

Dec. 4, 1934.

C. E. HATHORN

1,983,368

SEALING MEANS FOR CONTROL RODS

Filed April 17, 1933

FIG. 1.

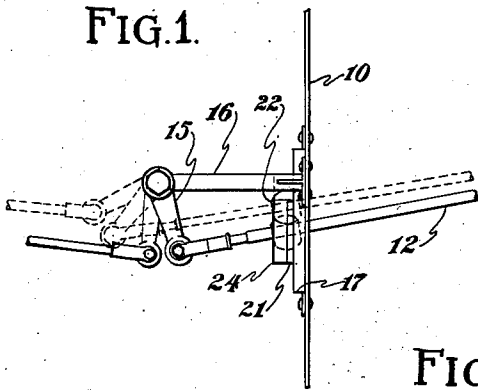


FIG. 2.

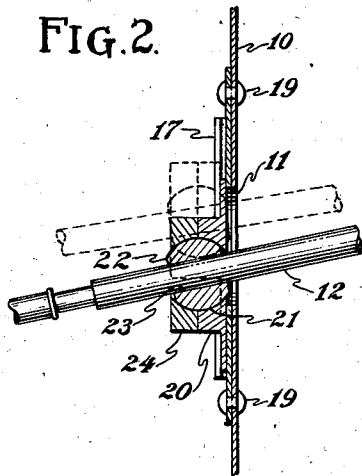


FIG. 4.

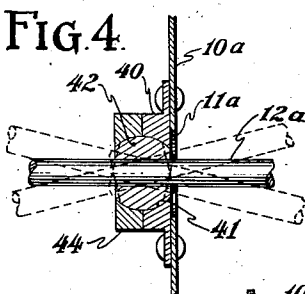


FIG. 5.

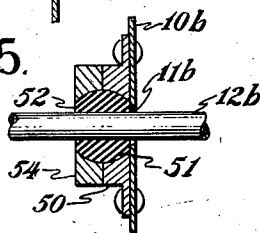


FIG. 3.

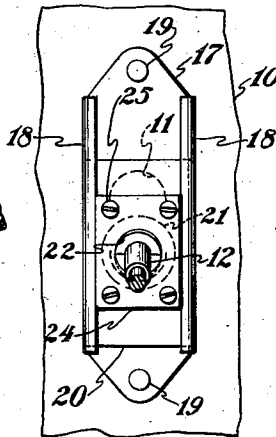


FIG. 7.

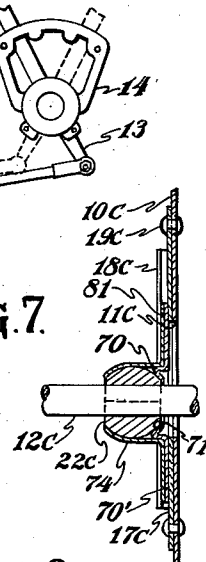


FIG. 8.

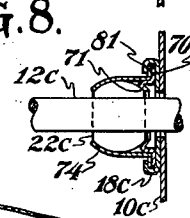
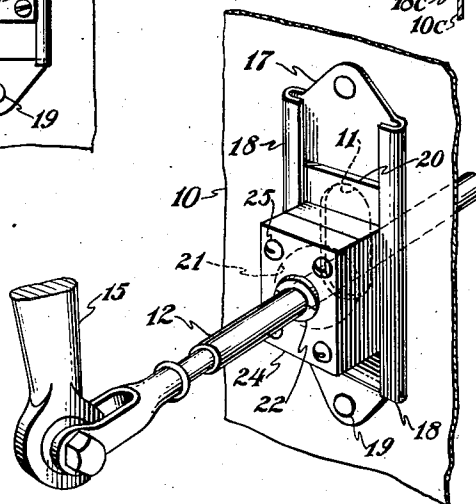


FIG. 6.



INVENTOR.

CHARLES E. HATHORN.

BY

W. E. H. J.
ATTORNEYS.

UNITED STATES PATENT OFFICE

1,983,368

SEALING MEANS FOR CONTROL RODS

Charles E. Hathorn, Hempstead, N. Y., assignor to
Curtiss Aeroplane & Motor Company, Inc., a
corporation of New York

Application April 17, 1933, Serial No. 666,484

2 Claims. (Cl. 286—15)

This invention relates to means for effecting fire-tight closures for wall openings, particularly for such openings through which movable members are adapted to pass.

5 More specifically, the invention relates to improvements in aircraft having an engine compartment and a control compartment separated by a fire wall. In such aircraft, it is usual to form openings in the fire wall through which a variety of tubes and engine control members may pass. For instance, the carburetor and magneto control rods pass from small cranks pivoted to the engine to pivoted control levers in the control compartment. The connecting control rods, therefore, have a combination of translational, angular and lateral motion, necessitating an elongated opening through the fire wall, so that the motion of the control rod may not be interfered with. Hence, extra space in the opening, defeats in some degree the purpose of the fire wall. Should an engine fire break out, it is possible, and has been known to occur, for tongues of flame to pass from the engine compartment, through said enlarged openings, to start a fire within the control compartment. Stationary tubes, such as fuel feed lines, oil lines and the like, also pass through the fire wall, and it has been customary to provide the fire wall opening of sufficient size so that such tubes will not rub against the edges of the fire wall opening to cause wear thereon.

It is an object of this invention, therefore, to provide relatively fire-proof means associated with a fire wall to prevent passage of fire there-through, and at the same time to permit limited translatory, angular and/or lateral movement of a member relative to the fire wall.

A further object is to provide a closure for a fire wall opening, said closure being adapted to receive a control member passing through said wall opening.

Another object is to provide a fire wall closure having elements identical in nature, which may be used in conjunction with several somewhat similar control members which pass through the fire wall.

A further object is to provide a ball socket slidable with respect to a fire wall, and a pierced ball rotatable in the socket and closely surrounding a member passing through the ball and the wall.

Another object is to provide means for supporting a member passing through a fire wall opening in such manner that movement of the member may be unrestricted, but that such move-

ment will not allow the passage of fire through the opening, nor allow undue rubbing of the member against the edge of the fire wall opening.

Still another object is to provide bearing means surrounding a movable control member, said means being adapted to form a fire-tight closure for the fire wall opening.

Further objects will be apparent from a reading of the subjoined specification and claims, and from a consideration of the accompanying drawing, wherein like reference characters denote like or corresponding parts, and in which:

Fig. 1 is a side elevation of a fire wall and a movable control member passing therethrough, including the closure means of this invention, and showing the relative positions of the movable control member with respect to the fire wall;

Fig. 2 is an enlarged detail section of a portion of Fig. 1;

Fig. 3 is a front elevation of a portion of Fig. 1;

Figs. 4 and 5 are enlarged detail sections of alternative embodiments of the invention;

Fig. 6 is a perspective view of the invention according to Fig. 1; and

Figs. 7 and 8 are, respectively, side and plan sections of an alternative embodiment of the invention.

Referring more particularly to Figs. 1, 2, 3 and 6, all of which show the same embodiment of the invention, a fire wall 10, preferably of relatively thin gauge sheet metal, has formed therein an elongated opening 11, through which a control member 12 passes. The control member 12, as shown, connects a control lever 13 mounted for pivoting on a quadrant 14 in the control compartment of an aircraft, with a bell crank 15 pivoted to a bracket 16 fixed to the fire wall 10 or to other suitable structural members. It will be seen that when the control lever 13 is moved to a forward position, the control lever will be lowered to a position such as that shown in solid lines in Figs. 1 and 2, while, when the control lever is moved to a rearward position, the control member 12 will necessarily be raised to a position such as that shown by dotted lines in Figs. 1 and 2. This up and down movement of the control member 12 makes necessary the oval conformation of the opening 11, and it will be readily appreciated that said control member occupies a relatively small portion of said opening when in any single position of adjustment, leaving a considerable area of opening through which fire might pass. To provide a closure for the unused parts of the opening, a guide 17 provided at its

edges with tracks 18 arranged parallel to the major axis of the opening 11, is attached as by rivets 19 to the fire wall. Said guide 17 is provided with an opening of substantially equal shape and form to the opening 11. A member 20, having a length substantially in excess of the length of the opening 11, is held by the tracks 18 for vertical sliding movement, said member being provided with a spherical socket 21, the rearward portion of which is adapted to register with the opening 11. The control member 12 is adapted to pass through this spherical socket 21, and a ball 22, having a cylindrical bore 23, within which the control member 12 may snugly slide, is seated in the socket 21. A cover socket 24 is adapted to hold the ball within the socket 21 and may be attached thereto as by screws 25. In the preferred construction, the ball 22 is made in halves, so that, by removal of the screws 25 and of the cover socket 24, the halves of the ball 22 may be withdrawn and removed from the control member. Preferably, these balls are made of a composition such as bakelite, to eliminate the possibility of their binding on the control member 12.

Certain control rods may only require angular movement with respect to the fire wall, so that a construction such as that shown in Fig. 4 may be more desirable. The elements in this embodiment are substantially the same as those described above, except that the guide 17 and those portions of the member 20 which engage therein are eliminated. The fire wall opening 11a in this case may be circular, and a member 40, having a socket 41 may be firmly attached thereto. A ball 42 seats within the socket 41 and surrounds the control member 12a. A cover socket 44 may be attached to the member 40 to retain the ball 42 in position. In this embodiment, then, the member 12a may slide and be moved in angular attitude with respect to the wall 10a.

Fig. 5 is substantially the same as Fig. 4, except that in this embodiment, the member 12b is adapted only for translation along its axis with respect to the fire wall 10b. The opening 11b in this case may be rather small, but the member 50, the cover socket 54 and the ball 52 are arranged in substantially the same manner as in Fig. 4.

The construction shown in Figs. 4 and 5 is well adapted for sealing tubes and pipe lines passing through the fire wall, where no movement of the pipe is expected. The ball may be of rubber, and by its mounting in the socket, adequate bearing is provided therefor, both interiorly and exteriorly, to give the rubber greater longevity. In prior constructions, rubber grommets have been adapted to bear against the edge of a thin metal fire wall, and the thin edge cuts the rubber quickly.

Figs. 7 and 8 show an alternate construction of the first embodiment of the invention, wherein the control member 12c is adapted for longitudinal, lateral and angular movement with re-

spect to the fire wall 10c. The guide 17c is attached as by rivets 19c over the elongated fire wall opening 11c. A member 70 is fabricated as a sheet metal stamping having edges 70' engaging within and held by the tracks 18c formed on the guide 17c. A ball socket 71 is formed in the central portion of the member 70 to receive a bored split ball 22c. A cover socket 74, formed as a sheet metal stamping, is adapted to engage the ball 22c and is provided with edges 81 which lie adjacent the edges 70' of the member 70, and are held within the tracks 18c of the guide 17c. By this construction, simple pressed metal parts may be used which provide the distinct advantage of light weight with simplicity of attachment and elimination of screws and like fastening devices. The operation of the embodiment of Figs. 7 and 8 is identical with that described previously. It will be obvious to those skilled in the art that changes may be made in the structure shown to provide for movement of the control rod 12 in different directions to those in which the embodiments shown are limited, as, for instance, by providing wide tracks 18 to permit the member 20 to not only slide in a vertical direction but in a limited horizontal direction as well, or in any combination of the two directions. It is also apparent that variations may be made in the construction of the guide 17 and in the ball sockets 20 and 24 to meet special conditions.

While I have described my invention in detail in its present preferred embodiment, it will be obvious to those skilled in the art, after understanding my invention, that various changes and modifications may be made therein without departing from the spirit or scope thereof. I aim in the appended claims to cover all such modifications and changes.

What is claimed is:

1. In a wall having an opening and a rod passing therethrough for angular and translatory movement; a pair of parallel guides each having a portion substantially normal to said wall and an intumed flange substantially parallel to said wall, said guides lying on opposite sides of said opening; an inner ball socket having edges adapted to slide in said guides, an outer ball socket adapted to be held in fixed relation to said inner socket by the engagement of edges of said outer socket in said guides, and a ball rotatably held within said sockets, said ball having a bore within which said rod may freely slide, said ball and sockets together forming a fire-tight closure for said opening, regardless of the angular or translatory position of said rod with respect to said wall.

2. In a closure for a rod passing through a wall, a guide member attached to said wall, a pair of ball socket halves each having edges slidably engageable with said guide member, and a pierced ball seating within said socket, said rod being embraced by said ball.

CHARLES E. HATHORN.