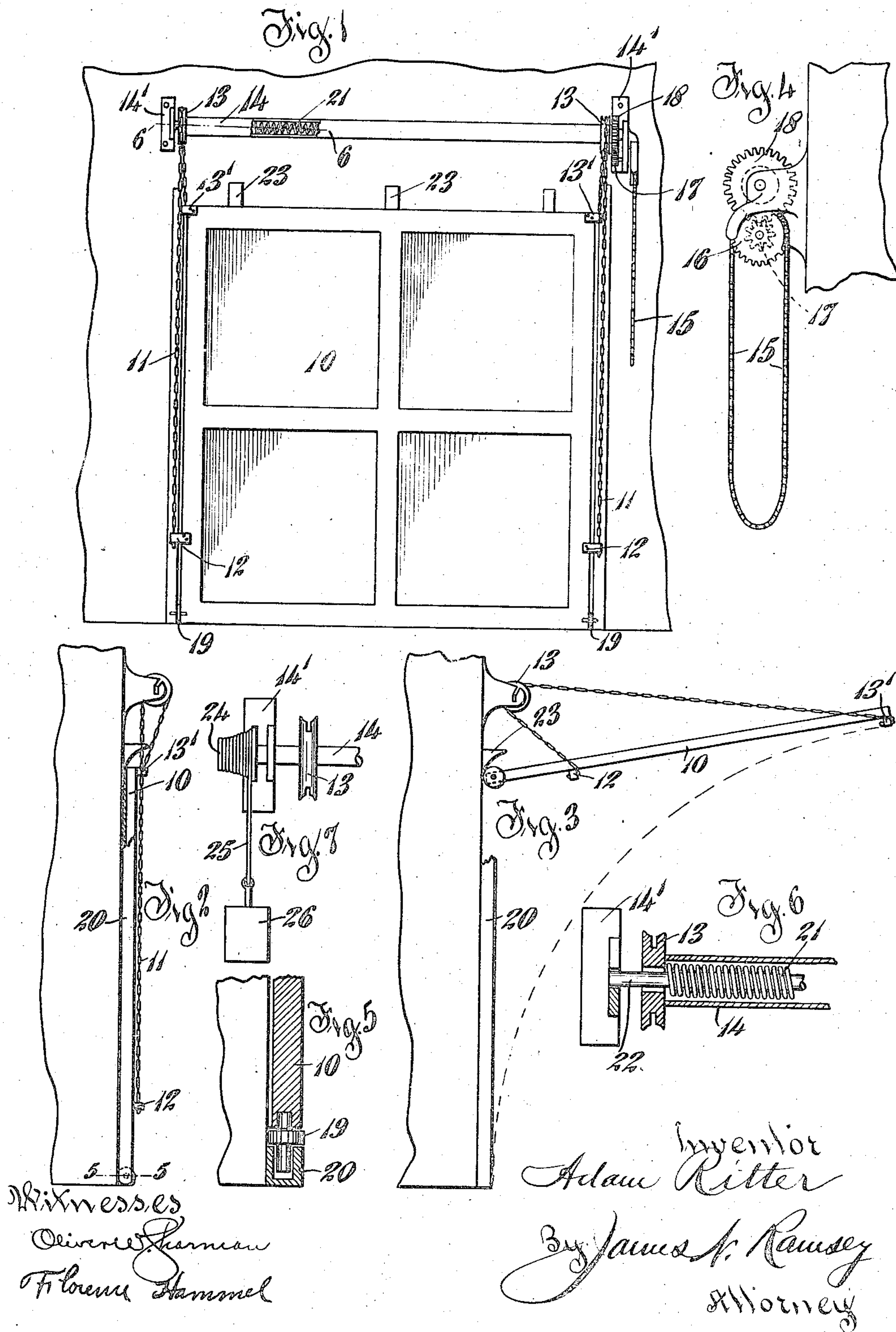


A. RITTER.  
LIFTING DOOR.

APPLICATION FILED JUNE 23, 1909.

965,940.

Patented Aug. 2, 1910.





# UNITED STATES PATENT OFFICE.

ADAM RITTER, OF CINCINNATI, OHIO.

## LIFTING DOOR.

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Specification of Letters Patent.

Patented Aug. 2, 1910.

Application filed June 23, 1909. Serial No. 503,799.

*To all whom it may concern:*

Be it known that I, ADAM RITTER, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Lifting Doors, of which the following is a specification.

My invention relates more particularly to doors used in freight houses and such places where the space directly in front of the door is very often filled up with freight, etc., and where a substantially continuous opening is desired.

In carrying out my invention, I provide a door or doors adapted to open directly upward by means of certain new combinations of parts which will hereinafter be described and claimed.

In the drawing: Figure 1 illustrates a door equipped with my invention. Fig. 2 is a side elevation of the door shown in Fig. 1. Fig. 3 is a view showing the door in its raised position, parts being broken away for the sake of clearness. Fig. 4 is an enlarged side view of the gear and sprocket mechanism employed in operating the door. Fig. 5 is an enlarged sectional view taken on the line 5—5 of Fig. 2. Fig. 6 is an enlarged sectional view taken on the line 6—6 of Fig. 1. Fig. 7 shows a modification of my invention where I use a cable adapted to be wound around a roller and a weight on the end of the cable heavy enough to balance the weight of the door thereby doing away with a spring.

Referring more particularly to the drawings, I show at 10 a door having chains 11 fastened in a suitable manner at 12 near the bottom to the door 10, and extending around a sprocket, sheave or wheel 13 fastened onto a hollow shaft 14, and then being fastened to the top of the door shown at 13' in any suitable manner. The hollow shaft 14 is supported by brackets 14'.

At 15 I show a common ordinary hand chain engaging a sprocket 16, a pinion 17 being fastened to the sprocket 16 and meshing with a gear 18, said gear 18 being fastened to the shaft 14.

At the bottom of the door, on either side, I provide a roller 19, one side journaled to the door and the other side adapted to slide in a channel iron 20, said channel iron being fastened to the wall adjacent the door and extending from the floor to a short distance above said door.

At 21 I show a coil spring fastened at one end to short shaft or stud 22 best shown in Fig. 6. The small shaft 22 fits in the bracket 14' in such a manner as to be held securely and is of such shape that it will not revolve in the bracket 14'. The spring 21, at its other end, is attached to the hollow shaft 14.

At 23 I show a plurality of wedge shaped blocks placed above the door and adapted to start the top of the door in an outwardly direction from the wall. When it is desired to open the door it is necessary to pull the hand chain in the proper direction thereby turning the sprocket 16, said sprocket 16 having the pinion 17 fastened thereon turns the gear 18. The gear 18 being fastened to the hollow shaft 14 and the sprocket or sheave 13 being fastened to the shaft 14, it is seen that the lower end of the chain 11 will rise, thereby lifting the door. As soon as the door begins to rise it hits the wedge shaped blocks 23 and is thereby guided outwardly. The rollers 19 being fastened to the door and sliding in the channel irons 20 prevent the bottom of the door from leaving the wall. Thus it is seen that the door must assume the position shown in Fig. 3.

The dotted line in Fig. 3 shows the path of the door as it is rising, and shows the small amount of space this form of door requires to operate properly. The purpose of the spring 21 is to provide means for holding the door in any position desired. For instance, without the spring, if the door was left in its middle position or half way up and then the operator let go of the hand chain 15 the door would immediately drop, whereas, by having the spring 21 wound tightly, the door 10 as it is raised will unwind said spring 21 and will thereby remain in any position desired, said spring 21 being of sufficient strength to balance the weight of the door.

In Fig. 7 I show another means for balancing the door in any position desired, and I employ a roller 24, a cable or rope 25, and a weight 26. When the door is being raised and the shaft 14, in this case being solid, is being rotated, it is seen that the roller 24 being securely fastened to the shaft 14 will rotate also. The cable 25 is fastened to the roller 24 and will wind about said roller when the door is being raised. When it is desired to raise the door, the operator turns the hand chain in the proper direction



shown in the other figures of the drawing, and in the same manner as has been described, the shaft 14 rotates, thereby rotating the roller 24 and winding up the cable

5 25. Now, in case the operator left the door in its uppermost position, the weight 26 is of sufficient weight to balance the door in said position. This means of balancing the door may be preferable over the means formerly described, inasmuch as the spring  
10 shown in Fig. 1 has been found to be unsatisfactory on account of it snapping or breaking when wound too tight. It is seen that with my improved operating mechanism for raising the door that freight, boxes,  
15 and other articles may be placed directly in front or within a short distance of said door and still not interfere with the door when it is being opened; also that a series  
20 of doors may be arranged adjacent each other in such a manner that the opening of one door will not interfere with or obstruct the opening of any of the other doors, though all of the doors are open at the same  
25 time.

My invention may be modified in various ways without departing from its spirit and scope, and I do not wish to be confined to the exact details shown.

30 What I claim as new and desire to secure by Letters Patent is:

1. The combination with a frame having a door opening and a sheave mounted above said opening, of a door the lower end of  
35 which engages and may travel vertically on the door jambs, a chain attached to the door near its lower end and running thence to and over said sheave and to a point of attachment at or near the upper end of the  
40 door, all so arranged that as the lower edge of the door, when the latter is being opened,

moves vertically the upper end swings outwardly away from the door opening, and of a compensating counterbalance for the door in all of its positions.

2. The combination with a frame having a door opening, and sheaves mounted above said opening, of a door the lower end of which engages and may travel vertically on the door jambs, a chain at each side of the door attached to the door near its lower end at each edge and running thence to and over the adjacent sheave and to a point of attachment at or near the upper end of the door, all so arranged that as the lower end  
5 of the door, when the latter is being opened, moves vertically the upper end swings outwardly away from the door opening, and of a compensating counterbalance for the door in all of its positions.

3. The combination with a frame having a door opening provided with a channel upon each vertical wall adjacent said opening, and having a sheave mounted above said opening, of a door the lower end of which  
6 engages and may travel vertically on the door jambs, a roller journaled to the door and adapted to run in said channel and engage said wall, a chain attached to the door near its lower end and running thence to  
7 and over said sheave and to a point of attachment at or near the upper end of the door, all so arranged that as the lower edge of the door, when the latter is being opened, moves vertically the upper end swings outwardly away from the door opening, and of a compensating counterbalance for the door in all of its positions.

ADAM RITTER.

Witnesses:

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FLORENCE HAMMEL.