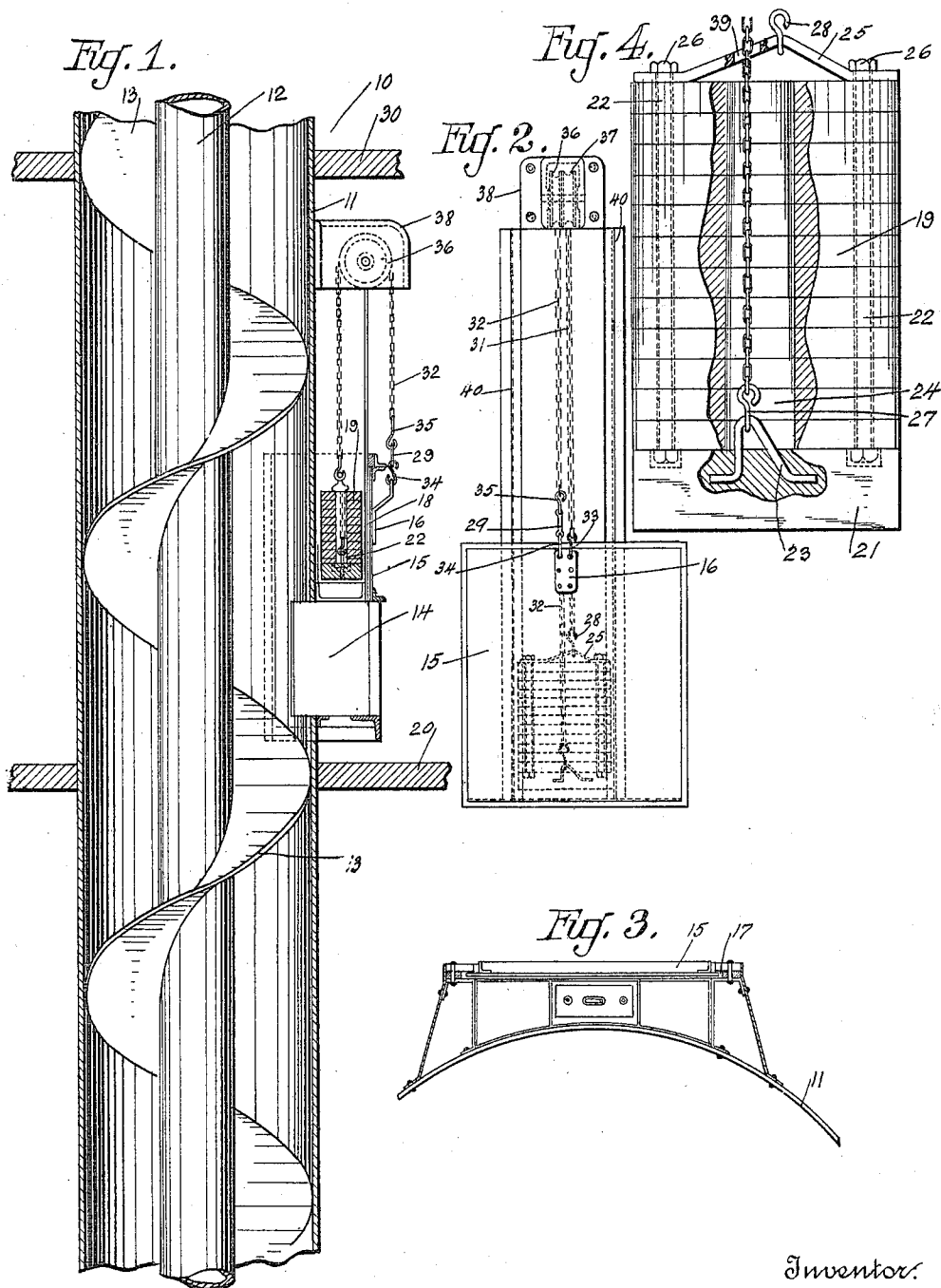


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 DOUBLE WEIGHT COUNTERBALANCE FOR GRAVITY CONVEYER DOORS.
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DOUBLE-WEIGHT COUNTERBALANCE FOR GRAVITY-CONVEYER DOORS.

986,336.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed August 11, 1903. Serial No. 448,056.

To all whom it may concern:

Be it known that I, GEORGE H. C. WILLIAMS, a citizen of the United States, residing at Metuchen, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Double-Weight Counterbalances for Gravity-Conveyer Doors, of which the following is a specification.

My invention relates to improvements in counterweights for fire doors, and, while the same is particularly adapted to the doors of gravity conveyers, it may have a more general application.

One object of my invention is the provision of means for holding a door stationary in any desired position, and which will automatically operate to close said door in case of fire.

A further object is the provision of improved means for counterbalancing a door in any position which will operate to allow the door to close gently when released by fire.

Other objects will appear hereinafter, the novel combinations of elements being pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in sectional elevation of a spiral gravity conveyer embodying my invention; Fig. 2 is a front view of a conveyer door and counterbalance therefor; Fig. 3 is a plan view of Fig. 2; Fig. 4 is a detail view of the counterbalance.

Similar characters of reference denote similar parts throughout all the figures.

Referring to the drawings, 10 designates a spiral gravity conveyer of well known construction comprising an outer shell or casing 11 and an inner central core 12, between which is arranged a spiral conveying surface or blade 13. The conveyer is usually arranged to connect the various floors, such as 20 and 30, of a building, suitable openings into the same being provided at each floor through which articles may be placed into the conveyer, whence they will descend upon the spiral conveying surface by the action of gravity to the basement or some intermediate floor, and there be discharged. These openings are generally arranged to be closed by suitable doors or slides when not in use, and, since the conveyer would provide a ready means for the spread of fire should the same occur, the doors at each conveyer

opening are preferably made of metal or other suitable fireproof material. A door so constructed would necessarily have considerable weight, and for this reason it is very desirable to counterbalance the doors by a weight which is substantially equal in weight to that of the door. A door so counterweighted will remain stationary in any position in which it may be placed.

In case a fire should break out in the vicinity of the conveyer, it is very desirable that the doors at the conveyer openings should automatically close up the openings, and in order to achieve this result a fusible link or its equivalent may be inserted in the counterweight suspension which would, upon becoming overheated, melt and by so doing disconnect the counterweight from the door and allow the latter to drop, thereby closing the corresponding conveyer opening. It is found, however, in actual practice that the door when thus released from its counterweight will descend with great force due to its own weight which must necessarily be considerable owing to its fireproof construction, and thus more or less damage is almost certain to occur, not only to the door itself, but to the door casing and conveyer structure as well.

The principal object of my invention is to overcome this objectionable feature, and, broadly speaking, it consists of a double counterbalance whose total weight is substantially equal to that of the door to which it is applied. One portion of the counterbalance is permanently connected to the door while the other portion, which is preferably the lighter of the two in weight, is connected to the door through a fuse link or equivalent device. Under normal conditions, the door is properly counterbalanced by both portions of the counterbalance acting jointly, but as soon as the lighter portion of the counterbalance is disconnected from the door by reason of the melting of the fuse link, the heavier portion of the counterbalance has not sufficient weight to retain the door in open position, and consequently the latter being underbalanced will automatically close. The door will not descend or close rapidly, however, since the counterbalance still connected thereto partially counterbalances the door and only allows it to descend gently without shock or jar.

Referring again to the drawings, 14 designates a conveyer opening which is provided with a door 15, herein shown as a vertically sliding door, although the same may be hinged or otherwise arranged to close an opening 14 when so desired. The conveyer opening may be provided with an additional inner door if desired, the door 15 being in such case used only as an emergency door or in case of fire. In the present instance, it is only necessary to consider the door 15. Around the opening 14 a square or rectangular frame or casing is constructed, the vertical sides of which are so arranged as to form a slot or groove 17 in which the door 15 freely slides. The door itself is preferably constructed of sheet metal with angle iron reinforcement at each side and at top and bottom, the angle irons upon each side forming guide pieces which are adapted to slide in the grooves 17 formed in the door casing.

The construction of the door and casing may be widely varied to suit different conditions, the precise construction having no particular bearing on the present invention, hence a detailed description of these parts will not be necessary.

At or near the top of the door 15 a bracket 16 is securely fastened. This bracket is connected to the counterbalance 18 by means of suitable chains or metal cables 31 and 32 which pass over the guide pulleys 37 and 36, respectively, contained in the housing 38 which is located upon the conveyer casing a short distance above the top of the door 15 when the latter is in open position. The door counterbalance 18 comprises two portions 19 and 21 adapted to travel between the vertical angle iron guide pieces 40, 40. The upper portion 19 is the heavier and consists of a number of cast iron weights secured together on either side by the bolts 22, 22 which pass through the weights and also through each side of a suspension piece 25 located at the top of the weights. Suitable nuts 26, 26 securely lock the parts together. A vertical channel or slot 24 is formed in the center of the counterbalance weight 19 as shown in Fig. 4. The lower portion 21 of the counterbalance is made in one piece and has a suspension loop 23 cast in the weight a short distance out of central position. Recesses are also provided in the top of this weight to allow for the heads of the bolts 22, 22. The upper or heavier counterweight 19 is suspended by means of the chain 31 which leads up over the guide pulley 37 and is connected to the bracket 16 on the conveyer door, suitable S hooks 28 and 33 being used to facilitate the chain connections. The lower weight 21 is in like manner suspended by the chain 32 which passes through the slot 24 in the upper weight 19 and through a clearance hole 39 in the suspension piece

25. Thence it leads up over the guide pulley 36 and is connected through the S hooks 35 and 34 and fuse link 29 to the bracket 16. Thus each portion 19 and 21 of the counterbalance is independently connected to the door.

As before pointed out, the entire counterbalance has just sufficient weight to properly counterbalance the door 15, and thus the door will remain stationary in whatever position it may be placed.

Assuming the door to be in open position and a fire should start, the fuse link 29 will, when sufficiently heated, melt and the weight 21 being no longer connected to the door will immediately drop. The counterbalance 18 is now lightened an amount equal to the weight of the counterweight 21 and is no longer of sufficient weight to retain the door in open position, and the result will be that the door will gently close, its descent being retarded by the weight 19 which is still connected thereto.

The relative weights of the two portions of the counterbalance may be varied with respect to each other as much as desired, in order to suit various conditions met with in practice.

The fuse link 29 may be replaced by any desired means which will operate when heated beyond a predetermined amount to effect a disconnection between the door and a portion of its sustaining means.

While I have described a preferred arrangement in connection with a single door of a conveyer, my invention may be applied to any number of doors or closures of any kind, whether the same are arranged vertically or otherwise.

My invention may have a general application, and for this reason I desire not to be limited to its use in connection with gravity conveyers as herein shown. Further, I wish not to be limited to the precise construction and arrangement of parts herein disclosed, since various changes could readily be made by those skilled in the art without departing from the spirit and scope of my invention.

What I claim as new and desire to have protected by Letters Patent of the United States is:—

1. The combination with a device provided with an opening, of a closure movable into and out of position to close the opening, a counterbalance weight composed of separate sections located one above the other, a flexible cable or chain connecting the upper section and the closure, and a separate chain or cable and fuse link connecting the lower section and the closure.

2. In a gravity conveyer, the combination with a spiral conveying surface, of a casing inclosing said surface and provided with an opening, a door movable into and out of position to close the opening, a counterweight

composed of separate sections located one
above the other, a connection between the
upper section and door, and means for sup-
porting the lower section and automatically
5 rupturable upon an excessive rise in the
temperature.

In testimony whereof, I have signed my

name to this specification in the presence of
two subscribing witnesses.

GEORGE H. C. WILLIAMS.

Witnesses:

CHAS. M. NISSEN,
W. H. BRADY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
