

March 26, 1963

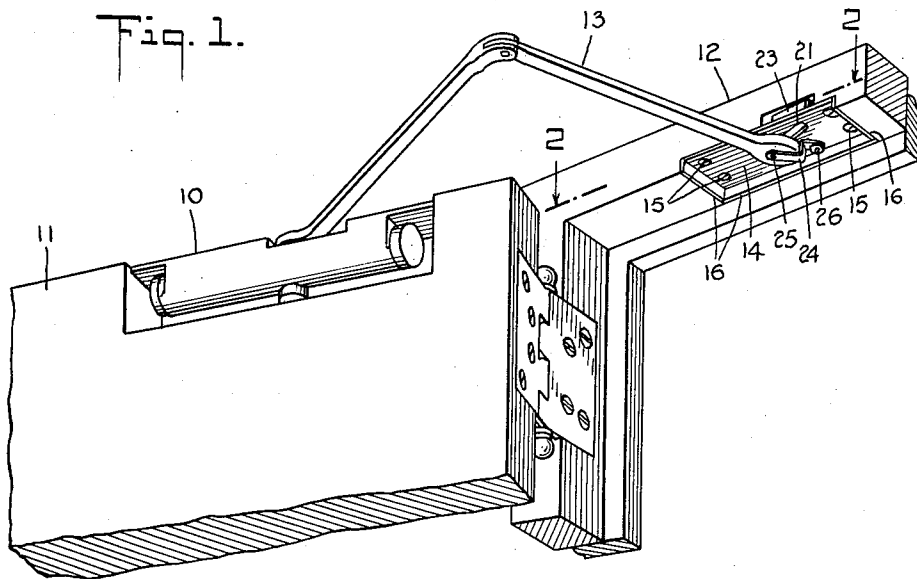
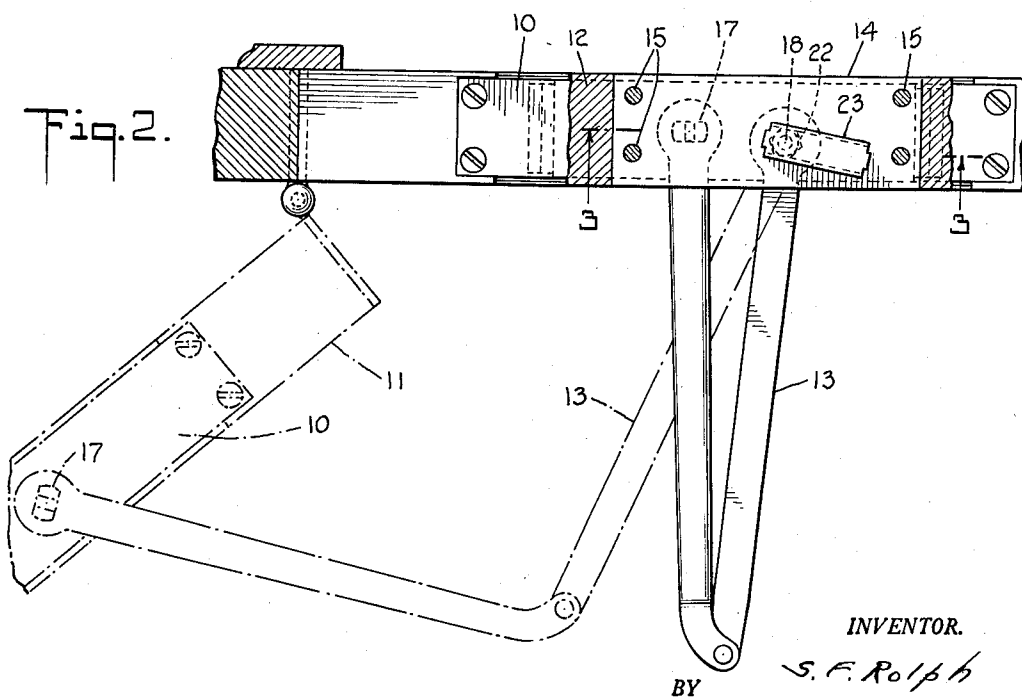
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3,082,471

DOOR CLOSER ADJUSTMENT

Filed Dec. 6, 1955

3 Sheets-Sheet 1



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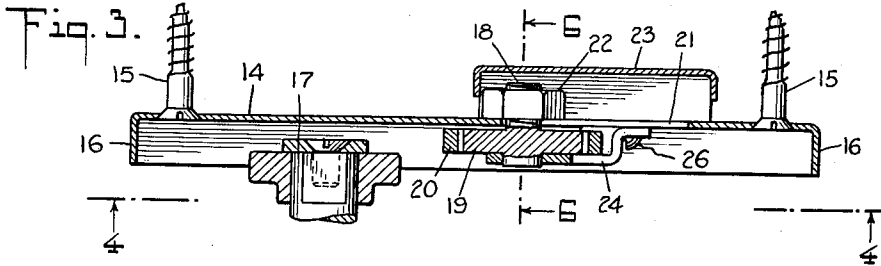
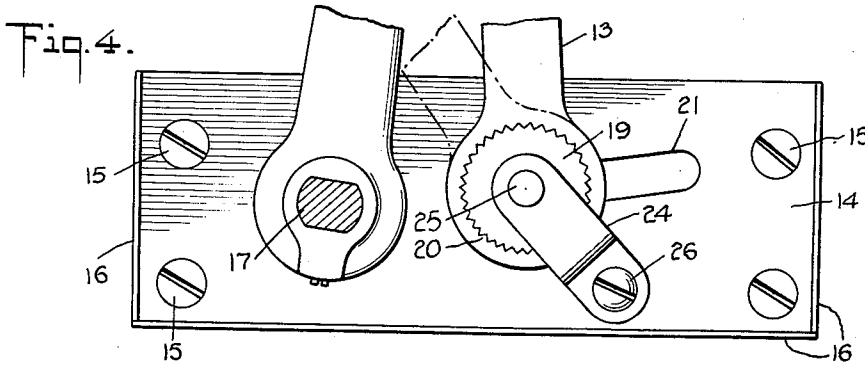
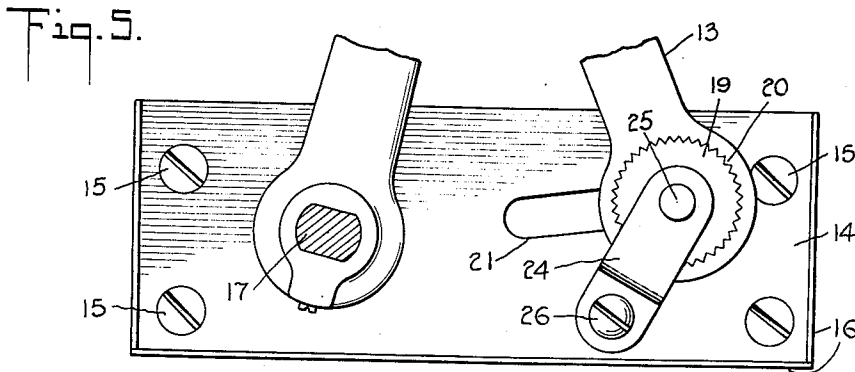
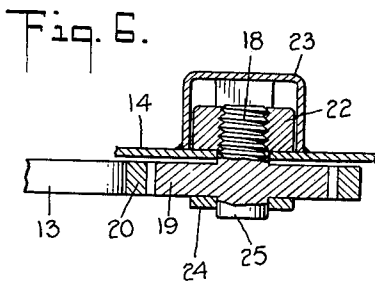
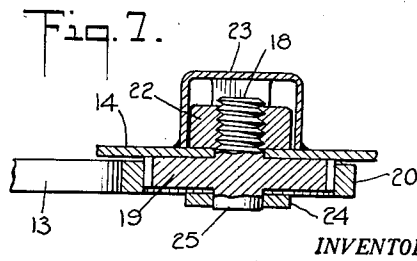
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3 Sheets-Sheet 2



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Fig. 8.

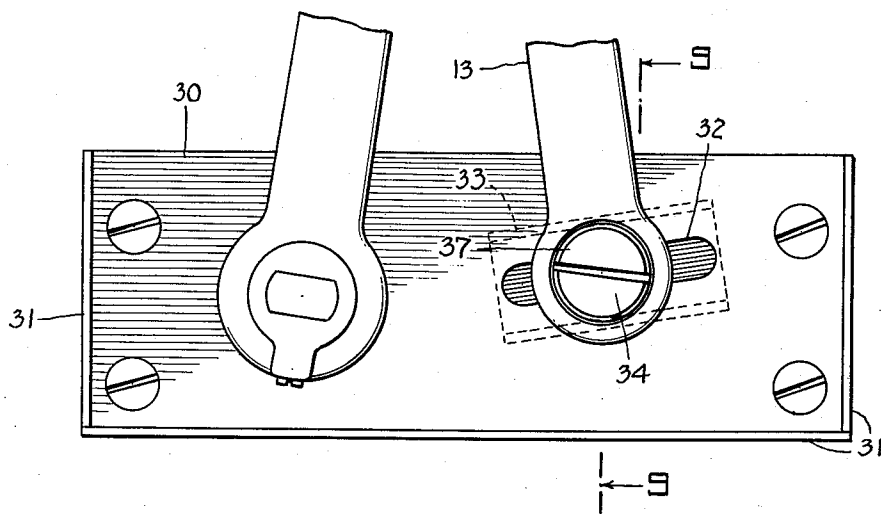
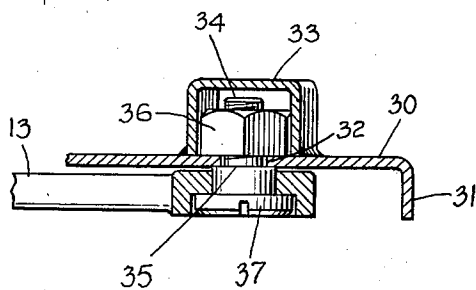


Fig. 9.



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## DOOR CLOSER ADJUSTMENT

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Filed Dec. 6, 1955, Ser. No. 551,469

4 Claims. (Cl. 16-49)

This application is a continuation-in-part of my earlier application, Serial No. 503,051, filed April 22, 1955, now abandoned.

My invention relates to the adjustment of the pivot through which an arm of a door closer is pivoted to the door frame. Those skilled in the art will appreciate that adjustments of this type are utilized to effect an adjustment in the action of the door closer. By adjusting the pivot, the pivot point of the arm is changed relatively to the door frame, and this increases or decreases the movement that takes place in the closer mechanism as the door moves between open and closed positions. This is a desirable arrangement because it enables the door closer to be adjusted through rather simple means, and without the necessity of making an adjustment in the closer mechanism itself. I have now conceived a door closer pivot adjustment that is extremely novel, and that is a very considerable improvement over the prior structures of the particular class.

As an important feature of my invention, I utilize with the pivot of the closer arm a bearing that slides relatively to the door frame. Through the sliding of this bearing, the pivot point of the arm can move to different positions on the door frame, and I maintain the pivot point in the position to which it moves through means that coact with the bearing. As a more detailed part of this feature, I equip the arm of the door closer with a pivot pin that is held in position through the bearing, but that can move in a linear slot through sliding of the bearing on the door frame. In one form of my invention, I utilize a clip for holding the pivot pin in adjusted position, with the pin adjustable in the slot through release of the clip.

As a further feature, I contribute means whereby the pivot pin can act as a holding device for holding the door in an open position. For the particular purpose, I arrange the pivot pin in wedging relation to its bearing, preferably through screw threads, with parts of the pin and bearing at opposed sides of a part on the door frame. When the arm of the door closer rotates incidental to opening movement of the door, the pivot pin and bearing wedge relatively to one another, thus holding the door open. For adjusting the holding position of the closer arm, I prefer to utilize a splined connection between the arm and pivot pin.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention. It

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is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of my invention, in order to prevent the appropriation of my invention by those skilled in the art.

Referring now to the drawings:

FIG. 1 shows a door closer utilizing my novel pivot adjustment.

FIG. 2 is a view on the line 2-2 of FIG. 1.

FIG. 3 is a longitudinal section on the line 3-3 of FIG. 2.

FIG. 4 is a view on the line 4-4 of FIG. 3.

FIG. 5 is similar to FIG. 4 but shows the pivot adjusted to a different position.

FIG. 6 is a cross section on the line 6-6 of FIG. 3.

FIG. 7 is like FIG. 6 but shows the pivot in wedging position whereby to hold the door open.

FIG. 8 shows another form of my novel pivot adjustment.

FIG. 9 is a section on the line 9-9 in FIG. 8.

In order that my invention may be fully appreciated, I show in FIG. 1 a door closer 10 mounted upon a door 11 that moves between open and closed positions relatively to a door frame 12. This door closer 10 is of a known type having a fore arm 13 that rotates on the door frame 12 during the movements of the door and that is pivoted to an arm secured on a shaft 17 of the door closer. Those skilled in the art will appreciate that the point at which the arm 13 is pivoted to the door frame 12 is rather critical, and that a change in the position of the pivot point will cause a change in the action of the door closer. In closers of this type, therefore, an adjustment of the pivot can be utilized for adjusting the closer.

I prefer to utilize in my extremely novel pivot structure a bracket plate 14 that is held in position on the door frame 12 by screws 15, so that the bracket plate 14 is in effect an integral part of the frame. The bracket plate 14 that I illustrate actually forms a housing for the door closer shaft 17, FIGS. 2 and 3, when the door is in closed position, this plate 14 being formed on three sides with flanges 16 and set into a recess in the door frame 12, as shown in FIG. 1.

In the form of my invention that I show in FIGS. 1 to 7, I pivot the closer arm 13 to the bracket plate 14 through a pivot pin 18 that normally rotates with the arm 13, but that can be adjusted angularly relatively to the arm. For the particular purpose, I form the pivot pin 18 near its lower end with a circular splined portion 19 that is interlocked with a corresponding splined portion 20 on the closer arm 13. I shall refer later to this adjustment between pin 18 and arm 13, and it is important here to know merely that the pivot pin 18 rotates with the arm 13.

As best seen in FIGS. 3, 4, and 5, I form the bracket plate 14 with a linear slot 21 for the pivot pin 18. Further, I form the upper portion of the pivot pin 18 with a screw thread whereby I assemble a nut 22 to the pin, FIGS. 3, 6, and 7. This nut 22 acts as a bearing on which the pivot pin 18 rotates, and is adapted to slide on the surface of the bracket plate 14 with pivot pin 18 moving linearly in the slot 21. Upon the bracket plate 14 I weld an inverted channel 23, this channel being aligned relatively to the slot 21 and arranged with its opposed sides juxtaposed to the nut 22. Thereby the nut 22 cannot

rotate in any position to which it slides on plate 14, and cannot become accidentally disassembled from the pivot pin 18.

I equip the bracket plate 14 at its lower side with an offset clip 24, this clip having at one end an opening whereby the clip fits over a lower end portion 25 on pivot pin 18. To attach the clip 24 to bracket plate 14, I utilize a screw 26. This screw 26 is so positioned as to hold the clip 24 relatively to pivot pin 18 when the pin is in either of two positions in the slot 21, as shown in FIGS. 4 and 5. It will be seen that, by loosening the screw 26 to release clip 24 relatively to the lower end 25 of pivot pin 18, the pin can be adjusted linearly in slot 21 relatively to the door frame, and the pin can then be secured in its adjusted position through the clip 24 and screw 26. In either position of pivot pin 18, the clip 24 acts together with the sliding bearing 22 to hold the pivot pin 18 in predetermined relation to the door frame. Through this extremely novel construction, I am able to hold the pivot point of the closer arm 13 very securely at a fixed point on the door frame, yet I can very readily adjust the pivot point when this is desired. It may be observed here that the clip 24 is juxtaposed to the splined portion 20 of closer arm 13, and the clip therefore acts further to hold the arm assembled to the splined part 19 on the pivot pin.

I shall now describe the action that takes place when I utilize my extremely novel pivot as a door holding device. To understand this feature of my invention, it should be realized that the screw threads on the pivot pin 18 can cause the pin and nut 22 to wedge relatively to one another during the rotation of the closer arm 13. Of course, when the pin 18 and nut are relatively loose, as in FIG. 6, the pivot pin can rotate freely with the closer arm 13, and the door closer will control the door movements in a normal fashion. However, when the arm 13 rotates the pivot pin 18 to a predetermined position, the nut 22 and splined portion 19 of the pivot pin are drawn toward one another and against opposed sides of the bracket plate 14, as in FIG. 7, whereby the nut, pin, and bracket are wedged together. It will be understood, of course, that the channel 23 holds the nut 22 so that it does not rotate with the pivot pin 18. Obviously, the wedging action imposes a very substantial restraint upon further rotation of arm 13 in either direction, so that the door will be held in a corresponding position.

In order to adjust the position in which the door is held, I utilize the splined connections 19, 20 between the arm 13 and pivot pin 18. It is necessary merely to loosen the screw 26 and to move the clip 24 away from the closer arm 13 so that the splined portions 19, 20 can be slipped apart. The arm 13 can then be adjusted angularly and reassembled in desired relation to the pivot pin. Through this procedure, the wedging action can be made to take place at any desired point in the movement of the door. By this procedure, also, the wedging action can be eliminated should the holding effect not be desired. The clip 24 when reassembled will naturally prevent a change of adjustment between the arm 13 and pin 18.

I shall now describe the form of my novel pivot structure that I show in FIGS. 8 and 9 of the drawings. I utilize in that form of my invention a bracket plate 30 that is substantially like the bracket plate 14 I have already described. Thus, the plate 30 has flanges 31 on three sides, and is formed with a linear pivot pin slot 32. Also, bracket plate 30 has an inverted channel 33 welded to its upper surface in aligned relation to the slot 32.

For pivoting the closer arm 13 to the bracket plate 30, I utilize a pivot pin 34, FIG. 9, that is positioned for linear movement in the bracket plate slot 32, and that has a shoulder 35 in opposed relation to the lower surface of the plate at the sides of the slot 32. I form the upper portion of pivot pin 34 with a screw thread whereby I assemble the pin to a nut 36 that lies against the upper surface of the bracket plate 30. With the pivot pin 34 assembled in this way, the nut 36 acts as a bearing that

slides on the plate 30 as the pin moves in slot 32. The inverted channel 33 will guide the nut 36 during its sliding movement, and also will hold the nut against rotation on the plate 30. Further, I form the pivot pin 34 at its lower end with a head 37 that holds the closer arm 13 assembled on the pin 34, but with sufficient clearance to enable the arm 13 to rotate freely relatively to the pin.

It will thus be seen that I can very easily adjust the pivot point of the closer arm 13 through movement of the pivot pin 34 in slot 32. Nevertheless, by rotating the pin 34 relatively to its bearing 36, it is possible to clamp the bracket plate 30 between the bearing 36 and the shoulder 35 on the pin, thereby securing the pin 34 in a fixed position in slot 32. Through the particular construction, I can place the pivot point of the closer arm at any point along the slot 32 of the bracket plate whereby to adjust the door closer and I can then secure the pivot point against a change of adjustment.

Through the extremely novel structure that I have described, I am able to adjust very easily and effectively the pivot point of a door closer relatively to the door frame. I accomplish this adjustment through a sliding movement of the pivot on the door frame, and I do not require that the closer arm or pivot be disassembled for that purpose. I hold the pivot securely in adjusted position through extremely simple means, that need merely be loosened to permit adjustment of the pivot. In addition, I am able so to construct my novel pivot structure that it will act as a door holding device. I believe, therefore, that those skilled in the art will realize that I have contributed a novel door closer pivot of very considerable value.

I now claim:

1. In a door closer of the class described having an arm that pivots relatively to the door frame as the door moves between open and closed positions, a pivot pin about the axis of which the arm rotates, a plate secured to the door frame and formed with a linear slot through which said pivot pin extends, a bearing sliding on the upper surface of said plate and mounting the pivot pin for movement to different positions in said slot, an inverted channel on the upper surface of said plate securing said bearing for sliding relatively to said plate, and means holding the bearing in the positions to which it moves the pivot pin in the slot whereby said arm pivots at different points on the door frame.

2. In a door closer of the class described having an arm that pivots relatively to a door frame as the door moves between open and closed positions, a pivot pin about the axis of which the closer arm rotates, a plate secured to the door frame and formed with an opening larger than said pivot pin and through which said pin extends, a bearing on the upper surface of said plate mounting the pivot pin upon the plate, an inverted channel on the upper surface of said plate securing said bearing for sliding relatively to said plate to support the pivot pin in different position in the plate opening, and means holding the bearing in the various positions wherein it supports the pivot pin in the opening whereby said arm pivots about the axis of said pin at different points on the door frame.

3. In a door closer of the class described having an arm that pivots relatively to a door frame as the door moves between open and closed positions, a pivot pin about the axis of which the closer arm rotates, a plate secured to the door frame, a bearing adapted to move on said plate and mounting the pivot pin upon the plate, a channel secured to said plate, parts of said channel extending in juxtaposed relation to the bearing and securing the bearing for sliding to support the pivot pin in different positions relatively to said plate, and means holding the bearing and pin in the various positions in which the bearing supports the pin relatively to the plate whereby the closer arm pivots about the axis of said pin at different points on the door frame.

4. In a door closer of the class described having an arm

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that pivots relatively to a door frame as the door moves between open and closed positions, a plate secured to the door frame and having a slot therein, a bearing member engaging one side of said plate over said slot, a pivot pin extending through said slot and screw-threaded into said bearing member, said arm being connected to said pin on the other side of said plate for rotation about the axis of said pin, said pin and bearing member being movable along said slot to adjustably position said axis, means for securing said pin and bearing member in

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adjusted position, and means for preventing rotation of said bearing member comprising a channel member overlying said slot on said one side of said plate with the sides of said channel engageable with the bearing member in all positions of the latter along said slot.

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