

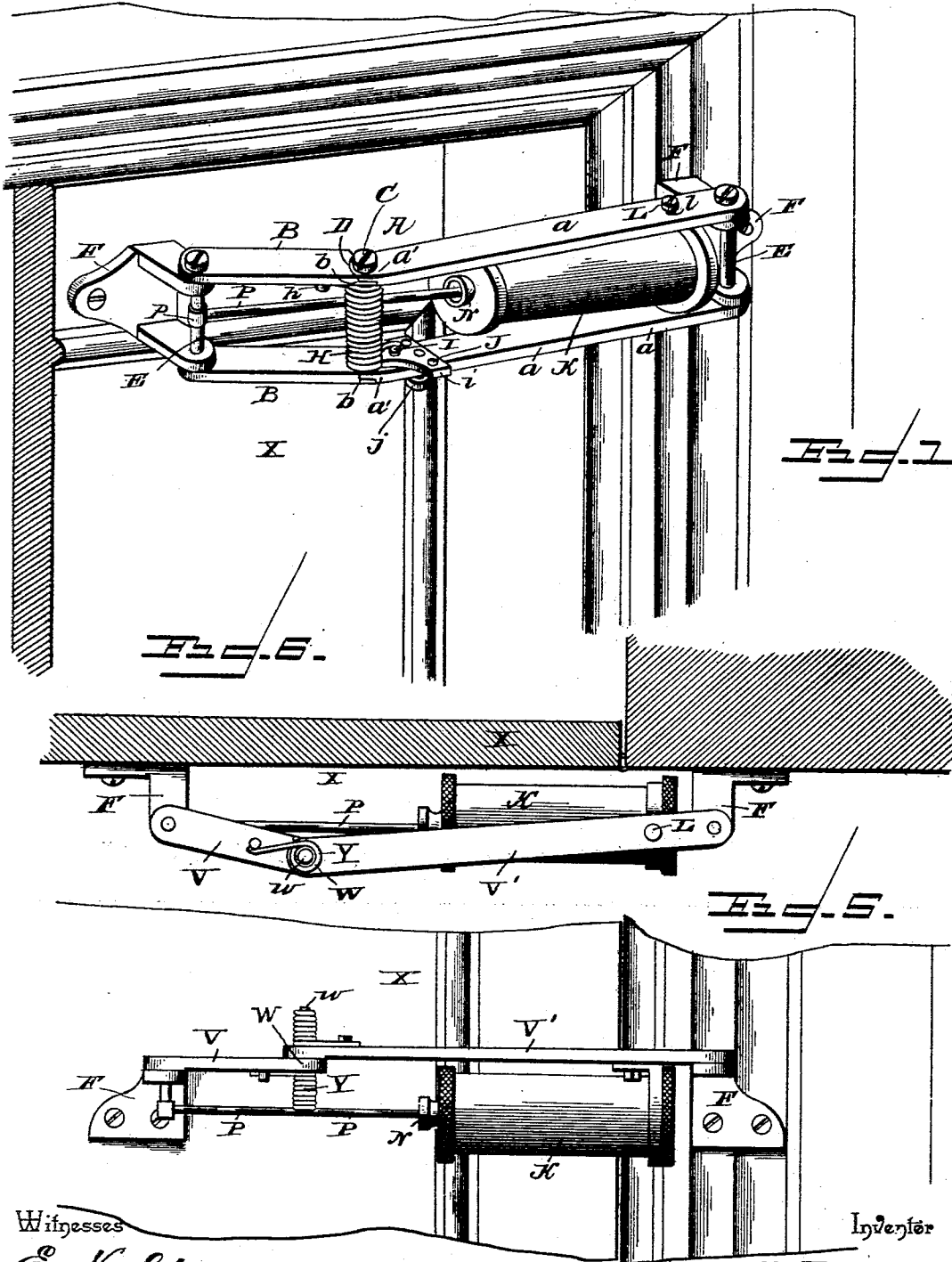
(No Model.)

2 Sheets—Sheet 1.

G. E. DUDLEY.
DOOR CHECK AND SPRING.

No. 504,826.

Patented Sept. 12, 1893.



Witnesses

C. H. Stewart.
D. P. Wolhaupter.

Inventor

George E. Dudley

By W. S. Attorneys,

C. A. Snow & Co.

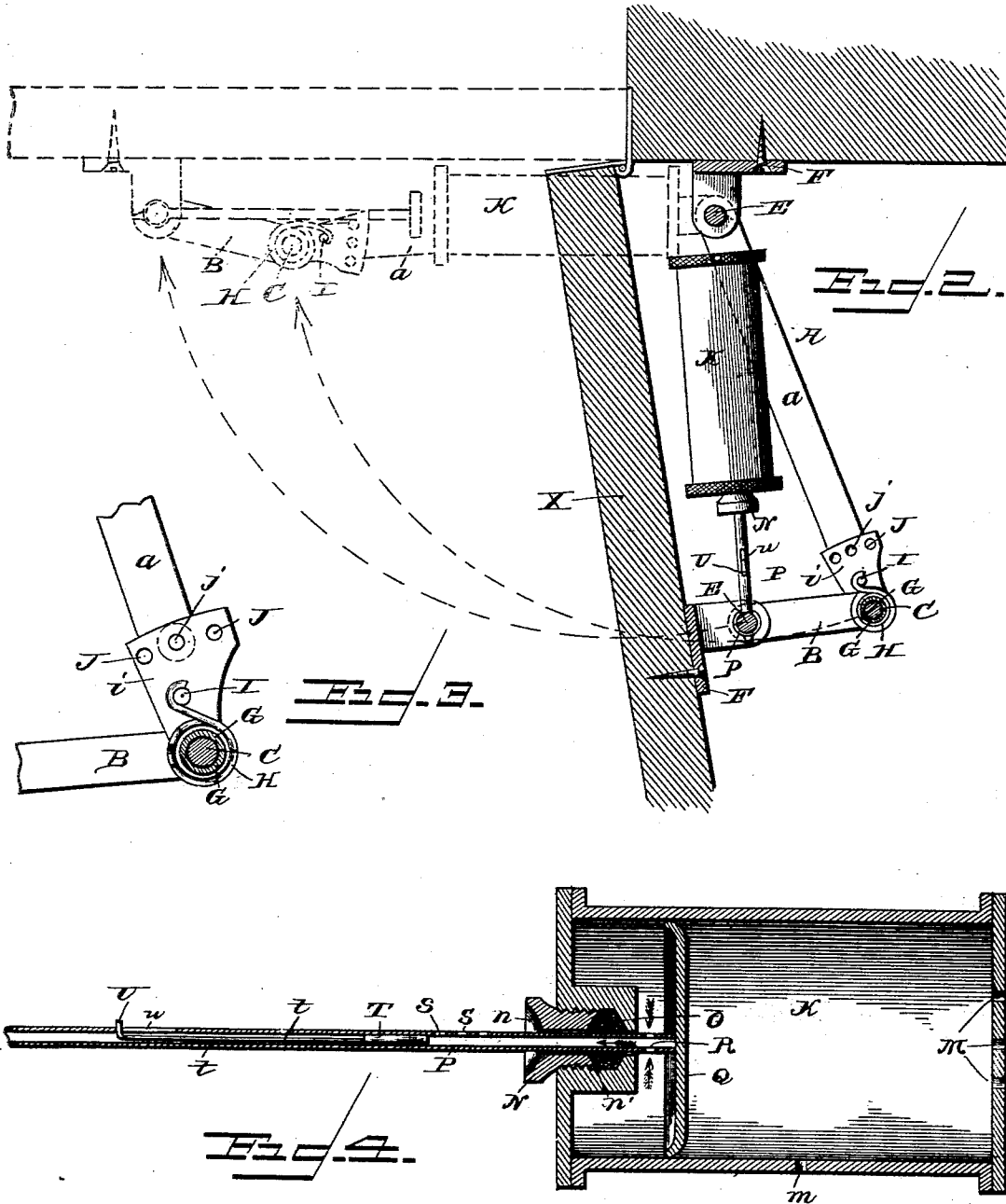
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E. H. Stewart.
D. P. Walhauser.

Inventor

George E. Dudley.

Boyd's Attorneys,

Chas. H. Snow & Co.

UNITED STATES PATENT OFFICE.

GEORGE E. DUDLEY, OF PROVO, UTAH TERRITORY.

DOOR CHECK AND SPRING.

SPECIFICATION forming part of Letters Patent No. 504,826, dated September 12, 1893.

Application filed April 5, 1893. Serial No. 469,111. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. DUDLEY, a citizen of the United States, residing at Provo, in the county of Utah and Territory of Utah, have invented a new and useful Combined Door Check and Spring, of which the following is a specification.

This invention relates to combined door checks and springs; and it has for its object to provide an improved device of this character, which, while preventing the sudden closing or slamming of the door, at the same time insures the automatic closing thereof and checks both the closing and opening of the door.

To this end the main and primary object of the invention, is to provide an improved door check and spring, applicable alike to heavy and large doors, and which while comparatively simple in construction and efficient in operation, at the same time is so constructed as to provide in itself a stop for holding the door open when it has reached or passed a certain position.

With these and other objects in view which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts, hereinafter more fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a perspective view of the upper portion of a door casing and door showing my improved check and spring device attached in position. Fig. 2 is a horizontal sectional view of the device showing the position thereof when the door is opened at an angle at which the spring will not close it, and therefore forms a stop for holding the same open, also showing in dotted lines the closed position of the door. Fig. 3 is an enlarged detail sectional view showing more clearly the construction of the spring adjusting device. Fig. 4 is an enlarged horizontal sectional view through one end of the cylinder, including the hollow piston rod and the regulating valve inside of the same. Fig. 5 is a detail elevation of a modification. Fig. 6 is a detail top view showing the door and frame in section.

Referring to the accompanying drawings, A represents a jointed lever frame comprising the parallel long lever arms *a*, having

rabbeted ends *a'*, and the parallel short lever arms B, having inner rabbeted ends *b*, registering with the rabbeted ends of the long lever arms and connected thereto in a joint by means of the pivot bolt C, passing transversely through the connected ends of the lever arms. As may be clearly seen in the drawings, the rabbeted ends of the long lever arms *a*, are slightly curved on an angle as at D, to form stops, which normally dispose the short lever arms B, at an angle, so as to hold the device off from the door to which it is attached. The opposite ends of the jointed lever frame A, or at least the outer extremities of the long and short arms thereof, are connected by the end bolts E, and by which they are pivotally connected to the perforated attachment plates F. The attachment plate F, connected to the bolt at one end of the long lever arms *a*, is attached to the door frame adjacent to the hinge of the door X, while the other attachment plate attached to the swinging ends of the short lever arms, is attached to the back of the door X, at a point near the center of the same, so that when the door is opened, the short lever arms B, have their outer extremities drawn toward the point of attachment of the lever frame to the door frame, so that the joint of the lever frame is bowed out or broken as may be clearly seen in Fig. 2 of the drawings.

The joint or pivot bolt C, accommodates a spacing sleeve G, which holds the opposite frame arms separated and spaced from each other and receives thereon the heavy coiled door spring H. The heavy coiled door spring H, has one extremity thereof held in position on the pin *h*, projecting from one of the short lever arms B, while the other extremity of the spring engages a pin I, projecting from one end of the adjustable tension adjusting plate *i*. The adjustable tension adjusting plate *i*, is pivoted at one end on the bolt C, and is provided in its other end with a series of openings J, any one of which is engaged by the adjusting screw *j*, passing through a threaded perforation in one of the long lever arms *a*. By adjusting the plate *i*, the tension of the spring H, can be increased or diminished as may be required, and by reason of having the extremities of the spring connected, respectively, to the long and

short members of the jointed lever frame, the tension of said spring is such as to normally close the said lever frame, and when the door is opened slightly, it will bow the lever frame by breaking the joint thereof against the tension of the door spring. When the door is released, the tension of such spring is sufficient to close the jointed frame and therefore close the door. Now by reference to Fig. 2 of the drawings particularly, it will be readily seen that in case the door is opened an angle of sixty degrees or more, so that the short lever members or arms B, are drawn into a position at approximately right angles to the long lever arms, the tendency of such short lever arms to return into their normal positions, will not be exerted in a direction to close the door, but on the contrary will tend to hold the same open, therefore forming a stop to hold the door open in a wide position, until closed manually. This is an important feature to note.

In connection with the door spring just described, I employ a check cylinder K, which is arranged inside of the jointed lever frame between the parallel long lever members or arms thereof. The cylinder K, is constructed in the ordinary shape and is pivotally supported in position at one end near to the fixed pivotal support of the arms *a*, on the pivot screws L, passing through threaded openings *l*, in the opposite lever arms and engaging directly opposite portions of one end of the said cylinder. The cylinder K, is provided in its rear pivoted end with one or more end escape or exhaust openings M, and at an intermediate point with a central exhaust opening *m*. The swinging end of the cylinder K, is inclosed by the head or cap N, provided with a conical recess *n*, exteriorly threaded to receive the perforated packing nut *n'*, which nut adjustably clamps into position in the bottom of the recess *m*, the packing O, and accommodates the hollow sliding piston rod P. The hollow sliding piston rod P, carries at its inner end the piston head Q, which works inside of the cylinder K, and by compressing the air at both ends thereof is designed to serve as a check not only for the closing of the door but also for the sudden opening thereof. The outer extremity of the hollow sliding piston rod P, is connected centrally at *p*, to the end bolt E, connecting the short lever arms B, so that as the joint of the lever frame is bowed and closed, respectively, the said piston rod will be slid in and out of the cylinder K, to move the piston head Q, therein. The said hollow piston rod P, is further provided near its extreme inner end inside of the cylinder K, with a transverse series of air escape openings R, while at a point beyond the inner end thereof, the rod is provided with a longitudinal series of valve openings S, which are covered and uncovered as may be desired by the interior sliding valve plug T. The interior sliding valve plug T, is arranged at one end of the regulator rod *t*, ar-

ranged inside of the piston rod P, and has a finger end U, adapted to work in the slot *u* formed in the piston rod, so that by hand the regulating valve T, can be moved to cover and uncover the valve openings S, as desired.

When the door is opening, the piston head Q, will be moved toward the pivoted end of the cylinder K, and the air will exhaust through the central exhaust *m*, as well as the end exhaust opening, so that a sufficient exhaust or escape will be provided, when the door is opening, in order that the air will not compress until the piston head has passed beyond the central exhaust *m*, thereby forming a very slight cushion at the pivoted end of the cylinder. But the end exhaust openings M, are primarily designed to allow the air to pass freely out of the pivoted end of the cylinder, while on the other hand the central exhaust provides means whereby the air will not commence to compress in the swinging end of the cylinder until always at about the same point, irrespective of how wide the door has been thrown open. When the door is closing under the tension of the door spring, the piston head Q, compresses the air in front of the same, so that an air cushion is formed which checks the rapid closing of the door, and almost stops the same, until the piston rod P, has been drawn out of the cylinder sufficiently so as to expose the valve openings S, which provide means for the immediate relief of the compressed air which rushes out of the escape openings R, and said valve openings. As the air is exhausted from the swinging end of the cylinder through the valve openings S, the tension of the spring immediately closes the door. By adjusting the valve plug T, so as to cover the valve openings, the device can be adjusted to stop at any desired point before closing, as will be readily apparent.

By reference to Figs. 5 and 6 of the drawings, it will be observed that a slight modification of the frame constructed is employed so as to adapt the device for screens and other light doors, and in this modification I employ single lever arms V and V', respectively which are jointed at W, on the rod *w*, extended to both sides of the single arms and carrying on the extended portion thereof the springs Y, which are designed to act in the same capacity as the spring H, herein described. In this modification, the other features of the invention as herein set forth are practically the same, the essential difference being the construction of the jointed lever frame which is reduced to comprise two single arms.

From the foregoing it is thought that the construction, operation and many advantages of the herein described combined door check and spring will be readily apparent, and I will have it understood that changes in the form, proportion and the minor details of construction, as embraced within the scope of the appended claims may be resorted to without departing from the principle or sac-

rificing any of the advantages of this invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a combined door check and spring, the combination of a jointed lever frame comprising long and short lever arms connected together by a single pivot bolt, the outer extremity of the long lever arm being pivoted to a fixed point of attachment and the outer extremity of the short lever arm being pivoted to a movable point of attachment, a spring loosely coiled on the pivot bolt of the lever frame and having its extremities connected to the separate members of the frame respectively, and a cylinder and piston check device mounted within and carried by the lever frame, the cylinder being pivoted to the long lever arm and the rod of the piston being pivotally connected to the movable point of attachment, substantially as set forth.

2. In a device of the class described, a jointed lever frame comprising separate parallel long lever arms having inner rabbeted ends curved on an angle, and short lever arms having inner rabbeted ends curved on an angle and overlapping the corresponding ends of the long arms to form a "joint-stop" holding the frame normally bowed, a single joint or pivot bolt connecting the rabbeted ends of the lever arms, attachment plates pivotally connected to the outer ends of the lever arms and adapted to be fastened respectively to a door frame and door, and a spring coiled on the joint or pivot bolt and attached at its extremities to a long and a short lever arm of the lever frame, substantially as set forth.

3. In a device of the class described, a jointed lever frame having long and short lever members connected at their ends by end bolts, attachment plates pivotally connected to said end bolts, a joint or pivot bolt for the lever frame, an adjustable tension adjusting plate pivoted at one end on said joint or pivot bolt and having perforations in its other end, an adjusting screw arranged on the lever

frame and adapted to engage any one of said perforations in said plate, and a door spring coiled on the said joint or pivot bolt and having its extremities connected to the short lever member and to said tension adjusting plate respectively, substantially as set forth.

4. In a device of the class described, a jointed lever frame having long and short lever members connected at their ends by end bolts, attachment plates pivotally connected to said end bolts, a closing spring arranged at the joint of the lever frame, an air cylinder pivoted at one extremity inside of the lever frame, a sliding hollow piston rod pivotally connected at one end to one of said end bolts and having at its other end a piston head sliding within the cylinder and escape and valve openings near the piston head, and a sliding valve plug adapted to work inside of the hollow piston rod and to cover and uncover said valve openings, substantially as set forth.

5. In a combined door check and spring, the combination of a spring jointed lever frame having a short swinging section or member carrying at its outer extremity an end bolt, of an air cylinder pivoted at one extremity to the frame and having a central exhaust opening and end exhausts in its pivoted end, a sliding hollow piston rod pivotally attached at its outer extremity to said end bolt of the short swinging section of the lever frame and carrying at its inner end a piston head moving within the cylinder, said piston rod being provided at a point near the piston head with a series of escape openings, and at a point beyond the escape openings with a series of valve openings, and a valve device adapted to cover and uncover said valve openings, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEORGE E. DUDLEY.

Witnesses:

M. B. EWART,
JOSEPH D. TYO.