(No Model.) 2 Sheets—Sheet 1.

T. G. LAMB & J. H. McCLURE.

ELEVATOR SHAFT GATE.

No. 526,237. Patented Sept. 18, 1894.

Fig. 1.

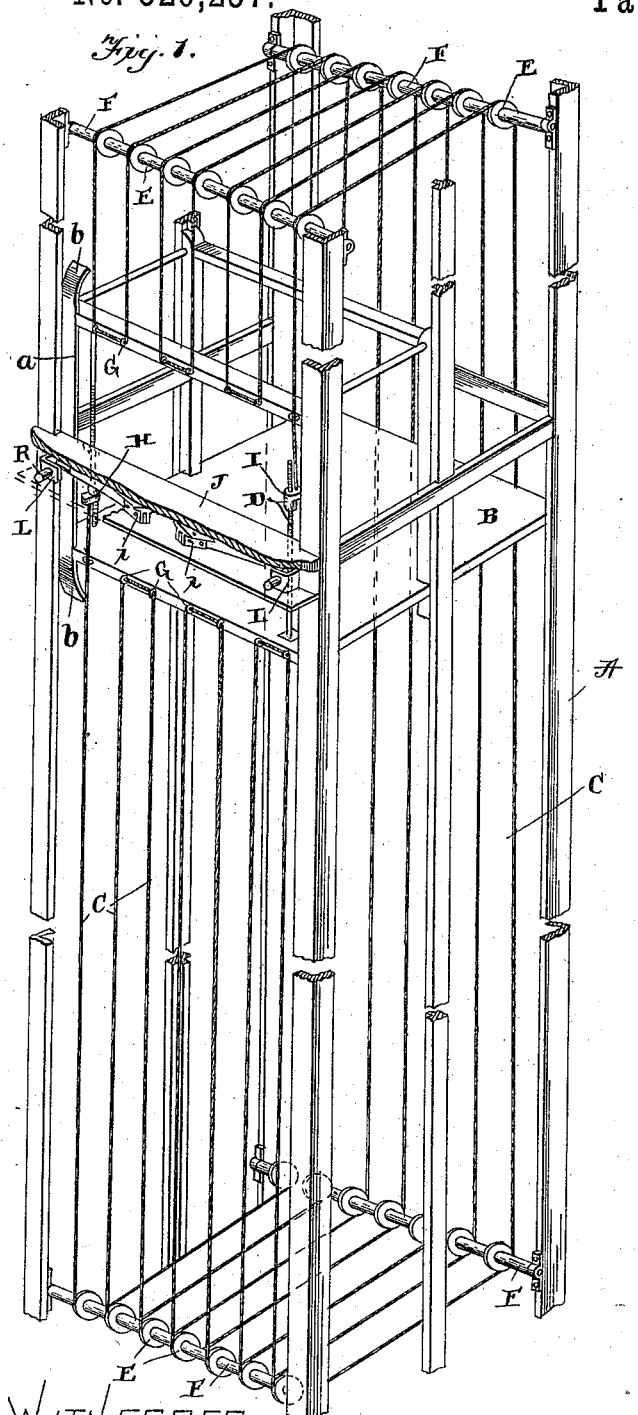
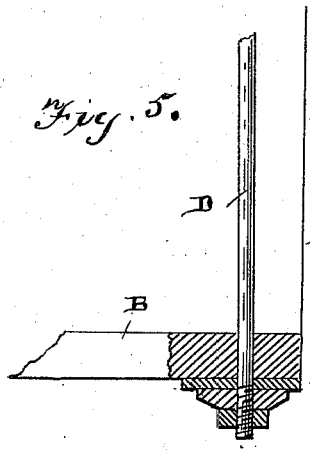


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

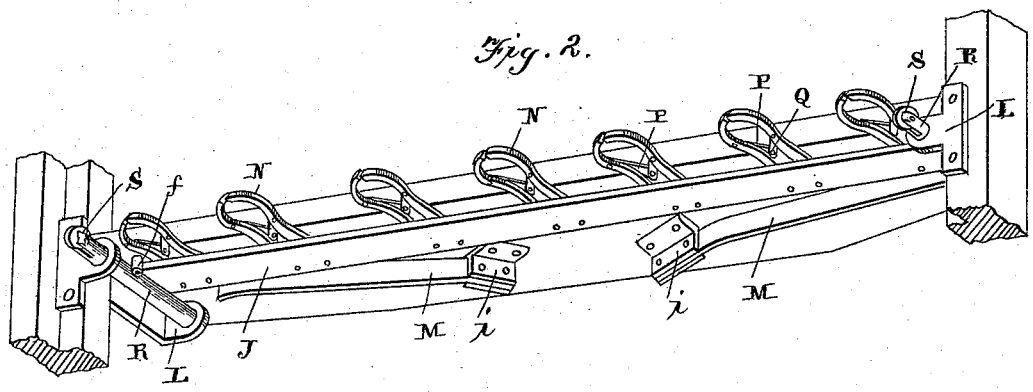


Fig. 3.

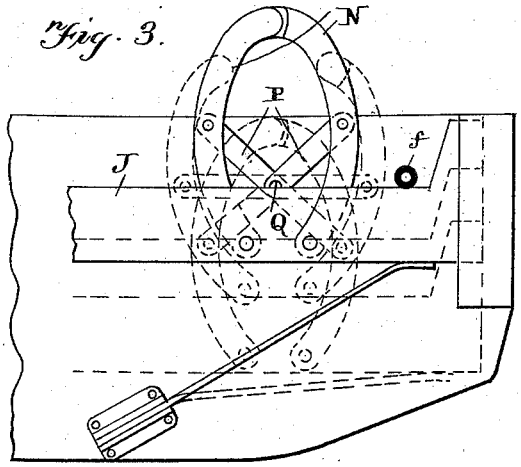
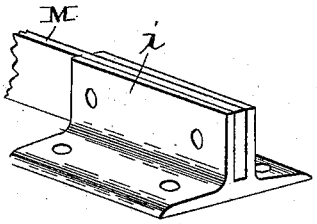


Fig. 4.



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UNITED STATES PATENT OFFICE.

THOMAS G. LAMB AND JOHN HENRY McCLURE, OF HOMESTEAD, ASSIGNORS TO THE AUTOMATIC FIRE DOOR COMPANY, LIMITED, OF PITTSBURG, PENNSYLVANIA.

ELEVATOR-SHAFT GATE.

SPECIFICATION forming part of Letters Patent No. 526,237, dated September 18, 1894.

Application filed May 8, 1894. Serial No. 510,548. (No model.)

To all whom it may concern:

Be it known that we, THOMAS G. LAMB and JOHN HENRY MCCLURE, of Homestead, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Elevator-Shaft Gates; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates to improvements in elevator shaft gates and it consists in the particular arrangement and construction of parts which will be fully described hereinafter, and particularly set forth in the claims.

The primary object of our invention is to provide an elevator shaft gate consisting of a single rope or chain which has one end connected to one corner of the elevator car, then passed up over pulleys at the front and rear of the upper end of the shaft, down around pulleys at the front and rear of the lower end of the shaft, and then attached to the bottom of the car, and carried slightly across the car in a horizontal position and doubled around in the opposite direction to form a series of vertically extending wires or chains, the opposite end of the said chain connected to the same side of but at the diagonally opposite corner of the car, and one or both ends of said chain provided with a tightening means whereby all of the vertical chains can be tightened or loosened thereby, as circumstances and conditions may require, the said chain or rope traveling with the car and closing the shaft at every point except that occupied by the car as will be fully shown and described hereinafter.

Another object of our invention is to provide automatically acting holders which normally extend into the shaft and embrace the said chains to prevent them from being forced inward by the falling of a body or object against them, and which holders are automatically forced out of the shaft before the car reaches them, whereby the car is permitted to pass freely up and down the shaft without interfering with the said holders, and the holders made to automatically embrace and release the said cords as the car moves within the shaft.

In the accompanying drawings:—Figure 1 is a perspective view showing an elevator shaft in skeleton, the elevator car within the shaft, and our invention applied thereto. Fig. 2 is an inverted perspective view of a set of the automatically acting holders which are applied to the ceiling of each floor of the building. Fig. 3 is a detached enlarged view of one of the holders showing more clearly and fully its action in dotted lines. Fig. 4 is a detached view of one of the springs for moving the holders inward, and the device for clamping the same. Fig. 5 is a view showing the swiveled rods H and D.

Reference being had to the drawings, A indicates an ordinary elevator shaft which may be of any desired shape in cross section, such as rectangular, or triangular, and B the car which is placed therein and operated in the usual manner.

Our invention relates to a series of wires, chains or cords which extend longitudinally of the shaft at the front side thereof for keeping the same closed entirely throughout its length except at that point occupied by the car. The series of wires, chains or cords C, consist of a single chain or cord, which has one end connected to one corner of the car, by means of an adjustable connection D, then passes up over one of a series of pulleys E, which is rigidly connected to a shaft F, journaled at the upper front end of the elevator shaft. The chain, wire or cord then passes horizontally across the upper end of the elevator shaft and over one of the series of pulleys similar to the pulleys E which are placed at the upper rear side of the elevator shaft, then downward at the rear side of the elevator shaft, and under one of a series of pulleys at the rear lower side of the shaft, horizontally across the bottom of the shaft and under one of a series of pulleys E at the front lower end of the shaft and then upward to the bottom of the car B. At this point the chain passes through one of a series of staples or eyes G, which are attached to the bottom of the car as shown and then across a short distance horizontally and through another one of the eyes G and down under and

over the series of pulleys back to the top of the car and through one of the series of staples G at the upper end of the said car. In this way the chain is worked backward and forward connecting each time with the elevator car through the eyes G, until a series of vertical wires or chains is formed as appears in Fig. 1. The opposite end of this chain is then connected with the same side of but at the diagonally opposite corner of the elevator car by means of an adjustable connection H similar to the one D, except that the opposite end thereof is journaled to the elevator car as will appear farther on.

The adjustable connection D, has its lower end swiveled in the lower end of the elevator car, and consists of a screw threaded rod as shown, and a screw threaded nut I to which the chain C is attached. In this manner by revolving the screw threaded rod or adjustable connection H the nut I moves up or down upon the said rod for the purpose of tightening or slacking the chain as will be readily understood. The adjustable connection H at the diagonally opposite corner of the car, has its upper end swiveled in the upper end of the car and carries a nut I at its lower end to which the opposite end of the chain is connected as is clearly shown. From this description it will be understood that by revolving one or both of the screw threaded rods H and D, the chain, wire or cord is loosened or tightened as may be required in the construction of the gate, or when in use to accommodate itself to the contraction and expansion due to the changes in the atmosphere, as in winter and summer. When tightening the chain, it is merely necessary to strike or jar the chain when revolving the screw threaded rods and the slack will be readily taken up thereby. This arrangement is very desirable and necessary for a practically operating gate consisting of a series of vertically moving wires or chains for the purpose of keeping them at the proper tension at all times to serve the purpose for which they are intended, namely:—of preventing persons from falling within the shaft and also of preventing boxes or other large objects from falling within the shaft. It is necessary to provide some means for holding the wires or chains at each floor of the building, to prevent them from being forced inward from contact therewith of a person or other object, and this is provided for by the following mechanism: A bar J extends horizontally across the shaft under the floor or at the ceiling, as shown and the ends of this bar may be provided with the rod R moving in bracket L so that the rod is capable of being moved back and forth against the tension of adjustable springs M, which keep the bar normally pushed inward. Pivoted to this bar J, is the series of pairs of hooks N, the outer ends of the said hooks being beveled as shown in the enlarged figure thereof so that they overlap as will readily be understood. One of each of a pair of links P has its outer end connected to each of the said hooks N, and these links extend inward and are pivoted at a common point Q, either to a bar attached to the ceiling of each floor, or directly to the floor, according as to whether the construction of the building will permit it, so that when the said bar J is normally held inward by the springs M, the links P draw the hooks N together so that said hooks embrace the chain C as is clearly shown in the drawings and form what we term holders. In this position the chains are allowed sufficient play to move free without friction against said hooks, while at the same time they are held against being moved inward or being separated sufficiently to permit the passage of a person or object between the said chains into the elevator shaft.

At each end of the bar J, is a friction roller S consisting preferably of rubber, raw hide or other similar material to prevent noise, when brought in contact with the vertical plate *a* at opposite sides of the elevator car. The upper and lower ends of these plates are bent inward to form cam surfaces *b*, so that as the car moves upward within the shaft the friction wheels or rollers S are engaged by these cam surfaces and the bar J moves outward carrying with it the hooks N, and through the medium of the links P, the hooks are made to separate before they move inward sufficiently to engage the chains. In this manner the holding devices or the pairs of hooks, are automatically moved out of the elevator shaft in advance of the elevator car and the chains released for the purpose of permitting the car to move freely upward within the shaft by each floor of the building. Should the springs which hold the bar inward become broken or injured in any manner, it will be seen that the car will force the bar and the hooks out of the shaft where it will remain so that the car will not be interfered with in its movement or any injury to the parts occur because of the accident.

From the above description it will be seen that we have produced a very simple, effective, durable and practical means for holding the chains against separation and inward movement under pressure of a person or other object, while at the same time the holding devices therefor are forced out of the elevator shaft in advance of the car as it goes up and down therein.

In Fig. 3, which shows an enlarged view of one of the holders, we show the bar J having its ends moving in a horizontal guide way, in place of the rod and bracket shown in Fig. 2, either of which may be used as found desirable.

We call attention to the fact that the free ends of the hooks are beveled as shown at *e* so that they overlap to prevent the chains from being forced inward, while at the same time we intend that the free ends of the said hooks shall not engage and thus make a noise,

and this we provide for by using the limiting pins *f* which engage the bar J and prevent it from being forced inward sufficiently far to bring the free ends of the hooks together as will be readily understood. The outward movement of the said bar is regulated by the depth of the cam at the free end of the plate *a*.

Each of the springs M, for holding the bar normally inward is held in a block *i*, by means of which the tension of the springs against the bar can be increased or diminished at will by removing all the screws but one and twisting it, and by replacing the screws in a new place, and this arrangement is found very convenient in setting the springs to obtain the proper tension on the bar J.

We here show and prefer the gate composed of a single wire extending back and forth as described to form a series of vertical wires, but the gate may be formed of a series of separate wires without affecting the function or operation of the holders, and we do not limit ourselves in connection with the holders to forming the gate of a single wire, for in either event the gate is composed of a series of vertical wires.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination with an elevator shaft and car and pulleys at the top and bottom of the shaft, of a gate consisting of a single wire, chain or cord connected at intervals to the car at its top and bottom and passing around said pulleys at the top and bottom of the shaft.

2. The combination with an elevator shaft and car and pulleys at the top and bottom of the shaft, of a gate consisting of a single wire, chain or cord loosely connected intermediate its ends to the top and bottom of the car, and an adjustable connection for the end of the cord, wire or chain.

3. The combination with an elevator shaft and car, of a gate composed of vertical wires or chains connected to and moving with the car, a series of movable holders embracing and releasing said chains and adapted to be operated by the movement of the car.

4. The combination with an elevator shaft and car, of a gate composed of vertical chains, wires or cords connected to and moving with the car, a series of holders for said wires, chains or cords, a connection between said holders, whereby they move simultaneously, and a means for operating said holders.

5. The combination with an elevator shaft and car, of a gate composed of a vertical series of wires, chains or cords attached to and traveling with the said car and closing the said shaft except at the point occupied by the car, a series of hooks adapted to embrace the said chains, and a means operated by the said car for opening and closing the said hooks, substantially as set forth.

6. The combination with an elevator shaft and car, of a gate composed of a vertical series of wires, chains or cords attached to and set in motion by the car and closing the shaft except at the point occupied by the car, of a series of horizontally moving hooks connected in pairs, and adapted to embrace the said chains, and a means operated by the car for opening and closing the said hooks, substantially as described.

7. The combination with an elevator shaft and car, of a gate composed of a vertical series of wires, chains or cords connected to and moving with the said car and closing the shaft except at the place occupied by the car, of a series of hooks connected in pairs and adapted to embrace the chains at their free ends, a bar connected with the said hooks, links connected with the said hooks, and a means carried by the car for moving the said bar and thereby opening and closing the hooks, substantially as set forth.

8. The combination with an elevator shaft and car, of a gate composed of a vertical series of wires. chains or ropes connected with and moved by the car and closing the shaft except at the point occupied by the car, of a series of horizontally moving, automatically opening holders adapted to embrace the said chain, and a means for moving the said holders out of the shaft in advance of the car, substantially as specified.

9. The combination with an elevator shaft and car, of a gate composed of a vertical series of wires, chains or cords connected to and moving with the said car and closing the shaft except at the point occupied by the said car, of a laterally moving bar, a series of holders carried by the said bar and adapted to embrace the chains, a means for automatically holding the said bar inward and the holders within the elevator shaft, and a means carried by the said car for moving the said bar outward and the hooks out of the shaft and away from said chains, substantially as specified.

10. The combination with an elevator shaft and car, of a gate composed of a vertical series of wires, chains or cords connected to and moving with the said car and adapted to close the shaft except at the point occupied by the car, of a series of holders adapted to embrace the said chains and move within and out of the said shaft, a means carried by the car for moving the said holders, and a means for limiting the inward movement of the holders to prevent them from engaging at their free ends and making a noise, substantially as set forth.

11. The combination with an elevator shaft, a car, and a gate composed of vertical wires, cords or chains connected to and moving with said car, of a series of normally closed holders for said chains, and a means for opening said holders.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS G. LAMB.
JOHN HENRY McCLURE.

Witnesses:
A. S. PATTISON,
J. M. NESBIT.