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[54] **MIXING AND BAGGING MACHINE FOR DRY MIXES**

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[52] **U.S. Cl.** **141/67,** 222/318, 222/440, 222/450

[51] **Int. Cl.** **B65b 1/12**

[58] **Field of Search** 141/10, 67, 68, 76, 114, 141/256, 257, 313–317; 222/318, 440, 450

[56] **References Cited**

UNITED STATES PATENTS

547,848 10/1895 Davis 222/440

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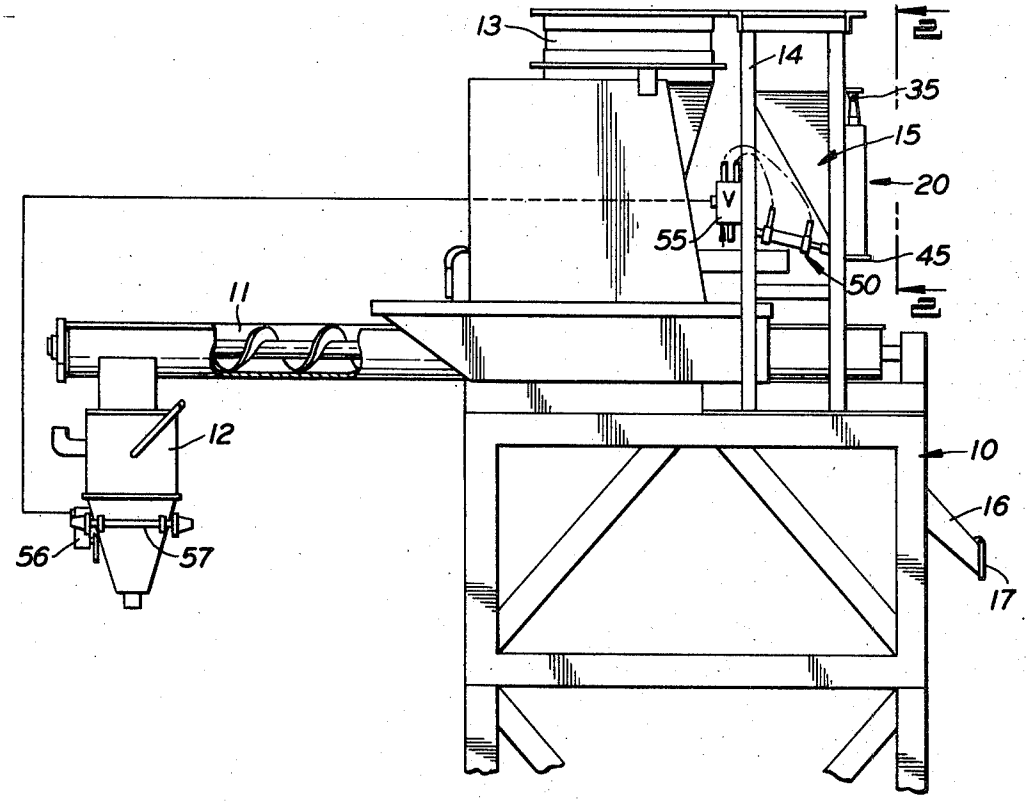
Attorney, Agent, or Firm—Mahoney, Miller & Stebens

[57] **ABSTRACT**

A machine for receiving and mixing various dry materials and then bagging the mix. It includes at least two hoppers which contain different dry materials to be supplied to a mixing compartment in a preselected proportion. An adjustable flow valve assembly is provided for producing gravity flow simultaneously from both hoppers in an accurate preselected proportion, such proportion being variable as desired.

9 Claims, 5 Drawing Figures



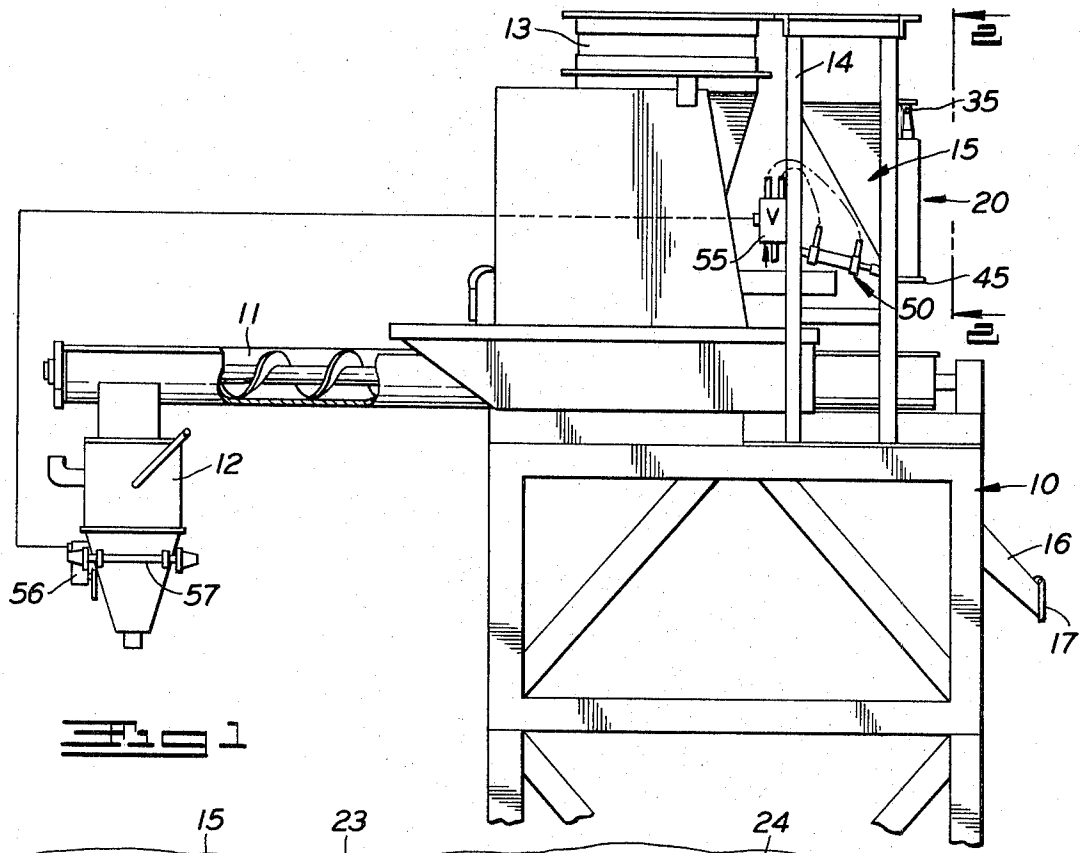

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Fig 1

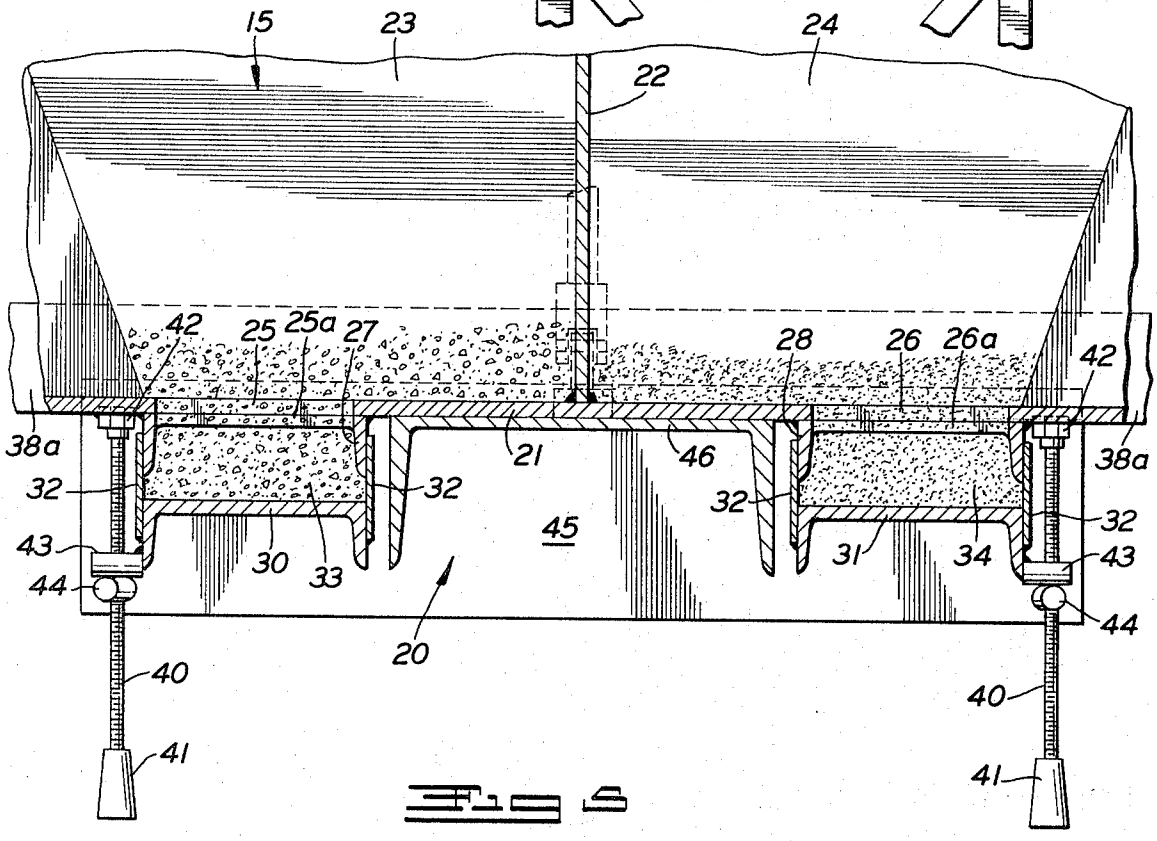
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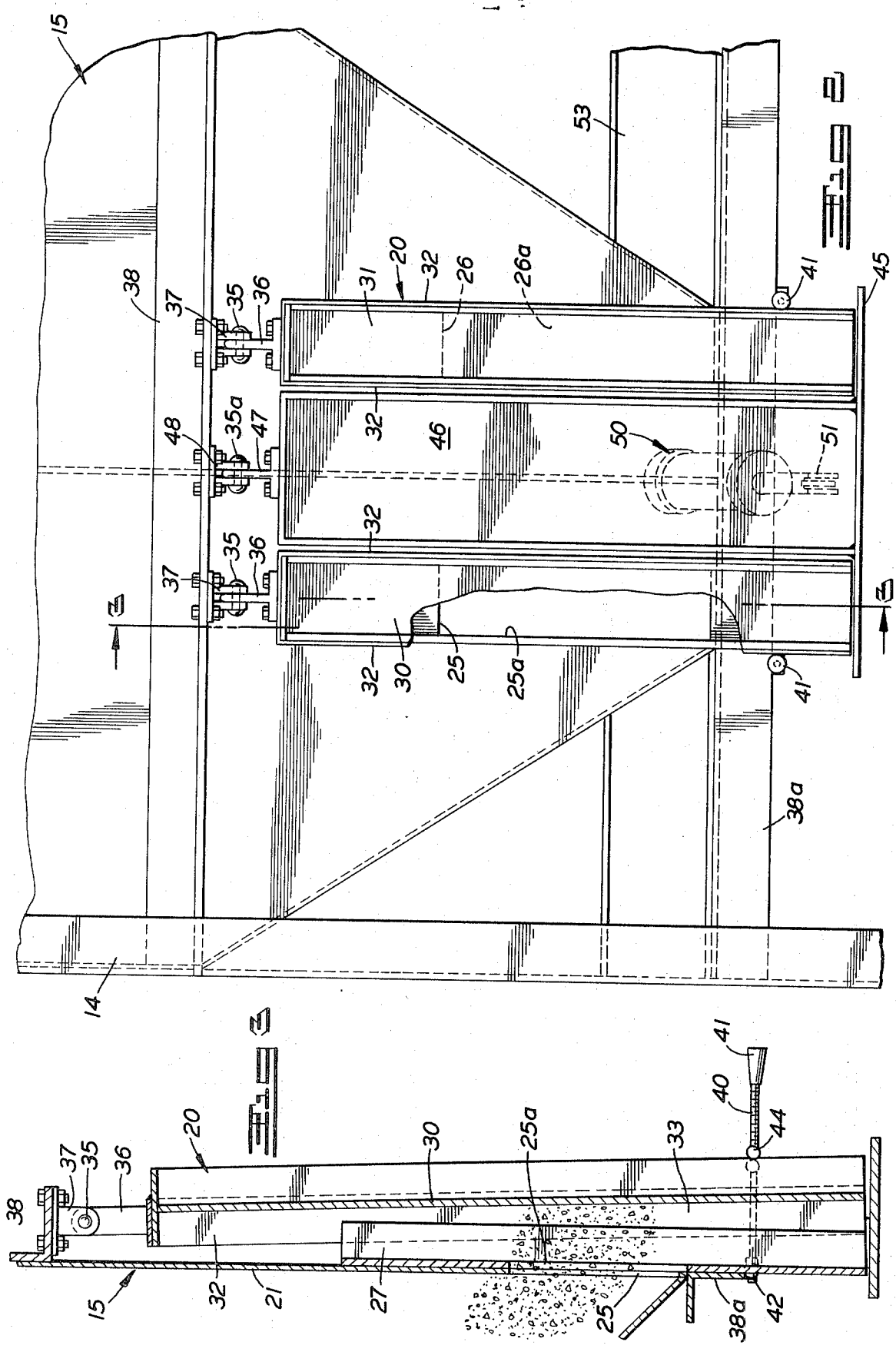
Fig 2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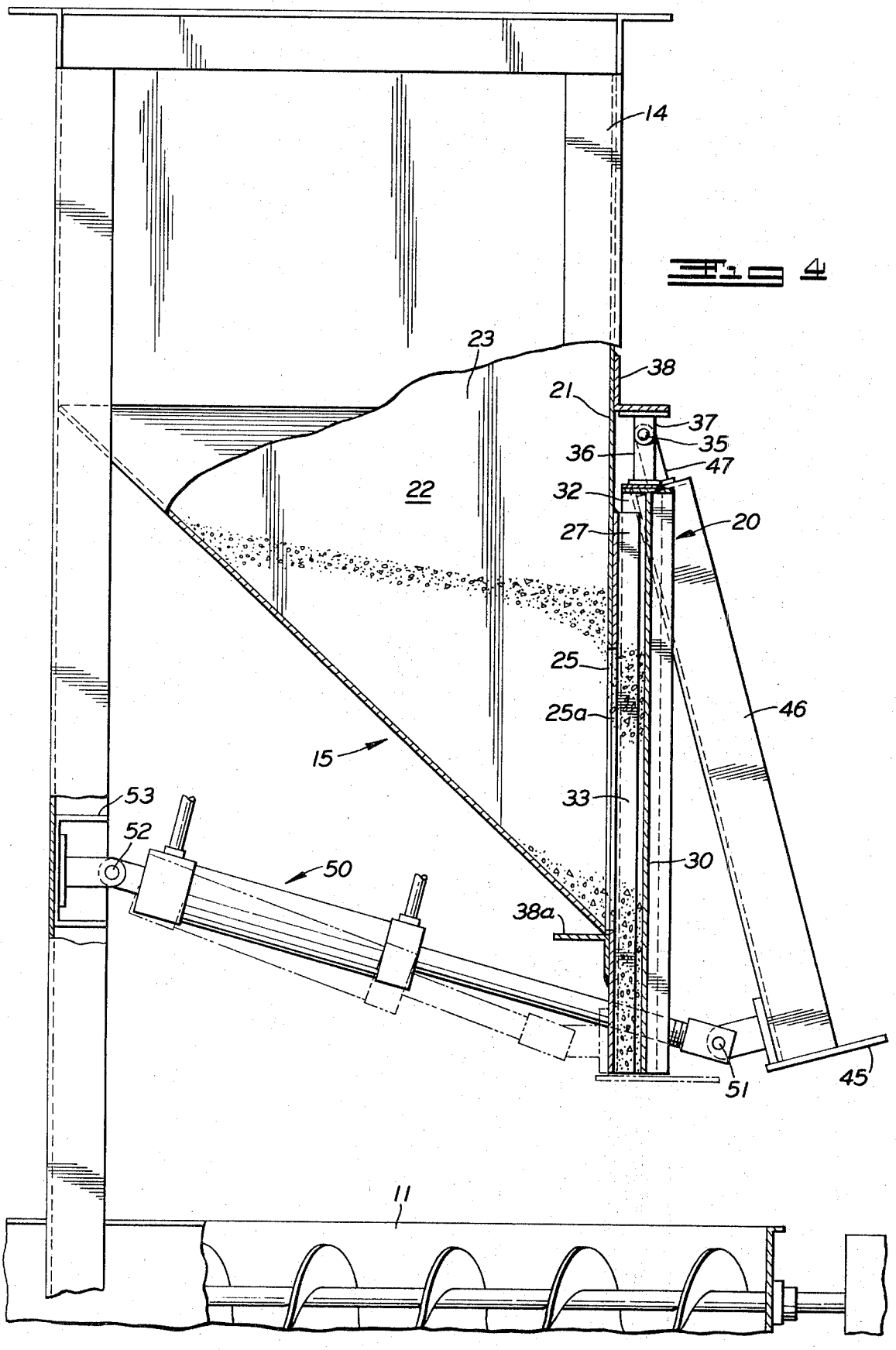
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FIG. 4

MIXING AND BAGGING MACHINE FOR DRY MIXES

BACKGROUND OF THE INVENTION

The present invention relates to a mixing and bagging machine for dry mixes especially cementious mixes such as concrete mixes. This general type of machine has been provided in the past and usually includes a mixing trough having an outlet where a bag is supported to receive the mix. The materials or ingredients of the mix, usually aggregate such as gravel, sand and cement, must be supplied to the mixing trough in a selected proportion. Ordinarily, the cement is supplied directly by means of a spout but the gravel and sand are usually supplied by means of vibrator feeders. Such feeders are difficult to adjust and maintain in adjustment and do not feed the material in a uniform proportion and, therefore, are not completely satisfactory. Also it is difficult to adjust the proportion as desired.

The present invention provides for the gravity feed of the sand and gravel simultaneously from respective hoppers to the mixing trough in an accurate preselected proportion and in the desired volume and for the selective variation of the proportion. This is accomplished with a novel valve assembly cooperating with the adjacent sand and gravel hoppers.

BRIEF DESCRIPTION OF THE DRAWINGS

The best mode contemplated in carrying out this invention is illustrated in the accompanying drawings in which:

FIG. 1 is a side elevational view, partly broken away, of a mixing and bagging machine embodying this invention.

FIG. 2 is an enlarged end elevational view, partly broken away, showing the valve assembly, taken from the position indicated at line 2—2 of FIG. 1.

FIG. 3 is a vertical sectional view taken along line 3—3 of FIG. 2, the valve assembly being shown in closed condition.

FIG. 4 is an enlarged side elevational view partly broken away, showing the valve assembly in open condition.

FIG. 5 is an enlarged horizontal sectional view, partly broken away, taken through the valve assembly.

DETAILED DESCRIPTION OF THE INVENTION

With reference to the drawings and especially to FIG. 1, the overall machine embodying this invention is shown as consisting generally of a supporting frame **10** of suitable construction and height, a longitudinally extending mixing trough **11** of a trough and screw assembly for receiving and mixing the materials and discharging the mix into a bagging spout unit **12** depending from one end thereof, an upstanding hopper for cement indicated at **13** supported upright for receiving cement from a suitable source and directing it into the trough **11**, and a double hopper unit **15** for cement and gravel which is carried by an upstanding frame **14** in such a position as to feed its contained materials into the inlet end of the trough **11** or opposite the discharge end where the bagging unit **12** is located. It is preferred to provide on the frame **10** a chute **16** with a spring-held hinged closure door **17**, the chute leading from a bottom outlet (not shown) at the inlet end of the trough **11**. The present invention relates particularly to the valve assembly **20** which is provided on the double hopper unit **15** for controlling the flow of materials, such as sand and gravel, from that unit and allowing them to drop by gravity into the inlet end of the trough **11** disposed directly therebelow.

The double hopper unit is of suitable form having angled inner and side walls which will feed the material downwardly and toward an outer flat substantially vertically disposed wall **21**. The unit is divided into two compartments by an upright partition wall **22** disposed at a right angle to the wall **21**. The one compartment **23** may contain gravel and the other compartment **24** may contain sand. An outlet **25** is provided adjacent one of the angled hopper sidewalls in the flat wall **21** for the hopper compartment **23** and a similar outlet **26** is provided adjacent the other angled hopper sidewall for the other compartment **24**. These outlets are in the form of laterally outwardly-opening vertical slots extending from the lower extremities of the compartments upwardly to a suitable level in the flat outer wall **21**. Suitably secured to the outer surface of the wall **21**, as by welding, are the outwardly-directed metal channels **27** and **28** which are vertically disposed over the openings **25** and **26** but are provided with vertical slots **25***a* and **26***a* which align with the respective openings **25** and **26**. An outwardly-directed channel **30** and a similar channel **31** are provided in cooperation with the respective channels **27** and **28** to provide the vertically disposed flow control chutes **33** and **34** offset laterally of the outlets **25** and **26** leading from the respective compartments **23** and **24**. Each of the channels **30** and **31** carries a pair of strips **32** which are secured to the flanges thereof, such as by welding, and which project inwardly into slidable overlapping relationship to the flanges of the respective channels **27** and **28**. The outer channel **30** is mounted for adjustable movement in and out relative to the inner channel **27** to vary the cross-sectional area and resulting flow capacity of the flow control chute **33** and the outer channel **31** is similarly mounted for movement relative to the inner channel **28** to vary the cross-sectional area and resulting flow capacity of the chute **34**. Each of the channels **30** and **31** is mounted for swinging movement relative to the flat vertical outer wall **21** by means of a pivot pin **35** connecting an upstanding pivot bracket **36**, bolted to the upper end of the channel, to a depending pivot bracket **37**, bolted to the lower flange of a transversely extending horizontal angle **38** which is at the outer side of the upstanding support frame **14** adjacent the upper end thereof. To adjust each of the channels **30** and **31** about its respective upper pivot **35**, an adjusting screw **40** is provided at its lower end. Each screw **40** is provided with a knob **41** fixed on its outer end and its inner end is rotatably mounted but axially fixed in a bearing **42** fixed to the lower horizontal angle **38***a* of the frame **14**. The screw is tapped through a laterally extending lug **43** on the outer flange of the cooperating channel so that when the screw is rotated, the outer channel is moved in or out relative to the inner channel as indicated by a comparison of the position shown in FIG. **3** relative to that of FIG. **4**. A stop **44** fixed axially on the screw engages the lug **43** to limit the inward movement of the outer channel.

It will be seen that the chutes **33** and **34** formed by the pairs of cooperating telescoping channels **27–30** and **28–31**, are open at their lower ends and for cooperating with these lower ends to control opening and closing thereof is a movable gate or closure **45**. This closure

is in the form of a flat horizontally disposed plate **45** which is mounted for movement from a closing position below the pockets to an opening position outwardly of the pockets. For this movement, the plate is carried on the lower end of an outwardly opening support channel **46** which is located laterally between the pairs of channels **27–30** and **28–31.** The upper end of the channel is pivoted for swinging movement about a common axis with the pivots **35** by means of a pivot pin **35***a* which connects an upstanding bracket **47** on the channel **46** to a depending bracket **48** on the angle support **38.**

Normally the plate **45** is disposed directly below the chutes **33** and **34** to close their lower ends as shown in FIGS. **2, 3** and **5.** However, when it is desired to open the chutes to permit downward discharge by gravity, the plate is moved outwardly by outward swinging of the channel **46,** as shown in FIG. **4,** from its innermost position in flat contact with the wall **21** shown in FIGS. **2** and **3.** For so swinging the channel **46,** a fluid-actuated cylinder and piston unit **50** is provided, being pivotally connected at **51** to the inner side of channel **46,** at its lower end, and being pivotally connected at **52** to a transverse channel **53** forming a part of the frame **14.** This unit **50** may be controlled by an electromagnetic valve **55** indicated in FIG. **1.** This valve may be controlled by a switch **56** electrically connected thereto and actuated by a bag clamp **57** on the bagging spout unit **12.**

The hopper **13** will receive cement from a suitable source and will control feed into the trough **11** in the usual manner. The compartment **23** will receive gravel from a suitable source and the compartment **24** will receive sand from a suitable source. The level of material in these respective compartments will always be above the upper ends of the slots **25** and **26** to obtain proper gravity feed laterally into the offset flow control chutes **33** and **34.** If desired, the compartments **23** and **24** could be in separate hoppers rather than in a divided hopper. The valve assembly **20** will normally be in closed condition with the plate **45** closing the lower ends of the respective chutes **33** and **34.**

Each of the chutes **33** and **34** will be adjusted to the proper size by turning the proper knob **41** to adjust the expansible walls thereof to expand or contract the chute and thereby vary its flow capacity. The capacity of one chute will be adjusted relative to that of the other to obtain gravity feed of the gravel and sand in a proper relative proportion, as desired. During the time this adjustment is being made, the mixing screw will not be driven and the door **17** may be opened to allow the sand and gravel to by-pass through the calibrating chute **16** into a container where the sand and gravel can be examined and it can be determined whether or not they are in proper relative amounts. When the proper proportion has been determined, the door **17** is closed and the mixing screw is started and, thereafter, the materials will feed into the trough **11** where they will be mixed and advanced to the bagging unit **12,** also filling the chute **16.** Each time the bag gripper **57** thereof is actuated, the valve assembly **20** will be actuated to feed a charge of gravel and sand into the trough **11.**

With the valve assembly **20** in closed condition, the materials will feed by gravity from the respective chamber **23** and **24** into the chutes **33** and **34,** through the vertical slots **25** and **26** to a level substantially at the upper ends of those slots. Each time the switch **56** is actuated, the cylinder and piston unit **50** is actuated to swing the plate **45** outwardly from beneath the chutes **33** and **34** to permit the sand and gravel charges to simultaneously flow through the chutes and drop the trough **11.** The chutes **33** and **34** are laterally offset relative to the compartments **23** and **24** and the feed will be laterally through the slots **25** and **26** rather than directly through the bottoms of the compartments as is usual. This will result in a more uniform feed of the materials through the slots and then through the flow control chutes **33** and **34** while the valve is open.

It will be apparent from the above that this invention provides for the gravity feed of the sand and gravel, or other materials, simultaneously from respective hoppers or compartments into the mixing trough. This is accomplished with a novel valve assembly which results in the gravity feed uniformly in the desired accurate proportion and which is adjustable to vary that proportion as desired.

What is claimed is:

1. A compartment for receiving material to be fed therefrom in preselected amounts having a substantially upright vertical wall with a vertically-extending outlet leading laterally therefrom and other wall structure cooperating therewith to feed the material by gravity into contact with said upright wall and continuously through said vertically-extending outlet, and means for controlling the flow of material through said vertically-extending outlet, said means comprising a substantially vertically disposed flow control chute extending vertically along said upright vertical wall and in lateral communication with said compartment through said vertically-extending outlet, said vertically-extending flow control chute having a downwardly-opening exit opening at its lower end through which the material which flows into and through said chute can drop, a substantially horizontally-extending gate normally located below said exit opening to close it, and means for retracting said gate to expose said opening to drop the material accumulated in said chute.

2. Apparatus according to claim **1** in which the flow control chute has horizontally expansible and contractible walls to adjust the capacity of said chute, and adjusting means for expanding or contracting said walls and retain them in adjusted position.

3. Apparatus according to calim **1** including a plurality of compartments, each having said substantially upright vertical wall with its vertically-extending outlet comprising a vertically extending slot leading into the respective vertically extending flow control chute, said gate comprising a common closure plate extending horizontally beneath the chutes to open them simultaneously to permit dropping of accumulated material from the chutes simultaneously upon retraction of said plate.

4. Apparatus according to claim **3** in which each chute includes opposed vertical walls horizontally adjustable toward and away from each other to vary the flow capacity of the chute, and adjustable means for moving the walls towards and from each other and retaining them in adjusted position.

5. Apparatus according to claim **1** including a hopper having a plurality of the compartments formed therein with a substantially vertical upright wall providing the

upright vertical wall of each compartment and having a plurality of the vertically-extending outlets leading laterally from the respective compartments into the vertically-extending flow control chutes communicating with said respective outlets, said outlets being in the form of vertical slots at laterally spaced positions in said wall, each of said chutes being formed of vertically extending spaced side walls which form a chute of suitable horizontal cross-section that communicates with its respective compartment through its outlet slot and which has downwardly-opening lower end, said gate comprising a common closure plate normally disposed horizontally below the lower ends of the chutes to close them, and means for supporting said plate for oscillating movement between closing and opening positions to simultaneously open and close all of the lower ends of the chutes.

6. Apparatus according to claim **5** in which said vertically-extending spaced side walls of each of said chutes has over-lapping cooperating flanges to provide for relative expansion, one of said walls being mounted at its upper end for swinging movement relative to the other wall, and a screw arrangement between said walls at their lower ends for varying the cross-sectional area of the chute to vary the capacity thereof.

7. Apparatus according to claim **6** in which said closure plate-supporting means comprises a support member disposed vertically between said chutes and supporting the plate at its lower end, and pivot means for supporting said support member at its upper end to permit oscillation of said closure plate from closed to opened position relative to the downwardly-opening lower ends of said chutes.

8. Apparatus according to claim **5** in combination with a mixing trough disposed below said downwardly-opening chutes for receiving the material dropped therefrom, a bagging unit for receiving the mixed material from said trough, a cylinder and piston unit connected to said plate-supporting means to oscillate it, and control means actuated by said bagging unit for controlling said cylinder and piston unit.

9. Apparatus according to claim **8** in which said trough has a by-pass outlet in the bottom thereof located along the trough directly below the lower ends of said chutes, an additional calibrating chute leading from said trough at said by-pass outlet to permit direct discharge of material from said chutes into a suitable receiver, and a closure normally preventing discharge from said additional chute but selectively movable to permit discharge.

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