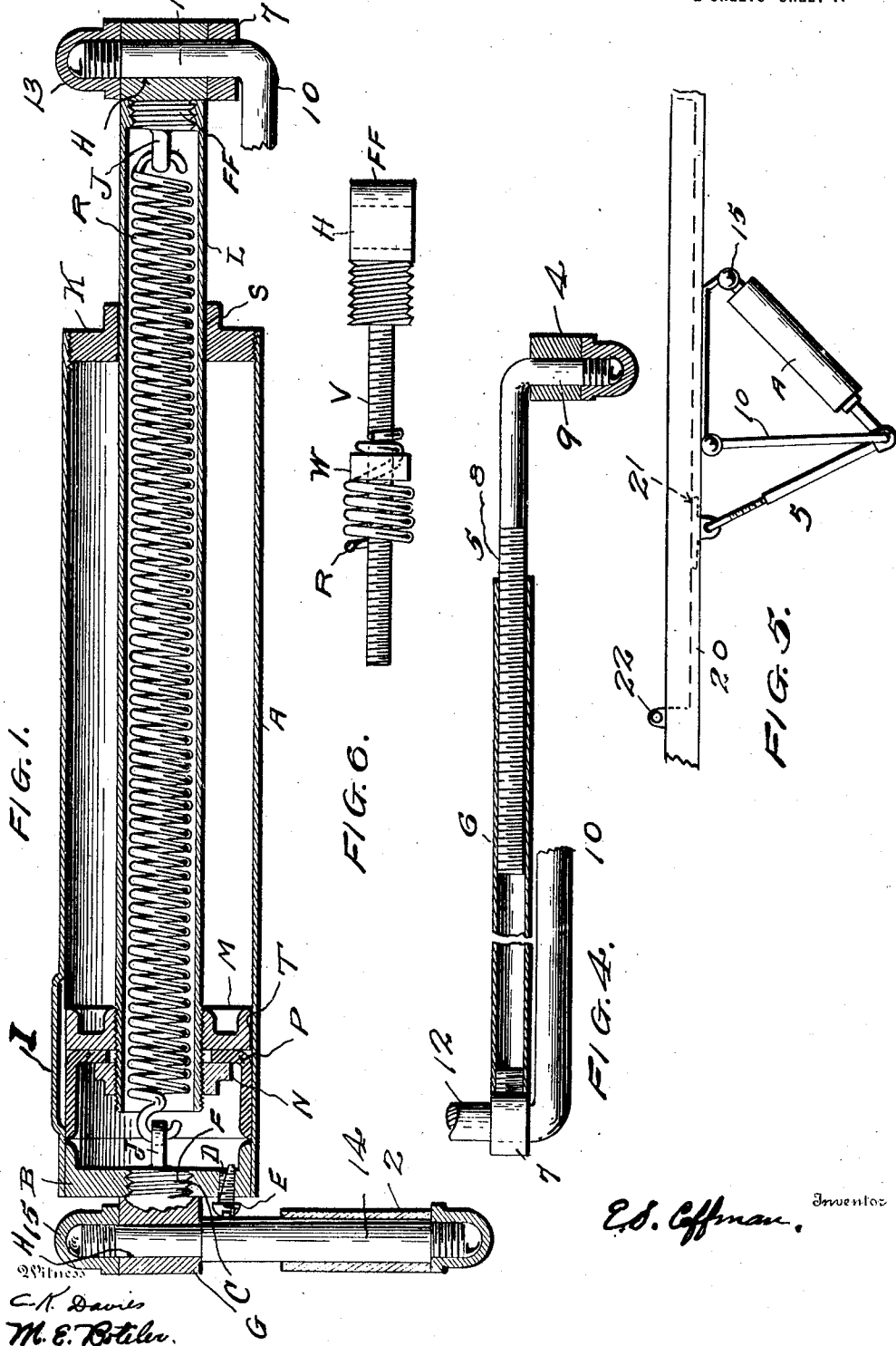


E. S. COFFMAN.  
DOOR CONTROLLING DEVICE.

APPLICATION FILED FEB. 12, 1913. RENEWED AUG. 22, 1919.

Patented Mar. 16, 1920.  
2 SHEETS—SHEET 1.

1,334,081.



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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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## DOOR-CONTROLLING DEVICE.

1,334,081.

Specification of Letters Patent.

Patented Mar. 16, 1920.

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*To all whom it may concern:*

Be it known that I, EDWARD S. COFFMAN, a citizen of the United States, residing at Clifton Forge, in the county of Alleghany and State of Virginia, have invented new and useful Improvements in Door-Controlling Devices, of which the following is a specification.

The invention relates to door controlling devices, and is in part a continuation of my prior applications filed November 6, 1909, No. 526,602, and my application filed Dec. 30, 1909, No. 535,672. The object of the invention is, first, the provision of a simple cushioning and spring means which may be used with various kinds of supplemental attachments to constitute a complete door controller, and, secondly, the provision of specific supplemental attachments for use in connection with the said cushioning and spring means which will permit of the use of a very light hollow metallic cylinder or tube, thus reducing the first cost of the entire device, and, further, the provision of such supplemental attachments in connection with the cushioning and spring means which, when suitably disposed relative to a door and casing, will not only close and cushion the door, but also hold the door open when it has been moved through a predetermined arc of a circle. However, the supplemental attachments may be so disposed that the door will not be held open.

The invention consists, first, in combining with a metallic tube or hollow cylinder a piston, hollow piston rod, and a coiled or helical spring located within the piston rod and attached directly or mediately at one end to or near the bottom of the tube or hollow cylinder and at the other end to the piston rod, so that when the piston and rod are moved relative to the tube or hollow cylinder the spring will be expanded and act by contractile energy to return the piston and rod to their normal positions; and, secondly, in certain novelties of construction and combinations of parts with the cushioning and spring means, such as the closing means for the ends of the tube and hollow piston rod, means for pivoting the same to a door and casing, and means for varying the tension of the spring, as herein set forth and claimed.

The accompanying drawings illustrate an example of the embodiment of the cushion-

ing and spring means and the combination therewith of supplemental attachments, all constructed and combined according to the best mode of procedure I have so far devised for the purpose.

Figure 1 is a longitudinal section on an enlarged scale of the cushioning and spring means, also illustrating certain parts of the supplemental attachments of Fig. 2.

Fig. 2 is a view in perspective of the cushioning and spring means combined with supplemental attachments and applied to a door and casing.

Fig. 3 is a top plan view showing the relative positions taken by the parts of the controller of Fig. 2 when the door has been opened through an arc of about 90°.

Fig. 4 shows the so-called adjustable pull or supplemental rod partly in section.

Fig. 5 shows in plan view the controller applied to a door and casing, the supplemental rod being attached to the door and the cushioning and spring means attached to the casing above the door. Fig. 6 shows means for adjusting the tension of the spring.

The cushioning and spring means comprises a metallic element, as a tube or hollow cylinder A, having an opening therein circular in cross section; a base B, secured in or on or brazed into the end of the tube, provided with a threaded opening C, and a threaded vent opening D within which is an adjustable screw E with part of the shank cut away so that the opening for the passage of air may be varied in size and the cushioning resistance correspondingly varied; a threaded spring base anchor F fitting the opening C, and having a head G with an opening H, and an eye J at the end of the shank; a head K with an opening for the piston rod, preferably screwed in or on the tube so as to be removable, but it may be brazed in or on the tube; a hollow piston rod L preferably exteriorly threaded at one end to receive a disk nut M and a clamping nut N between which nuts the flexible leather packing P is clamped forming a piston, as shown, and interiorly threaded at the opposite end to receive the threads upon a threaded spring anchor F F which is of the same construction as the anchor F and interchangeable therewith and designated as the piston rod spring anchor; and a tempered coiled or helical spring R located with-

in the hollow piston rod and having its opposite ends detachably secured to the eyes J, J of the anchors F and F F by means of hooked extensions of the wire or rod from which the spring is made or by suitable mediate means.

When the parts are combined as shown by Fig. 1 and the hollow piston rod is pulled out air in the tube in front of the piston escapes around the piston rod at S and past the piston at T, and air enters back of the piston by way of the vent opening D. The spring is at the same time expanded. When the piston and piston rod are released the contractile energy of the spring returns them to their normal positions, air escaping back of the piston by way of the vent opening D. The degree of cushioning obviously will depend upon the size of the opening through the vent D which can be varied by the screw E. In assembling the parts the spring should be under tension when the piston is seated within the tube. The detachable anchors F and F F allow the substitution or repair of the spring without the withdrawal of the piston and piston rod from the tube or hollow cylinder.

The tension of the spring may be varied by attaching the end of the spring R to a threaded bolt V and threaded nut W and fastening the end of the bolt to the anchor F F, Fig. 6.

Fig. 1 shows the hollow cylinder or tube provided with a channel I near the end, wider than the width of the piston and packing, constituting a by-pass for the fluid or air when the packing occupies a position between the ends of the channel. When the piston in traveling to its seat at a relatively slow velocity reaches a position opposite the channel the compressed fluid or air below the piston or packing can pass back of the same, allowing the spring to exert an increased sudden contractile energy and give an impulse which will accelerate the door and raise the latch or force back the bolt of the door and cause the door to reach the limit of its closing travel. In some instances I have found the presence of this arrangement desirable, especially where the bolt is actuated by a strong spring.

The cushioning and spring means or device substantially as described can be used in combination with different types or kinds of supplemental attachments and also with such specific attachments as are shown by the drawings.

In Figs. 2, 3 and 4 the cushioning and spring means is shown combined with the following attachments: A base piece 1, with bearings 2 and 3, secured to the door near its top edge, and the base may be in two parts, if desired; a bearing 4, with an opening on the casing; a so-called adjustable pull or supplemental rod 5 comprised of a tube 6

with an eye 7 seated therein at one end and interiorly threaded at the other end, and a rod 8 threaded at one end and bent at the other end to form a journal 9 movably supported within the opening of bearing 4, as shown by Fig. 4; a guide and holding rod 10 having its ends bent at right angles to form journals 11 and 12, the journal 11 being located in bearing 3 and the journal 12 being passed through the eye 7 and opening H in anchor F F and secured by a cap nut 13, as shown; and a shaft 14, one end seated in bearing 2 and the other end passed through the opening in the base spring anchor F and secured by a cap nut 15, as shown at the left in Fig. 1.

On reference to Fig. 2 it will be seen that the guide and holding rod 10 is disposed at an angle to the cushioning and spring means. When the door is opened the rod 5 will rotate in the bearing 4 on the casing and actuate the guide and holding rod and cushioning and spring means so they will turn and approach the same plane, and that a slight further movement of the door will cause the parts to occupy the relative positions shown by Fig. 3, where the guide and holding rod and the cushioning and spring means are on a dead center and the door held open.

By changing the points of attachment of the controlling device on the door and casing the position in which the door will be held open may be varied. Fig. 3 shows the door held open when it has turned through an arc of approximately 90°. A slight turn of the door toward the left will allow the spring to act and close the door, the cushioning means performing its function as the door closes.

In Fig. 5 the cushioning and spring means and the guide and holding rod are shown secured to the casing 20 and the supplemental rod journaled to the door 21 which turns on the hinges 22. The mode of operation is here substantially the same as in the particular application before described, for as the door is opened the rod 5 will pull the cushioning and spring means and the guide and holding rod about their bearings until they lie in different or substantially the same planes or reach a dead center.

In applying the controller the relative distances apart of the bearings on the door and casing may be varied and the relative proportions of the several parts and elements changed without constituting substantial departures.

What I claim is:

1. The combination in a door closer and check, and with a door and casing, of two hollow telescopic body members, the inner one having an extension outside the other for attachment; a contractile coiled spring arranged within and connected with each of

said members so as normally to hold them together; means for checking and retarding the speed of the telescopic movement of one member relative to the other when the members moved apart and the spring expanded are being drawn together by the contractile energy of the spring; and means for connecting the members in operative position to the door and door frame or casing so as to check and retard the movement of the door while closing.

2. The combination in a door closer and check, and with a door and casing, of two hollow telescopic body members, the remote ends and sides being substantially closed to form an air chamber of variable capacity the inner member having an extension for attachment; a contractile coiled spring within and connected to the members and normally holding them together; and means for connecting the said members to the door and door frame or casing; the said members being so fashioned and combined that air can pass to the air chamber when the members are telescoping apart and the spring expanding but shall be checked and retarded in its passage or flow from the chamber when the members are telescoping together and the door closing by the contractile energy of the spring.

3. The combination in a door closer and check, and with a door and casing, of outer and inner hollow telescopic body members the inner member having an extension beyond the other adapting it for attachment; means forming in connection with the members a substantially closed variable air chamber; a contractile coiled spring within and connected to said members and normally holding them together; and means for connecting the members with the door and door frame or casing; said members and means being so constructed and combined as to allow a variation of the quantity of air in the chamber, permitting its quite free flow in one direction but retarding its flow in the opposite direction to secure a checking effect in opposition to the action of the contractile energy of the spring when the members telescope together.

4. The combination in a door closer and check, and with a door and casing, of two telescopic hollow body members the inner one having an extension for attachment; a coiled spring arranged within and connected with each of said members to hold them together by its contractile energy; and means for connecting said members to the door and door frame or casing; said combined body members being constructed and united to form a suitable air chamber of variable capacity to which air can pass when the members are drawn apart and the spring expanded, and said combined body members being provided with an opening of

suitable limited area for the restricting or checking of the passage or flow of air from said air chamber when the members are relatively moved together by the contractile energy of the spring and the capacity of the air chamber decreases, and whereby the speed of the telescopic movement of one member relative to the other is retarded.

5. The subject-matter of claim 4, with the addition of adjustable valve mechanism for varying the size of the opening from the air chamber.

6. The combination in a door closer and check, and with a door and casing, of two hollow telescopic body members the inner one having an extension beyond the other for attachment; a coiled spring within secured to the opposite members and when the spring is contracted holding them in normal relative positions; means in connection with the outer and inner members forming a substantially closed air chamber; means for discharging air from the chamber when the members telescope and expand the spring; means for the restricted admission of air to said chamber when the members telescope reversely under the contractile energy of the spring; and means for attaching said members in operative position to the door and door casing.

7. The combination in a door closer and check, and with a door and casing, of two telescopic tubular body members the outer one having one end and its body substantially closed, the inner one having an extension beyond the other, said members being fashioned and combined to form a variable air chamber; a contractile helical spring having its ends secured to the opposite members and its axis in line with the axes of the body members and when contracted holding the members together; means for the admission of air to the chamber; means for restricting and retarding the discharge of air from said chamber to retard the inwardly telescopic movement; and means for connecting said members with the door and door casing.

8. The combination in a door closer and check, and with a door and casing, of two telescopic body members the outer one having a closed head and the inner one having an extension beyond the open end of the outer member for attachment; means in connection with said members forming a substantially closed air chamber of varying capacity; a contractile coiled spring having its ends secured to the opposite members and its axis in line with the axes of the body members and when contracted holding them together; an adjustable valve for controlling the passage of air out of said air chamber when one member is telescoped inwardly toward the other by the contractile energy of the spring; and means for con-

necting said members to the door and casing.

9. In combination with a door and casing, a door closer and check including tubular body members telescopically mounted one within the other, the inner one having an extension outside the other, heads closing the outer ends of said body members to form a substantially closed air chamber, a spring within and connecting the said members, means for admitting air between the members, means controlling and retarding the passage of air out of the air chamber formed by the body members and heads to secure a cushioning effect, and means for engaging the members and connecting them with the door and casing.

10. In combination with a door and door casing, a door check including tubular body members telescopically mounted one within the other, heads closing the outer ends of the body members, a spring within connecting said members, an air valve in connection with one of the members, an annular packing at the inner end of the inner body member, and means for attaching the body members to the door and door casing.

11. In combination with a door and casing, a door check including tubular telescopic members united and forming a substantially closed variable fluid chamber the inner member having an extension for attachment, a helical spring within and connecting the said members and when normally under slight tension holding the members together, means for allowing the passage of fluid to the chamber when the members are drawn apart, means for varying the amount of fluid discharged from the chamber in a given time when the members telescope together to secure a retarding or checking effect, and means for attaching both members to the door and casing.

12. The combination in a door closer and check, and with a door and casing, of inner and outer hollow telescoping members, the inner one having an extension beyond the other, providing a variable fluid chamber, a spring within and connecting the members and under slight tension normally to hold them together, means for forming a tight joint between the members when they are telescoping together and for the passage of fluid to the chamber from the space back of the chamber when the members are drawn apart, means for the restricted discharge of fluid from the chamber to secure a retarding effect, and means for the attachment of the members to the door and casing.

13. The combination in a door closer and check, and with a door and casing, of telescopic inner and outer members to form a variable fluid chamber the inner member having an extension outside the other for attachment; a contractile helical spring

within and its opposite ends connected respectively to the opposite members and normally holding them together; a piston to form a joint between the members; means for admitting fluid to one side of the said piston and expelling fluid from the other side thereof when the members are being drawn apart and also when they are telescoping together under the contractile energy of the spring to secure a retarding effect; and means for connecting said members to the door and casing.

14. In combination with a door and door casing, a door closer and check including telescoping inner and outer tubular body members closed at their outer ends and sides to provide a variable air chamber, a valve controlling the passage of air out of said chamber, a spring within the members and connecting the inner and outer members normally to hold the two together, and means for attaching the members to the door and door casing.

15. In combination with a door and casing, a door closer and check including telescopic inner and outer tubular body members substantially closed at their sides and ends means between said members to make a substantially tight joint and with the body members forming an air chamber of variable capacity, a contractile coiled spring within the said members and its ends connected with the inner and outer members, a valve device for controlling the discharge of air from the chamber, and means for connecting the members in operative position to the door and casing.

16. The combination in a door closer and check, and with a door and casing, of two tubes telescopically united with their remote ends and bodies substantially closed to form an inclosed air chamber of variable capacity; a contractile coiled spring within the tubes with its ends secured to the tubes and normally holding them together; and means for attaching said tubes to the door and casing; the end of one of said tubes having a removable head to provide for attaching the spring, and said tubes designed, constructed and united to allow air to pass to the chamber when the tubes telescope apart and to restrict its flow from the chamber when the tubes are telescoping together under the contractile energy of the spring whereby a cushioning and retarding result is secured.

17. The combination of telescoping inner and outer members to provide a variable fluid chamber, a contractile spring within uniting said members and when under tension normally holding them together, means for admitting fluid to and gradually discharging fluid from the chamber, and means for pivotally attaching the members to a door and casing including a guide rod, a

supplemental rod and suitable attaching means for said rods and one of the members; the supplemental rod being adapted, when the device is attached to a door and casing and while the door is being opened, to turn the members and the guide rod on their pivots and draw the members apart and expand the spring.

18. The combination in a door closer and check, and with a door and casing, of two hollow body members one extended outside of and reciprocable within the other to form a fluid chamber of variable capacity, means for restricting the flow of fluid from the chamber, a contractile coiled spring within the members one end whereof is secured to the end of one of the members, a bolt carried by the opposite remote end of the other member, an element adjustable upon said bolt to which element the other end of the spring is connected whereby the tension of the spring can be regulated, and means for connecting said members to the door and casing.

19. The combination in a door check and closer and with a door and casing, of outer and inner telescopic members said inner member having an extension outside the other member adapting the same for attachment and carrying a piston with a central opening therethrough, a substantially closed variable fluid chamber in connection with said members, means for allowing a variation of the quantity of fluid in the chamber, a contractile coiled spring under tension within and loosely passing through the central opening in the piston one end thereof being attached to the outer member and the opposite end secured to the inner member, and means for attaching the said members in operative position to the door and casing.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD S. COFFMAN.

Witnesses:

C. M. FORREST,  
M. E. BOTELER.