(No Model.) 2 Sheets—Sheet 1.

# J. N. BRIGGS.

## AUTOMATIC APPARATUS FOR LOWERING ICE FROM STORE HOUSES.

No. 399,011 Patented Mar. 5, 1889.

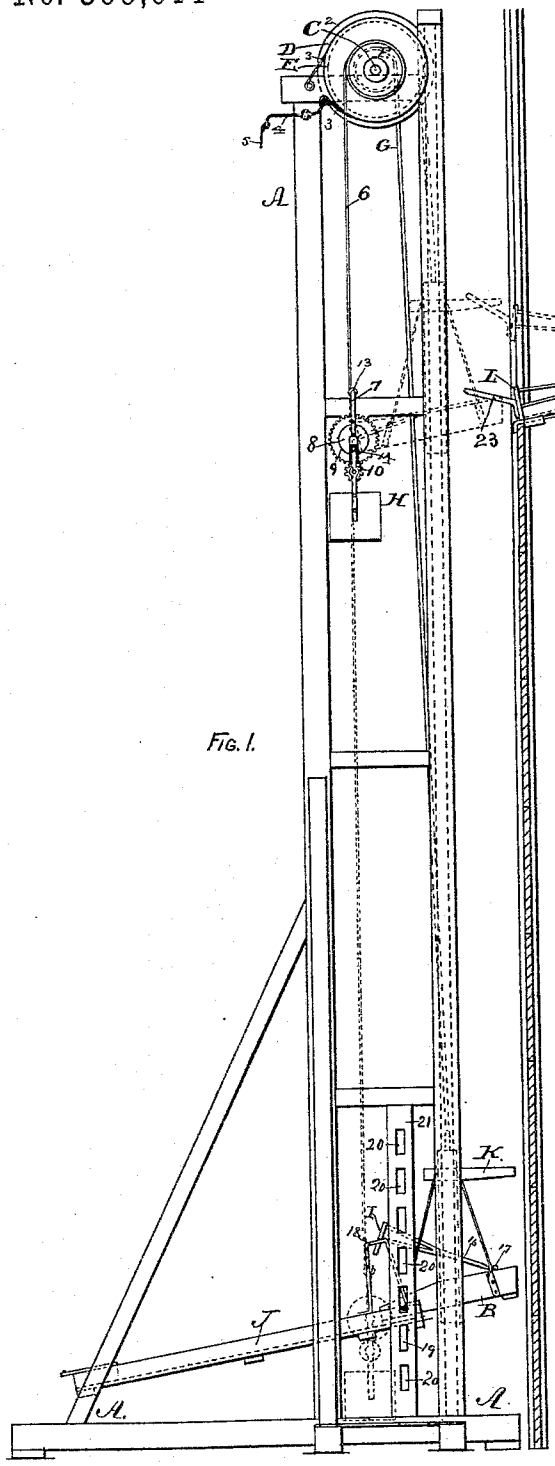


Fig. 1.

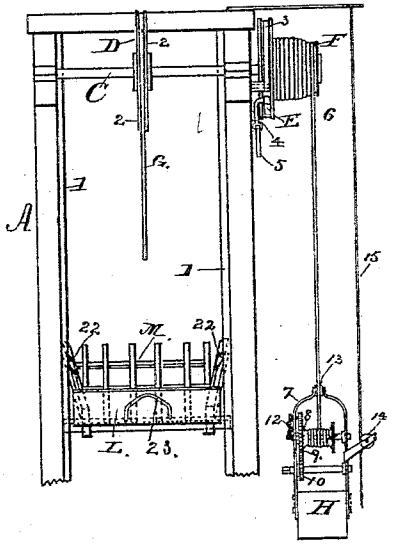
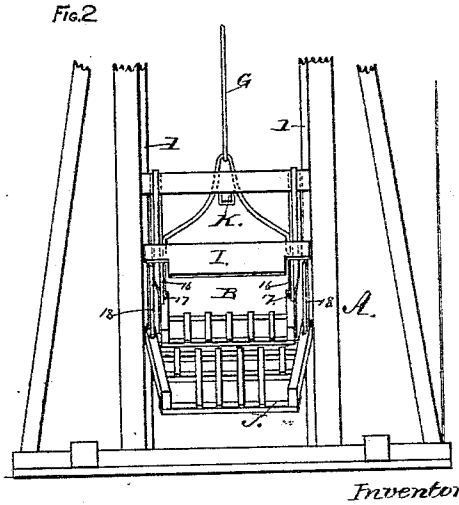


Fig. 2



Witnesses:
S. B. Brewer.
H. V. Scattergood.

Inventor:
JOHN N. BRIGGS,
by William W. Low,
attorney.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

# J. N. BRIGGS.

## AUTOMATIC APPARATUS FOR LOWERING ICE FROM STORE HOUSES.

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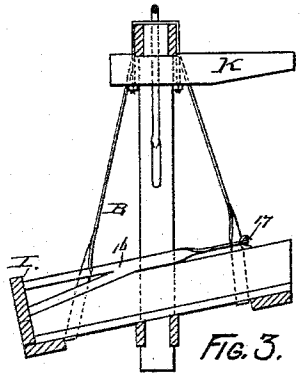



Fig. 3.

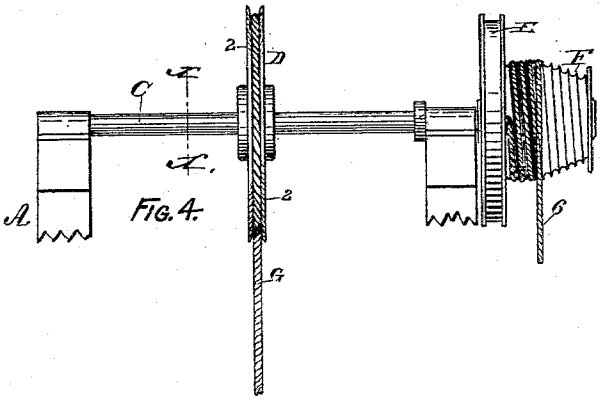



Fig. 4.

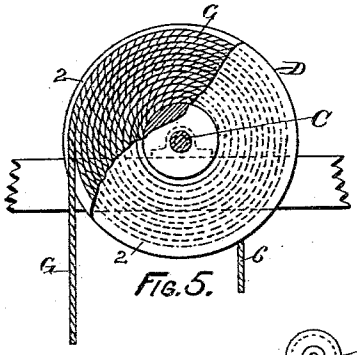



Fig. 5.

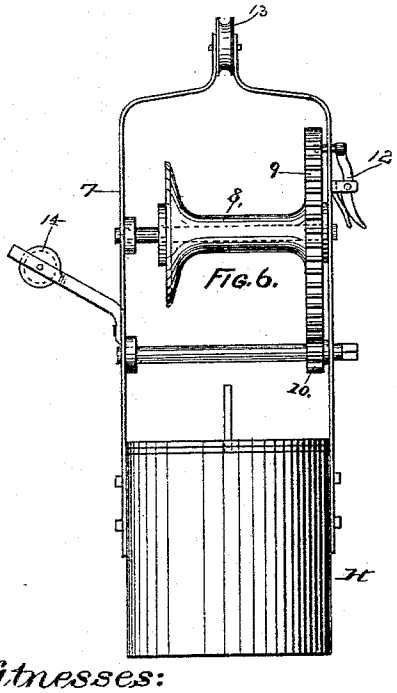



Fig. 6.

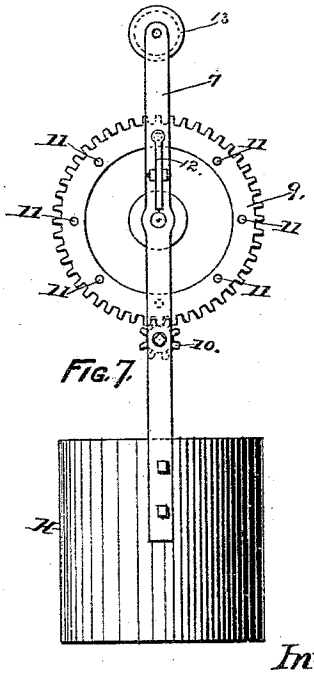



Fig. 7.

Witnesses:
S. B. Brewer,
H. V. Scattergood

Inventor:
JOHN N. BRIGGS,
by William H. Low,
attorney.

N. PETERS. Photo-Lithographer, Washington, D. C.

# UNITED STATES PATENT OFFICE.

JOHN N. BRIGGS, OF COEYMANS, NEW YORK.

## AUTOMATIC APPARATUS FOR LOWERING ICE FROM STORE-HOUSES.

SPECIFICATION forming part of Letters Patent No. 399,011, dated March 5, 1889.

Application filed September 18, 1888. Serial No. 285,697. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN N. BRIGGS, of Coeymans, in the county of Albany and State of New York, have invented a new and useful Automatic Apparatus for Lowering Ice from Store-Houses, of which the following is a specification.

My invention relates to an apparatus for automatically lowering ice from buildings in which it has been stored; and the object of my invention is to provide an apparatus that will automatically operate to lower cakes of ice as long as the latter are fed into the apparatus. I attain this object by the mechanism illustrated in the accompanying drawings, which are herein referred to and form part of this specification, and in which—

Figure 1 is a side elevation of my apparatus in position for lowering cakes of ice from an ice-house. Fig. 2 is a front elevation of the same with a portion of the frame-work broken out. Fig. 3 is a detached vertical section of the reciprocating gig of my apparatus. Fig. 4 is an enlarged front elevation of the upper part of my apparatus. Fig. 5 is a transverse section of the same at the line X X, with part of one of the flanges of the hoisting-drum removed for the purpose of showing the manner of winding the rope thereon. Fig. 6 is a front elevation of the weight for overcoming the weight of the empty reciprocating gig, and Fig. 7 is a side elevation of said weight.

As represented in the drawings, A designates the frame-work of my apparatus, which may be either permanently or removably erected in position in front of an opening from which ice is removed from an ice-house. Guides or ribbons 1 are fixed to said frame-work for the purpose of guiding the reciprocating gig. A drum-shaft, C, is journaled in the upper part of said frame-work, and is provided with a drum, D, which is secured thereon to range midway between the guides 1. Said shaft is also provided with a friction-brake, E, of the usual construction, and with a grooved drum, F, as hereinafter described.

The drum D is provided with two parallel disks or flanges, 2, which are spaced only at a sufficient distance apart to receive a single diameter of the rope G, but which are of sufficient diameter to retain the successive convolutions of said rope until its entire length is wound on said drum.

The friction-brake E is provided with a band, 3, which is fitted to clamp around the wheel of said brake in the usual manner. Said band is operated by a lever, 4, to which a hand-rope, 5, is connected for the purpose of depressing the outer end of said lever when necessary to contract said band around the brake-wheel, and thereby create frictional resistance to the rotations of the drum-shaft C. The hand-rope 5 extends downward nearly to the ground, so as to be in easy reach of a person detailed to attend to that duty.

The grooved drum F, which winds up a rope, 6, attached to a weight, H, employed to counteract the weight of the reciprocating gig, is made in a substantially cylindrical form, and is provided with a spirally-arranged groove that is adapted to effect the winding of the rope on said drum in a direction that is contrary to that in which the rope G is wound on the drum D—that is to say, while one rope is being wound on either of said drums the other rope will be reciprocally unwound from the other drum. The drum F is preferably made, near the end where the final turns of the rope are wound, with a gradually-decreasing diameter, said reduction being designed to compensate for the variations in the diameters of the successive turns of the rope around the drum D, as it will readily be seen that when all the rope is wound upon the drum D the outer coil will be considerably larger than when said rope is partially unwound therefrom, and consequently a weight suspended by the rope G will require a greater counteracting-weight to resist its sudden descent while said rope is fully wound on said drum than when it is only partially wound thereon, and it is this variableness of the effect of the weight on the rope G that requires compensation, and which I compensate for by the gradual reduction of diameter of the drum F instead of making the counteracting-weight itself variable.

The weight H, which is secured to the lower end of the rope 6, is preferably made up of a series of removable disks, as indicated by the parallel transverse lines near the top of said weight, as shown in Fig. 6, like those used on platform-scales, so as to regulate it to the re-

quirements of the work when the gig is not required to move to so great a height as when the height of the pile of ice in the store-house is reduced. Said weight is provided with a yoke, 7, in which is journaled a drum, 8, to which is fastened the lower end of the rope 6. Said drum is provided with a gear-wheel, 9, into which engages a pinion, 10, for the purpose of imparting motion to the drum 8. Said pinion is secured to a shaft to which a rotatory motion may be given by means of a hand-crank or other suitable appliance. The gear-wheel 9 is provided with a series of holes, 11, in which a spring-actuated dog, 12, attached to the yoke 7, is fitted to engage, so as to lock the drum 8 at any required point of its rotative movement. In the head of the yoke 7 a guide-sheave, 13, is journaled to receive the rope 6 and hold it centrally over the weight H. Another guide-sheave, 14, is fixed to the side of the yoke 7 and runs on a guide-rope, 15, for the purpose of preventing the weight H from swaying during its ascent and descent. By means of the drum 8 the weight H can be adjusted so that it will rest upon the ground when the gig has attained the upper point of its movement at any height it is required to go.

The gig B, on which the cakes of ice are lowered, is fitted to run on the guides 1, and it has its bottom inclined downwardly toward the discharging side. Said bottom is preferably formed of slats, which are run in the direction of the movement of the cakes of ice for the purpose of facilitating the discharge of the ice therefrom. An automatic gate, I, is arranged at the discharging side of the bottom of the gig for the purpose of preventing a discharge of the cake of ice before the gig has reached the lowermost point of its movement. Said gate is attached to a pair of arms, 16, which are connected to the gig B by a hinge-joint, 17, for the purpose of obtaining a perfectly free action for said gate. The latter is raised by reason of its coming in contact with fixed stops, like the brackets 18, or other suitable appliance, just before the gig B has reached the termination of its downward movement, so that when the latter point is reached the cake of ice carried by said gig will be free to slide therefrom and pass onto the discharge-chute J, which inclines downwardly from the outer side of the frame-work A, and by which the cake is discharged into a boat, car, or other means of transportation. The inner end of the discharge-chute J is carried on a cross-beam, 19, which is preferably made adjustable in height, so that said chute can be regulated to the height of the pile on which the cakes are deposited, and said adjustment is preferably effected by passing the bearing-beam through different ones of the series of mortises 20 in uprights 21, wherein said bearing-beam may be secured by means of pins, wedges, or other suitable fastenings.

The gig B is secured to the lower end of the rope G, so that as the latter is wound on or unwound from the drum D said gig will be correspondingly raised or lowered. Said gig is provided with an arm, K, or other device, which projects rearwardly therefrom, and which, as the gig is near the completion of its upward movement, engages with the movable end of an automatic gate, L, which is fitted to close the lower end of an inclined feeding-chute, M, on which the cakes of ice should be deposited as they are removed from the place in which they have been stored and down which said cakes will slide toward the gig B, ready to be taken by the latter. The gate L is hinged, as at 22, to the feeding-chute, and it is preferably provided with an outwardly-projecting arm or loop, 23, with which the arm K will engage to effect the lifting movement of said gate.

It must be understood that the weight H must be sufficiently in excess of the weight of the empty gig, so that the latter will rise to the highest point of its movement as soon as it is relieved of a load, the said point being its normal position when it is in a state of rest, and while the gig is in its normal position the gate L will remain in its raised position, as indicated by dotted lines in Fig. 1.

The operation of my apparatus is as follows: The empty gig B being in its normal position, with the gate L raised, the cakes of ice as they are removed from the house in which they have been stored are slid down the feeding-chute M. As soon as the first cake of the ice has been deposited on the gig B an excess of weight in favor of said gig is established to overcome the effect of the weight H. Thereupon the gig B begins to descend quite rapidly, permitting the gate L to drop and close the exit from the feeding-chute, so as to prevent the succeeding cakes from escaping from said chute. The descent of the gig B causes the rope G to unwind from the drum D, and the rope 6 to be wound upon the drum F, to raise the weight H until the gig B has reached the lowest point of its movements, at which point the gate I will be automatically raised, as hereinbefore described, and thereupon the cake of ice will slide from the gig B onto the discharge-chute J, down which said cake slides to the place of delivery. As quickly as the gig B is relieved of the weight of the cake of ice a preponderance of weight is established in favor of the weight H, and the latter, by its descent, causes said gig to return to its normal position, and as it approaches the termination of its upward movement said gig effects the raising of the automatic gate L, so that a cake of ice lying ready on the feeding-chute M will be free to slide upon said gig, and as soon as the cake is deposited on the gig the weight of the latter will be superior and cause the gig to again descend, and this automatic action of the apparatus will continue so long as the cakes of ice on the feeding-chute M are free to slide upon the gig B. When the feeding-chute M has become emptied of the cakes of

ice, the gig B will remain at its normal position until a fresh supply of ice is fed thereto; but while a supply of ice is fed to the gig the apparatus will continue its automatic operation above described.

I claim as my invention—

1. In an automatically-operating apparatus for lowering ice, the combination of a rope-drum having only sufficient space between its heads or flanges to receive a single diameter of the rope used thereon, and upon which the rope is wound so that each successive convolution of said rope will be wound upon and be of greater diameter than the precedent convolution, and a spirally-grooved cylindrical rope-drum having a gradual decrease in its diameter near the end where the terminal turns of said rope are wound thereon, the rope of one of said rope-drums being wound thereon in a contrary direction to that of the other drum, a gig for carrying the ice being secured to the lower end of the rope attached to the first drum, and a weight, which overbalances said gig when the latter is empty, being attached to the lower end of the rope of the other drum, as and for the purpose herein specified.

2. The combination of a vertically-reciprocating gig, a rope-drum to which said gig is connected and whose heads are spaced at such distance apart as to admit between them only a single diameter of the rope which connects said drum with the gig, a spirally-grooved rope-drum having a gradual decrease of diameter toward the end where the terminal turns of the rope are wound, and a counteracting-weight connected by a rope to said spirally-grooved drum, said weight having a preponderance over said gig when the latter is in an unloaded condition, and being adapted to move always in a reciprocally-different direction to that in which said gig moves in, as and for the purpose herein specified.

3. In an apparatus for automatically lowering ice, the combination of upper feeding-chute, whereon the cakes of ice slide by their own gravity toward the discharge end of said chute, an automatic gate located at the discharge end of said chute, a gig which has a vertically-reciprocating movement, and which is fitted to automatically raise said gate when said gig is near the upper termination of its movement, a drum-shaft provided with rope-drums, as herein described, one of said drums having said gig connected thereto by a rope, and the other drum having a weight connected thereto by a rope which winds in a contrary direction to the gig-rope, said weight being adapted to normally retain said gig when unloaded at the highest point of its movement, as and for the purpose herein specified.

4. In an apparatus for automatically lowering ice, the combination of an upper feeding-chute, whereon the cakes of ice slide by their own gravity toward the discharge end of said chute, an automatic gate located at the discharge end of said chute, a gig having an outwardly and downwardly inclined bottom, said gig having a vertically-reciprocating movement and provided with means for automatically raising said gate of the feeding-chute, and a drum-shaft provided with rope-drums, as herein described, one of said drums having said gig connected thereto by means of a rope, and the other drum having a weight connected thereto by means of a rope which winds in a contrary direction to the gig-rope, and said weight being adapted to retain said gig when the latter is unloaded at the highest point of its movement, and said gig being provided at its discharging side with an automatic gate, which is fitted to engage with a fixture by which said gate will be opened near the termination of its lowest point of movement, said apparatus being so arranged that its operation will be entirely automatic so long as cakes of ice remain on the feeding-chute, as and for the purpose herein specified.

JOHN N. BRIGGS.

Witnesses:
WM. H. LOW,
S. B. BREWER.