L. B. SMYSER.

TRANSOM OPERATING MEANS.

APPLICATION FILED MAY 10, 1913.

1,066,859.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

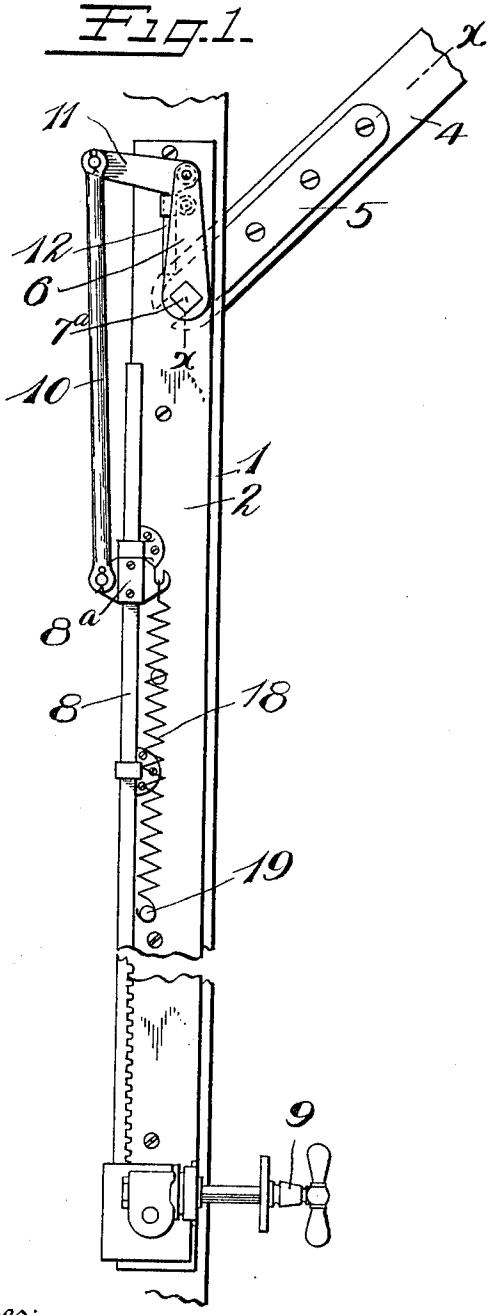
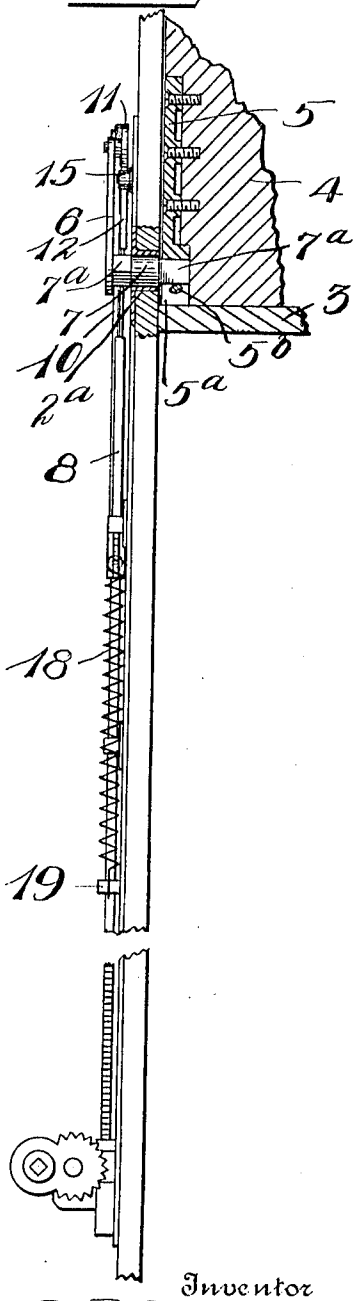


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

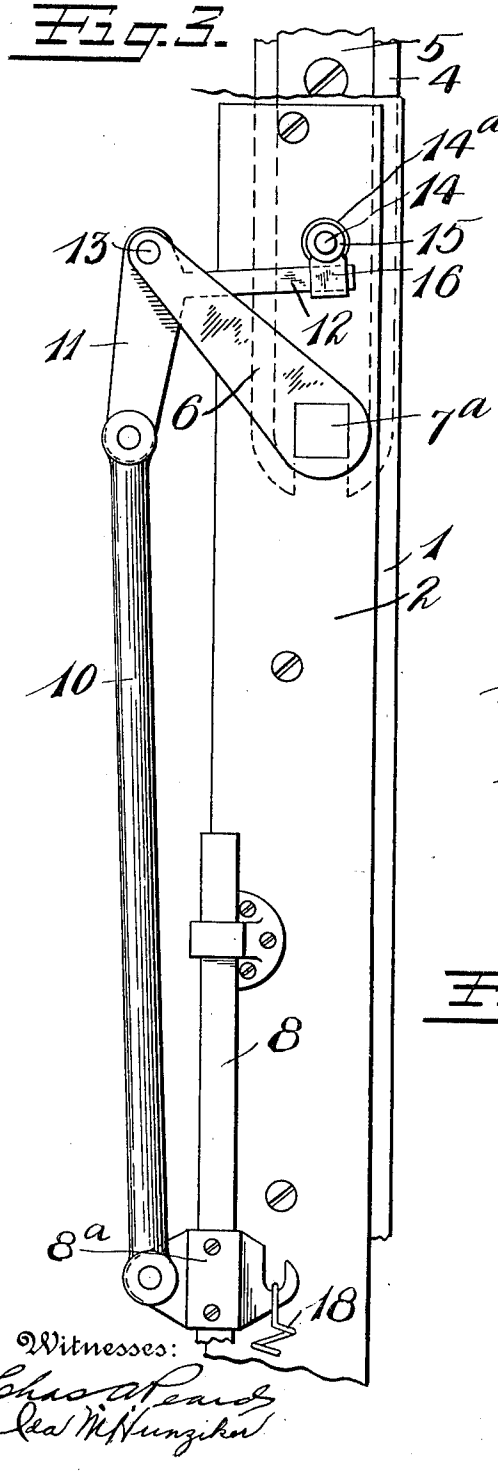


Fig. 4.

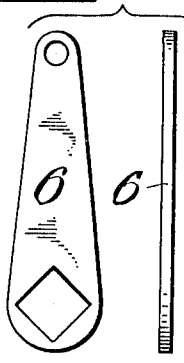


Fig. 5.

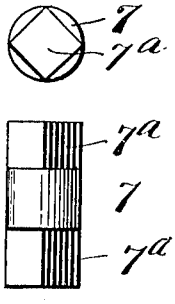


Fig. 6.

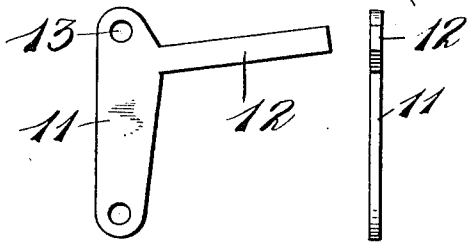


Fig. 7.

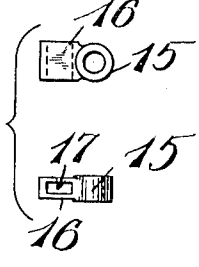
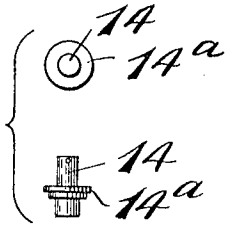


Fig. 8.



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TRANSOM-OPERATING MEANS.

1,066,859. Specification of Letters Patent. Patented July 8, 1913.

Application filed May 10, 1913. Serial No. 766,699.

To all whom it may concern:

Be it known that I, LOUIS B. SMYSER, a citizen of the United States, residing at New Britain, Hartford county, State of Connecticut, have invented certain new and useful Improvements in Transom-Operating Means, of which the following is a full, clear, and exact description.

This invention relates to operating means for transoms and other swinging closures, and is designed primarily to provide a simple and effective form of operating means wherein the operating leverage is so compounded as to secure the greatest power at the time of greatest load.

A preferable embodiment of this invention is illustrated in the accompanying drawings forming part of the following detailed specification and showing my improved form of operating means applied to a transom controller of the concealed type wherein the parts are hidden within the door casing, the operating handle alone being exposed at the face of the door casing and in a convenient position for manual operation.

The parts are shown, and preferably are constructed, to provide an assembled unitary structure so that the parts thereof may be properly assembled at the factory and later applied by the user without need for further adjustment.

In the drawings, Figure 1 is a view in elevation and on a reduced scale of the present invention as applied to transom operating means of the concealed type, the transom being shown in the open position and at the point of greatest load on the operating parts. Fig. 2 is a front edge view of the parts shown in Fig. 1, the transom itself being shown in section on the plane of the line x—x, Fig. 1. Fig. 3 is a fragmentary view in side elevation and on an enlarged scale of the parts shown in Fig. 1, but with the transom in closed position. Figs. 4 to 8 inclusive are views of details of construction.

Referring to the drawings by numerals: 1 indicates one side of a door casing or frame, and 2 a plate constituting the main frame or unit mounting for the various parts of the operating mechanism. This plate or frame is arranged to be secured to the inside of the door casing by suitable screws or other appropriate means.

3 designates a lintel bar, and 4 a transom located above said bar. This transom may be of usual construction and is provided with suitable hinging means in the form of a pivot bearing which passes through the side 1 of the door frame and which carries at its upper end the usual crank arm. This connection is preferably effected by means of a pivot stud having an intermediate portion 7 journaling in a bearing support or bushing 2^a which may be formed by offsetting the frame plate 2. The end extremities 7^a of this stud are preferably squared or made angular in order to be rigidly connected to the transom and to the crank arm. The transom preferably has its edge recessed to receive a keeper plate 5 having at its lower end a socket 5^a shaped to receive the squared end 7^a of the stud 7.

In order to provide for the ready removal of the transom from the stud, a keeper pin 5^b may be used. The outer end 7^a of the stud carries one end of a crank arm 6 which is suitably apertured to fit over and be rigidly connected with said squared end. The means for operating this crank and thereby swinging the transom on its pivot comprises a reciprocating bar 8 which is vertically movable through the medium of an operating handle 9 and suitable gearing controlled thereby. The lower end of this bar 8 may be toothed to coöperate with this gearing. For a detailed description of a suitable gear connection between the bar 8 and the operating handle 9, reference may be had to my copending application Serial No. 753,953, filed March 13th, 1913.

The operating bar 8 is provided with an offset 8^a to which the lower end of a link 10 is pivoted. Suitably secured to the frame plate 1 at a point adjacent to but on a different center from the crank pivot stud 7 is a second pivot stud 14 preferably provided with a bearing flange 14^a arranged to rest against the face of the plate 2. On this stud 14 is swiveled a guide 15, said guide having an offset portion 16 provided with a channel 17 therethrough. The walls of this channel may be provided with grease pockets or with other suitable friction reducing expedients well known in the art. This pivot stud 14 is positioned relatively to the crank 6 to lie within its arc of movement. An angular lever is provided to connect the link 10 and crank 6 and is arranged to have

a sliding engagement with the swiveled guide 15. This lever comprises the arms 11 and 12, the lower end of arm 11 being pivotally secured to the upper end of link 10, and the free end of arm 12 guiding within the channel 17 of the swiveled guide member 15, the lever being pivotally connected intermediate its ends to the crank 6 at a point adjacent its end as at 13, and removed from the pivot point of the crank a greater distance, relatively, than the point of its pivot stud 14.

It is immaterial where the transom is pivoted, *i. e.*, whether it is pivotally mounted at its lower or upper edge or at an intermediate point. In the drawings I have shown the pivot point near the lower edge of the transom, which is the preferable location, it being understood, of course, that the opposite end of the transom (not shown) is provided with an appropriate concentric pivotal support whereby the transom will be supported at each end. In describing the transom, therefore, as being so pivoted, it will be understood that I am merely showing one arrangement for the purposes of description, and that the operating means for the transom will be relatively arranged to provide the leverage hereinbefore described. Also, I should state that while I have shown the transom connected directly to the axis of the crank 6, it may be connected indirectly to a sliding connection, such as shown in my copending application hereinbefore referred to, or as shown in Patent No. 802,863 to G. C. Weil, of October 17th, 1905. I consider these various means of connecting crank 6 to the transom as equivalent, the present improvement residing in the system of compound leverage by which the crank may be turned to move the transom from opened to closed position, and vice versa.

In operation it will be seen that the greatest leverage against the transom through its crank arm 6 is secured at the time of the greatest transom load on this crank arm, in the present instance when the transom is open (see Fig. 1). In this position, the length of the actuating lever from its pivot point 14 to its point of connection 13 with the crank 6 (the resistance arm) is least, and that as the operating means pulls on the actuating lever through link 10, the length of said lever from its pivotal point or fulcrum to its point of crank connection increases with the decrease of closure load as when the transom is moved from the position shown in Fig. 1 to that shown in Fig. 3, this increase in the length of the lever between these points (*i. e.*, the resistance arm) providing a decrease in the effective leverage of said lever against said crank, the least leverage being secured at the period of least load or when the transom is in closed position as in the present case, and the greatest leverage being secured at the time of greatest load, as when the transom shown herein is in open position, (see Fig. 1.) In this connection, I should state that I prefer to employ a compensating spring 18, one end being hooked to the offset 8^a and the other being secured to a suitable anchor 19 on the plate or frame 2, this spring assisting to maintain the transom closed and also assisting the operator proportionately with the load.

The pivoting of the sliding actuating lever at a point adjacent to and eccentric or different from that of the crank pivot, provides a relative movement between the lever and crank, and the connection of the lever to the crank at a point removed from its crank a greater distance relatively than the pivot point of said lever, together with the sliding connection of said lever with its pivot, enables me to compound the leverage so as to secure the maximum leverage at the time of greatest load on the crank arm. It will be evident that in order to be effective the connection of the operating means to the lever, in the present case, should be at a point removed from the pivot stud of the lever and from the point of connection of said lever with said crank.

In the foregoing, I have described a specific and preferred embodiment of the invention. It will be evident also that the terms employed are only terms of description, and are only terms of limitation in so far as the invention is limited by the prior art. Also, I desire it understood that while a specific structure has been shown and described, various modifications in structure and in the relative arrangement of parts, is possible within the spirit of the invention and the scope of the appended claims.

What I claim, therefore, and desire to secure by Letters Patent is:

1. Operating means for swinging closures comprising a crank arranged for connection to and operation of a swinging closure, a lever pivoted on a center adjacent to and different from that of said crank and operatively connected to said crank at a point removed from its pivot point, operating means for swinging said lever connected thereto at a point outside of its pivotal center, and means whereby the length of said lever from its pivotal point to its point of crank connection varies with the closure operating movement of said lever.

2. Operating means for vertically swinging closures comprising a crank arranged for connection to and operation of a swinging closure, a lever pivoted on a center adjacent to and different from that of said crank and operatively connected to said crank at a point removed from its pivot point, operating means for swinging said

lever connected thereto at a point outside of its pivotal center, and means whereby the length of said lever from its pivotal point to its point of crank connection increases with the decrease of closure load on said crank.

3. Operating means for swinging closures comprising a crank arranged for connection to and operation of a swinging closure, a lever pivoted on a center adjacent to and different from that of said crank and operatively connected to said crank at a point removed from its pivot point a greater distance relatively than the pivot point of said lever, operating means for swinging said lever connected thereto at a point outside of its pivotal center and outside of the point of crank connection, and means whereby the length of said lever from its pivotal point to its point of crank connection varies with the closure operating movement of said lever.

4. Operating means for vertically swinging closures comprising a crank arranged for connection to and operation of a swinging closure, a lever pivoted on a center adjacent to and different from that of said crank and operatively connected to said crank at a point removed from its pivot point a greater distance relatively than the pivot point of said lever, operating means for swinging said lever connected thereto at a point outside of its pivotal center and outside of the point of crank connection, and means whereby the length of said lever from its pivotal point to its point of crank connection increases with the decrease of closure load on said crank.

5. Operating means for swinging closures comprising a crank arranged for connection to and operation of a swinging closure, a lever pivoted on a center adjacent to and different from that of said crank and pivotally connected to said crank at a point removed from its pivot point a greater distance relatively than the pivot point of said lever, said lever having a sliding connection with its pivot whereby the length of said lever from its pivot to its point of crank connection varies with the movement of said lever, and operating means for swinging said lever connected thereto at a point removed from its pivot and from its point of crank connection.

6. Operating means for vertically swinging closures comprising a crank arranged for connection to and operation of a swinging closure, a lever pivoted on a center adjacent to and different from that of said crank and pivotally connected to said crank at a point removed from its pivot point a greater distance relatively than the pivot point of said lever, said lever having a sliding connection with its pivot whereby the length of said lever from its pivot to its point of crank connection progressively increases with the decrease of closure load on said crank, and operating means for swinging said lever connected thereto at a point removed from its pivot and from its point of crank connection.

7. Operating means for swinging closures comprising a crank arranged for connection to and operation of a swinging closure, a pivot stud positioned adjacent to and on a different center from that of said crank, a guide swiveled on said stud provided with a channel, a lever sliding in said channel and pivoting on said stud, said lever being pivotally connected to said crank at a point removed from said crank pivot a greater distance relatively than said pivot stud, and operating means for swinging said lever connected thereto at a point removed from its pivot stud and from its point of crank connection.

8. Operating means for swinging closures comprising a crank arranged for connection to and operation of a swinging closure, a lever pivoted on a center adjacent to and different from that of said crank and operatively connected to said crank at a point removed from its pivot point, operating means for swinging said lever connected thereto at a point outside of its pivotal center, means whereby the length of said lever from its pivotal point to its point of crank connection varies with the closure operating movement with said lever, and a compensating spring connected to said operating means and arranged to assist the same proportionately with the load thereon.

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