(No Model.) 3 Sheets—Sheet 1.

A. L. HITCHCOCK.

HOISTING APPARATUS.

No. 456,332. Patented July 21, 1891.

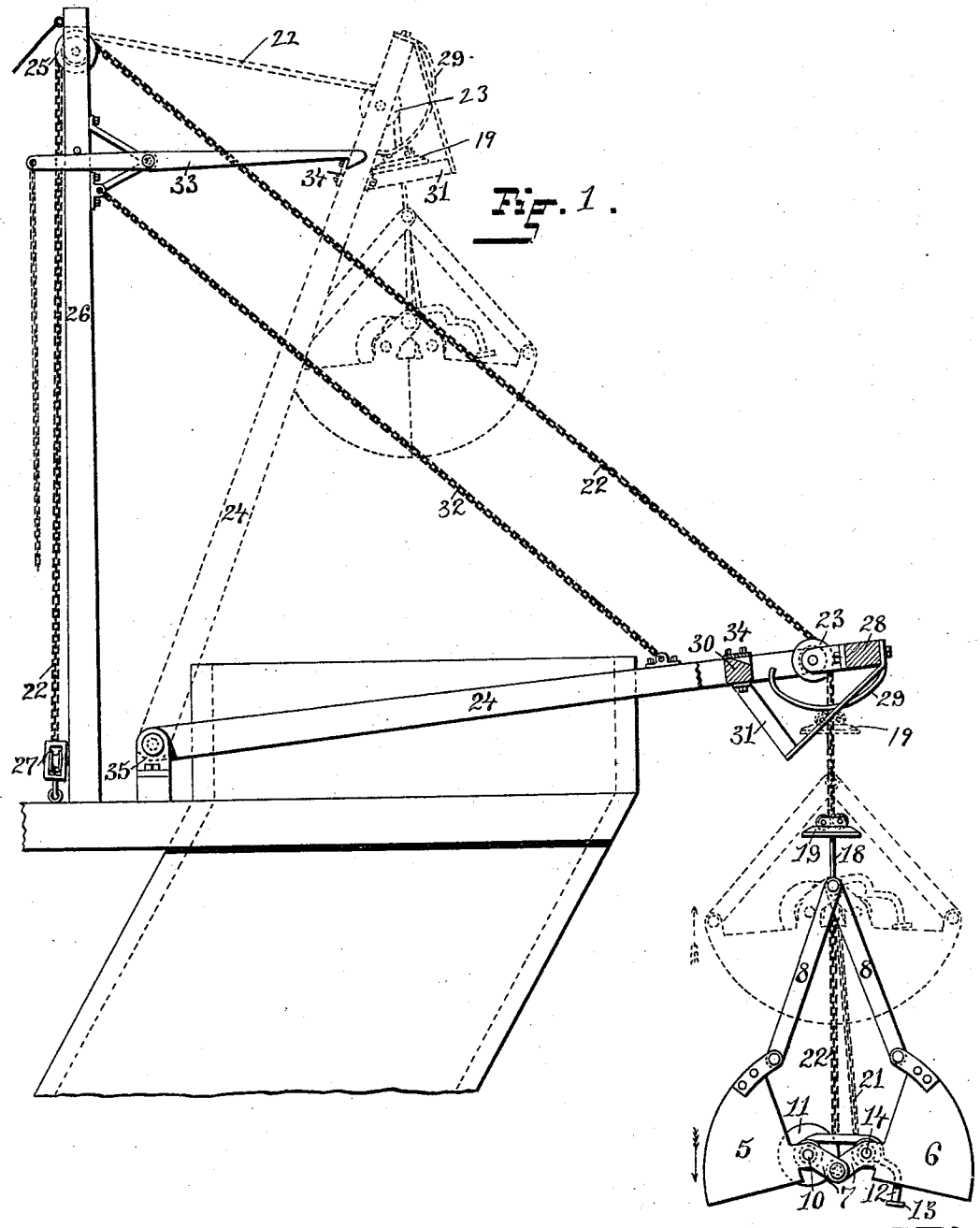


Fig. 1.

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(No Model.)

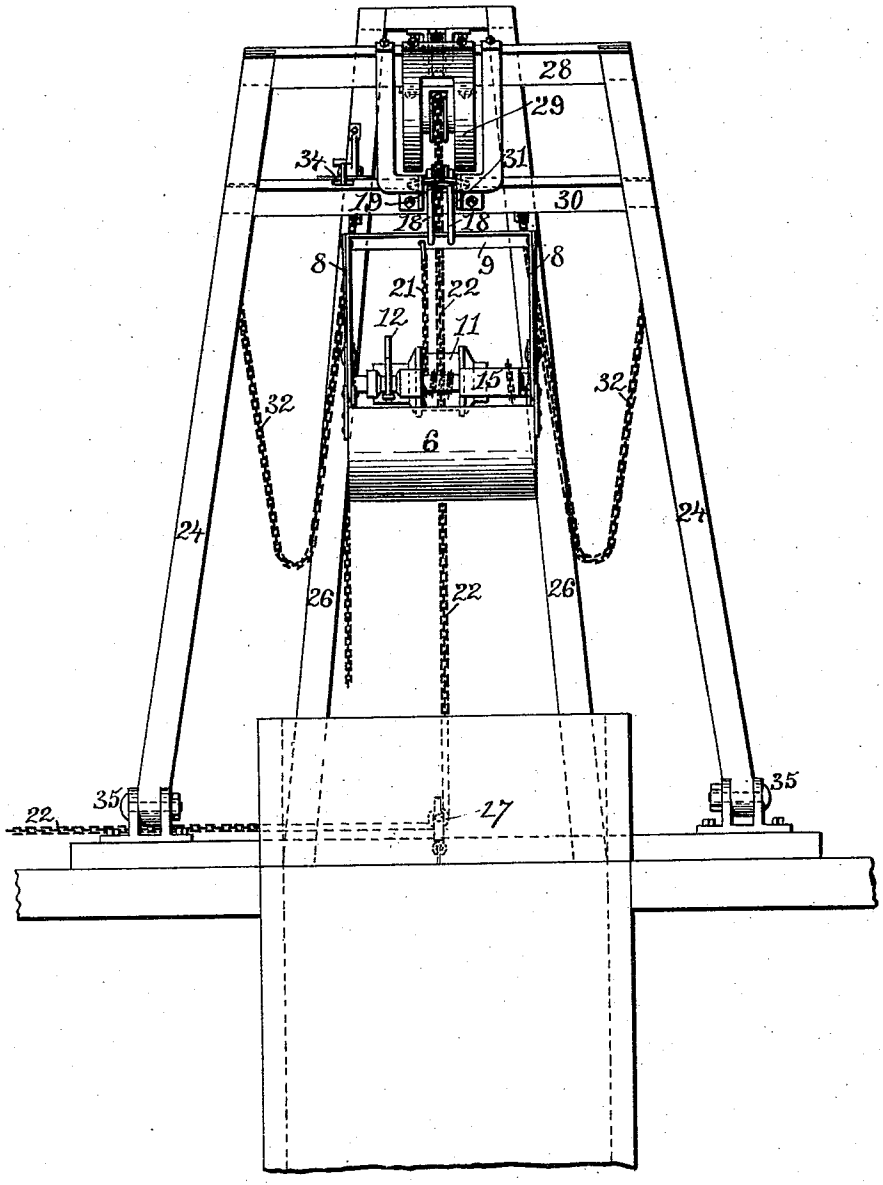
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Fig. 2.



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Fig. 3.

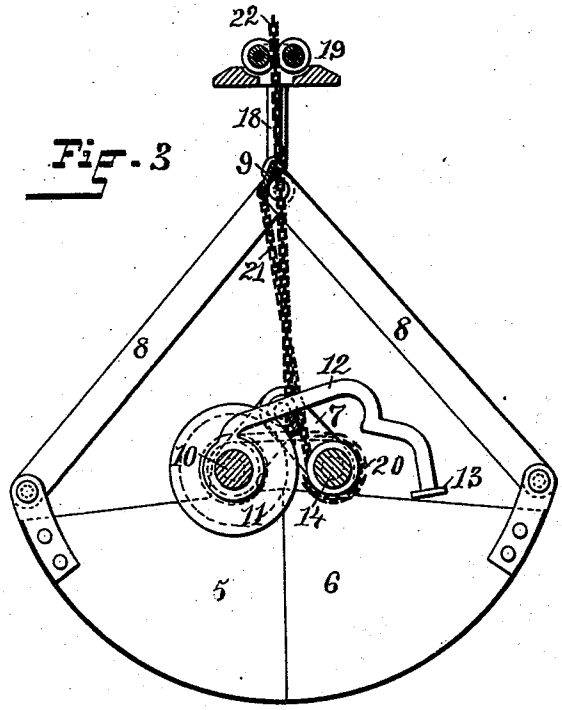
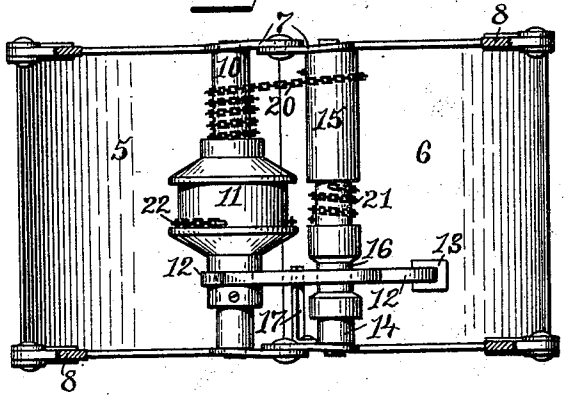


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT L. HITCHCOCK, OF PAWTUCKET, RHODE ISLAND.

HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 456,332, dated July 21, 1891.

Application filed November 5, 1890. Serial No. 373,385. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. HITCHCOCK, of the city of Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Hoisting Apparatus; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has particular reference to improvements in coal-hoisting apparatus, the object being to provide mechanism to automatically control the operation of elevating coal from the loading of the coal into the bucket to the depositing of the coal in the chute or car, as may be desired. For this purpose I have combined certain novel features of construction and peculiar arrangement of parts, as will hereinafter be more particularly described, and finally pointed out in the claims.

Figure 1 is a side view of the improved coal-elevator, indicating some of the positions assumed by the bucket and shears during the operation of elevating and lowering the bucket, parts being broken away. Fig. 2 is a front elevation of the improved elevator, showing the bucket in position over the chute and about to be released to dump the contents. Fig. 3 is an enlarged side view of the improved bucket. Fig. 4 is a top view of the bucket, showing the mechanism which controls its opening and closing.

The bucket of my improved elevator is formed of two halves 5 and 6, connected by the hinge-arms 7 and supported by the toggle-arms 8, which are pivoted and connected together by the cross-bar 9. The half 5 of the bucket has a shaft 10 journaled in the base of the hinge-arms 7, and this shaft is furnished with a chain-drum 11 and a latch 12 of the shape shown in the drawings. This latch 12 has a plate secured to its free end to form a step 13. That half of the bucket marked 6 is also provided with a shaft 14, journaled in the base of the hinge-arms 7. This shaft 14 is provided with a small chain-drum 15 and with a bearing 16 to act as a bearing for the shoulder of the latch 12. One of the hinge-arms 7 of the bucket-half 6 is furnished with a support 17 to support the latch 12 away from the bearing 16 when the bucket is closed. To the cross-bar 9 are secured two vertical rods 18, supporting the pulley-block 19. The bucket-jaws being closed, the chain 20 is secured to the small chain-drum 15 and one turn of the chain is taken around the drum. Several turns of the chain are then taken around the shaft 10, to which the loose end of the chain is then fastened. The chain 21 is secured to the shaft 14, three turns of the chain are taken around the shaft, and the other end of the chain is carried to the cross-bar 9, where it is secured in any suitable manner. The chain 22 is fastened to the large chain-drum 11, carried once around the drum 11, and then upward through the pulley-block 19, and thence over the sheave 23, supported at the upper end of the shears 24, and thence over the sheave 25 in the upper part of the vertical frame 26, and finally through the block 27 to the drum of the hoisting-engine. This chain 22 forms a single fall, which supports the bucket and its operating mechanism. The hinged shears 24 are formed of two legs, supported at their bases in substantial hinges 35 and braced together at their upper ends by the cross-beam 28, to which the guides 29 are secured, and by the cross-beam 30, to which the supports 31 are secured. The shears 24, when in a lowered position, are supported by the chains 32 to the vertical frame 25, which is suitably guyed, and the frame 25 is furnished with the lever-latch 33, arranged to engage with the latch-plate 34, secured to the shears 24, this lever-latch 33 having a chain depending from it by which it is operated.

The operation of the elevator is as follows: The bucket being in the elevated position shown in Fig. 1 and being open, the chain operating the latch 33 is drawn downward to release the latch-head from engagement with the latch-plate 34, bringing the weight of the shears 24 and the bucket onto the chain or fall 22. This chain or fall is now slackened from the hoisting-engine, allowing the upper end of the shears to descend as far as the length of the chains 32 will permit. During this movement of the shears the pulley-block 19 is released from the supports 31. The

chain 22 being further slackened, the bucket descends until it reaches the surface of the coal. The step 13 of the latch 12, being the first portion of the bucket mechanism to reach the coal rises and lifts the shoulder of the latch from the bearing 16. The slack of the chain 22 is now hauled in by the hoisting-engine, the result being to unwind that chain from the drum 11, thus turning the shaft 10, winding the chain 20 upon it, and consequently unwinding the chain 20 from the drum 15, upon which it had been wound when the bucket-jaws opened, thereby turning the shaft 14 and causing it to draw around it the chain 21. As the other end of the chain 21 is secured to the cross-bar 9, the winding up of the chain 21 onto the shaft 14 draws the shaft 14 upward, this movement acting through the hinge-arms 7 to force the edges of the bucket halves 5 and 6 into the loose coal and gradually bring them together, thus securing a load. As the halves of the bucket are closed the support 17 is carried upward by the hinge-arm to which it is attached and lifts the latch 12 with it away from the bearing 16 and into the position shown in Fig. 3. The hauling in of the chain 22 continues to lift the bucket until it reaches the position shown in dotted lines at the right of Fig. 1, when the pulley-block 19 strikes the guides 29, which form a stop. The shears 24 are now lifted by the movement of the chain 22, the pulley-block 19 gradually sliding along the guides 29 to a position above the supports 31 until the shears reach the position indicated in dotted lines in the upper part of Fig. 1, when the head of the lever-latch 33 engages with the latch-plate 34. The chain 22 is now slackened, the bucket being supported in the supports 31 by the pulley-block 19, rods 18, and toggle-arms 8. As these only support the outer ends of the bucket, the weight of the contents exerts a pull on the chain 21, which not being resisted by the chain 22 the chain 21 is unwound from the shaft 14, imparting motion to that shaft. This motion is transmitted by the chain 20 to the shaft 10 and drum 11, causing the chain 22 to be wound thereon. As the chain 21 unwinds from the shaft 14 the halves of the bucket are separated by the weight of the contents, which are thus dumped. The separating of the halves of the bucket causes the support 17 to drop below the level of the bearing 16, allowing the shoulder of the latch 12 to engage with the bearing 16 and hold the bucket open against its tendency to close from the strain on the chains when it is again lowered.

I do not limit my invention to use in elevating coal, as it is evident that it can be used for lifting grain, &c. It is also evident that it may be used for submarine excavating.

By the use of the single fall formed by the chain 22 the operation of the improved elevator is greatly simplified without disturbing the automatic action of the bucket-operating mechanism.

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

1. In a two-part elevator-bucket, a locking device for holding the bucket open, formed of the latch 12, having a step 13, pivotally secured to one half of the bucket and provided with a shoulder to engage a bearing secured to the other half of the bucket, and means for causing the latch to be automatically released therefrom, as described.

2. In a bucket for coal or other elevators, the combination, with the halves 5 and 6 of the bucket, connected by the hinge-arms 7, one of them having the support 17, having the toggle-arms 8, and cross-bar 9, supporting the rods 18 and pulley-block 19, of the shaft 10, provided with the chain-drum 11 and latch 12, the shaft 14, having the chain-drum 15 and bearing 16, and the chains 20, 21, and 22, as described.

3. In a coal or other elevator, the combination, with a vertical frame 26, suitably guyed and having at its upper end the chain-carrying sheave 25 and lever-latch 33, and the shears 24, hinged at the lower ends and connected by chain to the vertical frame 26 and having at its upper end the sheave 23, guides 29, supports 31, and latch-plate 34, of a bucket formed of two halves 5 and 6, the hinged arms 7, toggle-arms 8, cross-bar 9, rods 18, and pulley-blocks 19 and having the shafts 10 and 14 supplied with chain-drums 11 and 15, the latch 12, the bearing 17, and the chains 20 and 21, carried on the said shafts and on the drum 15, adapted for operating the bucket, and the chain 22, attached to the drum 11 and passing over the sheaves 23 and 25 and adapted for supporting the bucket, as and for the purpose described.

4. In a single-fall coal-elevator, the combination, with the shears 24, the vertical frame 26, secured thereto by a chain 32 and having guides 29, supports 31, and sheave 23 to carry the supporting-chain 22, of a bucket formed of two halves connected together by hinge-arms and having two shafts journaled in the bases of the hinge-arms, the shafts being provided with drums and chains to operate and close the bucket, the said bucket having the toggle-arms 8, cross-bar 9, rods 18, and pulley-block 19, adapted to support the bucket when hoisted, as described.

ALBERT L. HITCHCOCK.

Witnesses;
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