral **12**. I prefer to equip the truck with a support rack **13** for supporting the segmental boom **14**, as illustrated best in FIG. 1. Since the transit concrete-mix truck is of well-known construction, it is believed unnecessary to describe the structure in detail.

In the practice of my invention, the truck **10** is provided at its rear and at one side thereof with a bracket support **15**, as shown best in FIG. 3. Mounted upon the bracket **15** is a hollow base member **16** provided at its top with an apertured slew plate **17**. Mounted within the base **16** is a motor **18** for driving a shaft **19** fixedly-mounted within a collar **20**. The collar **20** is fixed to a base plate **21** which is adapted to rotate upon slew ring **17**, and plate **21** is equipped with a depending shoe **22** having an inwardly-projecting portion engaging the bottom of slew ring **17** and serving to produce a braking effect when the load is decelerated, as will be later described, and thus enabling very accurate positioning of the load.

Mounted upon plate **21** are triangular support members **23**. A pivot pin **24** extends through the members **23** to support a main boom segment or member **25**. Pivotally connected to the main boom by pins **26** is an intermediate boom member **27**, and pivotally connected to the intermediate boom **27** by pin **28** is an outermost hollow boom segment **29**. Telescopically received within the boom segment **29** is a hopper-supporting boom **30**. The telescoped boom **30** is provided at its outer end with a bifurcated head **31** having socket members **31***a* receiving trunnion pins **32** carried by the hopper **33**. The hopper **33** may be provided with spaced rings **34** and **35** which provide convenient handles for manipulating the hopper.

The hopper **33** may be provided on its inner side with a tubular flexible liner **36** having a downwardly-projecting portion forming a discharge sleeve **37**. Any suitable means may be employed for clamping the dispensing sleeve **37** together so as to seal off flow therethrough. In the specific structure shown in detail in FIGS. 6 and 7, pins **38** extend through the lower end of the hopper, and at their ends are provided with sector teeth **39**. Secured to the pins are outwardly-extending members **40** equipped with downwardly- and forwardly-extending bars **41**. The bars **41** which extend below the hopper **33** are each equipped with transverse gripper rods **42**. A spring **43** normally draws bars **41** toward each other to bring the rods **42** into tight engagement with the sleeve **37** so as to seal the sleeve against the flow of material therein. Handle bars **44** are provided for separating the gripper rods **42** so as to open the sleeve **37**, the sector teeth **39** enabling the opening of the sleeve to be accomplished by moving only one of the handles **44**.

A vibrator **45**, as shown best in FIG. 6, is supported by the lower end of the hopper so as to vibrate the concrete material to provide a discharge of low slump dry concrete mixes. The vibrator may be a hydraulically-actuated vibrator or electrically-operated vibrator equipped with the usual eccentric rotating parts, and since such structures are well known, a further detailed description herein is believed unnecessary.

Any suitable power mechanism may be provided for actuating the boom segments. In the specific illustration given, a hydraulic cylinder **46** is pivotally connected to pin **47** carried by the member **23**, as shown best in FIG. 3, and the piston therein is equipped with a rod **48** engaging pin **49** carried by the bracket **50**. Similarly, cylinder **51** is connected by pin **52** to the boom segment **25**, and the piston rod **53** thereof is connected to pin **28**. A cylinder **54** is connected on one side to pin **55** carried by bracket **56** on the intermediate boom segment **27**, and the piston rod **57** thereof is connected to pivot **28** carried by bracket **59** mounted on the boom segment **29**. A long cylinder **60** is pivotally mounted at one end on pin **28**, and the piston rod **61** thereof is connected to pivot pin **62** carried by the sliding or telescoping boom **30**.

The various pistons are hydraulically operated as double-acting hydraulic cylinders, the pump and flexible tubes leading to the cylinders not being shown in the drawings since they are of well-known construction.

Operation

In the operation of the apparatus, the hydraulic fluid is fed to the various pistons to manipulate the segments of the boom **14** in the manner illustrated best in FIGS. 1 and 2. By locating the base **16** at one side of the rear side of truck **10**, it is possible to rotate the boom **14** while the main boom segment **25** is in a slightly raised position to the carrying position shown in full lines in FIG. 1. In this position, the boom segment **29** rests

upon the bracket support **13** and the hopper **33** is suspended above the truck. At the point of construction, the boom **14** is raised slightly and then swung rearwardly to the position shown in dotted lines in FIG. 1, with the hopper **33** below the discharge pipe **12** of the mixer vessel. When the hopper is filled to the desired extent, it is elevated, the discharge sleeve **37** being held in closed position by the rods **42** actuated by spring **43**. The boom may then be raised to the desired point for pouring, as, for example, over a lintel, pilaster, etc., and the operator by moving the handle **44** can release the concrete through the discharge sleeve **37**. In the latter operation, the vibrator **45** is effective in causing low slump dry mixes to flow out of the hopper.

In the foregoing operation, the sliding boom **30** is very effective in the placement of the hopper prior to pouring. It enables the hopper to be lifted adjacent a wall carrying the lintels, etc., and then when the top of the wall is cleared, the boom **30** can be readily extended over the location where the concrete is to be poured. The telescoping structure enables accurate placement of the hopper to be made in a minimum of time. As a further aid in controlling the hopper movement, particularly during deceleration of the load, the shoe **22** carried by plate **21** and extending below slew plate **17** produces a braking effect so as to enable accurate positioning of the load. The pivotal support of the hopper on the bifurcated member **31** permits the operator to manually swing the hopper and the reduced extension **33***a* in the placing of the concrete discharged. In other words, the operator can swing the hopper toward and away from him and also can swing the same laterally through a limited range, with plate **21** rotating upon slew plate **17**.

With the foregoing apparatus, it is found that a single operator for the truck and mixing vessel who also operates the power cylinders for the boom, and with a single operator for the hopper at an elevated position in the construction area, can together carry on a complete concrete mixing and pouring operation with substantial saving in time and expense and while pouring a relatively low slump concrete.

In the preferred form of my invention, the segmental boom is carried by a base founded on the transit concrete-mixer truck for cooperation therewith in the filling and placing of the hopper; however, it will be understood that the base support for the boom may be carried by other vehicles or fixed structures for utilizing many of the novel inventive features described herein.

While in the foregoing specification I have shown specific apparatus in a considerable detail for the purpose of illustrating my invention, it will be understood that

such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In combination with a transit concrete-mix truck equipped with a discharge pipe, a hollow base carried by said truck, a boom support rotatably mounted in said base, a segmental boom carried by said support and having the segments thereof pivotally connected, a sliding boom telescopically engaging an outer segment of said segmental boom, said sliding boom having a bifurcated head, a hopper having trunnions received within the bifurcated head of said sliding boom for swinging movement thereon, said hopper having a reduced lower end, a flexible tubular member in said hopper having a reduced sleeve extension passing through the reduced lower end of said hopper to form a discharge sleeve, spring-urged gripper means carried by said hopper for normally gripping said sleeve to close the same, and handle means carried by said last-mentioned means for opening said sleeve to permit discharge therethrough.

2. The structure of claim **1** in which a vibrator is supported by said hopper adjacent the bottom thereof.

3. In combination with a transit concrete-mix truck equipped with a discharge pipe and provided with a base, a boom support rotatably mounted in said base, a segmental boom carried by said support and having the segments thereof pivotally connected, a sliding boom telescopically engaging an outer segment of said segmental boom, said sliding boom having a bifurcated head, a hopper having trunnions received within the bifurcated head of said sliding boom for swinging movement thereon, said hopper having a reduced lower end, a flexible tubular member in said hopper having a reduced sleeve extension passing through the lower end of said hopper to form a discharge sleeve, gripper means carried by said hopper for normally gripping said sleeve to close the same, and handle means carried by said last-mentioned means for opening said sleeve to permit discharge therethrough.

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