

(No Model.)

G. W. WRIGHT.
DOOR SPRING.

No. 491,156.

Patented Feb. 7, 1893.

Fig. 1

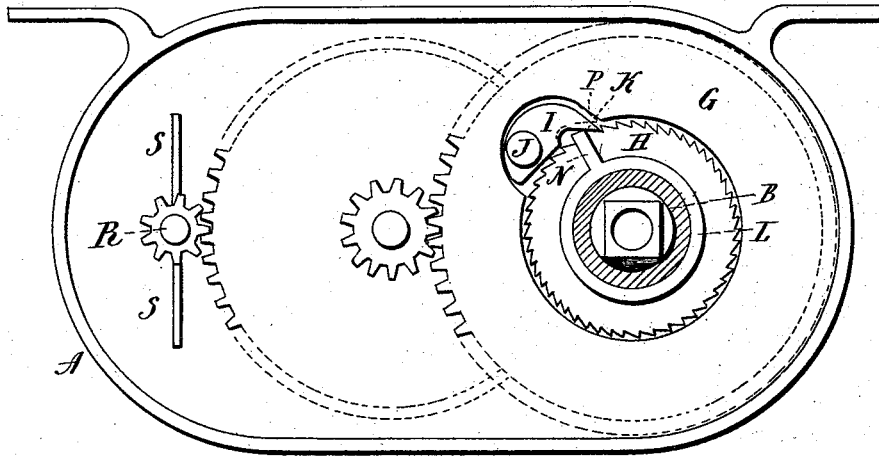


Fig. 2

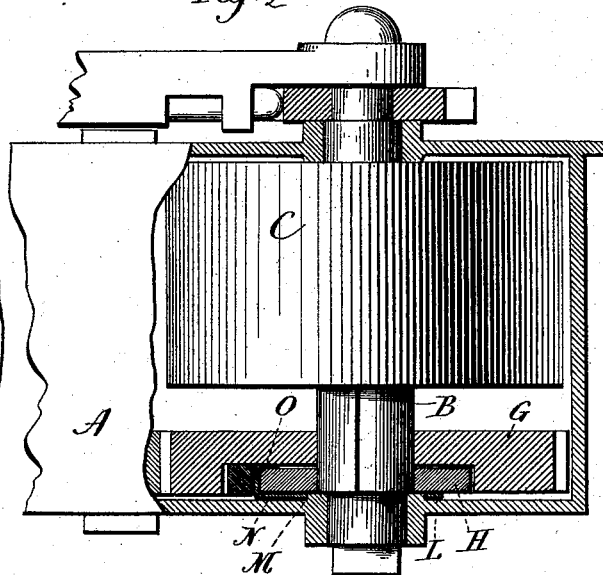


Fig. 3

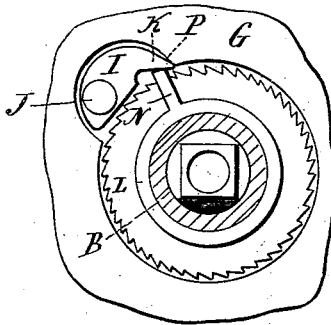
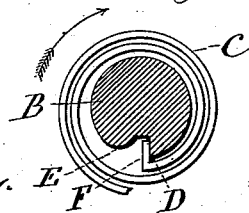


Fig. 4



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UNITED STATES PATENT OFFICE.

GRANVILLE W. WRIGHT, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO
THE SARGENT & COMPANY, OF SAME PLACE.

DOOR-SPRING.

SPECIFICATION forming part of Letters Patent No. 491,156, dated February 7, 1893.

Application filed May 18, 1892. Serial No. 433,455. (No model.)

To all whom it may concern:

Be it known that I, GRANVILLE W. WRIGHT, of New Haven, in the county of New Haven and State of Connecticut, have invented a new
5 Improvement in Door Springs and Checks; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the
10 same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, an under side view of the device with the bottom of the case removed to show the mechanism. Fig. 2, a vertical section of so
15 much of the mechanism as necessary to illustrate the invention. Fig. 3, a face view of the pawl, ratchet, and its gear-wheel, showing the pawl as thrown out of engagement with the ratchet. Fig. 4, a transverse section through
20 the spring-arbor showing a portion of the spring and illustrating the construction of the arbor for engagement with the spring.

This invention relates to an improvement in that class of attachments for doors which
25 are designed to forcibly close the door, but so as to prevent slamming, and particularly to that class of such devices in which a volute spring is employed within a case, one end of the spring attached to the case and the other
30 to a rotatable arbor, the arbor being provided with a lever which is connected with the door, so that as the door is opened the arbor rotates to wind the spring, and so that the reaction of the spring when the door is free, will cause
35 a return of the arbor and a consequent closing of the door under the force of the spring, and in which such a spring is provided with a checking device to prevent the slamming of the door. In the employment of a volute
40 spring, one end of which is made fast in the case which incloses the spring and the other attached to the arbor, it is necessary to wind the spring before it is applied to the door, and this winding is produced by rotating the arbor, the connection of the spring with the arbor causing that end to follow the arbor in its
45 revolution, and so as to wind the spring by the arbor, but it frequently happens in such winding that the person designing to wind
50 the spring will turn the arbor in the reverse direction, and as the spring is made fast to

the arbor, this reverse turning of the arbor meets a resistance very similar to that which it would meet if turned in the proper direction to wind the spring, but such wrong di- 55 rection of the arbor not infrequently breaks the spring.

The object of the first part of my invention is to avoid the possibility of breaking the spring under such wrong direction of rotation 60 of the arbor.

In this class of springs in which a check is combined therewith, and which is operated by the rotation of the arbor, a gear-wheel is arranged loosely upon the arbor, combined 65 with a toothed ratchet made fast to the shaft, and a pawl on the gear-wheel which works in connection with the said ratchet, so that in the opening movement of the door, the ratchet-wheel while revolving with the shaft, will 70 escape from the pawl without imparting rotation to the gear-wheel, but as the spring reacts to impart a return rotation to the arbor and the ratchet-wheel, the teeth of the ratchet will engage the pawl so as to impart corre- 75 sponding revolution to the gear-wheel, and this gear-wheel communicates the power to the checking device to bring it into action as the door closes. As the pawl must necessarily escape from the teeth of the ratchet as 80 the door opens, if it is permitted to fall from tooth to tooth as it naturally will do under the influence of its own spring, a disagreeable clicking noise is produced, which is a serious objection to this class of door-springs and 85 checks.

The object of the second part of my invention is to automatically disconnect the pawl from the ratchet during the opening movement, so that it may escape the teeth of the 90 rotating ratchet-wheel without contact therewith, and thereby avoid the objectionable clicking noise, and the invention consists in the construction as hereinafter described and particularly recited in the claims. 95

A, represents the case within which the mechanism is arranged, B, the main arbor which is supported in suitable bearings in the case. Around this arbor B the volute spring 100 C, is arranged, its outer end connected with the case in the usual manner, but instead of making a positive connection between the

inner end of the spring and the arbor, the arbor is grooved longitudinally, of a length corresponding at least to the width of the spring, the groove forming a vertical shoulder D, see 5 Fig. 4, this shoulder facing in the direction in which the arbor must rotate in winding the spring, and as indicated by the arrow in Fig. 4. The side of the groove opposite the side or shoulder D, is cut away so as to present 10 an inclined or deflecting surface E, toward the shoulder. The inner end of the spring C, is turned inward at substantially right angles, as at F, Fig. 4, and so that placed around the arbor B, the hook like end F, of the spring 15 may engage the shoulder D, of the arbor, and so that as the arbor B, is rotated in the direction indicated by the arrow, Fig. 4, it will take with it the inner end of the spring, and produce the required winding. Should the 20 arbor be turned in the reverse direction to that required for winding, the inclined or deflecting side E, of the arbor-groove will operate upon the turned in end F, as a cam, and force it outward, and so that the interlocking 25 end of the spring may escape from the groove and the arbor revolve without effect upon the spring. In thus turning the arbor in the wrong or reverse direction, the operator will soon discover his error, either by the click 30 which will be produced by the end F, of the spring as it escapes over the shoulder D, when a complete revolution has been made, or from other causes, and then when the arbor is turned in the right direction, it will rotate 35 freely, until the shoulder D, again comes into engagement with the hooked end F, of the spring.

From this description and illustration, it will be seen that the turning of the arbor in 40 the reverse direction can produce no straining effect upon the spring, or in any way have a tendency to injure or break it, but when turned in the right direction, engagement between the arbor and the spring is certain to 45 be made.

On the arbor the gear-wheel G, is arranged loose, in the usual manner, and fixed upon the arbor is a ratchet-wheel H, concentric with the gear-wheel G. The ratchet is preferably arranged in a corresponding recess 50 formed in the wheel G, as clearly seen in Fig. 2. On the wheel G, a spring-pawl I, is hung, upon a pivot J, and so that its nose K, may readily engage the teeth of the ratchet H, and 55 make such a connection between the gear-wheel and the ratchet that when the arbor and ratchet are rotated in one direction, that is, as in the opening movement of the door, the teeth of the ratchet will readily escape 60 from the pawl, but on the return rotation of the arbor and ratchet-wheel, a tooth of the ratchet will engage the pawl, and couple it with the gear-wheel G, so that that wheel will necessarily revolve with the arbor and ratchet 65 wheel.

To throw the pawl out of or away from the

teeth of the ratchet in the opening movement of the door, a ring L, is arranged on the side of the ratchet-wheel around a corresponding projection M, upon the inside of the 70 case. This projection M, is concentric with the arbor, and forms a support for the ring L, upon which it may oscillate. From the ring L, an arm N, extends radially outward between the nose of the pawl and its pivot, and 75 this arm is bent over the ratchet-wheel and returned upon its opposite side, as seen at O, Fig. 2, so that the arm N, frictionally embraces the ratchet-wheel, and stands between the pawl and ratchet at a point between the 80 nose of the pawl and the pivot upon which the pawl is hung. The frictional engagement thus produced between the arm of the ring and the ratchet is sufficient to cause the arm to swing with the ratchet-wheel, and so that 85 as the ratchet rotates, the arm and ring will partake of that rotation so long as the arm is free so to do. When the ratchet-wheel rotates as before described in the opening movement of the door, the arm N, will turn 90 with the ratchet, and operate as a cam upon the pawl to throw the pawl out of engagement with the teeth of the ratchet, as represented in Fig. 3, but so soon as the pawl is thus thrown out of engagement with the ratchet, 95 it strikes a stop P, which prevents its further swinging movement, (this stop here being the inside of the recess in the wheel in which the pawl is hung,) and the pawl thus arrested forms a stop to prevent the further swinging 100 of the arm N, then the ratchet-wheel will continue its rotation without further movement of the arm N, but so soon as the return or reaction commences, tending to turn the ratchet in the opposite direction, the frictional 105 contact between the ratchet and the arm N, will return the arm and permit the pawl to return into engagement with the teeth of the ratchet, so that the gear-wheel must partake of the rotation of the ratchet. By this arrangement the pawl is held out of possible 110 engagement with the ratchet during the opening movement of the door, but is thrown into engagement with the ratchet so soon as the opening movement commences, consequently 115 the clicking sound of the pawl escaping from tooth to tooth of the ratchet is avoided.

From the gear-wheel G, connection is made by gears to a shaft R, which operates upon the check, the arrangement of the gearing 120 being such that the partial revolution which is imparted to the gear-wheel G, in the closing of the door, will impart revolution to the said shaft R, and this rapid revolution will operate the check. The check itself 125 may be any suitable device, as for illustration, a fly composed of blades S, projecting from the shaft, which while permitting the spring to operate to close the door, will retard such operation of the spring to such 130 an extent as to prevent the slamming of the door, but no claim is made in this applica-

tion to any particular checking device, such devices being the subject of other applications.

I claim—

5 1. A door closing device consisting of an arbor supported in suitable bearings, combined with a volute spring around said arbor, the outer end of the spring held stationary, the arbor constructed with a single
10 longitudinal groove, one side of the groove forming substantially a radial shoulder facing in the direction in which the spring is to wind, the other side of the groove inclined outward and backward from the said shoulder,
15 the inner end of the spring bent inward to form a hook to engage upon said shoulder as the arbor rotates in one direction, but so as to escape therefrom as the arbor rotates in the opposite direction, and the arbor
20 provided with a lever by which connection may be made between the door and the arbor, substantially as and for the purpose described.

2. In a door-check, an arbor adapted for
25 rotation in one direction by the opening movement of the door, and for rotation in

the opposite direction by the reaction of a spring; the combination therewith of a gear loose upon the said arbor, a ratchet fixed upon the arbor concentric with said gear, a spring
30 pawl hung upon the gear-wheel, its nose adapted to engage the teeth of said ratchet in one direction and to escape therefrom in the opposite direction, an arm arranged in frictional contact with said ratchet, and so as
35 to partake to a limited extent of the rotation of said ratchet, the said arm adapted to bear upon the pawl between its nose and pivot, substantially as described, and whereby as the ratchet is rotated in one direction, the
40 said arm will operate to throw and hold the pawl out of engagement with the teeth of the ratchet, but permit the pawl to engage the ratchet in the reverse direction, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GRANVILLE W. WRIGHT.

Witnesses:

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CHAS. L. BALDWIN.