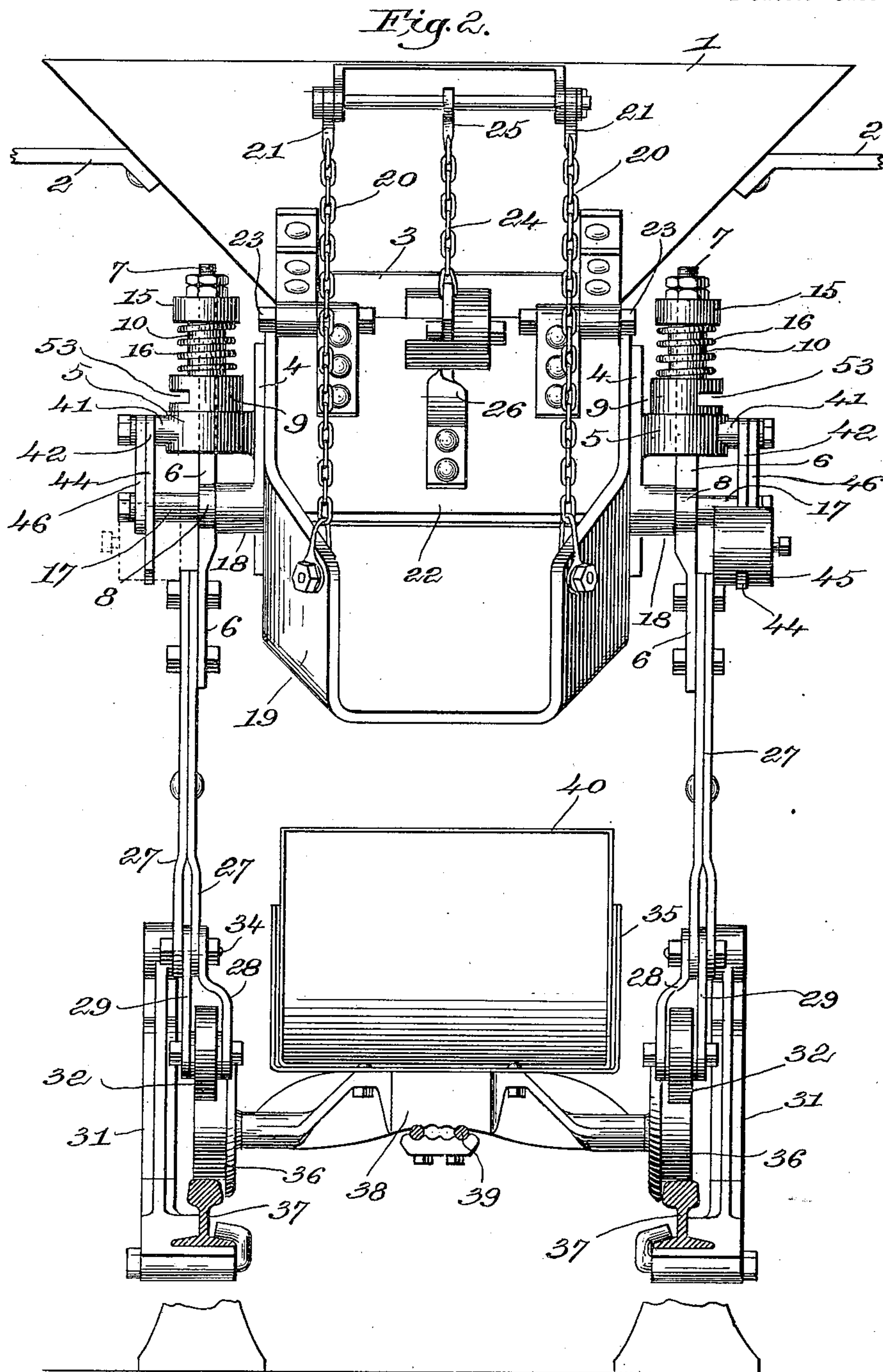


E. S. DECKER.
HOPPER DELIVERY MECHANISM.

(Application filed Aug. 11, 1900.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

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HOPPER-DELIVERY MECHANISM.

SPECIFICATION forming part of Letters Patent No. 663,422, dated December 11, 1900.

Application filed August 11, 1900. Serial No. 26,538. (No model.)

To all whom it may concern:

Be it known that I, EDWIN S. DECKER, a subject of the Queen of Great Britain, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Hopper-Delivery Mechanism, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

This invention has for its object the production of means for maintaining a constant steady flow of material from the delivery-throat of a hopper, whereby clogging or choking is effectually prevented.

In delivering ashes, wet coal, &c., from hoppers it frequently happens that the flow from the throat will be stopped or greatly impeded by more or less of the material choking or clogging up the passage, rendering the operation of the device uncertain and requiring the presence of an attendant to see that the throat is kept clear.

My present invention dispenses with the services of the attendant and provides for a constant and substantially uniform flow of the material to be delivered.

I have herein chosen to illustrate my invention in connection with an endless-conveyor system which is arranged to carry the material as discharged from the hopper to a distant point; but my invention is not in any sense restricted to such use or employment, as will be more clearly manifest from the following specification, taken in connection with the accompanying drawings.

Figure 1 is a side elevation of a hopper-delivery mechanism embodying one form of my invention shown in connection with an endless-conveyor system. Fig. 2 is a right-hand end elevation thereof, and Fig. 3 is an enlarged sectional detail to be described.

Referring to the drawings, a hopper 1 of any usual construction is fixedly mounted on supports 2, the throat 3 of the hopper, Fig. 2, being made in the inclined front wall thereof. Straps 4, secured to the opposite sides of the hopper, are provided with laterally-extended ears 5, apertured to receive substantially vertically movable hangers 6, threaded at their upper ends at 7, Fig. 3, and provided below

the ears with eyes 8. A thimble 9 rests on each ear 5 and receives loosely through a hole in its top a sleeve 10, through which the hanger slides, the head 12 of the sleeve being inclosed by the thimble, while the upper end of the sleeve is threaded at 13, Fig. 3, to screw into a threaded socket 14 in a head 15, which latter in turn is screwed onto the end 7 of the hanger. A strong spring 16 surrounds the sleeve between the thimble 9 and the under side of the head 15 to act as a buffer or cushion for and to yieldingly support the hanger. The eyes 8 of the hanger receive journals 17, projecting from bosses 18 on the sides of a discharge-spout 19, which at its rear or fulcrumed end embraces the lower end of the hopper, the throat 3 of the latter opening into the spout. The front end or mouth of the spout is sustained in any suitable manner, herein shown as by chains 20, which are caught onto hooks 21, fastened to the hopper, so that by taking up more or less of the chain the inclination of the spout-bottom can be varied according to the material which passes through the hopper, a sluggishly-traveling material requiring a sharper drop of the spout than would material which has less coherence. It will be seen that the weight of the spout and of the material passing through it is transmitted through the hangers to the buffers 16, so that the spout is yieldingly supported on movable fulcra, the buffers preventing shock when the spout is agitated, as will be described.

A gate 22 is pivotally mounted at 23 on the hopper-body in front of the throat, the gate-opening being controlled, as herein shown, by a chain 24, hooked onto a hook 25 on the hopper and secured at its other end to a weighted arm 26, rigidly attached to the gate. The gate can be used in connection with the spout and agitating means, or in some cases the gate may be dispensed with and the flow regulated entirely by the inclination of the spout and the agitation thereof.

I have herein shown pairs of extension-bars 27 bolted to the flattened lower ends of the hangers and depending therefrom, said bars being separated at their lower ends to alternate with the two members 28 29 of a bent lever, which is fulcrumed at 30 on a stand or

bracket 31, the free end of the member 28 being bent laterally (see Fig. 2) to embrace a roll 32, journaled at 33 in the members 28 29, while a pin 34 pivotally connects the bars 27 with the said members forming the bent lever. Now by raising the bent levers the hangers will be raised, lifting the fulcrumed end of the spout, and then the hangers will be lowered by gravity, the buffers 16 taking up the shock and preventing strain, and this up-and-down movement of the supports of the spout causes an agitation of the latter, to thus prevent any clogging or choking of the contents of the hopper as the material is discharged through the throat and into the spout.

In the embodiment of my invention herein illustrated the agitation of the spout is effected by or through the operation of an endless-conveyer system, the buckets or holding members of which are loaded from the hopper during travel of the conveyer. The conveyer shown comprises a series of connected pans 35, mounted on carrier-wheels 36, which travel on suitable tracks 37, the several trucks 38 on which the wheels are mounted being connected by cable or other flexible connections 39, buckets 40 being pivotally supported in and coöperating with the pans, as in United States Patent No. 630,805, dated August 8, 1899. The stands or brackets 31 are shown as secured to the tracks 37 in such manner as to permit the free passage thereby of the carrier-wheels, and the rolls 32 are located in the paths of movement of such wheels, each pair of the latter as they engage the pair of rolls lifting the latter as they pass over the wheels, thereby rocking the bent levers and through the intermediate connections lifting the hangers 6 and the fulcrumed end of the hopper-spout. This gives an intermitting movement to the spout, the agitation thereof effectually preventing clogging of the material as it is delivered to the conveyer no matter how inert or sluggish the material.

Obviously any other means may be used to alternately raise and lower the rolls 32 to effect the agitation of the spout without departing from the spirit and scope of my invention.

Sometimes it may be desirable with freely-running material to utilize only the inclination of the spout and the gate to control the flow, and I have provided a simple throw-off device to render the spout-agitating means inoperative. The ears 5 are provided each with a laterally-extended lug 41, reduced at its outer end to form a support for the ends 42 of a yoke 43, extended beneath and back of the hopper, Fig. 1, the front ends of the yoke-arms being bent down at 44 and having counterbalancing-weights 45 thereon. Short links 46 are pivoted at their upper ends on the yoke-arms 42, and at their lower ends the links are longitudinally slotted at 47 to loosely receive the reduced ends 48 of the journals 17 of the spout. A locking-latch 49

is shown in Fig. 1 as pivotally mounted on the hopper, the lip 50 of the latch being adapted to enter a notch 51 in the yoke 43 when the latter is depressed. Such depression raises the links 46 sufficiently to raise the hangers 6 until the rolls 32 are out of range of the carrier-wheels 36 of the conveyer in the construction herein shown, so that there is no agitation of the spout.

Referring to Fig. 3, it will be seen that by screwing the sleeve 10 into or out of the head 15 the tension of the buffer-spring 16 can be increased or decreased, respectively, so that the buffers can be adjusted according to circumstances. Sockets 52 are made in the head 12 of the sleeve to be engaged by a suitable wrench inserted through a slot 53 of the thimble 9, Figs. 1 and 2, in order to adjust the sleeve. By turning the head 15 upon the hanger the stroke of the latter is lengthened, and it will be shortened by screwing the head down without altering the adjustment of the buffer, and the length of stroke may be further varied by connecting the bars 27 and the bent levers 28 29 at the point 54, the adjustment of the stroke of the hangers manifestly varying the extent of agitation of the spout. A suitable check-nut 55 holds the head 15 in adjusted position on the hanger, and the various pivotal connections shown are prevented from accidental separation by suitable means, as by nuts, cotter-pins, or other equivalent means, nuts being herein shown for the purpose.

My invention is not restricted to the precise construction and arrangement herein shown and described, as the same may be modified or rearranged in various particulars without departing from the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In apparatus of the class described, a hopper provided with a delivery-spout, yielding supports on which the latter is fulcrumed, means to vary the inclination of the spout, and means to agitate its fulcrum.

2. In apparatus of the class described, a hopper, a pivoted discharge-spout therefor provided with spring-supported, vertically-movable fulcrum, and means to agitate the spout.

3. In apparatus of the class described, a hopper, a discharge-spout therefor, supporting-fulcrum for inner end of the spout, and means to vertically reciprocate the fulcrum.

4. In apparatus of the class described, a hopper, a pivotally-mounted discharge-spout therefor, means to vary the inclination of the spout, and means to vertically reciprocate the pivotal supports of the spout.

5. In apparatus of the class described, a hopper, a pivotally-mounted discharge-spout therefor, coöperating yielding buffers, and means to agitate the spout.

6. In apparatus of the class described, a

hopper, a discharge-spout therefor, yieldingly-mounted hangers on which the spout is fulcrumed, and means to reciprocate the hangers to thereby agitate the spout.

5 7. A hopper, a discharge-spout therefor, vertically-movable hangers on which the spout is fulcrumed, and means to reciprocate the hangers.

10 8. A hopper, a discharge-spout therefor, vertically-movable hangers on which the inner end of the spout is fulcrumed, means to adjustably support the outer end of the spout, and means to agitate the spout.

15 9. A hopper, a discharge-spout therefor, vertically-movable supports with which the spout is pivotally connected, fixedly-positioned guiding means for the supports, and means to intermittently move the supports to agitate the spout.

20 10. A hopper, a discharge-spout therefor, movable supports on which the spout is fulcrumed, fixedly-positioned guiding means for said supports, means to intermittently move the supports to thereby agitate the spout, and

25 means to vary the extent of such movement.
11. A hopper, a discharge-spout therefor, movable supports on which the spout is fulcrumed, buffers to cushion the supports on their descending movement, and means to intermittently effect rising-and-falling movement of the supports, to thereby agitate the spout.

30 12. A hopper, a discharge-spout therefor, movable supports on which the spout is fulcrumed, buffers to cushion the supports, means to vary the resistance of the buffers, and means to intermittently move the supports and thereby agitate the spout.

35 13. A hopper, a discharge-spout therefor, movable supports, on which the spout is fulcrumed, buffers to cushion the supports, means to vary the resistance of the buffers, means to intermittently move the supports, and an adjusting device to vary the extent of

40 such movement.
14. A hopper provided with a discharge-spout, a gate to cooperate with the spout, movable fulcra on which the spout is mounted, independent devices to regulate the gate and

50 change the inclination of the spout, respectively, and means to intermittently move the fulcra of the spout to agitate the latter.
15. A hopper, a discharge-spout therefor, movable supports on which the spout is fulcrumed, means to intermittently move the supports and thereby agitate the spout, and

a device to render said means inoperative to move the spout-supports.

16. A hopper having an open throat, a discharge-spout therefor, laterally-extended ears 60 on the hopper, longitudinally-movable, upright hangers extended through the ears and pivotally connected with the spout, a head on the upper end of each hanger, a buffer-spring interposed between each head and the adjacent ear, and means to intermittently lift the hangers to thereby agitate the spout. 65

17. A hopper having supporting-ears thereon, upright longitudinally-movable hangers extended through the ears and having adjustable heads on their upper ends, a discharge-spout fulcrumed on the hangers below the ears, a thimble on each ear, a spring between the head of each hanger and the corresponding thimble, and a sleeve loosely surrounding 75 the hanger within the spring and adjustably secured to the hanger-head, the lower headed end of the sleeve entering the thimble, rotation of the sleeve in the head varying the tension of the spring, while rotation of head and sleeve on the hanger regulates the stroke of the latter, and means to effect reciprocation of the hangers, to agitate the spout. 80

18. In apparatus of the class described, an endless conveyer having carrier-wheels, a feed-hopper, a discharge-spout therefor, vertically-movable hangers on which the spout is fulcrumed, buffer-springs to cushion the descent of the hangers, and means connected with the depending ends of the hangers to be engaged by the carrier-wheels of the conveyer, to intermittently lift the hangers. 85

19. A hopper, a discharge-spout therefor, vertically-movable supports on which the inner end of the spout is fulcrumed, means to move said supports to agitate the spout, and means to sustain the outer end of the spout. 90

20. An endless conveyer, a hopper provided with a discharge-spout, a support for the outer end of the latter, vertically-movable fulcra for the inner end of the spout, mounted independently of the conveyer, and means actuated by the latter to agitate the spout. 95

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 105

EDWIN S. DECKER.

Witnesses:

JOHN C. EDWARDS,
AUGUSTA E. DEAN.