(No Model.) 2 Sheets—Sheet 1.

O. SEELY.

PNEUMATIC DOOR CHECK.

No. 448,889. Patented Mar. 24, 1891.

Fig. 1.

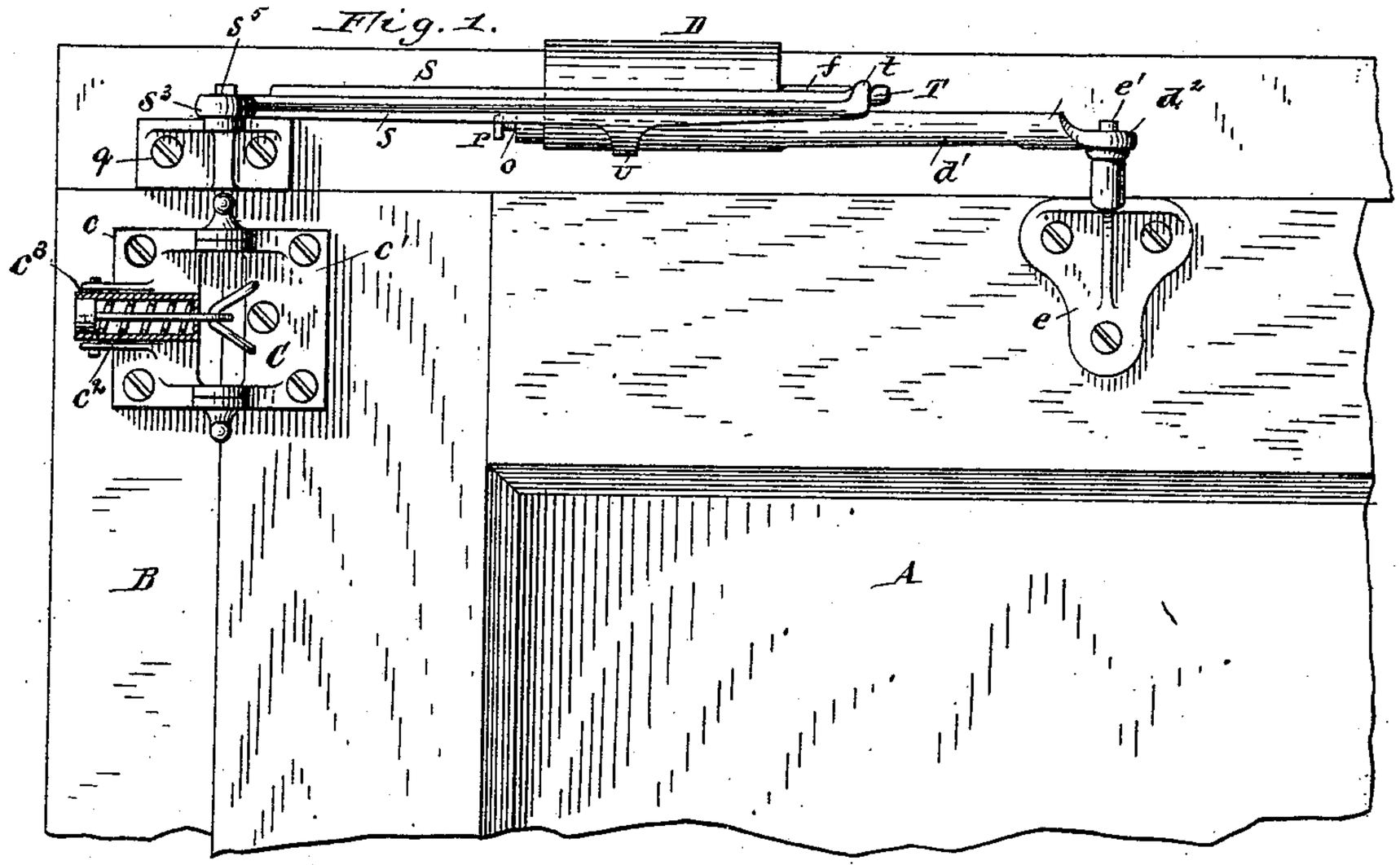

Fig. 2.

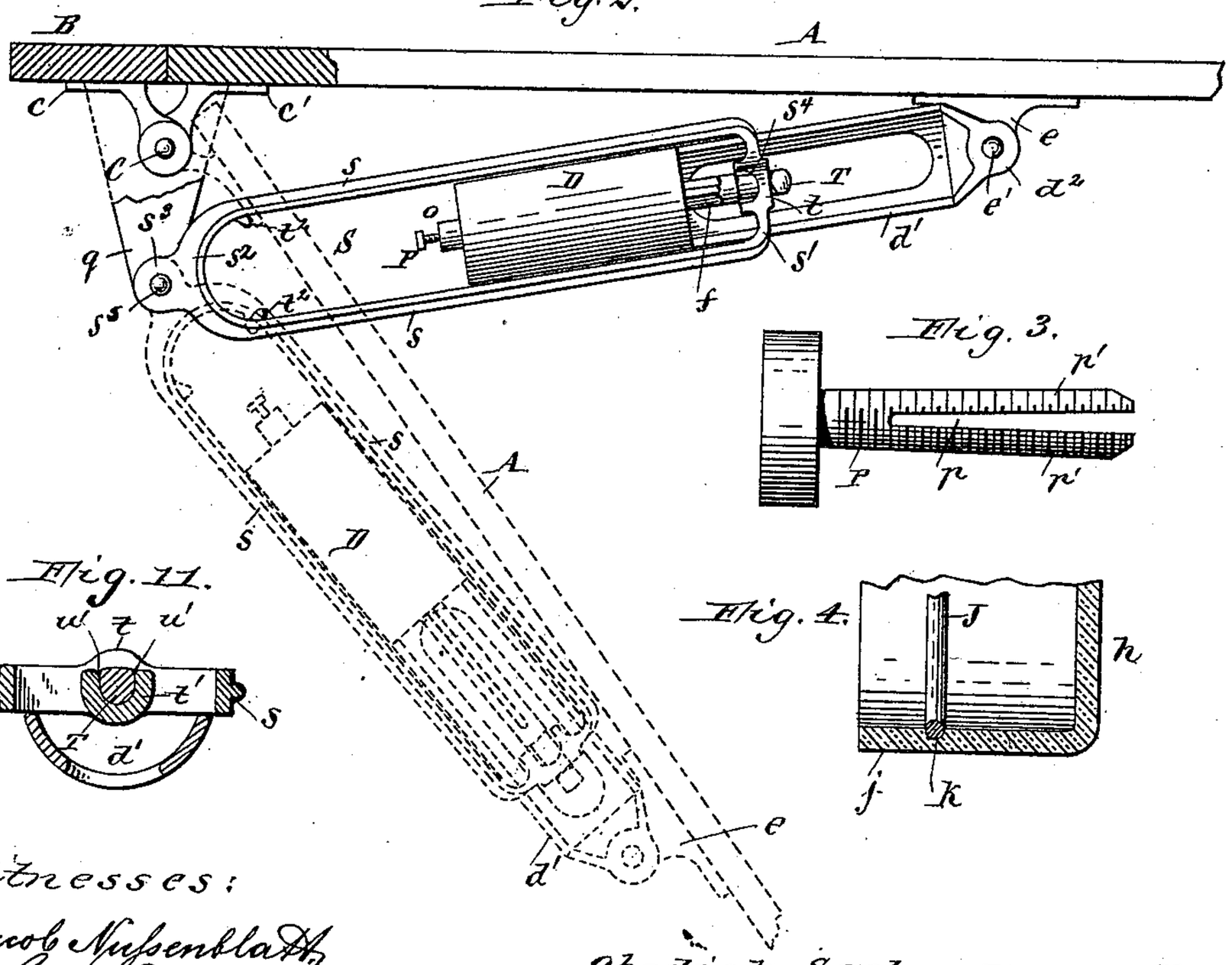

Fig. 3.

Fig. 4.

Fig. 11.

Witnesses:
Jacob Nufsenblatt
Theo. L. Popp.

Obadiah Seely, Inventor.
By Edward Wilhelm Attorney.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 5

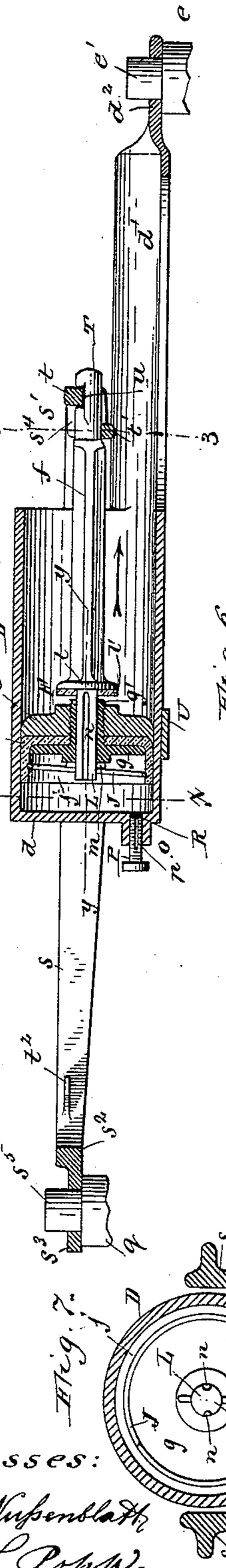


Fig. 6.

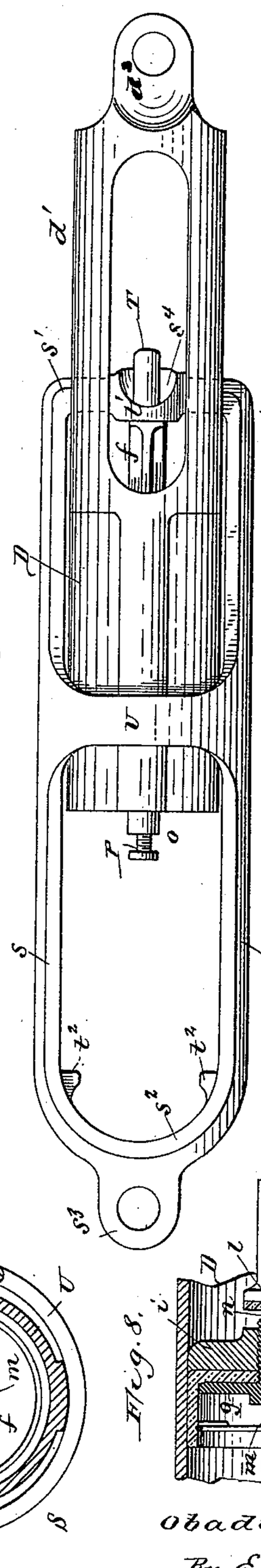


Fig. 10.

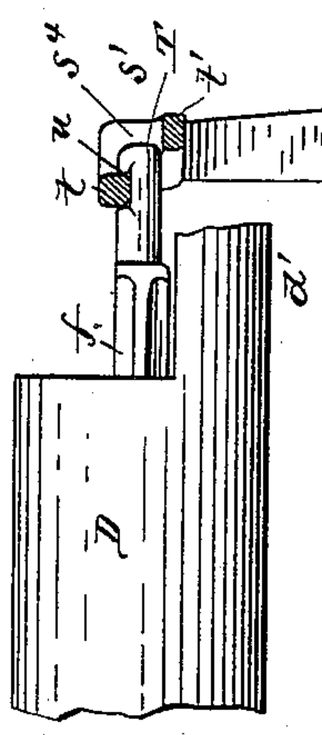


Fig. 9.

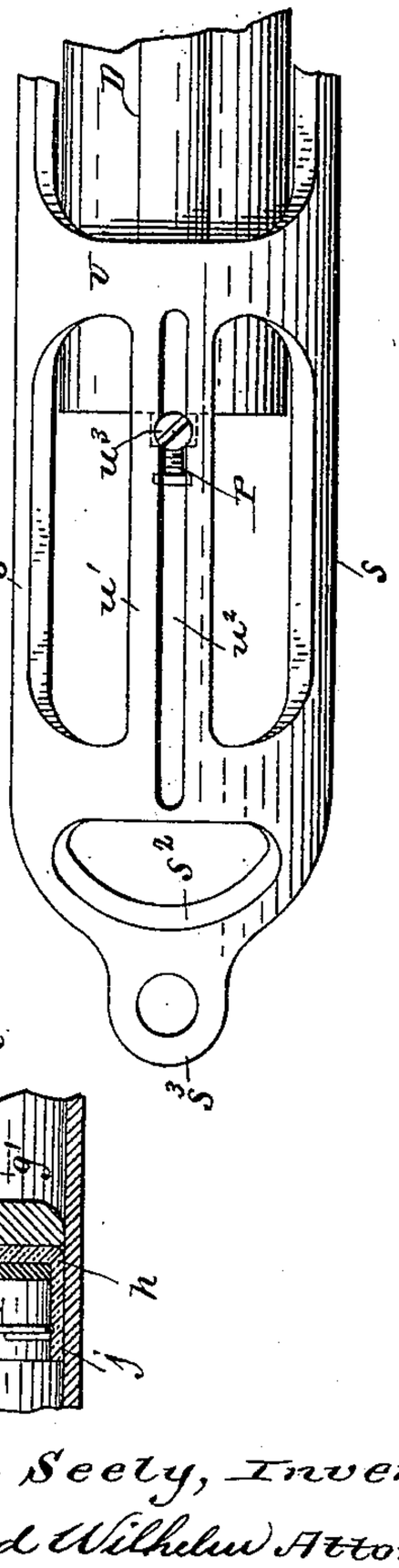
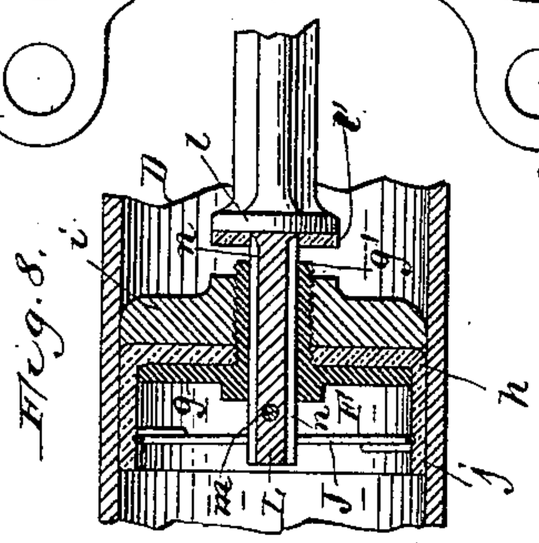


Fig. 7.

Fig. 8.



Witnesses:
Jacob Nussenblatt
Theo. L. Popp.

Obadiah Seely, Inventor.
By Edward Wilhelm Attorney.

UNITED STATES PATENT OFFICE.

OBADIAH SEELY, OF SYRACUSE, NEW YORK, ASSIGNOR TO E. C. STEARNS & CO., OF SAME PLACE.

PNEUMATIC DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 448,889, dated March 24, 1891.

Application filed April 4, 1890. Serial No. 346,582. (No model.)

To all whom it may concern:

Be it known that I, OBADIAH SEELY, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Improvement in Pneumatic Door-Checks, of which the following is a specification.

This invention relates to pneumatic door-checks whereby the closing movement of doors is arrested in a noiseless manner.

The object of my invention is to improve the construction of the door-check so as to simplify the same, render it more convenient in use, and permit it to be produced at comparatively small expense.

In the accompanying drawings, consisting of two sheets, Figure 1 is a fragmentary elevation of a door and its frame provided with my improved door-check. Fig. 2 is a top plan view thereof, partly in section. Fig. 3 is an enlarged view of the screw-valve which regulates the outlet of the air from the compressing-cylinder. Fig. 4 is a fragmentary section of the piston-packing and the spring for distending the same. Fig. 5 is an enlarged longitudinal sectional elevation of the door-check and its supporting-brackets. Fig. 6 is a bottom plan view thereof. Fig. 7 is a vertical transverse section in line $x\,x$, Fig. 5. Fig. 8 is a longitudinal horizontal section in line $y\,y$, Fig. 5. Fig. 9 is a fragmentary bottom plan view of the pivoted supporting-frame, showing a modified form of the same. Fig. 10 is a fragmentary sectional elevation showing the manner of connecting the piston-rod to the pivoted supporting-frame. Fig. 11 is a vertical cross-section in line 3 3, Fig. 5.

Like letters of reference refer to like parts in the several figures.

A represents the door, which is hinged to the frame B by means of two or more spring-hinges C. The latter consist, preferably, of two leaves $c\,c'$, pivoted to each other at their inner ends and provided with a spring c^2, arranged in a barrel c^3, which is pivoted to one leaf and eccentrically connected with the opposite leaf, as shown in Fig. 1, so that the spring-hinges will hold the door either open or shut.

D represents the air-compressing cylinder, which is closed at its front end by a head d and open at its rear end. This cylinder is provided on the lower side of its open rear end with a longitudinal arm or extension d', which is provided at its end with an eye d^2, by which it is pivoted to a bracket e, secured to the door. This bracket is provided with an upwardly-projecting pin e', with which the eye d^2 engages.

F represents the piston arranged in the cylinder, and f the piston-rod, which is loosely secured to the piston at its inner end. The piston consists, preferably, of a disk g, provided with an externally-threaded sleeve g', in which the piston-rod plays, a cup-shaped packing-ring h, and a screw-threaded clamping-plate i, applied to the sleeve g'.

J represents a spiral or annular spring arranged within the annular flange j of the packing-ring and pressing outwardly against the same, whereby the latter is retained in an expanded condition. The flange of the packing-ring is preferably provided in its inner side with an annular groove k, in which the spiral spring is seated, and whereby it is prevented from becoming displaced, as clearly shown in Fig. 4. The reduced inner end L of the piston-rod is capable of a limited longitudinal movement in the sleeve g' of the piston by means of a collar l and a pin m, arranged on the piston-rod, respectively, on the front and rear sides of the piston. The reduced portion L of the piston-rod is provided with one or more longitudinal grooves n, which form air-inlet passages, through which the air passes behind the piston on the forward stroke of the latter. The collar l on the piston-rod f forms an air-valve, which seats itself against the outer end of the sleeve g' of the piston to prevent the passage of air through the grooves n during the backward stroke of the piston. This collar is provided with a packing washer or disk l', of leather or rubber. In the forward movement of the piston in the direction of the arrow in Fig. 5 the collar on the piston-rod is withdrawn from the sleeve, whereby the air-inlet passages n are opened and air is permitted to enter the cylinder in rear of the piston. In the return movement of the piston-rod the valve or col-

lar seats itself on the sleeve of the piston, and thereby closes the air-inlet openings, whereby the return movement of the piston is caused to compress the air contained in the cylinder.

O represents an adjustable escape-valve arranged in the head of the cylinder and serving as a vent to permit the compressed air in the cylinder to escape gradually. This escape-valve consists of a screw-plug P, divided or split longitudinally by means of a slot *p*, and arranged in a screw-threaded air-outlet opening R, communicating with the interior of the air-cylinder. By screwing the plug in or out in the opening R more or less of its slot *p* is exposed, thereby regulating the escape of the compressed air from the cylinder. The two arms or jaws *p' p'*, formed by splitting the screw-plug, are spread apart so that on introducing them into the air-outlet opening of the cylinder they will bind in said opening and prevent the plug from being easily turned or displaced and its adjustment from being disturbed by the jarring of the door.

S represents an open oblong frame connected at one end to the piston-rod and turning with its opposite end on a bracket *q*, secured to the door-casing. This frame is composed of side bars *s s*, an end cross-bar *s'*, a semicircular end piece s^2, provided with an eye s^3 and a curved intermediate cross-bar U. The end cross-bar *s'* is connected with the piston-rod and is provided with a diagonal opening s^4, which receives the outer hooked or notched end T of the piston-rod. This diagonal opening is formed between two shoulders *t t'*, arranged diagonally opposite each other.

In connecting the outer end of the piston with the pivoted frame the latter is placed at right angles to the cylinder, with its upper shoulder *t* engaging in the notch *u* in the upper side of the piston-rod, as represented in Fig. 10. By swinging the frame upward in the direction of the arrow the lower shoulder *t'* of the frame is brought against the under side of the piston-rod, while the notch *u* will bear against opposite sides of the upper shoulder *t*, whereby the piston-rod and the oblong frame are held against lengthwise movement with reference to each other in this position of the parts. The hooked end T of the piston-rod is preferably provided with flat sides *u'* and is seated in a correspondingly-shaped socket formed in the lower shoulder *t'* when the parts are in a normal position, as shown in Fig. 11. The flattened sides of the piston-rod hold the latter against turning, and thereby prevent its hooked outer end T from becoming disengaged from the upper shoulder *t*. The curved cross-bar U, which connects the central portions of the side bars of the pivoted frame, is depressed, so as to support the cylinder. The eye s^3 of the pivoted frame engages with the upwardly-projecting pin s^5 on the bracket *q*, which is secured to the door-frame. The cylinder is supported on the curved cross-bar and on the bracket secured to the door, while the pivoted frame rests with its inner cross-bar on the upper side of the cylinder-extension and is supported at its outer end on the pivot-bracket secured to the door-frame. In this manner a very simple and durable supporting-frame for the air-compressing cylinder and its connecting parts is formed, which is capable of telescoping and changing its position during the movements of the door without binding in the movable parts. In opening the door the cylinder slides on the curved cross-bar of the pivoted frame toward the pivot thereof, whereby the piston is moved toward the open end of the cylinder and air is admitted into the latter behind the piston through the air-inlet passages. On releasing the door after it has passed the dead-center the spring-hinges will cause the door to continue and complete its opening movement, during which the piston-rod is caused to move at first inwardly a short distance without actuating the piston until the air-inlet valve has closed the air-inlet passages and to move the piston toward the head of the cylinder, whereby the air contained in the cylinder is compressed and caused to act as a cushion in checking the movement of the door. By means of the split vent-plug the escape of the air from the cylinder can be so regulated as to stop the movement of the door without noise. When the door is moved out of its wide-open position to a closed position air is admitted into the cylinder behind the piston until the door has passed the dead-center and is compressed and discharged during the further closing movement of the door in the same manner.

Stops t^2 t^2 are provided on the inner side of the pivoted frame to limit the outward movement of the cylinder in the same.

In case the door should settle or sag so as to incline the cylinder and its supporting-frame, the free end of the cylinder which is supported in the frame is liable to tilt upwardly on opening the door. To avoid this, the pivoted frame may be provided on its under side with a longitudinal slotted bar *u'* and the cylinder with a screw u^3, arranged to slide lengthwise in the slot of said bar, as represented in Fig. 9.

My improved door-check is attached to the door and casing by connecting the pivoted frame with the piston-rod in the abnormal position of the parts represented in Fig. 10, then placing the parts in their normal position, and engaging the eyes on the ends of the frame and cylinder-extension with the upwardly-projecting pins on the brackets of the door and casing. The door-check is removed when not required for use by simply lifting it from these pins. It is obvious that the pins might be formed on the frame and cylinder-extension and the eyes in the brackets.

When it is desired to give the door-check the same action on both sides of the dead-center, the pivotal line of the check is ar-

ranged directly in front of the pivot-line of the door-hinges, as represented in the drawings.

The pivoted frame and the cylinder with its extension are each cast in one piece, which renders the whole structure exceedingly simple and capable of being produced at comparatively small cost.

I claim as my invention—

1. In a pneumatic door-check, the combination, with the cylinder provided at one end with a pivot-extension and the piston and piston-rod, of a pivoted frame connected at one end with the outer end of the piston-rod and supporting the free end of said cylinder, substantially as set forth.

2. The combination, with the cylinder provided at one end with a pivot-extension and the piston and piston-rod, of a pivoted frame attached at one end to the piston-rod and provided with a depressed cross-bar, which supports the free end of the cylinder, substantially as set forth.

3. The combination, with the cylinder provided at one end with a pivot-extension having straight upper sides and the piston and piston-rod, of a pivoted frame attached to the piston-rod and guided upon the upper sides of the extension of the cylinder, substantially as set forth.

4. The combination, with the cylinder provided at one end with a pivot-extension forming a continuation of the lower part of the cylinder and the piston and piston-rod, of a pivoted frame provided with side bars on opposite sides of the cylinder, and an end bar resting upon the pivot-extension of the cylinder and attached to the piston-rod, substantially as set forth.

5. The combination, with the cylinder provided at one end with a pivot-extension and a piston and piston-rod, of a pivoted frame connected at one end to the piston-rod and provided with side bars on both sides of the cylinder, a cross-bar for supporting the free end of the cylinder, and stops to limit the longitudinal movement of the cylinder, substantially as set forth.

6. The combination, with the cylinder provided at one end with a pivot-extension, the piston, and a piston-rod provided with a hooked or notched outer end, of a pivoted frame having a cross-bar which is provided with two diagonal shoulders, whereby it is connected with the piston-rod, substantially as set forth.

7. The combination, with the cylinder provided at one end with a pivot-extension, the piston, and a piston-rod provided with a flat-sided portion and a hooked or notched outer end, of a pivot-frame having a cross-bar provided with a diagonal opening forming an upper shoulder which receives the hooked end of the piston-rod and a lower shoulder provided with a flat-sided socket adapted to receive the flattened portion of the piston-rod, substantially as set forth.

8. The combination, with the cylinder and its air-outlet opening, of a split screw-plug arranged in said opening, whereby spring-arms are formed on said screw-plug which hold the plug in place and also permits the air to escape, substantially as set forth.

Witness my hand this 31st day of March, 1890.

OBADIAH SEELY.

Witnesses:

THEO. L. POPP,

CHESTER D. HOWE.