

Feb. 6, 1945.

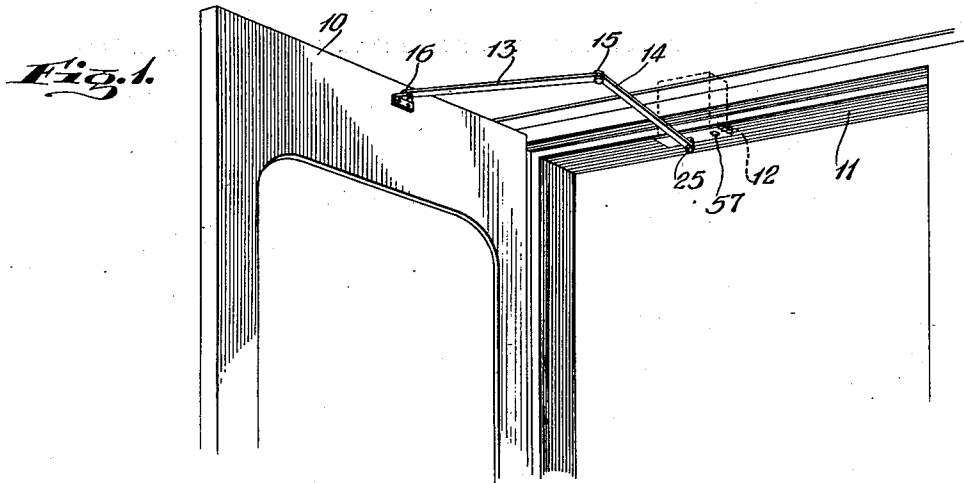
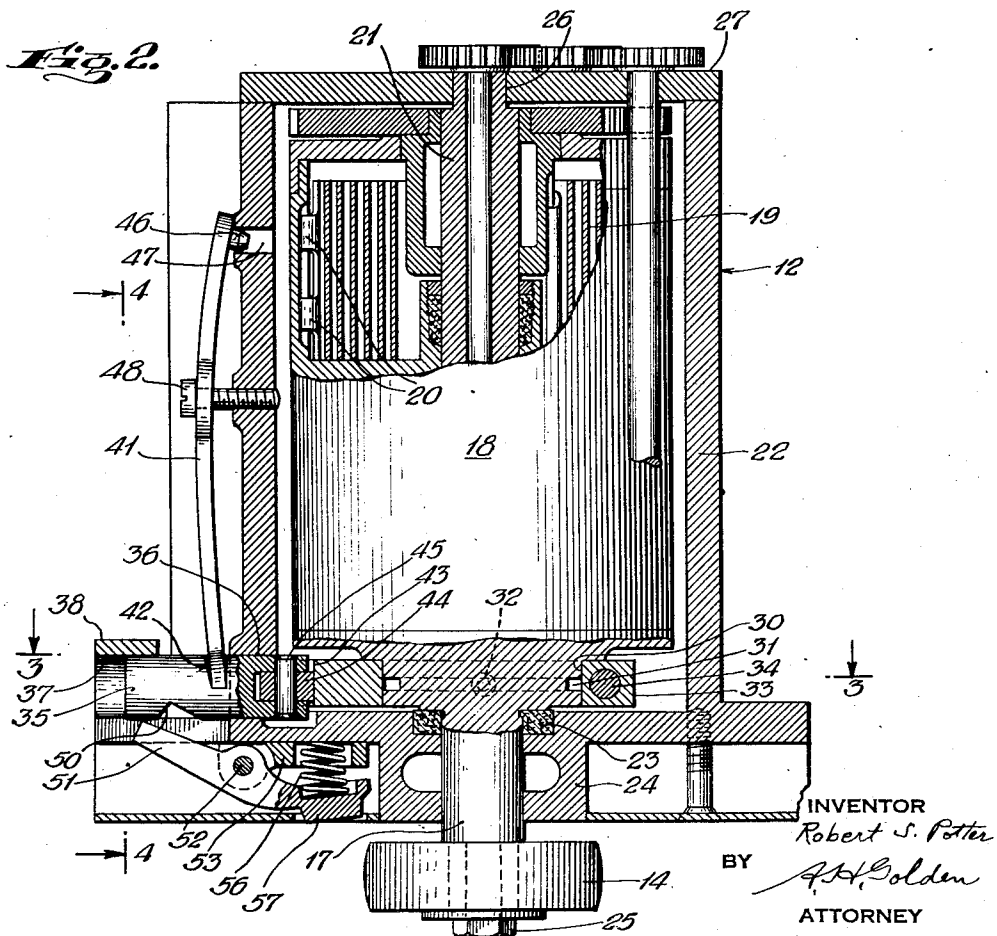
R. S. POTTER

2,368,875

DOOR HOLDER

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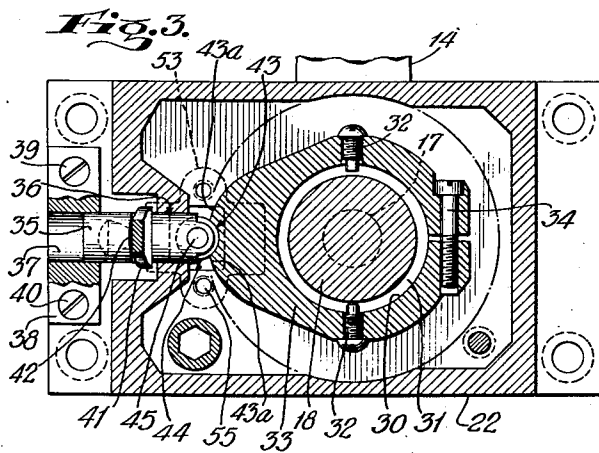
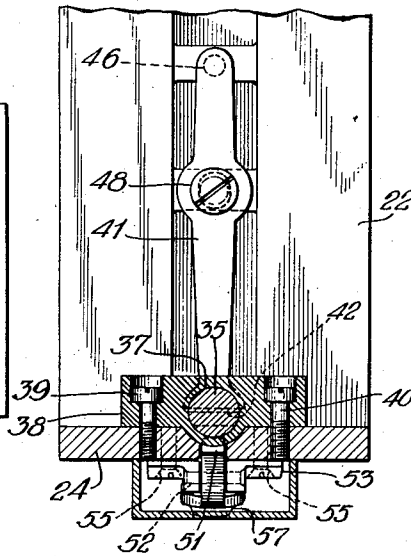
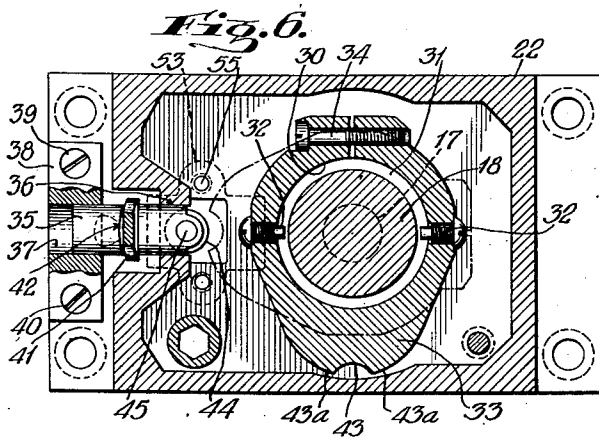
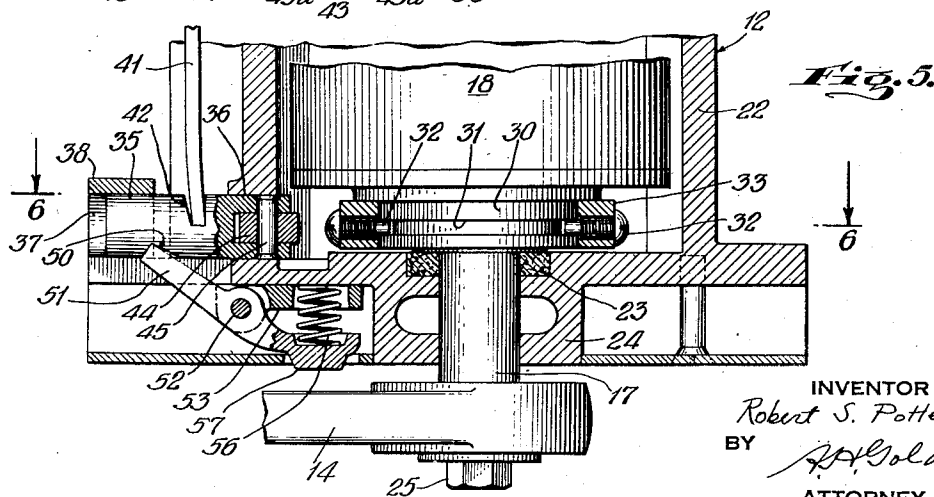
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,368,875

DOOR HOLDER

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Application April 9, 1942, Serial No. 438,229

24 Claims. (Cl. 16—49)

This invention relates to a door holder device utilized to hold a door in an open position. My invention is adapted for use on doors of public rooms, and more particularly on doors of railroad cars. It is the custom on railroad trains, for the trainmen to open the doors at station stops and to operate some device for holding the doors in open position thereafter. When the train pulls out of the station, the trainmen are then required to release the doors from the holding device so that the doors may close. It is a feature of my invention that it is adapted for this particular use, while facilitating considerably the work of the trainmen in carrying out the required operations.

A further feature of my invention resides in the arrangement of a holder device which does not obstruct the door opening nor provide surfaces against which persons may strike portions of their body when passing through the door opening.

Still a further feature of my invention resides in the arrangement of the elements of a holder device so that those elements are normally maintained against coaction but are adapted for movement into coaction when released for the purpose.

A still further feature resides in the construction whereby when the elements of the holder device are released relatively to one another to allow closing of the door, and preferably this release is automatic through the application of closing pressure to the door, the elements are thereafter held against coaction, and preferably in a separated position. It is a further feature of my invention that the said elements are automatically held in said separated position, when separated by the application of pressure to the door.

A still further feature of my invention resides in the arrangement whereby the elements of the holder device are held separated until released by a device which is preferably manually operated and which, in the preferred form of the invention, is the retainer device that is utilized to maintain the elements in separated relation.

A further important feature of my invention resides in the arrangement of the elements of the holder device as parts of a door closer assembly. A more particular feature of my invention resides in the mounting of elements of the holder closer so that one element rotates about the axis of the usual door closer shaft, while the other element remains stationary relatively to the said axis.

In describing my invention, I shall refer to it as mounted on a door closer of the type illustrated in my Patent No. 2,226,257, granted on December 24, 1940, but those skilled in the art will well appreciate that my invention may readily be adapted for use on other types of door closers, all in accordance with the teachings of my invention. Those skilled in the art will further appreciate that an understanding of the basic principles of my invention will readily lead to the development of other mechanical forms of the invention, and they will understand that the patent claims to be granted me should be sufficiently broad to prevent the appropriation of my invention in such other mechanical forms.

Referring now to the drawings,

Fig. 1 shows a door in open position, illustrating the relation of the door to the door closer and holder mechanism associated therewith.

Fig. 2 is a vertical section of a door closer of the type illustrated in my earlier patent, and showing the door holding mechanism of my invention applied thereto.

Fig. 3 is a section taken along lines 3—3 of Fig. 2.

Fig. 4 is a view taken along lines 4—4 of Fig. 2.

Fig. 5 is a view similar to Fig. 2 but illustrating the parts in a different operating position. Fig. 6 is a section taken along lines 6—6 of Fig. 5.

Referring now more particularly to the drawings and especially Fig. 1, a door 10 is shown in open position relatively to a door frame 11. The door closer assembly 12 is shown in dotted lines mounted within the door frame 11. Closer arms 13 and 14 are pivoted relatively to one another at 15, the arm 13 being pivotally connected to the door 10 at 16, and the arm 14 being secured for rotation with the shaft 17 of the door closer as illustrated best in Figs. 2 and 5. Those skilled in the art will understand that the opening movement of the door serves, through the arms 13 and 14, to wind the spring of the door closer assembly 12 by rotation of the shaft 17, the release of the door thereafter allowing the spring to move the door to its fully closed position.

In the particular door closer to which my invention is applied, the shaft 17 is an integral portion of the door closer casing 18 so that as the shaft rotates the casing 18 is rotated therewith. The closer spring is designated by reference numeral 19 and is secured at one end 20 to the casing 18 and at its other end relatively to

the internal shaft 21 of the door closer. The shaft 21 is maintained stationary relatively to a mounting member 22 that is utilized to mount the entire door closer assembly 12 within the frame 11. The shaft 17 is mounted for rotation relatively to a special oil impregnated bearing 23 carried on the base 24 of the mounting member 22, and protrudes downwardly through base 24 so that it may be secured to the arm 14 by the nut 25. In this way, the door closer casing 18 is well supported at its lower end for rotary movement as will be fully appreciated. The upper end of the door closer casing 18 rotates on its internal shaft 21 as a bearing, the shaft 21 being itself mounted in a bearing 26 formed in an upper plate 27 secured to the mounting member 22.

I have thus described briefly the construction of the door closer assembly 12, and the manner in which the shaft 17 rotates the door closer casing 18 to wind the spring 19, so that it in turn may thereafter be actuated by the spring to close the door, in order to outline the type of structure to which my door holding mechanism may be applied. For a clear and complete description of the door closer per se, reference should be made to my earlier patent referred to above. For an appreciation of the present invention, and the manner in which it may be utilized, the description I have given of the door closer assembly 12 is quite adequate.

The casing 18 of the door closer is formed with a circular surface 30 in which is cut a groove 31 for cooperation with screw studs 32 threaded into a split disk 33. This split disk 33 is mounted about the circular surface 30 and is clamped relatively thereto by a bolt 34. By loosening the bolt 34 the split disk 33 may be rotated and thus adjusted relatively to the door closer casing 18, after which the tightening of the bolt 34 will secure the split disk 33 in any adjusted position. The screw studs 32 are used merely to prevent the split disk 33 from dropping away from coaction with the circular surface 30 while the adjustment is being made.

The split disk 33 is employed by me as one element of what I term a holder couple. As will be rather apparent to those skilled in the art, the split disk 33 is merely one preferred and desirable form of element that may be utilized as part of my door holding couple. Actually, many other types of elements will be readily conceived by those skilled in the art as useful and adequate for the purpose, the form of the particular element being largely dependent on the type of door closer or other assembly with which it is to be used.

The second element of my door holding couple is a plunger 35 mounted partially within a bore 36 formed in the mounting member 22, and partially within a bore 37 formed on a block 38 which is secured to the base 24 of the mounting member 22 by bolts 39 and 40, as is probably best illustrated in Figs. 4 and 6. A leaf spring 41 is adapted to bear at one end in a slot 42 formed in the plunger 35, and urge the plunger to the right in the several figures, and toward a depression 43 in the peripheral surface of the split disk 33. A roller 44 is mounted through pin 45 on the plunger 35, and is adapted to lie within the depression 43 of disk 33 in certain positions of that element of the holding couple.

The upper end of the spring 41, as best illustrated in Fig. 2, is equipped with a stud 46 which lies in an opening 47 in the mounting member 22, whereby the said upper end of the spring is

anchored. An adjusting bolt 48 traverses a bore in a relatively central portion of leaf spring 41 and is threaded relatively to the mounting member 22 so that by a simple rotation of the bolt 48 the pressure with which the spring 41 urges the plunger 35 toward the disk 33 may be varied in accordance with conditions. Those skilled in the art will appreciate that when a very strong holding action is desired, the pressure of the spring 41 will be increased. The pressure of the spring 41 will also have to be increased if an increase is made in the tension of the door closer spring 19 as will be understood by those skilled in this art.

Figs. 2 and 3 illustrate the coaction between the plunger 35 and the disk 33 comprising the holding couple of the preferred embodiment of my invention. In those figures the door closer 18 has been rotated to a position corresponding to the open position of the door illustrated in Fig. 1. The disk 33 has been rotated relatively to the plunger 35 and to roller 44 so as to bring the depression 43 opposite the roller 44, whereupon the roller lies within the depression 43 and maintains the disk 33 and the door closer casing 18 against that rotation which will effect the closing of the door. Should it now be desired to close the door, the door 10 will merely be rotated forcibly so that the depression 43 will coact with the roller 44 to force the plunger 35 from its position of Fig. 3 to its position of Fig. 6 against the pressure of the spring 41. This naturally releases the disk 33 so that the door closer may effect the closing movement of the door. It will be noted that this action occurs automatically when the door is moved forcibly toward closed position.

It is a feature of my invention that when the plunger 35 is thus moved by disk 33 to its position of Fig. 6, it is thereafter maintained in the position of Fig. 6 so that it cannot again be effective for maintaining the door in an open position until some further action is taken. Moreover, the retention is entirely automatic. For the particular purpose, the plunger 35 is notched as at 50 for cooperation with a trigger 51 pivoted at 52 relatively to a support 53. The support 53 is secured to the base 24 of the mounting member 22 as best illustrated in Fig. 4, by a pair of bolts 55. A spring 56 is placed between the support 53 and a finger piece 57 formed as an integral part of the trigger 51.

It will now be understood that when the plunger 35 is moved from the position of Figs. 2 and 3 to the position of Figs. 5 and 6 by the forceful movement of the door 10, the spring 56 will force the trigger 51 into the notch 50 of the plunger 35 to maintain that plunger in the position of Figs. 5 and 6. It is obvious that if the door is again opened, the plunger 35 will be incapable of coaction with the disk 33 to hold the door in its open position. If it is desired to maintain the door in its open position once again, it is first necessary for the trainmen to open the door so as to bring the disk 33 into the position of Fig. 3. As the disk 33 is thus rotated, one of the surfaces 43a formed on the disk 33 at each side of the depression 43, will contact the roller 44 of the plunger 35 so as to move the plunger 35 slightly to the left of its position of Fig. 5. This slight movement will ease the pressure between the notch 50 of the plunger 35, and the end surface of the trigger 51, so as to facilitate manual movement of the trigger 51 against the pressure of the spring 56 into the release position of Fig. 2. The plunger 35 will now be free for movement to the position of Figs. 2 and 3 for cooperation with the

depression 43 of the disk 33 to maintain the door in an open position.

It is thought that it will be well to outline briefly one complete operation cycle of my invention as applied to railroad cars. When the train pulls into the station, the door 10 is in closed position and the plunger 35 is maintained in the position of Fig. 5 by the trigger 51. The door closer 18 is also in the position of Fig. 5. The trainman now moves the door 10 towards the position of Fig. 1, whereupon one of the surfaces 43a will move plunger 35 through its roller 44, and relieve the pressure between the plunger 35 and the trigger 51, so that the trainman can with very little difficulty move the trigger 51 to release the plunger 35 for movement into its position of Figs. 2 and 3. The parts in Fig. 3 are now adapted to maintain the door in open position against the force of the door closer 18 trying to close the door. When the train pulls out of the station the trainman merely forces the door towards its closed position, whereupon the plunger 35 is moved by disk 33 back towards the position of Figs. 5 and 6, in which position the trigger 51 once again coacts with the plunger notch 50 to maintain the plunger away from the disk 33, all as has been already described. The door closer 18 is now free to function as a usual door closer to close the door as the passengers open the door in entering and leaving the car.

I now claim:

1. In a combination of the class described, a holder couple for a door having a pair of elements adapted for coaction when moved into predetermined alignment to hold the door in open position, means normally urging the elements of said couple into coaction when brought into said predetermined alignment, means whereby said elements are brought into said predetermined alignment in a predetermined open position of the door, means whereby when said elements are in coaction and said door is moved from said predetermined open position, one element is moved away from coaction with the other element, and means for automatically retaining said one element thereafter against movement into coaction with the other element of said holding couple.

2. In a combination of the class described, a holder couple for a door having a pair of elements adapted for coaction when moved into predetermined alignment to hold the door in open position, means normally urging the elements of said couple into coaction when brought into said predetermined alignment, means whereby said elements are brought into said predetermined alignment in a predetermined open position of the door, means whereby when said elements are in coaction and said door is moved from its open position, one element is moved away from coaction with the other element, means for automatically retaining said one element thereafter against movement into coaction with the other element of said holding couple, and means mounting said last means for manual release.

3. In a combination of the class described, a holder couple for a door having a pair of elements adapted for coaction when moved into predetermined alignment to hold the door in open position, means of connection between said holder couple and the door whereby said elements are brought into said predetermined alignment when said door is in a predetermined open position, means for adjusting the relation of said elements to vary the predetermined open posi-

tion of the door, means normally urging the elements of said couple into coaction, means whereby when said elements are in coaction and said door is moved from its predetermined open position, one element is moved away from coaction with the other element, and means for automatically retaining said one element thereafter against movement into coaction with the other element of said holding couple.

4. In a door closer of the class described, a door closer, a holder couple having a pair of elements secured on parts of the door closer movable relatively to one another as the door closer is actuated during opening and closing movement of the door, means whereby said elements are spring pressed into engagement whereby to hold the parts of the door closer in a position corresponding to a predetermined open position of the door, means whereby when said elements are in engagement and said door is moved from its open position one of said elements is moved away from engagement with the other element, and retaining means for automatically retaining said one element thereafter against movement into engagement with the other element of said holding couple.

5. In a door closer of the class described, a door closer, a holder couple having a pair of elements secured on parts of the door closer movable relatively to one another as the door closer is actuated during opening and closing movement of the door, means whereby said elements are spring pressed into engagement whereby to hold the parts of the door closer in a position corresponding to a predetermined open position of the door, means whereby when said elements are in engagement and said door is moved from its open position one of said elements is moved away from engagement with the other element, and spring pressed retaining means for automatically retaining said one element thereafter against movement into engagement with the other element of said holding couple and manually movable to release said one element for engagement with said other element.

6. In a combination of the class described, a holder couple for a door comprising a surface having a detent depression and a spring pressed holder adapted to lie in said depression and thereby yieldingly prevent relative movement between said surface and holder, means of connection between at least one element of said holder couple and a door whereby when said surface and holder are held against relative movement by the said holder lying in said depression, said door is held in a particular open position, means whereby forceful movement of said surface relatively to said holder by forceful movement of the door effects the retraction of said holder a predetermined distance, and means for automatically retaining said holder retracted said predetermined distance.

7. In a combination of the class described, a holder couple for a door comprising a surface having a detent depression and a spring pressed plunger adapted to lie in said depression and thereby prevent relative rotation between said surface and plunger, means of connection between at least one element of said holder couple and a door whereby when said surface and plunger are held against rotation by the said plunger lying in said depression, said door is held in a particular open position, means whereby forceful rotation of said surface relatively to said plunger by forceful movement of the door

effects the retraction of said plunger a predetermined distance, and manually releasable retaining means for thereafter automatically retaining said plunger retracted said predetermined distance.

8. In a combination of the class described, a holder couple for a door comprising a member having a detent depression and a spring pressed plunger adapted to lie in said depression and thereby prevent relative rotation between said member and plunger, means of connection between at least one element of said holder couple and a door whereby when said member and plunger are held against rotation by the said plunger lying in said depression, said door is held in a particular open position, means whereby forceful rotation of said member relatively to said plunger by forceful movement of the door effects the retraction of said plunger a predetermined distance, and a spring pressed retaining means for automatically engaging and retaining said plunger retracted said predetermined distance, said retaining means being movable against its spring pressure to release said plunger for projection into said depression when aligned therewith.

9. In a combination of the class described, a door closer secured relatively to a door and having a door closing shaft rotatable upon opening movement of the door, a member fixed for rotation with said shaft as the door is closed and having a depression formed thereon, a spring pressed plunger adapted to enter said depression to hold said member and shaft against rotation from a predetermined position corresponding to the open position of the door to which said closer is applied, a retainer cooperable with said plunger for holding it against projection into said depression when said plunger is retracted a predetermined distance, said retainer being manually movable to release said plunger for entrance into said depression when said shaft is rotated to align the depression in said member with said plunger, and means for retracting said plunger said predetermined distance when said shaft and member are rotated forcefully relatively to said plunger.

10. In a combination of the class described a door closer having a door closing shaft, a disk fixed relatively to said shaft and having a depression formed thereon, a spring pressed plunger adapted to enter said depression in a position corresponding to the open position of the door to which said closer is applied, a retainer cooperable with said plunger for holding it against projection into said depression when said plunger is retracted a predetermined distance, said retainer being manually movable to release said plunger for entrance into said depression when said shaft is rotated to align the depression with said plunger, means for retracting said plunger said predetermined distance when said shaft and disk are rotated forcefully relatively to said plunger, and means for adjustably fixing said disk relatively to said shaft to determine the open position of said door.

11. In a combination of the class described, a door closer having a door closing shaft, a disk fixed relatively to said shaft and having a depression formed thereon, a spring pressed plunger adapted to enter said depression to hold said disk and shaft against rotation from a predetermined position corresponding to the open position of the door to which said closer is applied, a retainer spring pressed toward said plunger

for automatically holding it against projection into said depression when said plunger is retracted a predetermined distance, said retainer being manually movable to release said plunger for entrance into said depression when said shaft is rotated to align the depression with said plunger, and a surface on said disk for retracting said plunger said predetermined distance when said shaft and disk are rotated forcefully relatively to said plunger.

12. In a combination of the class described, a holder couple for a door having a pair of elements adapted for coaction when brought into predetermined alignment to hold the door in open position, means whereby said elements are brought into said predetermined alignment, when the door is moved to a predetermined open position, means retaining one element of said holder couple out of coaction with the other element of said couple so that said door may open and shut, means normally urging the elements of said couple into coaction, and means whereby when said elements are in coaction and said door is moved from said predetermined open position, the said one element is moved away from coaction with the other element whereupon it is held by said retaining means thereafter against coaction with the other element of said couple.

13. In a combination of the class described, a holder couple for a door having a pair of elements adapted for coaction when brought into predetermined alignment to hold the door in open position, means whereby said elements are brought into said predetermined alignment when the door is moved to a predetermined open position, means retaining one element of said holder couple out of coaction with the other element of said couple so that said door may open and shut, means normally urging the elements of said couple into coaction, and means whereby when said elements are in coaction and said door is moved from said predetermined open position, the said one element is moved away from coaction with the other element whereupon it is held by said retaining means thereafter against coaction with the other element of said couple until said retaining means is moved to release said one element for coaction with the other element of said couple.

14. In a combination of the class described, a holder couple for a door comprising a disk having a detent depression and a spring pressed plunger adapted to lie in said depression and thereby prevent relative rotation between said disk and plunger, means of connection between at least one of said parts of said holder couple and a door whereby when said disk and plunger are held against rotation by the said plunger lying in said depression, said door is held in a particular open position, a retainer for retaining said plunger out of said depression whereby normally to allow relative rotation of the elements of said holder couple and therefore free closing and opening movement of said door, the release of said plunger from said retainer allowing it to enter the depression in said disk, means whereby forceful rotation of said disk relatively to said plunger by forceful movement of the door effects the retraction of said plunger a predetermined distance, and means whereby said retainer thereafter retains the plunger retracted said predetermined distance until actuated to release said plunger.

15. In a combination of the class described, a holder couple for a door having a pair of elements

adapted for coaction when brought into predetermined alignment to hold the door in open position, means whereby said elements are brought into said predetermined alignment when the door is moved to a predetermined open position, means normally urging the elements of said couple into coaction, a retainer for retaining one element of said holder couple out of coaction with the other element of said couple against the urging of said means so that said door may open and shut.

16. In a combination of the class described, a holder couple for a door having a pair of elements adapted for coaction when brought into predetermined alignment to hold the door in open position, means whereby said elements are brought into said predetermined alignment when the door is moved to a predetermined open position, means normally urging the elements of said couple into coaction, a retainer for retaining one element of said holder couple out of coaction with the other element of said couple against the urging of said means so that said door may open and shut, said retainer being movable to release said one element for coaction with the other element of said couple.

17. In a door closer of the class described, a door closer, a holder couple having a pair of elements secured on parts of the door closer movable relatively to one another as the door closer is actuated during opening and closing movement of the door, spring means whereby said elements are spring pressed into engagement to hold the parts of the door closer in a position corresponding to a predetermined opening of the door, and retaining means for holding said elements out of engagement against the pressure of said spring means whereby to allow free opening and closing movement of the door.

18. In a combination of the class described, a plunger, a holding surface, a spring pressing said plunger toward said holding surface, a trigger spring pressed against a detent surface of said plunger whereby to hold said plunger against movement by its spring toward said holding surface, said trigger being manually movable away from said detent surface, a release surface movable relatively to said plunger for moving said plunger against its spring whereby to relieve somewhat the pressure between the plunger and said trigger, whereupon said trigger is the more readily moved against its spring pressure to release said plunger for movement toward said holding surface.

19. In a combination of the class described, a holder couple for a door comprising a member having a detent depression and a spring pressed plunger adapted to lie in said depression and thereby prevent relative rotation between said member and plunger, means of connection between at least one element of said holder couple and a door whereby when said member and plunger are held against relative rotation by the said plunger lying in said depression, said door is held in a particular open position, a surface on said member juxtaposed to said depression and cooperable with said plunger upon forceful rotation of the door to retract said plunger a predetermined distance, and a spring pressed retaining means for automatically engaging and retaining said plunger retracted said predetermined distance.

20. In a combination of the class described, a plunger, a holding member having a holding surface and a release surface in juxtaposed re-

lation, a spring pressing said plunger toward said holding surface, a trigger spring pressed against a detent surface of said plunger whereby to hold said plunger against movement by its spring toward said holding surface, said trigger being manually movable away from said detent surface, said release surface moving relatively to said plunger upon rotation of said holding member for moving said plunger against its spring whereby to relieve somewhat the pressure between the plunger and said trigger, whereupon said trigger is the more readily moved against its spring pressure to release said plunger for movement toward said holding surface.

21. In a combination of the class described, a holder couple for a door having a pair of elements adapted for coaction to hold the door in open position, means mounting each of said elements for movement, means normally urging the elements of said couple into coaction, means whereby when said elements are in coaction and said door is moved from its open position, one element is moved away from coaction with the other element, and means for automatically retaining said one element thereafter against movement into coaction with the other element of said holding couple.

22. In a combination of the class described, a holder couple for a door having a pair of elements adapted for coaction to hold the door open, means whereby one of said elements moves as the door rotates to open position, means whereby said second element effects retaining coaction with said first element after said first element is moved to a predetermined position corresponding to a predetermined open position of said door, means whereby when said elements are in coaction and said door is moved from its open position, one element is moved away from coaction with the other element, and means for automatically retaining said one element thereafter against movement into coaction with the other element of said holding couple.

23. In a combination of the class described, a holder couple for a door having a pair of elements adapted for coaction to hold the door in open position, means for adjusting the relation of said elements to vary the point of their coaction whereby to vary the open position of the door, means normally urging the elements of said couple into coaction, means whereby when said elements are in coaction and said door is moved from its open position, one element is moved away from coaction with the other element, and means for automatically retaining said one element thereafter against movement into coaction with the other element of said holding couple.

24. In a combination of the class described, a holder couple for a door comprising a member having a detent depression and a spring pressed plunger adapted to lie in said depression and thereby prevent relative rotation between said member and plunger, means of connection between at least one element of said holder couple and a door whereby when said member and plunger are held against rotation by the said plunger lying in said depression, said door is held in a particular open position, means cooperable with said plunger upon forceful rotation of the door to retract said plunger a predetermined distance, and a spring pressed retaining means for automatically engaging and retaining said plunger retracted said predetermined distance.

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