H. H. BENTLEY.

GEAR FOR OPERATING BULKHEAD DOORS AND THE LIKE.

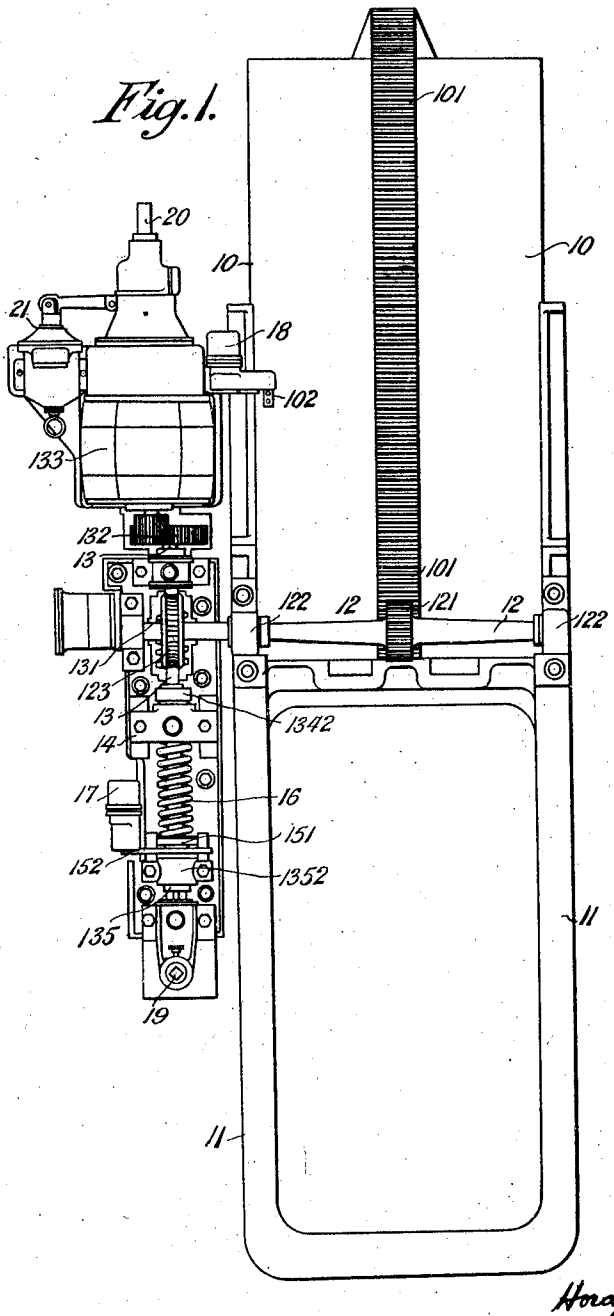
APPLICATION FILED FEB. 4, 1920.

1,361,221.

Patented Dec. 7, 1920.

2 SHEETS—SHEET 1.

Fig. 1.



Inventor:
Horatio H. Bentley
By his Attorneys
Baldwin & Wright

H. H. BENTLEY.

GEAR FOR OPERATING BULKHEAD DOORS AND THE LIKE.

APPLICATION FILED FEB. 4, 1920.

1,361,221.

Patented Dec. 7, 1920.

2 SHEETS—SHEET 2.

Fig. 2.

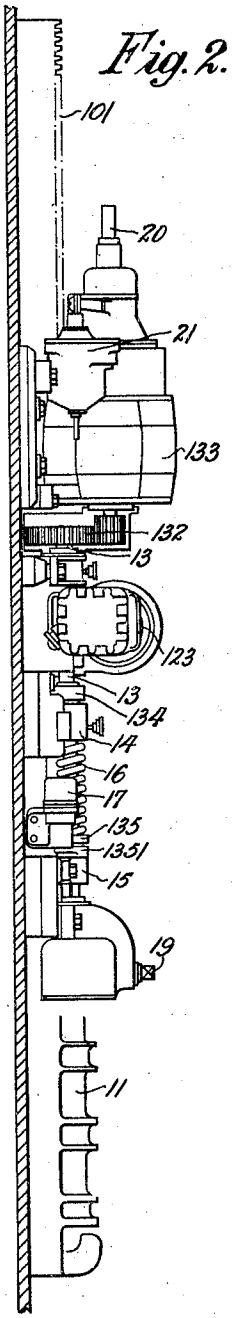
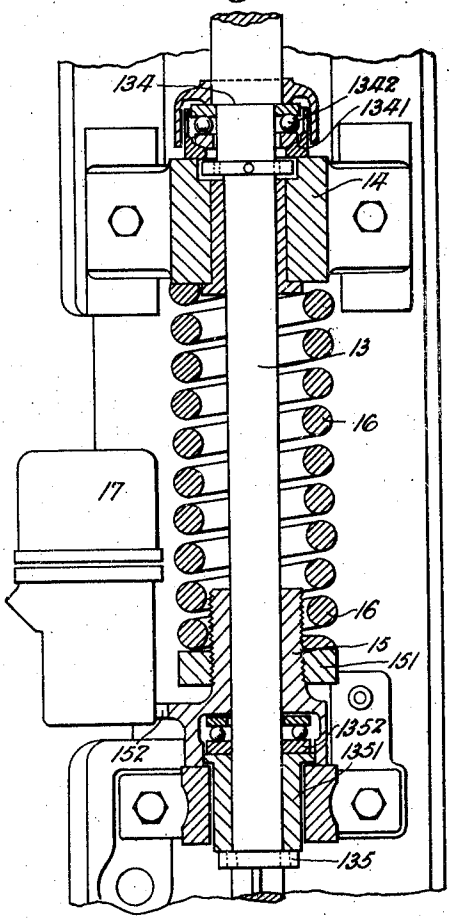


Fig. 3.



Inventor:
Horatio H. Bentley
By his attorneys,
Baldwin & Wight

UNITED STATES PATENT OFFICE.

HORATIO HALIBURTON BENTLEY, OF BELFAST, IRELAND, ASSIGNOR TO HIMSELF AND HARLAND AND WOLFF, LIMITED, OF BELFAST, IRELAND.

GEAR FOR OPERATING BULKHEAD-DOORS AND THE LIKE.

1,361,221. Specification of Letters Patent. Patented Dec. 7, 1920.

Application filed February 4, 1920. Serial No. 356,229.

To all whom it may concern:

Be it known that I, HORATIO HALIBURTON BENTLEY, a subject of the King of Great Britain, residing at Shipbuilding and Engineering Works, Belfast, Ireland, have invented new and useful Improvements in Gear for Operating Bulkhead-Doors and the like, of which the following is a specification.

This invention relates to gear for operating bulk head doors and like doors.

Each door is operated by an electric motor driving by means of reducing gear and a worm and worm wheel a shaft upon which is a pinion meshing with a rack on the door, and the current to the electric motors is controlled from a central station.

The door operating mechanism when the door is closed or in the case of vertical doors, after being relieved of the weight of the door by wedge-like clips at the base of the door frame or when the door meets an obstruction (for example, coal) compresses a spring whose pressure tends to press the door into the clips or the obstruction.

According to this invention the shaft on which is the worm actuating the door is surrounded by a helical spring arranged between a plumber block and a projection on the shaft and compressed between them when the thrust of the shaft is in one direction, while the second projection on the shaft bears against the plumber block when the thrust is in the other direction. When the spring has been sufficiently compressed a switch is operated opening the motor circuit. This may be effected by an arm on a sleeve which is actuated by the first projection. Another switch is provided for opening the motor circuit when the door is fully opened.

In the case of vertical doors the thrust is always downward except when the door is being forced into clips and in the case of horizontal doors the thrust is always in one direction for opening and in the opposite direction for closing.

Two sets of hand gear for operating a door may be provided, one adjacent to the door and the other at a distance, the latter being coupled to the door mechanism by a clutch which is preferably actuated by a solenoid so that the hand gear may be uncoupled when the door is operated electrically.

The annexed drawings show gear for operating bulk head doors made in accordance with this invention.

Figure 1 is a front elevation and Fig. 2 a side elevation of a door. Fig. 3 is a section to a larger scale of the helical spring on the shaft of the worm actuating the door.

10 is a door sliding in the frame 11 in the bulk head and on the door 10 is a rack 101 meshing with a pinion 121 on the shaft 12 turning in bearings 122 and having near one end a worm wheel 123. The worm wheel 123 is in gear with a worm 131 on a shaft 13 driven through reducing gear 132 by an electric motor 133.

On the shaft 13 is a shoulder 134 which when the thrust on the shaft is downward presses the ring 1341 of a ball bearing 1342 against the plumber block 14. On the shaft also is a collar 135 which when the thrust is upward presses upward the sleeve 15 through a bush 1351 and a ball bearing 1352, a helical spring 16 being compressed between the screw ring 151 on the sleeve 15 and the plumber block 14.

When the motor 133 starts to close the door 10 the weight of the door causes a downward thrust of the shaft 13 which is taken by the shoulder 134 upon the plumber block 14. When the door enters clips (not shown) at the bottom of the frame or meets with any obstruction the thrust of the shaft 13 is upward and causes the spring 16 to be compressed between the screw ring 151 and the lower surface of the plumber block 14. An arm 152 on the sleeve 15 operates a switch 17 when the spring 16 has been sufficiently compressed and this switch 17 opens the circuit of the motor switch relay coil and the movement of the door is thereby stopped, the door being held in the closed position by the action of the spring 16.

Similarly on the door 10 is a projection 102 which comes into contact with a switch 18 controlling a relay coil which opens the circuit of the motor 133 when the door is fully opened. The door 10 may be operated through hand gear 19, adjacent to the bulk head or through shafting actuating a shaft 20 which is connected to the shaft 13 by a

clutch which is moved out of action by a solenoid 21 when the circuit of the motor 133 is closed and the motor is in operation.

What I claim is:—

1. A door combined with a shaft, gearing between the shaft and the door, a fixed support, a projection on the shaft adapted to engage the fixed support when the thrust on the shaft is in one direction, a helical spring, a second projection on the shaft adapted to compress the spring against a fixed support when the thrust is in the other direction and means for driving the shaft.

2. A door combined with a shaft, a worm on the shaft, gearing between the worm and the door, a plumber block, a shoulder on the shaft adapted to engage the plumber block when the thrust on the shaft is in one direction, a helical spring, a collar on the shaft adapted to compress the spring against the plumber block when the thrust is in the other direction and means for driving the shaft.

3. A door combined with a shaft, gearing between the shaft and the door, a fixed support, a projection on the shaft adapted to engage the fixed support when the thrust on the shaft is in one direction, a helical spring, a sleeve on the shaft, a screw nut on the sleeve bearing against the helical spring, a second projection on the shaft adapted to engage the sleeve and compress the spring against a fixed support when the thrust is in the other direction and means for driving the shaft.

4. A door combined with a shaft, gearing between the shaft and the door, a fixed support, a projection on the shaft adapted to engage the fixed support when the thrust on the shaft is in one direction, a helical spring, a second projection on the shaft adapted to compress the spring against a fixed support when the thrust is in the other direction, means for operating an electric switch actuated by the second projection and means for driving the shaft.

5. A door combined with a shaft, gearing between the shaft and the door, a fixed support, a projection on the shaft adapted to engaged the fixed support when the thrust on the shaft is in one direction, a helical spring, a sleeve on the shaft, a screw nut on the sleeve bearing against the helical spring, a second projection on the shaft, adapted to engage the sleeve and compress the spring against a fixed support when the thrust is in the other direction, an arm on the sleeve adapted to operate an electric switch, and means for driving the shaft.

In testimony that I claim the foregoing as my invention, I have signed my name this thirteenth day of January, 1920.

HORATIO HALIBURTON BENTLEY.