Nov. 16, 1926. 1,607,303

H. W. RANNIKKO

CONCRETE DISCHARGE SPOUT

Filed Feb. 11, 1926

Fig. 1.

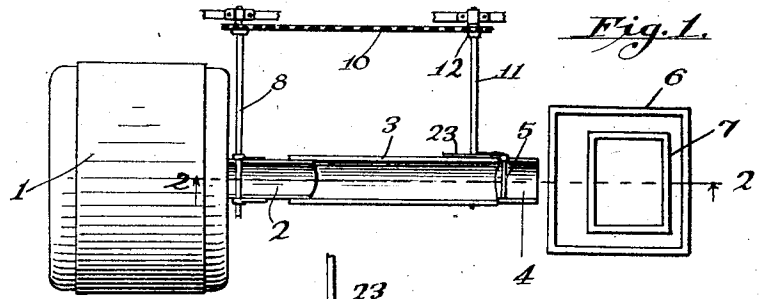


Fig. 4.

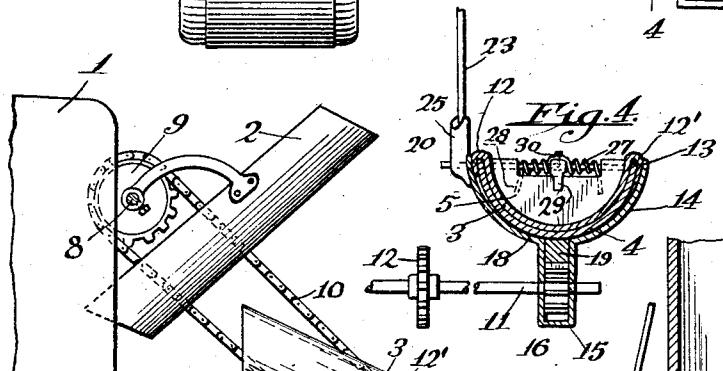


Fig. 2.

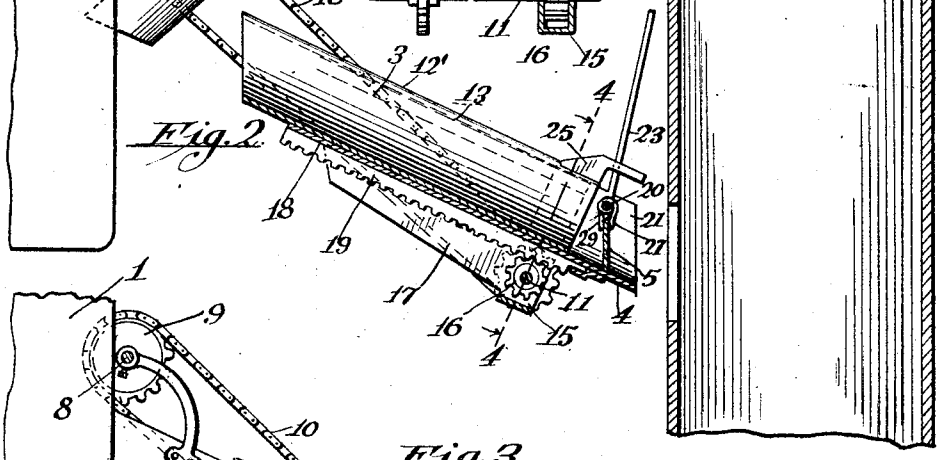


Fig. 3.

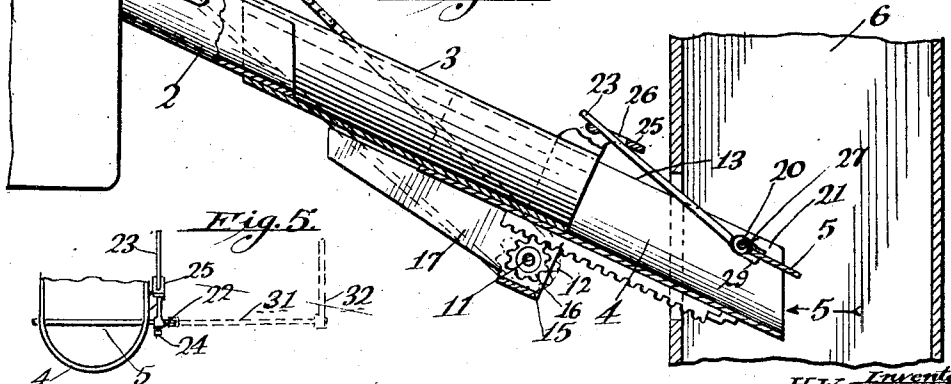


Fig. 5.

Witness:

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UNITED STATES PATENT OFFICE.

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CONCRETE-DISCHARGE SPOUT.

Application filed February 11, 1926. Serial No. 87,578.

My invention is a concrete discharge spout adapted to convey concrete from a mixer to a hoisting bucket or the like.

An object of my invention is a concrete discharge spout to discharge concrete into a hoisting bucket and having a gate at the lower end of the spout to shut off the concrete after the bucket is filled, the spout also having a sliding extension to extend over the bucket in filling same and to be drawn backwardly to allow the bucket to be elevated and lowered.

Another feature of my invention is to automatically control the opening and closing of the gate on the extension and drawing in of the spout so that when the spout is extended over the bucket the gate will be wide open and when the spout is retracted to allow further conveying of the bucket, the gate is closed.

In the ordinary type of spout conveying concrete from a concrete mixer to a bucket having a vertical travel in a tower or the like, to carry the concrete to an elevated structure, considerable concrete is wasted when the bucket is in position below the spout as the concrete which has been left in the spout after discharging the concrete mixer slides down the spout. There is also the wastage of labor in chipping out the concrete which becomes hardened at the bottom of the hoist.

Hence, another object of my invention is to control the extension and retraction of the spout by the action of discharging the concrete mixer and to open the gate as above mentioned by the extension of the spout, the retraction of the spout is governed by the stopping of the discharge mixer, the gate being also closed.

In constructing my invention I utilize a spout having a stationary section and a slidable lower end section, this being adapted to slide outwardly a sufficient distance to extend into a hoist and to substantially the center of a bucket. The gate is pivotally mounted in the slidable end of the spout and in its downward position closes the spout. An arm is attached to the shaft on which the gate is pivoted, this arm being slidable through a stationary slide mounted preferably on the fixed part of the spout. The arm is positioned at such an angle to the gate that on the outward sliding movement of the slidable part of the spout the arm is rotated to a sufficient angle to open the gate to the desired extent and on the drawing in of the spout the arm is swung backwardly, thereby closing the gate.

A common type of concrete mixer has a discharge trough pivotally mounted so that when in a downwardly inclined position the concrete from the rotating mixer drops on the trough and is discharged downwardly and when the trough is tilted in the opposite direction the concrete falling on the trough is discharged back into the mixer.

I prefer utilizing a gear train having a sprocket chain and sprockets to operate the sliding part of the spout through the medium of a rack and pinion due to the tilting of the mixer trough.

My invention will be more readily understood from the following description and drawings, in which:

Figure 1 is a schematic plan of an installation utilizing my discharge spout showing a concrete mixer, the tilting trough therefor, the fixed and sliding spout, a tower and a gear train between the trough and the sliding spout.

Fig. 2 is a longitudinal section on the line 2—2 in the direction of the arrows, showing the spout retracted and with the gate closed to prevent discharge of concrete from the spout.

Fig. 3 is a view similar to Fig. 2, showing the spout extended with the gate open.

Fig. 4 is a cross section on the line 4—4 of Fig. 2, in the direction of the arrows.

Fig. 5 is a partial end elevation in the direction of the arrow 5, showing the open gate when the spout is extended.

Referring particularly to Fig. 1, a concrete mixer is indicated by the numeral 1 and is of a common type, being shaped somewhat like a drum. A discharge trough 2 is pivotally mounted adjacent the mixer to discharge concrete therefrom. A spout 3 is positioned to receive the concrete from the trough, this spout being combined with my structure having a slidable extension 4, this being closed by the gate 5. A tower of any suitable construction is indicated by the numeral 6 and a bucket to elevate the concrete by the numeral 7. The trough shaft 8 carries a sprocket 9 thereon and by means of the sprocket chain 10 conveys motion to the spout shaft 11 through the sprocket 12. This spout shaft is adapted to operate the extension and retraction of the spout as hereunder set forth.

The fixed spout 3 is preferably formed with curled edges 12', the extension spout 4 having its upper edges 13 extending underneath the curl. A bracket 14 is attached to the fixed spout 3, preferably by being attached to the curled edges and has a downward extension 15 forming a journal for the spout shaft 11, this shaft carrying a pinion 16.

A bracing fin 17 extends upwardly on an inclination from the bracket and is adapted to engage the lower surface 18 of the sliding trough so as to hold it in firm relation to the stationary spout 3. The extension spout is provided with a rack 19 meshing with the pinion 16.

The gate 5 is attached to the gate shaft 20, this being journaled near the outer end 21 of the extension spout, the gate shaft being horizontal and preferably having a squared end 22 in one side. An arm is secured on this squared end preferably by a set screw 24 and engages a slide 25. This slide is formed with a slot 26, the slot being vertical and of sufficient width to accommodate the arm 23 and having a length to allow the rod to extend through the slot on an inclination as shown in Fig. 3.

The gate is preferably flexibly attached to the gate shaft by having springs 27 coiled around the shaft, the free end 28 engaging in front of the gate and normally tensioned to press the gate closed. A finger 29 is rigidly attached to the gate shaft and may be secured thereto by a set screw 30 so that when the shaft is rotated by the arm 23, the gate will be lifted into the open position as shown in Figs. 3 and 5.

In constructions in which the end of the spout cannot be placed close to a tower on account of the forward inclination of the arm 23, when the gate is closed, an extension shaft 31 as indicated in Fig. 5 may be attached thereto and an arm 32 placed on the end of such shaft. In this construction it would be necessary to secure the guide 25 to some structure to be held in a fixed position and to engage the readjusted arm 32.

The manner of using and operation of my concrete discharge spout is substantially as follows:

As above indicated, the buckets are raised and lowered in the tower 6 by any suitable mechanism and the concrete can only be discharged from the mixer by tilting and trough 2 from the position shown in Fig. 2 to that shown in Fig. 3 when a bucket is in position. The tilting of the trough which is done by the operator controlling the concrete mixer through the medium of the sprockets and sprocket gear, operates the pinion 16 which through the rack 19 extends the extension spout outwardly from the position shown in Fig. 2 to that shown in Fig. 3. In this movement the arm being engaged by the slot 26 in the guide 25 is swung from the position shown in Fig. 2, to that in Fig. 3, thus opening the gate and allowing discharge of the concrete.

On the reverse movement of the mixer trough into the position shown in Fig. 2, the extension spout is retracted and the gate is closed. Thus as there is usually a certain amount of concrete left in the trough 3, this is prevented from dropping off the end of the spout and will be discharged with the next batch.

The function of the spring 27 giving the resilient mounting for the gate 5 is to allow this to partially close should the lower edge of the gate be caught by stones or the like in the concrete, thereby preventing absolute closing of the gate.

Although I have shown a spout as being operated by the actuation of the mixer trough, it will be apparent that it may be manipulated independently thereof. Moreover, the gate could be suitably weighted and the arm 23 could engage a fixed device to swing the gate open on the forward movement of the trough extension.

Other variations in the construction and changes in the general features and specific details may be made to adapt my discharge spout to different installations and for different purposes than handling concrete. Such changes would be within the spirit of my invention as set forth in the description, drawings and claims.

Having described my invention, what I claim is:

1. A discharge spout comprising in combination a fixed spout, a slidable extension at the lower end of the said spout, a gate on the extension, a fixed structure, and means interengaging the gate and such structure to operate the gate on the sliding movement of the extension.

2. A discharge spout comprising in combination a fixed spout, a slidable extension at the lower end, a gate on the slidable extension, and means to operate the gate by the sliding movement thereof in being extended or retracted.

3. A discharge spout comprising in combination a fixed spout, an extension spout slidably mounted in relation thereto, a gate pivotally mounted in the extension spout, an arm attached to the gate and means to engage the arm on the extension of the extension spout, adapted to open the gate when the spout is extended and to close same when the spout is retracted.

4. A discharge spout as claimed in claim 3, in which the means engaging the arm comprises a guide having a slot therein, the arm fitting in the said slot.

5. A discharge spout comprising in combination a stationary spout, a slidable ex-

tension spout adjacent thereto, a rack on the extension, a gear engaging said rack, a gate at the lower end of the extension, means to rotate the gear to slide the extension and means to operate the gate on the sliding movement of the extension.

6. A concrete discharge spout comprising in combination a tiltable concrete mixer trough, a fixed spout for the trough to discharge into, an extension spout adjacent the fixed spout, a gate at the lower end of the extension, means to operate the extension spout by the movement of the mixer trough and means to operate the gate by the movement of the extension spout.

7. In combination a tiltable concrete mixer trough mounted on a shaft, a fixed spout into which said trough discharges, an extension spout slidably mounted in relation to the fixed spout, a fixed spout shaft, a gear train between the trough shaft and the spout shaft and means to operate the extension spout to extend same or retract same by the rotation of the spout shaft.

8. In combination a tiltable concrete mixer trough as claimed in claim 7, having in addition a gate mounted at the lower end of the extension spout, and means to open and close the gate by the sliding movement of said extension spout.

9. In combination a tiltable concrete mixer as claimed in claim 7, having in addition a gate pivotally mounted on a horizontal pivot at the lower end of the extension spout, an arm secured to the said pivot, and a fixed guide having a slot for said arm to open and close the gate on the sliding movement of the extension spout.

10. In combination a concrete mixer trough, a trough shaft on which same is mounted, a sprocket gear connected to said shaft, a fixed spout, a fixed spout shaft having a sprocket gear thereon, a sprocket chain between said sprockets, a pinion mounted on the spout shaft, an extension slidably mounted in relation to the fixed spout, a rack on said extension spout engaging the pinion, whereby on tilting of the mixer trough the extension trough is extended or retracted.

11. In combination a concrete mixer trough as claimed in claim 10, having in addition a gate pivotally mounted on a horizontal pivot at the lower end of the extension spout, and a guide connected to the fixed trough having a slot therein for the arm to open and close same on the sliding of the extension spout.

12. In a discharge spout, a fixed spout, an extension spout slidably mounted in relation thereto, having a horizontal gate pivot shaft, a gate mounted on said shaft, a spring coiled on the shaft engaging the gate normally pressing same in a closed direction, a finger connected to the shaft engaging the gate, an arm detachably connected to the gate shaft and means to operate the arm to turn the finger engaging the gate and rotating same in an open position.

In testimony whereof I have signed my name to this specification.

HJALMAR W. RANNIKKO.