

(No Model.)

2 Sheets—Sheet 1.

G. MÜLLER.  
AUTOMATIC WATER TIGHT DOOR.

No. 459,533.

Patented Sept. 15, 1891.

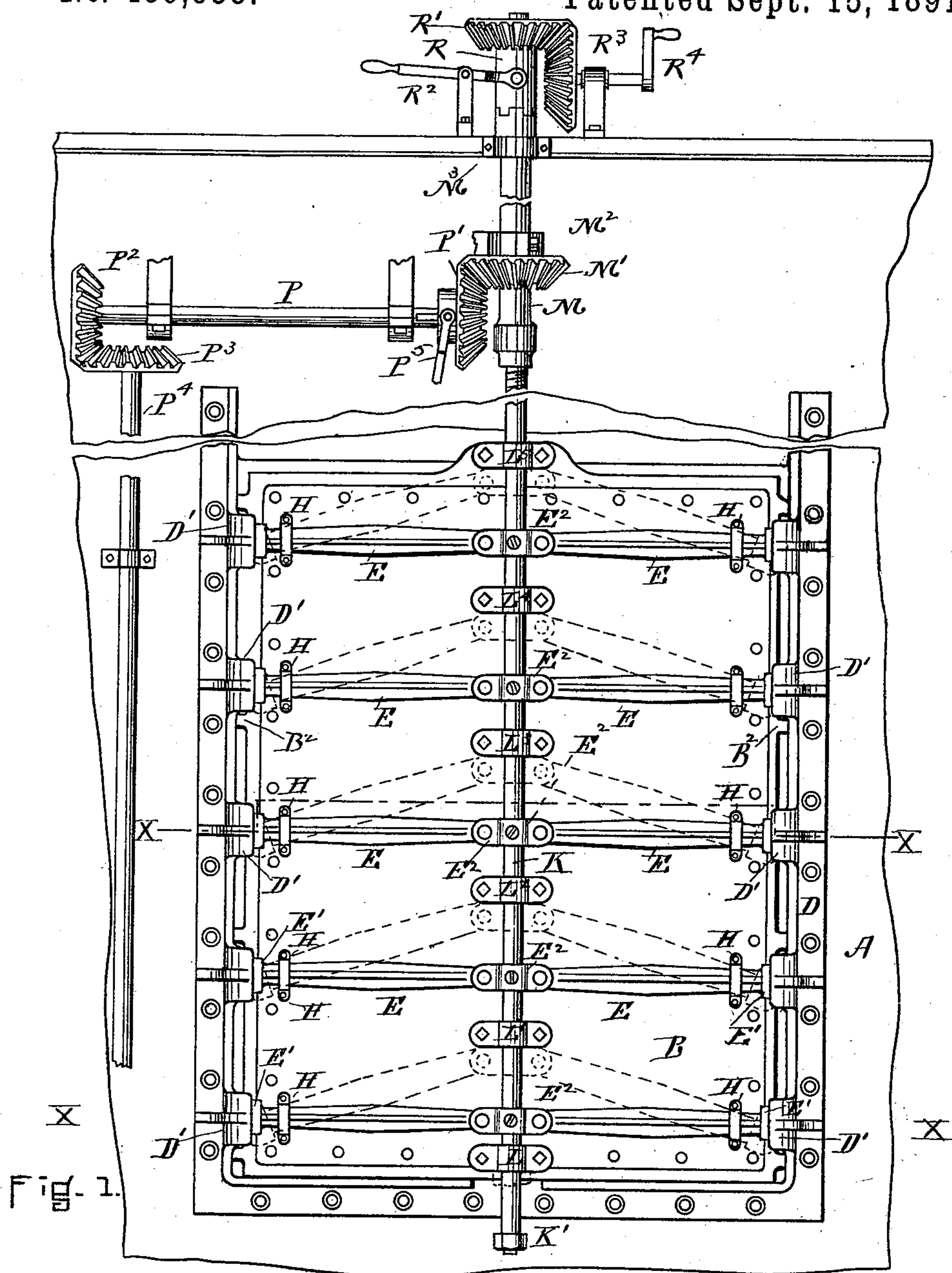


FIG. 1.

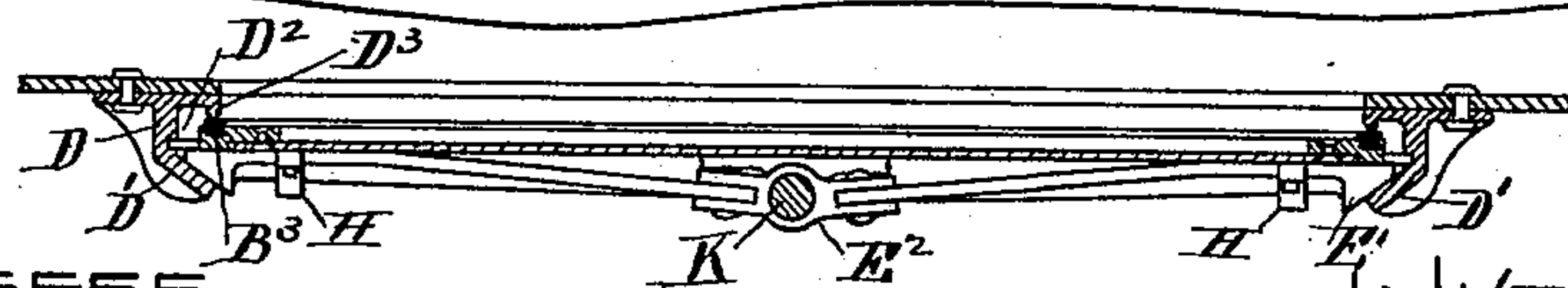


FIG. 2.

WITNESSES.

Frank G. Parker  
Edward S. Day

INVENTOR.

George Müller

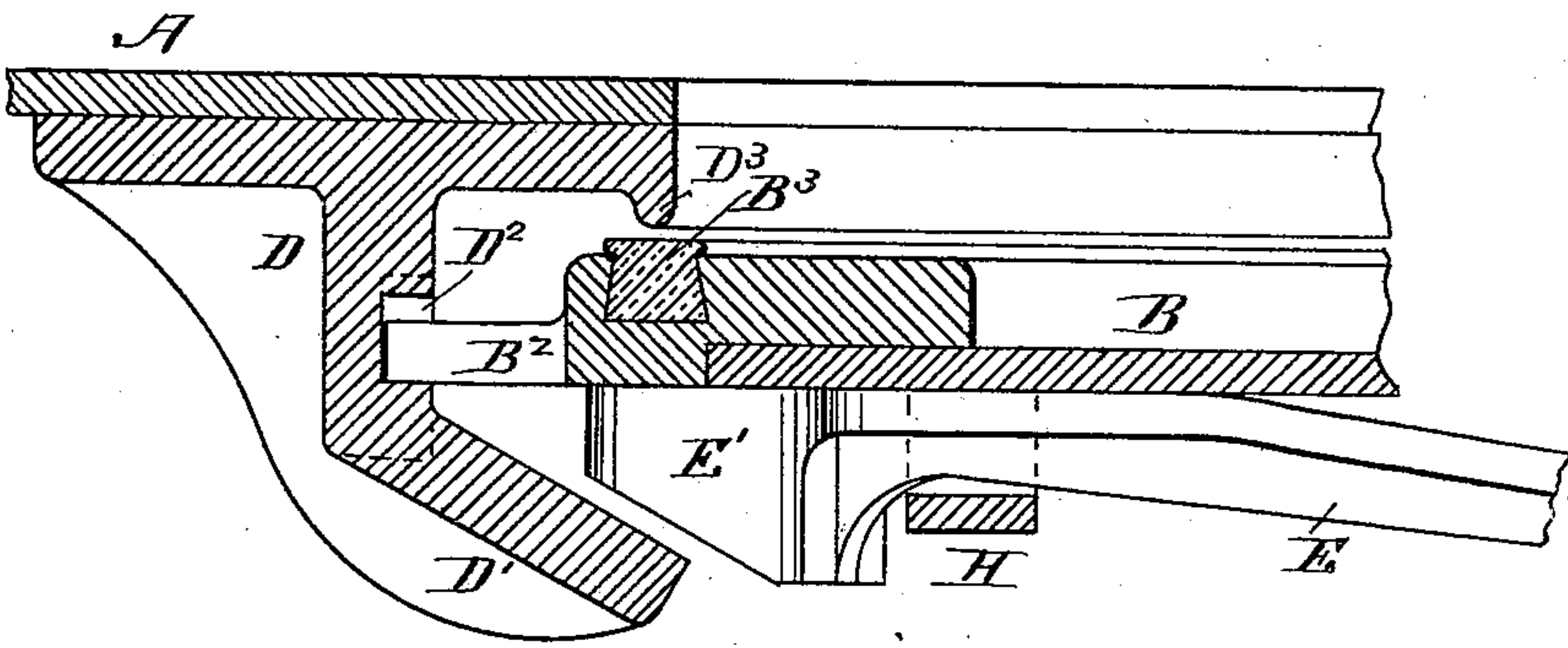
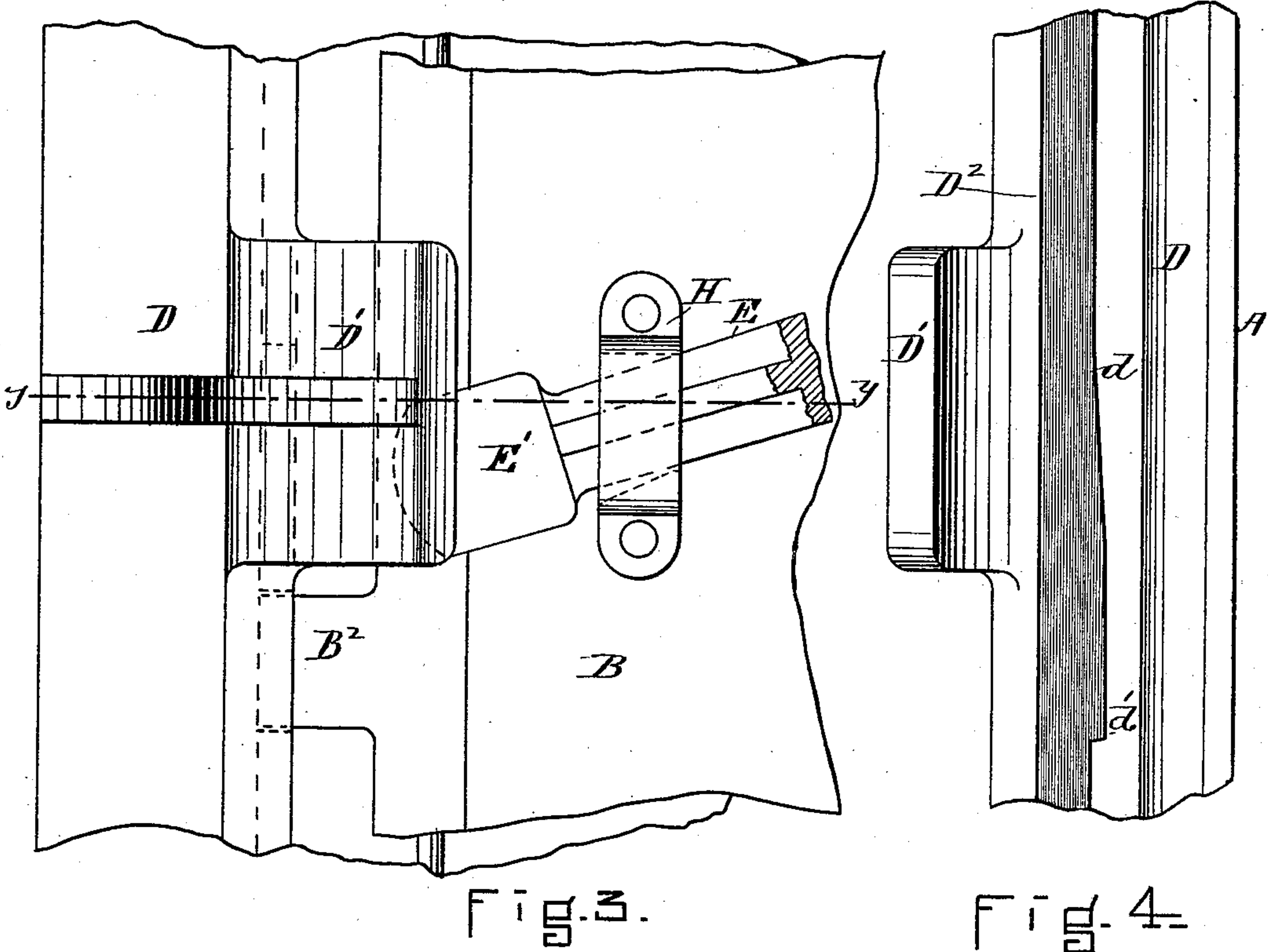
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Edward S. Day

Fig. 5.

INVENTOR.

George Miller



# UNITED STATES PATENT OFFICE.

GEORGE MÜLLER, OF BOSTON, MASSACHUSETTS.

## AUTOMATIC WATER-TIGHT DOOR.

SPECIFICATION forming part of Letters Patent No. 459,533, dated September 15, 1891.

Application filed June 25, 1890. Serial No. 356,647. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE MÜLLER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Automatic Water-Tight Doors, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is to so construct a door and its connected parts that the device for closing and opening it shall also serve as a clamping device, thus making the door practically air and water tight when closed, and yet sliding freely and without wearing friction in opening and closing, it being particularly adapted for marine uses, although it can be applied to other purposes. This door is intended to be used in the partitions between compartments in ships, also for use in divisions of caissons, mines, and, in fact, in any place at which it is desirable to have an air and water tight door.

The construction and operation of my device is illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation showing a door and its operating parts, also showing a part of the partition to which the door is applied. Fig. 2 is a horizontal section taken on line  $x$  of Fig. 1. Fig. 3 is a view in elevation showing a part of the door and particularly the clamping device. Fig. 4 shows in elevation a part of one of the guides or door-jamb. Fig. 5 is a horizontal section taken on line  $y$  of Fig. 3.

In the drawings, A represents the partition to which my door B is applied. This door slides in grooves  $D^2$ , made in the guide-pieces D, a part of one of the grooves  $D^2$  being shown in elevation in Fig. 4 and in horizontal section in Figs. 2 and 5. The groove  $D^2$  is so located and formed in relation to the lugs  $B^2$  on the door and the stop-beads  $D^3$ , Figs. 2 and 5, on the door-jamb that when the door is not closed and not clamped it does not touch the stop-bead  $D^3$ —that is, the rubber gasket  $B^3$  is not in contact with any part of the door-jamb, and is consequently not injured by the abrasive action of the stop-bead, as it would be if allowed to slide on the stop-bead  $D^3$ . The arrangement by which I prevent the gasket  $B^3$  from sliding on the stop-bead  $D^3$  and still

have it possible to clamp the door air and water tight after it has been closed is as follows: The groove  $D^2$  (see Fig. 4) is widened, as indicated at  $d d'$ , on the jamb D, so that the projections  $B^2$  on the door B are allowed to be forced inward when opposite the lugs  $D'$ —that is, when the door is closed or shut down all of the projections  $B^2$  are opposite the widened places  $d d'$  of the grooves  $D^2$ , so that the clamps, which will be described below, may act.

To raise the door and to operate the clamps I have the following device: An iron rod K passes freely through cleats  $L L' L^2 L^3 L^4 L^5$ , made fast to the door B by bolts or otherwise. (See Fig. 1.) The upper end of the rod K has a screw-thread made on it, which engages with a hollow screw in the revolving quill M, and as the quill M is held longitudinally by the housings  $M^2$  and  $M^3$  it is evident that as the quill M is made to rotate by the beveled gear  $M'$  it will cause the rod K, which cannot rotate, to move up or down, as the case may be. A series of toggle-pieces  $E^2$  are attached to the rod K and move up and down with it. To each of the toggle-pieces  $E^2$ , I attach two clamping-levers E E, the outer ends of which pass through guide-brackets H H and terminate in wedge-shaped ends  $E'$ , adapted to engage with the lugs  $D'$  on the door-jamb and act as clamps to force the door-gaskets  $B^3$  firmly against the beads  $D^3$ , and thus make a tight joint. The action of the rod K is as follows: If we suppose the door closed, as shown in Fig. 1, then the action of opening it will be as follows: The quill M is rotated in the direction required for raising the rod K, and as the rod K rises it will, acting through the toggle-pieces  $E^2 E^2$ , lift the clamping-levers E E into the position indicated by dotted lines in Fig. 1 and at the same time withdraw their wedge-shaped ends  $E' E'$  from the lugs  $D'$ , thus freeing the door-gasket  $B^3$  from contact with the bead  $D^3$ . Now a continued upward movement of the rod K will cause the nut  $K'$  at its lower end to come in contact with the cleat L on the lower end of the door, and will also cause the several toggle-pieces  $E^2 E^2$  to come in contact with the cleats  $L' L^2 L^3 L^4 L^5$ , and thus bring a lifting strain onto the door and raise it to the desired height. From the above it may be seen that the door



in rising and lowering does not move with the gaskets  $B^3$  in rubbing contact with the beads  $D^3$ . Thus all wear and consequent deterioration of the gaskets is avoided, and the door, even after long usage, will close air and water tight.

In the drawings I have shown two mechanisms for operating the screw-quill  $M$ . One consists of the beveled gear  $P'$ , which engages with the gear  $M'$  and is connected to the shaft  $P$  in such a manner that it can be moved longitudinally on the same by means of the hand-lever  $P^5$ , when it is desired to throw it out of gear. The shaft  $P$  is turned by the shaft  $P^4$ , acting through the gears  $P^3 P^2$ . By this mechanism the door may be operated from below.

To work the door from above I have the following means:  $R$  is a quill-clutch, mounted on the upper end of the rod  $K$  and having on it a gear  $R'$ , which is operated by the crank  $R^4$ , acting through the gear  $R^3$ . To throw the quill-clutch  $R$  out of action I use the hand-lever  $R^2$ .

I claim—

1. In an automatic water-tight door device, the combination of a door having projections  $B^2$   $B^2$  extending from its edges into corresponding grooves made in the door-jambs, said grooves being widened inwardly at intervals to form enlarged sections  $d$   $d'$  and adapted to act in connection with the said

projections to draw the door toward the slip-beads of the door-jamb, as described, with the door-jambs, and having mechanism by which the door is operated, substantially as and for the purposes set forth.

2. In an automatic water-tight door device, the combination of a door having guide projections  $B^2$  and cleats  $L' L^5$ , rod  $K$ , and toggle-levers having wedge-shaped ends adapted to operate in connection with the lugs  $D'$  so as to press the door-gaskets  $B^3$  against the beads  $D$ , as described, with the door-jambs, lugs, and grooves, substantially as and for the purposes set forth.

3. In an automatic water-tight door device, the combination of a sliding door having cleats  $L' L^5$ , adapted to receive the rod  $K$ , and the toggle-pieces  $E^2$ , attached to the said rod  $K$ , with the screw-quill  $M$ , adapted to engage with the screw-thread on the upper end of the rod  $K$ , and the gears  $M' P'$ , all operating together substantially as and for the purposes set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 24th day of June, A. D. 1890.

GEORGE MÜLLER.

Witnesses:

FRANK G. PARKER,  
EDWARD S. DAY.